PN-ABY-470

Industry Profiles

Catalog of Investment Information and Opportunities

Volume II

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

Catalog of Investment Information and Opportunities
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INDUSTRY PROFILES

PN-ABY-469
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RAMIE DECORTICATION

I. P. No. 66051

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.

RAMIE DECORTICATION: Standard Industrial Classification 0719

A. PRODUCT DESCRIPTION

Ramie is a perennial plant of the hemp family and grows in tropical and sub-tropical climates. Decorticating is the first stage in processing ramie fibers. They are then degummed and finally processed for use in textile manufacture. The decorticating process covered by this profile begins with cutting the stalks in the fields by the enterprise's own harvesters, which remove leaves, tops and most of the pith of the inside stalks, to make ramie ribbons. These are cleaned, dried and baled in the plant.

B. GENERAL EVALUATION

The first requirement is a local supply of raw material sufficient to keep the plant operating at full capacity. The second requirement is an adequate market. Competition comes not only from other ramie producers but also from other fibers. Careful investigation of markets and prices should be made. If it is expected to sell only in the domestic market it is necessary to make certain that sufficient final processing capacity exists to handle all production. If export is contemplated close attention should be paid to price trends and risks of price fluctuations. Demand for ramie has increased, but it is a standard product and price is a vital consideration in marketing it. This project should be undertaken only if there is reasonable assurance that the production cost will be low enough to meet the competition to be expected.

C. MARKET ASPECTS

1. USERS. Plants processing and baling the fibers for use by textile plants.
2. SALES CHANNELS AND METHODS. Sales direct to users.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Normally nation-wide. b. Export. Product is sold internationally. Freight and handling costs generally not a limiting factor.
4. COMPETITION. a. Domestic Market. Competition normally only from other domestic producers. Unless production costs are abnormally high, import competition unimportant. b. Export Market. As with other semi-processed products with an international market, the problem in exporting is not so much to find buyers as to obtain a remunerative price.
5. MARKET NEEDED FOR PLANT DESCRIBED. For domestic market existence of sufficient finishing capacity is essential. The international market is sufficient to absorb production of plant of this size without much difficulty.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 1,680,000 Pounds

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. 5 acres		$ --
Building. One story, 80'x250', plus office & boiler room.		130,000
Equipment, Furniture & Fixtures		
Prodn. tools & equipmt	$204,000	
Other tools & equipmt.	1,000	
Furniture & fixtures	1,000	
Transportation equipmt.	6,000	212,000
Total (excl. Land)		$342,000

Principal Items. 2 harvesters, 3 tractors, 24 wagons, truck, jeep, 2 cleaning machines, 2 centrifuges, dryer, baling press, jake wagons, pallets, scales, air compressor.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 55,500
Admin. Costs(b), Contingencies. Sales Costs(c)	30	4,000
Training Costs		6,000
Total Working Capital		$ 65,500

c. TOTAL CAPITAL (EXCL. LAND) $407,500

2. MATERIAL AND SUPPLIES

	Annual Requirements	Annual Cost
a. Direct Materials		
Ramie field ribbons	3,000 tons	$ 76,200
Baling materials		600
Total		$ 76,800

b. Supplies

Lubricants & hand tools	$ 100
Cutting tools & abrasives	100
Maintenance & spare parts	500
Office supplies	200
Total	$ 900

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 500 hp. connected load.	$ 12,000
b. Fuel. Gas and oil.	$ 4,200
c. Water. 5 million gals. make-up water.	$ 1,200

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 3 tractors, truck and jeep.	$ 2,000

b. External Transport Equipment. Ramie ribbons are hauled to plant by trucks as harvested. Good highway needed.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	4	$ 20,000
Semi-skilled	10	40,000
Unskilled	40	120,000
Total	54	$180,000
b. Indirect Labor		
Manager & Supervisors	5	$ 36,000
Office	3	12,000
Truck drivers	2	8,000
Total	10	$ 56,000

c. Training Needs. Manager & supervisors must have several years' experience. With 4 skilled workers, they should be able to train all workers and reach full production in 30 days.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

Direct Materials	$ 76,800
Direct Labor	180,000
Manufacturing Overhead(a)	76,300
Admin. Costs(b), Contingencies	26,000
Sales Costs(c), Bad Debts	22,000
Depreciation on Fixed Capital	28,700
Total	$409,800

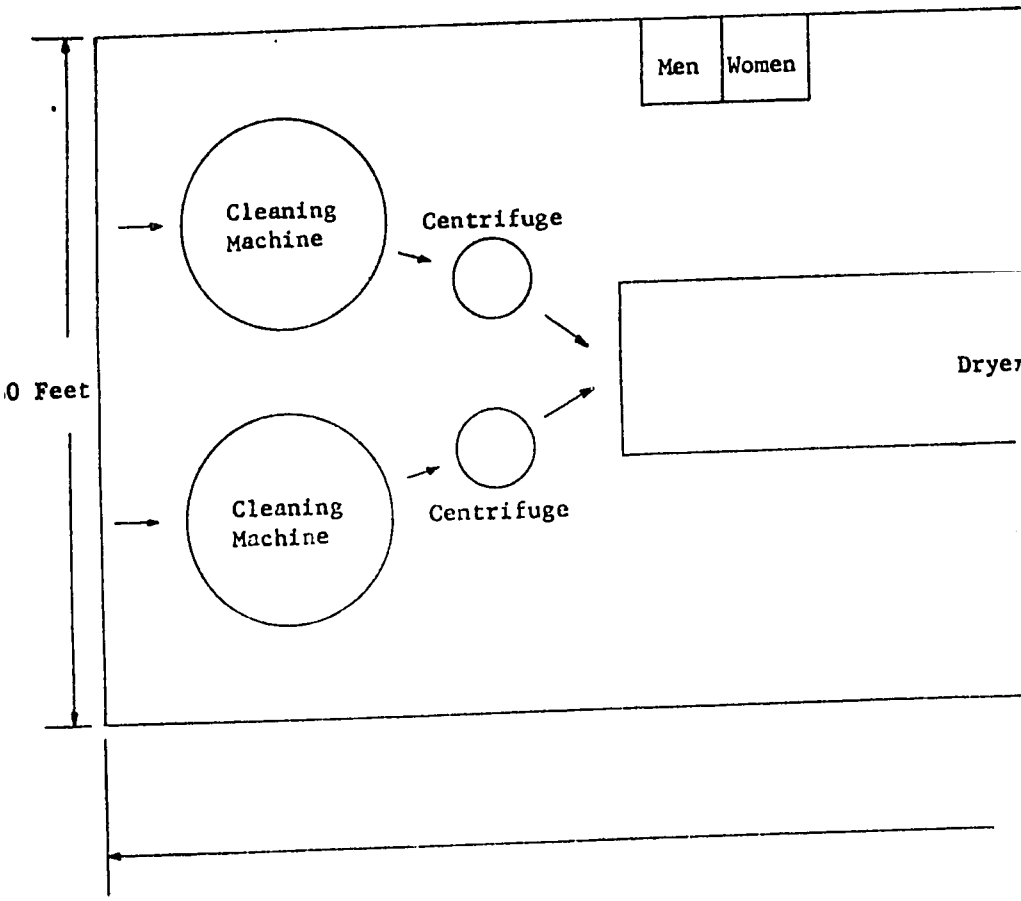
b. Annual Sales Revenue $504,000

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

RAMIE DECORTICATION: S.I.C. 0719

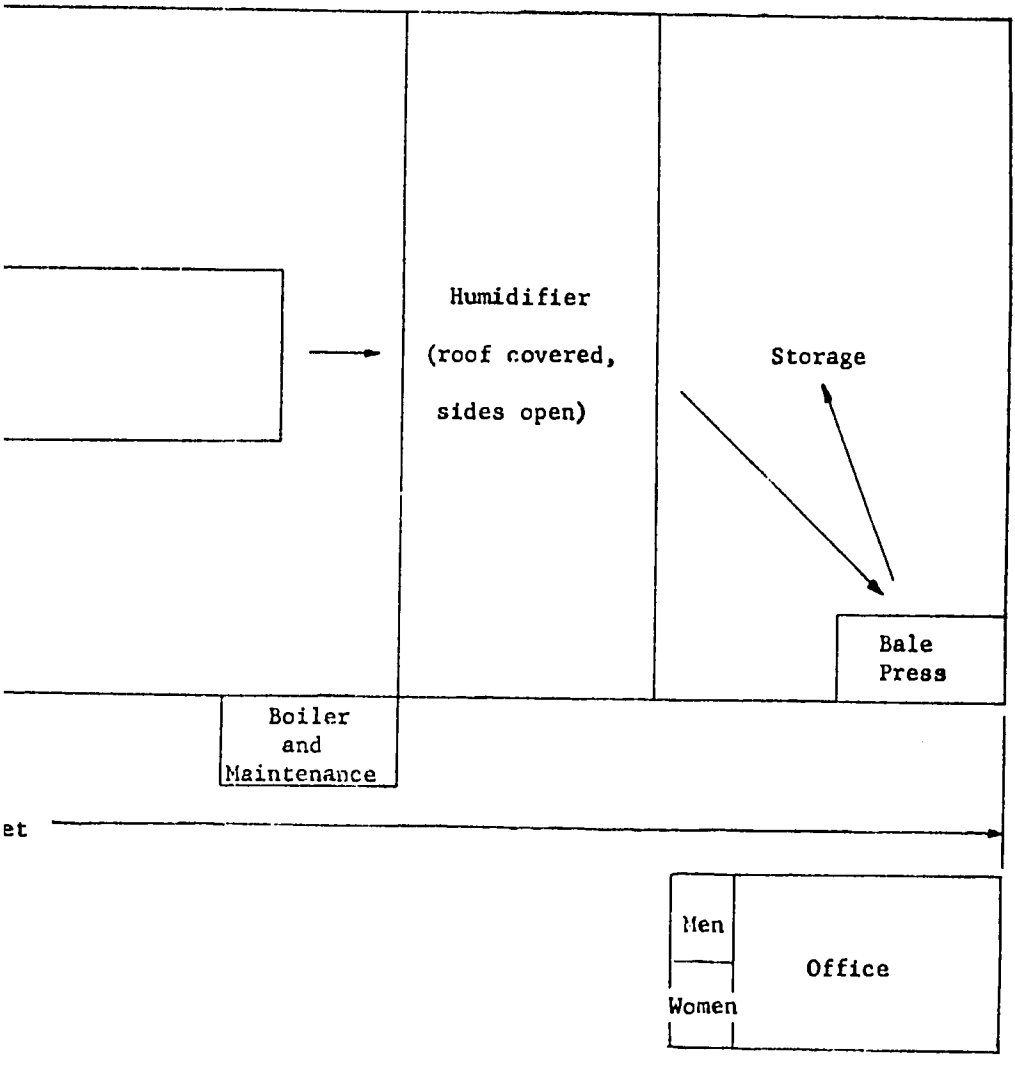
RAMIE DECORTIC

PLANT LAYOUT A



S.I.C. 0719

FLOW



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RAMMIE DECORTICATION : S. I. C. 0719

SELECTED REFERENCES

I. TEXTBOOKS

A. The Technology of Cordage Fibres and Rope. D. Himmelfarb. 1958. 385 p. Illus. $6.00.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, New York
Preparation, hand and mechanical finishing operations of natural fibres including ramie.

B. Fibre to Fabric. M. D. Potter and B. P. Corbman. 1959. 342 p. Illus. $5.20.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, New York
Natural fibres, their processing for textile and other uses.

II. PERIODICALS

A. Review of Textile Progress. Annual. $8.00/year.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, New York
Describes latest developments and advances in all phases of the textile industry, including production of natural fibres and their conversion into finished yarns.

B. Natural and Synthetic Fibres. Monthly. $90/year.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, New York
Latest investigations and patents on processing of fibres, and their manufacture into fabrics.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Ramie Decortication. TI-87. March 1961. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523.
Basic information for establishing ramie fibre decorticating plants whose annual gross sales would be about $500,000.

B. Ramie Production Machinery. 1956. M. H. Byrom. 20 p. Illus.
Agricultural Information Bulletin No. 156. Gratis.
United States Department of Agriculture
Washington, D. C. 20250
Implements and machinery.

SELECTED REFERENCES (Continued)

IV. OTHER PUBLICATIONS

A. Handbook of Textile Fibres. J. Gordon Cook. $5.50
Textile Book Service
257 Park Avenue South
New York 10, New York,
Processing and production data on various textile fibres.

B. Textile Chemicals and Auxiliaries. H. C. Speel and E. W. K. Schwarz. 1957. 552 p. $13.50.

Reinhold Publishing Corporation
430 Park Avenue
New York 22, New York
Physical and chemical nature of fibres, and the preparation for processing into fabrics

V. U. S. PATENTS

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

A. Patent No. 2,759,224. 1956. 13 p.
Apparatus for extracting fibres from fibre-bearing plants.

B. Patent No. 2,747,232. 1956. 8 p.
Process for decorticating fibrous materials.

C. Patent No. 2,685,108. 1954. 5 p.
Mechanism for processing vegetable and root fibres.

D. Patent No. 2,633,421. 1953. 3 p.
Fibre liberation process by use of steam.

VI. TRADE ASSOCIATIONS

A. Hard Fibres Association
160 Broadway
New York 38, New York

B. American Textile Machinery Association
P. O. Box 96
Vienna, Virginia

VII. ENGINEERING COMPANIES

A. Rust Engineering Company
930 Fort Duquesne Boulevard
Pittsburgh, Pennsylvania
Design, equipment selection and installation, initial plant operation.

VIII. DIRECTORIES

A. Davison's Textile Catalogue and Buyers' Guide. $12.00.
Davison Publishing Company
Ridgewood, New Jersey

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.

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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

MEN'S WORK PANTS

I. P. No. 66052

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

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MEN'S WORK PANTS: Standard Industrial Classification 2328

A. PRODUCT DESCRIPTION

Work pants made from cotton denim, with four pockets, waist sizes 28 to 44 inches, length 30 to 36 inches. Brass rivets are used at pocket openings where the stress is greatest.

B. GENERAL EVALUATION

Capital requirements for this plant are moderate and little technical skill is needed. The product is in wide demand, but price competition is often keen. The project appears suitable for many developing areas.

C. MERKET ASPECTS

1. USERS. Individuals, institutions and organizations.

2. SALES CHANNELS AND METHODS. Sales to wholesalers, large retailers, and major institutions and organizations.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is easy to ship and transport costs are normally low in relation to product value. Market may be nation-wide. b. Export. Market is international, though low wage areas are likely to import materials and manufacture for themselves rather than import the made-up article.

4. COMPETITION. a. Domestic Market. Very small makers and imports may provide competition. b. Export Market. The plant is relatively small and might have great difficulty in competing with large-scale plants or with exports from areas where labor is plentiful and cheap.

5. MARKET NEEDED FOR PLANT DESCRIBED. Under average conditions a population of about a million would probably be large enough to provide a market for the production of this plant.

D. PRODUCTION REQUIREMENTS

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

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 10,000 sq. ft.		$ --
Building. One story, 60'x100'		36,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$26,500	
Other tools & equipmt.	1,000	
Furniture & fixtures	1,000	28,500
Total (excl. Land)		$ 64,500

Principal Items. Cutting tools, cloth spreader, cloth unwinder, electric knives, electric drill, 28 sewing machines, 2 button-whole machines, folding machine, presser, 2 trim masters, turning stands, 3 hand trucks, stacker, riveting machine, button machine.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 53,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,000
Training Costs		3,000
Total Working Capital		$ 58,300

c. TOTAL CAPITAL (EXCL. LAND) $122,800

2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
a. Direct Materials		
Blue denim	360,000 yds.	$144,000
Thread		2,600
Buttons		1,600
Size tags (paper)		100
Labels (woven)		1,500
Rivets		1,000
Pins		400
Boxes		3,600
Shipping cartons		1,400
Total		$156,200
b. Supplies		
Lubricants & hand tools		$ 300
Maintenance & spare parts		1,500
Office supplies		200
Total		$ 2,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load 100 hp.	$ 3,000
b. Fuel. Any local fuel suitable for making steam and heating	$ 500
c. Water. Processing, sanitation and fire protection.	$ 400

4. TRANSPORTATION

a. Own Transport Equipment. None needed.

b. External Transpot Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	2	$ 10,000
Semi-Skilled	24	96,000
Unskilled	4	12,000
Total	30	$118,000
b. Indirect Labor		
Manager & supervisors	4	$ 30,000
Office	1	4,000
Maintenance	1	4,000
Total	6	$ 38,000

c. Training Needs. Manager and supervisors should be fully experienced. With 6 skilled and semi-skilled workers they should be able to train all workers and reach full production in 30 days.

