

PN-ABY-469

# **Industry Profiles**

**Catalog of Investment Information  
and Opportunities**

**Volume I**

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

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## CARBONATED BEVERAGES

I.P. No. 66001

*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.

## CARBONATED BEVERAGES: Standard Industrial Classification 2086

### A. PRODUCT DESCRIPTION

Flavored carbonated soft drinks--orange, lemon, lime, grape, cherry, cola, etc.

### B. GENERAL EVALUATION

Capital requirements for this industry are moderate, and little skilled labor is needed. A good supply of clean potable water is necessary. Consumption of carbonated beverages is rising in many areas. Given sound management, a plant of the kind described would appear to have good prospects of success.

### C. MARKET ASPECTS

1. SALES CHANNELS AND METHODS. Sales to retail stores, bars, restaurants, hotels, clubs, vending machine companies. A distinctive and attractive brand name is desirable. Active salesmanship and well-maintained display advertising of various types is usually necessary.
2. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. These products must be handled with care, and transport costs on them are generally rather high. Normally the market is limited to an area that can be easily and frequently served by the plant's own delivery trucks, plus some points that are easily accessible by rail or water transport. b. Export. Because of high freight costs there is very little international trade in these products, and exports are limited mainly to small regional shipments.
3. COMPETITION. a. Domestic Market. Competition from imports is rarely significant. Direct competition in the domestic market comes normally only from rival producers. b. Export Market. Opportunities to export are likely to be very few.
4. MARKET NEEDED FOR PLANT DESCRIBED. Demand will depend on income levels, climate, drinking habits of the people, etc. Consumption of carbonated soft drinks appears to be increasing rather rapidly in most countries. In hot places where income levels are not excessively low, a total population of half a million in an urban area might consume the production of this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 3 Million 12-Ounce Bottles.

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	Cost
Land. About 5,000 sq. ft.	\$ ---
Building. One story, 40'x60'.	13,200
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt.	\$18,000
Other tools & equipmt.	1,000
Furniture & fixtures	700
Stock of bottles & boxes	18,800
Transportation equipmt.	8,000
Total (excl. Land)	\$ 46,500
Total (incl. Land)	\$ 59,700

Principal Items. Bottle washer & conveyor, bottle filler & capper, dry ice convactor, water filter, 3 syrup tanks, 2 mixing tanks, water cooler, boiler, carbonator, lift truck, 40 pallets, bottles & boxes, 2 delivery trucks.

NOTE. Initial requirements of bottles & beverage boxes are estimated at 150,000 bottles, costing \$11,200, & 5,600 boxes, costing \$7,600. Deposits should be charged on bottles & boxes sufficient to cover replacement if they are not returned. An annual allowance of 20% of \$18,800 is included with Depreciation under Annual Costs, to cover losses in manufacture and delivery.

#### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 14,100
Admin. Costs(b), Contingencies Sales Costs(c)	30	1,200
Total		\$ 15,300
c. TOTAL CAPITAL (EXCL. LAND)		\$ 75,000

### 2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Sugar	140 tons	\$ 26,800
Extracts & citric acid		8,000
Caps	3,000,000	5,500
6-bottle cartons	125,000	6,000
Labels for bottles & cartons		1,000
Total		\$ 47,300
b. Supplies		
Lubricants & hand tools		\$ 100
Bottle washing materials		2,500
Maintenance & repair parts		1,200
Office supplies		200
Total		\$ 4,000

### 3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 10 hp.	\$ 500
b. Fuel. About 4,000 gals. oil annually.	\$ 500
c. Water. Water must be potable & filtered. About 1.2 million gals. annually for production & other purposes	\$ 300

### 4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. Two trucks for deliveries.	\$ 1,400

b. External Transport Facilities. Local deliveries would be made by own trucks. Good highways necessary. Long distance deliveries might be made by rail or waterways.

### 5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	1	\$ 5,000
Semi-skilled	1	4,000
Unskilled	1	3,000
Total	3	\$ 12,000
b. Indirect Labor		
Manager - buys, sells & supervises	1	\$ 8,000
Office	1	3,600
Other	2	7,000
Total	4	\$ 18,600

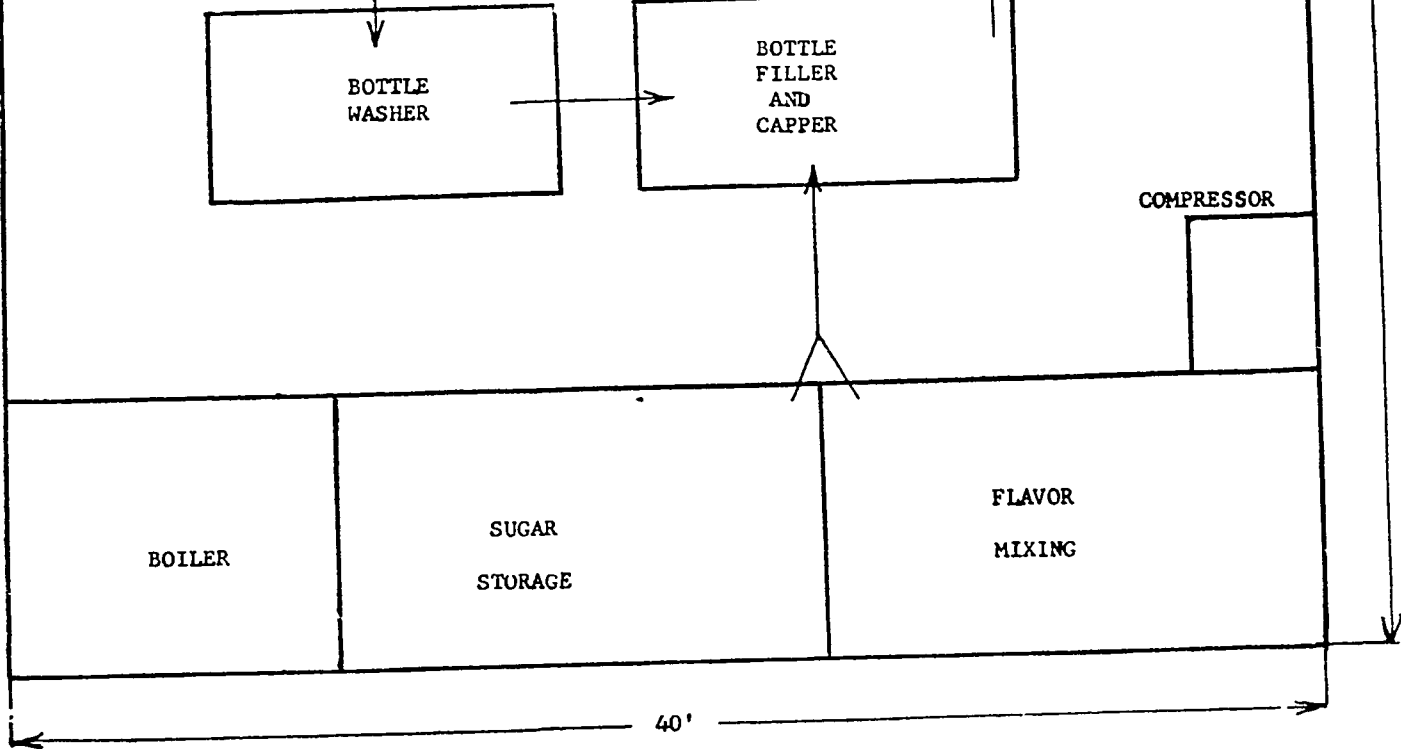
c. Training Needs. Manager must be fully experienced. With 1 skilled worker no training time should be required.

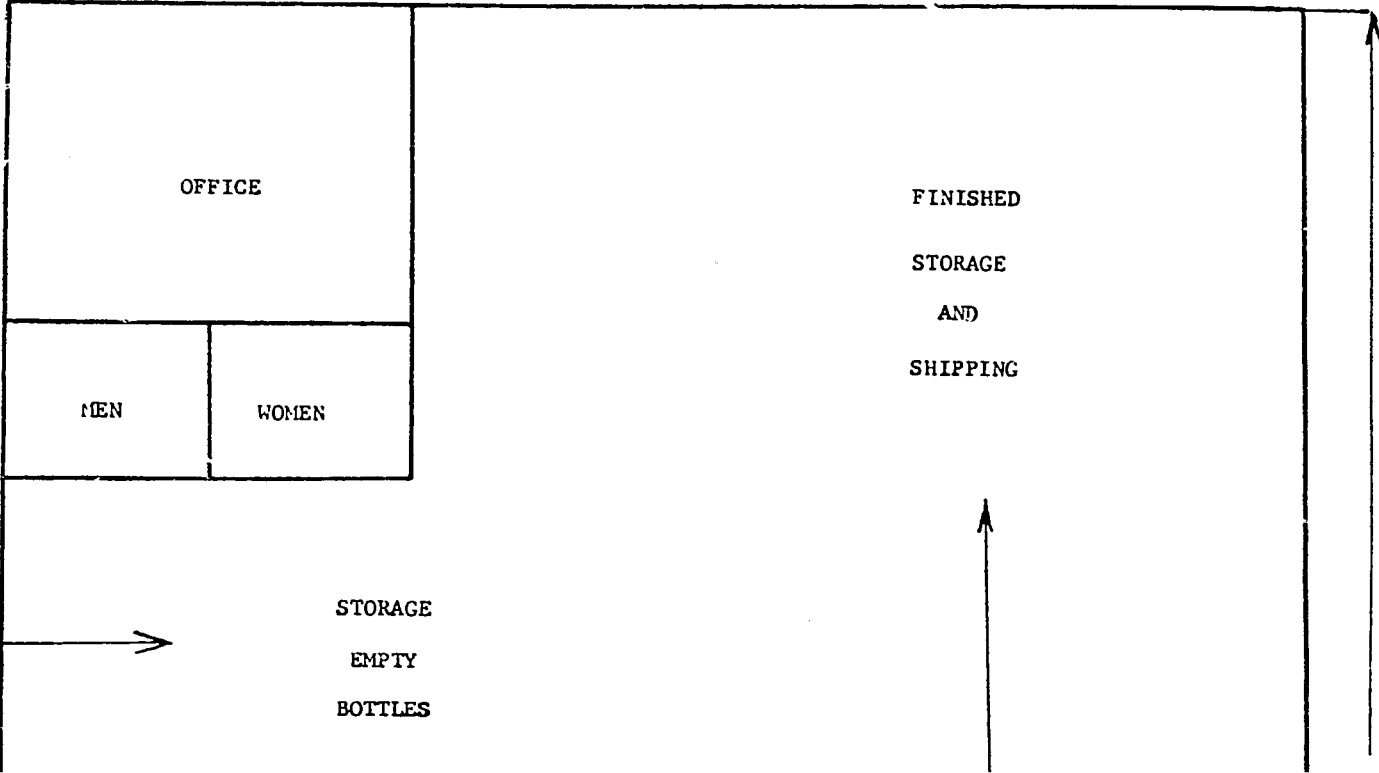
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	\$ 47,300
Direct Labor	12,000
Manufacturing Overhead(a)	25,300
Admin. Costs(b), Contingencies	5,000
Sales Costs(c), Bad Debts	9,000
Depreciation on Fixed Capital, including allowance for replacements of bottles and boxes	10,000
Total Annual Costs	\$108,600
b. Annual Sales Revenue	\$150,000

NOTES. (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

CARBONATED BEVERAGES: S.I.C. 2086





OFFICE

MEN

WOMEN

STORAGE  
EMPTY  
BOTTLES

FINISHED  
STORAGE  
AND  
SHIPPING

GES: S.I.C. 2086

ut  
w of Work



# CARBONATED BEVERAGES· S. I. C. 2086

## SELECTED REFERENCES

### I. TEXTBOOKS

- A. Chemical Analysis of Foods and Food Products. 1958. 3rd Edition.  
\$18.00.  
D. Van Nostrand Co., Inc.  
120 Alexander Street  
Princeton, New Jersey  
Preservation of foods including carbonated non-alcoholic beverages.

### II. PERIODICALS

- A. The American Soft Drink Journal. Monthly. \$4.00/year.  
McFadden Business Publications  
316 Peachtree Street, N. E.  
Atlanta, Georgia  
News and information of interest to those in the carbonated beverage industry.
- B. National Bottlers' Gazette. Monthly. \$7.00/year.  
Keller Publishing Company  
9 East 31st Street  
New York 16, New York  
Supplies subscribers with carbonated beverage processing and merchandising news and information.

### III. OTHER PUBLICATIONS

- A. Bridges Food and Beverage Analyses. M. A. Bridges. 3rd Edition. 1950.  
\$5.50.  
Lea and Febiger  
Washington Square  
Philadelphia 6, Pennsylvania  
Chemical and physical analyses of many foods and beverages.

### IV. TECHNICAL PAPERS

- A. Carbonic Gas Volume Chart. Gratis.  
Burns Bottling Machine Works, Inc.  
2229 Kirk Avenue  
Baltimore, Maryland  
This chart provides pounds pressure for gas volume at various temperatures in degrees Fahrenheit.

## SELECTED REFERENCES (Continued)

### V. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$.25 each.

- A. Patent No. 2,988,450. 1961. 3 p.  
Carbonated beverage manufacture,
- B. Patent No. 2,942,978. 1960. 2 p.  
Improving character and life of carbonated beverages.
- C. Patent No. 2,870,016. 1958. 5 p.  
Method and apparatus for preparing carbonated beverages.
- D. Patent No. 2,855,307. 1958. 3 p.  
Process and apparatus for making carbonated liquids.
- E. Patent No. 2,851,361. 1958. 7 p.  
Carbonated drinks and concentrate for producing them.

### VI. TRADE ASSOCIATIONS

- A. Carbonated Beverage Institute  
122 West 30th Street  
New York 1, New York  
Association of carbonated beverage producers for promotion of products.

### VII. ENGINEERING COMPANIES

- A. Burns Bottling Machine Works, Inc.  
829 East Belvedere Avenue  
Baltimore 12, Maryland  
Complete line of bottling equipment.
- B. Burgess, Smith and Rodgers, Inc.  
220 West 42nd Street  
New York 36, New York  
Designs and erects soft drink plants.

### VIII. DIRECTORIES

- A. Thomas' Register of American Manufacturers. Annually. \$20.00.  
Thomas Publishing Company  
461 Eighth Street  
New York 1, New York  
Lists 100,000 manufacturers and classified list of over 500,000 listings of products and industries.

## 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.

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## 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

## SYNTHETIC DETERGENT

I. P. No. 66002

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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.

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.

## SYNTHETIC DETERGENT: Standard Industrial Classification 2841

### A. PRODUCT DESCRIPTION

Synthetic detergent made from various chemicals, packaged in one pound boxes.

### B. GENERAL EVALUATION

The use of synthetic detergents is increasing even in areas of low income, and the prospects for a plant of this kind are good in a number of areas. It is, however, a very competitive business, and to compete effectively with the large-scale makers with world-wide organizations it is necessary to have excellent management which pays close attention to product quality and improvement and to maintenance of a vigorous selling effort.

### C. MARKET ASPECTS

1. USERS. Households, buildings of many kinds.
2. SALES CHANNELS AND METHODS. Sales to wholesalers and to large retailers. An attractive brand name, advertising, and an energetic and sustained sales effort are necessary.
3. GEOGRAPHICAL EXTENT OF MARKET. The product is packed in one-pound boxes which are shipped in corrugated cartons. They can thus be easily and cheaply shipped long distances, both domestically and overseas.
4. COMPETITION. a. Domestic Market. Imports from well-known large-scale manufacturers may offer strong competition. b. Export Market. A plant of this size would have much difficulty in competing in the international market with large-scale manufacturers with large sales and publicity organizations.
5. MARKET NEEDED FOR PLANT DESCRIBED. A reasonably prosperous community with a population of the order of 2 million should generally provide a large enough market.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 1,252,000 Pounds

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<b>Cost</b>
Land. About 1/2 acre.		--
Building. Two-story, 60'x100', or 12,000 sq. ft.		72,000
Equipment. Furniture & Fixtures.		
Prodn. tools & equipmt.	\$120,000	
Other tools & equipmt.	12,000	
Furniture & fixtures	1,000	133,000
<b>Total (excl. Land)</b>		<b>\$ 205,000</b>

Principal Items. Sulfonator (with jacket and agitator), neutralizing vessel (with jacket and agitator), slurry storage tank with jacket and agitator, crutcher (jacketed), drop tank, spray dryer, pumps (8), boiler, drums, blowers, flow meters, furnace, filters, screen, conveyor, piping and valves, hand trucks.

### b. WORKING CAPITAL

	<b>No. of days</b>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 29,100
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,600
Training Costs		1,800
<b>Total</b>		<b>\$ 32,500</b>

**c. TOTAL CAPITAL (EXCL. LAND) \$ 237,500**

### 2. MATERIALS AND SUPPLIES

	<b>Annual Requirement</b>	<b>Annual Cost</b>
<b>a. Direct Materials</b>		
Surface active agent	375,600 lbs.	\$ 45,100
96% sulfuric acid	719,900 lbs.	7,900
25% sodium hydroxide	2,003,200 lbs.	24,000
CMC (soil suspending agent)	21,910 lbs.	9,200
Packing Materials		24,000
<b>Total</b>		<b>\$ 110,200</b>

### b. Supplies

Cleaning and housekeeping	\$ 100
Indirect expendable items	100
Maintenance & spare parts	200
Office supplies	200
<b>Total</b>	<b>\$ 600</b>

### 3. POWER, FUEL AND WATER

	<b>Annual Cost</b>
<b>a. Electric Power.</b> About 75,000 kw-hr.	\$ 1,500
<b>b. Fuel.</b>	\$ 1,000
<b>c. Water.</b> For general purposes	\$ 100

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.  
 b. External Transport Facilities. In and out shipments average 4 tons per day. Good highways and rail facilities necessary.

### 5. MANPOWER

	<b>Number</b>	<b>Annual Cost</b>
<b>a. Direct Labor</b>		
Skilled	2	\$ 12,000
Semi-skilled	2	10,000
Unskilled	5	20,000
<b>Total</b>	<b>9</b>	<b>\$ 42,000</b>
<b>b. Indirect Labor</b>		
Manager	1	\$ 10,000
Office	1	5,000
Shipping & receiving	1	4,000
<b>Total</b>	<b>3</b>	<b>\$ 19,000</b>

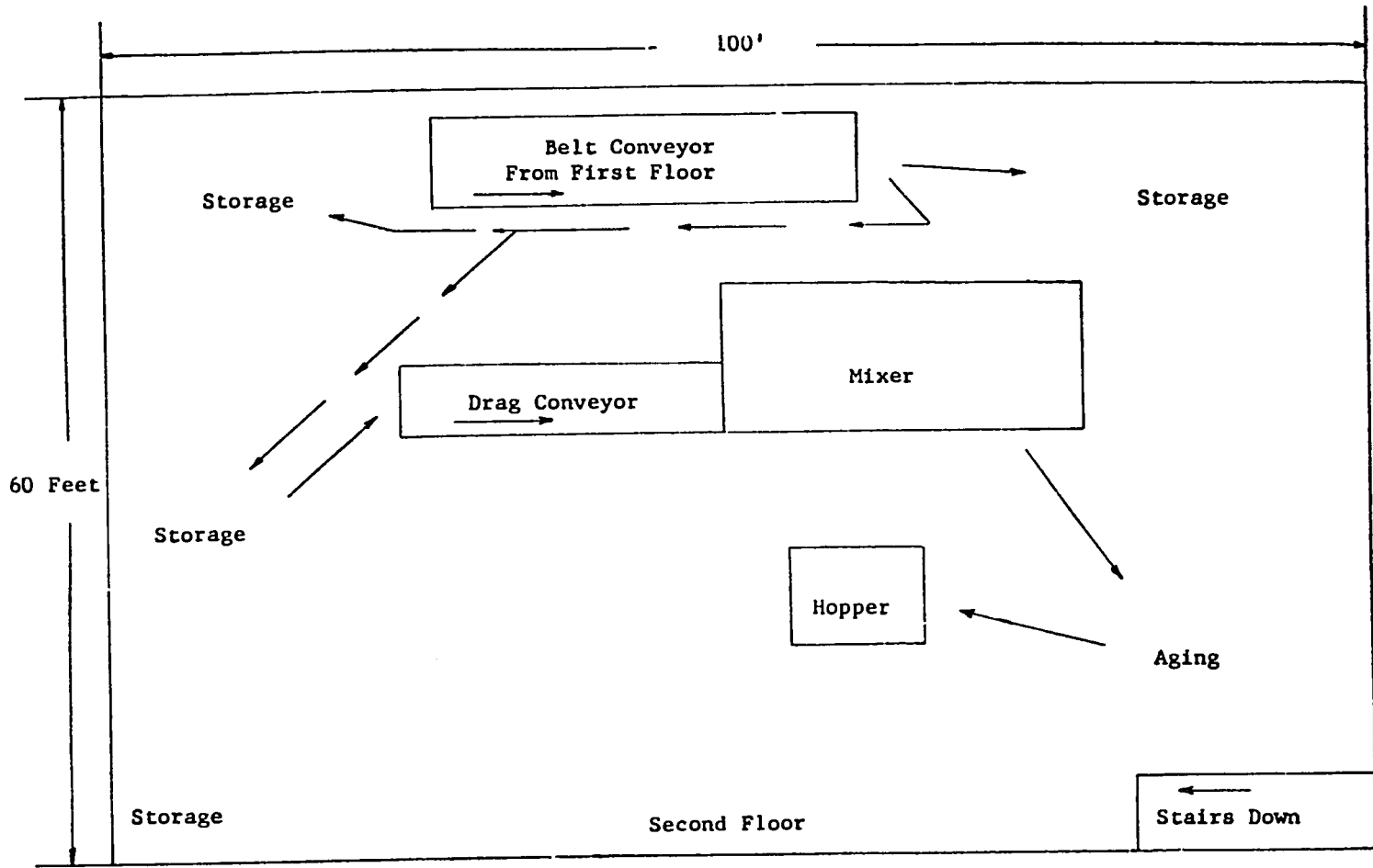
- c. Training Needs. Manager must be fully experienced. He should be able to train other employees and reach full production in 30 days.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>	
Direct Materials	\$110,200
Direct Labor	42,000
Manufacturing Overhead(a)	22,200
Admin. Costs(b), Contingencies	9,000
Sales Costs(c), Bad Debts	10,000
Depreciation on Fixed Capital	16,900
<b>Total Annual Costs</b>	<b>\$210,300</b>
<b>b. Annual Sales Revenue</b>	<b>\$250,000</b>

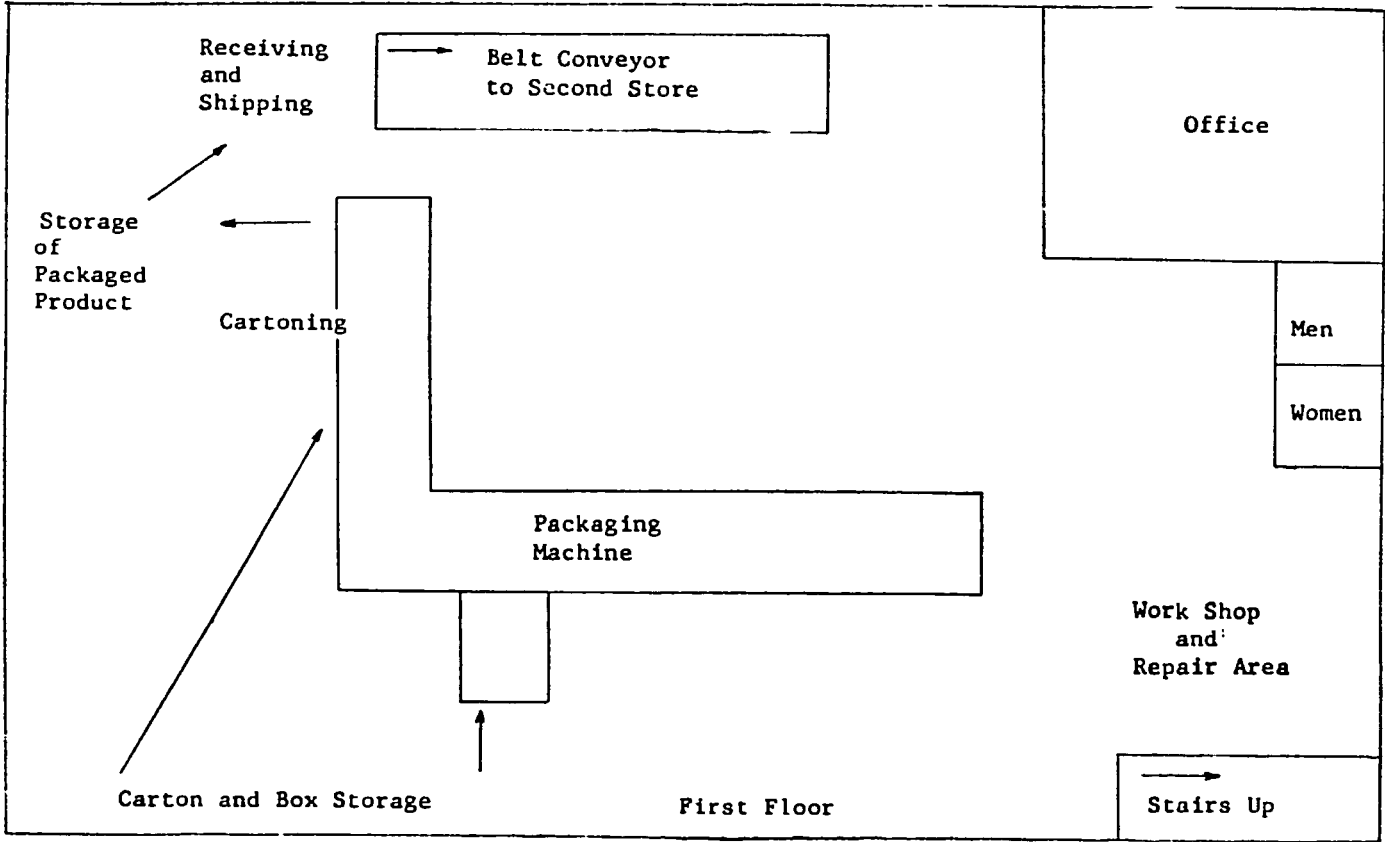
NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

SYNTHETIC DETERGENT: S.I.C. 2841



SYNTHETIC DI  
PLANT LAYO

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62



# SYNTHETIC DETERGENT: S.I.C 2841

## SELECTED REFERENCES

### I. TEXTBOOKS

- A. Surface Active Agents and Detergents. Vol. II. A. M. Schwartz, J. W. Perry, and J. Berch. 1957. 856 p. Illus. \$19.50  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York 1, New York  
Process of synthesizing and manufacturing surface active agents. The physical chemistry of surface active agents in theory and practice.
- B. Encyclopedia of Chemical Technology. R. E. Kirk and D. F. Othmer. First supplement volume. 1957. 992 p. Illus. \$25.00.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York 1, New York  
A thorough coverage of the fields of chemical engineering, including detergents.

### II. PERIODICALS

- A. Soap and Chemical Specialists. Monthly. \$4.00/year.  
McNair Dorland  
254 West 31st Street  
New York 1, New York  
Serves all who deal in soaps, detergents, sanitary supplies, pest control agents.
- B. Chemical Engineering Progress. Monthly. \$6.00/year.  
American Institute of Chemical Engineers  
25 West 45th Street  
New York 36, New York  
Progress in chemical engineering including detergents.

### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Synthetic Detergents. IR-15749.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523

### IV. OTHER PUBLICATIONS

- A. Chemical Engineering Cost Estimation. R. S. Aries and R. D. Newton. 1955. 263 p. Illus. \$6.50.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Equipment cost, plant investment, other costs including manufacturing cost.

### V. TECHNICAL PAPERS

- A. Powder Detergent. IR-26933. 3 p. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Information about an improved process that is employed in the manufacture of powder detergents.

## SELECTED REFERENCES (Continued)

### VI. U. S. PATENTS

Available U. S. Patent Office

Washington, D. C. 20231 \$.25 each

- A. Patent No. 2,975,141. 1961. 2 p.  
The preparation of sulfo detergents
- B. Patent No. 2,831,815. 1958. 3 p.  
Materials and method in making detergent composition.
- C. Patent No. 2,364,767. 1944. 8 p.  
Manufacture of synthetic detergent of the alkyl aryl sulfonate type.
- D. Patent No. 2,130,361. 1938. 12 p.  
Art of deterging, deterging materials, and process of manufacturing detergents.

### VII. TRADE ASSOCIATIONS

- A. Manufacturing Chemists Association  
1825 Connecticut Avenue, N. W.  
Washington, D. C. 20009
- B. American Institute of Chemical Engineers  
345 East 47th Street  
New York 17, New York

### VIII. ENGINEERING COMPANIES

- A. Bowen Engineering Company  
North Branch, New Jersey  
Spray drying consultants.
- B. Pfaudler Permutit, Inc.  
P. O. Box 1600  
Rochester, New York  
Design of plants to manufacture detergents and allied products.

### IX. DIRECTORIES

- A. Soap Blue Book. Annual (April issue of Soap and Chemical specialties magazine). \$4.00/year.  
McNair Dorland  
245 West 31st Street.  
New York 1, New York  
Sources of supply for raw materials, equipment, machinery, containers, and finished products for manufacturers and converters in the detergent, soap and other chemical specialties industries.

## 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

## JOB PRINTING

I. P. No. 66003

*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.

## JOB PRINTING: Standard Industrial Classification 2751

### A. WORK DESCRIPTION

Printing of letterheads, business documents, cards, handbills, etc., offset work.

### B. GENERAL EVALUATION

An enterprise of this kind requires only a modest amount of capital. Managerial and labor skill requirements are moderate. Many developing areas should be able to provide a sufficient market for the services of a business of this kind.

### C. MARKET ASPECTS

1. USERS. Commercial and industrial concerns, clubs, associations, educational institutions, government offices, individuals, etc.
2. SALES CHANNELS AND METHODS. Business will be done direct with users. Advertising in the local press, by circularizing potential customers, and by other means, will generally be necessary.
3. GEOGRAPHICAL EXTENT OF MARKET. A little business might be done by mail outside the area in which the plant is located, but the bulk of the business will normally be strictly local.
4. COMPETITION. Limited to competition from rival establishments in same general locality.
5. MARKET NEEDED FOR PLANT DESCRIBED. Demand for job-printing services will depend on business, government and social activity. No useful estimate of market needed can be given in terms of total population.

## D. PRODUCTION REQUIREMENTS

ANNUAL SALES - ONE-SHIFT OPERATION : About \$85,000.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<u>Cost</u>
Land, about 2,000 sq. ft.		
Location should be convenient to business area.		
Building, One story, 30'x40'.	\$ --	7,200
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	\$18,500	
Other tools & equipmt.	800	
Furniture & fixtures	700	20,000
Total (excl. Land)		<u>\$ 27,200</u>

Principal Items, 2 hand feed open presses, cylinder press, offset press, paper cutter, type leads & slugs, galleys and galley cabinet.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 9,800
Admin. Costs(b), Contingencies, Sales Costs(c)	30	300
Training Costs		2,000
<u>Total</u>		<u>\$ 12,100</u>

c. TOTAL CAPITAL (EXCL. LAND) \$ 39,300

### 2. MATERIALS AND SUPPLIES

<b>a. Direct Materials</b>		<u>Annual Cost</u>
Paper		\$ 25,000
Ink		200
<u>Total</u>		<u>\$ 25,200</u>

### b. Supplies

Gasoline & rags	\$ 200
Oil, grease, type & tools	200
Maintenance & repair parts	500
Office supplies	100
<u>Total</u>	<u>\$ 1,000</u>

### 3. POWER, FUEL AND WATER

	<u>Annual Cost</u>
a. <u>Electric Power</u> , Connected load about 10 hp.	\$ 300
b. <u>Fuel</u> , For heating, if necessary.	\$ 400
c. <u>Water</u> , For sanitation and fire protection.	\$ 100

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. No special requirements.

### 5. MANPOWER

	<u>One-shift Operation</u>	<u>Number</u>	<u>Annual Cost</u>
<b>a. Direct Labor</b>			
Skilled	2		\$ 12,000
Semi-skilled	1		5,000
Unskilled	2		7,000
<u>Total</u>	<u>5</u>		<u>\$ 24,000</u>
<b>b. Indirect Labor</b>			
Manager	1		\$ 8,000

- c. Training Needs. Manager should be experienced. With 1 skilled worker, he should be able to do all necessary labor training. Plant should reach full production in 2 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

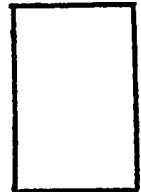
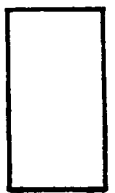
<b>a. Annual Costs</b>		
Direct Materials		\$ 25,200
Direct Labor		24,000
Manufacturing Overhead(a)		9,800
Admin. Costs(b), Contingencies		2,000
Depreciation on Fixed Capital		2,200
<u>Total Annual Costs</u>		<u>\$ 74,700</u>
<b>b. Annual Sales Revenue</b>		\$ 85,000

NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

JOB

PRESS

PRESS



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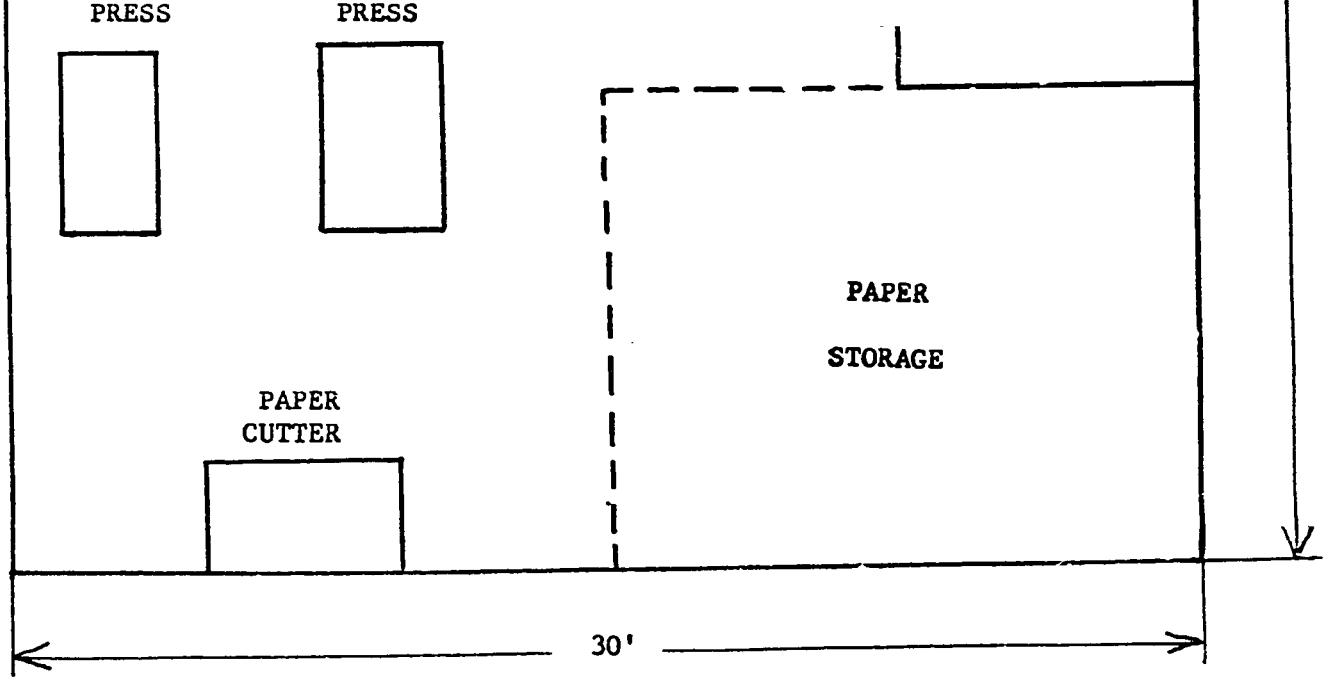
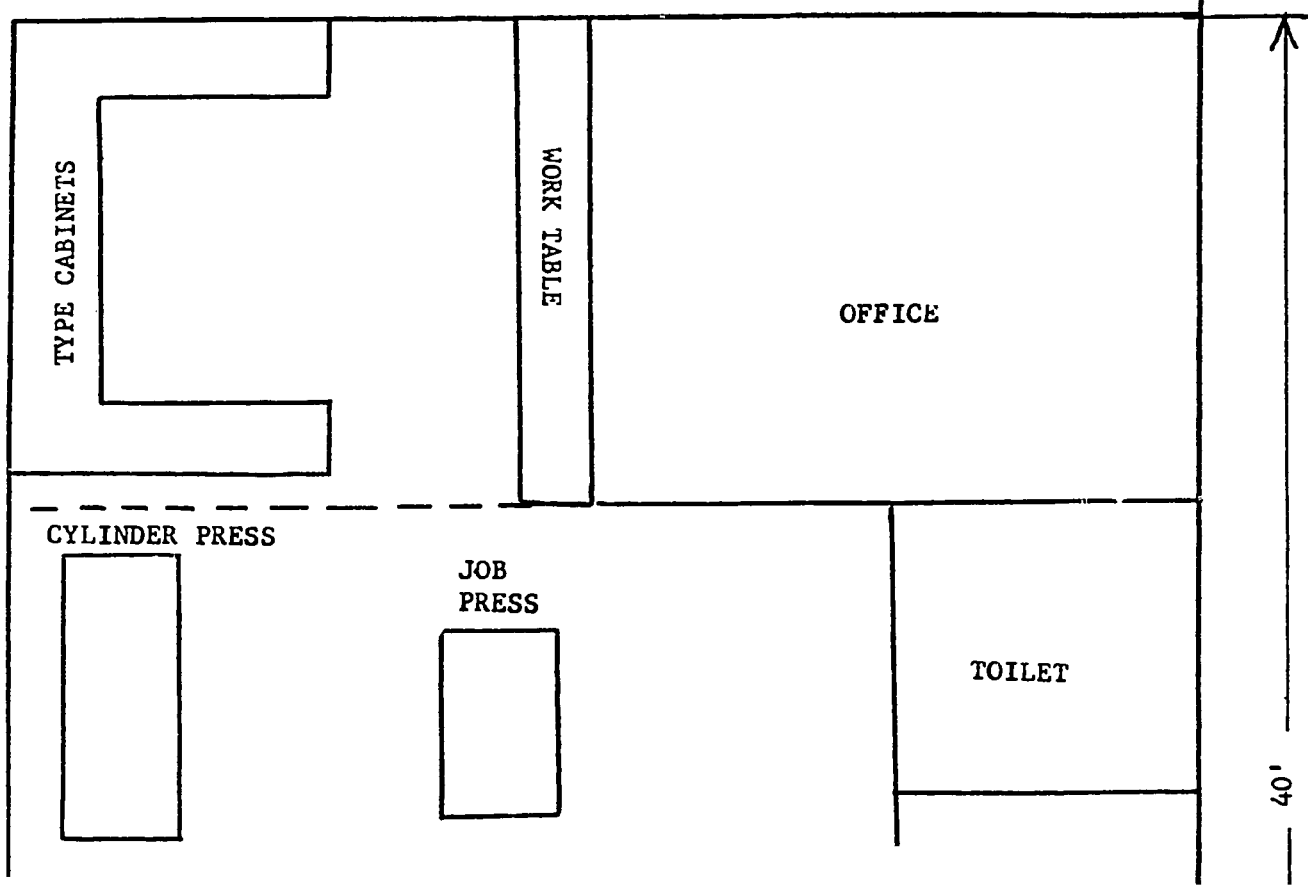


FIG: S.I.C. 2751

FIT LAYOUT



12



JOB PRINTING: S.I.C. 2751

SELECTED REFERENCES

I. TEXTBOOKS

- A. A Practical Introduction to the Graphic Arts. H. E. Jackson. 1957. 320 p. Illus. \$4.96.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Type case, hand composition, and press work.
- B. Printing and the Allied Trades. R. R. Karch. 1958. 318 p. Illus. \$3.80.  
Pitman Publishing Corporation  
2 - 6 West 45th Street  
New York 36, New York  
Layout, typography, equipment, job printing practices.

II. PERIODICALS

- A. American Printer and Lithographer. Monthly. \$15.00/year.  
Moore Publishing Company, Inc.  
48 West 38th Street  
New York 18, New York  
Current information on printing machinery, materials, equipment, and processes.
- B. Printing Production. Monthly. \$5.00/year.  
Willsea Publishing Company  
1276 West 3rd Street  
Cleveland 13, Ohio  
Information on techniques of manufacturing, equipment development, and results of technical printing trade conferences.

III. GOVERNMENT PUBLICATIONS, U.S.

- A. Job Printing Shop. SBB-44. March 1961. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Research  
Washington, D. C. 20523  
Describes job printing shop establishment, costs, and business opportunities.

IV. OTHER PUBLICATIONS

- A. General Printing. G.U. Cleeton and C.W. Pitkin. 1958. 195 p. Illus. \$3.00.  
McKnight and McKnight Publishing Company  
Towanda Avenue and Route 66  
Bloomington, Illinois  
Type faces, inks, machinery, equipment, and printing processes.
- B. Practice of Printing. R.W. Polk. 1952. 324 p. Illus. \$4.75.  
Charles A. Bennett Company, Inc.  
1457 Duroc Building  
Peoria, Illinois  
Layout, presses, and printing operation.

## SELECTED REFERENCES (Continued)

### V. TECHNICAL PAPERS

- A. Cut Costs with Good Plant Design. C.W. Latham. Inland and American Printer and Lithographer. October 1959. Vol. 144. p. 65-7. \$.50.  
MacLean-Hunter Publishing Company  
79 West Monroe Street  
Chicago 3, Illinois

### VI. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$.25 each.

- A. Patent No. 2,963, 966. 1960. 6 p.  
Method of making variable speed platen printing press.
- B. Patent No. 2, 947,245. 1960. 4 p.  
Job printing press and its manufacture.
- C. Patent No. 2,767,790. 1956. 7 p.  
Construction of a rotary printing apparatus.

### VII. TRADE ASSOCIATIONS

- A. Lithographers and Printers National Association  
1025 Connecticut Avenue, N.W.  
Washington, D.C. 20006
- B. National Printing Equipment Association  
217 Broadway  
New York, New York 10007

### VIII. ENGINEERING COMPANIES

- A. Olin E. Freedman Company  
201 East Walton Place  
Chicago 11, Illinois  
Design, engineering, construction supervision exclusively for the graphic arts industry.

### IX. DIRECTORIES

- A. The Inland and American Printer and Lithographer Directory Issue.  
Annual. \$.50.  
MacLean-Hunter Publishing Corp.  
79 West Monroe Street  
Chicago 3, Illinois  
Lists approximately 15,000 manufacturers of equipment, supplies, and services used by printers, lithographers and allied businesses.

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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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

## PAPER BAGS

I. P. No. 66004

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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.

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.

## PAPER BAGS: Standard Industrial Classification 2643

### A. PRODUCT DESCRIPTION

Self-opening, square kraft paper bags, ranging in size from 1/4 to 35 pounds, commonly known as grocers' bags, manufactured from medium length fiber kraft paper.

### B. GENERAL EVALUATION

This plant is about the minimum size for fully mechanized operations. Capital requirements are moderately high but little skilled labor is needed. Use of this type of paper big is increasing in urban areas as modern retailing methods are increasingly adopted, and, with such a potential market, prospects for the enterprise are good.

### C. MARKET ASPECTS

1. USERS. Stores and industries.
2. SALES CHANNELS AND METHODS. Sales to wholesale distributors and also direct to large users.
3. GEOGRAPHICAL EXTENT OF MARKET. The product is very easy to handle and transport costs are comparatively low. The domestic market area may be nation-wide. The product is exported all over the world by major paper manufacturing countries.
4. COMPETITION. a. Domestic Market. The plant could normally compete with imports, even if the paper needs to be imported. In less developed areas major competition would be from cheaper wrapping materials and containers. b. Export Market. The plant might make some sales to neighboring countries, but could not compete in the general international market with large-scale producers.
5. MARKET NEEDED FOR PLANT DESCRIBED. The size of population required to support the output of this plant depends principally on the level of income. Where stores generally use paper bags to package customers' purchases, a population of three to four million should support the output of this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 100 Million Bags.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<u>Cost</u>
Land. About 12,000 sq. ft.	\$	---
Building. One story, 5,000 sq. ft., concrete block & steel construction with truss roof.		40,000
Equipment, Furniture & Fixtures.		
Prod'n. tools & equipmt. \$85,200		
Other tools & equipmt. 10,400		
Furniture & fixtures 3,000		98,600
<u>Total (excl. Land)</u>		<u>\$138,600</u>

Principal Items. Bag machines (4), gas powered fork lift, paste cooking and mixing machine, factory platform trucks and skids, bundling press, paper cutter, waste paper baler, lathe, roll grinder, drill press.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 53,400
Admin. Costs(b), Contingencies, Sales Costs(c)	30	5,800
Training Costs		4,500
<u>Total</u>		<u>\$ 63,700</u>

c. TOTAL CAPITAL (EXCL. LAND) \$202,300

### 2. MATERIALS AND SUPPLIES

	<u>Annual Requirements</u>	<u>Annual Cost</u>
a. <u>Direct Materials</u>		
Paper	1650 tons	\$248,000
Glue	10 tons	5,000
<u>Total</u>		<u>\$253,000</u>

### b. Supplies

Maintenance & repairs	\$ 3,500
Lubrication & hand tools	500
Office supplies	200
<u>Total</u>	<u>\$ 4,200</u>

### 3. POWER, FUEL AND WATER

	<u>Annual Cost</u>
a. <u>Electric Power.</u> Connected load about 100 hp.	\$ 3,000
b. <u>Fuel.</u> About 6,000 gals. oil annually.	\$ 700
c. <u>Water.</u> About 1.6 million gals. annually for production, sanitation and fire protection.	\$ 400

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Total in and out shipments about 1,000 tons a month. Good highway needed, and railroad, if possible.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>		
Skilled	2	\$ 10,000
Semi-skilled	2	8,000
Unskilled	4	12,000
<u>Total</u>	<u>8</u>	<u>\$ 30,000</u>
b. <u>Indirect Labor</u>		
Manager & supervisor	2	\$ 15,000
Office	2	8,000
Maintenance	1	6,000
<u>Total</u>	<u>5</u>	<u>\$ 29,000</u>

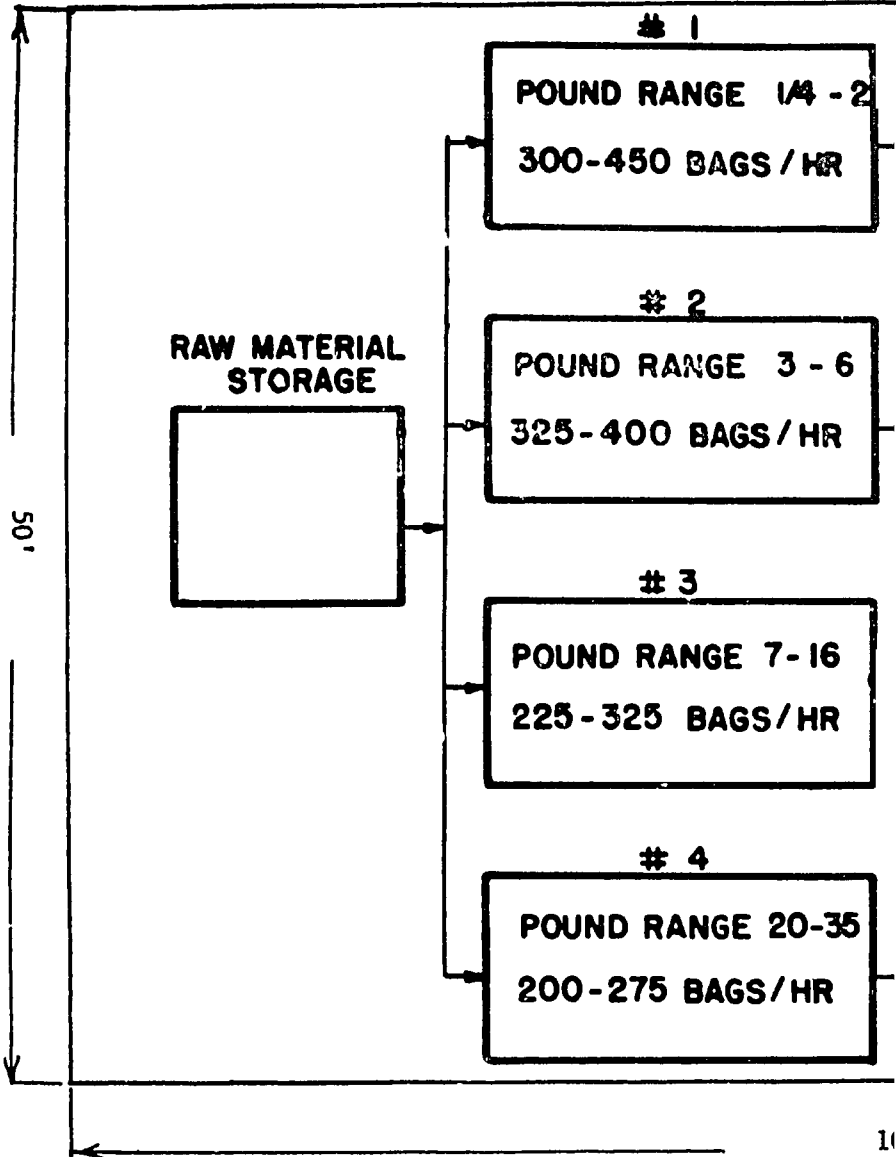
- c. Training Needs. Manager & supervisor must be experienced. With help of 1 skilled worker, they should be able to do all necessary labor training. Plant should reach full production in 2 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

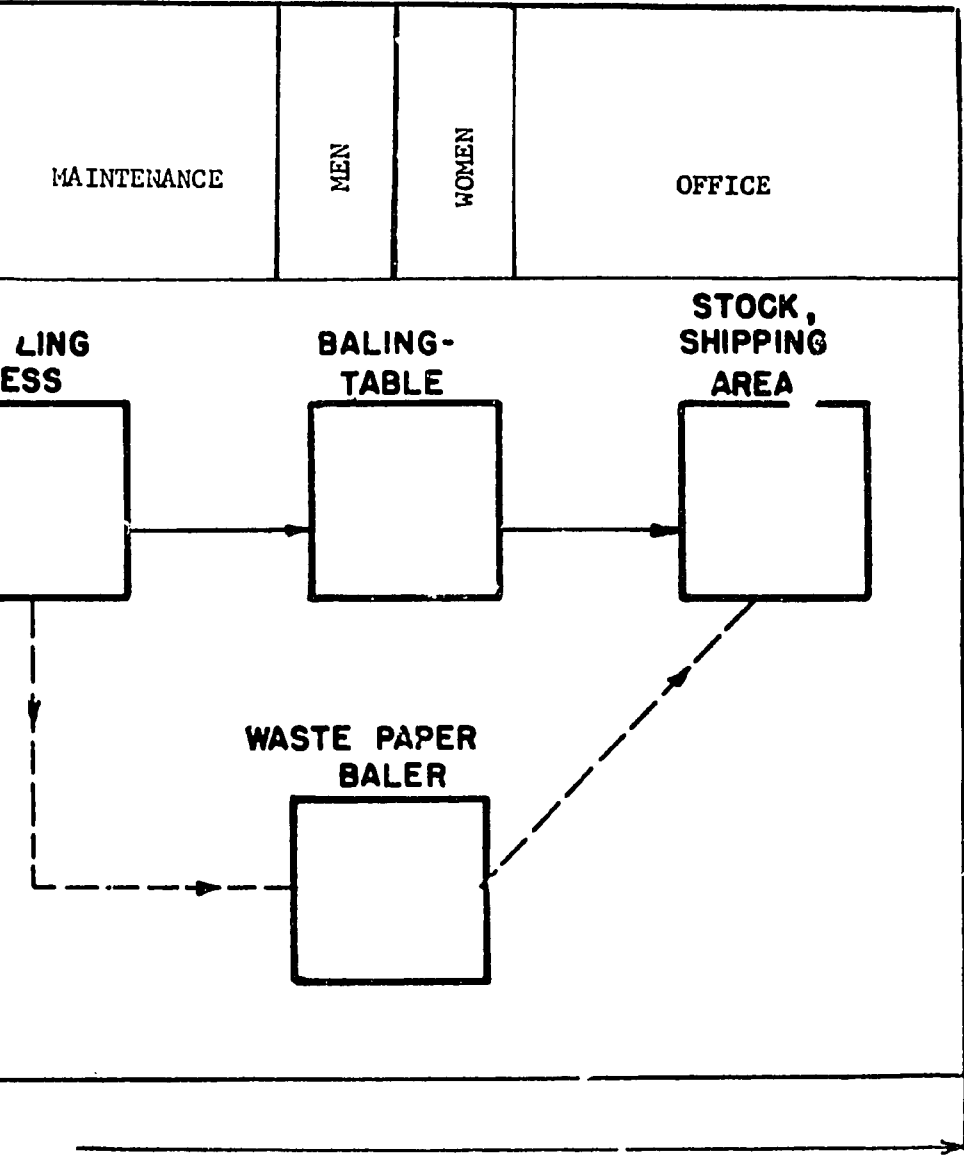
a. <u>Annual Costs</u>	
Direct Materials	\$253,000
Direct Labor	30,000
Manufacturing Overhead(a)	37,300
Admin. Costs(b), Contingencies	27,000
Sales Costs (c), Bad Debts	43,000
Depreciation on Fixed Capital	12,000
<u>Total Annual Costs</u>	<u>\$402,300</u>
b. <u>Annual Sales Revenue</u>	<u>\$540,000</u>

NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

ARROWS



AYOUT  
E WORK FLOW





PAPER BAGS: S.I.C. 2643

SELECTED REFERENCES

I. TEXTBOOKS

- A. The Technology of Coated and Processed Papers. R.H. Mosher, editor. 1952. 733 p. Illus. \$15.00.  
Chemical Publishing Company, Inc.  
212 Fifth Avenue  
New York 10, New York  
Paper converting machinery and products therefrom.

II. PERIODICALS

- A. The Paper Industry. Monthly. \$8.00/year.  
Fritz Publications, Inc.  
431 South Dearborn Street  
Chicago 5, Illinois  
Current developments and marketing information on paper and paper products.
- B. Paper and Paper Products. Semi-Monthly. \$5.00/year.  
Walden Sons and Mott, Inc.  
466 Kinderkamack Road  
Oradell, New Jersey  
Sources of supply and prices covering paper and paper products.

III. OTHER PUBLICATIONS

- A. The Dictionary of Paper. American Paper and Pulp Association. 1951  
393 p. Illus. \$6.50.  
American Paper and Pulp Association  
122 East 42nd Street  
New York 17, New York  
Includes concise information on methods of manufacture of types of paper and paper products.

IV. TECHNICAL PAPERS

- A. Grocers Paper Bags. No. 42-53. 1954. 12 p. \$10.  
U.S. Department of Commerce  
Washington, D.C. 20230  
Covers production processes and markets for grocers paper bags.

## SELECTED REFERENCES (Continued)

### V. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 30231 \$.25 each.

- A. Patent No. 2,997,831. 1961. 22 p.  
Bag making apparatus and process.
- B. Patent No. 2,986,975. 1961. 12 p.  
Apparatus for making bags.
- C. Patent No. 2,955,517. 1960. 4 p.  
Method of manufacturing paper bags.
- D. Patent No. 2,944,469. 1960. 5 p.  
Machines for the production of paper bags.
- E. Patent No. 2,854,899. 1958. 9 p.  
Apparatus for manufacturing paper bags.

### VI. TRADE ASSOCIATIONS

- A. Paper Bag Institute  
41 East 42nd Street  
New York 17, New York
- B. Kraft Paper Association  
122 East 42nd Street  
New York 17, New York

### VII. ENGINEERING COMPANIES

- A. Morris and Van Wormer  
25 Broad Street  
New York 4, New York  
Design and construct paper bag plants.
- B. Haida Engineering Company  
34-09 Vernon Boulevard  
Long Island City, New York  
Paper converting machinery and engineering.

### VIII. DIRECTORIES

- A. Paper Yearbook. Annual. \$10.00.  
Davidson Publishing Company  
405 East Superior Street  
Duluth 2, Minnesota  
Lists and describes in detail all types of paper, paper products, related papers specialties, and manufacturer of each given product.

## 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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### 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

## SMALL PRINTING SHOP (BOOKS)

I. P. No. 66005

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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.

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.

## SMALL PRINTING SHOP (BOOKS): Standard Industrial Classification 2732

### A. PRODUCT DESCRIPTION

Various sizes and types of books, catalogs and pamphlets.

### B. GENERAL EVALUATION

Capital and skilled labor requirements are fairly high. The market will be mainly local, since customers prefer to use printing establishments to which they have easy access. Many developing communities could provide an opportunity for an establishment of this kind.

### C. MARKET ASPECTS

1. USERS. Publishers, societies, government offices, etc.
2. SALES CHANNELS AND METHODS. Business is done direct with users.
3. GEOGRAPHICAL EXTENT OF MARKET. The market will usually be somewhat localized, though publishers sometimes use printing shops located far away, if the latter do unusually good work. Only in exceptional circumstances is there any foreign business.
4. COMPETITION. Competition will come only from similar establishments.
5. MARKET NEEDED FOR PLANT DESCRIBED. It will be necessary to have a rather large and sophisticated urban area containing publishing concerns, business houses, organizations, government offices, and so forth, to provide a clientele for this plant. Demand will vary greatly with local conditions, and the market should be carefully surveyed before such a venture is undertaken.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION : Printing Services, \$200,000.

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	Cost
Land. 1/2 acre	\$ ---
Building. One story, 100'x130', or 13,000 sq. ft.	
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt. \$173,000	
Other tools & equipmt. 1,000	
Furniture & fixtures 1,000	175,000
Total (excl. Land)	\$253,000

Principal Items. Cylinder presses 20'x26', small cylinder presses 12'x18', cylinder presses 9'x12', open press 10'x15', 2 automatic typesetting machines (20 type faces for automatic), hand type stencils, addressing machine, cutter, folder, binding equipment, mailing equipment, stitcher.

#### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 19,300
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,700
Training Costs		2,000
Total		\$ 23,000

c. TOTAL CAPITAL (EXCL. LAND) \$276,000

### 2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
a. Direct Materials		
Paper	90,000 lbs.	\$ 26,000
Ink	10,000 lbs.	3,000
Sketching & related materials		450
Packaging materials		550
Total		\$ 30,000

#### d. Supplies

Lubricants & hand tools	\$ 200
Maintenance & spare parts	1,000
Office supplies	300
Total	\$ 1,500

### 3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. About 38,000 kw-hr.	\$ 750
b. Fuel. About 5,000 gals. oil	\$ 500
c. Water. About 1 million gals.	\$ 250

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. No special requirements.

### 5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	9	\$ 54,000
Semi-skilled	1	5,000
Unskilled	1	4,000
Total	11	\$ 63,000
b. Indirect Labor		
Manager	1	\$ 10,000
Office	1	5,000
Maintenance	1	5,000
Total	3	\$ 20,000

- c. Training Needs. Manager should be fully experienced. With aid of skilled workers he should be able to train the other employees and reach full production in 30 days.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

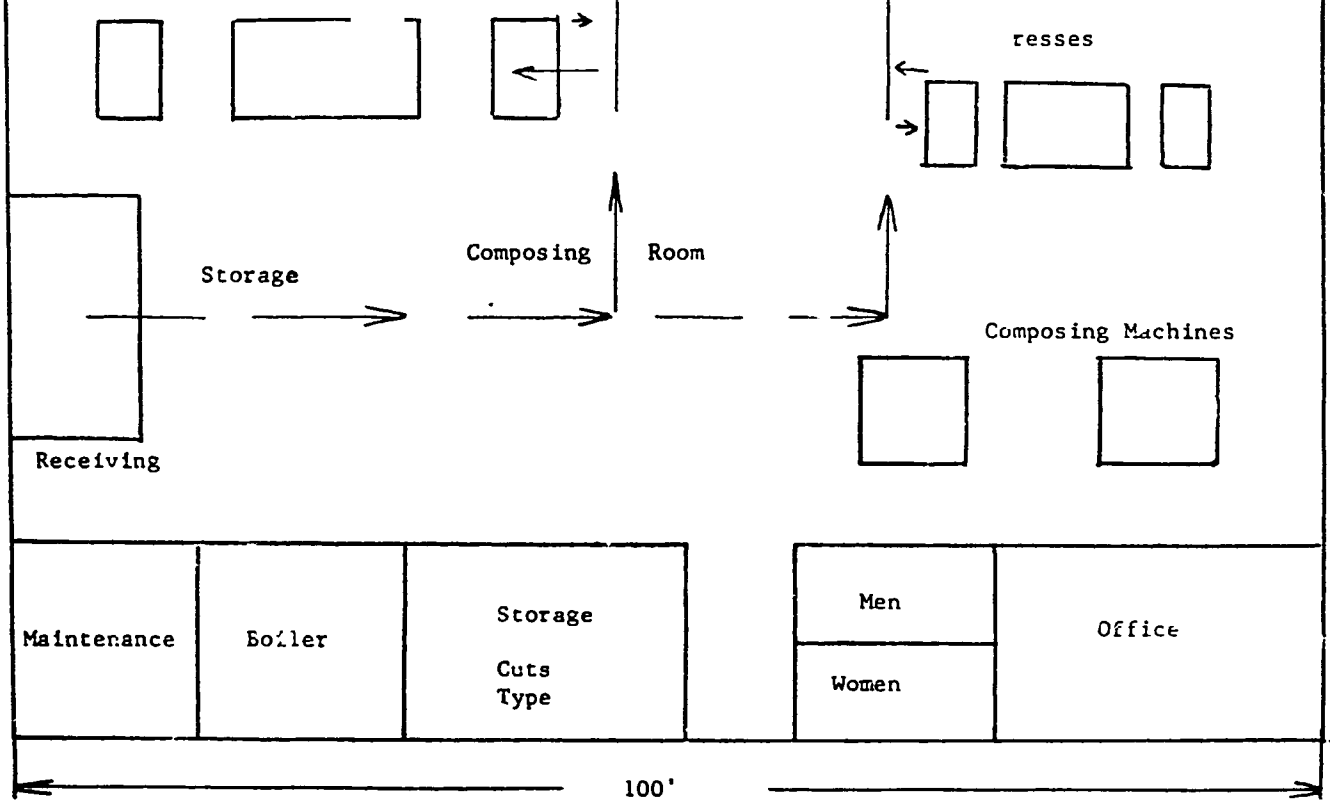
a. Annual Costs	
Direct Materials	\$ 30,000
Direct Labor	63,000
Manufacturing Overhead(a)	23,000
Admin. Costs(b), Contingencies	15,000
Sales Costs(c) Bad Debts	6,000
Depreciation on Fixed Capital	20,400
Total Annual Costs	\$157,400
b. Annual Sales Revenue	\$200,000

NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

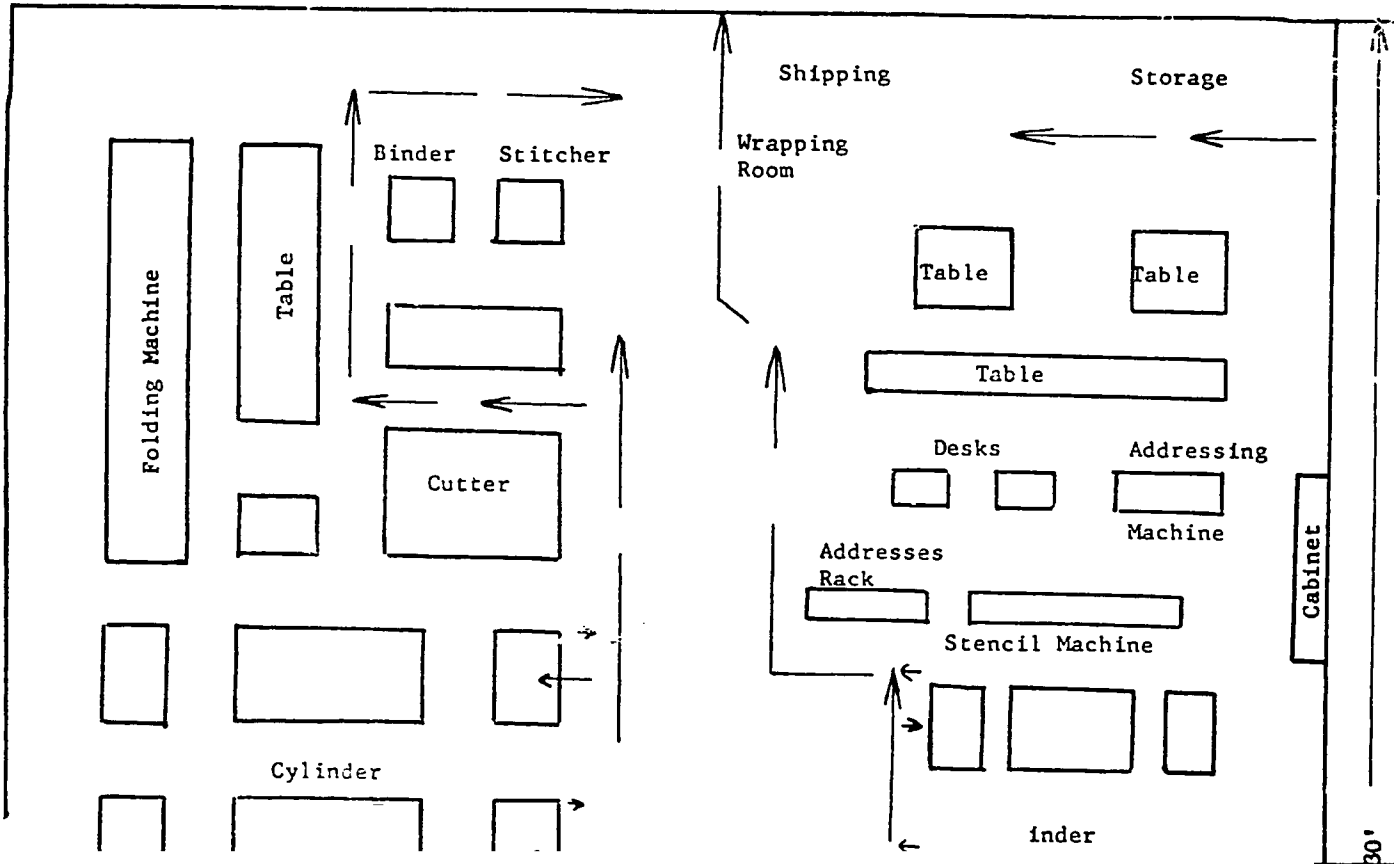
SMALL PRINTING SHOP (BOOKS): S.I.C. 2732

45

SMALL PRINTING



46





## SMALL PRINTING SHOP (BOOKS): S.I.C. 2732

### SELECTED REFERENCES

#### I. TEXTBOOKS

- A. A Practical Introduction to the Graphic Arts. H.E. Jackson. 1957. 320 p. Illus \$4.96  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Type case, hand composition, and press work.
- B. Printing and the Allied Trades.  
R.R. Karch. 1958. 318 p. Illus. \$3.80.  
Pitman Publishing Corporation  
2 - 6 West 45th Street  
New York 36, New York  
Layout, typography equipment, job printing practices.

#### II. PERIODICALS

- A. American Printer and Lithographer. Monthly. \$15.00/year.  
Moore Publishing Company, Inc.  
48 West 38th street  
New York 18, New York  
Current information on printing machinery, materials, equipment, and processes.
- B. Printing Production. Monthly. \$5.00/year.  
Willsea Publishing Company  
1276 West 3rd Street  
Cleveland 13, Ohio  
Information on techniques of manufacturing, equipment development, and results of technical printing trade conferences.

#### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Job Printing Shop. SBB-44. March 1961. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Describes job printing shop establishment, costs, and business opportunities.

#### IV. OTHER PUBLICATIONS

- A. General Printing. G.U. Vleeton and C.W. Pitkin. 1958. 195 p. Illus. \$3.00.  
McKnight and McKnight Publishing Company  
Towanda Avenue and Route 66  
Bloomington, Illinois  
Type faces, inks, machinery, equipment, and printing processes.
- B. Practice of Printing. R.W. Polk. 1952. 324 p. Illus. \$4.75.  
Charles A. Bennett Company, Inc.  
1457 Duroc Building  
Peoria, Illinois  
Layout, presses, and printing operations.

## SELECTED REFERENCES (Continued)

### V. TECHNICAL PAPERS

- A. Cut Costs with Good Plant Design. C.W. Latham. Inland and American Printer and Lithographer. October 1959. Vol. 144. p. 65-7. \$.50.  
MacLean-Hunter Publishing Company  
79 West Monroe Street  
Chicago 3, Illinois

### VI. U. S. PATENTS

Available U. S. Patent Office.  
Washington, D. C. 20231 \$.25 each.

- A. Patent No. 2,963,966. 1960. 6 p.  
Method of making variable speed platen printing press.
- B. Patent No. 2,716,942. 1955. 8 p.  
Manufacturing a rotary printing press.
- C. Patent No. 2,573,090. 1951. 6 p.  
Pivotal frame structure and elements for a printing machine.

### VII. TRADE ASSOCIATIONS

- A. Lithographers and Printers National Association  
1025 Connecticut Avenue, N. W.  
Washington, D. C. 20006
- B. National Printing Equipment Association  
217 Broadway  
New York, New York 10007

### VIII. ENGINEERING COMPANIES

- A. Olin E. Freedman Company  
201 East Walton Place  
Chicago 11, Illinois  
Design, engineering, construction supervision exclusively for the graphic arts industry.

### IX. DIRECTORIES

- A. The Inland and American Printer and Lithographer Directory Issue.  
Annual. \$.50.  
MacLean-Hunter Publishing Corporation  
79 West Monroe Street  
Chicago 3, Illinois  
Lists approximately 15,000 manufacturers of equipment, supplies, and services used by printers, lithographers and allied businesses.

SMALL PRINTING SHOP (BOOKS): S.I.C. 2732

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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# INDUSTRY PROFILES

## BOOK BINDERY

I. P. No. 66006

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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.

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.

A. DESCRIPTION OF WORK

Binding and rebinding of books in various materials, according to customers' specifications.

B. GENERAL EVALUATION

The workshop described requires a modest amount of capital. The skill and intelligence demanded of the manager and his assistants are fairly high. The economic feasibility of such an enterprise will depend on whether there is a sufficiently large demand for bookbinding services in the area that could be served. With the increase in literacy in many newly developing areas, opportunities for bookbinding establishments should become more numerous.

C. MARKET ASPECTS

1. USERS. Publishers, libraries, businesses, government departments, individuals.
2. SALES CHANNELS AND METHODS. Sales direct to users. Some publicity in local journals and directories would generally be useful.
3. GEOGRAPHICAL EXTENT OF MARKET. Sales likely to be predominantly local, though some business through the mails might be possible.
4. COMPETITION. Competition will be confined to rival establishments.
5. MARKET NEEDED FOR PLANT DESCRIBED. Demand for the services offered by this plant will depend on educational standards and facilities, government requirements, and general income level. Almost any city with a population of, say, half a million, should provide a potential market for such an establishment, account, of course, being taken of existing bookbinding facilities, if any. In the case of some cities, e.g., university cities, an appreciably smaller total population might suffice.

## D. PRODUCTION REQUIREMENTS

ANNUAL SALES - ONE-SHIFT OPERATION: \$33,000.

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	<u>Cost</u>
Land. About 3,000 sq. ft. Should be located in business district.	\$ —
Building. One story, 40'x60'.	14,400
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt.	\$18,000
Other tools & equipmt.	1,300
Furniture & fixtures	700
Total (excl. Land)	<u>\$ 20,000</u>
Total	<u>\$ 34,400</u>

Principal Items. Backing machine, hand press, wire stitcher, folder, stitching machine, plastic binder, hand paper cutter, and sewing tools, paper drill with attachments for slotting & notching, gluing equipment, stamping tools.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 3,200
Admin. Costs(b), Contingencies, Sales Costs(c)	30	300
Total		<u>\$ 3,500</u>

c. TOTAL CAPITAL (EXCL. LAND) \$ 37,900

### 2. MATERIALS AND SUPPLIES

a. <u>Direct Materials</u>	<u>Annual Cost</u>
Paper	\$ 1,200
Cardboard	250
Leather & imitation leather	500
Thread & glue	50
Plastic & metal	500
Total	<u>\$ 2,500</u>

### b. Supplies

Lubricants & hand tools	\$ 100
Cutting & stamping tools & dies	300
Maintenance & repair parts	400
Office supplies	200
Total	<u>\$ 1,000</u>

### 3. POWER, FUEL AND WATER

a. <u>Electric Power.</u> Connected load about 10 hp.	<u>Annual Cost</u> \$ 300
b. <u>Fuel.</u> For heating, if necessary.	\$ 400
c. <u>Water.</u> For general purposes.	\$ 100

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. No special requirements.

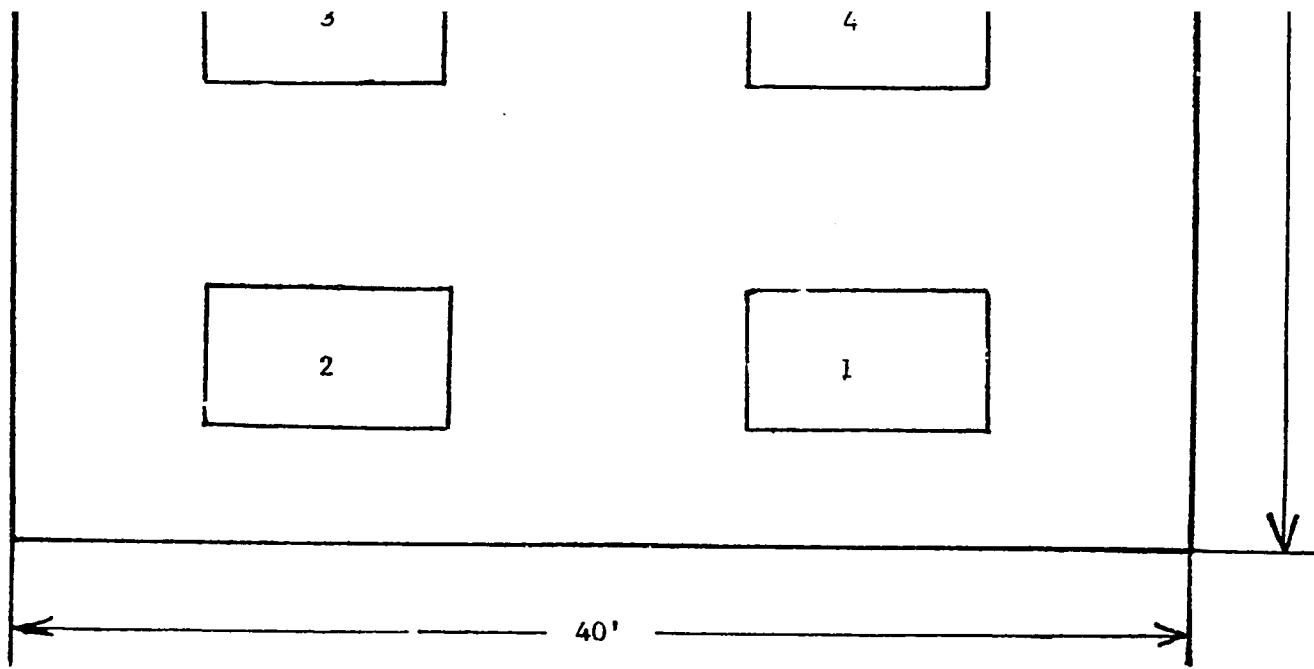
### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>		
Skilled	1	\$ 5,000
Unskilled	1	3,000
Total	<u>2</u>	<u>\$ 8,000</u>
b. <u>Indirect Labor</u>		
Manager	1	\$ 7,000

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 2,500
Direct Labor	8,000
Manufacturing Overhead(a)	8,800
Admin. Costs(b), Contingencies	2,000
Sales Costs, Bad Debts	1,200
Depreciation on Fixed Capital	2,700
Total Annual Costs	<u>\$ 25,200</u>
b. <u>Annual Sales Revenue</u>	<u>\$ 33,000</u>

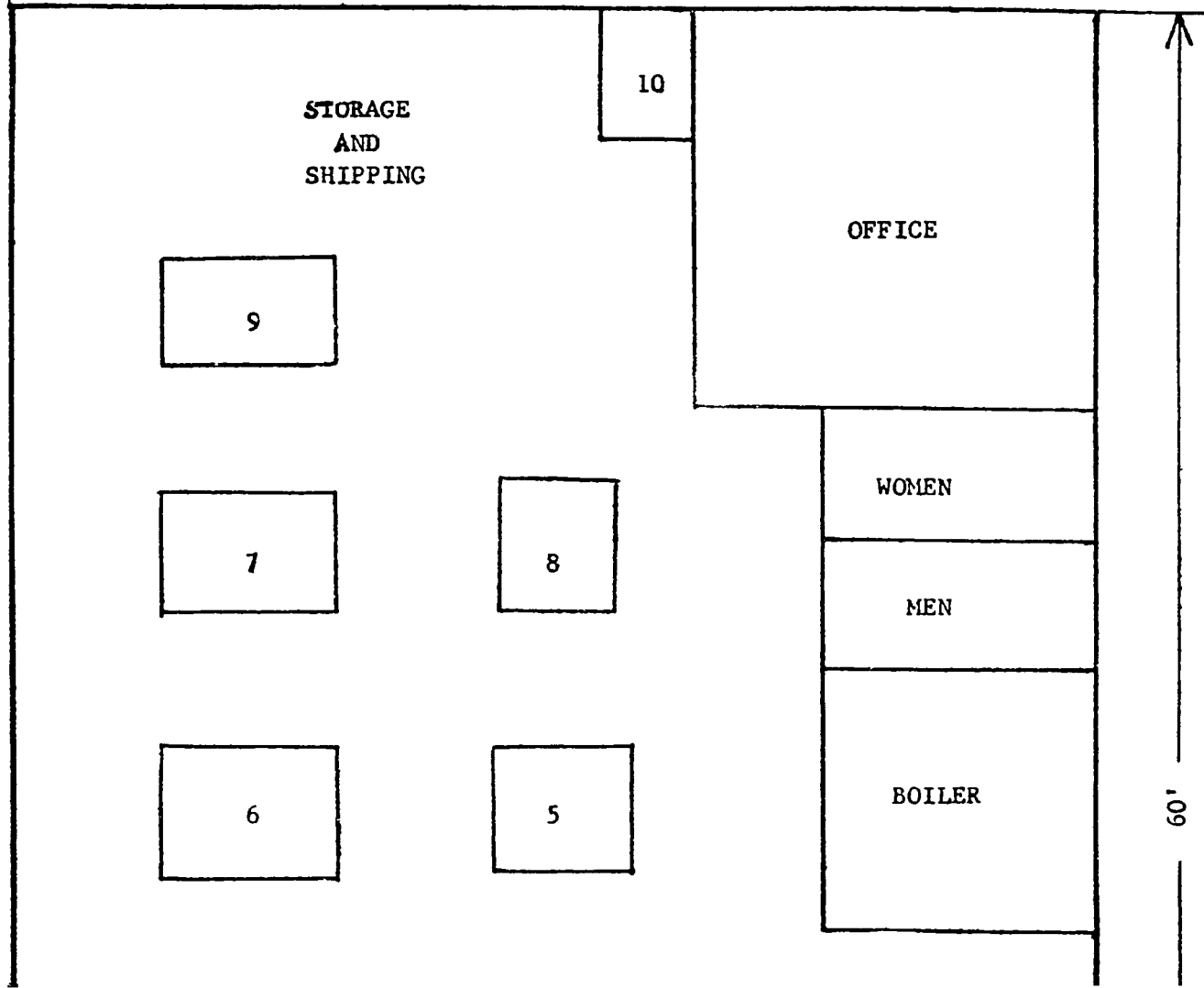
NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.



1. Hand paper cutter
2. Paper drill and attachments for slotting and notching
3. Folder
4. Stitching machine
5. Wire stitcher
6. Backing machine
7. Hand press
8. Plastic binder
9. Gluing equipment
10. Damping

K BINDERY : S.I.C. 2732

PLANT LAYOUT





## BOOK BINDERY: S.I.C. 2732

### SELECTED REFERENCES

#### I. TEXTBOOKS

- A. Pictorial Manual of Bookbinding. Manley Banister. 1958. 48 p. \$3.75.  
The Ronald Press Company  
15 East 26th Street  
New York 10, New York  
Two hundred photographs and drawings showing how to bind books.  
Step-by-step description of the various processes used in six types of binding.
- B. Bookbinding, Its Background and Technique. Edith Diehl. 1946.  
2 Vols. \$30.00.  
Rinehart and Company, Inc.  
232 Madison Avenue  
New York 16, New York  
History of books, bookbinding practices and all steps in bookbinding  
leading to the finished product.

#### II. PERIODICALS

- A. Book Production. Monthly. \$5.00/year.  
Book Production  
404 Fourth Avenue  
New York 16, New York  
Business paper devoted to the design, printing and binding of books,  
pamphlets, catalogs and allied products.

#### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Employment Outlook in Printing Occupations. 1958, 32 p. Illus. \$.25.  
Cat. No. L2.3:1215-8.  
Superintendent of Documents  
Government Printing Office  
Washington, D.C. 20401  
Includes composing room occupations, pressmen, bookbinders, and related  
workers.

#### IV. OTHER PUBLICATIONS

- A. Bindings in Cambridge Libraries. G.D. Hodson. 1929. \$60.00.  
Cambridge University Press  
32 East 57th Street  
New York 22, New York

#### V. TECHNICAL PAPERS

- A. Book Repairing. \$.25.  
University of Washington Press  
Seattle 5, Washington  
Various methods of book repairing, materials used.

