Industry Profiles

Catalog of Investment Information and Opportunities

Volume VII

Office of Development Finance and Private Enterprise
Agency for International Development
Washington, DC 20523

Catalog of Investment Information and Opportunities
Industry Profile Index

VOLUME I

66040 Plywood
66041 Particle Board
66042 Wooden Ice Cream Spoons and Sticks
66043 Bedroom and Dining Room Furniture
66044 Upholstered Occasional Chairs
66045 Foam Rubber and Polyurethane Foam
66046 Metal Filing Cabinets - MISSING
66047 Folding Chairs
66048 Corrugated Fiber Boxes
66049 Fiberboard
66050 Caustic Soda

VOLUME II

66051 Ramie Decortication
66052 Men's Work Pants
66053 Wooden Shoe Lasts
66054 Overstuffed Furniture
66055 Envelopes
66056 Cardboard Boxes and Paper Products
66057 Insecticides
66058 Meat Processing
66059 Slaughtering and Meat Packing
66060 Smoked Meat
66061 Citrus Fruit - Whole Sections, Canned
66062 Men's Work Shirts
66063 Planning Mill
66064 Rough Sawing of Logs
66065 Barrels
66066 Fertilizer Mixing
66067 Asphalt Floor Tiles
66068 Rubber Soled Fabric Shoes
66069 Rubber Floor Tiles
66070 Plastic Moldings
66071 Vinyl Floor Tiles
66072 Leather Tanning
66073 Men's Dress Shoes
66074 Ladies' Handbags and Leather Specialties
66075 Glass Containers
66076 Beverage Boxes
66077 Block Ice
66078 Boxes and Shooks
66079 Coarse Wrapping Paper (6,000) Tons Annually
66080 Coarse Wrapping Paper (12,500) Tons Annually
66081 Corrugated Paper Cartons
66082 Customers, Lamps and Picture Frames

66083 Cotton Roll-Edged Mattresses
66084 Crates, Baskets and Hampers
66085 Crude Olive Oil
66086 Kitchen Cabinets
66087 Mayonnaise
66088 Nylon Hosiery
66089 Office Chairs
66090 Orange Juice, Canned
66091 Orange Juice Concentrate
66092 Pulp from Bagasse for Wallboard
66093 Pulp from Scrap Wood for Wallboard
66094 Reed and Rattan Furniture
66095 Vanilla Extract
66096 Wood Fiber Souvenirs
66097 Wood Pulp for Coarse Wrapping Paper
66098 Wood Pulp for Wallboard
66099 Wood Tables and Chairs
66100 Wool Scouring

VOLUME III

66101 Brass Foundry
66102 Building Hardware
66103 Buckets, Pails and Pans
66104 Castor Oil Hydrogenated
66105 Copper Tubing
66106 Copper Wire
66107 Dry Ice
66108 Farm Hand Tools
66109 Ladies' Dress Shoes
66110 Laundry and Milled Toilet Soap
66111 Men's Work Shoes
66112 Mirror Manufacturing and Resilvering
66113 Oil of Cloves
66114 Paint
66115 Pharmaceutical Glass (Complete)
66116 Pharmaceutical Tablets and Pills
66117 Primary Hardware
66118 Rubber Cement
66119 Salicylic Acid
66120 Sea Salt
66121 Sheet Glass
66122 Small Leather Tannery
66123 Superphosphate and Diammonium
66124 Tanning Extracts
66125 Wallboard from Bagasse

66126 Abrasive Wheels
66127 Agricultural Implements
66128 Aluminum Architectural Specialties
66129 Aluminum Cooking Utensils
66130 Asbestos-Cement Siding
66131 Automobile and Truck Leaf Springs
66132 Building Bricks
66133 Cement
66134 Ceramic Dinnerware
66135 Coil Springs
66136 Kitchen Earthenware
66137 Metal Spinning
66138 Mineral Wool
66139 Ornamental Ironwork
66140 Pharmaceutical Glass from Purchased Tubing
66141 Plating
66142 Plows
66143 Rice Paddy Cultivators
66144 Sanitary Ware
66145 Small Ceramics Shop
66146 Split Gib-Head Keys, and Taper Pins
66147 Stainless Steel utensils
66148 Storage Bins
66149 Superphosphates
66150 Two-Burner Gas Plates

VOLUME IV

66151 Adhesive Tape
66152 Automobile Batteries
66153 Bicycles
66154 Brooms
66155 Cloth Bags for Agricultural Products
66156 Concrete Blocks
66157 Concrete Pipe
66158 Concrete Slabs
66159 Dry Cleaning
66160 Electric Motors, 1/6 to 10 Horsepower
66161 Gold Jewelry
66162 Job Machine Shop
66163 Laundry
66164 Lead Pencils
66165 Motor Starters
66166 Paint and Varnish Brushes
66167 Potato Flakes
66168 Refrigerated Walk-In Coolers

66212 Electrodes for Neon Lights
66213 Enameled Plates, Teapots and Kettles
66214 Hand Tools
66215 Heaters, Kerosene Asbestos Type
66216 Centrifugal Blowers
66217 Kitchen Equipment
66218 Lemon Oil
66219 Book Matches
66220 Portable Cooking Stoves
66221 Pumps, small Hand and Power Driven
66222 Saccharin
66223 Vegetable Canning (Commercial)
66224 Vegetable Canning (Cooperative)
66225 Welded Pipe
66226 Artificial Teeth
66227 Artists' Oil Paints
66228 Automobile Mufflers
66229 Automobile Tires
66230 Automobile Tires and Tubes
66231 Canned Beet
66232 Canned Tuna Fish
66233 Carbide
66234 Sulfuric Acid
66235 Compressors, 1/4 Horsepower Sealed Unit
66236 Cotton Yarn
66237 Gray from Jobbing Foundry
66238 Cotton Yarn (Small Plant)
66239 Soda-Line Window Glass, 5,500 Tons Annually
66240 Soda-Line Window Glass, 7,500 Tons Annually
66241 Soda-Line Window Glass, 10,500 Tons Annually
66242 Plastic Eyeglass Frames
66243 Steel Bars and Shapes, 15,000 Tons Annually
66244 Steel Bars and Shapes, 30,000 Tons Annually
66245 Steel Billets
66246 Electroplating
66247 Specular Reflectors
66248 Textbook Publishing
66249 Straight Pins
66250 Women's Shoes

VOLUME VI

67251 Stretch Socks for Men and Children
67252 Toilet Seats and Lids
67253 Dehydrated Blackstrap Molasses
67254 Innerspring Mattresses and Box Springs

67255	Shock Absorbers, Automobile and Truck
67256	Industrial Hand trucks and Skids
67257	Standard Sports Stockings
67258	Bookcases, Corner Cabinets and Secretaries
67259	Poultry Farm (Egg Production)
67260	Cast Iron Soil Pipe
67261	Fig and Date Processing
67262	Wooden Wardrobes
67263	Dryers, Laundry, Household
67264	Bentwood Chairs
67265	Bathrobes
67266	Coffee Tables, End Tables, and Bed Stands
67267	Ladies Cotton Broadcloth Dresses
67268	Men's Wash and Wear Pants
67269	Castor Oil and Meal
67270	Lawn Furniture
67271	Reinforced Concrete Construction Products
67272	Church Furniture
67273	Gloves, Vinyl Treated Fabric
67274	Radio Receiving Sets
67275	Brief Cases, Leather
67276	Prawn Processing Plant
67277	Mechanical Springs
67278	Soybean Oil and Meal
67279	Pajamas, Cotton
67280	Optical or Precision Glass
67281	Souvenirs and Small Jewelry
67282	School Furniture
67283	Dry Cleaning, Self-Service, Coin Operated
67284	Plating of Automobile Parts
67285	Concrete Posts
67286	Ready-Mixed Concrete in Bags
67287	Oxygen and Acetylene, Bottles
67288	Cocoa Butter
67289	Wooden Handles
67290	Electric Outlets, Switches and Fuse Boxes
67291	Neon Signs
67292	Meet Canning Plant
67293	Brewer's Flakes
67294	Raisins, Dehydrated Grapes
67295	Walnut Veneer
67296	Wash Tubs and Pails
67297	Self-Service Laundry
67298	Metal Lockers

67299 10-Horsepower Utility Riding Tractors
67300 Power Lawn Mower

VOLUME VII

67301 Slip Covers for Furniture
67302 Brass Table Lamps
67303 Tile Roofing, Clay
67304 Canned Fish
67305 Cattle Feed from Manioc Pulp
67306 Laundry Bags
67307 Portable Sawmill
67308 Aluminum Foundry
67309 Foundry Pattern Making
67310 Jigs and Fixtures
67311 Processed Seafood
67312 Canned Dehydrated Onions
67313 Glucose from Cassava Starch
67314 High Alumina Refractory Brick and Cement
67315 Potato Chips
67316 Sheet Steel, Hot Rolled
67317 Starch, Oil and Feed from Sorghum Grain
67318 Fish Oil and Fish Meal Plant-Evaporation Process (Processing 20 Tons of Raw Fish Per Hour)
67319 Bottled Milk
67320 Flashlight and Radio Batteries
67321 Creosoted Wood Products
67322 Washing Machines, Household
67323 Liquefied Petroleum Gas (Distribution)
67324 Liquefied Petroleum Gas (Manufactured)
67325 Dimension Hardwood
67326 Canned Cherries
67327 Canned Asparagus
67328 Canned Beets
67329 Canned Peaches
67330 Canned Hominy
67331 Canned Okra
67332 Canned Sweet Potatoes
67333 Canned Strawberries
67334 Canned Sliced Apples
67335 Canned Blueberries
67336 Canned Apricots
67337 Canned Cream Style Corn
67338 Canned Dry Beans
67339 Canned Spinach
67340 Canned Wax Beans

67341 Canned Blackeyed Peas
67342 Canned Tomatoes
67343 Canned Cream of Celery Soup, Ready to Serve
67344 Canned Cream of Asparagus Soup, Ready to Serve
67345 Gloves - Plastic Fronts, Canvas Backs
67346 Non-Ferrous Metals Foundry
67347 Men's Wash and Wear Shirts
67348 Men's and Youths' Suits
67349 Kerosene Lanterns
67350 Bicycle Tires and Innertubes

VOLUME VIII

67351 Canned Cauliflower
67352 Canned Pumpkin
67353 Canned Whole Kernel Corn
67354 Canned Green Beans
67355 Canned Onions
67356 Canned Apple Sauce
67357 Canned Pears
67358 Burlap Cloth from Jute
67359 Wallboard from Gypsum and Fiber
67360 Restaurant and Cafeteria Furniture
67361 Venetian Blinds
67362 Men's Sport Shirts
67363 Rice Bran Oil and Bran Meal
67364 Canned Red Raspberries
67365 Canned Tomato Soup, Ready to Serve
67366 Canned Pea Soup, Ready to Serve
67367 Canned Pork and Beans
67368 Candy and Confectionery
67369 Women's and Misses' Suits
67370 Shoe Repair Shop
67371 Grocery Carts
67372 Zinc Die Castings
67373 Wood Stake Truck Bodies
67374 Poultry Farm (Broiler Production)
67375 Pearl Starch
67376 Chocolate Dipped Products
67377 Fish Oil and Fish Meal Plant - Evaporation Process (Processing 40 tons of Raw Fish Per Hour)
67378 Slips, Women's Misses'; Children's
67379 Pottery, Earthenware
67380 Glazed Fruit and Fruit Peel
67381 Canned Cranberries
67382 Canned Green Peas

67383	Canned Sliced Pineapple
67384	Canned Lima Beans
67385	Assorted Nuts, Processed and Packaged
67386	Canned Squash
67387	Canned Plums
67388	Food Processing, General
67389	Canned Carrots
67390	Canned Kale Greens
67391	Canned Broccoli
67392	Canned Tomato Soup
67393	Canned Bean Soup, Ready to Serve
67394	Canned Cream of Corn Soup, Ready to Serve
67395	Canned Cream of Mushroom Soup, Ready to Serve
67396	Canned Sardines
67397	Women's and Misses' Cotton Gingham Dresses
67398	Nurses' Washable Service Apparel
67399	Light Bulb Assembly Plant
67400	Rockers, Wood, Upholstered

SLIP COVERS FOR FURNITURE

I. P. No. 67301
S. I. C. 2392

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

SLIP COVERS FOR FURNITURE

I.P. No. 67301
S.I.C. 2392
DECEMBER 1967

PRODUCT DESCRIPTION

Slip covers for upholstered furniture designed to fit standard sizes and shapes of furniture and cushions.

A. GENERAL EVALUATION OF PROSPECTS

The fixed investment required for this plant is small, especially in comparison with the amount of labor required and the annual sales volume. Twenty-two people are employed yet only two skilled workers are needed. Slip covers are in demand wherever upholstered furniture is used. The prospects for this industry in any country depends upon the type of furniture in general use by the population. If upholstered furniture is commonly used in living rooms, prospects for this plant should be good.

B. MARKET ASPECTS

1. USERS

Homes, hotels, apartments, clubs; wherever upholstered furniture is used.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be made direct to furniture stores. The market for this product depends entirely on the amount and kind of furniture used within the country. Slip covers are used only on upholstered furniture and, for this reason, a survey should be made to determine the potential sales. This product is well packaged and the value is relatively high in relation to the cost of transporting it. The domestic market should be nationwide. Competition could be encountered from small shops that hand-fit slip covers. But the cost of hand-fitted slip covers is so much higher than the ready-made product that such competition would be able to secure only a small percentage of the market. This plant should have no difficulty competing against imported products and some export sales might be made to neighboring countries that do not have a slip cover manufacturing plant of this type.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $260,000.
The total fixed investment, plus working capital, is estimated at $77,900.
The annual gross profit, before taxes, is estimated at $19,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 7.3%.
(A gross profit on sales, before taxes, of 7.3%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 24.3%.

5. COST PER MAN EMPLOYED

Eighteen direct and six indirect workers, or a total of twenty-four workers, are employed.
The total fixed capital investment is estimated at $31,000.
Based on these figures, the fixed investment per man employed amounts to about $1,300.

C. PRODUCTION REQUIREMENTS - SLIP COVERS FOR FURNITURE

I.P. No. 67301
S.I.C. 2392

ANNUAL CAPACITY - ONE SHIFT OPERATION : 20,000 UNITS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - about 8,000 sq. ft.	
Building - one story 30' x 80'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 31,000

Principal items:

Cloth spreader
Cutting table
Marking drill
12 sewing machines
Steam iron
Working stands
Racks and chairs

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 46,900
c. Total Capital Requirements	$ 77,900

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Slipcover material	160,000 yds.	
Cord and thread		
Packaging		
Total direct materials		$ 70,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 4,200

c. Availability of materials & supplies

All should be available locally. All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - about 16 H.P. connected load	
Fuel - heating as required	
Water - sanitation and fire protection	$ 1,000

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transporation equipment	4	
Total depreciation		$ 2,900

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager	1	
Supervisor	1	
Office	2	
Machine fixer	1	
Truck driver	1	
Total indirect labor	6	$ 45,000

b. Direct labor		
Skilled workers	2	
Semi-skilled workers	12	
Unskilled workers	4	
Total direct labor	18	$ 86,400

c. Training needs

Manager and machine fixer should be fully experienced. They with the help of two skilled workers should be able to train all workers and reach full production in two weeks.

6. TRANSPORTATION

a. Own transport equipment

truck.

b. External transport facilities

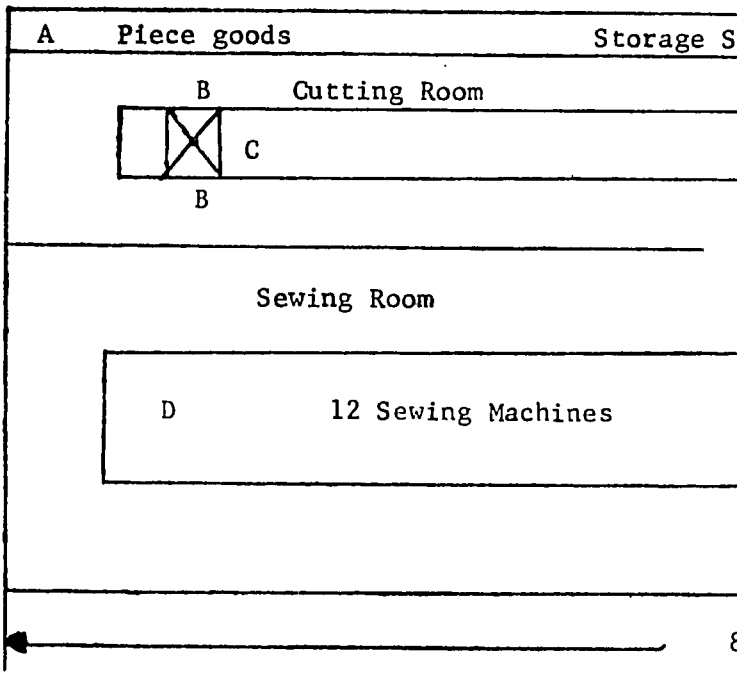
Product light and well packaged.
Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 70,000	
Direct labor	86,400	
Manufacturing overhead*	53,100	
Total manufacturing cost		$ 209,500
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		13,500
Sales expense		12,000
Freight-out, travel discounts Allowances & bad debts		6,000
Total annual costs		$ 241,000
Annual Gross Profit		$ 19,000
ANNUAL SALES REVENUE		$ 260,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT LAY

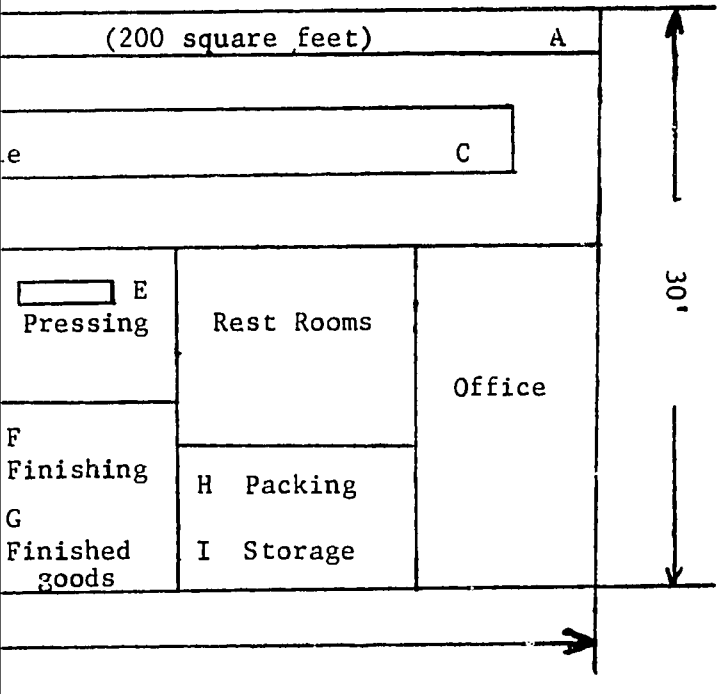


A - A. Piece goods
B - B. Cloth Spreader
C - C. Cutting Table, Cloth Spreader
D - D. Sewing Machines
E. Steam Iron, Pressing
F. Finishing
G. Finished Goods, Storing
H. Packing
I. Storage

RNITURE

I. P. NO. 67301
S. I. C. 2392

ORK FLOW



tting and Assembly

I.P. No. 67301
S.I.C. 2392

SLIP COVERS FOR FURNITURE

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. The Progressive Sewing Room. B. Frank. 1958. $6.50

Fairchild Publications, Inc.
7 East 12th Street
New York, New York 10003

Progressive sewing techniques.

B. Advances in Textile Processing. Volume I. J. E. Lynn and J. J. Press. 1961 $14.00

Interscience Publishers
605 Third Avenue
New York, New York 10016

Deals with the processing of textile goods.

II. TECHNICAL AND TRADE PERIODICALS

A. Textile World. Monthly. $2.00/year.

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Technical journal, includes modernization of operation, equipment and management.

B. Modern Textile Magazine. Monthly. $5 00/year.

Alfred H. McCollough Publishers
303 Fifth Avenue
New York, New York 10016

Modern textile methods.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp, 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231 $.50 each.

A.	Patent No. 3,116,953. Slip covers.	January 7, 1964	5 p.
B.	Patent No. 2,973,806. Chair with removable upholstery cover.	March 7, 1961	5 p.
C.	Patent No 2,877,832. Cover for chairs and the like.	March 17, 1959	7 p.
D.	Patent No. 2,828,812. Slip cover holding device.	April 1, 1958	4 p.
E.	Patent No. 2,820,510. Slip cover.	January 21, 1958	4 p.
F.	Patent No. 2,793,683. Slip covers.	May 28, 1957	4 p.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Upholstery Fabric Manufacturers Association
122 East 42nd Street
New York, New York 10017

B. Upholstery and Decorative Fabrics Association of America
1940 Palmer Avenue
Larchmont, New York 10538

VI. DIRECTORIES

Western Furniture Manufacture Buyers' Guide. Annual. $2.00

Logan-Phillips Publications, Inc.
1516 Westwood Boulevard
Los Angeles, California 90024

3,000 sources of material used in upholstered furniture manufacture.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professonal engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in detrmining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

ORDERING INSTRUCTIONS

The price of *Industry Profiles* is a minimum of $3.00 for from one to five "*Profiles*." The purchaser may select up to five of any "*Profiles*" available.

Complete sets of the 250 *Industry Profiles* published in 1966, I. P. No. 66001 through I. P. No. 66250 consecutively, may be purchased for $125.00 per set. Complete sets of the 150 *Industry Profiles* to be published in 1967, I. P. No. 67251 through I. P. No. 67400 consecutively, may be purchased for $75.00 per set. The latter "*Profiles*" will automatically be shipped to full set purchasers upon release.

Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

BRASS TABLE LAMPS

I. P. No. 67302
S. I. C. 3642

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I. P. No. 67702
S. I. C. 3642
DECEMBER 1967

BRASS TABLE LAMPS

PRODUCT DESCRIPTION

Brass table lamps complete with shades.

A. GENERAL EVALUATION OF PROSPECTS

The factory selling price of this lamp is fairly high per unit. Since table lamps suitable for use in the average home can usually be purchased for about half this price, this brass table lamp can be considered a luxury item in most countries. While the capital requirements are low in comparison with the sales volume, the estimated profits, before taxes, are also low for a luxury item; therefore, the market for this product should be carefully investigated before embarking on this venture. If electric power is not available in the interior, sales will be possible only in the metropolitan areas.

B. MARKET ASPECTS

1. USERS

Principally homes. Some might be used in business offices and hotels.

2. SALES CHANNELS AND METHODS

This plant would sell direct to furniture stores, department stores and electrical appliance stores. The market for this product will depend upon the per capital income of the population and the availability of electric power in the rural areas. Since this is a luxury item, an accurate estimate of sales potential cannot be made without a survey to determine its marketing possibilities. Keen competition will probably be encountered from lower-priced, similar items. Transportation costs should be minor when compared with the selling price of these lamps. The geographical extent of the domestic market will be controlled by the sales price and the availability of electric power. This plant should not expect to compete in the export market except for possible sales to gift shops that cater to tourists.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $576,,000.
The total fixed investment, plus working capital, is estimated at $168.000.
The annual gross profit, before taxes, is estimated at $58,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 10.1%.
(A gross profit on sales, before taxes, of 10.1%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 34.5%.

5. COST PER MAN EMPLOYED

Seventeen direct and seven indirect workers, or a total of twenty-four workers, are employed.
The total fixed capital investment is estimated at $73,000.
Based on these figures, the fixed investment per man employed would amount to about $ 3,040.

C. PRODUCTION REQUIREMENTS - BRASS TABLE LAMPS — I.P. No. 67302
ANNUAL CAPACITY - ONE SHIFT OPERATION: 48,000 LAMPS — S.I.C. 3642
NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - two acres	
Building - one story 75' x 100'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 73,000
Principal items:	
5 Buffing and polishing machines	
Buffing and polishing wheels	
Molds	
Dust collector	
Spray booth and related equipment	
Air compressor	
Racks	
Benches	
Tables and chairs	
Maintenance tool and spare parts	
b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 95,000
c. Total Capital Requirements	$ 168,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Loaders	96,000 pounds	
Bases, brakes and founts	144,000 pcs.	
Wiring and sockets	96,000 pcs.	
Harps, rings, lock nuts and felt	96,000 pcs.	
Shades and finials	96,000 pcs.	
Cartons and plastic bags		
Lacquer		
Total direct materials		$ 302,000
b. Supplies		
Lubricants & hand tools		
Cutting tools & abrasives		
Maintenance & spare parts		
Office supplies		
Gas, oil and maintenance of truck		
Total supplies		$ 2,200

c. Availability of materials & supplies

All materials and supplies should be available locally.
All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 40 H.P. connected load	
Fuel - for heating	
Water - for sanitation and fire production	$ 1,700

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 5,700

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager and foreman	2	
Office	2	
Receiving and shipping	1	
Maintenance	1	
Truck Driver	1	
Total indirect labor	7	$ 51,000
b. Direct labor		
Skilled workers	12	
Semi-skilled workers	3	
Unskilled workers	2	
Total direct labor	17	$ 94,200

c. Training needs

Manager and foreman should have years of experience. They, with three skilled workers, should be able to train the other workers and reach full production in thirty days.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

Product is light and well packaged.

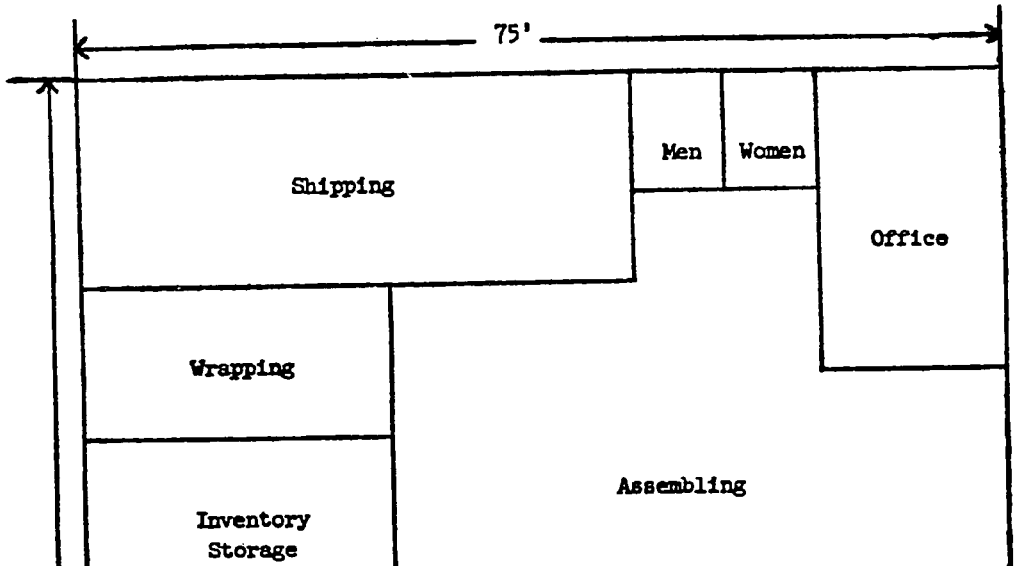
Good highways needed.

7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$ 302,000	
Direct labor	94,200	
Manufacturing overhead*	60,600	
Total manufacturing cost		$ 456,800
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 30,200
Sales expense		$ 24,000
Freight-out, travel discounts Allowances & bad debts		$ 7,000
Total annual costs		$ 518,000
Annual Gross Profit		$ 58,000
ANNUAL SALES REVENUE		$ 576,000

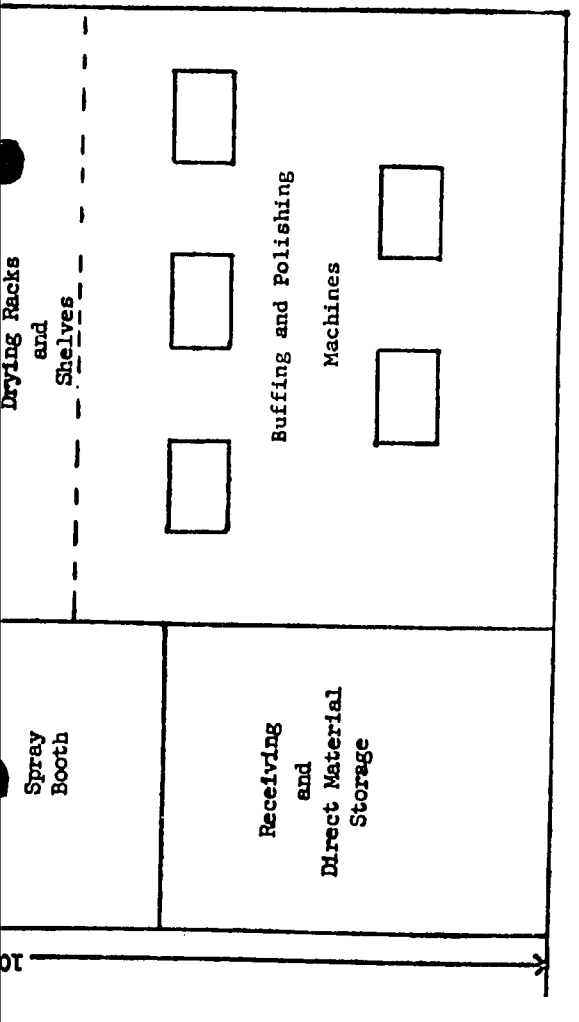
*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

Plant Layout



LAMPS

I. P. NO. 67302
S. I. C. 3642



BRASS TABLE LAMPS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Metal Processing. 2nd Edition. O. W. Boston. 1951. 763 pp. Illus. $9.50

John Wiley and Sons, Inc.
605 Third Avenue
New York, New York 10016

Has section dealing with grinding, buffing, and polishing.

B. Work Simplification. G. Nadler. 1957. 292 pp. Illus. $7.95

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Devoted to the analysis and improvement of manual work methods to increase productivity, reduce fatigue, eliminate danger.

II. TECHNICAL AND TRADE PERIODICALS

A. Lamp Journal. Monthly. $5.00/year.

Ebel Doctorow Publications, Inc.
101 Springfield Avenue
Summit, New Jersey 07901

Devoted to the lamp industry.

B. Lighting. Monthly. Controlled free distribution.

WRC Smith Publishing Company
1760 Peachtree Road, N. W.
Atlanta, Georgia 30309

Devoted to the lighting and lamp industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Insights and clues concering the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Profitable Small Plant Layout. John R. Immer. 48 pp. Illus. 1964. No. 21 (2nd Edition) in the Small Business Management Series of the Small Business Administration, Washington, D. C.

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

How to move materials through the shop economically and efficiently.

IV. REPRESENTATIVE U. S. PATENTS

No patents are available on the assembling of or on assembled brass table lamps.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Lamp and Shade Institute of America
15 East 26th Street
New York, New York 10010

B. Incandescent Lamp Manufacturers Association
760 South 13th Street
Newark, New Jersey 07103

C. American Home Lighting Institute
360 North Michigan Avenue
Chicago, Illinois 60601

VI. DIRECTORIES

A. Housewares Directory. Annual. $1.00

Haire Publishing Company
111 Fourth Avenue
New York, New York 10003

Lists all U.S. manufacturers of houseware and hardware products.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in the Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

ORDERING INSTRUCTIONS

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

TILE ROOFING, CLAY

I. P. No. 67303
S. I. C. 3259

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

TILE ROOFING, CLAY

I.P. No. 67303
S.I.C. 3259
DECEMBER 1967

PRODUCT DESCRIPTION

Roofing tile, half round, color of red clay, made by soft mud method.

A. GENERAL EVALUATION OF PROSPECTS

Local sources of good clay and sand material situated near the potential market are essential for this industry. The location of clay and sand relatively close together is not uncommon and the production of roofing tile has long been practiced in many countries. Where roofing tile is commonly used, plants of this type may already be in existence. A new plant would, therefore, be required only to meet increased demand or to replace small and technically backward plants. Roofing tile presents an attractive appearance and is not expensive compared with other roofing. Since the capital investment for this plant is moderate in comparison with the gross sales, prospects for this industry should be good in many countries.

B. MARKET ASPECTS

1. USERS

Building and public works contractors; individuals for minor jobs.

2. SALES CHANNELS AND EXTENT OF MARKET

Direct sales to large building contractors and to building materials supply houses. In view of the variety of materials that can be used for roofing and the variation in the amount of building construction from country to country, it is not considered practical to determine the market potential for support of this plant in terms of population. In countries where clay roofing tile is commonly used, other plants will undoubtedly exist. A modern plant should be able to compete effectively with small producers. Where roofing tile is not commonly used, the sales appeal of this new product would be a major consideration. A comprehensive survey should be made before investing in this plant. Transport costs of roofing tile are too high to make it economically feasible to ship nationwide. The market area will depend on good, paved highways, inland waterways and low freight rates. Under ordinary conditions, delivery by truck over a radius of more than fifty miles would not be profitable. Roofing tiles, because of their weight, are seldom, if ever, exported.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognised that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $235,000
The total fixed investment, plus working capital, is esimated at $272,200.
The annual gross profit, before taxes, is estimated at $26,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 11.1%.
(A gross profit on sales, before taxes, of 11.1%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 9.6%.

5. COST PER MAN EMPLOYED

Twenty direct and five indirect workers, or a total of twenty-five workers, are employed.
The total fixed capital investment is estimated at $230,000.
Based on these figures, the fixed investment per man employed would amount to $9,200.

C. PRODUCTION REQUIREMENTS - TILE ROOFING, CLAY — I. P. No. 67303
ANNUAL CAPACITY - ONE SHIFT OPERATION: 4,000,000 UNITS — S.I.C. 3259
NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - about 10 acres, including clay and sand deposits if possible	
Building - one story, 5,000 sq. ft. Office: 20' x 32'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$230,000

Principal Items :

Power shovel	Conveyors
Dump truck	Delivery truck
Granulator	
Disintegrator & crusher	
Pug mill	
Automatic tile machine	
Tunnel dryers	
Cars for drying tunnel	
Pallets	
Kilns	

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 42,200
c. Total Capital Requirements	$272,200

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Clay	10,000 tons	
Parting sand	200 tons	
Total direct materials		$ 4,000

b. Supplies

Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 3,500

c. Availability of materials & supplies

The materials must be available locally. All supplies should be available locally.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 200 H. P. connected load	
Fuel - fuel 3,000 tons coal	
Water - about 500,000 gals.	$ 12,500

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 21,400

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Supervisor	1	
Office	2	
Truck Driver	1	
Total indirect labor	5	$ 39,000
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	12	
Unskilled workers	6	
Total direct labor	20	$ 93,600

c. Training needs

Manager and supervisor must be fully experienced. With the help of two skilled workers they should be able to train all workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

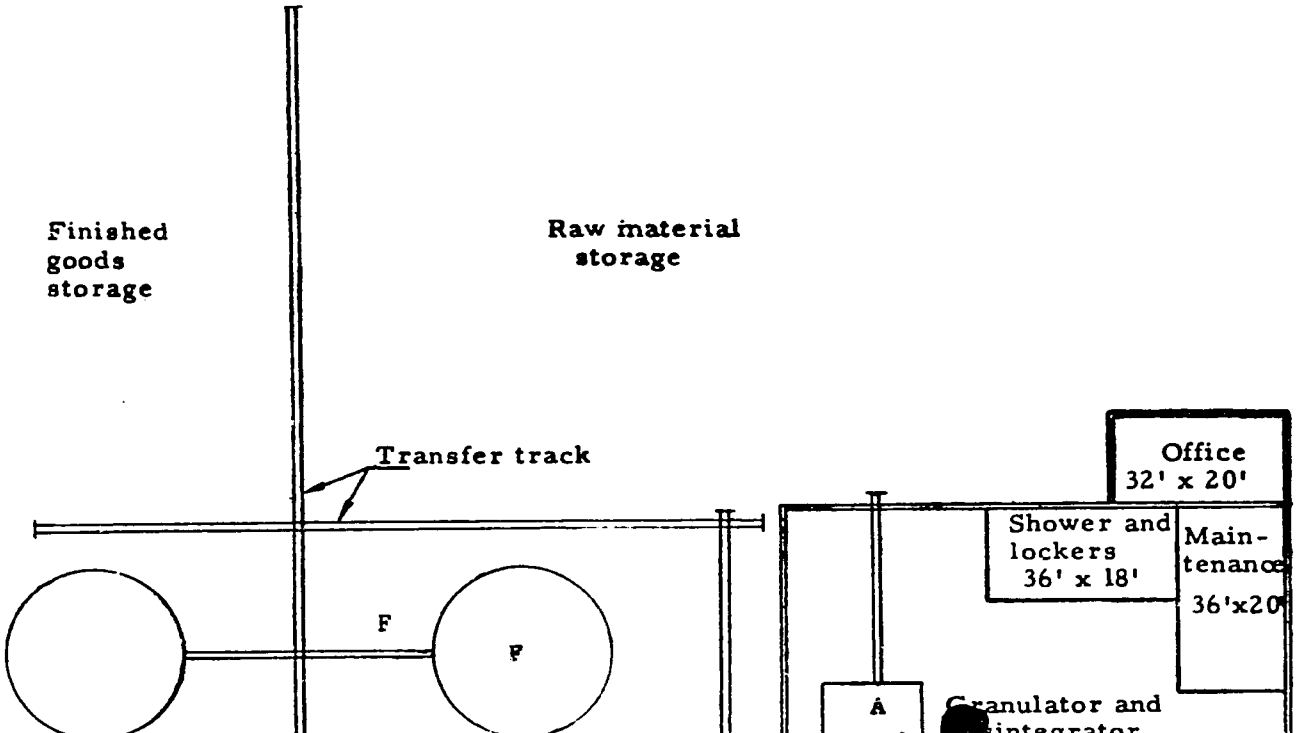
In and out shipments about 3,000 tons per month. Shipments close to plant will be made by truck. Some buyers will pick up tiles at plant. Plant should be located on good highway and as close to a railroad as possible.

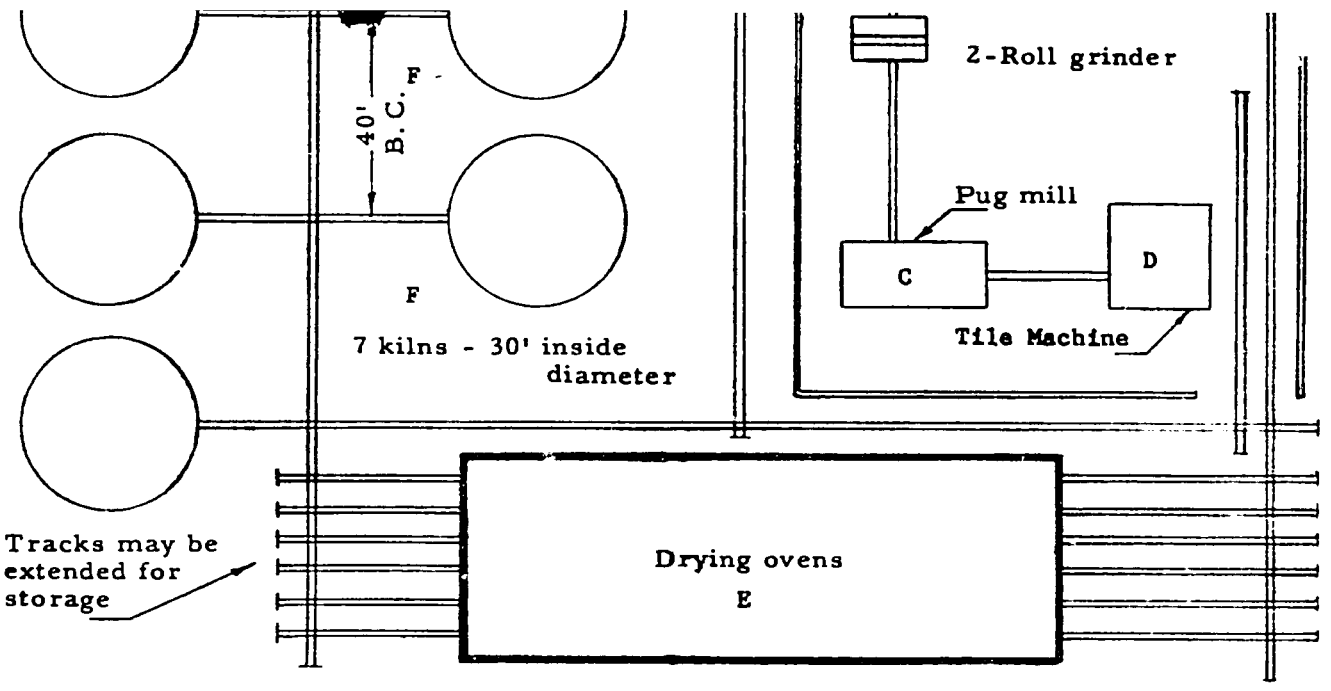
7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$ 4,000	
Direct labor	93,600	
Manufacturing overhead*	82,400	
Total manufacturing cost		$ 180,000
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 15,000
Sales expense		$ 10,000
Freight-out, travel discounts Allowances & bad debts		$ 4,000
Total annual costs		$ 209,000
Annual Gross Profit		$ 26,000
ANNUAL SALES REVENUE		$ 235,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT LAYOUT AND WORK FLOW





Building height - 20 feet

A. Granulator and disintegrator
B. 2-roll grinder
C. Pug mill
D. Tile Machine
E. Drying ovens
F. 7-kilns

I. P. NO. 67303
S. I. C. 3259

TILE ROOFING, CLAY

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Clay Mineralogy. R. E. Grim. 1953. 348 pp. Illus. $13.00

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Concepts of composition of clay materials.

B. Introduction to Ceramics. W. D. Kingery. 1960. 781 pp. Illus. $15.95

John Wiley & Sons, Inc.
605 Third Avenue
New York, New York 10016

Discussion of ceramic properties, processes and characteristics.

II. TECHNICAL AND TRADE PERIODICALS

A. Ceramic Age. Monthly. $4.00/year

Francis Tatnall, Editor and Publisher
2800 Euclid Avenue
Cleveland, Ohio 44115

Covers news on progress in the industry, including materials, supplies, engineering machinery, and management.

B. The Brick and Clay Record. Monthly. $5.00

Cahners Publishing Company
5 South Wabash Avenue
Chicago, Illinois 60603

New trends and developments for manufacturers of burned clay products.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years : Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
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Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

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Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Starting and Managing a Small Business of Your Own. Wendell O. Metcalf. 49 pp. 1962. $.25. Vol. I (2nd Edition) of the Starting and Managing Series of the Small Business Administration, Washington, D. C.

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Pitfalls usually encountered when entering a new business. Sources of additional information given.

IV. REPRESENTATIVE U.S. PATENTS

Available U. S. Patent Office, Washington, D. C. 20231 $.50 each.

A. Patent No. 3,252,257. May 24, 1966. 6 p.
Self-sealing shingle.

B. Patent No. 3,137,972. June 23, 1964. 3 p.
Roofing.

C. Patent No. 3,137,100. June 16, 1964. 7 p.
Roofing products.

D. Patent No. 3,121,649. February 18, 1964. 6 p.
Method of installing roof insulation on buildings.

E. Patent No. 3,079,729. March 5, 1963. 4 p.
Shingles.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National Building Materials Distributors Association
22 West Monroe Street
Chicago, Illinois 60603

B. Structural Clay Products Institute
1520 - 18th Street, N. W.
Washington, D. C. 20036

Research, technical information, marketing, promotion in the structural clay products industry.

VI. DIRECTORIES

A. Building Supply News Purchasing File. Annual. $2.50

Cahners Publishing Company
5 South Wabash Avenue
Chicago, Illinois 60603

Manufacturers and suppliers of building supply machinery and equipment.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

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National Society of Professional Engineers
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Washington, D.C. 20006

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Clearinghouse for Federal Scientific and
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Springfield, Virginia 22151

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GENERAL INFORMATION

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This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

CANNED FISH

I. P. No. 67304
S. I. C. 2031

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

CANNED FISH

PRODUCT DESCRIPTION

Canned fish in 1/2-pound and 1-pound cans.

A. GENERAL EVALUATION OF PROSPECTS

The prospects for this industry depend to a large extent upon an adequate supply of fish for at least 75 consecutive days each year at reasonable prices. The fixed investment is modest in relation to the annual sales revenue and the number of men employed. This plant could be used to can many types of fiish and, with some alterations, could also be used to can vegetables.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military installations, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be made to wholesalers for distribution to retail stores and direct to military installations and other large users. The market required to support this industry will depend, to some extent, upon the per capita income and the other types of food available such as poultry and meat. The product is well packaged and the value is high in relation to transportation costs. The domestic market would be nationwide. Competition can be expected in areas where fresh fish is in plentiful supply. Plants similar to this one that are already in existence within the country will also furnish competition. If this plant is well managed and efficiently operated, it should have no difficulty in exporting any surplus production not consumed locally.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

The annual gross sales revenue is estimated at $700,000.
The total fixed investment, plus working capital, is estimated at $416,500.
The annual gross profit, before taxes, is estimated at $65,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 9.3%.
(A gross profit on sales, before taxes, of 9.3%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 15.7%.

5. COST PER MAN EMPLOYED

One hundred and twenty direct workers and eleven indirect workers, or a total of one hundred and thirty-one workers, are employed.
The total fixed-capital investment is estimated at $314,000.
Based on these figures, the fixed investment per man employed would amount to about $2,400.

C. PRODUCTION REQUIREMENTS - CANNED FISH

I.P. No. 67304
S.I.C. 2031

ANNUAL CAPACITY - THREE SHIFT OPERATION, 75 DAYS: 2,000,000 CANS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 5 acres	
Building - one-story, 100' x 100' 12,000 square feet refrigerated.	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 314,000

Principal items:

Wash
Scald
Trays
Racks
Process tables
Can sterilizer
Can filler
Can closer
Retorts
Packer & sealer
Fork lift truck

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 102,500
c. Total Capital Requirements	$ 416,500

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Fish	2,500,000 lbs	
Soybean oil	250,000 lbs.	
Salt	15,000 lbs.	
Cans, cartons and labels		
Total direct materials		$ 391,000

b. Supplies	
Lubricants & hand tools	
Gas, oil and maintenance of truck	
Maintenance & spare parts	
Office supplies	
Total supplies	$ 6,000

c. Availability of materials & supplies

Fish must be available at plant site. All other materials should be availabe locally. All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 100 H.P. connected load	
Fuel - Bunker C oil	
Water - for production, sanitation and fire protection. Must be potable	$ 11,500

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 24,700

5. MANPOWER

	Number	Annual Cost
a Indirect labor		
Manager	1	
Supervisor	3	
Office	2	
Inspectors	3	
Maintenance	1	
Truck Driver	1	
Total indirect labor	11	$ 46,000
b. Direct Labor		
Skilled workers	9	
Semi-skilled workers	9	
Unskilled workers	102	
Total direct labor	120	$ 99,000

c. Training needs

Manager, supervisors, must be fully experienced. They, with the help of the skilled workers should be able to train other workers and reach full production in two weeks.

6. TRANSPORTATION

a. Own transport equipment

Truck.

b. External transport facilities

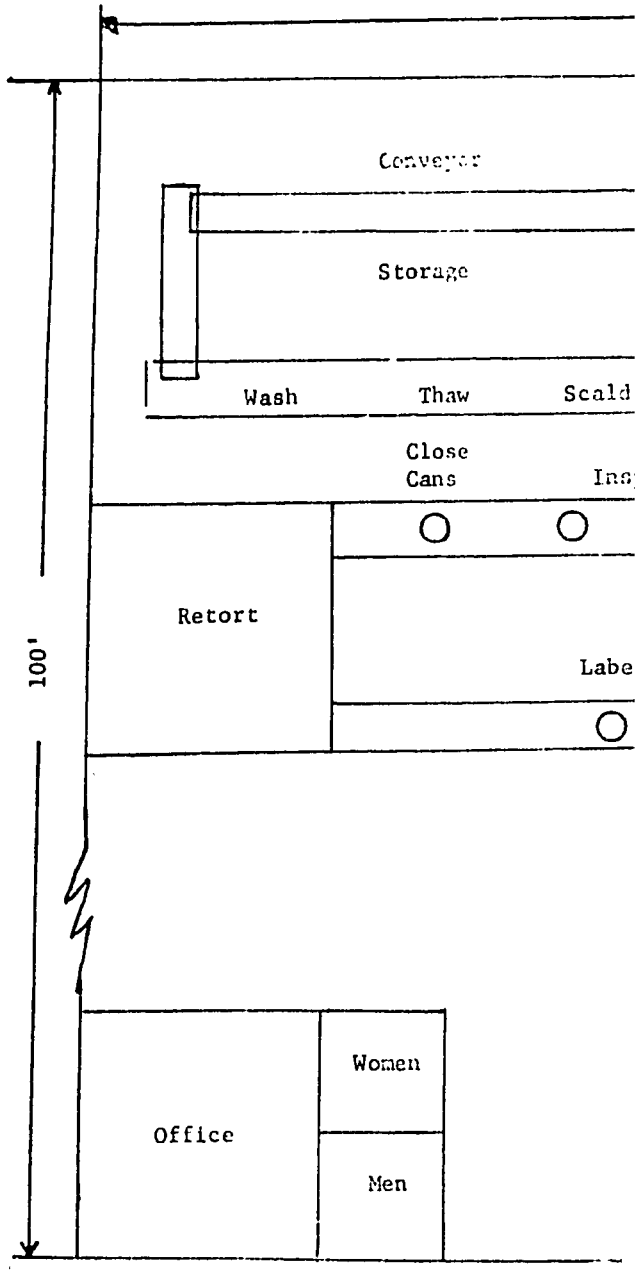
Plant should be located close to source of the fish supply. About 1,400 tons of fish are shipped per year. Good highways and railroad if possible.

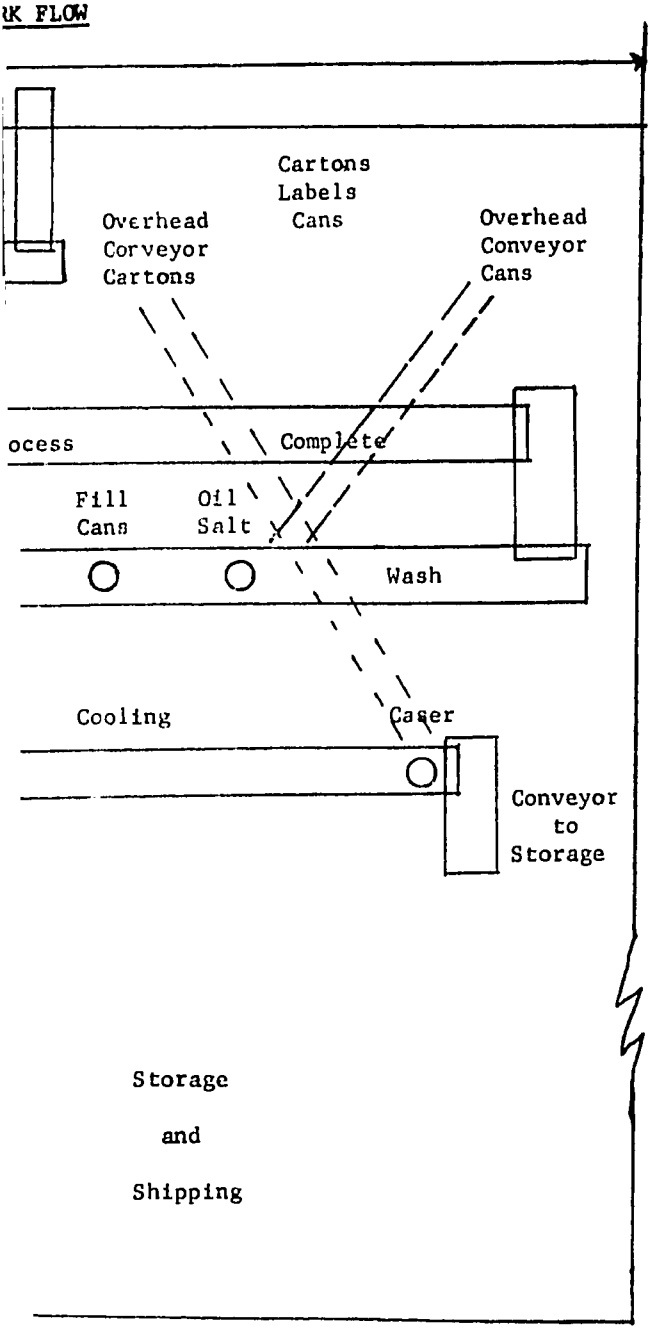
7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$ 391,000	
Direct labor	99,000	
Manufacturing overhead*	88,200	
Total manufacturing cost		$578,200
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 26,800
Sales expense		$ 18,000
Freight-out, travel discounts Allowances & bad debts		$ 12,000
Total annual costs		$635,000
Annual Gross Profit		$ 65,000
ANNUAL SALES REVENUE		$700,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT LAYOUT




RK FLOW
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Cooling
Caser
Conveyor
to
Storage
Storage
and
Shipping

CANNED FISH

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Industrial Fishery Technology. M. E. Stansby. 1963. $12.00

Reinhold Publishing Corporation
430 Park Avenue
New York, New York 10022

B. Fish Handling and Processing. $8.00

British Information Services
845 Third Avenue
New York, New York 10022

II. TECHNICAL AND TRADE PERIODICALS

A. Pacific Fisherman. Monthly. $3.00/year.

Miller Freeman Publications
731 Southwest Oak Street
Portland, Oregon 97205

Commercial fisheries of the Pacific, canning, processing, and marketing.

B. Commercial Fisheries Review. Monthly. $5.50/year.

U S. Bureau of Commercial Fisheries
1815 North Fort Meyer Drive
Arlington, Virginia 22209

C. Fishing Gazette. Monthly. $3.00/year.

Fishing Gazette
461 Eighth Avenue
New York, New York 10001

Items of interest to canners, processors, Fishermen, and marine supply houses.

III. BUSINESS MANAGEMENT MATERIALS

A. Improving Materials Handling in Small Plants. $.20

Small Business Management Series No. 4
U. S. Government Printing Office
Washington, D. C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

B. The First Two Years : Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Insights and clues concerning the entire process of small business formation, growth and decline.

C. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

IV. REPRESENTATIVE U. S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231 $.50 each.

A. Patent No. 3,272,636 September 13, 1966 4 p.
Method of controlling micro-organisms in food products.

B. Patent No. 3,257,214 June 21, 1966 3 p.
Process for preparing canned food products.

C. Patent No. 3,230,095 January 1966 5 p.
Method of sterilizing.

D. Patent No. 3,226,237 December 1956 4 p.
Food heat treat process.

E. Patent No. 3,152,912 October 13, 1964 7 p.
Method of preparing fish for consumption.

F. Patent No. 2,794,326 June 1957 6 p.
Method and apparatus for cooling canned goods.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National Canners Association
1133 - 20th Street, N. W.
Washington, D. C. 20036

B. National Fisheries Institute, Inc.
1614, 20th Street, N. W.
Washington, D. C. 20009

VI. DIRECTORIES

A. Canner/Packer Yearbook. Annual. $5.00

Triad Publishing Company
59 East Monroe Street
Chicago, Illinois 60603

Buyers guide of food equipment and supplies. Directory of over 100 food industry trade associations.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the :

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

ORDERING INSTRUCTIONS

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

CATTLE FEED FROM MANIOC PULP

I. P. No. 67305
S. I. C. 2042

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I. P. No. 67305
S.I.C. 2042
DECEMBER 1967

CATTLE FEED FROM MANIOC PULP

PRODUCT DESCRIPTION

Cattle and poultry feed made from manioc (cassava) pulp, mixed with other feed ingredients and sold in 100 pound paper bags.

A. GENERAL EVALUATION OF PROSPECTS

The prospects for this industry will depend on an adequate supply of manioc pulp and on a potential sales of 1,450 tons annually. The pulp supply must be sufficient to operate the plant 24 hours a day, 250 days a year. The addition of facilities to manufacture manioc pulp would substantially increase the margin of profit and assure an adequate supply of pulp.

B. MARKET ASPECTS

1. USERS

Stock farms, poultry farms, feeding places where animals are conditioned for slaughter and areas where specialized feeding of animals is done.

2. SALES CHANNELS AND EXTENT OF MARKET

There is a great flexibility in the use of this product and no exact estimate can be given of the number of animals required to absorb the plant's production. Much depends on the composition of animals' other food intake. The plant's production could feed about 3,000 steers and approximately the same number of dairy cattle. Used for poultry feed, the plant's output could maintain about 30,000 laying hens or about 250,000 pullets during the fattening season. Sales would be made to wholesalers and possibly to large users. Active sales promotion among users is necessary, especially if the product is new in the market. The only domestic competition would come from a similar manufacturing plant in the area but unless costs are high, competition should be met without difficulty. This is a common world-wide export but little difficulty should be experienced in selling any surplus feed providing high quality is maintained and shipping and tariff costs are not prohibitive. The potential domestic market in countries of moderate size and with reasonably good transport systems is nationwide. Keep delivery costs as low as possible.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

The annual gross sales revenue is estimated at $130,000.
The total fixed investment, plus working capital, is estimated at $81,500.
The annual gross profit, before taxes, is estimated at $9,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 6.9%.
(A gross profit on sales, before taxes, of 6.9%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 11.0%.

5. COST PER MAN EMPLOYED

Seven direct workers and three indirect workers, or a total of ten workers, are employed.
The total fixed capital investment is estimated at $ 59,000.
Based on these figures, the fixed investment per man employed would amount to $5,900.

C. PRODUCTION REQUIREMENTS CATTLE FEED FROM MANIOC PULP I.P. No. 67305
ANNUAL CAPACITY - THREE SHIFT OPERATION: 250 DAYS: 1,450 TONS S.I.C. 2042

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - about 1 acre	
Building - one story 25' x 100'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 59,000

Principal items :

Zenith Press, Dryer, Hammer Mill & Crusher, Products Collector, Storage Bin, Vertical Mixer, Bucket Elevator, Finished Feed Bin, Molasses Mixer, Molasses Pump, Storage Tank, Fork-Lift Truck

b. Working Capital (30 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 22,500

c. Total Capital Requirements $ 81,500

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Dried pulp	1,000 tons	
Soybean meal	200 tons	
Alfalfa	195 tons	
Molasses	42 tons	
Di-calcium phosphate	1,600 lbs.	
3 thickness paper bags	29,000	
Total direct materials		$ 35,000

b. Supplies

Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance for truck	
Total supplies	$ 2,150

c. Availability of materials & supplies

All should be available locally. All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 12 H.P. connected load	
Fuel - Gas	
Water - About 600,000 gallons. Must be potable	$ 1,900

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 5,850

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Office	1	
Truck Driver	1	
Total indirect labor	3	$ 23,000
b. Direct labor		
Skilled workers	3	
Semi-skilled workers	3	
Unskilled workers	1	
Total direct labor	7	$ 36,600

c. Training needs

The manager should be fully experienced. He, with the help of two skilled workers, should be able to train all workers and reach full production in two weeks.

6. TRANSPORTATION

a. Own Transport equipment

Truck

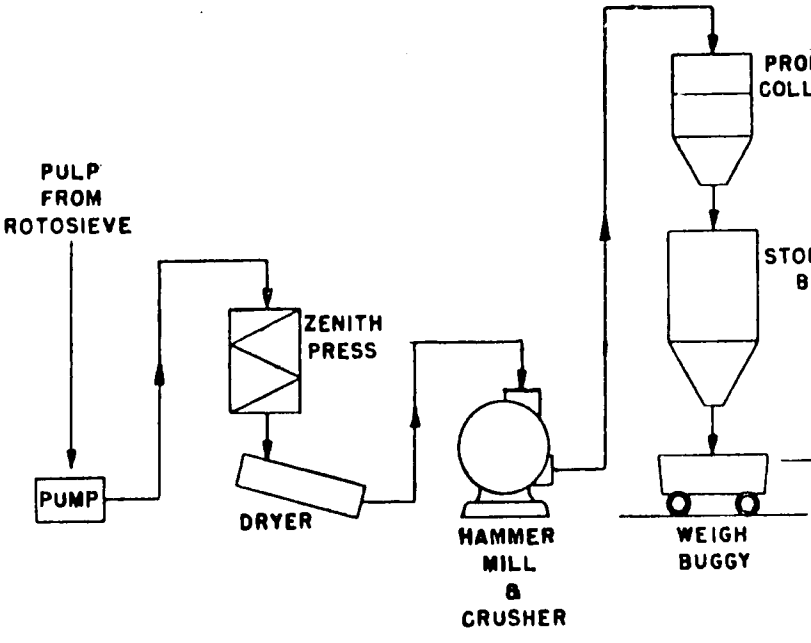
b. External transport facilities

In and out shipments about 12 tons per day. Good highways. Railroad if possible.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 35,000	
Direct labor	36,600	
Manufacturing overhead*	32,900	
Total manufacturing cost		$ 104,500
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 7,500
Sales expense		$ 7,000
Freight-out, travel discounts Allowances & bad debts		$ 2,000
Total annual costs		$ 121,000
Annual Gross Profit		$ 9,000
ANNUAL SALES REVENUE		$ 130,000

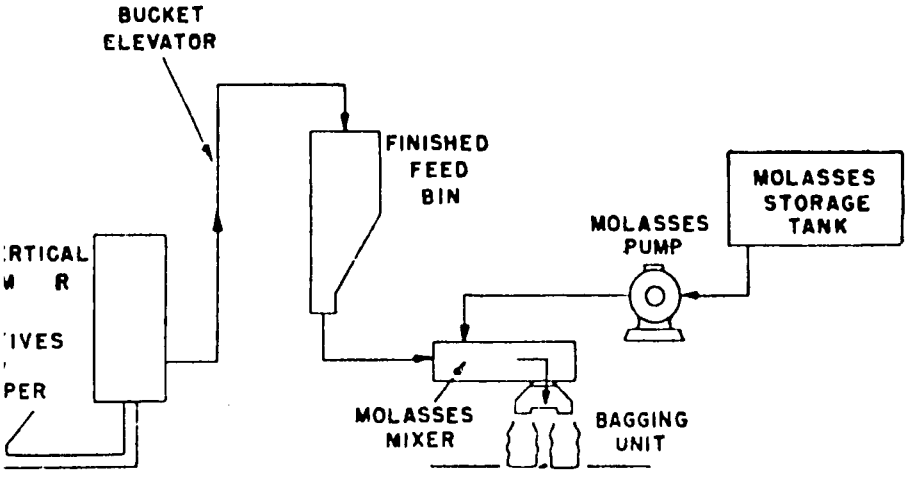
*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.


PULP
FROM
ROTOSIEVE
PUMP
ZENITH
PRESS
DRYER
HAMMER
MILL
&
CRUSHER
WEIGH
BUGGY

ROM MANIOC PULP

I. P. NO. 67305
S. I. C. 2042

ORK FLOW



CATTLE FEED FROM MANIOC PULP

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. National Academy of Science. Joint United States-Canada tables of feed composition. 1964. $2.50

National Academy of Science
National Research Council
2101 Constitution Avenue, N. W.
Washington, D, C. 20418

Devoted to feed composition for livestock.

B. Approved Practices in Feeds and Feeding. Daniel W. Cassard and Elwood M. Juergenson. 1963. Illus. $3.75

Interstate Printers and Publishers, Inc.
1927 North Jackson Street
Danville, Illinois 61832

Devoted to the latest methods in feeding livestock.

C. Animal Nutrition. Leonard A. Maynard and John K. Loosli. 544 pp. 90 Illus. 1962. $10.50.

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Principles of nutrition and their applications to feeding practice.

II. TECHNICAL AND TRADE PERIODICALS

A. Feeds Illustrated. Monthly. $2.50/year

National Provisioner
15 West Huron Street
Chicago, Illinois 60610

Business magazine for feed manufacturers.

B. Grain Terminals and Processing Plants. Monthly. Controlled free distribution.

Grain Elevator and Processing Superintendents
316 South LaSalle Street
Chicago, Illinois 60604

Devoted to the operation and management of grain plants.

III. BUSINESS MANAGEMENT MATERIALS

A. Improving Materials Handling in Small Plants. $.20

Small Business Management Series No. 4
U. S. Government Printing Office
Washington, D. C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

B. A Handbook of Small Business Finance. $.30

Small Business Management Series No. 15
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Washington, D. C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,244,527. April 1966. 5 p.
Cattle feeding process, composition, and product.

B. Patent No. 3,257,210. June 1966. 5 p.
Feed composition.

C. Patent No. 3,222,179. December 1965. 4 p.
Feed additives containing rennet and calcium chloride.

D. Patent No. 3,268,336. August 1962. 11 p.
Method of producing a food product.

E. Patent No. 2,851,357. September 9, 1958. 4 p.
Animal feed emulsion and process.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National Feed Ingredients Association
1918 West 16th Street, Box 1632
Des Moines, Iowa 50306

B. American Feed Manufacturers Association
53 West Jackson Boulevard
Chicago, Illinois 60604

C. Distillers Feed Research Council
1232 Enquirer Building
617 Vine Street
Cincinnati, Ohio 45202

D. Midwest Feed Manufacturers Association
934 Wyandotte Street
Kansas City, Missouri 64105

VI. DIRECTORIES

A. Dairy Industries Catalog. Free to firms in the dairy industry. $5.00 to others.
Published annually.

Olsen Publishing Company
14445 North 5th Street
Milwaukee, Wisconsin 53212

Lists all manufacturess of equipment and supplies used in the dairy industry.

VII. PROFESSIONAL ENGINEERING SERVICES

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LAUNDRY BAGS

I. P. No. 67306
S. I. C. 5087

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LAUNDRY BAGS

I.P. No. 67306
S. I. C. 5087

PRODUCT DESCRIPTION

Laundry bags with cord and eyelet made from duck in two sizes, 26" x 26" for individual use in private homes and 30" x 48" for commercial laundries, hotels, institutions, military establishments, rooming houses, etc.

A. GENERAL EVALUATION OF PROSPECTS

The capital requirements for this industry are moderate. The manufacturing operations are relatively simple and do not demand a highly skilled work force. All direct materials and supplies should normally be available locally. The use of laundry bags in rural areas might be limited in some countries. Sales, for the most part will be concentrated in populous, urban areas.

B. MARKET ASPECTS

1. USERS

Principal users of this product are commercial laundries. Hotels, apartment and rooming houses might be reached by merchandising through a hotel supply company or other similar outlet Large institutions, hospitals, and the military may buy in big quantities direct.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be made direct to laundries and other large volume users, direct to stores for sales to individuals for home use and to hotel supply companies or other similar outlets. Laundry bags are light and well packaged and can be shipped at moderate cost anywhere through out the country although most sales will be concerntrated in urban areas. Competition might be encountered from small family-owned and operated factories. But if this plant is well managed, quality and lower costs should prevail. No competition from imported products should be encountered since laundry bags seldom are found in the international market place.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $240,000.
The total fixed investment, plus working capital, is estimated at $76,000.
The annual gross profit, before taxes, is estimated at $18,000.
Based on these figures, the profit on gross sales, before taxes, amounts to 7.5%.
(A gross profit on sales, before taxes, of 7.5%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 23.7%.

5. COST PER MAN EMPLOYED

Sixteen direct workers and six indirect workers, or a total of twenty-two workers are employed.
The total fixed capital investment is estimated at $57,000.
Based on these figures, the fixed investment per man employed would amount to about $2,600.

C. PRODUCTION REQUIREMENTS - LAUNDRY BAGS — I.P. No. 67306
ANNUAL CAPACITY - ONE SHIFT OPERATION: 110,000 BAGS — S.I.C. 5087
NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - one-half acre	
Building - one story 50' x 80'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 57,000

Principal items:
Cutting table
Cloth spreader
Cloth unwinder
Electric cloth cutter
Electric drill
8 sewing machines
8 chairs
Presser
Bench
Hand truck

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 19,000
c. Total Capital Requirements	$ 76,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Flat duck	180,000 yds.	
Cord and eyelets		
Packaging		
Total direct materials		$ 60,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 3,200

c. Availability of materials & supplies

All should be available locally. All are available in world markets.

3. POWER, FUEL AND WATER

Electric Power - 40 H.P. connected load Fuel - heat as required Water - sanitation and fire protection	Annual Cost $ 1,400

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 4,900

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Supervisor	1	
Office	2	
Machine fixer	1	
Truck Driver	1	
Total indirect labor	6	$ 47,000
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	10	
Unskilled workers	4	
Total direct labor	16	$ 76,400

c. Training needs

Manager and machine fixer should have years of experience. They with 2 skilled workers should be able to train all workers and reach full production in 2 weeks.

6. TRANSPORTATION

a. Own transport equipment

Truck.

b. External transport facilities

In and out shipments small. Good highways.