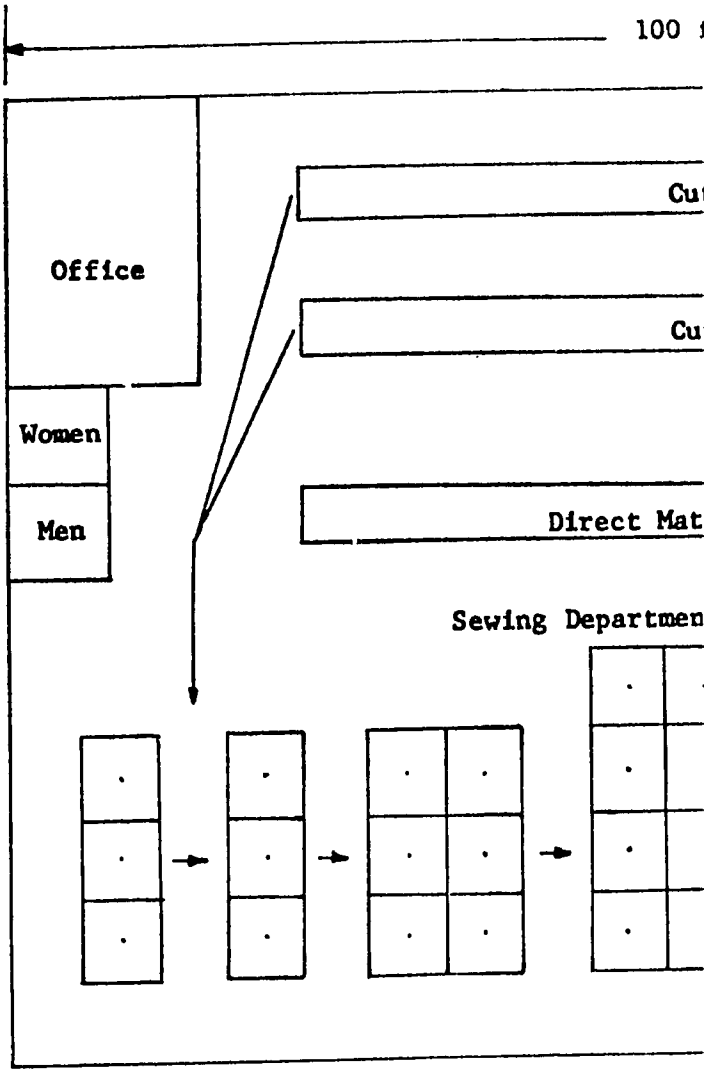
6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	$156,200
Direct Labor	118,000
Manufacturing Overhead(a)	43,900
Admin. Costs(b), Contingencies	12,000
Sales Costs (c), Bad Debts	16,000
Depreciation on Fixed Capital	4,800
Total	$350,900
b. Annual Sales Revenue	$420,000

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

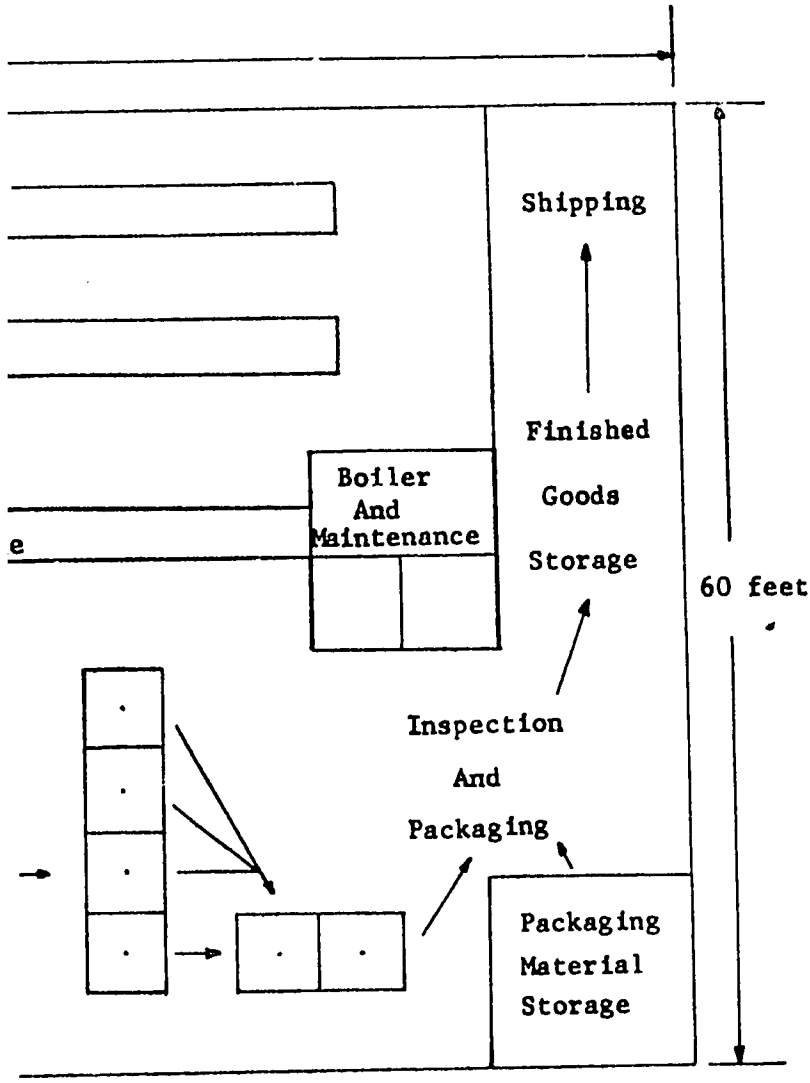
MEN'S W

PLANT



S: S.I.C. 2328

WORKFLOW



MEN'S WORK PANTS: S.I.C. 2328

SELECTED REFERENCES

I. TEXTBOOKS

A. Slacks and Trousers. 1951. 308 p. Illus. Price not given.
Guildcraft Tailors
Newark, New Jersey
Directions and drawing for making various kinds of slacks and pants.

B. Clothing Construction and Wardrobe Planning. D.S. Lewis and others. 1955. 534 p. Illus. $4.40.
Macmillan Company
60 Fifth Avenue
New York 11, New York
Contains information on the manufacture of mens' pants.

II. PERIODICALS

A. Mens' Wear. Semi-monthly. $6.00/year.
Fairchild Publications, Inc,
7 East 12th Street
New York 3, New York
Contemporary survey of the mens' wear industry.

B. Merchant's Trade Journal. Monthly. $6.00/year.
Boreman Company
1912 Grand Avenue
Des Moines, Iowa
Includes information on the production and marketing of men's clothing.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Men's Work Pants. MIL-T-814. 1955. 10 p. Gratis.
Department of Defense
Washington, D.C. 20301
Specifications as to material and construction of men's work pants.

IV. OTHER PUBLICATIONS

A. Clothing Construction. E.A. Mansfield. 1953. 454 p. Illus. $5.50.
Houghton Mifflin Company
2 Park Street
Boston 7, Massachusetts
Covers clothing making and includes mens' pants.

B. Apparel Engineering and Needle Trades Handbook. 1960. 388 p. $15.0
Frederick Kogos Publishing Company, Inc.
1140 Broadway
New York 1, New York
Includes information on the manufacture of mens' pants.

SELECTED REFERENCES (Continued)

V. TECHNICAL PAPERS

A. Characteristics and Rate of Wear of Worsted Serge in Trousers.
R.P. Dowlen and R.L. Ward. Textile Research Journal. June 1959.
Vol. 29. p. 514-20. $2.50.
Textile Research Institute, Inc.
P.O. Box 625
Princeton, New Jersey
Has data on mens' work pants containing worsted serge material.

VI. U.S. PATENTS

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

A. Patent No. 2,977,601. 1961. 3 p.
Men's pants for work or sports.

B. Patent No. 2,778,026. 1957. 3 p.
Making mens' work pants and pockets thereof.

C. Patent No. 2,755,481 1956. 4 p.
Mens' work pants with adjustable waist and seat.

VII. TRADE ASSOCIATIONS

A. Trouser Institute of America
347 Fifth Avenue
New York 16, New York

VIII. ENGINEERING COMPANIES

A. Anderson-Nichols Company
150 Causeway
Boston, Massachusetts
Designers, engineers, and Industrial management.

B. Alpha Engineering and Machine Works, Inc.
802 West Central Road
Mount Prospect, Illinois
Design and build industrial machinery and manufacturing plants.

IX. DIRECTORIES

A. Sheldon's Manufacturing Trade. Annual. $6.00.
J.S. Phelon and Company
32 Union Square
New York 3, New York
Lists manufacturers of men's, women's, and children's garments throughout the U.S. (except New York City).

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

WOODEN SHOE LASTS

I.P. No. 66053

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.

WOODEN SHOE LASTS: Standard Industrial Classification 2499

A. PRODUCT DESCRIPTION

Hinged lasts made of maple wood, or wood of equivalent quality, to hold the shape of shoes during the process of manufacture.

B. GENERAL EVALUATION

This plant requires a fairly large capital and a relatively large amount of skilled labor. The product is highly specialized, and since lasts are used over and over again the plant's capacity could service a sizable shoe industry, especially since large manufacturers often make their own lasts. It will, therefore, generally be suitable only for an area where there is a large shoe-making industry.

C. MARKET ASPECTS

1. USERS. Shoe factories and small establishments making shoes to order.

2. SALES CHANNELS AND METHODS. Sales direct to users.

3. GEOGRAPHICAL EXTENT OF MARKET. Transport costs are low in relation to product value and are not a major factor in limiting the market area. More important is the fact that lasts are commonly made to users' requirements and it is more convenient to buy from a nearby source.

4. COMPETITION. This is a highly specialized product made to customers' requirements and the only competition is from other makers of the product. Some large shoe factories make their own lasts. Competition from imports is usually unimportant, since users find it more convenient to deal with domestic producers. For the same reason there is little chance of doing export business.

5 MARKET NEEDED FOR PLANT DESCRIBED. This plant would normally be established only in a large industrial center where there is an important shoe manufacturing industry.

). PRODUCTION REQUIREMENTS

NNUAL CAPACITY - ONE-SHIFT OPERATION: 35,000 Pairs or 70,000 Lasts

CAPITAL REQUIREMENTS

FIXED CAPITAL		Cost
Land. About 1/2 acre.		$ --
Building. One story, 80'x125'.		60,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$136.000	
Other tools & equipmt.	3,000	
Furniture & fixtures	1,000	140,000
Total (excl. Land)		$200,000

Principal Items. Grading machine, 2 circular saws, 6 wood turning lathes, toe and heel machine, heeling machine, double drill, bandsaw, slotting machine, facing knife, trimming machine, 3 sanding wheels, single drill, tube punching machine, punch press skiving machine, 3 grinders, polisher and waxer, exhaust system.

. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 17,800
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,800
Training Costs		1,800
Total Working Capital		$ 21,400

:. TOTAL CAPITAL (EXCL. LAND) $221,400

2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
ı. Direct Materials		
Maple blocks	75,600	$ 28,800
Galvanized iron	1,940 sq. ft.	1,500
Hinges and pins	35,000 sets	3,100
Leather	560 lbs.	300
Heel tubes	70,000	3,000
Nails, sandpaper & glue		1,000
Polish, wax and stains		400
Packaging material		2,500
Total		$ 40,600
ɔ. Supplies		
Lubricants & hand tools		$ 200
Cutting tools & abrasives		100
Maintenance & spare parts		600
Office supplies		200
Total		$ 1,100

3. POWER, FUEL & WATER

	Annual Cost
a. Electric Power. 50 hp. connected load.	$ 800
b. Fuel. 20 tons of coal; can use scrap wood also.	$ 300
c. Water. For general purposes.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	7	$ 35,000
Semi-skilled	4	16,000
Total	11	$ 51,000
b. Indirect Labor		
Manager	1	$ 9,000
Office	1	4,000
Total	2	$ 13,000

c. Training Needs. Manager should be fully experienced. With 2 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	$ 40,600
Direct Labor	51,000
Manufacturing Overhead(a)	15,300
Admin. Costs(b), Contingencies	12,000
Sales Costs(c), Bad Debts	9,000
Depreciation on Fixed Capital	17,300
Total	$145,200
b. Annual Sales Revenue	$190,000

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

WOODEN SHOE LASTS: S.I.C. 2499

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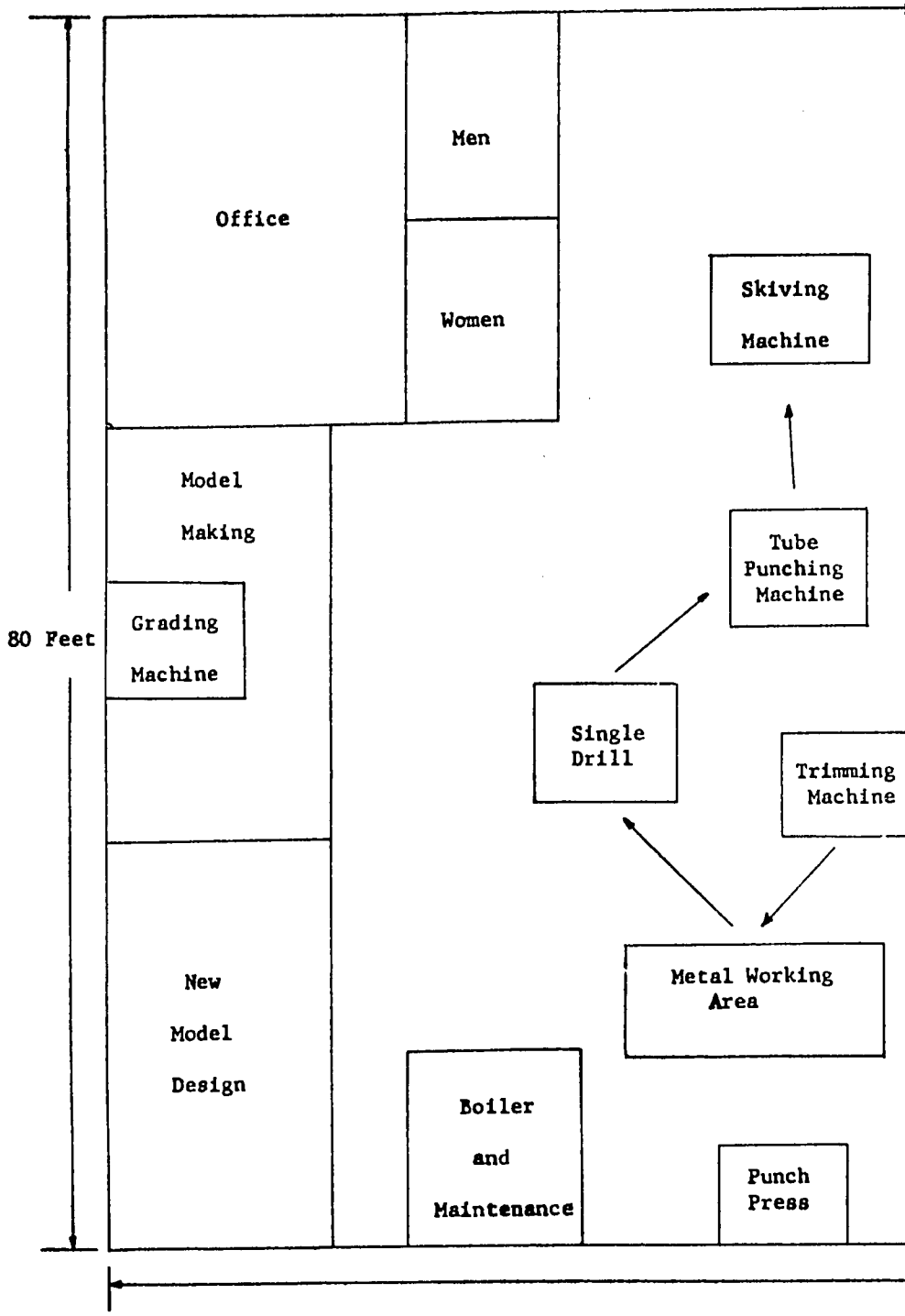
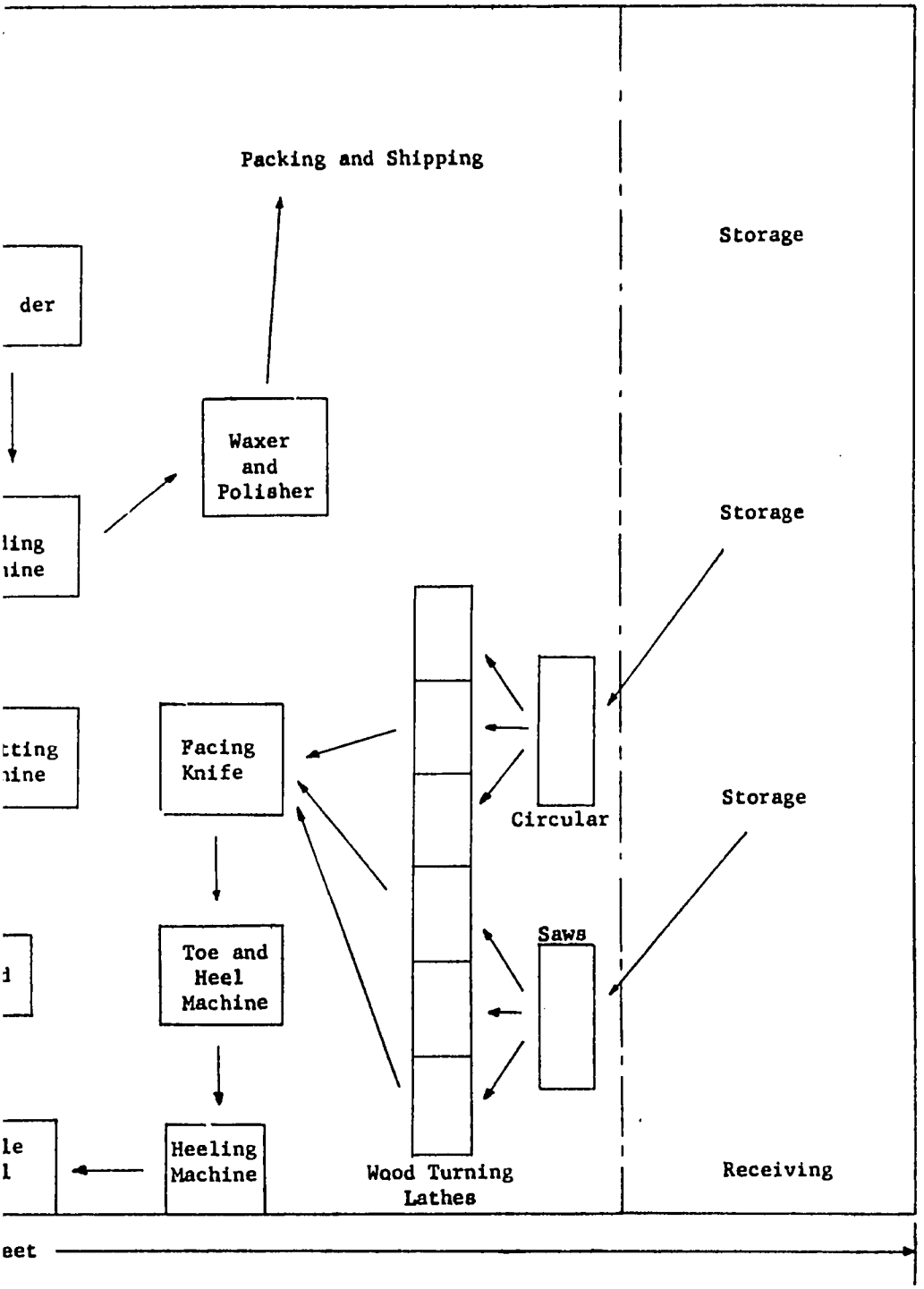
PLANT LA



TS: S.I.C. 2499

WORKFLOW



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WOODEN SHOE LASTS: S.I.C. 2499

SELECTED REFERENCES

I. TEXTBOOKS

A. The Wood Turning Lathe. R.E. Haines and others. 1952. 172 p. Illus. $3.50. D. Van Nostrand Company, Inc.
120 Alexander Street
Princeton, New Jersey
Detailed instructions for the operation of a wood turning lathe.

B. General Woodworking. C. H. Groneman. 2nd Edition. 1959. 256 p. Illus. $6.75. McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, New York
Machine tool processes, portable tool processes and hand tool processes.

II. PERIODICALS

A. The Woodworker. 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
Wheaton, Illinois
Covers woodworking field.

III. GOVERNMENT PUBLICATIONS, U.S.

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 quality control in industry.

IV. OTHER PUBLICATIONS

A. The Art of Wood Turning. W. W. Klenke. 1954. 186 p. Illus. $3.85.
Charles A. Bennett Company, Inc.
1457 Duroc Building
Peoria, Illinois
Devoted to wood turning.