## SELECTED REFERENCES (Continued)

### VI. U.S. PATENTS

Available: U.S. Patent Office  
Washington, D.C. 20231 \$.25 each.

- A. Patent No. 2,769,414. Nov. 6, 1956. 6 p.  
Bookbinding means and methods.
- B. Patent No. 2,744,481. May 8, 1956. 3 p.  
Tape feeding device for book sewing machines.
- C. Patent No. 2,711,703. June 28, 1955. 6 p.  
Book sewing machine.
- D. Patent No. 2,615,410. Oct. 28, 1952. 3 p.  
Automatic book cutting-off device for severing the stitching threads  
between the last signature of one book and the first signature of the next.
- E. Patent No. 2,601,113. June 17, 1952. 7 p.  
Improvements in an attachment for book sewing machines for preventing  
the sewing of signatures.

### VII. TRADE ASSOCIATIONS

- A. Book Manufacturing Institute  
25 West 43rd Street  
New York 36, New York  
Association of bookbinders for keeping members informed of news and  
developments in the trade.

### VIII. ENGINEERING COMPANIES

- A. F.P. Rosback Company  
Benton Harbor, Michigan  
Book binders' machinery and equipment.
- B. T.W. and C.B. Sheridan Company  
135 Lafayette  
New York, New York  
Machinery for all phases of bookbinding.

### IX. DIRECTORIES

- A. MacRae's Blue Book. Annual. \$17.50.  
MacRae's Blue Book  
18 East Huron Street  
Chicago 11, Illinois  
Approximately 40,000 manufacturing and industrial firms in the United  
States, their products and their financial ratings.

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# INDUSTRY PROFILES

## FISH OIL AND FISH MEAL

I. P. No. 66007

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## FISH OIL AND FISH MEAL: S.I.C. 2095

### A. PRODUCT DESCRIPTION

Fish oil and fish meal, made from fish and fish wastes.

### B. GENERAL EVALUATION

This industry would be established only where there are ample nearby supplies of the raw materials. The operation requires a moderately large capital but little technical skill. The products have multiple uses but have to compete with oils, animal feeds and fertilizers from a variety of sources. Prospects depend on the possibility of finding sufficient market outlets where the products can be profitably sold at competitive prices. Since the products are jointly produced it should be ascertained that there is a sufficient market for both of them.

### C. MARKET ASPECTS

1. USERS. Manufacturers of margarine, lower-grade cooking fats, shortening, soap, lubricating oils, paints, fungicide sprays, animal feed, fertilizers.
2. SALES CHANNELS AND METHODS. Sales to wholesalers and industrial users.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Though product is fairly easy to transport, freight cost is an important factor in limiting the market area. b. Export. market is international.
4. COMPETITION. a. Domestic Market. There is usually competition from similar products derived from other sources, and delivered price is the controlling factor. b. Export Market. As in the domestic market, delivered price is the decisive factor.
5. MARKET NEEDED FOR PLANT DESCRIBED. It is not feasible to estimate the size of the market needed in terms of population or other quantitative measure. The essential requirement is accessibility to areas where user industries are located.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY: 2,300 Tons of Meal, 2,000 Tons of Oil.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<b>Cost</b>
Land, 1 acre.	\$	--
Building, 50'x100'x25' production, 50'x100'x14' storage, 25'x25' boiler.		
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	\$200,000	
Other tools & equipmt.	18,000	
Furniture & fixtures	1,000	
Transportation equipmt.	6,000	
<b>Total (excl. Land)</b>		<b>\$225,000</b>

Principal Items: Boiler 200 hp., fish pump, dewatering screen, measuring machine, pre-breaker, cooker, multi-stage press, cake press, dryers (direct & indirect), refractoryless furnace, fan, disintegrator, grinder, 2 centrifugal oil separators, 3 elevators, 3 conveyors.

### b. WORKING CAPITAL

	<b>No. of Days</b>	
Direct Materials, Direct Labor, Mfg. Overhead (a)	60	\$ 50,000
Admin. Costs(b), Contingencies, Sales Costs (c)	30	3,200
Training Costs		1,000
<b>Total</b>		<b>\$ 54,200</b>

### c. TOTAL CAPITAL (EXCL. LAND) \$344,200

### 2. MATERIALS AND SUPPLIES

	<b>Annual Requirements</b>	<b>Annual Cost</b>
<b>a. Direct Materials</b>		
Raw fish	10,000 tons	\$160,000
Antibiotics & other chemicals		2,000
Bags	46,000 bags	9,200
Oil drums (55 gals.)	10,300 drums	67,000
<b>Total</b>		<b>\$238,200</b>

### b. Supplies

Lubricants & hand tools	\$	500
Maintenance & spare parts		6,000
Office supplies		300
<b>Total</b>		<b>\$ 6,800</b>

### 3. POWER, FUEL AND WATER

	<b>Annual Cost</b>
<b>a. Electric Power.</b> 200 hp. connected load.	\$ 5,000
<b>b. Fuel.</b> 50,000 gals. of oil.	\$ 6,000
<b>c. Water.</b> Production, sanitation, and fire protection.	\$ 200

### 4. TRANSPORTATION

	<b>Annual Operating Cost</b>
<b>a. Own Transport Equipment.</b> 5-ton truck.	\$ 1,800
<b>b. External Transport Facilities.</b> In and out shipments 50 tons a day. Plant should be located on a railroad siding and good highways.	

### 5. MANPOWER

	<b>Number</b>	<b>Annual Cost</b>
<b>a. Direct Labor</b>		
Skilled	2	\$ 10,000
Semi-skilled	2	8,000
Unskilled	3	9,000
<b>Total</b>	<b>7</b>	<b>\$ 27,000</b>
<b>b. Indirect Labor</b>		
Manager	1	\$ 10,000
Office	1	5,000
<b>Total</b>	<b>2</b>	<b>\$ 15,000</b>

**c. Training Needs.** Manager should be fully experienced. With 1 skilled worker he should be able to train employees and reach full production in 1 month.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

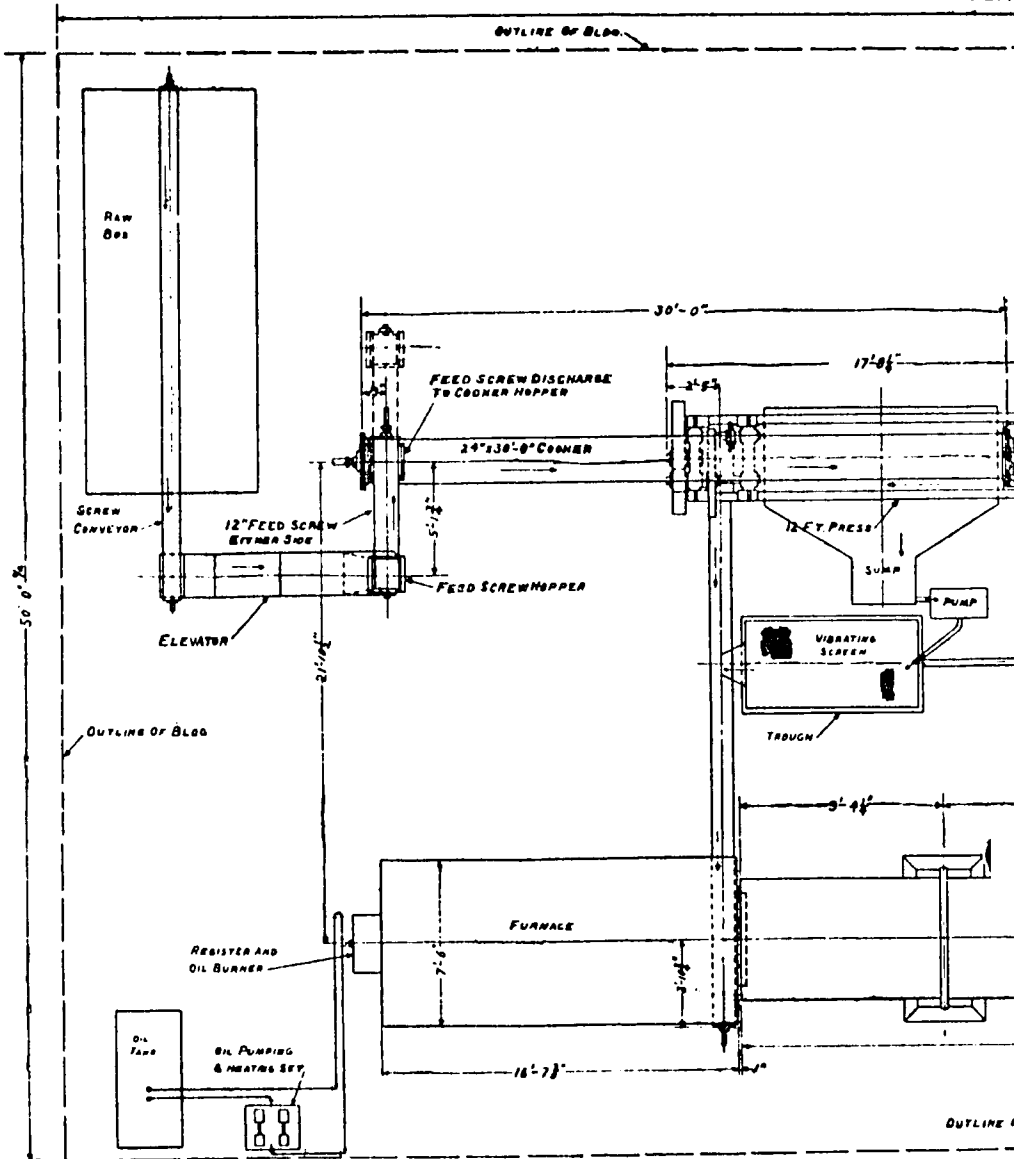
<b>a. Annual Costs</b>	
Direct Materials	\$238,200
Direct Labor	27,000
Manufacturing Overhead (a)	34,800
Admin. Costs (b), Contingencies	24,000
Sales Costs(c), Bad Debts	14,000
Depreciation on Fixed Capital	26,600
<b>Total Annual Costs</b>	<b>\$364,600</b>
<b>b. Annual Sales Revenue</b>	<b>\$518,400</b>

NOTES: (a) Includes Supplies, Power Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out Travel.

FISH OIL AND FISH MEAL: S.I.C. 2095

# FISH MEAL A

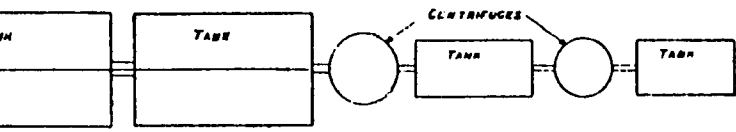
PLA



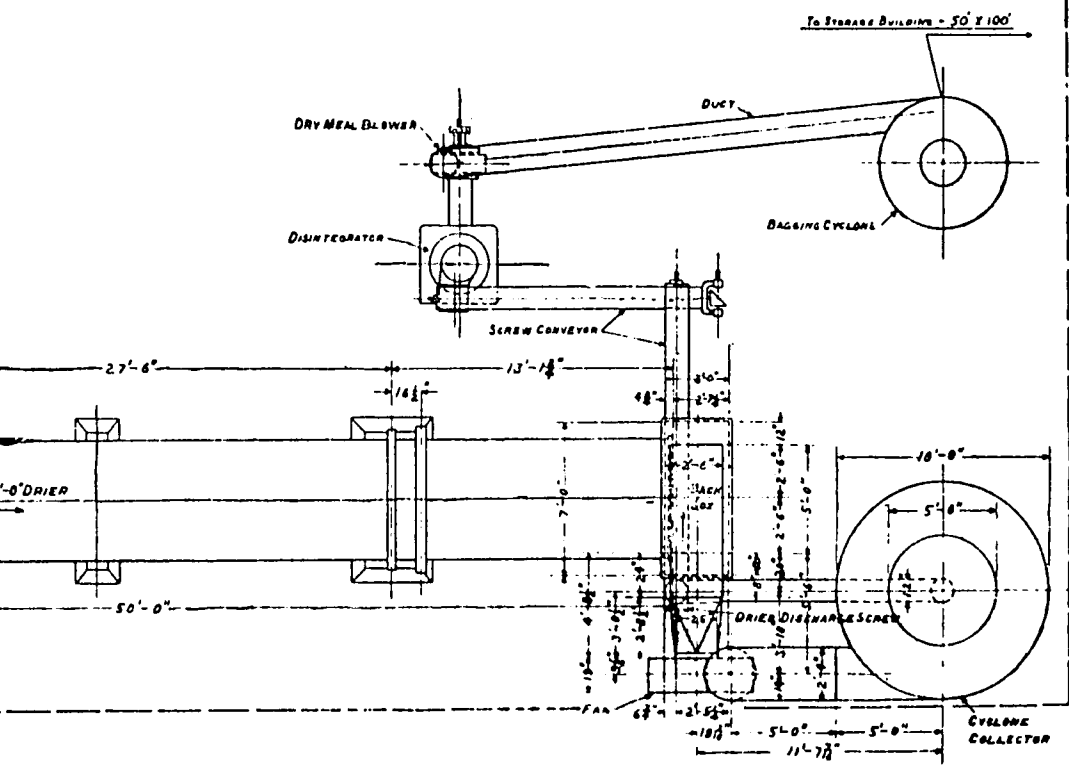
# H OIL : S.I.C. 2095

## T AND WORKFLOW

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### SETTLING TANKS & CENTRIFUGES



63



# FISH OIL AND FISH MEAL: S.I.C. 2095

## SELECTED REFERENCES

### I. TEXTBOOKS

- A. Marine Products of Commerce. 2nd Edition. D.K. Tressler. 1951.  
800 p. \$20.00.  
Reinhold Publishing Corporation  
430 Park Avenue  
New York 22, New York  
Comprehensive text covering all commercial products derived from the sea.  
Includes a section on fish meal and oil.

### II. PERIODICALS

- A. The Fishing Gazette. Monthly. \$10.00/year.  
Fishing Gazette Publishing Corporation  
461 Eighth Avenue  
New York 1, New York  
Contains facts and figures of the fishing trade.
- B. National Fisherman. Monthly. \$4.00/year.  
National Fisherman  
Goffstown, New Hampshire  
Contains information on new ideas and developments in the trade.

### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Fish Meal and Oil. IR-23856. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Preliminary technical data on the production of fish meal.

### IV. TECHNICAL PAPERS

- A. Fish Reduction Processes. Fishery Leaflet 126. 1956. Gratis.  
Fish and Wildlife Service  
U.S. Department of the Interior  
Washington, D.C. 20242  
Describes the various processes for fish reduction, types of equipment used, products resulting from the processes, and packaging necessary for each product and by-product.

## SELECTED REFERENCES (Continued)

### V. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$ .25 each.

- A. Patent No. 2,972,542. 1961. 2 p.  
Preparing deodorized fish meal and oil.
- B. Patent No. 2,877,122. 1959. 7 p.  
Method of dehydrating fish for manufacture of Meal, oil, and other products.
- C. Patent No. 2,844,476. 1958. 3 p.  
Process of comminuting and dehydrating fish into meal and related products, including oil.
- D. Patent No. 2,686,126. 1954. 3 p.  
Treatment of fish to produce meal and oil.

### VI. TRADE ASSOCIATIONS

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

### VII. ENGINEERING COMPANIES

- A. Edward Renneburg and Sons Company  
2637 Boston Street  
Baltimore, Maryland  
Producers of machinery for fish meal and fish oil production.
- B. The Cog Corporation  
4926 West Grand  
Chicago, Illinois  
Designers and producers of fish reduction machinery.

### VIII. DIRECTORIES

- A. List of Fishery Associations in the United States and Alaska. Annually.  
Gratis.  
Fish and Wildlife Service  
U.S. Department of the Interior  
Washington, D.C. 20242  
Contains national and regional associations of fisheries and the fishing industry.

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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## 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, DRIED AND SALTED

I. P. No. 66008

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## FISH, DRIED AND SALTED: S.I.C. 2031

### A. PRODUCT DESCRIPTION

The kind of fish processed will depend on the species caught locally. Scaling, removal of entrails and thorough washing are required before salting and drying. Packaging may be in transparent bags, cartons, wooden boxes, or other containers.

### B. GENERAL EVALUATION

This operation requires a steady supply of suitable fish, good transport facilities, and a population with a fairly high average income to provide a market. Processing techniques are simple, and the main requirement is control to assure that the work is thoroughly done and the product is of good quality. In many areas dried fish are produced by primitive methods and though the resultant product may be inferior in quality it may have a substantial price advantage that is difficult to overcome. Given a large enough market, this is a business with prospects of steady growth as population increases and incomes rise. It requires a fairly large initial capital. It seems to be an appropriate project for a group of existing small producers desiring to modernize their methods and expand production, or for a fishery cooperative.

### C. MARKET ASPECTS

1. USERS. Households, eating places.
2. SALES CHANNELS AND METHODS. Sales direct to wholesalers and large retailers. A brand name might be advantageous.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Good public transport facilities and careful handling and sometimes refrigeration are needed if the market is to extend beyond the local delivery area. If these are available sales in inland areas should be possible. b. Export. Some export to conveniently located nearby points may be possible in some cases, but the general export market is very small and limited to a few special products.
4. COMPETITION. a. Domestic Market. Competition from small producers may be keen. Competition from imports is likely only in exceptional cases. Competition from alternative foodstuffs will depend on relative prices and eating habits. b. Export Market. In overseas markets transport costs, customs duties and other charges usually rule out the possibility of meeting competition from domestic producers, except for a few specialities for which demand is small and sometimes comes mainly from expatriates.
5. MARKET NEEDED FOR PLANT DESCRIBED. The size of the population needed to absorb the production of this plant depends on eating habits, income levels, availability of fresh fish, etc. No estimate of the total population needed is possible in this case.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 300 Tons

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	Cost
Land. 1/2 acre.	\$ --
Building. One story, 100'x100', with 40'x40' refrigerator. Equipment, Furniture & Fixtures.	80,000
Prdn. tools & equipment.	\$ 47,000
Other tools & equipment.	\$ 4,300
Furniture & fixtures	700
Transportation equipment	3,000
<u>Total (excl. Land)</u>	<u>\$135,000</u>
Principal items. 6 drying ovens, 30 drying trees, 20 racks, cleaning tanks, cleaning tables, brine tanks, packing tables, hand trucks, hand tools, monorail conveyor, scales.	

### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead (a)	60	\$ 56,600
Admin. Costs (b), Contingencies, Sales Costs (c)	30	3,600
Training Costs		3,200
<u>Total Working Capital</u>		<u>\$ 63,400</u>

c. TOTAL CAPITAL (EXCL. LAND) \$198,400

### 2. MATERIALS AND SUPPLIES

a. <u>Direct Materials</u>	Annual Requirements	Annual Cost
Fish	500 tons	\$200,000
Salt	25 tons	500
Sugar	5 tons	500
Other additives		1,000
Packaging		10,000
<u>Total</u>		<u>\$212,000</u>

#### Supplies

Lubricants & hand tools	\$ 100
Cutting tools & abrasives	200
Maintenance & spare parts	2,000
Office supplies	200
<u>Total</u>	<u>\$ 2,500</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> 30 hp. connected load.	\$ 600
b. <u>Fuel.</u> Gas.	\$ 6,000
c. <u>Water.</u> 5 million gallons.	\$ 1,250

### 4. TRANSPORTATION

	Annual Operating Cost
a. <u>Own Transport equipment.</u> One ton pickup and delivery truck.	\$ 1,200
b. <u>External Transport Facilities.</u> In and out shipments average about 4 tons per day. Good highways needed.	

### 5. MANPOWER

a. <u>Direct Labor</u>	Number	Annual Cost
Skilled	3	\$ 15,000
Semi-skilled	3	12,000
Un-skilled	20	60,000
<u>Total</u>	<u>26</u>	<u>\$ 87,000</u>
b. <u>Indirect Labor</u>		
Manager and supervisor	2	\$ 16,000
Office	2	8,000
Truck driver	1	5,000
<u>Total</u>	<u>5</u>	<u>\$ 29,000</u>

c. Training Needs. Manager and supervisor  
must be fully experienced. With 3 skilled  
workers they should be able to train other  
men and reach full production in 30 days.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

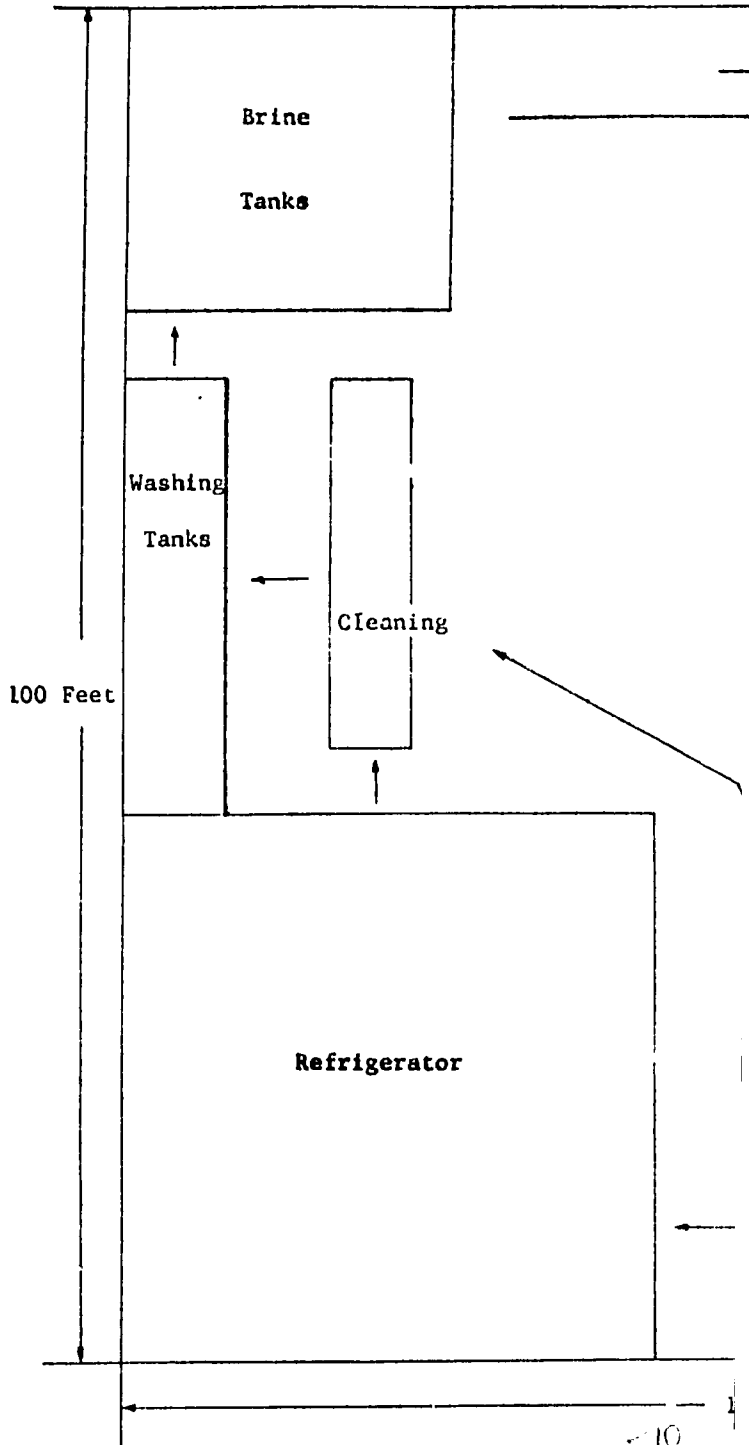
a. <u>Annual Costs</u>	
Direct Materials	\$212,000
Direct Labor	87,000
Manufacturing Overhead (a)	40,550
Admin. Costs (b). Contingencies	20,000
Sales Costs (c). Bad Debts	24,000
Depreciation on Fixed Capital	10,000
<u>Total</u>	<u>\$393,550</u>
b. <u>Annual Sales Revenue</u>	<u>\$500,000</u>

NOTES: (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

FISH, DRIED AND SALTED: S.I.C. 2031

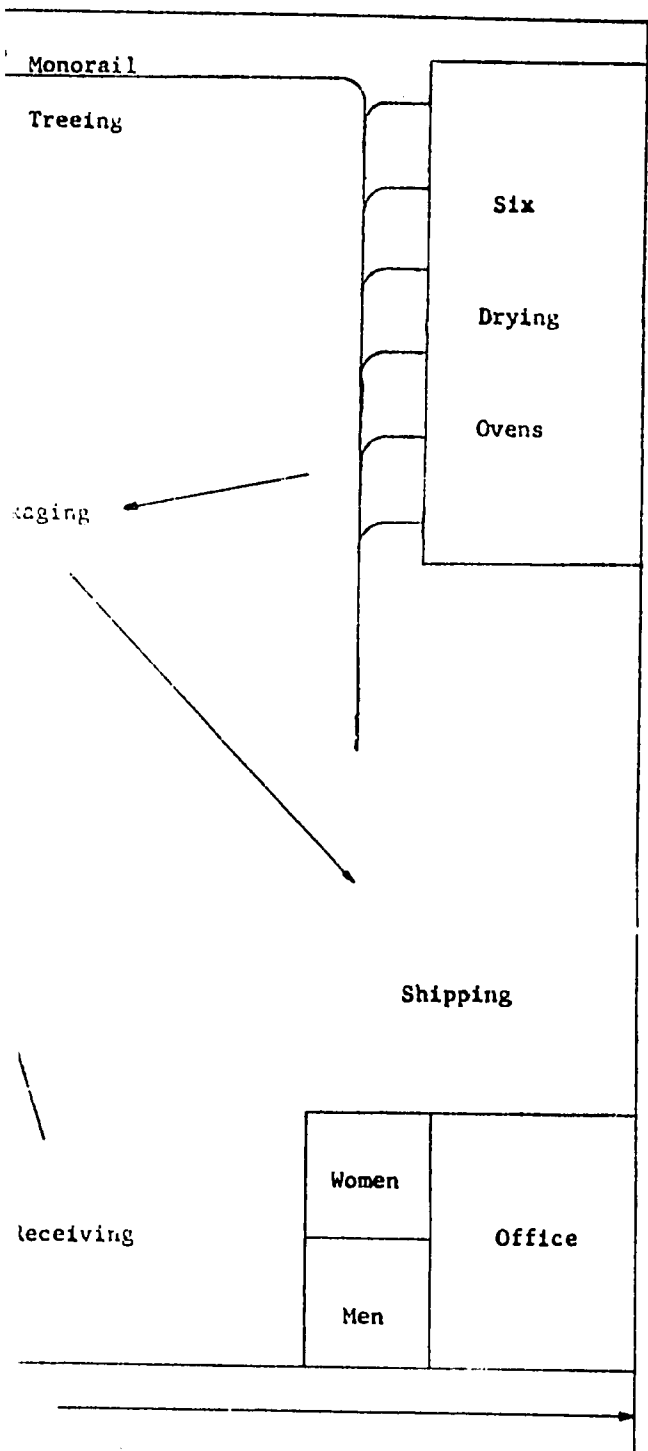
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PLANT LAYOUT



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ND WORKFLOW



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# FISH, DRIED AND SALTED: S.I.C. 2031

## SELECTED REFERENCES

### I. TEXTBOOKS

- A. Food Technology. Prescott and Proctor. 1937. 630 p. Illus. \$12.00.  
McGraw-Hill Publishing Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Comprehensive survey of sources, handling, and manufacture of principal commercial foods. Fish drying and salting are included.

### II. PERIODICALS

- A. Pacific Fisherman. Monthly. \$3.00/year.  
Miller Freeman Publications  
731 S.W. Oak Street  
Portland, Oregon

### III. OTHER PUBLICATIONS

- A. Marine Products of Commerce. 2nd edition. Lemon and Tressler.  
1956. 800 p. \$20.00  
Reinhold Publishing Corporation  
430 Park Avenue  
New York 22, New York  
Information on procuring and processing products from the sea. Section on drying and salting fish.

### IV. TECHNICAL PAPERS

- A. Fishery Periodicals. Gratis.  
Fish and Wildlife Service  
U.S. Department of the Interior  
Washington, D.C. 20242  
Contains a comprehensive list of papers on the fish industry.

### V. U.S. PATENTS

- Available U.S. Patent Office.  
Washington, D.C. 20231 \$ .25 each.
- A. Patent No. 2,930,139. 1960. 5 p.  
Drying in the preservation of fish.
- B. Patent No. 2,765,236. 1956. 4 p.  
Applying preservation techniques to fish.
- C. Patent No. 2,686,126. 1954. 3 p.  
Preservation of fish by drying.
- D. Patent No. 2,619,425. 1952. 7 p.  
The drying and defatting of fish.
- E. Patent No. 2,507,891. 1950. 4 p.  
Apparatus for salting fish and other meats.

SELECTED REFERENCES (Continued)

VI. TRADE ASSOCIATIONS

- A. Fishery Council  
118 South Street  
New York 38, New York

VII. ENGINEERING COMPANIES

- A. Arenco Machine Company, Inc.  
500 Hollister Road  
Teterboro, New Jersey  
Deheading and degutting machines.
- B. Technical Enterprises, Inc.  
31 South Street  
New York 4, New York  
Builds and installs complete plants.

VIII. DIRECTORIES

- A. List of fishery cooperatives in the United States and Alaska. **Gratis.**  
Fish and Wildlife Service  
U.S. Department of the Interior  
Washington, D.C. 20242  
Lists fishery cooperatives throughout the United States and Alaska.

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Springfield, Virginia 22151

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# INDUSTRY PROFILES

## UNFERMENTED GRAPE JUICE

I. P. No. 66009

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## UNFERMENTED GRAPE JUICE: Standard Industrial Classification 2033

### A. PRODUCT DESCRIPTION

Unfermented grape juice, unsweetened, not concentrated; in five gallon carboys, shipped to bottling plants for bottling in retail size bottles.

### B. GENERAL EVALUATION

This plant would need to be located near a grape growing area able to provide an assured and adequate supply of grapes. Since the juice has to settle for a four-month period initial working capital is fairly high and no income will accrue from sales during the first six months of operation. Total capital requirements are moderate and little skilled labor is needed. With the general increase in the consumption of fruit juices the prospects for a business of this kind seem reasonably good.

### C. MARKET ASPECTS

1. USERS. Juice bottlers.
2. SALES CHANNELS AND METHODS. Sales to bottling plants.
3. GEOGRAPHICAL EXTENT OF MARKET. Plant must be located close to the supply of grapes. Finished product is bulky and must be boxed for transport, but need not be refrigerated. Nation-wide distribution is possible. Plant would not ship abroad, except possibly into immediately surrounding territory.
4. COMPETITION. a. Domestic Market. Other fruit juices, possibly imported, would compete. b. Export Market. Plant would not ship abroad. Competition from well established large, foreign firms would be too strong, particularly since concentrates have been developed that reduce shipping costs considerably.
5. MARKET NEEDED FOR PLANT DESCRIBED. Consumption largely depends on income levels and drinking habits. Bottling plants serving a population of four to five million might absorb the output of the plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 125,000 Gallons

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>		<u>Cost</u>
Land. About 16,000 sq. ft.	\$	--
Building. One-story, 60'x80'		30,000
<u>Equipment, Furniture &amp; Fixtures.</u>		
Prodn. tools & equipmt.	\$27,000	
Other tools & equipmt.	1,300	
Stock of 4200 returnable crated carboys	15,400	
Furniture & fixtures	800	
<u>Total (excl. Land)</u>		<u>\$ 74,500</u>
Principal items. Conveyor, spraying equip- ment, crusher, kettle, press, press cloths and racks, juice tank, juice cloths and racks, pasteurizer, storing jugs, filter- ing equipment, siphoning equipment, packag- ing, boiler, 5 gal. carboys.		

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, 1 yr.'s supply of grapes		\$ 18,000
Direct Labor	180	13,000
Manufacturing Overhead(a)	180	12,200
Admin. Costs(b), Contingencies	180	3,000
Sales Costs(c)	30	850
<u>Total</u>		<u>\$ 47,050</u>

c. TOTAL CAPITAL (EXCL. LAND) \$121,550

### 2. MATERIALS AND SUPPLIES

	<u>Annual</u>	<u>Annual</u>
a. <u>Direct Materials</u>	<u>Requirements</u>	<u>Cost</u>
Grapes	1,500 tons	\$ 18,000

### b. Supplies

Lubricants & hand tools	\$	100
Filter cloths		300
Maintenance & spare parts		1,400
Office		200
<u>Total</u>		<u>\$ 2,000</u>

### 3. POWER, FUEL, WATER

	<u>Annual Cost</u>
a. <u>Electric Power.</u> Connected load about 20 hp.	\$ 600
b. <u>Fuel.</u> About 8,000 gals. oil annually.	\$ 1,000
c. <u>Water.</u> 3,200,000 gals. annually. Water must be potable.	\$ 800

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Grapes are delivered at plant. Shipments about 250 tons per month. Good highway needed.

### 5. MANPOWER

	<u>One-shift Operation</u>	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>			
Skilled		1	\$ 4,000
Semi-skilled		8	20,000
Unskilled		1	2,000
<u>Total</u>		<u>10</u>	<u>\$ 26,000</u>
b. <u>Indirect Labour</u>			
Manager		1	\$ 8,000
Office		1	4,000
Other		2	8,000
<u>Total</u>		<u>4</u>	<u>\$ 20,000</u>

- c. Training Needs. Manager should have long experience. With 1 skilled worker he should be able to do all labor training. Latter can be carried out without additional cost during initial six month production period.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 18,000
Direct Labor	26,000
Manufacturing Overhead(a)	24,400
Admin. Costs(b), Contingencies	6,000
Sales Costs(c). Bad Debts	10,200
Depreciation on Fixed Capital (including allowance for carboy losses)	6,000
<u>Total Annual Costs</u>	<u>\$ 90,600</u>
b. <u>Annual Sales Revenue</u>	<u>\$125,000</u>

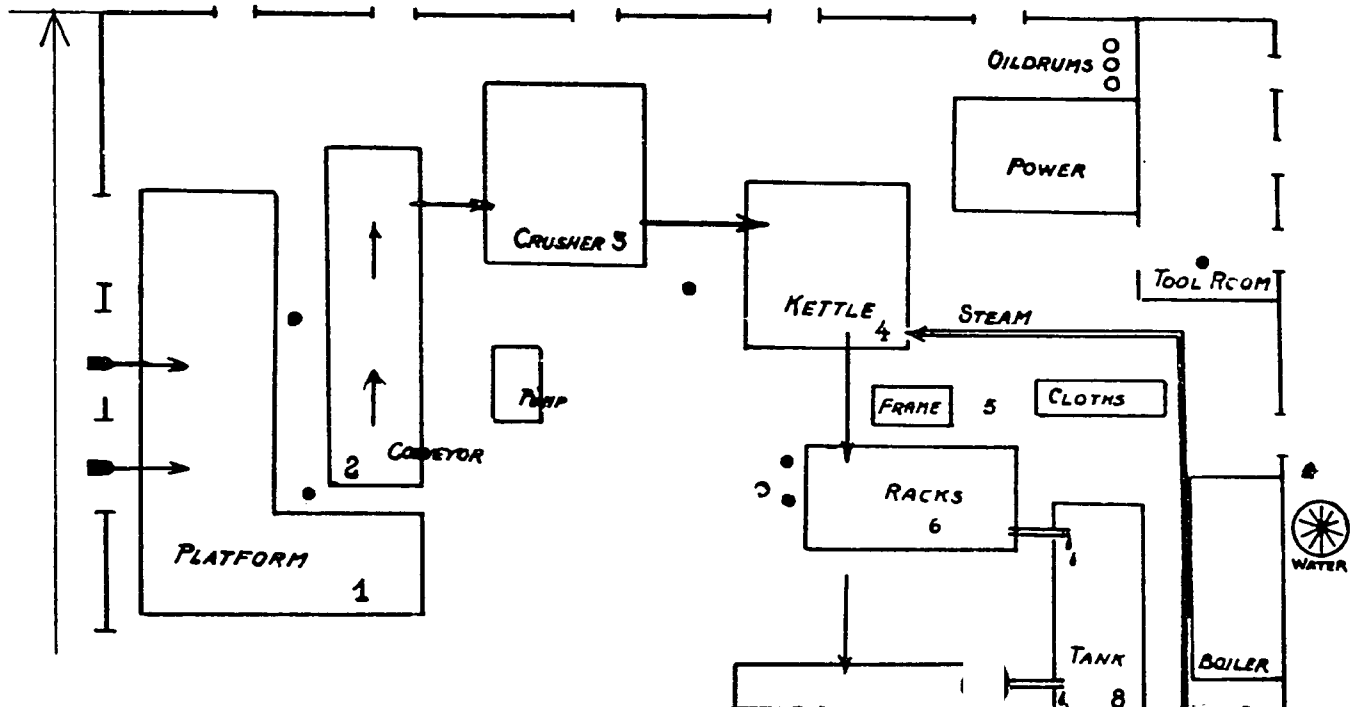
NOTES: (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

UNFERMENTED GRAPE JUICE: S.I.C. 2033

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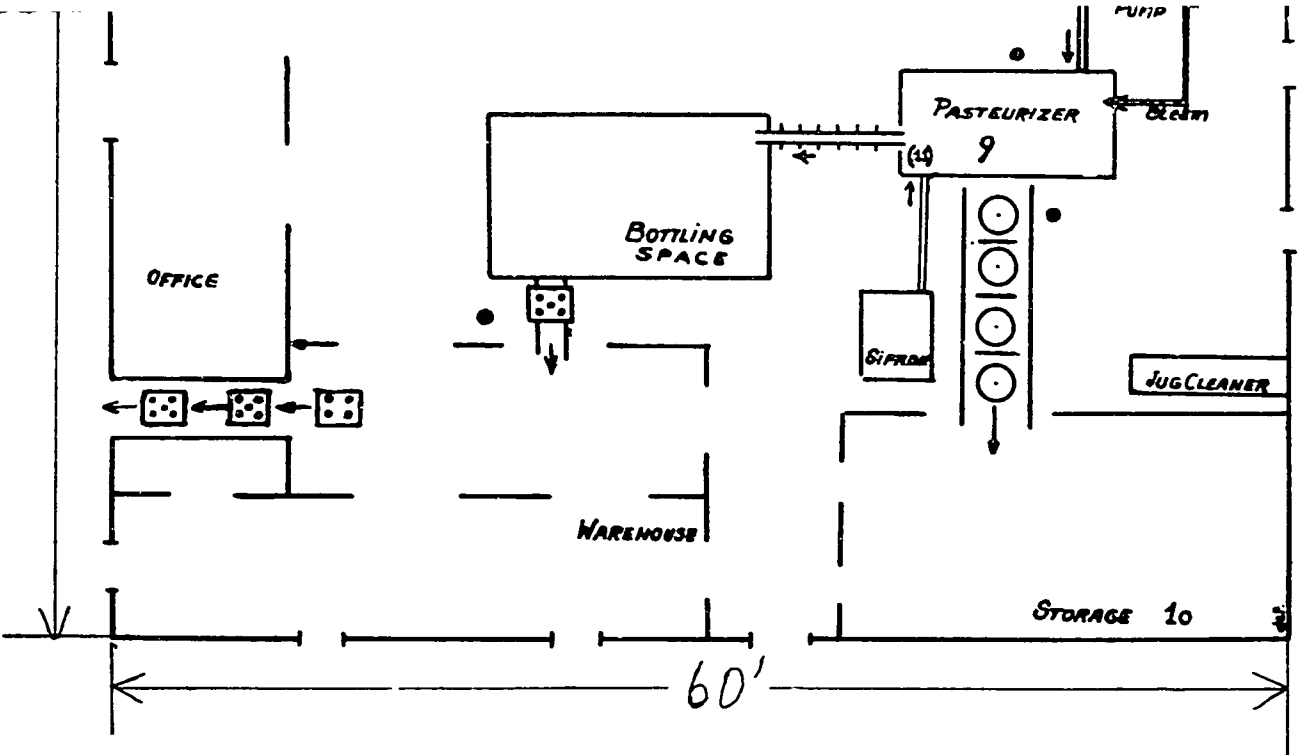
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ARROWS IND.



PLAN

UNFERMENTED





# UNFERMENTED GRAPE JUICE: S.I.C. 2033

## SELECTED REFERENCES

### I. TEXTBOOKS

- A. Fruit and Vegetable Juice Processing Technology. D.K. Tressler and M.A. Joslyn. 1961. 1,040 p. \$19.75.  
The A V I Publishing Company, Inc.  
P.O. Box 388  
Westport, Connecticut  
Comprehensive coverage of the technology of fruit and vegetable juice processing.
- B. Principles of Fruit Preservation. 2nd edition. T.N. Morris. 1947. 198 p. \$5.50.  
D. Van Nostrand Company, Inc.  
120 Alexander Street  
Princeton, New Jersey  
Devoted to fruit processing, including fruit juices.

### II. PERIODICALS

- A. National Bottlers' Gazette. Monthly. \$7.00/year.  
Keller Publishing Company  
9 East 35th Street  
New York 16, New York  
Covers the processing and merchandizing of soft drinks.

### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Unfermented Grape Juice. IR-16384. September 1961. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Requirements for establishing and operating plant to process 15 tons of unfermented grape juice per day.

### IV. OTHER PUBLICATIONS

- A. Fundamentals of Quality Control in the Food Industry. A. Kramer and B.A. Twigg. 1962. \$14.75.  
The A V I Publishing Company, Inc.  
P.O. Box 388  
Westport, Connecticut  
Comprehensive study of quality control in the food industry.

### V. TECHNICAL PAPERS

- A. The Chemical Composition of Ripe Concord Type Grapes. Bulletin No. 285. Gratis.  
New York State Agricultural Experiment Station  
Geneva, New York  
Deals with the above subject.

SELECTED REFERENCES (Continued)

VI. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$\$.25 each.

- A. Patent No. 2,928,744. 1960. 2 p.  
Preparation of fruit juices.
- B. Patent No. 2,903,372. 1959. 5 p.  
Method of processing grape juice.
- C. Patent No. 2,817,589. 1957. 4 p.  
Process for the production of fruit juice.
- D. Patent No. 2,614,048. 1952. 5 p.  
Method of extraction and treatment of fruit products.
- E. Patent No. 2,517,569. 1950. 5 p.  
Process of extracting and preserving the original flavors and food values of  
fruit juices.

VII. TRADE ASSOCIATIONS

- A. California Fruit Exchange  
1400 10th Street  
Sacramento 14, California

VIII. ENGINEERING COMPANIES

- A. Horix Manufacturing Company  
1384 Island Avenue  
Pittsburgh 4, Pennsylvania  
Complete line of bottling equipment.
- B. Minneapolis-Honeywell Manufacturing Company  
Philadelphia 44, Pennsylvania  
Complete line of gauges and instruments.

IX. DIRECTORIES

- A. Canners Directory. Published odd numbered years. \$3.50.  
National Canners Association  
1133 20th Street, N.W.  
Washington, D.C. 20006  
Lists canners of food, including juices.

## 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

## BABY BEDS, PENS, AND BASSINETS

I. P. No. 66010

*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.

A. PRODUCT DESCRIPTION

These products are made of wood and finished in lacquer. Casters and a thin waterproof pad are supplied with each unit. They are fully assembled and then disassembled for shipment knocked down in corrugated cartons.

B. GENERAL EVALUATION

Capital requirements are modest and labor skills needed are not of a high order. Good management and supervision are required to ensure that product quality is maintained. Market potential should be carefully investigated, since these products, though in common use, are fairly durable and are frequently purchased secondhand, especially where the income level is low.

C. MARKET ASPECTCS

1. USERS Households, hotels, institutions.
2. SALES CHANNELS AND METHODS. Sales usually to furniture stores and specialist stores selling articles for babies. Direct sales are occasionally made to institutions.
3. GEOGRAPHICAL EXTENT OF MARKET. Shipping is easy but freight charges generally make it impracticable to ship very long distances. These products are almost never exported since they can be made almost anywhere, or some adequate substitute can be produced locally.
4. COMPETITION. Small establishments may sometimes be able to compete in their own localities, though in general the factory can produce a better article for the price.
5. MARKET NEEDED FOR PLANT DESCRIBED. This will vary greatly with the income level and child-rearing practices. Where these products are commonly used a total population of the order of a million should provide a sufficient market.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 5,000 Beds, 5,000 Pens, 5,000 Bassinets.

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	<u>Cost</u>
Land, 25,000 sq. ft.	\$ --
Building, One story, 80'x100'	48,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt.	\$30,000
Other tools & equipmt.	3,000
Furniture & fixtures	1,000
<u>Total (excl. Land)</u>	<u>\$ 82,000</u>

Principal Items. Cut off saw, rip saw, jointer, plane, backknife lathe, turning sander, table sander, three drum sander, drum sander, 2 trim saws, band saw, shaper, horizontal boring machine, upright boring machine, chain mortiser, tenon machine, glue pots, assembly presses, spray booth, sewing machine.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 26,800
Admin. Costs(b), Contingencies, Sales Costs (c)	30	2,000
Training Costs		2,300
<u>Total</u>		<u>\$ 31,100</u>

### c. TOTAL CAPITAL (EXCL. LAND) \$113,100

### 2. MATERIALS AND SUPPLIES

a. <u>Direct Materials</u>	<u>Quantity</u>	<u>Annual Cost</u>
Lumber	400,000 ft.	\$ 55,000
Casters	60,000	2,300
Paint & lacquer		2,500
Waterproof pad material		3,000
Corrugated boxes		3,000
<u>Total</u>		<u>\$ 65,500</u>

### b. Supplies

Lubricants & hand tools	\$ 250
Cutting tools & abrasives	500
Maintenance & spare parts	1,250
Glue	250
Sandpaper	550
Office supplies	200
<u>Total</u>	<u>\$ 3,000</u>

### 3. POWER, FUEL AND WATER

a. <u>Electric Power</u> , Connected load about 65 hp.	<u>Annual Cost</u>
	\$ 2,000
b. <u>Fuel</u> , Scrap lumber & sawdust.	--
c. <u>Water</u> , Production & general purposes.	\$ 200

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Products are bulky. Goods highways needed, and rail facilities, if possible.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>		
Skilled	4	\$ 20,000
Semi-skilled	6	24,000
Unskilled	6	18,000
<u>Total</u>	<u>16</u>	<u>\$ 62,000</u>
b. <u>Indirect Labor</u>		
Manager & supervisor	2	\$ 16,000
Office	2	8,000
Maintenance	1	4,000
<u>Total</u>	<u>5</u>	<u>\$ 28,000</u>

- c. Training Needs. Manager and supervisor must be experienced. With 3 skilled workers they can train other workers and reach full production in 30 days.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 65,500
Direct Labor	62,000
Manufacturing Overhead(a)	33,200
Admin. Costs(b), Contingencies	9,000
Sales Costs(c), Bad Debts	15,000
Depreciation on Fixed Capital	7,800
<u>Total Annual Costs</u>	<u>\$192,500</u>
b. <u>Annual Sales Revenue</u>	<u>\$240,000</u>

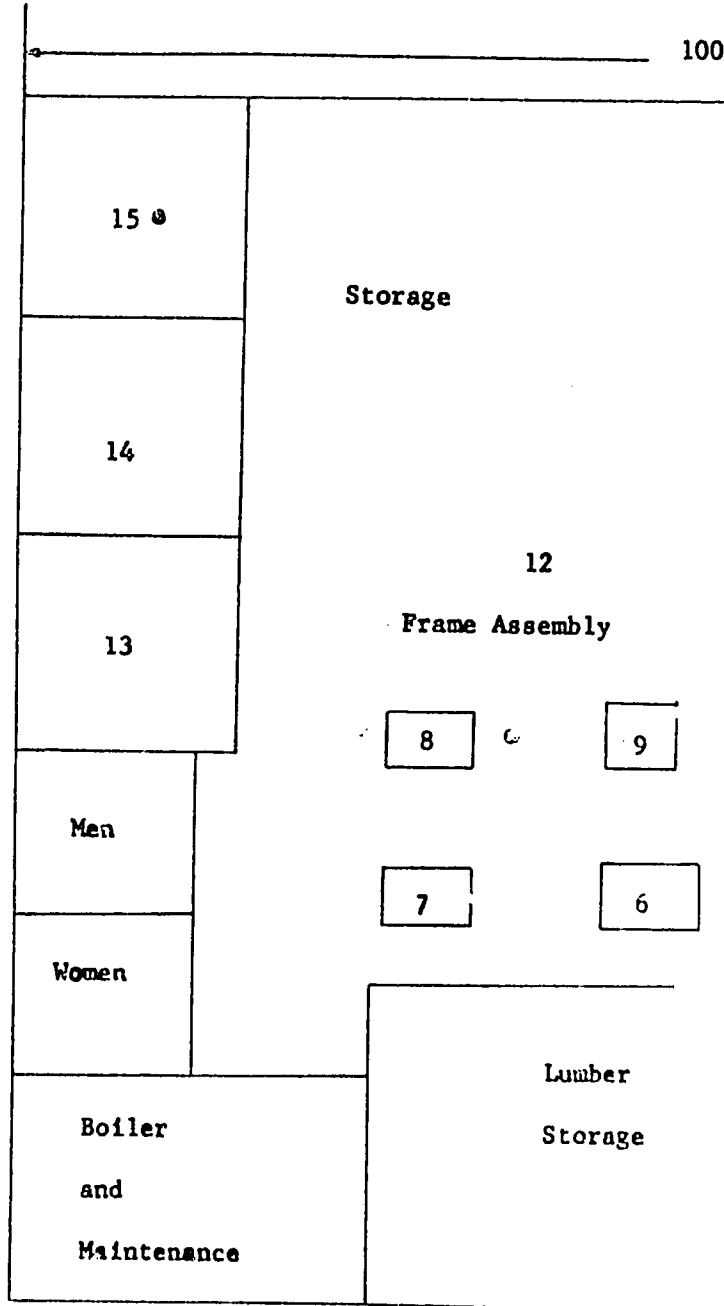
NOTES: (a) Includes Supplies, Power, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

BABY BEDS, PENS, AND BASSINETS: S.I.C. 2511

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BABY BEDS, PENS

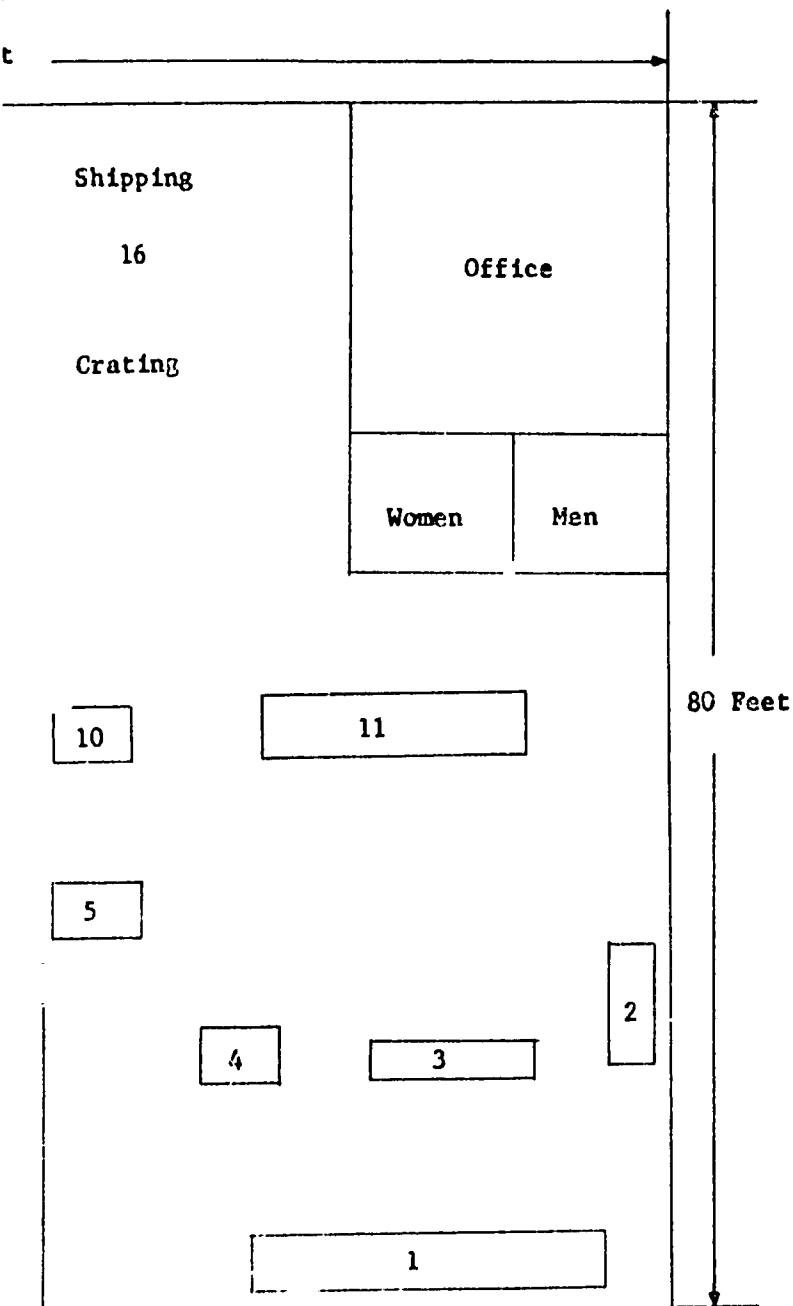
PLANT LAYO



- |                |                              |
|----------------|------------------------------|
| 1. Cut-off saw | 5. Shaper                    |
| 2. Rip saw     | 6. Bandsaw                   |
| 3. Jointer     | 7. Horizontal boring machine |
| 4. Trim saw    | 8. Upright boring machine    |

D BASSINETS : S.I.C. 2511

AND WORK FLOW



- |                    |                          |
|--------------------|--------------------------|
| 9. Chain mortiser  | 13. Spray booth          |
| 10. Tenon machine  | 14. Cut pads             |
| 11. Table sander   | 15. Sew pads             |
| 12. Frame assembly | 16. Crating and shipping |

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BABY BEDS, PENS, CRIBS AND BASSINETS : S. I. C. 2511

SELECTED REFERENCES

I. TEXTBOOKS

- A. How to make Children's Furniture and Play Equipment. Illus. 1963. \$6.50.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Detailed presentation of materials and construction plans for children's toys.

II. PERIODICALS

- A. Hitchcock's Wood Working. Monthly. \$4.00/year.  
Hitchcock Publishing Company  
222 East Willow Avenue  
Wheaton, Illinois  
A leading publication in the woodworking field, covering all phases of the subject.
- B. The Wood Worker. Monthly \$ 2.00/year.  
S. H. Smith Company  
2232 North Meridian  
Indianapolis, Indiana  
Provides subscribers with news on developments, processes, methods, markets, in the woodworking field.

III. GOVERNMENT PUBLICATIONS, U.S.

- A. Wood Furniture Industry. TB-118.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523

IV. TECHNICAL PAPERS

- A. Cutting Techniques for Woodworkers. Thomas D. Perry. 1955. 53p. \$.50.  
Hitchcock Publishing Company  
Wheaton, Illinois  
A Wood Working Digest. Technical Series Reprint No. 107. Descriptions of cutting techniques in woodworking and the tools used therein.
- B. Furniture Finishing. Harold B. Gatslick. 1956. 82 p. \$1.00.  
Hitchcock Publishing Company  
Wheaton, Illinois  
A Wood Working Digest. Technical Series Reprint No. 108. Descriptions of finishing techniques in woodworking and the materials and tools used to implement them.

## SELECTED REFERENCES (Continued)

### V. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$.25 each.

- A. Patent No. D-165,763. Jan. 29, 1952. 2 p.  
Design for a bassinet.
- B. Patent No. D-165,644. Jan. 8, 1952. 2 p.  
Design for infant's crib.
- C. Patent No. D-161,377. Dec. 26, 1950. 2 p.  
Design for juvenile crib or bed.
- D. Patent No. D-152-002. Dec. 7, 1948. 3 p.  
Design for collapsible crib.
- E. Patent No. D-147,787, Nov. 4, 1947. 2 p.  
Design for baby cribs.

### VI. TRADE ASSOCIATIONS

- A. National Association of Furniture Manufacturers  
666 Lake Shore Drive  
Chicago 11, Illinois  
Keeps members informed on latest developments, processes, techniques,  
and marketing in furniture field.

### VII. ENGINEERING COMPANIES

- A. Henry Keck Associates  
660 South Fairs Oaks Avenue  
Pasadena, California  
Design of products and machines for appearance and utility.

### VIII. DIRECTORIES

- A. Hitchcock's Wood Working Directory. 1959. 250 p. \$10.00.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Lists producers of furniture and other wood products, machinery  
manufacturers for the industry, and trade associations.

## 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.

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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

## BISCUITS AND CRACKERS

I. P. No. 66011

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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.

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.

## BISCUITS AND CRACKERS: Standard Industrial Classification 2052

### A. PRODUCT DESCRIPTION

Soda crackers, sprayed crackers, vanilla wafers, semisweet biscuits.

### B. GENERAL EVALUATION

The equipment listed can produce any kind of biscuit or cracker, to suit customers' tastes. Capital requirements are moderate, and highly-skilled labor is not needed. Biscuits and crackers are often produced cheaply in small, ill-equipped factories, and these may offer competition among the poorer members of the community. Competition may also come from the products of large, well-known concerns. To compete successfully it is generally necessary to have a high-quality product, with a well-chosen brand name and active salesmanship.

### C. MARKET ASPECTS

1. USERS. Households, eating places.
2. SALES CHANNELS AND METHODS. Sales to wholesalers and large retailers. An attractive brand name and energetic sales methods are necessary.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transport presents no problem, transport costs normally low in proportion to product value. Market may be nation-wide. b. Export. Market for biscuits and crackers is world-wide, but special export packing is often required for countries with hot and humid climates.
4. COMPETITION. a. Domestic Market. Competition may come from small producers and bakeries, as well as from internationally-known large producers. b. Export Market. This plant is on too small a scale to compete effectively with large-scale, well-known producers in the general export market, though some regional exports may be possible.
5. MARKET NEEDED FOR PLANT DESCRIBED. An urban population of about a million people would, in most cases, be sufficient to consume the output of this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 1,040,000 Pounds.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<u>Cost</u>
Land, 1/2 acre.		\$ --
Building, One story, 48'x125'.		36,000
Equipment, Furniture & Fixtures.		
Prod'n. tools & equipment.	\$68,500	
Other tools & equipmt.	6,500	
Furniture & fixtures	800	
Transportation equipmt.	2,400	78,200
Total (excl. Land)		<u>\$114,200</u>

Principal Items. Dough brake, cutting machine, sheeter, rotary molding machine, oven 27"x60-1/2", cooling conveyor 50', oil spraying machine, mixer (2 barrel), pans scales, water meter, refrigerator, sacks, measuring equipment, handling equipment, packaging equipment.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 24,300
Admin. Costs(b), Contingencies, Sales Costs(c)	30	3,700
Training Costs		1,200
Total		<u>\$ 29,200</u>

**c. TOTAL CAPITAL (EXCL. LAND) \$143,200**

### 2. MATERIALS AND SUPPLIES

	<u>Annual Requirements</u>	<u>Annual Cost</u>
<b>a. Direct Materials</b>		
Flour	624,000 lbs.	\$ 37,500
Shortening	117,000 lbs.	14,100
Yeast	520 lbs.	100
Sugar	234,000 lbs.	23,400
Salt	9,360 lbs.	500
Soda	4,160 lbs.	200
Invert syrup	15,600 lbs.	1,900
Non-fat drymilk	7,800 lbs.	1,300
Eggs	15,600 lbs.	2,800
Ammonium bicarbonate	390 lbs.	100
Packaging materials		10,000
Total		<u>\$ 91,900</u>

### b. Supplies

Lubricants & hand tools	\$ 200
Cutting tools & abrasives	50
Maintenance & spare parts	2,150
Office supplies	200
Total	<u>\$ 2,600</u>

### 3. POWER, FUEL AND WATER

	<u>Annual Cost</u>
<b>a. Electric Power.</b> 7-1/2 hp. connected load.	\$ 400
<b>b. Fuel.</b> For baking.	\$ 500
<b>c. Water.</b> 125,000 gallons.	\$ 100

### 4. TRANSPORTATION

	<u>Annual Operating Cost</u>
<b>a. Own Transport Equipment.</b> One pickup and delivery truck.	\$ 1,200
<b>b. External Transport Facilities.</b> In and out shipments average about 4 tons a day. Good highways necessary.	

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
<b>a. Direct Labor</b>		
Skilled	3	\$ 15,000
Semi-skilled	1	4,000
Unskilled	2	6,000
Total	6	<u>\$ 25,000</u>
<b>b. Indirect Labor</b>		
Manager	1	\$ 9,000
Office	1	5,000
Sales clerk - truck	2	10,000
Total	4	<u>\$ 24,000</u>

**c. Training Needs.** Manager should be fully experienced. With 3 skilled workers he should be able to train others and reach full production in 30 days.

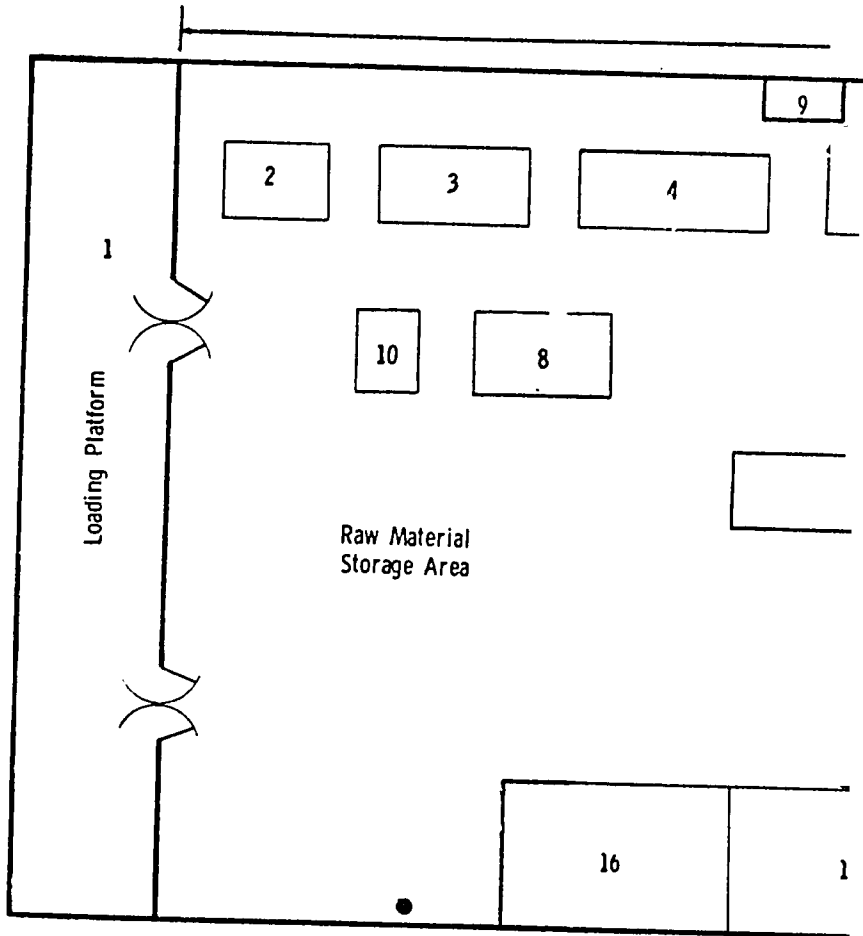
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>	
Direct Materials	\$ 91,900
Direct Labor	25,000
Manufacturing Overhead(a)	28,800
Admin. Costs(b), Contingencies	20,000
Sales Costs(c), Bad Debts	24,000
Depreciation on Fixed Capital	10,000
Total Annual Costs	<u>\$199,700</u>
<b>b. Annual Sales Revenue</b>	<u>\$260,000</u>

NOTES. (a) Includes Supplies, Power, Fuel, water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

# BISCUITS AND

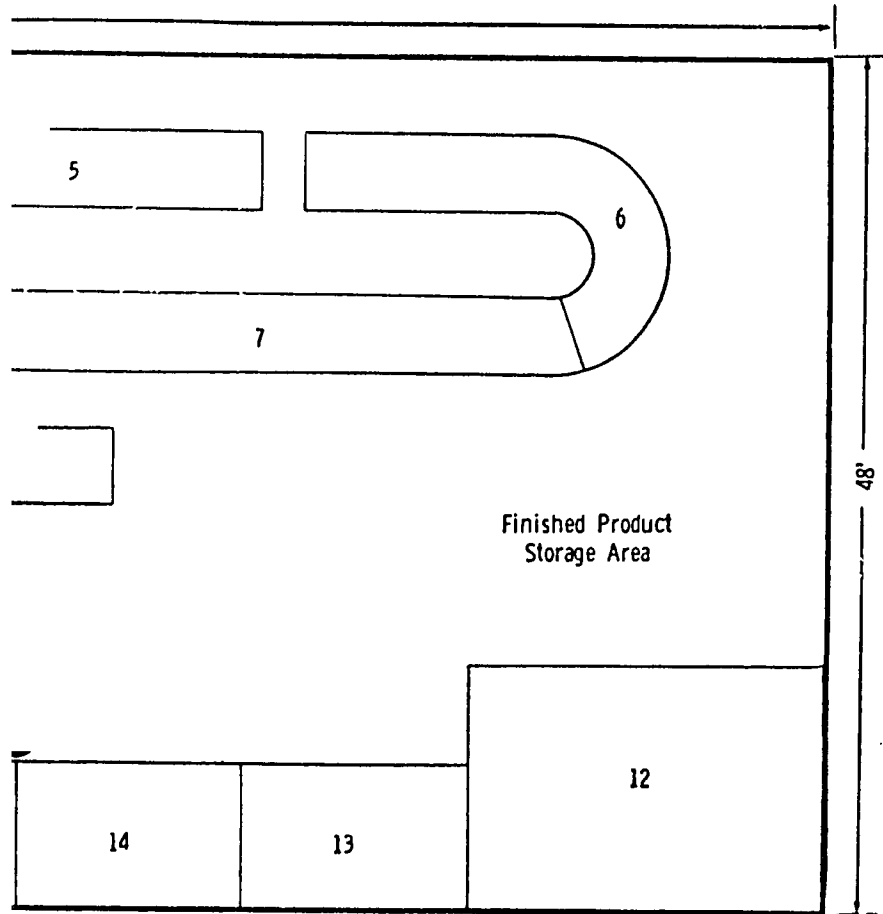
## PLANT LAY



- |                             |                     |
|-----------------------------|---------------------|
| 1. Receiving Platform       | 7. Cooling Conveyor |
| 2. Flour Dump & Scales      | 8. Proofing Area    |
| 3. Dough Mixer              | 9. Water Flow Meter |
| 4. Dough Sheeter and Cutter | 10. Refrigerator    |
| 5. Oven                     | 11. Packing Area    |
| 6. Takeoff and Shingler     | 12. Retail Stores   |

CKERS : S.I.C. 2052

ND WORKFLOW



- 13. Office
- 14. Mens Locker Room
- 15. Womens Locker Room
- 16. Boiler Room

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## BISCUITS AND CRACKERS: S.I.C. 2052

### SELECTED REFERENCES

#### I. TEXTBOOKS

- A. Biscuit and Cracker Production. R.H. Bohn. 1957. Illus. \$15.00.  
American Trade Publishing Company  
71 Vanderbilt Avenue  
New York 17, New York  
Management and processes for the production of biscuits and crackers.
- B. Bakery Technology and Engineering. S.A. Metz. 1960. \$15.00.  
The A V I Publishing Co., Inc.  
P.O. Box 388  
Westport, Connecticut  
General treatise on the engineering aspect of the baking industry.

#### II. PERIODICALS

- A. Biscuit and Cracker Baker. Monthly. \$3.00/year.  
American Trade Publishing Company  
71 Vanderbilt Avenue  
New York 17, New York  
News, new developments, processes, products, in the biscuit and cracker industry, as well as packaging and business.
- B. Baking Industry. Bi-weekly. \$3.00/year. (U.S.A.). \$10.00 (Foreign).  
Clissold Publishing Company  
105 West Adams Street.  
Chicago 3, Illinois  
News of the baking industry, including design, compounding, mixing, baking, decorating, displaying, and selling of baked goods.

#### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Biscuits and Crackers. TI-83. Nov. 1960. 35 p. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Presents general picture for establishing a bakery for producing biscuits and crackers.

#### IV. OTHER PUBLICATIONS

- A. Digest of Pointers on Cooking Starch. T.A. Whitey. May 1959 issue of Food Processing. p. 45. Gratis.  
Putman Publishing Company  
111 East Delaware Place  
Chicago 11, Illinois  
Cooking of starch in food processing must be closely controlled.

SELECTED REFERENCES (Continued)

V. TECHNICAL PAPERS

- A. Job Descriptions for Bakery Products Industry. 1939. 347 p. illus. \$1.00  
Catalog. No. L7.16:B17.  
Superintendent of Documents  
Government Printing Office  
Washington, D.C. 20402

VI. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231                      \$.25 each.

- A. Patent No. 2,929,541. March 22, 1960. 6 p.  
A method of forming biscuits from a blanket of dough, to simulate in  
appearance rolls that are spirally wound.
- B. Patent No. 2,589,908. March 18, 1952. 5 p.  
Cutter for crackers and biscuit cutting and embossing machine.
- C. Patent No. 2,547,118. April 3, 1951. 7 p.  
Relates to cutting and embossing mechanism for biscuit dough and the  
like.

VII. TRADE ASSOCIATIONS

- A. Biscuit and Cracker Manufacturers' Association of America  
20 North Wacker Drive  
Chicago 6, Illinois  
Supplies members with news and information on latest developments  
in biscuit and cracker industry.
- B. American Institute of Baking  
400 East Ontario Street  
Chicago 11, Illinois  
News and information for baking industry.

VIII. ENGINEERING COMPANIES

- A. Baker Perkins, Inc.  
1000 Hess Street  
Saginaw, Michigan  
Bakery products engineering.

IX. DIRECTORIES

- A. Thomas' Wholesale Grocery and Kindred Trades Register.  
1800 p. \$10.00.  
Thomas Publishing Company  
461 Eighth Avenue  
New York 1, N.Y.  
Directory of wholesale grocery and related trades in the United States.

## 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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## 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

## ORANGE JUICE, CHILLED, IN WAXED CONTAINERS

I. P. No. 66012

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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.

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.

## ORANGE JUICE, CHILLED, IN WAXED CONTAINERS: S.I.C. 2033

### A. PRODUCT DESCRIPTION

Single strength orange juice in one-quart waxed containers.

### B. GENERAL EVALUATION

This operation requires an adequate and assured supply of locally produced oranges. The plant operates on a ten-hour a day basis for about 160 days a year. Capital requirements are large. Apart from machinery and equipment maintenance, operations are simple and require little skilled labor. Orange juice in waxed containers is usually sold only within a rather restricted area, as it must be shipped in refrigerated trucks and cars. It is normally more economical to ship orange juice in bulk or to ship the fruit over very long distances and put it into containers locally. Therefore, it is usually necessary to have a large concentration of population, with a fairly high income level, to provide a market for the output envisaged. The prospects for successful operation will depend on the existence of such an outlet and the vigor with which sales promotion for what in many areas will be a novel product is pursued. It may be possible to sell the orange peelings for fertilizer and feed stock.

### C. MARKET ASPECTS

1. USERS. Households, eating and drinking places.
2. SALES CHANNELS AND METHODS. Sales to wholesalers and large retailers. An attractive brand name is desirable. Active sales promotion and display advertising usually essential.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Usually rather localised, as juice will normally be sent in bulk rather than small containers to distant points, where it will be put in small containers locally, thus reducing transport costs and difficulties. b. Export. There is virtually no export possibility for this product because of the high cost involved in transporting in a comparatively flimsy container a product which must be kept refrigerated and handled carefully.
4. COMPETITION. a. Domestic Market. The product will need to be competitive in price with frozen and canned juice and the fresh fruit. b. Export Market. As mentioned in paragraph 3 above, there is virtually no export market for this product.
5. MARKET NEEDED FOR PLANT DESCRIBED. An urban concentration of several million people with a moderately high living standard would be needed to provide a market for this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE 10 HOUR-SHIFT OPERATION: 20,500,000 WAXED CONTAINERS

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	Cost
Land. 4 acres.	\$ --
Building. One story, 21,000 sq. ft.	126,000
Equipment, Furniture & Fixtures.	
Prodn. tool & equipmt.	\$270,000
Other tools & equipmt.	6,000
Furniture & fixtures	1,000
Transportation equipmt.	100,000
Total (excl. Land)	<u>\$503,000</u>

Principal items. Conveyors, elevators, fruit bins, roller graders, scald tank, washers, distribution belt, roller spreader, roll sizers, 8 extractors, screw conveyor, empty carton feed belt, stainless steel tanks, pumps, heat exchangers, refrigeration compressor, condensers, brine chillers, stainless steel filling equipment, cold room, boiler 61 hp. 125 p.s.i., storage tank and peel meal equipment.

#### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead (a)	60	\$910,000
Admin. Costs (b), Contingencies, Sales Costs(c)	30	11,300
Training Costs		2,200
Total		<u>\$923,500</u>

#### c. TOTAL CAPITAL (EXCL. LAND) \$1,426,500

### 2. MATERIALS AND SUPPLIES

#### a. Direct Materials

	Annual Requirements	Annual Cost
Oranges	1,600,000 bxs.	\$4,640,000
Containers, waxed	20,500,000 qts.	455,000
Cases, cardboard and labels	812,000	128,000
Total		<u>\$5,223,000</u>

#### b. Supplies

Lubricants & hand tools	\$ 200
Cutting tools & abrasives	400
Maintenance & spare parts	6,000
Gas, oil & maintenance	20,100
Office supplies	300
Total	<u>\$ 27,000</u>

### 3. POWER, FUEL AND WATER

#### a. Electric power. Connected load

165 hp.	<u>\$ 1,800</u>
---------	-----------------

#### b. Fuel. 50,000 gals. oil.

	<u>\$ 6,000</u>
--	-----------------

#### c. Water. Washing fruit, boiler and sanitary purposes.

	<u>\$ 400</u>
--	---------------

### 4. TRANSPORTATION

#### a. Own Transport Equipment.

10 tractors and 15 trailers.	<u>\$ 10,000</u>
------------------------------	------------------

#### b. External Transport Facilities. Fruit must be trucked to the plant. Good highway needed.

### 5. MANPOWER

#### a. Direct Labor

	Number	Annual Cost
Skilled	3	\$ 12,000
Semi-skilled	17	56,700
Unskilled	17	45,300
Total	<u>37</u>	<u>\$114,000</u>

#### b. Indirect Labor

Manager & supervisor	2	\$ 18,000
Office & inspector	6	22,000
Truck drivers	11	36,700
Total	<u>19</u>	<u>\$ 76,700</u>

#### c. Training Needs. Manager and supervisor must have years of experience. With 3 skilled workers, they should be able to train all workers and reach full production in 2 weeks.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

#### a. Annual Costs

Direct Materials	\$5,223,000
Direct Labor	114,000
Manufacturing Overhead(a)	121,900
Admin. Costs (b), Contingencies	75,000
Sales Costs(c), Bad Debts	60,000
Depreciation on Fixed Capital	59,000
Total Annual Costs	<u>\$5,652,900</u>

#### b. Annual Sales Revenue

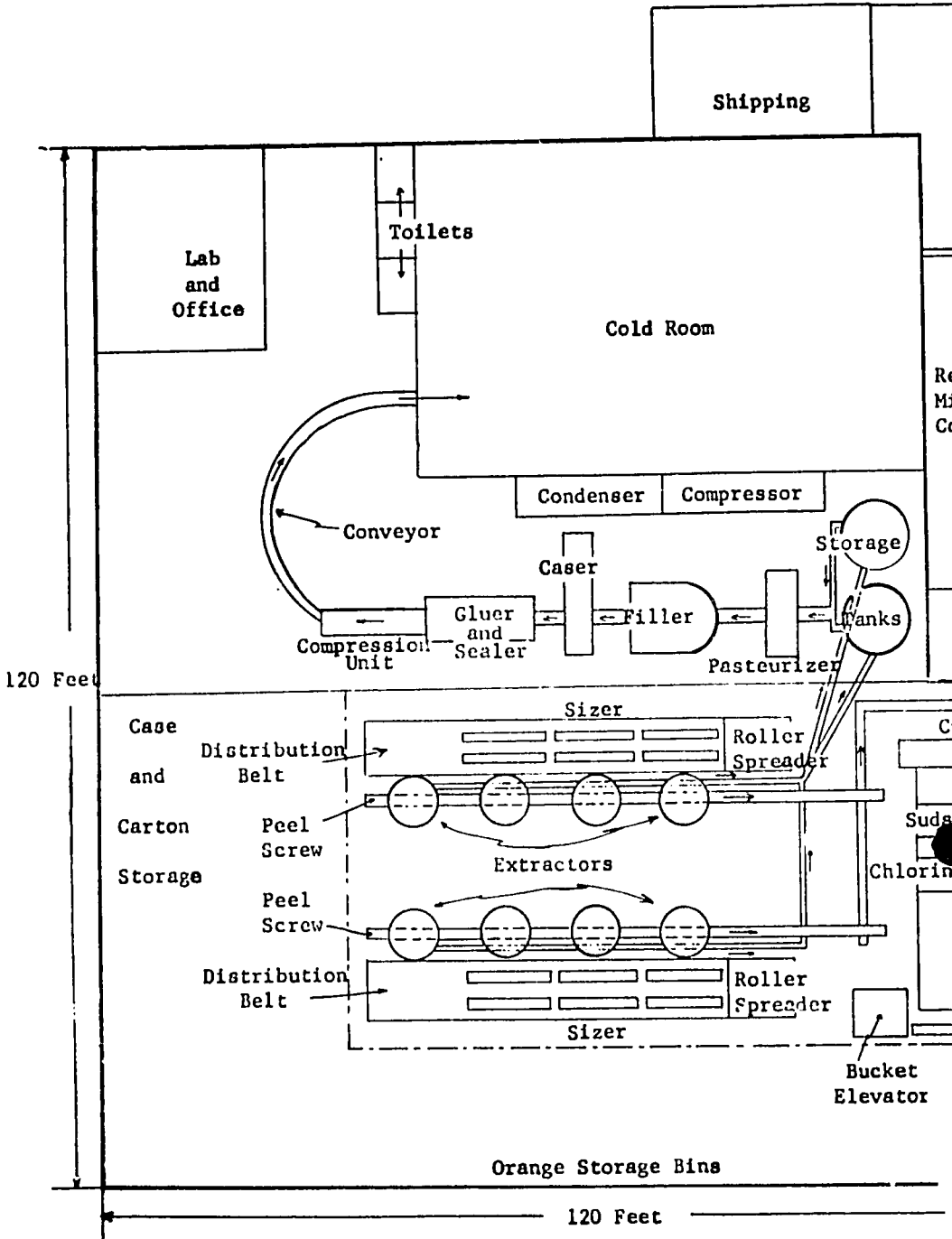
	<u>\$6,150,000</u>
--	--------------------

NOTES. (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

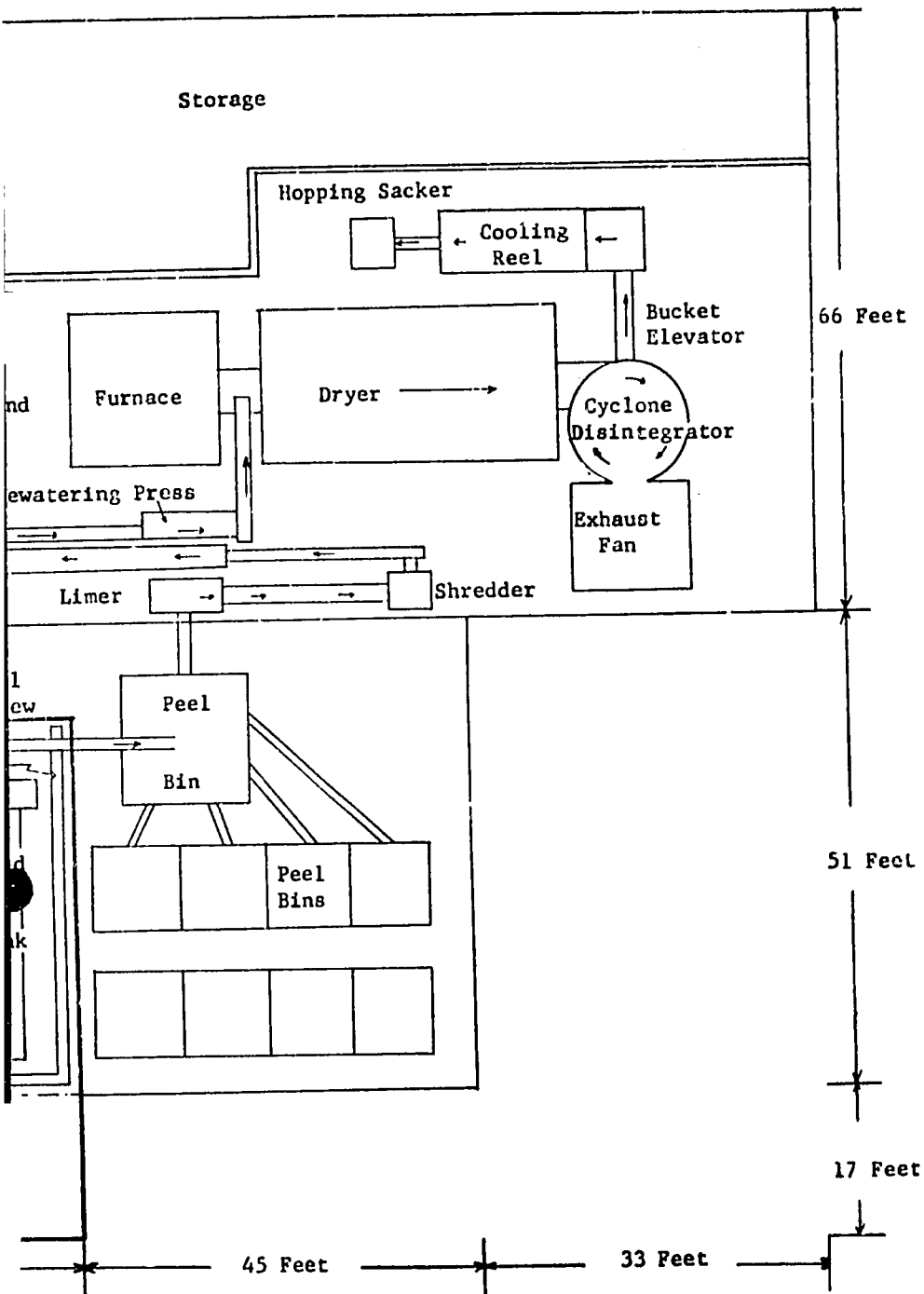
ORANGE JUICE, CHILLED, IN WAXED CONTAINERS: S.I.C. 2033

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PLANT LAYOUT



# WORKFLOW





ORANGE JUICE IN WAXED CONTAINERS: S.I.C. 2033

SELECTED REFERENCES

I. TEXTBOOKS

- A. Citrus Products. J.B.S. Braverman. 1949. 438 p. Illus. \$12.00.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York 1, New York  
Canning citrus fruit products. Utilization of citrus peels.
- B. Principles of Fruit Preservation. T.N. Morris. 2nd Edition. 1947. 198 p.  
\$5.50.  
D. Van Nostrand Company, Inc.  
120 Alexander Street  
Princeton, New Jersey  
Canning fruits, fruit juices, and jellies.