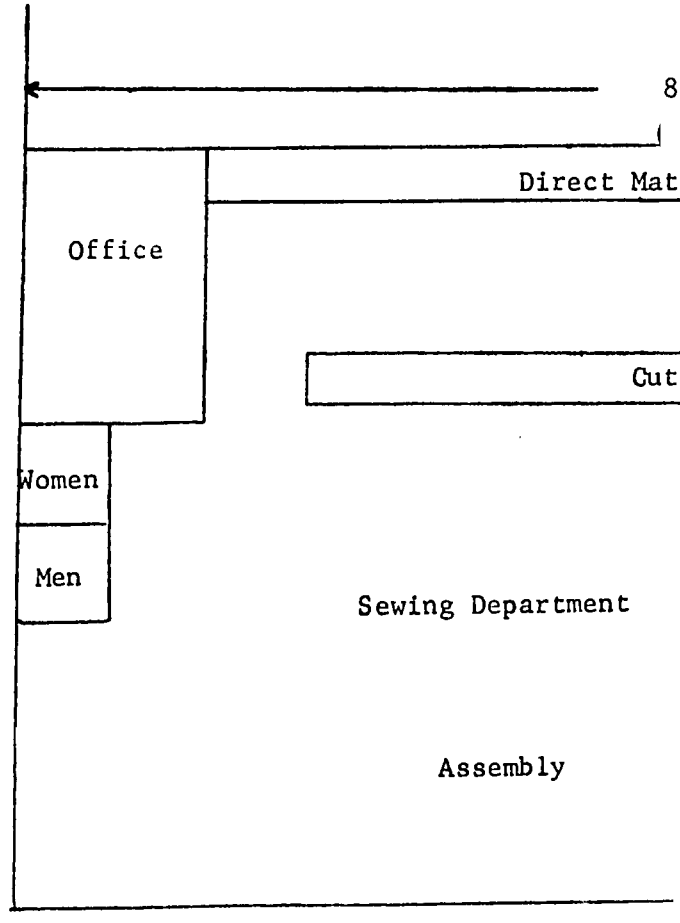
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 60,000	
Direct labor	76,400	
Manufacturing overhead*	56,500	
Total manufacturing cost		$ 192,900
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 12,100
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 5,000
Total annual costs		$ 222,000
Annual Gross Profit		$ 18,000
ANNUAL SALES REVENUE		$ 240,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

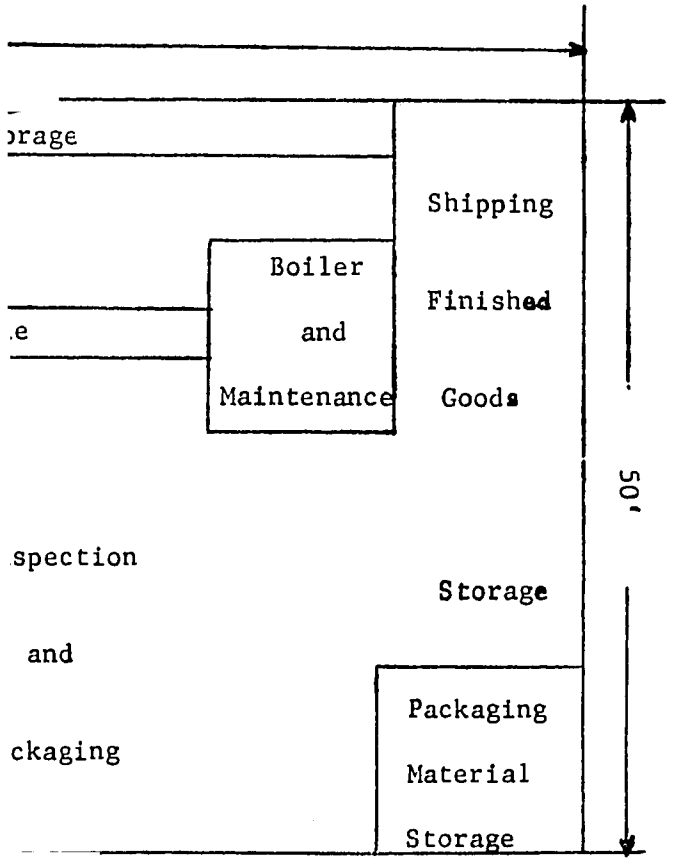
LAUN

PLANT


80
Direct Mate
Office
Cutt
Women
Men
Sewing Department
Assembly

I. P. NO. 67306
S. I. C. 5087

Y O U T



I. P. No. 67306
S.I.C. 5087

LAUNDRY BAGS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. The Progressive Sewing Room. B. Frank. 1958. $6.50

Fairchild Publications, Inc.
7 East 12th Street
New York, New York 10003

Progessive sewing techniques in industry.

B. Time Study Manual for the Textile Industry. Norbert L. Enrick. 1960. 224 pp. 62 Illus. $7.50

John Wiley & Sons, Inc.
605 Third Avenue
New York, N. Y. 10016

II. TECHNICAL AND TRADE PERIODICALS

A. Textile World Monthly. $2.00/year.

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Technical journal devoted to production of textile products, operations, equipment, and management.

B. Modern Textile Manazine. Monthly. $5.00/year.

Alfred H. McCollough, Publisher
303 Fifth Avenue
New York, New York 10016

Markets, sources of materials and supplies, machinery and equipment.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Improving Materials Handling in Small Plants. $.20.

Small Business Management Series No. 4
U.S. Government Printing Office
Washington, D.C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A.	Patent No. 3,285,309 Bag with attached draw string.	November 1966	3 p.
B.	Patent No. 3,143,153 Container.	August 1964	3 p,
C.	Patent No. 3,079,966 Drawstring bag.	March 1963	4 p.
D.	Patent No. 3,029,853 Drawstring closure.	April 1962	3 p.
E.	Patent No. 2,798,523 Bags with method of manufacturing.	July 1957	4 p.
F.	Patent No. 2,777,491 Manufacture of draw cord bags and the product thereof.	January 1957	5 p.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Textile Bag Manufacturers Association
518 Davis Street, Suite 208
Evanston, Illinois 60201

B. Textile Research Institute
P. O. Box 625
Princeton, New Jersey 08540

C. Textile Converters Association
1450 Broadway
New York, New York 10018

VI. DIRECTORIES

A. Laundry Industry Guide Book. Annual. $2.00

Laundry Journal
466 Lexington Avenue
New York, New York 10017

Lists manufacturers and suppliers of equipment.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the :

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

PORTABLE SAWMILL

I. P. No. 67307
S. I. C. 2421

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I.P. No. 67307
S.I.C. 2421
DECEMBER 1967

PORTABLE SAWMILL

PRODUCT DESCRIPTION

Portable sawmill with diesel power unit on a truck that is also used to transport the portable sawmill from one location to another.

A. GENERAL EVALUATION OF PROSPECTS

The prospects for this industry depend to a great extent upon the availability of logs. The mill could operate under a contract of so much per thousand per board foot of lumber or it could buy and saw the logs and sell the lumber. On either basis, under normal conditions, the mill should show a profit if an adequate supply of logs is available.

B. MARKET ASPECTS

1. USERS

Lumber from sawmills is usually further processed before being sold to industry or to others for construction purposes.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made directly to fabricating plants for further processing before use. The market required to support this portable sawmill depends primarily on the amount of industry within the country which requires lumber and the amount of construction and building that takes place annually. A sales survey should be made to determine the potential for this plant. Since lumber is used in both industry and construction, the geographical extent of the market would be nationwide. A portable sawmill of this type could not compete with a large sawmill located where large amounts of timber are available. But, where it can operate some distance away from permanent sawmills and where logs can be purchased at reasonable prices, competition could be met. Because of the high cost of importing lumber, this plant would also be able to meet competition from imported products. The output of this plant is too small to consider entering international markets.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $265,000.
The total fixed investment, plus working capital, is estimated at $67,300.
The annual gross profit, before taxes, is estimated at $21,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 8.0%.
(A gross profit on sales, before taxes, of 8.0%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 31.2%.

5. COST PER MAN EMPLOYED

Six direct and three indirect workers, or a total of nine workers, are employed.
The total fixed capital investment is estimated at $21,000.
Based on these figures, the fixed investment per man employed would amount to about $2,325.

C. PRODUCTION REQUIREMENTS - PORTABLE SAWMILL I.P. No. 67307
ANNUAL CAPACITY - ONE SHIFT OPERATION: 3,000,000 BOARD FEET S.I.C. 2421
NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - in woods, no cost	
Building - no building	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 21,000

Principal items:

Headrig with circular saw
Sawmill carriage
Feed works
Log turner
Saws
Edger
100 H.P. Diesel Motor mounted on truck
Track
Swing saw
Belts and hand tools

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales Costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 46,300
c. Total Capital Requirements	$ 67,300

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Logs	3,000,000 bd. ft.	
Total direct materials		$ 155,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts (including truck)	
Office supplies	
Diesel fuel and oil for operation of truck included in section No. 3 above	
Total supplies	$ 2,500

c. Availability of materials & supplies

Logs must be available locally.
All supplies should be available locally.
All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - none	
Fuel - Diesel Oil	
Water - small amount	
	$ 2,500

4. DEPRECIATION

	Yrs. life	Amount
Building	0	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 3,000

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager	1	
Saw filer	1	
Truck Driver	1	
Total indirect labor	3	$ 25,000
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	2	
Unskilled workers	2	
Total direct labor	6	$ 30,000

c. Training needs

Manager and saw filer should be full experienced. They, with the help of 2 skilled workers should be able to reach full production in two weeks.

6. TRANSPORTATION

a. Own transport equipment

Diesel-powered truck

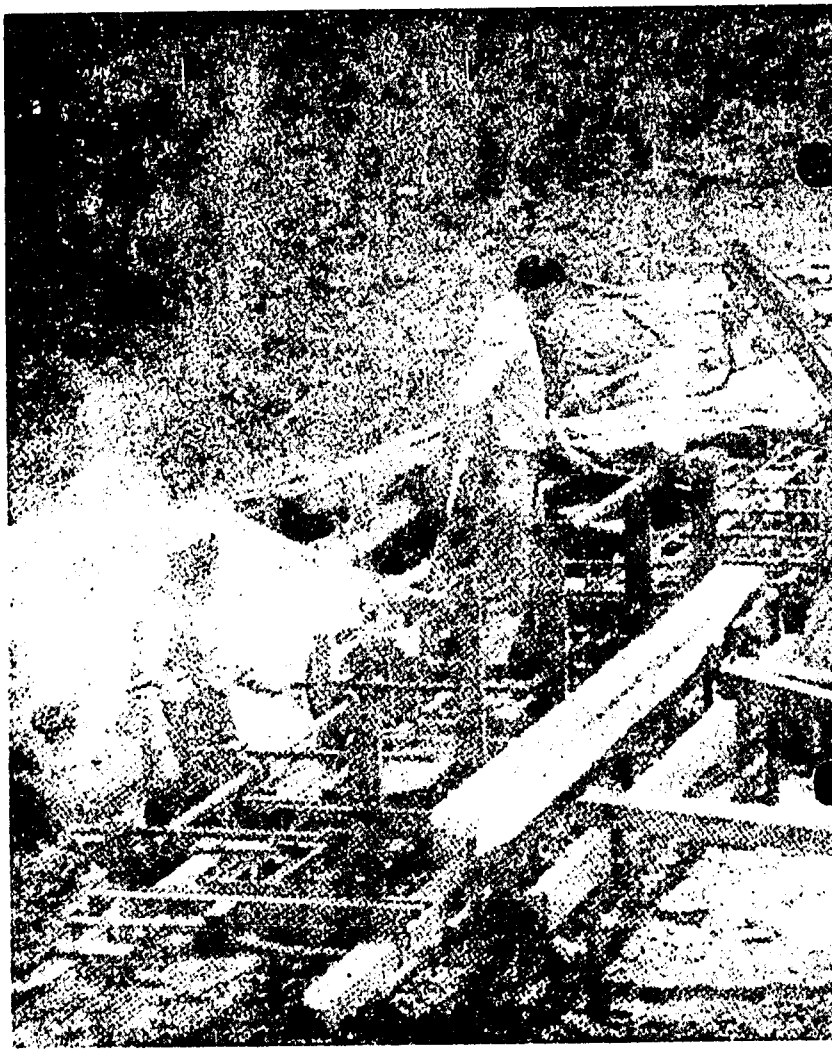
b. External transport facilities

Lumber is usually piled and sold where it is produced.

7. TOTAL ANNUAL COSTS AND SALES

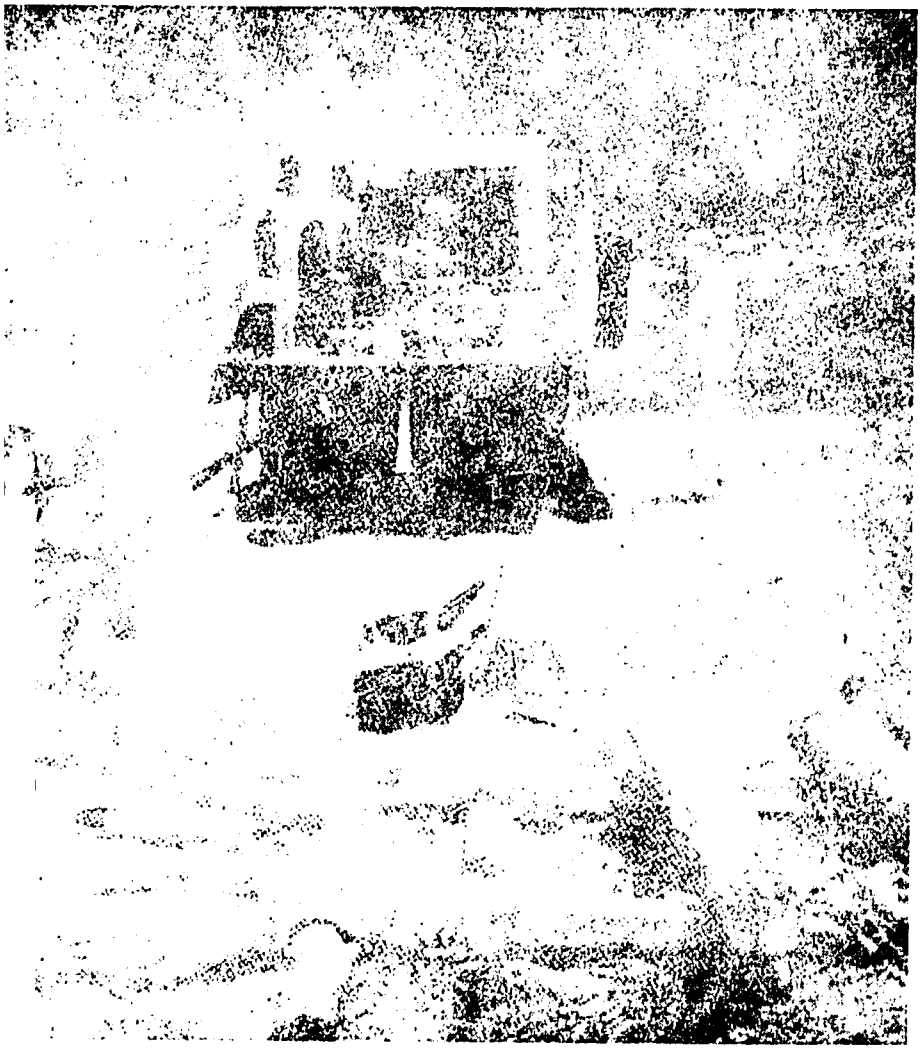
REVENUE		
Direct materials	$ 155,000	
Direct labor	30,000	
Manufacturing overhead*	33,000	
Total manufacturing cost		$ 218,000
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 14,000
Sales expense		$ 6,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 244,000
Annual Gross Profit		$ 21,000
ANNUAL SALES REVENUE		$ 265,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.



PORTABLE SAWMILL

I.P. NO. 67307
S. I. C. 2421



PORTABLE SAWMILL

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Lumber. N. C. Brown and J. S. Bethel. 1958. 379 pp. Illus. $7.50

John Wiley and Sons
605 Third Avenue
New York, New York 10016

Development of lumber industry. The sawmill: Type, size, location, layout, log storage and handling, sawmill machinery, manufacturing and drying lumber.

B. Forest Products - Their Sources, Production and Utilization. A. J. Panshin. 2nd Edition. 1962. 549 pp. $13.50

McGraw Hill, Inc.
330 West 42nd Street
New York, New York 10036

Origin, methods of conversion and utilization of the principal primary and secondary forest products.

C. Fundamentals of Forestry Economics. W. A. Duerr. 1960. 579 pp. $11.50

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Practical treatment of the ways business and economics affect forestry and the forest products industries.

II. TECHNICAL AND TRADE PERIODICALS

A. Wood and Wood Products. Monthly. $5.00/year

Vance Publishing Corporation
59 East Monroe Street
Chicago, Illinois 60603

Management and production magazine to the wood industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

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Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

IV. REPRESENTATIVE U. S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A.	Patent No. 3,056,438. Sawmill carriage.	October 1962.	6 p.
B.	Patent No. 2,875,795. Single slash gang sawmill.	1959.	8 p.
C.	Patent No. 2,873,775. Chain saws.	1959.	7 p.
D.	Patent No. 2,862,532. Gang sawmill.	1958.	10 p.
E.	Patent No. 2,783,791. Portable sawmill lifting and dogging apparatus.	March 1957.	6 p.
F.	Patent No. 2,778,392. Gage means for portable lumber sawmill.	January 1957	8 p.
G.	Patent No. 2,740,436. Reciprocative, double sash, gang sawmill.	1956.	4 p.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National Forest Products Association
1619 Massachusetts Avenue, N. W.
Washington, D. C. 20036

VI. DIRECTORIES

A. Directory of the Forest Products Industry. Annual. $25.00

Miller-Freeman Publications
500 Howard Street
San Francisco, California 94105

VII. PROFESSIONAL ENGINEERING SERVICES

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Washington, D.C. 20006

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

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ALUMINUM FOUNDRY

I. P. No. 67308
S. I. C. 3361

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ALUMINUM FOUNDRY

I. P. No. 67308
S.I.C. 3361
DECEMBER 1967

PRODUCT DESCRIPTION

Small aluminum foundry. Other non-ferrous metals may be cast on a small-scale basis.

A. GENERAL EVALUATION OF PROSPECTS

This plant employs only two people - - the owner and a skilled worker. They would cast novelties for gift shops, small aluminum toys and do repair work of all kinds for individuals or private industry. Any non-ferrous article that has been broken could, by using the broken pieces as a pattern, be reproduced in this foundry. This plant could also produce non-ferrous parts for small industries. A plant of this kind can be a valuable asset to the economy and industrial development of an emerging nation.

B. MARKET ASPECTS

1. USERS

Small industries needing non-ferrous castings as components. Repair work can also be done for individuals. Artistic castings and novelties for gift shops will also use the services of this plant. The market for the kind of work depends essentially upon the volume of business done by gift shops, upon the needs of other small industries and upon the amount of repair work of non-ferrous articles required within the country. It is not practical to estimate sales potential on the basis of population. The value of this product is high in relation to its weight and transportation costs should be low. The geographical extent of the market should be nationwide. This plant should have a considerable degree of protection against imports since it produces a high quality product and because of the convenience of the service. Competition from substitutes should be insignificant. These products are seldom exported and this plant is too small to consider entering the export market.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $45,000.
The total fixed investment, plus working capital, is estimated at $18,400.
The annual gross profit, before taxes, is estimated at $5,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 11.1%.
(A gross profit on sales, before taxes, of 11.1%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 27.2%.

5. COST PER MAN EMPLOYED

One direct worker and one indirect worker or a total of two workers, are employed.
The total fixed capital investment is estimated at $11,000.
Based on these figures, the fixed investment per man employed would amount to $5,500.

C. PRODUCTION REQUIREMENTS - ALUMINUM FOUNDRY — I. P. No. 67308
ANNUAL CAPACITY - ONE SHIFT OPERATION: $45,000 SALES — S.I.C. 3361
NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 10,000 sq. ft.	
Building - one story 30' x 30'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 11,000

Principal items:
Steel cylinder for melting furance
Small electric blower connected with melting furance
Ladles
Crucibles
Flasks
Core oven
Molding tools
Bench grinder

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 7,400
c. Total Capital Requirements	$ 18,400

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Aluminum ingot	60,000 lbs.	
Packaging		
Total direct materials		$ 15,700

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Sand and other supplies	
Total supplies	$ 1,500

c. Availability of materials & supplies
Aluminum ingots may have to be imported.
All other should be available locally.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 1 H.P.	
Fuel - oil for furnace and core oven	
Water - sanitation and fire protection	$ 1,070

4. DEPRECIATION

	Yrs. life	Amount
Building		
Prodn. tools & equipment		
Other tools & equipment		
Furniture & fixtures		
Total depreciation		$ 730

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Owner	1	
Total indirect labor	1	$ 6,000
b. Direct labor		
Skilled workers	1	
Semi-skilled workers		
Unskilled workers		
Total direct labor	1	$ 6,000

c. Training needs
Only 2 workers; both skilled; very little training required.

6. TRANSPORTATION

a. Own transport equipment
None required.

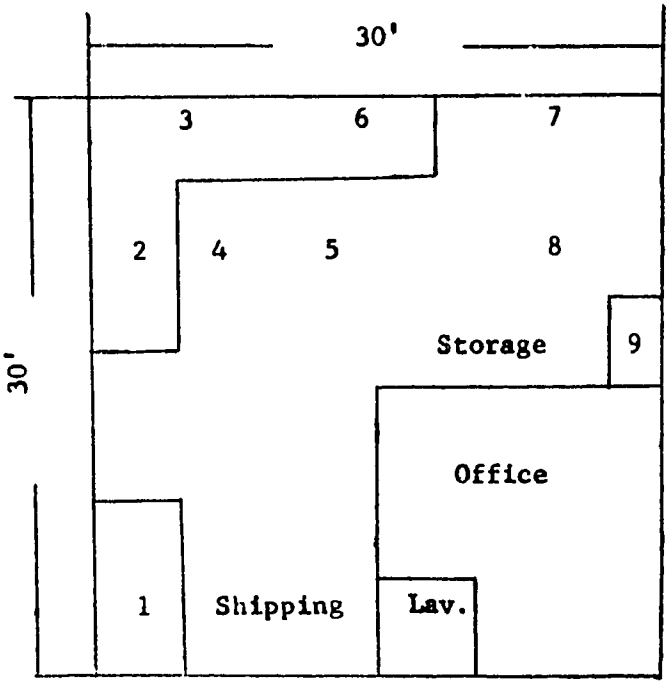
b. External transport facilities
Shipments are small.
Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 15,700	
Direct labor	6,000	
Manufacturing overhead*	9,300	
Total manufacturing cost		$ 31,000
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 3,000
Sales expense		$ 5,000
Freight-out, travel discounts Allowances & bad debts		$ 1,000
Total annual costs		$ 40,000
Annual Gross Profit		$ 5,000
ANNUAL SALES REVENUE		$ 45,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

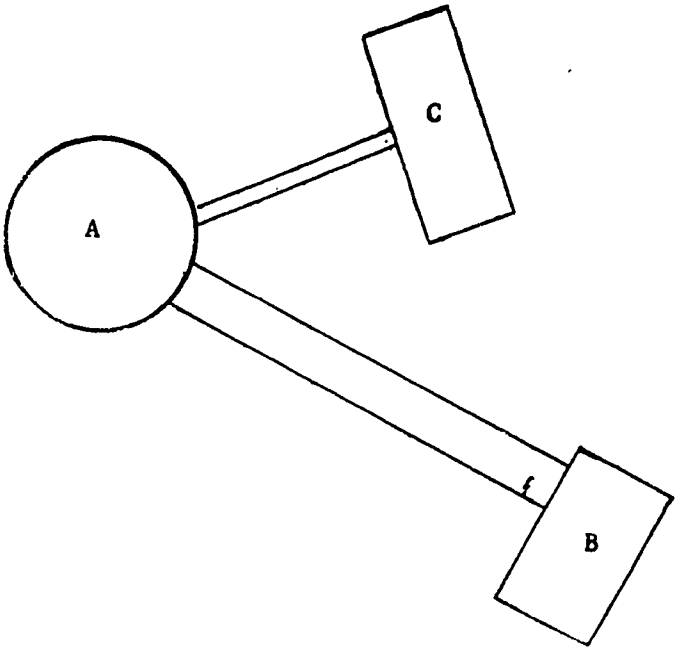
PLANT LAYOUT



1. Packaging
2. Flasks & Patterns
3. Molding Bench
4. Molding Sand
5. Parting Sand
6. Core Oven
7. Melting Furnace
8. Pouring Floor
9. Grinding

I. P. NO. 67308
S. I. C. 3361

MELTING FURNACE



A. Steel Cylinder for Melting Furnace

B. Electric Blower and Pipe

C. Oil Tank and Pipe, Gravity Feed

ALUMINUM FOUNDRY

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Foundry Engineering. H. F. Taylor and others. 1959 559 pp. Illus. $10.00

John Wiley and Sons, Inc.
605 Third Avenue
New York, New York 10016

Text using operational and scientific terminology to cover foundry engineering, emphasizing fundamentals that apply to all cast metals.

B. Foundry Practices. Samuel E. Rusinoff. $6.50

American Technical Society
848 East 58th Street
Chicago, Illinois 60637

II. TECHNICAL AND TRADE PERIODICALS

A. Foundry. Monthly. $10.00/year in U.S., $20.00/year outside U.S.

Penton Publishing Company
1213 West Third Street
Cleveland, Ohio 44113

Supplies subscribers with news and thoroughly covers all phases of foundry practice, both technical and non-technical.

B. Modern Castings. Monthly. $6.00/year.

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Des Plaines, Illinois 60016

Current reporting on modern techniques of metal casting, foundry management and operations, equipment, and materials handling.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer ar Sidney Goldstein. 233 pp. $1.00

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Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

IV. REPRESENTATIVE U. S. PATENTS

Available U. S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,253,306 May 1966 42 p.
Machine for making storage battery elements.

B. Patent No. 3,196,501 July 1965 4 p.
Apparatus and method for metal castings.

C. Patent No. 3,118,196 January 1964 4 p.
Casting apparatus.

D. Patent No. 3,068,537 December 1962 13 p.
Foundry system and apparatus.

E. Patent No. 2,777,187 January 1957 5 p.
Casting apparatus.

F. Patent No. 2,722,726 November 1955 7 p.
Foundry apparatus.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Foundry Equipment Manufacturers' Association
5225 Manning Place, N. W.
Washington, D. C. 20016

VI. DIRECTORIES

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National Society of Professional Engineers
2029 K Street, N.W.
Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

FOUNDRY
PATTERN MAKING

I. P. No. 67309
S. I. C. 3565

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I.P. No. 67309
S.I.C. 3565
DECEMBER 1967

FOUNDRY PATTERN MAKING

PRODUCT DESCRIPTION

Wood patterns for use in both ferrous and non-ferrous foundries.

A. GENERAL EVALUATION OF PROSPECTS

The prospects for this industry depend upon the amount of other industries within the country requiring pattern marking. Many industries buy their own patterns so that they can procure foundry work at any foundry by merely furnishing the patterns. The sales of these products, therefore, would derive from both foundries and industries that use castings. The plant described in this profile is small and can easily be expanded should business warrant. Where an adequate potential sales volume in foundry patterns exists, this industry should prove a good investment.

B. MARKET ASPECTS

1. USERS

Foundries and industries that use castings.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be made direct to users. The maket for this industry depends upon the number of foundries using castings. A sales survey should be made to determine the dollar value of patterns purchased locally by foundries and industry each year. Patterns should be distributed nationally. They are not usually found in the export market. The only competition that can be expected, therefore, is from other plants of this or larger capacity within the same country. A great deal of skill is required in pattern making which puts quality of product in first place as a competitive factor.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $84,000.
The total fixed investment, plus working capital, is estimated at $60,000.
The annual gross profit, before taxes, is estimated at $13,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 15.5%.
(A gross profit on sales, before taxes, of 15.5%, while reflecting U.S. experience, should not be considered normal for a developing country, where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 21.7%.

5. COST PER MAN EMPLOYED

Three direct workers and three indirect workers, or a total of six workers, are employed.
The total fixed capital investment is estimated at $33,000.
Based on these figures, the fixed investment per man employed would amount to $5,500.

C. PRODUCTION REQUIREMENTS - FOUNDRY PATTERN MAKING I.P. No. 67309
ANNUAL CAPACITY - ONE SHIFT OPERATION : $84,000 GROSS SALES S.I.C. 3565

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRICTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital — Cost

Land - 6,000 sq. ft.
Building - one-story 30' x 50'
Equipment, furniture & fixtures
Prodn. tools & equipment
Other tools & equipment
Furniture & fixtures
Transportation equipment
Total fixed capital $ 33,000

Principal items :

Radial saw
Jointer
Trim saw
Attachment for ripping
Planer
Bandsaw
Drill press
Table sander
Shaper
Jigsaw

b. Working Capital (60 days)

Direct materials
Direct labor
Manufacturing overhead
Administrative costs
Sales costs
Freight-out, discounts, bad debts & allowances
Sales revenue
Training costs
Total working capital $ 27,000

c. Total Capital Requirements $ 60,000

2. MATERIAL AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Lumber	16,000 bd. ft.	
Finishing materials		
Packaging		
Total direct materials		$ 4,000

b. Supplies

Lubricants & hand tools
Cutting tools and abrasives
Maintenance & spare parts
Office supplies
Gas, oil & maintenance of truck

Total supplies $ 2,050

c. Availability of materials & supplies

3. POWER, FUEL AND WATER — Annual Cost

Electric Power - 40 H.P.

Fuel - heat as required

Water - sanitation and fire protection

$ 1,000

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 3,350

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager	1	
Office	1	
Truck driver	1	
Total indirect labor	3	$ 22,000

b. Direct labor		
Skilled workers	1	
Semi-skilled workers	1	
Unskilled workers	1	
Total direct labor	3	$ 21,000

c. Training needs

Manager and the skilled worker should be fully experienced. They should be able to train all workers and reach full production in one week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

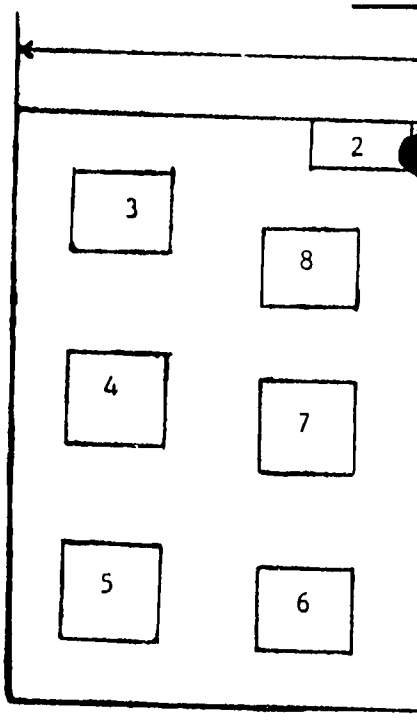
In and out shipments small.
Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 4,000	
Direct labor	21,000	
Manufacturing overhead*	28,400	
Total manufacturing cost		$ 53,400
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total admistrative cost		$ 11,600
Sales expense		$ 3,000
Freight-out, travel discounts Allowances & bad debts		$ 3,000
Total annual costs		$ 71,000
Annual Gross Profit		$ 13,000
ANNUAL SALES REVENUE		$ 84,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PL

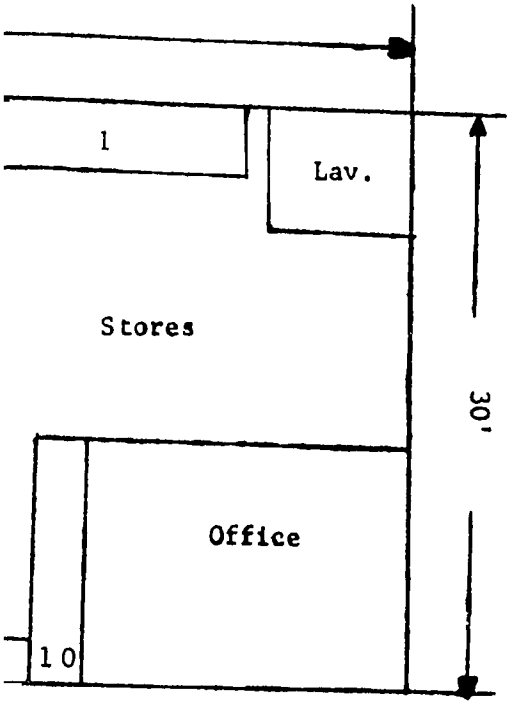


1. Radial Saw
2. Jointer
3. Planer
4. Trim Saw
5. Bandsaw

TERN MAKING

I.P. NO. 67309
S. I. C. 3565

A Y O U T



7. Shaper
7. Drill Press
8. Jigsaw
9. Table Sander
0. Assembly Bench

FOUNDRY PATTERN MAKING

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Foundry Engineering. H. F. Taylor and others. 1959. 407 pp. Illus. $10.00

John Wiley and Sons, Inc.
605 Third Avenue
New York, New York 10016

Includes chapter on pattern construction.

B. Principles of Metal Casting. Richard H. Hime and Philip C. Sponthal. 1955. 639 pp. Illus. $9.50. 2nd Edition in preparation.

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Contains chapter on patterns.

C. Foudry Practices. Samuel E. Rusinoff. $6.50

American Technical Society
848 East 58th Street
Chicago, Illinois 60637

II. TECHNICAL AND TRADE PERIODICALS

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IV. REPRESENTATIVE U.S. PATENTS

Available U. S. Patent Office, Washington, D. C. 20231. $.50 each.

A.	Patent No. 3,193,893 Molding process.	July 13, 1965	3 p.
B.	Patent No. 3,105,277 Dependable pattern bonding agent.	October 1, 1963	3 p.
C.	Patent No. 3,085,895 Composite wooden pattern.	April 16, 1965	4 p.
D.	Patent No. 2,982,998 Method of producing molds.	May 1961	6 p.
E.	Patent No. 2,946,742 Pattern and mothod of molding.	August 1958	6 p.
F.	Patent No. 2,620,529 Pattern and pattern making.	December 9, 1952	6 p.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Foundry Equipment Manufacturers Association
5225 Manning Place, N. W.
Washington, D. C. 20016

B. National Foundry Association
9838 Roosevelt Road
Westchester, Illinois 60153

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INDUSTRY PROFILES

JIGS AND FIXTURES

I. P. No. 67310
S. I. C. 3544

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JIGS AND FIXTURES

PRODUCT DESCRIPTION

Design and production of jigs and fixtures for metal working industries. Plant could also perform die sinking.

A. GENERAL EVALUATION OF PROSPECTS

Prospects for this industry depend largely upon the number of small industries within a country needing jigs, fixtures and small dies for precision work. Large plants usually have their own tool room. The fixed investment for this plant is modest in comparison with the gross sales and the annual gross profits.

B. MARKET ASPECTS

1. USERS

Small industries that do not have their own tool room.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be made direct to small plants and industries. The market needed to support this plant depends entirely upon the needs of small industries without their own tool-making facilities. This plant could do production work on a contract basis for small industries as well as produce jigs and fixtures. When making a feasibility survey for this plant, this should be taken into consideration. The extent of the domestic market will include all areas where small industries exist. Jigs and fixtures are small and well packaged and the transportation cost in relation to the value of the finished product is low. A large number of machine tools are required to manufacture jigs and fixtures and only large plants of the kind described in this profile could produce any form of competition. Jigs and fixtures are not usually exported although this plant might make some sales in neighboring countries not enjoying this plant's capabilities.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $200,000.
The total fixed investment, plus working capital, is estimated at $173,700.
The annual gross profit, before taxes, is estimated at $30,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 15%.
(A gross profit on sales, before taxes, of 15%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 17.3%.

5. COST PER MAN EMPLOYED

Nine direct and five indirect workers, or a total of fourteen workers, are employed.
The total fixed capital investment is estimated at $141,000.
Based on these figures, the fixed investment per man employed would amount to about $10,070.

C. PRODUCTION REQUIREMENTS - JIGS AND FIXTURES — I.P. No. 67310
ANNUAL CAPACITY - ONE SHIFT OPERATION: GROSS SALES $200,000 — S I.C. 3544

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - 1 acre	
Building - 60' x 80'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 141,000

Principal items :

Power hacksaw	Welding heat treat furnace
Engine lathe	Surface plates and measuring instruments
Bench lathe	
Milling machines	
O.D. grinder	
2 Surface grinders	
Toll grinder with drill grinding attachment	
Cutter grinder	
Radial drill	
Drill press	
Boring machine	
Planer	
Shaper	

b. Working Capital (30 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 32,700

c. Total Capital Requirements $ 173,700

2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
a. Direct materials		
Costs of materials will vary depending on type of industries served. Average cost of material for this volume of business is		$ 17,000
b. Supplies		
Lubricants & hand tools		
Cutting tools & abrasives		
Maintenance & spare parts		
Office supplies		
Gas, oil and maintenance of trucks		
Total supplies		$ 4,600

Availability of materials & supplies

All should be available locally.

All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric power - 150 H.P. connected load	
Fuel - production and heat	
Water - sanitation and fire protection	$ 4,100

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 13,100

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Supervisor	1	
Office	2	
Truck driver	1	
Total indirect labor	5	$ 39,000
b. Direct labor		
Skilled workers	5	
Semi-skilled workers	3	
Unskilled workers	1	
Total direct labor	9	$ 57,000

c. Training needs

The manager and the supervisor must have years of experience. The 4 skilled workers must be experts in this filed. They should be able to train the other workers and reach full production in one week.

6. TRANSPORTATION

a. Own transport equipment

Truck.

b. External transport facilities

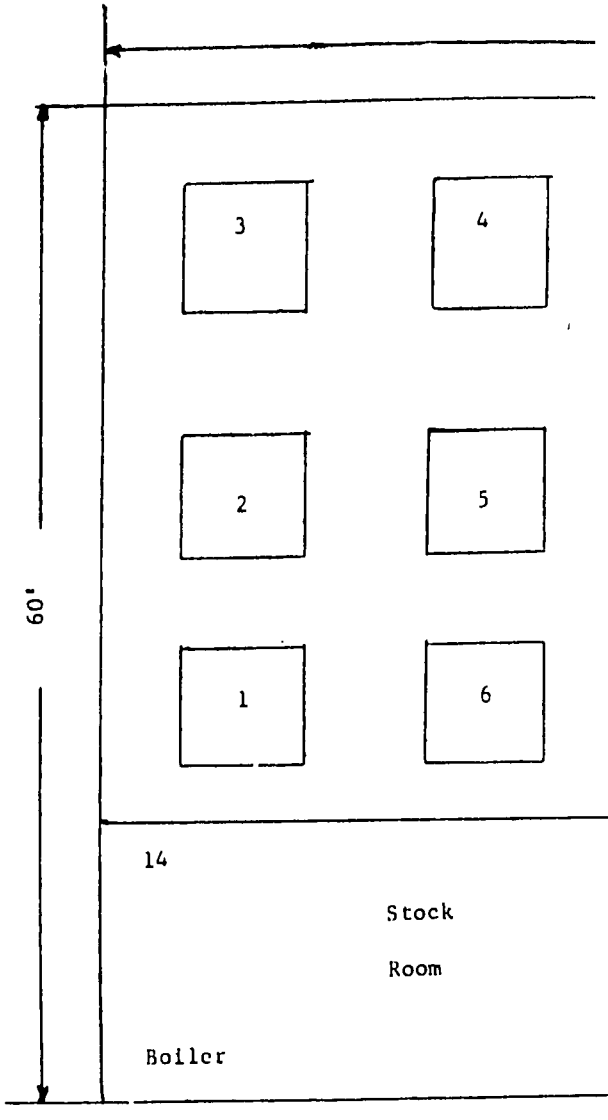
Daily in and out shipments small. Good highways.

7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$ 17,000	
Direct labor	57,000	
Manufacturing overhead*	60,800	
Total manufacturing cost		$ 134,800
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 12,200
Sales expense		$ 17,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 170,000
Annual Gross Profit		$ 30,000
ANNUAL SALES REVENUE		$ 200,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

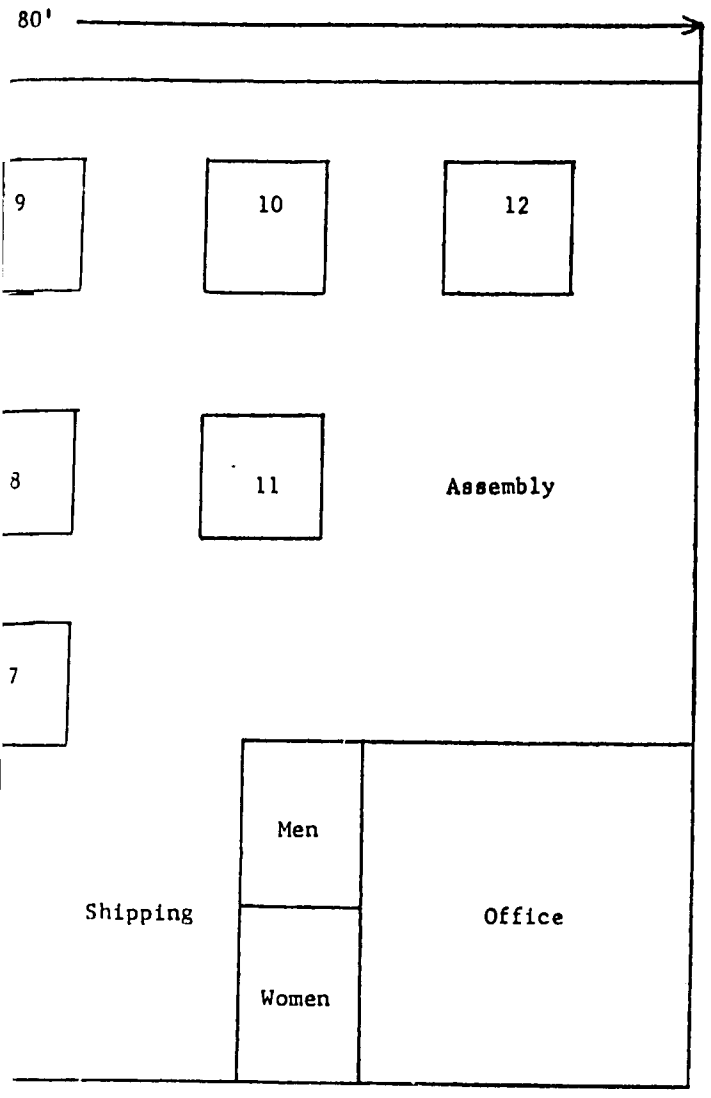


1. Power Hacksaw
2. Engine Lathe
3. Bench Lathe
4. Milling Machine
5. Wet Grinder
6. Cutter Grinder
7. Surface Grinder Magne

ND FIXTURES

I.P. NO. 67310
S. I. C. 3544

LAYOUT



8. Drill Press
9. Boring Machine
10. Planer
11. Shaper
12. Welding
13. Heat Treat Furnace
14. Compressor

JIGS AND FIXTURES

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Tool Design. 2nd Edition. Cyril Donaldson and George H. LeCain. 1957. 577 pp. 549 Illus. $7.50

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Practical design and construction of jigs, fixtures, and dies.

B. Handbook of Fixture Design American Society of Tool and Manufacturing Engineers. 1962. 479 pp. 502 Illus. $15.00

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Pre-design analysis and fixture design procedure. Devoted exclusively to jigs and fixtures.

C. Training Handbook for Apprentices. $12.00. Mathematics Book. $5.25. Machine Shop Theory Book $4.95. Moldmaking and Die Cast Dies for Apprentices. $12.00

National Tool Die & Precision Machining Association
1411 "K" Street, N. W.
Washington, D. C. 20005

D. Basic Die Making. $10.95. Advanced Die Making. $9.95

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

II. TECHNICAL AND TRADE PERIODICALS

A. Tool and Manufacturing Engineer. Monthly. $2.00/year

American Society of Tool Engineers
20501 Ford Road
Dearborn, Michigan 48128

Development in tool, jig and fixture production in various fields of manufacturing.

B. Journal of Applied Mechanics. Quarterly. $15.00/year.

American Society of Chemical Engineers
345 East 47th Street
New York, New York 10017

III. BUSINESS MANAGEMENT MATERIALS

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D.C. 20231. $0.50 each.

A.	Patent No. 3,280,661. Tool for positioning holes as in gear plates and the like.	October 25, 1966.	5 p.
B	Patent No. 3,273,426. Drilling jig.	September 20, 1966	5 p.
C.	Patent No. 3,264,941. Precise repetitive positioning device.	August 9, 1966.	5 p.
D.	Patent No. 3,264,340. Bowling ball drill jig.	July 26, 1966.	6 p.
E.	Patent No. 3,244,205. Flush bolt jig cutter.	Aprill 5, 1966.	6 p.
F.	Patent No. 3,224,021. Combination drilling and tapping jig.	December 21, 1965.	4 p.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National Tool, Die and Precision Machining Association
1411 "K" Street, N. W.
Washington, D. C. 20005

VI. DIRECTORIES

A. Tool and Manufacturing Engineers' Suppliers Directory. Published Annually. $4.50/year.

The American Society of Tool and Manufacturing Engineers
10700 Puritan Avenue
Detroit, Michigan 48223

1,500 product headings, manufacturers, names, addresses.

VII. PROFSSIONAL ENGINEERING SERVICES

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National Society of Professional Engineers
2029 K Street, N.W.
Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

PROCESSED SEA FOOD

I P. No. 67311
S I. C. 2036

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I.P. No. 67311
S.I.C. 2036
DECEMBER 1967

PROCESSED SEAFOOD

PRODUCT DESCRIPTION

Frozen breaded or frozen fried fish, shrimp, frozen lobster tails. The product mix can be adapted to the varieties available and to the market demand.

A. GENERAL EVALUATION OF PROSPECTS

The plant requires a fairly large capital investment, a highly skilled management and ten skilled workers, although most of the laborers need not be highly skilled. There must, of course, be an adequate supply of suitablish fish. There is a growing demand for processed seafood and wherever a continuous and adequate supply of seafood is available for processing the year around, this industry should represent a good investment, providing highly skilled management is employed.

B. MARKET ASPECTS

1. USERS

Households and wher er food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales will generally be made to wholesale food distributors and, in some cases, direct to large consumers. The market needed for this plant will depend on a sufficiently high per capita income and the acceptability of seafood in the ordinary diet of the population. Where the average income is high enough to permit most people to buy these products and where seafood is usual in the eating habits, an adequate market for the production of this plant should be found. Since this plant requires a fairly large investment, the only domestic competition would arise from the fresh fish industries As a rule, however, in tropical countries, fresh fish are not shipped long distances. The extent of the domestic market for this product will depend upon the existence of refrigeration equipment including refrigerated transportation and customer-owned refrigeration facilities. Where such refrigeration is available, the extent of the domestic market would be nationwide. The ability of this plant to export surplus production will depend on the type and quality of the products, the refrigeration facilities available and the ability of management to control costs.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognised that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $1,150,000
The total fixed investment, plus working capital, is esimated at $640,600.
The annual gross profit, before taxes, is estimated at $104,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 9.0%.
(A gross profit on sales, before taxes, of 9.0%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 16.0%.

5. COST PER MAN EMPLOYED

Seventy-three direct workers and eleven indirect workers, or a total of eighty-four workers, are employed. The total fixed capital investment is estimated at $450,000.
Based on these figures, the fixed investment per man employed would amount to $5,357.

C. PRODUCTION REQUIREMENTS - PROCESSED SEAFOOD — I.P. No. 67311
ANNUAL CAPACITY - ONE SHIFT OPERATION: 2,400,000 8-OUNCE PACKAGES — S.I.C. 2036

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a Fixed Capital	Cost
Land - one acre at pier	
Building - one story, 90' x 125'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$450,000

Principal Items :

Platform scales	Cooling Tunnel
Flight elevator	Semi-automatic piston filler
Washer	
Preparation conveyor	Heat sealer
Washing and Drying conveyor	Cooling tank
Battering machine	Shrimp peeler and deveiner
Plate freezer	Compressor
Sizer	Steam generator
Batter mixer	Laboratory equipment
Truck	
Steam jacketed kettles	
Band saws	
Fryer	

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$190,600
c. Total Capital Requirements	$640,600

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Fish and shrimp		
Batter and breading mix		
Hydrogenated fat		
Wax paper overwrap		
Cartons and shipping cases		
Total direct materials		$500,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Cleaning & sanitizing chemicals	
rubber gloves and aprons	
Gas, oil and maintenance of truck	
Total supplies	$ 6,400

c. Availability of materials & supplies

Fresh fish must be available at pier.
All supplies should be available locally.
All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 175 H. P. connected load	
Fuel - Bunker C oil	
Water - must be potable	$ 7,000

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 38,600

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Supervisors	2	
Office	3	
Inspectors	2	
Maintenance	2	
Truck Driver	1	
Total indirect labor	11	$ 14,000
b. Direct labor		
Skilled workers	10	
Semi-skilled workers	13	
Unskilled workers	50	
Total direct labor	73	$ 305,000

c. Training needs

The manager, 2 supervisors and 2 inspectors must be fully experienced. They with the help of the skilled workers should be able to train all workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Truck - refrigerated

b. External transport facilities

Daily shipments of processed fish will amount to about 5 tons per day.

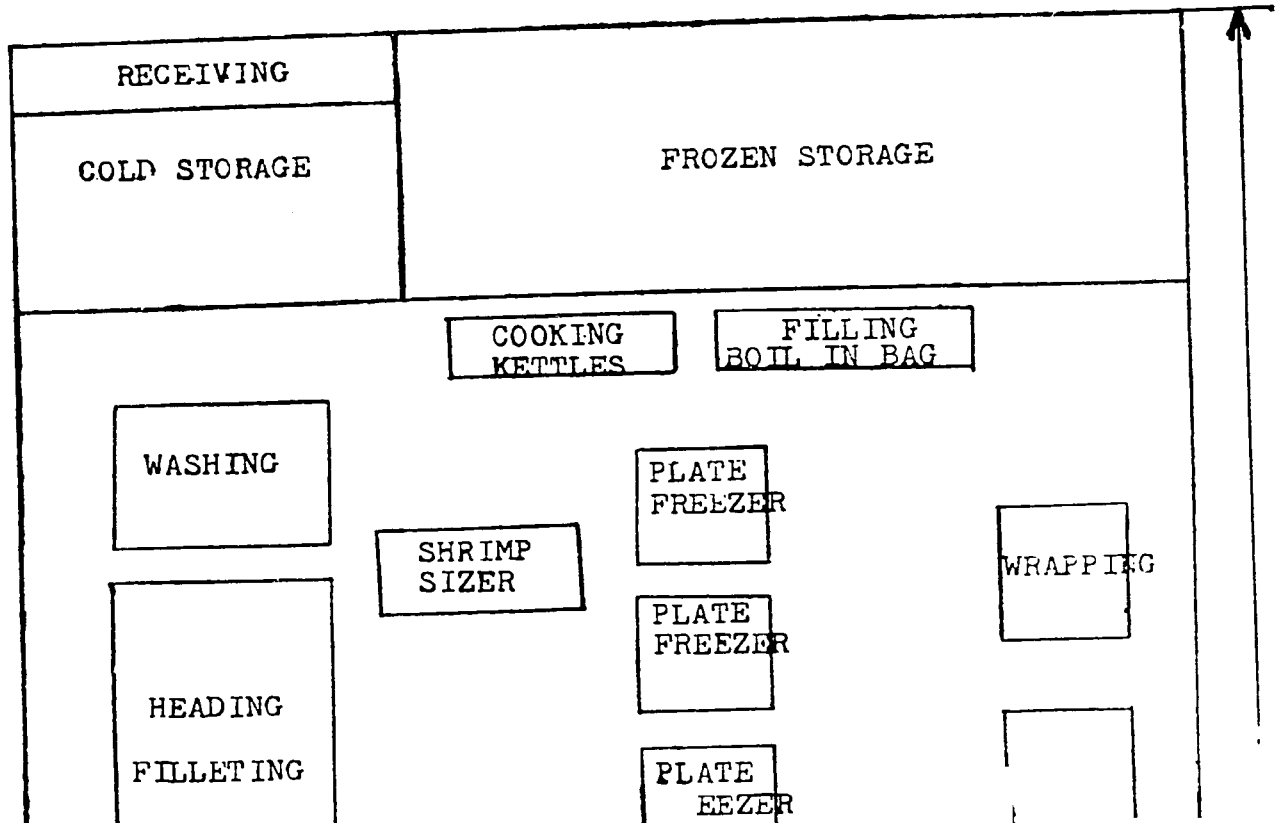
Good highways.

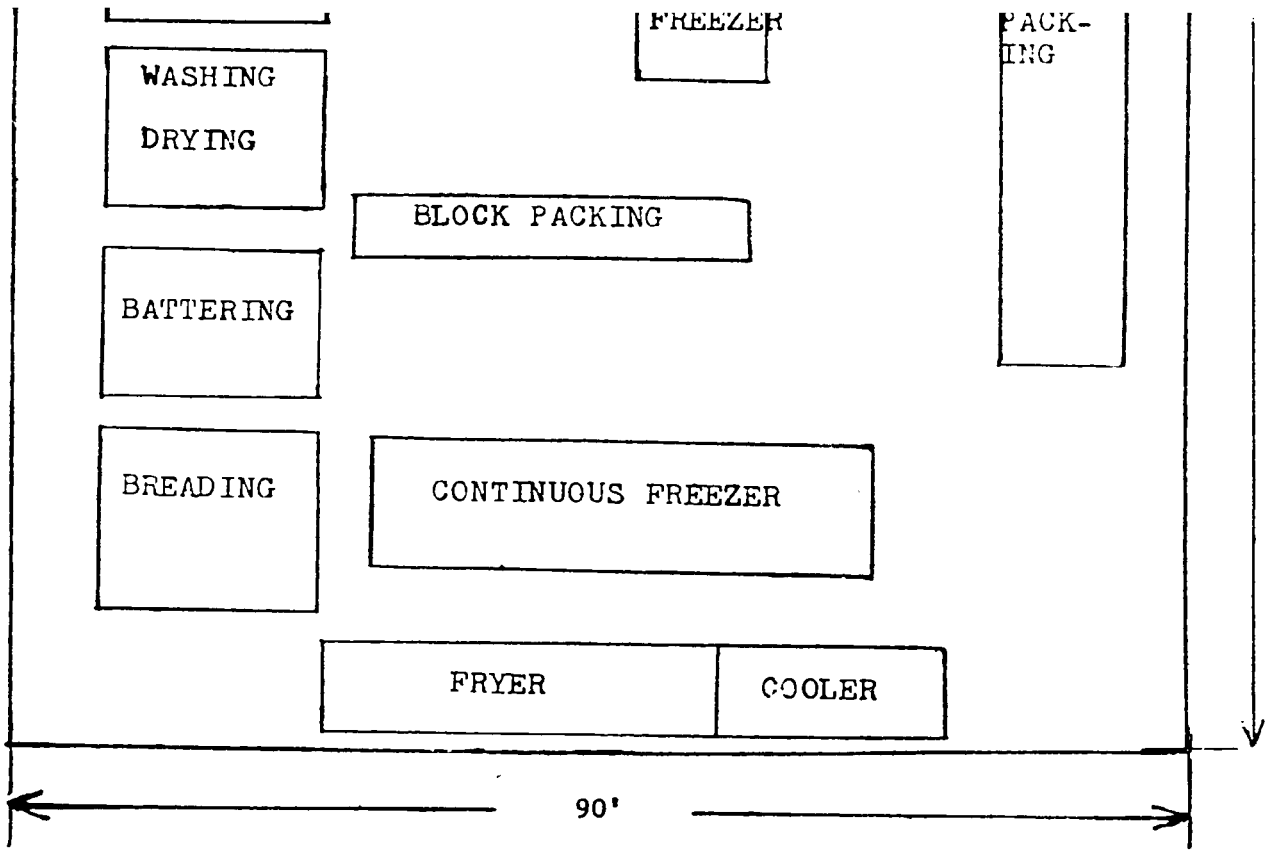
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$500,000	
Direct labor	305,000	
Manufacturing overhead*	126,000	
Total manufacturing cost		$ 931,000
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 65,000
Sales expense		$ 37,000
Freight-out, travel discounts Allowances & bad debts		$ 13,000
Total annual costs		$1,046,000
Annual Gross Profit		$ 104,000
ANNUAL SALES REVENUE		$1,150,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT LAYOUT





I.P. NO. 67311
S. I. C. 2036

PROCESSED SEAFOOD

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Industrial Fishery Technology. M. E. Stansby. 1963. 400 pp. $12.00

Reinhold Publishing Company
430 Park Avenue
New York, New York 10022

Study of a major United States industry never before covered in such detail.

B. The Freezing and Preservation of Foods. Vol. 1, Fresh Foods. $19.75. Vol. II, Precooked and Prepared Foods. 1957. $10.00.

AVI Publishing Company
Box 388
Westport, Connecticut 06881

Devoted to the freezing of foods, including fish.

II. TECHNICAL AND TRADE PERIODICALS

A. The Fishing Gazette. Monthly. $3.00

The Fishing Gazette Publishing Corporation
461 Eighth Avenue
New York, New York 10001

Contains facts and figures on the fishing trade.

B. National Fisherman. Monthly. $4.00/year.

National Fisherman
Camden, Maine 04843

Contains information on new ideas and developments in the trade.

C. Food Engineering. Monthly. $25.00

Chilton Company
Chestnut & 56th Streets
Philadelphia, Pennsylvania 19139

Deals with the processing and research on food materials.

III. BUSINESS MANAGEMENT MATERIALS

A. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

B. The First Two Years : Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Insights and clues concerning the entire process of small business formation, growth, and decline.

IV. REPRESENTATIVE U.S. PATENTS

Available U. S. Patent Office, Washington, D. C. 20231 $.50 each.

A. Patent No. 3,255,201. June 1966. 3 p.
Method of preparing frozen seafood.

B. Patent No. 3,152,915. October 1964. 5 p.
Method of freezing, packaging, and breading shrimp.

C. Patent No. 3,245,226. April 1966. 6 p.
Apparatus for quick freezing solid foods.

D. Patent No. 3,213,634. October 1965. 4 p.
Method and apparatus for individual quick freezing.

E. Patent No. 3,166,425. January 1965. 6 p.
Method of freezing cooked food.

F. Patent No. 3,162,020. December 1964 6 p.
Method of conserving and transporting fresh fish.

G. Patent No. 2,933,398. April 19, 1960. 5 p.
Method of preserving protein foods.

H. Patent No. 2,909,040. October 20, 1959. 4 p.
Apparatus and method for freezing fish.

I. Patent No. 2,863,779. December 9, 1958. 4 p.
Method of preparing shrimp in frozen condition.

J. Patent No. 2,851,367. September 9, 1958. 10 p.
Process of producing frozen fish fillets.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National Shrimp Breaders Association
2 N. Riverside Plaza
Chicago, Illinois 60606

B. National Prepared Frozed Food Processors Association
382 S. Oyster Bay Road
Hicksville, L. I., New York 11801

VI. DIRECTORIES

A. Directory of Frozen Food Processors. Annually. $7.00

E. W. Williams Publications
1776 Broadway
New York, New York 10019

Lists more than 1,800 frozen food processors in the U. S., Canada, and other countries.

VII. PROFESSIONAL ENGINEERING SERVICES

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CANNED DEHYDRATED ONIONS

I. P. No. 67312
S. I. C. 2034

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

CANNED DEHYDRATED ONIONS

I. P. No. 67312
S. I. C. 2034
DECEMBER 1967

PRODUCT DESCRIPTION

Dehydrated onions in No. 10 cans (canners' designation 306-700, i.e. 6 3/16" in diameter and 7" in height.)

A. GENERAL EVALUATION OF PROSPECTS

An assured adequate supply of suitable, locally-grown onions is essential. The plant would operate 24 hours a day for about 130 days a year. Therefore, a supply of seasonal workers would be required. The capital requirements for this plant are moderately high. The demand for this product is increasing. If a high standard of product quality is maintained, there should be no difficulty in finding market outlets. However, a feasibility study of this project should be made covering source of material, labor, market, and all other important factors.

B. MARKET ASPECTS

1. USERS

Households and wherever food is served.

2. SALES CHANNELS AND METHODS

Sales would be made to wholesalers and direct to large retailers, military installations and other large consumers. There are many factors to be considered in arriving at the market needed to support this factory. In tropical and semi tropical countries where onions could be grown the year around, sales would naturally be adversely affected. The cost of dehydrated onions might prohibit their use where the per capita income is low and the supply of raw fresh onions ample. The use of onions in the diet varies from country to country. Therefore, a survey of market potential is mandatory. Dehydrated onions are light and well packaged, presenting no transportation problem, so the domestic market should be nationwide. This is a distinctive product with no direct substitutes and it cannot be produced without a sizeable investment. Therefore, no domestic competition should be expected unless it comes from other plants producing the same product. Dehydrated onions are exported worldwide. But a plant of this size might be at a disadantage in competing in world markets with mass product.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $600,000.
The total fixed investment, plus working capital, is estimated at $580,100.
The annual gross profit, before taxes, is estimated at $50,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 8.3%.
(A gross profit on sales, before taxes, of 8.3%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 8.6%.

5. COST PER MAN EMPLOYED

Forty-nine direct workers and ten indirect workers, or a total of fifty-nine workers are employed.
The total fixed capital investment is estimated at $480,000.
Based on these figures, the fixed investment per man employed would amount to about $8,135.

C. PRODUCTION REQUIREMENTS - CANNED DEHYDRATED ONIONS — I.P. No. 67312
ANNUAL CAPACITY - THREE SHIFT OPERATION, 130 DAYS: 520,000 CANS — S.I.C. 2034

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - 2 acres	
Building - one story 160' x 225'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 480,000

Principal items:

Conveyors, Elevators, Washer, Peeler, Scalder, Trimming Table, Cutters, Dehydration Machine, Drying bins, Canning equipment, Sealer, Atmosphere conditioning equipment, two 5-ton trucks

b. Working Capital (30 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 100,100

c. Total Capital Requirements — $ 580,100

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Onions	3600 tons	
No. 10 size cans	520,000	
Labels		
Cartons		
Total direct materials		$ 248,000

b. Supplies

Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of trucks	
Total supplies	$ 10,625

c. Availability of materials & supplies

All should be available locally.

All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 200 H.P. connected load	
Fuel - Gas	
Water - 5,000,000 gallons. Must be potable	$ 37,200

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 39,375

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager, full time	1	
Supervisor, part time	1	
Office, part time	3	
Inspector, part time	3	
Truck Drivers, full time	2	
Total indirect labor	10	$ 50,000
b. Direct labor		
Skilled workers	3	
Semi-skilled workers	6	
Unskilled workers	40	
Total direct labor	49	$ 101,000

c. Training needs

Manager and supervisor must be fully experienced. They with 3 skilled workers should be able to train all workers and reach full production in two weeks.

6. TRANSPORTATION

a. Own transport equipment

Two 5-ton trucks.

b. External transport facilities

Vegetables must be trucked to the plant.

Good Highways necessary.

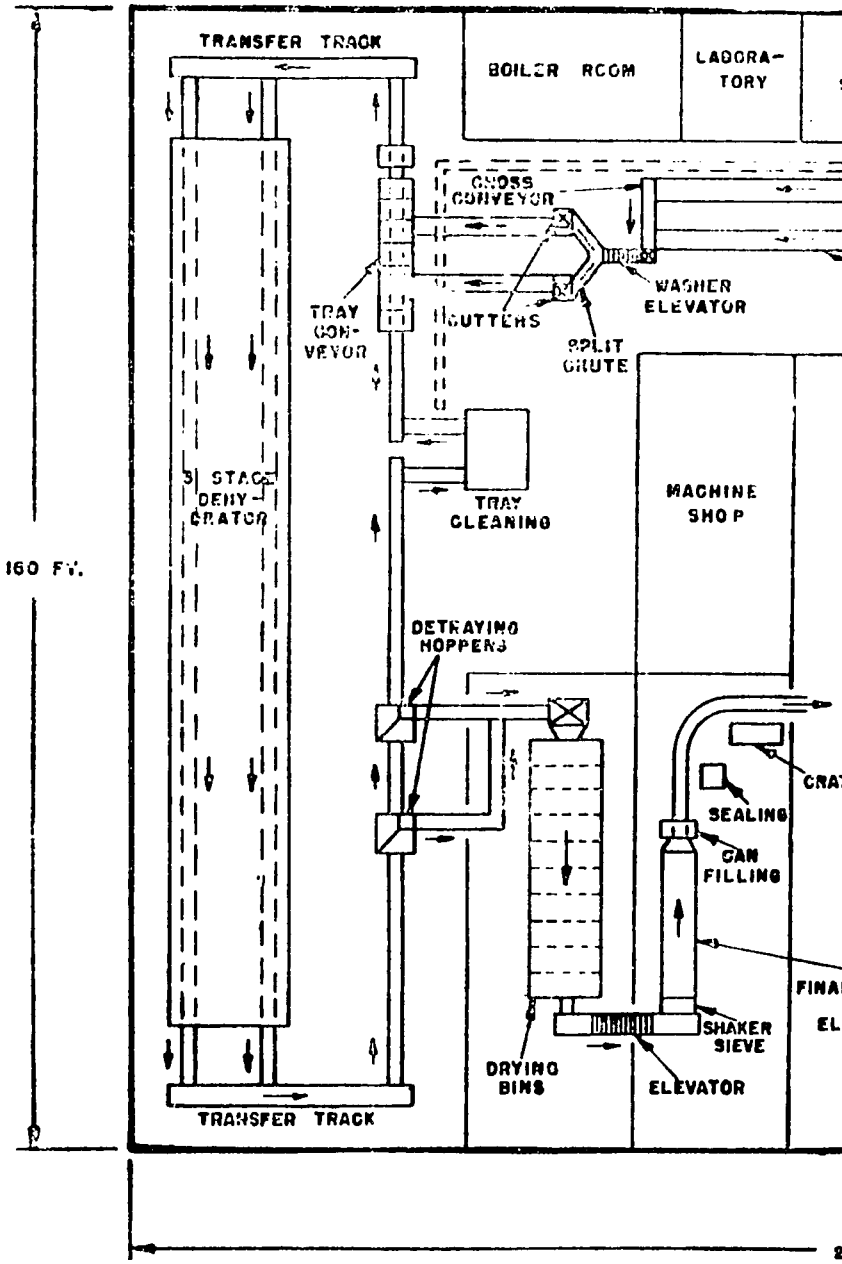
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 248,000	
Direct labor	101,000	
Manufacturing overhead*	137,200	
Total manufacturing cost		$ 486,200
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 35,800
Sales expense		$ 18,000
Freight-out, travel discounts Allowances & bad debts		$ 10,000
Total annual costs		$ 550,000
Annual Gross Profit		$ 50,000
ANNUAL SALES REVENUE		$ 600,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

CANNED DEHY

PLANT



ONIONS

I. P. NO. 67312
S. I. C. 2034

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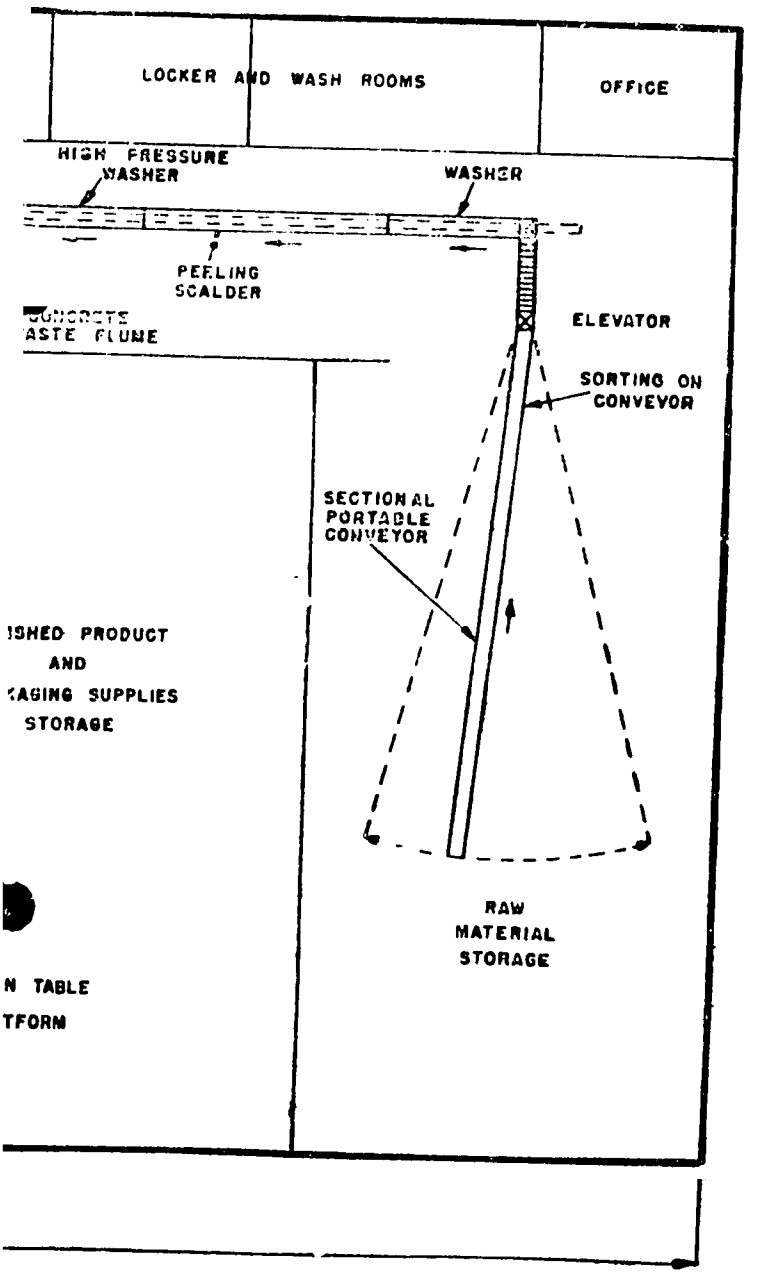

CANNED DEHYDRATED ONIONS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Food Dehydration. Volume I, Principles. W. B. Van Arsdel 1963. $10.00.
Volume II, Products and Technology. W. B. Van Arsdel and M. H. Copley. 1964.
732 pp. 161 Illustrations. $23.50.

AVI Publishing Company
P. O. Box 388
Westport, Connecticut 06881

These two volumes are devoted exclusively to the dehydration of foods.

B. Food Composition and Analysis. Harold O. Triebold and L. W. Aurand. 1963. 497 pp. $12.50.

Van Nostrand Company, Inc.
120 Alexander Street
Princeton, New Jersey 08540

General procedures and methods used in food analysis.

II. TECHNICAL AND TRADE PERIODICALS

A. Food Engineering. Monthly. $25.00/year.

Chilton Company
Chestnut and 56th Streets
Philadelphia, Pa. 19139

Devoted to coverage of the food industries.

B. Canning Trade. Bi-Weekly. $5.00/year.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Devoted to coverage of the food processing industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 1961. (Small Business Administration). 233 pp. $1.00.

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Prepared by the Small Business Administration to assist in the development of more effective management in small business.

B. Profitable Small Plant Layout. John R. Immer. 1964. (Small Business Administration, Small Business Management Series No. 21, 2nd Edition) 48 pp. $0.25.

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

A guide to moving production materials through the shop in an orderly manner, to savin labor costs and to increasing net profits.

IV. REPRESENTATIVE U. S. PATENTS

Available U. S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,197,312 July 1965 5 p.
Process for preparing reconstitutable foods.