SELECTED REFERENCES (Continued)

V. U. S. PATENTS

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

A. Patent No. 2,806,233. 1957. 5 p.
Shoe last for automatic manufacturing of shoes.

B. Patent No. 2,764,768. 1956. 7 p.
Shoe lasts.

C. Patent No. 2,761,159. 1956. 6 p.
Lasts for the assembly of footwear.

D. Patent No. 2,733,463. 1956. 3 p.
Shoe last construction.

E. Patent No. 2,617,129. 1952. 4 p.
Shoe last.

VI. TRADE ASSOCIATIONS

A. Wood Turners & Shapers Association
428 Statler Office Building
Boston 16, Massachusetts

B. Woodworkers Machinery Manufacturers Association
1900 Arch Street
Philadelphia, Pennsylvania

VII. ENGINEERING COMPANIES

A. Mattison Machine Works
200 Blackhawk Park Avenue
Rockford, Illinois
Woodwork engineers and machinery.

B. United States Machinery Company, Inc.
90 Broad Street
New York 4, New York
Designs and installs woodworking plants.

VIII. DIRECTORIES

A. Hitchcock's Woodworking Directory. Annual. $10.00.
Hitchcock Publishing Company
Wheaton, Illinois
Lists manufacturers of woodworking machinery and equipment.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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INDUSTRY PROFILES

OVERSTUFFED FURNITURE

I. P. No. 66054

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.

OVERSTUFFED FURNITURE: Standard Industrial Classification 2512

A. PRODUCT DESCRIPTION

Moderately-priced overstuffed chairs and sofas with wooden frames, steel springs, cotton padding, and fabric covers. The sofas have two or three seat cushions, according to size.

B. GENERAL EVALUATION

Capital requirements are moderate and the level of technical skill needed is not very high. Good management and supervision are necessary in order to keep up with style changes and maintain production standards. The figures given are based on production of medium-priced furniture, but the plant can produce cheaper or more expensive furniture to suit local requirements.

C. MARKET ASPECTS

1. USERS. Households, hotels, clubs and institutions.

2. SALES CHANNELS AND METHODS. Sales to furniture stores and sometimes direct to hotels, clubs and institutions.

3. GEOGRAPHICAL EXTENT OF MARKET. These products are bulky and transport costs will usually be a significant factor in limiting the market area. This type of furniture is not usually exported.

4. COMPETITION. Some competition can be expected from small workshops in low wage areas. Chairs and sofas made of other materials, such as rattan or metal, may also be competitive, especially in very hot and humid climates.

5. MARKET NEEDED FOR PLANT DESCRIBED. Demand will depend on income levels, living habits, and climate. Where these products are commonly used, an urban area with a population of about half a million would generally provide a sufficient market.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION : 3,000 Chairs, 1,500 Sofas.

CAPITAL REQUIREMENTS

. FIXED CAPITAL

		Cost
Land. 1 acre.		$ --
Building. One story, 100'x100'.		60,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$28,000	
Other tools & equipmt.	5,000	
Furniture & fixtures	700	33,700
Total (excl. Land)		$ 93,700

Principal Items. Cut off saw, rip saw, jointer, planer, band saw, trim saw, horizontal boring machine, upright boring machine, table sander, chain mortiser, tenon machine, assembly presses, glue pots spray booth, upholstery material racks, cutting table, 6 sewing machines.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 31,600
Admin. Costs(b), Contingencies, Sales Costs (c)	30	2,800
Training Costs		6,000
Total Working Capital		$ 40,400

c. TOTAL CAPITAL (EXCL. LAND) $134,100

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements.	Annual Cost
Lumber		$ 26,000
Upholstery materials	25,000 yds.	50,000
Burlap	12,000 yds.	1,200
Nails, wood screws, glue		800
Tacks, thread & buttons		400
Crating materials		2,000
Total		$ 80,400

Supplies	
Lubricants & hand tools	$ 300
Cutting tools	500
Maintenance & spare parts	1,500
Sandpaper	100
Office supplies	200
Total	$ 2,600

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 50 hp. connected load.	$ 1,500
b. Fuel. Scrap wood and sawdust.	
c. Water. Production, sanitation and fire protection.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. Crated furniture is bulky. Good highway and easy access to railroad desirable.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	6	$ 30,000
Semi-skilled	8	32,000
Unskilled	3	9,000
Total	17	$ 71,000
b. Indirect Labor		
Manager & supervisors	3	$ 22,000
Office	2	8,000
Maintenance	1	4,000
Total	6	$ 34,000

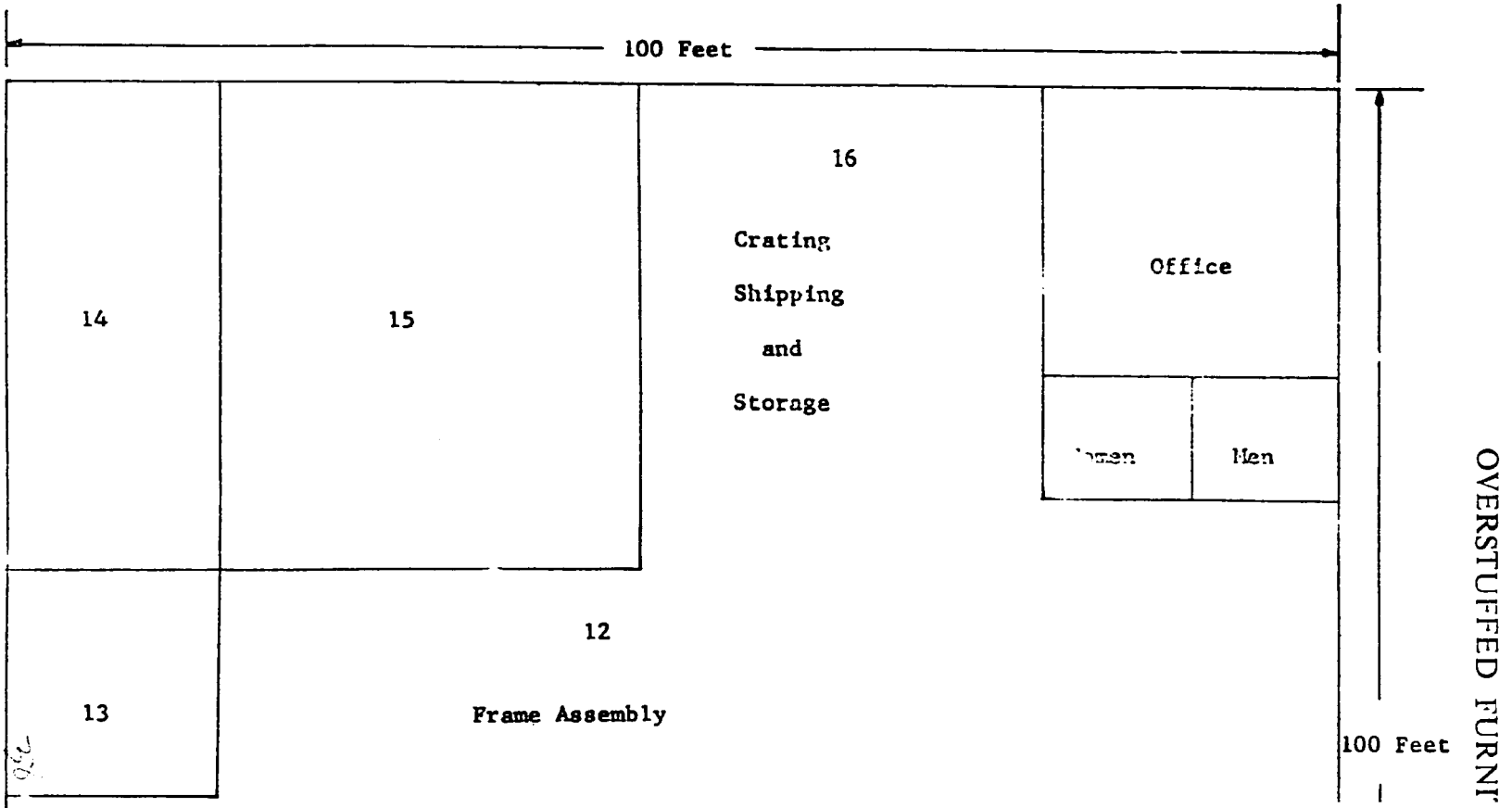
c. Training Needs. Manager and supervisors must be fully experienced. With 3 skilled workers they should be able to reach full production in 2 months.

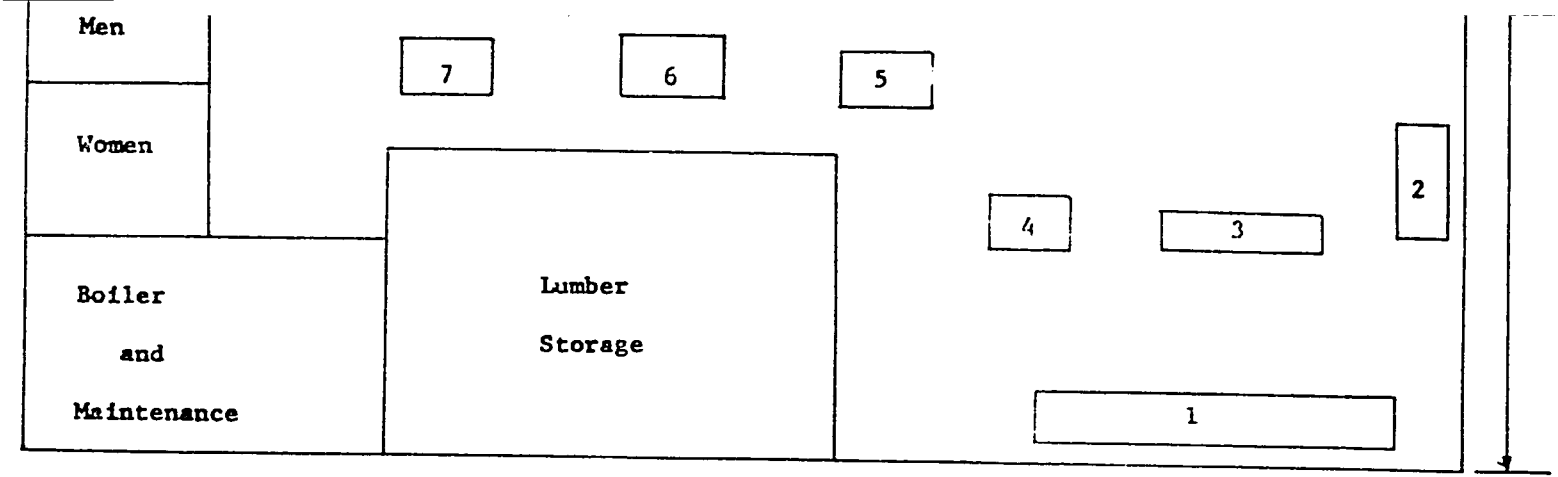
6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	$ 80,400
Direct Labor	71,000
Manufacturing Overhead(a)	38,200
Admin. Costs(b), Contingencies	16,000
Sales Costs(c), Bad Debts	18,000
Depreciation on Fixed Capital	6,900
Total	$230,500
b. Annual Sales Revenue	$280,000

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

PLANT LAYOUT AND WORKFLOW





Lumber

Yard

1. Cut-off saw
2. Rip saw
3. Jointer
4. Trim saw
5. Shaper
6. Bandsaw
7. Horizontal boring machine
8. Upright boring machine
9. Chain mortiser
10. Tenon machine
11. Table sander
12. Frame assembly
13. Spray booth
14. Cut and sew upholstery materials
15. Upholsterer
16. Crating, shipping and storage

2512

OVERSTUFFED FURNITURE: S.I.C. 2512

SELECTED REFERENCES

I. TEXTBOOKS

A. Furniture Making and Cabinet Work. B. W. Pelton. 1961. Illus. $7.95.
D. Van Nostrand Publishing Company, Inc.
120 Alexander Street
Princeton, New Jersey
Shows furniture construction, finishing, and upholstery.

II. PERIODICALS

A. Upholstering. Monthly. $4.00/year.
Hall Publishing Company
230 Fifth Avenue
New York 1, New York
Monthly periodical covering the upholstery industry.

B. Furniture Manufacture. Monthly. $5.00/year.
Vincent Edwards, Incorporated
342 Madison Avenue
New York, New York
Periodical of furniture manufacturers.

III. GOVERNMENT PUBLICATION. U. S.

A. Furniture. IR-20619. 1958. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523
Lists references on woodworking machinery and production methods for the manufacturing of furniture.

IV. OTHER PUBLICATIONS

A. Essentials of Modern Upholstery. H. Bast. 1963. 316 p. $3.75.
Bruce Publishing Company
400 North Broadway
Milwaukee 1, Wisconsin
Complete guide to all the processes of upholstering.

V. TECHNICAL PAPERS

A. Gluing Techniques for Woodworkers. Thomas D. Perry. 1955. 50 p. $.50.
Hitchcock Publishing Company
Wheaton, Illinois
Covers gluing techniques in the woodworking industry, including furniture.

SELECTED REFERENCES (Continued)

VI. U. S. PATENTS

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

A. Patent No. 2,991,583. 1961. 3 p.
Seat press for use in the manufacture of overstuffed furniture.

B. Patent No. 2,932,121. 1960. 4 p.
Materials and upholstering fabric used in making overstuffed furniture.

C. Patent No. 2,921,403. 1960. 11 p.
Upholstery making for overstuffed furniture.

D. Patent No. 2,754,893. 1956. 4 p.
Overstuffed furniture and method of upholstering same.

VII. TRADE ASSOCIATIONS

A. Upholstered Furniture Manufacturers Association
276 Fifth Avenue
New York 1, New York

VIII. ENGINEERING COMPANIES

A. United States Machinery Company, Inc.
Industrial Woodworking Machinery
90 Broadway
New York 4, New York
Industrial woodworking machinery. Designs and installs woodworking plants.

B. Oliver Machinery Company
Grand Rapids 2, Michigan
Manufacturers of machinery for furniture plants.

IX. DIRECTORIES

A. Hitchcock's Woodworking Directory. Biennially. $10.00.
Hitchcock Publishing Company
Wheaton, Illinois
Lists manufacturers and suppliers of over 800 products in the woodworking industry.

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.

INDUSTRY PROFILES

ENVELOPES

I. P. No. 66055

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43

ENVELOPES : Standard Industrial Classification 2642

A. PRODUCT DESCRIPTION

Envelopes, sizes 3½"x6" and 4"x9", using bond paper.

B. GENERAL EVALUATION

This plant requires little capital or skilled labor. The market will almost certainly be domestic only and probably rather localized, since envelope making requires only simple equipment and is frequently carried on together with the manufacture of other stationery products. With additional dies and auxiliary equipment envelopes of other sizes than those mentioned above can be made. The plant could also be readily expanded to make other stationery products. Such an enterprise is suited to the conditions of many developing areas.

C. MARKET ASPECTS

1. USERS. Offices, individuals.

2. SALES CHANNELS AND METHODS. Sales to stationery stores and possibly direct to large users.

3. GEOGRAPHICAL EXTENT OF MARKET. The product can be easily and cheaply transported, but as envelopes can be made almost anywhere with simple equipment the market may be rather localized. Export business in envelopes is generally limited to small quantities of high-quality and fancy goods.

4. COMPETITION. a. Domestic Market. Imports are unlikely to offer serious competition if the product is reasonably good. b. Export Market. Envelopes of this type normally could not compete with local products in foreign markets.

5. MARKET NEEDED FOR PLANT DESCRIBED. A commercial and administrative center with a population of about half a million would generally offer a large enough market, but this figure may vary greatly with income and education levels, etc.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 12,500,000

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. 10,000 sq. ft.		$ - -
Building. One story, 40'x80'.		19,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$30,000	
Other tools & equipmt.	3,800	
Furniture & fixtures	700	34,500
Total (excl. Land)		$ 53,500

Principal Items. Die cutting machine, 2 plunger machines, folding box, creasing box templet stripper plates, pickers, puncher plates, counting box, glue box, factory trucks.

b. WORKING CAPITAL

	No. of Days	
Direct Materials Direct Labor, Mfg. Overhead(a)	60	$ 9,100
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,200
Training Costs		800
Total Working Capital		$ 11,100

c. TOTAL CAPITAL (EXCL. LAND) $ 64.600

2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
a. Direct Materials		
Paper	80 tons	$ 16,000
Glue		700
Packaging materials		1,800
Total		$ 18,500

b. Supplies

Lubricants & hand tools	$ 100
Cutting tools & abrasives	200
Maintenance & spare parts	1,000
Office supplies	200
Total	$ 1,500

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 10 hp. connected load.	$ 200
b. Fuel. Heating, if necessary	$ 250
c. Water. Sanitation and fire protection.	$ 50

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	1	$ 5,000
Semi-skilled	1	4,000
Unskilled	3	9,000
Total	5	$ 18,000
b. Indirect Labor		
Manager	1	$ 8,000
Office	1	4,000
Maintenance	1	4,000
Total	3	$ 16,000

c. Training Needs. Manager should be experienced. With 1 skilled worker he should be able to train the others and reach full production in 30 days.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

Direct Materials	$ 18,500
Direct Labor	18,000
Manufacturing Overhead(a)	18,000
Admin Costs(b), Contingencies	6,000
Sales Costs(c), Bad Debts	8,000
Depreciation on Fixed Capital	4,800
Total	$ 73,300