II. GOVERNMENT PUBLICATIONS. U.S.

- A. Orange Juice. TI-21. April 1958. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Plant requirements for the processing of citrus products.

III. OTHER PUBLICATIONS

- A. Commercial Canning in Florida. Bulletin No. 117. August 1960. Gratis  
State of Florida  
Department of Agriculture  
Tallahassee, Florida  
Description of the canning industry in Florida including citrus fruits  
canning.

IV. TECHNICAL PAPERS

- A. Shipping Takes Know-How. Gratis.  
Quick Frozen Foods  
E.W. Williams Publications, Inc.  
82 Wall Street  
New York 5, New York  
Paper on the shipping of citrus products.

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# INDUSTRY PROFILES

## SALTED PEANUTS

I. P. No. 66013

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## SALTED PEANUTS: S.I.C. 2034

### A. PRODUCT DESCRIPTION

Shelled, roasted and salted Virginia-type peanuts, packed in small cellophane envelopes.

### B. GENERAL EVALUATION

Salted peanuts are a semi-luxury food. The type of packaging increases the cost of the item. Although peanuts are produced in many areas, and neither the level of skill nor the amount of capital required for the operation of the plant is of a high order, demand for the product may be confined to a small section of the community. The plant is fully automatic, including an automatic packaging device. The peanuts are not the cheapest variety, Spanish peanuts, which are processed without removing the brown skins, but the somewhat more expensive Virginia variety.

### C. MARKET ASPECTS

1. SALES CHANNELS. Sales to wholesalers for sale to stores and vending machine operators.
2. GEOGRAPHICAL EXTENT OF MARKET, a. Domestic. Transportation costs are low. Care has to be taken in boxing the envelopes of nuts to avoid crushing them in transit or storage. Distribution may be nation-wide. b. Export. Market is world-wide. Care must be taken in boxing and in not exposing the product to great heat for too long a period.
3. COMPETITION. a. Domestic Market. In many countries nuts are consumed in non-processed form rather than as a salted confection. Where an established market for salted peanuts exists, imports might compete. b. Export Market. The plant might export to immediately surrounding areas. Size of the plant would not allow for large export trade.
4. MARKET REQUIRED FOR PLANT DESCRIBED. The size of the population required to support the output of this plant depends primarily upon the food habits of the population and the level of income. Where demand already exists and where imports are no major threat, a population of two to three million should consume the output of this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 500 Tons.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<u>Cost</u>
Land, 10,000 sq. ft.	\$	--
Building, Two-story, including storage, 40'x80'.		19,200
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	\$32,000	
Other tools & equipmt.	1,000	
Furniture & fixtures	1,000	34,000
Total (excl. Land)		\$ 53,200
Principal Items. Peanut sheller, shaker-grader, bucket elevator, roaster, thermo color control with indicating dial, tilting type colling car with track, baffled hopper for storage & curing, whole nut blancher, nut frialator, cooling table, packaging machine.		

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 62,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,600
Training Costs		3,200
Total		\$ 67,800

c. TOTAL CAPITAL (EXCL. LAND) \$121,000

### 2. MATERIALS AND SUPPLIES

	<u>Annual Requirements</u>	<u>Annual Cost</u>
a. Direct Materials		
Raw peanuts	1,000 tons	\$320,000
Salt	15 tons	300
Cooking oil		3,000
Packaging paper		2,000
Total		\$325,300
Supplies		
Lubricants & hand tools		\$ 200
Maintenance & repair parts		800
Office supplies		200
Total		\$ 1,200

### 3. POWER, FUEL, WATER

	<u>Annual Cost</u>
a. Electric Power. Connected load about 40 hp.	\$ 900
b. Fuel. Natural or coal gas is preferable for roasting, though oil may be used. Temperature control is easier with gas. Annual cost estimated at \$800. Fuel for heating, if necessary, about \$400 a year.	\$ 1,200
c. Water. For sanitation & fire protection.	\$ 100

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Total in and out shipments about 160 tons a month. Good highway needed.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
a. Direct Labor		
Skilled	2	\$ 10,000
Semi-skilled	3	12,000
Unskilled	2	5,000
Total	7	\$ 28,000
b. Indirect Labor		
Manager	1	\$ 8,000
Office	2	7,000
Total	3	\$ 15,000
c. Training Needs. Manager must be experienced. With aid of 1 skilled worker, he should be able to do all labor training. Plant should reach full production in 2 months.		

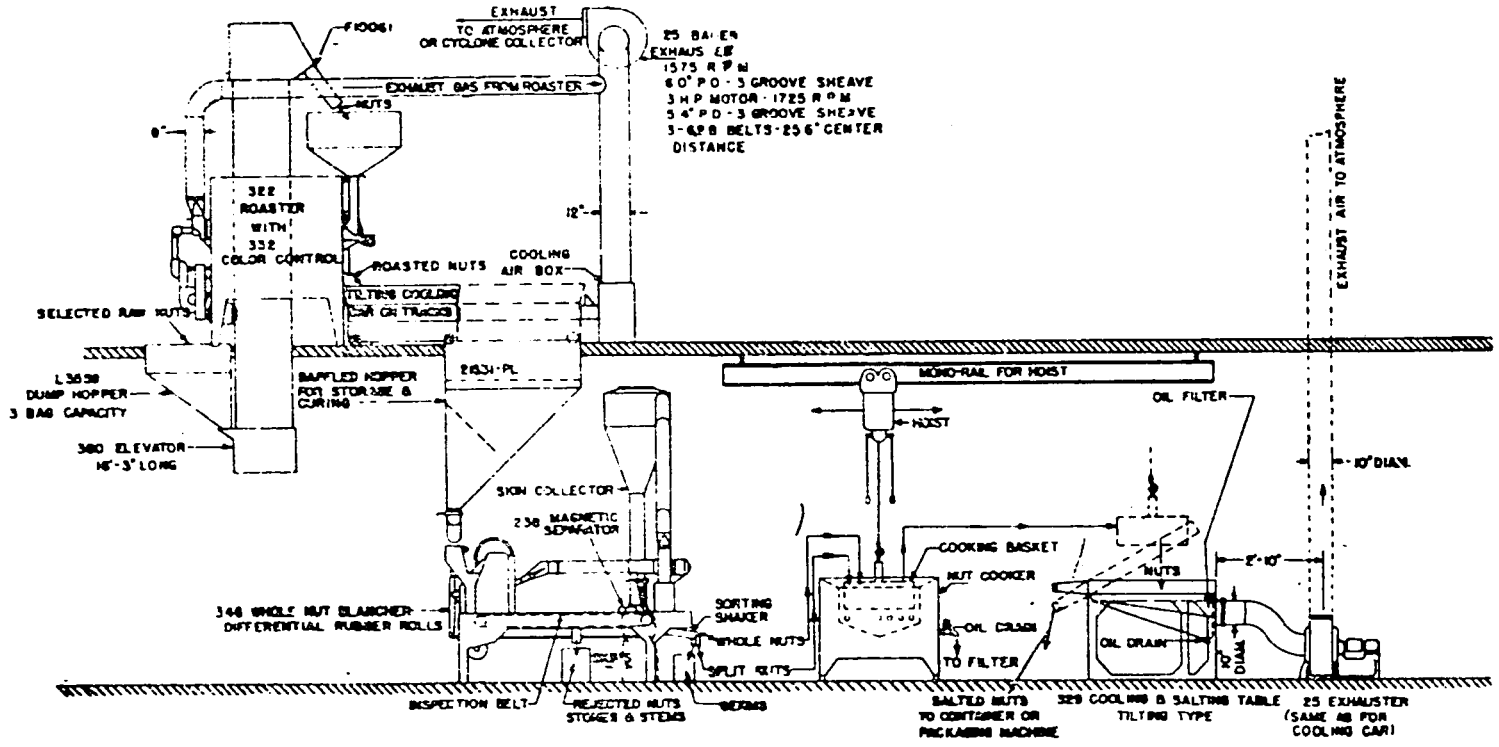
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	\$325,300
Direct Labor	28,000
Manufacturing Overhead (a)	18,400
Admin. Costs(b), Contingencies	10,000
Sales Costs (c), Bad Debts	21,000
Depreciation on Fixed Capital	4,300
Total Annual Costs	\$407,000
b. Annual Sales Revenue	\$530,000

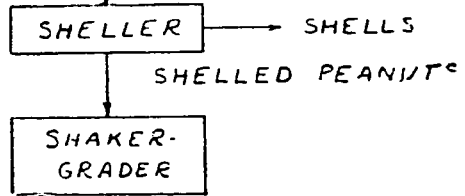
NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

SALTED PEANUTS: S.I.C. 2071

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RAW PEANUTS



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Fig

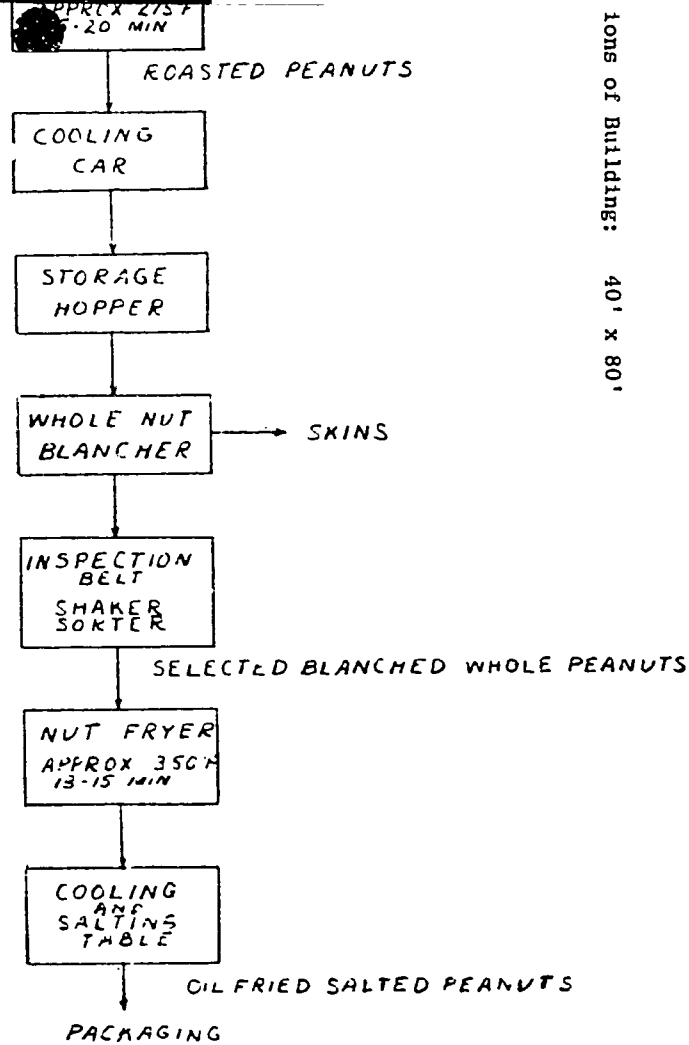
D

P

ROASTED PEANUTS: S.I.C. 2071

LAYOUT AND WORK FLOW

Dimensions of Building: 40' x 80'



///



# SALTED PEANUTS: S. I. C. 2071

## SELECTED REFERENCES

### I TEXTBOOKS

- A. Abstract Bibliography of the Chemistry and Technology of Peanuts. N. J. Morris. 1949. 231 p. \$5.00  
Southern Regional Research Laboratory  
New Orleans, Louisiana

### II. PERIODICALS

- A. Peanut Journal and Nut World. Monthly. \$3.00/year.  
Peanut Journal Publishing Company  
Suffolk, Virginia  
Serves those concerned with the production and marketing of peanuts and other nuts.

### III. OTHER PUBLICATIONS

- A. Salted Peanuts for Food. 1943. 6 p. Gratis.  
Nut Salters and Processers  
New York, New York

### IV. TECHNICAL PAPERS

- A. Analysis of Peanut Shelling Industry. Catalog No. A 1821134. 1956. 30 p. Illus. \$.30.  
Superintendent of Documents  
Government Printing Office  
Washington 25, D.C.

### V. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$.25 each.

- A. Patent No. 2,813,029. 1957 1 p.  
Peanut preparation for consumption.
- B. Patent No. 2,742,364. 1956. 2 p.  
Processing of nut meats.
- C. Patent No. 2,643,190. 1953. 3 p.  
Process for roasting and salting nuts.
- D. Patent No. 2,494,717. 1950. 2 p.  
Peanut products and processes.
- E. Patent No. 2,469,078. 1949. 2 p.  
Salted nuts and process for preparing same.

SELECTED REFERENCES (Continued)

VI. TRADE ASSOCIATIONS

- A. Peanut and Nut Salters Association  
4500 College Avenue  
College Park, Maryland
- B. National Peanut Council  
1120 Connecticut Avenue, N.W.  
Washington, D.C.

VII. ENGINEERING COMPANIES

- A. Foster D. Snell, Inc.  
29 West 15th Street  
New York, New York.  
Consulting engineers and designers of plants for producing salted peanuts.
- B. Bauer Brothers company  
1717 Sheridan Avenue  
Springfield, Ohio  
Manufacturers of peanut processing equipment.
- C. J. C. Pitman and Sons, Inc.  
Concord, New Hampshire  
Manufacturers of peanut dryers.

VIII. DIRECTORIES

No suitable directory pertaining to the salted peanut industry available.

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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# INDUSTRY PROFILES

## QUICK-FROZEN FISH

I. P. No. 66014

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## QUICK-FROZEN FISH: Standard Industrial Classification 2036

### A. PRODUCT DESCRIPTION

Locally available fish quick-frozen and packaged for sale.

### B. GENERAL EVALUATION

An assured supply of suitable locally-caught fish is essential. Capital requirements are moderate. Marketing possibilities will depend on existence of refrigeration facilities in households and restaurants and, outside the plant's own delivery area, on availability of refrigerated shipping facilities. An export market is unlikely unless the area produces special or particularly good quality fish. A careful study of market potential should be made before undertaking this project.

### C. MARKET ASPECTS

1. USERS. Households and eating establishments.
2. SALES CHANNELS AND-METHODS. Sales to wholesalers and large retailers.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Depends on extent to which refrigeration facilities exist and, outside delivery range of plant's own refrigerated tractor-trailer, on availability of refrigerated shipping facilities. b. Export. For certain types of fish of high value market is world-wide.
4. COMPETITION. a. Domestic Market. Fresh fish likely to provide keen competition where it is readily available. b. Export Market. Possibility of entering export market depends on type of fish caught and delivered cost.
5. MARKET NEEDED FOR PLANT DESCRIBED. Depends on eating habits, relative price compared with meat and poultry, availability of fresh fish, export possibilities, etc. Not feasible to estimate market size in terms of total population.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 2,500,000 Pounds

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	Cost
Land. 1/2 acre.	--
Building. One-story 75'x90'.	\$ 40,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt. \$41,000	
Other tools & equipmt. 7,500	
Furniture & fixtures 1,500	
Transportation equipmt. 30,000	80,000
<u>Total (excl. Land)</u>	<u>\$120,000</u>

Principal items: Sharp freeze room, frozen fish storage room, 2 electric scalers, 4 weighing scales, washing vats, work tables, 2 hand trucks, 12 freezing racks.

### b. WORKING CAPITAL

	No. of days	
Direct Materials, Direct Labor, Mfg. Overhead (a)	60	\$ 88,600
Admin. Costs (b), Contingencies, Sales Costs (c)	30	3,250
Training Costs		2,000
<u>Total</u>		<u>\$ 93,850</u>

c. TOTAL CAPITAL (EXCL. LAND) \$213,850

### 2. MATERIALS AND SUPPLIES

a. <u>Direct Materials</u>	Annual Requirements	Annual Cost
Fresh fish	3,250,000 lbs.	\$390,000
Ice	120 tons	500
Packaging materials		50,000
<u>Total</u>		<u>\$440,500</u>

### b. Supplies

Lubricants & hand tools	\$ 200
Cutting tools & abrasives	100
Maintenance & spare parts	2,000
Office supplies	200
<u>Total</u>	<u>\$ 2,500</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> Connected load about 100 hp.	\$ 1,000
b. <u>Fuel.</u> For heating office, if necessary.	\$ 100
c. <u>Water.</u> For production, sanitation and fire protection.	\$ 200

### 4. TRANSPORTATION

	Annual Operating Cost
a. <u>Own Transport Equipment.</u> Refrigerated tractor-trailer.	\$ 3,000
b. <u>External Transport Facilities.</u> In and out shipments average about 12 tons per day. Good highway, and railroad facilities, if possible.	

### 5. MANPOWER

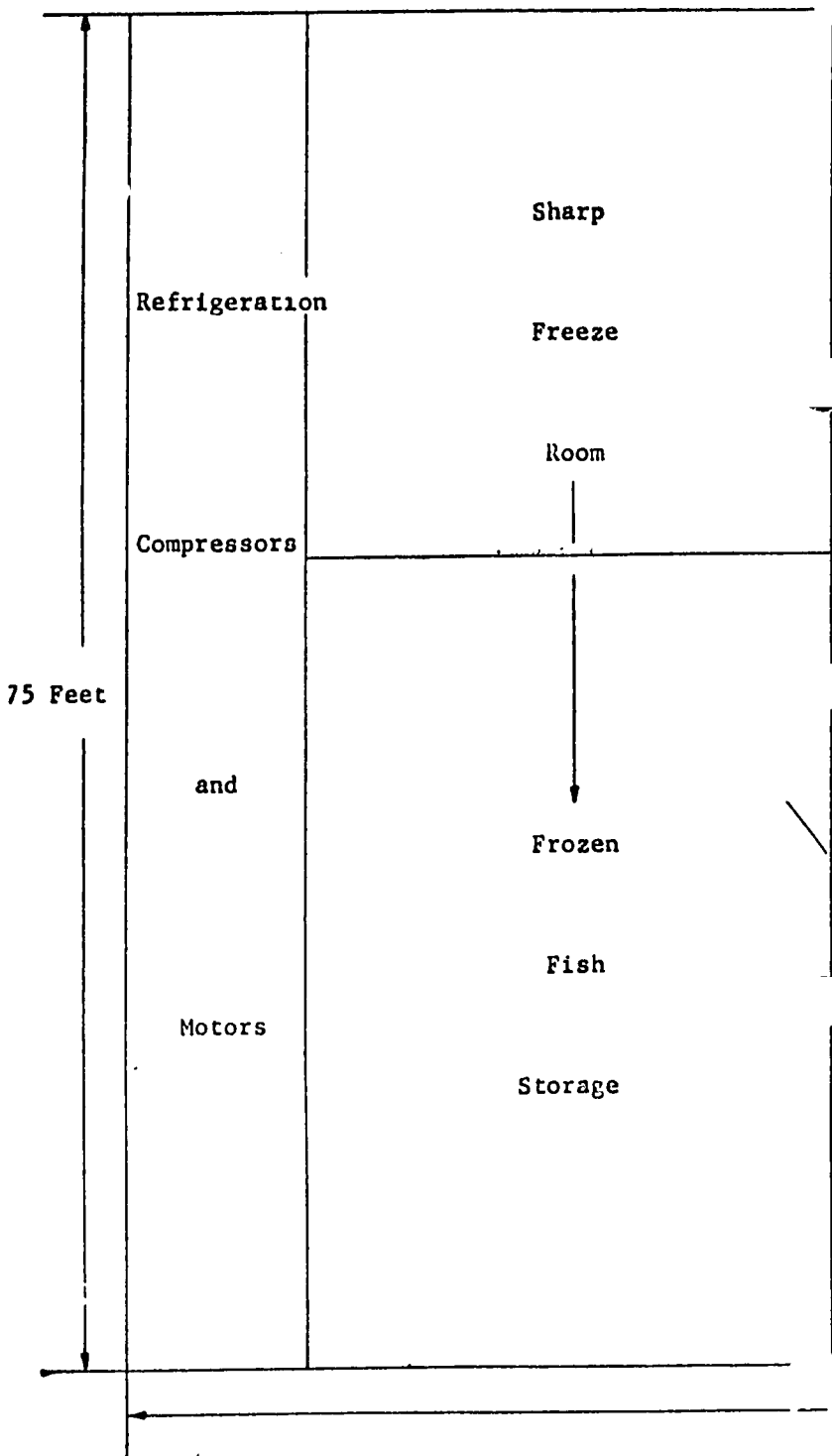
	Number	Annual Cost
a. <u>Direct Labor</u>		
Skilled	2	\$ 10,000
Semi-skilled	8	32,000
Unskilled	4	12,000
<u>Total</u>	<u>14</u>	<u>\$ 54,000</u>
b. <u>Indirect Labor</u>		
Manager & engineer	2	\$ 18,000
Office	2	8,000
Driver	1	4,000
<u>Total</u>	<u>5</u>	<u>\$ 30,000</u>

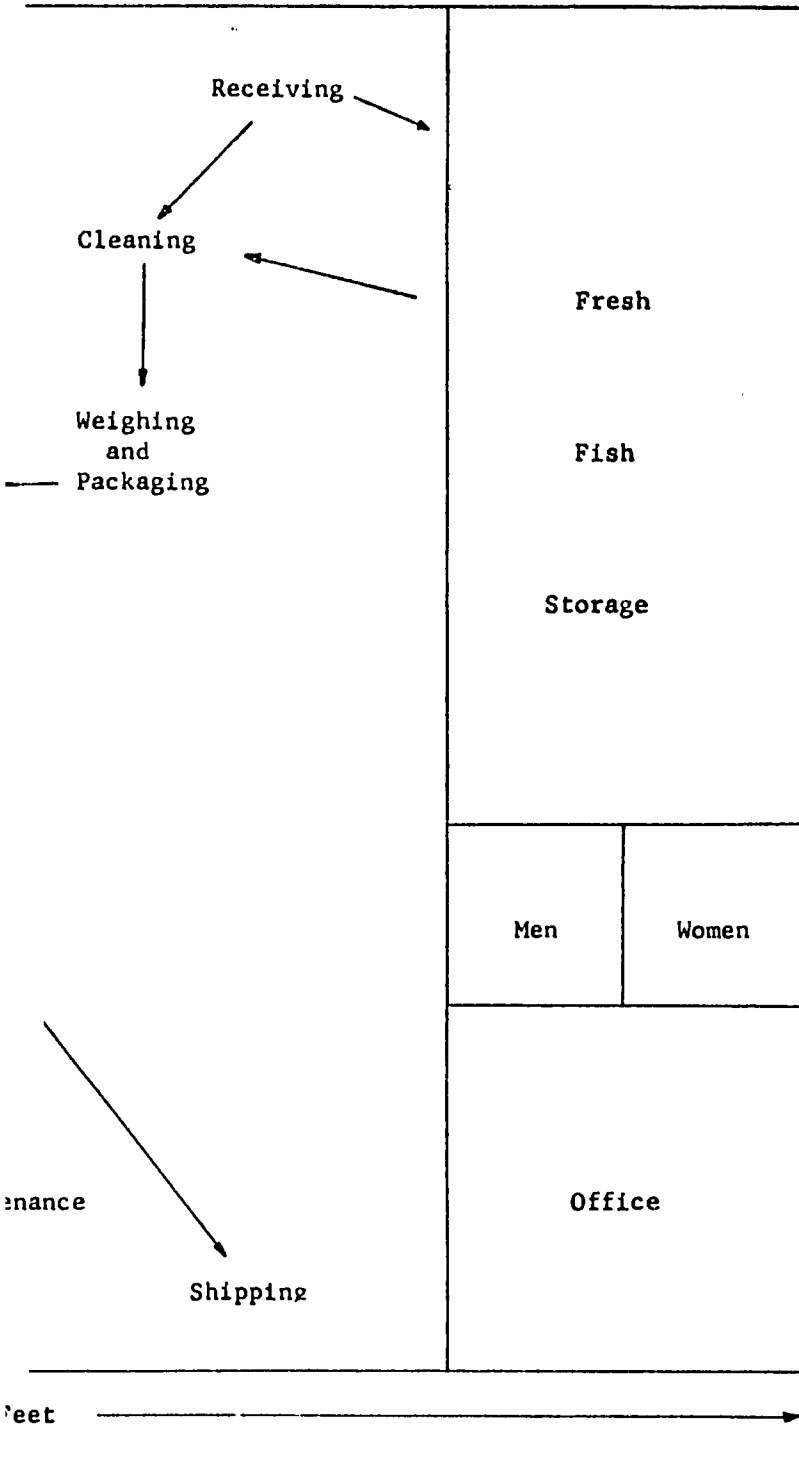
c. Training Needs. Manager & engineer must be fully experienced. With 2 skilled workers they should be able to train the other workers and reach full production in 30 days.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$440,500
Direct Labor	54,000
Manufacturing Overhead(a)	36,800
Admin Costs(b), Contingencies	18,000
Sales Costs(c), Bad Debts	21,000
Depreciation on Fixed Capital	14,450
<u>Total Annual Costs</u>	<u>\$584,750</u>
b. <u>Annual Sales Revenue</u>	<u>\$715,000</u>

NOTES. (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.







QUICK-FROZEN FISH: S.I.C. 2036

SELECTED REFERENCES

I. TEXTBOOKS

- A. Refrigeration Engineering. 2nd Edition. H. J. Macintire and F. W. Hutchinson. 1950. 610 p. Illus. \$10.50.  
John Wiley and Sons, Inc.  
440 Park Avenue  
New York 16, New York  
Engineering data and discussion of refrigerants and refrigerating systems.
- B. Marine Products of Commerce. J. M. Lemon and D. K. Tressler. 2nd Edition. 1951. 800 p. \$20.00.  
Reinhold Publishing Corporation  
430 Park Avenue  
New York 22, New York  
Information on procuring and processing products from the sea. Section on quick freezing of fish.

II. PERIODICALS

- A. Freezer Provisioning. Monthly. \$4.00/year.  
Freezer Provisioning  
111 South Meramec Avenue  
Saint Louis 5, Missouri  
Magazine for producers of frozen products.
- B. Food Engineering. Monthly. \$20.00/year.  
McGraw-Hill Publishing Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Deals with processing and research on food materials.

III. GOVERNMENT PUBLICATIONS, U. S.

- A. Fish Freezing and Packaging - Refrigeration. IR-22703. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Concerns the processing of fish and shrimp.

IV. OTHER PUBLICATIONS

- A. Food Technology. S.C. Prescott and B. E. Proctor. 1937. 630 p.  
Illus. \$10.50.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York  
A comprehensive survey of the methods of handling and manufacture of the principal commercial foods.

## SELECTED REFERENCES (Continued)

### V. TECHNICAL PAPERS

- A. Factors to be considered in the Freezing and Cold Storage of Fishery Products. Fishery Leaflet 429. M. E. Stansby, S. R. Pottinger and D. T. Mujauchi. 1956. 65 p. Gratis.  
Fish and Wildlife Service  
Department of the Interior  
Washington, D. C. 20242  
Covers changes of temperature during freezing, theories for causes of texture changes resulting from freezing, advantages of quick freezing, thawing and refreezing.

### VI. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$ .25 each.

- A. Patent No. 2, 839, 410. 1958. 2 p.  
Method of preserving fish by the use of quick-freeze apparatus.
- B. Patent No. 2, 790, 720. 1957. 3 p.  
Improvement in the process of preservation of quick-freeze fish.
- C. Patent No. 2, 758, 930. 1956. 3 p.  
Apparatus for fish quick-freeze and storage plant.

### VII. TRADE ASSOCIATIONS

- A. Fishery Council  
118 South Street  
New York 38, New York

### VIII. ENGINEERING COMPANIES

- A. Technical Enterprises, Inc.  
31 South Street  
New York 4, New York  
Designers and builders of complete plants.
- B. Consolidated Engineering Enterprises  
3067 North Elston Avenue  
Chicago, Illinois  
Frozen food machinery and equipment designed or built to order.

### IX. DIRECTORIES

- A. List of Fishery Cooperatives in the United States and Alaska. Gratis.  
Fish and Wildlife Service  
Department of the Interior  
Washington D.C. 20242

## 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

## ANIMAL FEED PELLETS

I. P. No. 66015

*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.

## ANIMAL FEED PELLETS: Standard Industrial Classification 2042

### A. PRODUCT DESCRIPTION

Pellets composed of various kinds of animal feed and feed supplements, in proportions fixed according to formula.

### B. GENERAL EVALUATION

Animal feed pellets differ in composition, and the formula can be varied to some extent without affecting essential properties, so as to make maximum use to locally-produced materials. Producers in U.S. devote considerable effort to improving the formula and lowering costs. In developing areas it is usually necessary to educate farmers in scientific animal feeding and the keeping of the necessary records. Scientific animal husbandry is spreading, however, and the prospects for a plant such as this are reasonably good in many areas.

### C. MARKET ASPECTS

1. USERS. Stock farms, poultry farms, dairies, feeding places where animals are conditioned before slaughter, and other places where specialized feeding of animals is done.
2. SALES CHANNELS AND METHODS. Sales ordinarily made to wholesalers, sometimes also direct to farmers. Manufacturers usually give their product a brand name. Publicity largely directed to educating farmers in use of product, through distribution of pamphlets and visits of salesmen.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is easily transported and transport costs are moderate in relation to value. Potential market in country of moderate size and with reasonably good transport system is nation-wide. b. Export. Products of this type are commonly exported and market is world-wide. Major exporting countries are U.S. and Canada.
4. COMPETITIVE SITUATION a. Domestic Market. In U.S. some farmers themselves make by simple processes pellets not significantly inferior to commercial product. Others take own grain to customs food mixers who add ingredients necessary to make formula desired by farmer. Unless costs are unusually high, it should be possible to meet competition of imports without great difficulty. b. Export Market. Exports to nearby countries might in some cases be possible for plant of type described, and regional market on limited scale might be developed.
5. MARKET NEEDED FOR PLANT DESCRIBED. Demand will depend on degree to which scientific animal feeding has been developed in potential market area. Plant of this size would not possess sufficient resources to create demand on substantial scale through its own efforts. There is great flexibility in the use of the product and no exact estimate can be given of number of animals required to absorb plant's production. Much depends on composition of animals' other food intake. Roughly, however, plant's production could feed 25,000 steers on maintenance feeding only, or about the same number of dairy cattle of average milk output by U.S. standards. Steers being fattened consume 3 to 4 times as much as those on maintenance only. Used for poultry, output could maintain about 250,000 laying hens, or could feed 2 million pullets during 9-week fattening period.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: 12,500 Tons.

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	Cost
Land. About 2 acres.	--
Buildings, Main portion 42'x30', 20' high, with monitor top large enough to cover the collectors & a basement under 24' of the length. Remainder of building 116' long, 30' wide, 12' high. Boiler house 20'x10', equipped with 15 hp. boiler. Buildings should be steel frame, covered with sheet steel.	\$ 40,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt. \$68,500	
Other tools & equipmt. 1,300	
Furniture & fixtures 500	
Transport equipmt. 5,400	75,700
Total (excl. Land)	<u>\$115,700</u>

Principal Items. 14-inch hammermill, crusher, 100 bu. mixer pellet mill, elevator, conveyors & scales, lift truck, pallet truck, pallets, grain storage tanks, two delivery trucks.

#### b. WORKING CAPITAL.

	No. of Days	
Direct Materials		
Labor, Mfg. Overhead(a)	60	\$148,300
Admin. & Sales Costs(b), Contingencies	30	9,300
Training Costs		7,200
Total		<u>\$164,800</u>
c. TOTAL CAPITAL (EXCL. LAND)		<u>\$280,500</u>

### 2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
a. Direct Materials		
Yellow corn & oats	4,833 T	\$203,200
Wheat bran & middlings	1,412 "	61,550
Linseed & soybean oil meal	3,415 "	201,350
Dehydrated alfalfa	885 "	39,850
Molasses	437 "	9,200
Fish & bone meal	485 "	81,550
Meat scraps	307 "	31,550
Dried whey & skim milk	1,195 "	33,250
Brewers, yeast	53 "	10,100
Distillers' dried solubs.	227 "	18,200
Riboflavin supplement	19 "	9,000
Ground limestone	132 "	3,300
Iodized Salt	89 "	2,800
D-activated sterol	6 "	1,300
Manganese sulfate	1.6 "	200
Vitamin A feeding oil	2.6 "	1,600
Vitamin A & D concentrate	1.2 "	2,500
3-thickness paper bags	125 "	27,500
Total		<u>\$738,000</u>
b. Supplies		
Factory maintenance & repairs		\$ 3,000
Lubricants		300
Office supplies		300
Total		<u>\$ 3,600</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power, Connected load about 30 hp.	<u>\$ 2,400</u>
b. Fuel. For production and general purposes. Coal or Bunker C oil may be used, but consideration should be given to use of other local fuel.	<u>\$ 3,000</u>
c. Water. About 4.8 million gals. annually for production & general needs.	<u>\$ 1,200</u>

### 4. TRANSPORTATION

	Annual Operating Costs
a. Own Transport Equipment	
Two 3-ton delivery trucks.	<u>\$ 1,800</u>
b. External Transport Facilities. Combined in and out shipments about 2,200 tons a month. Much of this will be between plant and nearby farm areas. Plant should be located where good highways exist, radiating to farm areas, and, if possible, on railroad siding.	

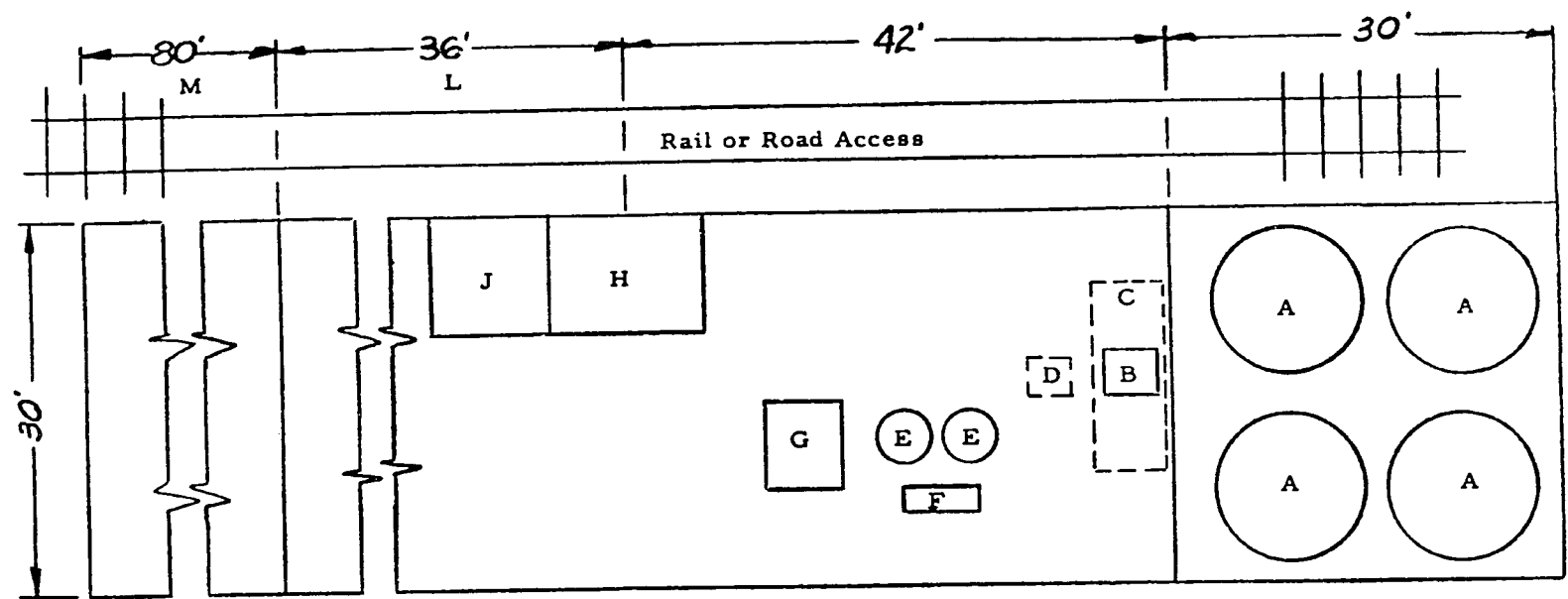
### 5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	6	\$ 30,000
Unskilled	6	21,000
Total	<u>12</u>	<u>\$ 51,000</u>
b. Indirect Labor		
Manager & foremen	3	\$ 21,000
Office Staff	2	8,000
Other indirect labor	15	60,000
Total	<u>20</u>	<u>\$ 89,000</u>
c. Training Needs. Manager, 2 foremen & 1 skilled operator should be fully experienced and able to train operators. Many operations can be done by unskilled workers.		

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	\$738,000
Direct Labor	51,000
Manufacturing Overhead (a)	101,000
Admin. & Sales Costs(b), Bad Debts, Contingencies	112,000
Depreciation on Fixed Capital	10,000
Total Annual Costs	<u>\$1,012,000</u>
b. Annual Sales Revenue	<u>\$1,200,000</u>

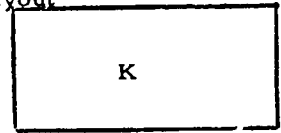
NOTES. (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges, Sales Commissions, Freight Out, Travel.



Key

- A Grain storage tank
- B Scale
- C Overhead batch bin
- D Grinder in basement
- E Mixer
- F Molasses mixer
- G Pelletizing equipment

Plant Layout



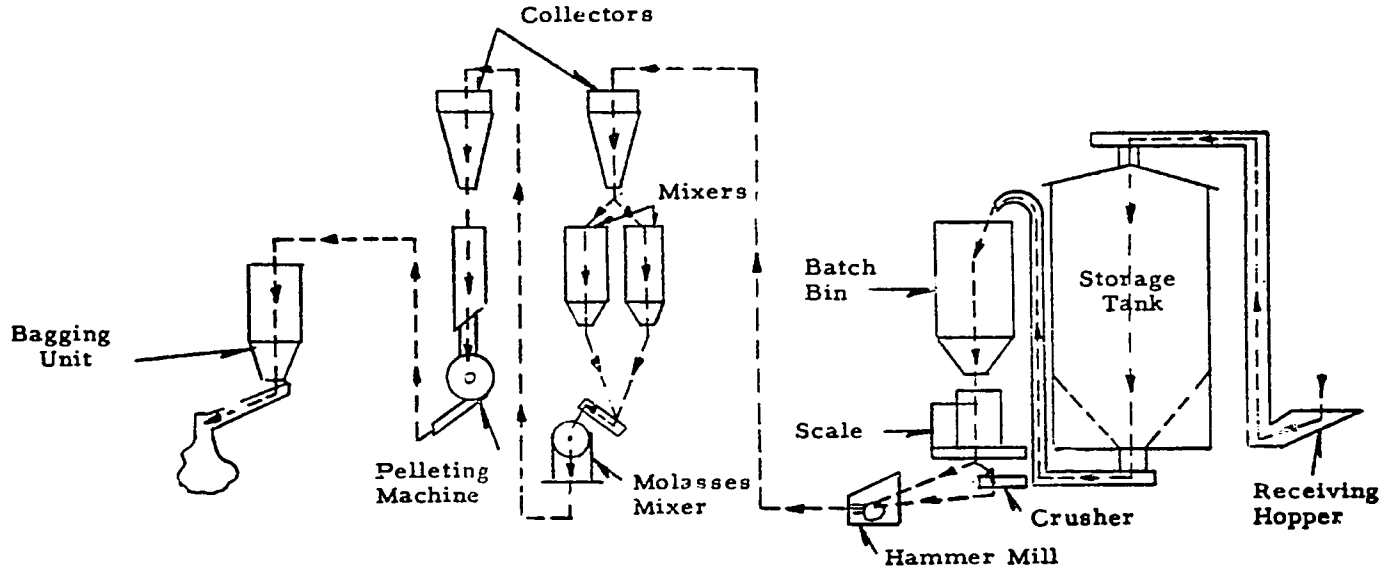
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ANIMAL FEED F

L  
M

Direct materials - 2400 sq. ft.  
Bagged feed - 2400 sq. ft.

IS: S.I.C. 2042



Schematic View of Material Flow Through Processing

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## ANIMAL FEED PELLETS: S.I.C. 2042

### SELECTED REFERENCES

#### I. TEXTBOOKS

- A. Animal Nutrition. Leonard A. Maynard and John K. Loosli. 5th Edition. 1962. \$9.95. McGraw-Hill Book Company, Inc. 330 West 42nd Street New York 36, New York  
Presents both the principles of nutrition and their application in feeding practice.
- B. Animal Feeding and Nutrition. 3 volumes. T.J. Chuna, J.R. Couch, J.K. Loosli. Vol. I - 1957. 312 p. Illus. \$5.00. Vols. II and III in preparation. Interscience Publishers, Inc. 250 Fifth Avenue New York 1, New York  
Animal feeding and nutrients for pigs (Vol. I).  
Feeds for poultry and egg production (Vol. II).  
Ruminant nutrition (Vol. III).

#### II. PERIODICALS

- A. Feed Age. Monthly. \$3.00/year. American Trade Publishing Company 71 Vanderbilt Avenue New York 17, New York  
The business magazine for feed manufacturers.

#### III. TECHNICAL PAPERS

- A. Feeding and Feedstuffs and Hormones. 54 p. 1953. Gratis. National Research Council 2101 Constitution Avenue, N.W. Washington, D.C.  
Report of the Committee of Animal Nutrition by the Committee on Hormones. Hormonal relationships and applications in the production of meats, milk and eggs.

#### IV. U.S. PATENTS

- Available U.S. Patent Office Washington, D.C. 20231 \$.25 each.
- A. Patent No. 2,742,362. April 17, 1956. 1 p. Animal feed compositions containing growth promoting agents.
- B. Patent No. 2,835,582. May 20, 1958. 3 p. Feed pellets and manufacture of same.
- C. Patent No. 2,928,737. Mar. 15, 1960. 3 p. Pelleting cottonseed meal for making it into feeds which are suitable for animals, poultry, and the like.
- D. Patent No. 2,958,600. Nov. 1, 1960. 7 p. Animal feeds and methods of producing same in pellet form.

## SELECTED REFERENCES (Continued)

### V. TRADE ASSOCIATIONS

- A. National Feed Ingredients Association  
Equitable Building  
Des Moines 9, Iowa  
Keeps members informed of latest developments and processes.
- B. American Feed Manufacturers Association  
53 West Jackson Boulevard  
Chicago 4, Illinois  
Association for providing members with latest information on production methods, ingredients, marketing.

### VI. ENGINEERING COMPANIES

- A. F.J. Stokes Corporation  
5500 Tabor Road  
Philadelphia, Pennsylvania  
Chemical research and mechanical farming machines.

### VII. DIRECTORIES

- A. Thomas Wholesale Grocery and Kindred Trades Register.  
Annual. \$10.00.  
Thomas Publishing Company  
461 Eighth Avenue  
New York 1, New York  
A guide edited for buyers, sellers and brokers in all kinds of food trades manufacturing, including machinery and supplies.

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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# INDUSTRY PROFILES

## SURGICAL COTTON

I. P. No. 66016

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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.

## SURGICAL COTTON: Standard Industrial Classification 3842

### A. PRODUCT DESCRIPTION

Surgical or absorbent cotton, consisting of cotton batting which has been carefully washed, bleached, packed, and sterilized, for use in surgery or other applications requiring sterile dressings.

### B. GENERAL EVALUATION

This is a small, not wholly mechanized plant. In large plants such operations as bale-breaking, opening and picking, straightening of fibre and the final cutting and packaging are done by machinery that has many times the capacity of this plant. Since many of these operations do not require a high degree of skill, they can easily be done by manual labor. The picking operation, however, needs very close supervision. If there are other plants in the area engaged in processing raw cotton into picked and cleaned cotton, this plant could purchase such processed cotton from them and eliminate the first step of its own production. This is a practice not uncommon in the U.S. The raw material itself consists of long staple cotton, which, if not grown domestically, is readily available in the international market. The general level of skill required for this plant is not very great and the capital requirements are rather small.

### C. MARKET ASPECTS

1. USERS. Hospitals, doctors, dentists, industrial safety organizations, individuals.
2. SALES CHANNELS AND METHODS. Medical supply distributors.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transportation costs are minor; therefore distribution can be nation-wide. b. Export. Transportation costs are no barrier to export.
4. COMPETITION. a. Domestic Market. Competition would come from well-established, large-scale firms. b. Export Market. The plant might supply some nearby foreign territory, but it would not be able to compete generally with large-scale producers in the world market.
5. MARKET NEEDED FOR PLANT DESCRIBED. The population needed to support the output of this plant depends partly upon the level of income. This level must be such as to support the regular use of some medical services, such as a hospital and some clinic services. If the income level is high enough, some ready-made bandages, which are a high-priced item, would compete with the use of surgical cotton, particularly in the home. If some hospital and other medical facilities exist in the area a population of between 1 and 2 million should be sufficient to absorb this plant's output.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT: 12 tons.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		
Land, 10,000 sq. ft.	\$	--
Building, One story, 40'x60'		14,400
Equipment, Furniture & Fixtures.		
Prod'n. tools & equipment	\$30,000	
Other tools & equipment	2,000	
Furniture & fixtures	7,00	32,700
Total (excl. Land)	\$	47,100

Principal Items. Scales, tables, hand trucks, tools for breaking, opening and picking; 250 gal. stainless steel tank with steam jacket; 500 gal. storage tanks (3) for chemical solutions; stainless steel endless screen; 1 set squeeze rolls; carding machine; cutting table; wrapping and packaging; 1 sterilizer boiler.

### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 7,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	700
Training Costs		1,000
Total		\$ 8,700

c. TOTAL CAPITAL (EXCL. LAND) \$ 55,800

### 2. MATERIALS AND SUPPLIES

<b>a. Direct Materials</b>		Annual Requirements	Annual Cost
Baled cotton	16 tons		\$ 12,000
Packaging			300
Total			\$ 12,300

### b. Supplies

Lubricants & hand tools	\$	100
Maintenance & spare parts		700
Soaps, detergents & sterilizing chemicals		300
Office supplies		200
Total	\$	1,300

### 3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 10 hp.	\$ 400
b. Fuel, 4,000 gals. oil annually.	\$ 500
c. Water, 400,000 gals. annually.	\$ 100

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. In and out shipments about 4 tons per month. No special requirements.

### 5. MANPOWER

	Number	Annual Cost
<b>a. Direct Labor</b>		
Skilled	1	\$ 5,000
Semi-skilled	2	8,000
Unskilled	2	6,000
Total	5	\$ 19,000
<b>b. Indirect Labor</b>		
Manager - buys, sells, keeps books, & supervises.	1	\$ 8,000

- c. Training Needs. Manager must be fully experienced. With 1 skilled worker, he should be able to do all necessary labor training. Plant should reach full production in 1 month.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

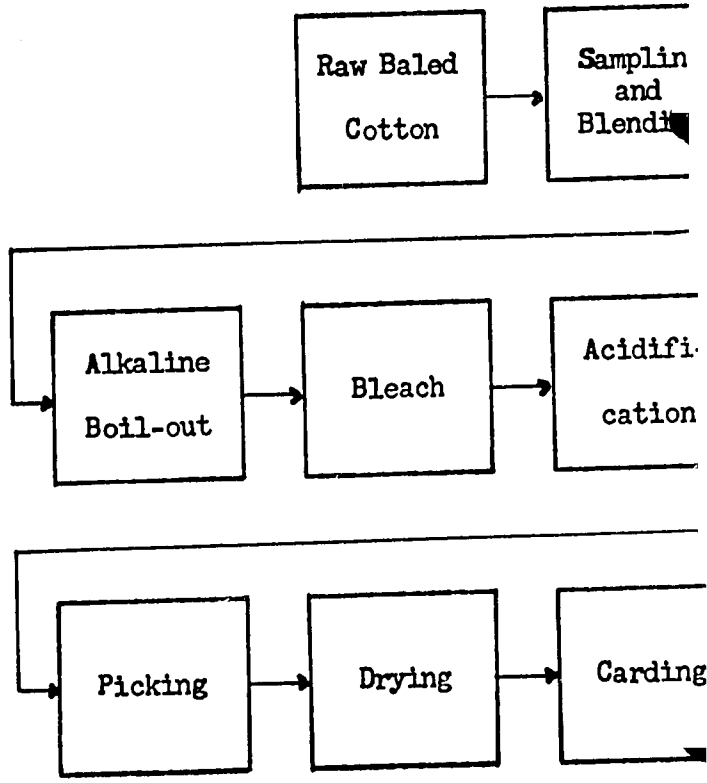
<b>a. Annual Costs</b>		
Direct Materials		\$ 12,300
Direct Labor		19,000
Manufacturing Overhead(a)		10,300
Admin. Costs(b), Contingencies		3,000
Sales Costs(c), Bad Debts		5,000
Depreciation on Fixed Capital		4,000
Total Annual Costs		\$ 53,600
<b>b. Annual Sales Revenue</b>		\$ 66,000

NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

SURGICAL COTTON: S.I.C. 3842

132

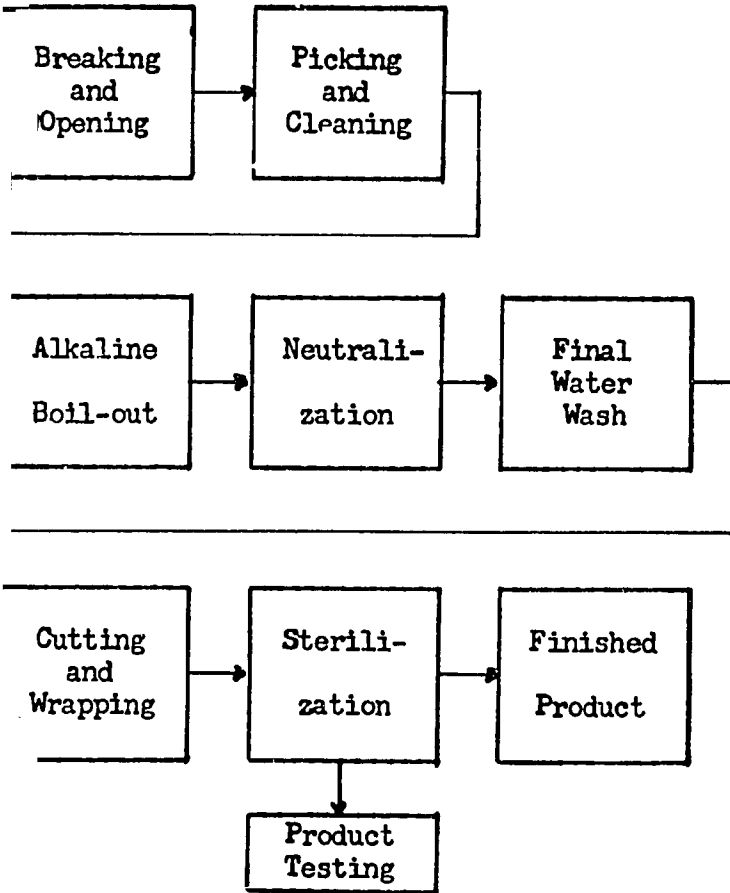
SURGICAL  
ARROWS INDICATE



DIMENSIONS

N: S.I.C. 3842

LOW OF WORK



LDING 40' x 60'



# SURGICAL COTTON: S.I.C. 3842

## SELECTED REFERENCES

### I. TEXTBOOKS

- A. Remington's Practice of Pharmacy. 11th edition. E. F. Cook and E.W. Martin, editors. 1956. 1,707 p. Illus. \$20.00.  
The Mack Publishing Company  
20th and Northampton Streets  
Easton, Pennsylvania  
Treatise on the manufacturing, standardizing, and dispensing of pharmaceutical products, including surgical cotton.

### II. PERIODICALS

- A. Textile Research Journal Monthly. \$21.00/year.  
Textile Research Institute  
Prince and Lemon Streets  
Lancaster, Pennsylvania  
Dedicated to materials and processes for the textile industry.
- B. Textile World. Monthly. \$15.00/year.  
McGraw-Hill Publishing Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Covers all phases of textiles including chemical treating of textiles.

### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Surgical Cotton. TI-39. June 1958. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Requirements for establishing and operating a plant to produce surgical cotton.

### IV. OTHER PUBLICATIONS

- A. American Cotton Handbook. G.R. Merrill and others. 2nd edition. 1949. 943 p. Illus \$8.50.  
Textile Book Publishers  
303 Fifth Avenue  
New York 16, New York  
Practical text for the cotton industry, covering the operations of opening, picking, carding, combing, drawing, and roving.

### V. TECHNICAL PAPERS

- A. Quality Control. TB-66. March 1960. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Manual for training personnel in the subject of quality control in industry.

## SELECTED REFERENCES (Continued)

### VI. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$.25 each.

- A. Patent No. 2,899,337. 1959. 8 p.  
Absorbent cotton balls.
- B. Patent No. 2,897,108. 1959. 5 p.  
Absorbent cotton pad.
- C. Patent No. 2,829,648. 1958. 3 p.  
Surgical sponge.
- D. Patent No. 2,755,805. 1956. 4 p.  
Surgical sponge and method of making same.

### VII. TRADE ASSOCIATIONS

- A. American Textile Manufacturers Institute  
1501 Johnston Building  
Charlotte 2, North Carolina
- B. National Cotton Council of America  
1918 Parkway  
Memphis 12, Tennessee

### VIII. ENGINEERING COMPANIES

- A. Proctor and Schwartz, Inc.  
700 Tabor Road  
Philadelphia 20, Pennsylvania  
Suppliers of cotton textile equipment.
- B. Whitin Machine Works  
Whitinsville, Massachusetts  
Complete equipment for textile plant.

### IX. DIRECTORIES

- A. Davison's Textile Blue Book. Annual. \$9.75.  
Davison Publishing Company  
Ridgewood, New Jersey  
Lists 8,470 textile plants in the United States. Also lists  
thousands of suppliers to these plants.

## 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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### 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

## MEN'S SOCKS

I. P. No. 66017

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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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## MEN'S SOCKS: Standard Industrial Classification 2252

### A. PRODUCT DESCRIPTION

Men's knitted cotton socks.

### B. GENERAL EVALUATION

Capital requirements in this industry are moderate. Manufacturing operations are largely automatic, and not much skilled labor is needed. International competition in this industry is keen. In general, however, this industry, even where it must operate with imported materials, is suitable for many developing areas, if the domestic market is large enough.

### C. MARKET ASPECTS

1. SALES CHANNELS AND METHODS. Sales direct to large stores and bulk buyers, such as military, and to wholesalers. A distinctive and well-chosen brand name is desirable. Energetic salesmen are necessary in this competitive business. Some general advertising may be useful.
2. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is very easy to handle and transport costs are small in relation to product value. Potential market is commonly nation-wide. b. Export. Sales are world-wide.
3. COMPETITIVE SITUATION. a. Domestic Market. Competition from imports is usually strong. b. Export Market. Plant of this size would normally be unable to compete with large-scale plants in major producing countries. There are some very low-cost producers, e.g., Japan, Hong Kong.
4. MARKET NEEDED FOR PLANT DESCRIBED. This will depend on living standards, climate, etc. In general a total population of more than a million will be needed to provide a market.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - TWO-SHIFT OPERATION : 80,000 Dozen.

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>		<u>Cost</u>
Land. About 6,000 sq. ft.	\$	--
Building. One story, 128'x30'.		23,000
<u>Equipment, Furniture &amp; Fixtures.</u>		
Prod'n. equipment	\$46,900	
Furniture & fixtures	800	47,700
<u>Total (excl. Land)</u>		<u>\$ 70,700</u>

Principal Items. Knitting machines, elastic top attachments, packing charge, motor & transmissions, rotary die vat and motor, loopers & motor, extractor & motor, turning boards, boarding tables, boarding toes, hand trucks, small tools.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 34,800
Admin. & Sales Costs(b), Contingencies	30	4,500
Training Costs		8,700
<u>Total</u>		<u>\$ 48,000</u>

c. TOTAL CAPITAL (EXCL. LAND) \$118,700

### 2. MATERIALS AND SUPPLIES

	<u>Annual</u>	<u>Annual</u>
a. <u>Direct Materials</u>	<u>Requirements</u>	<u>Cost</u>
Cotton Yarn	105,000 lbs.	\$ 71,500
Dyes		16,000
<u>Total</u>		<u>\$ 87,500</u>

### b. Supplies

Needles	\$ 1,000
Repair parts	1,000
Maintenance materials	700
Lubricants	100
Office supplies	200
<u>Total</u>	<u>\$ 3,000</u>

### 3. POWER, FUEL AND WATER

Annual Cost

a. <u>Electric Power.</u> Connected load about 45 hp.	<u>\$ 1,200</u>
b. <u>Fuel.</u> Small boiler needed for dyeing operations, as well as for heating, where necessary. Any locally available boiler fuel may be used.	<u>\$ 600</u>
c. <u>Water.</u> Clean water is needed for dyeing operations & availability should be taken into account in choosing plant site. Requirements for all purposes about 1.2 mn. gals. annually.	<u>\$ 300</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Total in and out shipments about 12 tons a month. Therefore no special requirements.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>		
Skilled	4	\$ 20,000
Semi-skilled	9	36,000
Unskilled	9	27,000
<u>Total</u>	<u>22</u>	<u>\$ 83,000</u>
b. <u>Indirect Labor</u>		
Manager	1	\$ 8,000
Office	2	8,000
Other	5	17,500
<u>Total</u>	<u>8</u>	<u>\$ 33,500</u>

- c. Training Needs. Manufacturing operations do not require long training. Manager & 1 machine fixer or maintenance man should be fully experienced in the industry and be able to train all operators. Plant should reach full production in about 2 months.

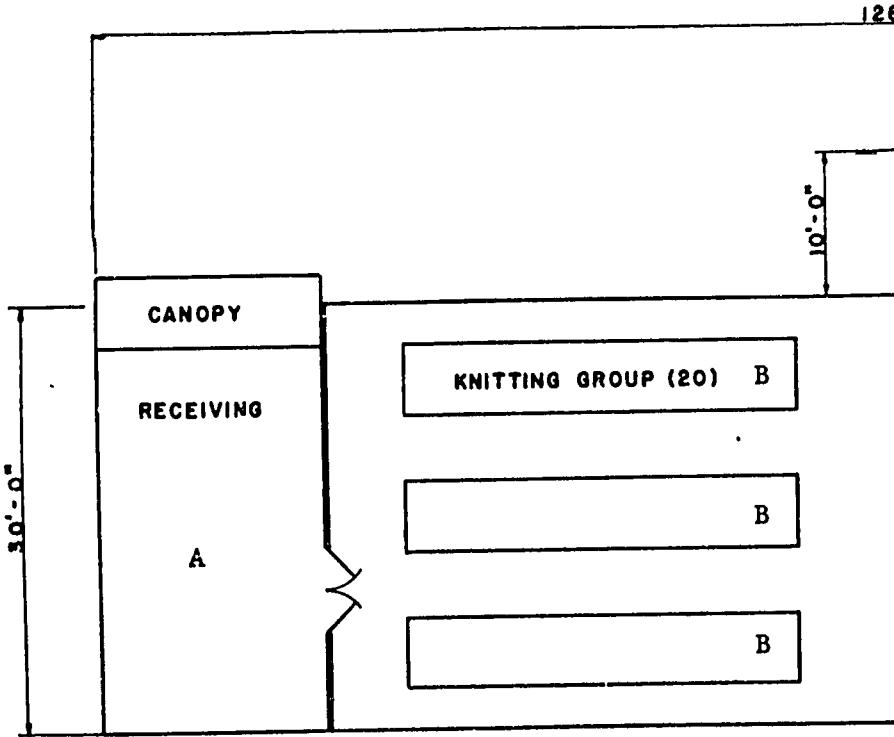
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 87,500
Direct Labor	83,000
Manufacturing Overhead(a)	38,600
Admin. & Sales Costs(b), Bad Debts, Contingencies	48,000
Depreciation on Fixed Capital	6,000
<u>Total Annual Costs</u>	<u>\$263,100</u>
b. <u>Annual Sales Revenue</u>	<u>\$340,000</u>

NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges, Sales Commissions, Freight Out, Travel.

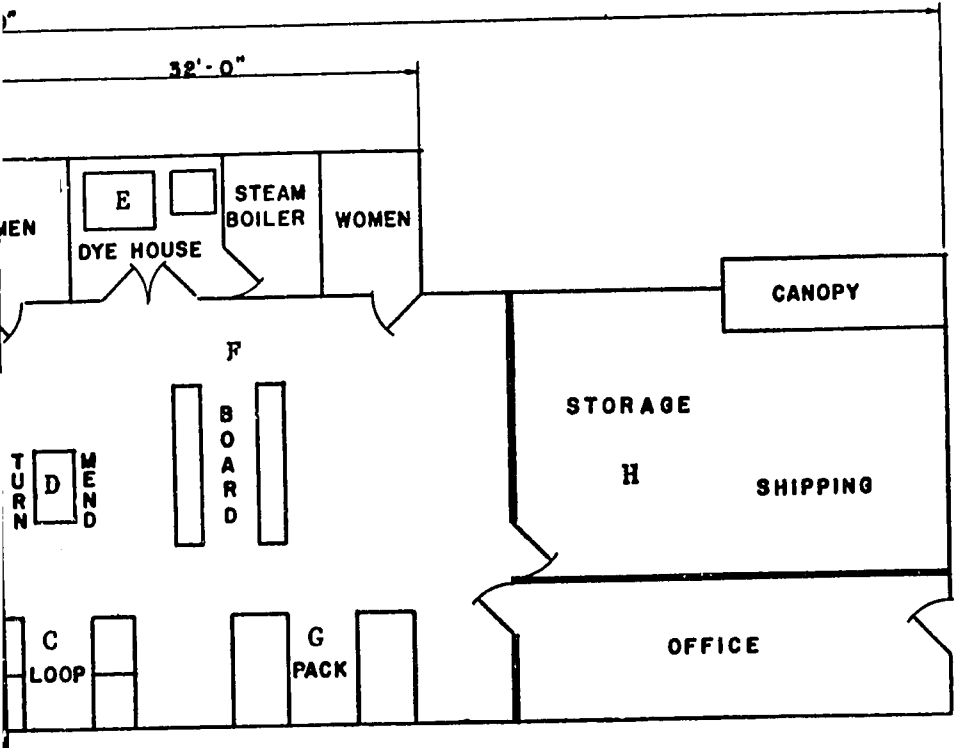
MEN'S SOCKS: S.I.C. 2252

MEN'S SO  
PLANT LAYOU



- A. Receiving
- B. Knitting
- C. Looping
- D. Turn and mend

S : S.I.C. 2252  
AND WORK FLOW



- E. Dying
- F. Board
- G. Package
- H. Storage and shipping



MEN'S SOCKS: S.I.C. 2252

SELECTED REFERENCES

I. TEXTBOOKS

- A. American Cotton Handbook. G. R. Merrill, A. R. Macormac, and H. R. Mauersberger. 2nd Edition. 1949. 1056 p. \$9.50.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York 1, New York  
History and economic and statistical background of cotton industry in the U. S. A. from plant to fabric, including knit goods manufacture.
- B. Principles of knitting. W. E. Shinn. 2 Vols. \$4.00 each.  
Textile Book Service  
257 Fourth Avenue  
New York 10, New York  
Volume 1 - general. Volume 2 - circular.

II. PERIODICALS

- A. Hosiery and Underwear Review. Monthly. \$2.00/year (U.S.). \$10.00/year (foreign).  
The Knit Goods Publishing Company  
307 Fifth Avenue  
New York 16, New York  
News and technical information as well as markets, materials, supplies, machinery, and equipment.

III. OTHER PUBLICATIONS

- A. Handbook of Textile Fibers. J. Gordon Cook. \$5.50.  
Textile Book Service  
257 Fourth Avenue  
New York 10, New York  
Terms, definitions, and other information related to the textile industry.

IV. U.S. PATENTS

- Available U.S. Patent Office  
Washington, D.C. 20231 \$.25 each.
- A. Patent No. 2,987,898. 1961. 10 p.  
Circular stocking making machine of the axially opposed double cylinder type.
- B. Patent No. 2,979,927. 1961. 10 p.  
Knitting machine for circular articles including men's socks.
- C. Patent No. 2,959,040. 1960. 15 p.  
Sock making machine of the super-imposed needle cylinder type.
- D. Patent No. 2,828,617. 1958. 13 p.  
Circular knitting machine for socks and other knitted footwear.

SELECTED REFERENCES (Continued)

V. TRADE ASSOCIATIONS

- A. Textile Research Institute  
P. O. Box 625  
Princeton, New Jersey
- B. Knitted Outerwear Association  
386 Park Avenue South  
New York 16, New York

VI. ENGINEERING COMPANIES

- A. Wildman Manufacturing Company  
Norristown, Pennsylvania  
Circular knitting machines for making hosiery and other clothing.
- B. Textile Machine Works  
Reading, Pennsylvania  
Sock making equipment with production rates of 3 to 6 dozen pairs every eight hours.

VII. DIRECTORIES

- A. Davison's Knit Goods Trade. Annual. \$7.75.  
Davison Publishing Company  
Ridgeway, New Jersey  
Some 2,600 mills and 12,000 allied firms covering wholesalers, jobbers, chain stores, large retailers as well as suppliers of machinery and supplies of every description.

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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# INDUSTRY PROFILES

## SILK SCREEN PRINTING ON TEXTILES

I. P. No. 66018

*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.

A. PRODUCT DESCRIPTION

Stencil process of printing a colored design through silk on textiles.

B. GENERAL EVALUATION

This plant would work for textile fabric producers who do not do their own silk screen printing or who sometimes need to supplement their own facilities because of pressure of work. It would receive cloth from such producers and do the printing according to the designs and colors specified, returning it to the cloth producers when the printing is completed. Such a plant would need to be located near a complex of textile mills. Capital requirements are modest, and operations require care rather than a high degree of technical skill. With rising incomes in many areas the demand for silk screen printing is tending to increase.

C. MARKET ASPECTS

1. USERS. Textile cloth producers.
2. SALES CHANNELS AND METHODS. The plant would provide a service to producers and deal only with them.
3. GEOGRAPHICAL EXTENT OF MARKET. Such a plant would be located in a textile manufacturing center and generally would work only for local plants or those within easy reach.
4. COMPETITION. This would come only from rival plants.
5. MARKET NEEDED FOR PLANT DESCRIBED. Generally speaking it is necessary to have a complex of fairly small-scale cloth producers who do not individually have enough screen-printing work to justify establishing screen-printing units in their own establishments, although in some cases such a plant might form an appendage to one or two large-scale plants which can supply enough special work to keep an outside operator going.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 250,000 Yards.

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	Cost
Land, 25,000 sq. ft.	\$ --
Building. One story, 60'x210'x14' sidewalls,	75,600
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt.	\$18,500
Furniture & fixtures	900
Transport equipment	2,400
Total (excl. Land)	\$ 21,800
	\$ 97,400

Principal items. Printing tables, drying racks, storage racks (screens), storage racks (bolt material), hand trucks, light table, drafting board, laboratory bench, dye containers, drying oven and boiler.

#### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 11,900
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,400
Training Costs		800
Total		\$ 15,100

c. TOTAL CAPITAL (EXCL. LAND) \$112,500

### 2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Dyes	800 lbs.	\$ 3,000

#### b. Supplies

Screen lumber	\$ 100
Acetate sheet and lacquer	250
Silk bolting cloth and cloth tape	550
Angle irons, flat irons and screw eyes	100
Office supplies	200
Total	\$ 1,200

### 3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power, Lighting only.	\$ 200
b. Fuel. Oil for heating oven and building, 5,000 gals.	\$ 600
c. Water. Production, sanitation, and fire protection.	\$ 400

### 4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. Pickup and delivery truck.	\$ 1,200
b. External Transport Facilities. In and out shipments very small. Plant should be located on goods highway.	

### 5. MANPOWER

a. Direct Labor	Number	Annual Cost
Skilled	1	\$ 6,000
Semi-skilled	6	30,000
Unskilled	1	4,000
Total	8	\$ 40,000

#### b. Indirect Labor

Manager & Supervisor	2	\$ 17,000
Office	1	4,000
Truck driver	1	4,000
Total	4	\$ 25,000

c. Training Needs. Manager and supervisor must be fully experienced. They should be able to train all workers and reach full production in 15 days.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	\$ 3,000
Direct Labor	40,000
Manufacturing Overhead (a)	28,600
Admin. Costs(b), Contingencies	15,000
Sales Costs(c), Bad Debts	14,000
Depreciation on Fixed Capital	6,300
Total Annual Costs	\$106,900
b. Annual Sales Revenue	\$125,000

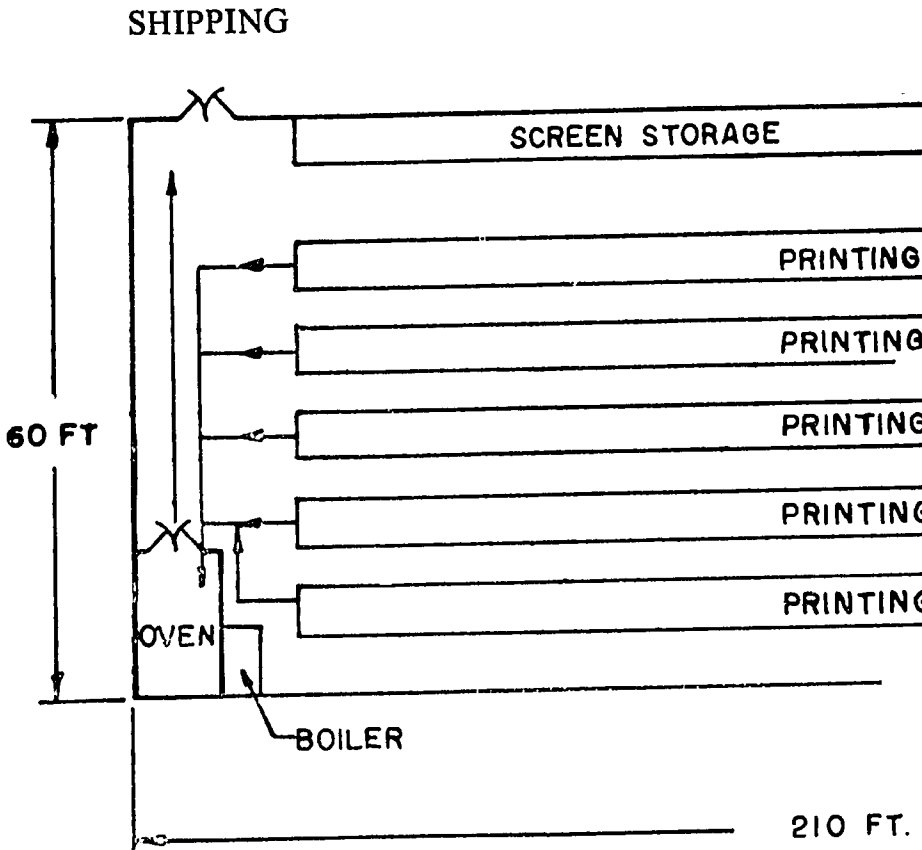
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SILK SCREEN PRINTING ON TEXTILES: S.I.C. 2262

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# SILK SCREEN PRINTING

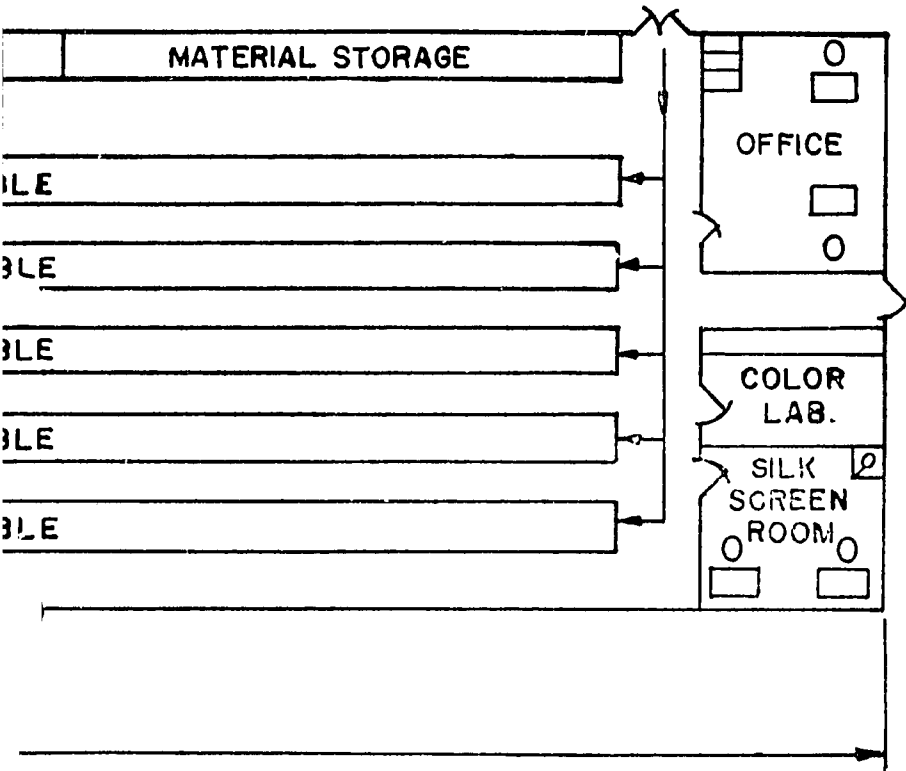
## PLANT LAYOUT



N TEXTILES : S.I.C. 2262

D WORKFLOW

RECEIVING





# SILK SCREEN PRINTING ON TEXTILES: S.I.C. 2262

## SELECTED REFERENCES

### I. TEXTBOOKS

- A. Printing. H.E. Jackson. 1957. 320 p. Illus. \$5.60.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Devoted to printing, including silk screen printing.
- B. Screen Process Methods of Reproduction. B. Zahn. 1956. \$5.00.  
Frederick J. Drake and Company  
9 South Clinton Street  
Chicago 6, Illinois  
Process of printing through a fabric plate on an industrial scale.

### II. PERIODICALS

- A. Screen Process. Monthly. \$4.00/year.  
The Signs of the Times Publishing Company  
P.O. Box 1171  
Cincinnati 1, Ohio  
Devoted to the subject of screen printing.
- B. American Ink Maker. Monthly. \$3.00/year.  
MacNair-Dorland Company, Inc.  
254 West 31st Street  
New York 1, New York  
Devoted to the ink industry, including ink for silk screen processing.

### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Silk Screen Printing on Textiles. TI-73. July 1960. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Requirements for establishing and operating a plant for silk screen printing on textiles.

### IV. OTHER PUBLICATIONS

- A. Silk Screen Printing J. Eisenberg and F.J. Kafka. 1958. 298 p. Illus. \$1.60.  
Taplinger Publishing Company, Inc.  
119 West 57th Street  
New York 19, New York  
Devoted to the subject of silk screen printing.

## SELECTED REFERENCES (Continued)

### V. TECHNICAL PAPERS

- A. Silk Screen Printing. IR-23773.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523

### VI. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$.25 each.

- A. Patent No. 2,747,501. 1956. 3 p.  
Squeege holder for silk screen printing.
- B. Patent No. 2,719,101. 1955. 2 p.  
Printing of textile pieces.
- C. Patent No. 2,590,643, 1952. 3 p.  
Method of textile printing.
- D. Patent No. 2,400,700. 1946. 4 p.  
Screen printing of fabrics.

### VII. TRADE ASSOCIATIONS

- A. Silk and Rayon Print Institute  
55 West 42nd Street  
New York 36, New York
- B. Silk and Rayon Printers and Dyers Association of America  
7 Church Street  
Paterson 1, New Jersey

### VIII. ENGINEERING COMPANIES

- A. Colonial Process Supply Company  
East Union Avenue  
East Rutherford, New Jersey

### IX. DIRECTORIES

There are no directories available that are devoted exclusively to the subject of silk screen printing.

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## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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# INDUSTRY PROFILES

## HOOKED RUGS

I.P. No. 66019

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## HOOKED RUGS: Standard Industrial Classification 2279

### A. PRODUCT DESCRIPTION

Rugs made of bulky yarn with burlap or other backing ranging from 18" by 18" to 9' by 12'. Larger rugs can be made to order. Plant capacity is given in terms of rugs of average size, viz. 32" by 51". Material costs given are for wool rugs, but other materials may be used

### B. GENERAL EVALUATION

This industry requires little capital, and, in relation to investment needed, employs a comparatively large amount of labor. The manufacturing operations demand a moderate degree of skill, but this skill is of a type that is not uncommon or that can be easily taught. For export purposes attractive and typically local designs are desirable. It should not be difficult to obtain such designs in any area producing locally designed textiles for export. Labor accounts for a high proportion of local costs, and in areas of low per capita income it will generally be possible to produce these rugs at low cost, even if materials have to be imported.

### C. MARKET ASPECTS

1. USERS Households, hotels, offices.
2. SALES CHANNELS AND METHODS. Sales are usually made to rug and furniture stores. Makers often give their product brand names.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is very easy to handle and transport costs are low in relation to value. In country of moderate size and with reasonably good transport system, potential market might be nationwide. b. Export. Rugs are a common export item and the trade is world-wide.
4. COMPETITION. a. Domestic Market. In most low income areas rugs are not a significant import item and therefore local rug manufacturers would not meet major competition from imports. b. Export Market. Rugs with distinctive and attractive local designs could prove a tourist attraction and also be directly exported.
5. MARKET NEEDED FOR PLANT DESCRIBED. Domestic demand will depend on general level of income and on income distribution. To the majority of people in many economically less developed areas rugs, particularly woolen rugs, are a luxury and a market can only be found among a small class with incomes well above the average. Other factors influencing demand include climate and type of dwelling in ordinary use. However, tourist and other export demand should be able to provide a market for the small output produced by this plant.

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## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 8,000 Rugs.

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	Cost
Land. About 600 sq. ft.	\$ --
Building. One story, about 16'x24'.	2,500
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt.	\$ 250
Other tools & equipmt.	100
Furniture & fixtures	150
Total (excl. Land)	<u>\$ 3,000</u>

Principal Items. Cloth stripping machine, yarn rewinder, adjustable floor stand rug frames, portable frames, clamps, bluenose hookers, rug hooks, rolling machines.

#### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 12,200
Admin. Costs(b), Contingencies, Sales Costs(c)	30	200
Training Costs		4,000
Total		<u>\$ 16,400</u>

#### c. TOTAL CAPITAL (EXCL. LAND) \$ 19,400

### 2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
a. Direct Materials		
Wool yarn-4 oz. skeins	26,000	\$ 11,200
Burlap backing stenciled	8,000	3,200
Total		<u>\$ 14,400</u>

#### b. Supplies

Hand tools	\$ 50
Wrapping & tags	400
Office supplies	50
Total	<u>\$ 500</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Only for lighting.	\$ 200
b. Fuel. For heating plant, if necessary.	\$ 200
c. Water. For sanitation and fire protection.	<u>\$ 100</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment. None needed.
- b. External Transport Facilities. No special requirements.

### 5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	2	\$ 10,000
Semi-skilled	10	35,000
Unskilled	2	6,000
Total	<u>14</u>	<u>\$ 51,000</u>

#### b. Indirect Labor

Manager (Acts as buyer, salesman, bookkeeper and general supervisor) 1 \$ 7,000

- c. Training Needs. Manager must be fully experienced in all operations. Together with 2 skilled workers, he should be able to train all workers. Plant should reach full production in 2 months.