B. Patent No. 3,194,670 July 1965 3 p.
Method of dehydrating foods.

C. Patent No. 3,185,581 May 1965 3 p.
Process for producing a friable readily constitutable food product.

D. Patent No. 3,107,803 February 1965 6 p.
Preparation of dehydrated food products.

E. Patent No. 3,098,750 July 1963 1 p.
Method of preparing toasted dehydrated onions.

F. Patent No. 3,031,313 April 1962 7 p.
Dehydration of fruits and vegetables.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National Onions Association
201 1 2 East Grand River
East Lansing, Michigan 48823

B. American Dehydrated Onion and Garlic Association
333 Montgomery Street
San Francisco, California 94104

VI. DIRECTORIES

A. Canners Directory. Annual. $5.00.

National Canners Association
1133 20th Street, N. W.
Washington, D. C. 20006

Lists 1,300 canning firms, grouped by type of product.

B. Canning Machinery Directory. Gratis.

Canning Machinery and supplies Association
7758 Wisconsin Avenue, N. W.
Washington, D. C. 20016

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in the Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

ORDERING INSTRUCTIONS

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

GLUCOSE FROM CASSAVA STARCH

I. P. No. 67313
S. I. C. 2041

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

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The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

GLUCOSE FROM CASSAVA STARCH

I.P. No. 67313
S.I C. 2041
DECEMBER 1967

PRODUCT DESCRIPTION

Glucose sold in bulk, shipped in tank cars or tank trucks.

A. GENERAL EVALUATION OF PROSPECTS

The prospects for this industry will depend on the adequate supply of wet cassava starch. This supply must be sufficient for the plant to operate 24 hours per day, 250 days per year. Glucose is used in a wide variety of food and other industries. The fixed capital investment is fairly moderate. Only three skilled workers are required. If the raw materials and sales potential are available, this industry should represent a good investment.

B. MARKET ASPECTS

1. USERS

Industries including manufacture of foodstuffs, medical preparations, tanning and finishing of leather, rayon manufacture and moisture conditioning of tobacco.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be made in bulk directly to industries. The market depends upon the utilization of the product by a variety of local industries. The plant should undertake nationwide distribution since bulk shipment to widely dispersed industries is a comparatively low-cost method of transportation. Since the investment required to produce this product prohibits competition from small factories, the only domestic competition encountered would arise from other plants of relative size producing the same product. If raw material is available locally and the plant is well managed, efficiently operated and turns out a high-quality product, there should be little difficulty in competing with imported products. This plant could also consider entering the worldwide market for glucose if shipping and tariff costs are not inordinately high.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $360,000.
The total fixed investment, plus working capital, is estimated at $370,200.
The annual gross profit, before taxes, is estimated at $48,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 13.3%.
(A gross profit on sales, before taxes, of 13.3%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 13%.

5. COST PER MAN EMPLOYED

Fifteen direct and six indirect workers, or a total of tweny-one workers, are employed.
The total fixed capital investment is estimated at $312,000.
Based on these figures, the fixed investment per man employed would amount to about $14,860.

C. PRODUCTION REQUIREMENTS - GLUCOSE FROM CASSAVA STARCH I.P. No. 67313
ANNUAL CAPACITY - THREE-SHIFT OPERATION, 250 DAYS: S.I.C. 2041
2,500 TONS

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 2 acres	
Building - one story 120' x 250'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 312,000
Principal items:	
Convertor tank	
Neutralization vat	
Drum filters	
Evaporators	
Mix tank	
2 lift trucks	
Rotary leaf filter	
b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 58,200
c. Total Capital Requirements	$ 370,200

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Cassava starch	1,870 tons	
Hydrochloric acid	8 tons	
Sodium carbonate	2,750 lbs.	
Packaging		
Total direct materials		$ 115,000
b. Supplies		
Lubricants & hand tools		
Cutting tools & abrasives		
Maintenance & spare parts		
Office supplies		
Gas, oil and maintenance of trucks		
Total supplies		$ 5,750

c. Availability of materials & supplies

All should be available locally.

All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 50 H.P. connected load	
Fuel - gas	
Water - about 4 million gals.	
	$ 6,500

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 23,350

5. MANPOWER

	Number	Annual Cost
a. Indirect Labor		
Manager	1	
Supervisor	1	
Office	2	
Truck Drivers	2	
Total indirect labor	6	$ 43,000
b. Direct Labor		
Skilled workers	3	
Semi-skilled workers	6	
Unskilled workers	6	
Total direct labor	15	$ 69,600

c. Training needs

Manager and supervisor must be fully experienced. With three skilled workers they should be able to train all workers and reach full production in two weeks.

6. TRANSPORTATION

a. Own transport equipment

Two trucks.

b. External transport facilities

Output of plant is approximately 10 tons per day. Good transportation facilities should be available to move this tonnage.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct Materials	$ 115,000	
Direct labor	69,600	
Manufacturing overhead*	78,600	
Total manufacturing cost		$ 263,200
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 27,800
Sales expense		$ 15,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 312,000
Annual Gross Profit		$ 48,000
ANNUAL SALES REVENUE		$ 360,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

FLOW

(COMMERCIAL)
GLUCOSE
EVAPORATOR
ROTARY - LEAF
FILTER
GLUCOSE -
CARBON
MIXTURE
ACTIVATED
CARBON
EFFECT
ATORS

AVA STARCH

I.P. NO. 67313
S. I. C. 2041

EET

GLUCOSE FROM CASSAVA STARCH

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Starch. R. L. Whistler, 1964. $13.50 (Volume 4 of Methods in Carbohydrate Chemistry)
Fundamental Aspects. 1965. $22.00
Volume II, Industrial Aspects. $22.00

Academic Press, Inc.
111 Fifth Avenue
New York, New York 10003

Deals with the chemistry and technology of the manufacturing of starch.

B. Quality Control and Reliability. 5th Edition. Norbert L. Enrick. 1966. 254 pp. $7.50

Industrial Press
93 Worth Street
New York, New York 10013

The 24 chapters of the book are divided into three main sections: (1) Basic quality control applications; (1) additional quality control methods; and (3) reliability.

II. TECHNICAL AND TRADE PERIODICALS

A. Sugar Journal. Monthly, $3.00

Sugar Journal, Inc.
107 Camp Street
New Orleans, Louisiana 70130

B. Sugar y Azucar. Monthly. $5.00

Industrial Press
Palmer Publications
25 West 45th Street
New York, New York 10036

III. BUSINESS MANAGEMENT MATERIALS

A. Federal Food, Drug, and Cosmetic Act, as amended. General Regulations for its Enforcement, Title 21, Part 1, $3.00

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Deals with all phases of quality and health aspects of processed foods, including additives, such as vitamins, seasoning, coloring, and the enforcement of regulations.

B. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Insights and clues concerning the entire process of small business formation, growth and decline.

C. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

IV. REPRESENTATIVE U. S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231 $.50 each.

A. Patent No. 3,236,687. February 22, 1966 7 p.
Process for producing sugars from starch.

B. Patent No. 3,169,083. February 9, 1965 4 p.
Continuous conversion of starch into dextrose and related products.

C. Patent No. 3,067,066. December 4, 1962 4 p.
Glucose from the multiple hydrolysis of starch.

D. Patent No. 3,029,192. April 10, 1962 2 p.
Conversion of starch by enzymatic action.

E. Patent No. 2,989,425. June 20, 1961 3 p.
Method for hydrolysis of starch - relates to a method for starch in an acid water suspension while heating.

F. Patent No. 2,946,706. July 26, 1960 3 p.
Process for the hydrolyzation of starch and other polysaccharides.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Corn Refiners Association
1001 Connecticut Avenue
Washington, D. C. 20036

Membership represents all U.S. glucose producers. Publishes quarterly magazine "Corn".

VI. DIRECTORIES

A. Sugar y Azucar. Yearbook. Annually. $10.00

Palmer Publications
604 Fifth Avenue
New York, New York 10020

Lists 2,300 sugar manufacturers in 63 countries of the world.

VII. PROFESSIONAL ENGINEERING SERVICES

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National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

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This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

HIGH ALUMINA REFRACTORY BRICK AND CEMENT

I. P. No. 67314
S. I. C. 3297

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

HIGH ALUMINA REFRACTORY BRICK AND CEMENT

I.P. No. 67314
S.I.C. 3297
DECEMBER 1967

PRODUCT DESCRIPTION

High alumina refractory brick and cement of not over 70 percent aluminum oxide. The bricks will be 9" x 4 1/2" x 3" straight or their equivalent in arches, wedges, feather wedges, keys and other special shapes

A. GENERAL EVALUATION OF PROSPECTS

These products are used principally by industry. Therefore, the prospects for this business depend upon the number of industries within the country that require high alumina brick and cement. It is also important that raw materials be available locally.

B. MARKET ASPECTS

1. USERS

Industries are the principal users of these products.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be made direct to industry and the market for these products depends entirely on industrial requirements. Therefore, a market survey of industry will determine the annual potential sales volume. These products are packaged well and the sales price permits nation-wide distribution. Sales, of course, will probably center in urban industrial areas. This plant cannot be operated successfully on a small-volume basis. Only another plant of this size and capacity could offer any domestic competition. If the principal raw materials are available locally at reasonable cost and the plant is efficiently operated, this factory should have no difficulty competing against imported products. Some export sales to neighboring countries not having a plant of this size are feasible.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $600,000.
The total fixed investment, plus working capital, is estimated at $846,000.
The annual gross profit, before taxes, is estimated at $90,000.
Using these figures, the profit on gross sales, before taxes, amounts to 15%.
(A gross profit on sales, before taxes, of 15%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 10.6%.

5. COST PER MAN EMPLOYED

Seventeen direct and eight indirect workers, or a total of twenty-five workers, are employed.
The total fixed capital investment is estimated at $750,000.
Based on these figures, the fixed investment per man employed would amount to $30,000.

C. PRODUCTION REQUIREMENTS - HIGH ALUMINA REFRACTORY BRICK AND CEMENT

I.P. No. 67314
S.I.C. 3297

ANNUAL CAPACITY - ONE SHIFT OPERATION : 1,500,000 BRICKS
400 TONS CEMENT

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - two acres	
Building - 70' x 140'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 750,000

Principal items:

Hoppers and feeders	Elevators
Tractor shovel	Conveyors
Grinders	Maintenance equipment
Screens	2 Fork lift trucks
Scales	
Storage bins	
Mixer	
Bagger presses	
Kilns	
Crusher	
Ball mill	
Dryer	
Oil Tanks	

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 96,000
c. Total Capital Requirements	$ 846,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Bauxite	6,000 tons	
Flint clay or high heat duty clay	5,000 tons	
Multiwall paper bags	8 M	
Steel bands		
Fine sand		
Total direct materials		$ 98,800

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Welding rods and pyrometric cones	
Gas. oil and maintenance of truck	
Total supplies	$ 15,150

c. Availability of materials & supplies

Some supplies may have to be imported. All materials and supplies available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 250 H.P. connected load	
Fuel - 540,000 gal. Bunker C oil	
Water - Production, sanitation and fire protection	$ 52,200

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transporation equipment	4	
Total depreciation		$ 69,150

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager and supervisor	2	
Office	3	
Inspector	1	
Maintenance	1	
Truck driver	1	
Total indirect labor	8	$ 54,000
b. Direct labor		
Skilled workers	4	
Semi-skilled workers	8	
Unskilled workers	5	
Total direct labor	17	$ 82,000

c. Training needs

Manager and supervisor should be fully experienced. They should be able to train all workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Truck.

b. External transport facilities

In and out shipments about 60 tons per day.
Good highway essential and railroad if possible

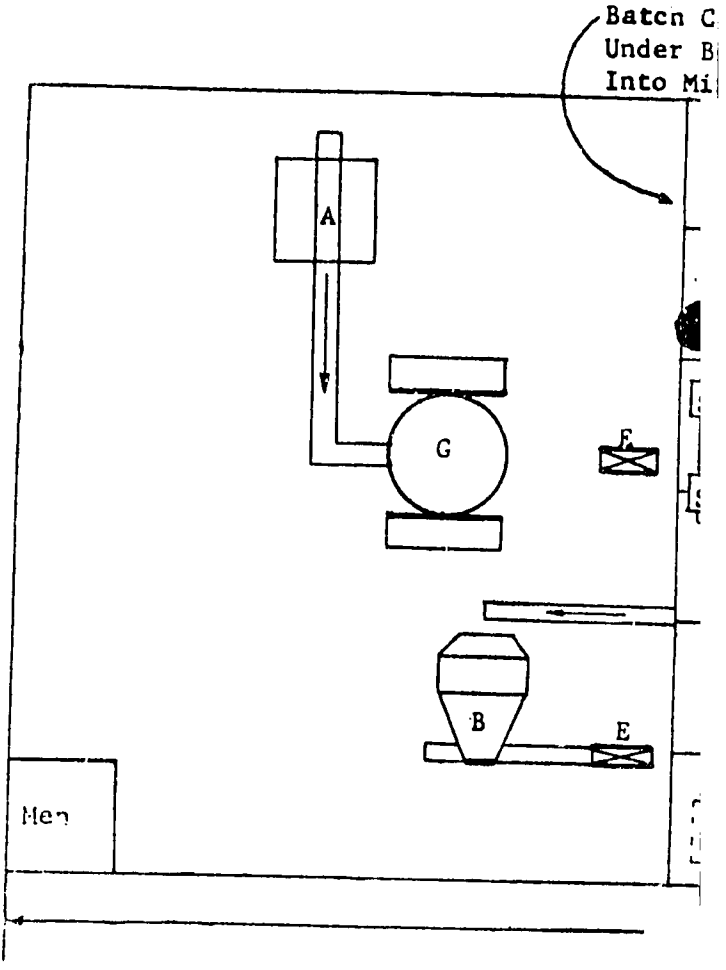
7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$ 98,800	
Direct labor	82,000	
Manufacturing overhead*	190,500	
Total manufacturing cost		$ 371,300
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		72,700
Sales expense		36,000
Freight-out, travel discounts Allowances & bad debts		30,000
Total annual costs		$ 510,000
Annual Gross Profit		$ 90,000
ANNUAL SALES REVENUE		$ 600,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

HIGH ALUMINA R

PLANT L



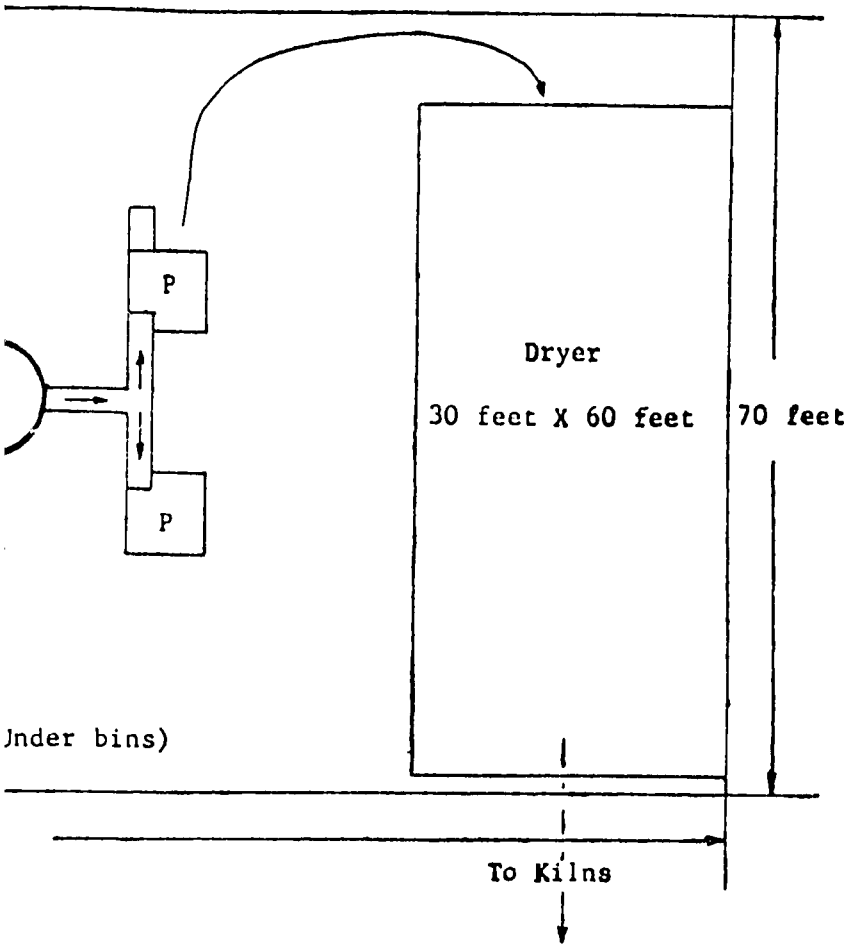
A - Apron Feeder and Hopper
B - Ball Mill
C - Bagging Machine
G - Grinder
E - Bucket Elevators
M - Mixer
P - Presses
S - Screens over Bins

TORY BRICK AND CEMENT

I. P. NO. 67314
S. I. C. 3297

AND WORKFLOW

Scales
charges



I.P. No. 67314
S.I.C. 3297

HIGH ALUMINA REFRACTORY BRICK AND CEMENT

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. High Temperature Technology. Ivor E. Campbell. 2nd Edition in preparation. 526 pp. Illus.

John Wiley and Sons, Inc.
305 Third Avenue
New York, New York 10016

B. Refractories. 3rd Edition. F. H. Norton. 1949. 782 pp. Illus. $16.50

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Scope of the refractories industry in the United States. Refractory raw materials, molding methods, drying, firing, kilns, some special refractory materials.

II. TECHNICAL AND TRADE PERIODICALS

A. Brick and Clay Record. Monthly. $5.00/year

Cahners Publishing Company
5 South Wabash Avenue
Chicago, Illinoins 60603

Materials and manufacturing of bricks, refractories, and other products.

B. Ceramic Age. Monthly. $4.00/year.

Francis Tatnall, Editor and Publisher
2800 Euclid Avenue
Cleveland, Ohio 44115

Production magazine covering industrial ceramics, refractories, structural clay products, raw materials and equipment.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp, 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Starting and Managing a Small Business of Your Own. Wendell O. Metcalf. 49 pp. 1962. $.25. Vol. I (2nd Edition) of the Starting and Managing Series of the Small Business Administration, Washington, D. C.

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Pitfalls usually encountered when entering a new business. Sources of additional information given.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231 $.50 each.

A. Patent No. 3,258,349. June 28, 1966. 4 p.
Refractory brick and light and porous method.

B. Patent No. 3,244,540. April 5, 1966. 4 p.
High alumina refractory bodies.

C. Patent No. 3,194,671. July 13, 1965. 5 p.
Self setting refractory cements and methods of making same.

D. Patent No. 3,188,368. June 8, 1965. 8 p.
Composition, casting and process for producing a high-temperature resistant concrete.

E. Patent No. 3,108,007. October 22, 1963. 2 p.
Process of making refractory brick containing calcinated magnesia.

F. Patent No. 3,102,037. August 27, 1963. 4 p.
Novel improved insulating refractory cement and its construction.

G. Patent No. 2,965,504. December 20, 1960. 2 p.
Process for preparation of refractory insulating blocks.

H. Patent No. RE 25.527. Reissued May 12, 1964. 5 p.
Fired silica refractories.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Special Refractories Association
271 North Avenue
New Rochelle, New York 10801

VI. DIRECTORIES

A. Ceramic Data Book Buyers' Directory. Annual. $3.50

Cahners Publishing Company
5 South Wabash Avenue
Chicago, Illinois 60603

Lists manufacturers and suppliers of raw materials and equipment to the ceramics industry.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professonal engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

ORDERING INSTRUCTIONS

The price of *Industry Profiles* is a minimum of $3.00 for from one to five "*Profiles*." The purchaser may select up to five of any "*Profiles*" available.

Complete sets of the 250 *Industry Profiles* published in 1966, I. P. No. 66001 through I. P. No. 66250 consecutively, may be purchased for $125.00 per set. Complete sets of the 150 *Industry Profiles* to be published in 1967, I. P. No. 67251 through I. P. No. 67400 consecutively, may be purchased for $75.00 per set. The latter "*Profiles*" will automatically be shipped to full set purchasers upon release.

Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

POTATO CHIPS

I. P. No. 67315
S. I. C. 2099

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The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

POTATO CHIPS

I.P. No. 67315
S.I.C. 2099
DECEMBER 1967

PRODUCT DESCRIPTION

Potato chips packaged in glassine bags and friction sealed cans.

A. GENERAL EVALUATION OF PROSPECTS

This product will sell to the people in the upper income brackets in any country. However, in many countries where rice, for example, is the staple food and, in many cases, about the only food that the lower income people have to eat, potato chips will be a luxury seldom enjoyed.

B. MARKET ASPECTS

1. USERS

This product is used in homes, hotels, restaurants, bars, clubs and wherever food is sold or served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to retail stores and, in some cases, direct to large users. In many countries, this product would be considered a luxury item by a large percentage of the population. The market will vary, therefore, according to the income levels. This product is light and well packaged. Since it is used by practically everyone in the domestic market--providing it is an affordable expense--the market would be nationwide. A relatively large investment is required in order to produce potato chips. For this reason, domestic competition --if any--will come from other plants within the country with the same production capability. There should be no competition from imported potato chips since these are seldom found in the world trade market. However, small export sales to friendly, neighboring countries might be expected.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $260,000.
The total fixed investment, plus working capital, is estimated at $272,000.
The annual gross profit, before taxes, is estimated at $24,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 9.2%.
(A gross profit on sales, before taxes, of 9.2%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on total capital requirements, before taxes, is estimated at 8.8%.

5. COST PER MAN EMPLOYED

Twelve direct and six indirect workers, or a total of eighteen workers, are employed.
The total fixed capital investment is estimated at $228,600.
Based on these figures, the fixed investment per man employed would amount to $12,700.

C. PRODUCTION REQUIREMENTS - POTATO CHIPS

I.P. No. 67315
S.I.C. 2099

ANNUAL CAPACITY - ONE SHIFT OPERATION: 300,000 POUNDS
NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - one acre	
Building - one story 100' x 300'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 228,600

Principal items :

Potato Peeler, Potato Slicer, Cooker, Cooking Oil Filter, Oil Preheater, Filling Machine and Accessories, Bucket Conveyor, Flat Bed Conveyor, Extra Flat Belts

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 43,400
c. Total Capital Requirements	$ 272,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Potatoes	1,200,000 lbs.	
Cooking Oil	120,000 lbs.	
Salt	6,000 lbs.	
Packaging		
Total direct materials		$ 65,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil & maintenance of truck	
Total supplies	$ 4,300

c. Availability of materials & supplies

All materials and supplies should be available locally.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 12 H.P. connected load	
Fuel - production and heat	
Water - production and sanitation. Water must be portable.	$ 3,140

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation Equipment	4	
Total depreciation		$ 14,660

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Supervisor	1	
Office	2	
Maintenance	1	
Truck driver	1	
Total indirect labor	6	$ 46,000
b. Direct labor		
Skilled workers	1	
Semi-skilled workers	2	
Unskilled workers	9	
Total direct labor	12	$ 48,400

c. Training needs

The manager with one skilled worker should be able to train all workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

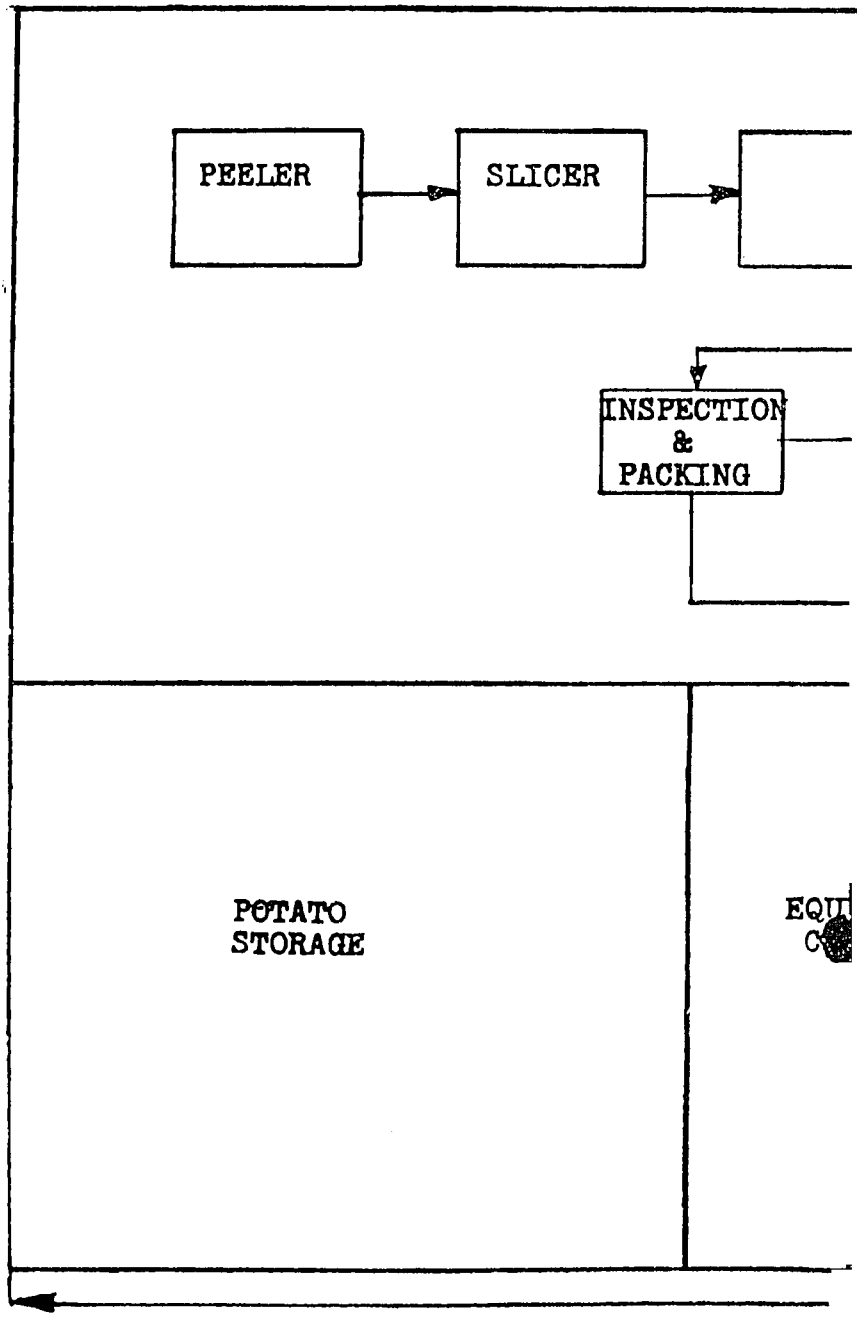
In and out shipments about 4 tons per day.
Good highway and railroad if possible.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

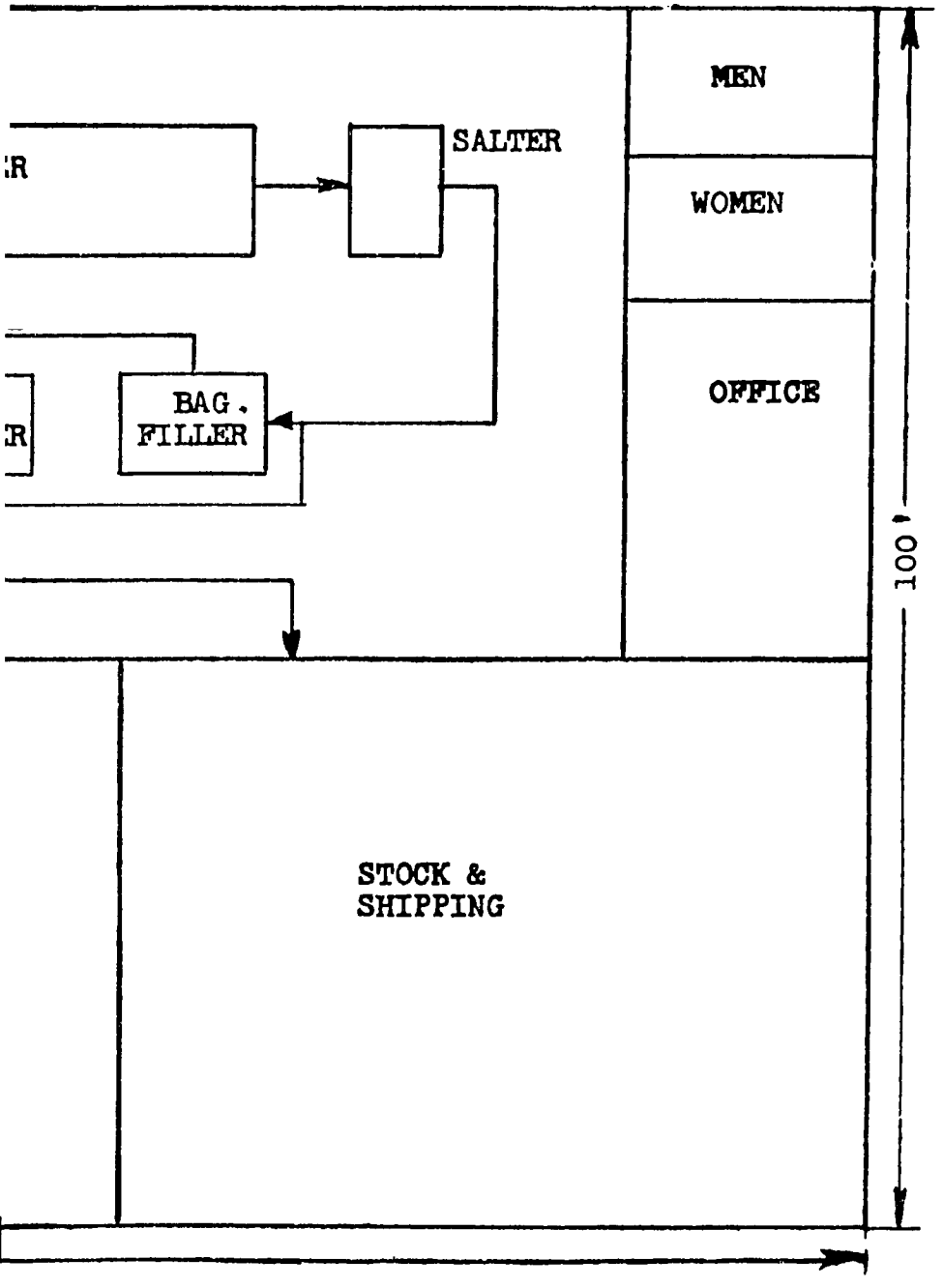
Direct materials	$ 65,000	
Direct labor	48,400	
Manufacturing overhead*	68,100	
Total manufacturing cost		$ 181,500
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 36,000
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 6,500
Total annual costs		$ 236,000
Annual Gross Profit		$ 24,000
ANNUAL SALES REVENUE		$ 260,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consquently only representative totals are used.

PLANT LAYOUT



I. P. NO. 67315
S. I. C. 2099



POTATO CHIPS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Potato Processing. W. F. Talburt. 1959. 475 pp. 113 Illus. $9.50

AVI Publishing Company
P. O. Box 388
Westport, Connecticut 06881

Devoted entirely to processing potato products including potato chips.

B. Quality Control and Reliability. 5th Edition. Norbart L. Enrick. 1966. 254 pp. $7.50

The Industrial Press
93 Worth Street
New York, New York 10013

The 24 chapters of the book are divided into three main sections: (1) Basic quality control applications; (2) additional quality control methods; and (3) reliability.

II. TECHNICAL AND TRADE PERIODICALS

A. Food Engineering. Monthly. $25.00/year

Chilton Company
Chestnut & 56th Street
Philadelphia, Pennsylvania 19139

Devoted to engineering in the food industry.

B. Potato Chipper. Monthly. No price given.

Potato Chip Institute International
946 Hanna Building
Cleveland, Ohio 44115

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years : Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
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Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

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Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Improving Materials Handling in Small Plants. $.20

Small Business Management Series No. 4
U. S. Government Printing Office
Washington, D. C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S Patent Office, Washington, D.C. 20231. $.50 each.

A. Patent No. 3,243,302. March 1966 6 p.
High fat food products and preparation methods.

B. Patent No. 3,231,390. January 1966 6 p.
Method of purifying cooking oils used.

C. Patent No. 3,210,193. October 1965 6 p.
Method of deep fat frying.

D. Patent No. 3,217,633. November 1965 10 p.
Semi tube deep fat fryer.

E. Patent No. 3,217,271. March 1964 4 p.
Process for frying non-greasy fried combustibles.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Potato Chip Institute International
946 Hanna Building
Cleveland, Ohio 44115

B. National Potato Council
741 Munsey Building
1329 "E" Street, N. W.
Washington, D. C. 20004

VI. DIRECTORIES

A. National Food Brokers Association Directory. Biennial. (Odd years). Free of charge to business firms.

National Food Brokers Association
1916 "M" Street, N. W.
Washington, D. C. 20036

VII. PROFESSIONAL ENGINEERING SERVICES

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2029 K Street, N.W.
Washington, D.C. 20006

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

SHEET STEEL, HOT ROLLED

I. P. No. 67316
S. I. C. 3316

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

SHEET STEEL, HOT ROLLED

I. P. No. 67316
S. I. C. 3316
DECEMBER 1967

PRODUCT DESCRIPTION

Sheet steel, 15 to 25 gauge, 48" wide, for the manufacture of lightweight fixtures.

A. GENERAL EVALUATION OF PROSPECTS

For the tonnage involved in the production of steel by the plant described in this profile, it would be uneconomical to manufacture slab or billet steel for rolling. This plant requires a very substantial capital investment. Its economic feasibility depends entirely upon the existence of other industries within the country which use hot rolled sheet steel and upon the availability of steel slabs delivered at reasonable cost.

B. MARKET ASPECTS

1. USERS

The principal users of hot rolled sheet steel are fabricators who make their products by means of stamping and forming.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales will be made principally direct to industries; some may be made to metal merchants. The market for hot rolled sheet steel depends on the existence or development of industries needing this type of steel for their fabrication work and upon export sales to neighboring countries that do not have a sheet steel plant. A comprehensive survey should be undertaken to determine the market potential. This product is easily transported and if good transportation facilities exist throughout the country, nationwide distribution of the product should be made. Competition in the domestic market can be expected from foreign suppliers presently serving the area particularly if their operations are fully integrated because they will enjoy a distinct price advantage. This plant could not compete in the international market against mass producers.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See page 3 for supporting data)

The annual gross sales revenue is estimated at $6,500,000.
The total fixed investment, plus working capital, is estimated at $1,908,700.
The annual gross profit, before taxes, is estimated at $757,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 11.6%.
(A gross profit on sales, before taxes, of 11.6%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 39.4%.

5. COST PER MAN EMPLOYED

Fifty direct workers and fourteen indirect workers, or a total of sixty-four workers, are employed.
The total fixed capital investment is estimated at $1,395,000.
Based on these figures, the fixed investment per man employed would amount to about $21,800.

C. PRODUCTION REQUIREMENTS SHEET STEEL, HOT ROLLED — I.P. No. 67316
ANNUAL CAPACITY - TWO SHIFT OPERATION : 50,000 TONS — S.I.C. 3316
NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 10 acres	
Building - one story 60' x 180'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$1,395,000

Principal Items :

Slab heating furnace	Air compressor
Hot rolled steel mill	Transfer tables
Crop shear	and hydraulic
Coilers	system
Hoists	10 ton stake truck
Conveyors	
Lift trucks	
Strapping tables	
Oil storage tank	
Pump	
Piping and valves	

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 513,700
c. Total Capital Requirements	$1,908,700

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Steel slabs	50,500 tons	
Less amount earned from sale of scrap		
Packaging material		
Total direct materials		$4,883,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 50,000

c. Availability of materials & supplies

Steel slabs may have to be imported. All available in world markets.

3. POWER, FUEL AND WATER

a. Electric Power - 1,800,000 KWH connected load Fuel - 1,250,000 gal. Bunker C oil Water - about 48,000,000 gals.	Annual Cost
	$128,000

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$135,200

5. MANPOWER

a. Indirect Labor	Number	Annual Cost
Manager	1	
Supervisors	2	
Office	5	
Maintenance	4	
Truck driver	2	
Total indirect labor	14	$ 87,000
b. Direct Labor		
Skilled workers	8	
Semi-skilled workers	16	
Unskilled workers	26	
Total direct labor	50	$256,000

c. Training Needs

Manager and supervisor should have years of experience. They, with 8 skilled workers, should be able to train all workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment.
one 10 ton stake truck

b. External transport facilities.
In and out shipments amount to about 400 tons per working day. Plant should be located on railroad siding and good highways.

7. TOTAL ANNUAL COSTS AND SALES

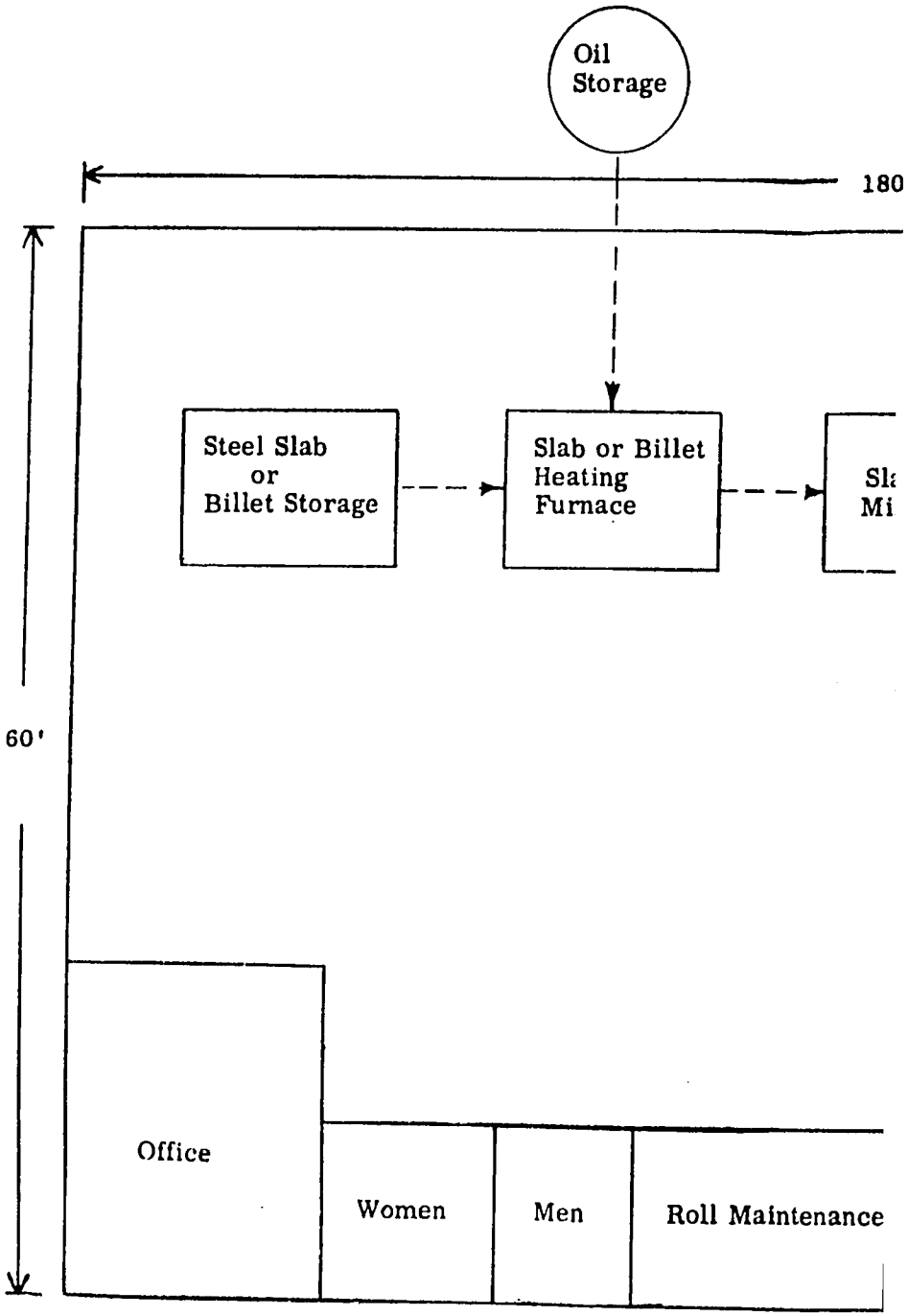
REVENUE		
Direct materials	$4,883,000	
Direct labor	256,000	
Manufacturing overhead*	401,000	
Total manufacturing cost		$5,540,000
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		131,000
Sales expense		36,000
Freight-out, travel discounts Allowances & bad debts		36,000
Total annual costs		$5,743,000
Annual Gross Profit		$ 757,000
ANNUAL SALES REVENUE		$6,500,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect Labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors consequently only representative totals are used.

B3

SHEET STEEL

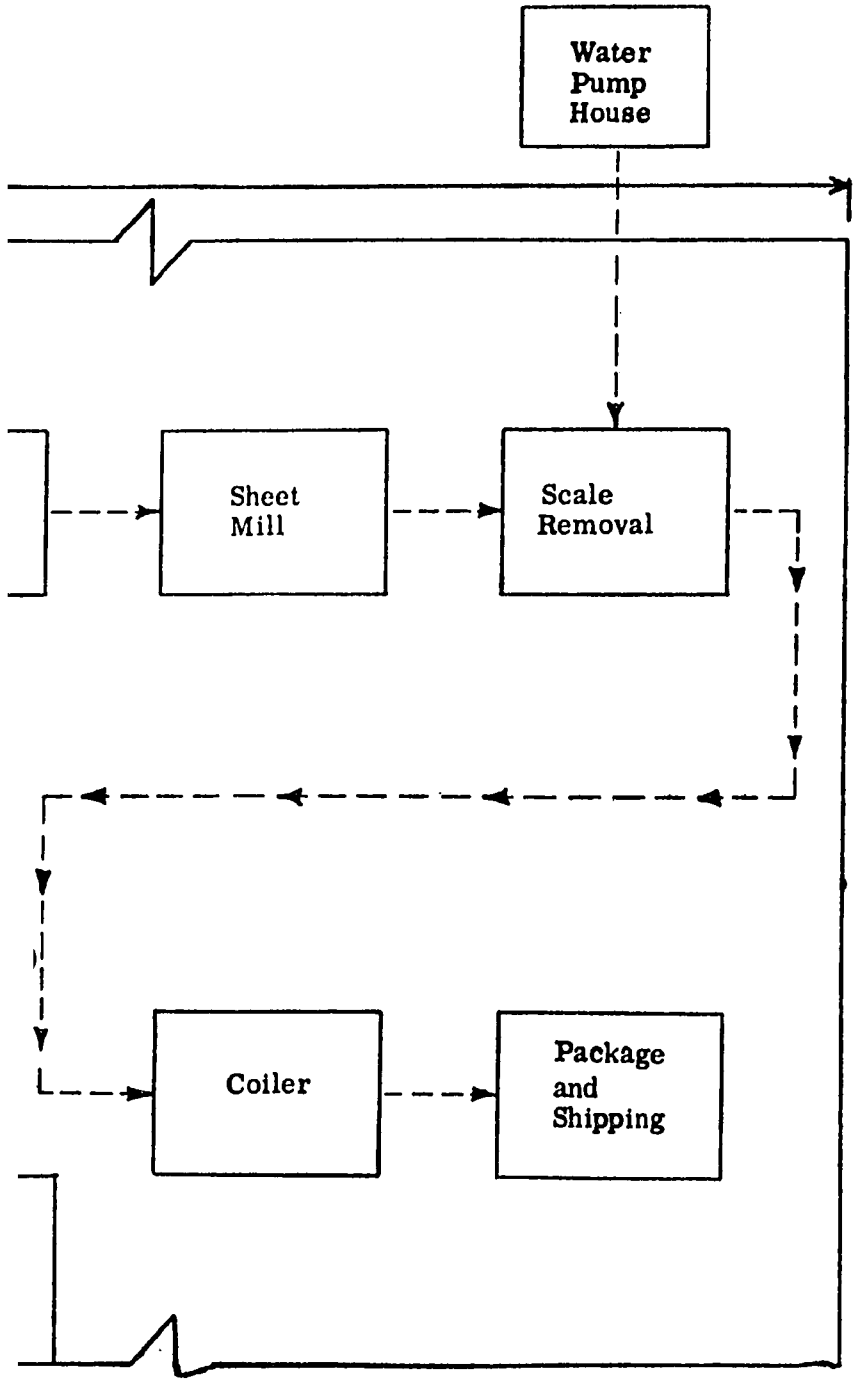
PLANT LAYOUT



ROLLED

I. P. NO. 67316
S. I. C. 3316

WORKFLOW



SHEET STEEL

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. The Physical Chemistry of Steel Making. J. F. Elliott. 1958. 258 pp. Illus. $17.50

Massachusetts Institute of Technology Press
Cambridge, Massachusetts 02142

Liquid metals and properties of solutes in liquid iron

B. Metallurgy. Carl G. Johnson and William R. Weeks. 4th Edition. Illus. $5.50

American Technical Society
848 East 58th Street
Chicago, Illinois 60637

II. TECHNICAL AND TRADE PERIODICALS

A. Steel. Weekly. $25.00/year.

Penton Publishing Company
1213 West Third Street
Cleveland, Ohio 44113

Metal working weekly with technical articles on the production of steel; business and market situations.

B. Iron Age. Monthly. $10.00

Chilton Publishing Company
Chestnut & 56th Streets
Philadelphia, Pennsylvania

C. Metal Progress. Monthly. $9.00/year.

American Society for Metals
Metals Park
Novelty, Ohio 44072

Metallurgy ond uses of materials and alloys.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U.S. Government Printing Office
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Insights and clues concerning the entire process of small business formation, growth, and decline.

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U.S. Government Printing Office
Washington, D.C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each

A. Patent No. 3,262,688 July 26, 1966 10 p.
Jet convection heat transfer.

B. Patent No. 3,252,693 May 24, 1966 7 p.
Control system for continuous annealing lines and the like.

C. Patent No. 3,239,201 March 8, 1966 7 p.
Heat treating and quenching apparatus.

D. Patent No. 3,208,742 September 28, 1965 4 p.
Apparatus for spray quenching.

E. Patent No. 3,186,698 June 1, 1965 4 p.
Heat treating apparatus.

F. Patent No. 3,151,197 September 29, 1953 2 p.
Apparatus for quenching roll products.

G. Patent No. 2,959,922 November 15, 1960 5 p.
Master controlling device for rolling mills and the like.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. American Iron and Steel Institute
150 East 42nd Street
New York, New York 10017

VI. DIRECTORIES

A. Directory of Iron and Steel Plants. $17.00

Steel Publications, Inc.
624 Grant Building
Pittsburgh, Pennsylvania 15230

Lists approximately 22,000 executives and key operating officials in 2,500 steel companies and plants.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

ORDERING INSTRUCTIONS

The price of *Industry Profiles* is a minimum of $3.00 for from one to five "*Profiles*." The purchaser may select up to five of any "*Profiles*" available.

Complete sets of the 250 *Industry Profiles* published in 1966, I. P. No. 66001 through I. P. No. 66250 consecutively, may be purchased for $125.00 per set. Complete sets of the 150 *Industry Profiles* to be published in 1967, I. P. No. 67251 through I. P. No. 67400 consecutively, may be purchased for $75.00 per set. The latter "*Profiles*" will automatically be shipped to full set purchasers upon release.

Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

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INDUSTRY PROFILES

STARCH, OIL, AND FEED FROM SORGHUM GRAIN

I. P. No. 67317
S. I. C. 2041

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The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

STARCH, OIL AND FEED FROM SORGHUM GRAIN

I.P. No. 67317
S.I.C. 2041
DECEMBER 1967

PRODUCT DESCRIPTION

Oil, starch and cattle feed produced from sorghum grain. The oil is sold in bulk. The starch and cattle feed are sold in 100-pound bags.

A. GENERAL EVALUATION OF PROSPECTS

This plant requires a substantial capital investment. The manufacturing procesees are largely mechanical. Therefore, not much skilled labor is required. Good management and supervision are needed, however, to control the production costs. These products are fairly standardized and will have to be sold at market prices over which the individual producer has little control. The prospects for this industry, therefore, depend upon the the availability of a regular supply of sorghum grain at reasonable prices and upon the control of operating costs of which labor is an important element.

B. MARKET ASPECTS

1. USERS

(a) Oil: Vegetable oil refineries, food and other industries.

(b) Starch: Food and other industries.

(c) Feed: Livestock raisers.

2. SALES CHANNELS AND EXTENT OF MARKET

The oil and starch would be sold mainly to other industries using these products and, possibly, to exporters. The feed would be sold to wholesale feed merchants. Markets for these products are likely to be dispersed and varied in charac er, depending to a great extent on the use of the products by industries and on livestock feeding methods. In estimating the market, all three products must be considered as a unit since a market must exist for all in order to earn a profit. A comprehensive feasibility survey including a careful market investigation must be conducted. These products are more or less standardized. Producers must sell at prevailing market prices. The marketing problem, therefore, lies not in finding buyers but in producing at an attractive price while earning an adequate margin of profit. Bulk transport facilites are necessary for the shipment of the oil and, to the extent that these are available, the domestic market would be nationwide.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognised that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $1,330,000.
The total fixed investment, plus working capital, is estimated at $1,055,200.
The annual gross profit, before taxes, is estimated at $180,000.
Using these figures, the profit on gross sales, before taxes, amounts to 13.5%.
(A gross profit on sales, before taxes, of 13.5%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 17.1%.

5. COST PER MAN EMPLOYED

Fifty-four direct and eleven indirect workers, or a total of sixty-five workers, are employed.
The total fixed capital investment is estimated at $741,000.
Based on these figures, the fixed investment per man employed would amount to $11,400.

C. PRODUCTION REQUIREMENTS - STARCH, OIL AND FEED FROM SORGHUM GRAIN

I.P. No. 67317
S.I.C. 2041

ANNUAL CAPACITY - THREE SHIFT OPERATION: 250 DAYS
8,500 TONS STARCH, 400 TONS OIL, 2,000 TONS FEED

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 3 acres	
Building - one story 125' x 300'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 741,000

Principal items:

Grain storage tanks	Storage bins
Steep tanks	Conveyors
Weigh tanks	Weighing scales
Rotary dryer	2 fork lift trucks
Oil expeller	One pickup truck
Filter press	
Degerminating mill	
Disintegrator	
Evaporator	
Cake mill	
Drum dryers	
Centrifugals	
Flash dryer	

b. Working Capital (30-60 Days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 314,200
c. Total Capital Requirements	$1,055,200

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Sorghum grain	11,675 tons	
100 lb. sacks	180,000	
Total direct materials		$ 593,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil & maintenance of truck	
Total supplies	$ 17,000

c. Availability of materials & supplies
All should be available locally. All are available in world markets.

3. POWER, FUEL AND WATER

Annual Cost

Electric Power - 500 H.P. connected load
Fuel - gas
Water - about 5 million gals. must be potable.

$ 38,200

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 64,100

5. MANPOWER

	Number	Annual cost
a. Indirect labor		
Manager	1	
Supervisor	2	
Office	3	
Inspector	1	
Maintenance	2	
Truck drivers	2	
Total indirect labor	11	$ 81,000
b. Direct labor		
Skilled workers	6	
Semi-skilled workers	20	
Unskilled workers	28	
Total direct labor	54	$ 236,800

c. Training needs
Manager and 2 supervisors should be fully experienced. They with 6 skilled workers should be able to train all workers and reach full production in 30 days.

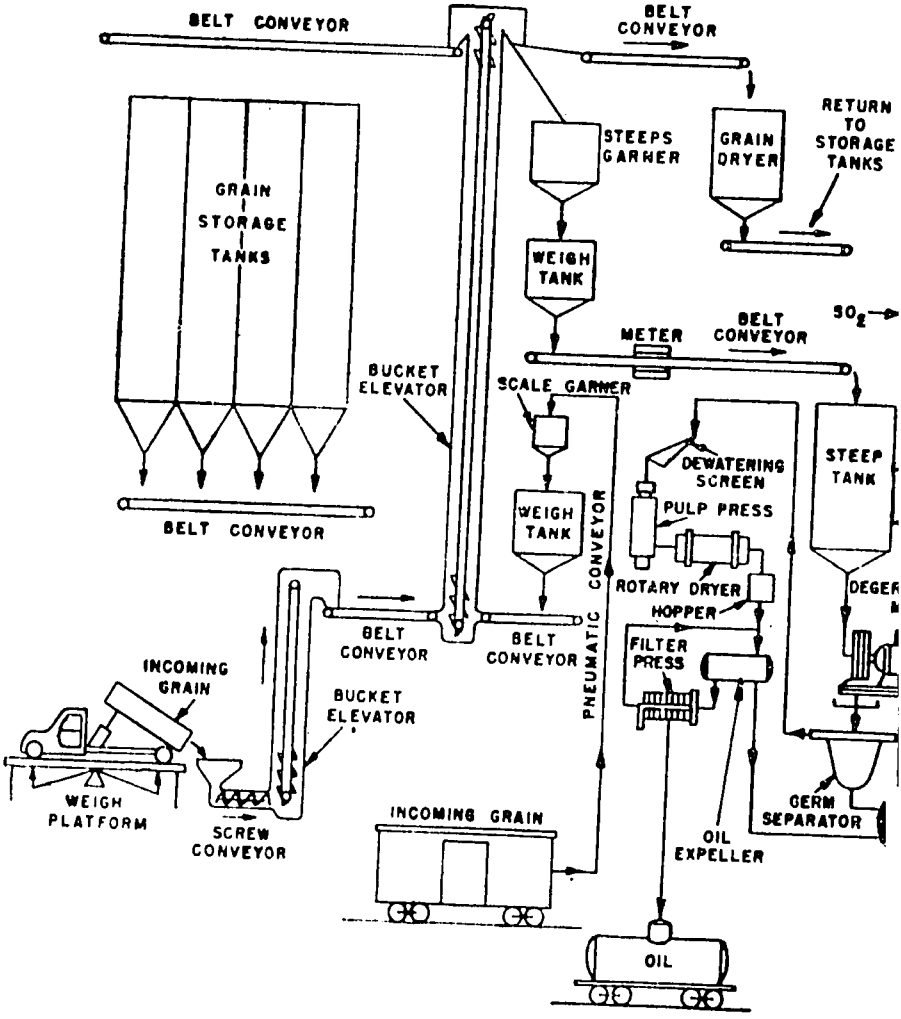
6. TRANSPORTATION

a. Own transport equipment - Two heavy fork lift trucks and one pickup truck
b. External transport facilities
In and out shipments at about 90 tons per day. Plant should be located on a railroad siding.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

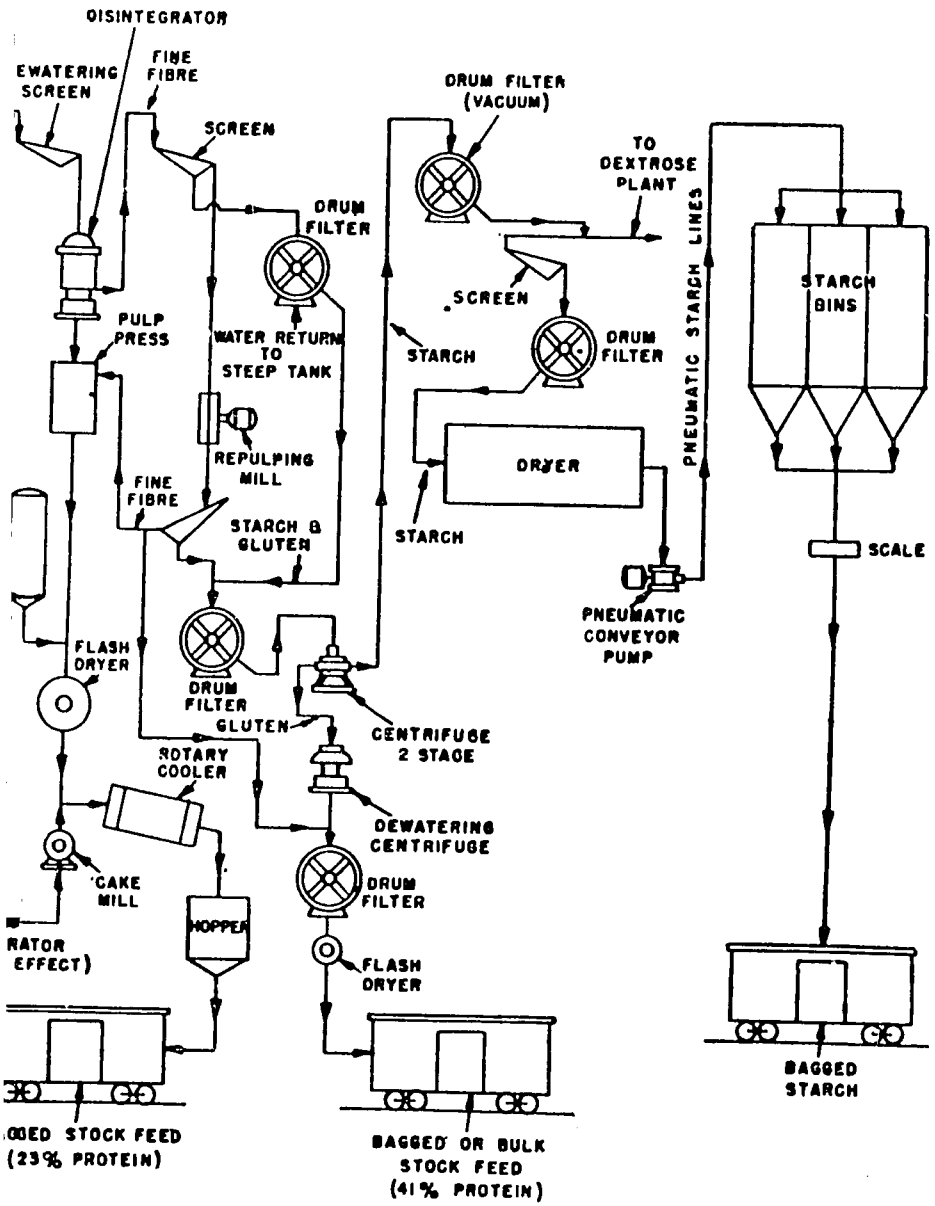
Direct materials	$ 593,000	
Direct labor	236,000	
Manufacturing overhead*	200,300	
Total manufacturing cost		$ 1,030,100
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 59,900
Sales expense		$ 36,000
Freight-out, travel discounts Allowances & bad debts		$ 24,000
Total annual costs		$ 1,150,000
Annual Gross Profit		$ 180,000
ANNUAL SALES REVENUE		$ 1,330,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.


BELT CONVEYOR
BELT CONVEYOR
STEEPS GARNER
GRAIN DRYER
RETURN TO STORAGE TANKS
GRAIN STORAGE TANKS
WEIGH TANK
METER
BELT CONVEYOR
SO2
BUCKET ELEVATOR
SCALE GARNER
DEWATERING SCREEN
STEEP TANK
WEIGH TANK
PULP PRESS
BELT CONVEYOR
PNEUMATIC CONVEYOR
ROTARY DRYER
HOPPER
BELT CONVEYOR
BELT CONVEYOR
FILTER PRESS
INCOMING GRAIN
BUCKET ELEVATOR
WEIGH PLATFORM
SCREW CONVEYOR
INCOMING GRAIN
OIL EXPELLER
GERM SEPARATOR
OIL

SORGHUM GRAIN

I.P. NO. 67317
S. I. C. 2041



STARCH, OIL AND FEED FROM SORGHUM GRAIN

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Starch. R. L. Whistler, 1964. $13.50 (Vol. IV of Methods in Carbohydrate Chemistry)

Academic Press
111 Fifth Avenue
New York, New York

Devoted to the starch industry.

B. Quality Control and Reliability. 5th Edition. Norbert L. Enrick. 1966. 254 pp. $7.50

The Industrial Press
93 Worth Street
New York, New York 10013

The 24 chapters of the book are divided into three main sections: (1) Basic quality control applications; (2) additional quality control methods; and (3) reliability.

II. TECHNICAL AND TRADE PERIODICALS

A. Feeds Illustrated. Monthly. $2.50/year

National Provisioner
15 West Huron Street
Chicago, Illinois 60610

Business magazine for feed manufacturers.

B. Journal of the American Oil Chemist Society Monthly $12.00

American Oil Chemists' Society
35 East Wacker Drive
Chicago, Illinois 60601

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U. S. Government Printing Office
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Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

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Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Improving Materials Handling in Small Plants. $.20

Small Business Management Series No. 4
U. S. Government Printing Office
Washington, D. C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

IV. REPRESENTATIVE U. S. PATENTS

Available U. S. Patent Office, Washington, D. C. 20231 $.50 each.

A. Patent No. 3,268,336 August 1966 11 p.
Method of producing food products.

B. Patent No. 3,257,210 June 1966 5 p.
Poultry feed composition.

C. Patent No. 3,244,527 April 1966 5 p.
Cattle feeding process composition and products.

D. Patent No. 3,222,179 December 1965 4 p.
Feed additive containing rennet and calcium chloride.

E. Patent No. 2,989,425 June 1961 3 p.
Method of hydrolysis of starch.

F. Patent No. 2.946,706 July 1960 3 p.
Process for the hydrolization of starch.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Grain Sorghum Producers Association
5501 Bergett Drive
Amarillo, Texas 79106

B. American Feed Manufacturers Association, Inc.
53 West Jackson Blvd.
Chicago, Illinois 60604

C. Corn Refiners Association, Inc.
1001 Connecticut Avenue
Washington, D. C. 20036

VI. DIRECTORIES

A. Directory of the Edible Oil Industry. $1.00

Institute of Shortening & Edible Oils, Inc.
815 Connecticut Avenue, N. W.
Washington, D. C. 20006

Lists 60 companies processing edible oil in the U. S. Published every three years.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

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PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

ORDERING INSTRUCTIONS

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

FISH OIL AND FISH MEAL PLANT—EVAPORATION PROCESS (20 tons)

I. P. No. 67318
S. I. C. 2095

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

FISH OIL AND FISH MEAL PLANT -- EVAPORATION PROCESS
(Processing 20 tons of raw fish per hour)

PRODUCT DESCRIPTION

Fish oil and fish meal derived from inedible fish and fish wastes using an evaporating process.

(Explanatory Note: The production requirements given on page three of this profile and their related references were compiled on the premise that 20 tons of raw fish would be processed per hour in an operation of eight hours duration. Production requirements and cost figures for the processing of forty tons of raw fish per hour are set forth in another profile (I. P. No. 67377, S. I. C. 2095).

A. GENERAL EVALUATION OF PROSPECTS

The availability of the principal raw material for this product and the constantly increasing demand for fish meal and fish oil for a growing number of uses makes prospects for this industry particularly good in almost any country. Another favorable aspect of this industry is that production of palm fats and other liquid oils is not keeping pace with the increased demand. These factors, together with the export potential of this plant, provide excellent prospects for investors in this industry. This plant processes 20 tons of raw fish per hour.

B. MARKET ASPECTS

1. USERS

Manufacturers of margarine, animal feeds, fungicide sprays, soap, fertilizer, paints, lubricating oil, lower grade cooking fats and shortening.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are generally made to large dealers in fish meal and fish oil who have representives in all countries. Local sales are usually made directly to local industries and to wholesalers of animal feeds. Oil is shipped in drums and in tank cars. The production volume of this plant should be consumed in the domestic market easily since its products are found as components of a great number of other products. There is a nationwide market for these items in any country that has increased or is increasing its livestock production, soil productivity or is improving or increasing the protein content of the people's diet. There should be no difficulty in exporting any percentage of the output not sold locally. Fish oil and meal are easily transported.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $1,600,000.
The total fixed investment, plus working capital, is estimated at $812,000.
The annual gross profit, before taxes, is estimated at $160.000.
Based on these figures, the profit on gross sales, before taxes, amounts to 10.0%.
(A gross profit on sales, before taxes, of 10.0%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 19.8%.

5. COST PER MAN EMPLOYED

Eight direct workers and six indirect workers, or a total of fourteen workers, are employed.
The total fixed capital investment is estimated at $555,000.
Based on these figures, the fixed investment per man employed would amount to about $39,650.

C. PRODUCTION REQUIREMENTS - FISH OIL AND FISH MEAL PLANT - EVAPORATION PROCESS (Processing 20 Tons of Raw Fish Per Hour)

I.P. No. 67318
S.I.C. 2095

ANNUAL CAPACITY - ONE SHIFT OPERATION: 8,000 TONS MEAL; 4,000 TONS OIL

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital — Cost

Land - 5 acres
Building - 100' x 200'
Equipment, furniture & fixtures
Prodn. tools & equipment
Other tools & equipment
Furniture & fixtures
Transportation equipment

Total fixed capital — $ 555,000

Principal items:

Fist pump
Dewatering system
Measuring machine
Drag chain
Cooker
Presses
Screw conveyor
Dryers
Air pollution control system
Temperature control
Screw conveyor
Separators
Meal grinder
Screw conveyor
Bagging and weighing

b. Working Capital (30 days)

Direct materials
Direct labor
Manufacturing overhead
Administrative costs
Sales costs
Freight-out, discounts, bad debts & allowances
Sales revenue
Training costs

Total working capital — $ 257,000

c. Total Capital Requirements — $ 812,000

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Raw fish	40,000 tons	
Bags		
Oil drums		
Total direct materials		$1,102,000

b. Supplies

Lubricants & hand tools
Gas, oil and maintenance of truck
Maintenance & spare parts
Office supplies

Total supplies — $ 21,700

c. Availability of materials & supplies

Fish must be available locally. All other items available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 700 H.P. connected load Fuel - 420,000 gal. Bunker C oil Water - production, sanitation and fire protection.	$ 50,200

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 49,900

5. MANPOWER

	Number	Annual Cost
a Indirect labor		
Manager	1	
Supervisor	1	
Office	2	
Maintenance	1	
Truck Driver	1	
Total indirect labor	6	$ 46,000
b. Direct Labor		
Skilled workers	2	
Semi-skilled workers	2	
Unskilled workers	4	
Total direct labor	8	$ 36,400

c. Training needs

Manager should be fully experienced. With the help of 2 skilled workers he should be able to train all workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Truck.

b. External transport facilities

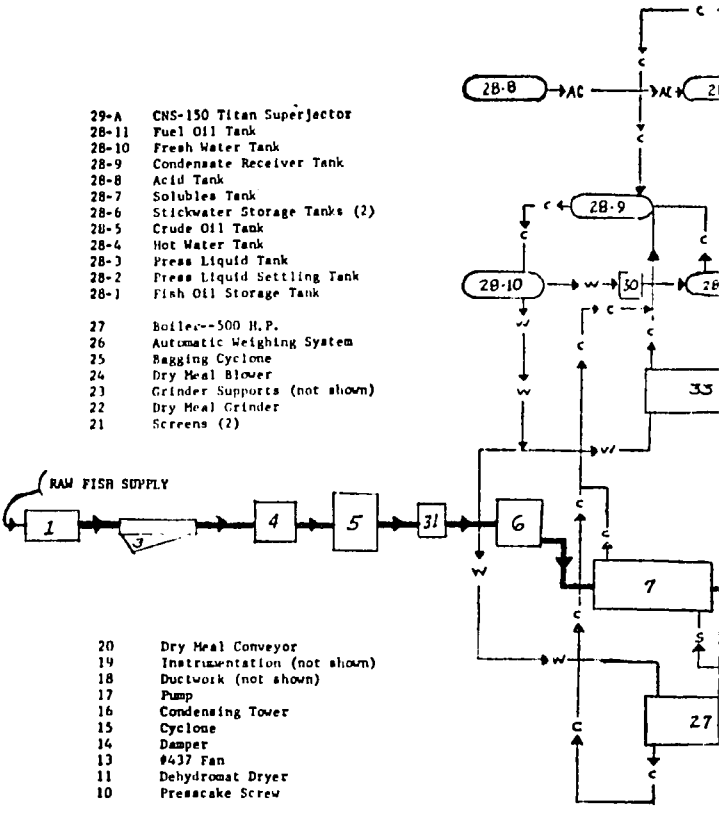
In and out shipments about 140 tons per day. Railroad essential.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$1,102,000	
Direct labor	36,400	
Manufacturing overhead*	167,800	
Total manufacturing cost		$1,306,200
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		73,800
Sales expense		36,000
Freight-out, travel discounts Allowances & bad debts		24,000
Total annual costs		$1,440,000
Annual Gross Profit		$ 160,000
ANNUAL SALES REVENUE		$1,600,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

FISH OIL AND FISH MEAL



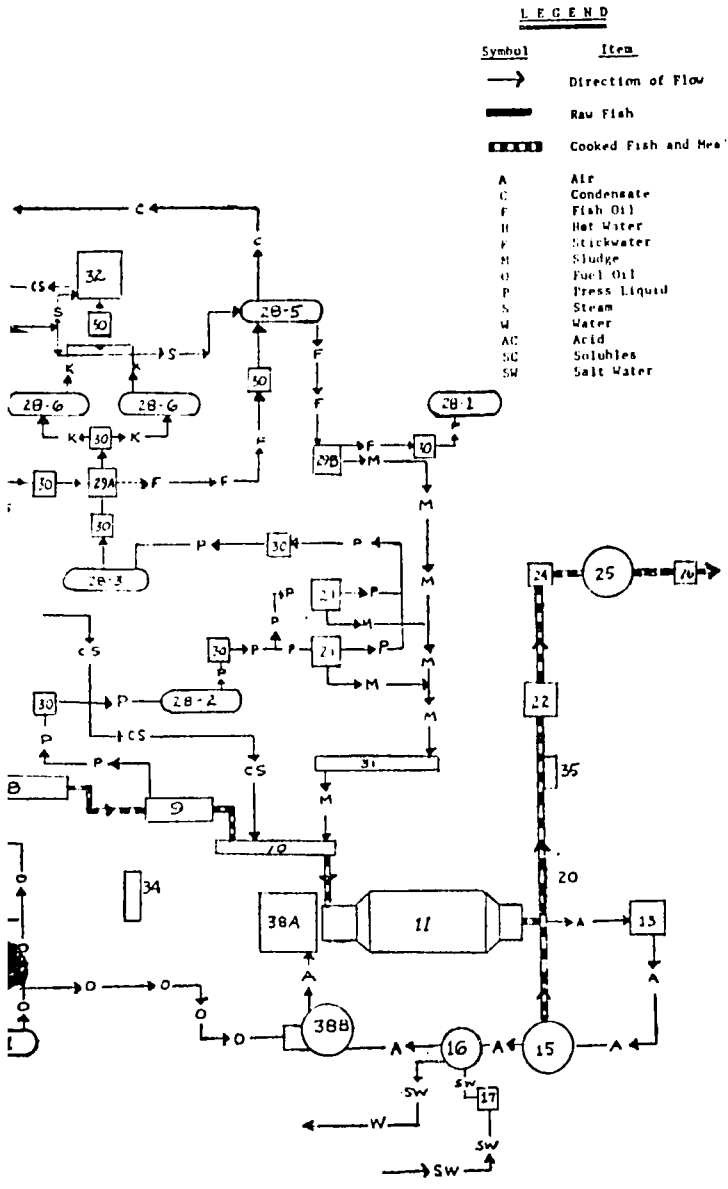
29-A	CNS-150 Titan Superjector
28-11	Fuel Oil Tank
28-10	Fresh Water Tank
28-9	Condensate Receiver Tank
28-8	Acid Tank
28-7	Solubles Tank
28-6	Stickwater Storage Tanks (2)
28-5	Crude Oil Tank
28-4	Hot Water Tank
28-3	Press Liquid Tank
28-2	Press Liquid Settling Tank
28-1	Fish Oil Storage Tank
27	Boiler--500 H.P.
26	Automatic Weighing System
25	Bagging Cyclone
24	Dry Meal Blower
23	Grinder Supports (not shown)
22	Dry Meal Grinder
21	Screens (2)

20	Dry Meal Conveyor
19	Instrumentation (not shown)
18	Ductwork (not shown)
17	Pump
16	Condensing Tower
15	Cyclone
14	Damper
13	#437 Fan
11	Dehydromat Dryer
10	Presscake Screw
9	Press
8	Predrainage Screw
7	Cooker
6	Cooker Feed Chute
5	Raw Box
4	Fish Measuring Machine
3	Dewatering Conveyor
2	Process Piping (not shown)
1	Fish Pump

35	Permanent Magnet
34	Power Control Center
33	Boiler -- 500 H.P.
32	Stickwater Evaporator
31	Sludge Screw Conveyor
30	Pumps (12)
29-B	CNS-66 Titan Superjector
28-D	Refractory Material (not
28-C	Ductwork (not shown)
28-B	Incinerator
28-A	Feed Breeching
37	Prebreaker (optional)
36	Air Compressor (not sh

EVAPORATION PROCESS (20 tons)

I. P. NO. 67318
S. I. C. 2095



FISH OIL AND FISH MEAL PLANT - EVAPORATION PROCESS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Fish as Food. 4 Volumes. Volume 1 - Production, Biochemistry and Microbiology. 1961. $24.00 Volume 2 - Nutrition, sanitation and utilization. 1962. $28.00 Volume 3 - Processing - Part I, 1965. $17.50. Volume 4 - Processing - Part II, 1965. $18.50

Academic Press, Inc.
111 Fifth Avenue
New York, New York 10003

B. Fisheries By-Product Technology. Julius Brody. 1966. 350 pp. $13.50 outside U.S.

AVI Publishing Company
Box 670
Westport, Connecticut 06881

Devoted to the manufacture and utilization of fishery by-products.