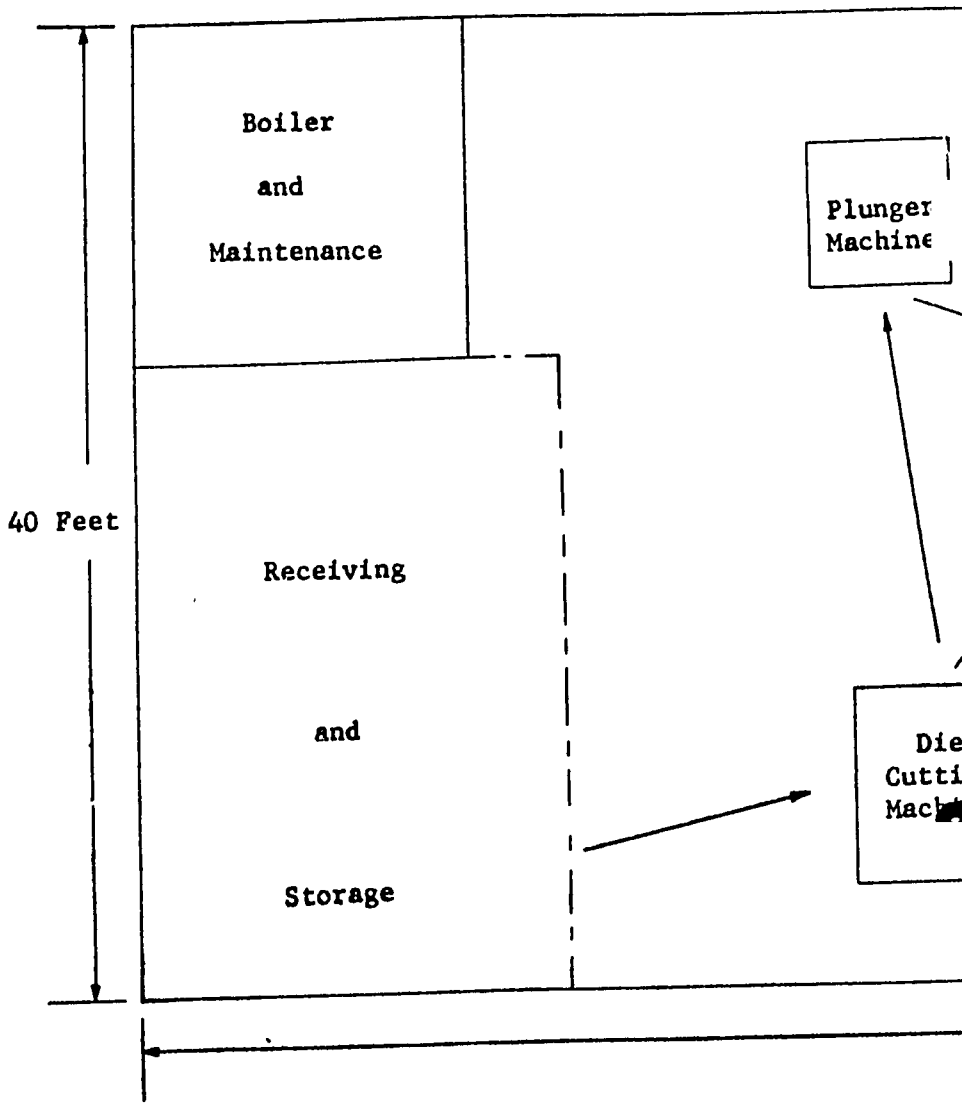
b. Annual Sales Revenue $ 90,000

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

ENVELOPES S.I.C. 2642

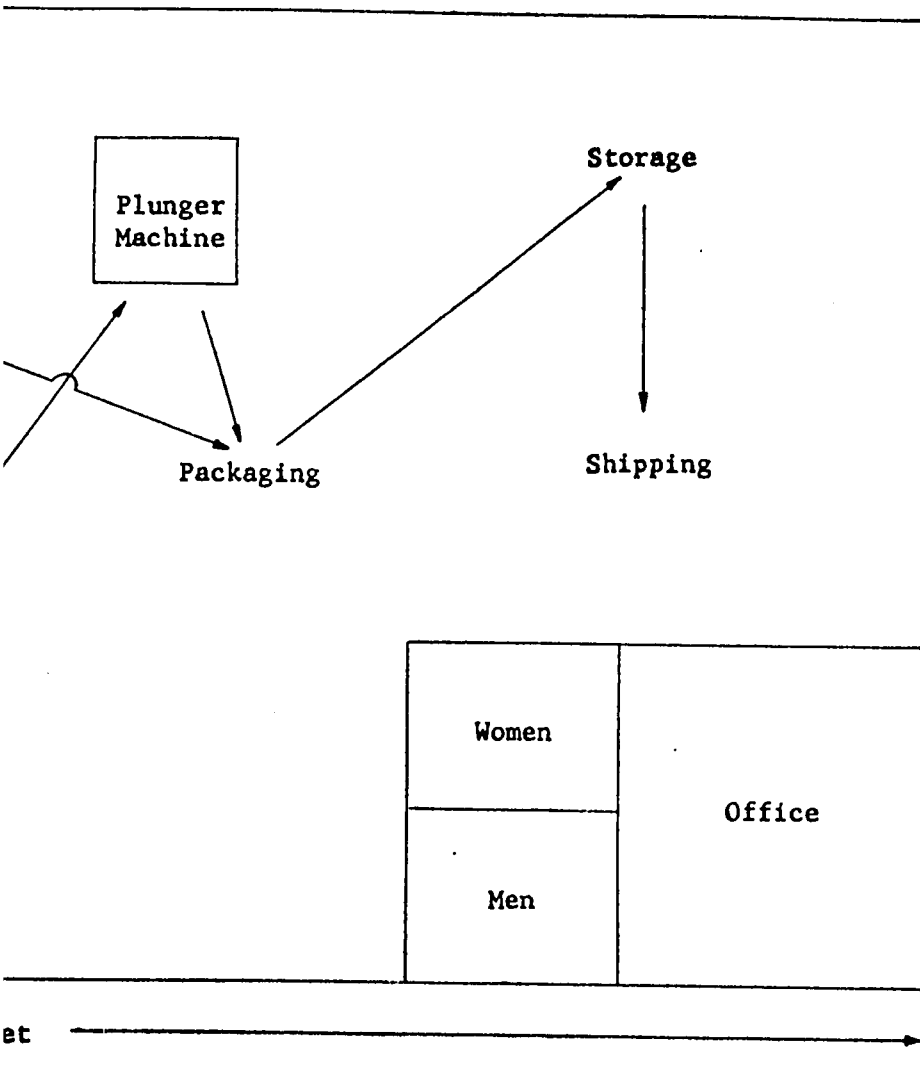
ENVELO

PLANT LAYO



.C. 2642

WORKFLOW



ENVELOPES: S. I. C. 2642

SELECTED REFERENCES

I. TEXTBOOKS

A. The History of Envelopes. R. H. Ramage. 1952. 84 p. Illus. $1.00
Envelope Manufacturers Association of America
One Rockefeller Plaza
New York 20, New York
Thorough coverage of the history of the development of the envelope and the machinery for producing it.

II. PERIODICALS

A. Paper and Paper Products. Semi-monthly. $5.00/year.
Walden, Sons and Mott, Inc.
466 Kindermack Road
Oradell, New Jersey
Current information on all major kinds of pulp and paper products.

B. Modern Converter. Semi-monthly. $3.00/year.
Davidson Publishing Company
One East First Street
Duluth 2, Minnesota
Covers industry of converting paper into paper products.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Envelope Manufacture. IR-25994. September 1960. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523
Machinery, equipment and personnel for a minimal size plant to manufacture envelopes.

IV. OTHER PUBLICATIONS

A. Symposium on Paper and Paper Products. 1959. 73 p. Gratis
American Society for Testing Materials
1916 Race Street
Philadelphia, Pennsylvania
Includes discussion on envelope materials and manufacturing.

SELECTED REFERENCES (Continued)

V. U. S. PATENTS

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

A. Patent No. 2,983,201. 1961. 13 p.
Method and apparatus for making envelopes.

B. Patent No. 2,944.470. 1961. 6 p.
Method and apparatus for the production of envelopes with gummed closing flaps.

C. Patent No. 2,851,934. 1958 8 p.
Manufacture of envelopes.

D. Patent No. 2,811,905 1957 8 p.
Processes and equipment for making envelopes.

E. Patent No. 2,796.008. 1957. 8 p.
Manufacture of envelopes.

VI. TRADE ASSOCIATIONS

A. Envelope Manufacturers Association of America
One Rockefeller Plaza
New York 20, New York

B. Paper, Stationery, and Tablet Manufacturers Association
444, Madison Avenue
New York 22, New York

VII. ENGINEERING COMPANIES

A. Vertex Company
24 Mill Road
Montvale, New Jersey
Paper cutting and gluing machinery.

B. Olm Company
740 Washington Avenue, North
Minneapolis, Minnesota
Envelope tabling, scoring, and other envelope manufacturing machinery.

VIII. DIRECTORIES

A. Lockwood's Directory of the Paper and Allied Trades. Annual $12.00.
Lockwood Trade Journal, Inc.
15 West 47th Street
New York 36, New York
Guide to the paper and allied trades, including converters equipment and suppliers, converters, paper merchants, trade associations.

ENVELOPES: S.I.C. 2642

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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INDUSTRY PROFILES

CARDBOARD BOXES AND PAPER PRODUCTS

I. P. No. 66056

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CARDBOARD BOXES AND PAPER PRODUCTS: Standard Industrial Classification 2651

A. PRODUCT DESCRIPTION

Writing paper and envelopes, packed in cardboard boxes made in plant. Also cardboard boxes of various sizes and shapes, sold separately. It is assumed that value of sales will be in the ratio of 4 for cardboard boxes to 3 for writing paper and envelopes. Ratio of production can, however, be adapted to market conditions within fairly wide limits.

B. GENERAL EVALUATION

Capital and skilled labor requirements are moderate. The products are in common use and as market economies develop and standards of literacy rise, there is increasing demand for cardboard and paper products. Except in the smallest and poorest of the economically less developed areas, it should be possible to find a market large enough for a plant of this kind.

C. MARKET ASPECTS

1. USERS. Industries, stores, offices, individuals.

2. SALES CHANNELS AND METHODS. Cardboard boxes will usually be sold direct to industries and stores. Stationery items are commonly sold to wholesale and retail distributors, occasionally direct to large users, such as government offices.

3. GEOGRAPHICAL EXTENT OF MARKET. These products can usually be sold over a wide area, since transport costs are not burdensome. They are common in international trade.

4. COMPETITION. a. Domestic Market. Competition from imports may be fairly strong. b. Export Market. Though this plant would be too small to do much export business, some regional sales might be possible.

5. MARKET NEEDED FOR PLANT DESCRIBED. Demand will depend on income levels, the importance of industry and trade in the economy, the extent of urbanization, etc. In the average conditions of less developed areas this plant could probably supply the needs for these products of a total population of one or two million people.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: Cardboard Boxes, $200,000; Writing Paper & Envelopes, $150,000

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 8,000 sq. ft.		$ --
Building. One story, 60'x70'.		25,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$30,000	
Other tools & equipmt.	6,000	
Furniture & fixtures	1,000	37,000
Total (excl. Land)		$ 62,000

Principal Items. Paper cutting machine, scoring and slitting machine, notching machine, 2 box machines, envelope machine, stamping machine, embossing machine, boiler.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 40,700
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,300
Training Costs		10,000
Total Working Capital		$ 53,000

c. TOTAL CAPITAL (EXCL. LAND) $115,000

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Paper & cardbord	250 tons	$ 80,000
Printing material		3,000
Mucilage		1,000
Wrapping materials		2,000
Total		$ 86,000

b. Supplies

Lubricants & hand tools	$ 100
Cutting tools	200
Maintenance & spare parts	500
Office supplies	200
Total	$ 1,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 25 hp.	$ 800
b. Fuel. For heating plant, if necessary.	$ 400
c. Water. For general purposes.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	7	$ 35,000
Semi-skilled	16	64,000
Unskilled	7	21,000
Total	30	$120,000
b. Indirect Labor		
Manager & supervisors	3	$ 20,000
Office	2	8,000
Other	2	8,000
Total	7	$ 36,000

c. Training Needs. Manager & supervisors should be experienced. With 2 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

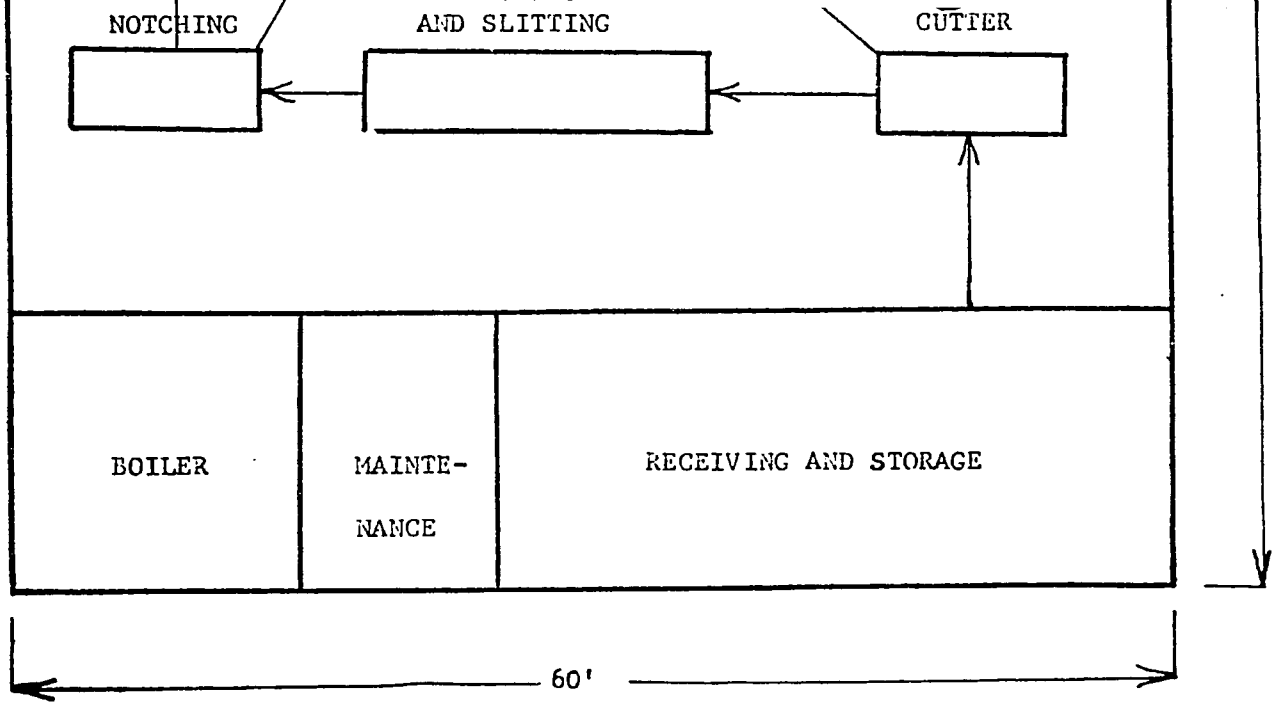
a. Annual Costs

Direct Materials	$ 86,000
Direct Labor	120,000
Manufacturing Overhead(a)	38,300
Admin. Costs(b), Contingencies	8,000
Sales Costs(c). Bad Debts	20,000
Depreciation on Fixed capital	5,600
Total	$277,900

b. Annual Sales Revenue $350,000

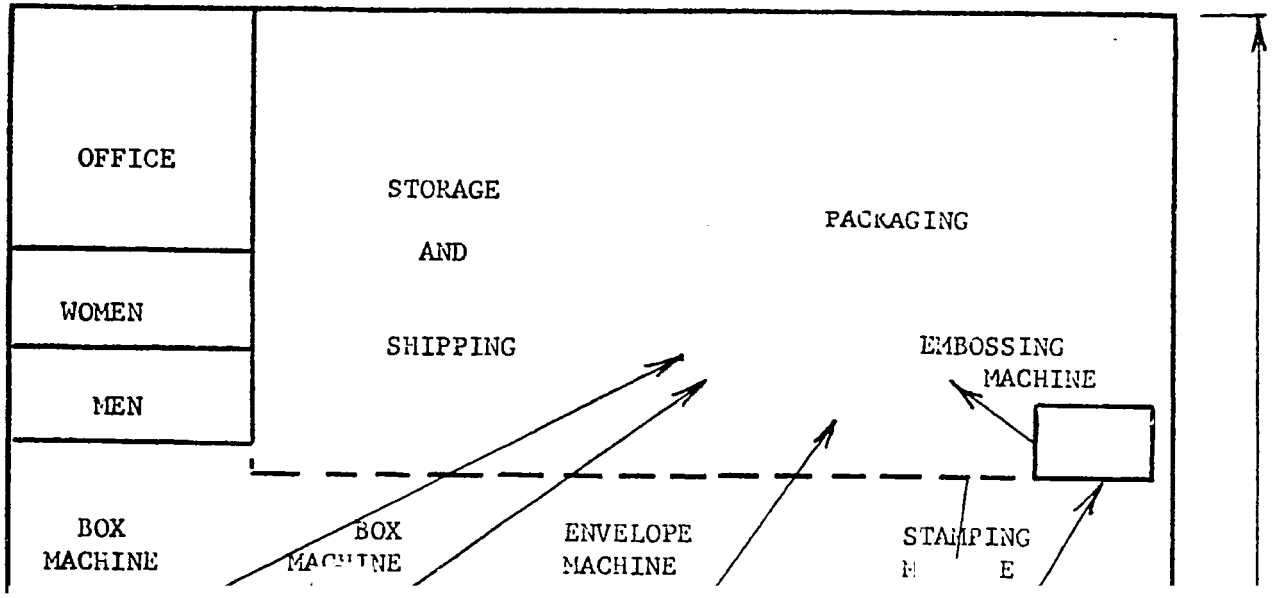
NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

CARDBOARD BOXES AND PAPER PRODUCTS: S.I.C. 2651


NOTCHING
AND SLITTING
CUTTER
BOILER
MAINTE-
NANCE
RECEIVING AND STORAGE
60'

CARDBOARD BOXES AND PAPER PRODUCTS: S.I.C. 2651

PLANT LAYOUT AND WORK FLOW



CARDBOARD BOXES AND PAPER PRODUCTS: S.I.C. 2651

SELECTED REFERENCES

I. TEXTBOOKS

A. Packaging Engineering. L.C. Barail. 1954. 414 p. $9.50.
Reinhold Publishing Company
430 Park Avenue
New York 22, New York
Describes packaging materials, their best uses, and the methods employed by packaging engineers to obtain the most efficient results at the lowest possible cost.

II. PERIODICALS

A. American Box Maker. Monthly. $4.00/year.
Howard Publishing Company
200 South Prospect Avenue
Park Ridge, Illinois
Production, management, design and merchandising of corrugated and solid fiber containers, folding cartons, and set-up boxes.

B. Fibre Containers and Paperboard Mills. Monthly. $9.00/year.
Board Products Publishing Company
228 North Lasalle Street
Chicago 1, Illinois
Serving all paperboard fields, with economic analysis, technical articles on paperboard containers and their application in various industries.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Envelopes. IR-25994. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D.C. 20523
Technical inquiry relative to the manufacturing of envelopes.

IV. OTHER PUBLICATIONS

A. Paper and Paperboard (STP-60A). ASTM. 1951. 140 p. $2.50.
American Society for Testing Materials
1916 Race Street
Philadelphia 3, Pennsylvania
Provides a discussion of the characteristics of the different types of paper, the significance of tests applied to them, and paper terms and nomenclature.

V. TECHNICAL PAPERS

A. Quality Control System. Gratis.
Greater New York Box System
New York, New York
Technical information on quality control for box manufacture.

SELECTED REFERENCES (Continued)

VI. U.S. PATENTS

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

A. Patent No. 2,839,971. 1958. 4 p.
Paper box making and assembling machines.

B. Patent No. 2,811,087. 1957. 24 p.
Carton and related paper products setting up and assembling machine.

C. Patent No. 2,801,578. 1957. 18 p.
Automatic Machine for assembling cardboard boxes.

D. Patent No. 2,645,984. 1953. 21 p.
Cardboard box and related paper products making machine.

E. Patent No. 2,554,004. 1951. 18 p.
Machanism and method for making cardboard boxes with attached handles.

VII. TRADE ASSOCIATIONS

A. National Paper Box Manufacturers Association
Liberty Trust Building
Philadelphia 7, Pennsylvania

B. National Paper Trade Association
220 East 42nd Street
New York 17, New York

VIII. ENGINEERING COMPANIES

A. South Wabash Engineering Company
203 North Wabash Avenue
Chicago, Illinois
Designs plants for production of cardboard boxes and paper products.