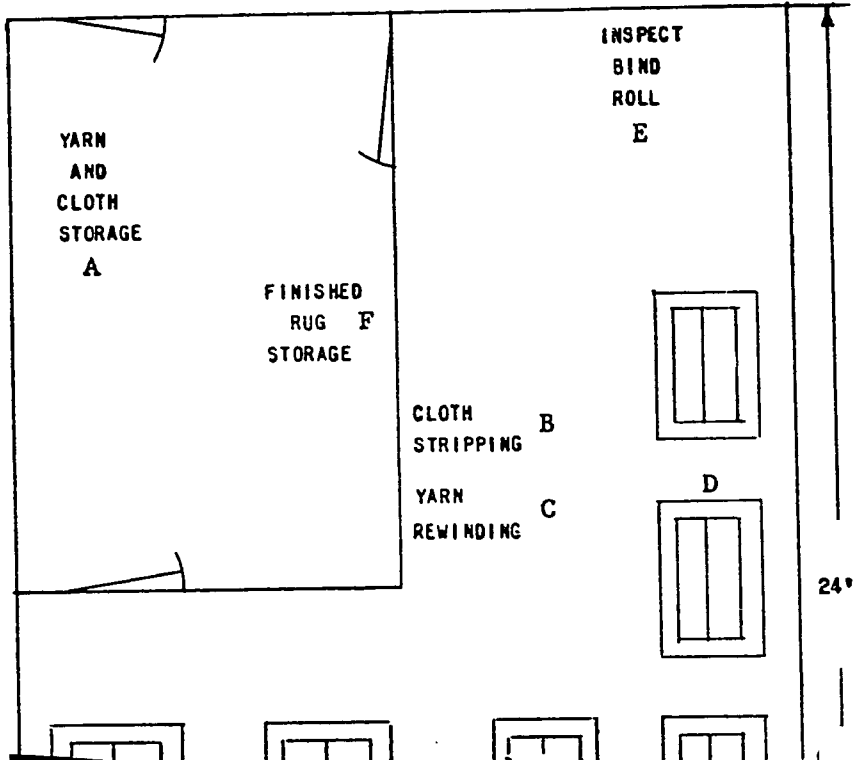
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	\$ 14,400
Direct Labor	51,000
Manufacturing Overhead(a)	8,000
Admin. Costs(b), Contingencies	1,000
Sales Costs(c), Bad Debts	1,000
Depreciation on Fixed Capital	200
Total Annual Costs	<u>\$ 75,600</u>
b. Annual Sales Revenue	<u>\$100,000</u>

NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

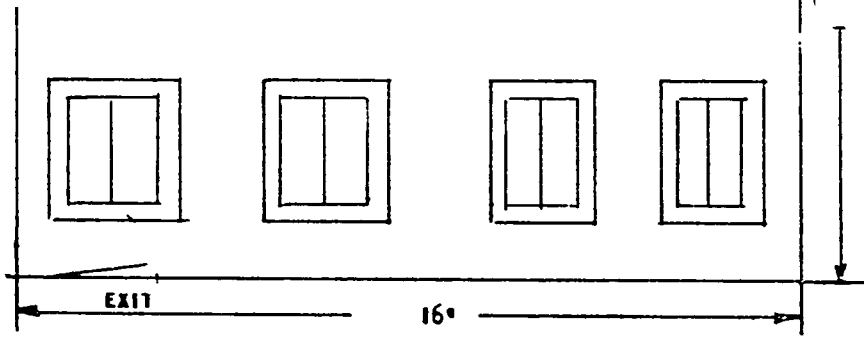
HOOKED RUGS: S.I.C. 2279

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PLANT LAYOUT

HOOKED



- A. Materials, storage
- B. Cloth, stripping
- C. Yarn, rewinding
- D. 10 frames and tables
- E. Inspection and rolling
- F. Finished, storage and shipping

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HOOKED RUGS: S.I.C. 2279

SELECTED REFERENCES

I. TEXTBOOKS

- A. Complete book of Rug Hooking. Barbara J. Zarbock. 1961. \$6.75.  
D. Van Nostrand Co., Inc.  
120 Alexander Street  
Princeton, New Jersey

II. PERIODICALS

- A. Handweaver and Craftsman. Quarterly. \$5.00/year.  
Handweaver and Craftsman, Inc.  
246 Fifth Avenue  
New York 1, New York  
Covers commercial weaving, rugs and similar material.

III. OTHER PUBLICATIONS

- A. Rug Hooking and Braiding. D. Lawless. Revised Edition 1962. 208 p.  
\$ 5.95.  
Thomas Y. Crowell Company  
432 Fourth Avenue  
New York 16, New York  
Designs, patterns, and techniques for making rugs.

IV. TECHNICAL PAPERS

- A. Quality Control. TB-66. March 1960. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Manual for training personnel in the subject of quality control in industry.

V. U.S. PATENTS

- Available U.S. Patent Office  
Washington, D.C. 20231. \$.25 each.
- A. Patent No. 2,993,258. 1961. 3 p.  
Process used in making hooked rugs and other articles.
- B. Patent No. 2,985,941. 1961. 5 p.  
Method of making various kinds of rugs.
- C. Patent No. 2,981,999. 1961. 9 p.  
Process for making articles from yarn, including rugs.
- D. Patent No. 2,974,392. 1961. 8 p.  
Process for making yarn and articles therefrom.
- E. Patent No. 2,857,651. 1958. 4 p.  
Yarn for hooked rugs and making of same.

## SELECTED REFERENCES (Continued)

### VI. TRADE ASSOCIATIONS

There are no trade associations established for hooked rugs.

### VII. ENGINEERING COMPANIES

There are no engineering companies that specialize in the hooked rug industry.

### VIII. DIRECTORIES

- A. Floor Covering Profits Annual Directory. \$2.00.  
Bill Brothers Publishing Corporation  
630 Third Avenue  
New York 17, New York  
Lists all floor covering and accessory manufacturers, importers,  
selling agents, and distributors in the United States.

## 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.

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# INDUSTRY PROFILES

## STEP AND EXTENSION LADDERS

I.P. No. 66020

*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.

## STEP AND EXTENSION LADDERS: Standard Industrial Classification 2499

### A. PRODUCT DESCRIPTION

Standard type wooden step and extension ladders.

### B. GENERAL EVALUATION

Capital requirements for this industry are small, and labor skills needed are not of a high order. These products are in general demand, both in urban and rural areas. Competition from imports is unlikely. A plant such as this should be economically feasible in many developing areas.

### C. MARKET ASPECTS

1. USERS. Builders and decorators, industries, transport and communications organizations, farms, households, etc.
2. SALES CHANNELS AND METHODS. Sales to building supplies houses, wholesale and retail distributors, possibly direct to government agencies.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transport costs on these products may be fairly heavy and in areas distant from the plant small woodworking establishments may be able to compete. However in this industry factory-made products are often superior, and they may be able to command a higher price. b. Export. Since most countries can make adequate ladders locally, and since freight costs on them are fairly high, these products are not commonly exported.
4. COMPETITION. a. Domestic Market. Competition from imports is unlikely. Competition from metal ladders is increasing. b. Export Market. In some cases exports to nearby foreign areas may be possible, but in general export opportunities are likely to be very few.
5. MARKET NEEDED FOR PLANT DESCRIBED. Demand will depend on the extent to which industries, public services and institutions, and modern buildings are developed. In the average conditions of less developed areas, this plant might be able to meet the needs of a total population of upwards of a million people.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION : 10,000 Ladders.

### 1. CAPITAL REQUIREMENTS

a. <b>FIXED CAPITAL</b>	<u>Cost</u>
Land. About 5,000 sq. ft.	\$ --
Building. One story, 40'x50'.	12,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipment	\$ 8,000
Other tools & equipmt.	2,300
Furniture & fixtures	700
<u>Total (excl. Land)</u>	<u>\$ 23,000</u>

Principal Items. Radial cutoff saw, rip saw, jointer, planer, drill press, trim saw, bench grinder, table belt sander, band saw, chain mortiser, chain mortiser grinder, electric screw-driver, electric drill, single end tenoner.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 13,400
Admin. Costs(b), Contingencies, Sales Costs(c)	30	800
Training Costs		3,400
<u>Total</u>		<u>\$ 17,600</u>

c. TOTAL CAPITAL (EXCL. LAND) \$ 40,600

### 2. MATERIALS AND SUPPLIES

a. <u>Direct Materials</u>	<u>Annual Requirements</u>	<u>Annual Cost</u>
Lumber	198,500 sq. ft.	\$ 26,800
Steel rods		500
Bolts, nuts & washers		400
Glue		300
Finishing materials		1,500
<u>Total</u>		<u>\$ 29,500</u>

### b. Supplies

Lubricants & hand tools	\$ 100
Cutting tools	200
Maintenance & repair parts	500
Office supplies	200
<u>Total</u>	<u>\$ 1,000</u>

### 3. POWER, FUEL AND WATER

a. <u>Electric Power.</u> Connected load about 30 hp.	<u>Annual Cost</u>
	\$ 800
b. <u>Fuel.</u> Scrap lumber may be used. No purchased fuel necessary.	
c. <u>Water.</u> Small amount needed for glue, also for general purposes.	\$ 100

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. No special requirements.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>		
Skilled	2	\$ 10,000
Semi-skilled	3	12,000
Unskilled	3	9,000
<u>Total</u>	<u>8</u>	<u>\$ 31,000</u>
b. <u>Indirect Labor</u>		
Manager-buys, sells & supervises	1	\$ 8,000
Foreman	1	6,000
Office	1	4,000
<u>Total</u>	<u>3</u>	<u>\$ 18,000</u>

- c. Training Needs. Manager and foreman must be experienced. With aid of 1 skilled worker, they should be able to do all labor training. Plant should reach full production in 2 months.

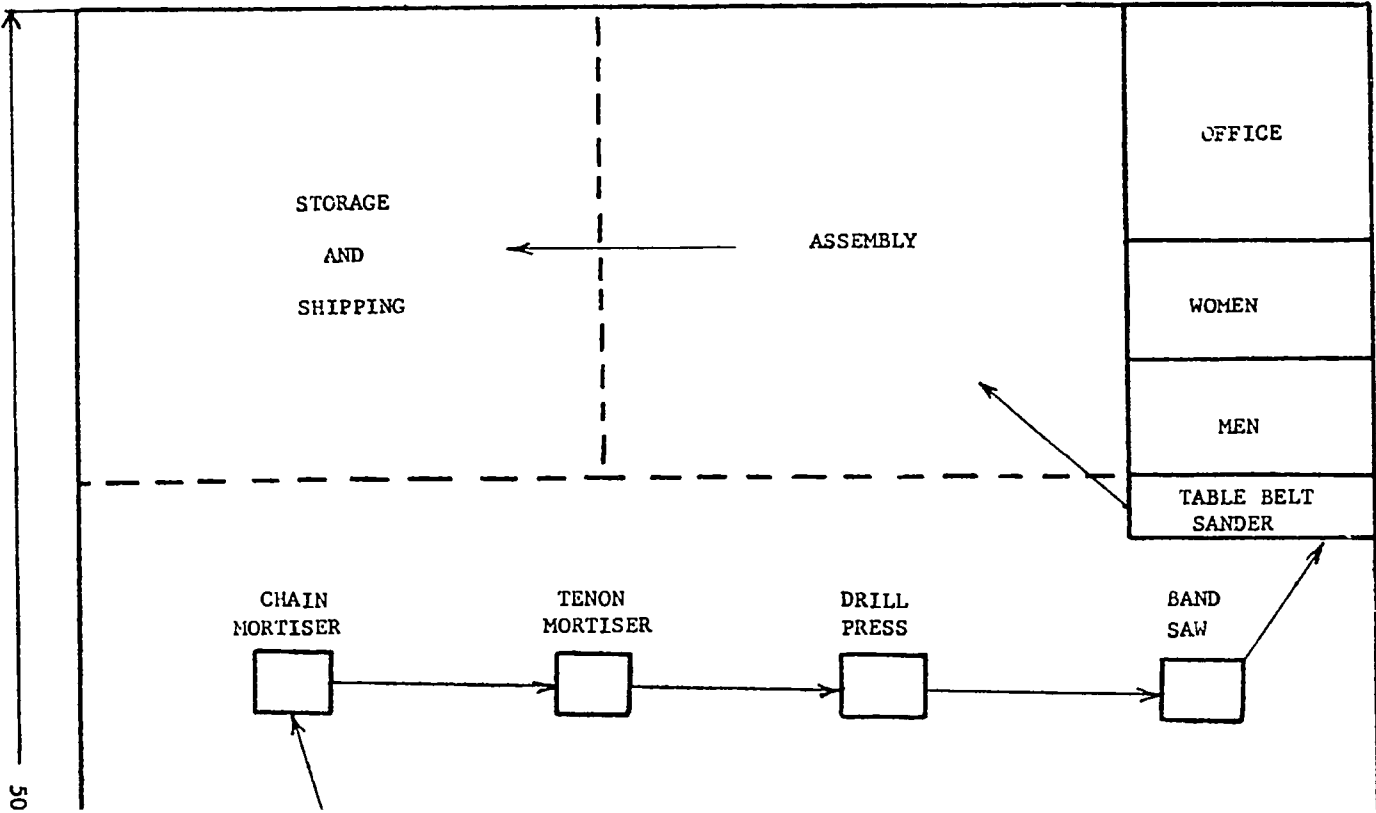
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 29,500
Direct Labor	31,000
Manufacturing Overhead(a)	19,900
Admin. Costs(b), Contingencies	4,000
Sales Costs(c), Bad Debts	6,000
Depreciation on Fixed Capital	1,700
<u>Total Annual Costs</u>	<u>\$ 92,100</u>
b. <u>Annual Sales Revenue</u>	\$110,000

NOTES. (a) Includes Supplies. Power, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

STEP AND EXTENSION LADDERS: S.I.C. 2499

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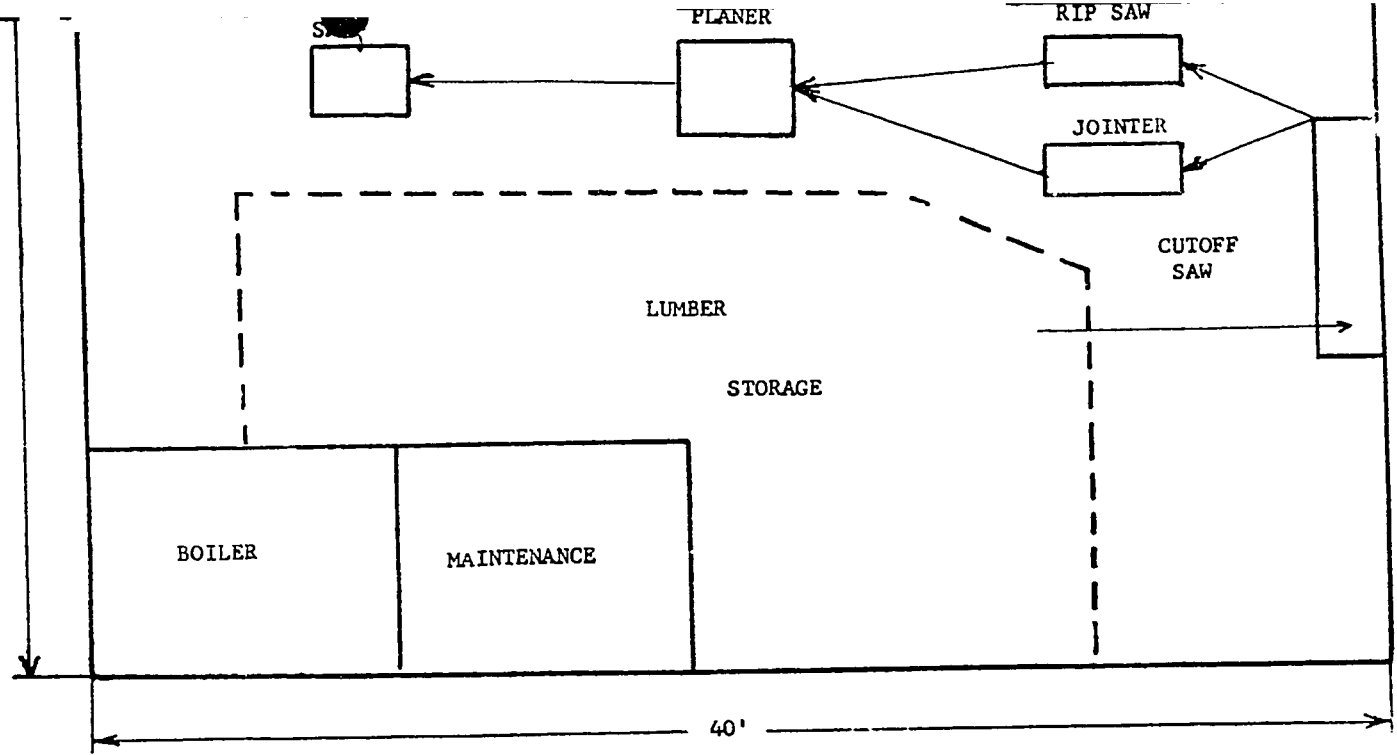


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WORK FLOW



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STEP AND EXTENSION LADDERS: S. I. C. 2499

SELECTED REFERENCES

I. TEXTBOOKS

- A. General Woodworking. C. H. Groneman. 1959. 256 p. Illus. \$6.75.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Machine tool processing, portable tool processing, and hand tool processing.
- B. Complete Book on Wood Finishing. R. Scharff. 1956. 277 p. \$4.59.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Devoted to the finishing of all types of wood products.

II. PERIODICALS

- A. The Wood-Worker. Monthly. \$2.00/year.  
S. H. Smith Company  
2232 North Meridian Street  
Indianapolis 7, Indiana  
Devoted to the woodworking industry.
- B. Hitchcock's Wood-Worker. Monthly. \$4.00/year.  
Hitchcock Publishing Company  
222 East Willow Avenue  
Wheaton, Illinois  
Covers the woodworking field.

III. GOVERNMENT PUBLICATIONS, U.S.

- A. Lumber Seasoning. PO-15. July 1961. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Devoted to the subject of the seasoning of lumber.

IV. OTHER PUBLICATIONS

- A. Cutting Techniques for Woodworkers. T. D. Perry. 1955. 52 p. \$.50.  
Hitchcock Publishing Company  
222 East Willow Avenue  
Wheaton, Illinois  
Cutting tools and techniques.

V. TECHNICAL PAPERS

- A. Production Planning and Control. TB-82. May 1960. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Manual for the training of personnel in the subject of production planning and control in industry.

## SELECTED REFERENCES (Continued)

### VI. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$.25 each.

- A. Patent No. 2,962,111. 1960. 5 p.  
Combination step-extension ladder.
- B. Patent No. 2,919,762. 1960. 5 p.  
Combination step and extension ladder.
- C. Patent No. 2,704,178. 1955. 2 p.  
Extension ladder.
- D. Patent No. 2,670,119. 1954. 3 p.  
Extension ladder bracket.

### VII. TRADE ASSOCIATIONS

- A. American Ladder Institute  
666 Lake Shore Drive  
Chicago 11, Illinois
- B. Woodworking Machinery Manufacturers Association  
1900 Arch Street  
Philadelphia 3, Pennsylvania

### VIII. ENGINEERING COMPANIES

- A. United States Machinery Company, Inc.  
90 Broad Street  
New York 4, New York  
Designs and installs woodworking plants.
- B. Mattison Machine Works  
200 Blackhawk Avenue  
Rockford, Illinois  
Designs and builds large line of woodworking machinery.

### IX. DIRECTORIES

- A. Hitchcock's Woodworking Directory. Biennial. \$10.00.  
Hitchcock Publishing Company  
Geneva Road  
Wheaton, Illinois  
Lists manufacturers of woodworking machinery and equipment.

STEP AND EXTENSION LADDERS: S. I. C. 2499

## 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.

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# INDUSTRY PROFILES

## CORK PRODUCTS

I.P. No. 66021

*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.

## CORK PRODUCTS: Standard Industrial Classification 2499

### A. PRODUCT DESCRIPTION

Plugs for bottles and jugs, floats, various types of handles and insulation sleeves, etc., made of natural cork.

### B. GENERAL EVALUATION

Cork has been, and continues to be replaced by synthetic and other materials in many uses, particularly for bottle stoppers. However, it continues to be used for many purposes, especially insulation. Though this project does not offer much prospect of growth, it is a small operation requiring little capital and should be suitable for small entrepreneurs in some developing areas.

### C. MARKET ASPECTS

1. USERS. A variety of industries, hospitals, pharmacies, etc.
2. SALES CHANNELS AND METHODS. Sales to user industries and wholesalers.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transport costs are low in relation to product value and market area could be nation-wide.  
b. Export. Shipping presents no product but, except for certain standard items made in the cork-producing countries, most countries find it better to import cork and make domestically the items suited to their particular needs.
4. COMPETITION. a. Domestic Market. Substitute materials increasingly compete with cork for many uses. b. Export Market. It is unlikely that an enterprise of this kind could find export outlets, except possibly in some few cases in nearby areas of neighboring countries.
5. MARKET NEEDED FOR PLANT DESCRIBED. A complex of user industries in the domestic market would be needed to provide an outlet, at least for the major part of this plant's production.

## D. PRODUCTION REQUIREMENTS

**ANNUAL CAPACITY - ONE-SHIFT OPERATION:** 5,000,000 Plugs, Sizes 5-18; 1,000,000 Floats, Handles, Sleeves.

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	Cost
Land. 1/2 acre	\$ --
Building. One story, 20'x50'.	6,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt. \$2,400	
Furniture & fixtures 400	2,800
Total (excl. Land)	\$ 8,800

Principal Items. Circular knife (1,600 r p. m.), foot blocker, end polishing machine, tapering machine, boiling or steaming vat, lathe.

### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 7,100
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,700
Training Costs		1,000
Total		\$ 9,800

c. TOTAL CAPITAL (EXCL. LAND) \$ 18,600

### 2. MATERIALS AND SUPPLIES

a. <u>Direct Materials</u>	Annual Requirements	Annual Cost
Work wood	52 tons	\$ 6,000
Packing cartons		1,000
Total		\$ 7,000

b. <u>Supplies</u>	Cost
Lubricants & hand tools	\$ 100
Maintenance & spare parts	300
Office supplies	100
Total	\$ 500

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> 20 hp. connected load.	\$ 200
b. <u>Fuel.</u> Any local fuel for boiling water and for heat.	\$ 500
c. <u>Water.</u> 800,000 gals.	\$ 200

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. In and out freight average less than 1/2 ton a day. No special requirements.

### 5. MANPOWER

	Number	Annual Cost
a. <u>Direct Labor</u>		
Skilled	3	\$ 15,000
Semi-skilled	2	8,000
Unskilled	1	3,000
Total	6	\$ 26,000

b. <u>Indirect Labor</u>		
Manager	1	\$ 8,000

- c. Training Needs. Manager and 3 skilled workers should be fully experienced. They should be able to train other employees and reach full production in 30 days.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 7,000
Direct Labor	26,000
Manufacturing Overhead(a)	9,400
Admin. Costs(b), Contingencies	6,000
Sales Costs(c), Bad Debts	14,000
Depreciation on Fixed Capital	600
Total	\$ 63,000

b. Annual Sales Revenue \$ 80,000

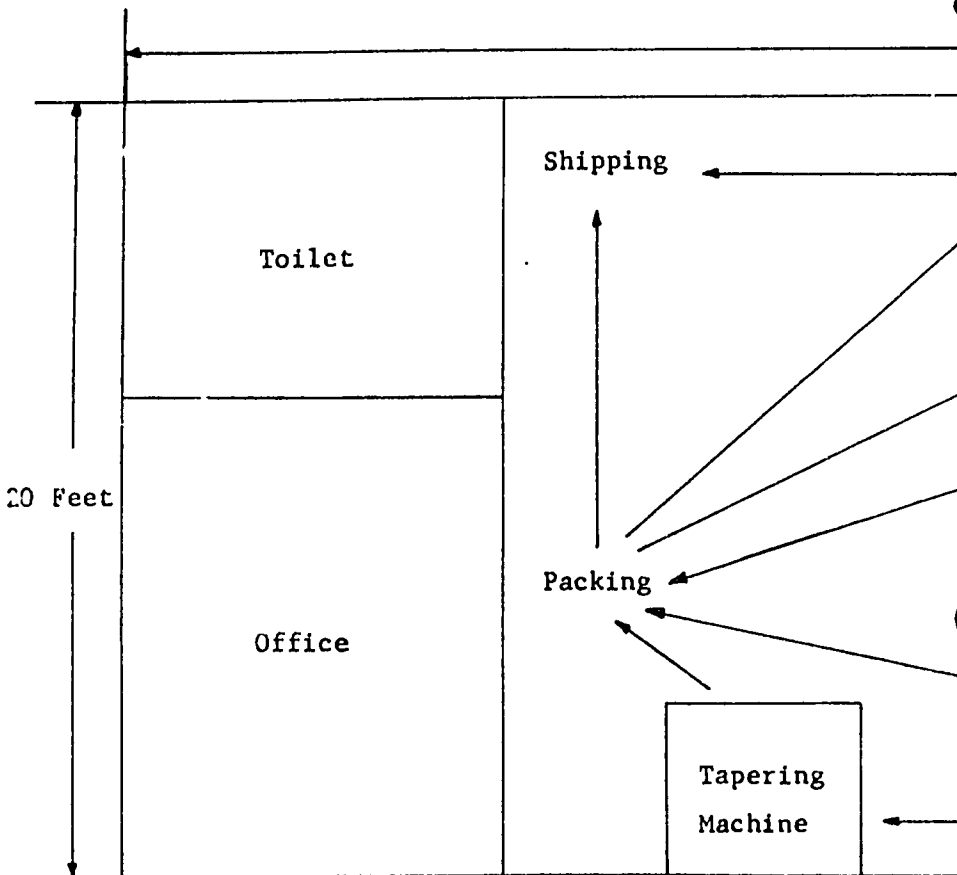
NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commission, Freight Out, Travel.

CORK PRODUCTS: S.I.C. 2499

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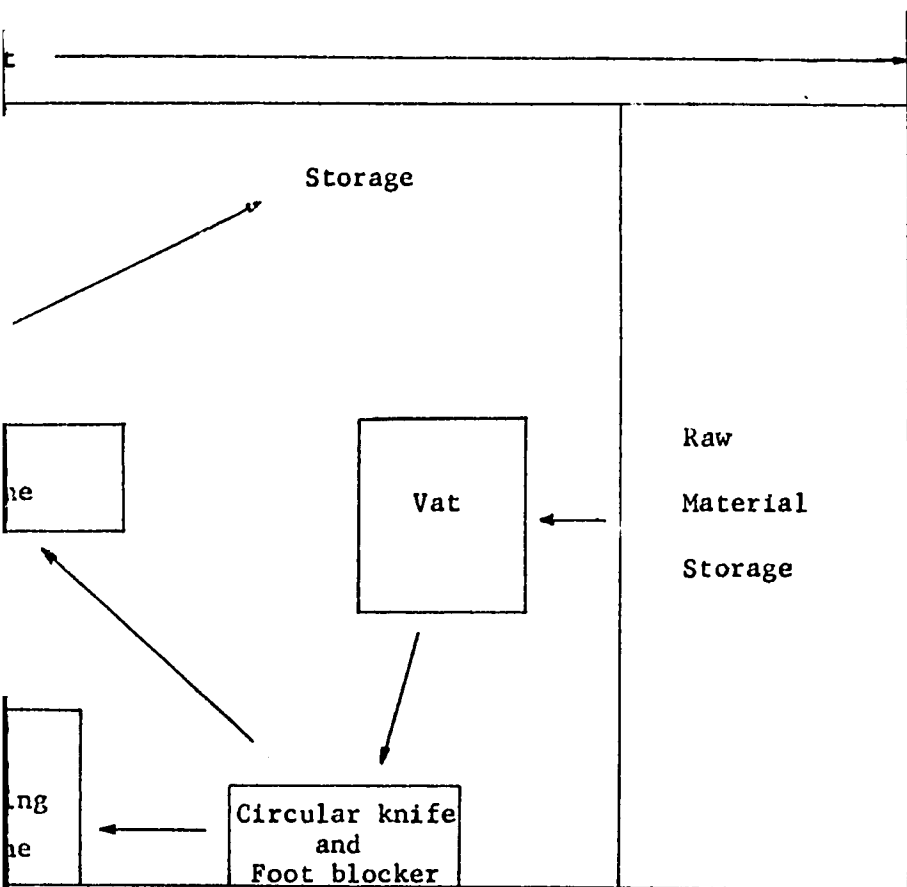
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S.I.C. 2499

WORKFLOW



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## CORK PRODUCTS: S.I.C. 2499

### SELECTED REFERENCES

#### I. TEXTBOOKS

No suitable textbooks available that are devoted to the cork industry.

#### II. PERIODICALS

- A. Industrial Woodworking. Monthly. \$5.00/year.  
Cleworth Publishing Company, Inc.  
One River Road  
Cos Cob, Connecticut  
News about woodworking and wood fabricating.
- B. Wood Working. Monthly. \$5.00/year.  
Hitchcock Publishing Company  
Geneva Road  
Wheaton, Illinois  
News of new developments in the field of wood working and wood fabricating.

#### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Cork Products. IR-25590. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Information relative to the manufacture of products from natural and composition cork.

#### IV. OTHER PUBLICATIONS

No suitable publications available that are devoted to the cork industry.

#### V. TECHNICAL PAPERS

- A. Cork, Bark of the Exotic Quercus Suber. G. B. Cooke. Scientific Monthly. Vol. 72. p. 169-179. \$.75.  
American Association for the Advancement of Science  
1515 Massachusetts Avenue, N.W.  
Washington, D.C.  
Composition, processing, and commercial uses of cork. Extensive bibliography relating to cork and cork products.

## SELECTED REFERENCES (Continued)

### VI. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$ .25 each.

- A. Patent No. 2,927,709. 1960. 4 p.  
Method of making cork bottle stopper.
- B. Patent No. 2,904,524. 1959. 4 p.  
Cork composition for insulation and other purposes.
- C. Patent No. 2,889,951. 1959. 2 p.  
Cork bottle closure, and method of making.
- D. Patent No. 2,786, 594. 1957. 5 p.  
Cork closure for bottles and like containers.

### VII. TRADE ASSOCIATIONS

- A. Cork Institute of America  
342 Madison Avenue  
New York 17, New York

### VIII. ENGINEERING COMPANIES

- A. Hydraulic Press Manufacturing Company  
380 Marion Road  
Mount Gilead, Ohio  
Manufacturer of cork products machinery.
- B. A. Johnson Machine Works, Inc.  
Van Riper Avenue and Boulevard  
East Paterson, New Jersey  
Cork cap and stopper cutting machinery.
- C. Consolidated Cork International Corp.  
4012 Second Avenue  
Brooklyn 32, New York  
Establish manufacturing plants in foreign countries.

### IX. DIRECTORIES

- A. Hitchcock's Woodworking Directory. Biennial. \$10.00.  
Hitchcock Publishing Company  
Geneva Road  
Wheaton, Illinois  
Lists producers of many wood products, machinery, manufacturers for the industry, and trade associations.

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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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.

## ORDERING INSTRUCTIONS

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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

## SASH AND DOOR PLANT

I.P. No. 66022

*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.

## SASH AND DOOR PLANT: Standard Industrial Classification 2431

### A. PRODUCT DESCRIPTION

Windows, doors, moldings, stairways, and other wooden fixtures for buildings. Made from lumber already seasoned and surfaced.

### B. GENERAL EVALUATION

The capital needed for this industry is moderately large and skilled labor needs are also fairly high. Local production of suitable lumber, though not indispensable, would generally be a distinct advantage. The equipment is adaptable to the production of a wide range of wooden fixtures. Many developing areas should be able to provide a market for a plant of this kind.

### C. MARKET ASPECTS

1. USERS. Building contractors, individual and institutional property owners.
2. SALES CHANNELS AND METHODS. Sales to building contractors and building supplies houses.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transport costs on these products are fairly high and the market area normally does not extend very far. In low wage countries small woodworking establishments using little or no mechanical equipment may be able to compete in their own immediate vicinity with factory-made products of this type. b. Export. There is little export trade in these products.
4. COMPETITION. a. Domestic Market. Competition from small woodworking establishments may be strong in some areas. b. Export Market. Opportunities for export business are likely to be very rare.
5. MARKET NEEDED FOR PLANT DESCRIBED. Demand will depend, among other things, on the type of dwellings in common use. A market for this plant's total production might be found in an urban area with a population numbering about two million, with an average growth rate and building construction keeping pace.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 8,400 Pieces.

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	<u>Cost</u>
<u>Land.</u> 2 acres, including lumber yard.	\$ --
<u>Building.</u> Plant 7,840 sq. ft. Office 670 sq. ft. Covered area 2,130 sq. ft.	57,500
<u>Equipment, Furniture &amp; Fixtures.</u>	
Prod'n. tools & equipmt.	\$ 54,300
Other tools & equipmt.	3,500
Furniture & fixtures	1,200
<u>Total (excl. Land)</u>	<u>\$116,500</u>

Principal items. Radial saw, trim saw, planer, molder, mortiser, band saw, hand jointer, shaper, router, sander-3-drum, single end tenoner, edge belt sander, hand belt sander, end & frame clamp, bar clamp, glue cooker & pots double end emery grinder.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
<u>Direct Materials, Direct Labor, Mfg. Overhead (a)</u>	60	\$ 63,500
<u>Admin. Costs (b), Contingencies, Sales Costs(c)</u>	30	4,600
<u>Training Costs</u>		11,800
<u>Total</u>		<u>\$ 79,900</u>

c. TOTAL CAPITAL (EXCL. LAND) \$196,400

### 2. MATERIALS AND SUPPLIES

a. <u>Direct Materials</u>	<u>Annual Requirements</u>	<u>Annual Cost</u>
Lumber	2,050,000 bd. ft.	\$205,000
Hardware		5,500
Glue		5,000
<u>Total</u>		<u>\$215,500</u>

### b. Supplies

Lubricants & hand tools	\$ 300
Sandpaper	3,000
Cutting tools	3,000
Maintenance & spare parts	3,000
Office supplies	200
<u>Total</u>	<u>\$ 9,500</u>

### 3. POWER, FUEL AND WATER

a. <u>Electric power.</u> Connected load about 80 hp.	<u>Annual Cost</u>
	\$ 2,400
b. <u>Fuel.</u> Wood scrap may be used. No purchased fuel necessary.	
c. <u>Water.</u> About 1.6 mn. gals. annually for production, heating sanitation & fire protection.	<u>\$ 400</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Shipments are bulky and plant should be on railroad, if possible.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>		
Skilled	10	\$ 50,000
Semi-skilled	8	32,000
Unskilled	7	21,000
<u>Total</u>	<u>25</u>	<u>\$103,000</u>
b. <u>Indirect Labor</u>		
Manager & supervisor	2	\$ 17,500
Office	2	8,500
Other	7	24,000
<u>Total</u>	<u>11</u>	<u>\$ 50,000</u>

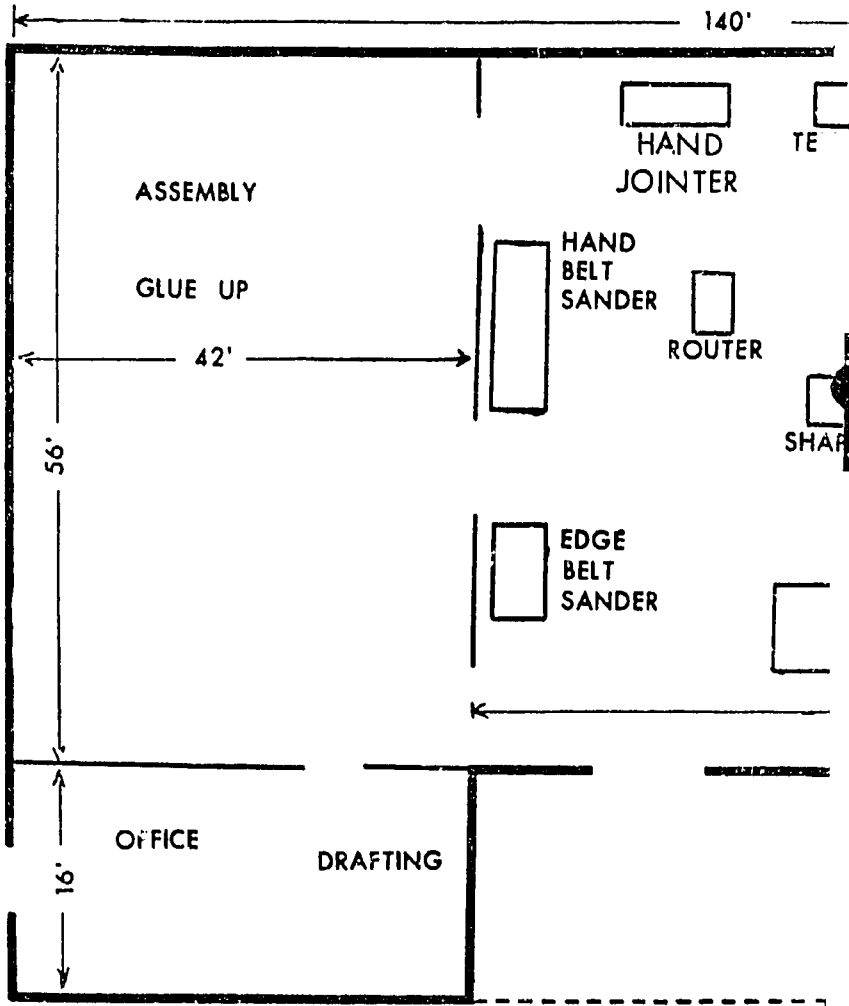
- c. Training Needs. Manager and supervisor must have long experience. With 4 skilled workers, they should be able to do all necessary labor training. Plant should reach full production in 2 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$215,500
Direct Labor	103,000
Manufacturing Overhead(a)	62,300
Admin. Costs (b), Contingencies	20,000
Sales Costs(c), Bad Debts	35,000
Depreciation on Fixed Capital	8,800
<u>Total Annual Costs</u>	<u>\$444,600</u>
b. <u>Annual Sales Revenue</u>	<u>\$570,000</u>

NOTES. (a) Includes Supplies, Power, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

SASH AND DOOR PLANT: S.I.C. 2431

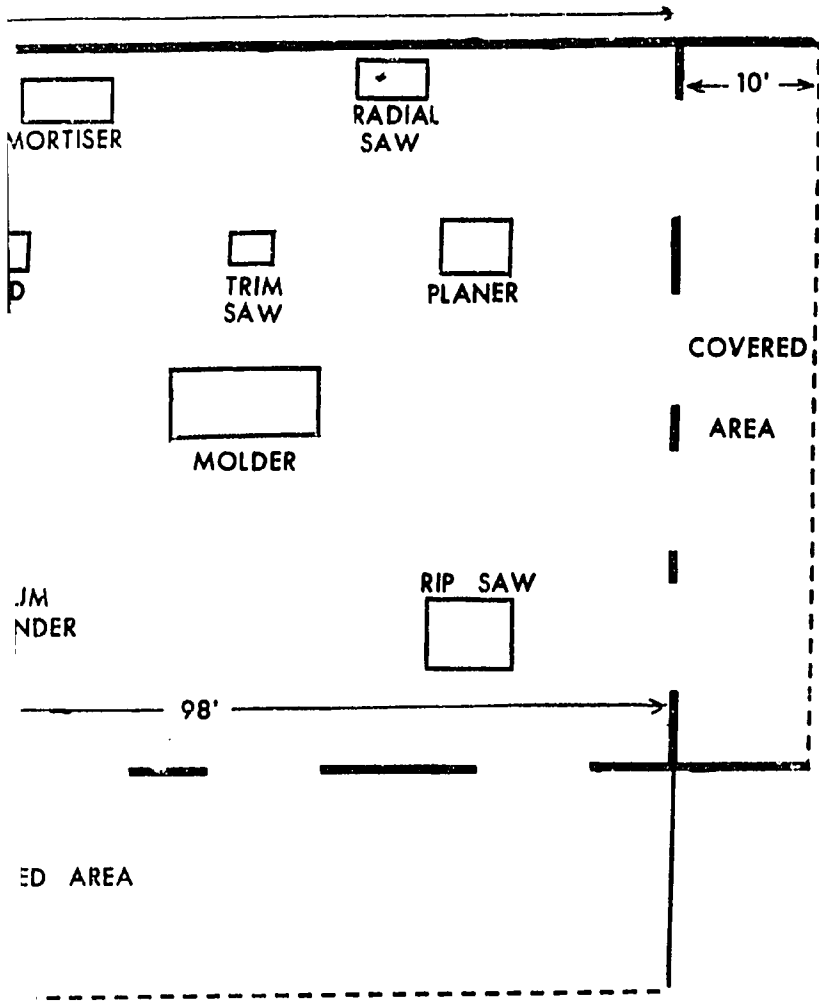


The operations are so diversified that a straight line flow of work from rough cutting to defects and cutting to rough lengths. From there it could go to

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Some parts will require operations on several machines. Some

NT: S.I.C. 2431



cticable. All lumber will go to the radial saw for removing of the following five machines, depending on its end use

quire only a few operations.

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SASH AND DOOR PLANT: S.I.C. 2431

SELECTED REFERENCES

I. TEXTBOOKS

- A. General Woodworking. C.H. Groneman. 1959. 256 p. Illus. \$6.75.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York  
General information on processes of woodworking, covering both hand tool and power tool operations.

II. PERIODICALS

- A. Wood and Wood Products. Monthly. \$12.00/year.  
Vance Publishing Corporation  
817 West Market Street  
Louisville 2, Kentucky  
Machining, techniques, and organization of woodworking operations.
- B. Wood Working. Monthly. \$5.00/year.  
Hitchcock Publishing Company  
Geneva Road  
Wheaton, Illinois  
Covers all major branches of the wood products industry.

III. GOVERNMENT PUBLICATIONS. U.S.

- A. Sash and Door Plant. PO-11. February 1957. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Requirements for establishing and operating a plant to produce windows, doors, moldings, stairways, and other wooden fixtures for buildings.

IV. OTHER PUBLICATIONS

- A. Basic Tools for Woodworking. 2nd Edition. L. Frankl. 1954. 128 p.  
\$2.90  
Prentice-Hall, Incorporated  
Englewood Cliffs, New Jersey  
Driving tools, cutting tools, boring tools, holding tools, measuring and marking tools, and many of the other tools of woodworking.

V. TECHNICAL PAPERS

- A. Quality Control. TB-66. April 1960. Gratis  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Manual for training personnel in the subject of quality control in industry.

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## SELECTED REFERENCES (Continued)

### VI. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$ .25 each.

- A. Patent No. 2,993,244. 1961. 3 p.  
Invention relating to flush doors.
- B. Patent No. 2,817,933. 1957. 3 p.  
Improved window assembly.
- C. Patent No. 2,757,420. 1956. 6 p.  
Relates to window sashes.
- D. Patent No. 2,645,826. 1953. 5 p.  
Window construction.
- E. Patent No. 2,571,731. 1951. 3 p.  
Window construction.

### VII. TRADE ASSOCIATIONS

- A. National Woodwork Manufacturers Association  
400 West Madison Street  
Chicago, Illinois 60606
- B. Architectural Woodwork Institute of America  
332 South Michigan Avenue  
Chicago 4, Illinois

### VIII. ENGINEERING COMPANIES

- A. United States Machinery Company, Inc.  
90 Broad Street  
New York 4, New York  
Industrial woodworking machinery. Designs and installs woodworking plants.
- B. Yates American Machine Company  
701 4th Street  
Beloit, Wisconsin  
Complete line of woodworking machinery.

### IX. DIRECTORIES

- A. Hitchcock's Wood Working Directory. Biennial. \$10.00.  
Hitchcock Publishing Company  
222 East Willow Avenue  
Wheaton, Illinois  
Lists manufacturers and suppliers of over 800 products used in the wood-working industry.

SASH AND DOOR PLANT: S.I.C. 2431

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## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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# INDUSTRY PROFILES

## MEN'S DRESS SHIRTS

I.P. No. 66023

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## MEN'S DRESS SHIRTS: Standard Industrial Classification 2321

### A. PRODUCT DESCRIPTION

Shirts made from white broadcloth, in any of a variety of styles made to be worn with suits and ties.

### B. GENERAL EVALUATION

In certain of the less industrialized areas the market for this type of shirt may be greater than for the work shirt, e.g. in areas where T shirts or no shirts at all are worn for manual labor, but where the shirts here described are used for prestige occasions and are worn most of the time by white collar workers, officials and executives. The type of machinery required is exactly the same as that used for the work shirts. Therefore fixed capital expenditure is identical. But the fabric used is somewhat more expensive, the degree of skill needed somewhat greater, and the total labor force somewhat larger. It may be feasible to produce both shirts in the same factory at different times, depending upon the demand for the two types. (See Industry Profile on Men's Work Shirts: S I.C. 2328).

### C. MARKET ASPECTS

1. SALES CHANNELS AND METHODS. Sales to wholesalers and large retailers.
2. GEOGRAPHICAL EXTENT OF MARKET. Product is easily shipped and can be transported anywhere. Limiting factor in this case will be size of plant and outside competition rather than transportation.
3. COMPETITION. a. Domestic Market. More expensive materials may compete for prestige wear. Large-scale foreign manufacturers, with a large, low-wage labor force available, may constitute serious competition.  
b. Export Market. Size of plant would exclude entrance into international market.
4. MARKET NEEDED FOR PLANT DESCRIBED. The rate of consumption of dress shirts will depend primarily upon the level of income, and the availability of other prestige wear. Where such shirts are worn for more formal occasions and at all times by officials, higher white collar workers and professional people, a population between 2 and 3 million should be sufficient to support the output of this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 15,000 Dozen Shirts.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		Ct.st
Land. About 6,000 sq. ft.	\$	--
Building. One story, 60'x100'		36,000
Equipment, Furniture & Fixtures.		
Prod'n. tools & equipmt.	\$26,000	
Other tools & equipmt.	1,000	
Furniture & fixtures	1,000	28,000
Total (excl. Land)		\$ 64,000

Principal Items. 2 cutting tables, 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.

<b>d. WORKING CAPITAL.</b>		No. of Days
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 58,500
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,800
Training Costs		9,400
Total		\$ 69,700

**c. TOTAL CAPITAL (EXCL. LAND)** \$133,700

### 2. MATERIALS AND SUPPLIES

	Annual	Annual
<b>a. Direct Materials</b>	Requirements	Cost
White Broadcloth	400,000 yds.	\$160,000
Lining material	8,000 yds.	2,000
Thread		2,600
Buttons		2,000
Size tag (paper)		200
Label (woven)		1,600
Shirt board & paper		1,200
Pins		400
Boxes		4,000
Shipping cartons		2,000
Total		\$176,000

<b>b. Supplies</b>		
Lubricants & hand tools	\$	300
Maintenance & spare parts		1,500
Office supplies		200
Total		\$ 2,000

### 3. POWER, FUEL AND WATER

	Annual Cost
<b>a. Electric Power.</b> Connected load about 100 hp.	\$ 3,000
<b>b. Fuel.</b> 5,000 gals. oil annually for steam for pressing and heating.	\$ 600
<b>c. Water.</b> For steam, sanitation & fire protection.	\$ 400

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. No special requirements.

### 5. MANPOWER

	Number	Annual Cost
<b>a. Direct Labor</b>		
Skilled	4	\$ 20,000
Semi-skilled	26	104,000
Unskilled	4	12,000
Total	34	\$136,000
<b>b. Indirect Labor</b>		
Manager & supervisors	4	\$ 26,000
Office	1	4,000
Other	1	3,000
Total	6	\$ 33,000

- c. Training Needs. Manager and supervisors must be fully experienced. With 4 skilled operators, they will train all other workers. Plant should reach full production in 2 months.

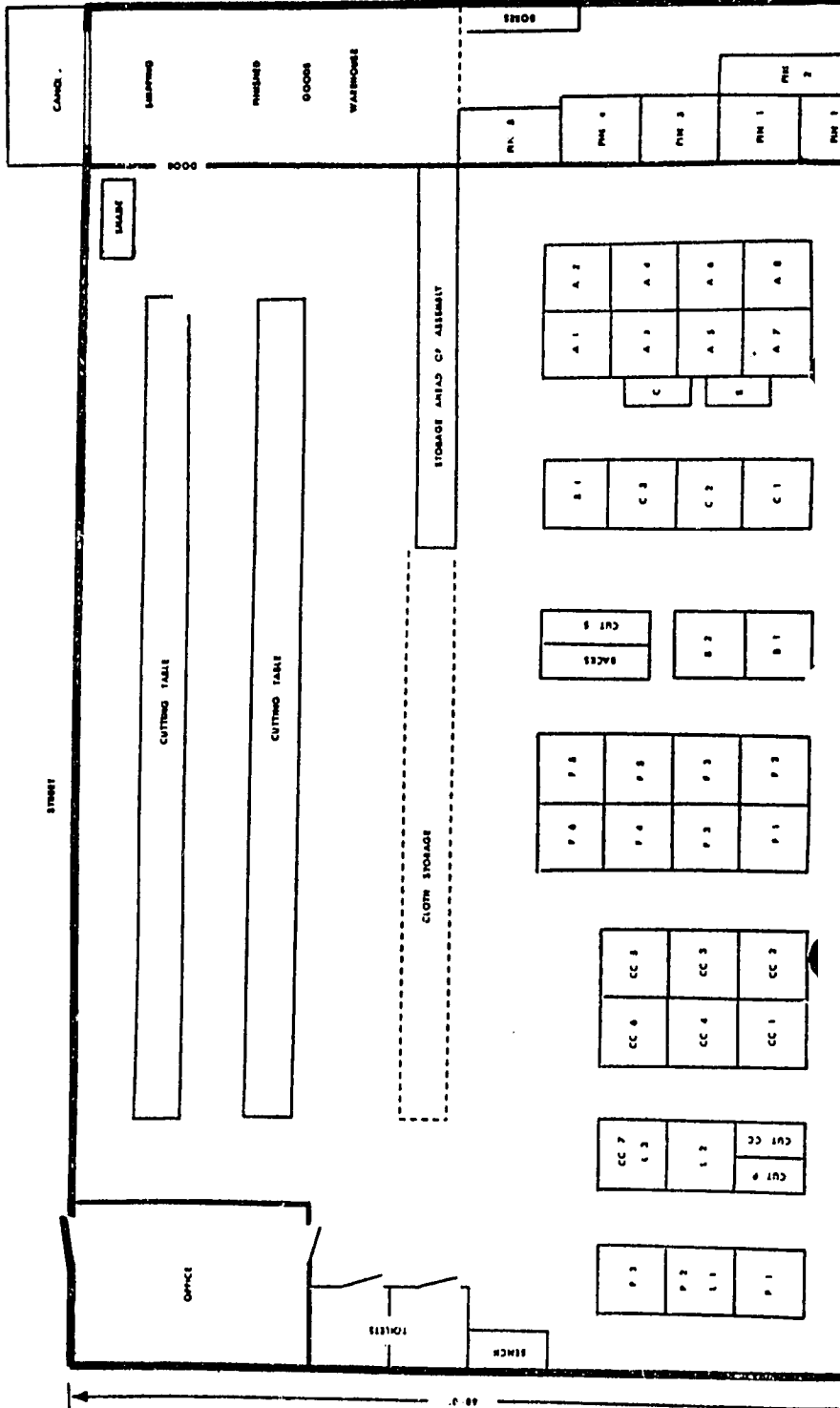
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>		
Direct Materials		\$176,000
Direct Labor		136,000
Manufacturing Overhead(a)		39,000
Admin. Costs(b), Contingencies		10,000
Sales Costs(c), Bad Debts		12,000
Depreciation on Fixed Capital		4,600
Total Annual Costs		\$377,600
<b>b. Annual Sales Revenue</b>		\$450,000

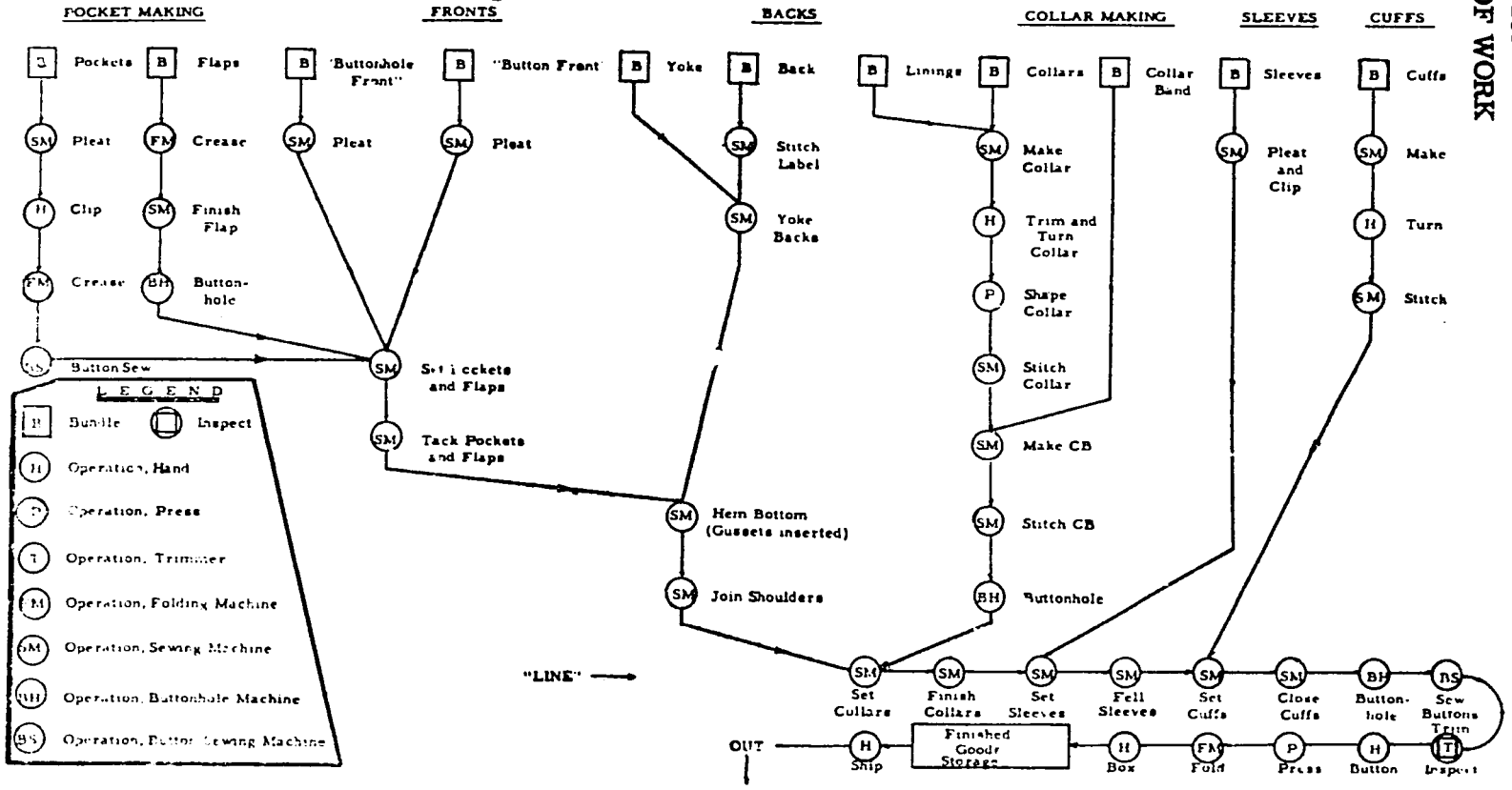
**NOTES.** (a) Includes Supplies, Power, Fuel, Water Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

MEN'S DRESS SHIRTS: S.I.C. 2321

MEN'S DRESS SHIRTS  
ARROWS INDICATE



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1971



MEN'S DRESS SHIRTS: S.I.C. 2321

SELECTED REFERENCES

I. TEXTBOOKS

- A. Clothing Construction. E. A. Mansfield. 1953. 454 p. Illus. \$5.50.  
Houghton Mifflin Company  
2 Park Street  
Boston 7, Massachusetts  
Materials, equipment, and processes of manufacturing men's shirts and related items.
- B. Clothing Construction and Wardrobe Planning. D. S. Lewis. 1955. 534 p. Illus. \$4.40.  
Macmillan Company  
60 Fifth Avenue  
New York 11, New York  
Describes construction of various articles of clothing including men's shirts.

II. PERIODICALS

- A. Apparel Arts. Monthly. \$3.00/year.  
Esquire, Inc.  
488 Madison Avenue  
New York 22, New York  
Current information on men's shirts.
- B. Merchant's Trade Journal. Monthly. \$6.00/year.  
Boreman Company  
1912 Grand Avenue  
Des Moines, Iowa  
Production and marketing news on all phases of the clothing and wearing apparel field.

III. GOVERNMENT PUBLICATIONS, U.S.

- A. Men's Shirt Industry. IR-15767. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Capital requirements and operational data on plants making men's shirts.

IV. OTHER PUBLICATIONS

- A. Apparel Engineering and Needle Trades Handbook. 1960. 388 p. \$15.00.  
Frederick Kogos Publishing Company  
1140 Broadway  
New York 1, New York  
Contains information on the making of men's shirts.

SELECTED REFERENCES (Continued)

V. TECHNICAL PAPERS

- A. Men's White Shirts. Consumers Reports. January 1960. Vol. 43.  
p. 9-11. \$.50.  
Consumers' Research, Inc.  
Washington, New Jersey  
Specifications and construction details of men's dress shirts.

VI. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$.25.

- A. Patent No. 2,941,210. 1960. 4 p.  
Improved method for making men's shirts.
- B. Patent No. 2,935,749. 1960. 6 p.  
Men's and boy's dress shirts.
- C. Patent No. 2,846,687. 1958. 5 p.  
Method for making men's shirts.

VII. TRADE ASSOCIATIONS

- A. American Apparel Manufacturers Association  
2000 K Street, N.W.  
Washington, D.C. 20006

VIII. ENGINEERING COMPANIES

- A. Singer Sewing Machine Company  
149 Broadway  
New York 6, New York  
Provides technical information relative to the factory manufacture of shirts.
- B. A. J. Boynton and Company  
111 North Wabash Avenue  
Chicago, Illinois  
Engineers and technical counselors on plant layouts for industry.

IX. DIRECTORIES

- A. Suppliers Register, Annual. \$4.95.  
Frederick Kogos Publishing Company  
1140 Broadway  
New York 1, New York  
Lists suppliers of fabrics, machinery, and equipment for the garment industry.

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## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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# INDUSTRY PROFILES

## WORK GLOVES

I.P. No. 66024

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## WORK GLOVES: Standard Industrial Classification 2381

### A. PRODUCT DESCRIPTION

Machine-sewn canvas gloves with knit wristlets.

### B. GENERAL EVALUATION

These gloves are inexpensive and easily manufactured. The investment required for the manufacture of 400,000 pairs is very small. Variation in output can easily be achieved by varying the number of sewing machines employed. The degree of labor skill required is also small. Raw materials are inexpensive and readily obtainable. These gloves are worn by many workmen, such as train engineers, crane operators, and other workers. They are also widely used in households for protecting the hands while doing rough work in the house or in the garden. Many developing areas should be able to support a plant of this character.

### C. MARKET ASPECTS

1. USERS. Workmen, individuals for household and other activities.
2. SALES CHANNELS AND METHODS. wholesale and large retail distributors. Direct sales to large organizations such as railroads may be possible.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. The product is light and easily transported. Nation-wide distribution should generally be possible.  
b. Export. This product is commonly exported.
4. COMPETITION. a. Domestic Market. Competition from imports is likely to be keen. Hand sewn gloves, as well as gloves made of other materials, may also compete. b. Export Market. A plant of this size would normally not be able to compete in export markets with large-scale manufacturers.
5. MARKET REQUIRED FOR PLANT DESCRIBED. In a country where such gloves are commonly used by workmen, a total population of the order of 5 million would support the output of this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 400,000 Pairs.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<b>Cost</b>
Land. About 5,000 sq. ft.	\$	---
Building. One story, 30'x70'.		12,600
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	\$	6,000
Other tools & equipmt.		1,000
Furniture & fixtures		700
Total (excl. Land)		<u>7,700</u>
	\$	<u>20,300</u>
Principal Items. Cloth spreader, cutting table, electric drill, work tables, 10 sewing machines.		

### b. WORKING CAPITAL

	<b>No. of Days</b>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 13,200
Admin. Costs(b), Contingencies, Sales Costs(c)	30	500
Training Costs		3,500
Total		<u>\$ 17,200</u>

c. **TOTAL CAPITAL (EXCL. LAND)** \$ 37,500

### 2. MATERIALS AND SUPPLIES

	<b>Annual Requirements</b>	<b>Annual Cost</b>
a. <b>Direct Materials</b>		
Canvas	55,400 yds.	\$ 15,600
Knit wrists	58,000 yds.	7,000
Total		<u>\$ 22,600</u>

### b. Supplies

Lubricants & tools	\$	200
Maintenance & repair parts		600
Office supplies		200
Total	\$	<u>1,000</u>

### 3. POWER, FUEL AND WATER

	<b>Annual Cost</b>
a. <b>Electric Power.</b> Connected load about 5 hp.	\$ <u>300</u>
b. <b>Fuel.</b> For heating, when required.	\$ <u>200</u>
c. <b>Water.</b> For sanitation & fire protection.	\$ <u>100</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. No special requirements.

### 5. MANPOWER

	<b>Number</b>	<b>Annual Cost</b>
a. <b>Direct Labor</b>		
Skilled	1	\$ 5,000
Semi-skilled	8	32,000
Unskilled	2	6,000
Total	<u>11</u>	<u>\$ 43,000</u>
b. <b>Indirect Labor</b>		
Manager - buys & sells	1	\$ 8,000
Office	1	4,000
Total	<u>2</u>	<u>\$ 12,000</u>

- c. Training Needs. Manager should be well experienced. With skilled worker, he should be able to do all labor training. Plant should reach full production in 2 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

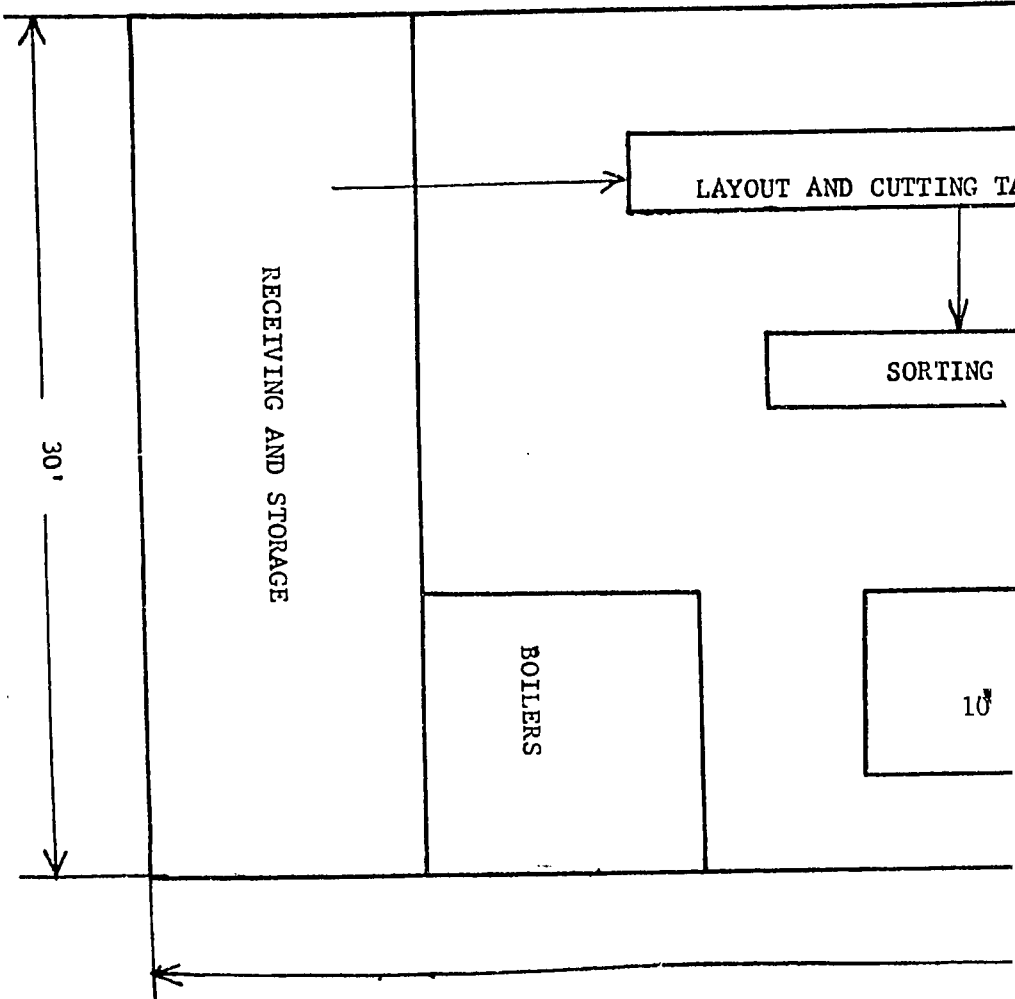
a. <b>Annual Costs</b>	
Direct Materials	\$ 22,600
Direct Labor	43,000
Manufacturing Overhead(a)	13,600
Admin. Costs(b), Contingencies	2,000
Sales Costs(c), Bad Debts	3,600
Depreciation on Fixed Capital	1,400
Total Annual Costs	<u>\$ 86,200</u>
b. <b>Annual Sales Revenue</b>	<u>\$100,000</u>

**NOTES.** (a) Includes Supplies, Power, Fuel, Water, Indirect Labor (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

WORK GL

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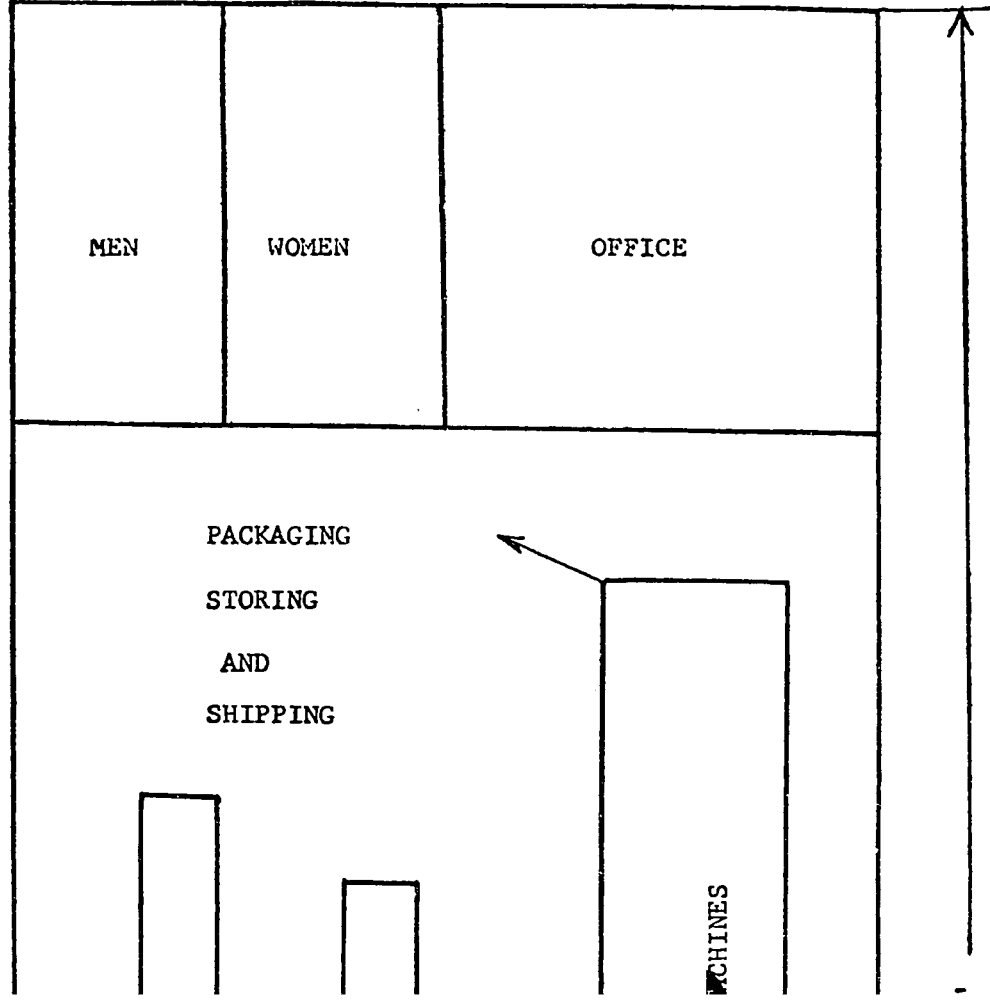


198

: S.I.C. 2381

OUT

WORK FLOW



1999



## WORK GLOVES: S. I. C. 2381

### SELECTED REFERENCES

#### I. TEXTBOOKS

- A. The Singer Sewing Book. M. B. Picken. 1953. 275 p. Illus. \$3.95.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York  
Sewing machine techniques and production methods.
- B. Apparel manufacturing Analysis, J. Solinger. 1961. \$22.50.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York 1, New York  
Devoted to the machines and operations required to produce cloth products.

#### II. PERIODICALS

- A. Textile World. Monthly. \$15.00/year.  
McGraw-Hill Publishing Company  
330 West 42nd Street  
New York 36, New York  
Technical journal devoted to production of textile products, operations, equipment, and management.
- B. Textile Research Journal. Monthly. \$21.00/year.  
Textile Research Institute  
Prince and Lemon Streets  
Lancaster, Pennsylvania  
Research on materials and processes for the textile industry; studies on new processes and machinery.

#### III. OTHER PUBLICATIONS

- A. Plant Production Control. 2nd Edition. C. A. Koepke. 1949. 569 p. Illus. \$7.50. 3rd Edition. 1961. \$8.95.  
John Wiley and Sons, Inc.  
440 Park Avenue South  
New York 6, New York  
All phases of production control from product design and specifications to dispatching of finished product.

#### IV. TECHNICAL PAPERS

- A. Clothing Industry. SSS-2. June 1956. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Study on the standardization and simplification of operations in the clothing industry.

SELECTED REFERENCES (Continued)

V. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$ .25 each.

- A. Patent No. 2,923,946. 1960. 2 p.  
Safety gloves.
- B. Patent No. 2,864,091. 1958. 4 p.  
Reinforced work glove.
- C. Patent No. 2,862,208, 1958. 2 p.  
Protective work glove.

VI. TRADE ASSOCIATIONS

- A. Textile Converters Association  
1450 Broadway  
New York 18, New York

VII. ENGINEERING COMPANIES

- A. Singer Sewing Machine Company  
149 Broadway  
New York, New York  
Manufacturers and engineering consultants to the glove industry,
- B. Union Special Machine Company  
402 North Franklin Street  
Chicago 10, Illinois  
Manufacturers and engineering consultants.

VIII. DIRECTORIES

- A. Suppliers Register. Annual. \$4.95.  
Frederick Kogos Publishing Company  
1140 Broadway  
New York 1, New York  
Lists over 20,000 suppliers of materials, machinery, and equipment for  
the clothing industry.

## 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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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

## MEN'S UNDERWEAR

I.P. No. 66025

*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.

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## MEN'S UNDERWEAR: Standard Industrial Classification 2322

### A. PRODUCT DESCRIPTION

Briefs manufactured from cotton knit materials, with elasticized waist and leg bindings, and fly front. T shirts with round neck and short sleeves. Athletic shirts, sleeveless, with lower cut neckline can also be produced.

### B. GENERAL EVALUATION

This plant is integrated; provision is made not only for the sewing of the garments but also for the knitting of the fabric from which the garment pieces are cut. Fabric can be knitted in it for finished goods other than those described and, if desired, from materials other than cotton. Yard for yard knitted fabrics are cheaper than woven ones and the former can be adapted for use in almost any type of clothing. Manufacturing processes are relatively simple, although the few skilled workers and the supervisory personnel need experience. The plant is suitable for many developing areas.

### C. MARKET ASPECTS

1. USERS. Male population; T shirts may also be worn by some of the women.
2. SALES CHANNELS AND METHODS. Wholesalers and large stores. Some purchases are made by government institutions, such as the military.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transport costs are unimportant for this product. Therefore the market may be nation-wide. b. Export. Transport costs would be no barrier to exports. The product is traded in the world market.
4. COMPETITION. a. Domestic Market. In very low wage countries, home-made clothing would compete. Otherwise, low priced imports would constitute the bulk of the competition. b. Export Market. Textile exports by large, well-established firms in the major producing countries would make it unlikely that any relatively small firm could successfully compete in the world market.
5. MARKET NEEDED FOR PLANT DESCRIBED. This type of clothing is lightweight; therefore climate should not be a severely limiting factor. The extent to which underclothing is worn will depend largely on the level of income. Assuming that a majority of the male population wears underpants and that T shirts are in use either as part of the undergarments or as outer wear, a population of 1 million would support the output of this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 30,000 dozen Briefs; 16,000 dozen Shirts.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<u>Cost</u>
Land. About 6,000 sq. ft.	\$	--
Building. One story, 4200 sq. ft.		25,200
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	\$54,000	
Other tools & equipmt.	5,000	
Furniture & fixtures	1,000	60,000
Total (excl. Land)		<u>\$ 85,200</u>

Principal Items. Electric cutting knife, electric binding cutter, sewing machines, tables for lay-up, shape, cutting, sorting, and inspection, folder, wash tub, extractor, one-section multipass dryer, hand trucks, loading trucks, bench grinder, and small drill press.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 42,200
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,400
Training Costs		6,600
Total		<u>\$ 50,200</u>

**c. TOTAL CAPITAL (EXCL. LAND)** \$135,400

### 2. MATERIALS AND SUPPLIES

	<u>Annual Requirements</u>	<u>Annual Cost</u>
<b>a. Direct Materials</b>		
Yarn	120,000 lbs.	\$ 89,300
Waist elastic		26,700
Leg elastic		2,300
Shoulder tape		6,000
Thread		6,300
Labels		2,300
Boxes		3,000
Cartons & wrapping paper		700
Total		<u>\$136,600</u>

### b. Supplies

Maintenance materials	\$	600
Spare parts		1,000
Lubricants		100
Tools		100
Office supplies		200
Total		<u>\$ 2,000</u>

### 3. POWER, FUEL AND WATER

	<u>Annual Cost</u>
<b>a. Electric Power.</b> About 480 kw-hr per day.	<u>\$ 2,500</u>
<b>b. Fuel.</b> For production, heating, and sanitation.	<u>\$ 900</u>
<b>c. Water.</b> For production, heating, and sanitation, 1.2 mn. gals.	<u>\$ 300</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment.** None necessary.
- b. External Transport Facilities.** Combined in and out shipments about 25 tons per month. No special facilities needed.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
<b>a. Direct Labor</b>		
Skilled	3	\$ 15,000
Semi-skilled	17	68,000
Unskilled	1	3,000
Total	<u>21</u>	<u>\$ 86,000</u>
<b>b. Indirect Labor</b>		
Manager & supervisor	2	\$ 14,000
Office	1	4,000
Other	2	7,000
Total	<u>5</u>	<u>\$ 25,000</u>

- c. Training Needs.** Manager and supervisor require considerable experience and ability to train others. Four others (2 weavers, material cutter, and machine fixer) should be experienced. Manufacturing operations are comparatively simple. Plant should attain full production in about 2 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

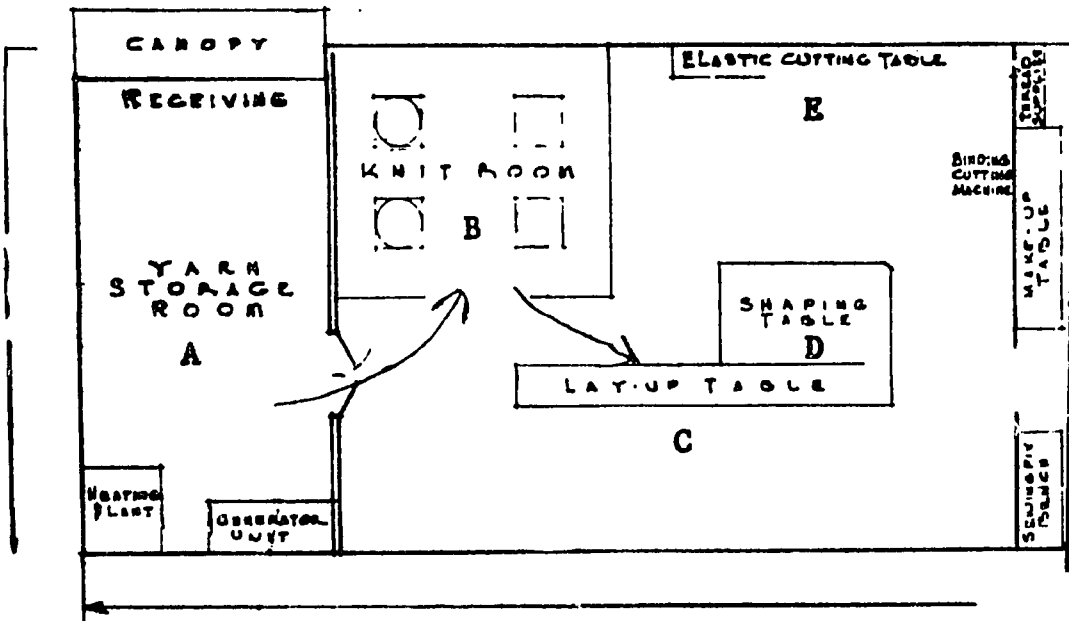
<b>a. Annual Costs</b>	
Direct Material	\$136,600
Direct Labor	86,000
Manufacturing Overhead (a)	30,700
Admin. Costs(b), Contingencies	8,500
Sales Costs (c), Bad Debts	18,000
Depreciation on Fixed Capital	7,200
Total Annual Costs	<u>\$287,000</u>
<b>b. Annual Sales Revenue</b>	<u>\$322,000</u>

NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

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MEN'S UNDE

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LEGEND

 KNITTING MACHINES

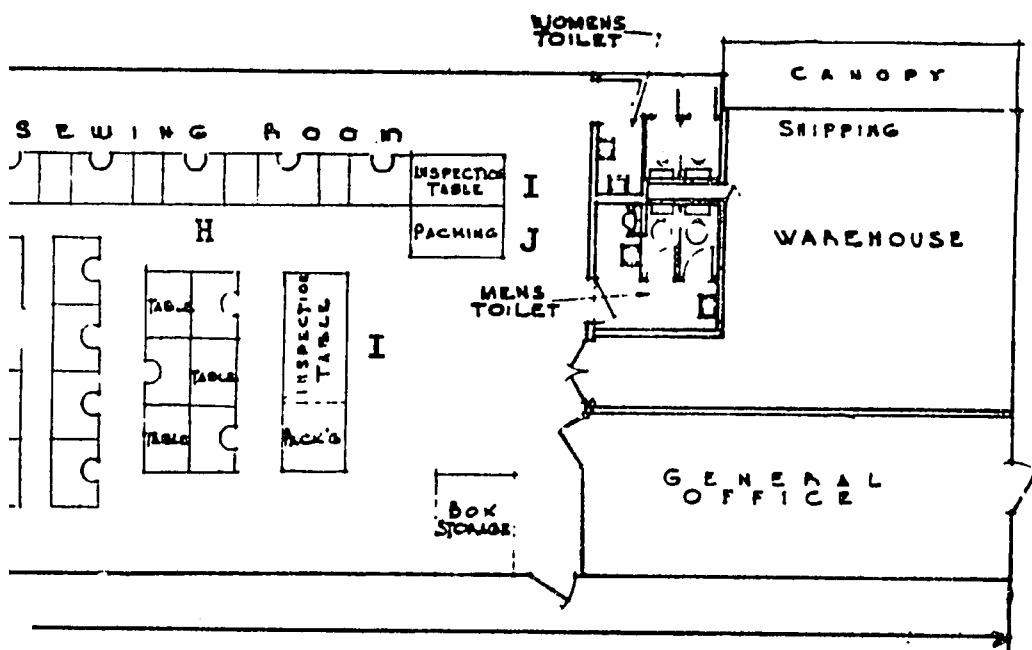
 SEWING MACHINES

- A - Yarn storage
- B - Knitting room
- C - Layout and cu
- D - Shaping table
- E - Elastic cutting
- F - Binding cutting
- G - Make up bench

*Handwritten signature*

R: S.I.C. 2322

WORK FLOW



- H - Sewing machine
- I - Inspection
- J - Packaging
- K - Sewing fix bench



## MEN'S UNDERWEAR: S.I.C. 2322

### SELECTED REFERENCES

#### I. TEXTBOOKS

- A. Advances in Textile Processing. J. E. Lynn and J. J. Press. Vol. I. 1961. \$14.00.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York 1, New York  
Deals with latest processes in the textile industry.
- B. Fabrics and Clothing. J. M. Holt. \$2.25.  
Textile Book Publishers, Inc.  
303 Fifth Avenue  
New York 16, New York

#### II. PERIODICALS

- A. Textile World. \$2.00/year/U.S. Other countries \$15.00/year.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York
- B. Daily News Record. Daily, \$20.00/year.  
Fairchilds Publications, Inc.  
7 East 12th Street  
New York 3, New York
- C. Modern Textile Magazine. Monthly. \$5.00/year.  
Alfred H. McCollough, Publisher  
303 Fifth Avenue  
New York 15, New York

#### III. GOVERNMENT PUBLICATIONS, U. S.

- A. Machinery for Manufacturing Men's Undergarments. IR-5643.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
This report covers the general plant requirements for manufacture of 30,000 dozen briefs and 16,000 dozen shirts annually with a gross sales value amounting to \$292,000.

#### IV. OTHER PUBLICATIONS

- A. Handbook of Textile Fibres. J. Gordon Cook. 1955. 356 p. \$5.50.  
Textile Book Service  
257 Park Avenue South  
New York 10, New York  
Terms, definitions and other information such as economic and production data.
- B. Natural and Synthetic Fibres Yearbook. Milton Harris and H. Mark. 1959. 1000-1400 p. \$60.00.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York 1, New York  
Compilation of abstracts of papers on natural and synthetic fibers.