II. TECHNICAL AND TRADE PERIODICALS

A. The Fishing Gazette. Monthly. $3.00/year

Fishing Gazette Publishing Corporation
461 Eighth Avenue
New York, New York 10001

Contains facts and figures of the fishing trade for canners and processors.

B. Food Engineering. Monthly. $25.00/year

Food Engineering
Chestnut and 56th Streets
Philadelphia, Pennsylvania 19139

Devoted to coverage of the food processing industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Improving Materials Handling in Small Plants. $.20

Small Business Management Series No. 4
U. S. Government Printing Office
Washington, D. C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $50 each.

A. Patent No. 3,249,442 May 3, 1966 6 p.
Method of processing fish.

B. Patent No. 3,041,174 June 26, 1962 2 p.
Process for treating oil-containing animal material, such as fish and fish offal.

C. Patent No. 2,934,433 April 26, 1960 4 p.
Fish protein product and method of preparing same.

D. Patent No. 2,909, 984 October 27, 1959 10 p.
Apparatus for producing animal protein meals.

E. Patent No. 2,972,542 1961 2 p.
Preparing deodorized fish meal and oil.

F. Patent No. 2,877,122 1959 7 p.
Method of dehydrating fish for manufacture of meal, oil, and other products.

G. Patent No. 2,844,476 1958 3 p.
Process of comminuting and dehydrating fish into meal and related products, including oil.

H. Patent No. 2,686,126 1954 3 p.
Treatment of fish to produce meal and oil.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Essential Oil Association
2 Lexington Avenue
New York, New York 10010

B. American Feed Manufacturers Association, Inc.
53 West Jackson Boulevard
Chicago, Illinois 60604

VI. DIRECTORIES

A. List of Fishery Associations in the United States and Alaska. Annual. Gratis.

Bureau of Commercial Fisheries, Branch of Reports
1801 North Moore Street
Arlington, Virginia 22209

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the :

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

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INDUSTRY PROFILES

BOTTLED MILK

I. P. No. 67319
S. I. C. 2026

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BOTTLED MILK

I. P. No. 67319
S.I.C. 2026
DECEMBER 1967

PRODUCT DESCRIPTION

Milk is purchased from dairy farmers, pasteurized, bottled and delivered to the customer.

A. GENERAL EVALUATION OF PROSPECTS

The prospects for this industry depend on two factors: (1) that a good supply of milk is available locally all year round, at reasonable prices; and (2) that the output of this plant can be sold locally all year round. These and other factors should be determined by conducting a comprehensive survey.

B. MARKET ASPECTS

1. USERS

Anywhere that food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

About 75 to 80 percent of the output of this plant would be delivered to users. The balance would be delivered to retail stores for sale to consumers. Milk, a highly perishable product, must be kept under proper refrigeration at all times. Therefore, it must be chilled during delivery by truck to the consumer or the retail outlet. For this reason, the market usually would be within a relatively few miles of the pasteurizing plant. Since a large investment is required to produce milk that complies with all health laws and regulations, competition will have to be met by a combination of good management, efficient plant operation and an able sales force.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See Supporting data on page 3)

The annual gross sales revenue is estimated at $600,000.
The total fixed investment, plus working capital, is estimated at $250,000.
The annual gross profit, before taxes, is estimated at $30,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 5.0%.
(A gross profit on sales, before taxes, of 5.0%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 12.0%.

5. COST PER MAN EMPLOYED

Six direct workers and ten indirect workers, or a total of sixteen workers, are employed.
The total fixed capital investment is estimated at $ 193,000.
Based on these figures, the fixed investment per man employed would amount to about $12,070.

C. PRODUCTION REQUIREMENTS - BOTTLED MILK
ANNUAL CAPACITY -ONE SHIFT OPERATION : 480,000 GALS. (RAW MILK)

I.P. No. 67319
S.I.C. 2026

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - one acre	
Building - one story 60' x 100'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 193,000

Principal items:

Steam generator	Compressor and refrigeration system
Pasteurizer and cooler	Milk storage tanks
Milk cans	Metal baskets
Filler and capper	Laboratory equipment
Separator	Trucks
Homogenizer	
Bottle washer	
Milk scales	
Blending tanks	
Can washer	
Conveyors	
Life truck and pallets	
Sanitary piping and fittings	

b. Working Capital (15 to 30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 57,000
c. Total Capital Requirements	$ 250,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Raw Milk	480,000 gals.	
Bottle caps		
Bottles and wax cartons		
Total direct materials		$ 408,000

b. Supplies	
Lubricants & hand tools	
Cleaning and sanitizing materials	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of trucks	
Total supplies	$ 14,300

c. Availability of materials & supplies

Raw milk must be available locally. All other supplies are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 80 H.P. connected load	
Fuel - Production and heat	
Water - must be potable	
	$ 3,500

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 23,200

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager	1	
Inspector & Laboratory	1	
Office	1	
Truck Drivers	7	
Total indirect labor	10	$ 56,000

b. Direct labor	
Skilled workers	1
Semi-skilled workers	3
Unskilled workers	2
Total direct labor	6
	$ 28,200

c. Training Needs

Manager must be fully experienced. He, with the help of 1 skilled worker, should be able to train all workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Seven delivery trucks

b. External transport facilities

All deliveries made to local areas.

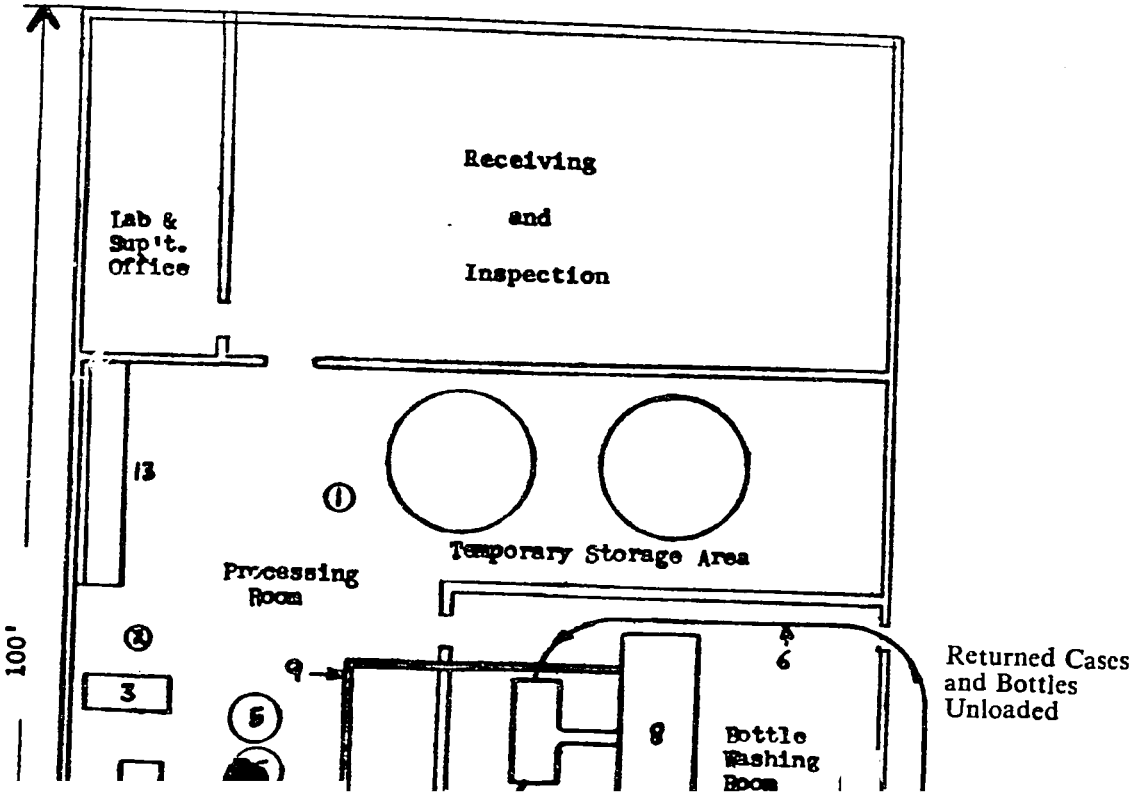
Good roads essential.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

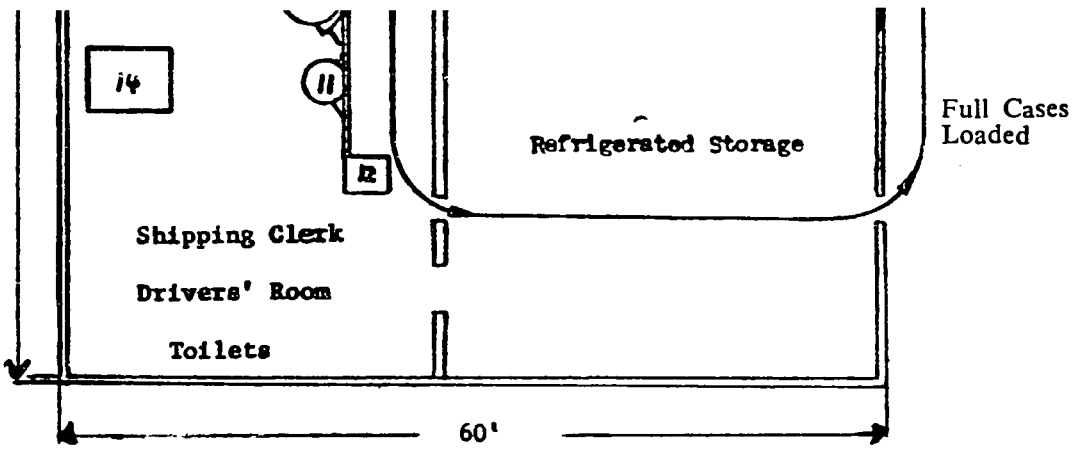
Direct materials	$ 408,000	
Direct labor	28,200	
Manufacturing overhead*	97,000	
Total manufacturing cost		$ 533,200
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 21,000
Sales expense		$ 10,000
Freight-out, travel discounts Allowances & bad debts		$ 5,800
Total annual costs		$ 570,000
Annual Gross Profit		$ 30,000
ANNUAL SALES REVENUE		$ 600,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT LAYOUT



BOTTLE



LAYOUT OF MARKET MILK PROCESSING PLANT

The exact arrangement of equipment will vary with the type of milk being bottled, the number of other dairy products manufactured, local laws, etc.

Equipment Illustrated

1. Clarifier
2. Separator
3. Pasteurizer with regenerator
4. Homogenizer
5. Holding tanks
6. Case conveyor
7. Case washer
8. Bottle washer
9. Washed bottle conveyor
10. Filling machine
11. Bottle capper
12. Casing operation
13. Equipment wash sink
14. Vat pasteurizer

BOTTLED MILK

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. The Market Milk Industry. 2nd Edition. Chester Linwood Roadhouse and James Lloyd Henderson. 716 pp. 171 Illus. 1950. $11.50

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Covers technical and economic phases of market milk industry: Costs, pricing, transportation, flavoring, and plant operation.

B. Milk and Milk Processing. B. L. Herrington. 343 pp. 32 Illus. 1948. $8.50

McGraw Hill, Inc.
330 West 42nd Street
New York, New York 10036

Emphasizes principles underlying milk processing.

C. Engineering of Dairy and Food Products. Arthur W. Farrall. 674 pp. 1963. $17.00

John Wiley and Sons, Inc.
605 Third Avenue
New York, New York 10016

A reference book of complete plant operation with topics ranging from power requirements, refrigeration, storage, sterilizing, and plant design, through waste disposal.

II. TECHNICAL AND TRADE PERIODICALS

A. American Dairy Review. Monthly. $5.00/year.

Watt Publishing Company
Mount Morris, Illinois 61054

Milk, ice cream, and milk producing industry.

B. Milk Dealer. Monthly. $10.50/year.

Miller Publishing Company
2501 Wyzatta Boulevard
Minneapolis, Minnesota 55440

Covers fluid milk industry.

III. BUSINESS MANAGEMENT MATERIALS

A. Dairy Plant Management. Paul H. Tracy, G. D. Armerding, and H. W. Hannah. 430 pp 60 Illus. 1958. $10 75

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

A management text for dairy plant executives covering plant design, equipment purchases, personnel selection, accident prevention, and advertising with major emphasis on labor relations, business management and plant efficiency.

B. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Insights and clues concerning the entire process of small business formation, growth, and decline.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,163,971 January 5, 1965 4 p.
Method of sterile packing sterile goods.

B. Patent No. 3,092,503 June 4, 1963 5 p.
Method and apparatus for sterilizing.

C. Patent No. 3,054,684 September 18, 1962 8 p.
Process and apparatus for treating fluid materials.

D. Patent No. 2,878,391 May 19, 1959 3 p.
Method for production of pasteurized beverages.

E. Patent No. 2,831,610 April 22, 1958 4 p.
Liquid dispensing container.

F. Patent No. 2,772,979 December 4, 1956 18 p.
Method of processing milk products.

G. Patent No. 2,697,313 December 26, 1954 5 p.
Method of making, filling, and sealing sterile containers.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Milk Industry Foundation
910 - 17th Street, N. W.
Washington, D. C. 20006

B. Dairy Society International
1145 - 19th Street, N. W.
Washington, D. C. 20006

C. Milk Handlers and Processors Association
56-24 58th Street
Maspeth, New York 11378

VI. DIRECTORIES

A. Dairy Industries Catalog. Annual. $5.00

Olsen Publishing Company
14445 North 5th Street
Milwaukee, Wisconsin 53212

Lists all manufacturers of equipment and supplies used by the dairy industry.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

'62

FLASHLIGHT AND RADIO BATTERIES

I. P. No. 67320
S. I. C. 3692

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

FLASHLIGHT AND RADIO BATTERIES

I.P. No. 67320
S.I.C. 3692
DECEMBER 1967

PRODUCT DESCRIPTION

Leakproof primary batteries for flashlights and radios.

A. GENERAL EVALUATION OF PROSPECTS

This plant requires a fairly large capital investment despite the fact it uses relatively little skilled labor. Good management and supervision are necessary to maintain quality, to control costs and to keep abreast of technical developments. There is an expanding market, worldwide, for flashlight and radio batteries and in developing areas with a large and moderately prosperous population, there should be good possibilities for this plant.

B. MARKET ASPECTS

1. USERS

Individuals, industrial concerns, mines, railroads and the military.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are made to electrical supply distributors, hardware stores, automotive wholesalers, chain stores, retail electrical and retail automotive outlets and direct to large-volume users. An attractive brand name, adequate advertising and publicity and an active sales campaign is advisable in the distribution of these productions. The market potenital will depend to a great extent on the number of radios in the country. A large and moderately prosperous community is needed to provide a sales outlet for these products. A market survey should be made. Since a large fixed capital investment is required to set up this plant, no domestic competition should be expected unless other large producers have already established plants in the country. This plant should be able to meet competition from imported batteries since it would have the advantage of lower freight costs and, perhaps, freedom from import duties. Batteries are small, well packaged and easily transported. Shipping costs are normally low in relation to the product's value and, therefore, nationwide distribution should be contemplated. Some export sales to neighboring countries may also be made.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requiremens" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Such elements and relationships therefore would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $600,000.
The total fixed investment, plus working capital, is estimated at $726,000.
The annual gross profit, before taxes, is estimated at $60,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 10%.
(A gross profit on sales, before taxes, of 10%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 8.3%.

5. COST PER MAN EMPLOYED

Fifty direct and eight indirect workers or a total of fifty-eight workers, are employed.
The total fixed capital investment is estimated at $622,000.
Based on these figures, the fixed investment per man employed would amount to about $10,730.

C. PRODUCTION REQUIREMENTS - FLASHLIGHT AND RADIO BATTERIES I.P. No. 67320
ANNUAL CAPACITY - ONE SHIFT OPERATION: 3,000,000 UNITS S.I.C. 3692

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - about 2 acres	
Building - one story 160' x 300' with utilities & maintenance in basement	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 622,000
Principal items:	
Ball mill	
Wet mixer	
Tamper	
Paste mill	
Filling equipment	
Top and bottom washer assembly	
Pitch application equipment	
Tube making equipment	
Materials handling equipment	
Delivery truck	
b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 104,000
c. Total Capital Requirements	$ 726,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Zinc cans & metal caps	3,000,000	
Carbon electrodes	3,000,000	
Manganese dioxide	150 tons	
Carbon black	20 tons	
Ammonium chloride	36 tons	
Zinc chloride	3 tons	
Flour	10 tons	
Starch	13 tons	
Cardboard	10,000 lbs.	
Ink adhesives etc.		
Packaging		
Total direct materials		$ 132,500
b. Supplies		
Lubricants & hand tools		
Cutting tools & abrasives		
Maintenance & spare parts		
Office supplies		
Gas, oil and maintenance of truck		
Total supplies		$ 12,100

c. Availability of materials & supplies

Some of the materials may have to be imported. All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 50 H.P. connected load	
Fuel - about 5,000 gals. oil	
Water - 1,000,000 gals.	
	$ 3,900

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 47,900

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager	1	
Supervisor	1	
Office	3	
Technical	1	
Maintenance	1	
Truck Driver	1	
Total indirect labor	8	$ 65,000
b. Direct labor		
Skilled workers	4	
Semi-skilled workers	6	
Unskilled workers	40	
Total direct labor	50	$ 198,000

c. Training Needs

The manager, supervisor, technician and two skilled workers should be able to train all workers and reach fullproduction in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

Good highways necessary.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

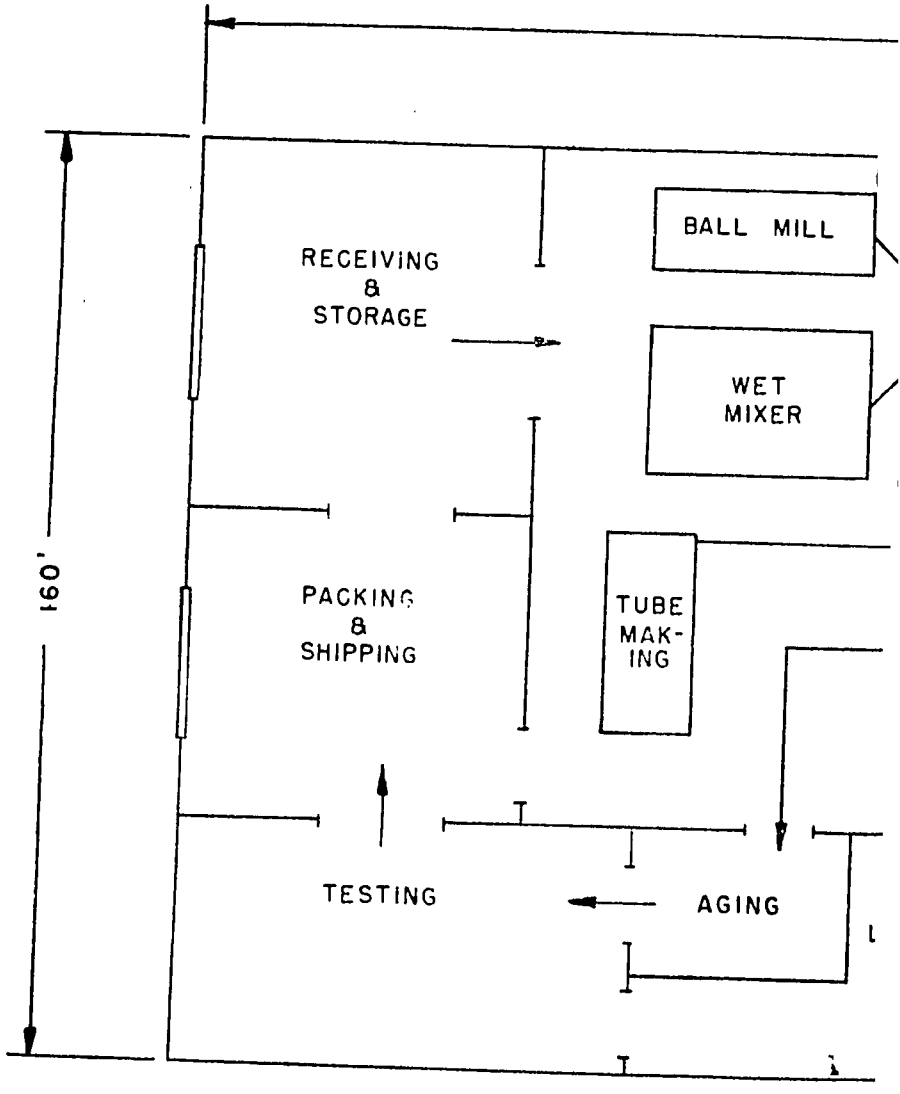
Direct materials	$ 132,500	
Direct labor	198,000	
Manufacturing overhead*	128,900	
Total manufacturing cost		$ 459,400
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 40,600
Sales expense		30,000
Freight-out, travel discounts Allowances & bad debts		$ 10,000
Total annual costs		$ 540,000
Annual Gross Profit		$ 60,000
ANNUAL SALES REVENUE		$ 600,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

FLASHLIGHT AND

PLANT



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BATTERIES

I. P. NO. 67320
S. I. C. 3692

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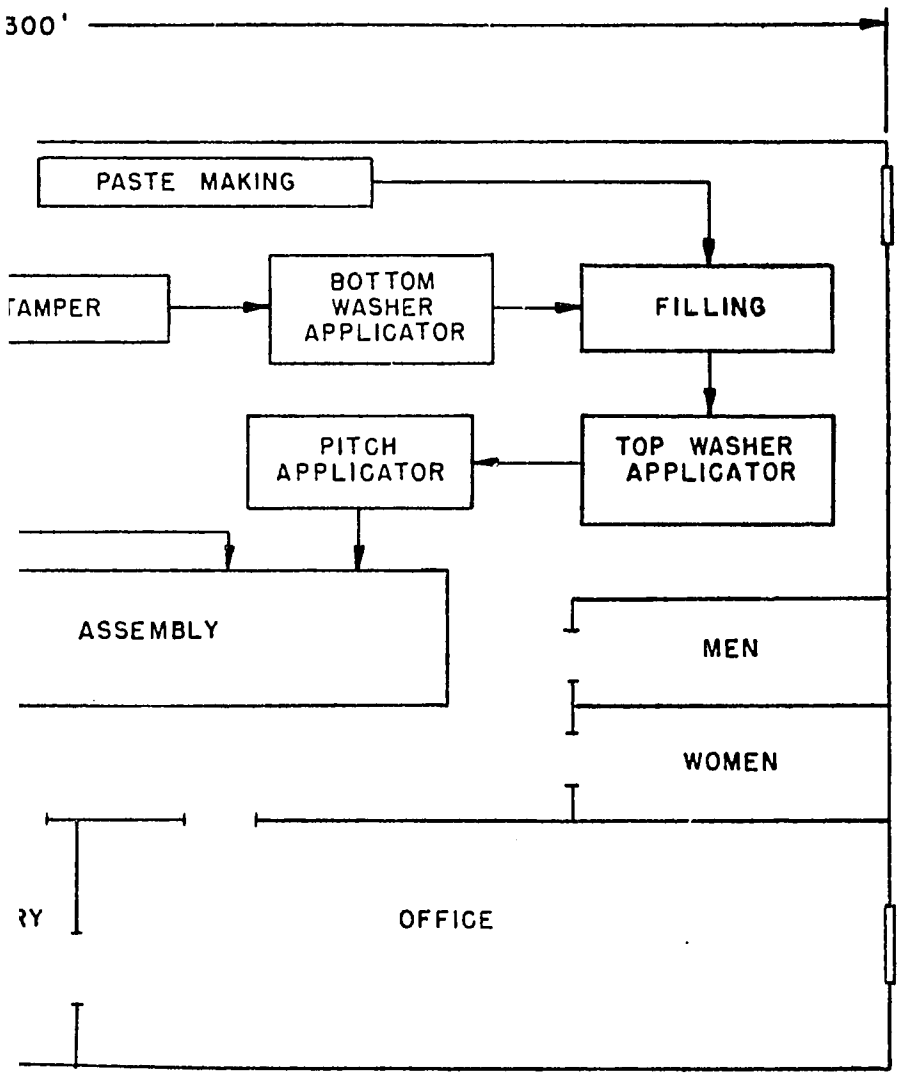

16

FLASHLIGHT AND RADIO BATTERIES

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Principles and Practices of Electrical Engineering. Alexander Gray and G. A. Wallace. 8th Edition. 1962. $9.95

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Basic text on electrical engineering, including coverage of storage batteries and their operation.

B. Elements of Electricity. William H. Timbie and Alexander Kusko. 4th Edition. 1953. 631 pp. Illus. $7.95

John Wiley and Sons, Inc.
605 Third Avenue
New York, New York 10016

Electric power and energy, including batteries and electrochemical action.

C. Storage Batteries. George W. Vinal. 4th Edition. 1955. 446 pp. $12.50

John Wiley and Sons, Inc.
605 Third Avenue
New York, New York 10016

II. TECHNICAL AND TRADE PERIODICALS

A. The Battery Man. Monthly. $3.00/year. (U. S. price)

Independent Battery Manufacturers, Inc.
100 Larchwood Drive
Largo, Florida 33540

Provides subscribers with news, technical and market information, and developments in the battery industry.

B. Electrical World. Weekly. $8.00/year.

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Information on supplies and services relating to electrical products.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and make better decisions in the future.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,265,537. August 9, 1666 4 p.
Method for assembling primary battries.

B. Patent No. 3,223,555. December 14, 1965 11 p.
Sealed battery stacked electrode.

C. Patent No. 3,201,279. Augut 17, 1965 4 p.
Batteries - relates to batteries and more particularly to batteries having high capacities and long shelf life.

D. Patent No. 3,196,051. July 20, 1965 3 p.
Method of assembly of primary batteries.

E. Patent No. 3,189,487. June 15, 1965 7 p.
Method of assembly of batteries.

F. Patent No. 3,178,314 April 3, 1965 5 p.
Compressed electrode assembly and process for making same.

G. Patent No. 3,169,889. February 16, 1965 3 p.
Storage battery cell and method of making same.

H. Patent No. 3,168,420. February 2, 1965 5 p.
Electrochemical cell and process for manufacture of same.

I. Patent No. 2,953,620. September 20, 1960 4 p.
Battery cell stucture - relates to a novel structure for a battery cell, and more particularly to such a structure for battery cell, including solid components.

J. Patent No. 2,729,693. January 3, 1956 3 p.
Dry cell.

K. Patent No. 2,638,489. May 12, 1953 3 p.
Primary cell.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Independent Battery Manufacturers Association
100 Larchwood Drive
Largo, Florida 33540

VI. DIRECTORIES

A. Thomas Registry of American Manufacturers. $20.00/year

Thomas Publishing Company
461 Eighth Avenue
New York, New York 10001

Lists manufacturers of batteries, manufacturers and suppliers of parts and materials,

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

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INDUSTRY PROFILES

CREOSOTED WOOD PRODUCTS

I. P. No. 67321
S. I. C. 2491

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

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CREOSOTED WOOD PRODUCTS

I. P. No. 67321
S.I.C. 2491
DECEMBER 1967

PRODUCT DESCRIPTION

Bridge timbers, railroad ties, telephone poles, fence posts and other wood products that require creosoting to prevent deterioration caused by insects and decay.

A. GENERAL EVALUATION OF PROSPECTS

This industry is usually operated on a contract basis. Wood products are purchased by the end user and shipped to the creosoting plant for treatment, under contract, according to specifications, and for shipment as directed by the owner. This plant could be operated on the basis whereby the plant would itself purchase the wood products, then process and re-sell them. However, this second method of operation would require a large amount of working capital and, if any large orders were cancelled, the plant might have to carry the heavy investment for an indefinite period. If the potential gross annual sales volume for creosoted wood products is sufficient, the prospect for this plant should be good provided the plant is operated on a contract basis.

B. MARKET ASPECTS

1. USERS

Construction companies, railroads, telephone and telegraph companies, governments and other concerns, needing the creosoting of wood products.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be direct to companies using creosoted wood products. Sales methods would be by contract whereby the customers will furnish the wood products for creosoting at the plant. The sales potential depends upon the amount of creosoted wood products used within the country for construction purposes. Where suitable timber is not available, substitute materials such as concrete, iron or steel are sometimes used. A survey should be made to determine the sales potential of the domestic market. The extent of the market should be nationwide. This industry cannot be operated successfully on a small volume basis. Therefore, unless other creosoting plants exist within the country, no domestic competition can be expected. Creosoted wood products are not exported because of their bulk and weight.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $370,000.
The total fixed investment, plus working capital, is estimated at $628,000.
The annual gross profit, before taxes, is estimated at $37,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 10.0%.
(A gross profit on sales, before taxes, of 10.0%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 59%

5. COST PER MAN EMPLOYED

Sixteen direct and eight indirect workers, or a total of twenty-four workers, are employed.
The total fixed capital investment is estimated at $566,000.
Based on these figures, the fixed investment per man employed would amount to about $23,585.

C. PRODUCTION REQUIREMENTS - CREOSOTED WOOD PRODUCTS
ANNUAL CAPACITY - TWO SHIFT OPERATION: SALES REVENUE $ 370,000 ON CONTRACT BASIS

I.P. No. 67321
S.I.C. 2491

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 18 1/2 acres	
Building - 5 small buildings totaling about 6,000 sq. ft. Local materials.	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 566,000

Principal items :

Plant equipment	Other tools and equipment :
Tanks	
Pumps	
Condenser	Yard equipment
Gauges	Diesel crawler crane
Stripping equipment	Track
Marking and cutting equipment	Cars
	Fork-lift truck
Boiler	Cylinders
Piping	Heating and conditioning apparatus
Water tank	
Tire protection equipment	
Testing and laboratory equipment	

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 62,000
c. Total Capital Requirements	$ 628,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Creosote		
Coal tar solutions		
Petroleum solution		
The amount of each of the above will depend upon the kind of wood and the creosote specifications.		
Total direct materials		$ 30,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 7,900

c. Availability of materials & supplies

Direct materials may have to be imported. Other supplies should be available locally.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 100 H.P. connected load	
Fuel - Bunker C oil	
Water - Production and sanitation	
	$ 13,400

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 57,300

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager and supervisors	4	
Office	2	
Maintenance	1	
Truck Driver	1	
Total indirect labor	8	$ 67,000

b. Direct labor		
Skilled workers	4	
Semi-skilled workers	5	
Unskilled workers	7	
Total direct labor	16	$ 74,400

c. Training needs

Manager and supervisors must have years of experience. They, with two skilled workers, should be able to train all workers and reach full production in thirty days.

6. TRANSPORTATION

a. Own Transport equipment

Truck

b. External transport facilities

Material is bulky.

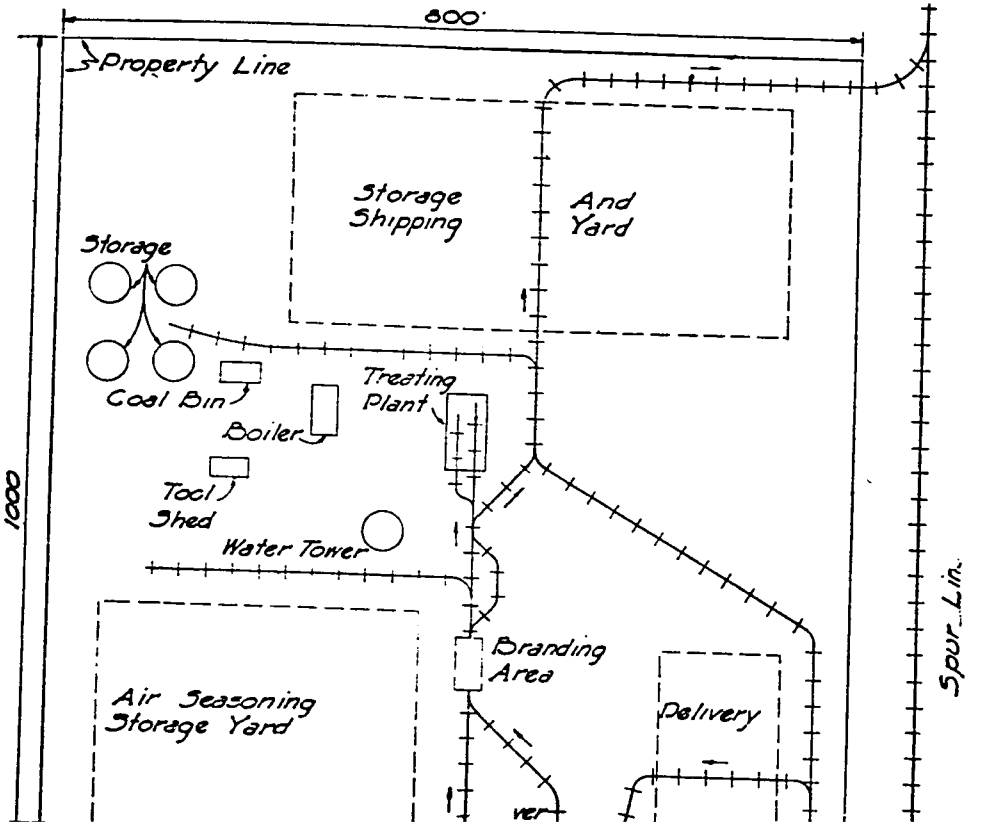
Plant must be located on a railroad.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 30,000	
Direct labor	74,400	
Manufacturing overhead*	145,600	
Total manufacturing cost		$ 250,000
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 43,000
Sales expense		$ 30,000
Freight-out, travel discounts Allowances & bad debts		$ 10,000
Total annual costs		$ 333,000
Annual Gross Profit		$ 37,000
ANNUAL SALES REVENUE		$ 370,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

173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Boiler
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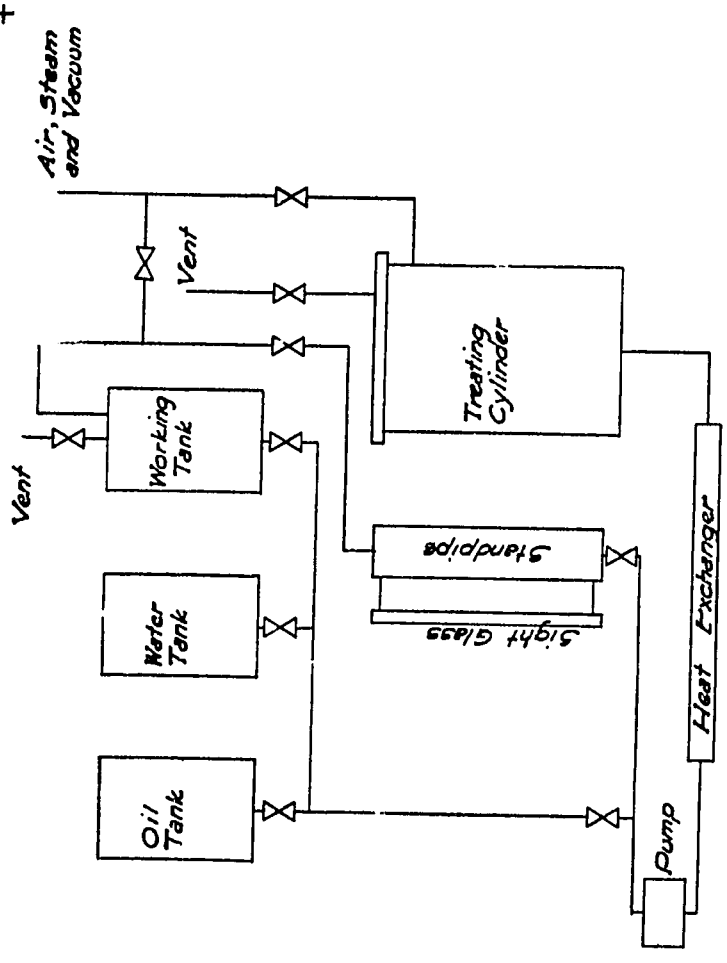
Plant
Tool
Shed
Water Tower
1000
Branding
Area
Air Seasoning
Storage Yard
Delivery
Spur Lin.

17-L

CREOSO

I.P. NO. 67321
S.I.C. 2491

Diagrammatic Layout Area 18½ Acres



Schematic drawing of pressure treating equipment

115

CREOSOTED WOOD PRODUCTS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Wood Preservation. 2nd Edition. G. M. Hunt and G. A. Garrett. 1953. Illus. 405 pp. $10.50

McGraw-Hill, Inc.
330 West 42nd Street
New York, New Yo k 10036

Thoroughly covers the field of wood preservation: Natural durability, treatability, methods, effects, equipment, economic aspects.

B. Wood and Cellulose Science. A. J. Stamm. 1964. $15.00

Ronald Press Company
15 East 26th Street
New York, New York 10010

Contains section on wood preservation.

II. TECHNICAL AND TRADE PERIODICALS

A. Wood Preserving News. Monthly. $3.00/year.

American Wood Preservers Institute
1707 "L" Street, N. W.
Washington, D. C. 20036

Devoted to the technology of protecting wood against physical, chemical and biological attack.

B. Wood and Wood products. Monthly. $5.00/year

Vance Publishing Corporation
59 East Monroe Street
Chicago, Illinois 60603

Machinery, techniques, and organization of wood-work operations and management of wood products plants.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00.

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

C. Starting and Managing a Small Business of Your Own. Wendell O. Metcalf. 49 pp. 1962. $.25. Vol. I (2nd Ed.) of the Starting and Managing Series of the Small Business Administration, Washington, D.C.

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Pitfalls usually encountered when entering a new business. Sources of additional information given.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each

A. Patent No. 3,061,508. October 1962. 5 p.
Wood preservation composition and method.

B. Patent No. 3,058,839 October 16, 1962 4 p.
Method of protecting wood from marine organisms.

C. Patent No. 3,046,217 July 24, 1966 3 p.
An improved wood preservative and its use.

D. Patent No. 2,988,477 1961 3 p.
Creosote composition of improved flowability and its production.

E. Patent No. 2,965,516 December 20, 1960 2 p.
Method for the preservation of the wooden structures.

F. Patent No. 2,931,737 April 5, 1960 3 p.
Impregation process.

G. Patent No. 2,884,302 1959 6 p.
Impregnation of wooden poles with preservatives.

H. Patent No. 2,860, 070 November 11, 1958 19 p.
Method of drying and impregnating wood.

I. Patent No. 2,833,006 1958 3 p.
Method of increasing the groundline protection of wood poles treated with oil-type preservatives.

J. Patent No. 2,799,597 July 16, 1957 2 p.
Method of impregnating wood with wood preserver.

K. Patent No. 2,786,784 March 21, 1957 16 p.
Process and apparatus for impregnating wood.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. American Wood Preservers
839 - 17th Street, N. W.
Washington, D. C. 20006

B. American Wood Preservers Institute
1707 "L" Street, N. W.
Washington, D. C. 20036

Both organizations publish monthly magazines concerning news of wood preserving industry.

VI. DIRECTORIES

A. Directory of the Forest Products Industry. Annual. $25.00

Miller Freeman Publications, Inc.
500 Howard Street
San Francisco, California 94105

Lists wood preserving plants and suppliers of equipment for wood preserving and other forest products industries.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized product. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

ORDERING INSTRUCTIONS

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

WASHING MACHINES, HOUSEHOLD

I. P. No. 67322
S. I. C. 3633

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

WASHING MACHINES, HOUSEHOLD

PRODUCT DESCRIPTION

Electric clothes washer for home use. This machine is intended to wash 14 pounds of clothing at one time. It washes, rinses and spin dries clothes automatically.

A. GENERAL EVALUATION OF PROSPECTS

Electricity is required for use of this product. Some areas of some countries do not have electric power--a factor that will directly influence sales. In many rural areas with electric power, the per capita income may be too low to allow purchase of this product. The bulk of sales of washing machines, therefore, will be made in urban areas where the per capita income is higher than in rural areas and where electric power is available.

B. MARKET ASPECTS

1. USERS

Private households. A larger washing machine would be needed for commercial purposes.

2. SALES CHANNELS AND EXTENT OF MARKET

These products are usually sold direct to retail stores. Washing machines cannot be made in small plants. Their production requires a fairly large investment in buildings, equipment, and materials. The plant described in this profile is mainly an assembly plant. Most of the material needed will be purchased ready for assembly. This includes the motors, plastic agitators, castings, pipes and hoses, completed wiring and all apparatus, switches, nuts and bolts and the enamel. This product is shipped in cardboard cartons and is easily transportable. If sales potential exists nationwide, national distribution is warranted. This plant should be able to compete against imported washing machines since it will have the advantage of freedom from import taxes and lower freight costs. A plant of this small size should not hope to compete in international markets against large mass producers of washing machines. A thorough analysis of marketing conditions and sales potential is mandatory before embarking on this investment venture.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $420,000.
The total fixed investment, plus working capital, is estimated at $188,600.
The annual gross profit, before taxes, is estimated at $40,000.
Using these figures, the profit on gross sales, before taxes, amounts to 9.5%.
(A gross profit on sales, before taxes, of 9.5%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 21.3%.

5. COST PER MAN EMPLOYED

Twenty direct and seven indirect workers, or a total of twenty-seven workers, are employed.
The total fixed capital investment is estimated at $118,000.
Based on these figures, the fixed investment per man employed would amount to about $4,400.

C. PRODUCTION REQUIREMENTS - WASHING MACHINES, HOUSEHOLD

I.P. No. 67322
S.I.C. 3633

ANNUAL CAPACITY - ONE SHIFT OPERATION: 5,000 UNITS
NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 1 acre	
Building - 100' x 100'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 118,000
Principal items:	
Square shear	
Sheet metal brake	
Punch press	
Lathe	
Milling machine	
Drill press	
Grinding machine	
Arbor press	
Saw machine	
Welding equipment	
Spray booth	
b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales Costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 70,600
c. Total Capital Requirements	$ 188,600

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Sheet steel	300 tons	
Motors		
Plastic agitators		
Castings		
Pipe and hose		
Wiring complete		
Switches		
Bolts & nuts		
Enamel		
Cartons		
Total direct materials		$ 170,000

b. Supplies

Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 4,300

c. Availability of materials & supplies

All should be available locally.

All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 44 H.P. connected load	
Fuel - heat as required	
Water - Sanitation and fire protection	$ 1,900

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 9,600

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Supervisor	1	
Office	2	
Inspector	1	
Maintenance	1	
Truck Driver	1	
Total indirect labor	7	$ 54,000
b. Direct labor		
Skilled workers	5	
Semi-skilled workers	7	
Unskilled workers	8	
Total direct labor	20	$ 93,000

c. Training needs

The manager with the supervisor and two skilled workers should be able to train all workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

The in and out shipments amount to over two tons per day

Good highway and rail road if possible.

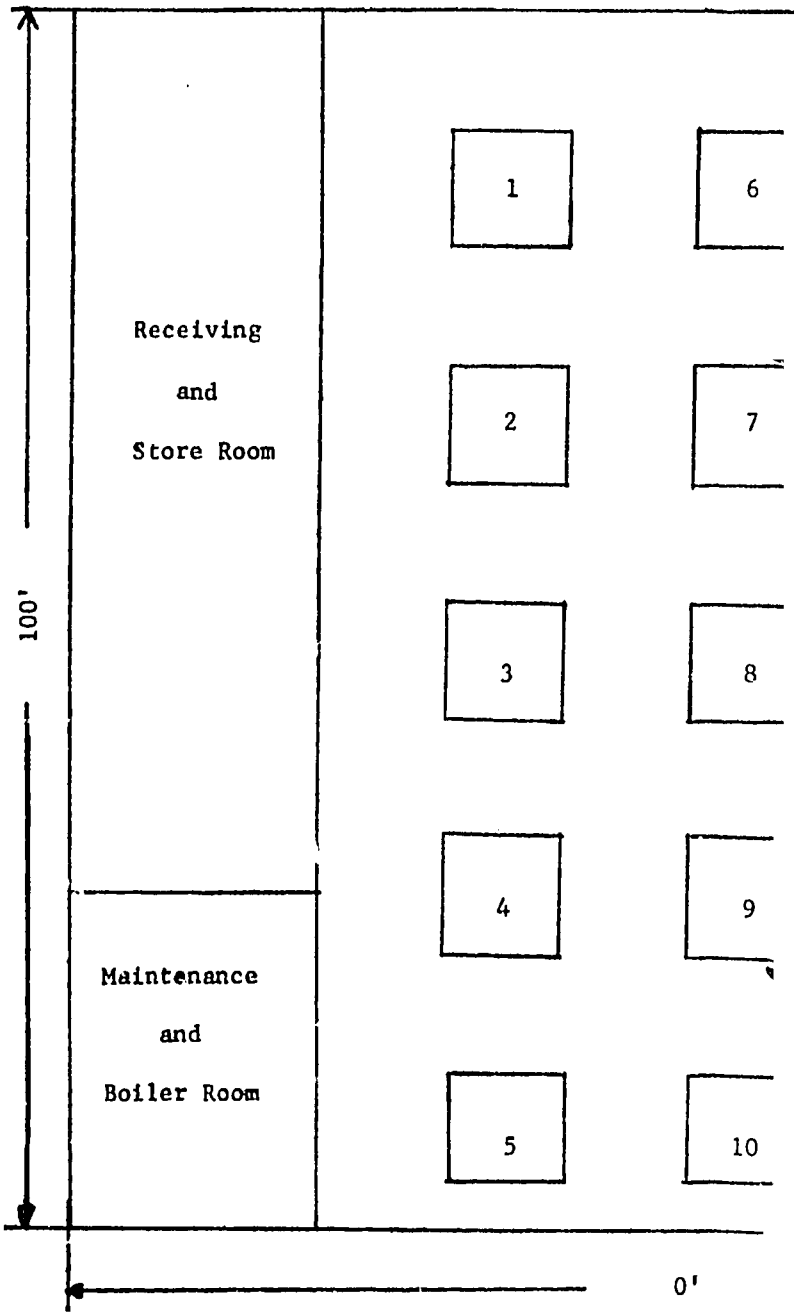
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 170,000	
Direct labor	93,000	
Manufacturing overhead*	69,000	
Total manufacturing cost		$ 332,800
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 29,200
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 380,000
Annual Gross Profit		$ 40,000
ANNUAL SALES REVENUE		$ 420,000

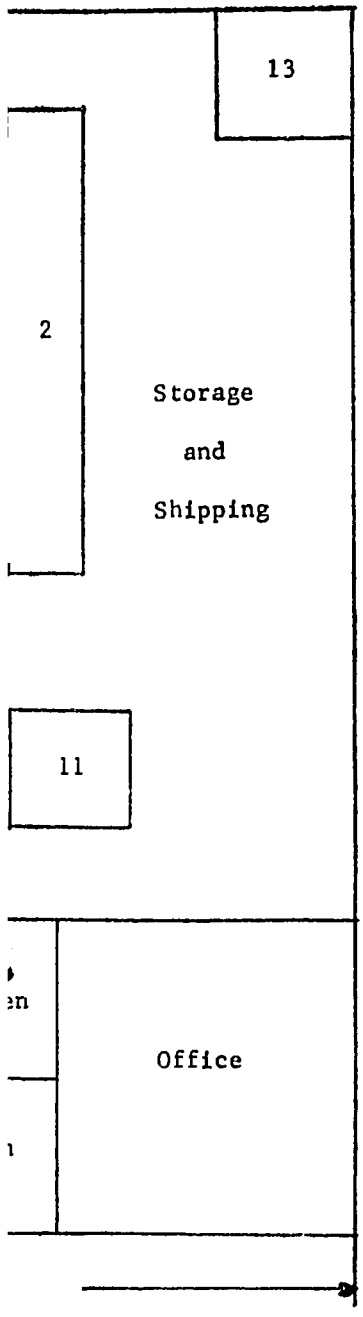
*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

WASHING MACHINES, HO

PLANT LAYOU



I.P. NO. 67322
S.I.C. 3633



WORK FLOW

1. Square Shears
2. Sheet Metal Brake
3. Punch Press
4. Lathe
5. Milling Machine
6. Drill Press
7. Grinding Machine
8. Arbor Press
9. Keyway Miller
10. Saw Machine
11. Welding Equipment
12. Assembly Conveyor
13. Spray Booth

WASHING MACHINES, HOUSEHOLD

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Metal Machinery and Farming Technology. J. P. Vidosic. 1964. 588 pp. Illus. $11.00

The Ronald Press Company
15 East 26th Street
New York, New York 10010

The fundamentals of machine tools and metal cutting processes.

B. The New American Machinist Hand Book. Rupert LeGrand. 1959. 1572 pp. 1,000 Illus. $15.00

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Answers to practical problems in metal working are brought together to aid machinists, designers, draftsmen, and engineers.

C. Machine Tool Operation. Part I, 5th Edition. Henry D. Burghardt and Aaron Axelrod. 558 pp. Illus. 1959. $5.75. Spanish edition in preparation.

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Deals with the machinist trade, safety, measuring tools and machine shop operations.

II. TECHNICAL AND TRADE PERIODICALS

A. Machine and Tool Blue Book. Monthly. $5.00/year

Hitchcock Publishing Company
Wheaton, Illinois 60188

Completely blankets U.S. metal working field.

B. Western Machinery and Steel World. Monthly. $8.00

R. J. Cardinal, Publisher
43 Cleveland Street
San Francisco, California 94103

Devoted to steel machinery.

III. BUSINESS MANAGEMENT MATERIALS

A. Improving Materials Handling in Small Plants. $.20

Small Business Management Series No. 4
U. S. Government Printing Office
Washington, D. C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

IV. REPRESENTATIVE U. S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A.	Patent No. 3,263,814. Washing machine.	August 2, 1966.	4 p.
B.	Patent No. 3,257,830. Washing machine.	June 28, 1966.	8 p.
C.	Patent No. 3,248,908. Washing machine.	May 3, 1966.	9 p.
D.	Patent No. 3,216,227. Clothes washing machine.	November 9, 1965.	9 p.
E.	Patent No. 3,216,226. Clothes washing machine.	November 9, 1965.	12 p.
F.	Patent No. 3,216,224. Clothes washing machine.	November 9, 1965.	2 p.
G.	Patent No. 3,215,232. Domestic laundering machine.	November 2, 1965.	6 p.
H.	Patent No. 3,213,650. Washing machine.	October 26, 1965.	7 p.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. American Home Laundry Manufacturers
20 North Wacker Drive
Chicago, Illinois 60604

B. Association of Home Appliance Manufacturers
20 North Wacker Drive
Chicago, Illinois 60606

VI. DIRECTORIES

A. Hitchcock's Machine and Tool Buyers' Directory. Annual. $15.00

Hitchcock Publishing Company
Wheaton, Illinois 60188

2,100 alphabetical, cross-indexed metalworking products, 3,200 manufacturers, 175 trade associations, 3,800 trade names.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

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This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

LIQUEFIED PETROLEUM GAS (DISTRIBUTION)

I. P. No. 67323
S. I. C. 5983

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I.P. No. 67323
S.I.C. 5983
DECEMBER 1967

LIQUEFIED PETROLEUM GAS (DISTRIBUTION)

PRODUCT DESCRIPTION

Liquefied petroleum gas purchased in bulk and distributed by tank truck or in cylinders or bottles to consumers.

A. GENERAL EVALUATION OF PROSPECTS

The success of this industry depends on the availability of natural gas or other fuels that may cost less. If natural gas or other, cheaper, fuels are not available locally and the sales potential for liquefied petroleum gas is adequate, the prospects for this industry should prove good. Fixed capital requirements are moderate in comparison with the annual estimated profits and no highly skilled workers are required. The figures shown in this profile are based on the bottling and distribution of liquefied petroleum gas. The production of bulk liquefied petroleum gas is covered in a separate profile (I. P. No. 67324).

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, trailers, boats, camps, farms and industrial plants.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be made direct to consumers. Delivery would be made in bottles to users or in bulk to establishments engaged mainly in some other activity (such as a hardware store) but which act as local dealers in small-quantity bottled distribution. Empty cylinders would be picked up for refilling. The market for this product depends on so many variable factors that an accurate estimate of sales potential can be made only after a comprehensive survey is completed. The sale of liquefied petroleum gas is possible only where piped natural gas or other fuels are not available. If land owners have plenty of wood available on their own land, domestic sales would be curtailed. This plant should not expect to compete in export markets.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $630,000.
The total fixed investment, plus working capital, is estimated at $413,000.
The annual gross profit, before taxes, is estimated at $83,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 13.2%.
(A gross profit on sales, before taxes, of 13.2%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 20.1%.

5. COST PER MAN EMPLOYED

Nine direct and eleven indirect workers, or a total of twenty workers, are employed.
The total fixed capital investment is estimated at $313,000.
Based on these figures, the fixed investment per man employed would amount to $15,650.

C. PRODUCTION REQUIREMENTS - LIQUEFIED PETROLEUM GAS (DISTRIBUTION) — I. P. No. 67323, S.I.C. 5983

ANNUAL CAPACITY - ONE SHIFT OPERATION: 3,500,000 GALLONS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - one acre	
Building - one story 25' x 50', plus dock, fence, 11,000 sq. ft. of pavement	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 313,000

Principal items:

2 Tanks, Appurtenances, Connections and Foundations, Pipe, Wiring and Ground Wiring, 2 Compressors, 2 Pumps and Connections, Hose, 5,000 Cylinders, 200 Tanks, 2 3-ton Tank Trucks, 3 2-ton Cylinder Carriers, Cylinder Testing Equipment, Tank Testing equipment, Pipe Fitters' Tools and Equipment, Electrical Repair Equipment, Welding Kit and Tools, Truck Repair Tools

b. Working Capital (30 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 100,000

c. Total Capital Requirements $ 413,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Distillate Gas	3,500,000 gallons	
Total direct materials		$ 350,000

b. Supplies

Lubricants & hand tools	
Welding rods	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 10,900

c. Availability of materials & supplies

Since this plant is designed in conjunction with a bottled liquid petroleum plant, the materials and supplies should be readily available.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 2 kilowatts connected load	
Fuel - for heating only	
Water - 1,500,000 gallons annually protection	$ 700

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation Equipment	4	
Total depreciation		$ 34,000

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Foreman	1	
Office	3	
Truck Repairmen	2	
Truck Driver	4	
Total indirect labor	11	$ 64,000
b. Direct labor		
Truck Drivers	6	
Unskilled workers	3	
Total direct labor	9	$ 48,000

c. Training needs

Manager and foreman should be fully experienced. They should be able to train other workers and reach full production in 30 day.

6. TRANSPORTATION

a. Own transport equipment

2 tank trucks and 3 cylinder carriers.

b. External transport facilities

None.

7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$350,000	
Direct labor	48,000	
Manufacturing overhead*	109,600	
Total manufacturing cost		$ 507,600
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 224,000
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 5,000
Total annual costs		$ 547,000
Annual Gross Profit		$ 83,000
ANNUAL SALES REVENUE		$ 630,000

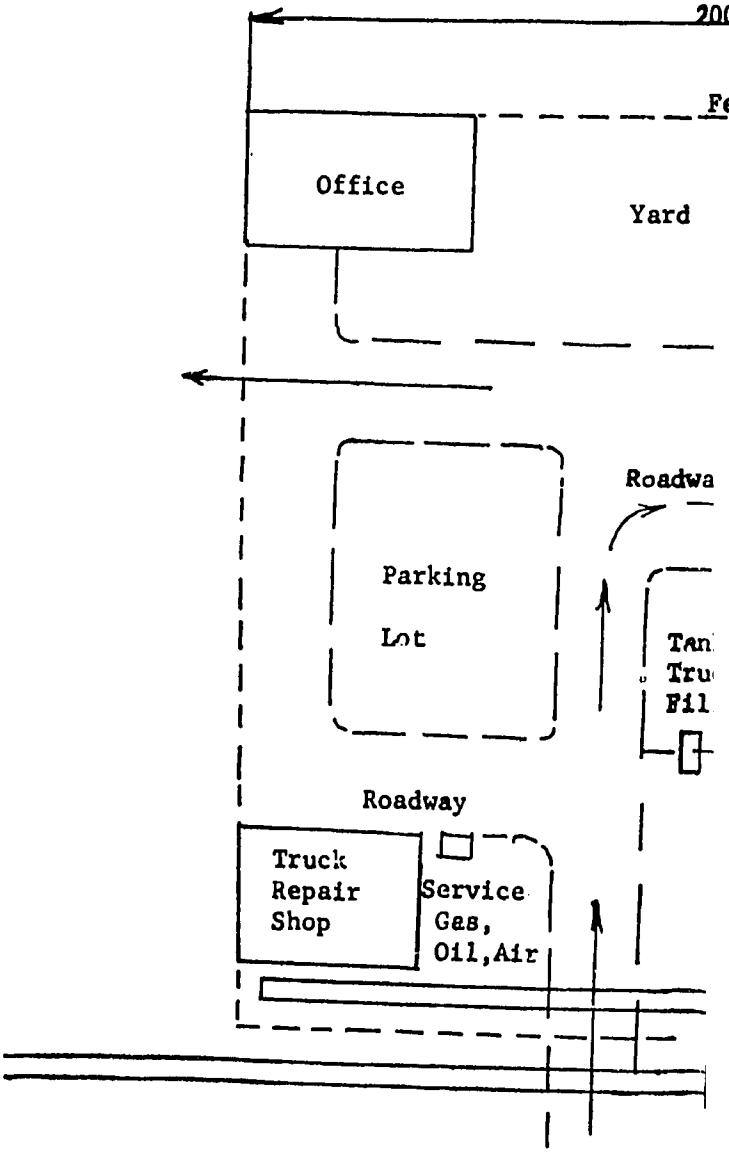
*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

LIQUEFIED PETROLEUM GAS

PLANT LAYOUT AND W

DISTRIBUTION F



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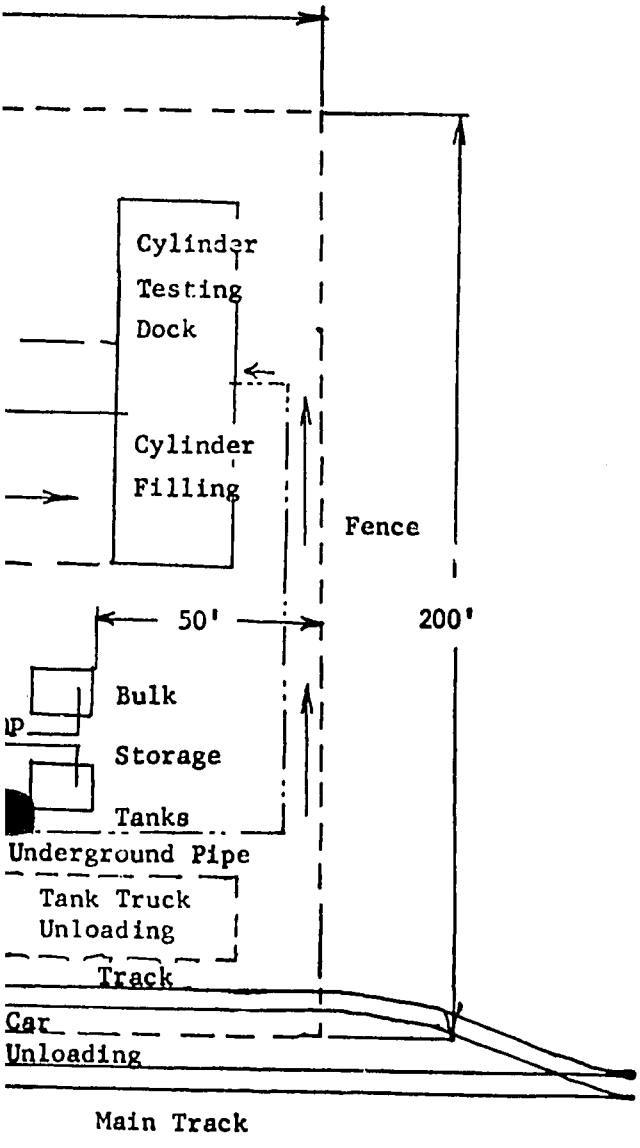

LIQUEFIED PETROLEUM GAS (DISTRIBUTION)

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Petroleum Products Handbook. V. Guthrie. 1960. 864 pp. Illus. $19.50

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Covers liquefied petroleum gas, natural gas, and crude petroleum

B. Natural Gas Industry. Edward J. Neuner. 1960. $5.75

University of Oklahoma Press
Faculty Exchange
Norman, Oklahoma 73069

Natural gas and petroleum. Processes and equipment design.

C. Petroleum Refinery Engineering. W. L. Nelson. 960 pp. Illus. 1958. $17.00

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Washington, D. C. 20402

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IV. REPRESENTATIVE U.S. PATENTS

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A.	Patent No. 3,237,416. Liquefication of gases.	March 1966.	8 p.
B.	Patent No. 3,194,205. Gas liquefication by multiple expansion refrigeration.	July 1965.	4 p.
C.	Patent No. 3,144,316. Process and apparatus for liquefying.	August 1964.	10 p.
D.	Patent No. 3,066,492. Process for the liquefication of gas.	December 1962.	3 p.
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G.	Patent No. 3,020,685. Process and apparatus for filling pressure tight containers.	1962.	3 p.
H.	Patent No. 2,763,107. Method and apparatus for sealing containers.	1956.	13 p.
I.	Patent No. 1,965,126. Process and apparatus for filling gas containers.	1934.	7 p.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National L P Gas Association
79 West Monroe Street
Chicago, Illinois 60603

VI. DIRECTORIES

A. American Gas Journal Handbook. Annual. $3.00

American Gas Journal
P.O. Box 1589
Dallas, Texas 75221

Lists manufacturers and suppliers to the gas industry.

B. Butane-Propane News Directory and Data Number. Annual. July $3.00

Butane-Propane News
Chilton Company
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Los Angeles, California 90015

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the :

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

ORDERING INSTRUCTIONS

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

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This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

LIQUEFIED PETROLEUM GAS (MANUFACTURED)

I. P. No. 67324
S. I. C. 1321

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

LIQUEFIED PETROLEUM GAS (MANUFACTURED)

I. P. No. 67324
S.I.C. 1321
DECEMBER 1967

PRODUCT DESCRIPTION

Liquefied petroleum gas produced from both refinery processes and wet natural gas and sold in bulk to distributors.

A. GENERAL EVALUATION OF PROSPECTS

The success of this industry depends on the availability of natural gas. If natural gas by direct pipeline or other, cheaper, fuels are not available locally and the sales potential of this product is adequate, the prospects for manufacture of liquefied petroleum gas should be good. The fixed capital requirements are fairly moderate in comparison with the annual estimated profits and only one skilled worker is needed. The figures shown in this profile are based on bulk sales. Distribution of liquefied petroleum gas is covered in a separate profile (I. P. No. 67323).

B. MARKET ASPECTS

1. USERS

Sold in bulk to distributors for distribution to ultimate users. Consumers include homes, restaurants, hotels, trailers, camps, boats, farms and industrial plants.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be made direct in bulk to distributors who would bottle the gas and sell it to users. An accurate estimate of market potential cannot be made unless a comprehensive survey of sales potential is undertaken because so many variable factors come into play. Sales of liquefied petroleum gas are possible only where piped natural gas, wood for fuel, or other, cheaper, fuels are not readily available. Liquefied petroleum gas is not an export product and this plant should not expect to compete in world markets.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $ 192,000.
The total fixed investment, plus working capital, is estimated at $ 248,600.
The annual gross profit, before taxes, is estimated at $ 25,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 13%.
(A gross profit on sales, before taxes, of 13%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 10.1%.

5. COST PER MAN EMPLOYED

Six direct and four indirect workers, or a total of ten workers, are employed.
The total fixed capital investment is estimated at $218,000.
Based on these figures, the fixed investment per man employed would amount to $ 21,800.