B. American Special Machinery Company
South Port and Webster Avenues
Chicago, Illinois
Designs special machinery for production of cardboard boxes and pape products.

IX. DIRECTORIES

A. Paper Yearbook. Annual. $10.00
Davidson Publishing Company
405 East Superior Street
Duluth 2, Minnesota
Lists manufacturers and converters of paper products and related specialties.

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INDUSTRY PROFILES

INSECTICIDES

I. P. No. 66057

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INSECTICIDES: Standard Industrial Classification 2842

A. PRODUCT DESCRIPTION

Liquid insecticides with kerosene base, packaged in one gallon cans. The equipment listed can be used to manufacture any formula of liquid insecticide.

B. GENERAL EVALUATION

Capital requirements are small and little skilled labor is needed. The use of insecticides is generally on the increase, and a plant of this kind should be suitable for many developing areas.

C. MARKET ASPECTS

1. USERS. Households, business establishments, farms, etc.

2. SALES CHANNELS AND METHODS. Sales mostly to wholesalers, some direct to large retailers and large users.

3. GEOGRAPHICAL EXTENT OF MARKET. Since this industry can be set up with a rather small capital and requires no advanced technical skill, there is a tendency for it to be somewhat localized, with a resultant saving in transport costs. There is little export trade in insecticides packaged in this way.

4. COMPETITION. a. Domestic Market. Competition would normally come only from other plants of a similar kind located in the same general area. b. Export Market. In some cases it might be possible to export to adjacent foreign territory for which this plant was a convenient source of supply.

5. MARKET NEEDED FOR PLANT DESCRIBED. This would vary greatly with climate, topography, type of economic activity, income level, etc. In tropical areas where the general income level is moderately high a population of about a million might easily absorb the plant's output, whereas elsewhere the population required might be very much higher.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 200,000 Gallons.

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 1/2 acre.		$ - -
Building. One story, 30'x60'.		10,800
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$1,400	
Furniture & fixtures	800	2,200
Total (excl. Land)		$ 13,000

Principle Items. 2 portable mixers, including glass lined tanks of 50 gallon capacity, factory trucks.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 28,200
Admin. Costs(b), Contingencies, Sales Costs(c)	30	3,000
Training Costs		800
Total Working Capital		$ 32,000

c. TOTAL CAPITAL (EXCL. LAND) $ 45,000

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Deodorized kerosene	198,085 gals.	$ 59,450
Chlordane (toxicant)	2,005 gals.	16,950
Containers (1 gal. tins)	200,000	44,000
Gummed labels	200,000	4,000
Corrugated cartons	50 000	7,500
Total		$131,900

b. Supplies

Lubricants & hand tools	$ 100
Maintenance & spare parts	250
Office supplies	150
Total	$ 500

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 1 hp. connected load.	$ 200
b. Fuel.	$ 200
c. Water. For general purposes.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. In and out freight shipments average about 8 tons per day. Good highways and rail facilities necessary.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	2	$ 12,000
Semi-skilled	1	5,000
Unskilled	1	4,000
Total	4	$ 21,000
b. Indirect Labor		
Manager	1	$ 10,000
Office	1	5,000
Total	2	$ 15,000

c. Training Needs. Manager should be fully experienced. He should be able to train the workers and reach full production in 15 days.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

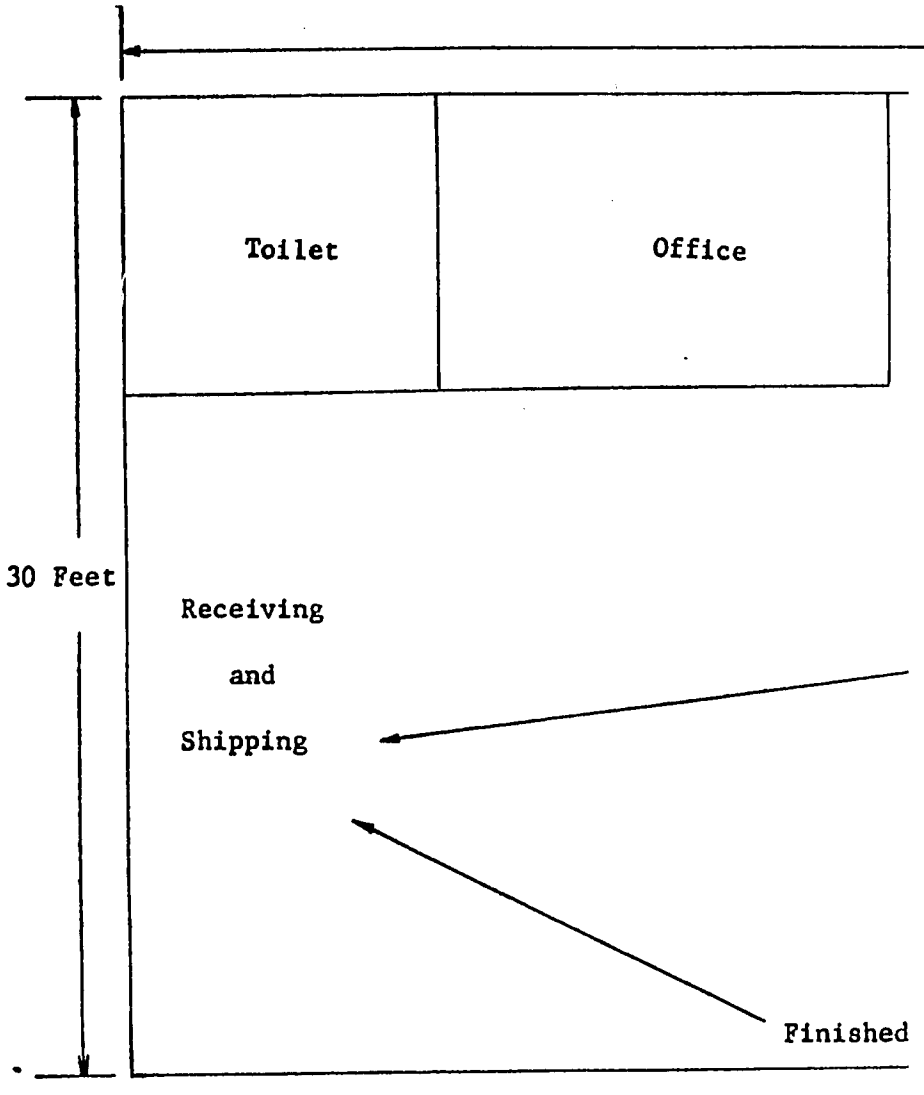
Direct Materials	$131,900
Direct Labor	21,000
Manufacturing Overhead(a)	16,000
Admin. Costs(b), Contingencies	12,000
Sales Costs(c), Bad Debts	24,000
Depreciation on Fixed Capital	800
Total	$205,700

b. Annual Sales Revenue $260,000

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

INSECT

PLANT LA



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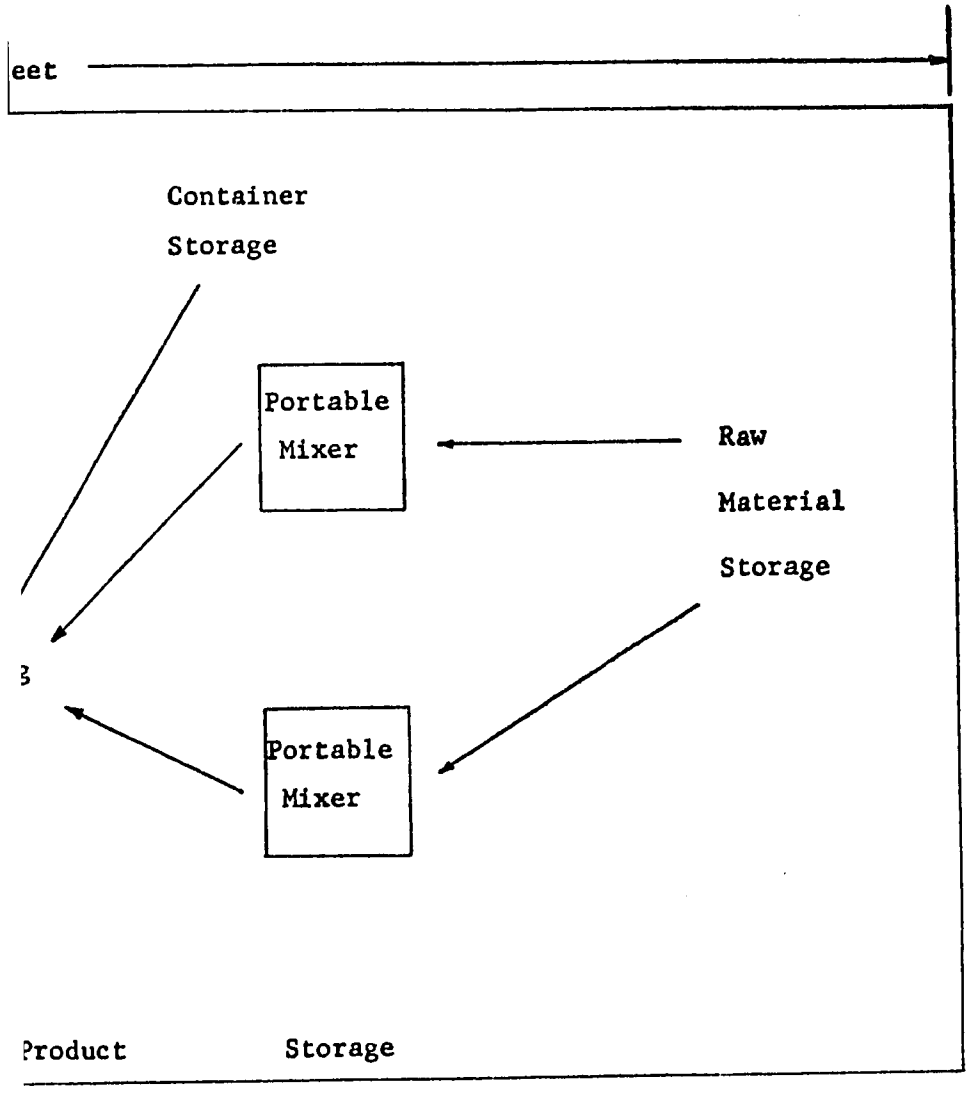
S.I.C. 2842

ɔ WORKFLOW



63

INSECTICIDES: S.I.C. 2842

SELECTED REFERENCES

I. TEXTBOOKS

A. The Chemistry and Action of Insecticides. H. H. Shepard. 1951. 501 p. Illus $11.50.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, New York
Concerned with the properties of insecticides. Includes the essential facts, and theories regarding the chemical, physical and toxicological aspects of insecticides.

B. Chemistry of Pesticides. 3rd Edition. D.E.H. Frear. 1955. 469 p. Illus. $9.75.
D. Van Nostrand Company, Inc.
120 Alexander Street
Princeton, New Jersey
Origin, chemistry, properties, methods of preparation, applications, and reactions of insecticides as well as of rodenticides, fungicides, and herbicides.

II. PERIODICALS

A. Farm Chemicals. Monthly. $6.00/year.
Ware Brothers Company
317 North Broad Street
Philadelphia 7, Pennsylvania
Magazine of farm fertilizers and insecticides.

B. Croplife. Weekly. $5.00/year.
Miller Company
P.O. Box 67
2501 Wayzata Boulevard
Minneapolis 1, Minnesota
Magazine of farm chemicals.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Chemicals Evaluated as Insecticides and Repellents at Orlando, Florida, U.S.
Department of Agriculture. 1954. AH-69. $2.25.
Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

B. Insecticides From Plants: A Review of the Literature 1941-1953. AH-154. 1958. Gratis.
Publications Division
Office of Information
U.S. Department of Agriculture
Washington, D.C. 20250
Technical review of literature on insecticides.

SELECTED REFERENCES (Continued)

IV. OTHER PUBLICATIONS

A. Organic Insecticides - Their Chemistry and Mode of Action. R. L. Metcalf.
1955. 402 p. Illus. $10.00.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, New York
Describes the chemistry and action of many insecticides.

V. U.S. PATENTS

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

A. Patent No. 2,998,348. 1961. 2 p.
Manufacture of liquid insecticides.

B. Patent No. 2,998,346. 1961 4 p.
Insecticides, their ingredients, and formulation.

C. Patent No. 2,996,542. 1961. 4 p.
Insecticides and their compounding.

D. Patent No. 2,982,687. 1961. 2 p.
Preparation of insecticides.

VI. TRADE ASSOCIATIONS

A. Chemical Specialities Manufacturers Association
50 East 41st Street
New York 17, New York

VII. ENGINEERING COMPANIES

A. Alsop Engineering and Manufacturing Corp.
1947 Norton Street
Mildale, Connecticut
All kinds of liquid handling equipment.

B. Hewett-Robins, Inc.
664 Glenbrook Road
Stamford, Connecticut
Designers and engineers of insecticide plants.

VIII. DIRECTORIES

A. Soap Blue Book. Published annually as the April issue of Soap and Chemical Specialities Magazine. (Subscription rate - $4.00/year.)
McNair Dorland Company. Inc.
254 West 31st Street
New York, New York
Devoted to soap detergents, aeorosols, insecticides, disinfectants, and other chemical specialities.

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

MEAT PROCESSING

I. P. No. 66058

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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MEAT PROCESSING : Standard Industrial Classification 2011

A. PRODUCT DESCRIPTION

Fresh pork cuts, hams, bacon, pork sausages, frankfurters, salami, bologna, scrapple, lard, etc.

B. GENERAL EVALUATION

Plant described is designed primarily for making pork products. A plant for processing other kinds of meat, though basically similar, would need somewhat different equipment. Capital requirements for this industry are moderate. Labor skills needed are mostly not of a high order, and in any area where this plant would be appropriate it is to be supposed that workers familiar with meat processing would be available who could be easily trained for work in a modern plant. Local supply of livestock is indispensable. Commonest situation where establishment of plant of this character and size would be contemplated is where it is desired to modernize and expand existing business. This situation will exist only where there is already a large community deriving a high proportion of its animal protein from products in question. Where market exists, advantages of having modern sanitary plant are evident. In some cases such a plant might encourage consumption and therefore provide bigger market for hog raisers.

C. MARKET ASPECTS

1. USERS. Restaurants, public institutions, households.
2. SALES CHANNELS AND METHODS. Sales mostly to retailers. Some direct sales to big restaurants and public institutions.
3. GEOGRAPHICAL EXTENT OF MARKET. a Domestic. Market will generally be localized. b. Export. Since pork in most forms is highly perishable, exports are mainly confined to bacon and canned products.
4. COMPETITION. a. Domestic Market. Main competition is likely to come from small processors who, with low labor costs and small profit margins, can often, at least in their own immediate vicinity, compete effectively with modern plant. b. Export Market. Export market in pork products, and to some extent in meat products generally, is highly special one. Apart from some regional shipments (regional movements are often of live animals rather than meat) export market consists mainly of a few high-income countries with high meat consumption, where domestic meat production is insufficient. Plant described would certainly have no export outlets of any significance.
5. MARKET NEEDED FOR PLANT DESCRIBED. Obvious first requirement is community in which pork products constitute substantial part of animal protein intake. In such a community meat processing establishments will already exist. Assuming that, on the average, half the animal protein is taken in the form of pork and that plant is able to obtain 20% of total market, in average conditions of urban communities plant described would need total population of the order of 600,000 within its delivery range.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 23,000 Hundredweight

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cos
Land. About 1 acre.		$ --
Building. One story, 70'x140', plus small smokehouse.		60,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$56,500	
Other tools & equipmt.	3,500	
Furniture & fixtures	1,000	
Transportation equipmt.	14,000	75,000
Total (excl. Land)		$135,000

Principal Items. Meat slicing machine, overhead tracking equipment, factory trucks, trays, refrigerators & compressors, knives, saws, cleavers, boiler, 1 pick-up & 3 panel delivery trucks.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 73,700
Admin. & Sales Costs(b), Contingencies	30	5,300
Training Cost		14,000
Total Working Capital		$ 93,000

c. TOTAL CAPITAL (EXCL. LAND) $228,000

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Hogs	1,400 tons	$305,000
Veal	5.6 tons	2,600
Boneless beef	10.0 tons	5,000
Corn meal	27.5 tons	2,200
Salt	15.0 tons	600
Sugar, spices, chemicals, etc.		1,200
Packing materials		2,000
Total		$318,600

b. Supplies

Maintenance supplies	$ 1,800
Office supplies	200
	$ 2,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Conected load about 170 hp.	$ 6,500
b. Fuel. Hot water & steam needed for meat processing. Any boiler fuel may be used.	$ 1,800
c. Water. About 2.8 mn. gals. annually for production & general purposes.	$ 700

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 3 panel trucks, with refrigeration, for deliveries. A 1-ton pick-up truck for general purposes.	$ 3,000

b. External Transport Facilities. Plant should be located as close to sources of livestock as is compatible with having ready access to markets. It shoud be on good highway and, if possible, on railroad siding.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor.		
Skilled	5	$ 30,000
Semi-skilled	5	20,000
Unskilled	9	32,400
Total	19	$ 82,400
b. Indirect Labor		
Manager	1	$ 8,000
Office	1	4,000
Other	5	15,000
Total	7	$ 27,000

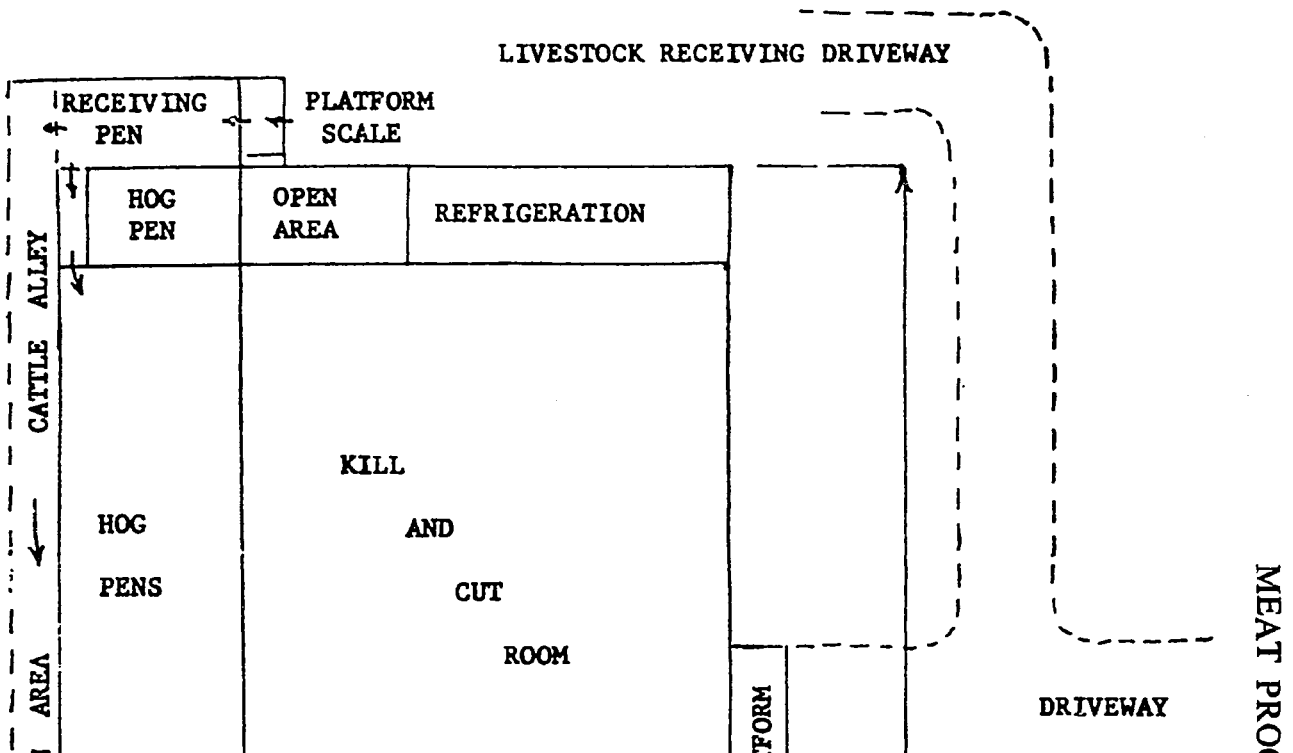
c. Training Needs. Manager & skilled workers should be experienced in this industry & be able to train other workers. Plant should reach full production in 2-3 months.