## SELECTED REFERENCES (Continued)

### V. TECHNICAL PAPERS

- A. Introduction to General Textiles. Laboratory Manual. H. T. Stevens and H. L. Rickey. \$1.75.  
Burgess Publishing Company  
426 South Sixth Street  
Minneapolis 15, Minnesota

### VI. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$.25 each.

- A. Patent No. 2,904,042. 1959. 3 p.  
Process for manufacturing men's underwear.
- B. Patent No. 2,827,051. 1958. 4 p.  
New and useful improvements in making men's underwear.
- C. Patent No. 2,822,807. 1958. 7 p.  
Construction of men's underwear.

### VII. TRADE ASSOCIATIONS

- A. Underwear Institute  
468 Park Avenue, South  
New York 16, New York
- B. Textile Research Institute  
P. O. Box 625  
Princeton, New Jersey
- C. Southern Textile Association  
218 West Morehead Street  
Charlotte 6, North Carolina

### VIII. ENGINEERING COMPANIES

- A. Cocker Machine and Foundry Company  
215 Chestnut Street  
Gastonia, North Carolina  
Warp preparation equipment.
- B. Von Kohorn International Corporation  
White Plains, New York
- C. Warner and Swasey Company  
Textile Machinery Division  
New Philadelphia, Ohio  
Textile equipment.

### IX. DIRECTORIES

- A. Annual Buyers Guide. \$1.00/copy.  
W. R. C. Smith Publishing Company  
806 Peachtree Street  
Atlanta, Georgia  
Annual review of all new products and services and all new literature in the textile industry.

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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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

## WHEAT FLOUR

I.P. No. 66026

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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.

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.

## WHEAT FLOUR: Standard Industrial Classification 2041

### A. PRODUCT DESCRIPTION

Wheat flour for making white bread.

### B. GENERAL EVALUATION

The plant described is about the minimum size for a modern mill. Working three shifts daily it could mill about 228,000 bushels of wheat a year. Locally-grown wheat is not essential, but advantageous. Assuming an annual yield of 15 bushels an acre, it will be necessary to have about 15,000 acres under wheat to supply this plant's capacity requirements. The plant is assumed to make flour principally for bread, and for this it will need a hard type of wheat. The capital requirements are fairly large, and skilled labor requirements are moderately high. The plant will only be appropriate in areas where bread is a staple part of the diet.

### C. MARKET ASPECTS

1. USERS. Households, eating places.
2. SALES CHANNELS AND METHODS. Sales to wholesale distributors and large bakeries.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. The product is of fairly high value in relation to weight and bulk. In a country of moderate size and with a good transport network the potential domestic market may be nationwide. b. Export. The major wheat producing countries export large quantities of wheat flour.
4. COMPETITION. a. Domestic Market. Competition from imports may be strong. In bread-eating countries competition from bread substitutes will be important only among the poorest groups of the people. b. Export market. A plant of this size would have little chance of making export sales in competition with large-scale producers.
5. MARKET NEEDED FOR PLANT DESCRIBED. In areas where wheaten bread is a staple article of diet, a total population of the order of a quarter of a million should be able to support this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION : 5,000 TONS

### 1. CAPITAL REQUIREMENTS

2. <u>FIXED CAPITAL</u>		Cost
Land, About 2 acres		\$ --
Building, Elevator silo.	\$ 75,000	
Mill building, 2-story.	80,000	155,000
Equipment, Furnitures & Fixtures		
Prodn. tools & equipmt.	\$ 170,000	
Other tools & equipmt.	11,400	
Furniture & fixtures	1,000	182,000
Total (excl. Land)		<u>\$337,400</u>
Principal Items. Equipment for cleaning, grinding, bolting, purifying, rebolting, packaging.		

### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Overhead (a)	60	97,400
Admin. Costs (b), Contingencies, Sales Costs (c)	30	4,200
Training Costs		5,600
Total Working Capital		<u>\$107,200</u>

c. TOTAL CAPITAL (EXCL. LAND) \$444,600

### 2. MATERIALS AND SUPPLIES

	Annual Re qumts.	Annual Cost
a. <u>Direct Materials</u>		
Wheat	228,000 bu.	\$467,400
Sacks	100,000 sacks	10,000
Total		<u>\$477,400</u>

### b. Supplies

Lubricants & hand tools	\$ 500
Maintenance & repair parts	2,000
Office supplies	300
Total	<u>\$ 2,800</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> Connected load about 375 hp.	\$ 20,000
b. <u>Fuel.</u> Where heating is necessary, about 6,000 gals. oil, or equivalent in other fuel.	\$ 700
c. <u>Water.</u> For heating, sanitation and fire protection. About 1.2 mn. gals. annually.	\$ 300

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Total in and out shipments about 1,100 tons a month. Plant should be located on railroad, if possible.

### 5. MANPOWER

	Number	Annual Cost
a. <u>Direct Labor</u>		
Skilled	6	\$ 30,000
Semi-skilled	6	24,000
Total	<u>12</u>	<u>\$ 54,000</u>
b. <u>Indirect Labor</u>		
Manager	1	\$ 8,000
Maintenance & supervision	3	15,000
Office	2	6,000
Total	<u>6</u>	<u>\$ 29,000</u>

- c. Training Needs. Manager and 3 supervisors must be well experienced. With 3 skilled workers, they should be able to do all labor training. Plant should reach full production in 2 months.

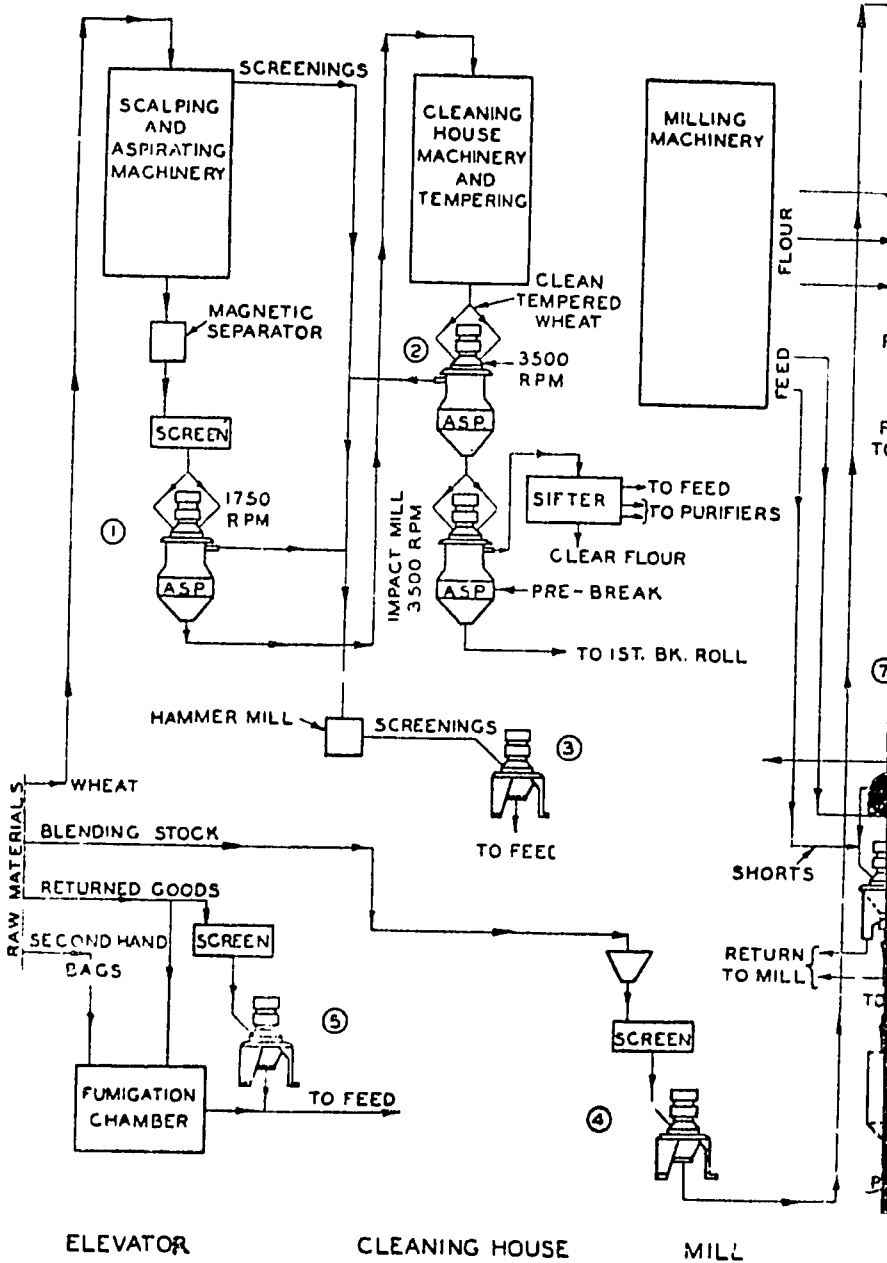
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$477,400
Direct Labor	54,000
Manufacturing Overhead (a)	52,800
Admin. Costs (b), Contingencies	26,000
Sales Costs (c), Bad Debts	24,000
Depreciation on Fixed Capital	26,000
Total Annual Costs	<u>\$660,200</u>
b. <u>Annual Sales Revenue</u>	<u>\$800,000</u>

NOTES : (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

WHEAT FLOUR: S. I. C. 2041

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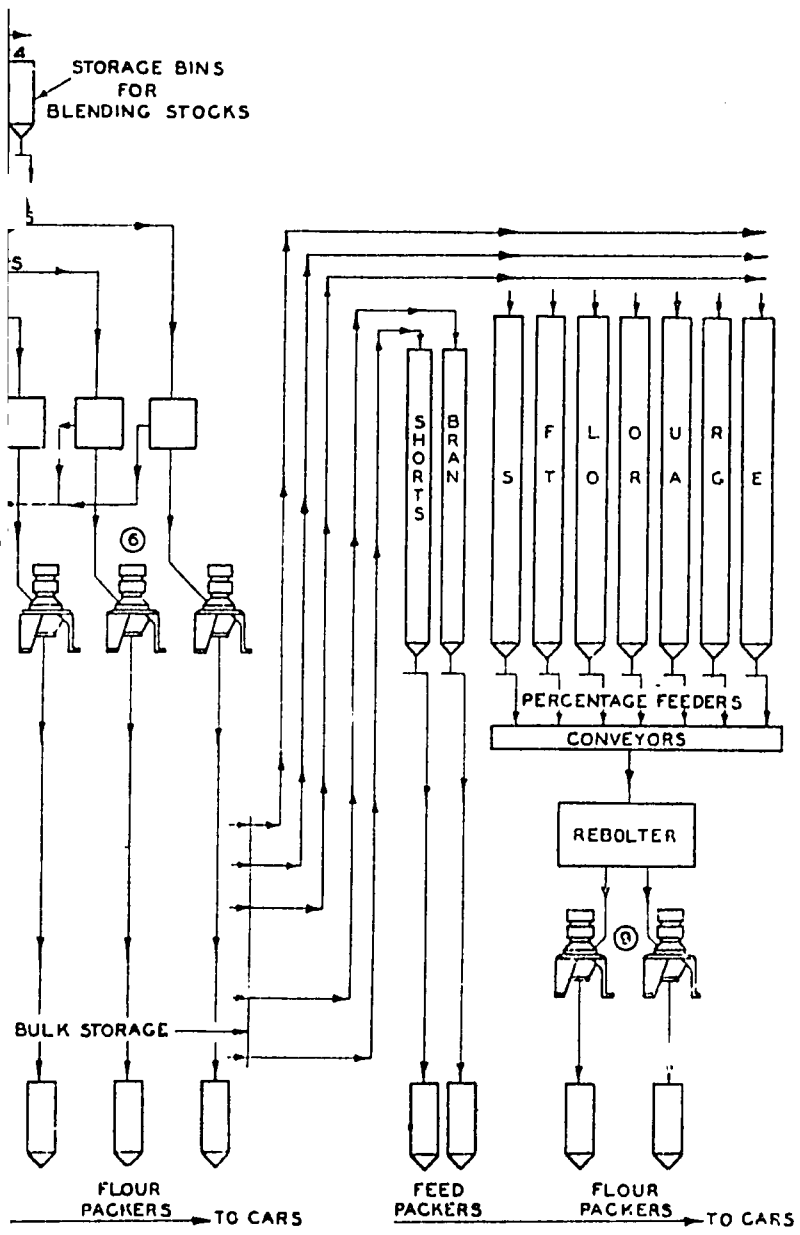


ELEVATOR

CLEANING HOUSE

MILL

K FLOW



PACKING

BULK STORAGE

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WHEAT FLOUR: S. I. C. 2041

SELECTED REFERENCES

I. TEXTBOOKS

- A. Food Technology. S. C. Prescott and B. E. Proctor. 1937. 630 p. Illus. \$10.50.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York, New York 10036  
Contains section devoted to wheat and wheat milling.

II. PERIODICALS

- A. The Northwestern Miller. Monthly. \$7.00/year.  
The Miller Publishing Company  
2501 Wayzata Boulevard  
Minneapolis 40, Minnesota  
Published for the flour industry and grain trade.

III. GOVERNMENT PUBLICATIONS, U. S.

- A. Flour Handling and Packaging. IR-11957. August 1953. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Devoted to the subject of flour handling and packaging.
- B. Wheat Milling. IR-24076. August 1959. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523

IV. OTHER PUBLICATIONS

- A. Enzymes and Their Role in Wheat Technology. J. A. Anderson. 1946. 381 p. \$7.50.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York, New York 10001  
General chemistry of enzymes, amylases in milling and baking esterases in milling and baking, oxidizing enzyme systems of wheat and flour.

## SELECTED REFERENCES (Continued)

### V. U. S. PATENTS

Available U. S. Patent Office

Washington, D. C. 20231. \$ .25 each.

- A. Patent No. 2,879,004. 1959. 11 p.  
Impact milling of flour.
- B. Patent No. 2,759,511. 1956. 6 p.  
Apparatus for hulling grain.
- C. Patent No. 2,530,272. 1950. 4 p.  
Milling process.
- D. Patent No. 2,382,365. 1946. 9 p.  
Milling process.
- E. Patent No. 2,379,677. 1945. 4 p.  
Method of milling grain.

### VI. TRADE ASSOCIATIONS

- A. Wheat Flour Institute  
309 West Jackson Boulevard  
Chicago 6, Illinois
- B. Millers National Federation  
309 West Jackson Boulevard  
Chicago 6, Illinois

### VII. ENGINEERING COMPANIES

- A. Allis-Chalmers Manufacturing Company  
864 South 70th Street  
Milwaukee 1, Wisconsin  
Builds and installs complete milling plants.
- B. Great Western Manufacturing Company  
1937 Baker Street  
Leavenworth, Kansas  
Builds grain elevators and flour mills.

### VIII. DIRECTORIES

- A. List of Flour Mills. Published irregularly. Apply to publisher for price.  
The Northwestern Miller  
P. O. Box 67  
Minneapolis 1, Minnesota  
Lists 1,200 flour mills in the United States and Canada.

## 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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## ORDERING INSTRUCTIONS

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Address orders to: U.S. Department of Commerce  
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Technical Information, 410.12  
Springfield, Virginia 22151

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## GENERAL INFORMATION

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# INDUSTRY PROFILES

## RICE

I.P. No. 66027

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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.

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.

## RICE: Standard Industrial Classification 2044

### A. PRODUCT DESCRIPTION

Polished rice made from purchased paddy.

### B. GENERAL EVALUATION

The rice mill described is rather completely mechanized, and, in relation to its production capacity, requires a fairly large investment in fixed capital. Labor skills needed are not especially high. Rice-growing areas will already possess rice-milling facilities, which may be less modern than the plant described. The latter would be an addition to or replacement of existing facilities. The economic feasibility of this plant could only be judged in relation to trends in rice production and in the light of comparative production cost studies covering this plant and already existing facilities.

### C. MARKET ASPECTS

1. SALES CHANNELS. Sales to rice dealers.
2. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Polished rice is easily transported and is often shipped long distances within countries. b. Export. This product is shipped world-wide.
3. COMPETITION. a. Domestic Market. Competition from imports is not usually important in rice-growing countries. When the price of rice is high, alternative foodstuffs may compete with rice, particularly in very low income countries. High prices are usually the consequence of crop deficiencies, which will affect the demand for rice-milling facilities. b. Export Market. Possibility of exporting would depend largely on location.
4. MARKET NEEDED FOR PLANT DESCRIBED. In countries where rice is the staple food, a total population of about 25,000 people could provide a market for this plant's output.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION : 3,200 TONS

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	Cost
Land. About 6,000 sq. ft.	\$ ---
Building Mill-2 story, 40'x50'x36' high. Warehouse lean-to, 25'x40'x 10' clearance.	25,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt. \$44,000	
Other tools & equipmt. 6,000	
Furniture & fixtures 10,00	51,000
<u>Total (excl. Land)</u>	<u>\$ 76,000</u>

Principal Items. Rough rice cleaner, rough rice scale, rough rice disc grader, disc seed separator, rough rice sheller 48", rough rice sheller 20", paddy separator, white rice huller, white rice polisher, aspirator, vibrating screen, cylinder grader, disc white rice grader, cyclone dust collectors, elevators, screw conveyor.

#### b. WORKING CAPITAL

	No	of Days	
Direct Materials, Direct Labor, Mfg. Overhead (a)	60		\$ 65,700
Admin. Costs (b), Contingencies, Sales Costs (c)	30		1,800
<u>Total Working Capital</u>			<u>\$ 67,500</u>

c. TOTAL CAPITAL (EXCL. LAND) \$143,500

#### b. MATERIALS AND SUPPLIES

	Annual Reqmts	Annual Cost
a. Direct Materials		
Paddy rice	4,000 tons	\$348,000
Bags		20,000
<u>Total</u>		<u>\$368,000</u>
b. Supplies		
Maintenance & repair parts		\$ 1,000
Lubricants & hand tools		100
Chemicals		500
Office supplies		200
<u>Total</u>		<u>\$ 1,800</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> Connected load about 95 hp.	\$ 2,800
b. <u>Fuel.</u> For heating, if necessary.	\$ 300
c. <u>Water.</u> For general purposes.	\$ 200

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Total in and out shipments about 750 tons a month. Plant should be located on railroad, if possible.

### 5. MANPOWER

	Number	Annual Cost
a. <u>Direct Labor</u>		
Skilled	1	\$ 6,000
Unskilled	2	7,000
<u>Total</u>	<u>3</u>	<u>\$ 13,000</u>
b. <u>Indirect Labor</u>		
Manager	1	\$ 8,000

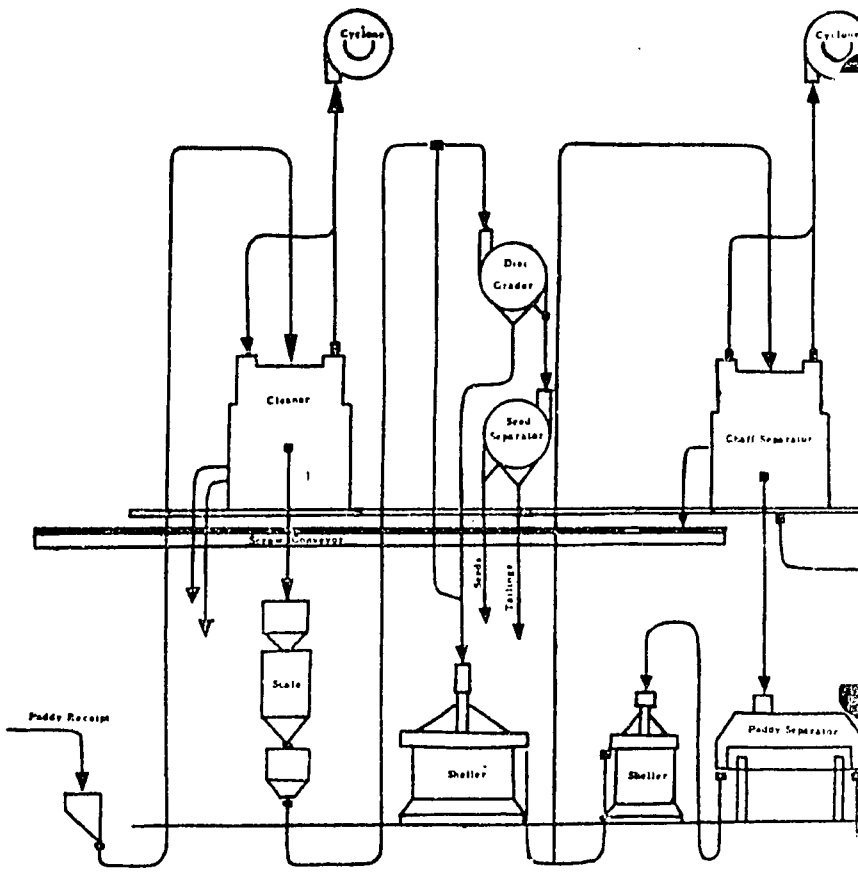
- c. Training Needs. Manager should be fully experienced. He will act as buyer, seller, bookkeeper and supervisor. With help of skilled workman, he should be able to train other workers. Plant should operate at capacity from the start.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$368,000
Direct Labor	13,000
Manufacturing Overhead (a)	13,100
Admin. Costs (b), Contingencies	6,000
Sales Costs (c), Bad Debts	15,000
Depreciation on Fixed Capital	6,400
<u>Total Annual Costs</u>	<u>\$421,500</u>
b. <u>Annual Sales Revenue</u>	<u>\$496,000</u>

NOTES : (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

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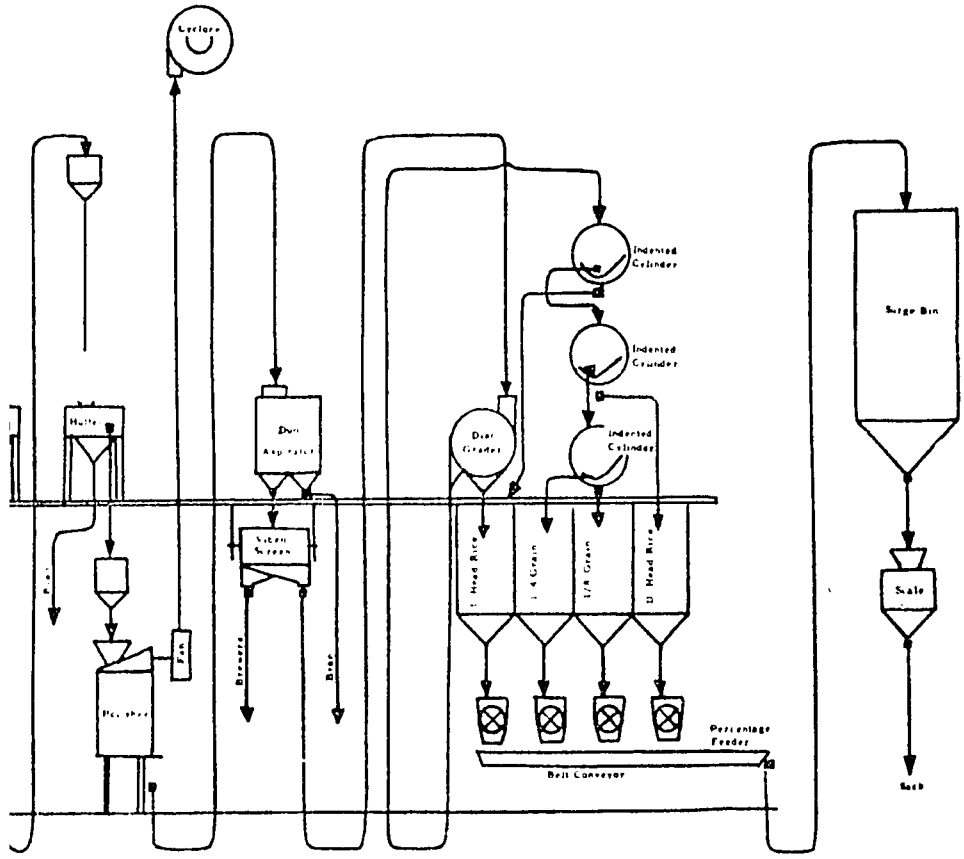


Building  
Mill 40 x 50 x  
Warehouse le

2. 2044

### ND WORK FLOW

### ONTAINED RICE MILL



2 story)  
: 40 x 10



SELECTED REFERENCES

I. TEXTBOOKS

- A. Rice. 3rd Edition. D.H. Grist. 1959. \$9.50.  
John Wiley & Sons, Inc.  
605 Third Avenue  
New York, New York  
Rice technology. The growing and processing of rice.
- B. Grain Crops. 2nd Edition. H.K. Wilson. 1955. 396 p. Illus. \$8.50.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York, New York 10036  
Covers the characteristics, botany, growth habits, varieties, growing, harvesting, and marketing problems as related to the major grain crops, including rice.
- C. Symposium on Rice. Conakry. 1963. Illus. \$2.50.  
International Publication Service  
18 East 33rd Street  
New York, New York

II. PERIODICALS

- A. Rice. Monthly. \$5.00/year.  
Rice Journal  
823 Perdido Street  
New Orleans, Louisiana  
Directed at producers, dryers, storers, and processors of rice.
- B. Cereal Chemistry. Bi-monthly. \$11.00/year.  
The American Association of Cereal Chemists.  
500 South 5th Street  
Minneapolis, Minnesota  
Scientific papers dealing with raw materials, processes, products, of the cereal industry.

III. OTHER PUBLICATIONS

- A. Elements of Food Engineering. Vol. I. M. E. Parker and others. 1952.  
392 p. \$8.75.  
Reinhold Publishing Corporation  
430 Park Avenue  
New York, New York 10022  
Contains a comprehensive section on rice milling.

IV. TECHNICAL PAPERS

- A. Costs of Operating Southern Rice Mills. MRR-330. 1959. Gratis.  
Publications Division  
Office of Information  
U.S. Department of Agriculture  
Washington 25, D.C.

## SELECTED REFERENCES (Continued)

### V. U.S. PATENTS

Available U.S. Patent Office

Washington, D.C. 20231 \$ .25 each.

- A. Patent No. 2,633,171. 1953. 6 p.  
Method of hulling, washing, and drying of grain with simultaneous screening.
- B. Patent No. 2,211,096. 1940. 8 p.  
Machine for shelling rice.
- C. Patent No. 1,495,561. 1924. 4 p.  
Process for the milling of rice.

### VI. TRADE ASSOCIATIONS

- A. Rice Millers Association  
1048 Pennsylvania Building  
425 13th Street, N.W.  
Washington, D.C. 20004
- B. Grain Processing Machinery Manufacturers Association  
7400 East 13th Street  
Kansas City, Missouri

### VII. ENGINEERING COMPANIES

- A. Sprout-Waldron and Company, Inc.  
60 Logan Street  
Muncy, Pennsylvania  
Complete equipment for the rice mill.

### VIII. DIRECTORIES

- A. Grain Trade Buyers Guide. Annual. \$4.50.  
Grain Trade Buyers Guide  
317 South Sherman Street  
Chicago 4, Illinois  
Lists sources of supply for grain elevators and feed mill machinery, equipment, and supplies.

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## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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# INDUSTRY PROFILES

## BAKERY

I. P. No. 66028

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## BAKERY: Standard Industrial Classification 2051

### A. PRODUCT DESCRIPTION

Bread and pastry. The exact products made will vary according to demand.

### B. GENERAL EVALUATION

This is a small neighborhood bakery and the type of bread and pastry produced will vary. Bakery goods, unless produced on a large scale or with cheaper ingredients than the home kitchen uses, are usually more expensive than the home-baked product. Therefore such enterprises can operate profitably only where there is a moderate high standard of living. Methods of selling would vary. Therefore no transportation equipment has been provided for. In some areas delivery trucks might be needed; in others, delivery might be made by bicycle; in still others, customers might make all purchases directly from the store. Capital and the amount of skilled labor required are small. Such a plant should be suited to many developing areas.

### C. MARKET ASPECTS

1. USERS. Homes, eating places.
2. SALES CHANNELS AND METHODS. Sales are made direct.
3. GEOGRAPHICAL EXTENT OF MARKET. Distribution would be local only.
4. COMPETITION. Competition would come from home-baked products and from other bakeries.
5. MARKET NEEDED FOR PLANT DESCRIBED. Consumption of bakery goods varies widely between areas. In a bread consuming area, where the people purchase their bread and bakery goods rather than make them at home, a total population of about 20,000 might provide a sufficient market. However, because of the wide variation in consumption in different areas, no estimate of total population needed would have any general validity.

## D. PRODUCTION REQUIREMENTS

ANNUAL SALES - ONE-SHIFT OPERATION : \$ 140,000

### 1. CAPITAL REQUIREMENTS

	<u>Cost</u>
a. <u>FIXED CAPITAL</u>	
Land. About 10,000 sq. ft.	\$ --
Building. One story. 40'x60' for bakery and store.	14,400
Equipment. Furniture & Fixtures.	
Prodn. tools & equipmt. \$ 12,400	
Other tools & equipmt. 900	
Furniture & fixtures. 700	14,000
Total (excl. Land)	<u>\$ 28,400</u>
Principal Items. Dough mixer, baking oven, flour bins, rack trucks, pans and tins, scales, store fixtures, small refrigerator.	

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 16,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,000
Total Working Capital		<u>\$ 17,000</u>

c. TOTAL CAPITAL (EXCL. LAND) \$ 45,400

### 2. MATERIALS AND SUPPLIES

	<u>Annual Reqsmts.</u>	<u>Annual Cost</u>
a. <u>Direct Materials</u>		
Flour	300 tons	\$ 42,000
Sugar	120 tons	12,000
Eggs fillings, etc.		7,000
Baking powder, soda and flavors		1,500
Wrapping materials		5,000
Total		<u>\$ 67,500</u>
b. <u>Supplies</u>		
Maintenance & repair parts	\$ 500	
Caustic soda & chlorine	300	
Office	200	
Total		<u>\$ 1,000</u>

### 3. POWER, FUEL AND WATER

	<u>Annual Cost</u>
a. <u>Electric Power</u> , Connected load about 10 hp.	\$ 600
b. <u>Fuel</u> . 5,000 gals. oil annually.	\$ 600
c. <u>Water</u> . 800,000 gals. for production, sanitation and fire protection.	<u>\$ 200</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment. No equipment specified. See Section B.
- b. External Transport Facilities. Good highway necessary.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>		
Skilled	2	\$ 12,000
Semi-skilled	1	4,000
Unskilled	1	3,000
Total	<u>4</u>	<u>\$ 19,000</u>
b. <u>Indirect Labor</u>		
Manager buys, supervises and keeps books	<u>1</u>	<u>\$ 7,000</u>

- c. Training Needs. Manager must be fully experienced. With 1 skilled worker he would maintain full production while training other operators.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

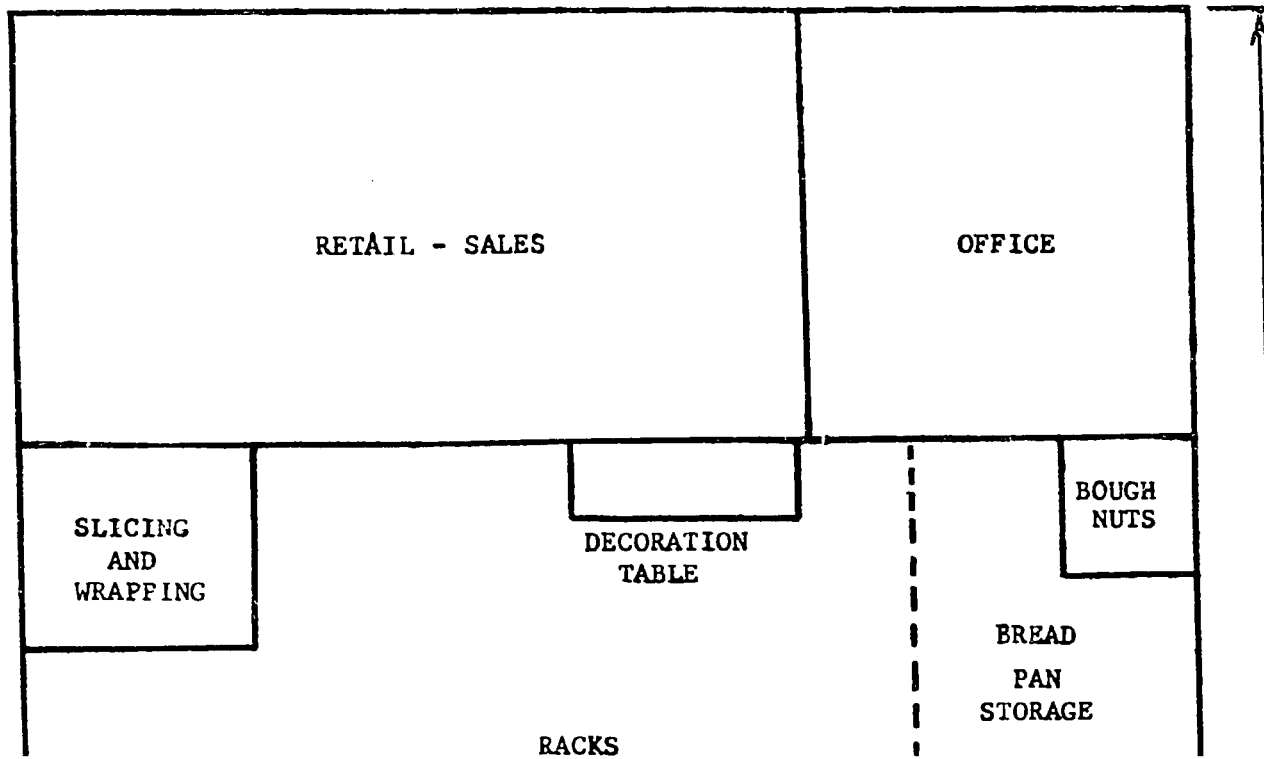
a. <u>Annual Costs</u>	
Direct Materials	\$ 67,500
Direct Labor	19,000
Manufacturing Overhead(a)	9,400
Admin. Costs(b), Contingencies	3,000
Sales Costs(c), Bad Debts	9,000
Depreciation on Fixed Capital	2,000
Total Annual Costs	<u>\$109,900</u>
b. <u>Annual Sales Revenue</u>	<u>\$140,000</u>

NOTES : (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

BAKERY: S. I. C. 2051

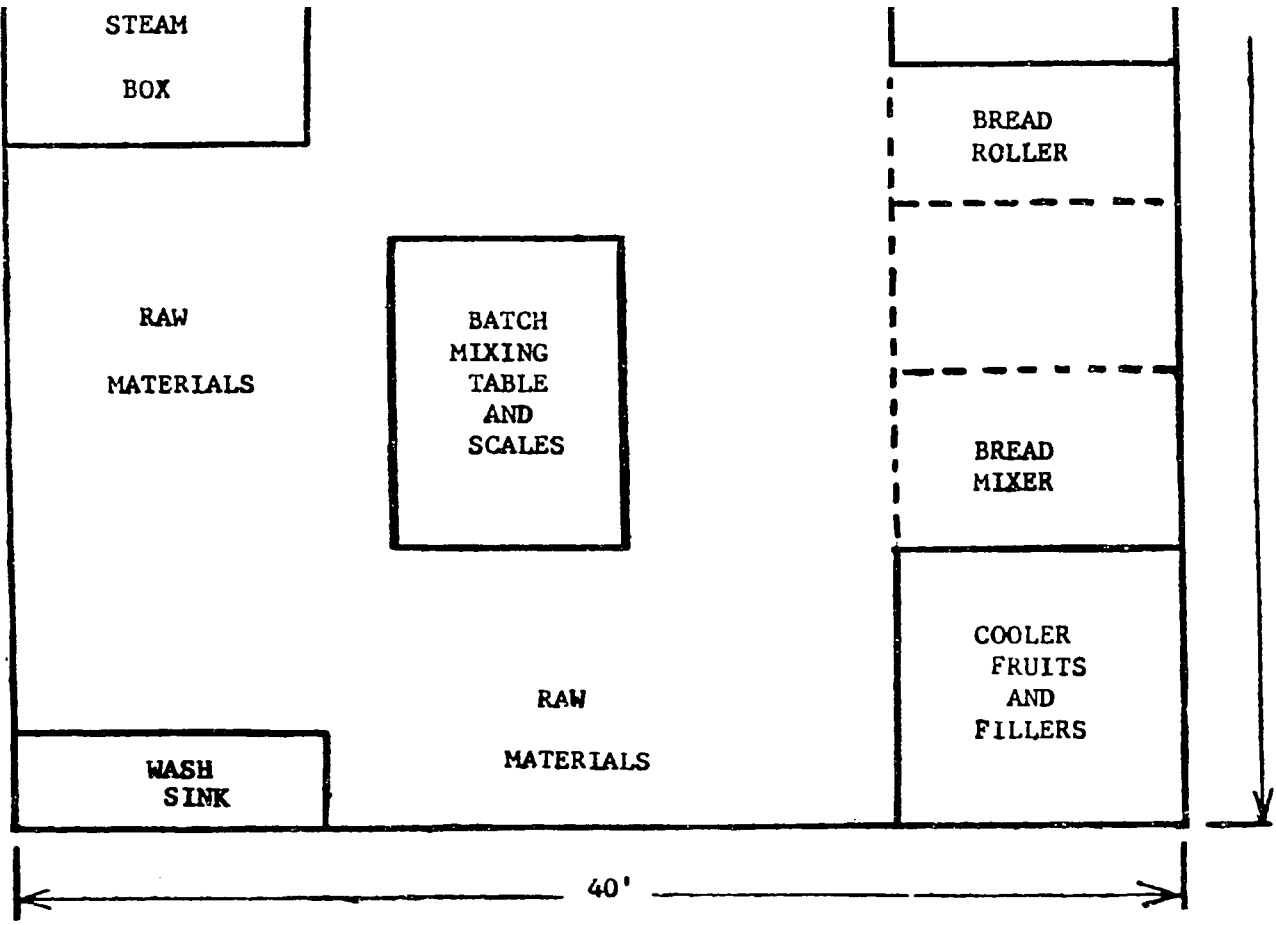
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PLANT LAYOUT



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S.I.C. 2051

23'



BAKERY: S. I. C. 2051

SELECTED REFERENCES

I. TEXTBOOKS

- A. Breads, White and Brown. R. A. McCance and E. M. Widdowson. 1956.  
Illus. \$5.00.  
The Macmillan Company  
60 Fifth Avenue  
New York, New York 10011  
Deals with the principles, practices and methods of bread baking. Information relative to baking equipment, organization, and operation.

II. PERIODICALS

- A. Baker's Weekly. \$5.00/year.  
American Trade Publications Company  
71 Vanderbilt Avenue  
New York, New York 10017  
News for the baking industry on developments in materials, processes, methods, marketing.
- B. Baker's Review. Monthly. \$2.00/year.  
William R. Gregory Company  
625 Eighth Avenue  
New York, New York 10018  
Covers wholesale and retail manufacturing bakeries throughout the U. S.

III. GOVERNMENT PUBLICATIONS, U. S.

- A. Equipment for Bakeries. IR-19052  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523
- B. Bread Baking. 1956. 163 p. Illus. \$0.75 Catalog No.  
D101. 11:10-410.  
Superintendent of Documents  
Government Printing Office  
Washington, D. C.  
Department of Army publication suitable as a text to assist in training in the fundamentals of an over-all bakery operation.

IV. OTHER PUBLICATIONS

- A. Breadmaking: Its Principles and Practices. E. B. Bennion. 1959.  
3rd Edition. Illus. \$7.20  
Oxford University Press  
1600 Pollitt Drive  
Fair Lawn, New Jersey  
Provides comprehensive information on methods, materials, formulas, equipment, and machinery for baking bread.

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## SELECTED REFERENCES (Continued)

### V. U. S. PATENTS

Available U. S. Patent Office

Washington, D. C. 20231 \$25 each.

- A. Patent No. 2,868,143. Jan. 13, 1959. 8 p.  
Apparatus for making bread and pastry dough.
- B. Patent No. 2,677,336. May 4, 1954. 5 p.  
Oven for baking bread and like products with improvements and increased efficiency in the baking operation.
- C. Patent No. 2,595,298. May 6, 1952. 7 p.  
Horizontal dough mixers provided with cooling means for maintaining a desired pre-determined temperature within the mixer chambers.
- D. Patent No. 2,575,291. Nov. 13, 1951. 4 p.  
Apparatus for baking bread and similar food products more quickly than had heretofore been possible and at the same time producing a superior product.
- E. Patent No. 2,535,650. Dec. 26, 1950. 3 p.  
Baking oven for baking such articles of food as bread, biscuits, cakes.

### VI. TRADE ASSOCIATIONS

- A. American Bakers Association  
20 North Wacker Drive  
Chicago 6, Illinois  
Supplies members with information and news on the baking industry.
- B. American Institute of Baking  
400 East Ontario Street  
Chicago 11, Illinois  
The scientific and educational affiliate of the American Bakers Association.

### VII. ENGINEERING COMPANIES

- A. Baker Perkins, Inc.  
Fraser and Young Streets  
Saginaw, Michigan  
Provides engineering services in field of production of bread, biscuits, cakes, pretzels.
- B. J. E. Siebel Sons and Company  
4055 West Peterson Avenue  
Chicago, Illinois  
Bakery engineering.

### VIII. DIRECTORIES

- A. Thomas' Wholesale Grocery and Kindred Trades Register. 1961.  
1800 p. \$10.00.  
Thomas Publishing Company  
459 Eighth Avenue  
New York, New York 10001  
Directory of wholesale grocery and related trades in the United States.

BAKERY: S. I. C. 2051

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# INDUSTRY PROFILES

## RAW SUGAR

I.P. No. 66029

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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.

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.

## RAW SUGAR: Standard Industrial Classification 2061

### A. PRODUCT DESCRIPTION

Raw sugar made from sugar cane.

### B. GENERAL EVALUATION

Raw sugar is produced by mills usually called centrals that are commonly located in the areas producing the raw material, in this case sugar cane. During the harvesting season, estimated to last about five months, the central described needs an input of 600 tons of cane a day for its economic operation. The area under sugar cane needed to provide materials for this central is about 2,000 acres, the exact extent depending on the sugar yield of the cane. The economic feasibility of the central will depend, firstly, on the existence of a reliable supply of sugar cane, and, secondly, on the existence of local sugar refineries and/or raw sugar using industries that can absorb the central's production; or, alternatively, of export outlets. A sugar central is a major undertaking, requiring heavy capital investment and a significant amount of skilled labor. All aspects of the industry, and particularly the marketing problem, require careful examination before an investment in a plant of this type is made.

### C. MARKET ASPECTS

A plant of the kind described will normally be started only where sugar refineries or raw sugar using industries have been or are being established and may be expected to provide an outlet for the raw sugar. In some cases, the whole process, from cane growing to refined sugar or other products, may be undertaken in developing areas. In such cases the over-all object may be to reduce dependence on imports. In the less developed countries a plant such as that described could meet the raw sugar requirements of possibly a million people. If there are no sugar refineries or user industries that offer an outlet, and it is necessary to seek a market for the raw sugar abroad, careful examination of the international trade in sugar and the various restrictive arrangements applying to it is necessary.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - CONTINUOUS OPERATION DURING 5 MONTH SEASON:  
10,000 TONS

### 1. CAPITAL REQUIREMENTS.

#### a. FIXED CAPITAL

	<u>Cost</u>
Land. About 1 acre.	\$ --
Building. One story, about 25,000 sq. ft. floor space. Steel construction, with corrugated siding & roofing, ventilating sash windows, steel doors, concrete floors.	200,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt.	1,984,000
Other tools & equipmt.	25,000
Furniture & fixtures	5,000
Transportation equipmt.	6,000
<u>Total (excl. Land)</u>	<u>2,020,000</u>
<u>Total</u>	<u>\$2,220,000</u>

Principal Items. Rotary cane hoist, cane feeder table, auxiliary cane carrier, main cane carrier, rotary cane leveler, 2 sets cane knives, magnetic separator, 5 3-roll cane mills, 2 horizontal juice heaters, clarifier, multiple evaporator, bagging equipment, 3 500 hp. water tube boilers, 2 750 kw. turbo generators, 1 250 kw. diesel generator, laboratory, lathe, milling machine, drill press, power hack saw, 3 diesel tractors, 5-ton truck.

#### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead (a)	60	\$ 153,500
Admin. Costs (b), Contingencies, Sales Costs (c)	30	11,200
<u>Total Working Capital</u>		<u>\$ 164,700</u>

c. TOTAL CAPITAL (EXCL. LAND) \$2,384,700

### 2. MATERIALS AND SUPPLIES

	<u>Annual Reqsmts.</u>	<u>Annual Cost</u>
a. <u>Direct Materials</u>		
Sugar cane	90,000 tons	\$ 450,000

#### b. Supplies

Maintenance, mats. & parts	\$ 35,000
Chemicals, incl. sulfur & lime	36,500
Tools	2,000
Lubrication	500
Office supplies	500
<u>Total</u>	<u>\$ 74,500</u>

### 3. POWER, FUEL AND WATER

	<u>Annual Cost</u>
a. <u>Electric Power.</u> Power generating plant is included in equipment. No purchased power.	
b. <u>Fuel.</u> Bagasse will be used & no fuel will need to be purchased. Boiler should be adapted to use of bagasse.	
c. <u>Water.</u> For production, steam generation, fire protection, sanitation. About 20 mn. gals. annually.	\$ 5,000

### 4. TRANSPORTATION

	<u>Annual Operating Cost</u>
a. <u>Own Transport Equipment.</u> Five-ton truck for general purposes	\$ 1,200
b. <u>External Transport Facilities.</u> Cane is purchased on basis of delivery at mill. Raw sugar is produced at rate of 2,000 tons a month during cane harvesting season. Since no large storage is provided prompt shipment is necessary. Plant should have railroad facilities, if possible.	

### 5. MANPOWER

Continuous operation. Indirect labor is employed full time, direct labor only during 5-month cane harvesting season, when plant is in operation.

	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>		
Unskilled workers	100	\$ 130,000
b. <u>Indirect Labor</u>		
Manager	1	12,000
Superintendents	4	32,000
Chemists	3	27,000
Skilled leaders	15	75,000
Office	3	12,000
Other	13	52,000
<u>Total</u>	<u>39</u>	<u>\$ 210,000</u>

c. Training Needs. Manager, superintendents, chemists, maintenance men, engineers, skilled leaders should all be well experienced & able to train & supervise the direct labor. Plant should reach full production from the start.

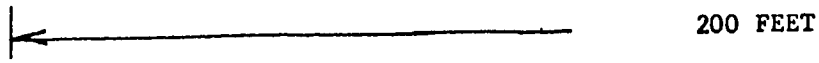
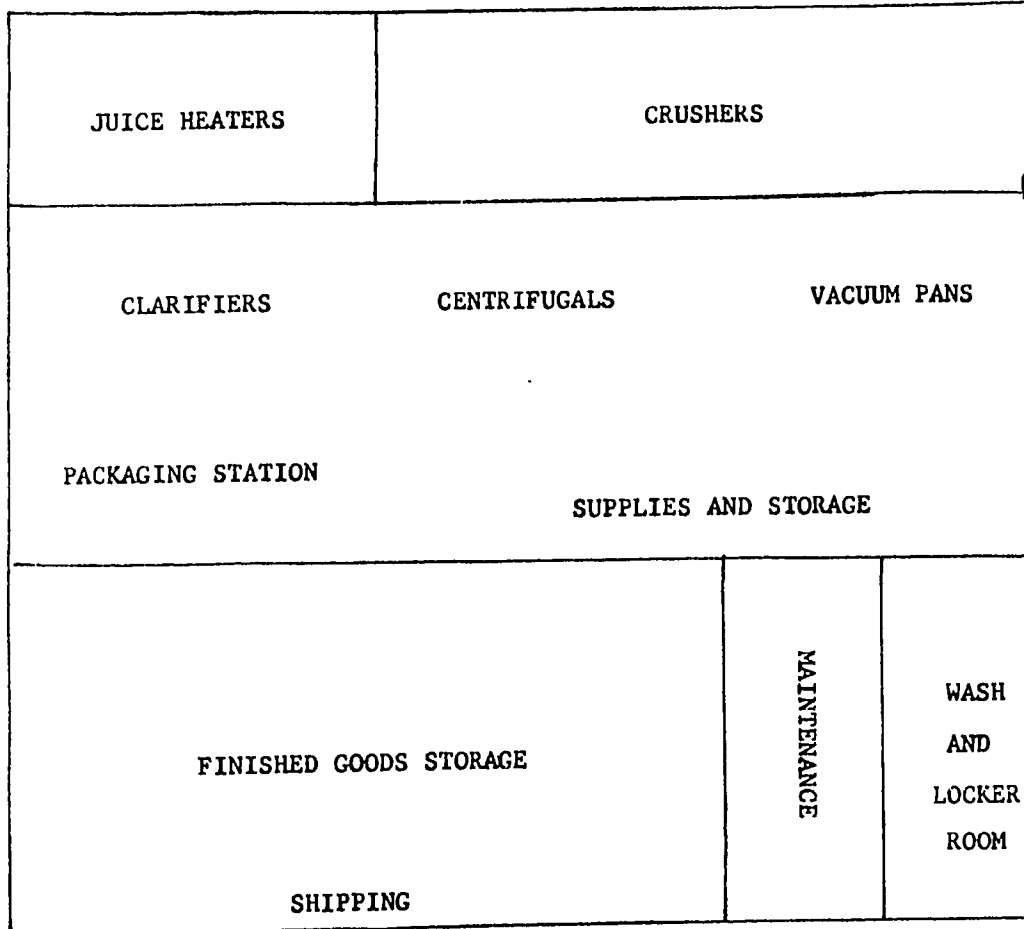
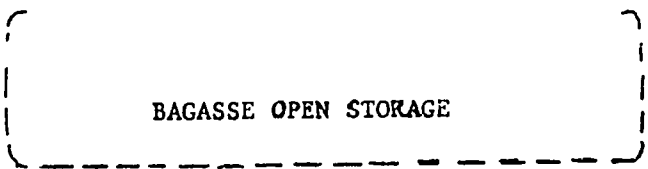
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 450,000
Direct Labor	180,000
Manufacturing Overhead (a)	290,700
Admin. Costs (b), Contingencies	60,000
Sales Costs (c), Bad Debts	75,000
Depreciation on Fixed Capital	212,500
<u>Total Annual Costs</u>	<u>\$1,268,300</u>
b. <u>Annual Sales Revenue</u>	<u>\$1,500,000</u>

NOTES: (a) Includes Supplies, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

RAW SUGAR: S.I.C. 2061

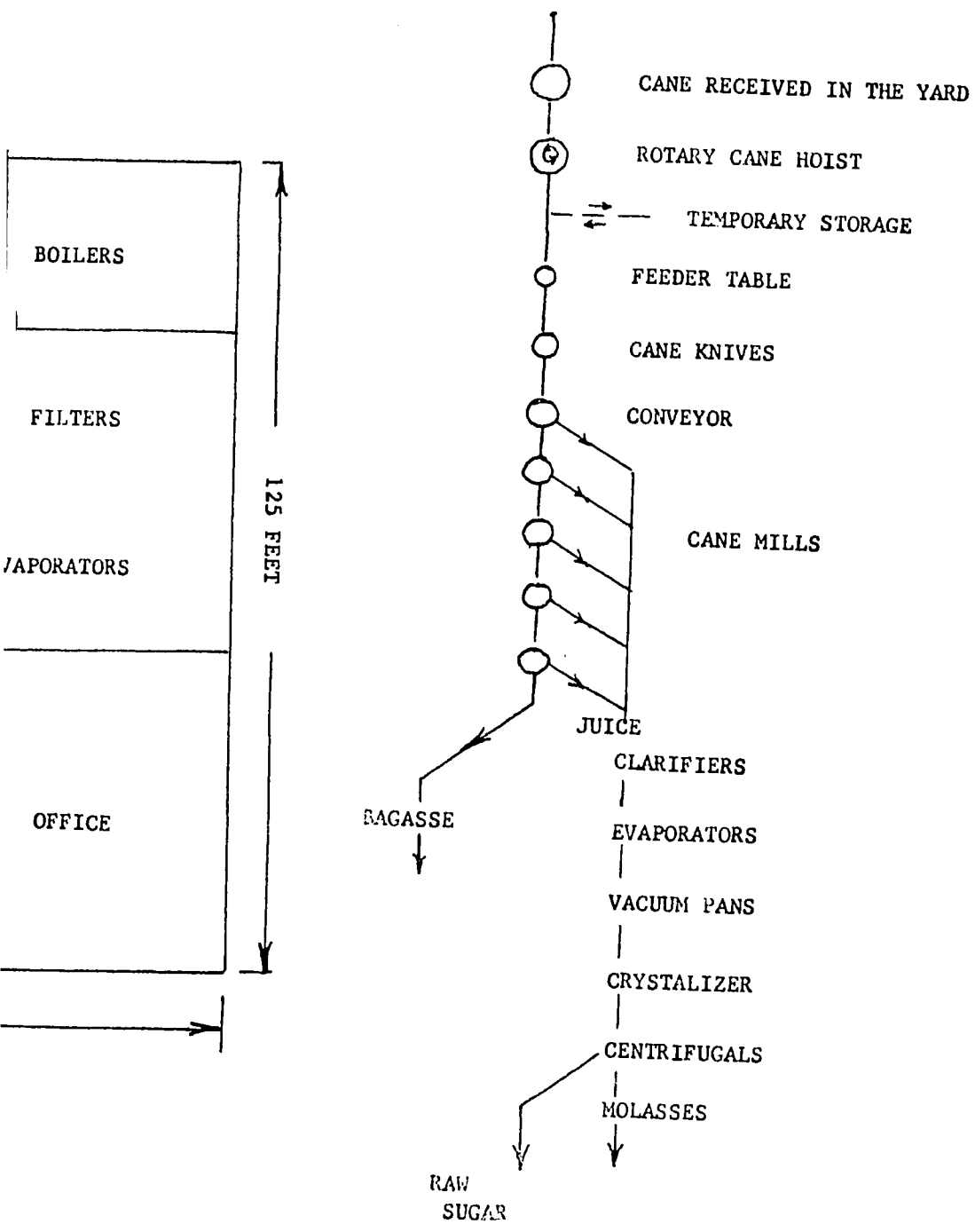
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PLANT LAYOUT

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FLOW CHART





RAW SUGAR: S. I. C. 2061

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I. TEXTBOOKS

- A. Cane Sugar Handbook. G. L. Spencer and G. P. Meade. 9th Edition. 1963.  
834 p. Illus. \$23.75.  
John Wiley and Sons, Inc.  
440 Park Avenue South  
New York, New York 10016  
Manufacture of raw sugar from cane, sugar analysis, and chemical control  
in the factory.
- B. Marketing Problems of Sugar at the Hemisphere and World Levels. 1963.  
\$50.  
Pan American Union  
Sales and Promotion Division  
Washington, D. C. 20006

II. PERIODICALS

- A. Sugar Journal. Monthly. Apply to publisher for price.  
Sugar Journal, Inc.  
823 Perdido Street  
New Orleans 12, Louisiana  
Covers agricultural and technological aspects of sugar cane production  
and processing.
- B. Sugar y Azucar. Monthly. Apply to publisher for price.  
Russel-Palmer Trust  
109 Market Place  
Baltimore, Maryland  
English-Spanish journal devoted to sugar industry.

III. GOVERNMENT PUBLICATIONS

- A. Sugar Processing in 1962. 1/00/01196.  
French title - La Sucrichimie en 1962.  
U. S. Department of Commerce  
Clearinghouse for Federal Scientific and Technical Information, 410.14  
Springfield, Virginia 22151

IV. OTHER PUBLICATIONS

- A. Principles of Sugar Technology. P. Honig.  
Vol. 1. 1953. 768 p. Illus. \$19.00.  
Vol. 2. 1959. 568 p. Illus. \$18.00.  
Vol. 3. 1963. Illus. \$22.00.  
American Elsevier Publishing Company  
52 Vanderbilt Avenue  
New York, New York 10017  
Physical properties of sugars and nonsugars, purification of technical sugar  
solutions, crystallography of sucrose, chemistry of crystallization, process-  
ing fundamentals and techniques.

## SELECTED REFERENCES (Continued)

### V. TECHNICAL PAPERS

- A. **Production Management.** TB-97. September 1960. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Manual on training of personnel in the subject of production management.

### VI. U.S. PATENTS

Available U. S. Patent Office  
Washington, D, C. 20231 \$ .25 each.

- A. Patent No. 2,971,868. 1961, 24 p.  
Process for manufacturing sugar from cane.
- B. Patent No. 2,829,985. 1958. 3 p.  
Recovering sugar from natural products containing it.
- C. Patent No. 2,672,428. 1954. 5 p.  
Method of manufacturing raw sugar.

### VII. TRADE ASSOCIATIONS

- A. **American Sugar Cane League**  
228 St. Charles Avenue  
New Orleans 12, Louisiana
- B. **Sugar Association**  
52 Wall Street  
New York 5, New York

### VIII. ENGINEERING COMPANIES

- A. **Stearns-Rodgers Manufacturing Company**  
660 Bannock Street  
Denver, Colorado  
Designers, manufacturers, and erectors of complete sugar plants.
- B. **Dorr-Oliver, Inc.**  
Cane Sugar Division  
99 Havemeyer Lane  
Stamford, Connecticut  
Consulting, designing, chemical with cane sugar as a specialty.

### IX. DIRECTORIES

- A. **Manual of Sugar Companies.** Annual. \$7.50.  
Farr Whitlock and Company  
120 Wall Street  
New York, New York 10005  
Lists Pan American sugar companies and United States cane sugar refineries.

RAW SUGAR: S. I. C. 2061

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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## 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.

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# INDUSTRY PROFILES

## CRUSHED ICE AND ICE CUBES, PACKAGED

I.P. No. 66030

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A. PRODUCT DESCRIPTION

Crushed ice and ice cubes, made from filtered, chlorinated water.

B. GENERAL EVALUATION

This is a very small operation, requiring very little capital or technical skill. Customers would pick up their purchases at the plant, so no transport equipment would be needed. The enterprise is suited to small urban communities.

C. MARKET ASPECTS

1. USERS. Households, eating and drinking places.
2. SALES CHANNELS AND METHODS. Customers pick up purchases at plant.
3. GEOGRAPHICAL EXTENT OF MARKET. Immediate vicinity.
4. COMPETITION. Increasing use of refrigerators in households and eating and drinking places.
5. MARKET NEEDED FOR PLANT DESCRIBED. This will vary with climate and income, but a community of 25,000 people or so would generally provide a market for such a plant

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY : 120 TONS

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	Cost
Land. 1/4 acre.	\$ --
Building. 200 sq. ft., insulated.	1,600
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt. \$5,000	
Furniture & fixtures 500	5,500
<u>Total (excl. Land)</u>	<u>\$ 7,100</u>

Principal Items. Ice machine, ice crusher, freezer and refrigerating motor, storage tank, chlorinating pump, filter, pressure/roller, liquid level controller control valve, test kit, piping and valves, scale, tank, crock.

#### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Overhead(a)	60	\$ 1,800
Admin. Costs(b), Contingencies	30	100
<u>Total Working Capital</u>		<u>\$ 1,900</u>

c. TOTAL CAPITAL (EXCL. LAND) \$ 9,000

### 2. MATERIALS AND SUPPLIES

	Annual Reqrmts.	Annual Cost
a. <u>Direct Materials</u>		
Water		\$ 250
Bags 15,000		750
<u>Total</u>		<u>\$ 1,000</u>
b. <u>Supplies</u>		
Lubricants & hand tools		\$ 50
Cutting tools & abrasives		50
Maintenance & spare parts		300
Ammonia		100
<u>Total</u>		<u>\$ 500</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
Electric Power. 4.5 hp. connected load.	\$ 300

### 4. TRANSPORTATION

None. Product is manufactured for local consumption and will be purchased at the plant.

### 5. MANPOWER

	Number	Annual Cost
a. <u>Direct Labor</u>		
Skilled	1	\$ 5,000
Unskilled	1	4,000
<u>Total</u>	<u>2</u>	<u>\$ 9,000</u>

b. Training Needs. The owner would operate the plant and needs only 1 helper. He should be fully experienced.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

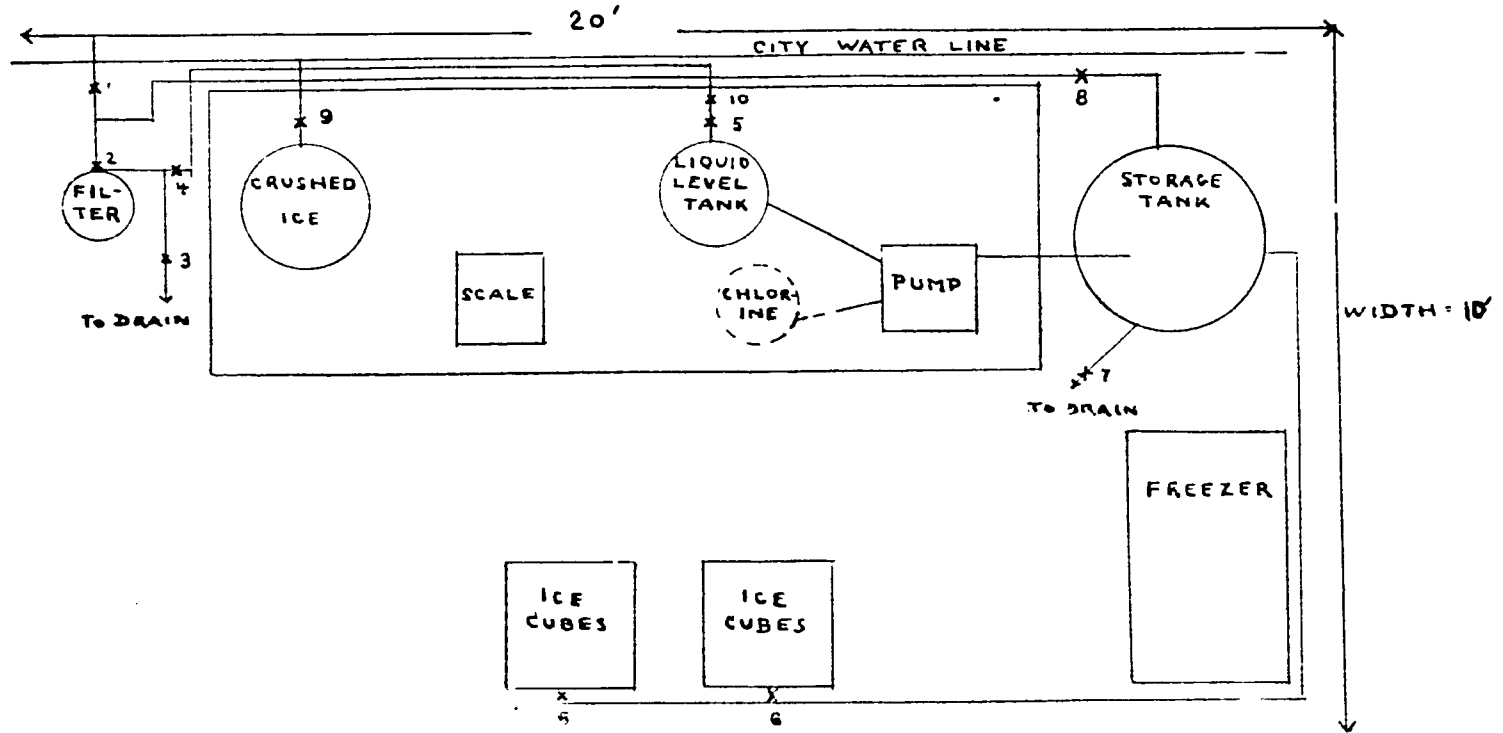
a. <u>Annual Costs</u>	
Direct Materials	\$ 1,000
Direct Labor	9,000
Manufacturing Overhead(a)	800
Admin. Costs(b), Contingencies	1,000
Depreciation on Fixed Capital	600
<u>Total Annual Costs</u>	<u>\$12,400</u>
b. <u>Annual Sales Revenue</u>	<u>\$14,400</u>

NOTES : (a) Includes Supplies, Power. (b) Includes Interest, Insurance.

CRUSHED ICE AND ICE CUBES, PACKAGED : S. I. C. 2097

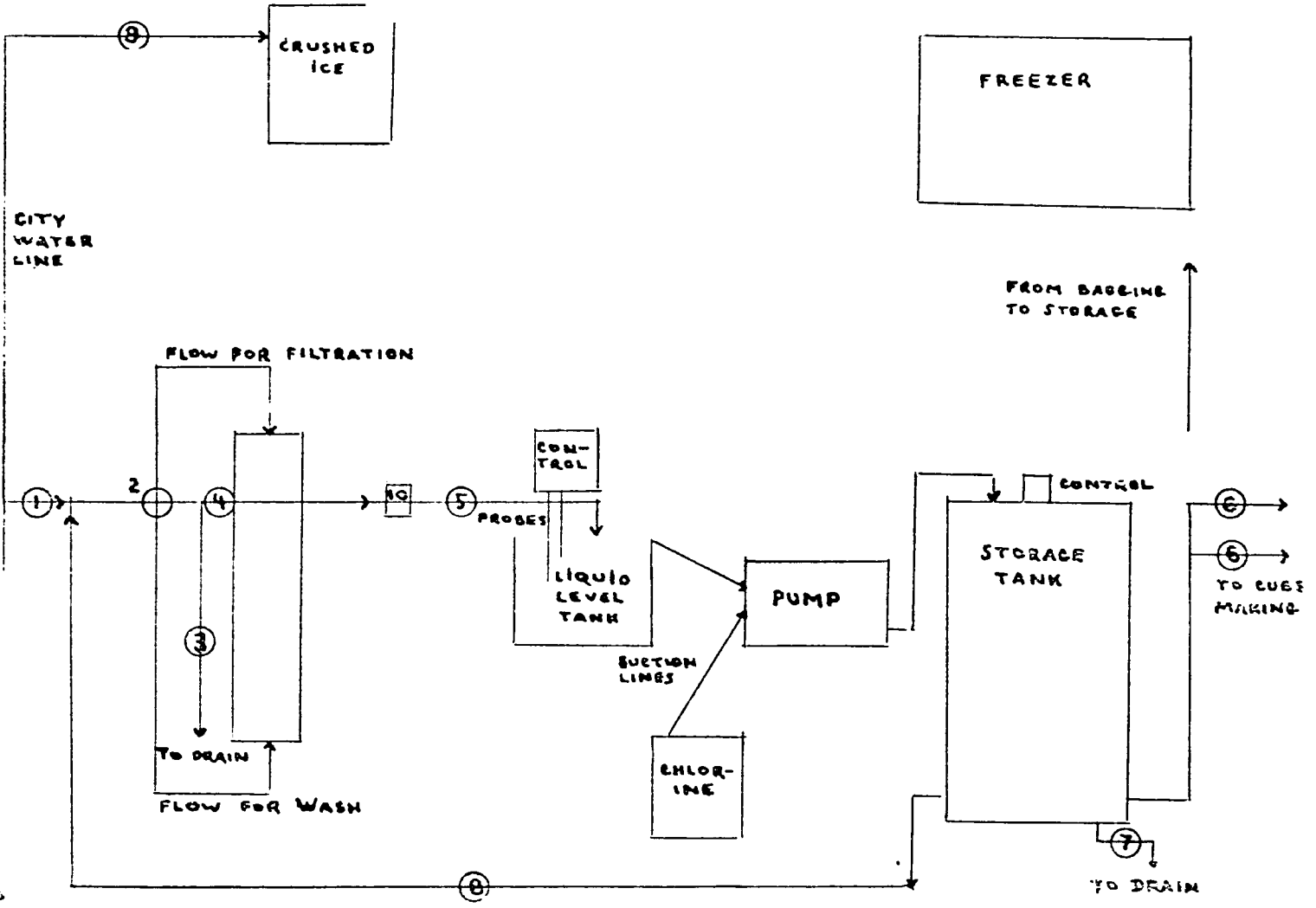
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# PLANT LAYOUT



CRUSHED ICE AND LIQUID

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CRUSHED ICE AND ICE CUBES, PACKAGED: S. I. C. 2097

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I. TEXTBOOKS

- A. Drake's Refrigeration Service Manual. H. P. Manly. 1962. 349 p. \$3.00.  
Frederick J. Drake and Company  
8 South Clinton Street  
Chicago 6, Illinois  
Mechanical refrigeration, plant construction and operation.
- B. Commercial and Industrial Refrigeration. C. W. Nelson. 1952. 465 p.  
Illus. \$7.00.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York, New York 10036  
Systematic explanation of the installation, operation, and servicing of  
various kinds of ice making plants and processes.

II. PERIODICALS

- A. Refrigeration. Monthly. \$2.00/year.  
John W. Yopp Publishing Company  
1070 Spring Street  
Atlanta, Georgia  
Ice manufacturing methods and merchandising.

III. GOVERNMENT PUBLICATIONS, U. S.

- A. Crushed Ice and Package Ice Cube Plant. January 1960. TI-63. 17 p.  
Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Layout and operational information for the small-scale production of  
crushed ice and ice cubes at a yearly production rate of 100 tons.
- B. Refrigerators and Refrigeration Equipment. \$0.10.  
Office of Technical Services  
U. S. Department of Commerce  
Washington, D. C. 20230

IV. OTHER PUBLICATIONS

- A. Mechanical Refrigeration. N. R. Sparks and C. C. Dilio. 1959. 276 p.  
Illus. \$9.50.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York, New York 10036  
Principles, equipment, systems relating to commercial refrigeration and  
ice making.

## SELECTED REFERENCES (Continued)

### V. U. S. Patents

Available U. S. Patent Office

Washington, D. C. 20523 \$25 each.

- A. Patent No. 2,942,430. 1960. 12 p.  
Apparatus and process for freezing ice.
- B. Patent No. 2,800,456. 1957. 5 p.  
Method for manufacturing ice.
- C. Patent No. 2,699,045. 1953. 21 p.  
Complete description of equipment and method for producing ice.

### VI. TRADE ASSOCIATIONS

- A. National Ice Association  
1901 Pennsylvania Avenue, N. W.  
Washington, D. C. 20006
- B. American Society of Heating, Refrigerating, and Air Conditioning Engineers  
345 East 47th Street  
New York, New York

### VII. ENGINEERING COMPANIES

- A. Rust Engineering Company  
930 Fort Duquesne Boulevard  
Pittsburgh, Pennsylvania  
Design, engineer, and provide construction management for processing plants of all types, including ice and refrigeration.

### VIII. DIRECTORIES

- A. Air Conditioning and Refrigerating Data Book. \$10.00.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York, New York 10036

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# INDUSTRY PROFILES

## COTTON SHIRTING

I.P. No. 66031

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## COTTON SHIRTING; Standard Industrial Classification 2211

### A. PRODUCT DESCRIPTION

Cotton shirting, 36 inches wide, suitable for manufacture of medium-priced men's shirts.

### B. GENERAL EVALUATION

Though this plant requires moderately large capital, it is a small unit for an integrated cotton mill. In this industry international competition is keen and large-scale producers generally have an advantage. The project is suitable for supplying a local market where shirt-making and allied industries are established. Price, quality and service will be highly important in developing market outlets.

### C. MARKET ASPECTS

1. USERS. Shirts-makers, households.
2. SALES CHANNELS AND METHODS. Sales to user industries, wholesalers, large retailers.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is easy to handle, and transport cost is relatively small. Market could be nation-wide.  
b. Export. Market is international.
4. COMPETITION. a. Domestic Market. Competition from imports may be keen. Competition from man-made fibers is generally increasing. b. Export Market. Plant is too small to compete in general international market with large-scale manufacturers. Some sales to neighboring countries might be possible.
5. MARKET NEEDED FOR PLANT DESCRIBED. The plant could produce shirting for a population of the order of half a million, where this product is in common use.

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## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION : 925,000 Yards

### I. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<b>Cost</b>
Land, 2 acres.	\$	--
Building, One story, 80'x120'	57,600	
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	\$241,600	
Other tools & equipmt.	18,000	
Furniture & fixtures	1,000	260,600
Total (excl. Land)		<u>\$318,200</u>

Principal Items. Opening machinery ; picking machinery ; 8 carding machines ; 4 drawing machines ; roving machines, 28 spindles ; spinning frames, 60 spindles ; 4 under frame cleavers ; cone winders, 20 spindles ; tube or spring winder ; 42 high speed 40" looms with accessories and automatic stop motor devices ; warpers ; slashers ; spoolers, knot tiers, reels, folders, and accessories ; compressors and humidifiers.

### b. WORKING CAPITAL

	<b>No. of Days</b>		
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$	33,600
Admin. Costs(b), Contingencies, Sales Costs(c)	30		3,800
Training Costs			2,500
Total Working Capital			<u>\$ 39,900</u>

c. **TOTAL CAPITAL (EXCL. LAND)** \$358,100

### 2. MATERIALS AND SUPPLIES

<b>a. Direct Materials</b>		<b>Annual Cost</b>
Cotton	\$	95,000
Packaging material		700
Total		<u>\$ 95,700</u>

<b>b. Supplies</b>		<b>\$</b>
Lubricants & hand tools		200
Cutting tools & abrasives		50
Maintenance & spare parts		2,550
Office supplies		200
Total		<u>\$ 3,000</u>

### 3. POWER, FUEL AND WATER

		<b>Annual Cost</b>
<b>a. Electric Power, 230 hp. connected load.</b>		<u>\$ 2,300</u>
<b>b. Fuel. Heat only, any local fuel</b>		<u>\$ 400</u>
<b>c. Water. Humidity control, sanitation and fire protection</b>		<u>\$ 100</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment. None needed.
- b. External Transport Facilities. Total in and out shipments slightly over 1 ton a day. No special requirements.

### 5. MANPOWER

<b>a. Direct Labor</b>		<b>Number</b>	<b>Annual Cost</b>
Skilled		4	\$ 20,000
Semi-skilled		7	28,000
Unskilled		8	24,000
Total		<u>19</u>	<u>\$ 72,000</u>
<b>b. Indirect Labor</b>			
Manager + supervisor	2		\$ 16,000
Office	2		8,000
Shipping clerk	1		4,000
Total	<u>5</u>		<u>\$ 28,000</u>

- c. Training Needs. The manager and supervisor must be well experienced. With 4 skilled workers, they should be able to train all employees and reach full production in 30 days.

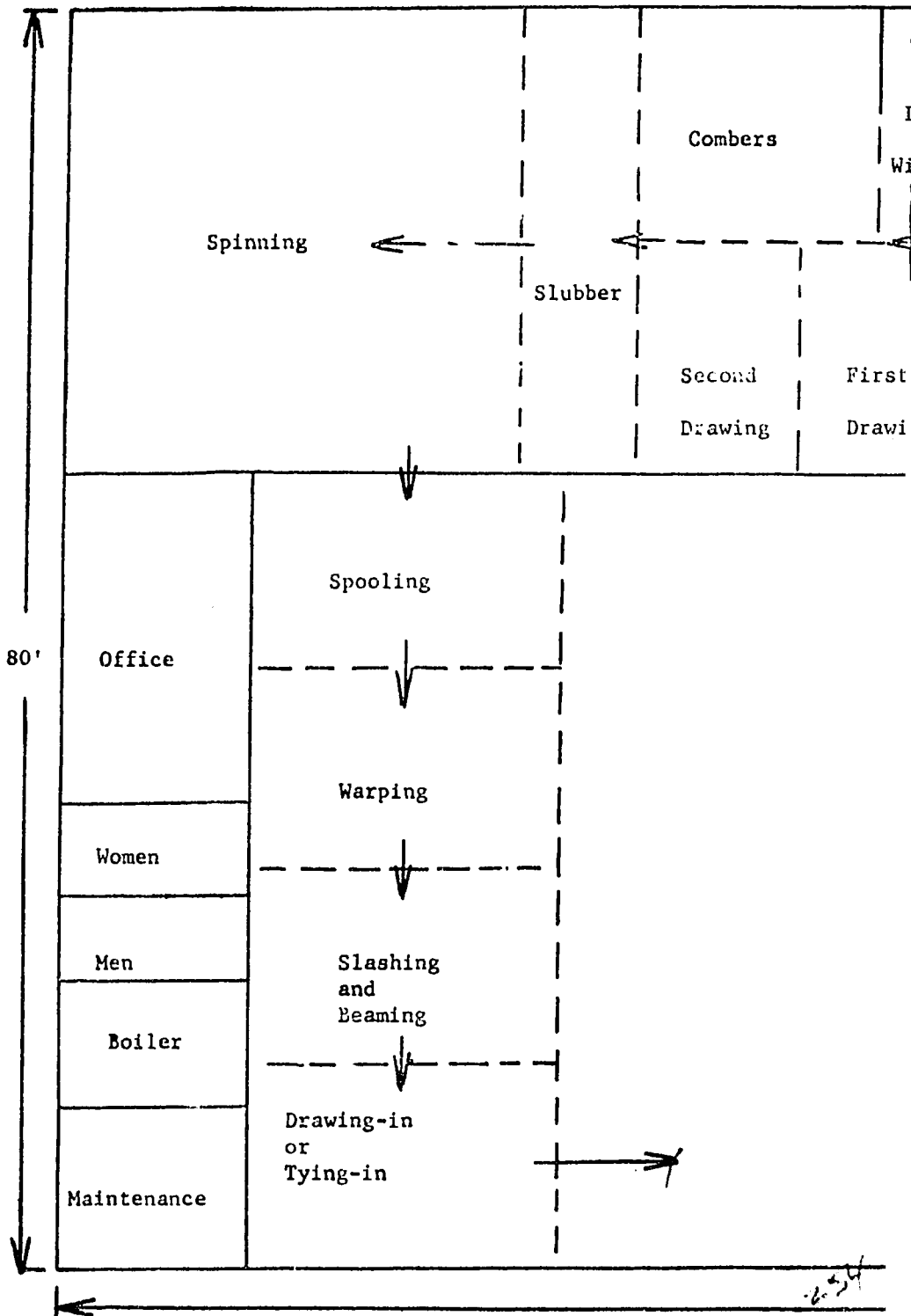
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>		
Direct Materials		\$ 95,700
Direct Labor		72,000
Manufacturing Overhead(a)		33,800
Admin. Costs(b), Contingencies		24,000
Sales Costs(c), Bad Debts		21,000
Depreciation on Fixed Capital		28,000
Total Annual Costs		<u>\$274,500</u>
<b>b. Annual Sales Revenue</b>		<u>\$352,000</u>

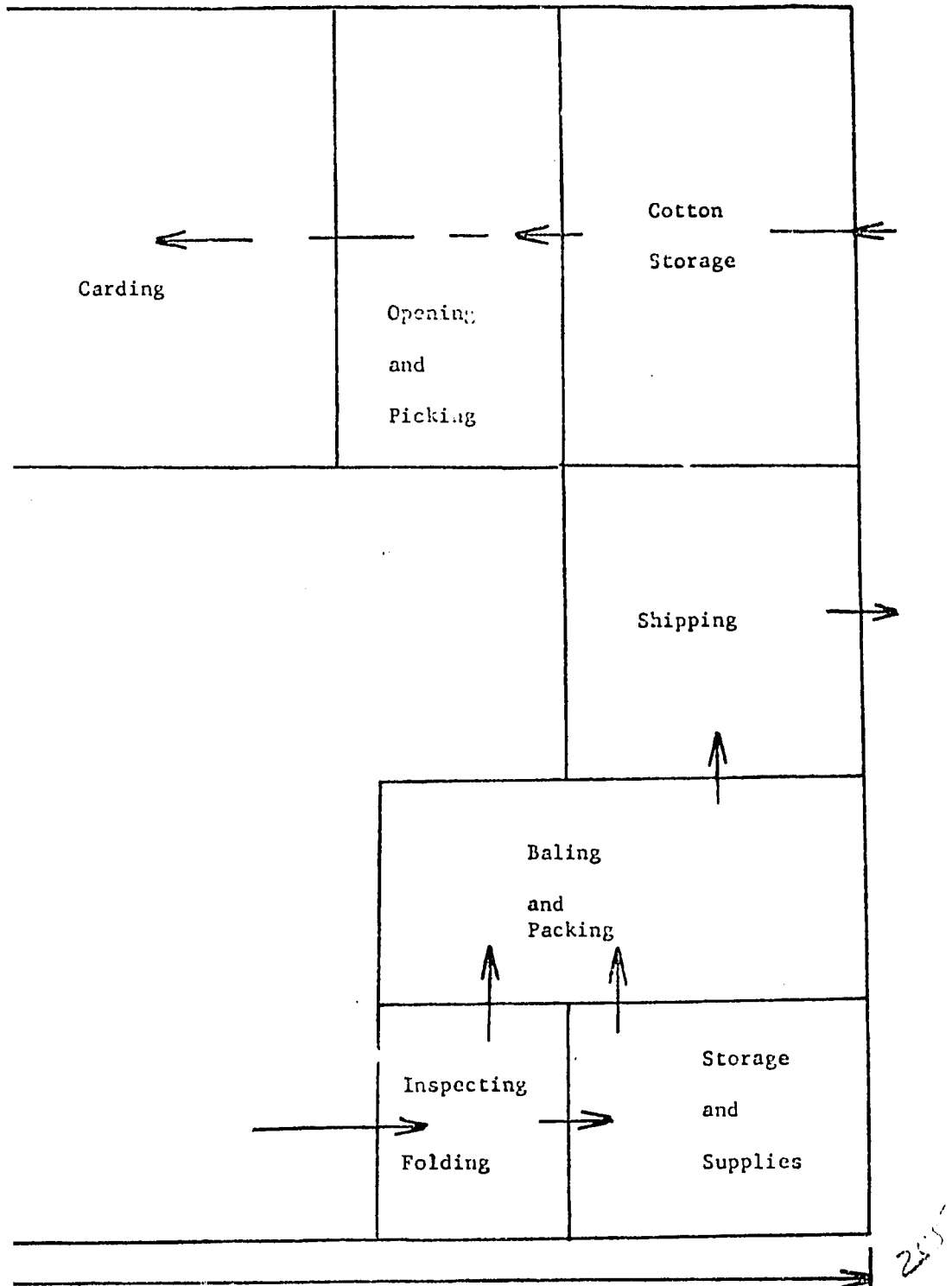
NOTES: (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

COTTON SHIRTING: S. I. C. 2211

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WORKFLOW





COTTON SHIRTING: S.I.C. 2211

SELECTED REFERENCES

I. TEXTBOOKS

- A. Fibre to Fabric. 3rd Edition. M. D. Potter and B. P. Corbman. 1959. 342 p. Illus. \$4.20.  
McGraw-Hill Book Company, Inc.  
331 West 42nd Street  
New York, New York 10036  
Discusses and compares all fibres, with emphasis on weaving and finishing of fibres and fabrics.