C. PRODUCTION REQUIREMENTS - LIQUEFIED PETROLEUM GAS (MANUFACTURED)

I.P. No. 67324
S.I.C. 1321

ANNUAL CAPACITY - THREE SHIFT OPERATION, 52 WEEKS PER YEAR: 211,700 BARRELS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital — Cost

Land - two acres
Building - one story 20' x 50'
Equipment, furniture & fixtures
Prodn. tools & equipment
Other tools & equipment
Furniture & fixtures
Transportation equipment
Total fixed capital — $ 218,000

Principal items:

Three towers, 3 Accumulator Tanks, Vent Tank, Lean Oil Tank, Surge Tank, 2 Heat Exchangers, 2 Condensers, 3 Coolers, Recompressor, 4 Pumps, Steam Generator, Water Cooler, Piping and Valves, Maintenance Tools and Equipment, Oil

b. Working Capital (30 days)

Direct materials
Direct labor
Manufacturing overhead
Administrative costs
Sales costs
Freight-out, discounts, bad debts & allowances
Sales revenue
Training costs

Total working capital — $ 30,600

c. Total Capital Requirements — $ 248,600

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Natural Gas	7,300 million cubic feet	
Total direct materials		$ 36,500

b. Supplies

Lubricants & hand tools
Absorber Oil
Maintenance & spare parts
Office supplies
Gas, oil and maintenance of truck
Total supplies — $ 7,000

c. Availability of materials & supplies

All materials and supplies should be available locally.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - one kilowatt connected load	
Fuel - no fuel purchased - boiler maintenance	
Water - 200,000 gallons per day	$ 3,200

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 21,900

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Supervisor-manager	1	
Chemist	1	
Office	1	
Truck Driver	1	
Total indirect labor	4	$ 31,000
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	2	
Unskilled workers	2	
Total direct labor	6	$ 29,200

c. Training needs

Supervisor must be fully experienced. He and one skilled worker should be able to train other workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Pickup Truck

b. External transport facilities

Annual shipments in and out amount to about 423,000 barrels. Railroad and good highways essential.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 36,500	
Direct labor	29,200	
Manufacturing overhead*	63,100	
Total manufacturing cost		$ 128,800
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 21,200
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 5,000
Total annual costs		$ 167,000
Annual Gross Profit		$ 25,000
ANNUAL SALES REVENUE		$ 192,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
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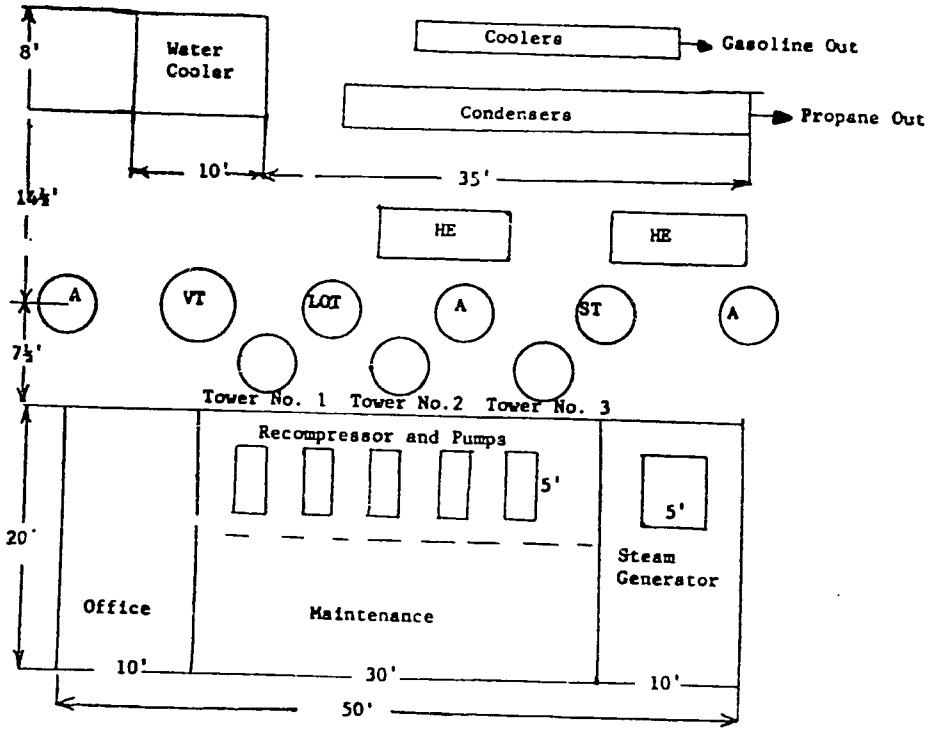
EXTRACTING PLANT LAYOUT

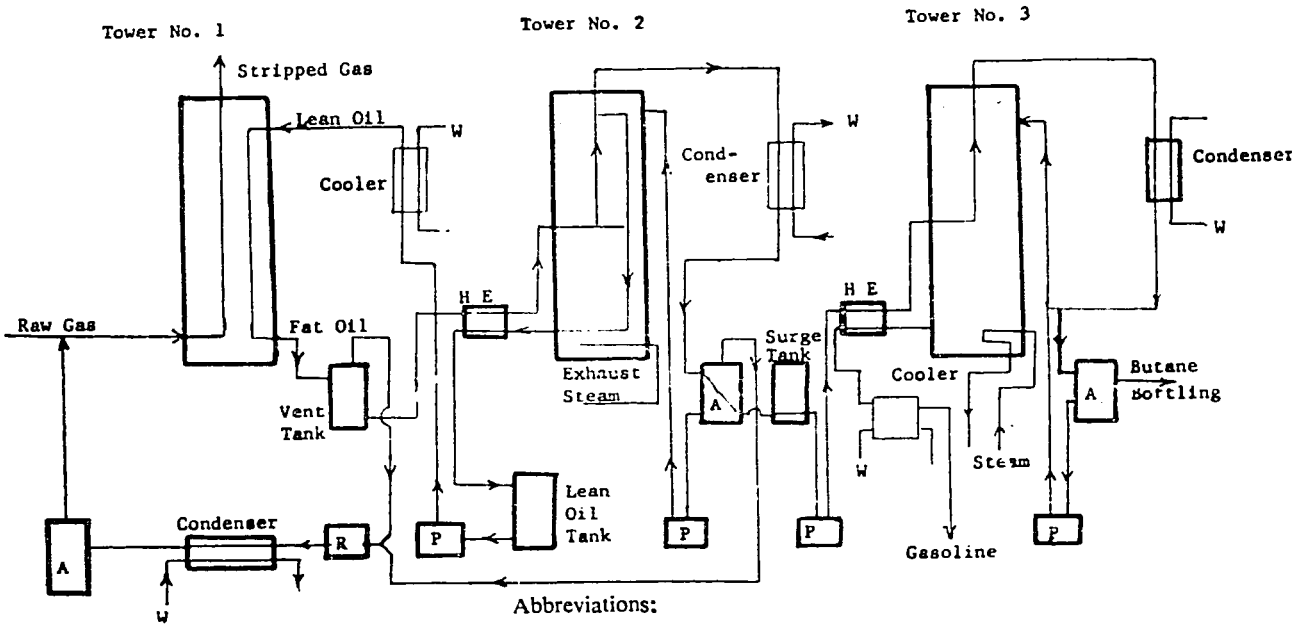


Abbreviations:

VT = Vent Tank

Accumulator

EXTRACTING PLANT



Abbreviations:

A = Accumulator Tank
P = Pump
HE = Heat Exchanger
R = Recompressor
W = Water

19.5

LIQUEFIED PETROLEUM GAS (MANUFACTURED)

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Petroleum Products Handbook. V. Guthrie. 1960. 864 pp. Illus. $19.50

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Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Starting and Managing a Small Business of Your Own. Wendell O. Metcalf. 49 pp. 1962. $.25. Vol. I (2nd Edition) of the Starting and Managing Series of the Small Business Administration, Washington, D. C.

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Pitfalls usually encountered when entering a new business. Sources of additional information given.

V. REPRESENTATIVE U. S. PATENTS

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20th

INDUSTRY PROFILES

DIMENSION HARDWOOD

I. P. No. 67325
S. I. C. 2426

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DIMENSION HARDWOOD

I. P. No. 67325
S. I. C. No. 2426
DECEMBER 1967

PRODUCT DESCRIPTION

Moldings and other stock machined to exact dimensions according to specifications supplied by customers.

A. GENERAL EVALUATION OF PROSPECTS

The prospects for this industry will be bright where the source of lumber is a long distance from the industrial center and the transportation facilities are inadequate. The cutting waste on lumber for most purposes varies from 20 to 40 percent. Therefore, when lumber is shipped and delivered in specified dimensions, kiln dried, ready for use, the shipping cost is considerably reduced. Such reductions in shipping costs represent sound sales arguments. When the source of lumber is near the industrial center and transportation facilities are adequate, there is less advantage in purchasing dimensioned lumber. A market survey should be made to determine if existing conditions will produce sufficient sales.

B. MARKET ASPECTS

1. USERS

Industries and construction contractors are the principal users of dimension lumber. Small amounts are sometimes purchased by individuals.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made direct to industries, large construction contractors and to lumber yards or building materials companies. The existing activity in home building and the kind of materials used for such construction are two important factors in determining market potential. A careful survey should be made to determine sales potential. Dimensional lumber is bulky and heavy but for long distance hauls it is usually shipped by the truck load or railroad car load. The market would be nationwide but industrial centers would consume the largest percentage. This industry cannot be operated successfully on a small basis. If an adequate supply of lumber is available within the country, this industry should have no difficulty in competing with imported dimension hardwood.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $450,000.
The total fixed investment, plus working capital, is estimated at $204,400.
The annual gross profit, before taxes, is estimated at $36,000.
Using these figures, the profit on gross sales, before taxes, amounts to 8%.
(A gross profit on sales, before taxes, of 8%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 17.6%.

5. COST PER MAN EMPLOYED

Nine direct and five indirect workers, or a total of fourteen workers, are employed.
The total fixed capital investment is estimated at $132,000.
Based on these figures, the fixed investment per man employed would amount to about $9,430.

C. PRODUCTION REQUIREMENTS - DIMENSION HARDWOOD

I.P. No. 67325
S.I.C. 2426

ANNUAL CAPACITY - ONE SHIFT OPERATION: 2,000,000 BOARD FEET OF MOLDING AND OTHER DIMENSION HARDWOOD

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - two acres	
Building - 80' x 60' one story building. Dry kiln. Local materials may be used.	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 132,000

Principal items :
Cutoff saw
Ripsaw
Molder
3-drum sander
Trim saw
Boiler
Factory trucks

b. Working Capital (30 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 72,400

c. Total Capital Requirements $ 204,400

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Hardwood lumber	2,400,000 board feet	
Packaging material		
Total direct materials		$ 265,000

b. Supplies

Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 4,500

c. Availability of materials & supplies

All materials and supplies should be available locally.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 50 H.P. connected load	
Fuel - scrap wood used	
Water - sanitation and fire protection	$ 2,100

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 11,400

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Office	2	
Maintenance	1	
Truck driver	1	
Total indirect labor	5	$ 37,000
b. Direct labor		
Skilled workers	3	
Semi-skilled workers	3	
Unskilled workers	3	
Total direct labor	9	$ 43,800

c. Training needs

Manager must be thoroughly experienced. He and three skilled workers should be able to train the other workers and reach full production in thirty days.

6. TRANSPORTATION

a. Own transport equipment

Truck.

b. External transport facilities

Product is bulky. Good highways essential. Plant should be located on railroad, if possible.

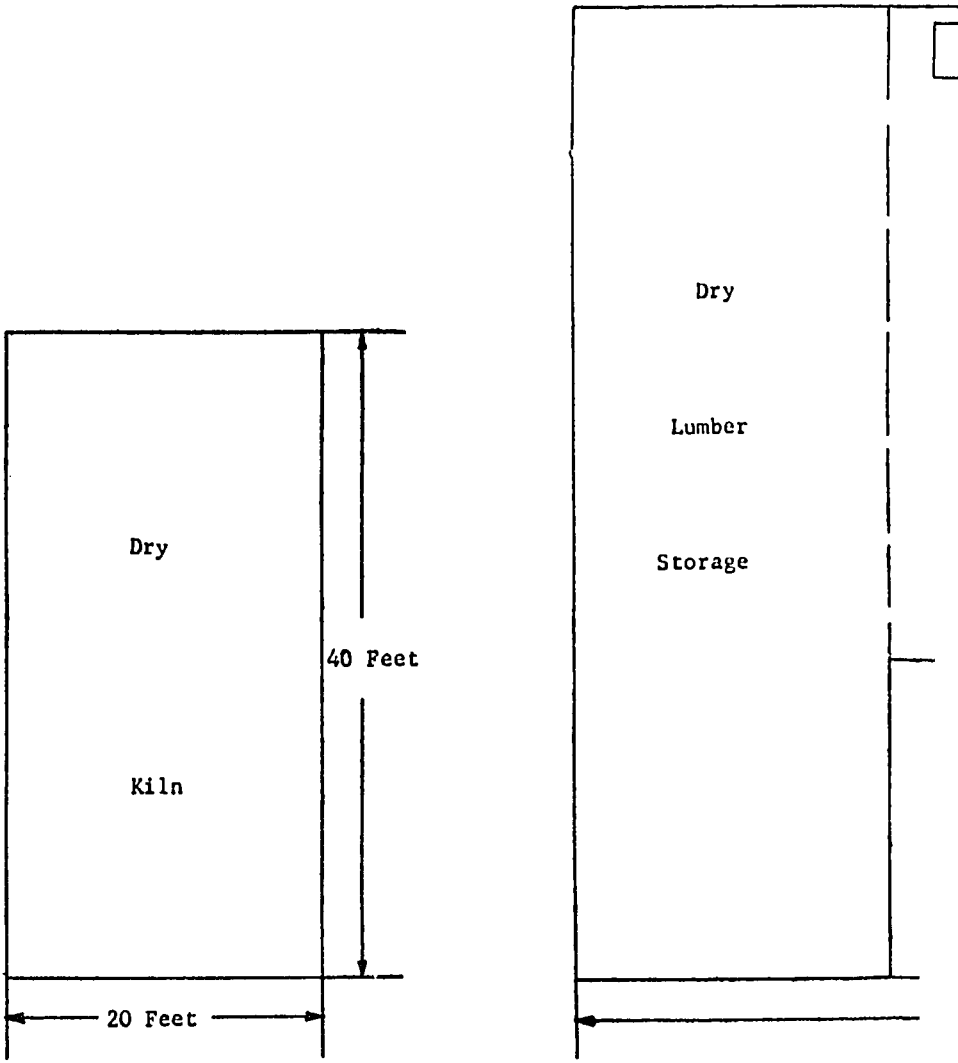
7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$ 265,000	
Direct labor	43,800	
Manufacturing overhead*	55,000	
Total manufacturing cost		$ 363,800
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 29,200
Sales expense		$ 15,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 414,000
Annual Gross Profit		$ 36,000
ANNUAL SALES REVENUE		$ 450,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT LA



ARDWOOD

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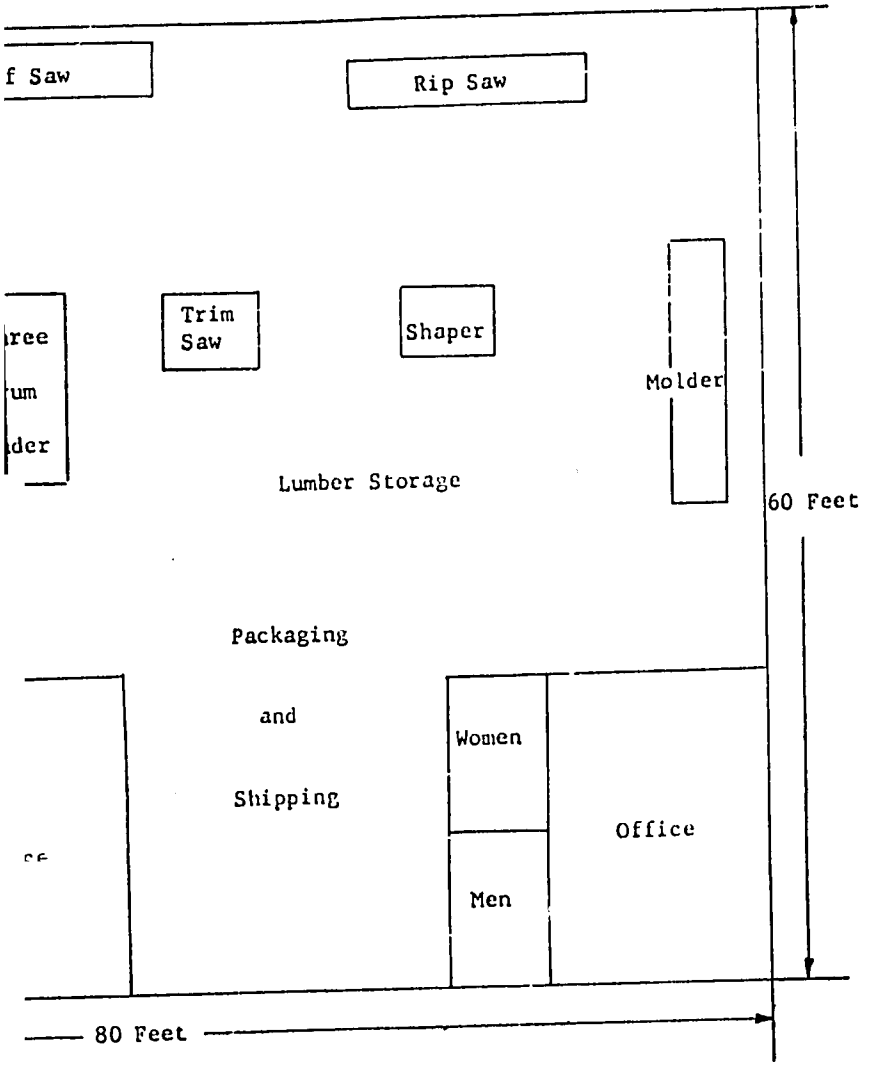
ND WORKFLOW



207

DIMENSION HARDWOOD

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. General Woodworking. 2nd Edition. C. H. Groneman. 1959. 256 pp. Illus. $7.25

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Machine tool processes, hand tool processes, portable tool processes, and related woodworking information

B. Accounting and Cost Controls Manual in the Hardwood Conversion Industry. Vincent E. Noltmeyer and others. 1967. $6.50

Hardwood Dimension Manufacturers Association
3813 Hillsboro Road
Nashville, Tennessee 37215

How to reduce costs and increase efficiency through better administrative procedures and controls.

II. TECHNICAL AND TRADE PERIODICALS

A. Wood and Wood Products. Monthly. $5.00/year

Vance Publishing Corporation
59 East Monroe Street
Chicago, Illinois 60603

Effective management and production in the wood industry.

B. Woodworking Digest. Monthly. $5.00/year

Hitchcock Publishing Company
Wheaton, Illinois 60188

Covers the major branches of the woodworking industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Starting and Managing a Small Business of Your own. Wendell O. Metcalf. 49 pp. 1962. $.25. Vol. I (2nd Edition) of the Starting and Managing Series of the Small Business Administration, Washington, D. C.

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Pitfalls usually encountered when entering a new business. Sources of additional information given.

IV. REPRESENTATIVE U.S. PATENTS

There are no patents available that deal directly with dimension hardwood cut to specifications.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Hardwood Dimension Manufacturers Association
3813 Hillsboro Road
Nashville, Tennessee 37215

B. Woodworking Machinery Manufacturers Association
1900 Arch Street
Philadelphia, Pennsylvania 19103

VI. DIRECTORIES

A. Hitchcock's Woodworking Directory and Handbook. Annual. $5.00

Hitchcock Publishing Company
Wheaton, Illinois 60188
Lists manufacturers and suppliers for the wood working industries.

B. Directory of the Forest Products Industry. Annual. $25.00

Miller-Freeman Publications, Inc.
500 Howard Street
San Francisco, California 94105

Lists suppliers of equipment for the forest products industries.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by referring to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N.W.
Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

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This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

CANNED CHERRIES

I. P. No. 67326
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I.P. No. 67326
S.I.C. 2033
NOVEMBER 1967

CANNED CHERRIES

PRODUCT DESCRIPTION

Canned cherries, 303 cans, size 303 x 406, net weight one pound

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned cherries normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned fruits. Consumption of canned fruits will vary primarily with the climate, the availability of fresh fruits, the level of income and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $150,000.
The total fixed investment, plus working capital, is estimated at $137,900.
The annual gross profit, before taxes, is estimated at $7,500.
Based on these figures, the profit on gross sales, before taxes, amounts to about 5.0%.
(A gross profit on sales, before taxes, of 5.0%, while reflecting U.S. experience, should not be considered normal for a developing country, where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 5.4%.

5. COST PER MAN EMPLOYED

Twenty-two direct workers and four indirect workers, or a total of 26 workers, are employed.
The total fixed capital investment is estimated at $124,000.
Based on these figures, the fixed investment per man employed would amount to about $4,770.

C. PRODUCTION REQUIREMENTS - CANNED CHERRIES

I.P. No. 67326
S.I.C. 2033

ANNUAL CAPACITY - ONE SHIFT OPERATION -10 WEEKS : 720,000 CANS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital — Cost

Land - 2 acres

Building - one story, 100′ x 120′

Equipment, furniture & fixtures
Prodn. tools & equipment
Other tools & equipment
Furniture & fixtures
Transportation equipment
Total fixed capital — $ 124,000

Principal items :

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H. P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P -120 P.S.I., Eliminator, Inspection Belt, Pitter. Washer

b. Working Capital (15 days)

Direct materials
Direct labor
Manufacturing overhead
Administrative costs
Sales costs
Freight-out, discounts, bad debts & allowances
Sales revenue
Training costs
Total working capital — $ 13,900

c. Total Capital Requirements — $ 137,900

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Cherries	450 tons	
Cans	720,000	
Additives		
Labels & Cartons		
Total direct materials		$ 72,600

b. Supplies

Lubricants & hand tools
Cutting tools and abrasives
Maintenance & spare parts
Office supplies
Gas, oil & maintenance of truck
Total supplies — $ 1,200

c. Availability of materials & supplies

Cherries must be available locally. Labels and cartons should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER — Annual Cost

Electric Power - 12 H.P. connected load
Fuel - oil
Water - must be potable
$ 1,300

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 9,300

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck driver	1	
Total indirect labor	4	$ 6,000
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	17	
Total direct labor	22	$ 19,000

c. Training needs

The manager and the inspector should be fully experienced. They, with the two skilled workers, should be able to train all workers and reach full production in one week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input at this plant will amount to about 7.8 tons per day. Good highways.

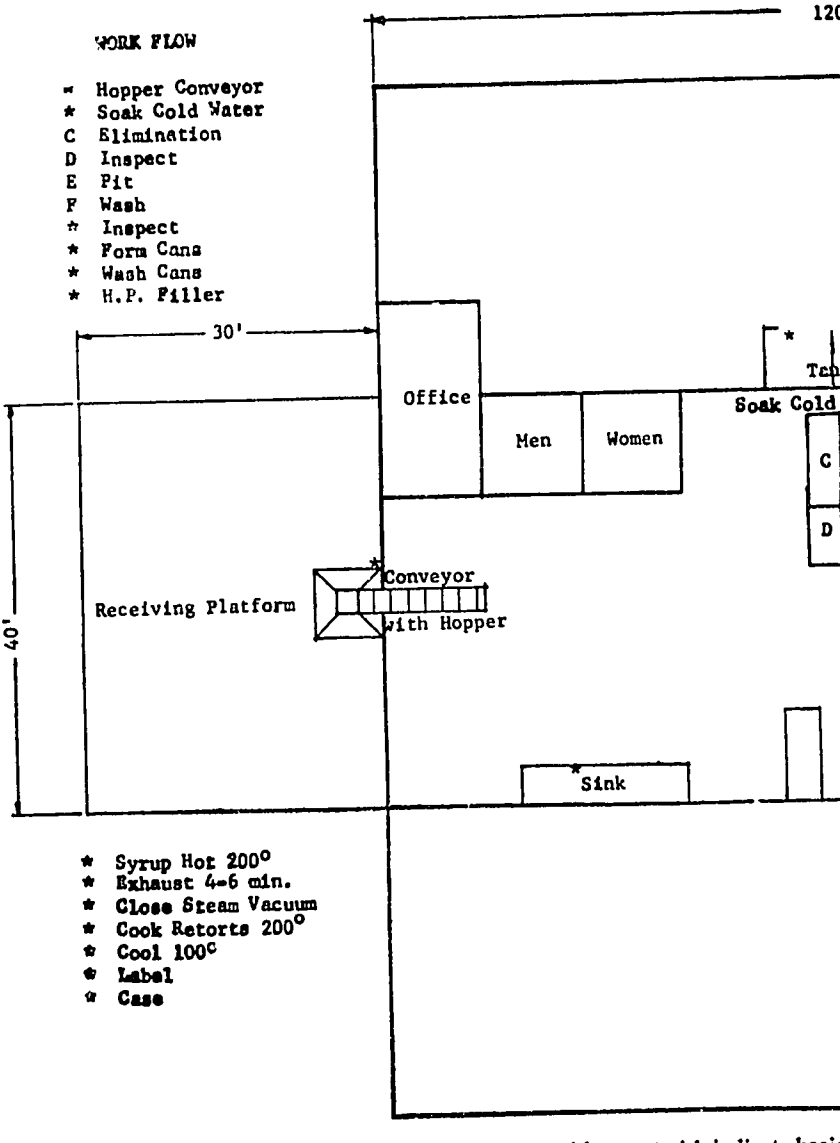
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 72,600	
Direct labor	19,000	
Manufacturing overhead*	17,800	
Total manufacturing cost		$ 109,400
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 15,100
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 142,500
Annual Gross Profit		$ 7,500
ANNUAL SALES REVENUE		$ 150,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT LA



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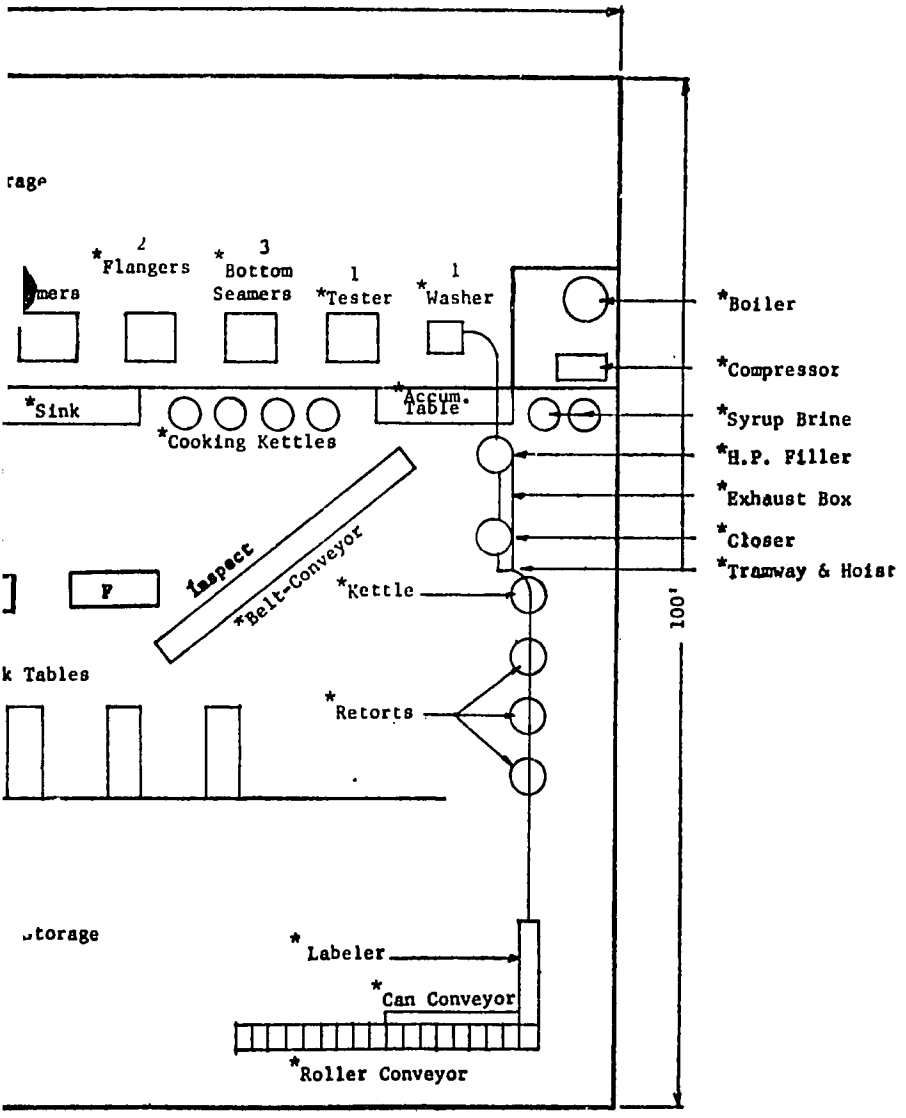

d for canning all products.

ılly for this product.

CANNED CHERRIES

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Complete Course in Canning. 8th. ed. 1966. 400 p. $15.00.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Covers all products, fruits, vegetables, meats, milk, soups, juices, etc. in minute detail, with full basic instruction from the field through to the warehouse.

B. The Almanac of the Canning, Freezing, and Preserving Industries, 1967. 510 p. $7.50.

Edward E. Judge
P.O. Box 866
Westminster, Maryland 21157

Includes latest prices on vegetables, fruits, cans, glass jars, canned products, as well as data on quality grade standards, labeling, packaging, international trade, U.S. and world packs, and other valuable information.

C. Quality Control and Reliability. Norbert L. Enrick. 1966. 5th ed. 254 p. $7.50.

The Industrial Press
93 Worth Street
New York, N.Y. 10013

The 24 chapters of the book are divided into three main sections: (1) basic quality control applications; (2) additional quality control methods; and (3) reliability.

D. Federal Food. Drug and Cosmetic Act, General Regulations for its enforcement, Title 21, Par 1, $3.00.

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Deals with all phases of quality and health aspects of processed foods, including minimum standards and additives, such as vitamins, coloring, and enforcement of regulations.

II. TECHNICAL AND TRADE PERIODICALS

A. Canning Trade. Bi-weekly. $5.00/year.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Devoted exclusively to the food processing industry.

B. Food Engineering. Monthly. $25.00/year.

Food Engineering
Chestnut & 56th Street
Philadelphia, Pa. 19139

Devoted exclusively to the food processing industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 1961. (Small Business Administration). 233 pp. $1.00.

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Prepared by the Small Business Administration to assist in the development of more effective management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U. S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,272,636 Sept. 1966 4 p.
Method of controlling microorganisms in food products.

B. Patent No. 3,232,770 Feb. 1966 9 p.
Method of sterilizing and canning field material.

C. Patent No. 3,071,475 Jan. 1963 7 p.
Sterilizing method for canned foodstuff.

D. Patent No. 2,794,326 June 1957 6 p.
Method and apparatus for cooling canned goods.

E. Patent No. 2,793,582 May 1957 4 p.
Continuous operating cooker.

F. Patent No. 2,760,837 Aug. 1956 4 p.
Process for transporting cans through a continuous sterilizer.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National Canners Association
1133 20th Street, N.W.
Washington, D.C. 20036

B. Canning Machinery and Supplies Association
7758 Wisconsin Avenue, N.W.
Washington, D.C. 20036

VI. DIRECTORIES

A. Canners Directory. $5.00. Annual.

National Canners Association
1133 20th Street, N.W.
Washington, D.C. 20036

B. Canning Machinery Directory. Gratis.

Canning Machinery and Supplies Association
7758 Wisconsin Avenue, N.W.
Washington, D.C. 20014

C. The Directory of the Canning, Freezing, Preserving Industries. $25.00. Annual.

Edward E. Judge
P O. Box 866
Westminster, Maryland 21157

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

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National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

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INDUSTRY PROFILES

CANNED ASPARAGUS

I. P. No. 67327
S. I. C. 2033

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CANNED ASPARAGUS

PRODUCT DESCRIPTION

Canned asparagus, 303 cans, size 303 x 406, net weight one pound,

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND METHODS

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned asparagus normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned vegetables. Consumption of canned vegetables will vary primarily with the climate, the availability of fresh vegetables, the level of income and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $256,000.
The total fixed investment, plus working capital, is estimated at $147,800.
The annual gross profit, before taxes, is estimated at $13,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 5.1%.
(A gross profit on sales, before taxes, of 5.1%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 8.8%.

5. COST PER MAN EMPLOYED

Twenty-six direct workers and four indirect workers, or a total of thirty workers are employed.
The total fixed capital investment is estimated at $127,000.
Based on these figures, the fixed investment per man employed would amount to about $4,225.

C. PRODUCTION REQUIREMENTS - CANNED ASPARAGUS
ANNUAL CAPACITY - ONE SHIFT OPERATION - 13 WEEKS: 930,000 CANS

I.P. No. 67327
S.I.C. 2033

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 127,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, 3 Can Bottom Seamers, Can Tester, Can Washer, H. P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P - 120 P.S.I., Snipper, 2 Washers, Grader, Cutter, Blancher

b. Working Capital (15 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 20,800

c. Total Capital Requirements $ 147,800

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Asparagus	565 tons	
Cans	930,000	
Additives		
Labels and Cartons		
Total direct materials		$ 153,600

b. Supplies

Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 1,200

c. Availability of materials & supplies

Asparagus must be available locally. Labels and cartons should be available locally. Cans may have to imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 14 H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,600

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 9,600

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck Driver	1	
Total indirect labor	4	$ 10,500
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	21	
Total direct labor	26	$ 34,000

c. Training needs

The manager and the inspector should be fully experienced. They with 2 skilled workers should be able to train all workers and reach full production in about one week.

6. TRANSPORTATION

a. Own transport equipment

Truck.

b. External transport facilities

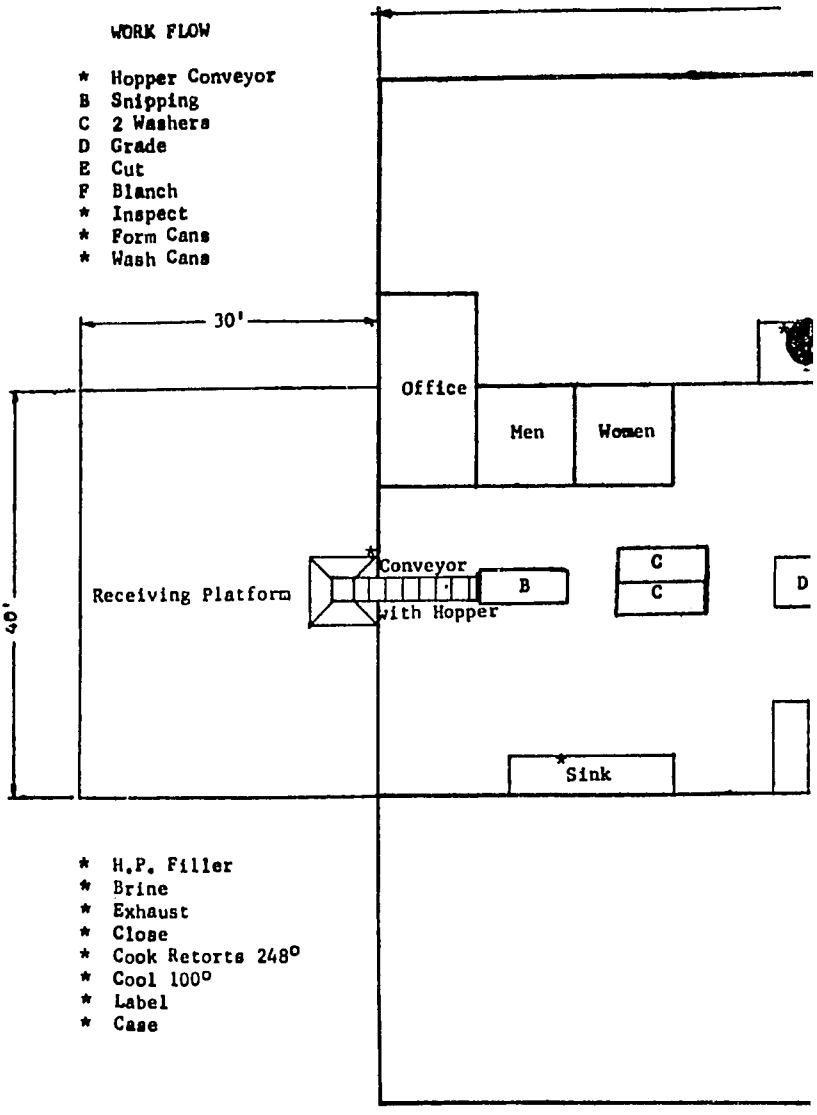
During the canning season the input at the plant will amount to about 7.2 tons per day. Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 153,600	
Direct labor	34,000	
Manufacturing overhead*	22,900	
Total manufacturing cost		$ 210,500
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 16,500
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 4,000
Total annual costs		$ 243,000
Annual Gross Profit		$ 13,000
ANNUAL SALES REVENUE		$ 256,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLAN



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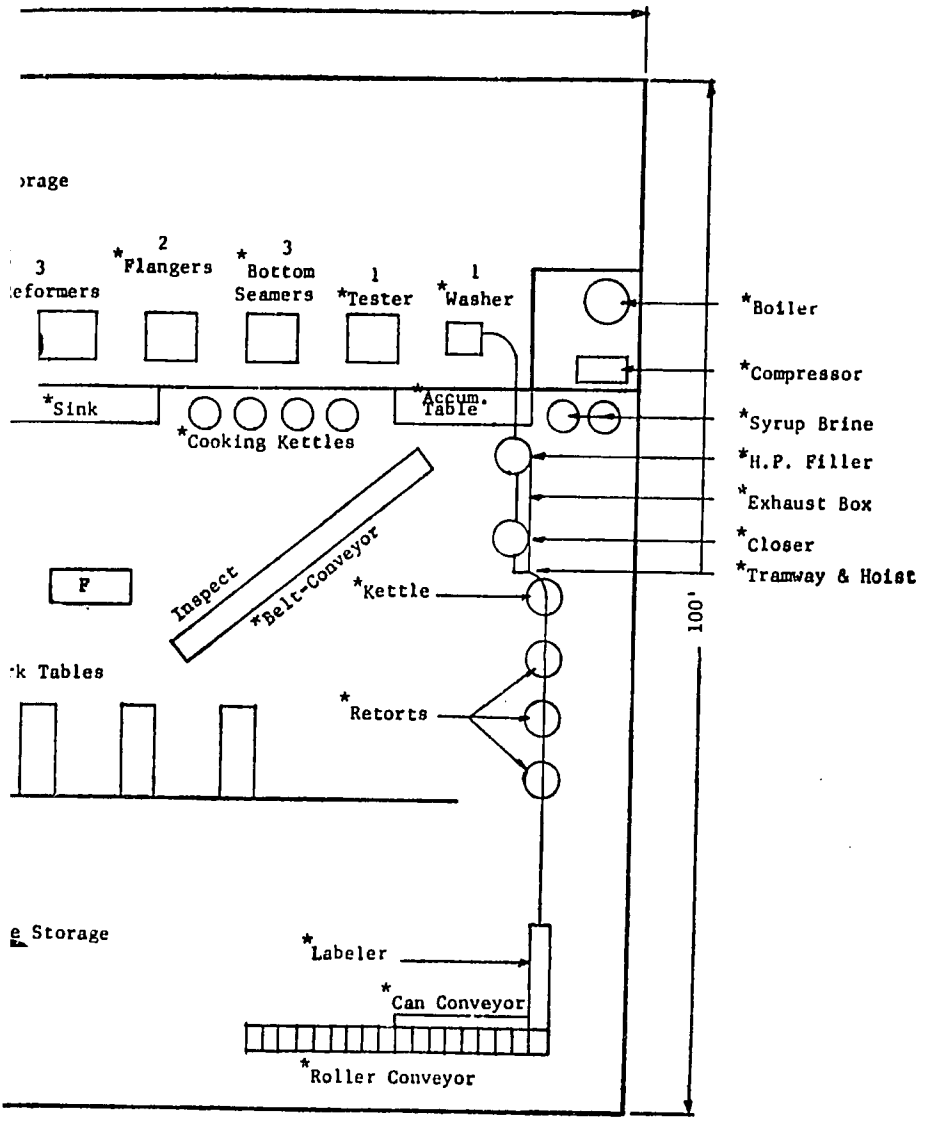

ed for canning all products

ially for this product.

CANNED ASPARAGUS

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National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

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The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

CANNED BEETS

I. P. No. 67328
S. I. C. 2033

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Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

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I.P. No. 67328
S.I.C. 2033
NOVEMBER 1967

CANNED BEETS

PRODUCT DESCRIPTION

Canned beets, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned beets normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned vegetables. Consumption of canned vegetables will vary primarily with the climate, the availability of fresh vegetables, the level of income and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognised that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $255,000
The total fixed investment, plus working capital, is esimated at $155,800.
The annual gross profit, before taxes, is estimated at $14,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 5.5%.
(A gross profit on sales, before taxes, of 5.5%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 9.0%.

5. COST PER MAN EMPLOYED

Twenty direct workers and four indirect workers, or a total of twenty-four workers, are employed.
The total fixed capital investment is estimated at $135,000.
Based on these figures, the fixed investment per man employed would amount to about $5,620.

C. PRODUCTION REQUIREMENTS - CANNED BEETS

I.P. No. 67328
S.I.C. 2033

ANNUAL CAPACITY - ONE SHIFT OPERATION - 33 WEEKS: 2,370,000 CANS

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital — Cost

Land - 2 acres

Building - one story, 100' x 120'

Equipment, furniture & fixtures
Prodn. tools & equipment
Other tools & equipment
Furniture & fixtures
Transportation equipment
Total fixed capital — $135,000

Principal Items :

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift Truck with Pallets, Compresor, Platform Scales, Boiler 100 H.P.-120 P S I., Cleaning Reel, Washer, Grader, Blancher, Abrasive Peeler, Washer

b. Working Capital (15 days)
Direct materials
Direct labor
Manufacturing overhead
Administrative costs
Sales costs
Freight-out, discounts, bad debts & allowances
Sales revenue
Training costs
Total working capital — $ 20,800

c. Total Capital Requirements — $155,800

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Beets	1,400 tons	
Cans	2,370,000	
Additives		
Labels and Cartons		
Total direct materials		$116,000

b. Supplies
Lubricants & hand tools
Cutting tools & abrasives
Maintenance & spare parts
Office supplies
Gas, oil and maintenance of truck
Total supplies — $ 1,900

c. Availability of materials & supplies

Beets must be available locally. Labels and cartons should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER — Annual Cost

Electric Power - 16 3/4 H. P. connected load
Fuel - oil
Water - must be potable — $ 6,000

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 10,700

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspectors	1	
Truck Driver	1	
Total indirect labor	4	$ 18,900
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	15	
Total direct labor	20	$ 50,500

c. Training needs

The manager and the inspector should be fully experienced. They with 2 skilled workers should be able to train all workers and reach full production in about one week.

6. TRANSPORTATION

a. Own transport equipment
Truck

b. External transport facilities

During the canning season the input at the plant will amount to about 7.1 tons per day.

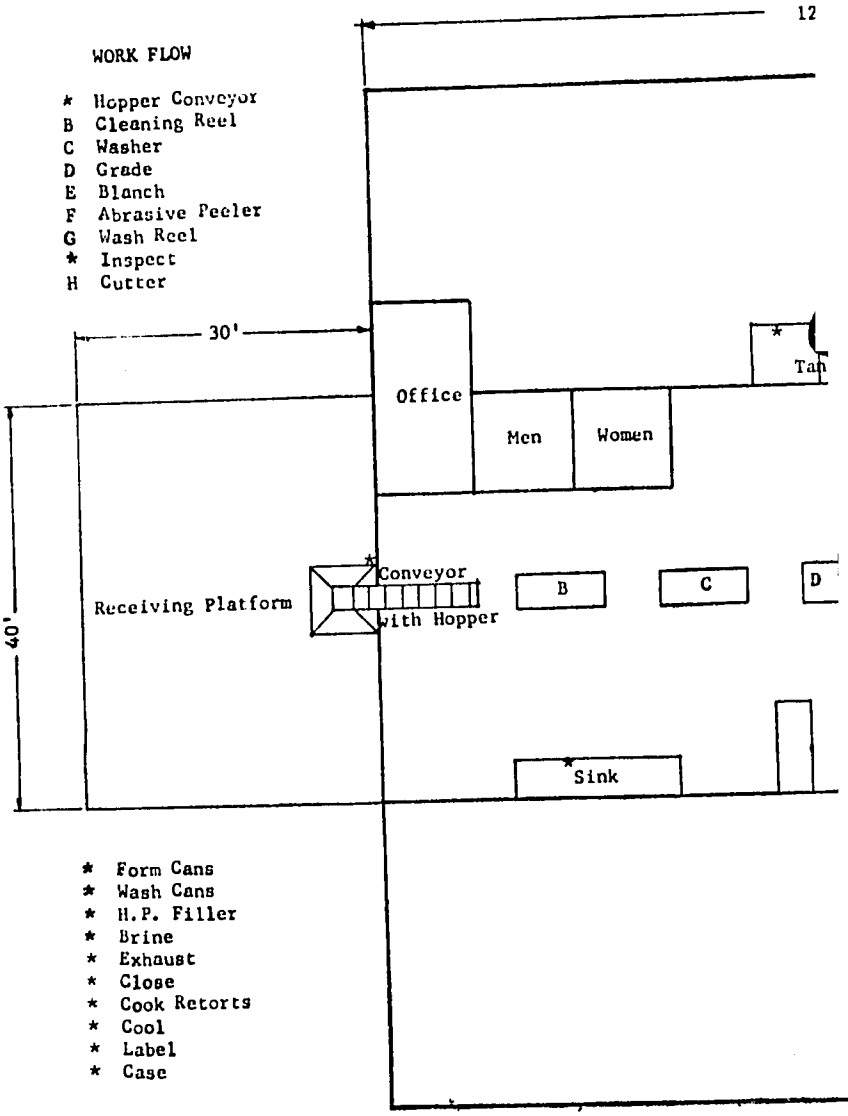
Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$116,000	
Direct labor	50,500	
Manufacturing overhead*	37,500	
Total manufacturing cost		$ 204,000
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 15,000
Sales expense		$ 16,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 241,000
Annual Gross Profit		$ 14,000
ANNUAL SALES REVENUE		$ 255,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT



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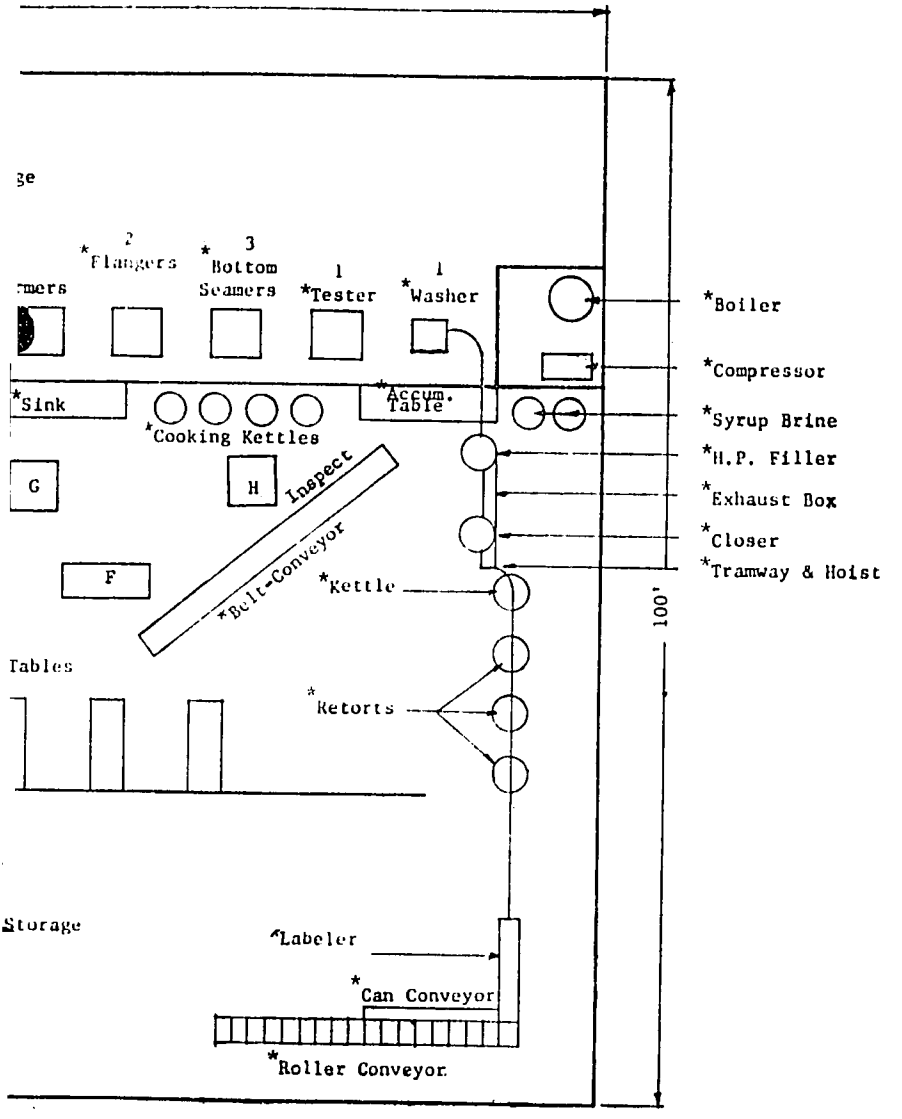
EETS

I. P. NO. 67328
S. I. C. 2033



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/ for this product.

23.1

I.P. No. 67328
S.I.C. 2033

CANNED BEETS

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INDUSTRY PROFILES

CANNED PEACHES

I. P. No. 67329
S. I. C. 2033

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I.P. No. 67329
S.I.C. 2033
NOVEMBER 1967

CANNED PEACHES

PRODUCT DESCRIPTION

Canned peaches, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seeasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several sesonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned peaches normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned fruits. Consumption of canned fruits will vary primarily with the climate, the availability of fresh fruits, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $131,000.
The total fixed investment, plus working capital, is estimated at $139,300.
The annual gross profit, before taxes, is estimated at $6,600.
Based on these figures, the profit on gross sales, before taxes, amounts to about 5.04%.
(A gross profit on sales, before taxes, of 5.04%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 4.7%.

5. COST PER MAN EMPLOYED

Twenty-three direct workers and four indirect workers, or a total of 27, are employed.
The total fixed capital investment is estimated at $129,000.
Based on these figures, the fixed investment per man employed would amount to $4,777.

C. PRODUCTION REQUIREMENTS - CANNED PEACHES

I.P. No. 67329
S.I.C. 2033

ANNUAL CAPACITY - ONE SHIFT OPERATION - 9 WEEKS : 645,000 CANS

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - 2 acres	
Building - one story 100′ x 100′	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 129,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 2 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P. - 120 P.S.I., Washer, Scalder, Abrasive Peeler, Fruit Washer

b. Working Capital (15 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 10,300

c. Total Capital Requirements $ 139,300

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Peaches	455 tons	
Cans	645,000	
Additives		
Cartons and Labels		
Total direct materials		$ 62,800

b. Supplies

Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Peaches must be available locally. Cartons and labels should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 14 H P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,400

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 10,000

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck Driver	1	
Total indirect labor	4	$ 5,200
b. Direct Labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	18	
Total direct labor	23	$ 17,900

c. Training needs

The manager and the inspector should be fully experienced. They with 2 skilled workers should be able to train all workers and reach full production in one week.

6. TRANSPORTATION

a. Own transport equipment

One truck.

b. External transport facilities

During the canning season the input at the plant will amount to about 8.6 tons per day.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct Materials	$ 62,800	
Direct labor	17,900	
Manufacturing overhead*	18,500	
Total manufacturing cost		$ 99,200
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 11,200
Sales expense		$ 10,000
Freight-out, travel discounts Allowances & bad debts		$ 4,000
Total annual costs		$ 124,400
Annual Gross Profit		$ 6,600
ANNUAL SALES REVENUE		$ 131,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

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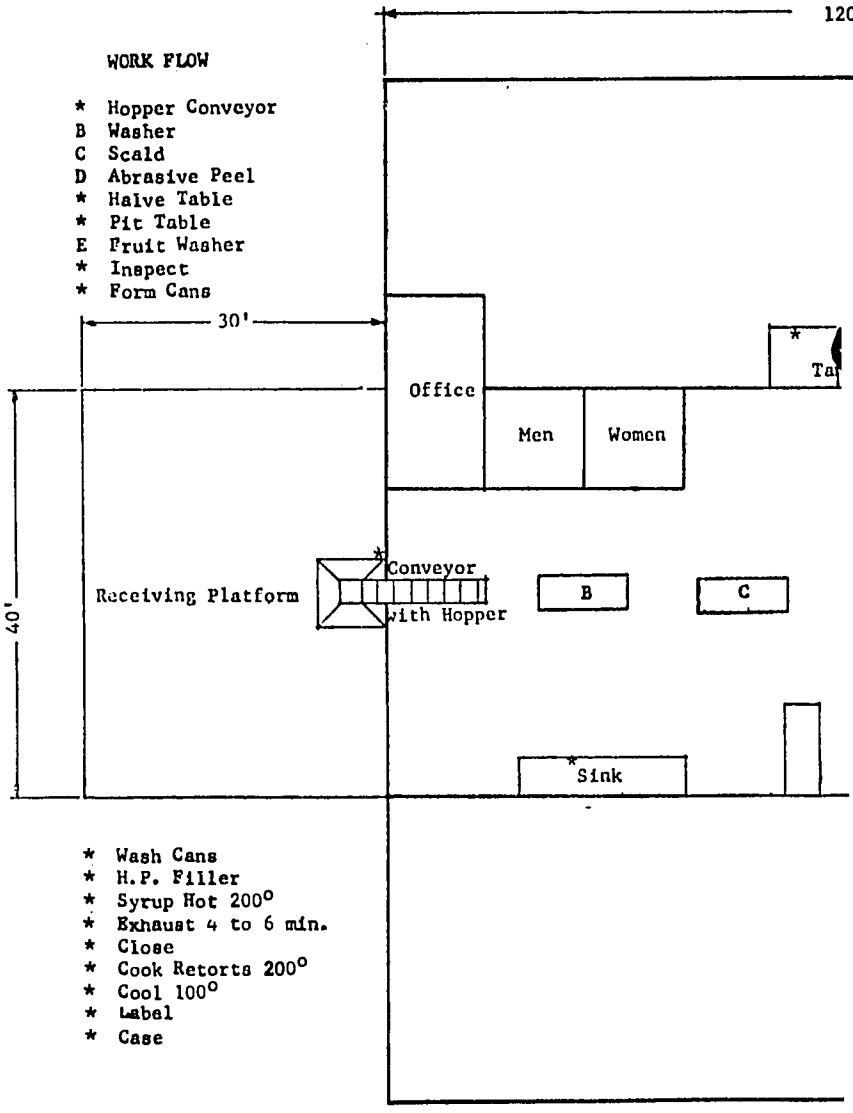
PLANT



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PEACHES

I. P. NO. 67329
S. I. C. 2033

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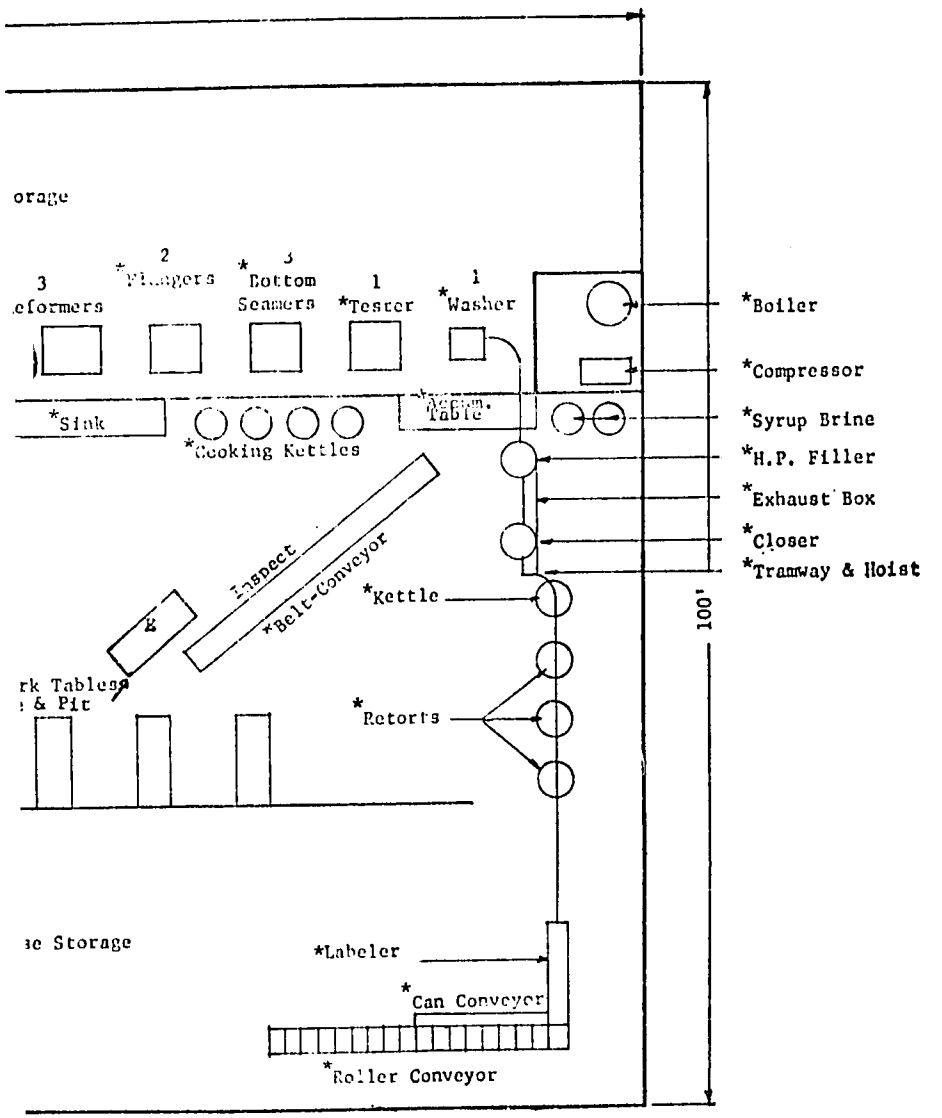

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lly for this product.

CANNED PEACHES

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410 12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

CANNED HOMINY

I. P. No. 67330
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I.P. No. 67330
S.I.C. 2033
NOVEMBER 1967

CANNED HOMINY

PRODUCT DESCRIPTION

Canned hominy, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer and fall months, that will keep the plant busy during theso seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned hominy normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned vegetables. Consumption of canned vegetables will vary primarily with the climate, the availability of fresh vegetables, the level of income and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $90,000.
The total fixed investment, plus working capital, is estimated at $132,700.
The annual gross profit, before taxes, is estimated at $5,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 5.5%.
(A gross profit on sales, before taxes, of 5.5%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 3.8%.

5. COST PER MAN EMPLOYED

Twenty direct workers and four indirect workers, or a total of twenty-four workers, are employed.
The total fixed capital investment is estimated at $125,000.
Based on these figures, the fixed investment per man employed would amount to about $5,200.

C. PRODUCTION REQUIREMENTS - CANNED HOMINY

I.P. No. 67330
S.I.C. 2033

ANNUAL CAPACITY - ONE SHIFT OPERATION--8 WEEKS: 570,000 CANS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 125,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H. P. - 120 PSI, Dry Clean Blower Lye Tank, Huller, Washer, Blanch, Washer

b. Working Capital (15 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 7,700

c. Total Capital Requirements $ 132,700

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Corn	740 tons	
Cans	570,000	
Additative:		
Labels and Cartons		
Total direct materials		$ 37,000

b. Supplies

Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil & maintenance of truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Corn must be available locally. Labels and cartons should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 15 1/4H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,700

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation Equipment	4	
Total depreciation		$ 9,700

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck driver	1	
Total indirect labor	4	$ 4,600
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	15	
Total direct labor	20	$ 13,900

c. Training needs

The manager and the inspector should be fully experienced. They, with the two skilled workers, should be able to train all workers and reach full production in about one week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input at this plant will amount to about 15 tons per day. Good highways.

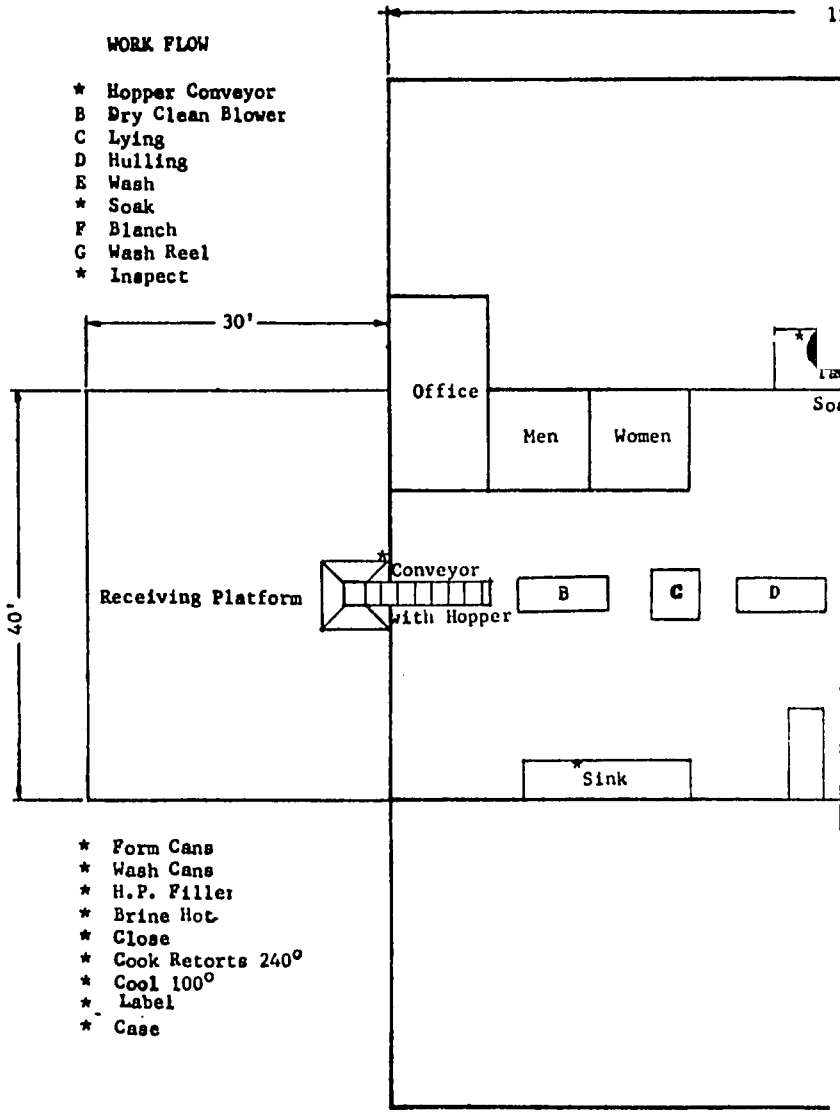
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 37,000	
Direct labor	13,900	
Manufacturing overhead*	17,800	
Total manufacturing cost		$ 68,700
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		7,300
Sales expense		6,000
Freight-out, travel discounts Allowances & bad debts		3,000
Total annual costs		$ 85,000
Annual Gross Profit		$ 5,000
ANNUAL SALES REVENUE		$ 90,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consquently only representative totals are used.

PLAN



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I. P. NO. 67330
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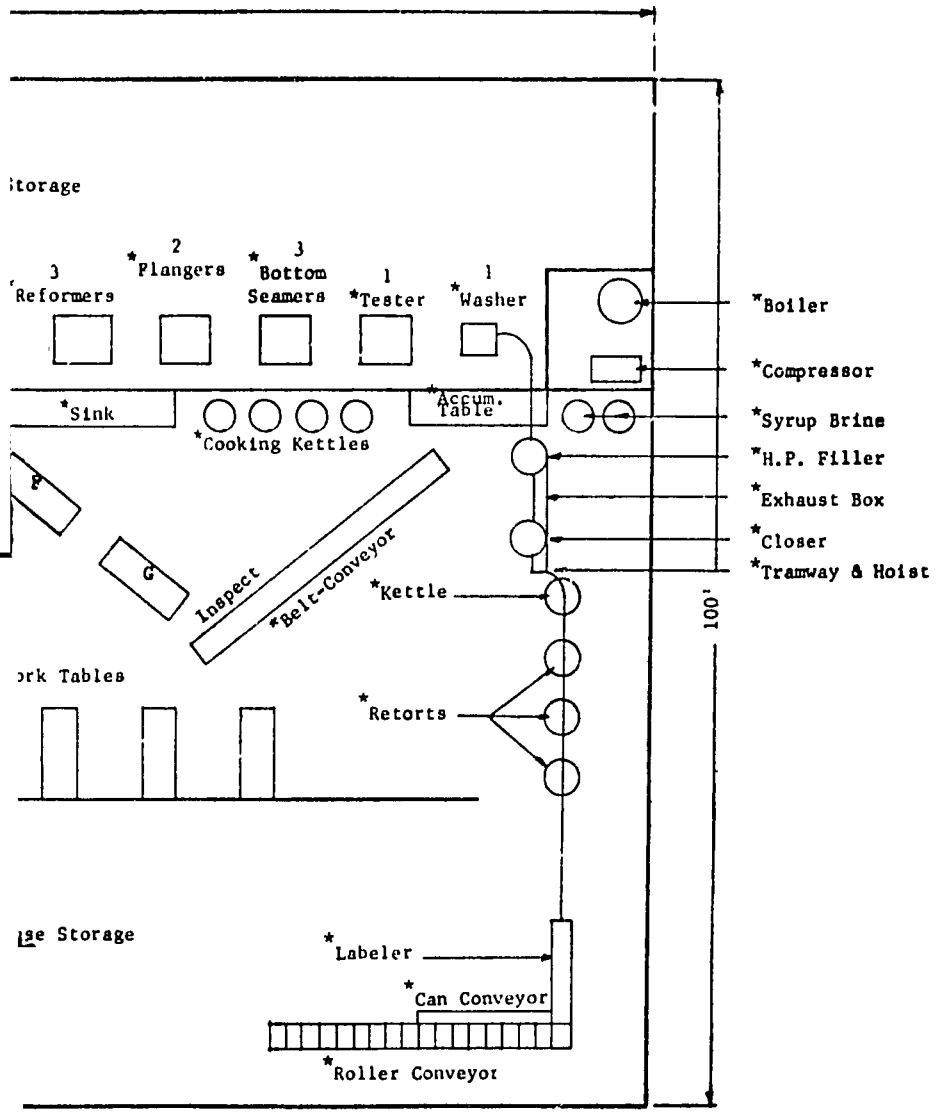

ed for canning all products

ally for this product.

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Complete sets of the 250 *Industry Profiles* published in 1966, I. P. No. 66001 through I. P. No. 66250 consecutively, may be purchased for $125.00 per set. Complete sets of the 150 *Industry Profiles* to be published in 1967, I. P. No. 67251 through I. P. No. 67400 consecutively, may be purchased for $75.00 per set. The latter "*Profiles*" will automatically be shipped to full set purchasers upon release.

Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

CANNED OKRA

I. P. No. 67331
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I.P. No. 67331
S.I.C. 2033
NOVEMBER 1967

CANNED OKRA

PRODUCT DESCRIPTION

Canned okra, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned okra normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned vegetables. Consumption of canned vegetables will vary primarily with the climate, the availability of fresh vegetables, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other factors, should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $130,000.
The total fixed investment, plus working capital, is estimated at $139,800.
The annual gross profit, before taxes, is estimated at $7,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 5.4%.
(A gross profit on sales, before taxes, of 5.4%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 5.0%.

5. COST PER MAN EMPLOYED

Twenty direct workers and four indirect workers, or a total of twenty-four workers, are employed.
The total fixed capital investment is estimated at $129,000.
Based on these figures, the fixed investment per man employed would amount to $5,375.

C. PRODUCTION REQUIREMENTS CANNED OKRA
ANNUAL CAPACITY - ONE SHIFT OPERATION: 12 WEEKS: 860,000 CANS

I.P. No. 67331
S.I.C. 2033

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 1 acre	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 129,000

Principal items:
Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P. - 120 P.S.I., Blancher, Wash Reel, Cutter

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 10,800
c. Total Capital Requirements	$ 139,800

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Okra	430 tons	
Cans	860,000	
Additives		
Lables and cartons		
Total direct materials		$ 56,100

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance for truck	
Total supplies	$ 1,900

c. Availability of materials & supplies

Okra must be available locally. Lables and cartons should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 13-3/4 H.P. connected load Fuel - oil Water - must be potable	$ 1,600

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 10,100

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck Driver	1	
Total indirect labor	4	$ 6,900
b. Direct Labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	15	
Total direct labor	20	$ 20,900

c. Training needs

The manager and the inspector should be fully experienced. They, with the two skilled workers, should be able to train all workers and reach full production in about one week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input at this plant will amount to about 5.1 tons per day.

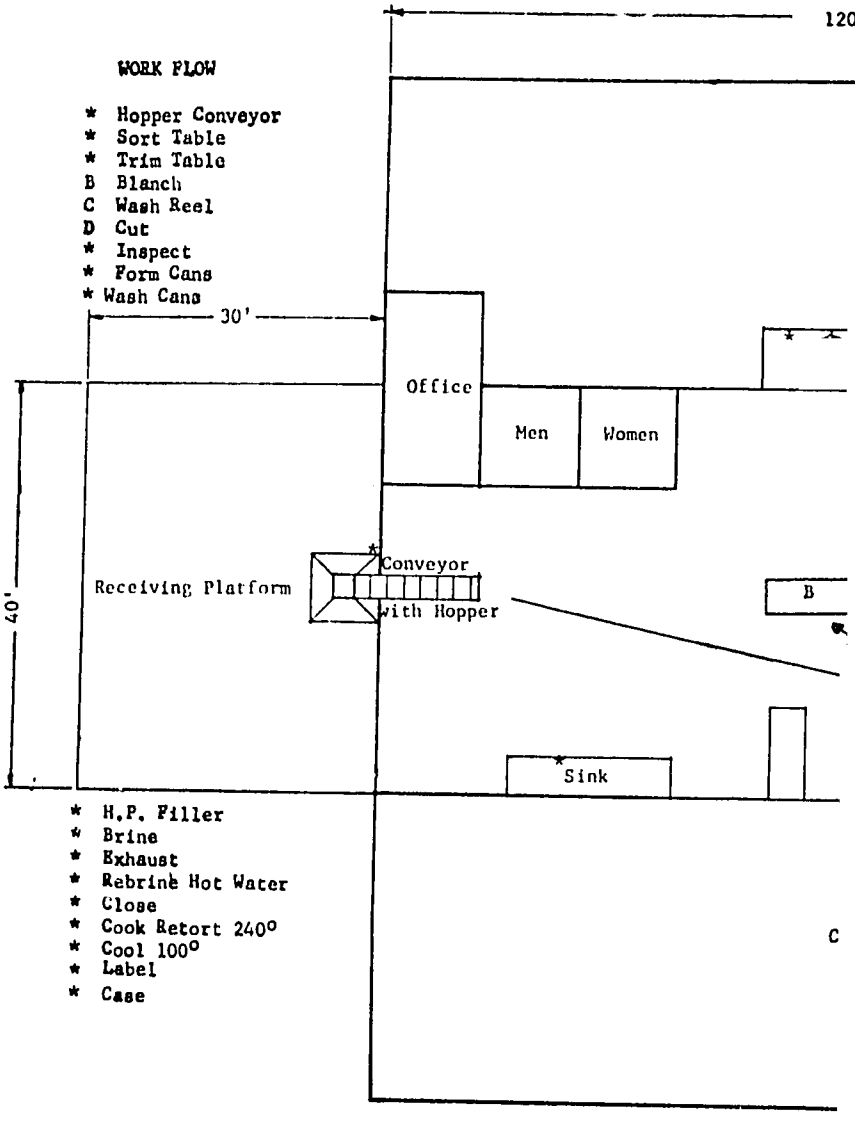
Good highway.