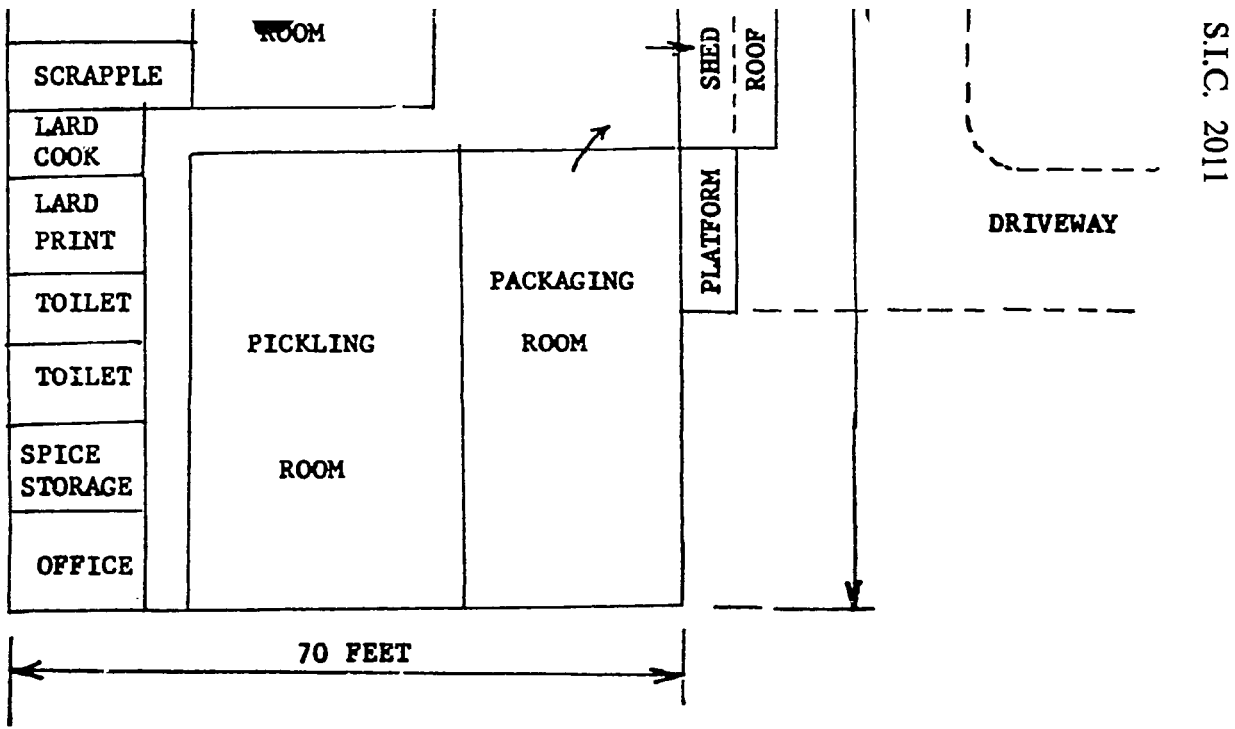
6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	$318,600
Direct Labor	82,400
Manufacturing Overhead(a)	41,000
Admin. & Sales Costs(b), Bad Debts, Contingencies	65,000
Depreciation on Fixed Capital	13,000
Total	$520,000
b. Annual Sales Revenue	$680,000

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

PLANT LAYOUT





ARROWS INDICATE FLOW

S.I.C. 2011

MEAT PROCESSING : S.I.C. 2011

SELECTED REFERENCES

I. TEXTBOOKS

A. Butchering, Processing and Preservation of Meats. F. G. Ashbrook.
1955. 318 p. Illus. $4.75.
D. Van Nostrand Company, Inc.
120, Alexander Street
Princeton New Jersey
Practical instructions for slaughtering, cleaning, processing and freezing meats and meat products.

B. Meat for the Table. S Bull. 1951. 240 p. Illus. $4.95.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, New York
Economics of meat production, the packing industry, with information on the processing of meat products.

II. PERIODICALS

A. Food Engineering. Monthly. $20.00/year.
McGraw-Hill Publishing Company, Inc.
330 West 42nd Street
New York 36, New York
Sources, processes, prices, and markets of staple foods and food products, including meats.

B. Meat Processing and Sausage Manufacturing. Monthly $7.00/year.
Davies Publishing Co.
1214 N. La Salle Street
Chicago 10, Illinois
Processing and marketing information of primary interest to meat packers.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Regulations Governing the Meat Inspection of the United States Department of Agriculture. 1959.
U. S. Department of Agriculture
Washington, D. C. 20250
Requirements and standards for the processing of meats and meat products.

IV. OTHER PUBLICATIONS

A. The Science of Meat and Meat Products.
American Meat Institute Foundation. 1960. 435 p. Illus. $9.60.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, New York
Includes information on meat processing and the manufacture of sausage products.

V. TECHNICAL PAPERS

A. Meat Curing Process Aided by Compressed Air.
J. F. Krambule. Compressed Air Magazine.
September 1959. Vol. 64. p. 27-8. $.50.
Compressed Air Magazine Company
942 Memorial Parkway
Phillipsburg, New Jersey
Recent developments in the processing of meat.

VI. U. S. PATENTS

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

A. Patent No. 2,995,449. 1961. 9 p.
Method for making skinless sausages.

B. Patent No. 2,978,738. 1961. 3 p.
Method of processing animal carcasses.

C. Patent No. 2,875,222. 1959. 2 p.
Rendering of animal fats.

VII. TRADE ASSOCIATIONS

A. American Meat Institute Foundation
939 East 57th Street
Chicago 37, Illinois

B. National Meat Industry Council
25 Broad Street
New York 4, N. Y.

VIII. ENGINEERING COMPANIES

A. Alsop Engineering Company
1950 Norton Street
Milldale, Connecticut
Packers and butchers machinery and engineering service.

B. Associated industrial Engineers, Inc.
1501 Race Street
Sandusky, Ohio
Engineering and technical counseling on meat processing plants.

IX. DIRECTORIES

A. Purchasing Guide for the Meat Industry. Annual. $7.50.
National Provisioner, Inc.
15 West Huron Street
Chicago 10, Illinois
Lists manufacturers of equipment and supplies used in the meat processing 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.

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INDUSTRY PROFILES

SLAUGHTERING AND MEAT PACKING

I. P. No. 66059

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SLAUGHTERING AND MEAT PACKING: Standard Industrial Classification S.I.C. 2011

A. PRODUCT DESCRIPTION

Beef, veal, pork, lamb and mutton in dressed weight form for final cutting in retail stores, restaurants, etc. The plant capacity shown is based on the following slaughter figures and conversion factors:-

No. of Livestock	Live Weight	Conversion Factor	Dressed Weight
3,125 cattle	3,125,000 lbs.	56%	1,750,000 lbs.
4,687 calves	1,043,575 lbs.	58%	605,300 lbs.
4,688 hogs	975,110 lbs.	76%	714,100 lbs.
4,688 sheep	398,480 lbs.	45%	179,300 lbs.
	5,542,165 lbs.		3,275,700 lbs.

The foregoing figures are given only as an example. Product mix can be varied within wide limits to meet demand.

B. GENERAL EVALUATION

Meat slaughtering facilities are needed in practically all areas, but unless meat is a staple part of the diet of the urban population, a completely mechanized slaughtering plant, depending upon a steady supply of live animals. might not be a good investment. The plant here described can process 75 hogs, sheep or calves, or 50 beef cattle per eight-hour day. Capital requirements are moderately large. Skilled labor is needed for efficient operation of the plant, but in areas where income is sufficiently high to allow for regular consumption of meat, it can be assumed that the labor skill required for the operation of the plant will be available.

C. MARKET ASPECTS

1. USERS. Retail stores, eating places.

2. SALES CHANNELS AND METHODS. Plant would sell to wholesalers for resale to retailers, restaurants, etc.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Products must be refrigerated in transit to avoid spoilage. Although this raises the cost of shipment the value is sufficiently high to be able to bear such added cost. Domestic market area may be nationwide. b. Export. World-wide.

4. COMPETITION. a. Domestic Market. Competition may come from cheaper kinds of animal protein, which in some countries include fish and poultry. In the consumption of the higher income groups, imported, canned and other preserved meat products may also compete. Such competition may be particularly serious where local meat products are not of high quality. b. Export Market. If the meat is of good quality exports into nearby foreign territory may be possible.

5. MARKET NEEDED FOR PLANT DESCRIBED. In areas where meat is an important part of the diet, and where the urban income is moderately high, a population of about 100,000 people should be sufficient to support the output of the plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 3,275,700 Pounds

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. about 4 acres.		$ --
Building. One story, main building & stock pens & runways 70'x116', office annex 20'x27'.		52,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$85 000	
Other tools & equipmt.	4 000	
Furniture & fixtures	1,000	90,000
Total (excl. Land)		$142,000

Principal Items. Meat-spicer mixer, meat grinder, silent cutter, sausage stuffer, smokehouse & chests, 3 hoists, cattle scale, monorail system, air compressor 100 cfm, 2 boilers 15 hp., 2 refrigeration compressors 20-ton F-12, wet pressure cooker, scraps dryer, casing cleaning unit, knocking pen, scalding vat with throwout, dehairing machine, lard chopper & table, hydraulic press.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 224,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	9,000
Training Costs		9,000
Total Working Capital		$ 242 000

c. TOTAL CAPITAL (EXCL. LAND) $ 384,000

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Cattle	3,125	$ 719,000
Calves	4,687	277,000
Hogs	4,688	117,000
Sheep	4,688	81,000
Total		$1,194,000

b. Supplies	
Lubricants & hand tools	$ 300
Maintenance & spare parts	2 000
Chemicals & detergents	200
Office supplies	300
Total	$ 2,800

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 220 hp.	$ 7,200
b. Fuel. About 38,000 gals. oil annually.	$ 4,600
c. Water. About 1.6 mn. gals. annually.	$ 400

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. Total in & out shipments about 400 tons a month. Good highway necessary, and access to railroad desirable.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	6	$ 36,000
Semi-skilled	7	28,000
Unskilled	7	25,000
Total	20	$ 89,000
b. Indirect Labor		
Manager & supervisors	3	$ 22,000
Office	2	8,000
Other	5	15,000
Total	10	$ 45 000

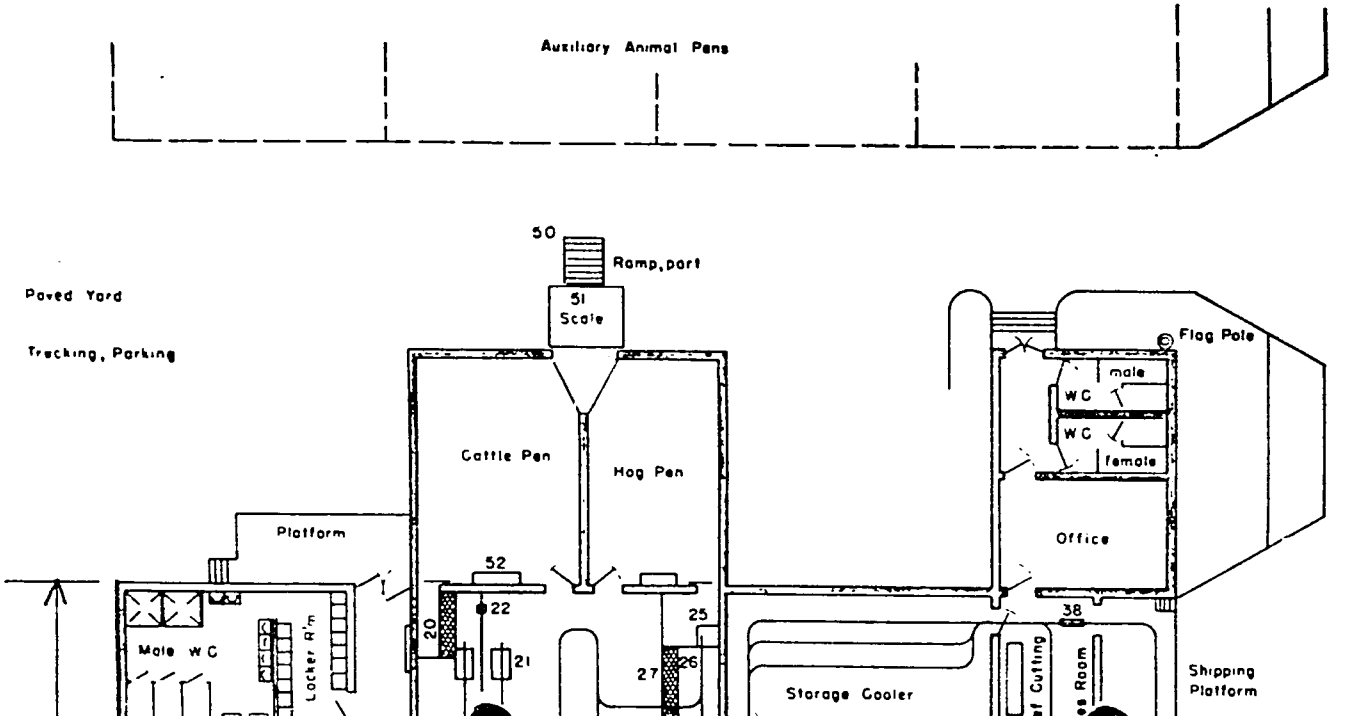
c. Training Needs. Manager & supervisors must be fully experienced. With 3 skilled workers, they should be able to do all labor training. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

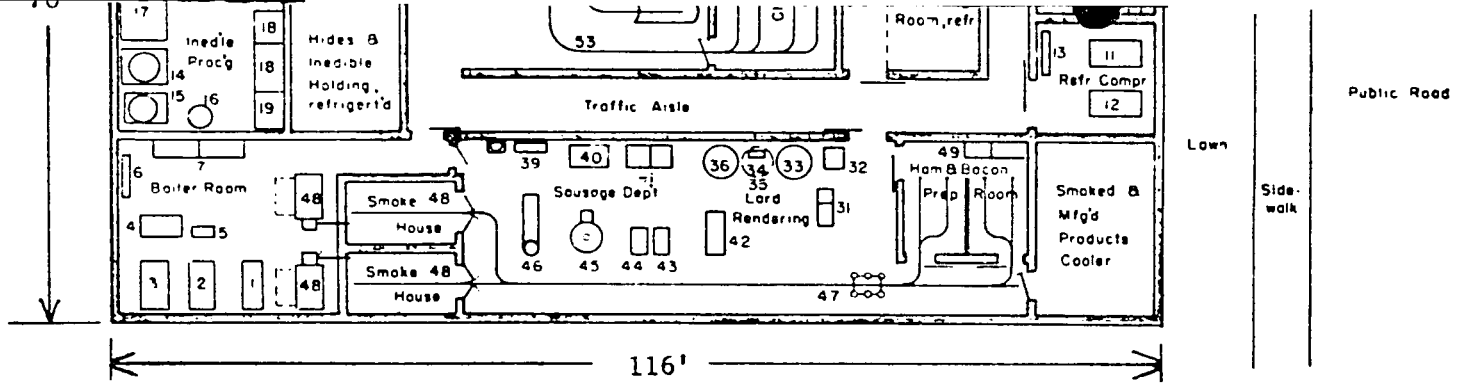
a. Annual Costs	
Direct Materials	$1,194,000
Direct Labor	89,000
Manufacturing Overhead(a)	60,000
Admin. Costs(b), Contingencies	35,000
Sales Costs(c), Bad Debts	75,000
Depreciation on Fixed Capital	12,000
Total	$1,465,000
b. Annual Sales Revenue	$1,800,000

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

PLANT LAYOUT AND WORK FLOW



SLAUGHTERING



BOILER ROOM
1 Air Compressor
2 Boiler, Building Heat
3 Boiler, Process Steam
4 Hot Water Tank
5 Hot Water Circulating Pump
6 Main Power Panel
7 Maintenance Benches

CURING ROOM
8 Pork Cutting Table
9 Pickling Table
10 Pickle Pump

COMPRESSOR ROOM
11 Refrigeration Compressor
12 " "
13 Control Panel

INEDIBLE PROCESSING
14 Wet Pressure Cooker
15 Scraps Dryer
16 Odor Condenser
17 Gut Slashing & Washing
18 Casing Cleaning Unit
19 Casing Salting

KILLING ROOM
20 Knocking Pen
21 Pritch Plates & Bars
22 Electric Hoist
23 Track Scale, overhead
24 Sterilizing Cabinet
25 Hog Hoist, electric
26 Bleeding Rail
27 Sticking Platform
28 Scalding Vat
29 Dehairing Machine
30 Gambreling Table

LARD RENDERING
31 Lard Chopper & Table
32 Hydraulic Press, hand-type
33 Kettle, Lard-open, steam jacketed
34 Settling Tank, overhead susp'd
35 Lard Pump
36 Lard Chill-Agitator

SALES ROOM
37 Beef-Cutting Table
38 Track Scale, overhead

SAUSAGE DEP'T
39 Spice Cabinet & Table
40 Loaf Oven
41 Cooking Vats, two
42 Large Table
43 Meat-Spice Mixer
44 Meat Grinder
45 Silent Cutter
46 Sausage Stuffer
47 Sausage Cold Shower
48 Smoke House & Chest

WASH & DRY ROOM
49 Ham & Bacon Soaking Vats

MISCELL. ITEMS
50 Cattle Ramp, portable
51 Cattle Scale, enclosed
52 Animal Watering Trough
53 Overhead Monorail System

The following not shown
Blood Drums
Gambrel Bars
Metal Trays & Trucks
Metal Pallets
Pallet Handtrucks
Meat Saws
Knifes, Steels, Hooks
Table Dial Weigh Scales
Wrapping Table, Sales Room
Water Cooling Tower & Pump
Sausage Racks
Ham & Bacon Smoke Trees
Sewerage Septic Tank
Office Equipment
Steel Shelving

.T PACKING: S. I. C. 2011

SLAUGHTERING AND MEAT PACKING: S. I C. 2011

SELECTED REFERENCES

I. TEXTBOOKS

A. The Meat We Eat. P. T. Ziegler 1962. $7.25.
The Interstate Printers and Publishers, Inc.
1927 North Jackson Street
Danville, Illinois
Discussions of slaughtering and dressing operations.