II. PERIODICALS

- A. Textile World. Monthly \$15.00/year.  
McGraw-Hill Publishing Company, Inc.  
330 West 42nd Street  
New York, New York 10036  
Technical journal covering production of textiles, modernization of operations and equipment, chemical treatment of textiles, management and business.
- B. Textile Bulletin. Monthly. \$5.00/year.  
Clark Publishing Company  
218 West Morehead Street  
Charlotte 6, North Carolina  
Information relative to spinning and weaving phases of textile industry, dyeing and finishing of yarns and woven fabrics.

III. GOVERNMENT PUBLICATIONS, U.S.

- A. Cotton Textiles CD-1 Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
A guide for understanding cost control problems in specific small industries.

IV. OTHER PUBLICATIONS

- A. American Cotton Handbook. 2nd Edition. G. R. Merrill, A. R. Macormac and H. R. Mauersberger. 1949. 1056 p \$9.50.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York, New York 10001  
Covers cotton fibers—from plant cultivation to manufacturing processes concerned with production of cotton fabrics.

V. TECHNICAL PAPERS

- A. Twist Formula for Maximum Cotton Yarn Strength. 1959. Textile World. \$25.  
McGraw-Hill Publishing Company  
330 West 42nd Street  
New York, New York 10036

## SELECTED REFERENCES (Continued)

### VI. U.S. PATENTS

Available U. S. Patent Office

Washington, D. C. 20231 \$2.25 each.

- A. Patent No. 2,977,475. 1961. 5 p.  
Method of and apparatus for processing cotton textiles.
- B. Patent No. 2,966,775. 1961. 5 p.  
Cotton yarns and textiles made therefrom.
- C. Patent No. 2,844,017. 1958. 6 p.  
Method and apparatus for making cotton cloth.
- D. Patent No. 2,802,355. 1957. 6 p.  
Knitting machine to manufacture flat cotton textiles.
- E. Patent No. 2,592,153. 1952. 3 p.  
Production of a cotton shirting textile.

### VII. TRADE ASSOCIATIONS

- A. American Textile Manufacturers Institute  
1501 Johnson Building  
Charlotte 2, North Carolina

### VIII. ENGINEERING COMPANIES

- A. Whitin Machine Works  
Whitinsville, Massachusetts  
Complete equipment for a cotton shirting plant.
- B. C. G. Sargents Sons Corporation  
Graniteville, Massachusetts  
Producers of textile machinery and equipment for a textile mill.

### IX. DIRECTORIES

- A. Davison's Textile Blue Book. Annual. \$9.75.  
Davison Publishing Company  
Ridgewood, New Jersey  
Lists 8,470 Textile plants in the U.S. Also lists thousands of suppliers to these plants.

## 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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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

## TERRY CLOTH

I.P. No. 66032

*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.

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## TERRY CLOTH : Standard Industrial Classification 2211

### A. PRODUCT DESCRIPTION

Cotton fabric with loops on one or both sides. Woven with two sets of warp threads and one of filling. One set of warp threads is held tight during weaving while the other is released to form the loops.

### B. GENERAL EVALUATION

Terry cloth is a fairly high-priced item and is used mainly in cool climates. Capital requirements are moderately high. Potential investors in this industry should make certain that there is sufficient demand to warrant the investment and that any plant established in the area could compete successfully with large-scale makers. Unless fabricating plants already exist, they would have to be established simultaneously.

### C. MARKET ASPECTS

1. USERS Fabricating plants making towels, robes, etc.
2. SALES CHANNELS AND METHODS. Sales to fabricating plants.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Because of low transport costs in relation to value of product, the potential market is nation-wide.  
b. Export. Market is world-wide.
4. COMPETITION. a. Domestic Market. In most areas competition would be from cheaper kinds of cotton cloth. Where there is a market for terry cloth, imported cloth would generally constitute competition. b. Export Market. International competition is strong. Therefore it is unlikely that a newly established plant of this rather small size could compete in the international market. Some exports to nearby areas might be possible.
5. MARKET NEEDED FOR PLANT DESCRIBED. The population required to support a plant of this type depends primarily on the level of income and the climate. In low-income as well as in very hot areas, demand would be small. In a temperate area, with a moderately high standard of living and where terry cloth items are standard household and hotel equipment, a population of 1,000,000 might support the output of this plant.

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## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 1,080,000 sq. yds.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<u>Cost</u>
Land. About 16,000 sq. ft.	\$	--
Building. One story, 75'x100', fireproof.		45,000
Equipment. Furniture & Fixtures.		
Prodn. tools & equipmt. \$150,000		
Other tools & equipmt. 8,000		
Furniture & fixtures 2,000		160,000
<u>Total (excl. Land)</u>		<u>\$205,000</u>
Principal Items. Yarn scale, creeling truck, beaming creeler, beamer, monorail hoist, looms, beams bobbins, shuttles, bailer, and special factory trucks.		

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 77,600
Admin. Costs(b), Contingencies Sales Costs(c)	30	2,400
Training Costs		7,200
<u>Total Working Capital</u>		<u>\$ 87,200</u>

c. TOTAL CAPITAL (EXCL. LAND) \$292,200

### 2. MATERIALS AND SUPPLIES

	<u>Annual Requirs.</u>	<u>Annual Cost</u>
<b>a. Direct Materials</b>		
Cotton Yarn	582,000 lbs,	\$350,600
<b>b. Supplies</b>		
Spare parts		\$ 2,400
Maintenance materials		800
Tools		300
Lubricants		200
Office supplies		300
<u>Total</u>		<u>\$ 4,000</u>

### 3. POWER, FUEL AND WATER

	<u>Annual Cost</u>
<b>a. Electric Power.</b> Connected load about 100 hp.	
	<u>\$ 6,000</u>
<b>b. Fuel.</b> For hot water, heating, and sanitation.	
	<u>\$ 800</u>
<b>c. Water.</b> For sanitation and fire protection, and possibly for heating and humidifying.	
	<u>\$ 400</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment. None required.
- b. External Transport Facilities. Combined in and out shipments about 50 tons per month. Good highway desirable.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
<b>a. Direct Labor</b>		
Skilled	5	\$ 25,000
Semi-skilled	7	28,000
Unskilled	10	30,000
<u>Total</u>	<u>22</u>	<u>\$ 83,000</u>
<b>b. Indirect Labor</b>		
Manager	1	\$ 8,000
Office	1	5,000
Other	2	8,000
<u>Total</u>	<u>4</u>	<u>\$ 21,000</u>

- c. Training Needs. Manager and supervisor should be well experienced. With assistance of 5 skilled workers, they should be able to train all workers. Plant should reach full production in about 3 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>	
Direct Materials	\$350,600
Direct Labor	83,000
Manufacturing Overhead(a)	32,200
Admin. Costs(b), Contingencies	17,200
Sales Costs(c), Bad Debts	24,000
Depreciation on Fixed Capital	17,400
<u>Total Annual Costs</u>	<u>\$524,400</u>
<b>b. Annual Sales Revenue</b>	
	<u>\$580,000</u>

NOTES: (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

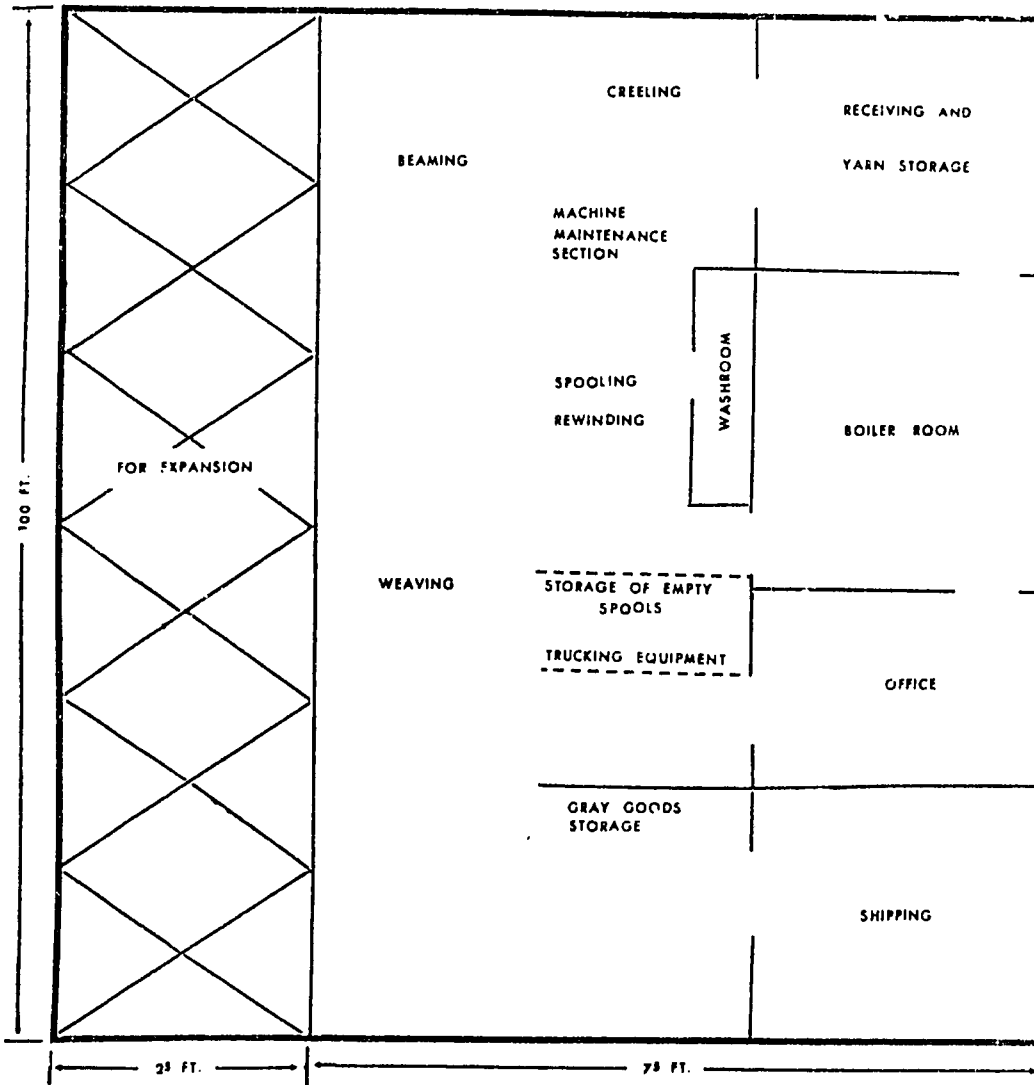
TERRY CLOTH: S.I.C. 2211

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# TERRY CLOTH WEAVING MILL

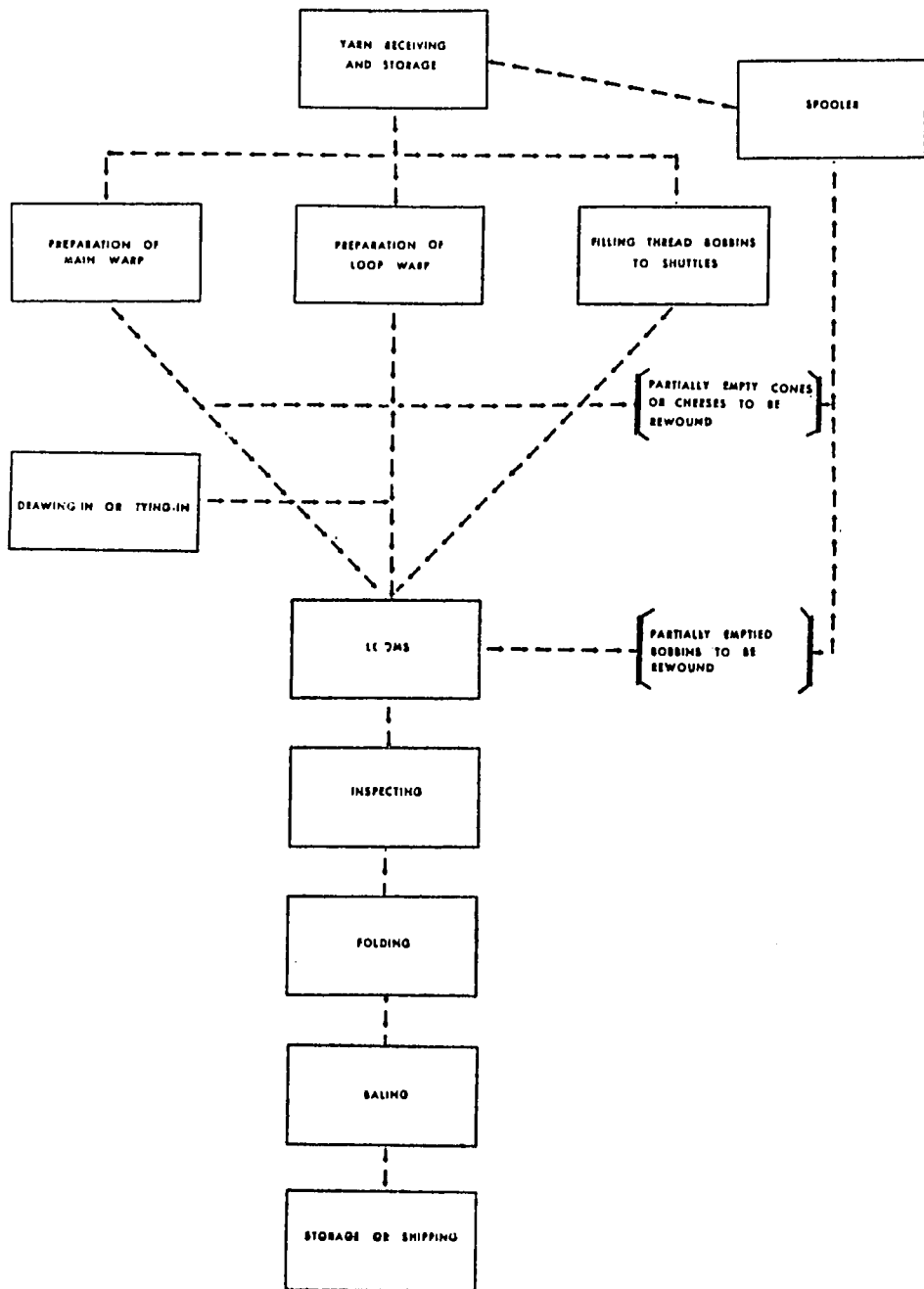
## TERRY CLOTH WEAVING MILL

### SCHEMATIC FLOOR PLAN



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PRODUCTION FLOW DIAGRAM  
DOUBLE LOOP TERRY CLOTH PLANT





TERRY CLOTH: S. I. C. 2211

SELECTED REFERENCES

I. TEXTBOOKS

- A. The Textile Fibers. J. M. Mathews 6th ed. 1954. 1283 p.  
\$18.50.  
John Wiley and Sons, Inc.  
440 Fourth Avenue  
New York 16, New York  
Chemical properties of fibers and fiber testing methods.
- B. Yarn and Cloth Calculations. L. H. Jackson. 1947. 196 p.  
\$5.00  
Interstate Publishers, Inc.  
250 Fifth Avenue  
New York 1, New York  
Calculation based on fiber analysis.

II. PERIODICALS

- A. Daily News Record. Daily. \$20.00/year.  
Fairchild's Publications Inc.  
7 East 12th Street  
New York 3, New York
- B. Textile World Monthly. \$12/year/U.S. \$15/other countries.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York 36, New York

III. GOVERNMENT PUBLICATIONS, U. S.

- A. A Terry Cloth Towel Manufacturing Factory for Nigeria. 1963.  
\$4 50. Identification Number 3/22/02164.  
U. S. Department of Commerce  
Clearinghouse for Federal Scientific and Technical Information, 410 14  
Springfield, Virginia 22151

IV. OTHER PUBLICATIONS

- A. Handbook of Textile Fibers. J. Gordon Cook. \$5.50.  
Textile Book Service  
257 Fourth Avenue  
New York 1, New York  
Terms and definitions and other information such as economic and  
production data.
- B. Natural and Synthetic Fibres Yearbook. Milton Harris and H. Mark.  
1000-1400 p. 1959. \$60.00.  
Interscience Publisher, Incorporated  
250 Fifth Avenue  
New York 1, New York  
Compilation of abstracts of papers on fibres.

## SELECTED REFERENCES (Continued)

### V. TECHNICAL PAPERS

- A. A Technology for the Analysis, Design, and Use of Textile Structures as Engineering Materials. W. S. Hamburger. 56 p. \$1.50.  
American Society for Testing Materials  
1916 Race Street  
Philadelphia 3, Pennsylvania  
Reviews textile craftsmanship. Discusses methods of improving textiles.

### VI. U.S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$.25 each.

- A. Patent No. 2,983,023 1961. 9 p.  
Processing machinery for pile fabrics including terry cloth.
- B. Patent No. 2,875,504. 1959. 4 p.  
Method of processing terry cloth fabrics.

### VII. TRADE ASSOCIATIONS

- A. Southern Textile Association  
P. O. Box 1225, 218 W. Morehead Street.  
Charlotte 6, North Carolina
- B. Textile Research Institute  
P. O. Box 625  
Princeton, New Jersey

### VIII. ENGINEERING COMPANIES

- A. Von Kohorn International Corporation  
White Plains, New York  
Complete plants, machinery, processes.
- B. Warner and Swasey Company  
Textile Machinery Division  
New Philadelphia, Ohio  
Weaving equipment.
- C. Cocker Machine and Foundry Company  
215 Chestnut Street  
Gastonia, North Carolina  
Warp preparatory equipment.

### IX. DIRECTORIES

- A. Annual Buyers Guide. \$1.00.  
W. R. C. Smith Publishing Company  
806 Peachtree Street  
Atlanta, Georgia  
Annual review of all new products and services and all new literature on the textile industry.
- B. Davison's Textile Blue Book. \$7.25.  
Davison Publishing Company  
Ridgewood, New Jersey  
8,470 plants, names of executives, buyers guide.

TERRY CLOTH: S. I. C. 2211

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## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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Clearinghouse for Federal Scientific and  
Technical Information, 410.12  
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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

## COTTON CROCHET AND KNITTING YARN

I.P. No. 66033

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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.

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.

COTTON CROCHET AND KNITTING YARN: Standard Industrial Classification 2281

A. PRODUCT DESCRIPTION

Cotton yarn, sold by weight; spun with a lower twist and from shorter staple cotton than yarn for weaving.

B. GENERAL EVALUATION

This plant would be established only where knitting mills or handicraft knitting industry provide a market for its products. Capital requirements are moderate and little skilled labor is needed. The project seems suitable for many developing areas.

C. MARKET ASPECTS

1. USERS. Knitting mills, handicraft industry, households.
2. SALES CHANNELS AND METHODS. Sales to Industry and wholesalers.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is very easily handled and shipping costs are minor. Market area may be nation-wide.  
b. Export. Some export to nearby countries where there are no local producers may be possible.
4. COMPETITION. a. Domestic Market. Plant would have to expect competition from large-scale foreign producers of yarn. Some homespun yarn and man-made fibers might also compete with cotton yarn. b. Export Market. Except for export into the immediately surrounding area this plant should not be expected to compete in the foreign market.
5. MARKET NEEDED FOR PLANT DESCRIBED. Knitting facilities producing for about a million people, on the average.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE SHIFTS, SIX DAYS A WEEK : 220,000 lbs.

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		
Land. 1/2 acre.		\$ --
Building. One story, 50'x100'.		30,000
Equipment, Furniture & Fixtures		
Prodn. tools & equipmt.	\$111,000	
Other tools & equipmt	10,000	
Furniture & fixtures	1,000	122,000
Total (excl. Land)		<u>\$152,000</u>

Principal Items. Opening machinery; picking machinery; 7 carding machines; 4 drawing machines; combing machinery; roving machinery, 24 spindles, humidifiers, spinning frames, 60 spindles; 3 under frame cleaners; cone winder, 18 spindles; tube or spring winder, 20 spindles; 3 skein winders, 16 spindles; boiler.

### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 24,200
Admin. Costs(b), Contingencies, Sales Costs (c)	30	1,500
Training Costs		4,000
Total Working Capital		<u>\$ 29,700</u>

c. TOTAL CAPITAL (EXCL. LAND) \$181,700

### 2. MATERIALS AND SUPPLIES

	Annual Reqsmts.	Annual Cost
<b>a. Direct Materials</b>		
Cotton	300,000 lbs.	\$ 81,000
Packaging		600
Total		<u>\$ 81,600</u>

### b. Supplies

Lubricants & hand tools	\$ 100
Maintenance & spare parts	1,000
Office	100
Total	<u>\$ 1,200</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
<b>a. Electric Power.</b> Connected load 25 hp.	
	\$ 2,200
<b>b. Fuel.</b> Heating only. Any boiler fuel may be used.	
	\$ 300
<b>c. Water.</b> Sanitation & fire protection.	
	\$ 100

### 4. TRANSPORTATION

- a. Own Transport Equipment. None required.
- b. External Transport Facilities. Total in and out shipments about 25 tons a month. No special requirements.

### 5. MANPOWER

	Number	Annual Cost
<b>a. Direct Labor</b>		
Skilled	1	\$ 5,000
Semi-skilled	7	28,000
Unskilled	2	6,000
Total	<u>10</u>	<u>\$ 39,000</u>
<b>b. Indirect Labor</b>		
Manager + supervisor	2	\$ 14,000
Office	1	4,000
Other	1	3,000
Total	<u>4</u>	<u>\$ 21,000</u>

- c. Shifts. Manager and supervisor work during the day with unskilled labor and set up work for the evening and night shifts, which use skilled and semi-skilled labor.
- d. Training Needs. Manager and supervisor must be well experienced. With skilled worker, they should be able to train all workers. Plant should reach full production in 2 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>	
Direct Materials	\$ 81,600
Direct Labor	39,000
Manufacturing Overhead(a)	24,800
Admin. Costs(b), Contingencies	9,000
Sales Costs(c), Bad Debts	8,800
Depreciation on Fixed Capital	13,000
Total Annual Costs	<u>\$176,200</u>
<b>b. Annual Sales Revenue</b>	
	<u>\$220,000</u>

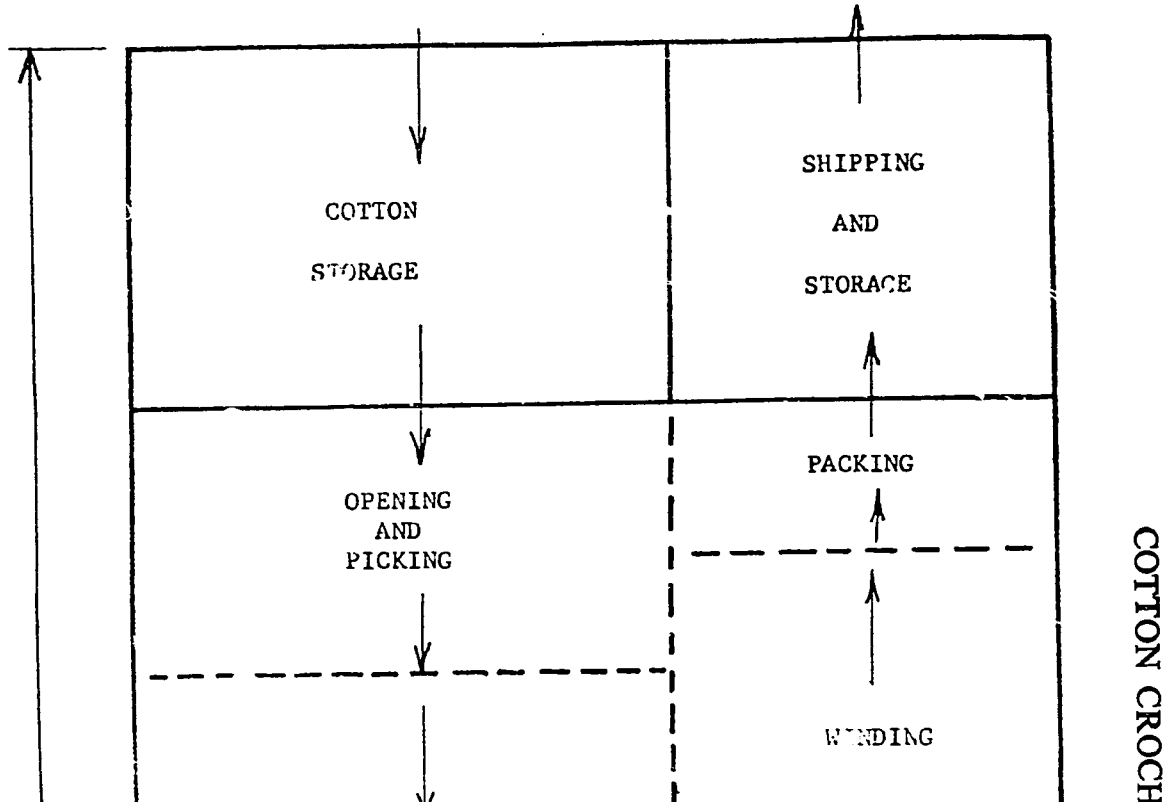
NOTES: (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

COTTON CROCHET AND KNITTING YARN : S.I.C. 2281

. 267

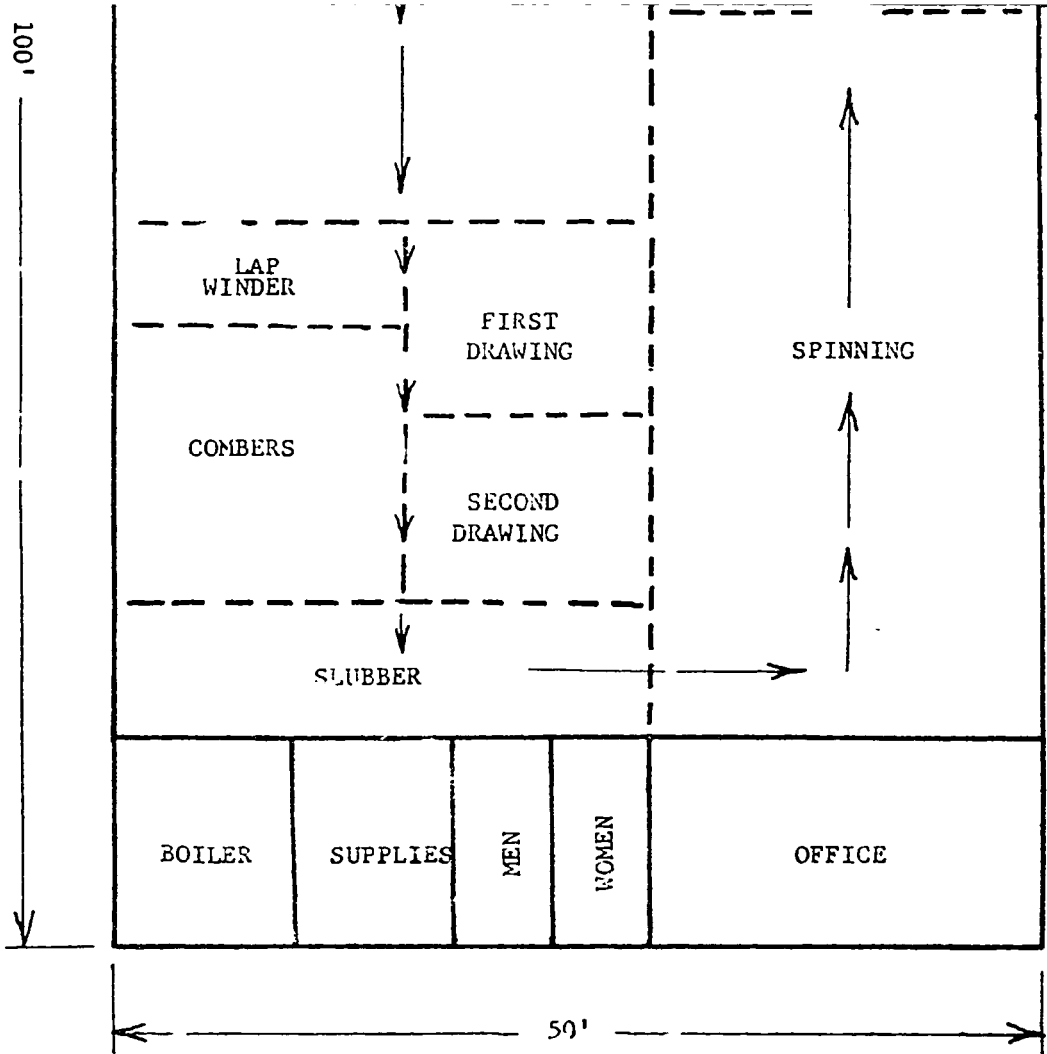
# PLANT LAYOUT

ARROWS INDICATE WORK FLOW



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Wool Knitting Yarn: S.I.C. 2281



100'

50'

271



COTTON CROCHET AND KNITTING YARN: S. I. C. 2281

SELECTED REFERENCES

I. TEXTBOOKS

- A. American Cotton Handbook. G. R. Merrill, A. R. Macormac, H. R. Mauersberger. 2nd Edition. 1949. 1056 p. \$9.50.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York, New York 10001  
Contains operations of cotton yarn manufacturing as well as history, economics, and statistical background.

II. PERIODICALS

- A. The Cotton Trade Journal. Weekly. \$6.00/year.  
Cotton Trade Journal, Inc.  
Hickman Building  
Memphis 3, Tennessee  
News of developments in the cotton industries.

III. OTHER PUBLICATIONS

- A. Handbook of Industrial Fabrics. G. B. Haven. Illus. \$5.00.  
Textile Book Service  
2320 South Street, N. W.  
Washington, D. C. 20008  
Contains concise information on the manufacturing processes and uses of many fibers.

IV. TECHNICAL PAPERS

- A. Twist Formula for Maximum Cotton Yarn Strength. 1959. Textile World. \$.25.  
McGraw-Hill Publishing Company  
330 West 42nd Street  
New York, New York 10036

## SELECTED REFERENCES (Continued)

### V. U. S. PATENTS

Available U. S. Patent Office

Washington, D. C. 20231. \$.25 each.

- A. Patent No. 2,972,856. 1961. 4 p.  
Process and apparatus for producing cotton yarns of any desired count.
- B. Patent No. 2,946,180. 1960. 3 p.  
Production of twistless cotton knitting yarns.
- C. Patent No. 2,897,647. 1959. 4 p.  
Machines for the manufacture of cotton crocheting and related yarns.
- D. Patent No. 2,656,671. 1953. 3 p.  
Method of making cotton and other kinds of knitting yarns.
- E. Patent No. 2,602,195. 1952. 15 p.  
Spinning method and apparatus for cotton yarns.

### VI. TRADE ASSOCIATIONS

- A. Combed Yarn Spinners Association  
427 West Franklin Avenue  
Gastonia, North Carolina

### VII. ENGINEERING COMPANIES

- A. Lockwood Greene Engineers, Inc.  
200 Park Avenue  
New York, New York  
Consulting engineers providing service for textile and industrial plants.
- B. Venango Engineering Company, Inc.  
8313 Torresdale Avenue  
Philadelphia, Pennsylvania  
Makers of textile machinery.

### VIII. DIRECTORIES

- A. Skinner's Cotton Trade Directory. \$15.00.  
Thomas Skinner and Company, Ltd.  
111 Broadway  
New York, New York 10006  
Lists approximately 20,000 firms connected with the cotton industry throughout the world.

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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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.

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# INDUSTRY PROFILES

## WOOLEN YARN

I.P. No. 66034

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## WOOLEN YARN: Standard Industrial Classification 2283

### A. PRODUCT DESCRIPTION

Yarn spun directly from a carded sliver of wool, as distinct from worsted yarn, which is spun from a combed sliver, or top.

### B. GENERAL EVALUATION

This plant requires a fairly large investment. Though an area may have suitable locally-produced raw wool, if this is to be used by local industry proper facilities for scouring must also exist locally. Woolen yarn is not as readily graded as worsted yarn, and large weaving concerns often prefer to spin their own yarn in integrated mills rather than purchase yarn. In regard to marketing, development of an export market for woolen yarn in competition with countries that have long been in this business may be difficult and, at least initially, it will generally be necessary to rely on the domestic market. Woolen goods are relatively high-priced, and demand is also limited by climatic conditions.

### C. MARKET ASPECTS

1. USERS. Textile industry, including factory and handicraft weavers.
2. SALES CHANNELS AND METHODS. Sales to industrial users and wholesalers.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Shipping costs are minimal compared to value of product. Therefore potential market is usually nation-wide. b. Export. World-wide market.
4. COMPETITION. a. Domestic Market. Main competition would come from imported wool yarn. Synthetic fibers might also compete, if their prices are not too high, particularly where lightness and durability are important. b. Export Market. Plant could generally not expect to compete in the world market.
5. MARKET NEEDED FOR PLANT DESCRIBED. If a weaving industry and other fabricating plants exist or are established simultaneously, the yarn plant should be able to satisfy the need for woolen clothing of a population of two to three million in an area of moderate climate and moderately high income.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION : 400,000 Pounds

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	<u>Cost</u>
Land. About 12,000 sq. ft.	--
Building. One story, 60'x100'.	\$ 36,000
Equipment, Furniture & Fixtures.	
Prod'n. tools & equipmt. \$210,000	
Other tools & equipmt. 8,000	
Furniture & fixtures 700	<u>218,700</u>
Total (excl. Land)	<u>\$254,700</u>

Principal Items. Picking & blending unit, 2 sets 60x60 cards, 2 Peralta rolls, 4 spinning frames, humidifying equipment.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$105,200
Admin. Costs(b), Contingencies, Sales Costs(c)	30	5,000
Training Costs		4,500
Total Working Capital		<u>\$114,700</u>

c. TOTAL CAPITAL (EXCL. LAND) \$369,400

### 2. MATERIALS AND SUPPLIES

	<u>Annual Reqsmts.</u>	<u>Annual Cost</u>
a. <u>Direct Materials</u>		
Wool	505,000 lbs.	\$556,000
Packaging		4,000
Total		<u>\$560,000</u>
b. <u>Supplies</u>		
Lubricants & hand tools		100
Maintenance & repairs		1,200
Office		200
Total		<u>\$ 1,500</u>

### 3. POWER, FUEL AND WATER

	<u>Annual Cost</u>
a. <u>Electric Power.</u> Connected load about 50 hp.	\$ 4,000
b. <u>Fuel.</u> About 6,000 gals. oil annually.	\$ 800
c. <u>Water.</u> Production, sanitation and fire protection.	\$ 200

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.  
 b. External Transport Facilities. In and out shipments less than 50 tones a month. No special requirements.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>		
Skilled	2	\$ 10,000
Semi-skilled	6	24,000
Unskilled	5	15,000
Total	<u>13</u>	<u>\$ 49,000</u>
b. <u>Indirect Labor</u>		
Manager	1	\$ 8,000
Office staff	1	4,000
Other	1	4,000
Total	<u>3</u>	<u>\$ 16,000</u>

c. Shifts. Manager works during the day with unskilled labor and sets up work for the evening and night shifts. The latter use skilled and semi-skilled labor.

d. Training Needs. Manager should be fully experienced. With 3 experienced operators, he should be able to train all workers. Plant should reach full production in 2 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$560,000
Direct Labor	49,000
Manufacturing Overhead(a)	22,500
Admin. Costs(b), Contingencies	16,500
Sales Costs(c), Bad Debts	44,000
Depreciation on Fixed Capital	23,000
Total Annual Costs	<u>\$715,000</u>
b. <u>Annual Sales Revenue</u>	<u>\$880,000</u>

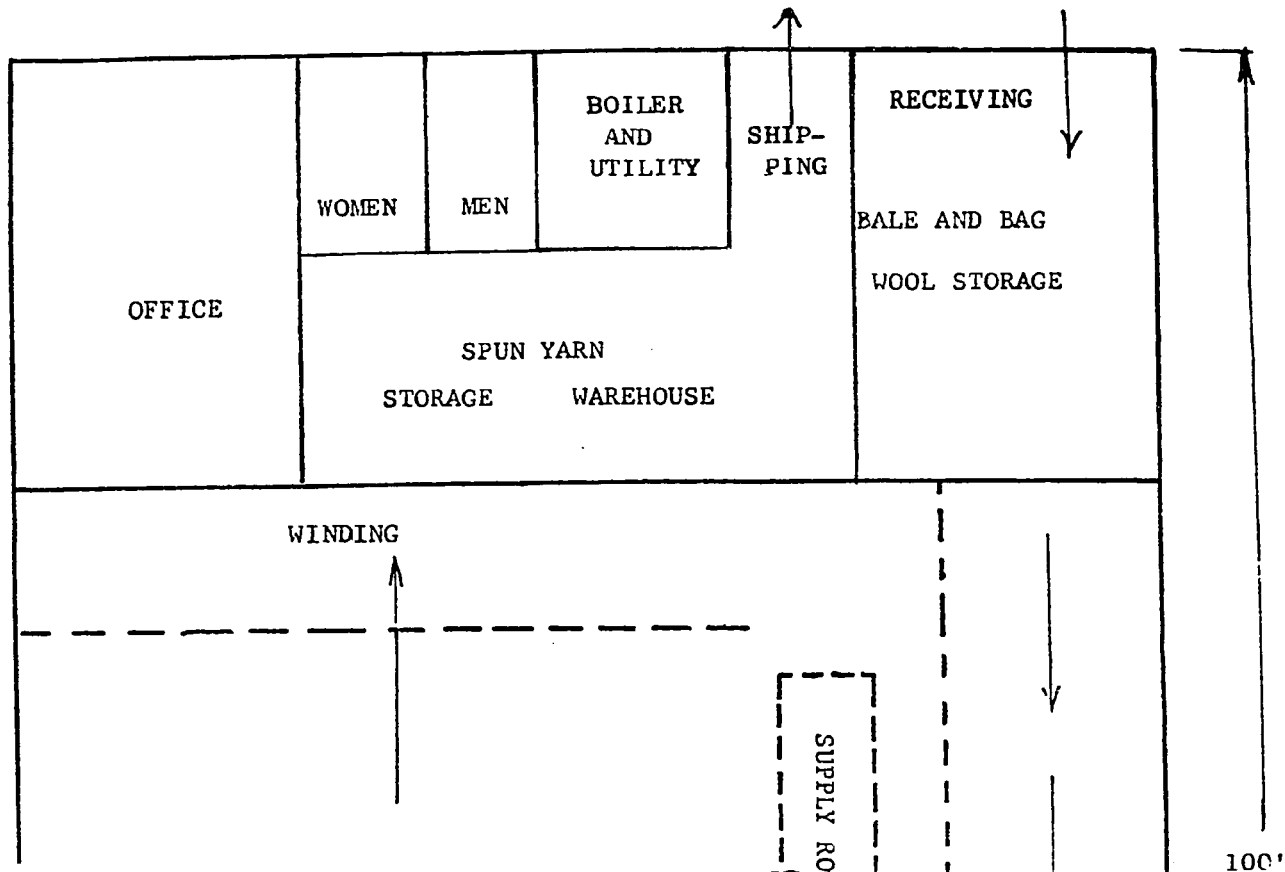
NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

WOOLEN YARN: S.I.C. 2283

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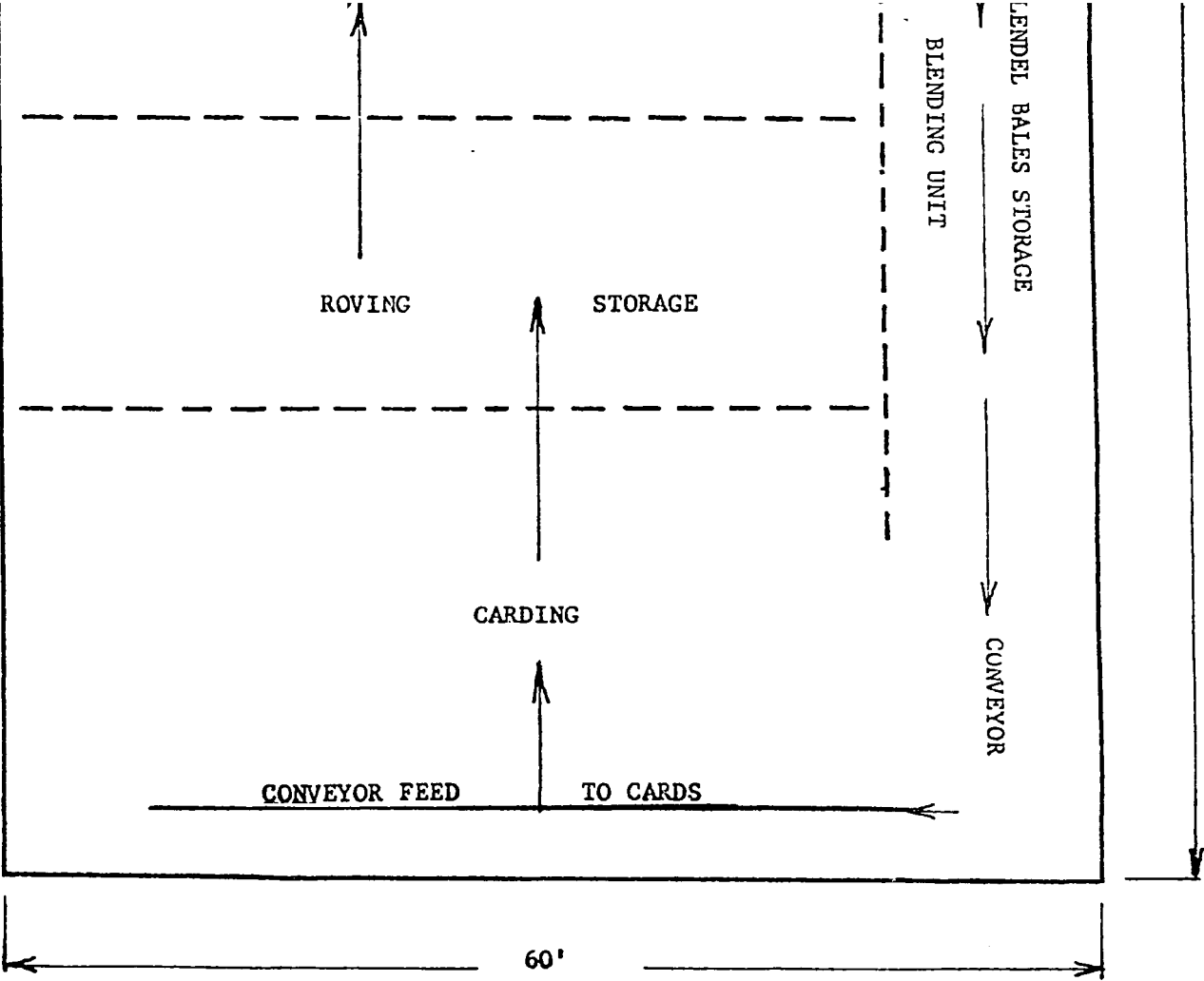
# PLANT LAYOUT

ARROWS INDICATE WORK FLOW



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ARN: S.I.C. 2283



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WOOLEN YARN: S.I.C. 2283

SELECTED REFERENCES

I. TEXTBOOKS

- A. Wool Handbook. 3rd Edition. W. von Bergen. Vol. I. 1963. \$22.00.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York, New York 10001  
Deals with the raw material and with manufacturing processes.
- B. Wool: Its Chemistry and Physics. P. Alexander and R. F. Hudson. 1954.  
412 p. \$8.50.  
Textile Book Service  
257 Park Avenue South  
New York, New York 10010  
Comprehensive treatment of the chemical, physical, and biological characteristics of wool.

II. PERIODICALS

- A. World Wool Guide. Annually. \$10.00/year  
World Wool Guide, Inc.  
138 North 7th Street  
Philadelphia 6, Pennsylvania  
Devoted exclusively to the wool industry.

III. OTHER PUBLICATIONS

- A. Friction in Textiles. H. G. Howell. 1959. 276 p. Illus. \$6.75.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York, New York 10001  
Contains section on wool and yarns.

IV. TECHNICAL PAPERS

- A. Quality Control. TB-66. March 1960. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Manual for training of personnel in the subject of quality control.

## SELECTED REFERENCES (Continued)

### V. U. S. PATENTS

Available U. S. Patent Office

Washington, D. C. 20231 \$0.25 each.

- A. Patent No. 3,012,397. 1961. 2 p.  
Method of making high bulk yarns.
- B. Patent No. 3,003,304. 1961. 5 p.  
Method of manufacturing yarns.
- C. Patent No. 3,000,168. 1961. 3 p.  
Method and apparatus for producing bulky yarns.

### VI. TRADE ASSOCIATIONS

- A. National Association of Wool Manufacturers  
386 Fourth Street  
New York, New York 10016

### VII. ENGINEERING COMPANIES

- A. Proctor and Schwartz, Inc.  
7th Street and Tabor Road  
Philadelphia, Pennsylvania  
Manufactures machinery and equipment for the wool industry.
- B. Riggs and Lombard, Inc.  
750 Suffolk Street  
Lowell, Massachusetts  
Manufactures machinery and equipment for the wool industry.

### VIII. DIRECTORIES

- A. World Wool Trade Annual. \$10.00.  
World Wool Guide, Inc.  
1505 Race Street  
Philadelphia 2, Pennsylvania  
World-wide coverage of the wool industry.

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# INDUSTRY PROFILES

## WORSTED YARN

I.P. No. 66035

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## WORSTED YARN: Standard Industrial Classification 2283

### A. PRODUCT DESCRIPTION

Wool yarn, spun from longer fibers than woolen yarn, and with tops as an intermediate product.

### B. GENERAL EVALUATION

Worsted yarns are high quality yarns, spun according to rigid specifications and woven into high-grade cloth. Frequently the production of yarn is part of an integrated process. Where weaving mills buy yarn, they tend to purchase it from known suppliers who produce goods of known quality. Therefore the marketability of worsted yarns is limited not only by the level of income and the climate, but also by the reluctance of weaving firms to purchase from unknown sources. Market possibilities therefore need to be explored carefully. Capital requirements are fairly high, as is the demand for skilled and semi-skilled labor.

### C. MARKET ASPECTS

1. USERS. Textile Industries.
2. SALES CHANNELS AND METHODS. Direct sales to industry.
3. GEOGRAPHICAL EXTENT OF MARKET. Transport costs are not important for the industry. Market can be nation-wide. Shipments abroad are feasible from the transportation point of view.
4. COMPETITION. a. Domestic Market. A domestic market will exist only where there are weaving facilities. Plant should be able to compete with imported yarn, if it maintains high standards of quality. b. Export Market. High quality requirements and the competition of well-established concerns are major problems the plant would face in establishing itself in the international market.
5. MARKET NEEDED FOR PLANT DESCRIBED. A local complex of textile mills engaged in fabricating worsted cloth.

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## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: 350,000 Pounds

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<u>Cost</u>
Land. About 24,000 sq. ft.	\$	--
Building. One story, 100'x120'		72,000
Equipment, Furniture & Fixtures.		
Prod. tools & equipmt.	\$225,000	
Other tools & equipmt.	11,000	
Furniture & fixtures	1,000	237,000
Total (excl. Land)		<u>\$309,000</u>

Principal Items. Pin drafters (3), cone rovers (2), 100 spindle frames, spinning frames (6) 240 spindles, twisting frames (3) 240 spindles, winding - 1 double frame, winding - 1 cone frame, humidifiers, boiler.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$132,700
Admin. Costs(b), Contingencies, Sales Costs (c)	30	6,200
Training Costs		18,000
Total Working Capital		<u>\$156,900</u>

c. TOTAL CAPITAL (EXCL. LAND) \$465,900

### 2. MATERIALS AND SUPPLIES

	<u>Annual Reqmnts.</u>	<u>Annual Cost</u>
<b>a. Direct Materials</b>		
Wool	534,000 lbs.	\$590,000
Packaging		5,000
Total		<u>\$595,000</u>

### b. Supplies

Lubricants & hand tools	\$	200
Maintenance & repair parts		4,000
Office supplies		300
Total		<u>\$ 4,500</u>

### 3. POWER, FUEL AND WATER

	<u>Annual Cost</u>
<b>a. Electric Power.</b> Connected load about 100 hp.	
	<u>\$ 9,000</u>
<b>b. Fuel.</b> About 30,000 gals. oil annually.	
	<u>\$ 3,600</u>
<b>c. Water.</b> About 800,000 gals. annually.	
	<u>\$ 200</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. In and out shipments less than 50 tons a month. No special requirements.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
<b>a. Direct Labor</b>		
Skilled	12	\$ 60,000
Semi-skilled	18	72,000
Unskilled	6	18,000
Total	<u>36</u>	<u>\$150,000</u>
<b>b. Indirect Labor</b>		
Manager & supervisor	2	\$ 18,000
Office	2	8,000
Other	2	8,000
Total	<u>6</u>	<u>\$ 34,000</u>

- c. Training Needs. Manager & supervisor should be fully experienced. With 3 skilled workers they should be able to train all workers. Plant should reach full production in 2 months.

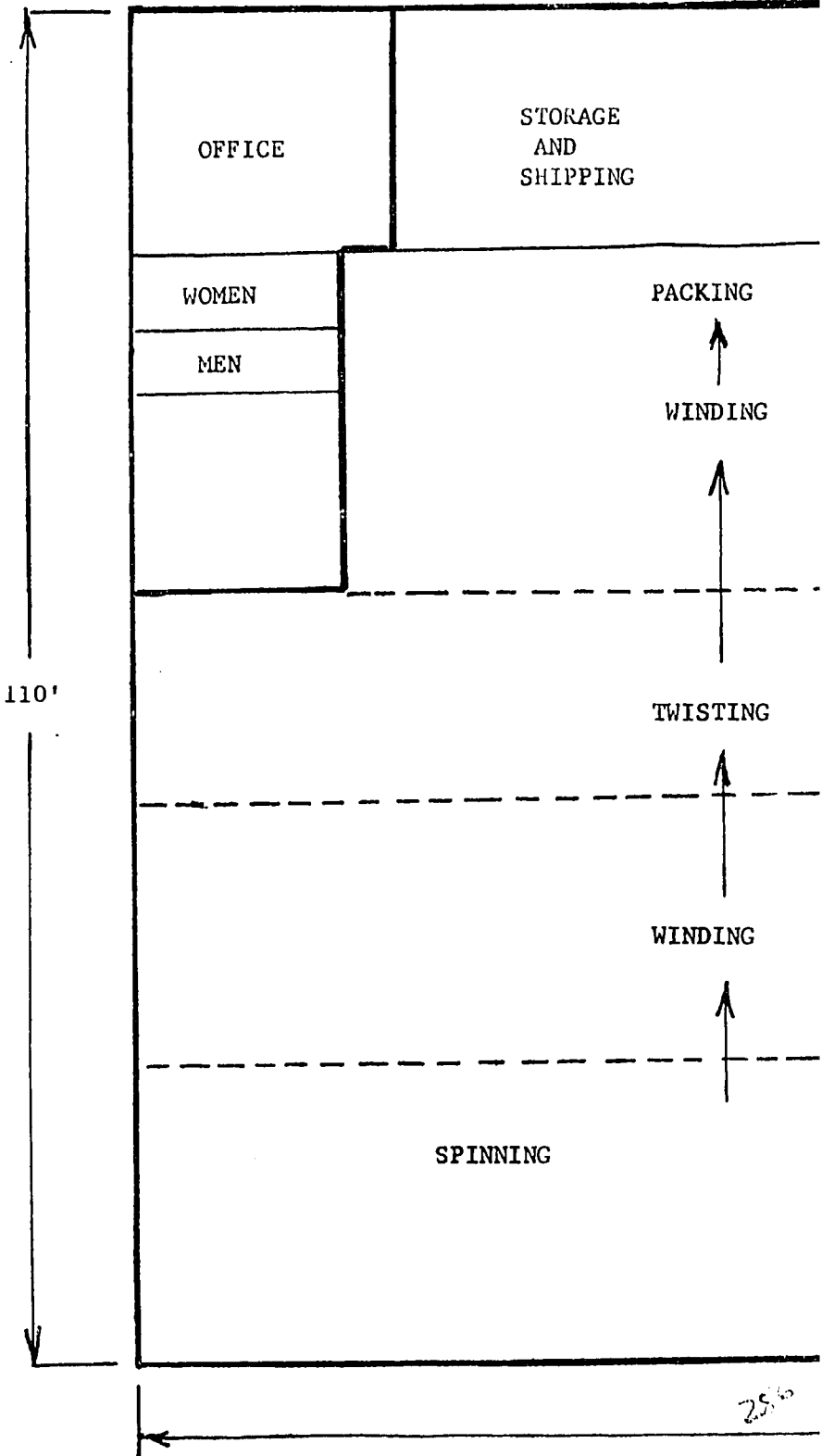
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>	
Direct Materials	\$595,000
Direct Labor	150,000
Manufacturing Overhead(a)	51,300
Admin. Costs(b), Contingencies	30,000
Sales Costs(c), Bad Debts	44,000
Depreciation on Fixed Capital	25,500
Total Annual Costs	<u>8895,800</u>
<b>b. Annual Sales Revenue</b>	
	<u>\$1,000,000</u>

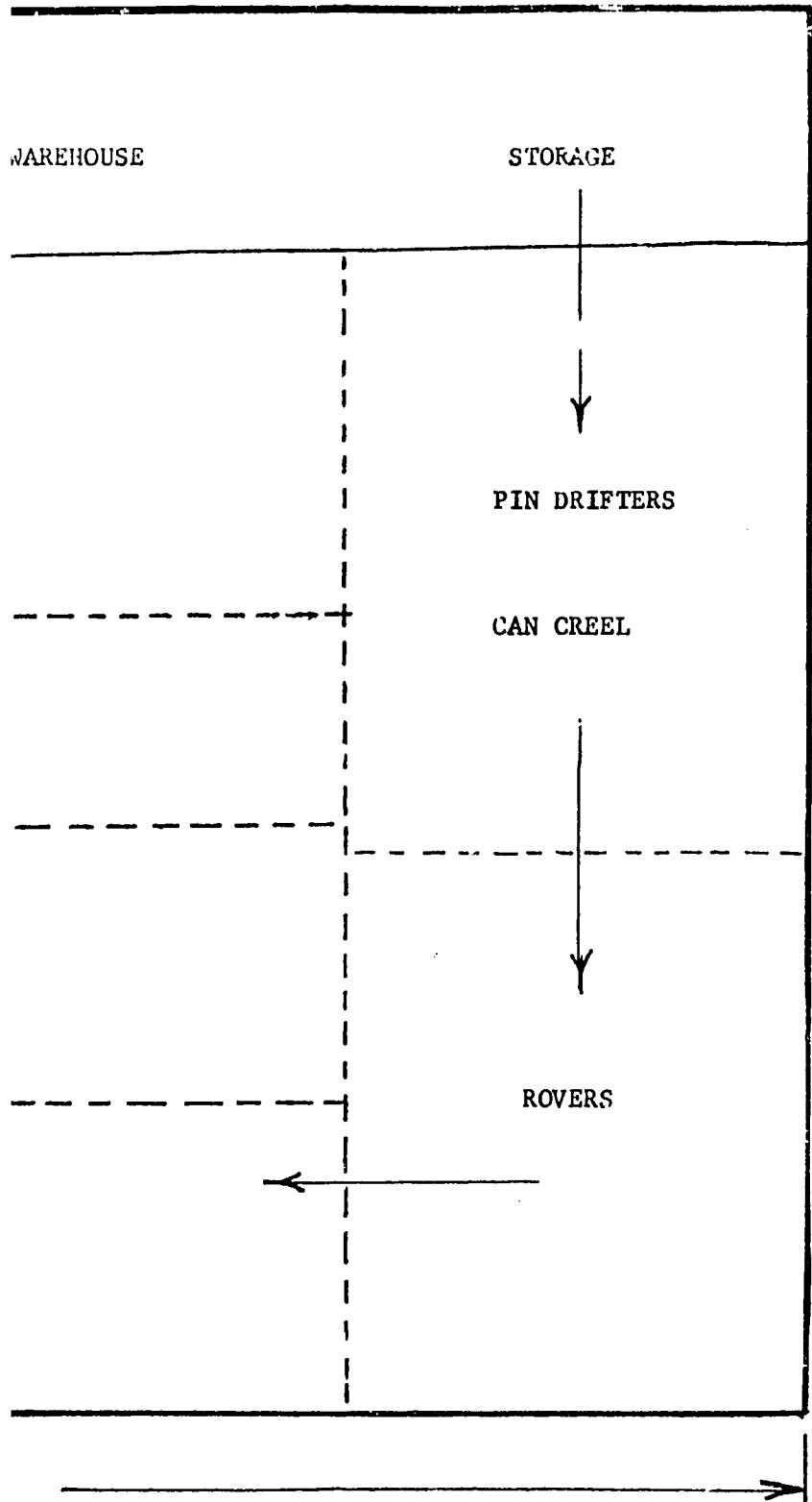
NOTES: (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commission, Freight Out, Travel.

WORSTED YARN: S.I.C. 2283

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INDICATE WORK FLOW





WORSTED YARN: S. I. C. 2283

SELECTED REFERENCES

I. TEXTBOOKS

- A. Wool Handbook. 3rd Edition. W. von Berger and H. R. Mauersberger. 1963. \$22.00.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
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Deals with the raw materials and with manufacturing and processing.
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Frank P. Bennett and Company, Inc.  
286 Congress Street  
Boston, Massachusetts  
Devoted exclusively to the textile industry.
- B. World Wool Guide. Annually. \$10.00/year.  
World Wool Guide, Inc.  
138 North 7th Street  
Philadelphia 6, Pennsylvania  
Devoted exclusively to the wool industry.

III. OTHER PUBLICATIONS

- A. Practical Textile Chemistry. J. W. Bell. 1956. 259 p. \$4.75.  
Chemical Publishing Company  
212 Fifth Avenue  
New York, New York  
Covers textile processing, identification, and testing techniques with emphasis on wool.

IV. TECHNICAL PAPERS

- A. Quality Control. TB-66. March 1960. Gratis.  
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Manual for training of personnel in the subject of quality control in industry.

## SELECTED REFERENCES (Continued)

### V. U. S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$25 each.

- A. Patent No. 1,978,001. 1934. 6 p.  
Spinning and twisting machinery for fibers such as wool.
- B. Patent No. 1,939,525. 1932. 8 p.  
Method of producing yarn rovings.
- C. Patent No. 1,514,253. 1924. 11 p.  
Spinning and doubling machine for worsted yarn.
- D. Patent No. 874,714. 1907. 7 p.  
Method of making worsted yarns.

### VI. TRADE ASSOCIATIONS

- A. National Association of Wool Manufacturers  
386 Fourth Avenue  
New York, New York 10016

### VII. ENGINEERING COMPANIES

- A. Proctor and Schwartz, Inc.  
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# INDUSTRY PROFILES

## JUTE YARN

I.P. No. 66036

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## JUTE YARN : Standard Industrial Classification 2299

### A. PRODUCT DESCRIPTION

Spun 14-pound jute yarn (14,400 yards weigh 14 pounds). commonly known as carpet yarn and used primarily for carpet backing.

### B. GENERAL EVALUATION

Jute is primarily used in industrial textiles, for rug backing, twine, furniture webbing, electric cable covering, knit tubing, linoleum backing, sugar bags, cotton bale covering and the like. The over-all consumption of jute has declined since the war, partly because paper has been substituted for some of its uses, such as sugar and feed bags; partly because jute was not readily available during the war to many western industrialized nations, and substitute fibers, such as kenaf, were developed and have continued in use. The machinery here described could spin such other soft fibers. Capital requirements are small. While the labor force required is not large, the degree of skill needed is relatively high. Local consumption in less industrialized areas would depend primarily upon the need for bags for such items as coffee, rice, etc. Some local consumption might also come from such users as the hooked rug industry. But all of these local uses would require weaving facilities in addition to the spinning plant.

### C. MARKET ASPECTS

1. USERS. Jute weaving plants.
2. SALES CHANNELS AND METHODS. Sales direct to textile industry.
3. GEOGRAPHICAL EXTENT OF MARKET. Plant should be located close to source of raw material, which is bulky. Finished product is easily transported. Nationwide distribution as well as entrance into the international market is feasible.
4. COMPETITION. a. Domestic Market. Competition in the domestic market would come primarily from other wrapping materials, such as paper, although jute bur-lap still has price advantages. b. Export Market. Competition of paper for wrapping materials is serious in the international market. Some other industrial uses, such as backing for linoleum, have declined because the consumption of linoleum has been limited by the use of substitutes. In other industrial uses, such as twine, upholstery supports, etc., it is still used widely. The plant could normally compete in the international market only if raw materials are produced locally.
5. MARKET NEEDED FOR PLANT DESCRIBED. Jute is not used directly by the final consumer. The amount required will vary largely with the harvest of foodstuffs, such as rice, coffee and sugar and requirements of the industries using jute as one of their materials, such as the rug industry.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION : 420,000 Pounds of 14-pound Jute Yarn

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	Cost
Land. About 8,000 sq. ft.	\$ --
Building. One story, 50'x80'.	24,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt. \$10,000	
Other tools & equipmt. 1,300	
Furniture & fixtures 700	42,000
<u>Total (excl. Land)</u>	<u>\$ 66,000</u>

Principal Items. Oil tank, pump & sprayer, bale breaker, softening machine, breaker cards, finishing cards, drawing frames, spinning frames, winders.

#### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 19,500
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,500
Training Costs		3,000
<u>Total Working Capital</u>		<u>\$ 24,000</u>

#### c. TOTAL CAPITAL (EXCL. LAND) \$ 90,000

### 2. MATERIALS AND SUPPLIES

	Annual Reqsmts.	Annual Cost
a. <u>Direct Materials</u>		
Jute 500,000 lbs.		\$ 75,000
Packaging		1,000
<u>Total</u>		<u>\$ 76,000</u>
b. <u>Supplies</u>		
Lubricants & hand tools		\$ 100
Maintenance & repair parts		1,000
Office supplies		200
<u>Total</u>		<u>\$ 1,300</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> Connected load about 25 hp.	\$ 2,000
b. <u>Fuel.</u> About 3,000 gals. oil annually.	\$ 400
c. <u>Water.</u> For production, sanitation and fire protection.	\$ 200

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Total in and out shipments about 50 tons a month. Good highway desirable.

### 5. MANPOWER

	Number	Annual Cost
a. <u>Direct Labor</u>		
Skilled	2	\$ 10,000
Semi-skilled	2	8,000
Unskilled	1	3,000
<u>Total</u>	<u>5</u>	<u>\$ 21,000</u>
b. <u>Indirect Labor</u>		
Manager	1	\$ 8,000
Office	1	4,000
Other	1	4,000
<u>Total</u>	<u>3</u>	<u>\$ 16,000</u>

c. Shift Operation. Manager and 1 semi-skilled worker set up work during the day for other shifts.

d. Training Needs. Manager must be experienced. With aid of 1 skilled worker, he should be able to do all labor training. Plant should reach full production in 2 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 76,000
Direct Labor	21,000
Manufacturing Overhead(a)	19,900
Admin. Costs (b), Contingencies	9,000
Sales Costs (c), Bad Debts	8,900
Depreciation on Fixed Capital	7,200
<u>Total Annual Costs</u>	<u>\$142,000</u>
b. <u>Annual Sales Revenue</u>	<u>\$178,000</u>

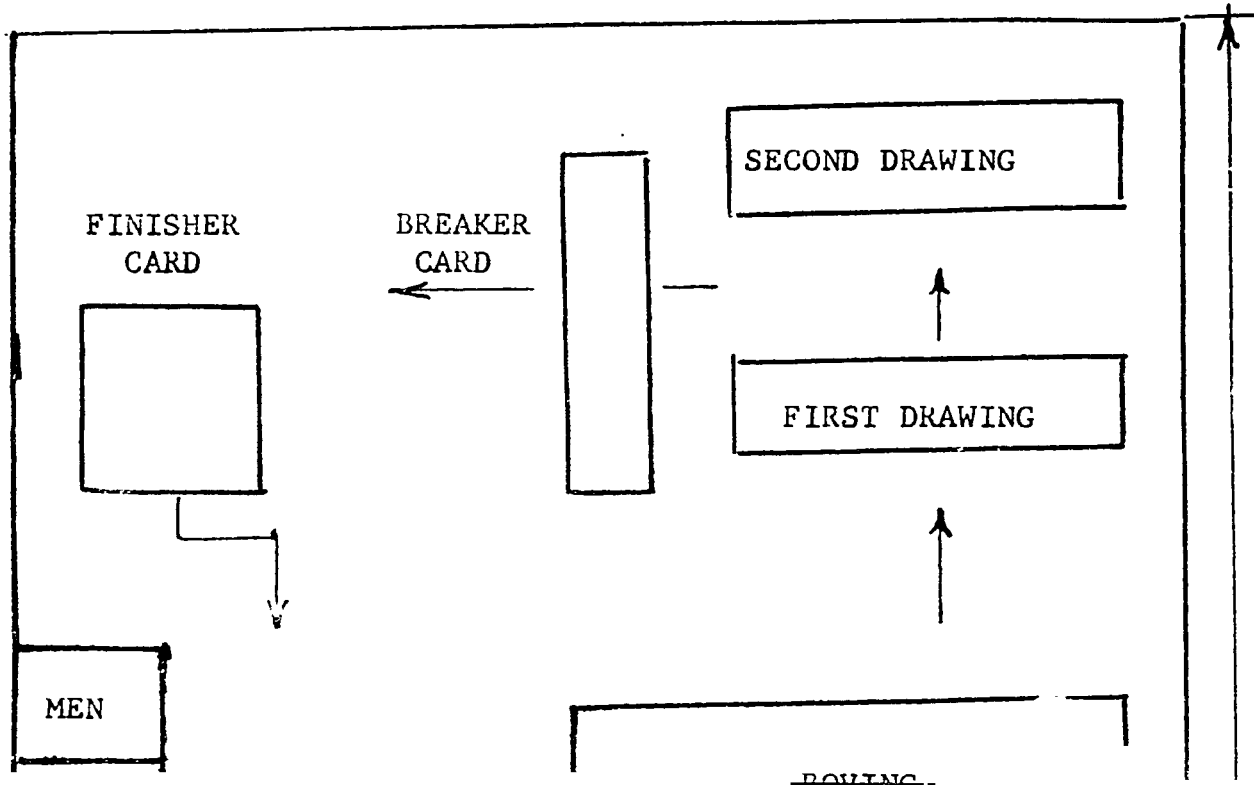
NOTES : (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

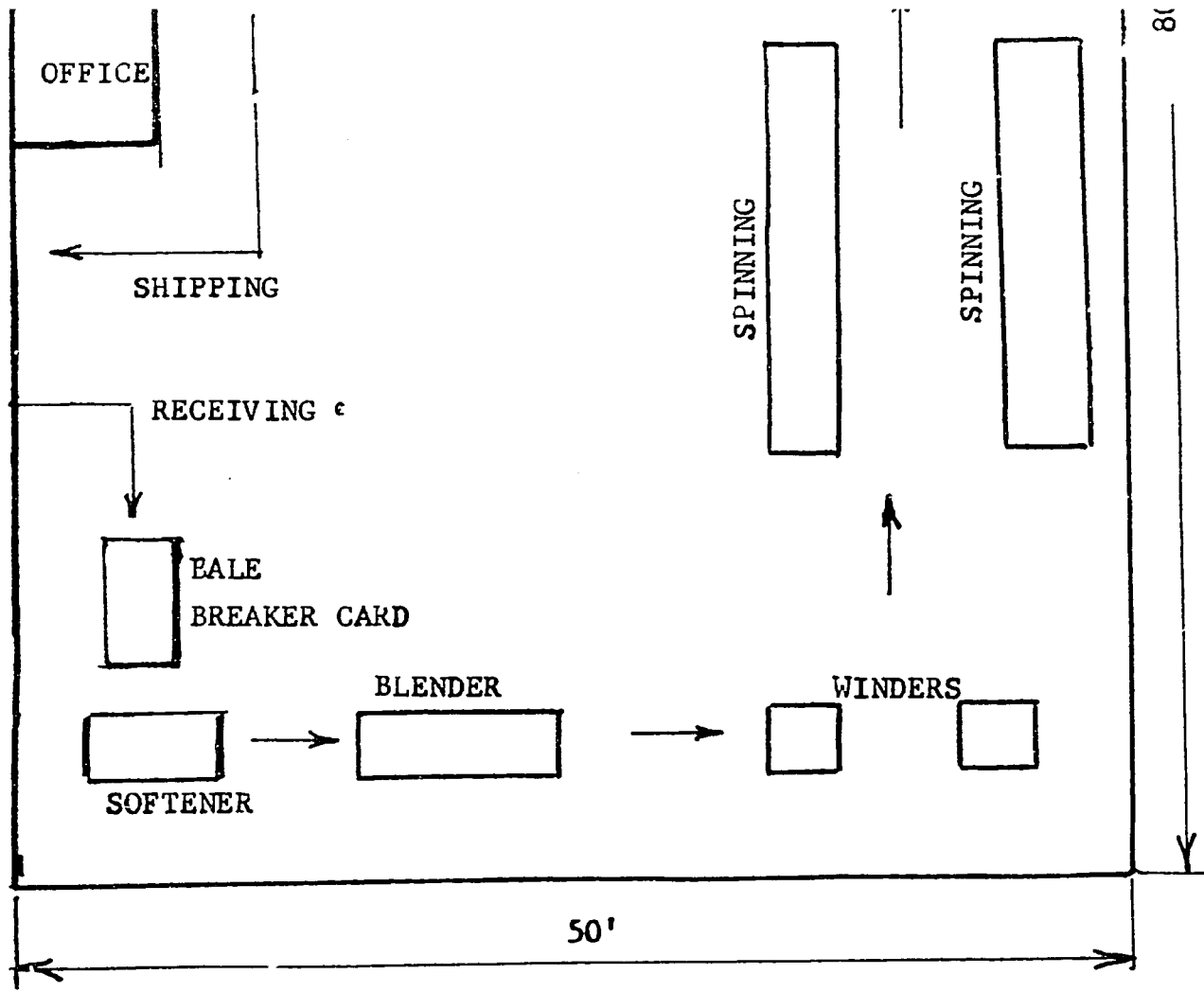
JUTE YARN: S.I.C. 2299

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# PLANT LAYOUT

ARROWS INDICATE FLOW OF WORK





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JUTE YARN : S. I. C. 2299

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McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York, New York 10036  
Discusses all fibers, their properties, finishing, and weaving.
- B. Long Vegetable Fibers. L. Weindling. 1947. 311 p. Illus. \$5.00.  
Columbia University Press  
2960 Broadway  
New York, New York 10027  
Standard text on jute cultivation, manufacturing, and the jute industry.

II. PERIODICALS

- A. Daily Mill Stock Reporter. Daily. \$26.00/year.  
National Business Press, Inc.  
425 West 25th Street  
New York, New York 10001  
Includes information on jute stock, prices, markets.

III. OTHER PUBLICATIONS

- A. Matthews Textile Fibers. H. R. Mauersberger, editor. 1954. 1283 p. Illus. \$18.50.  
John Wiley and Sons, Inc.  
440 Fourth Avenue  
New York, New York 10016  
Covers properties, processing, and commercial products of the various fibers, including jute.
- B. The Modern Textile Dictionary. G. E. Linton. 1954. 772 p. Illus. \$12.50.  
Duell, Sloan and Pierce, Inc.  
124 East 30th Street  
New York, New York 10016  
Terms pertaining to fibers and operations in their processing.

IV. TECHNICAL PAPERS

- A. Accessibility of Various Cellulose Preparations from Jute. D. K. R. Choudhury. Textile Research Journal. May 1959. Vol. 29, p. 396-7. \$2.50.  
Textile Research Institute  
P. O. Box 625  
Princeton, New Jersey

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### V. U. S. PATENTS

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Washington, D. C. 20231 \$25 each.

- A. Patent No. 2,972,856. 1961. 4 p.  
Process for twining vegetable fibers into yarns.
- B. Patent No. 2,910,733. 1959. 22 p.  
Carding apparatus and method.
- C. Patent No. 2,879,549. 1959. 8 p.  
Process for manufacturing carding apparatus.
- D. Patent No. 2,808,697. 1957. 4 p.  
Method for spinning various fibers into yarns.

### VI. TRADE ASSOCIATIONS

- A. Burlap and Jute Association  
160 Broadway  
New York, New York 10038
- B. Twisted Jute Packing and Oakum Institute  
P. O. Box 52  
Scarsdale, New York

### VII. ENGINEERING COMPANIES

- A. Alsop Engineering and Manufacturing Corp.  
1947 Norton Street  
Milldale, Connecticut  
Design, engineer, development, and manufacturing.

### VIII. DIRECTORIES

- A. Davison's Textile Catalogues and Buyer's Guide. Annual. \$12.00.  
Davison Publishing Company  
Ridgeway, New Jersey  
Covers complete textile field, listing some 15,000 textile firms under  
leading buyers' guide.

## 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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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

## COTTON DRESSES

I.P. No. 66037

*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.

## COTTON DRESSES: Standard Classification 2361

### A. PRODUCT DESCRIPTION

Cotton dresses of simple design. Equipment listed can produce style effects such as shirring, ruffles, zigzag stitching. Differing style demands may necessitate slightly different balance of machines. Plant can also produce cotton blouses. Capacity required for five blouses is roughly equivalent to that for three dresses.

### B. GENERAL EVALUATION

Technically this industry presents no serious problems. Little skilled labor is required, materials are easily procurable, where necessary by import, demand for utilities and transport is minimal. Capital requirements are modest. In most areas demand for ready-made dresses is increasing. For these reasons, this industry appears suited to conditions of many developing areas. It should be noted, however, that, if costs are to be kept within reasonable limits, any one plant is restricted to comparatively few basic styles, and therefore market required, in terms of total population, may be quite large.

### C. MARKET ASPECTS

1. USERS. Women.
2. SALES CHANNELS AND METHODS. Sales mainly to wholesalers, sometimes direct to large stores. Brand names are sometimes used. Good salesmen with ability to judge trend of demand for different styles of dresses are necessary.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transport costs are low in relation to value of product and handling is easy. Market may be nation-wide. b. Export. World-wide. However, dress materials rather than finished dresses are much commoner in international trade, because of differences in style preferences in different markets. Finished dresses go mostly from low-wage countries to those where wages are relatively much higher and where total demand is very large.
4. COMPETITION. a. Domestic Market. In low-wage areas competition from imports is not generally very formidable in the case of finished dresses. In areas where labor costs are very low, small dressmaking establishments can often compete in price with factory-made article and may provide major competition. b. Export Market. Plant of this size could not normally compete with large producers located in major textile exporting countries, who can supply wider range of styles and sizes. Some exports to neighboring countries might be possible in a few cases.
5. MARKET NEEDED FOR PLANT DESCRIBED. Factors influencing demand for cotton dresses are climate and income levels. Where climate permits year-round use demand will of course be higher. As to income levels, where incomes are very low demand will be limited by lack of purchasing power. At higher levels of income, on the other hand, purchasers become increasingly selective about styles, and since style range of any one plant making cheap dresses is necessarily restricted no manufacturer can expect to have predominant share of total market. Assuming that (a) Western-style dress is commonly worn, (b) cotton dresses are wearable throughout the year, (c) incomes are about average, plant described could probably find outlet for its full production in a total population of the order of a million people.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY: ONE-SHIFT OPERATION: 7,000 DOZEN DRESSES

### 1. CAPITAL REQUIREMENTS

	Cost
a. <u>FIXED CAPITAL</u>	
Land. About 6,000 sq. ft.	\$ ---
Building. One story, 30'x80'.	14,400
Equipment, Furniture & Fixtures.	
Prod'n. equipment.	\$ 7,000
Other tools & equipmt.	800
Furniture & fixtures	1,000
Total (excl. Land)	\$ 8,800
	\$ 23,200

Principal Items. Cloth spreader, cutting table, cutting machine, marking drill, 18 sewing machines, steam iron, work tables, stands, racks.

### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead (a)	60	\$ 27,100
Admin. & Sales Costs (b)		
Contingencies,	30	2,100
Training Costs		7,500
Total Working Capital		\$ 36,700

c. TOTAL CAPITAL (EXCL. LAND) \$ 59,900

### 2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
a. <u>Direct Materials</u>		
Piece goods	275,000 yds.	\$ 82,500
Thread	2,500,000 yds.	500
Buttons	125,000	500
Snaps	250,000	250
Slide fasteners	25,000	1,250
Trimmings		1,250
Boxes	7,000	1,250
Total		\$ 87,500

### b. Supplies

Lubricants & tools	\$ 200
Needles & repair parts	800
Maintenance	400
Patterns	1,000
Office supplies	300
Total	\$ 2,700

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> Connected load about 20 hp.	\$ 800
b. <u>Fuel.</u> For heating, if necessary.	\$ 300
c. <u>Water.</u> For general purposes.	\$ 100

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Combined in and out shipments about 12 tons a month. No special requirements.

### 5. MANPOWER

	Number	Annual Cost
a. <u>Direct Labor</u>		
Skilled	2	\$ 10,000
Semi-skilled	2	8,000
Unskilled	11	33,000
Total	15	\$ 51,000
b. <u>Indirect Labor</u>		
Manager	1	\$ 8,000
Office	2	8,000
Other	1	4,000
Total	4	\$ 20,000

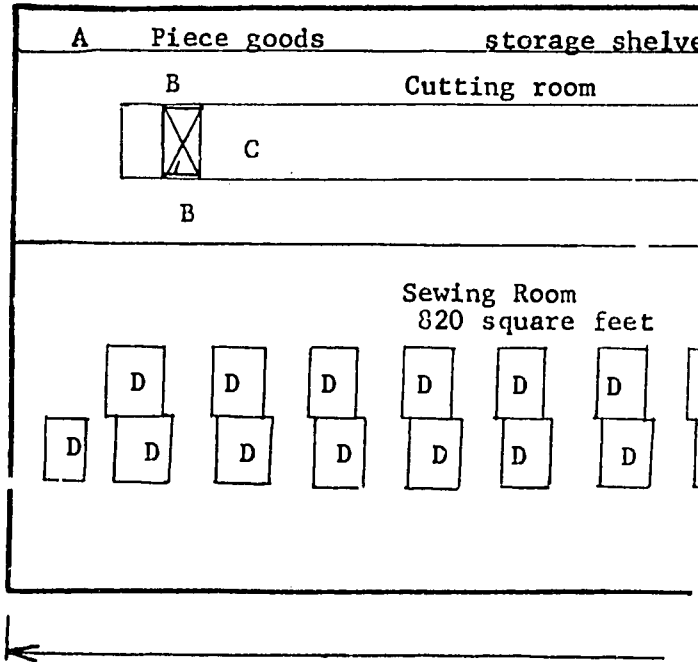
- c. Training Needs. Manager should be fully experienced. He and 2 skilled operators should be able to train all workers. Plant should reach full production in 3 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 87,500
Direct Labor	51,000
Manufacturing Overhead (a)	23,900
Admin. & Sales Costs (b),	
Bad Debts, Contingencies	25,200
Depreciation on Fixed Capital	1,500
Total Annual Costs	\$ 189,100
b. <u>Annual Sales Revenue</u>	\$ 252,000

NOTES. (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges, Sales Commissions, Freight Out, Travel.

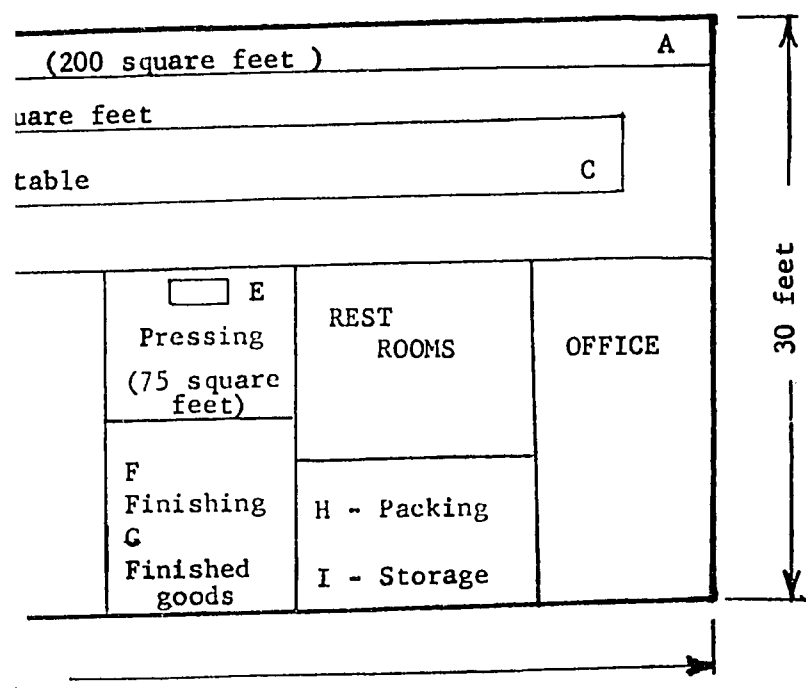
COTTON DRESSES: S.I.C. 2361



- A - A. Piece goods
- B - B. Cloth sprea
- C - C. Cutting tabl  
cloth spl
- D - D. Sewing mac
- E. Steam iron,
- F. Finishing
- G. Finished go
- H. Packing
- I. Storage

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ES: S.I.C. 2361



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COTTON DRESSES: S.I.C. 2361

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New York, New York 10003  
Progressive sewing techniques in the garment industry.
- B. Progressive Apparel Production. B. Frank. 1953. \$4.50.  
Fairchild Publications, Inc.  
7 East 12th Street  
New York, New York 10003  
Progressive techniques in the garment industry.