7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$ 56,100	
Direct labor	20,900	
Manufacturing overhead*	20,500	
Total manufacturing cost		$ 97,500
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		10,500
Sales expense		10,000
Freight-out, travel discounts Allowances & bad debts		5,000
Total annual costs		$ 123,000
Annual Gross Profit		$ 7,000
ANNUAL SALES REVENUE		$ 130,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT



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) OKRA

I. P. NO. 67331
S. I. C. 2033

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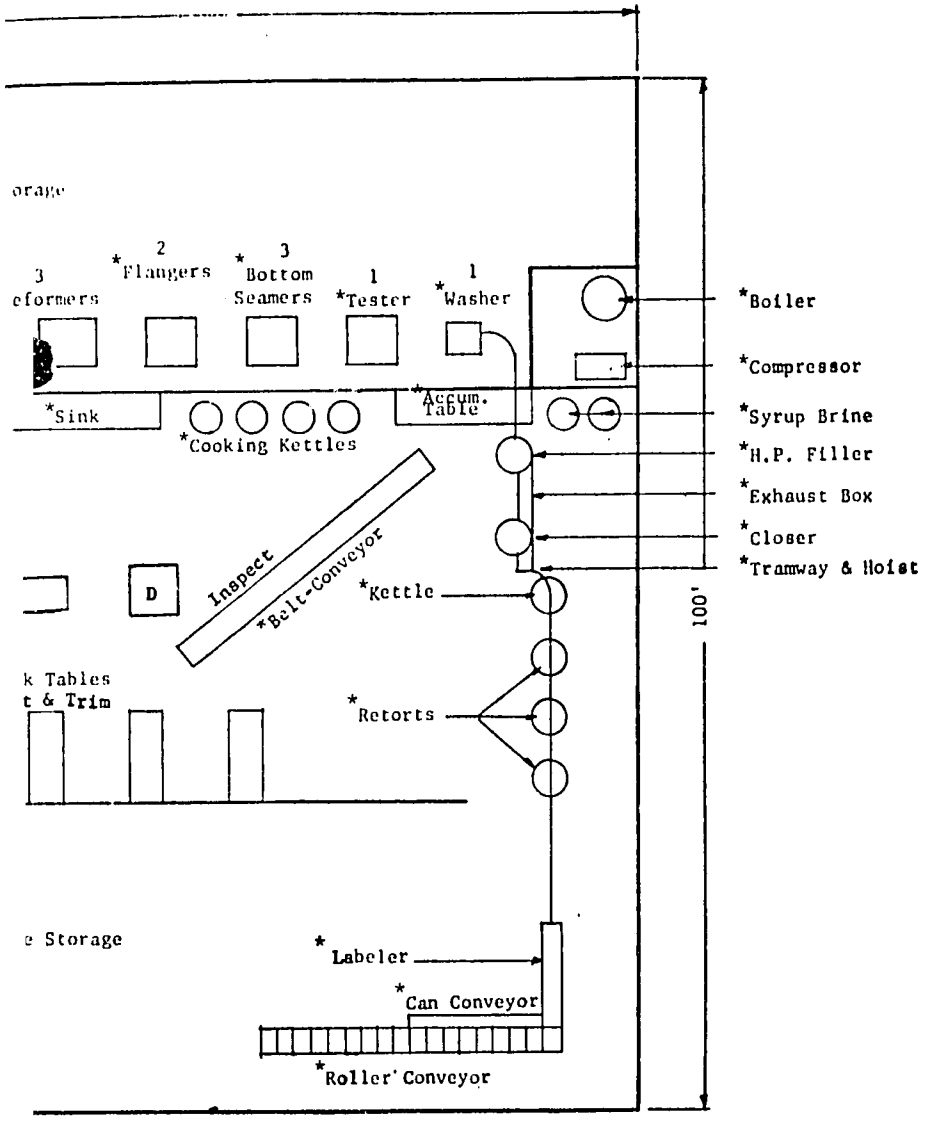

d for canning all products.

lly for this product.

CANNED OKRA

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Complete Course in Canning. 8th ed. 1966. 400 p. $15.00.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Covers all products, fruits, vegetables, meats, milk, soups, juices, etc. in minute detail, with full basic instruction from the field through to the warehouse.

B. The Almanac of the Canning, Freezing and Preserving Industries, 1967. 510 p. $7.50

Edward E. Judge
P. O. Box 866
Westminster, Maryland 21157

Includes latest prices on vegetables, fruits, cans, glass jars, canned products, as well as data on quality grade standards, labeling, packaging, international trade, U. S. and world packs, and other valuable information.

C. Quality Control and Reliability. Norbert L. Enrick. 1966. 5th Edition. 254 pp. $7.50

Industrial Press
93 Worth Street
New York, New York 10013

The 24 chapters of the book are divided into three main sections: (1) Basic quality control applications; (1) additional quality control methods; and (3) reliability.

D. Federal Food, Drug and Cosmetic Act, General Regulations for its enforcement, Title 21, Par I, $3.00.

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Deals with all phases of quality and health aspects of processed foods, including minimum standards and additives, such as vitamins, coloring, aad enforcement of regulations.

II. TECHNICAL AND TRADE PERIODICALS

A. Canning Trade. Bi-weekly. $5.00/year.

The Canning Trade
2619 Maryland Avenue
Baltimore, maryland 21218

Devoted exclusively to the food processing industry.

B. Food Engineering. Monthly. $25.00/year.

Food Engineering
Chestnut & 56th Street
Philadelphia, Pa. 19139

Devoted exclusively to the food processing industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years : Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 1961. (Small Business Administration). 233 pp. $1.00

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Prepared by the Small Business Administration to assist in the development of more effective management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S Patent Office, Washington, D.C. 20231. $.50 each.

A. Patent No. 3,272,636. Sept. 1966 4 p.
Method of controlling microorganisms in food products.

B. Patent No. 3,232,770. Feb. 1966 9 p.
Method of sterilizing and canning food material.

C. Patent No. 3,071,475. January 1963 7 p.
Sterlizing method for canned foodstuff.

D. Patent No. 2,794,326. June 1957 6 p.
Method and apparatus for cooling canned goods.

E. Patent No. 2,793,582. May 1957 4 p.
Continuous operating cooker.

F. Patent No. 2,760,837 Aug. 1956 4 p.
Process for transporting cans through a continuous sterilizer.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National Canners Association
1133 20th Street, N.W.
Washington, D.C. 20036

B. Canning Machinery and Supplies Association
7758 Wisconsin Avenue, N.W.
Washington, D.C. 20014

VI. DIRECTORIES

A. Canners Directory. $5.00. Annual.

National Canners Association
1133 20th Street, N.W.
Washington, D. C. 20036

B. Canning Machinery Directory. Gratis.

Canning Machinery and Supplies Association
7758 Wisconsin Avenue, N. W.
Washington, D. C. 20014

C. The Directory of the Canning, Freezing, Preserving Industries. $25.00. Annual.

Edward E. Judge
P. O. Box 866
Westminster, Maryland 21157

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N.W.
Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

ORDERING INSTRUCTIONS

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CANNED SWEET POTATOES

I. P. No. 67332
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

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CANNED SWEET POTATOES

I. P. No. 67332
S. I. C. 2033
DECEMBER 1967

PRODUCT DESCRIPTION

Canned sweet potatoes, 303 cans, size 303 x 406, net weight one pound

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned sweet potatoes normally would be nationwide. If a plant is efficiently managed and operation it should have no difficulty in competing with imported canned vegetables. Consumption of canned vegetables will vary primarily with the climate, the availability of fresh vegetables, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $140,000.
The total fixed investment, plus working capital, is estimated at $146,800.
The annual gross profit, before taxes, is estimated at $7,500.
Using these figures, the profit on gross sales, before taxes, amounts to about 5.4%.
(A gross profit on sales, before taxes, of 5.4%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 5.1%.

5. COST PER MAN EMPLOYED

Seventeen direct workers and four indirect workers, or a total of twenty-one workers, are employed.
The total fixed capital investment is estimated at $135,000.
Based on these figures, the fixed investment per man employed would amount to about $6,425.

C. PRODUCTION REQUIREMENTS CANNED SWEET POTATOES

I.P. No. 67332
S.I.C. 2033

ANNUAL CAPACITY - ONE SHIFT OPERATION 12 WEEKS: 860,000 CANS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 135,000

Principal Items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Fitller, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labler, Can Conveyor, Roller Conveyor Lift-Truck with Pallets, Compressor, Platform Scales Boiler 100 H P - 120 P.S.I, Dry Clean Reel, Washer, Scalder, Abrasive Peel, Grader, Cutter

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 11,800
c. Total Capital Requirements	$ 146,800

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Sweet Potatoes	476 tons	
Cans	860,000	
Additives		
Labels and cartons		
Total direct materials		$ 68,300

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 1,900

c. Availability of materials & supplies

Sweet potatoes must be available locally. Labels and cartons should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 16-1/4 H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,700

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 10,700

5. MANPOWER

	Number	Annual Cost
a. Indirect Labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck driver	1	
Total indirect labor	4	$ 6,900
b. Direct Labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	12	
Total direct labor	17	$ 18,000

c. Training Needs

The manager and the inspector should be fully experienced. They, with the two skilled workers, should be able to train all workers and reach full production in one week.

6. TRANSPORTATION

a. Own transport equipment.

Truck

b. External transport facilities.

During the canning season the input at this plant will amount to about 6.6 tons per day.

Good highways.

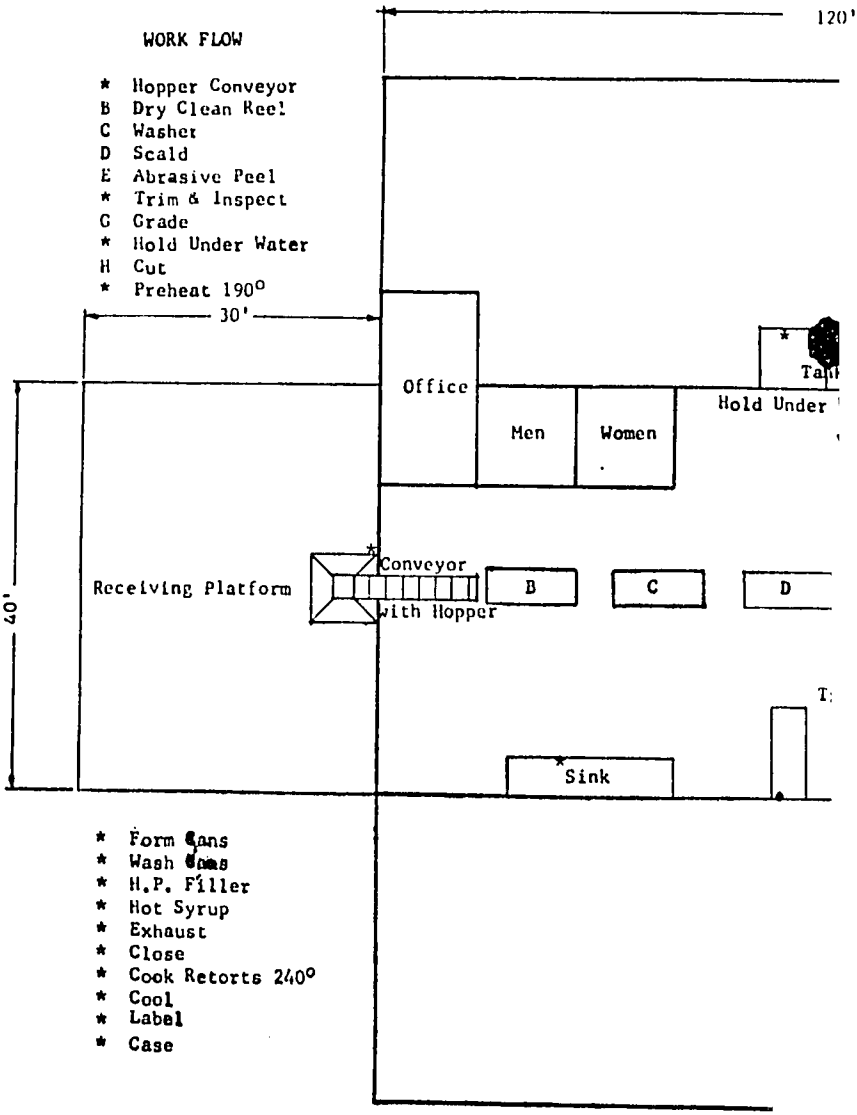
7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$ 68,300	
Direct labor	18,000	
Manufacturing overhead*	21,200	
Total manufacturing cost		$ 107,500
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		11,000
Sales expense		10,000
Freight-out, travel discounts Allowances & bad debts		4,000
Total annual costs		$ 132,500
Annual Gross Profit		$ 7,500
ANNUAL SALES REVENUE		$ 140,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect Labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT



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WEET POTATOES

I. P. NO. 67332
S. I. C. 2033

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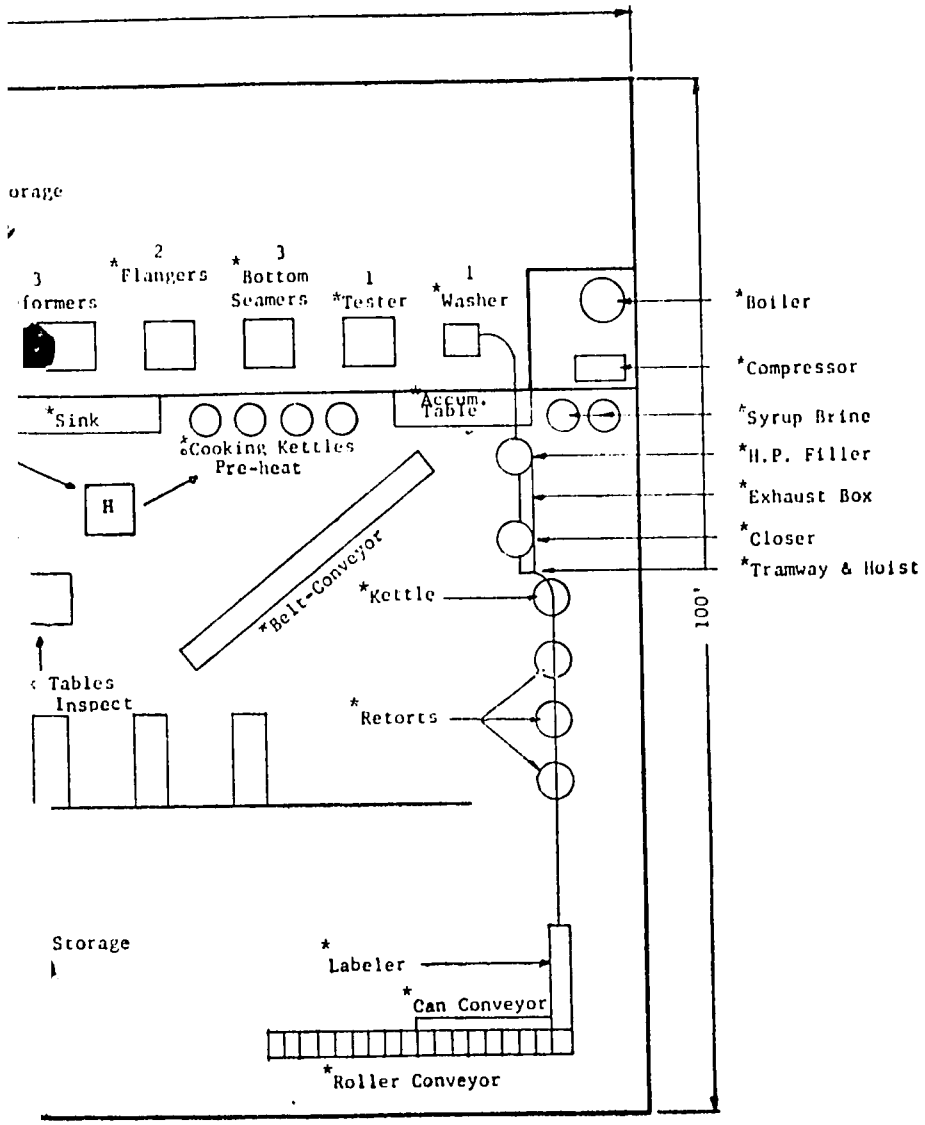

for canning all products.

ly for this product.

262

CANNED SWEET POTATOES

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Complete Course in Canning. 8th ed. 1966. 400 p. $15.00.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Covers all products, fruits, vegetables, meats, milk, soups, juices, etc. in minute detail, with full basic instruction from the field through to the warehouse.

B. The Almanac of the Canning, Freezing and Preserving Industries, 1967. 510 p. $7.50.

Edward E. Judge
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Westminster, Maryland 21157

Includes latest prices on vegetables, fruits, cans, glass jars, canned products, as well as data on quality grade standards, labeling, packaging, international trade, U.S. and world packs, and other valuable information.

C. Quality Control and Reliability. Norbert L. Enrick. 1966. 5th ed. 254 p. $7.50.

The Industrial Press
93 Worth Street
New York, N. Y. 10013

The 24 chapters of the book are divided into three main sections: (1) basic quality control applications; (2) additional quality control methods; and (3) reliability.

D. Federal Food, Drug and Cosmetic Act, General Regulations for its enforcement, Title 21, Par 1, $3.00.

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Deals with all phases of quality and health aspects of processed foods, including minimum standards and additives, such as vitamins, coloring, and enforcement of regulations.

II. TECHNICAL AND TRADE PERIODICALS

A. Canning Trade. Bi-weekly. $5.00/year.

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2619 Maryland Avenue
Baltimore, Maryland 21218

Devoted exclusively to the food processing industry.

B. Food Engineering. Monthly. $25.00/year.

Food Engineering
Chestnut & 56th Street
Philadelphia, Pa. 19139

Devoted exclusively to the food processing industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Prepared by the Small Business Administration to assist in the development of more effective management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each

A. Patent No. 3,272,636 Sept. 1966 4 p.
Method of controlling microorganisms in food products.

B. Patent No. 3,232,770 Feb. 1966 9 p.
Method of sterilizing and canning food material.

C. Patent No. 3,071 475 Jan. 1963 7 p.
Sterilizing method for canned foodstuff.

D. Patent No. 2,794,326 June 1957 6 p.
Method and apparatus for cooling canned goods.

E. Patent No. 2,793,582 May 1957 4 p.
Continuous operating cooker.

F. Patent No. 2,760,837 Aug. 1956 4 p.
Process for transporting cans through a continuous sterilizer.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. National Canners Association
1133 20th Street, N.W.
Washington, D.C. 20036

B. Canning Machinery and Supplies Association
7758 Wisconsin Avenue, N.W.
Washington, D.C. 20014

VI. DIRECTORIES

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C. The Directory of the Canning, Freezing, Preserving Industries, $25.00. Annual.

Edward E. Judge
P.O. Box 866
Westminster, Maryland 21157

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The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

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Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

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GENERAL INFORMATION

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This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

CANNED STRAWBERRIES

I. P. No. 67333
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I. P. No. 67333
S.I.C. 2033
NOVEMBER 1967

CANNED STRAWBERRIES

PRODUCT DESCRIPTION

Canned strawberries, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribulion to small retail stores and to large users, such as military. The extent of the market for canned strawberries normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned fruits. Consumption of canned fruits will vary primarily with the climate, the availability of fresh fruits, the level of income and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $270,000.
The total fixed investment, plus working capital, is estimated at $149,200.
The annual gross profit, before taxes, is estimated at $14,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 5.2%.
(A gross profit on sales, before taxes, of 5.2%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 9.4%.

5. COST PER MAN EMPLOYED

Twenty direct workers and four indirect workers, or a total of 24 workers, are employed.
The total fixed capital investment is estimated at $ 129,000.
Based on these figures, the fixed investment per man employed would amount to $5,375.

C. PRODUCTION REQUIREMENTS - CANNED STRAWBERRIES

I.P. No. 67333
S.I.C. 2033

ANNUAL CAPACITY - ONE SHIFT OPERATION - 10 WEEKS : 720,000 CANS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 1 acre	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 129,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P. -- 120 P.S.I., Fruit Washer, Drain Belt, Wash Reel

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 20,200
c. Total Capital Requirements	$ 149,200

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Strawberries	415 tons	
Cans	720,000	
Additives		
Cartons & Labels		
Total direct materials		$ 189,800

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Strawberries must be available locally. Cartons and labels should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 13 H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,600

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transporation equipment	4	
Total depreciation		$ 10,100

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck driver	1	
Total indirect labor	4	$ 5,700
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	15	
Total direct labor	20	$ 17,400

c. Training needs

The manager and the inspector should be fully experienced. They, with two skilled workers, should be able to train all workers and reach full production in one week.

6 TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input at this plant will amount to about 7 tons per day.

Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$189,800	
Direct labor	17,400	
Manufacturing overhead*	19,200	
Total manufacturing cost		$ 226,400
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		12,600
Sales expense		12,000
Freight-out, travel discounts Allowances & bad debts		5,000
Total annual costs		$ 265,000
Annual Gross Profit		$ 14,000
ANNUAL SALES REVENUE		$ 270,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT

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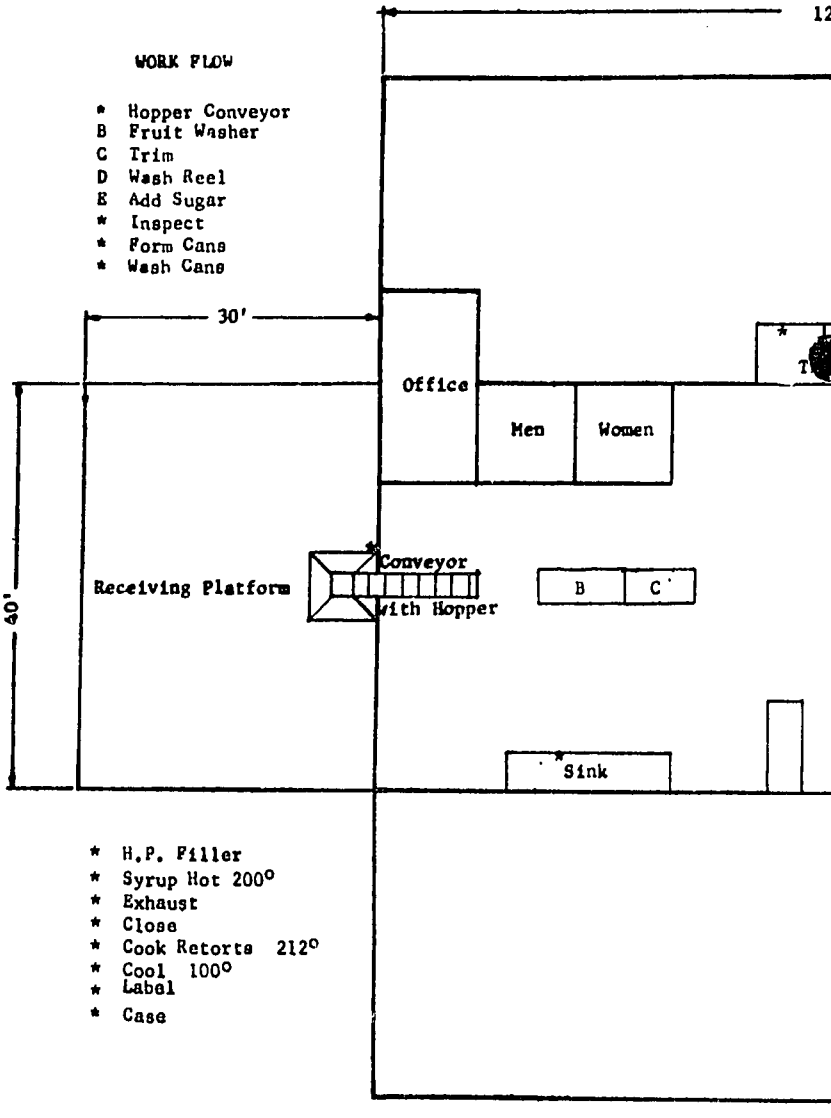

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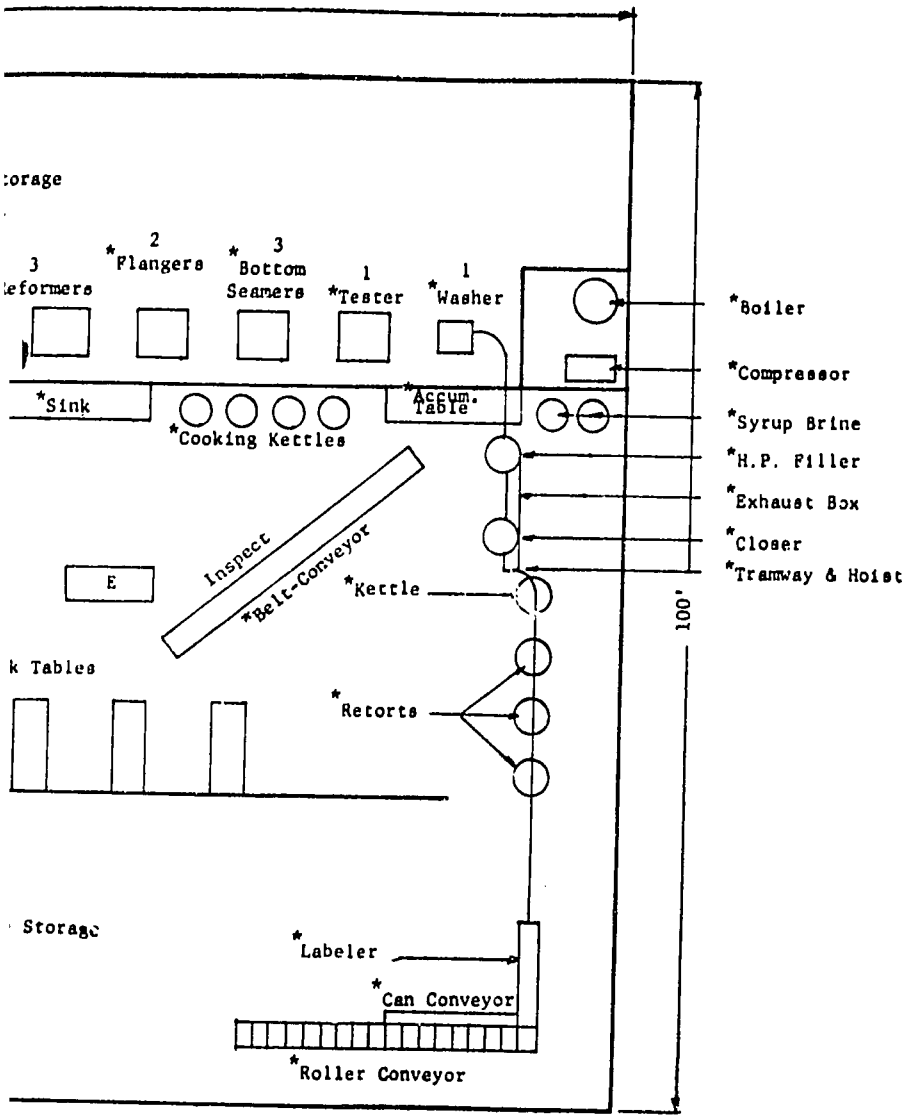

l for canning all products.

ly for this product.

CANNED STRAWBERRIES

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Complete Course in Canning. 8th ed. 1966. 400 p. $15.00.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Covers all products, fruits, vegetables, meats, milk, soups, juices, etc. in minute detail, with full basic instruction from the field through to the warehouse,

B. The Almanac of the Canning, Freezing and Preserving Industries, 1967. 510 p. $7.50.

Edward E. Judge
P. O. Box 866
Westminster, Maryland 21157

Includes latest prices on vegetables, fruits, cans, glass jars, canned products, as well as data on quality grade standards, labeling, packaging, international trade, U.S. and world packs, and other valuable information.

C. Quality Control and Reliability. Norbert L. Entrick. 1966. 5th ed. 254 p. $7.50.

The Industrial Press
93 Worth Street
New York, N. Y. 10013

The 24 chapters of the book are divided into three main sections: (1) basic quality control applications: (2) additional quality control methods; and (3) reliability.

D. Federal Food, Drug and Cosmetic Act, General Regulations for its enforcement, Title 21, Par 1, $3.00.

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Deals with all phases of quality and health aspacts of processed foods, including minimum standards ahd additives, such as vitamins, coloring, and enforcement of regulations.

II. TECHNICAL AND TRADE PERIODICALS

A. Canning Trade. Bi-weekly. $5.00/year.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Devoted exclusively to the food processing industry.

B. Food Engineering. Monthly. $25.00/year.

Food Engineering
Chestnut & 56th Street
Philadelphia, Pa. 19139

Devoted exclusively to the Food processing industry.

III. BUSINESS MANAGEMENT MATERIALS

B. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 1961. (Small Business Administration). 233 pp. $1.00

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Prepared by the Small Business Administration to assist in the development of more effective management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,272,636 Sept. 1966 4 p.
Method of controlling microorganisms in food products.

B. Patent No. 3,232,770 Feb. 1966 9 p.
Method of sterilizing and canning food material.

C. Patent No. 3,071,475 Jan. 1963 7 p.
Sterilizing method for canned foodstuff.

D. Patent No. 2,794,326 June 1957 6 p.
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INDUSTRY PROFILES

CANNED SLICED APPLES

I. P. No. 67334
S. I. C. 2033

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CANNED SLICED APPLES

PRODUCT DESCRIPTION

Canned sliced apples, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned sliced apples normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned fruits. Consumption of canned fruits will vary primarily with the climate, the availability of fresh fruits, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $185,000.
The total fixed investment, plus working capital, is estimated at $148,700.
The annual gross profit, before taxes, is estimated at $9,600.
Based on these figures, the profit on gross sales, before taxes, amounts to about 5.2%.
(A gross profit on sales, before taxes, of 5.2%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 6.4%.

5. COST PER MAN EMPLOYED

Twenty direct workers and four indirect workers, or a total of 24 workers, are employed.
The total fixed capital investment is estimated at $133,000.
Based on these figures, the fixed investment per man employed would amount to $5,540.

C. PRODUCTION REQUIREMENTS - CANNED SLICED APPLES — I.P. No. 67334
ANNUAL CAPACITY - ONE SHIFT OPERATION: 16 WEEKS; 1,150,000 CANS — S.I.C. 2033

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 133,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P.- -120 P.S.I., Wash reel, Peel & Core, Chip Reel, Slicer, Steam Vacuum, Blanch

b. Working Capital (15 Days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 15,700
c. Total Capital Requirements	$ 148,700

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Apples	1,000 tons	
Cans	1,150,000	
Additives		
Cartons & Labels		
Total direct materials		$ 95,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil & maintenance of truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Apples must be available locally. Cartons and labels should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 12 H.P. connected load	
Fuel - oil	
Water - must be potable.	
	$ 1,700

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 10,500

5. MANPOWER

	Number	Annual cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck driver	1	
Total indirect labor	4	$ 9,500
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	15	
Total direct labor	20	$ 27,800

c. Training needs

The manager and the inspector should be fully experienced. They, with two skilled workers, should be able to train all workers and reach full production in one week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

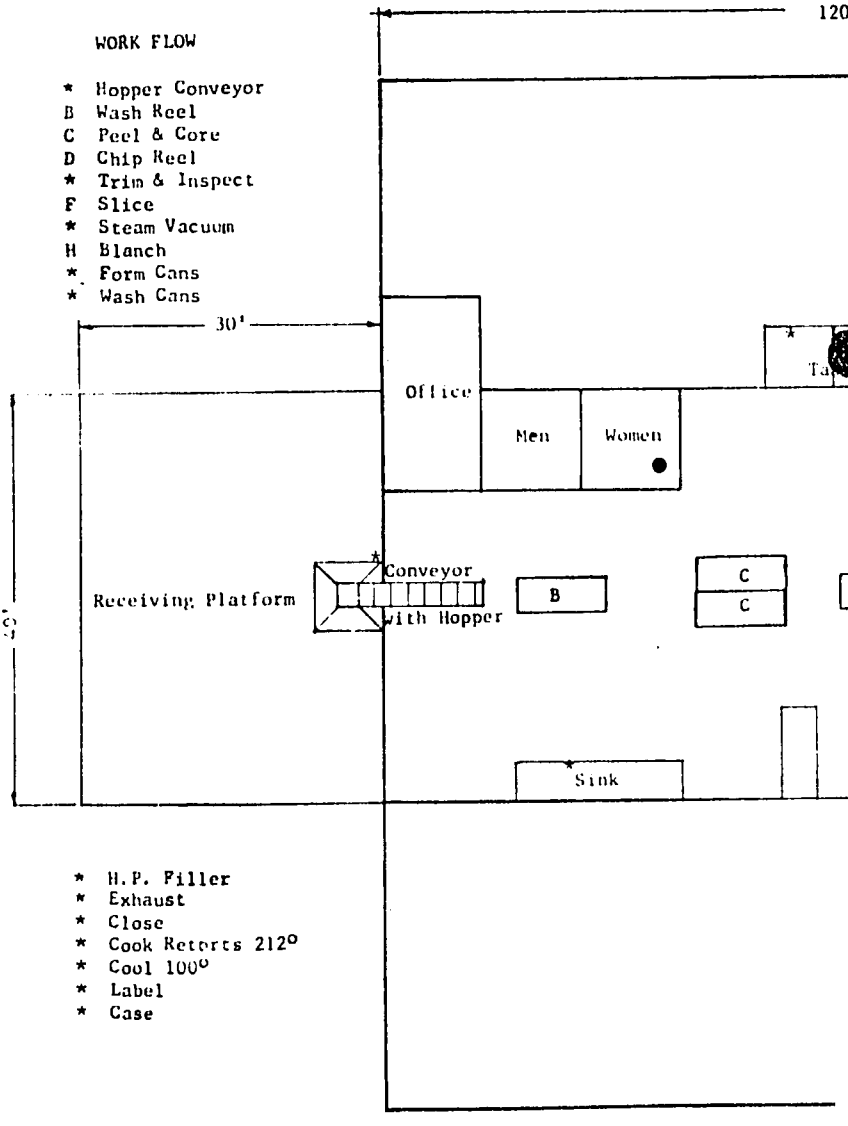
During the canning season the input at the plant will amount to about 10.4 tons per day. Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 95,000	
Direct labor	27,800	
Manufacturing overhead*	23,500	
Total manufacturing cost		$ 146,300
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 12,100
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 5,000
Total annual costs		$ 175,400
Annual Gross Profit		$ 9,600
ANNUAL SALES REVENUE		$ 185,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT



Items marked with an asterisk indicate basic

Items marked with letters indicate equipment

:D SLICED APPLES

I. P. NO. 67334
S. I. C. 2033

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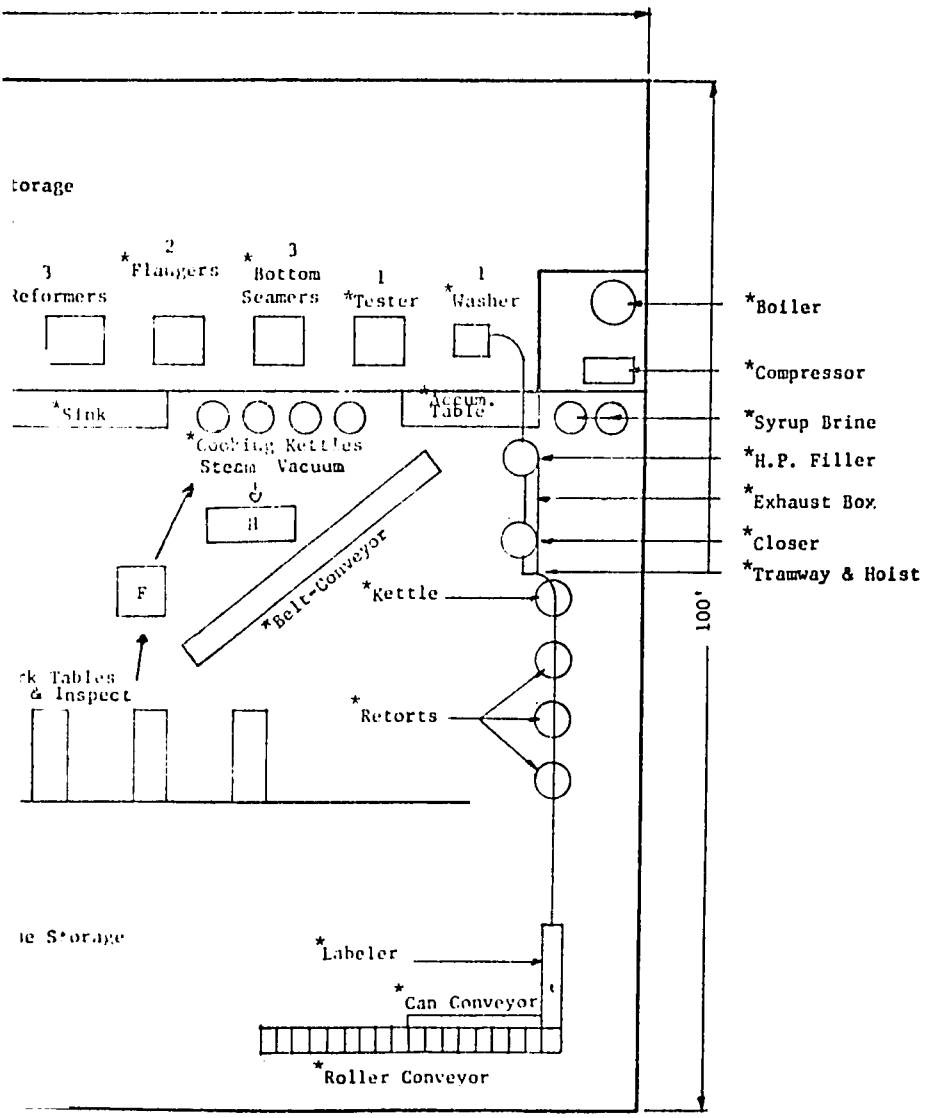

d for canning all products.

lly for this product.

279

CANNED SLICED APPLES

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Complete Course in Canning. 8th ed. 1966. 400 p. $15.00.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Covers all products, fruits, vegetables, meats, milk, soups, juices, etc. in minute detail, with full basic instruction from the field through to the warehouse.

B. The Almanac of the Canning, Freezing and Preserving Industries, 1967. 510 p. $7.50.

Edward E. Judge
P. O. Box 866
Westminster, Maryland 21157

Includes latest prices on vegetables, fruits, cans, glass jars, canned products, as well as data on quality grade standards, labeling, packaging, international trade, U.S. and world packs, and other valuable information.

C. Quality Control and Reliability. Norbert L. Enrick. 1966. 5th ed. 254 p. $7.50.

The Industrial Press
93 Worth Street
New York, N. Y. 10013

The 24 chapters of the book are divided into three main sections: (1) basic quality control applications; (2) additional quality control methods; and (3) reliability.

D. Federal Food, Drug and Cosmetic Act, General Regulations for its enforcement, Title 21, Par 1, $3.00.

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Deals with all phases of quality and health aspects of processed foods, including minimum standards and additives, such as vitamins, coloring and enforcement of regulations.

II. TECHNICAL AND TRADE PERIODICALS

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Continuous operating cooker.

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Washington, D.C. 20036

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National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective cutosmers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

CANNED BLUEBERRIES

I. P. No. 67335
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I.P. No. 67335
S.I.C. 2033
NOVEMBER 1967

CANNED BLUEBERRIES

PRODUCT DESCRIPTION

Canned blueberries, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in the profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large userrs, such as military. The extent of the market for canned blueberries normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned fruits. Consumption of canned fruits will vary primarily with the climate, the availability of fresh fruits, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognised that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $210,000.
The total fixed investment, plus working capital, is estimated at $145,600.
The annual gross profit, before taxes, is estimated at $11,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 5.2%.
(A gross profit on sales, before taxes, of 5.2%, while reflecting U.S. experience, should not be considered normal for a developing country, where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 7.5%.

5. COST PER MAN EMPLOYED

Twenty direct workers, and four indirect workers, or a total of 24 workers, are employed.
The total fixed capital investment is estimated at $128,000.
Based on these figures, the fixed investment per man employed would amount to $5,325.

C. PRODUCTION REQUIREMENTS - CANNED BLUEBERRIES
ANNUAL CAPACITY - ONE SHIFT OPERATION - 9 WEEKS : 540,000 CANS

I.P. No. 67335
S.I.C. 2033

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 128,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P. - 120 P.S.I., Cleaner Blower, Fruit Washer, Inspection Belt, Grader

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 17,600
c. Total Capital Requirements	$ 145,600

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Blueberries	280 tons	
Cans	540,000	
Additives		
Cartons & Labels		
Total direct materials		$ 135,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 1,300

c. Availability of materials & supplies

Blueberries must be available locally. Cartons and labels should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 14 H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,500

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 10,000

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager	1	
Clerk	1	
Inspector	1	
Truck Driver	1	
Total indirect labor	4	$ 5,200
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	15	
Total direct labor	20	$ 15,700

c. Training Needs

The manager and the inspector should be fully experienced. They, with two skilled workers, should be able to train all workers and reach full production in on week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input to the plant will amount to about 7.7 tons per day.

Good highways.

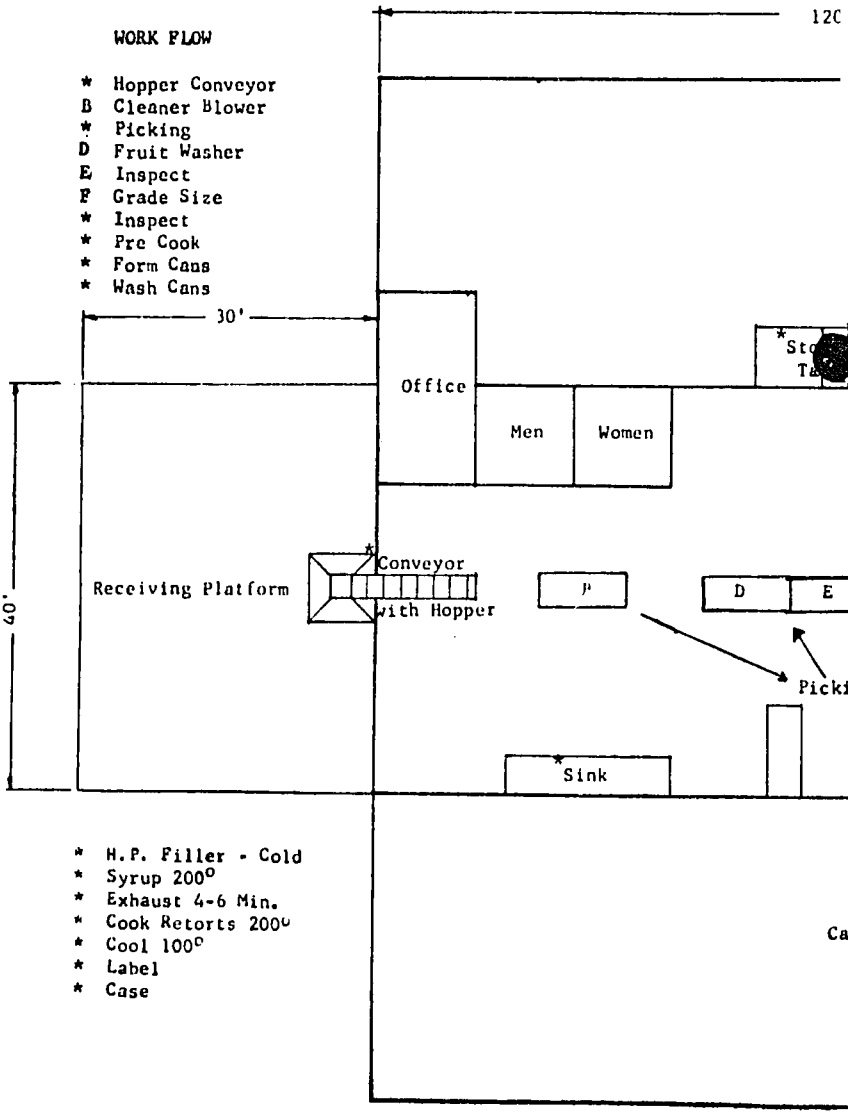
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 135,000	
Direct labor	15,700	
Manufacturing overhead*	18,500	
Total manufacturing cost		$ 169,200
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 12,800
Sales expense		12,000
Freight-out, travel discounts Allowances & bad debts		$ 5,000
Total annual costs		$ 199,000
Annual Gross Profit		$ 11,000
ANNUAL SALES REVENUE		$ 210,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

C

PLANT



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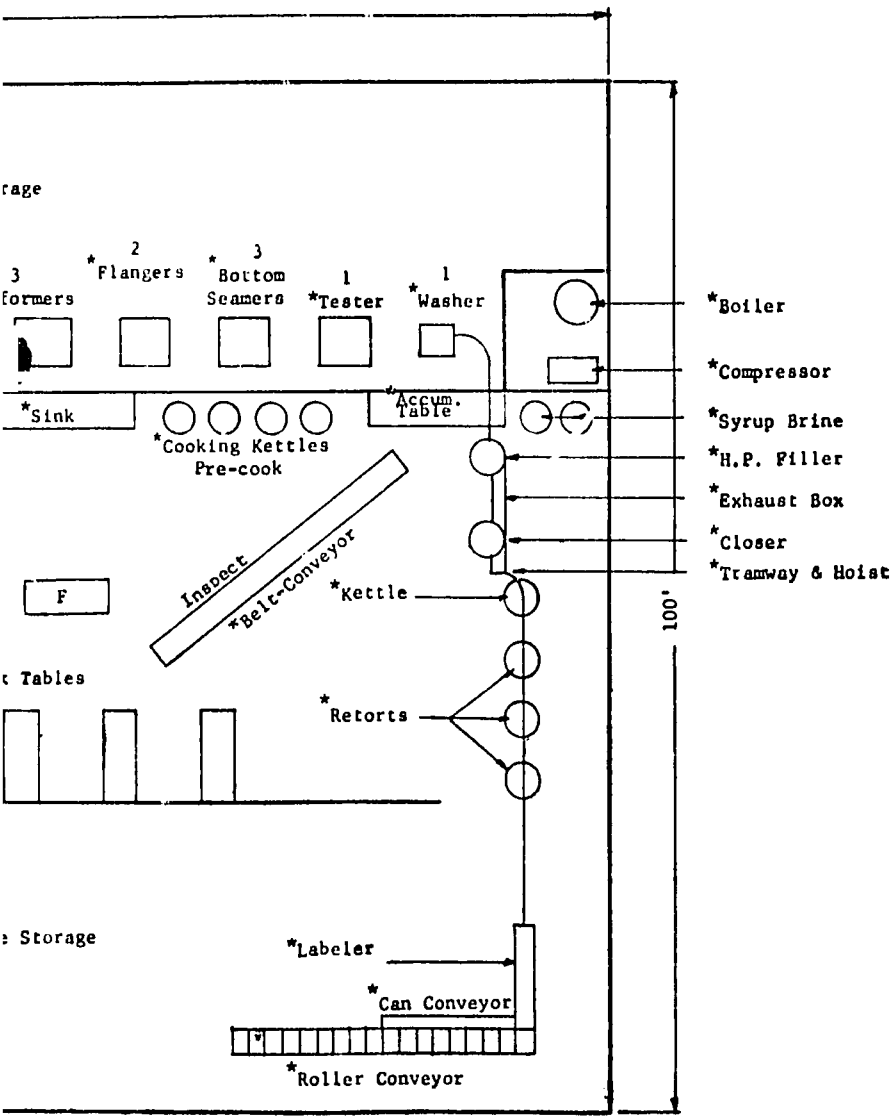

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CANNED BLUEBERRIES

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NDUSTRY PROFILES

CANNED APRICOTS

I. P. No. 67336
S. I. C. 2033

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I. P. No. 67336
S.I.C. 2033
NOVEMBER 1967

CANNED APRICOTS

PRODUCT DESCRIPTION

Canned apricots, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that the harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned apricots normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned fruits. Consumption of canned fruits will vary primarily with the climate, the availability of fresh fruits, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $ 117,000.
The total fixed investment, plus working capital, is estimated at $ 137,200.
The annual gross profit, before taxes, is estimated at $ 6,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 5.2%.
(A gross profit on sales, before taxes, of 5.2%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 4.3%.

5. COST PER MAN EMPLOYED

Twenty direct workers and four indirect workers, or a total of twenty-four workers, are employed.
The total fixed capital investment is estimated at $127,000.
Based on these figures, the fixed investment per man employed would amount to $ 5,300.

C. PRODUCTION REQUIREMENTS CANNED APRICOTS
ANNUAL CAPACITY -ONE SHIFT OPERATION : 8 WEEKS : 570,000 CANS

I.P. No. 67336
S.I.C. 2033

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital — Cost

Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 127,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P. — 120 P.S.I., Scalder, Abrasive Peeler, Grader, Fruit Washer

b. Working Capital (15 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 10,200
c. Total Capital Requirements	$ 137,200

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Apricots	348 tons	
Cans	570,000	
Additives		
Cartons and labels		
Total direct materials		$ 55,200

b. Supplies

Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Apricots must be available locally. Cartons and labels should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 13-3/4 H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,300

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 9,900

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck Driver	1	
Total indirect labor	4	$ 4,600
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	15	
Total direct labor	20	$ 13,900

c. Training Needs

The manager and the inspector should be fully experienced. They, with the two skilled workers, should be able to train all workers and reach full production in one week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

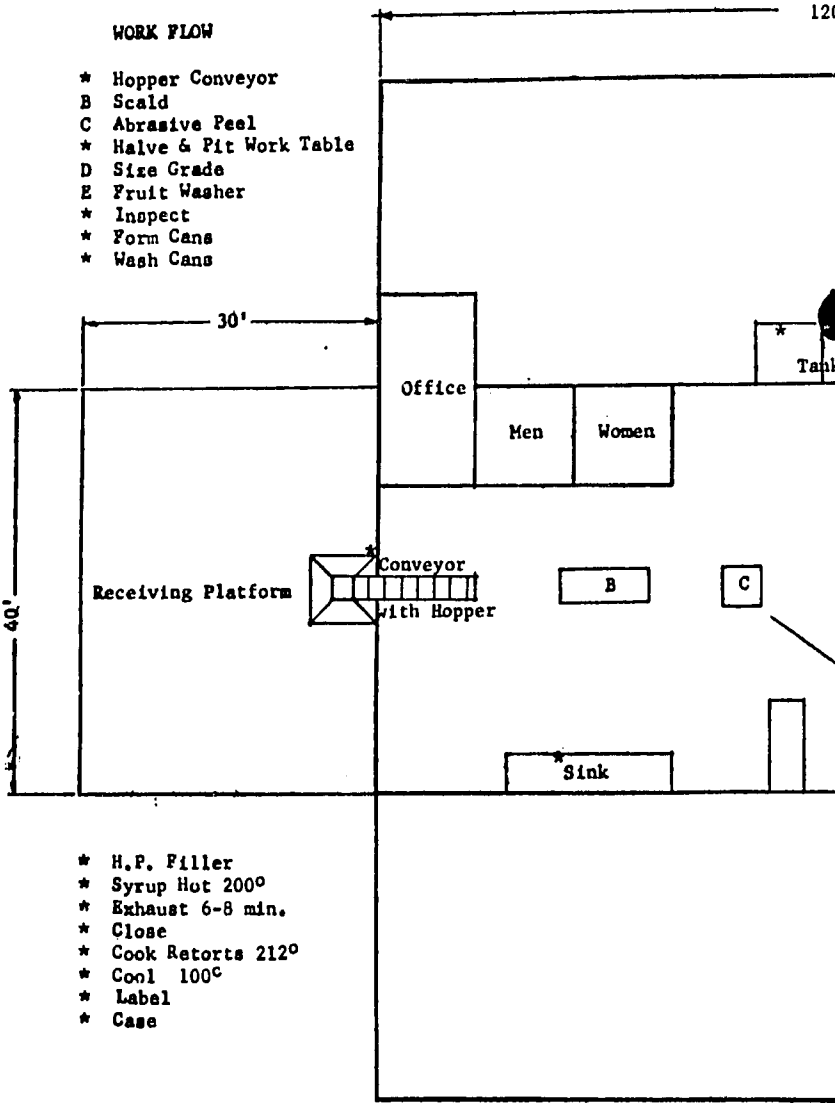
During the canning season the input at this plant will amount to about 7.3 tons per day. Good highways.

7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$ 55,200	
Direct labor	13,900	
Manufacturing overhead*	17,600	
Total manufacturing cost		$ 86,700
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 10,300
Sales expense		$ 10,000
Freight-out, travel discounts Allowances & bad debts		$ 4,000
Total annual costs		$ 111,000
Annual Gross Profit		$ 6,000
ANNUAL SALES REVENUE		$ 117,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT



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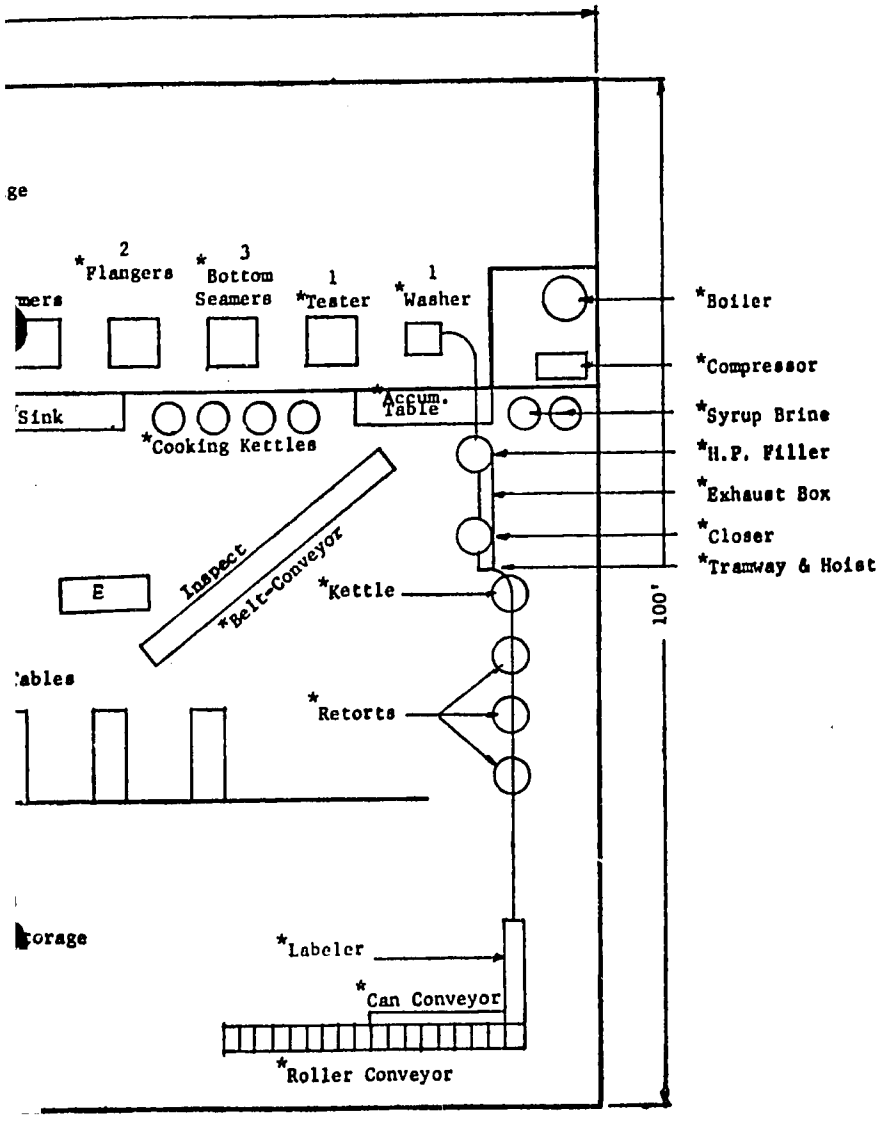

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/ for this product.

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Superintendent of Documents
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National Society of Professional Engineers
2029 K Street, N.W.
Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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GENERAL INFORMATION

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This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

CANNED CREAM STYLE CORN

I. P. No. 67337
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I. P. No. 67337
S. I. C. 2033
NOVEMBER 1967

CANNED CREAM STYLE CORN

PRODUCT DESCRIPTION

Canned cream style corn, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commerial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned cream style corn normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned vegetables. Consumption of canned vegetables will vary primarily with the climate, the availability of fresh vegetables, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $92,000.
The total fixed investment, plus working capital, is estimated at $138,700.
The annual gross profit, before taxes, is estimated at $5,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 5.4%.
(A gross profit on sales, before taxes, of 5.4%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 3.6%.

5. COST PER MAN EMPLOYED

Eighteen direct workers and four indirect workers, or a total of twenty-two workers, are employed.
The total fixed capital investment is estimated at $131,000.
Based on these figures, the fixed investment per man employed would amount to about $5,950.

C. PRODUCTION REQUIREMENTS - CANNED CREAM STYLE CORN
ANNUAL CAPACITY - ONE SHIFT OPERATION - 8 WEEKS : 570,000 CANS

I.P. No. 67337
S.I.C. 2033

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - 2 acres	
Building - one story, 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 131,000

Principal items :

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H. P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P.-120 P.S.I., Husker, Inspection Belt, Trimmer, Washer, Cutter, Desilker and Washer

b. Working Capital (15 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 7,700

c. Total Capital Requirements $ 138,700

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Sweet corn	642 tons	
Cans	570,000	
Additives		
Labels & Cartons		
Total direct materials		$ 35,000

b. Supplies

Lubricants & hand tools	
Cutting tools and abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance for truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Corn must be available locally. Cartons and labels should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 18-1/4 H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,600

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 10,300

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck driver	1	
Total indirect labor	4	$ 4,600
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	13	
Total direct labor	18	$ 12,600

c. Training needs

The manager and the inspector should be fully experienced. They, with two skilled workers, should be able to train all workers and reach full production in one week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input at this plant will amount to about 13.4 tons per day. Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 35,000	
Direct labor	12,600	
Manufacturing overhead*	18,300	
Total manufacturing cost		$ 65,900
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 10,100
Sales expense		$ 8,000
Freight-out, travel discounts Allowances & bad debts		$ 3,000
Total annual costs		$ 87,000
Annual Gross Profit		$ 5,000
ANNUAL SALES REVENUE		$ 92,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
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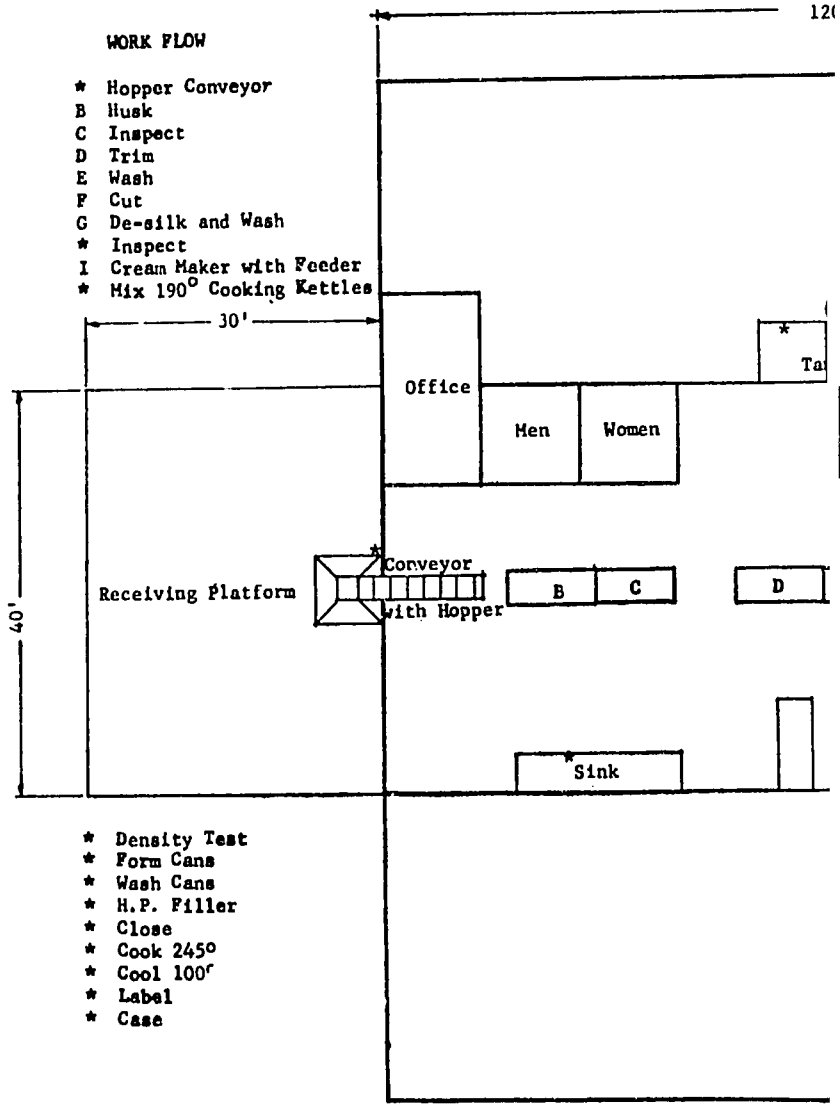
PLANT



Items marked with an asterisk indicate basic

Items marked with letters indicate equipmen

M STYLE CORN

I. P. NO. 67337
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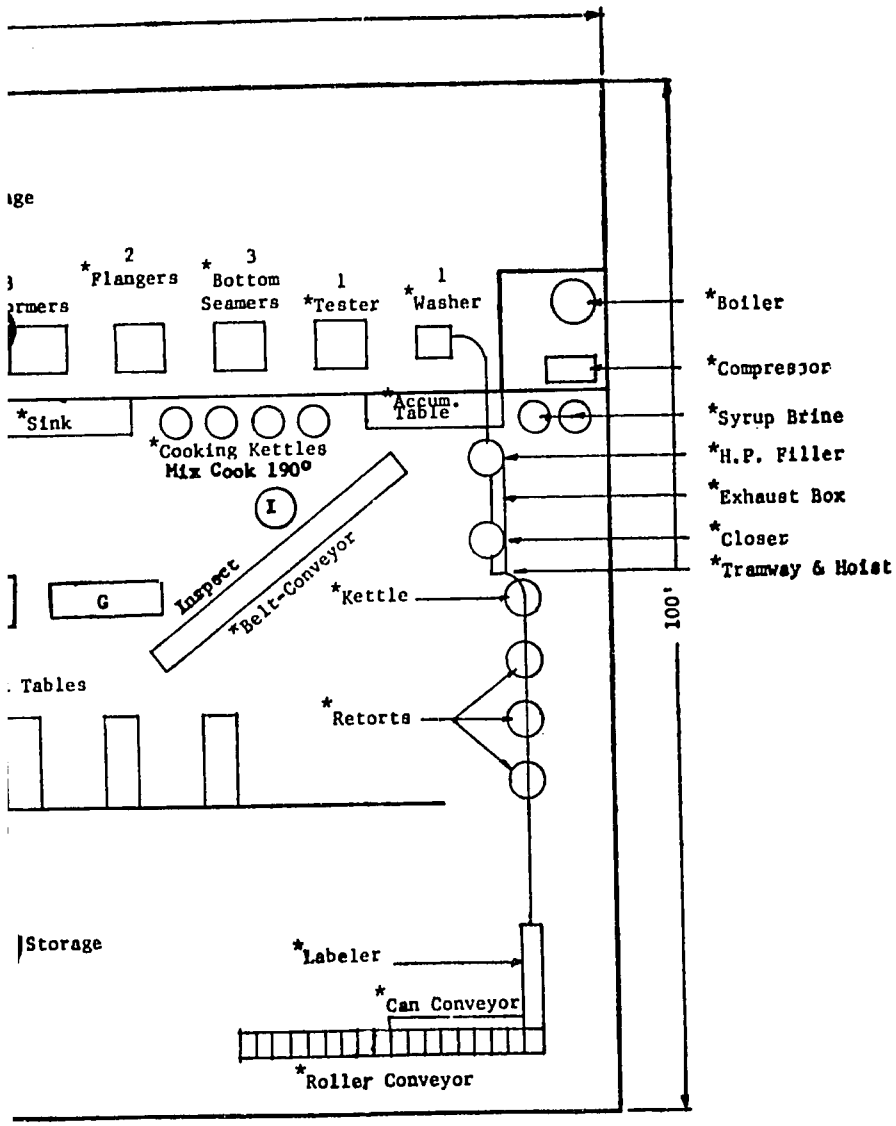

d for canning all products.

lly for this product.

CANNED CREAM STYLE CORN

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INDUSTRY PROFILES

CANNED DRY BEANS

I. P. No. 67338
S. I. C. 2033

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I.P. No 67338
S.I.C. 2033
NOVEMBER 1967

CANNED DRY BEANS

PRODUCT DESCRIPTION

Canned dry beans, 303 cans, size 303 x 406, net weight one pound

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned dry beans normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned dry beans. Consumption of this product will vary primaril with the climate, the level of income and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requiremens" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $187,000.
The total fixed investment, plus working capital, is estimated at $144,800.
The annual gross profit, before taxes, is estimated at $10,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 5.4%.
(A gross profit on sales, before taxes, of 5.4%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 6.9%.

5. COST PER MAN EMPLOYED

Twenty direct workers and four indirect workers or a total of twenty-four workers, are employed.
The total fixed capital investment is estimated at $129,000.
Based on these figures, the fixed investment per man employed would amount to $5,375.

C. PRODUCTION REQUIREMENTS - CANNED DRY BEANS
ANNUAL CAPACITY - ONE SHIFT OPERATION - 18 WEEKS : 1,280,000 CANS

I.P. No. 67338
S.I.C. 2033

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 129,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H. P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P. - 120 P.S I., Dry Clean Blower, Inspection Belt, Fume-de-Stone, Blancher

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 15,800
c. Total Capital Requirements	$ 144,800

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Dry beans	427 tons	
Cans	1,280,000	
Additives		
Labels and Cartons		
Total direct materials		$ 88,500

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 1,900

c. Availability of materials & supplies

Dry beans should be available locally. Cartons and labels should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 14-3/4 H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 2,300

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 10,100

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck Driver	1	
Total indirect labor	4	$ 10,300
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	15	
Total direct labor	20	$ 31,300

c. Training needs

The manager and the inspector should be fully experienced. They with two skilled workers, should be able to train all workers and reach full production in one week.

6. TRANSPORTATION

a. Own transport equipment

Truck.

b. External transport facilities

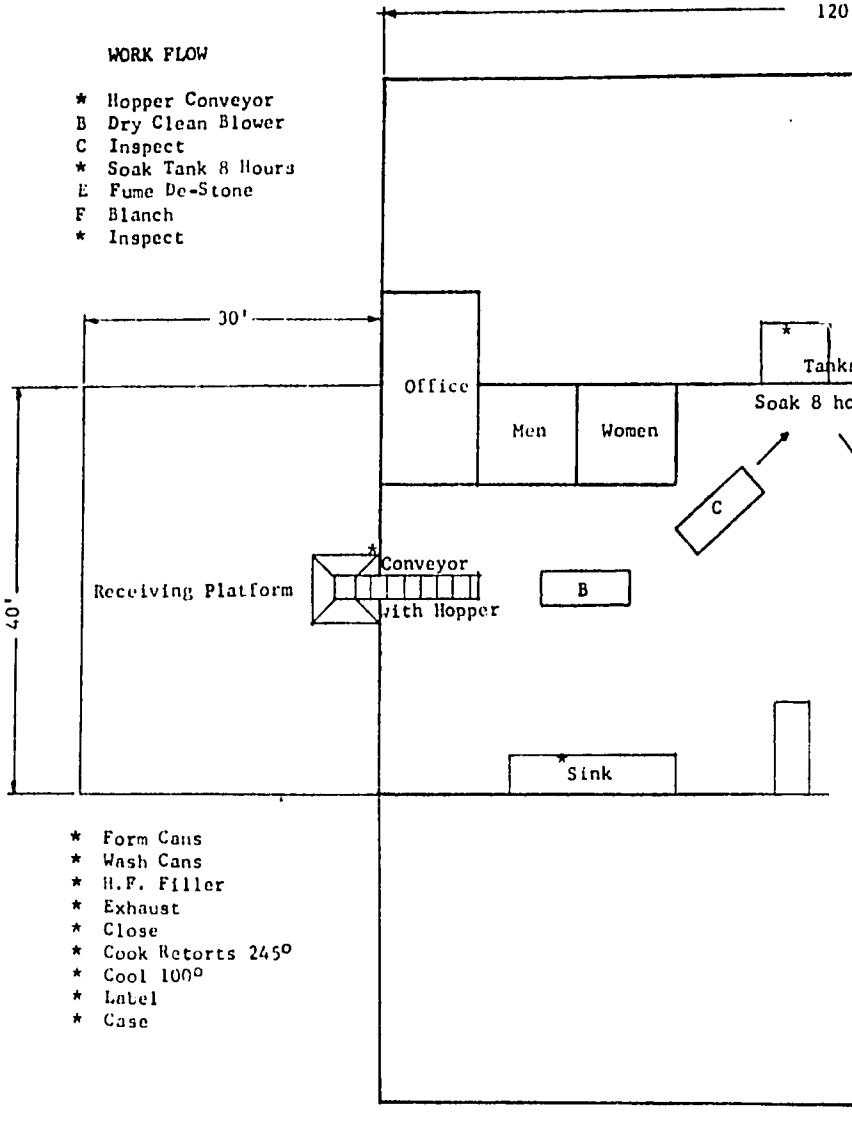
During the canning season the input at this plant will amount to about 4.0 tons per day. Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 88,500	
Direct labor	31,300	
Manufacturing overhead*	24,600	
Total manufacturing cost		$ 144,400
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 14,600
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 177,000
Annual Gross Profit		$ 10,000
ANNUAL SALES REVENUE		$ 187,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT



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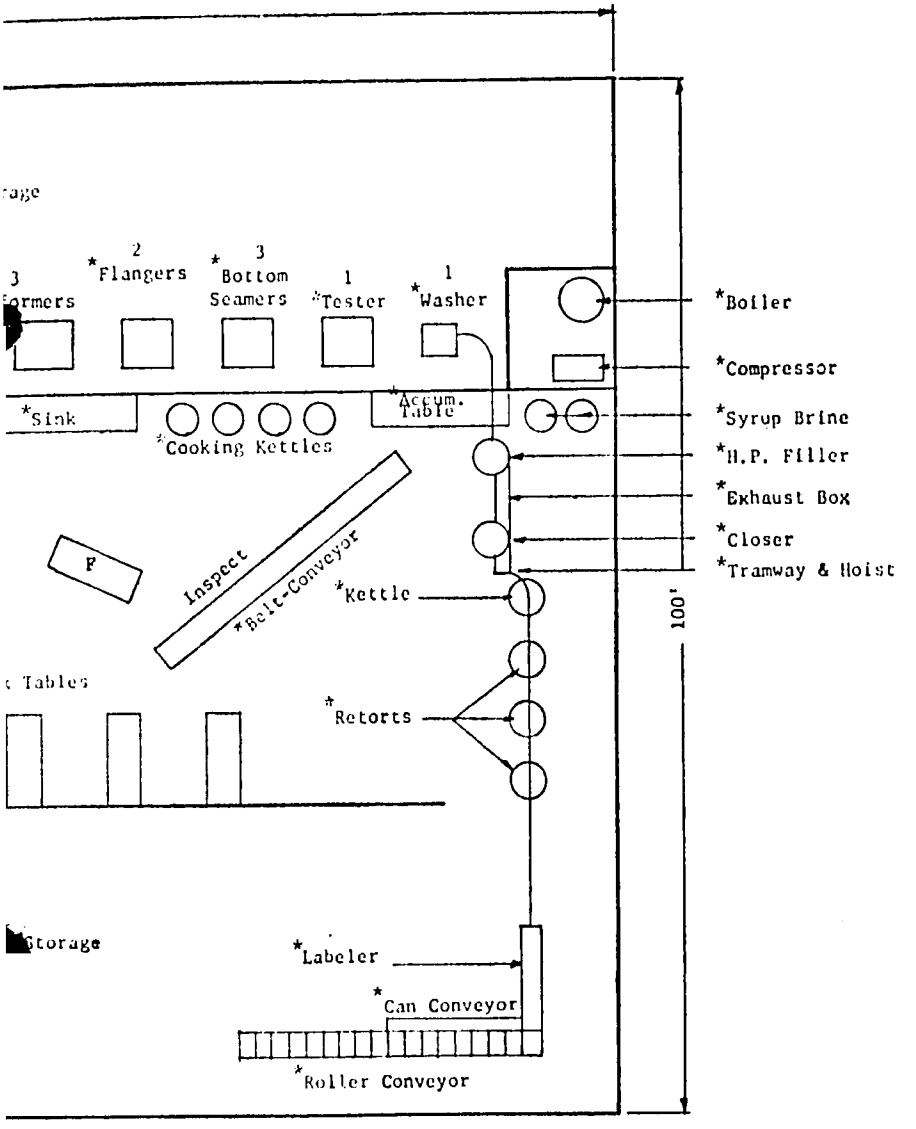
BEANS

I. P. NO. 67338
S. I. C. 2033



d for canning all products.

lly for this product.