B. Beef, Veal, and Lamb Operations. 4th edition.
Institute of Meat Packing. 1945. 424 p. $4.50.
Institute of Meat Packing
School of Business
University of Chicago
Chicago 37, Illinois
Discusses the slaughter and the dressing of food animals as well as chilling, trimming, boning and other related operations.

II. PERIODICALS

A. Meat. Monthly. $10.00/year.
Meat, Incorporated
59 East Van Buren Street
Chicago 5, Illinois
Operating and management for meat packers.

B. The National Provisioner. Weekly, $8.00/year.
The National Provisioner, Inc.
15 West Huron Street
Chicago 10, Illinois
Trade magazine for the meat industry, covering production methods and other operations.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Operational Data of Slaughterhouses. IR-11790.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523
Requirements for establishing and operating a slaughtering and meat packing plant.

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. Meat and Meat Foods. L. B. Jensen. 1949. 218 p. Illus. $5.00.
The Ronald Press
15 East 26th Street
New York 10, N. Y.
Processing and preservation of meats from plant to consumer, written in non-technical language.

V. U.S. PATENTS

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

A. Patent No. 2,988,452. 1961. 3 p.
Treatment of fresh meat.

B. Patent No. 2,968,570. 1961. 3 p.
Method of preparing hams.

C. Patent No. 2,942,986. 1960. 4 p.
Process for treating fresh meat.

D. Patent No. 2,847,313. 1958. 3 p.
Method of treating fresh meats.

VI. TRADE ASSOCIATIONS

A. American Meat Institute
59 East Van Buren Street
Chicago 5, Illinois

B. National Independent Meat Packers Association
1820 Massachusetts Avenue, N. W.,
Washington, D. C. 20036

VII. ENGINEERING COMPANIES

A. Koch Equipment Company
2522 Holmes Street
Kansas City 8, Missouri
Meat processing engineers and suppliers of equipment.

B. Technical Enterprises, Inc.
31 South Street
New York 4, N. Y.
Provide consulting services with meat packing as a specialty.

VIII. DIRECTORIES

A. Western Meat Industry Directory. Annual. $2.00.
Span Publishing Company
Keystone Building
Mill Valley, California
Lists about 1,500 packers and processers of meat and meat products, indicating type of operation of each.

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

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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

SMOKED MEAT

I. P. No. 66060

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

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SMOKED MEAT: Standard Industrial Classification 2013

A. PRODUCT DESCRIPTION

Fresh pork hams cured and smoked with hickory wood. Other kinds of meat or popultry can be similarly processed.

B. GENERAL EVALUATION

This project would require an adequate and steady supply of good quality locally-produced meat. It would also be desirable, though not essential, to have local supplies of the wood and other materials needed for the operation. A careful survey to determine whether there is a large enough market would be necessary, since consumers are likely to be very largely confined to the urban population and, in very low income areas, to the higher-income groups. The meat-eating habits of the people must also, of course, be considered. Keeping the meat in good condition during long-distance shipment may present problems and restrict the market area. The market may also be restricted geographically because small enterprises and even farmers from nearby districts may often be able to compete effectively in provincial towns. The project appears most suitable for entrepreneurs who are already experienced in the business and desire to expand and modernize existing operations.

C. MARKET ASPECTS

1. USERS. Housholds, eating places.

2. SALES CHANNELS AND METHODS. Sales to wholesalers and large retailers A brand name, attractive packaging, and some advertising are needed.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. If transport facilities are good a nation-wide market may be possible. b. Export. Some export to nearby foreign areas may be possible but development of a large foreign market is unlikely.

4. COMPETITION. a. Domestic Market. Competition from small-scale producer may be keen. However, this may be met by careful attention to quality maintenance and use of good packaging and a distinctive brand name, so that purchasers may readily identify the product and buy with assurance that it is of high quality. b. Export Market. The export market is limited to areas where purchasing power is high and there are sufficient people prepared to pay a high price for products of superior quality. In general it would be difficult to compete with existing producers. In some cases trade agreements exist which effectively exclude non-participating countries.

5. MARKET NEEDED FOR PLANT DESCRIBED. In areas where this product is a common part of the diet and where the living standard is fairly high an urban population of about half a million people might be sufficient to provide a market for this plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 884,800 Pounds

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. 1/2 acre.		$ --
Building. One story, 80'x120'.		58,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$47,600	
Other tools & equipmt.	5,000	
Furniture & fixtures	700	53,300
Total (excl. Land)		$111,300

Principal Items. 10 brick smoke ovens, refrigerating equipment, 120 trees, 3 washing vats, 2 hand trucks, 3 scales, monorail tracks for ovens, work tables.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 48,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	3,700
Training Costs		1,800
Total Working Capital		$ 53,500

c. TOTAL CAPITAL (EXCL. LAND) $164,800

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Fresh pork hams	1,106,000 lbs.	$221,200
Saltpeter		200
Salt	40 tons	600
Hickory wood	160 cords	2,400
Packaging material		6,000
Total		$230,400

b. Supplies

Lubricants & hand tools	$ 300
Cutting tools & abrasives	500
Maintenance & spare parts	2,000
Office supplies	200
Total	$ 3,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 140 hp. connected load.	$ 1,800
b. Fuel. For heating unrefrigerated areas only.	$ 300
c. Water. For sanitation, fire protection and production.	$ 300

4. TRANSPORTATION

a. Own Transport Equipment. None needed.

b. External Transport Facilities. In and out shipments amount to about 4.2 tons per day. Refrigerated transport facilities necessary.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	1	$ 5,000
Semi-skilled	8	32,000
Unskilled	1	3,000
Total	10	$ 40,000
b. Indirect Labor		
Manager	1	$ 8,000
Office	1	4,000
Total	2	$ 12,000

c. Training Needs. Manager must be fully experienced. With 1 skilled worker, he should be able to train other workers and reach full production in 30 days.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

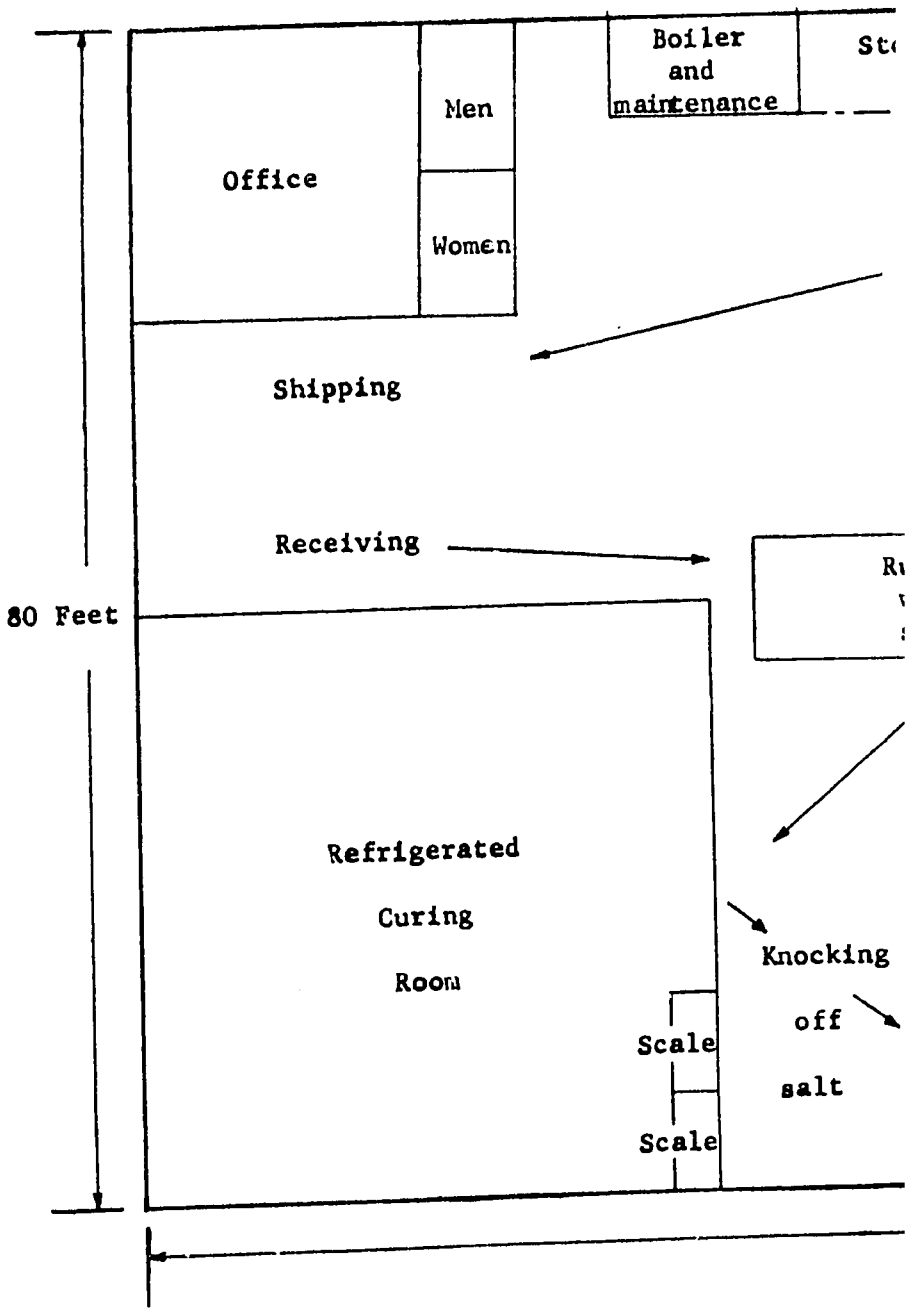
Direct Materials	$230,400
Direct Labor	40 000
Manufacturing Overhead(a)	17,400
Admin. Costs(b), Contingencies	15,000
Sales Costs(c), Bad Debts	30,000
Depreciation on Fixed Capital	8,700
Total	$341,500

b. Annual Sales Revenue $440,000

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

SMOKED M

PLANT LAYOUT



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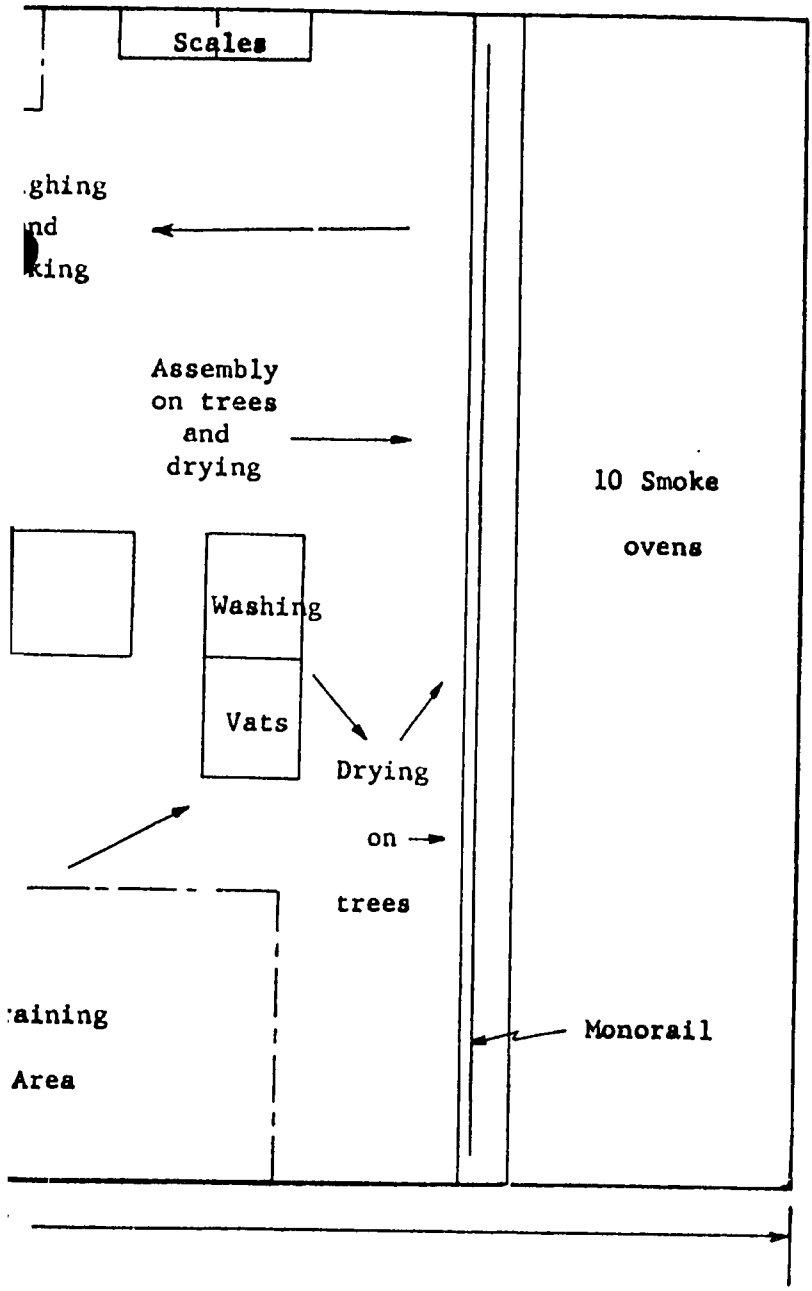
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SMOKED MEAT: S.I.C. 2013

I. TEXTBOOKS

A. The Technology of Food Preservation. N.W. Desrosier. 1959.
425 p. Illus. $9.50.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, N.Y.
Detailed description of fundamental principles of drying and curing of various foods, including meat.

B. Meat and Meat Foods. L.B. Jensen. 1949. 218 p. Illus. $5.00.
Ronald Press Company
18 East 26th Street
New York 10, N.Y.
Preservation, curing, and smoking of meats and of meat products, from meat plant to consumer.

II. PERIODICALS

A. Butchers' Advocate Dressed Poultry and The Food Merchant. Weekly.
$4.00/year.
Butchers' Advocate Publishing Co., Inc.
40 Exchange Place
New York 5, N.Y.
Current market information of interest to the meat industry.

B. The National Provisioner, Inc. Weekly. $6.00/year.
The National Provisioner, Inc.
15 West Huron Street
Chicago 10, Illinois

III. GOVERNMENT PUBLICATIONS, U.S.

A. U.S. Inspected Meat Processing Plants. 1961. Gratis.
United States Department of Agriculture
Washington, D.C. 20250
Repuirements to be met by meat processing plants before said plants are approved for operation.

IV. OTHER PUBLICATIONS

A. The Science of Meat and Production.
American Meat Institute Foundation. 1960. 435 p. Illus $9.60.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, N.Y.
Describes the different processes used in the preservation of meat and meat products.

SELECTED REFERENCES (Continued)

V. TECHNICAL PAPERS

A. Meat Curing Process Aided by Compressed Air.
J.F. Krambule. Compressed Air Magazine.
September 1959. Vol. 64. p. 27-8. $.50.
Compressed Air Magazine.
942 Memorial Parkway
Phillipsburg, New Jersey
Recent developments in the processing of meat employing the use of compressed air.

VI. U.S. PATENTS

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

A. Patent No. 2,994,085. 1961. 2 p.
Process for the curing of meat.

B. Patent No. 2,973,277. 1961. 6 p.
Process for producing smoked meats.

C. Patent No. 2,930,703. 1960. 15 p.
Meat curing process.

VII. TRADE ASSOCIATIONS

A. American Meat Institute
59 East Van Buren Street
Chicago 5. Illinois

B. National Independent Meat Packers Association
1820 Massachusetts Avenue, N.W.,
Washington, D.C. 20036

VIII. ENGINEERING COMPANIES

A. Consolidated Engineering Enterprises
9445 Third Street
Jacksonville, Florida
Packers machinery and plants designed.

B. Koch Equipment Company
2522 Holmes Street
Kansas City, Missouri
Engineering and technical equipment for the meat industry.

IX. DIRECTORIES

A. Purchasing Guide for the Meat Industry. Annual. $7.50.
The National Provisioner, Inc.
15 West Huron Street
Chicago 10, Illinois
Lists manufacturers of equipment and supplies used by the meat processing industry.

SMOKED MEAT: S. I. C. 2013

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INDUSTRY PROFILES

CITRUS FRUIT—WHOLE SECTIONS, CANNED

I. P. No. 66061

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a'

CITRUS FRUITS - WHOLE SECTIONS, CANNED: Standard Industrial Classification 2033

A. PRODUCT DESCRIPTION

Whole sections of oranges and grapefruit in 12-oz. cans, packaged 24 cans to a carton.

B. GENERAL EVALUATION OF PROSPECTS

An adequate and steady supply of locally grown fruit of good quality is necessary. The plant would operate about 160 days a year. Capital requirements are moderately high and a careful market survey should be made before this enterprise is undertaken. However, the demand for canned fruit is growing even in low income areas, in addition to which, if the quality is high and the price reasonable, there are export possibilities. Competition is keen and active less a promotion is necessary. Nevetheless, the chances for a product of consistently high quality are good.

C. MARKET ASPECTS

1. USERS. Homes, restaurants and other communal eating places.

2. SALES CHANNELS AND METHODS. Sales to wholesalers and large retail distributors. An attractive brand name and active sales promotion are essential.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. This product can be easily transported and unit transport costs are generally low enough to permit nation-wide marketing. b. Export. Market is world-wide.

4. COMPETITION. a. Domestic Market. Price and quality will determine the ability to compete with fresh fruit and imported canned fruit. b. Export Market. Export possibilities exist, mainly in countries not producing citrus fruit, but competition from large-scale and well-known producers is keen.