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Fairchild Publications, Inc.  
7 East 12th Street  
New York, New York 10003  
News and information concerning styles, markets, sources of supply,  
management in the women's wear industry.
- B. NAWCAS News  
Women's and Children's Apparel Salesmen, Inc.  
704 Bona Allen Building  
Atlanta, 3 Georgia

III. GOVERNMENT PUBLICATIONS, U. S.

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Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523

IV. OTHER PUBLICATIONS

- A. Textiles and Microscope. E. R. Schwartz. 329 p. \$6.75.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York, New York 10036  
Manual on the use of the microscope in analyzing textiles.
- B. Textile Calculations Simplified. J. H. Strong. 194 p. \$5.50  
Transatlantic Arts, Inc.  
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- A. The Application of Resin Finishes to Cotton Garments Using Drycleaning  
Plant Equipment. R.T. Graham, F. Loibl, and J. R. Wiebush. p. 252.  
Textile Research Journal. March 1958. \$1.00  
Textile Research Institute  
Princeton, New Jersey  
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finishes to cotton fabrics and garments.

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### VI. U.S. PATENTS

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Washington, D.C. 20231 \$.25 each.

- A. Patent No. 2,790,974. May 7, 1957. 3 p.  
One piece circle dress garment.
- B. Patent No. 2,582,643. Jan. 15, 1952. 4 p.  
Improvements in a garment known as a house dress.
- C. Patent No. 2,498,332. Feb. 21, 1950. 5 p.  
Reversible dress which may be worn with either the normally front or normally rear portion presented forwardly.

### VII. TRADE ASSOCIATIONS

- A. Textile Research Institute  
P.O. Box 625  
Princeton, New Jersey
- B. Southern Textile Association  
P.O. Box 1225  
218 West Morehead Street  
Charlotte 6, North Carolina

### VIII. ENGINEERING COMPANIES

- A. Lamports Company - Industrial Textile Division  
1403 West Sixth Street  
Cleveland 13, Ohio  
Textiles engineered for industry and commerce. Simulate plant conditions.  
Make recommendations.
- B. U.S. Cloth Cutting Machine Co., Inc.  
241 West 39th Street  
New York, New York 10018  
Complete assortment of cutters. Will design for unusual demands.

### IX. DIRECTORIES

- A. Annual Buyers' Guide. \$1.00.  
W. R. C. Smith Publishing Company  
806 Peachtree Street  
Atlanta, Georgia  
Annual review of all new products and services and all new literature in the textile industry.

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## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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# INDUSTRY PROFILES

## HARDWOOD PARQUET FLOORING

I.P. No. 66038

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## HARDWOOD PARQUET FLOORING: Standard Industrial Classification 2426

### A. PRODUCT DESCRIPTION

Wooden blocks, 12" x 12", made of kiln-dried hardwood boards joined to make a variety of patterns, and tongued and grooved at the ends.

### B. GENERAL EVALUATION

Hardwood flooring is in use in many areas where hardwood is available domestically. However, this type of flooring is expensive and its use is confined to the more costly types of dwelling units, offices and institutions. Its use is also limited by some technical factors, e.g. it is not suitable for installation on ground-contacting concrete floors. The development of relatively cheap new types of floor-coverings, such as the newer and more attractive types of plastic tiles, may also limit the market for parquet flooring in some areas. However, since the investment as well as the degree of labor skill required is moderate, a plant of this rather small size appears appropriate to areas where hardwood is readily available. The plant does not include a kiln; it is assumed that it will purchase properly seasoned lumber. Such facilities must therefore be available in the area.

### C. MARKET ASPECTS

1. USERS. Homes, offices, institutions.
2. SALES CHANNELS AND METHODS. Sales to wholesalers and direct to building contractors.
3. GEOGRAPHICAL EXTENT OF MARKET. The product is relatively easy to transport. Distribution may be nation-wide. Because there are so many types of flooring available and adequate substitutes for this particular type commonly exist locally, there is little international trade in this product.
4. COMPETITION. a. Domestic Market. Competition from imports is unlikely to be significant. Other expensive types of floor covering, such as mosaic tiles, might compete. Competition might also come from some of the more attractive, cheaper type floor coverings. b. Export Market. An area with cheap locally produced hardwood and facilities for seasoning it properly might conceivably develop sizable exports of hardwood parquet flooring to high income countries. However, the plant under consideration is on too small a scale for general export business.
5. MARKET NEEDED FOR PLANT DESCRIBED. This plant could provide annually flooring for about 250 houses of the type and size that would be likely to use this material. Business premises and public buildings of various kinds might also use it. It would generally be necessary to have a large and developing urban area with a good deal of building going on to provide this plant with a market.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION : 150,000 Blocks, 12" x 12"

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	Cost
Land. About 10,000 sq. ft.	\$ --
Building. One story, 40'x60', plus lumber shed.	15,000
Equipment, Furniture & Fixtures.	
Prod. tools & equipment. \$18,000	
Other tools & equipment. 3,500	
Furniture & fixtures 500	22,000
<u>Total (excl. Land)</u>	<u>\$ 37,000</u>

Principal Items. Cutoff saw, rip saw, jointer, planer, trim saw, boiler, tongue & groove machine, block press, table sander, compressor, spray booth & spray equipment, saw filer, grinder.

### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 15,500
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,300
Training Costs		3,000
<u>Total Working Capital</u>		<u>\$ 19,800</u>

c. TOTAL CAPITAL (EXCL. LAND) \$ 56,800

### 2. MATERIALS AND SUPPLIES

a. <u>Direct Materials</u>	Annual Reqsmts.	Annual Cost
Lumber (seasoned) 200,000 bd. ft.		\$ 50,000
Glue		2,000
<u>Total</u>		<u>\$ 52,000</u>

### b. Supplies

Lubricants & hand tools	\$ 100
Cutting tools	300
Maintenance & repair parts	600
Office supplies	200
<u>Total</u>	<u>\$ 1,200</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> Connected load about 30 hp.	\$ 900
b. <u>Fuel.</u> Scrap wood.	
c. <u>Water.</u> For glue pots, sanitation and fire protection.	\$ 100

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Lumber will be purchased delivered at plant. Good highway desirable.

### 5. MANPOWER

	Number	Annual Cost
a. <u>Direct Labor</u>		
Skilled	2	\$ 10,000
Semi-skilled	2	8,000
Unskilled	3	9,000
<u>Total</u>	<u>7</u>	<u>\$ 27,000</u>
b. <u>Indirect Labor</u>		
Manager - buys, sells, & supervises	1	\$ 8,000
Office	1	4,000
<u>Total</u>	<u>2</u>	<u>\$ 12,000</u>

- c. Training Needs. Manager should be well experienced. With 2 skilled workers, he should be able to carry out all necessary labor training. Plant should reach full production in 2 months.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

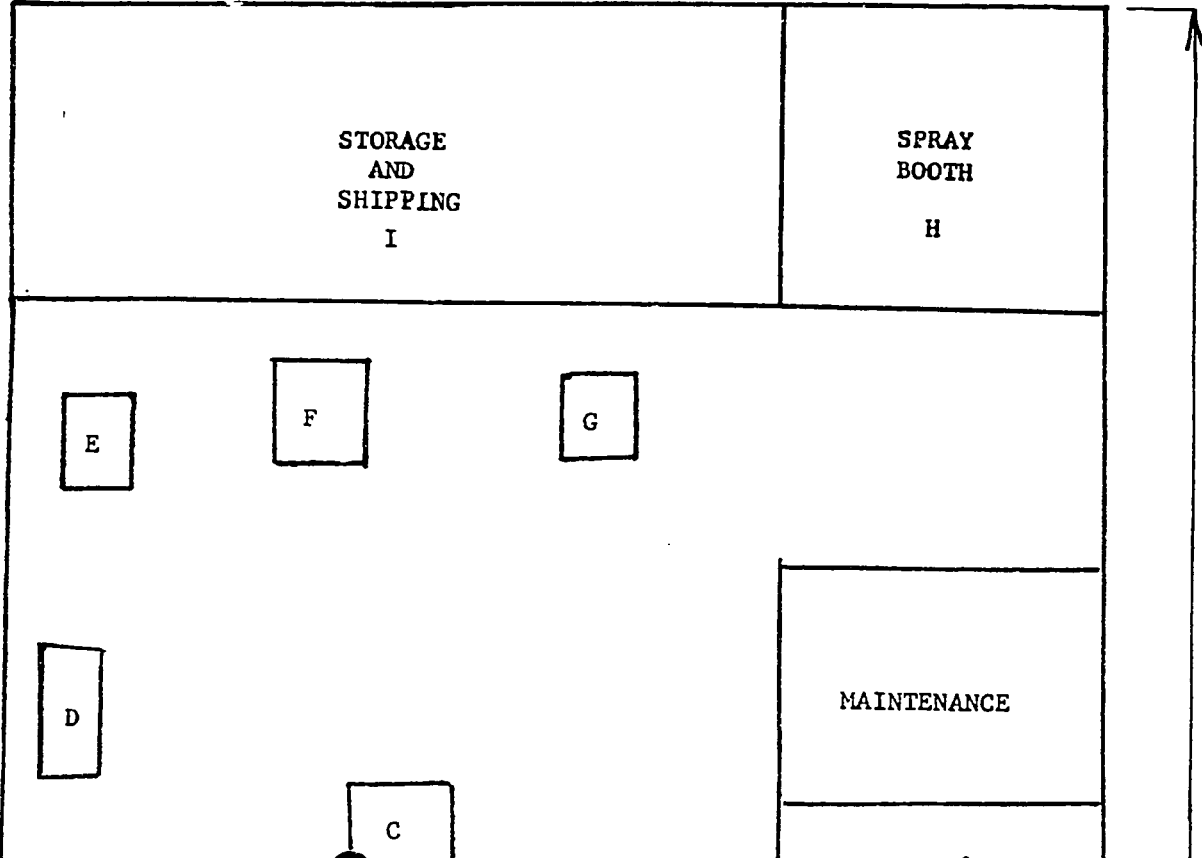
a. <u>Annual Costs</u>	
Direct Materials	\$ 52,000
Direct Labor	27,000
Manufacturing Overhead(a)	14,200
Admin. Costs(b), Contingencies	5,000
Sales Costs(c), Bad Debts	10,000
Depreciation on Fixed Capital	3,300
<u>Total Annual Costs</u>	<u>\$111,500</u>
b. <u>Annual Sales Revenue</u>	<u>\$150,000</u>

NOTES: (a) Includes Supplies, Power, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

HARDWOOD PARQUET FLOORING : S.I.C. 2426

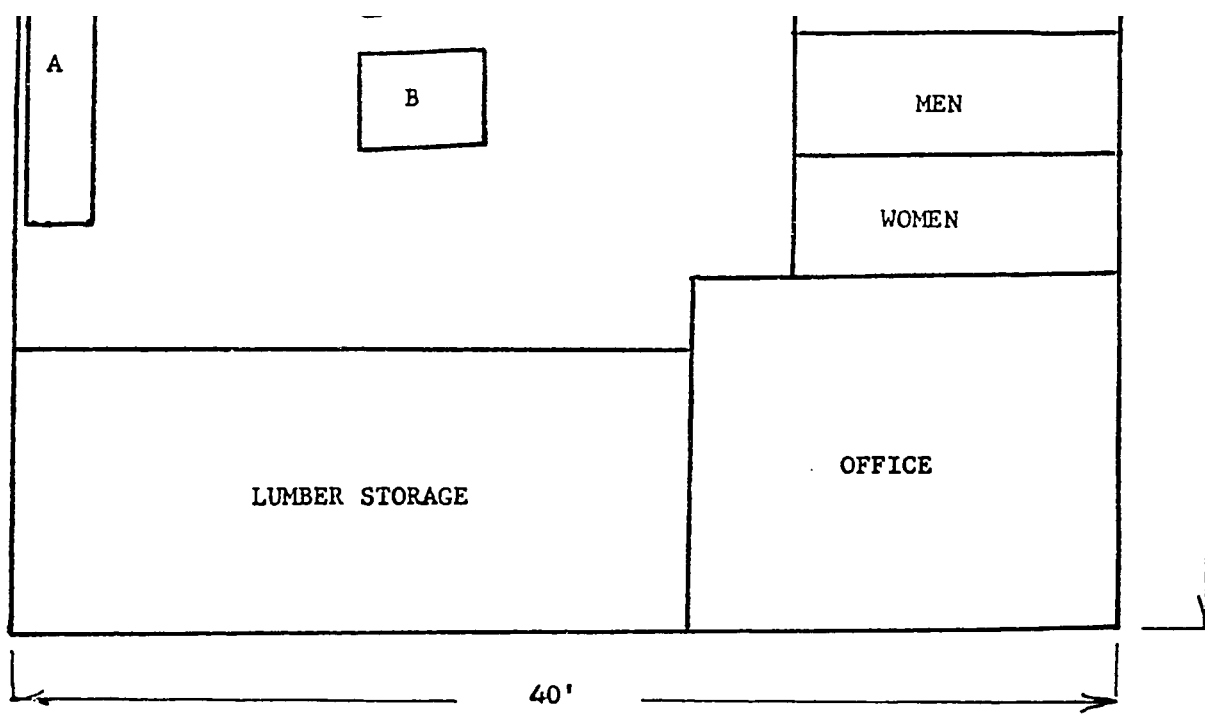
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PLANT LAYOUT AND WORK FLOW



HARDWOOD PARQUE

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Production continuous from A to G

- A. Cut off saw
- B. Planer
- C. Rip Saw
- D. Trim Saw
- E. Tongue and groove
- F. Block press
- G. Table sander
- H. Spray booth
- I. Storage and shipping

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# HARDWOOD PARQUET FLOORING : S.I.C. 2426

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McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York, New York 10036  
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- B. Cutting Techniques and Woodworkers. T. D. Perry. 1959. 54 p. Illus. \$5.00.  
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Woodworking digest that provides valuable data on wood cutting techniques.

### II. PERIODICALS

- A. Wood-working. Monthly. \$5.00/year.  
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Wheaton, Illinois  
All branches of woodworking, machinery, equipment, techniques, finishes, products.
- B. The Wood-Worker. Monthly. \$3.00/year.  
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### III. OTHER PUBLICATIONS

- A. General Shop Woodworking. V. C. Fryklund and A. J. LaBerge. 1964. \$4.80.  
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- A. Developments in New Flooring Blocks. 1954. Gratis.  
U. S. Forestry Products Laboratory  
Madison, Wisconsin  
Brief description of the preparation of hardwood flooring including parquet blocks.

## SELECTED REFERENCES (Continued)

### V. U. S. PATENTS

Available U. S. Patent Office

Washington, D. C. 20231 \$ .25 each.

- A. Patent No. 2,914,815. 1959. 7 p.  
Interlocked parquet flooring and method of making.
- B. Patent No. 2,906,049. 1959. 4 p.  
Method of making parquet floors.
- C. Patent No. 2,653,358. 1953. 4 p.  
Flooring of the parquet type and its production.
- D. Patent No. 2,491,498. 1949. 3 p.  
Means of making wooden floors of parquet and other kinds.

### VI. TRADE ASSOCIATIONS

- A. National Hardwood Lumber Association  
59 East Van Buren Street  
Chicago 5, Illinois
- B. Woodworking Machinery Manufacturers Association  
1900 Arch Street  
Philadelphia 3, Pennsylvania

### VII. ENGINEERING COMPANIES

- A. United States Machinery Company, Inc.  
90 Broad Street  
New York, New York 10004  
Industrial woodworking machinery. Designs and installs woodworking plants.
- B. Yates American Machine Company  
701 4th Street  
Beloit, Wisconsin  
Complete line of woodworking machinery.

### VIII. DIRECTORIES

- A. Hitchcock's Woodworking Directory. Biennial. \$10.00.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Lists manufacturers and suppliers of over 800 products used in the wood-working industry.

HARDWOOD PARQUET FLOORING : S.I.C. 2426

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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## ORDERING INSTRUCTIONS

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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

## FLUSH DOORS

I.P. No. 66039

*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.

## FLUSH DOORS : Standard Industrial Classification 2431

### A. PRODUCT DESCRIPTION

All grades of flush doors, both interior and exterior, up to 3 feet wide and 7 feet long. Costs given are based on an annual output of 12,500 doors of average size and quality, but no additional equipment would be needed to expand production up to as many as 100,000 doors annually.

### B. GENERAL EVALUATION

It is assumed that this industry will be established only as an adjunct to a woodworking plant, and the cost figures given are based on that assumption. If the basic woodworking facilities exist, the fixed capital needed to expand into the manufacture of flush doors is comparatively modest. Also, if there is a sizable woodworking industry already in existence, no great difficulty should normally be experienced in finding the type of skilled labor needed. Assuming that the production prerequisites are met, the economic feasibility of establishing this industry will turn on whether there is a sufficiently large demand for flush doors within the area that the plant is able to serve.

### C. MARKET ASPECTS

1. USERS. Building contractors, homeowners.
2. SALES CHANNELS AND METHODS. Sales to building contractors and building supplies houses.
3. GEOGRAPHICAL EXTENT OF MARKET. Transport costs will almost certainly restrict market area to internal market and normally to an area not very distant from the plant.
4. COMPETITION. Competition is likely to come mainly from small woodworking establishments, which in their own immediate neighborhoods will often be able to compete with factory-made product if the latter has to bear any appreciable amount of transport costs.
5. MARKET NEEDED FOR PLANT DESCRIBED. Use of this type of door varies greatly from area to area. Where such doors are commonly used in dwellings and buildings of all types, an urban community of about two million people, with an average growth rate and new building construction keeping pace, might provide an outlet for the production of this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION : 12,500 Doors

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<b>Cost</b>
Land. About 5,000 sq. ft.	\$	--
Building. One story, 40'x60', attached to wood-working plant.		14,500
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt. \$13,500		13,500
<b>Total (excl. Land)</b>	<b>\$</b>	<b>28,000</b>

Principal Items. Door frame forms (made at plant), wood cauls (made at plant), glue mixer, glue spreader, cold press air operated, door edger and trimmer.

### b. WORKING CAPITAL

	<b>No. of Days</b>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 15,300
Admin. Costs(b), Contingencies, Sales Costs(c)	30	500
<b>Total Working Capital</b>		<b>\$ 15,800</b>

**c. TOTAL CAPITAL (EXCL. LAND) \$ 43,800**

### 2. MATERIALS AND SUPPLIES

	<b>Annual Requirs.</b>	<b>Annual Cost</b>
<b>a. Direct Materials</b>		
Plywood panels	25,000	\$ 51,200
Stiles	25,000	4,500
Rails	25,000	1,500
Lock blocks	25,000	1,500
Long mesh strips	137,500	2,900
Cross mesh strips	225,000	2,200
Dowels, glue		1,300
<b>Total</b>		<b>\$ 65,100</b>

<b>b. Supplies</b>		
Sandpaper	\$	300
Hand tools & lubricants		200
Spare parts		300
Office supplies		100
<b>Total</b>	<b>\$</b>	<b>900</b>

### 3. POWER, FUEL AND WATER

	<b>Annual Cost</b>
<b>a. Electric Power.</b> Connected load about 25 hp.	<b>\$ 500</b>
<b>b. Fuel.</b> Wood scrap.	
<b>c. Water.</b> Water for glue, sanitation and fire protection.	<b>\$ 100</b>

### 4. TRANSPORTATION

- a. Own Transport Equipment.** None necessary.
- b. External Transport Facilities.** Desirable that plant should be located on good highway.

### 5. MANPOWER

	<b>Number</b>	<b>Annual Cost</b>
<b>a. Direct Labor</b>		
Skilled	5	\$ 25,000
<b>b. Indirect Labor</b>		
Supervision provided by existing wood-working plant.		

- c. Training Needs.** Three skilled workers in existing wood-working plant will machine door parts. Two skilled operators will assemble doors. No training time required.

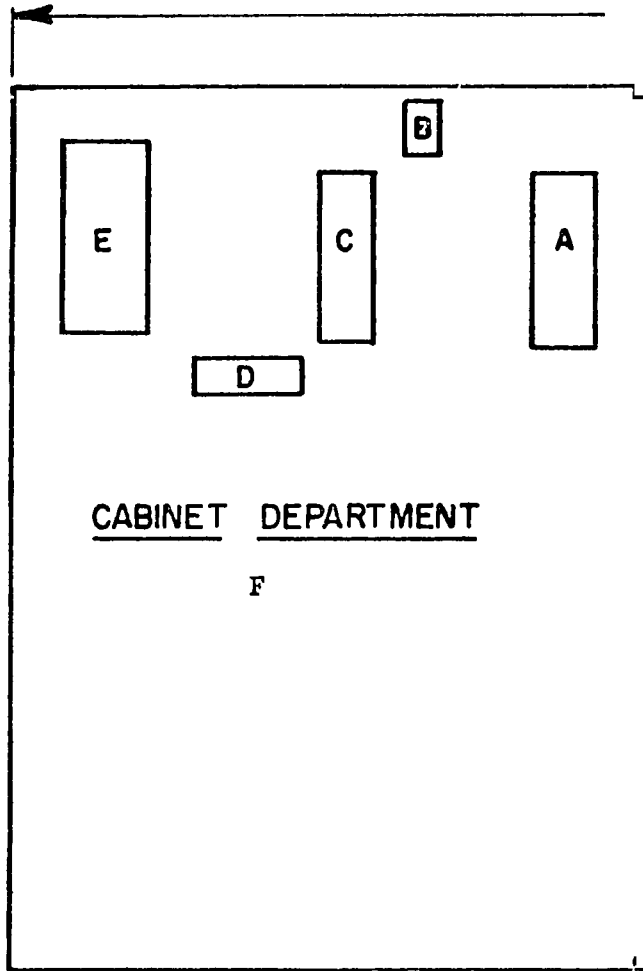
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>		
Direct Materials		\$ 65,100
Direct Labor		25,000
Manufacturing Overhead(a)		1,500
Admin. Costs(b), Contingencies		2,800
Sales Costs(c), Bad Debts		3,000
Depreciation on Fixed Capital		2,100
<b>Total Annual Costs</b>		<b>\$ 99,500</b>
<b>b. Annual Sales Revenue</b>		<b>\$125,000</b>

NOTES. (a) Includes Supplies, Power, Water. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

FLUSH DOORS: S.I.C. 2431

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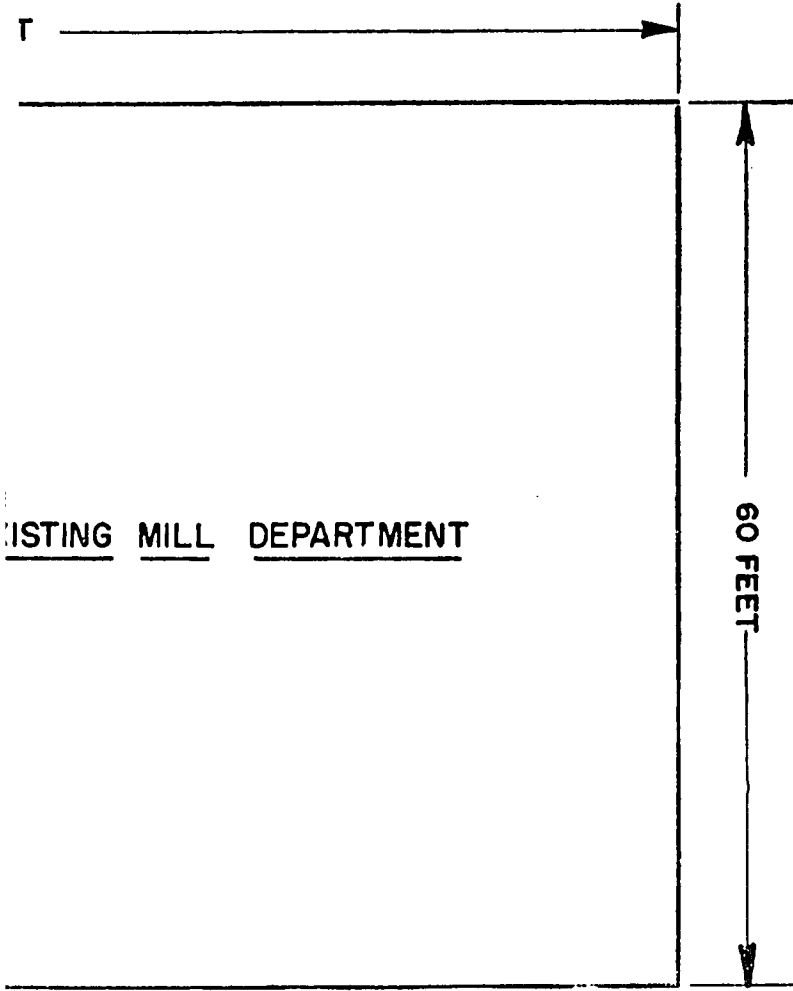


- A. Form for frame and core assembly
- B. Glue mixer
- C. Glue spreader

The flow of production is straight  
This is an addition to an exceed

RS: S.I.C. 2431

AND WORK FLOW



- D. Stacking table
- E. Cold press for flush doors
- F. Storage and shipping

to E with no back-tracking.  
working mill.



FLUSH DOORS: S. I. C. 2431

SELECTED REFERENCES

I. TEXTBOOKS

- A. Cutting Techniques for Woodworkers. Thomas D. Perry. 1959. 54 p.  
Illus. \$.50.  
Hitchcock Publishing Company  
Wheaton, Illinois  
A woodworking digest report that provides valuable data on wood cutting and techniques.

II. PERIODICALS

- A. The Wood Worker. Monthly. \$2.00/year.  
S. H. Smith Company  
2232 North Meridian Street  
Indianapolis 7, Indiana  
Wood fabrication techniques, machines and maintenance, product development, and reporting of woodworking industry news.
- B. Wood Working. Monthly \$5.00/year.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Covers all major branches of wood products industry.

III. OTHER PUBLICATIONS

- A. Principles of Woodworking. H. Hjorth. Revised Edition 1961. Illus. \$5.40.  
Bruce Publishing Company  
400 North Broadway  
Milwaukee 1, Wisconsin  
Machines, tools and planning in forming articles of wood.

IV. TECHNICAL PAPERS

- A. Federal Specifications. LLL-D-581.  
Doors, Exterior and Interior, Wood, Flush Type, Veneered. \$.10.  
General Services Administration  
7th and D Streets, S. W.  
Washington, D. C. 20405
- B. Commercial Standards. CS 200-55. Hardwood, Veneered, Hollow-Core, Flush Doors. \$.10.  
Superintendent of Documents  
U. S. Government Printing Office  
Washington, D. C. 20401  
A voluntary standard of the trade.

## SELECTED REFERENCES (Continued)

### V. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$25 each

- A. Patent No. 2,924,861. 1960. 6 p.  
Flush type door having formed plastic or other filler, and method of construction.
- B. Patent No. 2,893,076. 1959. 4 p.  
Method of manufacturing flush doors.
- C. Patent No. 2,869,598. 1959. 4 p.  
Process for making solid core flush doors.
- D. Patent No. 2,860,388. 1958. 5 p.  
Making hollow core flush doors.

### VI. TRADE ASSOCIATIONS

- A. National Woodwork Manufacturers Association  
400 West Madison Street  
Chicago, Illinois 60606

### VII. ENGINEERING COMPANIES

- A. U. S. Machinery Company, Inc  
90 Broad Street  
New York, New York 10004  
Industrial woodworking machinery. Designs and Installs woodworking plants.

### VIII. DIRECTORIES

- A. Hitchcock's Woodworking Directory. Biennially. \$10.00  
Hitchcocks Publishing Company  
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Lists manufacturers and suppliers of over 800 products of the woodworking industry.

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# INDUSTRY PROFILES

## PLYWOOD

I.P. No. 66040

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## PLYWOOD: Standard Industrial Classification 2432

### A. PRODUCT DESCRIPTION

Capacity of plant is given in terms of three-ply, hot-pressed, hardwood plywood, made into 4 feet by 8 feet panels, made from purchased logs. However, plant can manufacture all grades of veneer and plywood, including marine plywood, and can operate with hard or soft wood.

### B. GENERAL EVALUATION

Capital requirements for this industry are fairly large, even for a plant of this size, which by the general standards of the plywood industry is small. Skilled labor requirements are rather low. The industry will be appropriate to those developing areas that have steady supplies of suitable lumber. Where this is the case, manufacture for export as well as for domestic consumption is a possibility. If production conditions are favorable, the prospects for this industry are generally good, as demand for plywood and veneer has shown a rising trend in recent years. Many areas are deficient in lumber supply relative to their requirements and therefore offer a ready market, if specifications are met. The plant here described can be expanded easily, where demand warrants it.

### C. MARKET ASPECTS

1. USERS. Building contractors, furniture makers, large variety of industries, individuals,
2. SALES CHANNELS AND METHODS. Sales to lumber yards, building contractors, building supplies houses, large industrial users.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. This product is easily handled, and transport charges are not especially burdensome. The potential domestic market, where the transport network is reasonably good, may extend over a large area. b. Export. This product is exported world-wide.
4. COMPETITION. a. Domestic Market. Competition in some uses may come from alternative products, such as ordinary wood, particle board, wallboard, or plastics. The market position of plywood will to some degree depend on its price relative to such alternatives. b. Export Market. Though this plant is small, provided a high-standard product is produced, there should be opportunities for doing some export business where overseas trading facilities are reasonably well organized.
5. MARKET NEEDED FOR PLANT DESCRIBED. The size of the domestic market needed to support this plant will depend on activity in the building and furniture industries, and how far plywood-using industries have been developed. It will also, of course, be necessary to take into account the opportunities that may exist for export business. A developing urban community containing about a million people should in most cases be able to absorb the production of this plant.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 5 Million Square Feet

### 1. CAPITAL REQUIREMENTS

	Cost
a. <u>FIXED CAPITAL</u>	
Land. About 5 acres.	\$ --
Building. One story, U-shaped 40' wide, front 300', wings 40' and 60' long. Boiler house 20'x40'. Two lean-to buildings 20'x40' each. Total area 24,450 sq. ft.	172,000
Equipment, Furniture & Fixtures.	
Prod'n. tools & equipmt. \$250,000	
Furniture & fixtures 1,600	
Transportation equipmt. 2,400	254,000
<u>Total (excl. Land)</u>	<u>\$426,000</u>

Principal Items. Crane, chain saw, monorail & electric hoist, lathe-109" knife steam engine for lathe, infed table motorized, wet veneer clipper, dryer, sizing clippers, veneer jointer, veneer splicers, glue mixer, glue spreader, hot press, 3-drum sander, 100 skids, hand block table belt sander, 7 hydraulic hand lift trucks, knife grinder, waste hog and blower, waste conveyor, steam boiler, cutting tools, pick-up truck.

### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 68,100
Admin. Costs(b), Contingencies, Sales Costs(c)	30	5,800
Training Costs		15,000
<u>Total Working Capital</u>		<u>\$ 89,900</u>

c. TOTAL CAPITAL (EXCL. LAND) \$515,900

### 2. MATERIALS AND SUPPLIES

	Annual Reqsmts.	Annual Cost
a. <u>Direct Materials</u>		
Logs for 5 million sq. ft. plywood		\$150,000
Glue		40,000
Packaging materials		2,200
<u>Total</u>		<u>\$192,200</u>
b. <u>Supplies</u>		
Lubricants & hand tools	\$	300
Cutting tools		2,500
Sandpaper		1,000
Maintenance & repair parts		1,700
Office supplies		300
<u>Total</u>		<u>\$ 5,800</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> Connected load about 150 hp.	<u>\$ 3,000</u>
b. <u>Fuel.</u> Scrap wood may be used. No purchased fuel necessary.	No
c. <u>Water.</u> About 2 million gals. annually for production & general purposes.	<u>\$ 500</u>

### 4. TRANSPORTATION

Annual  
Operating Cost

a. <u>Own Transport Equipment.</u> One-ton pick-up truck for general purposes.	<u>\$ 1,200</u>
b. <u>External Transport Facilities.</u> Logs are purchased delivered at plant. Good highway essential, and railroad facilities, if possible.	

### 5. MANPOWER

Number      Annual Cost

a. <u>Direct Labor</u>		
Skilled	4	\$ 20,000
Semi-skilled	24	96,000
Unskilled	16	48,000
<u>Total</u>	<u>44</u>	<u>\$164,000</u>
b. <u>Indirect Labor</u>		
Manager & supervisor	2	\$ 18,000
Office staff	3	14,000
Other	3	10,000
<u>Total</u>	<u>8</u>	<u>\$ 42,000</u>

c. Training Needs. Manager & supervisor should have long experience. Together with 4 skilled workers, they should be able to do all necessary labor training. Plant should reach full production in 2 months.

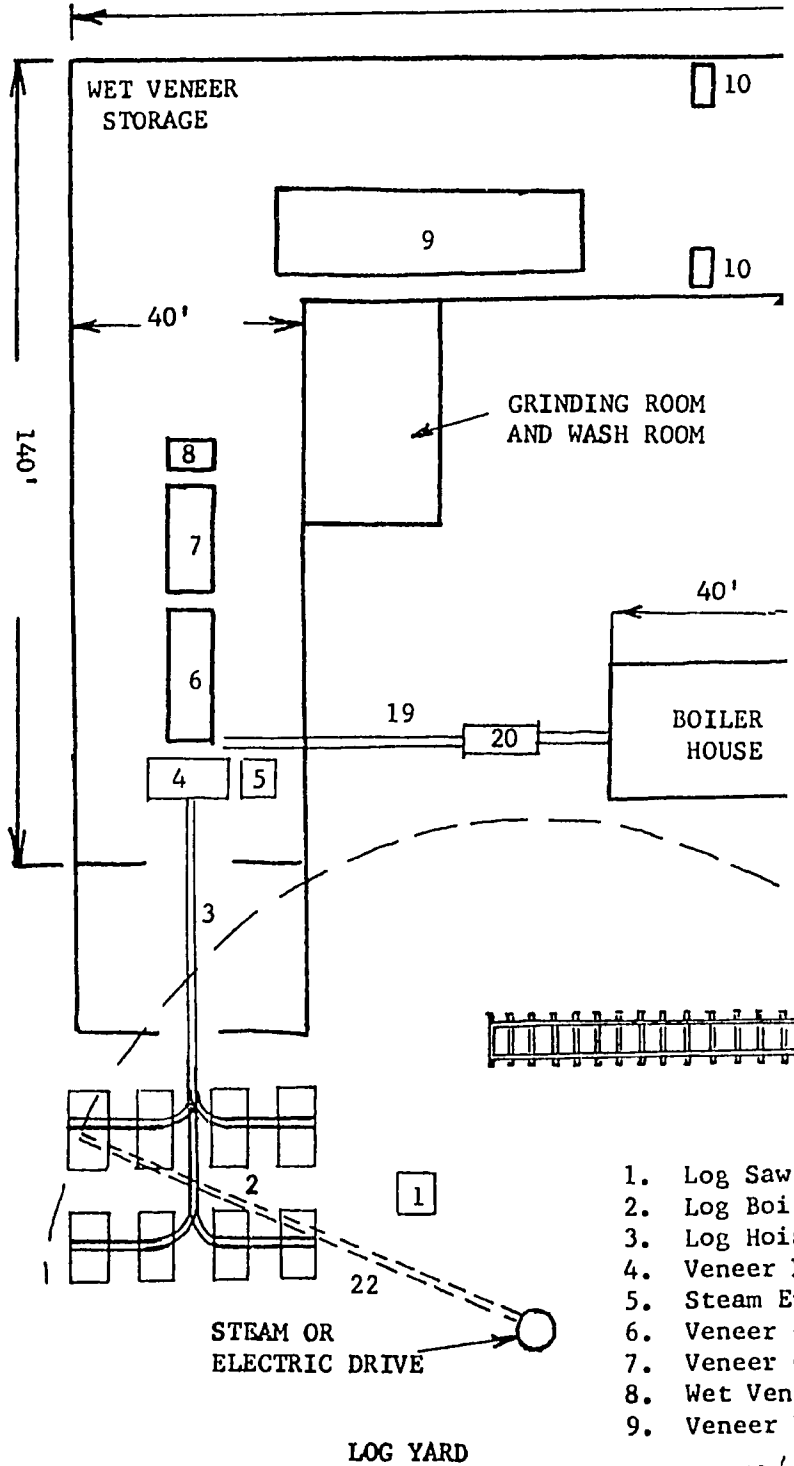
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$192,200
Direct Labor	164,000
Manufacturing Overhead(a)	52,500
Admin. Costs(b), Contingencies	40,000
Sales Costs(c), Bad Debts	30,000
Depreciation on Fixed Capital	30,000
<u>Total Annual Costs</u>	<u>\$508,700</u>
b. <u>Annual Sales Revenue</u>	<u>\$625,000</u>

NOTES. (a) Includes Supplies, Power, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

PLYWOOD: S.I.C. 2432

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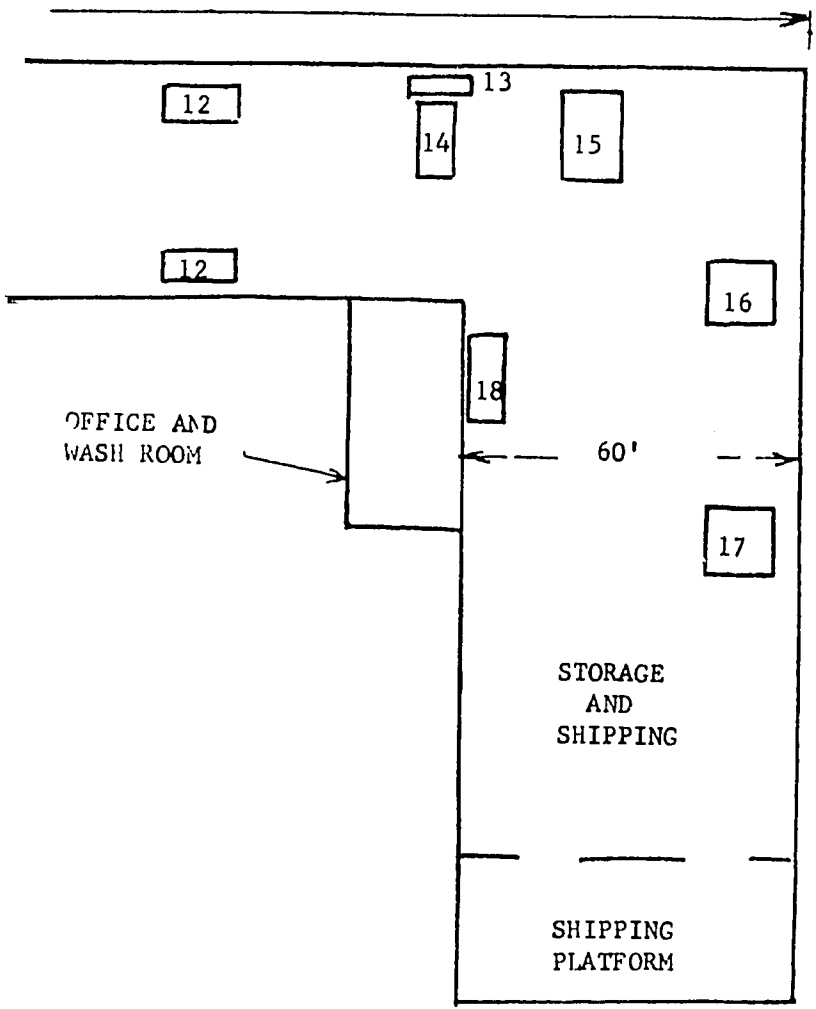


1. Log Saw
2. Log Boili
3. Log Hoist
4. Veneer La
5. Steam Er
6. Veneer C.
7. Veneer Co
8. Wet Venee
9. Veneer Dr

LOG YARD

*22/6*

PLANT AND WORK FLOW



WORK FLOW

OTHER EQUIPMENT

- |                                   |                    |
|-----------------------------------|--------------------|
| 10. Dry Veneer Sizing Clippers(2) | 19. Waste Conveyor |
| 11. Veneer Jointer                | 20. Waste Hog      |
| 12. Veneer Splicers (2)           | 21. Railroad Spur  |
| 13. Glue Mixer                    | 22. Yard Crane     |
| 14. Glue Spreader                 |                    |
| 15. Glue Press                    |                    |
| 16. Panel Sizer                   |                    |
| 17. Three Drum Sander             |                    |
| 18. Table Hand Block Sander       |                    |

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PLYWOOD : S. I. C. 2432

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I. TEXTBOOKS

- A. Modern Plywood. 2nd Edition. T. D. Perry. 1958. 458 p. \$7.00  
Pitman Publishing Corporation  
2 - 6 West 45th Street  
New York, New York 10016  
Standard treatise on the manufacturing, properties, and uses of plywood.

II. PERIODICALS

- A. Veneers and Plywood. Monthly. \$5.00/year.  
The S. H. Smith Co., Inc.  
2232 North Meridian  
Indianapolis, Indiana  
Plywood components, manufacturing, utilization and marketing.

III. GOVERNMENT PUBLICATIONS, U. S.

- A. Industry Information Sheet: Plywood. Malaysia. 1962. Identification  
No. 4/10/01653.  
U. S. Department of Commerce  
Clearinghouse for Federal Scientific and Technical Information  
Springfield, Virginia 22151  
A study of the feasibility of establishing a plywood plant in Singapore.

IV. TECHNICAL PAPERS

- A. Types of Plywood. Wood Working Digest Technical Series Reprint  
No. 104. Thomas D. Perry. 1955. 84 p. \$1.00  
Hitchcock Publishing Company  
Wheaton, Illinois  
Descriptions of various types of plywood now in use and their manu-  
facture and use.

V. U. S. PATENTS

- Available U. S. Patent Office  
Washington, D. C. 20231 \$25 each.
- A. Patent No. 6,635,976. April 21, 1953. 7 p.  
Method of making synthetic constructional boards and products thereof.
- B. Patent No. 2,635,066. April 14, 1953. 5 p.  
Method of producing plywood.
- C. Patent No. 2,616,824. Nov. 4, 1952. 5 p.  
Method of edge gluing wood veneer sheets and edge glued product.
- D. Patent No. 2,581,654. Jan. 8, 1952. 3 p.  
Dry process for making composite, consolidated products with controlled  
pre-steaming of the raw materials.

## SELECTED REFERENCES (Continued)

### VI. TRADE ASSOCIATIONS

- A. Plywood Research Foundation  
620 East 26th Street  
Tacoma 2, Washington  
Aims to improve production and properties, and to develop new products of Douglas fir plywood.

### VII. ENGINEERING COMPANIES

- A. Forest Products Engineering Company  
431 South Dearborn Street  
Chicago, Illinois  
Industrial lumber producing and consuming industries, drying consultants and engineers.
- B. J. Turnbull, Inc.  
1735 East 23rd Street  
Cleveland, Ohio  
Engineer various manufacturing establishments such as cement plants, hydroelectric plants, and plywood plants.
- C. Rust Engineering Company  
930 Fort Duquesne Boulevard  
Pittsburgh, Pennsylvania  
Design, engineer, construct, provide initial operation of manufacturing plants.

### VIII. DIRECTORIES

- A. Hitchcock's Wood Working Directory. 1959. 250 p. \$10.00.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Lists producers of furniture, plywood, veneer and other wood products, and machinery manufacturers for the industry, trade associations.

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I.P. No. 66041

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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.

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.

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## PARTICLE BOARD: Standard Industrial Classification 2499

### A. PRODUCT DESCRIPTION

Boards made from pulpwood converted into shavings in the plant. Process is designed to convert wood into a form in which it is virtually free from liability to swell or shrink, while retaining best qualities of ordinary wood. Standard size boards produced by plant described are 4 feet by 8 feet by  $\frac{1}{2}$  inch thick. Other sizes and thicknesses can, however, be produced.

### B. GENERAL EVALUATION

This plant requires a large capital investment and expert advice on selection of site and installation of equipment. Where particle board plants have been established in industrially less developed areas it is usually with the cooperation of outside experts. Though manufacturing operations are automatic, skilled management and maintenance personnel are essential. This industry is generally appropriate only where suitable pulpwood is locally produced. Where this condition is fulfilled, and where a convenient site, with sufficient water and electric power is available, this industry has much promise. Demand for particle board is increasing as familiarity with it spreads. Plant described is small by U. S. standards, but finding a market for its output may not be easy in initial stages and active sales promotion will generally be needed. In some cases it may be possible to sell to neighboring countries.

### C. MARKET ASPECTS

1. USERS. Building contractors, furniture, vehicle body and shipbuilding industries, individuals for small jobs.
2. SALES CHANNELS AND METHODS. Sales are made direct to building contractors and user industries, and to building supply houses for small scale distribution. Product is new in some areas, and active salesmen and advertising in appropriate publications will generally be necessary.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is easy to handle and normally transport costs will not be unduly burdensome. If there is a good railroad and/or inland waterways network, market area may be fairly extensive, even country-wide. b. Export. Particle board is widely exported.
4. COMPETITION a. Domestic Market. Assuming that locally produced pulpwood is available, industry should be able to meet competition from imports without difficulty. Account must be taken of relative cost of alternative materials, but generally particle board, considering its superior qualities for many uses, seems likely to be competitive in price. b. Export Market. International competition is active, but, in view of expanding demand, plant described might be able to sell regionally.
5. MARKET NEEDED FOR PLANT DESCRIBED. Demand will depend on amount of building construction, type of buildings common in the country, extent of development of user industries. In an area where construction is fairly active and where woodworking industries are important in the economy, the plant described could probably meet the needs of a total population of the order of 4 million people.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: 23 Million Square Feet

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	Cost
Land.	\$ --
Building. One story, 300'x60', with basement under area housing pulp equipment.	144,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt. \$763,500	
Other tools & equipmt. 1,800	
Furniture & fixtures 700	
Transport equipment 4,000	
Total (excl. Land)	\$ 974,000

Principal Items. Wood shaver, hammer mill & screen, double quick pulper, centrifugal pumps, screw press, digester pulp refiner, pulp washer thickener, consistency regulator, storage tank, agitator, cylinder board machine, presses, wet saw, trimming saw, 400 hp. boiler.

#### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 82,200
Admin. Costs(b), Contingencies, Sales Costs(c)	30	12,500
Training Costs		16,000
Total Working Capital		\$ 110,700

c. TOTAL CAPITAL (EXCL. LAND) \$1,024,700

### 2. MATERIALS AND SUPPLIES

#### a. Direct Materials

	Annual Cost
Pulp wood	\$ 162,000
Chemicals & adhesives	138,000
Total	\$ 300,000

#### b. Supplies

	Annual Cost
Welding rods	\$ 200
Welding gas	200
Lubricants	200
Maintenance materials	1,800
Spare parts	1,200
Hand tools	200
Office supplies	200
Total	\$ 4,000

### 3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 500 hp.	\$ 15,000
b. Fuel. 400 hp. boiler, 250 p.s.i. is needed.	\$ 12,000
c. Water. About 1,600 gals. of water per minute. Plant should be located near river or lake if possible, so that only cost for water will be pumping. Requirements about 12 mn. gals. annually of make-up water.	\$ 3,000

### 4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5-ton delivery truck.	\$ 1,200
b. External Transport Facilities. Both materials & finished product are bulky & heavy. Plant should be located in area of good all-weather highways and, if possible, on rail siding.	

### 5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	6	\$ 30,000
Semi-skilled	12	48,000
Unskilled	9	27,000
Total	27	\$ 105,000
b. Indirect Labor		
Manager	1	\$ 10,000
Foremen	3	18,000
Office	1	4,000
Other	6	21,000
Total	11	\$ 53,000

c. Training Needs. Mfg. operations are automatic. Manager, foremen & wet machine operators should be fully experienced & able to train other workers. Plant should reach full production in 1 month.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

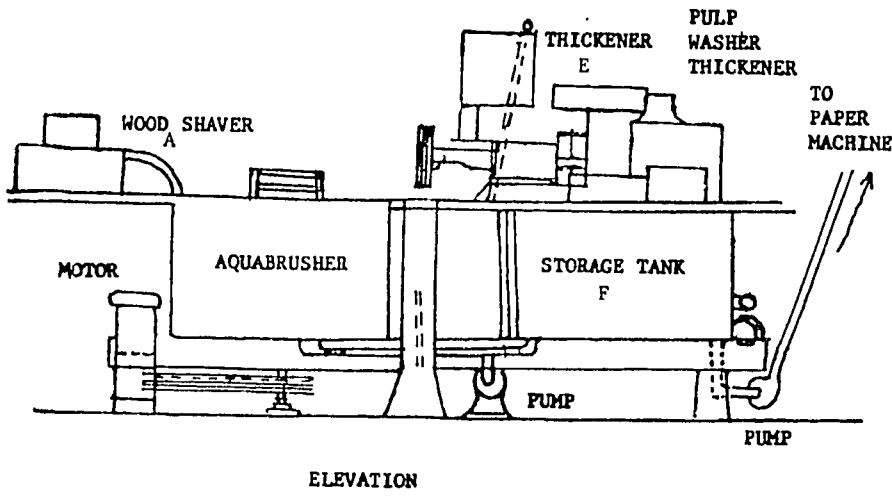
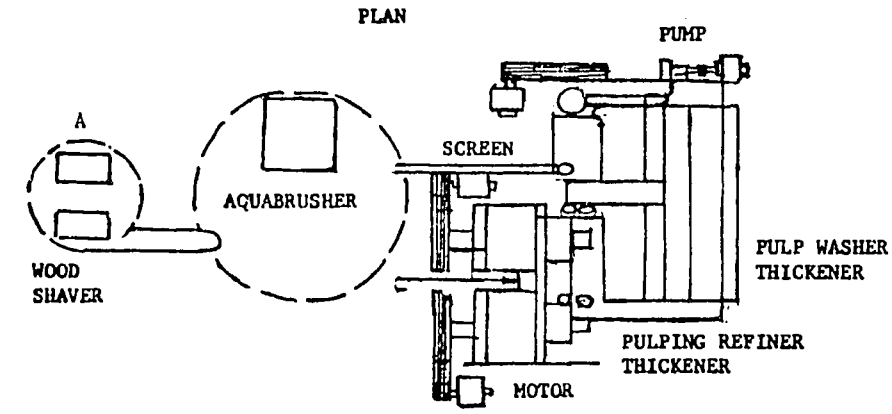
a. Annual Costs	
Direct Materials	\$ 300,000
Direct Labor	105,000
Manufacturing Overhead(a)	88,200
Admin. Costs(b), Contingencies	60,000
Sales Costs(c), Bad Debts	90,000
Depreciation on Fixed Capital	82,000
Total Annual Costs	\$ 725,200
b. Annual Sales Revenue	\$1,200,000

NOTES. (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

PARTICLE BOARD: S.I.C. 2499

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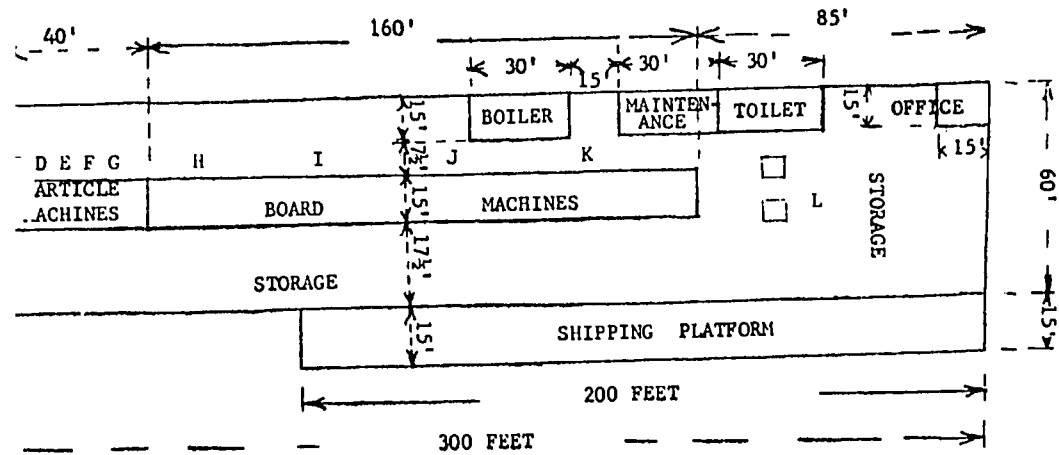
PARTICLE  
PLANT LAY



27.6

D: S.I.C. 2499

D WORK FLOW



IN ORDER TO SAVE SPACE AND TO USE GRAVITY FEED AS MUCH AS POSSIBLE, ONE-HALF OF THE PUMP EQUIPMENT IS LOCATED IN A BASEMENT. THE FLOW IS CONTINUOUS FROM THE WOOD SHAVERS TO THE FINISHED BOARD.



PARTICLE BOARD: S. I. C. 2499

SELECTED REFERENCES

I. TEXTBOOKS

- A. Chemical Processing of Wood. A. J. Stamm and E. E. Harris. 1953. 595 p. Illus. \$12.00.  
Tudor Publishing Company  
221 Park Avenue South  
New York, New York 10003  
Has sections on products manufactured from converted pulp wood.
- B. Forest Products. N. C. Brown. 1950. 399 p. Illus. \$6.50.  
John Wiley and Sons, Inc.  
440 Park Avenue South  
New York, New York 10016  
Includes information on the various materials produced from wood pulp, such as composition boards, and methods of manufacturing.

II. PERIODICALS

- A. Official Board Markets. Weekly. \$38.00/year.  
Board Products Publishing Company  
228 North La Salle Street  
Chicago 1, Illinois  
Current market information on pulp boards and related products.
- B. Pulp and Paper. Monthly. \$5.00/year.  
Miller Freeman Publications  
1791 Howard Street  
Chicago 26, Illinois  
Latest reports on products, by-products, and markets in the pulp and paper field.

III. GOVERNMENT PUBLICATIONS, U. S.

- A. Mat-Formed Wood Particle Board (Interior Use). CS 236-61. June 1, 1961. 9 p. Gratis.  
Department of Commerce  
Washington, D. C. 20230  
Standards and specifications for particle board for interiors.

IV. OTHER PUBLICATIONS

- A. Fibreboard and Particle Board. Food and Agriculture Organization. 1958. 188 p. \$2.00.  
Columbia University Press  
2960 Broadway  
New York, New York 10027  
Proceedings of a technical conference on the manufacture and uses of fibreboard and particle board.

V. TECHNICAL PAPERS

- A. Problems Relating to the Fabrication of Building Boards. M. E. Barker. 1954. 36 p. Price not given.  
University of Arkansas  
Fayetteville, Arkansas  
Includes data regarding the manufacture of particle board.

## SELECTED REFERENCES (Continued)

### VI. U.S. PATENTS

Available U. S. Patent Office

Washington, D. C. 20231 \$.25 each.

- A. Patent No. 2,924,548. 1960. 4 p.  
Process for making particle board and other products from wood pulp.
- B. Patent No. 2,805,946. 1957. 6 p.  
Making consolidated lignocellulose particle board.
- C. Patent No. 2,759,837. 1956. 6 p.  
Process for forming board products from pulp.
- D. Patent No. 2,757,113. 1956. 7 p.  
Production of hot-pressed particle board.

### VII. TRADE ASSOCIATIONS

- A. National Particleboard Association  
601 Association Building  
Washington, D. C.

### VIII. ENGINEERING COMPANIES

- A. Alvin H. Johnson and Company, Inc.  
415 Lexington Avenue  
New York, New York 10017  
Pulp and paper industry consulting services.
- B. Apmew, Inc.  
P. O. Box 1  
Glen Falls, New York  
Pulp mill equipment.
- C. The Sandy Hill Iron and Brass Works  
Hudson Falls, New York.  
Designers and builders of pulp and paper machinery.

### IX. DIRECTORIES

- A. Official Board Mill Directory. Annual. \$1.50.  
Board Products Publishing Company  
228 North La Salle Street  
Chicago 1, Illinois  
Shows companies, equipment, capacities, and grades of board manufactured.

## 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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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.

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# INDUSTRY PROFILES

## WOODEN ICE CREAM SPOONS AND STICKS

I.P. No. 66042

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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.

A. PRODUCT DESCRIPTION

Wooden ice cream spoons and sticks stamped from rotary cut veneer.

B. GENERAL EVALUATION

Capital requirements are moderately high. Little technical skill is needed. The products are highly specialized and it would, of course, be necessary to make a careful determination of market potential before embarking on this project. If costs are low enough, some exports might be feasible. With increasing sales of packaged ice cream products, the plant might have good possibilities in some developing areas.

C. MARKET ASPECTS

1. USERS. Manufacturers of ice cream and related products.
2. SALES CHANNELS AND METHODS. Sales direct to ice cream manufacturers.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transport cost will not normally limit market area. b. Export. Products have an international sale.
4. COMPETITION. a. Domestic Market. Imports will compete only if domestic production costs are unduly high. b. Export Market. If the price is competitive exports, particularly to countries which do not produce themselves, are a possibility.
5. MARKET NEEDED FOR PLANT DESCRIBED. Consumption of the products with which these wooden spoons and sticks are used varies greatly with climate, income level, eating habits, etc. Information on demand should be sought from ice cream manufacturers and export agents.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 160 Million Pieces

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<u>Cost</u>
Land, 16,000 sq. ft.		--
Building, One story, 40'x50', and boiler room.	\$ 14,000	
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	\$59,400	
Other tools & equipmt.	3,500	
Furniture & fixtures	700	
Transportation equipmt.	2,400	
<u>Total (excl. Land)</u>	<u>66,000</u>	
	<u>\$ 80,000</u>	
Principal Items. Vat, monorail & electric hoist, rotary lathe, steam engine drive for lathe, infeed table motorized, wet veneer clipper, die stamping machine, automatic dryer, sanding machine, packaging machine, scale, packing tables, factory trucks.		

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 12,700
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,200
Training Costs		1,200
<u>Total Working Capital</u>		<u>\$ 16,100</u>

c. TOTAL CAPITAL (EXCL. LAND) \$ 96,100

### 2. MATERIALS AND SUPPLIES

	<u>Annual Cost</u>
<b>a. Direct Materials</b>	
Logs for veneer	\$ 6,000
Packaging material	4,000
<u>Total</u>	<u>\$ 10,000</u>
<b>b. Supplies</b>	
Lubricants & hand tools	\$ 100
Cutting tools & abrasives	1,000
Maintenance & spare parts	2,000
Office supplies	200
<u>Total</u>	<u>\$ 3,300</u>

### 3. POWER, FUEL AND WATER

	<u>Annual Cost</u>
<b>a. Electric Power. Connected load about 60 hp.</b>	
	\$ 900
<b>b. Fuel. Scrap wood.</b>	
<b>c. Water. Vat and general purposes.</b>	
	\$ 100

### 4. TRANSPORTATION

	<u>Annual Operating Cost</u>
<b>a. Own Transport Equipment. Truck for yard and delivery.</b>	
	\$ 1,000
<b>b. External Transport Facilities. Logs usually delivered at plant. No special requirements.</b>	

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
<b>a. Direct Labor</b>		
Skilled	2	\$ 10,000
Semi-skilled	3	12,000
Unskilled	4	12,000
<u>Total</u>	<u>9</u>	<u>\$ 34,000</u>
<b>b. Indirect Labor</b>		
Manager & supervisor	2	\$ 15,000
Office	1	4,000
Truck drivers	2	8,000
<u>Total</u>	<u>5</u>	<u>\$ 27,000</u>

c. Training Needs. Manager & supervisor must be fully experienced. With 2 skilled workers they should be able to train the others and reach full production in 30 days.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>		
Direct Materials		\$ 10,000
Direct Labor		34,000
Manufacturing Overhead(a)		32,300
Admin. Costs(b), Contingencies		12,000
Sales Costs(c), Bad Debts		14,000
Depreciation on Fixed Capital		8,000
<u>Total Annual Costs</u>		<u>\$110,300</u>
<b>b. Annual Sales Revenue</b>		<u>\$140,000</u>

NOTES. (a) Includes Supplies, Power, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions. Freight Out, Travel.

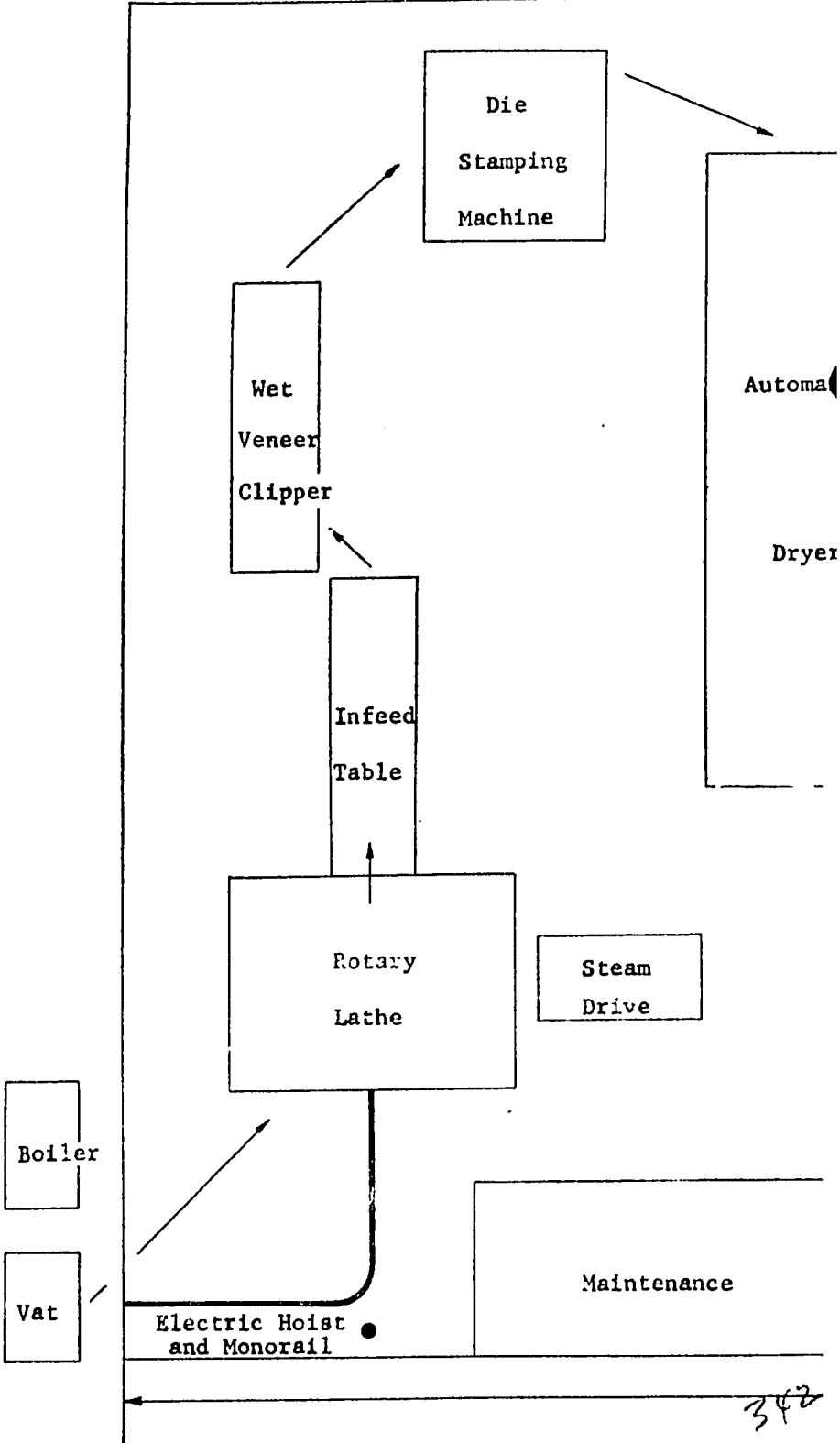
WOODEN ICE CREAM SPOONS AND STICKS: S.I.C. 2499

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WOODEN ICE CREAM

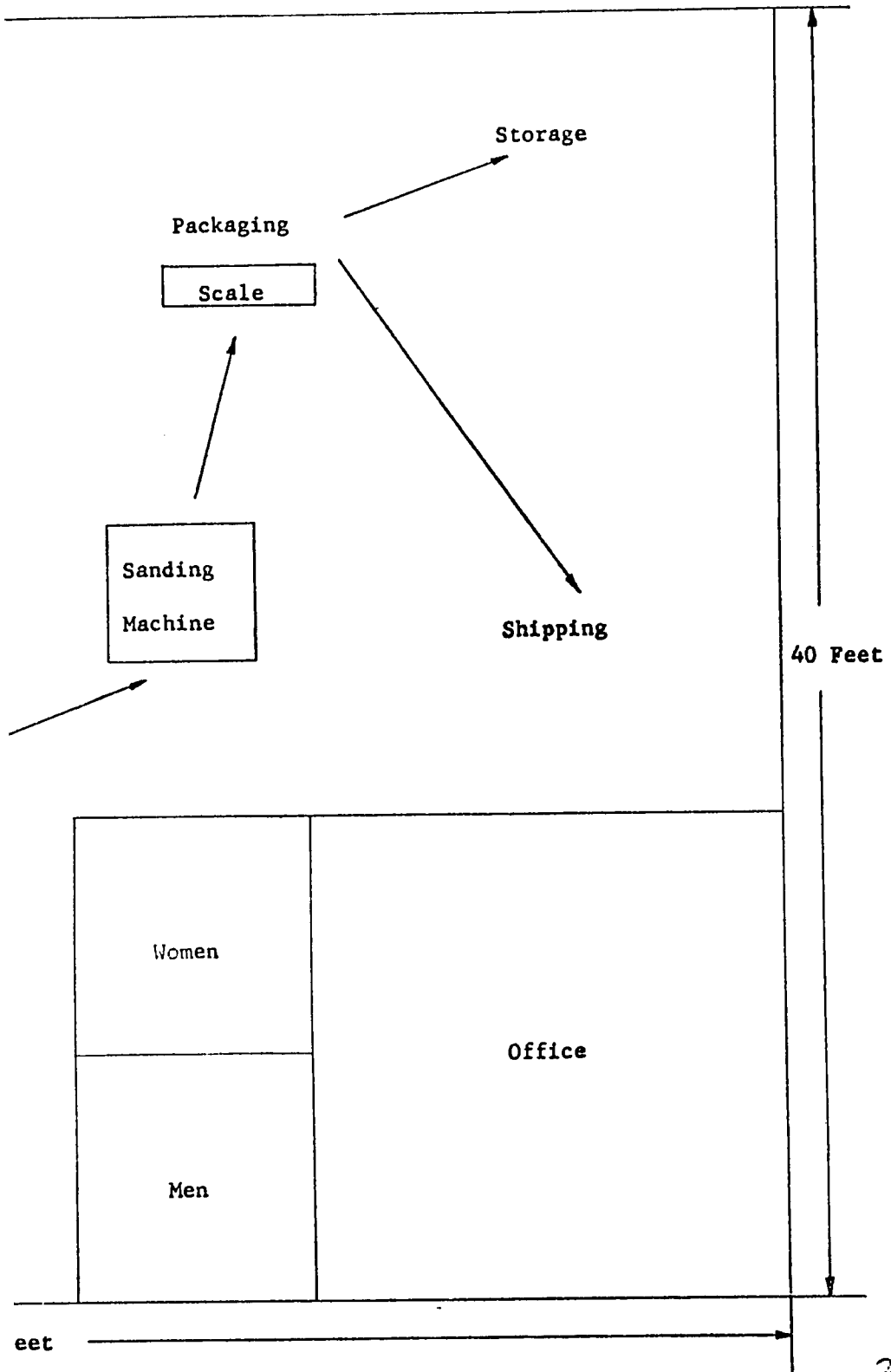
PLANT LAY

Log  
Yard



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ND WORKFLOW





WOODEN ICE CREAM SPOONS AND STICKS: S. I. C. 2499

SELECTED REFERENCES

I TEXTBOOKS

- A. General Woodworking. 2nd Edition. C. H. Groneman. 1959. 256 p.  
Illus. \$6.75  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York, New York 10036  
Hand tool processes, machine tool processes, and portable tool processes.
- B. Timbers and Woodwork. Revised Edition. J. C. S. Brough. 1955.  
232 p. \$2.75  
J. B. Lippincott Company  
East Washington Square  
Philadelphia 5, Pennsylvania  
Includes veneers, plywood, and crosscutting in sawing.

II. PERIODICALS

- A. The Wood-Worker. Monthly. \$2.00/year.  
S. H. Smith Company  
2232 North Meridian Street  
Indianapolis 7, Indiana  
Devoted to the woodworking industry.
- B. Hitchcock's Woodworking. Monthly. \$4.00/year.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Covers the woodworking field.

III. GOVERNMENT PUBLICATIONS, U. S.

- A. Lumber Seasoning PO-15. July 1961. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Devoted to the seasoning of lumber
- B. Production Planning and Control. TB-82. May 1960. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523  
Manual for training personnel in the subject of production planning and control in industry.

IV. OTHER PUBLICATIONS

- A. Cutting Techniques for Woodworkers. T. D. Perry. 1955. 52 p. \$5.00.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Cutting tools and techniques for woodworking industries.

## SELECTED REFERENCES (Continued)

### V. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$.25 each.

- A. Patent No. 2,942,342. 1960. 2 p.  
Infant feeding spoon.
- B. Patent No. 2,401,534. 1946. 3 p.  
Spoon, flat, preferably of wood.
- C. Patent No. 2,346,040. 1944. 6 p.  
Wooden spoon and methods of making same.
- D. Patent No. 1,907,737, 1933. 2p.  
Spoon of paper or like material.

### VI. TRADE ASSOCIATIONS

- A. Flat Veneer Products Association  
630 Third Avenue  
New York, New York 10017
- B. Woodworking Machinery Manufacturers Association  
1900 Arch Street  
Philadelphia 3, Pennsylvania

### VII. ENGINEERING COMPANIES

- A. United States Machinery Company, Inc.  
90 Broad Street  
New York, New York 10004  
Designs and installs woodworking plants.
- B. Mattison Machine Works  
200 Blackhawk Park Avenue  
Rockford, Illinois  
Designs and builds large line of woodworking machinery.

### VIII. DIRECTORIES

- A. Hitchcock's Woodworking Directory. Biennial. \$10.00  
Hitchcock Publishing Company  
Wheaton, Illinois  
Lists manufacturers of woodworking machinery and equipment.

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## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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# INDUSTRY PROFILES

## BEDROOM AND DINING ROOM FURNITURE

I.P. No. 66043

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**BEDROOM AND DINING ROOM FURNITURE: Standard Industrial Classification 2511/2**

**A. PRODUCT DESCRIPTION**

Bedroom sets have 6 pieces—2 twin beds, dresser, chest of drawers, and 2 chairs. Dining room sets have 9 pieces—table, buffet, china closet, and 6 chairs. Chair seats are upholstered, and dresser has full-sized mirror. Pieces are finished in lacquer. Any furniture wood may be used, according to availability and customers' preferences.

**B. GENERAL EVALUATION**

Capital requirements are moderately large. The degree of labor skill needed is not very high and is of a type that is common, but good management and supervision are essential in order to maintain high standards of workmanship and to keep up with style changes, which are important even for moderately-priced furniture of this kind. In low-wage areas small furniture makers, who manufacture to customers' special requirements may offer competition, but a well-equipped plant such as this should be able to produce a better product at the price than the small maker.

**C. MARKET ASPECTS**

1. USERS. Households, hotels, etc.
2. SALES CHANNELS AND METHODS Sales to furniture stores and direct to hotels and large purchasers.
3. GEOGRAPHICAL EXTENT OF MARKET. These articles are somewhat bulky and transport costs will tend to localize the market to some extent. Furniture export is normally limited to high-priced items of special design, and there would be no foreign demand for the kind of furniture produced by this plant.
4. COMPETITION. Small furniture makers might be able to compete in their own localities. Furniture made of metal and other materials offers some competition in low-price range.
5. MARKET NEEDED FOR PLANT DESCRIBED. The size of the market needed in terms of total population will vary greatly with the level of income in the area. A population of the order of half a million, with a strong middle class element, would probably in most cases offer a large enough market outlet.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 1500 9-pc. Dining Room Sets, 1500 6-pc. Bedroom Sets

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>	<b>Cost</b>
Land. About 4 acres.	\$ --
<u>Building.</u> 100'x200', one story, and drying kiln.	120,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt.	\$55,000
Other tools & equipmt.	5,000
Furniture & fixtures	1,000
Total (excl. Land)	<u>\$61,000</u>
	<u>\$181,000</u>

Principal Items. Kiln trucks, cut-off saw, up saw, jointer, planer, glue jointer, glue reel, band saw, 2 trim saws, double end tenon machine, shaper, 3 drum sanders, horizontal boring machine, upright boring machine, 2 chair mortisers, dish grinder, 5 assembly presses, complete spray booth, glue pot, factory trucks.

### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 35,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	3,800
Training Costs		9,000
<u>Total Working Capital</u>		<u>\$ 47,800</u>

c. TOTAL CAPITAL (EXCL. LAND) \$228,800

### 2. MATERIALS AND SUPPLIES

	Annual Reqmts.	Annual Cost
<b>a. Direct Materials</b>		
Lumber	337,000 ft.	\$ 33,700
Glass	9,000 sq. ft.	4,500
Upholstery material	2,400 yds.	4,500
Hardware		5,000
Glue		900
Finishing material		3,000
Cotton Padding		800
Packaging materials		2,900
<u>Total</u>		<u>\$ 55,300</u>
<b>b. Supplies</b>		
Lubricants & hand tools		\$ 100
Cutting tools & abrasives		600
Sandpaper		1,800
Maintenance & spare parts		2,500
Office supplies		300
<u>Total</u>		<u>\$ 5,300</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> Connected load about 100 hp.	\$ 3,000
b. <u>Fuel.</u> Scrap wood.	--
c. <u>Water.</u> For glue & general purposes.	<u>\$ 100</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Crated furniture is fairly bulky. Good highway and easy access to railroad desirable.

### 5. MANPOWER

	Number	Annual Cost
a. <u>Direct Labor</u>		
Skilled	6	\$ 30,000
Semi-skilled	10	40,000
Unskilled	10	30,000
<u>Total</u>	<u>26</u>	<u>\$100,000</u>
b. <u>Indirect Labor</u>		
Manager & supervisors	4	\$ 30,000
Office	2	8,000
Other	2	8,000
<u>Total</u>	<u>8</u>	<u>\$ 46,000</u>

- c. Training Needs. Manager & supervisors must be fully experienced. With 2 skilled workers, they should be able to train all employees and reach full production in 2 months.

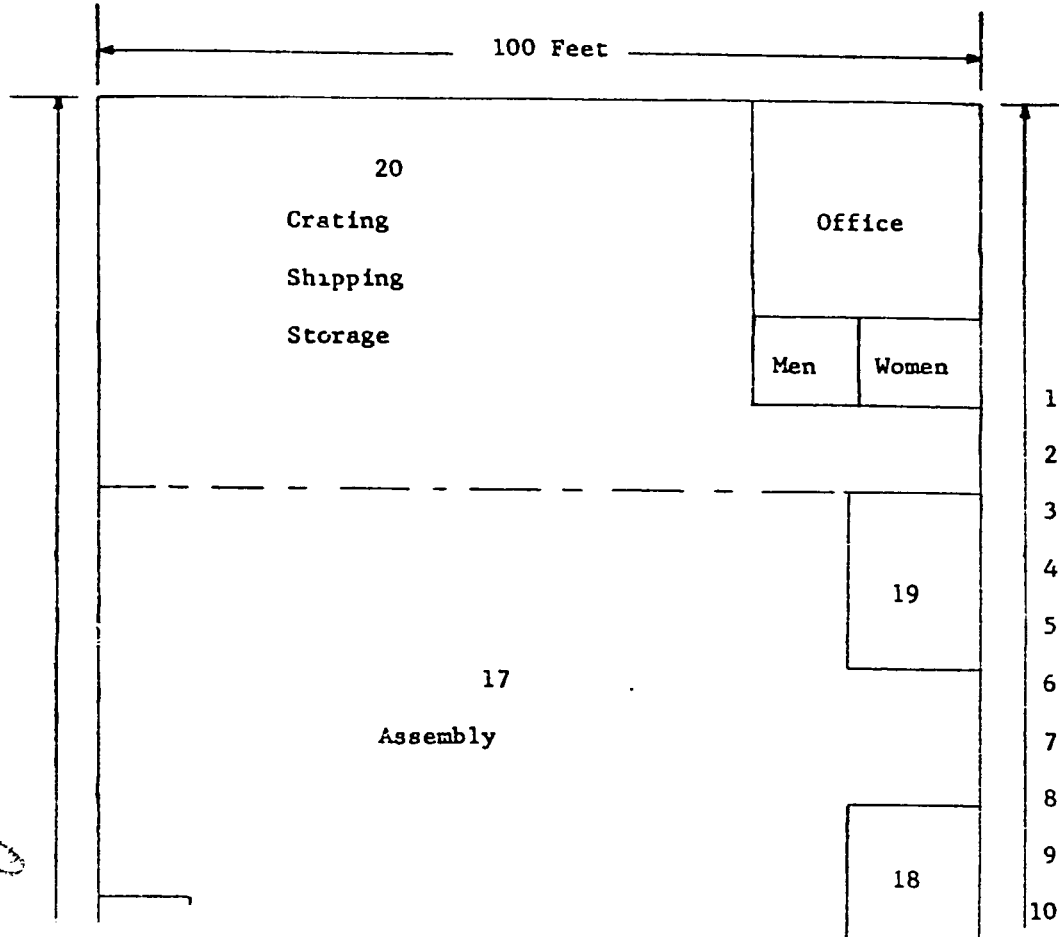
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 55,300
Direct Labor	100,000
Manufacturing Overhead(a)	54,400
Admin. Costs(b), Contingencies	18,000
Sales Costs(c), Bad Debts	27,000
Depreciation on Fixed Capital	10,900
<u>Total Annual Costs</u>	<u>\$265,600</u>
b. <u>Annual Sales Revenue</u>	<u>\$360,000</u>

NOTES. (a) Includes Supplies, Power, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal and Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

BEDROOM AND DINING ROOM FURNITURE: S.I.C. 2511/2

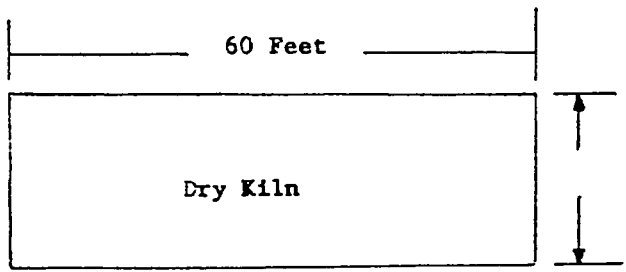
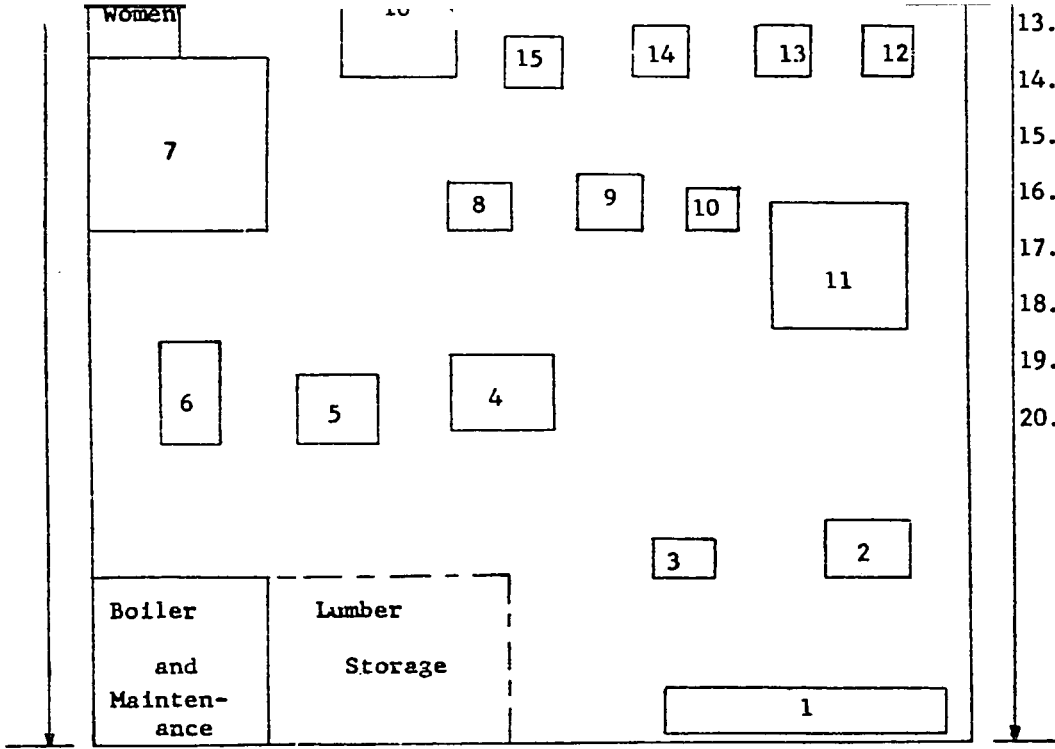
# PLANT LAYOUT AND WORKFLOW



1. Cut-off saw
2. Rip saw
3. Jointer
4. Planer
5. Trim saw
6. Glue jointer
7. Glue reel
8. Band saw
9. Shaper
10. Trim saw

BEDROOM AND DINING

- 13. Upright boring
- 14. Chair mortiser
- 15. Disk grinder
- 16. Three drum sander
- 17. Assembly
- 18. Spray booth
- 19. Chair upholstery
- 20. Crating, shipping, and storage



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## BEDROOM AND DINING ROOM FURNITURE: S.I.C. 2511/2

### SELECTED REFERENCES

#### I. TEXTBOOKS

- A. Cutting Techniques for Woodworkers. Thomas D. Perry. 1955. 60 p. \$.50.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Descriptions of cutting techniques in wood working and the tools used therein.
- B. Furniture Joinery. W.W. Klenke. 1943. 144 p. \$2.25.  
Charles A. Bennet Co., Inc.  
237 North Monroe Street  
Peoria 3, Illinois  
A picturized treatment of procedures and methods used to make the right joint, the wood to use, the service to be expected from the finished article.