CANNED DRY BEANS

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I. TECHNICAL AND TRADE BOOKS

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C. Quality Control and Reliability. Norbert L. Enrick. 1966. 5th ed. 254 p. $7.50.

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Washington, D. C. 20402

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National Society of Professional Engineers
2029 K Street, N.W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

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The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

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GENERAL INFORMATION

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This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

CANNED SPINACH

I. P. No. 67339
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

PRODUCT DESCRIPTION

Canned spinach, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seeasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several sesonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned spinach normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned vegetables. Consumption of canned vegetables will vary primarily with the climate, the availability of fresh vegetables, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $70,000.
The total fixed investment, plus working capital, is estimated at $134,000.
The annual gross profit, before taxes, is estimated at $4,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 5.7%.
(A gross profit on sales, before taxes, of 5.7%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 3.0%.

5. COST PER MAN EMPLOYED

Twenty direct workers and four indirect workers, or a total of twenty-four workers, are employed.
The total fixed capital investment is estimated at $128,000.
Based on these figures, the fixed investment per man employed would amount to $5,325.

C. PRODUCTION REQUIREMENTS - CANNED SPINACH
ANNUAL CAPACITY - ONE SHIFT OPERATION--6 WEEKS: 440,000 CANS

I.P. No. 67339
S.I.C. 2033

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 128,000

Principal items :

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales Boiler 100 H.P. -- 120 P.S.I., Washer, Blancher, Washer Reel, Drain Belt

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 6,000
c Total Capital Requirements	$ 134,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Spinach	150 tons	
Cans	440,000	
Additives		
Labels and Cartons		
Total direct materials		$ 20,900

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil & maintenance of truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Spinach must be available locally. Labels and cartons would be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 13-1/2 H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,000

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation Equipment	4	
Total depreciation		$ 10,000

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager	1	
Clerk	1	
Inspector	1	
Truck driver	1	
Total indirect labor	4	$ 3,500
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	15	
Total direct labor	20	$ 10,400

c. Training needs

The manager and the inspector should be fully experienced. They, with the two skilled workers, should be able to train all workers and reach full production in about one week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input at this plant will amount to about 4.2 tons per day. Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 20,900	
Direct labor	10,400	
Manufacturing overhead*	16,300	
Total manufacturing cost		$ 47,600
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		8,400
Sales expense		8,000
Freight-out, travel discounts Allowances & bad debts		2,000
Total annual costs		$ 66,000
Annual Gross Profit		$ 4,000
ANNUAL SALES REVENUE		$ 70,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
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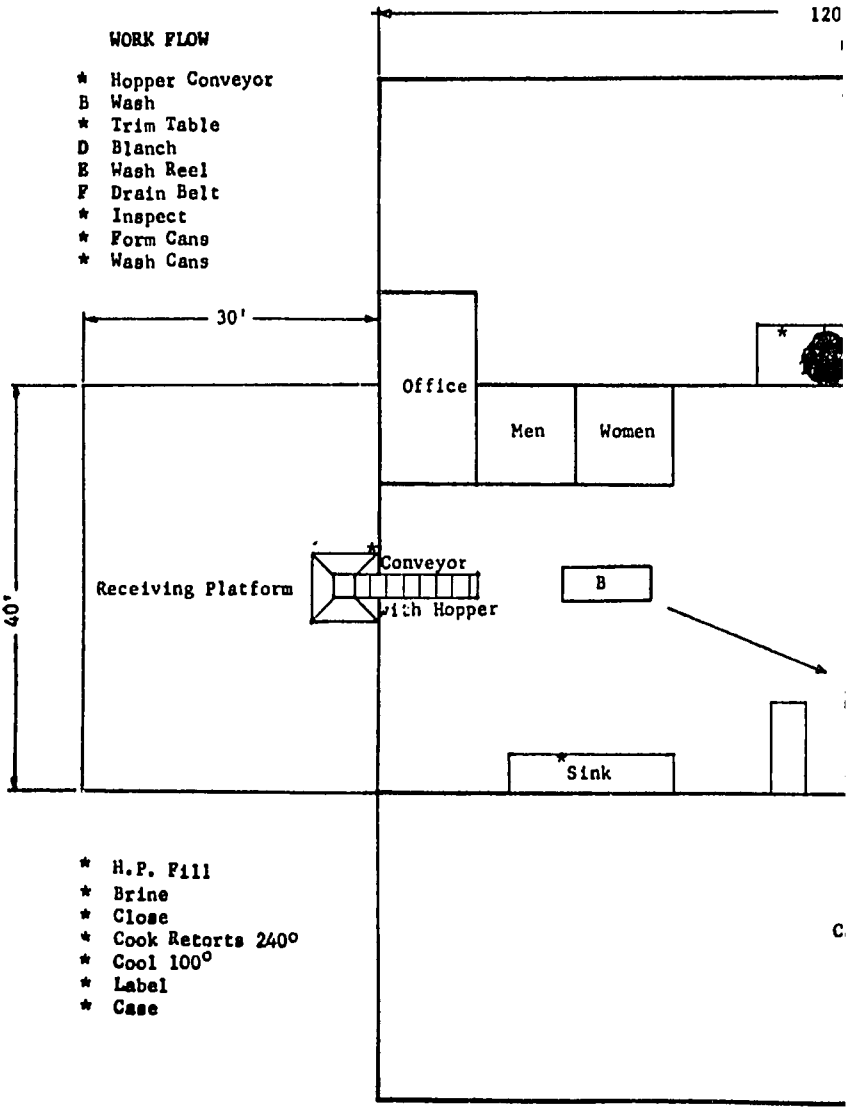
PLANT



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SPINACH

I. P. NO. 67339
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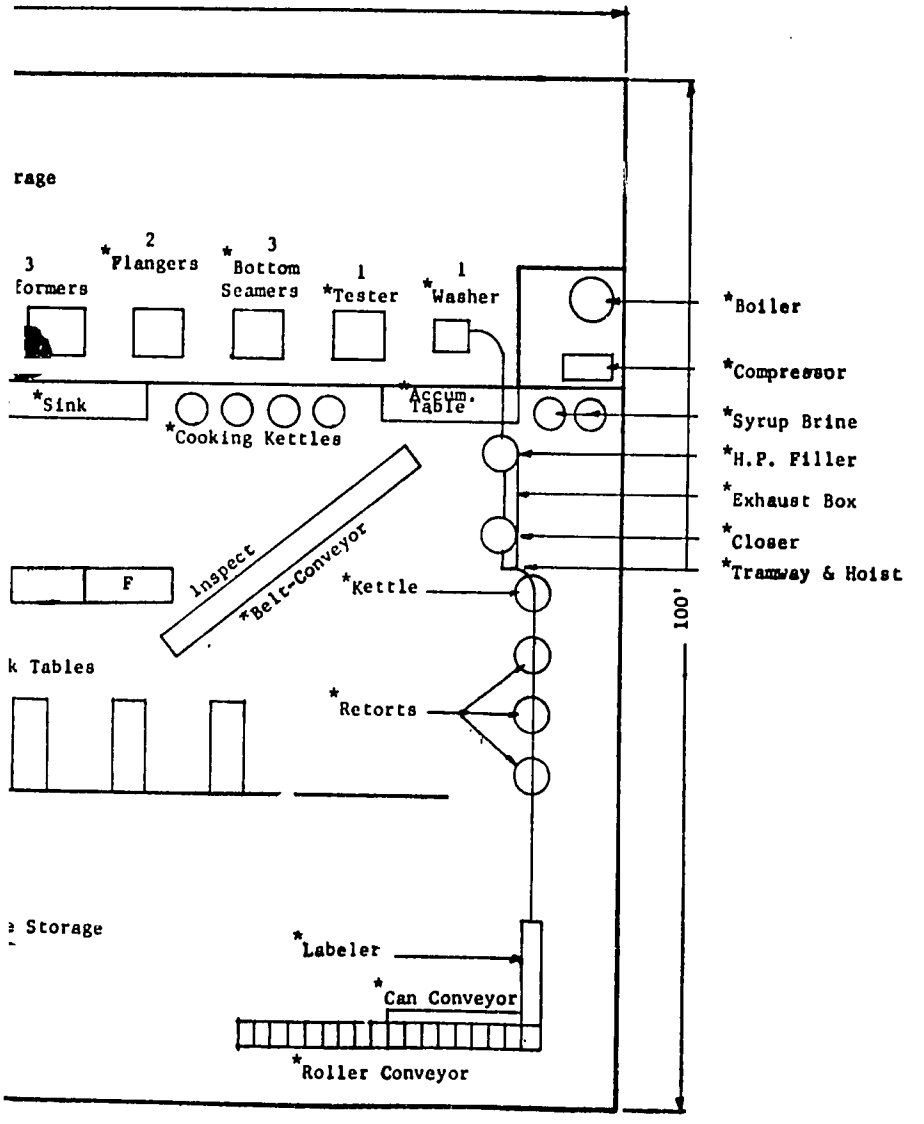

ed for canning all products.

ally for this product.

CANNED SPINACH

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INDUSTRY PROFILES

CANNED WAX BEANS

I. P. No. 67340
S. I. C. 2033

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I.P. No. 67340
S.I.C. 2033
NOVEMBER 1967

CANNED WAX BEANS

PRODUCT DESCRIPTION

Canned wax beans, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned wax beans normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned vegetables. Consumption of canned vegetables will vary primarily with the climate, the availability of fresh vegetables, the level of income and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognised that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $96,000
The total fixed investment, plus working capital, is esimated at $141,000.
The annual gross profit, before taxes, is estimated at $5,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 5.2%.
(A gross profit on sales, before taxes, of 5.2%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 3.6%.

5. COST PER MAN EMPLOYED

Seventeen direct workers and four indirect workers, or a total of twenty-one workers, are employed.
The total fixed capital investment is estimated at $133,000.
Based on these figures, the fixed investment per man employed would amount to about $6,325.

C. PRODUCTION REQUIREMENTS - CANNED WAX BEANS
ANNUAL CAPACITY - ONE SHIFT OPERATION - 8 WEEKS : 570,000 CANS

I.P. No. 67340
S.I.C. 2033

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 2 acres	
Building - one story 100′ x 120′	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 133,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamer Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P. - 120 P.S.I., Washer, 2 Snipppers, 2 Inspection Belts, Grader, Bean Cutter, Blancher, Wash Reel.

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 8,000
c. Total Capital Requirements	$ 141,000

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Wax Beans	190 tons	
Cans	570,000	
Additives		
Labels and Cartons		
Total direct materials		$ 39,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Wax beans must be available locally. Labels and cartons should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 16-3/4 H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,500

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 10,500

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager	1	
Clerk	1	
Inspector	1	
Truck Driver	1	
Total indirect labor	4	$ 4,600

b. Direct Labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	12	
Total direct labor	17	$ 12,000

c. Training needs

The manager and the inspector should be fully experienced. They, with the two skilled workers, should be able to train all workers and reach full production in about one week.

6. TRANSPORTATION

a. Own transport equipment

Truck.

b. External transport facilities

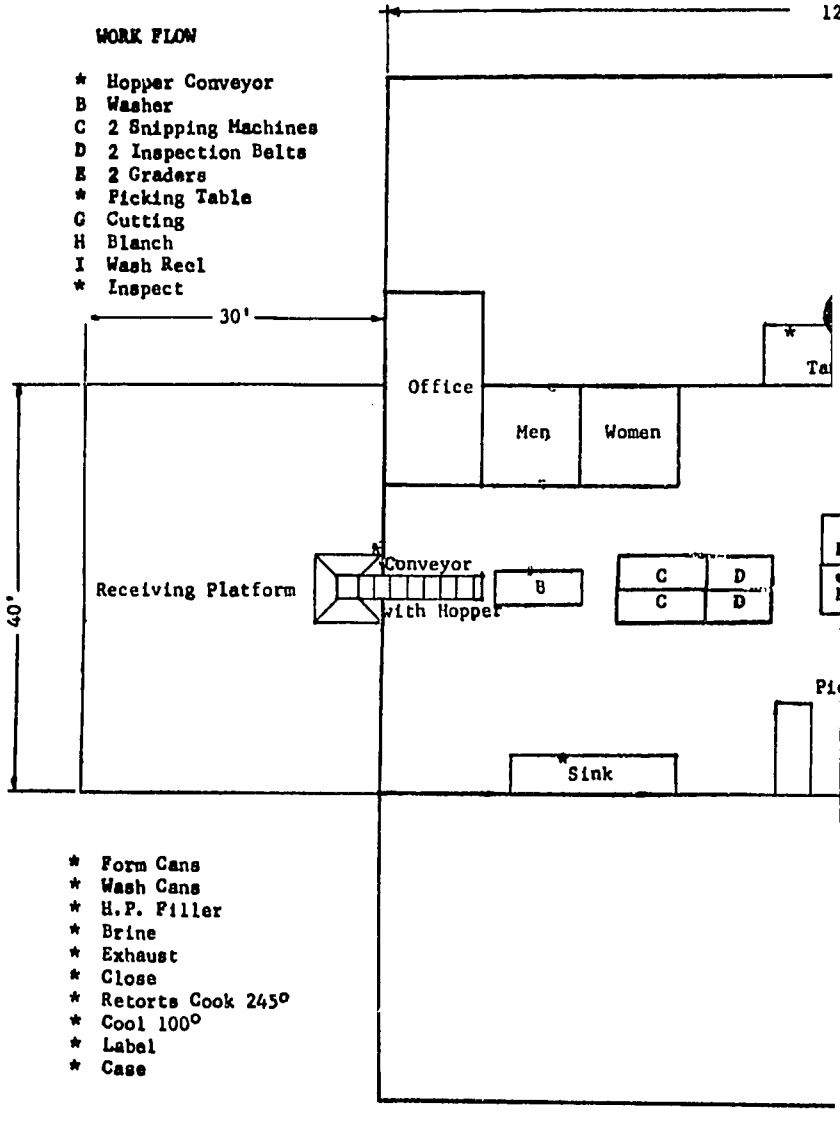
During the canning season the input at this plant will amount to about 4 tons per day. Good highways.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct Materials	$ 39,000	
Direct labor	12,000	
Manufacturing overhead*	18,400	
Total manufacturing cost		$ 69,400
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 9,600
Sales expense		$ 9,000
Freight-out, travel discounts Allowances & bad debts		$ 3,000
Total annual costs		$ 91,000
Annual Gross Profit		$ 5,000
ANNUAL SALES REVENUE		$ 96,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLAN



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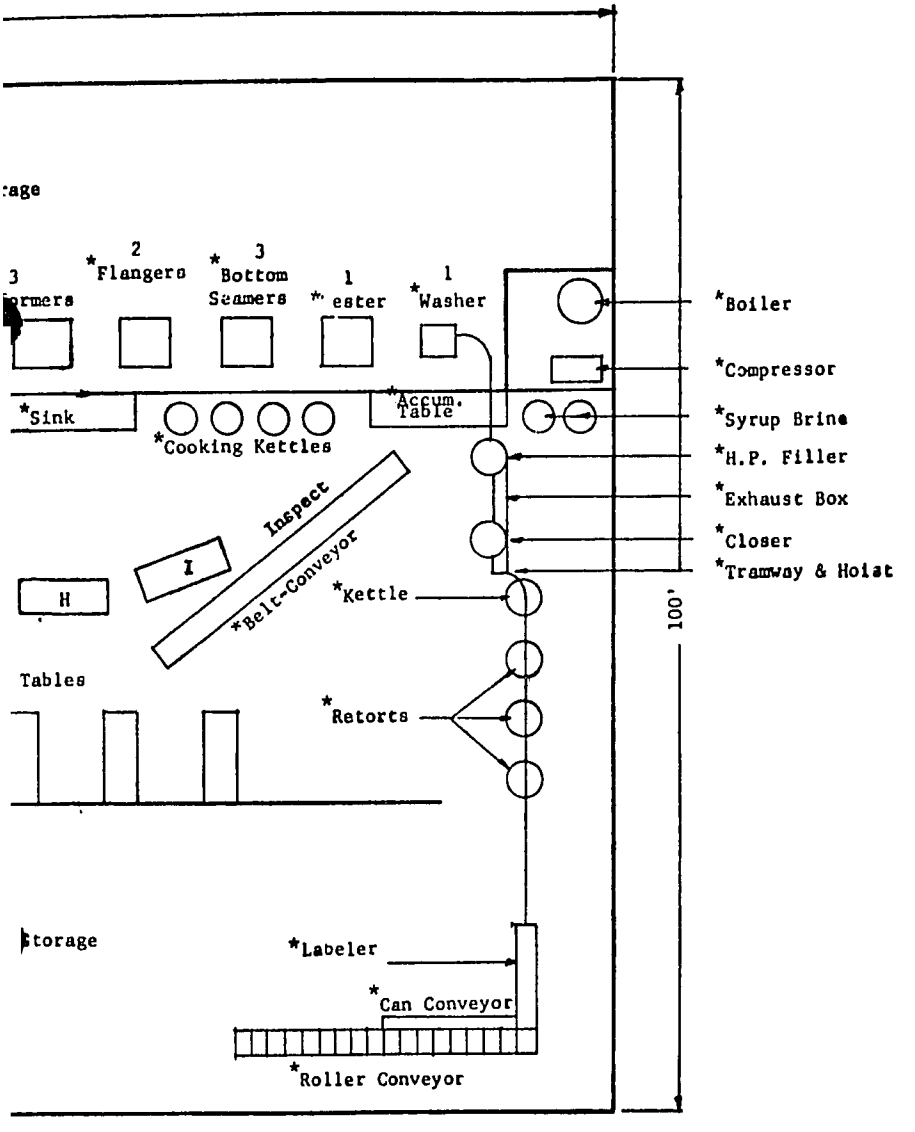
Items marked with letters indicate equipment

NAX BEANS

I. P. NO. 67340
S. I. C. 2033



l for canning all products.

lly for this product.

CANNED WAX BEANS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

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Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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Complete sets of the 250 *Industry Profiles* published in 1966, I. P. No. 66001 through I. P. No. 66250 consecutively, may be purchased for $125.00 per set. Complete sets of the 150 *Industry Profiles* to be published in 1967, I. P. No. 67251 through I. P. No. 67400 consecutively, may be purchased for $75.00 per set. The latter "*Profiles*" will automatically be shipped to full set purchasers upon release.

Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

CANNED BLACKEYED PEAS

I. P. No. 67341
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

CANNED BLACKEYED PEAS

I.P. No. 67341
S.I.C. 2033
NOVEMBER 1967

PRODUCT DESCRIPTION

Canned blackeyed peas, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned blackeyed peas normally would be nationwide If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned vegetables. Consumption of canned vegetables will vary primarily with the climate, the availability of fresh vegetables, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $190,000.
The total fixed investment, plus working capital, is estimated at $145,200.
The annual gross profit, before taxes, is estimated at $10,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 5.3%.
(A gross profit on sales, before taxes, of 5.3%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 6.9%.

5. COST PER MAN EMPLOYED

Twenty direct workers and four indirect workers, or a total of twenty-four workers, are employed.
The total fixed capital investment is estimated at $129,000.
Based on these figures, the fixed investment per man employed would amount to about $5,375.

C. PRODUCTION REQUIREMENTS - CANNED BLACKEYED PEAS
ANNUAL CAPACITY - ONE SHIFT OPERATION - 18 WEEKS: 1,280,000 CANS

I.P. No. 67341
S.I.C. 2033

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a Fixed Capital	Cost
Land - 2 acres	
Building - one story, 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$129,000

Principal Items :

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift Truck with Pallets, Compresor, Platform Scales, Boiler 100 H.P.-120 P.S.I., Dry Clean Blower, Inspection Belt, Fume, Blancher

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 16,200
c. Total Capital Requirements	$145,200

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Blackeyed peas	460 tons	
Cans	1,280,000	
Additives		
Labels and Cartons		
Total direct materials		$ 91,500
b. Supplies		
Lubricants & hand tools		
Cutting tools & abrasives		
Maintenance & spare parts		
Office supplies		
Gas, oil and maintenance of truck		
Total supplies		$ 1,900

c. Availability of materials & supplies

Blackeyed peas must be available locally. Labels and cartons should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 14-3/4 H. P. connected load	
Fuel - oil	
Water - must be potable	$ 2,300

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 10,100

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck Driver	1	
Total indirect labor	4	$ 10,300
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	15	
Total direct labor	20	$ 31,300

c. Training needs

The manager and the inspector should be fully experienced. They, with the 2 skilled workers, should be able to train all workers and reach full production in about one week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input at this plant will amount to about 4.3 tons per day.

Good highways.

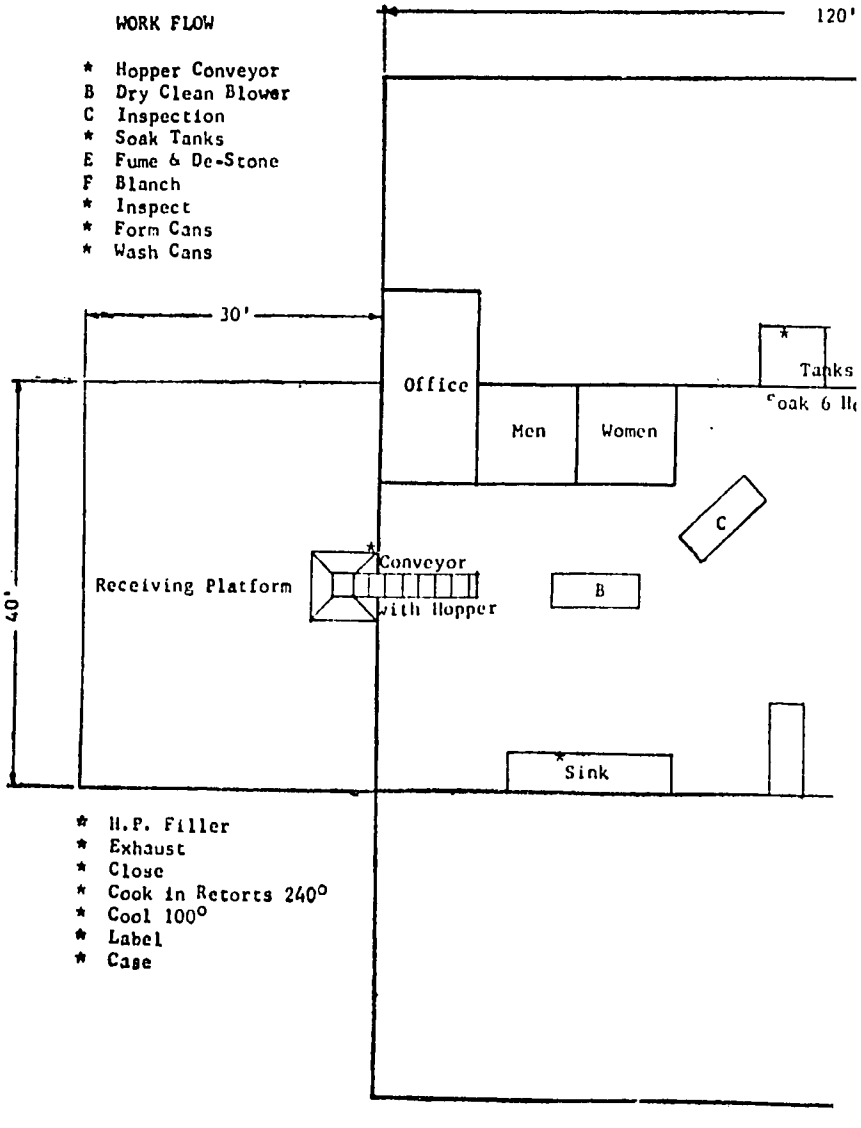
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 91,500	
Direct labor	31,300	
Manufacturing overhead*	24,600	
Total manufacturing cost		$ 147,400
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 14,600
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 180,000
Annual Gross Profit		$ 10,000
ANNUAL SALES REVENUE		$ 190,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT

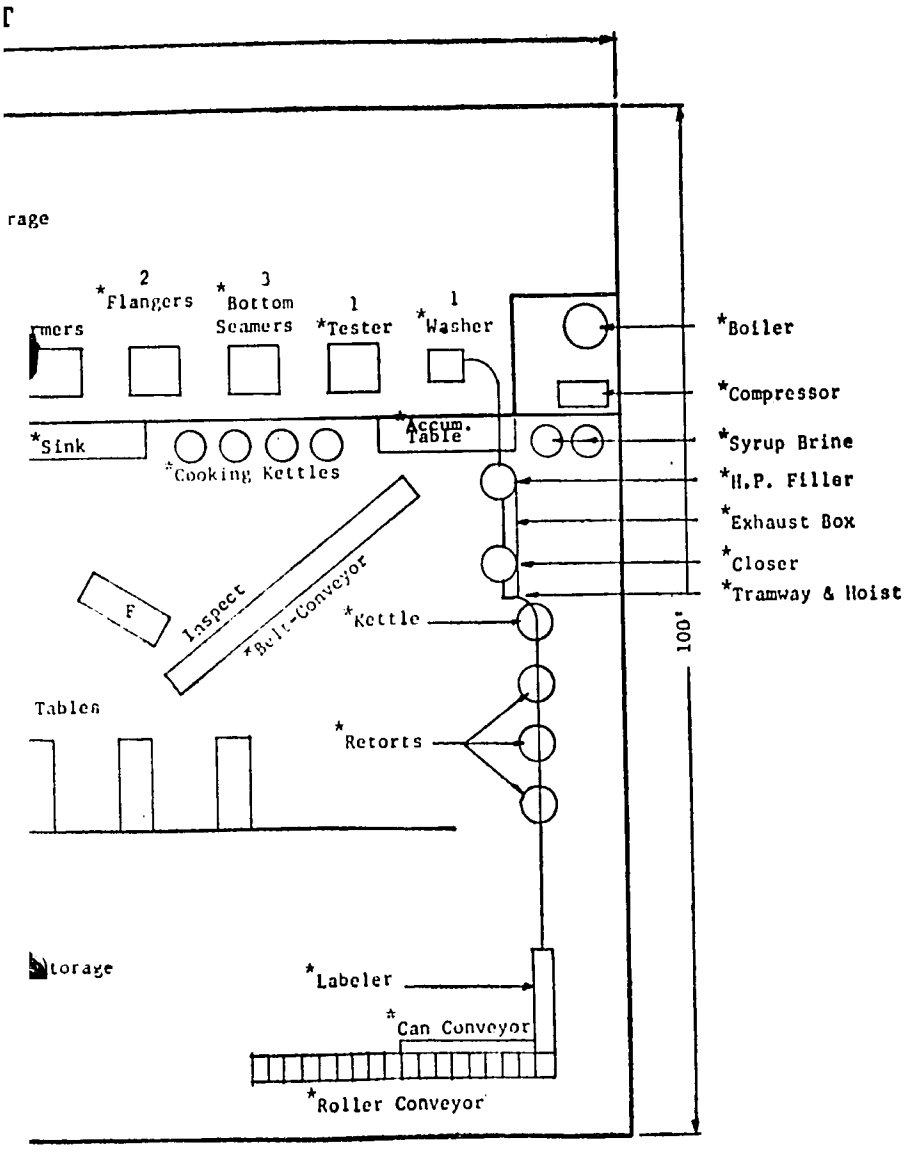


Items marked with an asterisk indicate basic

Items marked with letters indicate equipment

BLACKEYED PEAS

I. P. NO. 67341
S. I. C. 2033



d for canning all products

lly for this product.

CANNED BLACKEYED PEAS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

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Complete sets of the 250 *Industry Profiles* published in 1966, I. P. No. 66001 through I. P. No. 66250 consecutively, may be purchased for $125.00 per set. Complete sets of the 150 *Industry Profiles* to be published in 1967, I. P. No. 67251 through I. P. No. 67400 consecutively, may be purchased for $75.00 per set. The latter "*Profiles*" will automatically be shipped to full set purchasers upon release.

Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

CANNED TOMATOES

I. P. No. 67342
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile, should help in reaching correct assumptions.

CANNED TOMATOES

PRODUCT DESCRIPTION

Canned tomatoes, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users such as military. The extent of the market for canned tomatoes normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned vegetables. Consumption of canned vegetables will vary primarily with the climate, the availability of fresh vegetables, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $167,000.
The total fixed investment, plus working capital, is estimated at $139,400.
The annual gross profit, before taxes, is estimated at $9,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 5.4%.
(A gross profit on sales, before taxes, of 5.4%, while reflecting U. S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 6.5%.

5. COST PER MAN EMPLOYED

Twenty-seven direct workers and four indirect workers, or a total of thirty-one workers, are employed.
The total fixed capital investment is estimated at $125,000.
Based on these figures, the fixed investment per man employed would amount to $4,025.

C. PRODUCTION REQUIREMENTS - CANNED TOMATOES
ANNUAL CAPACITY - ONE SHIFT OPERATION - 16 WEEKS : 1,150,000 CANS

I.P. No. 67342
S.I.C. 2033

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 125,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H.P. - 120 P.S.I., Inspection Belt, Washer, Scalder, Juice Extractor

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 14,400
c. Total Capital Requirements	$ 139,400

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Tomatoes	745 tons	
Cans	1,150,000	
Additives		
Cartons & Labels		
Total direct materials		$ 67,300

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Tomatoes must be available locally. Cartons and labels should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 10 H.P. connected load	-
Fuel - oil	
Water - must be potable	
	$ 1,800

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 9,700

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager	1	
Clerk, part time	1	
Inspector, part time	1	
Truck Driver	1	
Total indirect labor	4	$ 9,100
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	22	
Total direct labor	27	$ 36,700

c. Training Needs

The manager and the inspector should be fully experienced. They, with two skilled workers, should be able to train all workers and reach full production in on week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input to the plant will amount to about 7.8 tons per day.

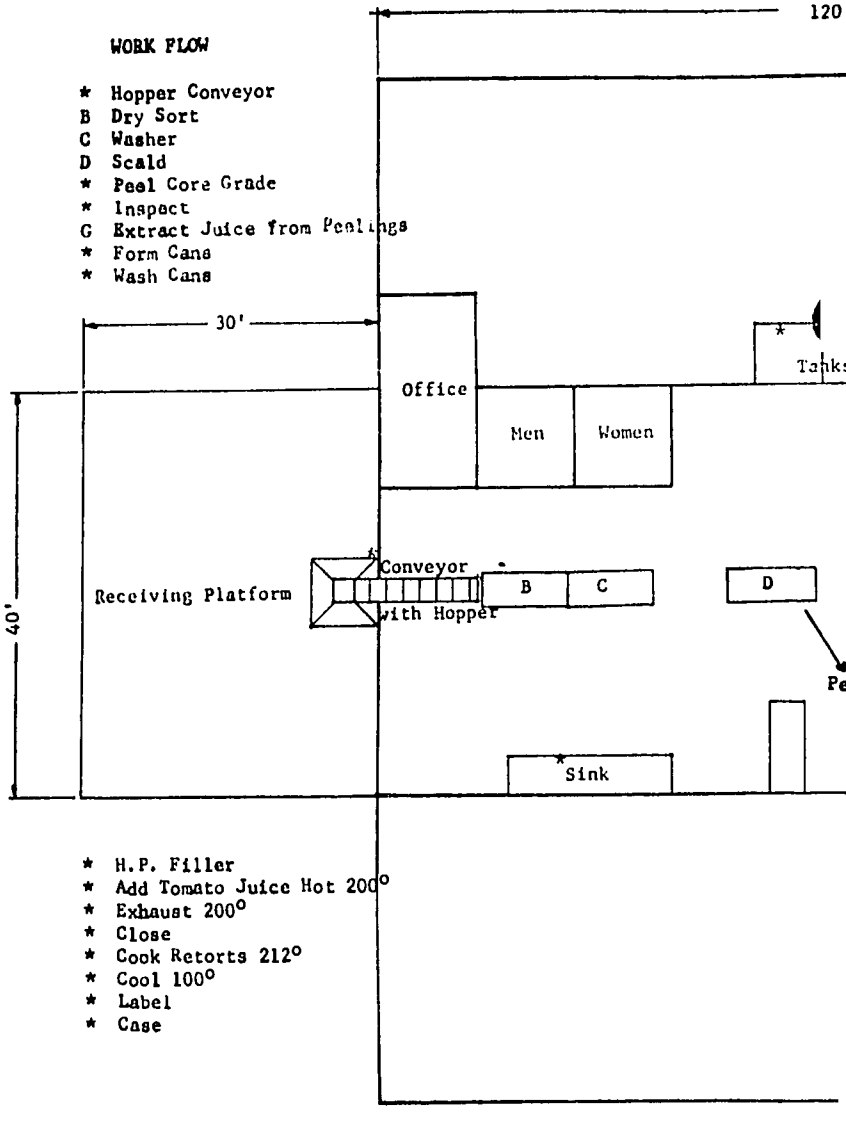
Good highways.

7. TOTAL ANNUAL COSTS AND SALES

REVENUE		
Direct materials	$ 67,300	
Direct labor	36,700	
Manufacturing overhead*	22,400	
Total manufacturing cost		$ 126,400
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 13,600
Sales expense		12,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 158,000
Annual Gross Profit		$ 9,000
ANNUAL SALES REVENUE		$ 167,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT

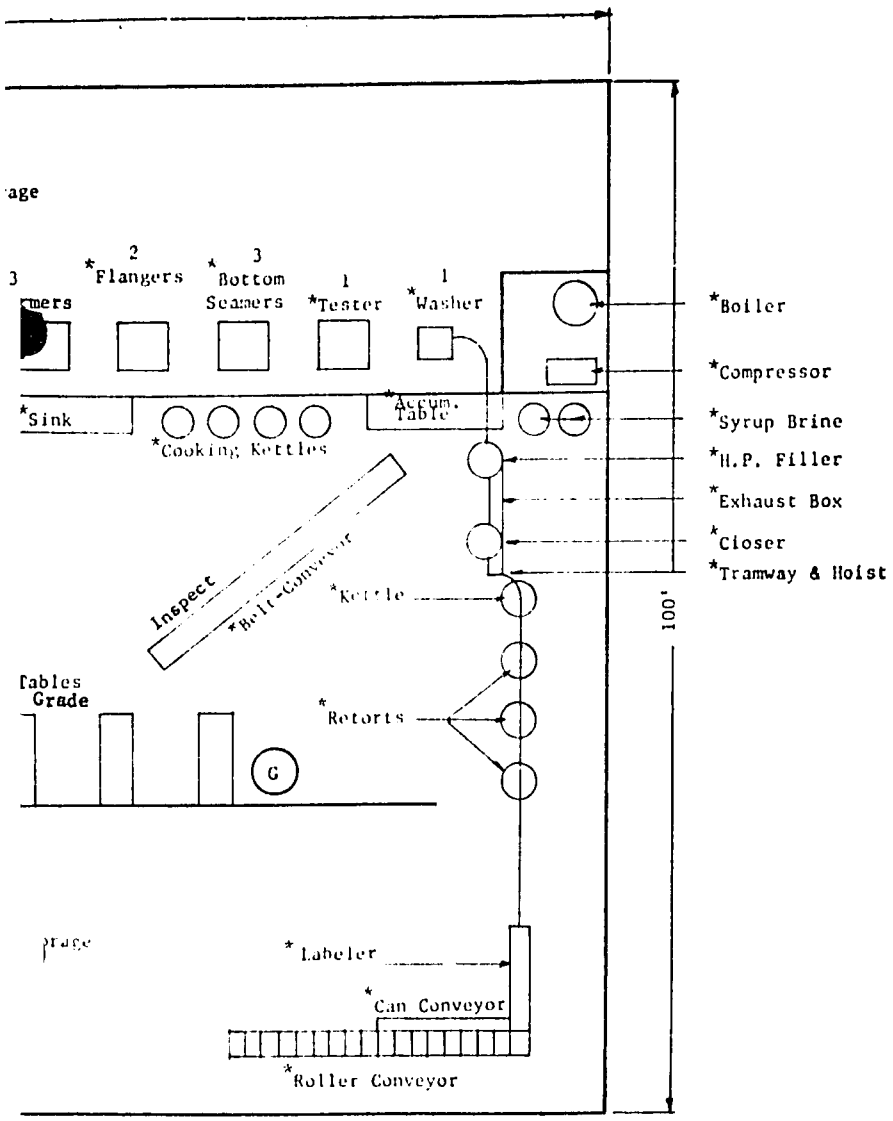


Items marked with an asterisk indicate basic

Items marked with letters indicate equipment

ATOES

I. P. NO. 67342
S. I. C. 2033



for canning all products

y for this product.

343

CANNED TOMATOES

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Complete Course in Canning. 8th ed. 1966. 400 p. $15.00.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Covers all products, fruits, vegetables, meats, milk, soups, juices, etc. in minute detail, with full basic instruction from the field through to the warehouse.

B. The Almanac of the Canning, Freezing and Preserving Industries, 1967. 510 p. $7.50.

Edward E. Judge
P. O. Box 866
Westminster, Maryland 21157

Includes latest prices on vegetables, fruits, cans, glass jars, canned products, as well as data on quality grade standards, labeling, packaging, international trade, U.S. and world packs, and other valuable information.

C. Quality Control and Reliability. Norbert L. Enrick. 1966. 5th ed. 254 p. $7.50.

The Industrial Press
93 Worth Street
New York, N. Y. 10013

The 24 chapters of the book are divided into three main sections: (1) basic quality control applications; (2) additional quality control methods; and (3) reliability.

D. Federal Food, Drug and Cosmetic Act, General Regulations for its enforcement, Title 21, Par 1, $3.00.

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Deals with all phases of quality and health aspects of processed foods, including minimum standards and additives, such as vitamins, coloring and enforcement of regulations.

II. TECHNICAL AND TRADE PERIODICALS

A. Canning Trade. Bi-weekly. $5.00/year.

The Canning Trade
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Baltimore, Maryland 21218

Devoted exclusively to the food processing industry.

B. Food Engineering. Monthly. $25.00/year.

Food Engineering
Chestnut & 56th Street
Philadelphia, Pa. 19139

Devoted exclusively to the food processing industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 1961. (Small Business Administration). 233 pp. $1.00

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Prepared by the Small Business Administration to assist in the development of more effective management in small business.

IV. REPRESENTATIVE U. S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,272,636 Sept. 1966 4 p.
Method of controlling microorganisms in food products.

B. Patent No. 3,232,770 Feb. 1966 9 p.
Method of sterilizing and canning food material.

C. Patent No. 3,071,475 Jan. 1963 7 p.
Sterilizing method for canned foodstuff.

D. Patent No. 2,794,326 June 1957 6 p.
Method and apparatus for cooling canned goods

E. Patent No. 2,793,326 May 1957 4 p.
Continuous operating cooker.

F. Patent No. 2,760,837 Aug. 1956 4 p.
Process for transporting cans through a continuous sterilizer.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Natonal Canners Association
1133 20th Street, N. W.
Washington, D.C. 20036

B. Canning Machinery and Supplies Association
7758 Wisconsin Avenue, N.W.
Washington, D.C. 20014

VI. DIRECTORIES

A. Canners Directory. $5.00. Annual.

National Canners Association
1133 20th Street, N.W.
Washington, D C. 20036

B. Canning Machinery Directory. Gratis.

Canning Machinery and Supplies Association
7758 Wisconsin Avenue, N.W.
Washington, D.C. 20014

C. The Directory of the Canning, Freezing, Preserving Industries. $25.00. Annual.

Edward E. Judge
P.O. Box 866
Westminster, Maryland 21157

II. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the :

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective cutosmers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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INDUSTRY PROFILES

CANNED CREAM OF CELERY SOUP, READY TO SERVE

I. P. No. 67343
S. I. C. 2032

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

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I.P. No. 67343
S.I.C. 2032
NOVEMBER 1967

CANNED CREAM OF CELERY SOUP, READY TO SERVE

PRODUCT DESCRIPTION

Canned cream of celery soup, ready to serve, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry, to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seassons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned cream of celery soup normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned soups. Consumption of canned soups will vary primarily with the climate, the availability of fresh vegetables, the level of income, and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognised that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $98,000.
The total fixed investment, plus working capital, is estimated at $133,100.
The annual gross profit, before taxes, is estimated at $5,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 5.1%.
(A gross profit on sales, before taxes, of 5.1%, while reflecting U.S. experience, should not be considered normal for a developing country, where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 3.8%.

5. COST PER MAN EMPLOYED

Fifteen direct workers, and four indirect workers, or a total of nineteen workers, are employed.
The total fixed capital investment is estimated at $125,000.
Based on these figures, the fixed investment per man employed would amount to $6,600.

C. PRODUCTION REQUIREMENTS - CANNED CREAM OF CELERY SOUP, READY TO SERVE

I.P. No. 67343
S.I.C. 2032

ANNUAL CAPACITY - ONE SHIFT OPERATION: 8 WEEKS: 570,000 CANS

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 125,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H P.- -120 P.S.I., Washer, Blancher, Wash Reel, 2 Mixing Kettles

b. Working Capital (15 Days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 8,100

c. Total Capital Requirements $ 133,100

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Celery	63.0 tons	
Milk	21,000 gals.	
Flour	10.5 tons	
Butter	8.6 tons	
Salt	2.1 tons	
Ground white pepper	200 lbs.	
Water	33,600 gals.	
Cans	570,000	
Labels & cartons		
Total direct materials		$ 41,700

b. Supplies

Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil & maintenance of truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Celery must be available locally. Cartons and labels should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 13 H.P. connected load	
Fuel - oil	
Water - must be potable.	
	$ 1,300

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 9,700

5. MANPOWER

	Number	Annual cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck driver	1	
Total indirect labor	4	$ 4,600
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	10	
Total direct labor	15	$ 10,700

c. Training needs

The manager and the inspector should be fully experienced. They, with two skilled workers, should be able to train all workers and reach full production in one week.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input at the plant will amount to about 3-1/2 tons per day.

Good highways.

7. TOTAL ANNUAL COSTS AND SALES

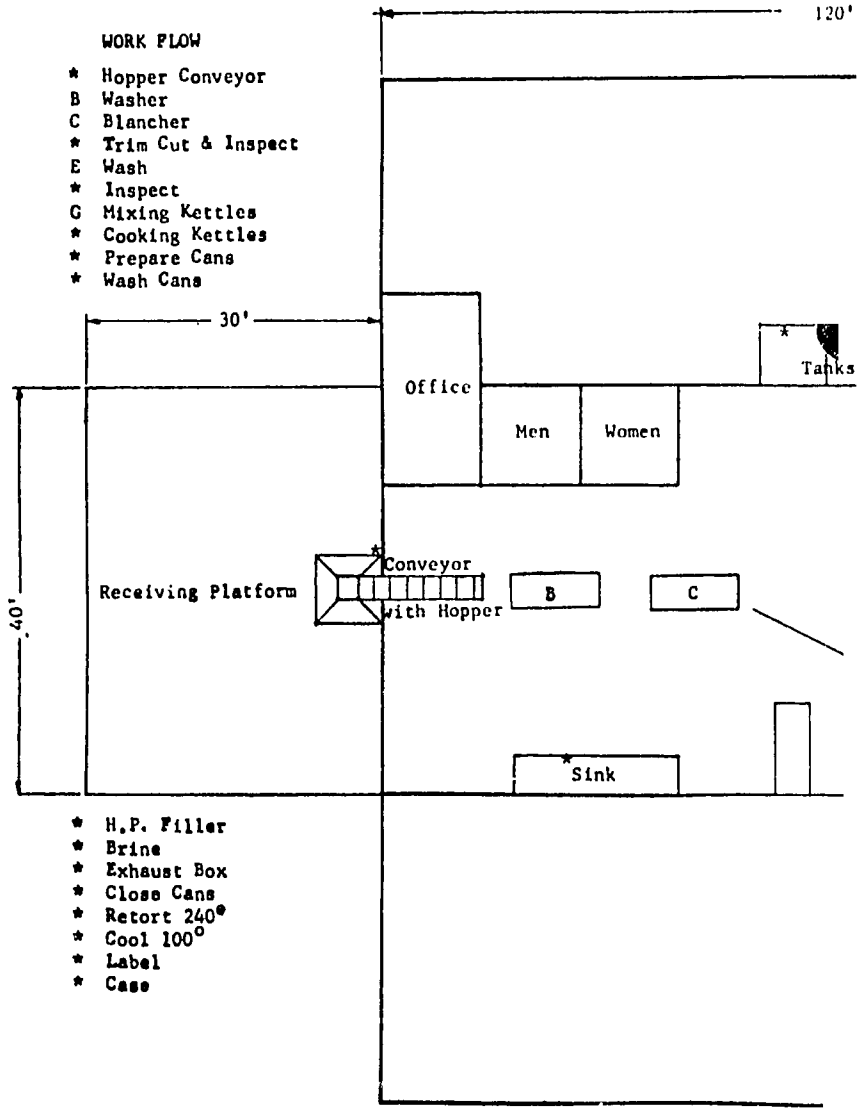
REVENUE		
Direct materials	$ 41,700	
Direct labor	10,700	
Manufacturing overhead*	17,400	
Total manufacturing cost		$ 69,800
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 112,000
Sales expense		$ 9,000
Freight-out, travel discounts Allowances & bad debts		$ 3,000
Total annual costs		$ 193,800
Annual Gross Profit		$ 5,000
ANNUAL SALES REVENUE		$ 98,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

CANNED CREAM O

PLANT L

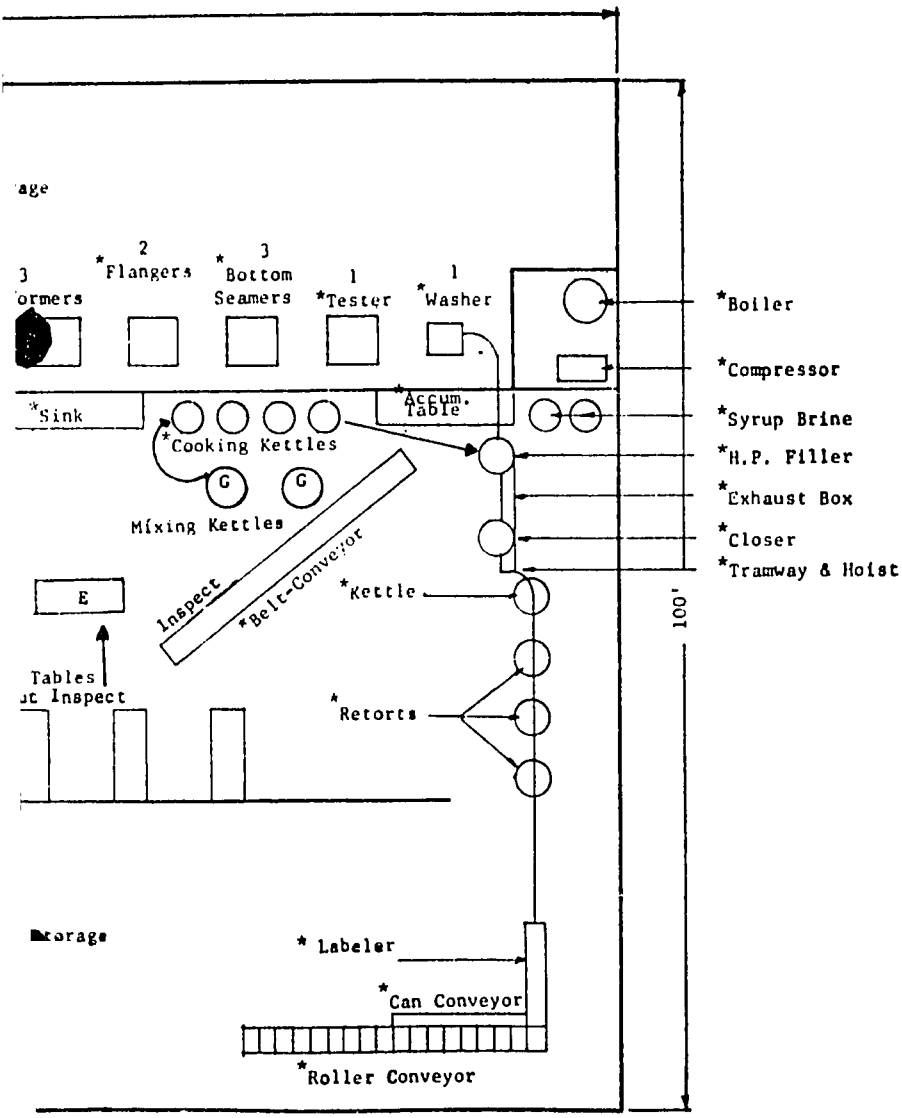


Items marked with an asterisk indicate basic

Items marked with letters indicate equipmen

RY SOUP, READY TO SERVE

I. P. NO. 67343
S. I. C. 2032



for canning all products.

/ for this product.

CANNED CREAM OF CELERY SOUP, READY TO SERVE

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Complete Course in Canning. 8th ed. 1966. 400 p. $15.00.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Covers all products, fruits, vegetables, meats, milk, soups, juices, etc. in minute detail, with full basic instruction from the field through to the warehouse.

B. The Almanac of the Canning, Freezing and Preserving Industries, 1967. 510 p. $7.50.

Edward E. Judge
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Includes latest prices on vegetables, fruits, cans, glass jars, canned products, as well as data on quality grade standards, labeling, packaging, international trade, U S. and world packs, and other valuable information.

C. Quality Control and Reliability. Norbert L. Enrick. 1966. 5th ed. 254 p. $7.50.

The Industrial Press
93 Worth Street
New York, N.Y. 10013

The 24 chapters of the book are divided into three main sections: (1) basic quality control applications; (2) additional quality control methods; and (3) reliability.

D. Federal Food, Drug and Cosmetic Act, General Regulations for its enforcement, Title 21, Par 1, $3.00.

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Deals with all phases of quality and health aspects of processed foods, including minimum standards and additives, such as vitamins, coloring, and enforcement of regulations.

II. TECHNICAL AND TRADE PERIODICALS

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B. Food Engineering. Monthly. $25.00/year.

Food Engineering
Chestnut & 56th Street
Philadelphia, Pa. 19139

Devoted exclusively to the food processing industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 1961. (Small Business Administration). 233 pp. $1.00

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Washington, D. C. 20402

Prepared by the Small Business Administration to assist in the development of more effective management in small business.

IV. REPRESENTATIVE U. S. PATENTS

Available U.S. Patent Office, Washington, D.C. 20231. $.50 each.

A. Patent No. 3,272,636 Sept. 1966 4 p.
Method of controlling microorganisms in food products.

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Washington, D.C. 20036

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Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and ableto provide appropriate consulting services.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

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GENERAL INFORMATION

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This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

NDUSTRY PROFILES

CANNED CREAM OF ASPARAGUS SOUP, READY TO SERVE

I. P. No. 67344
S. I. C. 2033

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

CANNED CREAM OF ASPARAGUS SOUP, READY TO SERVE

I. P. No. 67344
S.I.C. 2033
NOVEMBER 1967

PRODUCT DESCRIPTION

Canned cream of asparagus soup, ready to serve, 303 cans, size 303 x 406, net weight one pound.

A. GENERAL EVALUATION OF PROSPECTS

Although a few small canning plants, including some cooperatives, are equipped to can only one or two products, it is now customary in the commercial canning industry to operate the plant all year in order to derive maximum profits on the capital investment. This is accomplished by canning several products that are harvested at different seasons of the year. It is, therefore, suggested that several products be selected for canning that are grown in the area where the canning plant is to be located. These selections should include products that are harvested in the spring, summer, and fall months, that will keep the plant busy during these seasons. For the winter months, it is recommended that such products as dry beans and pork and beans be canned. Under this method a full annual operation for the plant would be assured. The plant layout, as shown in this profile, is designed for the purpose of canning several seasonal products, thereby providing year round operation for the plant. A feasibility survey should be conducted to determine what products are available for canning at various seasons during the year, in what quantity, and at what cost.

B. MARKET ASPECTS

1. USERS

Homes, restaurants, hotels, institutions, military, wherever food is served.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales are usually made to wholesalers for distribution to small retail stores and to large users, such as military. The extent of the market for canned cream of asparagus soup normally would be nationwide. If a plant is efficiently managed and operated it should have no difficulty in competing with imported canned soups. Consumption of canned soups will vary primarily with the climate, the availability of fresh vegetables, the level of income and the degree of urbanization of the population. A comprehensive survey related to these, as well as other, factors should be conducted to determine existing competition and sales potential.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial production costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $98,000.
The total fixed investment, plus working capital, is estimated at $134,300.
The annual gross profit, before taxes, is estimated at $5,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 5.1%.
(A gross profit on sales, before taxes, of 5.1%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 4.0%.

5. COST PER MAN EMPLOYED

Seventeen direct workers and four indirect workers, or a total of 21 workers, are employed.
The total fixed capital investment is estimated at $ 126,000.
Based on these figures, the fixed investment per man employed would amount to about $6,000.

C. PRODUCTION REQUIREMENTS - CANNED CREAM OF ASPARAGUS SOUP, READY TO SERVE

I.P. No. 67344
S.I.C. 2032

ANNUAL CAPACITY - ONE SHIFT-OPERATION: 8 WEEKS : 570,000 CANS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 2 acres	
Building - one story 100' x 120'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 126,000

Principal items:

Conveyor with Hopper, 2 Sinks, 5 Work Tables, 2 Soak Tanks, Belt Conveyor, 4 Cooking Kettles, Accumulation Table, 3 Can Reformers, 2 Can Flangers, 3 Can Bottom Seamers, Can Tester, Can Washer, H.P. Filler, 2 Syrup or Brine Kettles, Exhaust Box, Closer, Tramway & Hoist, Auxiliary Kettle, 3 Retorts (4 crates), 30 Crates, 10 Crate Dollies, Labeler, Can Conveyor, Roller Conveyor, Lift-Truck with Pallets, Compressor, Platform Scales, Boiler 100 H P. -- 120 P.S I., Snipper, 2 Washers, Grader, Cutter, Blancher, 2 Mixing Kettles

b. Working Capital (15 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 8,300
c. Total Capital Requirements	$ 134,300

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Asparagus	20 tons	
Butter	19,200 lbs.	
Salt	5.3 tons	
Sugar	1.7 tons	
Flour	6.1 tons	
Cracker Meal	3.1 tons	
Citric acid	210 lbs.	
Water	76,900 gals.	
Cans	570,000	
Labels & Cartons		
Total direct materials		$ 40,300

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas. oil and maintenance of truck	
Total supplies	$ 1,800

c. Availability of materials & supplies

Asparagus must be available locally. Cartons and labels should be available locally. Cans may have to be imported.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 13 3/4 H.P. connected load	
Fuel - oil	
Water - must be potable	
	$ 1,600

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 9,800

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Clerk	1	
Inspector	1	
Truck driver	1	
Total indirect labor	4	$ 4,600
b. Direct labor		
Skilled workers	2	
Semi-skilled workers	3	
Unskilled workers	12	
Total direct labor	17	$ 12,000

c. Training needs

The manager and the inspector should be fully experienced. They, with 2 skilled workers, should be able to train all workers and reach full production in one week.

6 TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

During the canning season the input to the plant will amount to about one ton per day. Good highways.

7. TOTAL ANNUAL COSTS AND SALES

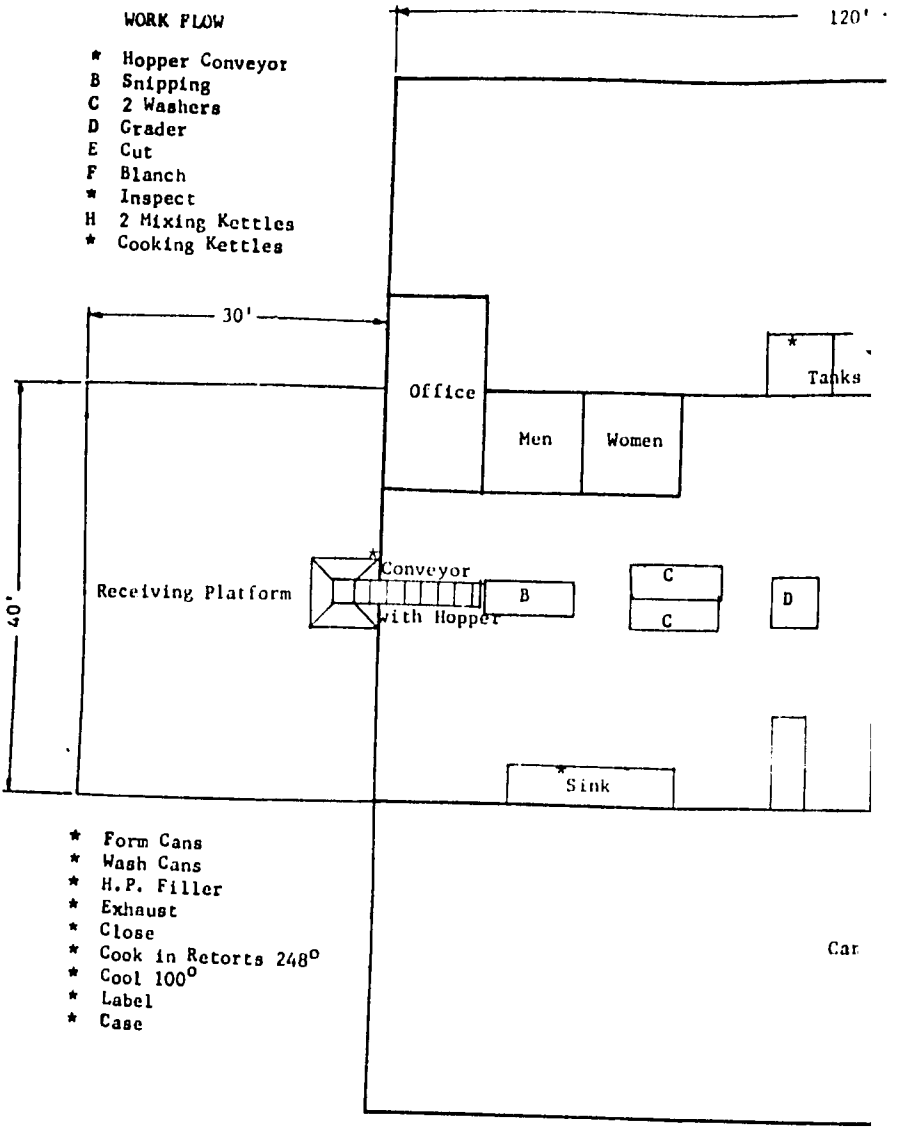
REVENUE		
Direct materials	$ 40,300	
Direct labor	12,000	
Manufacturing overhead*	17,800	
Total manufacturing cost		$ 70,100
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		9,900
Sales expense		9,000
Freight-out, travel discounts Allowances & bad debts		4,000
Total annual costs		$ 93,000
Annual Gross Profit		$ 5,000
ANNUAL SALES REVENUE		$ 98,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

CANNED CREAM OF ASP

PLANT L



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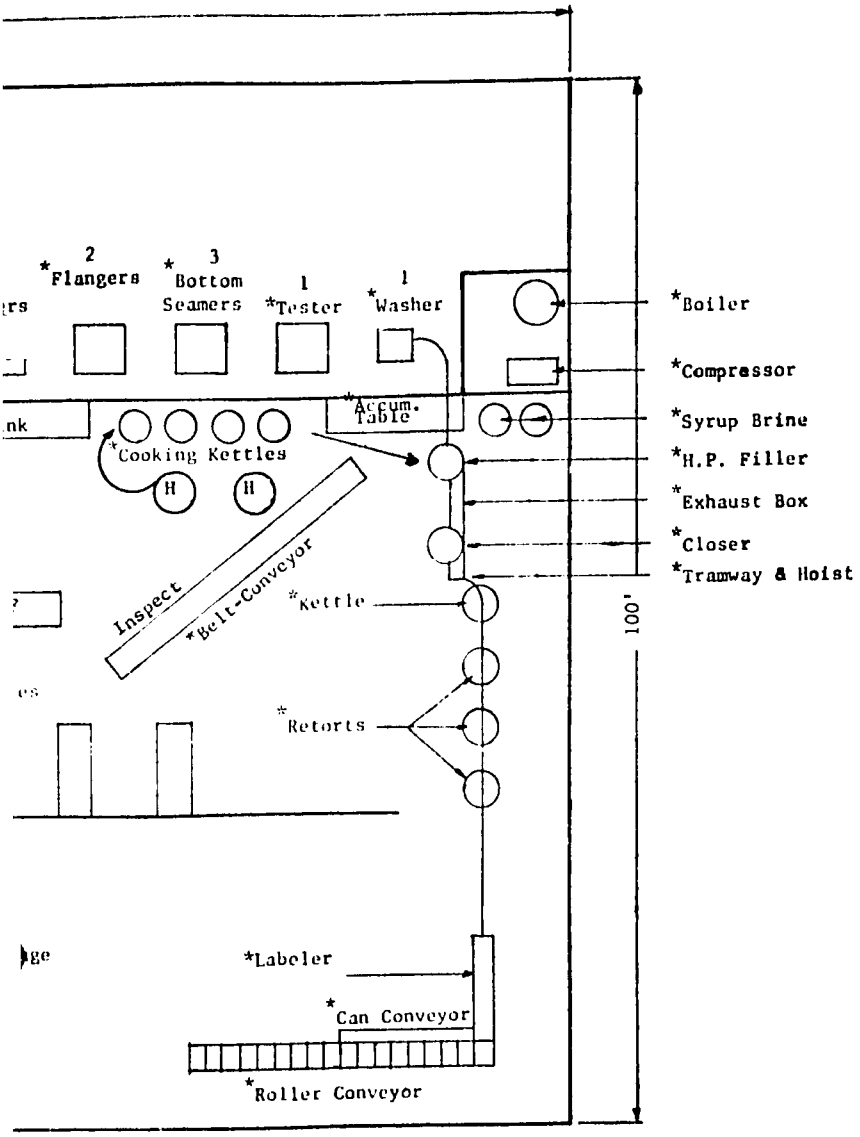
Items marked with letters indicate equipment adde

SOUP, READY TO SERVE

I. P. NO. 67344
S. I. C. 2033



canning all products

this product.

I. P. No. 67344
S. I. C. 2033

CANNED CREAM OF ASPARAGUS SOUP, READY TO SERVE

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Complete Course in Canning. 8th ed. 1966. 400 p. $15.00.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Covers all products, fruits, vegetables, meats, milk, soups, juices, etc. in minute detail, with full basic instruction from the field through to the warehouse.

B. The Almanac of the Canning, Freezing and Preserving Industries, 1967. 510 p. $7.50.

Edward E. Judge
P. O. Box 866
Westminster, Maryland 21157

Includes latest prices on vegetables, fruits, cans, glass jars, canned products, as well as data on quality grade standards, labeling, packaging, international trade, U.S. and world packs, and other valuable information.

C. Quality Control and Reliability. Norbert L. Enrick. 1966. 5th ed. 254 p. $7.50.

The Industrial Press
93 Worth Street
New York, N. Y. 10013

The 24 chapters of the book are divided into three main sections : (1) basic quality control applications : (2) additional quality control methods ; and (3) reliability.

D. Federal Food, Drug and Cosmetic Act, General Regulations for its enforcement, Title 21, Par 1, $3.00.

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Deals with all phases of quality and health aspacts of processed foods, including minimum standards ahd additives, such as vitamins, coloring, and enforcement of regulations.

II. TECHNICAL AND TRADE PERIODICALS

A. Canning Trade. Bi-weekly. $5.00/year.

The Canning Trade
2619 Maryland Avenue
Baltimore, Maryland 21218

Devoted exclusively to the food processing industry.

B. Food Engineering. Monthly. $25.00/year.

Food Engineering
Chestnut & 56th Street
Philadelphia, Pa. 19139

Devoted exclusively to the Food processing industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 1961. (Small Business Administration). 233 pp. $1.00 .

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INDUSTRY PROFILES

GLOVES, PLASTIC FRONTS, CANVAS BACKS

I. P. No. 67345
S. I. C. 2381

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GLOVES--PLASTIC FRONTS, CANVAS BACKS

PRODUCT DESCRIPTION

Machine-sewn work gloves with plastic fronts, canvas backs and knit wristlets.

A. GENERAL EVALUATION OF PROSPECTS

These gloves are more expensive than common canvas work gloves. The investment in fixed capital needed for the manufacture of 400,000 pairs per year is quite small. Variation in output can be easily achieved by varying the number of sewing machines employed. The degree of skilled labour required is small; the raw materials are inexpensive and readily attainable. Many of the developing countries should be able to support a plant of this kind if the domestic market is large enough.

B. MARKET ASPECT

1. USERS

Workmen in all types of activities where protective gloves are required.

2. SALES CHANNELS AND EXTENT OF MARKET

This plant will sell to wholesalers, to large retail distributors and will make direct sales to large organizations such as railroads and mines whenever possible. Competition from manufacturers of ordinary canvas gloves and of gloves with a cowhide split palm can be expected to be heavy. Competition from hand-sewn gloves made of other materials will also be keen. Work glove are exported all over the world and competition in all markets is very keen. A plant of the size described in this profile could not hope to compete against large mass producers of gloves in the world marketplace but some sales might be made in bordering countries. Standard sizes of gloves vary from country to country; therefore, sales of gloves made in this plant should be concentrated in the domestic market.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $178,000.
The total fixed investment, plus working capital, is estimated at $59,000.
The annual gross profit, before taxes, is estimated at $13,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 7.3%.
(A gross profit on sales, of 7.3%, before taxes, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 22.0%.

5. COST PER MAN EMPLOYED

Thirteen direct workers and four indirect workers or a total of seventeen workers, are employed.
The total fixed capital investment is estimated at $28,000.
Based on these figures, the fixed investment per man employed would amount to about $1,650.

C. PRODUCTION REQUIREMENTS - GLOVES - PLASTIC FRONTS, CANVAS BACKS

I.P. No. 67345
S.I.C. 2381

ANNUAL CAPACITY - ONE SHIFT OPERATION : 400,000 PAIR
211,700 BARRELS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - 5,000 sq. ft.	
Building - one story 30' x 70'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 28,000

Principal items:

Cloth spreader
Cutting table
Electric cloth cutter
Electric drill
10 Sewing machines
Work tables and chairs
Clicker machines and dies

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 31,000
c. Total Capital Requirements	$ 59,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Canvas	30,000 yds.	
Plastic cloth	24,000 yds.	
Knit wrists	58,000 yds.	
Packaging		
Total direct materials		$ 35,500

b. Supplies

Lubricants & hand tools
Cutting tools & abrasives
Maintenance & spare parts
Office supplies
Gas, oil and maintenance of truck

Total supplies $ 1,700

c. Availability of materials & supplies

All supplies should be available locally. Plastic cloth may have to be imported.

3. POWER, FUEL AND WATER

Electric Power - 5 H.P. connected load Fuel - heating as required Water - sanitation & fire protection	Annual Cost $ 800

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 2,700

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager	1	
Office	1	
Machine Fixer	1	
Truck Driver	1	
Total indirect labor	4	$ 32,000
b. Direct labor		
Skilled workers	1	
Semi-skilled workers	10	
Unskilled workers	2	
Total direct labor	13	$ 63,200

c. Training needs

Manager and one skilled worker should be able to train all workers and reach full production in about a month.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

Production of 1,600 paris gloves per day.

Good highways.

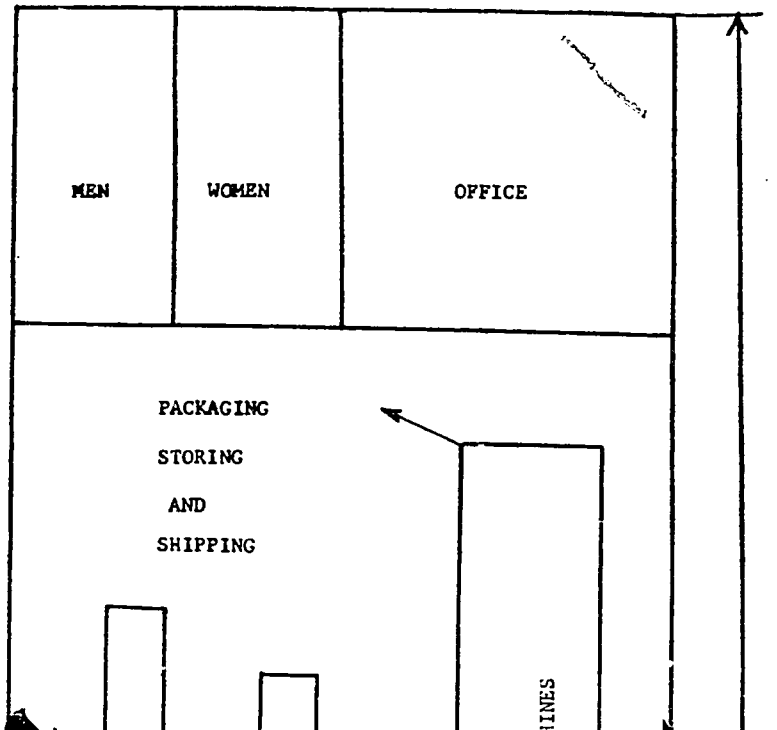
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 35,500	
Direct labor	63,200	
Manufacturing overhead*	37,200	
Total manufacturing cost		$ 135,900
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 12,100
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 5,000
Total annual costs		$ 165,000
Annual Gross Profit		$ 13,000
ANNUAL SALES REVENUE		$ 178,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT LAYOUT

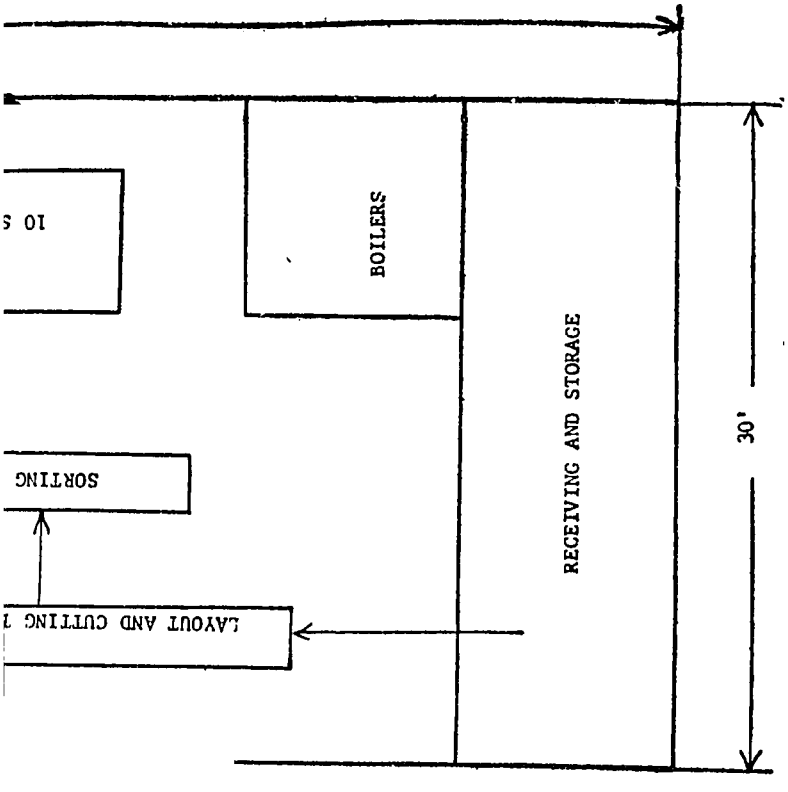
ARROWS INDICATE WORK FLOW



GLOVES, PLASTIC FRO

ANVAS BACKS

I.P. NO. 67345
S.I.C. 2381



GLOVES - PLASTIC FRONTS, CANVAS BACKS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Practical Glove Making. Isabel Edwards. $1.95

National Association of Glove Manufacturers, Inc.
52 South Main Street
Gloversville, New York 12078

B. The Art of Glove-Making. $1.00

National Association of Glove Manufacturers, Inc.
52 South Main Street
Gloversville, New York 12078

II. TECHNICAL AND TRADE PERIODICALS

A. Textile World. Monthly. $2.00/year.

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Technical journal devoted to production of textile products, operations, equipment and management.

B. Modern Textile Magazine. Monthly. $5.00/year.

Alfred H. McCollough, Publisher
303 Fifth Avenue
New York, New York 10016

Research on materials and processes for the textile industry; studies on new processes and machinery.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U. S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Improving Materials Handling in Small Plants. $.20

Small Business Management Series No. 4
U.S. Government Printing Office
Washington, D.C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A.	Patent No. 3,251,069 Glove having a novel thumb construction.	May 1966	9 p.
B.	Patent No. 3,221,344 Work glove with special safety construction.	December 1965	2 p.
C.	Patent No. 3,184,756 Workingman's protective glove.	May 1965	4 p.
D.	Patent No. 3,164,841 Gloves worn to protect hands while engaged in work.	January 1956	2 p.
E.	Patent No. 3,063,057 Reversible work gloves.	November 1962	3 p.
F.	Patent No. 2,923,946 Safety gloves.	1960	2 p.
G.	Patent No. 2,864,091 Reinforced work gloves.	December 1958	
H.	Patent No. 2,862,208 Protective work gloves.	July 1958	2 p.
I.	Patent No. 2,849,786 Industrial protective clothing.	September 1958	5 p.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Work Glove Institute
176 West Adams Street
Chicago, Illinois 60603

B. National Association of Glove Manufacturers, Inc.
52 South Main Street
Gloversville, New York 12078

VI. DIRECTORIES

A. Gloves Directory. Annual. $1.00

Haire Publishing Company
111 Fourth Avenue
New York, New York 10003

Lists over 1,000 glove manufacturers, the types of material required and their sources of supply.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by referring to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N.W.
Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

NON-FERROUS METALS FOUNDRY

I. P. No. 67346
S. I. C. 3362

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

NON-FERROUS METALS FOUNDRY

I.P. No. 67346
S.I.C. 3362
DECEMBER 1967

PRODUCT DESCRIPTION

Alloy castings, usually with copper base. The product described in this profile is brass but other non-ferrous alloys can be produced in this plant.

A. GENERAL EVALUATION OF PROSPECTS

Due to the large number of skilled workers required in this factory, good management and careful supervision are necessary. Compared with the production volume, the capital requirements are relatively low and an excellent profit should accrue if the plant is efficiently operated. In countries where mechanized industry prevails and where there is increasing use of consumer durable goods, the prospects for this industry appear excellent.

B. MARKET ASPECTS

1. USERS

The principal users of these products are other industries. Demands for replacement parts by machinery repair establishments are usually produced by jobbing foundries.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be direct to other industries, such industries sometimes furnishing patterns. Demand will depend on industrial development of concerns using non-ferrous castings. It should not be difficult to survey the principal local users of non-ferrous castings and to discover their current sources of supply. The value of these items, in relation to their weight and bulk, is high and transport costs do not usually place close limits on the extent of the domestic market. However, castings are made chiefly to individual specifications and customers normally prefer to use a manufacturer with whom they can maintain close touch. These products are commonly exported but, other things being equal, purchasers usually prefer to use a local manufacturer. Some export sales to nearby areas in neighboring countries may be possible but export sales are unlikely to constitute a large share of total sales

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $850,000.
The total fixed investment, plus working capital, is estimated at $188,000.
The annual gross profit, before taxes, is estimated at $94,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 11.1%.
(A gross profit on sales, before taxes, of 11.1%, while reflecting U.S. experience, should not be considered normal for a developing country, where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 50%.

5. COST PER MAN EMPLOYED

Forty direct and six indirect workers, or a total of 46 workers, are employed.
The total fixed capital investment is estimated at $48,000.
Based on these figures, the fixed investment per man employed would amount to about $1,045.

C. PRODUCTION REQUIREMENTS - NON-FERROUS METALS FOUNDRY I.P. No. 67346

ANNUAL CAPACITY - ONE SHIFT OPERATION: 1,050,000 LBS. S.I.C. 3362

NOTE : COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital — Cost

Land - 1 acre
Building - 45' x 90' one story.
Shed, 30' x 40', one story.
Equipment, furniture & fixtures
Prodn. tools & equipment
Other tools & equipment
Furniture & fixtures
Transportation equipment
Total fixed capital $ 48,000

Principal items :

2 Melting furnacees-oil
Core oven
Tumbling barrel
Platform scale
Portable grinder
Sand trimmer
Pyrometer
Chain hoist
12 Ladles
12 Crucibles
Crucible tongs
3 Crucible ladles
Flasks
Flask boards
Moulders benches
Tram rail
Small tools

b. Working Capital (30 days)

Direct materials
Direct labor
Manufacturing overhead
Administrative costs
Sales costs
Freight-out, discounts, bad debts & allowances
Sales revenue
Training costs
Total working capital $ 140,000

c. Total Capital Requirements $ 188,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Copper ingot	360,000 lbs.	
Copper melting scrap	600,000 lbs.	
Zinc ingot	192,000 lbs.	
Zinc melting scrap	120,000 lbs.	
Tin ingot	72,000 lbs.	
Brass melting scrap	96,000 lbs.	
Aluminum ingot	48,000 lbs.	
Magnesium	24,000 lbs.	
Alloying briquets		
Total direct materials		$ 427,000

b. Supplies

Lubricants & hand tools
Cutting tools & abrasives
Maintenance & spare parts
Office supplies
Gas, oil and maintenance of truck
Total supplies $ 3,600

c. Availability of materials & supplies

All should be available locally.
All available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 830 K.W.R. per day Fuel - production and heat oil Water - fire protection and sanitation	$ 9,000

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 4,400

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager and foreman	2	
Office	2	
Maintenance	1	
Truck driver	1	
Total indirect labor	6	$ 45,000
b. Direct labor		
Skilled workers	16	
Semi-skilled workers	9	
Unskilled workers	15	
Total direct labor	40	$ 195,000

c. Training needs

Manager, foreman and sixteen skilled workers should be able to train all workers and reach full production in thirty days

6. TRANSPORTATION

a. Own transport equipment

Truck.

b. External transport facilities

In and out shipments of six tons per day.
Good highways required.

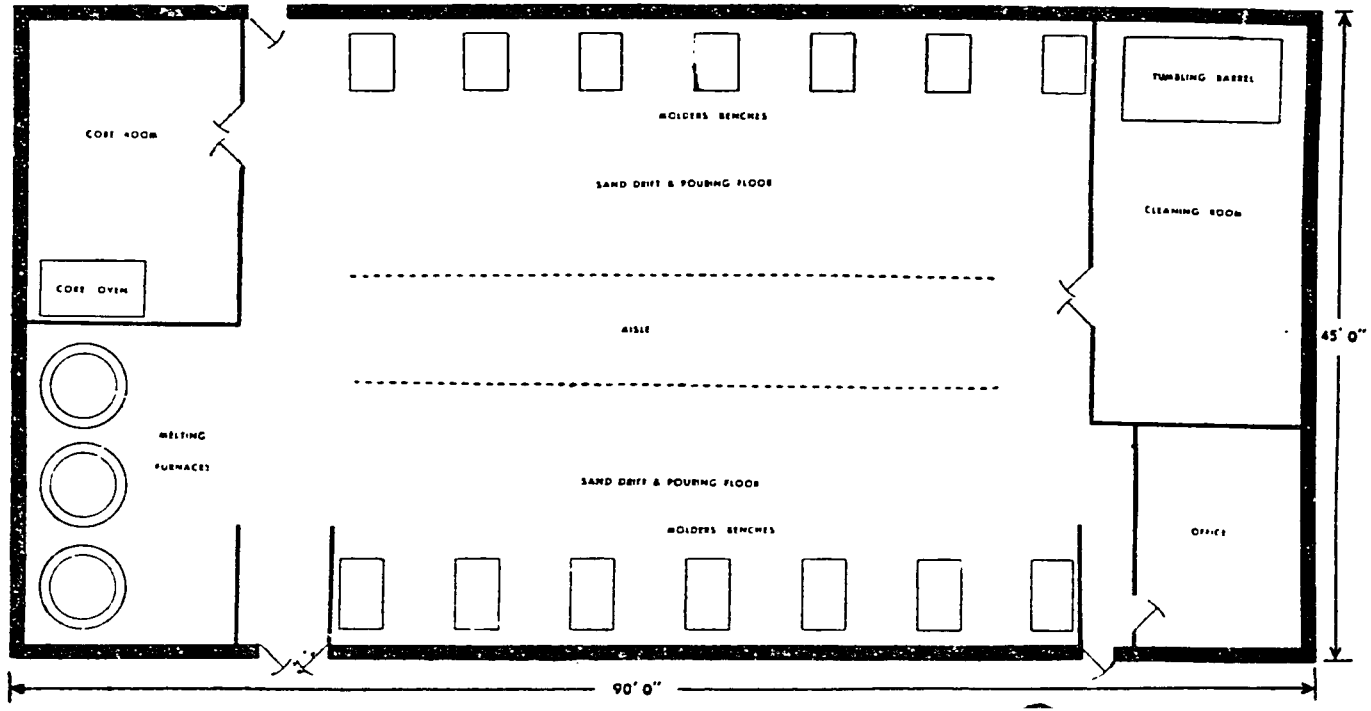
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 427,000	
Direct labor	195,000	
Manufacturing overhead*	62,000	
Total manufacturing cost		$ 684,000
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 24,000
Sales expense		$ 36,000
Freight-out, travel discounts Allowances & bad debts		$ 12,000
Total annual costs		$ 756,000
Annual Gross Profit		$ 94,000
ANNUAL SALES REVENUE		$ 850,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

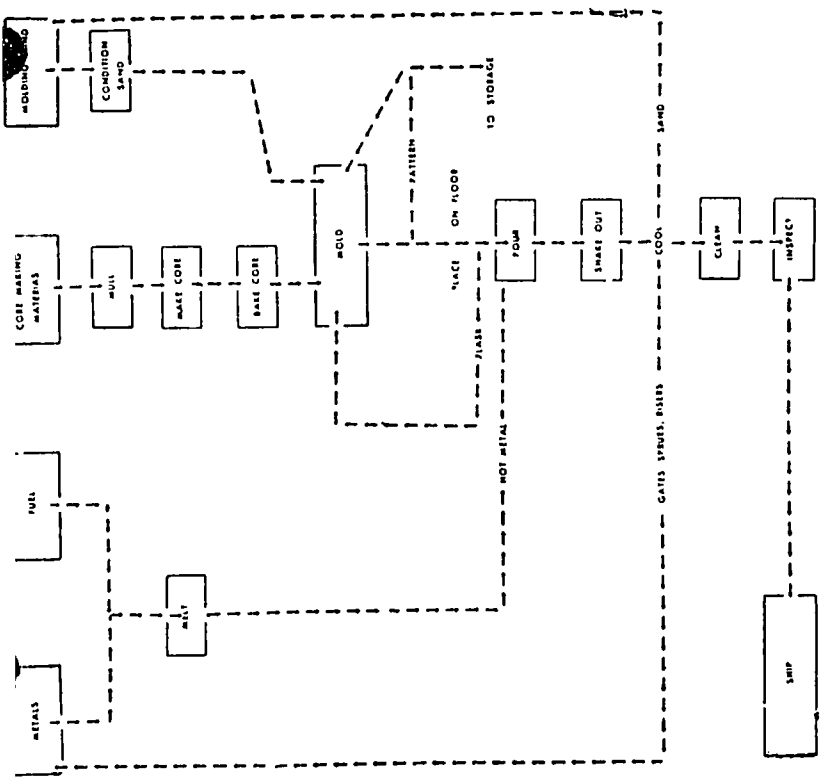
PLANT LAYOUT



NON-FERROUS

FOUNDRY

I. P. NO. 67346
S. I. C. 3362



NON-FERROUS METALS FOUNDRY

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Patternmaking and Founding. R. E. Smith. Paperback. $2.00

Taplinger Publishing Company
29 East 10th Street
New York, New York 10003

B. Foundry Engineering. H. F. Taylor, Merton C. Fleming and John Wulff. 1959. 507 pp. Illus. $10.00

John Wiley and Sons, Inc.
605 Third Avenue
New York, New York 10016

Text using operational and scientific terminology to cover foundry engineering, emphasizing fundamentals that apply to all cast metals.

C. Principles of Metal Casting. Richard H. Hime and others. 1955. 407 pp. Illus. $9.50 Second edition in preparation.

McGraw-Hill, Inc.
330 West 42nd Street
New York, New York 10036

Contains chapter on patternmaking.

II. TECHNICAL AND TRADE PERIODICALS

A. Foundry. Monthly. $10.00/year in U.S.A. ; $20.00/year, foreign.

Penton Publishing Company
1213 West Third Street
Cleveland, Ohio 44113

Supplies subscribers with news and thoroughly covers all phases of foundry practice, both technically and non-technically.

B. Modern Castings. Monthly. $6.00/year.

American Foundrymen's Society
Golf and Wolf Roads
Des Plaines, Illinois 60016

Current reporting on modern techniques of metal casting, foundry management and operations, equipment and materials handling.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two years : Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

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IV. REPRESENTATIVE U.S. PATENTS

Available U. S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,273,212. September 1966. 6 p.
Method of operating an electric furnace.

B. Patent No. 2,956,316. October 1960. 30 p.
Mechanized facilities for producing and assembling foundry molds of alternate differing types.

C. Patent No. 2,887,374. May 1959. 2 p.
This invention relates generally to copperbase alloys and more particularly to a brass alloy having superior characteristics with respect to biofouling and corroding effects.

D. Patent No. 2,863,398. December 1958. 7 p.
This invention relates to a mold conveyor system and particularly to a novel indexing mechanism for accurately positioning a mold conveyor at a predetermined station.

E. Patent No. 2,859,498. November 1958. 70 p.
An automatic method and apparatus for making casting.

F. Patent No. 2,830,343. April 1958. 7 p.
Cavityless casting mold and method of making same.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Non-Ferrous Founders Society
14600 Detroit Avenue
Cleveland, Ohio 44107

B. Foundry Equipment Manufacturers Association
5225 Manning Place, N. W.
Washington, D. C. 20016

VI. DIRECTORIES

A Penton's Foundry List. Biennial. $150.00

Penton Publishing Company
Penton Building
Cleveland, Ohio 44113

Comprehensive information on 5,674 metal casting plants in the U.S. and Canada (including die casters.)

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

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NDUSTRY PROFILES

MEN'S WASH AND WEAR SHIRTS

I. P. No. 67347
S. I. C. 2321

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I.P. No. 67347
S.I.C. 2321
DECEMBER 1967

MEN'S WASH AND WEAR SHIRTS

PRODUCT DESCRIPTION

Shirts made from wash and wear cotton material in a variety of styles, made to be worn with suits and ties.

A. GENERAL EVALUATION OF PROSPECTS

Since wash and wear shirts save a great deal of work and laundering expense and are equally as attractive as other shirts, they are becoming increasingly popular. The type and amount of machinery needed to produce wash and wear shirts is the same as for other shirts. Therefore, it might be possible to produce this shirt in the same plant that produces other types of shirts. (See Industry Profile No. 67362 covering Men's Sport Shirts.)

B. MARKET ASPECTS

1. USERS

Male adults and teenagers.

2. SALES CHANNELS AND EXTENT OF MARKET

This plant would sell directly to large stores and to wholesalers for resale to small retailers and dry goods stores. The rate of consumption of men's wash and wear shirts will depend to a great extent upon the capita income and the clothing habits of the population of the country. These shirts are packaged well in cardboard boxes making shipment easy anywhere within the country and, in some cases, it might be possible to export these shirts to neighboring countries not having a plant manufacturing wash and wear shirts. The only domestic market competition that could be expected would arise from factories similiar to this. The small size of this plant would prohibit it from competing in international markets.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U. S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $500,000.
The total fixed investment, plus working capital, is estimated at $161,600.
The annual gross profit, before taxes, is estimated at $36,000.
Based on these figures, the profit on gross sales, before taxes, amounts to 7.2%.
(A gross profit on sales, before taxes, of 7.2%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 22.4%.

5. COST PER MAN EMPLOYED

Thirty-four direct workers nine indirect workers, or a total of forty-three workers, are employed.
The total fixed capital investment is estimated at $ 73,000.
Based on these figures, the fixed investment per man employed would amount to about $1,700.

C. PRODUCTION REQUIREMENTS - MEN'S WASH AND WEAR SHIRTS

I. P. No. 67347
S.I.C. 2321

ANNUAL CAPACITY - ONE SHIFT OPERATION: 15,000 DOZEN

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital

	Cost
Land - About 1/2 acre	
Building - one story 60' x 100' Use any suitable local material	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 73,000

Principal items:

Cloth Spreader, Cloth Unwinder, Electric Knives, Electric Drill, 28 Sewing Machines, 2 Buttonhole Machines, Folding Machine, Presser, Collar Shaper, 2 Trim-Masters, Turning Stands, 2 Hand Trucks, Stacker, Chairs, Racks, Benches, 2 Cutting Tables

b. Working Capital (30 days)

Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 88,600

c. Total Capital Requirements $ 161,600

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Lawn wash and wear	40,000 yds.	
Linning material	8,000 yds.	
Thread		
Buttons		
Size tac paper		
Label woven		
Pins		
Box		
Shipping cartons		
Total direct materials		$ 162,600

b. Supplies

Lubricants & hand tools	
Gas, oil and maintenance of truck	
Maintenance & spare parts	
Office supplies	
Total supplies	$ 4,300

c. Availability of materials & supplies

All should be available locally. All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - About 100 H.P. connected load	
Fuel - 5,000 gals. oil steam pressing and heating	
Water - Sanitation and fire protection	$ 3,700

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation Equipment	4	
Total depreciation		$ 6,000

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager & Supervisors	5	
Office	2	
Machine Fixer	1	
Truck Driver	1	
Total indirect labor	9	$ 77,000
b. Direct labor		
Skilled workers	4	
Semi-skilled workers	26	
Unskilled workers	4	
Total direct labor	34	$ 168,400

c. Training needs

The Manager with four supervisors and four skilled workers should be able to train all workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

In and out shipments about 720 shirts per day.
Good highways.

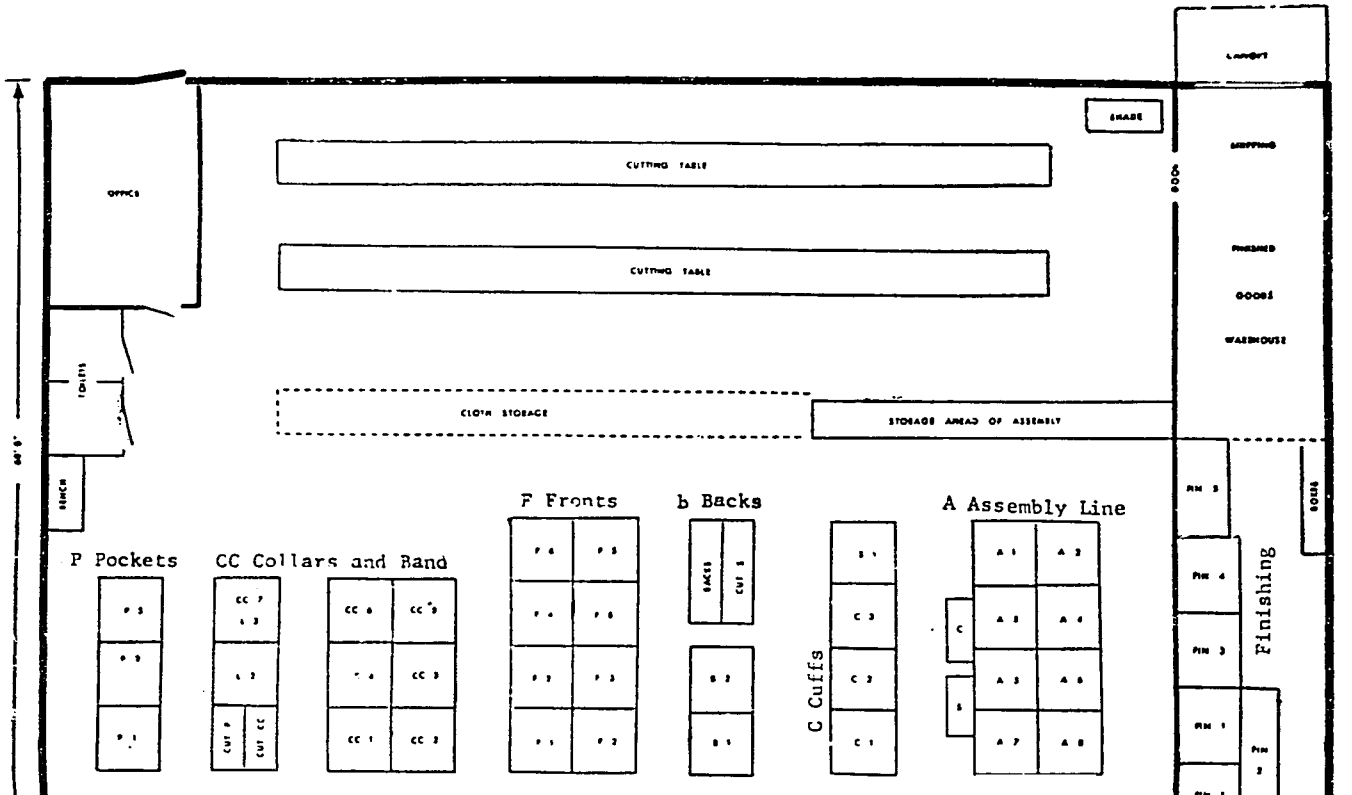
7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$162,600	
Direct labor	168,400	
Manufacturing overhead*	91,000	
Total manufacturing cost		$ 422,000
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 24,000
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 464,000
Annual Gross Profit		$ 36,000
ANNUAL SALES REVENUE		$ 500,000

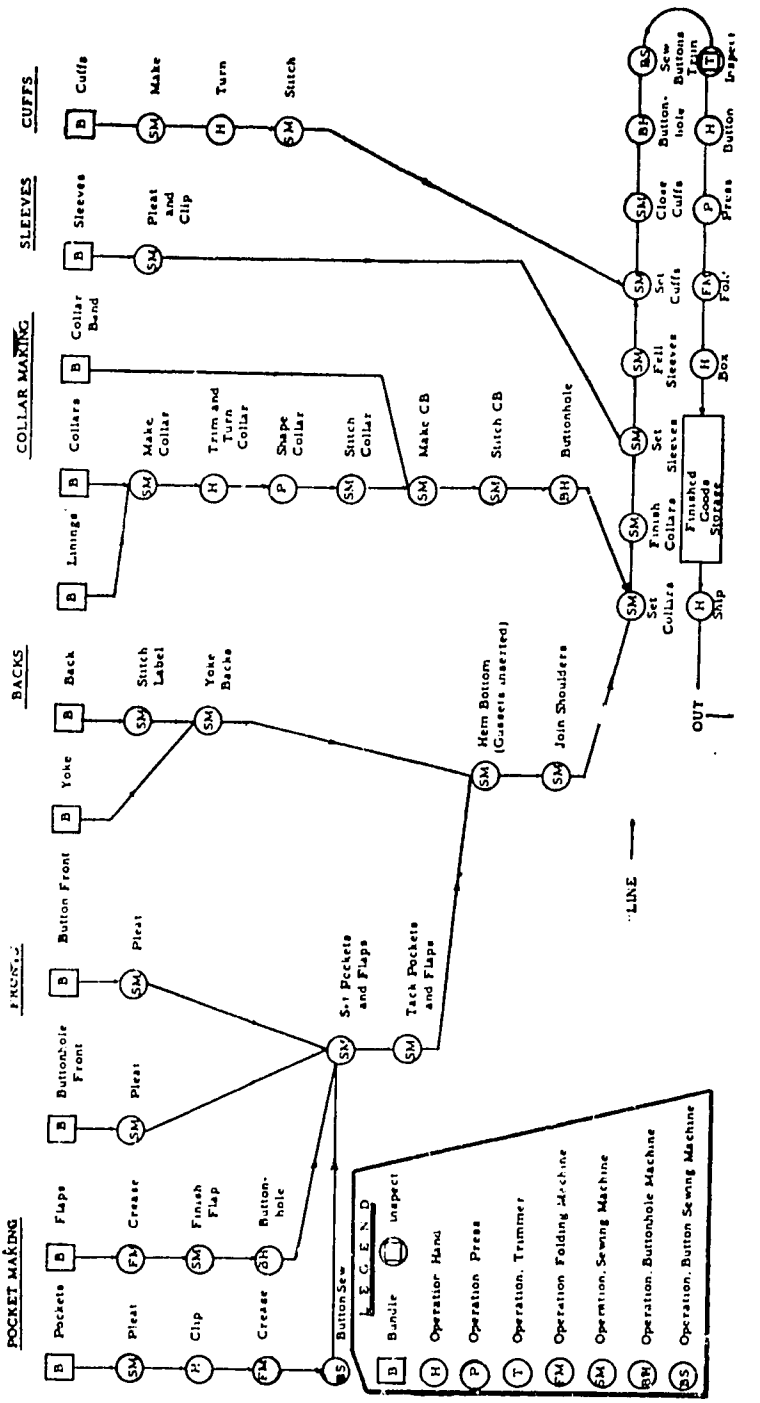
*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT LAYOUT AND WORK FLOW



MEN'S WASH A


POCKET MAKING
Pockets
Pleat
Clip
Crease
Flaps
Crease
Finish Flap
Button-hole
Button Sew
FRONTS
Button Front
Pleat
Buttonhole Front
Pleat
Set Pockets and Flaps
Tack Pockets and Flaps
BACKS
Back
Stitch Label
Yoke Backs
Yoke
COLLAR MAKING
Collar Band
Collars
Make Collar
Trim and Turn Collar
Shape Collar
Stitch Collar
Make CB
Stitch CB
Buttonhole
Linings
SLEEVES
Sleeves
Pleat and Clip
CUFFS
Cuffs
Make
Turn
Stitch
Hem Bottom (Gussets inserted)
Join Shoulders
Set Collars
Finish Collars
Set Sleeves
Fell Sleeves
Set Cuffs
Close Cuffs
Button-hole
Sew Buttons
Trim
Inspect
Button
Press
Fold
Box
Finished Goods Storage
Ship
OUT
LINE
LEGEND
Bundle
Inspect
Operation Hand
Operation Press
Operation Trimmer
Operation Folding Machine
Operation Sewing Machine
Operation Buttonhole Machine
Operation Button Sewing Machine

I.P. No. 67347
S.I.C. 2321

MEN'S WASH AND WEAR SHIRTS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Apparel Manufacturing Analysis. Jacob Solinger. 1961. 800 p. Illus. $25.00

John Wiley and Sons, Inc.
605 Third Avenue
New York, New York 10016

Nature and scope of apparel production including raw materials, design, cutting, sewing production equipment and machine operation, molding production, packaging, time and motion study, plant layout, organization, wages, sales engineering and cost controls.

B. Clothing Construction. E. A. Mansfield. 1953. 454 pp. Illus. $7.50

Houghton Mifflin Company
2 Park Street
Boston, Massachusetts 02108

Covers all types of clothing manufacture.

II. TECHNICAL AND TRADE PERIODICALS

A. Apparel Manufacturer. Monthly. $5.00/year

Haire Publishing Company
111 Fourth Avenue
New York, New York 10003

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B. The Bobbin Magazine. Monthly. $4.00

Needle Trades Publishing Company
P. O. Box 1354
Columbia, South Carolina 29202

Management magazine for the needle trades industries.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

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Insights and clues concerning the entire process of small business formation, growth, and decline.

B. A Handbook of Small Business Finance. Jack Zwick. 80 pp. 1965. No. 15 in the Small Business Management Series (Seventh Edition).

Superintendent of Documents
U.S. Government Printing Office
Washington, D. C. 20402

Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Improving Materials Handling in Small Plants. $.20

Small Business Management Series No. 4
U.S. Government Printing Office
Washington, D. C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,174,156 March 1965 5 p.
Shirt and sport shirt construction.

B. Patent No. 3,066,418 December 1962 5 p.
Outer shirts and blouses.

C. Patent No. 2,999,245 September 1961 6 p.
Shirt designs

D. Petent No. 2,941,210 1960 4 p.
Improved method for making men's shirts

E. Patent No. 2.935,749 1960 6 p.
Men's and boy's dress shirts

F. Patent No. 2,841,687 August 1958 5 p.
Man's shirt.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. American Apparel Manufacturers Association, Inc.
2000 "K" Street N.W.
Washington, D.C. 20006

VI. DIRECTORIES

A. Apparel Manufacturer Directory. Annual. $3.00

Haire Publishing Company
111 Fourth Avenue
New York, New York 10003

5,000 suppliers of garment industry fabrics, machinery and equipment.

B. Men's Furnishings & Sportswear Directory. Semi-annual. Free.

Fairchild Publications
Directory Division
7 East 12th Street
New York, New York 10003

Furnishings manufacturers in New York City.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

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They may also be reached through their national organizations, one of which is the :

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D.C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

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The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

The investor will need reasonably accurate information on Government and legal requirements, banking and financing, potential demand, competition, construction services, and manpower training requirements. Further, he should consider developing plans for management and production controls, operating procedures, and sales promotion.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

INDUSTRY PROFILES

MEN'S AND YOUTHS SUITS

I. P. No. 67348
S. I. C. 2311

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

I.P. No. 67348
S.I.C. 2311
DECEMBER 1967

MEN'S AND YOUTHS' SUITS

PRODUCT DESCRIPTION

Two-piece suits for men and youths made from worsted fabric.

A. GENERAL EVALUATION OF PROSPECTS

The success of this industry will depend upon the ready availability of the necessary raw materials and upon the styling and workmanship of these suits. Quality will be an important factor in meeting the heavy competition that can be expected from imported clothing of this type. The capital requirements for this plant are modest in relation to the gross sales revenue and the number of people employed.

B. MARKET ASPECTS

1. USERS

Men and youths.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales would be made direct to retail clothing stores. The population required to support the output of this plant depends to a great extent upon a relatively high per capita idcome. If the income in rural areas is low, this plant would have to depend on the urban areas alone to maintain the sales volume. Since this product is easily handled and its value is high in relation to its transportation costs, the domestic market should extend nationwide. Some export sales to neighboring countries not having a plant of this type may be made. This plant should have no difficulty competing against small factories producing hard-made suits. The principal competition will come from imports. However, with the advantages of lower freight rates and of not having to pay duties, this plant should be able to meet import competition.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $410,000.
The total fixed investment, plus working capital, is estimated at $139,100.
The annual gross profit, before taxes, is estimated at $30,000.
Based on these figures, the profit on gross sales, before taxes, amounts to about 7.3%.
(A gross profit on sales, before taxes, of 7.3%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, would amount to about 22.0%.

5. COST PER MAN EMPLOYED

Thirty direct workers and six indirect workers, or a total of thirty-six workers, are employed.
The total fixed capital investment is estimated at $66,000.
Based on these figures, the fixed investment per man employed would amount to about $1,835.

C. PRODUCTION REQUIREMENTS - MEN'S AND YOUTHS' SUITS

I.P. No. 67348
S.I.C. 2311

ANNUAL CAPACITY - ONE SHIFT OPERATION: 15,000 UNITS

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - about 1/2 acre	
Building - one story 60' x 80'	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 66,000

Principal items:
Cutting table
Cloth spreader
Cloth unwinder
Electric cutter
Electric drill
18 Sewing machines
Button hole machine
Button machine
Steam presses
Racks
Benches
Chairs

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales Costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 73,100
c. Total Capital Requirements	$ 139,100

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Suiting worsted	52,500 yds.	
Trimmings		
Buttons, thread, pockets & labels		
Packaging		
Total direct materials		$ 136,000

b. Supplies	
Lubricants & hand tools	
Gas, oil and maintenance of truck	
Maintenance & spare parts	
Office supplies	
Total supplies	$ 3,200

c. Availability of materials & supplies

All should be available locally.

All are available in world markets.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 65 H.P.	
Fuel - 6,000 gal. oil	
Water - 800,000 gal.	
	$ 3,200

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 5,700

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager	1	
Supervisor	1	
Office	2	
Machine fixer	1	
Truck Driver	1	
Total indirect labor	6	$ 47,000
b. Direct labor		
Skilled workers	5	
Semi-skilled workers	23	
Unskilled workers	2	
Total direct labor	30	$ 152,200

c. Training needs

The manager and the supervisor should be fully experienced. They with the help of 5 skilled workers should be able to train all workers and reach full production in 4 weeks.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

Plant produces 60 suits per day.

Good highways.

7. TOTAL ANNUAL COSTS AND SALES

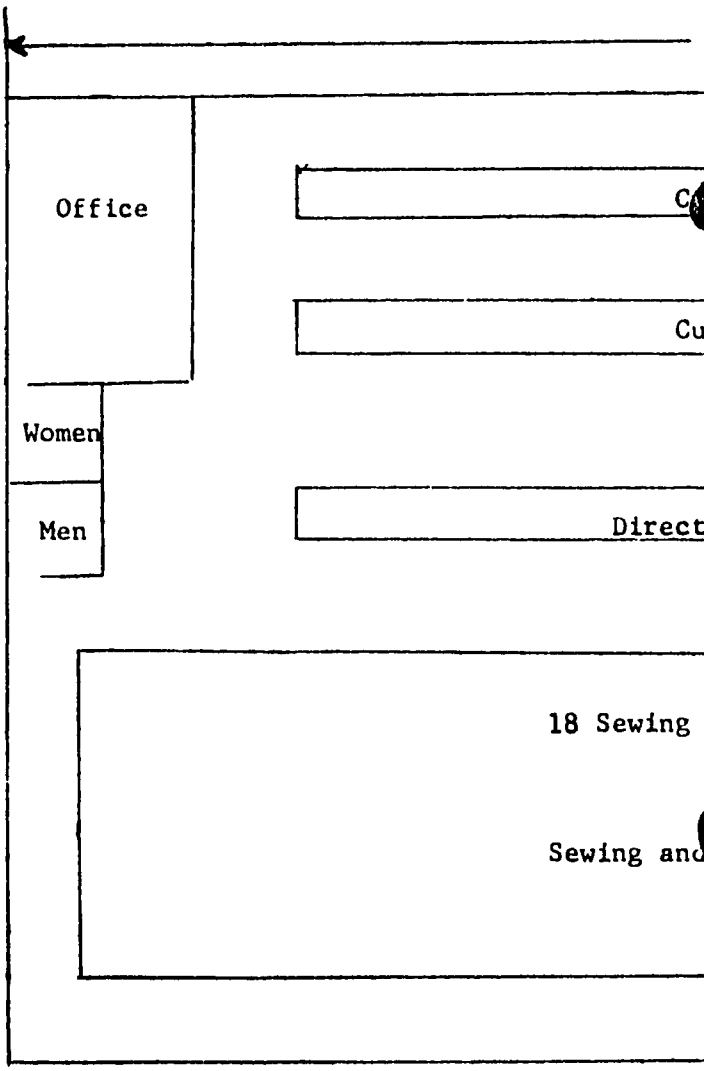
REVENUE		
Direct materials	$ 136,000	
Direct labor	152,200	
Manufacturing overhead*	59,100	
Total manufacturing cost		$ 347,300
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 14,700
Sales expense		$ 12,000
Freight-out, travel discounts Allowances & bad debts		$ 6,000
Total annual costs		$ 380,000
Annual Gross Profit		$ 30,000
ANNUAL SALES REVENUE		$ 410,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)

**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

MEN'S A

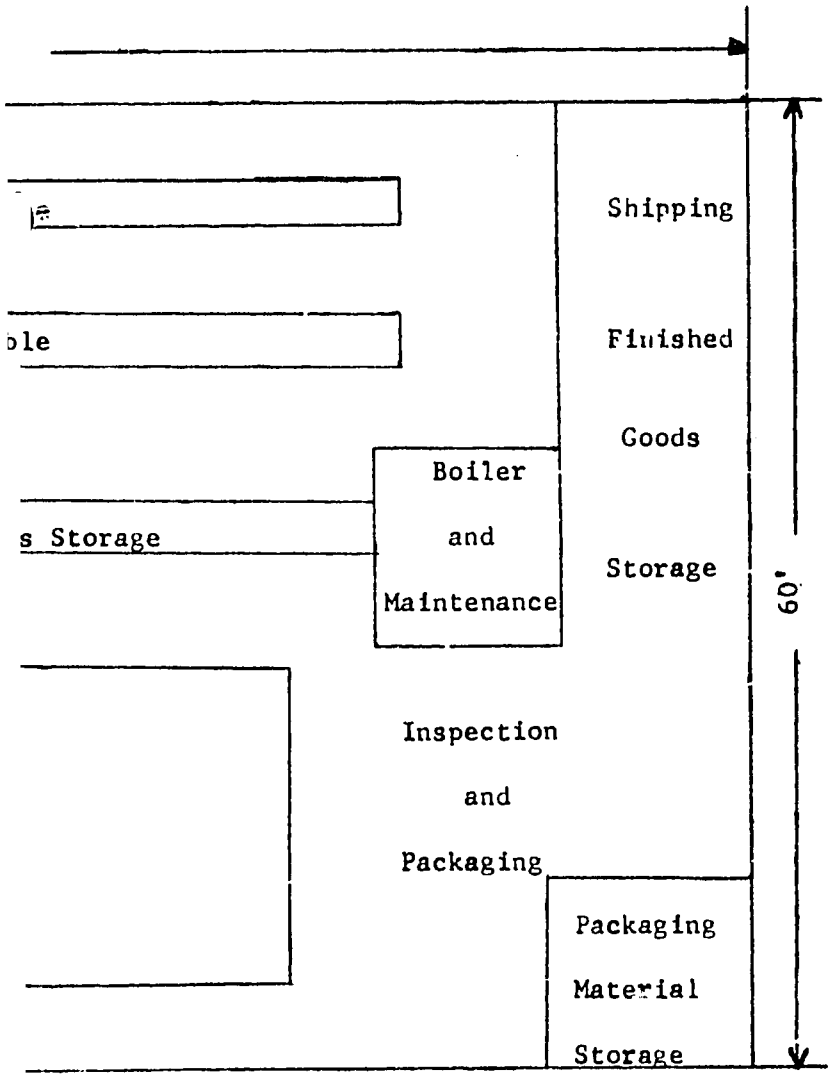
PLAN



THS' SUITS

I.P. NO. 67348
S.I.C. 2311

A Y O U T



MEN'S AND YOUTHS' SUITS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Apparel Manufacturing Analysis. Jacob Solinger. 1961. 800 pp. Illus. $25.00

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New York, New York 10016

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B. Clothing Construction. E. A. Mansfield. 1953. 454 pp. Illus. $7.50

Houghton Mifflin Company
2 Park Street
Boston, Massachusetts 02108

Covers all types of clothing manufacture.

C. Progressive Apparel Production. B. Frank. 1953. $4.50

Fairchild Publications, Inc.
7 East 27th Street
New York, New York 10003

Progressive sewing techniques in the garment industry.

II. TECHNICAL AND TRADE PERIODICALS

A. Men's Wear. Semi-monthly. $5.00/year

Fairchild Publications, Inc.
7 East 27th Street
New York, New York 10003

B. Apparel Manufacturer. Monthly. $5.00/year

Haire Publishing Company
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Washington, D. C. 20402

Points out major areas of financial management.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231. $.50 each.

A.	Patent No. 3,256,528 Garment construction.	June 21, 1966	3 p.
B.	Patent No. 3,218,651 Dual purpose ladies' garment.	November 23, 1965	3 p.
C.	Patent No. 3,189,920 Contour wrap-around pencil slim skirt.	June 22, 1965	4 p.
D.	Patent No. 3,168,749 Fabric hem.	February 9, 1965	6 p.
E.	Patent No. 3,159,845 Composite fabric and garment made therefrom.	December 8, 1964	3 p.
F.	Patent No. 3,111,681 Garment construction.	November 26, 1963	3 p.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

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INDUSTRY PROFILES

KEROSENE LANTERNS

I. P. No. 67349
S. I. C. 3642

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I. P. No. 67349
S.I.C. 3642
DECEMBER 1967

KEROSENE LANTERNS

PRODUCT DESCRIPTION

Lanterns using kerosene oil for fuel. Made in two sizes--large and small--and equipped with glass globes.

A. GENERAL EVALUATION OF PROSPECTS

The estimated gross profit, before taxes, shown for this industry, in comparison with the gross sales, are fairly good. However, the estimated gross profits, before taxes, in comparison with the total capital requirements are not as favorable. The potential sales for these products will depend on the existing conditions within each country and can be determined only by a sales survey. There are many uses for lanterns of this type but the product gets heavy competition from substitutes. For example, lanterns with red globes are often used to indicate danger on highways but flame torches are used nearly as often for the same purpose. A survey of the market potential should, therefore, be made.

B. MARKET ASPECTS

1. USERS

Farms, highways, mines, construction work, wherever a portable light is required.

2. SALES CHANNELS AND EXTENT OF MARKET

Direct sales to hardware stores and large department stores and direct to public works projects and other large-scale enterprises able to buy in big quantities. Since there are many substitutes for kerosene lanterns (battery-operated flash lights, flame torches and lamps using fuels other than kerosene), the market required cannot be determined by population with any reasonable accuracy. A survey of market potential must be made. Production of these lanterns requires a great deal of capital and investment in machinery and equipment and no competition from small producers can, therefore, be expected. A plant of this production capability would not be able to compete in world markets but some export sales to neighboring countries not having this plant's capacity might be expected.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $180,000.
The total fixed investment, plus working capital, is estimated at $193,000.
The annual gross profit, before taxes, is estimated at $18,000.
Using these figures, the profit on gross sales, before taxes, amounts to 10%.
(A gross profit on sales, before taxes, of 10%, while reflecting U.S. experience, should not be considered normal for a developing country where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at 9.3%

5. COST PER MAN EMPLOYED

Ten direct and six indirect workers, or a total of sixteen workers, are employed.
The total fixed capital investment is estimated at $164,000.
Based on these figures, the fixed investment per man employed would amount to about $10,250.

C. PRODUCTION REQUIREMENTS - KEROSENE LANTERNS
ANNUAL CAPACITY - ONE-SHIFT OPERATION: 30,000 LARGE SIZE AND 30,000 SMALL SIZE LANTERNS

I.P. No. 67349
S.I.C. 3642

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital	Cost
Land - one-half acre	
Building - 5,000 square feet. Local materials may be used.	
Equipment, furniture & fixtures	
Prodn. tools & equipment	
Other tools & equipment	
Furniture & fixtures	
Transportation equipment	
Total fixed capital	$ 164,000

Principal items:

6 Open back inclinable presses (complete)
Toggle draw press double acting
Four-slide wire machine with dies
Trimming lathe
Double seamer
2 Foot-operated presses
Welding equipment
Spray booth
Compressor
Dies

b. Working Capital (30 days)	
Direct materials	
Direct labor	
Manufacturing overhead	
Administrative costs	
Sales costs	
Freight-out, discounts, bad debts & allowances	
Sales revenue	
Training costs	
Total working capital	$ 29,000
c. Total Capital Requirements	$ 193,000

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Terne plate	7,160 sheets	
Tin plate	12,000 sheets	
Cold rolled galvanized steel coil	425 pounds	
Cold rolled steel	1,400 pounds	
Galvanized wire	5,525 pounds	
Basic and spring wire	3,300 pounds	
Solder	340 pounds	
Burners, wicks and globes		
Paint and thinner		
Total direct materials		$ 16,000

b. Supplies	
Lubricants & hand tools	
Cutting tools & abrasives	
Maintenance & spare parts	
Office supplies	
Gas, oil and maintenance of truck	
Total supplies	$ 2,900

c. Availability of materials & supplies

Some of the materials may have to be imported. All supplies should be available locally.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 225 H.P. connected load	
Fuel - oil for production and heating	
Water - for sanitation and fire protection	$ 6,200

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment		
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 15,700

5. MANPOWER

a. Indirect labor	Number	Annual Cost
Manager and supervisor	2	
Office	2	
Maintenance	1	
Truck Driver	1	
Total indirect labor	6	$ 43,000

b. Direct labor		
Skilled workers	5	
Semi-skilled workers	4	
Unskilled workers	1	
Total direct labor	10	$ 53,600

c. Training needs

Manager and supervisor must be fully experienced. They, with 6 skilled workers should be able to train the other workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own Transport equipment

Truck

b. External transport facilities

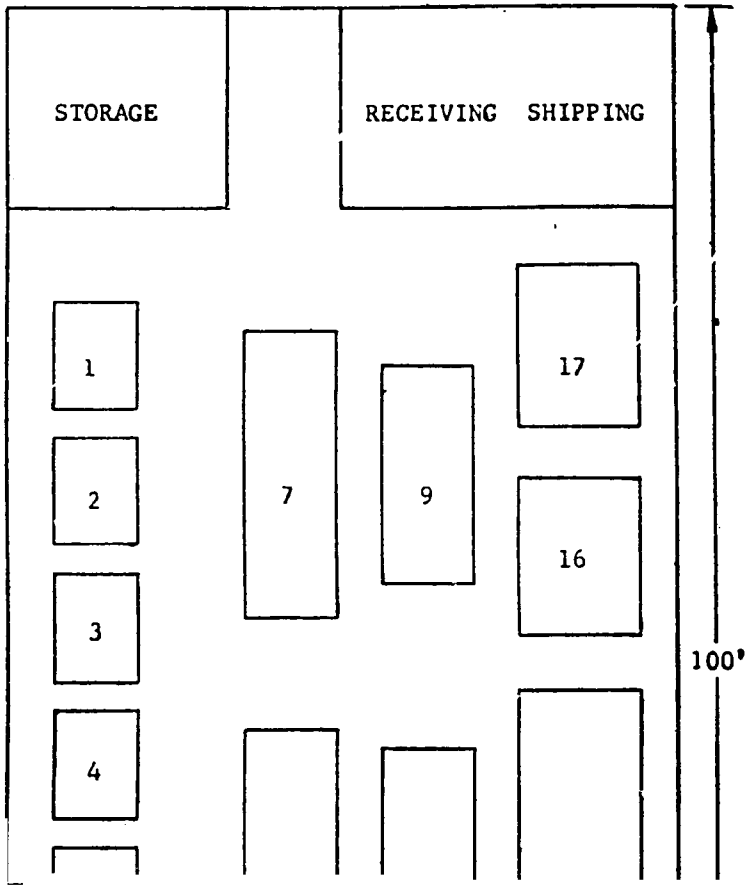
Products are light and well packaged.
Good highways essential.
Railroad if possible.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

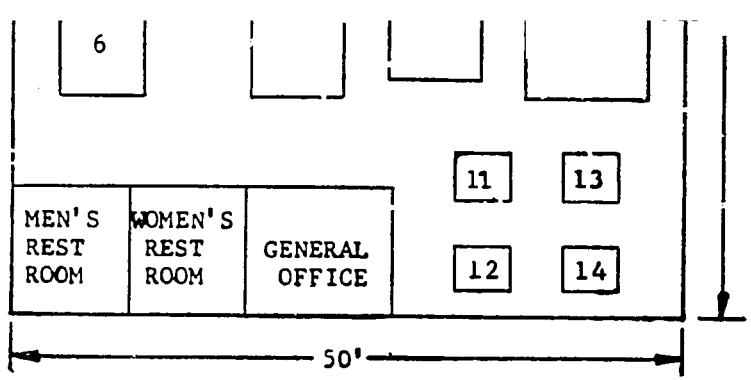
Direct materials	$ 16,000	
Direct labor	53,600	
Manufacturing overhead*	67,800	
Total manufacturing cost		$ 137,400
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 13,600
Sales expense		$ 9,000
Freight-out, travel discounts Allowances & bad debts		$ 2,000
Total annual costs		$ 162,000
Annual Gross Profit		$ 18,000
ANNUAL SALES REVENUE		$ 180,000

*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

PLANT
LAYOUT



KEROSENE LANTERNS



1. Open back inclinable press.
2. Open back inclinable press.
3. Open back inclinable press.
4. Open back inclinable press.
5. Open back inclinable press.
6. Open back inclinable press.
7. #1 Toggle draw press, double acting.
8. Slide wire machine.
9. Triming lathe.
10. Double seamer.
11. Foot operated press.
12. Foot operated press.
13. Foot operated press.
14. Foot operated press.
15. Assembly bench.
16. Painting area.
17. Packing area.

I.P. NO. 67349
S.I.C. 3642

24

KEROSENE LANTERNS

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Fundamentals of the Working of Metals. G. Sachs. 2nd Edition $4.75

Pergamon Press
44-01 21st Street
Long Island City, New York 11101

B. Principles and Methods of Sheet Metal Fabrication. G. Sachs. 2nd Edition. Illus. $15.00

Reinhold Publishing Corporation
430 Park Avenue
New York, New York 10022

Describes systematically the principles of major sheet metal forming methods.

II. TECHNICAL AND TRADE PERIODICALS

A. American Machinist. Bi-weekly. $20.00/year.

McGraw-Hill, Inc.
330 West 42nd Street
New York, New Yo.k 10036

Magazine of metalworking production, covering machinery, tools, design and production engineering problems and management of metalworking industries.

B. Lighting. Monthly. Controlled free distribution.

W.R.C. Smith Publishing Co.
1760 Peachtree Road, N. W.
Atlanta, Georgia 30309

Devoted to the lighting and lamp industry.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two Years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00.

Superintendent of Documents
U. S. Government Printing Office
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Insights and clues concerning the entire process of small business formation, growth, and decline.

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Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

C. Improving Materials Handling in Small Plants. $.20

Small Business Management Series No. 4
U. S. Government Printing Office
Washington, D. C. 20402

Prepared by Small Business Administration to assist in the development of management in small business.

IV. REPRESENTATIVE U.S. PATENTS

Available U.S. Patent Office, Washington, D. C. 20231; $.50 each

A.	Patent No. 3,131,872 Lantern of the hydro-carbon burning type.	May 5, 1964	7 p.
B.	Patent No. 2,985,751 Portable type lantern using combustible fluids.	May 23, 1961	5 p.
C.	Patent No 2,841,694 Portable gas lantern.	July 1, 1958	4 p.
D.	Patent No. 2,796,753 Gaseous fuel lamp.	June 25, 1957	4 p.
E.	Patent No. 1,413,244 Kerosene lantern.	1922	8 p.
F.	Patent No. 1,182,824 Lantern.	1916	5 p.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

No known technical institutes or trade associations for the lantern industry.

VI. DIRECTORIES

A. Directory of Metalworking Machinery (2 Volumes) $7.50

U.S. Government Printing Office
Division of Public Documents
Washington, D. C. 20402

U.S. metalworking manufacturers listed by manufacturer's code and machine types.

VII. PROFESSIONAL ENGINEERING SERVICES

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small.

A correct design is one which provides the greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

The addresses of professional engineers who specialize in Industrial Design, some of whom may be willing to undertake such work on low cost projects overseas, can be secured by reference to the published cards in various engineering magazines.

They may also be reached through their national organizations, one of which is the:

National Society of Professional Engineers
2029 K Street, N. W.
Washington, D. C. 20006

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized product. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project. The equipment manufacturer also knows, and can recommend, professional engineers in private practice who are willing and able to provide appropriate consulting services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

The foregoing information must be necessarily presented in concise form. Before an investment is made in a plant a feasibility study is suggested. The investor, for his planning, should have more information dealing with the specific locality contemplated. For obvious reasons, such information cannot be included in *Industry Profiles*. Such a study, therefore, should explore local factors and conditions, including costs, sources of raw materials and supplies, availability of utilities and fuel, manpower, transportation, etc.

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Address orders to: U.S. Department of Commerce
Clearinghouse for Federal Scientific and
Technical Information, 410.12
Springfield, Virginia 22151

Prepayment is required. Make check or money order payable to National Bureau of Standards—CFSTI. Clearinghouse deposit account holders may charge purchases to their accounts.

GENERAL INFORMATION

An *Index of Industry Profiles* is available on request from the agency for International Development, AA/PRR, Washington, D. C. 20523.

This *Industry Profile* was prepared for the U. S. Agency for International Development by International Development Services Inc., Washington, D. C.

J02

NDUSTRY PROFILES

BICYCLE TIRES AND INNERTUBES

I. P. No. 67350
S. I. C. 3011

Industry Profiles are intended to promote the development of private industry in the developing countries by assembling economic and technical information in a professional analysis to support basic decisions in the establishment of small or medium-scale plants in a specific industry. The information contained in a profile is selected and organized for the guidance of the entrepreneur in the less developed country.

Industry Profiles contain basic information on market aspects, production rates, capital requirements, materials and supplies, utilities, manpower operating costs and sales revenues. Work-flow diagrams and, in some instances, machinery layouts are included along with references to sources of technical information, professional services, patents, materials and equipment.

The profiles adopt as a benchmark, productivity rates and costs which could be anticipated under conditions prevailing in the United States. Anticipated profits are before taxes. Since conditions vary widely from country to country, the entrepreneur using this profile must make suitable adjustments to conditions prevailing in his country, This profile should help in reaching correct assumptions.

BICYCLE TIRES AND INNERTUBES

I.P. No. 67350
S.I.C. 3011
DECEMBER 1967

PRODUCT DESCRIPTION

Good grade, heavy duty bicycle tires and tubes to fit 26-inch diameter rims.

A. GENERAL EVALUATION OF PROSPECTS

The total capital requirements for this industry amount to about $848,600 and the annual sales are estimated at over $1,000,000. The cost of the raw materials amounts to about $500,400. Therefore, the most important factors to be considered when evaluating the prospects for this industry are the local availability of the necessary raw materials at satisfactory costs and the local sales potential. A comprehensive survey of these relevant factors should be made and, if the results of the survey are favorable, this plant should be a good investment.

B. MARKET ASPECTS

1. USERS

Bicycle manufacturers and, for tire replacements, the general public.

2. SALES CHANNELS AND EXTENT OF MARKET

Sales will be made direct to bicycle manufacturers and direct to retail stores for replacement sales. The sales demand for these products will depend on (1) the existence of bicycle manufacturing industry within the country and (2) the number of bicycles in use throughout the country. A survey is required to determine market potential. Bicycle tires and tubes are relatively light and well packaged and the selling price permits long distance shipment. Bicycles are used in rural and urban areas so the distribution of tires and tubes should be nationwide. The manufacture of these products requires a large investment. They cannot be produced on a small volume basis. Competition would arise from other large producers if any. If raw materials are available locally and the plant is well managed, this industry should have no difficulty competing against imported products. While this plant could not compete in world markets against mass producers of tires and tubes, some export sales to neighboring countries could be made.

3. RATE OF PROFIT

It should be emphasized that the information under "Production Requirements" on the next page illustrates typical U.S. cost relationships of the various factors entering into the manufacture in the United States of a specified product. It is generally recognized that profits before taxes of manufacturers in the United States may be appreciably lower than normally would be the case in a developing country. While certain imported capital items and specialized technical services may be higher in cost in developing countries, certain other significant production costs such as semi-skilled and unskilled labor, materials and supplies obtained locally may be significantly lower. Factors vitally affecting industrial products costs and profit margins such as degree of competition, size of market, availability of labor, availability of risk capital, relative financial risk, level of industry taxes, and general economic and political stability have widely differing interrelationships and impact on the selling price and profit margin of a manufactured product in a developing country as compared with the United States. Planned operations and production limits would, of necessity, have to be adapted to cost and profit conditions existing in a particular developing country as a first step in determining whether a more intensive survey of the manufacturing possibilities for a particular product and industry is warranted.

4. SELECTED GROSS PROFIT ITEMS

(See supporting data on page 3)

The annual gross sales revenue is estimated at $1,090,000.
The total fixed investment, plus working capital, is estimated at $848,600.
The annual gross profit, before taxes, is estimated at $90,000.
Using these figures, the profit on gross sales, before taxes, amounts to about 8.3%.
(A gross profit on sales, before taxes, of 8.3%, while reflecting U.S. experience, should not be considered normal for a developing country, where profit margins may be considerably higher in industry and trade.)
The annual profit on the total capital requirements, before taxes, is estimated at about 10.6%.

5. COST PER MAN EMPLOYED

Forty-two direct and ten indirect workers, or a total of fifty-two workers, are employed.
The total fixed capital investment is estimated at $666,000.
Based on these figures, the fixed investment per man employed would amount to about $12,800

C. PRODUCTION REQUIREMENTS - BICYCLE TIRES AND INNERTUBES I.P. No. 67350
ANNUAL CAPACITY - ONE SHIFT OPERATION : 500,000 SETS OF TIRES AND TUBES S.I.C. 3011

NOTE: COSTS AND OPERATING DATA ARE BASED ON UNITED STATES PRICES AND PRACTICES**

1. CAPITAL REQUIREMENTS

a. Fixed Capital — Cost

Land - one acre
Building - 100' x 100' or 10,000 sq. ft.
Local materials may be used.
Equipment, furniture & fixtures
Prodn. tools & equipment
Other tools & equipment
Furniture & fixtures
Transportation equipment
Total fixed capital $ 666,000

Principal items:

Internal mixer
Rubber slicer
3 Sheeting mills
Slab cutter
Strainer
Dryer
Calender
3 Extruders
Bead insulating & winding set-up
Bias cutter
12 Building wheels
20 Tire curing molds
20 Tube curing molds
10 Dual tire vulcanizing presses
20 Single tube vulcanizing presses
Compressor
Tube production line machinery
Steam production equipment

b. Working Capital (30 days)

Direct materials
Direct labor
Manufacturing overhead
Administrative costs
Sales costs
Freight-out, discounts, bad debts & allowances
Sales revenue
Training costs
Total working capital $ 182,600

c. Total Capital Requirements $ 848,600

2. MATERIALS AND SUPPLIES

a. Direct materials	Annual Requirements	Annual Cost
Rubber	532,100 lbs.	
Carbon black	253,530 lbs.	
Process oil	125,200 lbs.	
Zinc oxide	19,719 lbs.	
Accelerator, tubes	1,252 lbs.	
Accelerator, tires	6,260 lbs.	
Vulcanizing agent	16,589 lbs.	
Fabric	313,000 lbs.	
Bead wire	120,505 lbs.	
Tube boxes		
Valves		
Total direct materials		$ 500,400

b. Supplies

Lubricants & hand tools
Cutting tools & abrasives
Maintenance & spare parts
Office supplies
Gas, oil and maintenance of truck
Total supplies $ 8,700

c. Availability of materials & supplies

Many of the materials would have to imported into most countries. The supplies should be available locally.

3. POWER, FUEL AND WATER

	Annual Cost
Electric Power - 280 H.P. connected load Fuel - 300 tons of coal Water - 10,000,000 gallons	$ 11,200

4. DEPRECIATION

	Yrs. life	Amount
Building	20	
Prodn. tools & equipment	10	
Other tools & equipment	10	
Furniture & fixtures	10	
Transportation equipment	4	
Total depreciation		$ 64,300

5. MANPOWER

	Number	Annual Cost
a. Indirect labor		
Manager & plant engineer	2	
Office	3	
Maintenance	4	
Truck Driver	1	
Total indirect labor	10	$ 73,000
b. Direct labor		
Skilled workers	7	
Semi-skilled workers	21	
Unskilled workers	14	
Total direct labor	42	$ 197,400

c. Training needs

Manager and plant engineer must be thoroughly experienced. They with 7 skilled workers should be able to train other workers and reach full production in 30 days.

6. TRANSPORTATION

a. Own transport equipment

Truck

b. External transport facilities

In and out shimpments amount to about 8.5 tons per day.
Railroad and good highways essential.

7. TOTAL ANNUAL COSTS AND SALES REVENUE

Direct materials	$ 500,400	
Direct labor	197,400	
Manufacturing overhead*	157,200	
Total manufacturing cost		$ 855,000
Interest on loans		
Insurance		
Legal		
Audit		
Contingencies		
Total administrative cost		$ 75,000
Sales expense		$ 48,000
Freight-out, travel discounts Allowances & bad debts		$ 22,000
Total annual costs		$ 1,000,000
Annual Gross Profit		$ 90,000
ANNUAL SALES REVENUE		$ 1,090,000

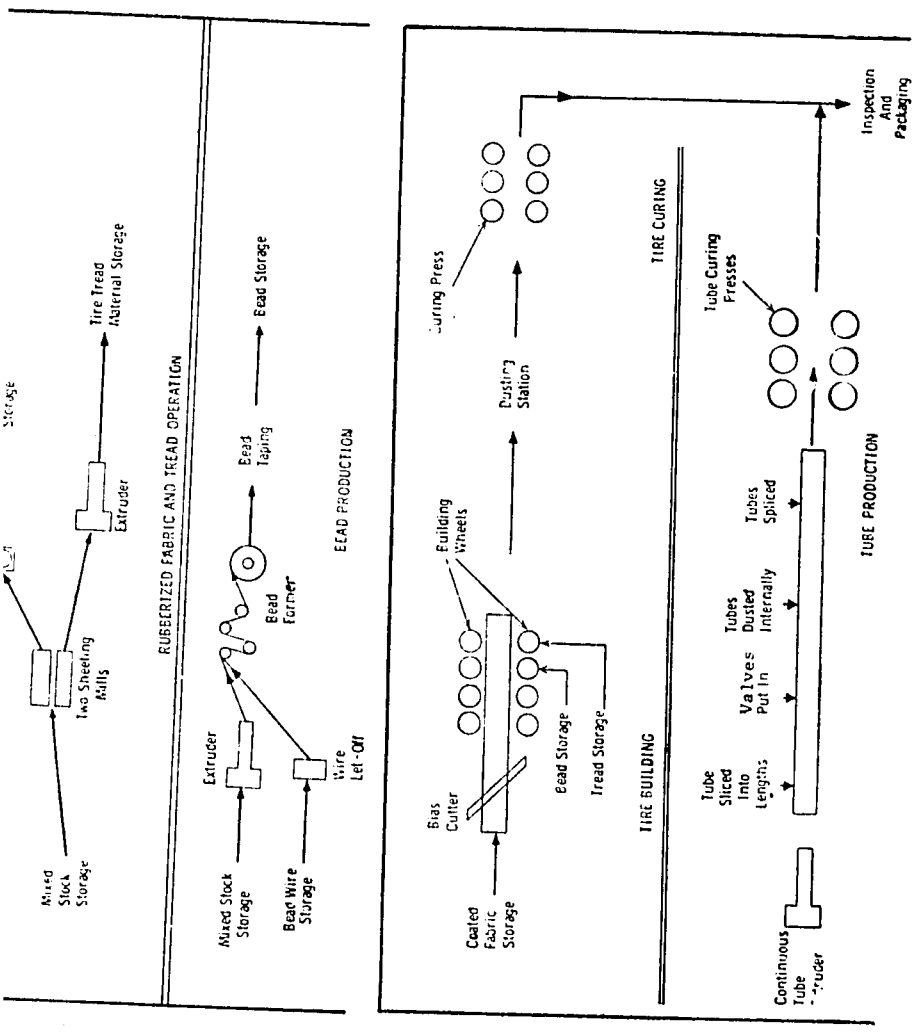
*Includes Supplies, Power, Fuel, Water, Depreciation and Indirect labor (2b-3-4-5a)
**It was not found practical to show individual item costs because of wide variations in price and other factors, consequently only representative totals are used.

Steam Plant
Compressed Air Equipment
Mixing Operation Area
Raw Rubber And Compounding Ingredient Storage
Shipping And Receiving Platform
Tube Production Area
Bead Production Area
Mixed Stock Storage Tire Tread Storage And Other Production Line Storage
Rubberized Fabric And Tread Production Area
Tube Curing
Office
Tire Building Area
Inspection Of Packaging
Tire Curing Area

Rubber Storage
Rubber Bale Slicer
Internal Mixer
Sheeting Mill
Strainer
Slab Cutter

NNERTUBES

I.P. NO 67350
S.I.C. 3011



401

BICYCLE TIRES AND INNERTUBES

SELECTED REFERENCES

I. TECHNICAL AND TRADE BOOKS

A. Modern Rubber Chemistry. H. Barron. 1948. 502 pp. $10.00

D. Van Nostrand Company, Inc.
120 Alexander Street
Princeton, New Jersey 08540

Rubber manufacturing and processing, vulcanizing, compounding, and processing of reclaimed rubber.

B. Motion and Time Study: Design and Measurement of Work. Ralph M. Barnes. 5th Ed. 739 pp. $9.50.

John Wiley & Sons, Inc.
605 Third Avenue
New York, New York 10016

Theories, principles, practices, and techniques of design and work methods.

II. TECHNICAL AND TRADE PERIODICALS

A. Rubber Age. Monthly. $5.00/year.

Palmerton Publishing Company, Inc.
101 West 31st Street
New York, New York 10001

Covers the manufacture of rubber and rubber products.

B. Rubber World. Monthly. $5.00/year.

Bill Brothers Publications
630 Third Avenue
New York, New York 10017

Technological studies on natural and synthetic rubber and production.

III. BUSINESS MANAGEMENT MATERIALS

A. The First Two years: Problems of Small Firm Growth and Survival. Kurt B. Mayer and Sidney Goldstein. 233 pp. $1.00

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Points out major areas of financial management and describes a few of the techniques that can help small businessmen understand past decisions and to make better decisions in the future.

IV. REPRESENTATIVE U.S. PATENTS

Available U. S. Patent Office, Washington, D. C. 20231. $.50 each.

A. Patent No. 3,211,819 October 1965 1 p.
Process for the production of tires of small dimension.

B. Patent No. 3,179,149 April 1965 3 p.
Pneumatic tire having good air retention characteristics.

C. Patent No. 2,652,980 January 1953 10 p.
Method of making pneumatic tires.

D. Patent No. 3,106,950 October 1963 5 p.
Adhesion of dissimilar rubber.

E. Patent No. 3,143,155 August 1964 4 p.
Tire of superior characteristics.

F. Patent No. 3,048,211 August 1962 6 p.
Method of balancing pneumatic tire.

G. Patent No. 3,051,212 August 1962 6 p.
Reinforced composite structures.

V. TECHNICAL INSTITUTES AND TRADE ASSOCIATIONS

A. Bicycle Institute of America
122 E. 42nd Street
New York, New York 10017

B. Tire and Rim Association, Inc.
34 North Hawkins Avenue
Akron, Ohio 44313

VI. DIRECTORIES

A. Rubber Red Book. Annual. $15.00

Palmerton Publishing Company
101 West 31st Street
New York, New York 10001

Gives information on U.S. manufacturers of rubber, products made, factories, machinery used, and personnel.

VII. PROFESSIONAL ENGINEERING SERVICES

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