#### II. PERIODICALS

- A. Furniture Manufacturer. Monthly. \$3.00/year.  
Vincent Edwards, Inc.  
342 Madison Avenue  
New York, New York  
Furniture components, manufacturing processes, marketing.
- B. The Wood-Worker. Monthly. \$2.00/year.  
S. H. Smith Co., Inc.  
2232 North Meridian Street  
Indianapolis, Indiana  
News and technical information in all phases of wood working.

#### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Wood Furniture Industry. TB-118.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523

#### IV. TECHNICAL PAPERS

- A. Furniture Finishing. Harold B. Gatslick. 1956. 82 p. \$1.00.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Descriptions of finishing techniques in wood working and the materials and tools used to implement them.

## SELECTED REFERENCES (Continued)

### V. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$.25 each.

- A. Patent No. D-178,851. Sept. 25, 1956. 1 p.  
Design for bedstead.
- B. Patent No. D-178,095. June 19, 1956. 1 p.  
Design for side chair.
- C. Patent No. D-178,096. June 19, 1956. 1 p.  
Design for arm chair.
- D. Patent No. D-178,094. June 19, 1956. 1 p.  
Design for drop leaf extension table.
- E. Patent No. D-165,074. Nov. 6, 1951. 2 p.  
Design for a bed.

### VI. TRADE ASSOCIATIONS

- A. National Association of Furniture Manufacturers  
666 Lake Shore Drive  
Chicago 11, Illinois  
Keeps members informed of latest developments in machinery, materials, processes, and market opportunities.

### VII. ENGINEERING COMPANIES

- A. Rust Engineering Company  
930 Fort Duquesne Boulevard  
Pittsburgh, Pennsylvania  
Design, engineer, construct, provide initial operation of manufacturing plants.
- B. Mechanical Designers and Builders, Inc.  
17 South Essex Avenue  
Orange, New Jersey  
Engineering counsel, plant layout, production methods.

### VIII. DIRECTORIES

- A. Hitchcock's Wood Working Directory. 1959. 250 p. \$10.00.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Lists producers of furniture and other wood products, machinery, manufacturers for the industry, and trade associations.

BEDROOM AND DINING ROOM FURNITURE: S.I.C. 2511/2

## 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

## UPHOLSTERED OCCASIONAL CHAIRS

I.P. No. 66044

*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.

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## UPHOLSTERED OCCASIONAL CHAIRS: Standard Industrial Classification 2512

### A. PRODUCT DESCRIPTION

Moderately-priced occasional chairs of simple design, with upholstered seats.

### B. GENERAL EVALUATION

Capital requirements for this industry are moderate, and not very much skilled labor is needed. From the production point of view, this industry might be suited to a fair number of economically less developed areas, particularly if low-priced locally-produced lumber is available. The market for this product is predominantly local, however, and many less developed areas might be unable to assure a market for the plant described, particularly in view of the probable competition from small workshops. In some areas humidity and heat may restrict demand.

### C. MARKET ASPECTS

1. USERS. Households, hotels, institutions.
2. SALES CHANNELS AND METHODS. Most sales will be made to furniture stores, though large users may buy direct.
3. GEOGRAPHICAL EXTENT OF MARKET. This product is rather clumsy and heavy, and costly to transport. The market is normally localized. This product is very rare in international trade.
4. COMPETITION. The principal direct competition will come from small workshops, which in low wage areas may provide strong competition with factory products. Chairs of alternative materials, e.g. with rattan or metal frames, may be competitive in some places.
5. MARKET NEEDED FOR PLANT DESCRIBED. Demand for this product will depend on income levels, living habits, climate, etc. In average conditions this plant could probably meet the needs of upwards of a million people.

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## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 12,000 Chairs

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	<u>Cost</u>
Land. About 1 acre.	\$ ---
Building. One story, 100'x100'.	60,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt. \$25,000	
Other tools & equipm. 5,000	
Furniture & fixtures 700	30,700
Total (excl. Land)	<u>\$ 90,700</u>

Principal Items. Cutoff saw, rip saw, jointer, planer, band saw, trim saw, shaper, 3 drum sanders, horizontal boring machine, upright boring machine, table belt sander, chain mortizer, tenon machine, disk sander, glue reel, assembly presses, spray booth complete, glue pots.

### b. WORKING CAPITAL

	<u>No. of Days</u>	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 28,200
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,800
Training Costs		6,000
Total Working Capital		<u>\$ 37,000</u>

c. TOTAL CAPITAL (EXCL. LAND) \$127,700

### 2. MATERIALS AND SUPPLIES

a. <u>Direct Materials</u>	<u>Annual Cost</u>
Lumber	\$ 40,000
Upholstery materials	20,000
Finishing materials	2,500
Nails, wood screws, glue	1,000
Thread & tacks	200
Crating materials	3,000
Total	<u>\$ 65,700</u>

### b. Supplies

Lubricants & hand tools	\$ 300
Cutting tools	500
Sandpaper	200
Maintenance & spare parts	1,500
Office supplies	300
Total	<u>\$ 2,800</u>

### 3. POWER, FUEL AND WATER

a. <u>Electric Power.</u> Connected load about 60 hp.	<u>Annual Cost</u>
	\$ 1,800
b. <u>Fuel.</u> Scrap wood and sawdust.	
c. <u>Water.</u> Small amount for glue, sanitation and fire protection.	<u>\$ 100</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment. None necessary.
- b. External Transport Facilities. Crated furniture is bulk. Good highway & easy access to railroad desirable.

### 5. MANPOWER

	<u>Number</u>	<u>Annual Cost</u>
a. <u>Direct Labor</u>		
Skilled	4	\$ 20,000
Semi-skilled	7	28,000
Unskilled	6	18,000
Total	<u>17</u>	<u>\$ 66,000</u>
b. <u>Indirect Labor</u>		
Manager & supervisors	3	\$ 22,000
Office	1	4,000
Other	2	6,000
Total	<u>6</u>	<u>\$ 32,000</u>

- c. Training Needs. Manager & supervisors should be fully experienced. They should be able to train all workers. Plant should reach full production in 2 months.

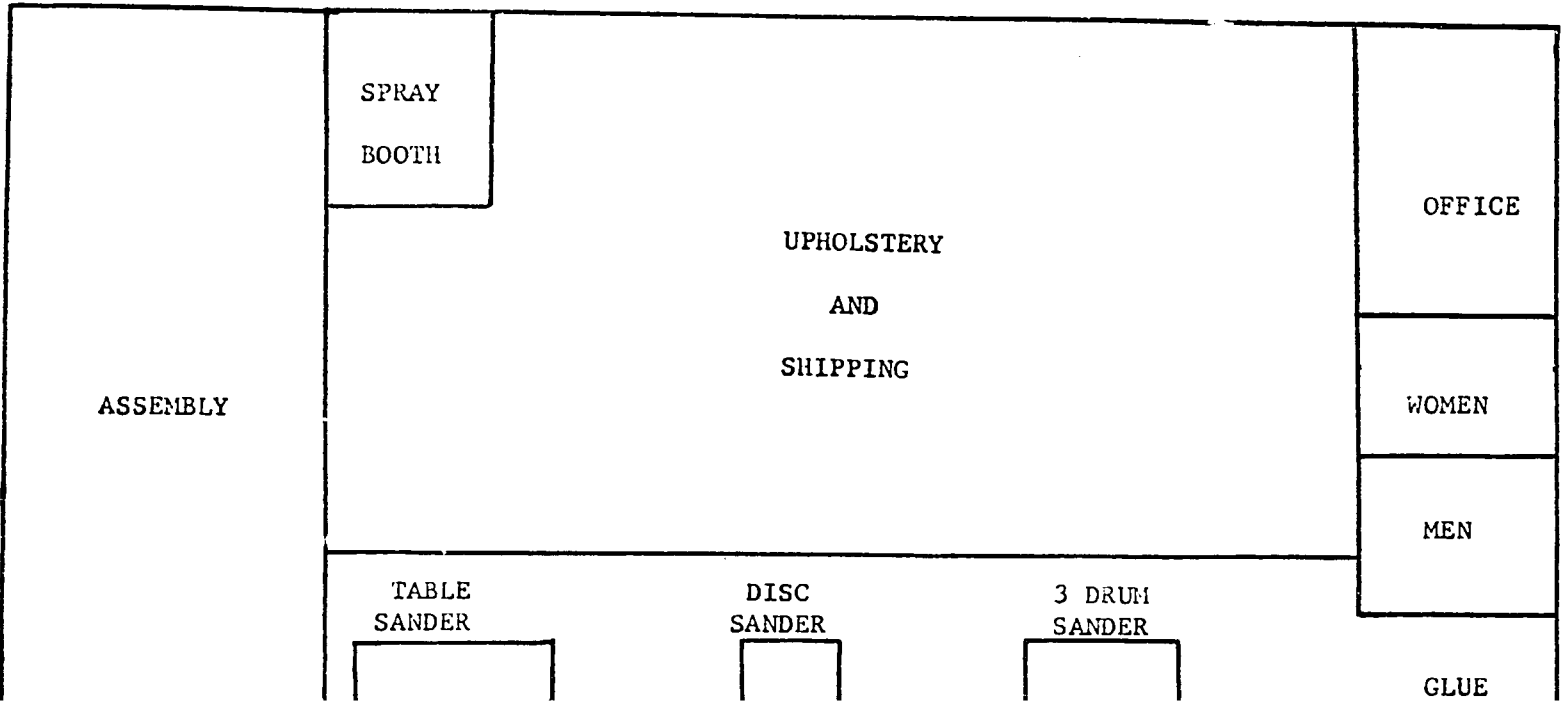
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 66,700
Direct Labor	66,000
Manufacturing Overhead(a)	36,700
Admin. Costs(b), Contingencies	13,000
Sales Costs(c), Bad Debts	20,000
Depreciation on Fixed Capital	6,600
Total Annual Costs	<u>\$209,000</u>
b. <u>Annual Sales Revenue</u>	<u>\$250,000</u>

NOTES: (a) Includes Supplies, Power, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

UPHOLSTERED OCCASIONAL CHAIRS: S.I.C. 2512

UPHOLSTERED OCCASIONAL CHAIRS: S.I.C. 2512  
PLANT LAYOUT AND WORK FLOW



ASSEMBLY

SPRAY  
BOOTH

UPHOLSTERY  
AND  
SHIPPING

OFFICE

WOMEN

MEN

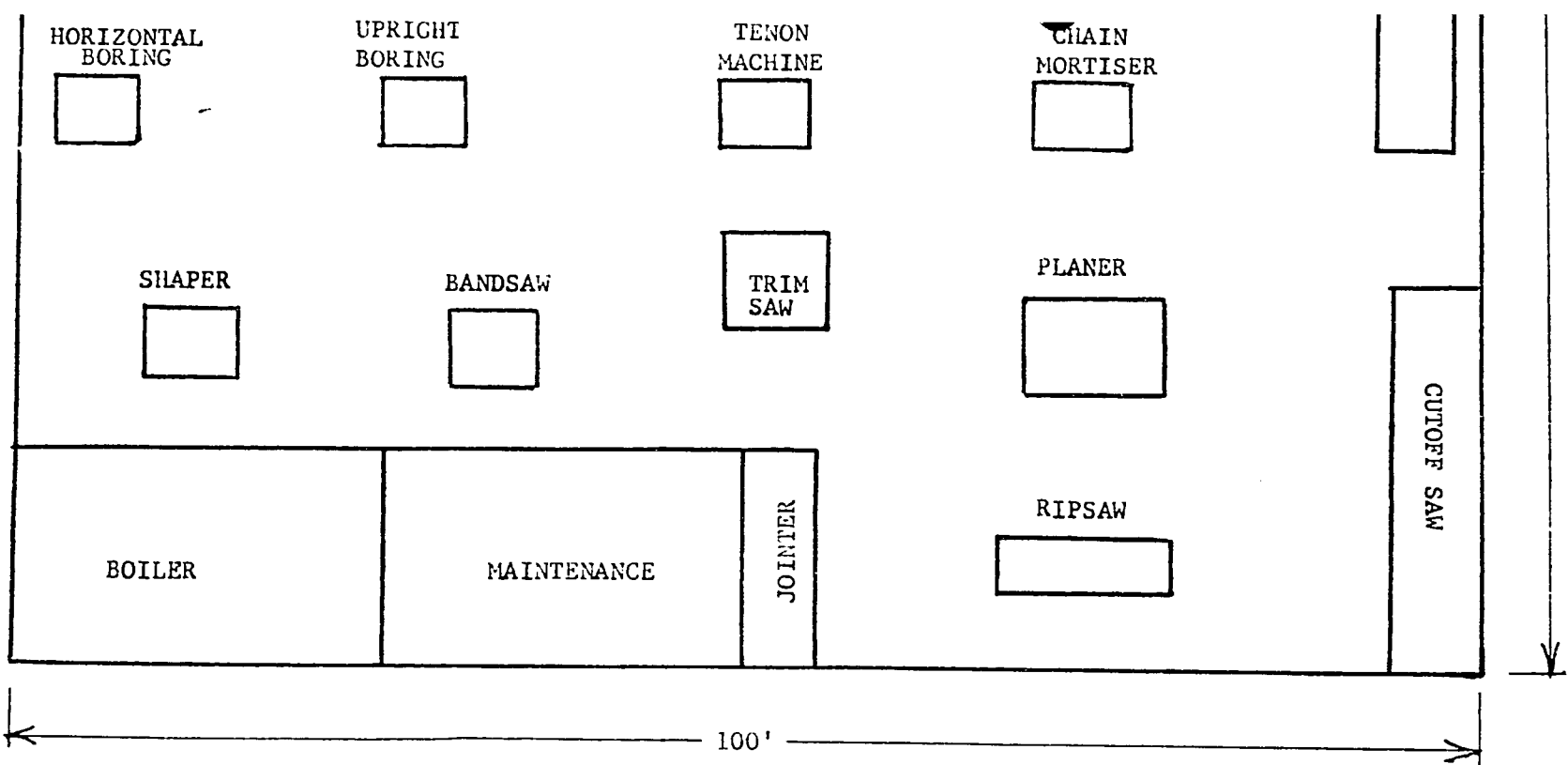
TABLE  
SANDER

DISC  
SANDER

3 DRUM  
SANDER

GLUE

bst



Work flows from cutoff saw through to upholstery. However, most parts do not stop at all machines since the operations vary.

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# UPHOLSTERED OCCASIONAL CHAIRS: S.I.C. 2512

## SELECTED REFERENCES

### I. TEXTBOOKS

- A. General Woodworking. 3rd Edition. C.H. Groneman, 1964.  
McGraw-Hill Book Company, Inc.  
330 West 42nd Street  
New York, New York 10036  
Machine tool processes, portable tool processes, and hand tools processes.
- B. How to Build Modern Furniture. 2nd Edition. M.D. Fabbro. 1957.  
214 p. \$4.95.  
F.W. Dodge Corporation  
119 West 40th Street  
New York, New York  
Covers design, machinery, construction, and upholstering of furniture.

### II. PERIODICALS

- A. The Wood-Worker. Monthly. \$2.00/year.  
S.H. Smith Company  
2232 North Meridian Street  
Indianapolis 7, Indiana  
Devoted to the woodworking industry.
- B. Hitchcock's Wood Working. Monthly. \$4.00/year.  
Hitchcock Publishing Company, Inc.  
Wheaton, Illinois  
Covers the woodworking field.

### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Lumber Seasoning. PO-15. July 1961. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Devoted to the seasoning of lumber.
- B. Production Planning and Control. TB-82. May 1960. Gratis.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D.C. 20523  
Manual for training of personnel in the subject of production planning and control in industry.

### IV. OTHER PUBLICATIONS

- A. Cutting Techniques for Woodworkers. T.D. Perry. 1955. 52 p. \$.50.  
Hitchcock Publishing Company, Inc.  
Wheaton, Illinois  
Wood cutting tools and techniques.

## SELECTED REFERENCES (Continued)

### V. U.S. PATENTS

Available U.S. Patent Office  
Washington, D.C. 20231 \$.25 each.

- A. Patent No. 2,913,041. 1959. 4 p.  
Upholstered furniture and method of construction.
- B. Patent No. 2,754,893. 1956. 4 p.  
Overstuffed furniture.
- C. Patent No. 2,705,995. 1955. 5 p.  
Method of manufacturing upholstered furniture.
- D. Patent No. 2,628,667. 1953. 5 p.  
Method of forming edge for overstuffed furniture.

### VI. TRADE ASSOCIATIONS

- A. Upholstered Furniture Manufacturers Association  
276 Fifth Avenue  
New York, New York 10001
- B. Woodworking Machinery Manufacturers Association  
1900 Arch Street  
Philadelphia 3, Pennsylvania

### VII. ENGINEERING COMPANIES

- A. United States Machinery Company, Inc.  
90 Broad Street  
New York, New York 10004  
Designs and installs woodworking plants.
- B. Mattison Machine Works  
200 Blackhawk Park Avenue  
Rockford, Illinois  
Designs and builds large line of woodworking machinery.

### VIII. DIRECTORIES

- A. Hitchcock's Woodworking Directory. Biennial. \$10.00.  
Hitchcock Publishing Company, Inc.  
Wheaton, Illinois  
Lists manufacturers of woodworking machinery and equipment.

UPHOLSTERED OCCASIONAL CHAIRS: S.I.C. 2512

## 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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Clearinghouse for Federal Scientific and  
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Springfield, Virginia 22151

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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

## FOAM RUBBER AND POLYURETHANE FOAM

I.P. No. 66045

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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.

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.

**FOAM RUBBER AND POLYURETHANE FOAM: Standard Industrial Classification 2515**

**A. PRODUCT DESCRIPTION**

Foam rubber in various widths and thicknesses according to specification.

**B. GENERAL EVALUATION**

Capital and skilled labor requirements are modest. The use of foam rubber for mattresses, cushions, etc. is increasing and a plant of this type should have good prospects in many developing areas.

**C. MARKET ASPECTS**

1. USERS. Mainly industries manufacturing mattresses, pillows, cushions, etc.
2. SALES CHANNELS AND METHODS. Sales chiefly to user industries direct, with some sales to wholesalers possible.
3. GEOGRAPHICAL EXTENT OF MARKET. The product is light and easy to transport, and the domestic market may be nation-wide. There is a substantial international market in this product but large-scale manufacturers generally have a distinct advantage in it.
4. COMPETITION. Foam rubber has become increasingly competitive with other materials used for the same purpose, as quality and durability has been improved. In the international market a plant of this size could generally not compete with large-scale producers.
5. MARKET NEEDED FOR PLANT DESCRIBED. A complex of user industries in the area where it would be feasible for this comparatively small plant to deliver at a competitive price is necessary.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: 160,000 Pounds

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<u>Cost</u>
Land, 1 acre.		--
Building, One-story, 50'x100'.	30,000	
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	\$36,000	
Other tools & equipmt.	3,000	
Furniture & fixtures	1,000	
Total (excl. Land)	40,000	
		<u>\$ 70,000</u>

Principal items: 2 ball mills,  
2 tanks, 2 blowers, 2 stirrers,  
2 emulsifiers, mixer, 10 molds,  
oven, 8 small tanks and stirrers,  
2 refrigeration units, air com-  
pressor, washing tank, boiler, 1  
set squeeze rolls, pipes, valves,  
pumps, conveyors, motors, switches,  
cutters and related equipment,  
laboratory equipment, maintenance  
tools, supply tanks, scales, work  
tables.

<b>b. WORKING CAPITAL</b>		<u>No. of days</u>	
Direct Materials, Direct Labor, Mfg. Overhead (a)	60	\$ 21,100	
Admin. Costs (b), Contingencies, Sales Costs (c)	30	1,600	
Training Costs		1,000	
Total Working Capital		<u>\$ 23,700</u>	

**c. TOTAL CAPITAL (EXCL. LAND) \$ 93,700**

### 2. MATERIALS AND SUPPLIES

<b>a. Direct Materials</b>		<u>Annual Requirements</u>	<u>Annual Cost</u>
Latex	124,000 lbs.		\$62,000
Soap & anti-oxidant	900 "		320
Curing agent	1,800 "		1,000
Accelerator	500 "		300
Sulfur	1,800 "		20
Light oil	3,600 "		360
Casein & zinc oxide	4,500 "		1,050
Potassium hydroxide	500 "		50
Chemical additives	4,300 "		9,450
Clay & other additives	22,100 "		1,550
Packaging materials			500
Total			<u>\$ 76,600</u>
<b>b. Supplies</b>			
Lubricants & hand tools		\$ 200	
Cutting tools, abrasives, welding		150	
Maintenance & spare parts		900	
Office supplies		150	
Total			<u>\$ 1,400</u>

### 3. POWER, FUEL AND WATER

<b>a. Electric Power.</b> Connected load		<u>Annual Cost</u>
12 hp.		\$ 300
<b>b. Fuel.</b> Any local fuel.		\$ 500
<b>c. Water.</b> 2.5 million gallons.		\$ 600

### 4. TRANSPORTATION

<b>a. Own Transport Equipment.</b>	None necessary.
<b>b. External Transport Facilities.</b>	No special requirements.

### 5. MANPOWER

<b>a. Direct Labor</b>		<u>Number</u>	<u>Annual Cost</u>
Skilled	1		\$ 5,000
Semi-skilled	2		8,000
Unskilled	6		18,000
Total	9		<u>\$ 31,000</u>
<b>b. Indirect Labor</b>			
Manager	1		\$ 8,000
Office	1		4,000
Maintenance	1		4,000
Total	3		<u>\$ 16,000</u>
<b>c. Training Needs.</b> Manager should be experienced. With 1 skilled worker he should be able to train other employees and reach full production in 30 days.			

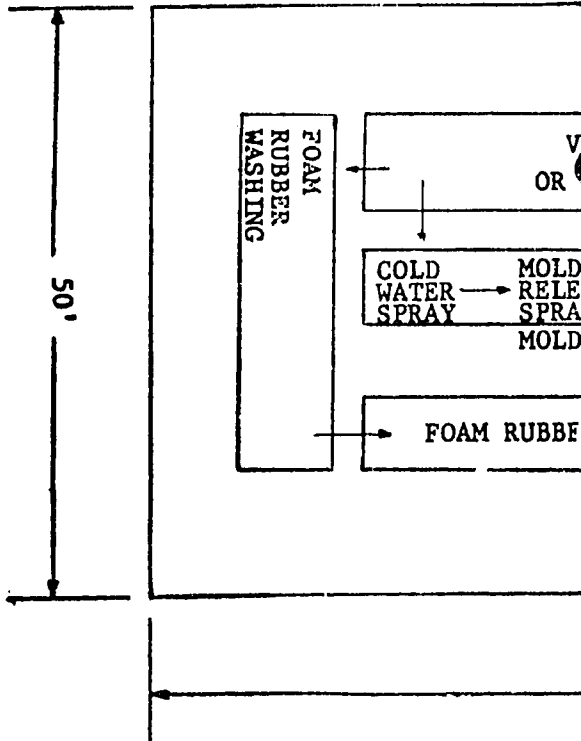
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>		
Direct Materials		\$ 76,600
Direct Labor		31,000
Manufacturing Overhead(a)		18,800
Admin. Costs(b), Contingencies		9,000
Sales Costs(c), Bad Debts		9,600
Depreciation on Fixed Capital		5,000
Total Annual Costs		<u>\$150,000</u>
<b>b. Annual Sales Revenue</b>		<u>\$192,000</u>

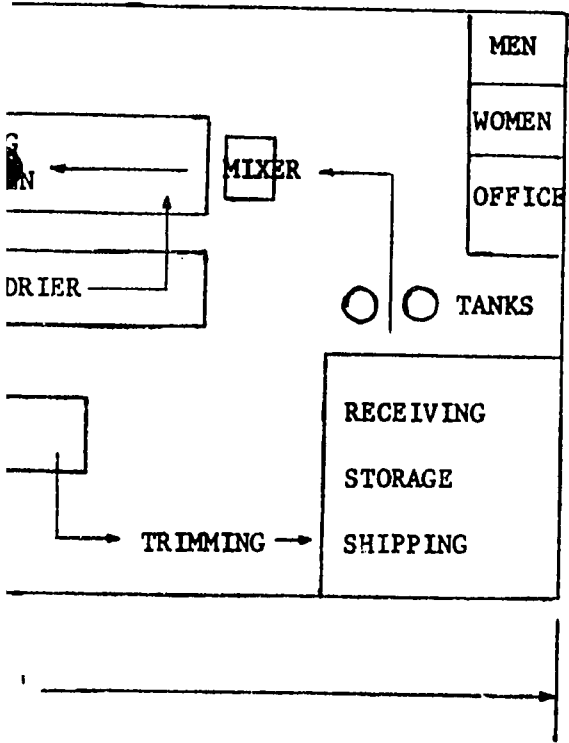
NOTES: (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

FOAM RUBBER AND POLYURETHANE FOAM: S.I.C. 2515

FOAM RUBBER AND PC  
PLANT LAYO



# ETHANE FOAM: S.I.C. 2515 WORKFLOW



36-1



# FOAM RUBBER AND POLYURETHANE FOAM: S.I.C. 2515

## SELECTED REFERENCES

### I. TEXTBOOKS

- A. Polythene. A. Renfrew. 1960. \$25.75.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York, New York 10001  
The history of polythene manufacturing process, the structure of polythene, oxidation and aging, general mechanical properties, testing and specification and processing techniques.
- B. Chemistry of Natural and Synthetic Rubber H. L. Fisher. 1957. 216 p.  
\$6.50.  
Reinhold Publishing Corporation  
430 Park Avenue  
New York, New York 10022  
Complete discussion of many rubbers, both natural and synthetic.
- C. Modern Rubber Chemistry. H. Barron. 1948. \$10.00.  
D. Van Nostrand Company, Inc.  
120 Alexander Street  
Princeton, New Jersey  
Explains in detail scientific principles underlying present day rubber manufacturing and the chemical and physical properties of rubber.

### II. PERIODICALS

- A. Rubber Age. Monthly. \$5.00/year.  
Palmerton Publishing Company  
101 West 31st Street  
New York, New York 10001
- B. Rubber World. Monthly. \$5.00/year.  
Bill Brothers Publishing Corporation  
386 Fourth Avenue  
New York, New York 10016

### III. GOVERNMENT PUBLICATIONS, U.S.

- A. Processing Foam Rubber. 1R-17093.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523

### IV. OTHER PUBLICATIONS

- A. Introduction to Rubber Technology. M. Morton. 1959. 553 p. \$11.50.  
Reinhold Publishing Corporation  
430 Park Avenue South  
New York, New York 10002  
Summary of rubber technology. Rubber plastics, softeners, and extenders. Carbon black, non-black compounding ingredients. Latex sponge and foam physical testing processing equipment for the rubber industry.

## SELECTED REFERENCES (Continued)

### V. TECHNICAL PAPERS

- A. The New Approach to Quality Control. Gratis.  
McGraw-Hill Publishing Company  
330 West 42nd Street  
New York, New York 10036

### VI. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$.25 each.

- A. Patent No. 2,979,775. 1961. 4 p.  
Method used in the manufacture of products from foam rubber.
- B. Patent No. 2,933,768. 1960. 2 p.  
Manufacturing foam and sponge rubber sheeting.
- C. Patent No. 2,910,724. 1959. 7 p.  
Apparatus and process for making foam rubber sheeting.

### VII. TRADE ASSOCIATIONS

- A. National Association of Plastic Fabricators  
1108 Standard Building  
Cleveland 13, Ohio
- B. Society of the Plastics Industry  
250 Park Avenue  
New York, New York 10017

### VIII. ENGINEERING COMPANIES

- A. Winner Manufacturing Company, Inc.  
100 Sullivan Way  
Trenton, New Jersey  
Plastic.
- B. DeBell and Richardson, Inc.  
10 Water Street  
Hazardville, Connecticut  
Research laboratories on plastics and polythene.

### IX. DIRECTORIES

- A. Rubber Red Book. Biannually. \$12.50.  
Palmerton Publishing Company, Inc.  
101 West 31st Street  
New York, New York 10001  
Rubber industry, rubber manufactures, and suppliers of equipment and materials.

## 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 — CFST1. 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

## FOLDING CHAIRS

I.P. No. 66047

*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.

## FOLDING CHAIRS: Standard Industrial Classification 2531

### A. PRODUCT DESCRIPTION

Wood slat seat folding chairs, of the type used commonly in assembly halls as temporary seating.

### B. GENERAL EVALUATION

Capital requirements for this industry are modest. Little skilled labor is needed. The major use for this product is in meeting places of various kinds, but it is also usable in the more modest kinds of public eating places, as well as in households as an occasional or outdoor chair. It has many possible uses. This is an industry particularly suited to areas which have suitable locally produced wood. The prospects for this industry should be good in many economically less developed areas.

### C. MARKET ASPECTS

1. USERS. Assembly halls, schools, sports arenas, eating places, households, etc.
2. SALES CHANNELS AND METHODS. Sales to retail stores, wholesale distributors, large users. Chairs of this type are often bought by establishments that hire out equipment for meetings.
3. GEOGRAPHICAL EXTENT OF MARKET. This product is easily portable and may be distributed over a fairly wide area. However, as with other such simple products, small-scale workshops can often produce sufficiently good alternatives to the factory product and in their immediate vicinity can provide competition if the factory product has to be transported very far. The ability to produce local substitutes almost anywhere at a low price means that this product does not often figure in international trade.
4. COMPETITION. a. Domestic Markt. Competition from imports is unlikely. There is some competition from metal furniture with plastic seats. Locally produced rattan furniture may also compete. Competition from small-scale producers is discussed in paragraph 3 above. b. Export Market. Plant would be unlikely to find any export outlets.
5. MARKET NEEDED FOR PLANT DESCRIBED. In view of the great differences that exist in the living and social habits of different peoples, it is difficult to generalize on the size of the market required for this plant. However, it should generally be possible to find an outlet for the production of a plant such as this in an urban area with a total population of about a million people and an average rate of growth and new construction.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 20,000 Chairs

### 1. CAPITAL REQUIREMENTS

<b>a. FIXED CAPITAL</b>		<b>Cost</b>
Land. About 5,000 sq. ft.	\$	--
Building. One story, 40'x50'.		12,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	\$8,000	
Other tools & equipmt.	2,000	
Furnitures & fixtures	700	
Total (excl. Land)		<u>\$ 22,700</u>

**Principal Items.** Radial cutoff saw, jointer, planer, drill press, band saw trim saw, table belt sander, single end tenoner, chain mortiser, paint spraying equipment, assembling presses.

### b. WORKING CAPITAL

	<b>No. of Days</b>		
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$	8,300
Admin. Costs(b), Contingencies, Sales Costs(c)	30		800
Training Costs			2,400
Total Working Capital			<u>\$ 11,500</u>

**c. TOTAL CAPITAL (EXCL. LAND)** \$ 34,200

### 2. MATERIALS AND SUPPLIES

	<b>Annual Reqsmts.</b>	<b>Annual Cost</b>
<b>a. Direct Materials</b>		
Lumber	100,000 bd. ft.	\$ 10,000
Hardware		500
Glue		800
Total		<u>\$ 11,300</u>

### b. Supplies

Lubricants & hand tools	\$	100
Cutting tools		200
Maintenance & repair parts		500
Sandpaper		500
Office supplies		200
Total		<u>\$ 1,500</u>

### 3. POWER, FUEL AND WATER

	<b>Annual Cost</b>
<b>a. Electric Power.</b> Connected load about 30 hp.	<u>\$ 900</u>
<b>b. Fuel.</b> Scrap wood.	
<b>c. Water.</b> For glue in production process, & for general purposes.	<u>\$ 100</u>

### 4. TRANSPORTATION

- a. Own Transport Equipment.** None necessary.
- b. External Transport Facilities.** No special requirements.

### 5. MANPOWER

	<b>Number</b>	<b>Annual Cost</b>
<b>a. Direct Labor</b>		
Skilled	2	\$ 10,000
Semi-skilled	2	8,000
Unskilled	2	6,000
Total	<u>6</u>	<u>\$ 24,000</u>
<b>b. Indirect Labor</b>		
Manager - buys, sells, and supervises	1	\$ 8,000
Office	1	4,000
Total	<u>2</u>	<u>\$ 12,000</u>

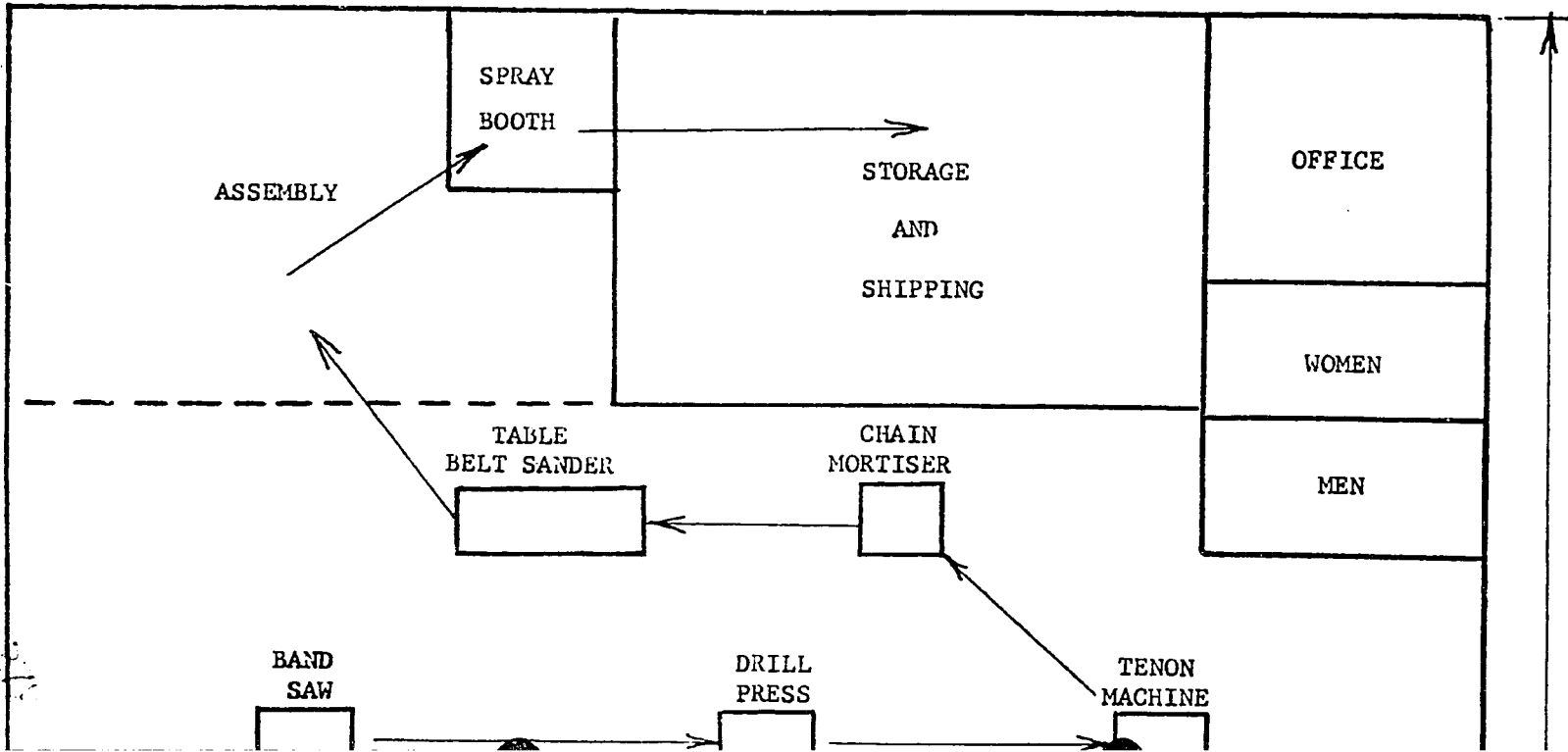
- c. Training Needs.** Manager must have experience. With aid of 1 skilled worker, he should be able to do all necessary labor training. Plant should reach full production in 2 months.

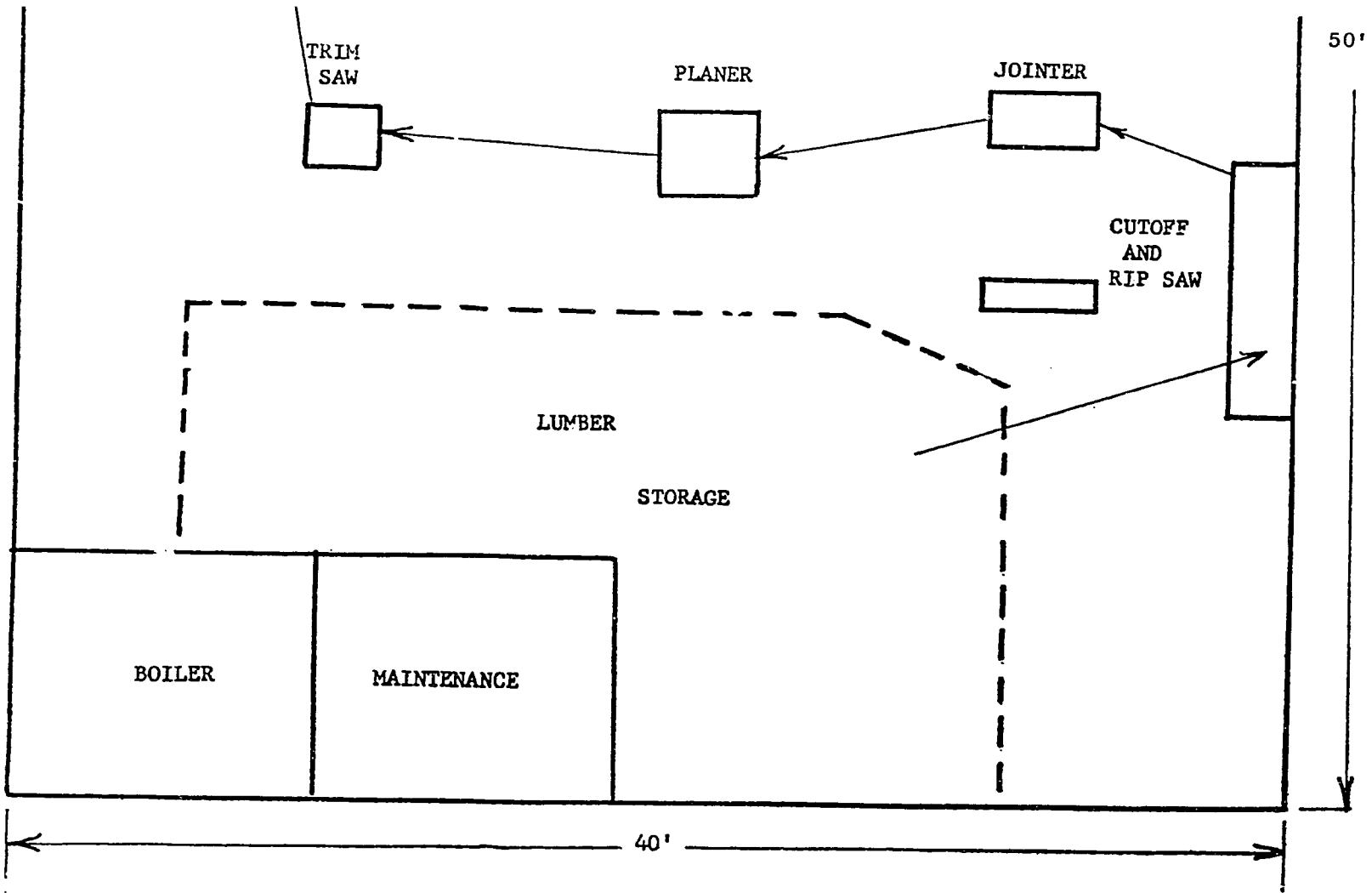
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

<b>a. Annual Costs</b>		
Direct Materials	\$ 11,300	
Direct Labor	24,000	
Manufacturing overhead(a)	14,500	
Admin. Costs(b), Contingencies	4,000	
Sales Costs(c), Bad Debts	6,000	
Depreciation on Fixed Capital	1,600	
Total Annual Costs	<u>\$ 61,400</u>	
<b>b. Annual Sales Revenue</b>		<u>\$ 80,000</u>

**NOTES :** (a) Includes Supplies, Power, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

PLANT LAYOUT  
ARROWS INDICATE WORK FLOW







FOLDING CHAIRS: S. I. C. 2531

SELECTED REFERENCES

I. TEXTBOOKS

- A. Furniture Making and Cabinet Work. B. W. Pelton. 1949. 602 p.  
Illus. \$7.95.  
D. Van Nostrand Company, Inc.  
120 Alexander Street  
Princeton, New Jersey  
Outdoor and indoor furniture construction and finishing.

II. PERIODICALS

- A. The Wood Worker. Monthly. \$2.00/year.  
S. H. Smith Company  
2232 North Meridan Street  
Indianapolis, Indiana  
News and technical information on all phases of wood working.
- B. Furniture Manufacturer. Monthly. \$5.00/year  
Vincent Edwards, Inc.  
342 Madison Avenue  
New York, New York  
Furniture components, manufacturing processes, construction and finishing.

III. GOVERNMENT PUBLICATIONS, U.S.

- A. Wood Furniture Industry. TB-118.  
Office of Technical Cooperation and Research  
Agency for International Development  
Washington, D. C. 20523

IV. OTHER PUBLICATIONS

- A. Furniture Joinery. W. W. Klenke. 1943. 144 p. Illus. \$2.25.  
Charles A. Bennet Company, Inc.  
237 North Monroe Street  
Peoria 2, Illinois  
A picturized treatment of procedures and methods used to make the right joint, the wood to use, and the services to be expected from the finished articles.

V. TECHNICAL PAPERS

- A. Furniture Finishing. H. B. Gatslick. 1956. 82 p. \$1.00. A Wood Working Digest. Technical Series Reprint No. 108.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Description of finishing techniques in wood working and the materials and tools used.
- B. Cutting Techniques for woodworkers. T. D. Perry. 1955. 60 p. \$.50. A Woodworking Digest. Technical Series Reprint No. 107.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Descriptions of cutting techniques in wood working and of the tools used therein.

## SELECTED REFERENCES (Continued)

### VI. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$.25 each

- A. Patent No. 2,767,776. 1956. 5 p.  
Material and method of making folding chairs.
- B. Patent No. 2,705,043. 1955. 4 p.  
Process for manufacturing folding chairs.
- C. Patent No. 2,567,111. 1951. 8 p.  
Manufacture of folding chairs.
- D. Patent No. 2,541,131. 1951. 6 p.  
Manufacturing folding chairs.

### VII. TRADE ASSOCIATIONS

- A. National Association of Furniture Manufacturers  
666 Lake Shore Drive  
Chicago 11, Illinois  
Keeps members informed of the latest developmnets in machinery,  
materials, processes, and market opportunities.

### VIII. ENGINEERING COMPANIES

- A. United States Machinery Company, Inc.  
90 Broad Street  
New York, New York 10004  
Industrial woodworking machinery. Designs and installs woodworking  
plants.
- B. Fay and Egan Company  
2024 Eastern Avenue  
Cincinnati, Ohio  
A broad line of woodworking machinery and equipment.

### IX. DIRECTORIES

- A. Hitchcock's Woodworking Directory. Biennial. \$.10.00.  
Hitchcock Publishing Company  
Wheaton, Illinois  
Lists manufacturers and suppliers of over 800 products used in the wood-  
working industry, as well as listing trade names, trade associations and  
other data.

## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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Clearinghouse for Federal Scientific and  
Technical Information, 410.12  
Springfield, Virginia 22151

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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

## CORRUGATED FIBER BOXES

I. P. No. 66048

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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.

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.

## CORRUGATED FIBER BOXES: Standard Industrial Classification 2653

### A. PRODUCT DESCRIPTION

Corrugated boxes made from purchased paperboard. Plant can also make corrugated fiberboard for interior packing of fragile articles and for other uses. To save shipping space boxes are almost always shipped knocked down flat, ready to be made up by users. Production capacity of plant is given in terms of boxes requiring an average of 13.2 square feet of board each, which after allowance for folding and waste makes a box approximately 1 foot square by 2 feet long.

### B. GENERAL EVALUATION

Corrugated boxes are strong, resilient, light in weight and inexpensive. In the United States about 90% of all packaged freight is shipped in corrugated containers, and they are now often used for quite heavy articles. This industry is developing steadily and appears to have possibilities of further substantial growth. The manufacturing operations are simple and call for little skilled labor. On the other hand, from the viewpoint of underdeveloped areas, the industry has the disadvantage that even the smallest economically and technically feasible mechanized plant necessitates a rather high investment, with correspondingly high production capacity. The economic feasibility of this plant is tied in with the development of secondary industries in general. When an extensive enough complex of them has been built up, this industry would appear to have a promising future.

### C. MARKET ASPECTS

1. USERS. Industries producing packaged foodstuffs, articles of metal, glass, ceramics, rubber, plastics, etc. Also firms engaged in packing and forwarding.
2. SALES CHANNELS AND METHODS. Almost all sales are made direct to user industries.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. The boxes, shipped flat, and the corrugated board for interior packing and other purposes are easy to handle and transport costs are not burdensome. Potential market may be nation wide. b. Export. These products are exported all over the world by countries producing paper products on a large scale.
4. COMPETITION. a. Domestic Market. Unless costs are abnormally high, this industry should be able to compete effectively with imports. As regards alternative materials, corrugated fiber boxes successfully compete with wooden boxes for an increasing number of uses. b. Export Market. Plant under consideration might be able to export to nearby areas of neighboring countries not possessing similar manufacturing facilities, but it would not be in a position to compete in general export business with countries producing on a large scale.
5. MARKET NEEDED FOR PLANT DESCRIBED. In the United States per capita utilization of corrugated boxes is close to 40 boxes of average size per annum. Such a high rate of utilization is due to the great variety of manufactured articles of all types produced in the U. S., widespread use of packaged foodstuffs, and fact that goods are often shipped long distances within the country. In some less developed areas few manufactured articles requiring such packaging may be produced, demand for such articles often being met very largely by imports: packaged foodstuffs are usually uncommon; and markets for articles of daily consumption tend to be local and therefore elaborate packaging is less needed. Where such industries as paint, soap, rubber-soled shoes, light bulbs, toys, canned fruit, etc. have been started, demand for corrugated boxes will arise. Where export trade in manufactured products has been developed, demand will be correspondingly more active. A survey of consumer industries, actual and potential, should usually be feasible. In some cases it will probably be found that wooden boxes are being used, e.g. for paint, where corrugated boxes would be as good or better. A study of the potential, as well as the actual, market is therefore of special importance.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 5.4 MILLION BOXES

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	Cost
Land. 2-1/2 acres.	\$ --
Building. One story, 120'x240'.	175,000
Equipment, Furniture & Fixtures.	
Prod'n. tools & equipment	\$255,000
Other tools & equipment	5,000
Furniture & fixtures	2,000
Transportation equipmt.	2,500
<u>Total (excl. Land)</u>	<u>\$439,500</u>

Principal Items. 68" single facer with rolls, mill roll stands, single preheating unit, duplex preheating unit, bridge & conveyor, glue machine, double facer, duplex slitter scorer, single sheet cut-off, sheet stacker & delivery, 2-ton electric hoists, 38" x 78" 2-color printer slotter, creaser & trimmer 50" x 106" 2-color printer-slotter, creaser & trimmer, 82" slitting & scoring machine, single operator automatic taper, steam boiler 200 p.s.i., starch equipment, pick-up truck.

b. <u>WORKING CAPITAL</u>	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$113,500
Admin. & Sales Costs(b), Contingencies	30	8,000
Training Costs		12,000
<u>Total Working Capital</u>		<u>\$133,500</u>

c. TOTAL CAPITAL (EXCL. LAND) \$573,000

### 2. MATERIALS AND SUPPLIES

a. <u>Direct Materials</u>	Annual Cost
Inner linings	\$184,300
Corrugated medium	118,500
Outer liner	183,800
Starch	14,000
Finishing	22,000
<u>Total</u>	<u>\$522,300</u>

b. <u>Supplies</u>	
Lubricants & hand tools	\$ 100
Maintenance	1,000
Spare parts	4,500
Hand tools	200
Office supplies	300
<u>Total</u>	<u>\$ 6,100</u>

### 3. POWER, FUEL AND WATER

	Annual Cost
a. <u>Electric Power.</u> Connected load 120 hp.	\$ 7,400
b. <u>Fuel.</u> 114,000 gals. bunker C oil annually.	\$ 8,000
c. <u>Water.</u> For boiler, sanitation, fire protection.	\$ 700

### 4. TRANSPORTATION

	Annual Operating Cost
a. <u>Own Transport Equipment.</u> 1-ton truck for pickups & local deliveries.	\$ 900
b. <u>External Transport Facilities.</u> Total in and out shipments about 625 tons a month. Plant should be located on good highway and, if possible, on railroad siding.	

### 5. MANPOWER

	Number	Annual Cost
a. <u>Direct Labor</u>		
Skilled	3	\$ 15,000
Semi skilled	7	28,000
Unskilled	20	60,000
<u>Total</u>	<u>30</u>	<u>\$103,000</u>
b. <u>Indirect Labor</u>		
Manager	1	\$ 10,000
Office staff	3	12,000
Other	3	\$ 10,500
<u>Total</u>	<u>7</u>	<u>\$ 32,500</u>

c. Training Needs. Manager should be fully experienced. With 3 skilled workers, he should be able to do all necessary labor training. Plant should reach full production in 2 months.

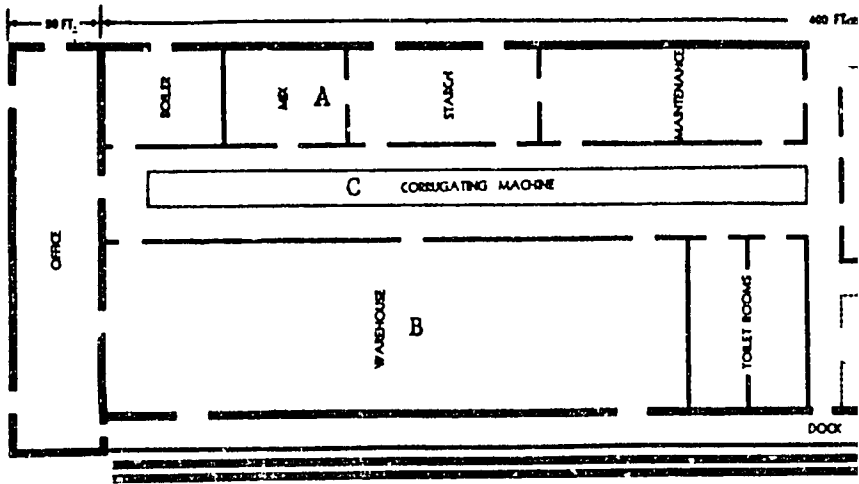
### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$522,300
Direct Labor	103,000
Manufacturing Overhead(a)	55,600
Admin. & Sales Costs(b), Bad Debts, Contingencies	94,500
Depreciation on Fixed Capital	33,700
<u>Total Annual Costs</u>	<u>\$809,100</u>
b. <u>Annual Sales Revenue</u>	<u>\$945,000</u>

NOTES. (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges, Sales Commissions, Freight Out, Travel.

# CORRUGATED FI

## PLANT LAYOU

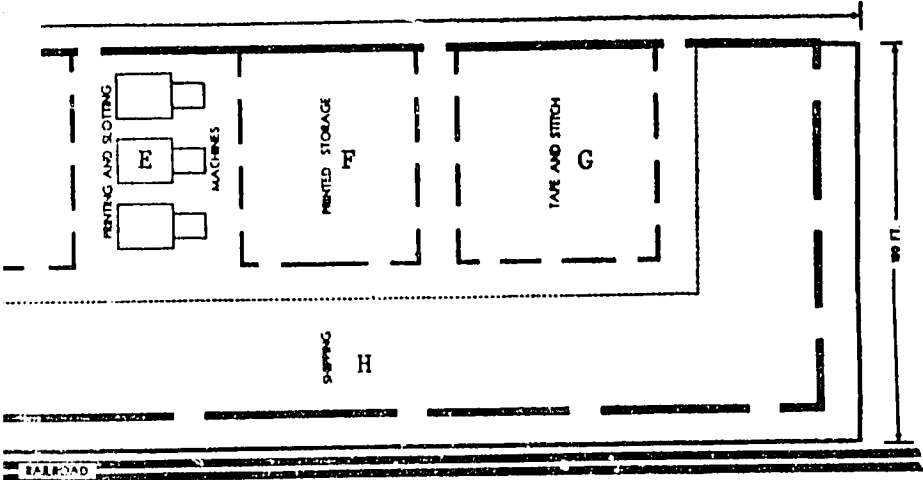


- A. Mix - adhesive
- B. Board - stock
- C. Corrugating machine
- D. Corrugated storage

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BOXES: S.I.C. 2653

D WORKFLOW



- E. Printing and slotting
- F. Printed storage
- G. Tape and stitch
- H. Storage and shipping

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CORRUGATED FIBER BOXES: S.I.C. 2653

SELECTED REFERENCES

I. TEXTBOOKS

- A. Mechanical Properties of Wood and Paper. R. Merideth. 300 p. \$7.25  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York, New York 10001  
Elastic and plastic properties; swelling and shrinking; papermaking;  
testing; tensile studies; compressibility and folding endurance.
- B. Packaging Engineering. D. C. Barail. 1954. 414 p. \$9.50.  
Avi Publishing Company, Inc.  
P. O. Box 388  
Westport, Connecticut  
Design and production of fiber boxes, management and engineering.

II. PERIODICALS

- A. Box Board Containers. Monthly. \$7.00/year.  
Haywood Publishing Company  
6 North Michigan Avenue  
Chicago 2, Illinois  
Manufacturing practices, production methods.
- B. Fiber Containers. Monthly. \$9.00/year.  
Board Products Publishing Company  
228 North La Salle  
Chicago 1, Illinois  
Serving the over-all paperboard field, with economic analyses, technical  
articles on paperboard containers, their application and trade notes.

III. OTHER PUBLICATIONS

- A. Modern Packaging. pp. 77-78. June 1960. Gratis.  
World Report Editor  
Modern Packaging  
575 Madison Avenue  
New York, New York 10022  
Abstracts from foreign packaging magazines.

IV. TECHNICAL PAPERS

- A. Military and Government Packaging. 40 p. \$2.00.  
Peacock Business Press, Inc.  
200 South Prospect Avenue  
Park Ridge, Illinois  
Reprinted from Paper, Film and Foil Converter and American Paper  
Merchant.

## SELECTED REFERENCES (Continued)

### V. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$.25 each.

- A. Patent No. 2,835,432. May 20, 1958. 4 p.  
Ventilated box or carton made from fibrous materials
- B. Patent No. 2,510,004. May 30, 1950. 4 p.  
Telescopic shipping carton made of corrugated board, fiberboard, or other bendable material.
- C. Patent No. 2,362,181. Nov. 7, 1944. 3 p.  
This patent applies to an improved construction for shipping or mailing boxes.

### VI. TRADE ASSOCIATIONS

- A. Fiber Box Association  
224 South Michigan Avenue  
Chicago 4, Illinois  
Keeps members informed of developments and progress in technology and products in the fiber box industry.
- B. National Paperboard Association  
224 South Michigan Avenue  
Chicago, Illinois 60604  
Association for development and promotion of paperboard, for major direct material used in the production of corrugated fiber boxes.

### VII. ENGINEERING COMPANIES

- A. Rust Engineering Company  
930 Fort Duquesne Boulevard  
Pittsburgh, Pennsylvania  
Complete service in consultation, engineering, procurement, and construction.

### VIII. DIRECTORIES

- A. Source of Supply Directory. 1268 p. \$6.00.  
Peacock Business Press, Inc.  
200 South Prospect Avenue  
Park Ridge, Illinois  
20,000 listings. Paper mills, converters, classified products, geographical directory, manufacturers' representatives, importers, exporters, supplies manufacturers, and trade associations.

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## PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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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.

## 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

## FIBERBOARD

I. P. No. 66049

*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.

## FIBER BOARD: Standard Industrial Classification 2661

### A. PRODUCT DESCRIPTION

This fiberboard is made from wood fibers or wood pulp. It is produced in sections four feet by eight feet by one-half inch thick. Other lengths widths and thicknesses can be produced, if desired.

### B. GENERAL EVALUATION

Capital requirements are rather large but not much skilled labor is needed. Prospects for the plant depend on the volume and kind of building construction in the area and to a less extent on the existence of user industries, as well as on the relative cost of alternative materials. In general the utilization of fiberboard is increasing, and the prospects for such a plant are good in many developing areas.

### C. MARKET ASPECTS

1. USERS. Builders, furniture makers who use it as a core for veneered wood.
2. SALES CHANNELS AND METHODS. Sales to builders, building materials supply houses, and to furniture makers. Active sales promotion may be necessary in areas where fiberboard is not yet commonly used.
3. GEOGRAPHICAL EXTENT OF MARKET. The product is easily transported and the domestic market may be very extensive. There is an international market for it, but large manufacturers who can produce cheaply and have the resources to organize an export business have the bulk of the trade.
4. COMPETITION. a. Domestic Market. Competition may come both from other materials and from imports. Careful attention must be paid to keeping down costs, so as to be able to sell profitably at a competitive price, and also to quality maintenance. b. Export Market. Some exports to nearby foreign areas may be possible, but the plant is not large enough to compete generally in the international market.
5. MARKET NEEDED FOR PLANT DESCRIBED. Since there will be great differences between different communities in the amount of construction going on and in the extent to which fiberboard is used in construction, the market needed cannot be estimated in terms of total population. A careful study of the market potential is needed to ascertain whether there is sufficient demand for the product in the area in which it is feasible to market it.

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## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION : 23 Million Square Feet

### 1. CAPITAL REQUIREMENTS

a. <u>FIXED CAPITAL</u>	Cost
Land, About 2 acres.	\$ ---
Building, 60'x300', with 60'x150' basement.	144,000
Equipment, Furniture & Fixtures.	
Prodn. tools & equipmt.	\$764,000
Other tools & equipmt.	2,000
Furniture & fixtures	1,000
Transportation equipmt.	4,000
Total (excl. Land)	\$ 771,000
Total (excl. Land)	\$ 915,000

Principal Items: Wood shaver, hammer mill and screen, double quick pulper, 6" centrifugal pumps (5), screw presses (2), digester pulp refiners (2), pulp washer thickener, consistency regulator, storage tank, agitator, cylinder board machine, presses, wet saw and trimming saw, boiler 400 hp.-250 p. s. i., starters, valves, piping and spare parts, welding equipment, compressor, hand tools, delivery trucks.

### b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 83,400
Admin. Costs(b), Contingencies, Sales Costs(c)	30	12,800
Training Costs		4,000
Total Working Capital		\$ 100,200

c. TOTAL CAPITAL (EXCL. LAND) \$1,015,200

### 2. MATERIALS AND SUPPLIES Annual Cost

a. <u>Direct Materials</u>	
Logs for pulp wood	\$ 162,000
Chemical adhesives	120,000
Chemical insecticides	15,000
Packaging materials	3,000
Total	\$ 300,000
b. <u>Supplies</u>	
Lubricants & hand tools	\$ 400
Cutting tools & abrasives	200
Maintenance & spare parts	3,000
Welding gas and rods	200
Office supplies	200
Total	\$ 4,000

### 3. POWER, FUEL AND WATER Annual Cost

a. <u>Electric Power.</u> Connected load 500 hp.	\$ 15,000
b. <u>Fuel.</u>	\$ 12,000
c. <u>Water.</u> 16,000 gals. a minute.	\$ 3,000

### 4. TRANSPORTATION

a. <u>Own Transport Equipment.</u>	Annual Operating Cost
Five-ton truck.	\$ 1,200
b. <u>External Transport Facilities.</u> In and out shipments average 60 tons a day. Good highways essential, and railroad facilities, if possible.	

### 5. MANPOWER Number Annual Cost

a. <u>Direct Labor</u>		
Skilled	6	\$ 30,000
Semi-skilled	9	36,000
Unskilled	12	36,000
Total	27	\$ 102,000
b. <u>Indirect Labor</u>		
Manager & supervisors	4	\$ 34,000
Office	3	13,000
Maintenance & driver	4	16,000
Total	11	\$ 63,000

c. Training Needs. Manager and 3 supervisors must be experienced. With 6 skilled workers they should be able to train other employees and reach full production in 30 days.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. <u>Annual Costs</u>	
Direct Materials	\$ 300,000
Direct Labor	102,000
Manufacturing Overhead(a)	98,200
Admin. Costs(b), Contingencies	78,000
Sales Costs(c), Bad Debts	75,000
Depreciation on Fixed Capital	82,800
Total	\$ 736,000
b. <u>Annual Sales Revenue</u>	\$1,000,000

NOTES : (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight out, Travel.

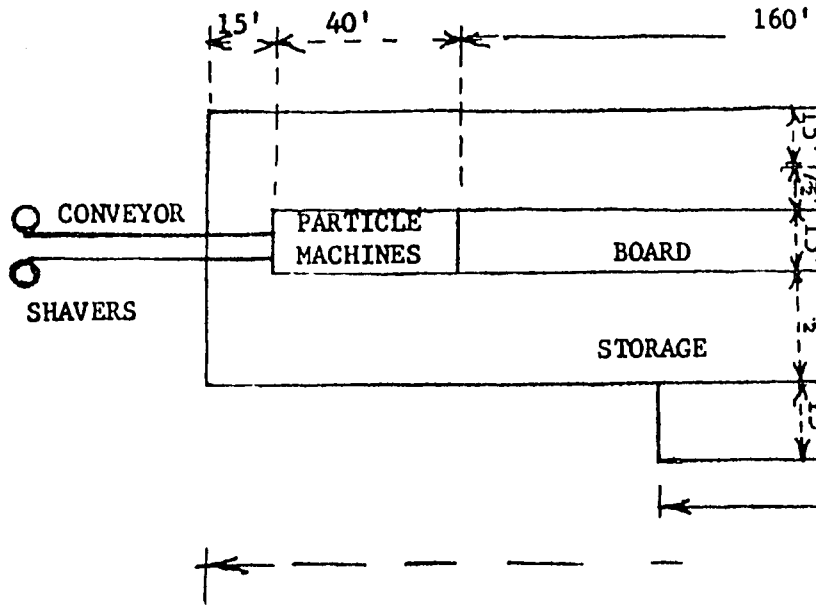
FIBER BOARD : S.I.C. 2661

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# FIBER BOA

## PLANT

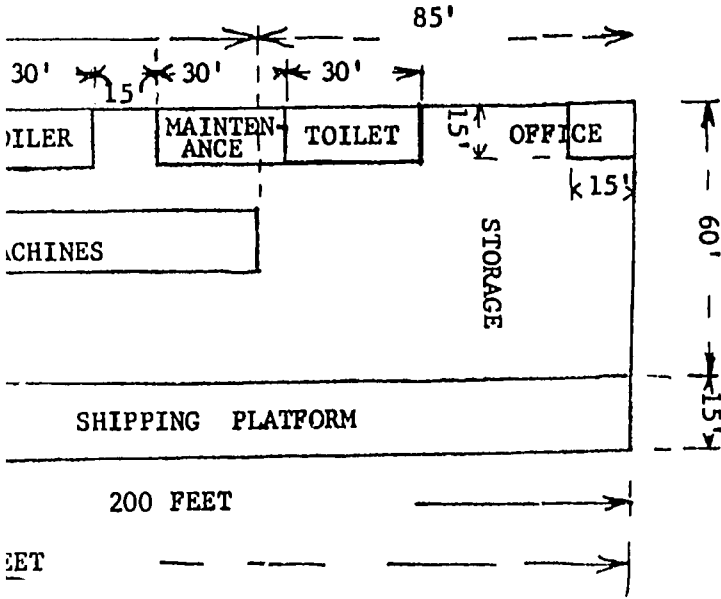
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rough board machines.





FIBER BOARD: S.I.C. 2661

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New York, New York 10022  
Encompasses the modern methods of wood pulp manufacture.

II. PERIODICALS

- A. Fiber Containers and Paperboard Mills. Monthly. \$9.00/year.  
Board Products Publishing Company  
228 North La Salle Street  
Chicago 1, Illinois  
New developments in industry.

III. GOVERNMENT PUBLICATIONS, U.S.

- A. Dry Method Pressboard Panels. IR-26941. January 1961.  
Office of Technical Cooperation and Research  
Agency for International Development  
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Presents information on dry methods for the manufacture of pressboard panels.

IV. OTHER PUBLICATIONS

- A. Pulp and Paper Manufacture Series. J.N. Stephenson. Vol. III. 1953.  
945 p. Illus. \$12.00.  
McGraw-Hill-Book Company, Inc.  
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Preparation and treatment of wood pulp. Manufacture and testing of paper and board.
- B. Insulating Board, Hardboard, and Other Structural Fiberboards. Lewis and Schwartz. 1959. 16 p. Gratis.  
Forest Products Laboratory  
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U.S. Department of Agriculture  
Madison, Wisconsin  
Technical data on fiber board and fiber board manufacture.

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Washington, D.C. 20231 \$25 each.

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- B. Patent No. 2,924, 548. 1960. 4 p.  
Process for making fiber board product.
- C. Patent No. 2,918, 398. 1959. 4 p.  
Process for making artificial board from fiber.
- D. Patent No. 2,881, 669. 1959. 6 p.  
Fiber board production and product.
- E. Patent No. 2,821,120. 1958. 14 p.  
Machine for making fiber board.

### VI. TRADE ASSOCIATIONS

- A. National Particle Board Association  
711 14th Street, N.W.  
Washington, D.C.

### VII. ENGINEERING COMPANIES

- A. Apmew, Inc.  
P.O. Box 1  
Glens Falls, New York  
Complete plants for pulp, paper and fiber board.
- B. Alven H. Johnson and Company, Inc.  
417 Lexington Avenue  
New York, New York 10017  
Complete plants for pulp, paper, and fiber board.
- C. Sandy Hill Iron and Brass Works  
Hudson Falls, New York  
Designers and builders of pulp, paper, and fiber board plants.

### VIII. DIRECTORIES

- A. Official Board Mill Directory. Annual. \$7.00.  
Board Products Publishing Company  
228 North La Salle Street  
Chicago 1, Illinois  
Lists over 450 manufacturers with production capacities and grades of products produced.

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# INDUSTRY PROFILES

## CAUSTIC SODA

I. P. No. 66050

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## CAUSTIC SODA: Standard Industrial Classification 2812

### A. PRODUCT DESCRIPTION

Caustic soda, NaOH, is a water soluble white solid. It is made by the electrolysis of salt and in other ways. Chlorine and hydrogen are by-products of the electrolysis method. Chlorine gas can be converted to liquid by low pressure method. In that form it can be shipped in cylinders and tank cars. Hydrogen can be combined with chlorine to make hydrochloric acid.

### B. GENERAL EVALUATION

This plant requires a large amount of capital. Manufacturing operations necessitate an ample and regular supply of electric power. A major problem in this industry often is to find markets for the chlorine produced as a by-product. It is very important to survey the market for chlorine as well as for caustic soda, as inability to market sufficient quantities of the former may determine the profitability or otherwise of the operation.

### C. MARKET ASPECTS

1. USERS. Caustic soda is used by soap factories and some chemical industries. Chlorine is used for water purification, bleaching, and other purposes. Hydrogen is used in some chemical processes.
2. SALES CHANNELS AND METHODS. Sales direct to user industries, water works, etc.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transport cost is an important factor in limiting the market area, and users will normally make their purchases from the supplier who can give them the lowest delivered price, though exceptionally they may pay higher prices for speed of delivery. The market area is conditioned by the same factors as operate in the case of other bulk standardized commodities. b. Export. Caustic soda is widely exported.
4. COMPETITION. a. Domestic Market. Generally there should be no difficulty in competing with imports if the plant is well located in relation to user industries. b. Export Market. Some exports to nearby countries might be possible, but the plant is too small to engage in general export trade.
5. MARKET NEEDED FOR PLANT DESCRIBED. Normally it is necessary to have a sizable complex of user industries located in the vicinity of the plant, or at points to which the products can be easily and cheaply delivered.

## D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: 7,000 Tons Caustic Soda, 6,230 Tons Chlorine

### 1. CAPITAL REQUIREMENTS

#### a. FIXED CAPITAL

	\$	Cost
Land. About 2 acres.		--
Building. Main bldg. 44.5'x252' ; office 1st floor 49'x64' ; 2nd floor 49'x54'.		154,800
Equipment, Furniture & Fixtures.		
Prodn. tools & equipment	\$1,120,600	
Other tools & equipment.	150,000	
Furniture & fixtures	1,000	
Transportation eqpmt.	4,000	
<u>Total (excl. Land)</u>		<u>\$1,430,400</u>

Principal Items. Brine treatment tanks and conveyor, electrolytic cells, transformers, switches, converters, evaporators, tanks, pipes, valves, pumps, fans and boiler.

#### b. WORKING CAPITAL

	No. of Days	\$
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	\$ 73,700
Admin. Costs(b), Contingencies, Sales Costs(c)	30	11,500
Training Costs		6,000
<u>Total Working Capital</u>		<u>\$ 91,200</u>

#### c. TOTAL CAPITAL (EXCL. LAND) \$1,521,600

### 2. MATERIALS AND SUPPLIES

	Annual Reqsmts.	Annual Cost
<b>a. Direct Materials</b>		
Salt	11,000 tons	\$ 62,000
Soda ash	13 tons	400
Muriatic acid	244 gals.	100
Sulfuric acid	210 tons	4,300
NaOH	1,050 tons	1,050
Sulrose	37,800 lbs.	3,400
Packaging materials		3,750
<u>Total</u>		<u>\$ 75,000</u>
<b>b. Supplies</b>		
Lubricants & hand tools		\$ 200
Cutting tools & abrasives		200
Maintenance & spare parts		10,600
Carbon		7,200
Asbestos		8,400
Office supplies		400
<u>Total</u>		<u>\$ 27,000</u>

### 3. POWER, FUEL AND WATER Annual Cost

a. Electric Power. About 13,650,000 kw-hr annually.	\$136,500
b. Fuel. About 850 tons bunker C oil	\$ 12,800
c. Water. About 110 million gals.	\$ 27,500

### 4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. Five-ton truck for pickup and delivery.	\$ 1,200
b. External Transport Facilities. In and out freight totals 40 tons per day. Railroad facilities and good highways are necessary.	

### 5. MANPOWER Number Annual Cost

a. Direct Labor		
Skilled	3	\$ 18,000
Semi-skilled	6	30,000
Unskilled	9	36,000
<u>Total</u>	<u>18</u>	<u>\$ 84,000</u>
b. Indirect Labor		
Manager & supervisors	3	\$ 32,000
Office workers	4	16,000
Others	6	30,000
<u>Total</u>	<u>13</u>	<u>\$ 78,000</u>

c. Training Needs. Manager should be fully experienced. With 3 supervisors he should be able to train employees and reach full production in 60 days.

### 6. TOTAL ANNUAL COSTS AND SALES REVENUE

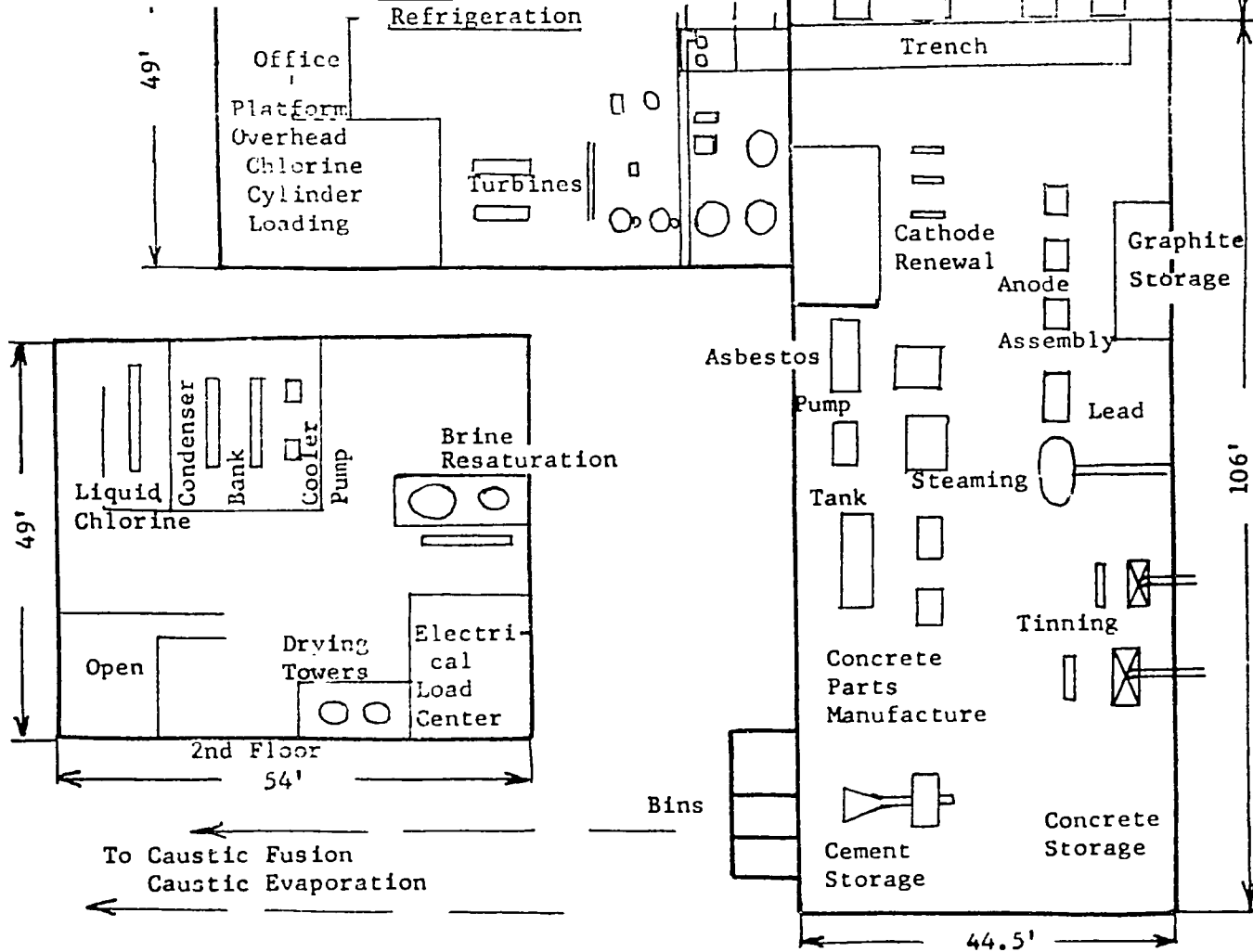
a. Annual Costs	
Direct Materials	\$ 75,000
Direct Labor	84,000
Manufacturing Overhead(a)	283,000
Admin. Costs(b), Contingencies	78,000
Sales Costs(c), Bad Debts	60,000
Depreciation on Fixed Capital	148,000
<u>Total</u>	<u>\$728,000</u>
b. Annual Sales Revenue	\$850,000

NOTES. (a) Includes Supplies, Power, Fuel, Water Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out Travel.

CAUSTIC SODA: S.I.C. 2812

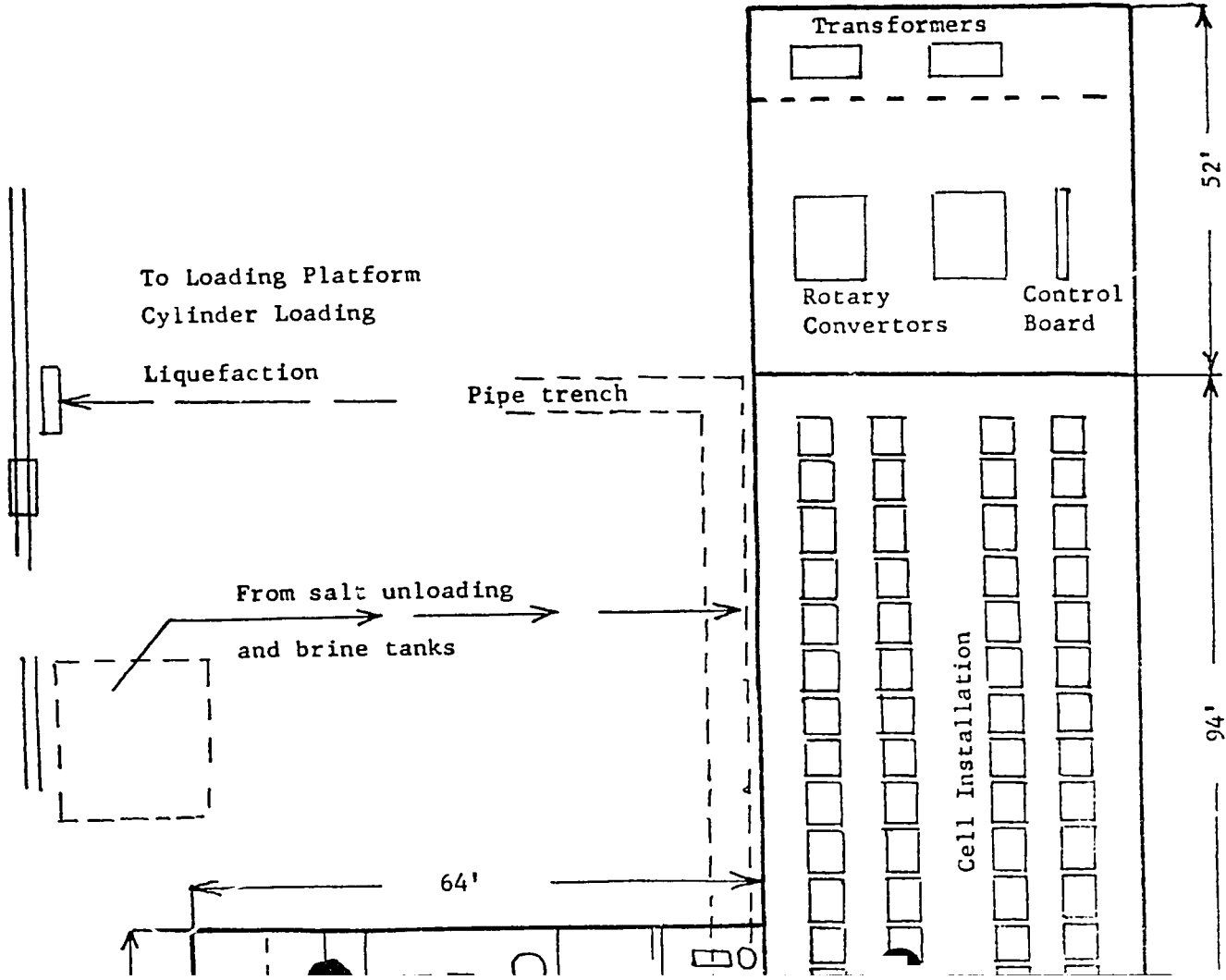
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CAUSTIC  
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S.I.C. 2812

D WORKFLOW



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## CAUSTIC SODA: S. I. C. 2812

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New York, New York 10036  
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New York, New York 10036
- B. Chemical and Engineering News. Weekly. \$6.00/year.  
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Washington, D. C.

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Explains the theory of industrial processes for such as those involving natural sodium salts.
- B. Encyclopedia of Chemical Technology. R. E. Kirk and D. Pothmer. 15 vols. \$400.  
Interscience Publishers, Inc.  
250 Fifth Avenue  
New York, New York 1001  
Thorough coverage of the fields of chemical engineering and industrial chemistry.

## SELECTED REFERENCES (Continued)

### V. TECHNICAL PAPERS

- A. The New Approach to Quality Control. Gratis.  
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330 West 42nd Street  
New York, New York 10036

### VI. U. S. PATENTS

Available U. S. Patent Office  
Washington, D. C. 20231 \$.25 each.

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Electrolytic decomposition of sodium chloride in the manufacture of caustic soda.
- B. Patent No. 2,909,412. 1959. 4 p.  
Process for production of caustic soda by electrolysis.
- C. Patent No. 2,829,095. 1958. 5 p.  
Method of production of caustic soda and other compounds by multi-compartment electrolysis.

### VII. TRADE ASSOCIATIONS

- A. American Institute of Chemical Engineers  
345 East 47th Street  
New York, New York 10017

### VIII. ENGINEERING COMPANIES

- A. Hooker Chemical Corporation  
Niagara Falls, New York
- B. Diamond Alkali Company  
Union Commerce Building  
Cleveland 14, Ohio

### IX. DIRECTORIES

- A. Library Guide for the Chemist. Byron A. Soule. 285 p. \$5.75.  
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330 West 42nd Street  
New York, New York 10036

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