5. MARKET NEEDED FOR PLANT DESCRIBED. In countries of small population and low income it would be necessary to develop export outlets. Generally speaking, the main markets will be outside the areas where fresh fruit can be easily and cheaply obtained.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE 10 HOUR SHIFT, 160 DAYS ANNUALLY: 22,000,000 Cans

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. about 4 acres.		$ --
Building. One story, 21,000 sq. ft.		126,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$160,000	
Other tools & equipmt.	6,000	
Furniture & fixtures	1,000	
Transportation equipmt.	100,000	267,000
Total (excl. Land)		$393,000

Principal Items. Conveyors, elevators, fruit bins, scald tanks, roller bed spray, peeling equipment, wire belts, baskets, sectioning and packing equipment, screw conveyors, precooler, storage chute, wheel conveyors, filling and sealing equipment, boiler.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	30	$471,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	10 000
Training Costs		4,000
Total Working Capital		$485,000

c. TOTAL CAPIT. (EXCL. LAND) $878,000

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Oranges	800,000 Boxes	$2,560,000
Grapefruit	800,000 Boxes	2,000,000
Cans-12 oz.	22,000,000	440,000
Cartons	917,000	138,000
Labels		12,000
Total		$5,150,000

b. Supplies

Lubricants & hand tools	$ 200
Cutting tools & abrasives	500
Maintenance & spare parts	20,000
Office supplies	300
Total	$ 21,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 165 hp. connected load.	$ 800
b. Fuel. About 50,000 gals. oil annually.	$ 6,000
c. Water. For production and sanitation and fire protection.	$ 400

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 10 trucks & 15 trailers.	$ 10,000

b. External Transport Facilities. Raw material hauled within radius of 50 miles. Good highway necessary.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	10	$ 40,000
Semi-skilled	60	200,000
Unskilled	60	160,000
Total	130	$400,000
b. Indirect Labor		
Manager & supervisor	2	$ 18,000
Office & inspection	3	12,000
Truck drivers	10	33,300
Total	15	$ 63,300

c. Training Needs. Manager & supervisor, with 10 skilled workers, should be able to train all workers and reach full production within 2 weeks.

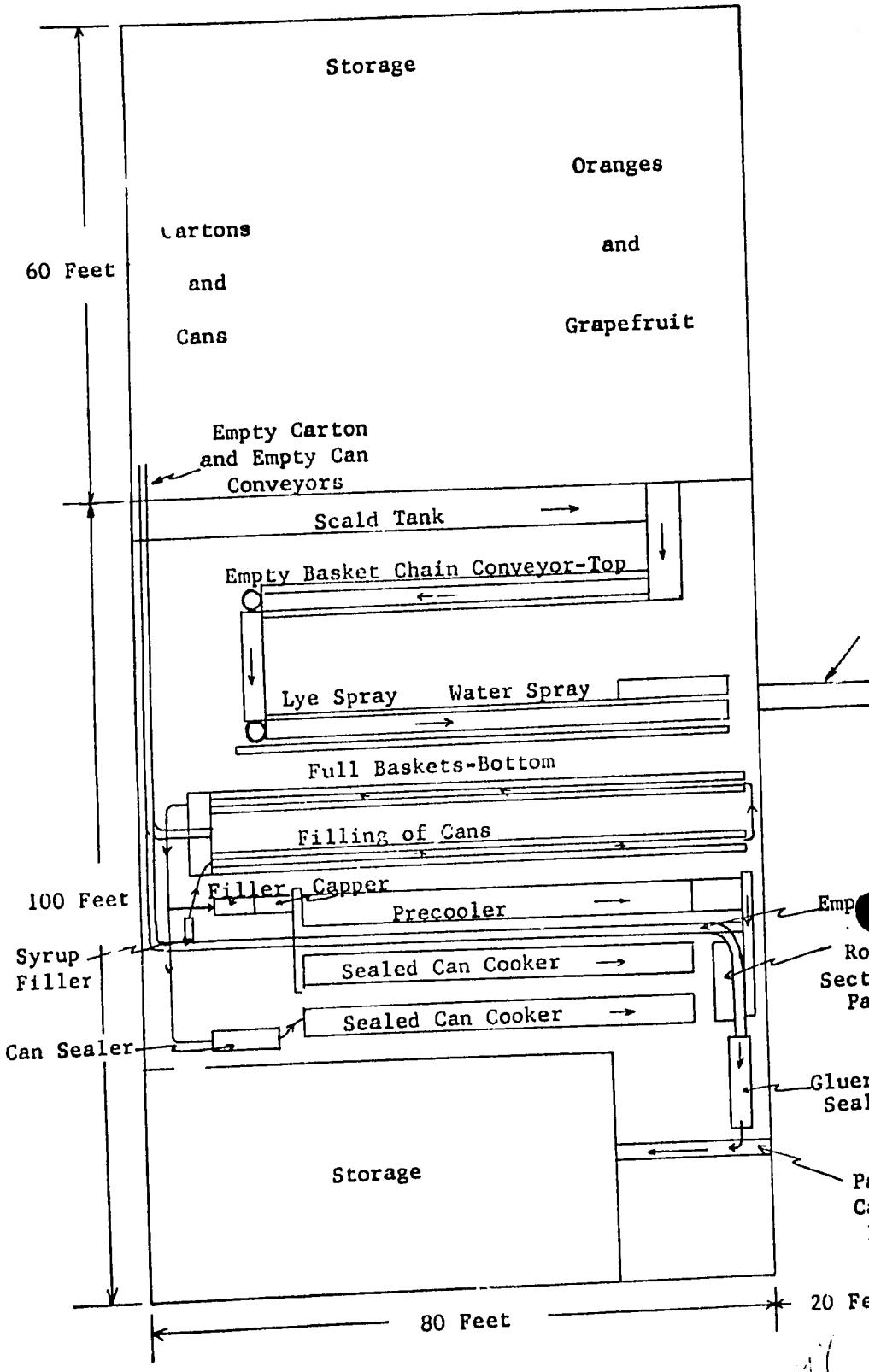
6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

Direct Materials	$5,150,000
Direct Labor	400,000
Manufacturing Overhead(a)	101,500
Admin. Costs(b), Contingencies	60,000
Sales Costs(c), Bad Debts	60,000
Depreciation on Fixed Capital	48,600
Total	$5,820,100

b. Annual Sales Revenue $6,500,000

NOTES. (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.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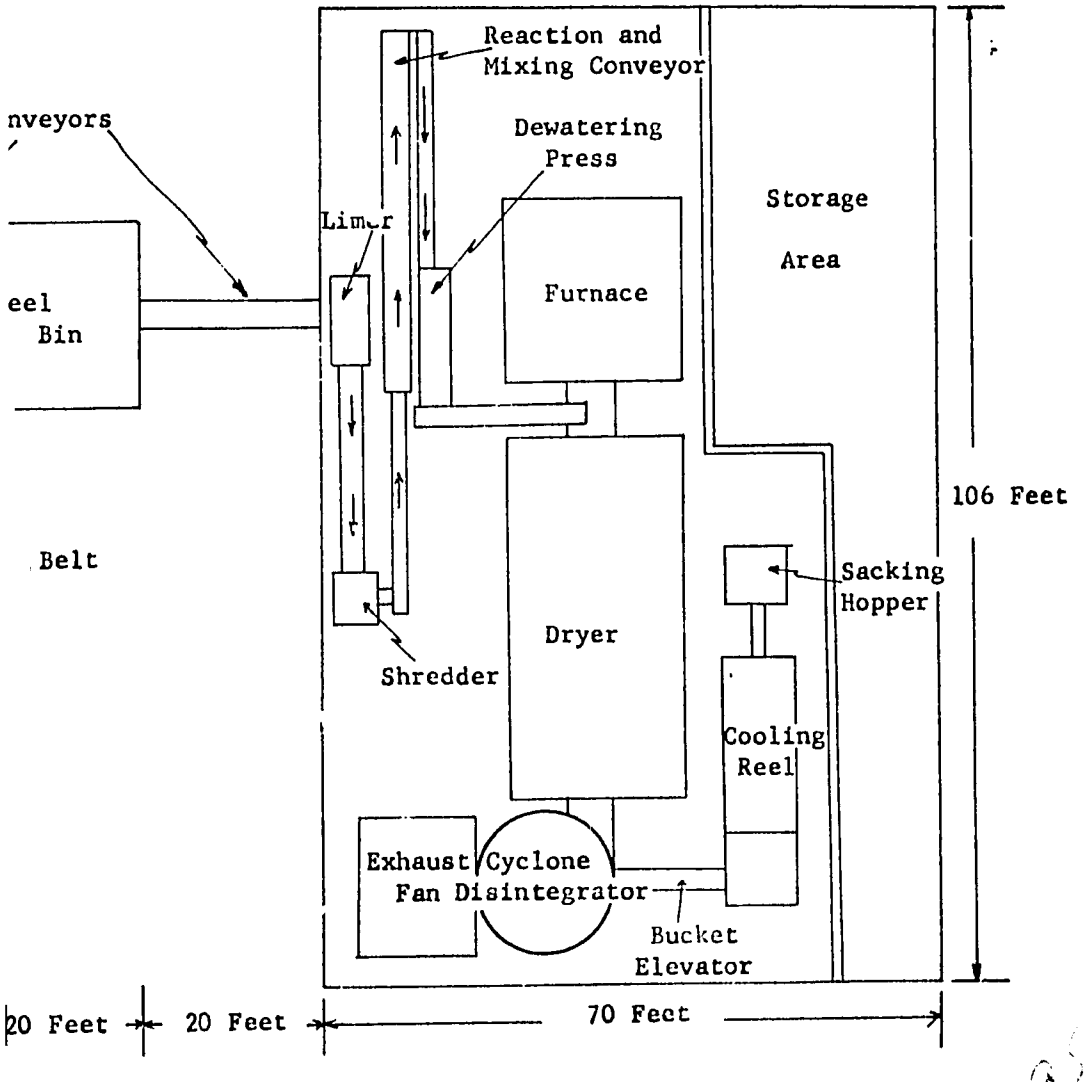
CITRUS FRUITS - WHOLE SECTIONS, CANNED: S.I.C. 2033

PLANT LAYOUT AND WORKFLOW



CITRUS FRUIT - WHOLE SECTIONS CANNED: 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 of fruits, fruit juices, and jellies.

II. PERIODICALS

A. California Fruit News. Weekly. $6.00/year.
Howard C. Rowley
405 Montgomery Street
San Francisco, California
Canning of citrus and other kinds of fruits and juices.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Vegetable and Fruit Canning IR-19082.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523

IV. OTHER PUBLICATIONS

A. Commercial Canning in Florida. Bulletin Number 117. August 1960.
Gratis.
State of Florida
Department of Agriculture
Tallahassee, Florida
Description of the canning industry in Florida including citrus fruit canning.

V. TECHNICAL PAPERS

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

VI. U. S. PATENTS

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

A. Patent No. 2,976,660. 1961. 35 p.
Container filling and closing machine for sectioned fruit.

B. Patent No. 2,976,654. 1961. 15 p.
Method and apparatus for filling containers for canning citrus fruit.

C. Patent No. 2,912,757. 1959. 3 p.
Apparatus to sectionalize citrus and other fruits.

D. Patent No. 2,836,886. 1958. 6 p.
Device to reduce citrus fruits into sections.

VII. TRADE ASSOCIATIONS

A. Florida Citrus Mutual
P. O. Box 499
Lakeland, Florida
All areas of citrus fruit production, including growing, canning of fruits, fruit juices, concentrates, and shipping.

B. Florida Canners Association
P. O. Box 780
Winterhaven, Florida
Membership includes canners of citrus fruits, juices and concentrates.

VIII. ENGINEERING COMPANIES

A. Citrus Machinery Company, Inc.
2211 West Washington Street
Orlando, Florida
Consulting engineers, designers and builders of citrus canning plants.

IX. DIRECTORIES

A. Canners Director. Biennially. $3.50.
National Canners Association
1133 20th Street, N. W.,
Washington 6, D. C.
Lists 1,300 canning firms that are members of the National Canners Association and other commercial canners. Office address and products canned are included.

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INDUSTRY PROFILES

MEN'S WORK SHIRTS

I. P. No. 66062

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MEN'S WORK SHIRTS: Standard Industrial Classification 2328

A. PRODUCT DESCRIPTION

Work shirts made from a cotton material called work-shirt chambray, with two pockets, and in neck sizes ranging from 14 to 17 inches, with larger sizes available on special order at a slight additional cost.

B. GENERAL EVALUATION

In the temperate zone, men's work shirts, as described above, are a readily marketable item. They are low-priced, partly because keen competition among the many manufacturers keeps the profit margin low. In warmer climates less clothing is worn at work and, if shirts are worn at all, short sleeved T shirts, which are less expensive, lighter, and more easily laundered than work shirts may be preferred. The shirt is strictly a work shirt and would not be worn for dress or prestige wear. The investment required is not very high; neither is the degree of labor skill. (See Industry Profile on Men's Dress Shirts: S.I.C. 2321)

C. MARKET ASPECTS

1. USERS. Individual workers, institutions.

2. SALES CHANNELS AND METHODS. Sales to wholesalers, large retailers, military, institutions.

3. GEOGRAPHICAL EXTENT OF MARKET. Product is easily shipped and can be transported anywhere.

4. COMPETITION. a. Domestic Market. Large-scale foreign producers who manufacture in a low wage area could compete. b. Export Market. This plant is too small to do any substantial export business.

5. MARKET NEEDED FOR PLANT DESCRIBED. The rate of consumption of work shirts will depend primarily upon climate and the level of income. In a country where work shirts are in general use by manual workers, a population of a 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

a. FIXED CAPITAL

		Cost
Land. About 10,000 sq. ft.		$ --
Buliding. One story, 60'x100'.		36,000
Equipment, Furniture & Fixtures.		
Prodn. 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, 2 buttonhole machines, folding machine, presser, collar shaper turning stands, 28 sewing machines, 2 trim-masters, 3 hand trucks, stacker.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 48,300
Admin. Costs(b), Contingencies Sales Costs(c)	30	1,500
Training Costs		6,000
Total Working Capital		$ 55,800

c. TOTAL CAPITAL (EXCL. LAND) $119,800

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Workshirt Chambray	400,000 yds.	$120,000
Lining material	8,000 yds.	1,600
Thread		2,500
Buttons		1,500
Size tags (paper)		100
Labels (woven)		1,500
Shirt boards		1,000
Pins		400
Boxes		3,000
Shipping cartons		1,200
Total		$132,800

b. Supplies	
Lubricants	$ 100
Hand tools	200
Maintenance	500
Spare parts	1,000
Office supplies	200
Total	$ 2,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 100 hp.	$ 3,000
b. Fuel. About 5,000 gals. oil, or equivalent in other fuel, annually for pressing steam, and heating.	$ 600
c. Water. For pressing steam, sanitation & fire protection.	$ 400

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

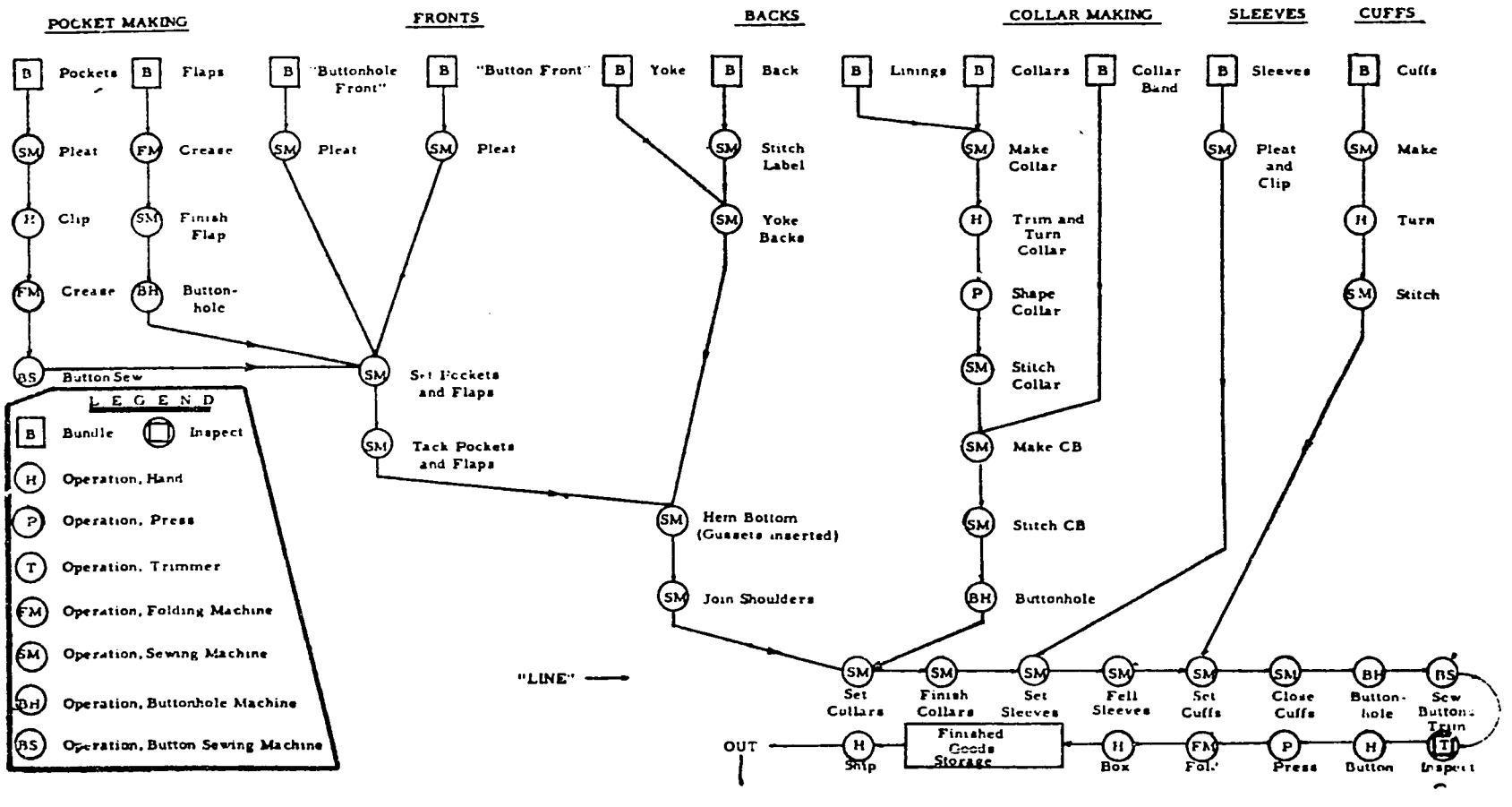
	Number	Annual Cost
a. Direct Labor		
Skilled	2	$ 10,000
Semi-skilled	24	96,000
Unskilled	4	12,000
Total	30	$118,000
b. Indirect Labor		
Manager & supervisors	4	$ 26,000
Office	1	4,000
Other	1	3,000
Total	6	$ 33,000

c. Training Needs. Manager & supervisors must be fully experienced. With 2 skilled workers, they will do all labor training. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

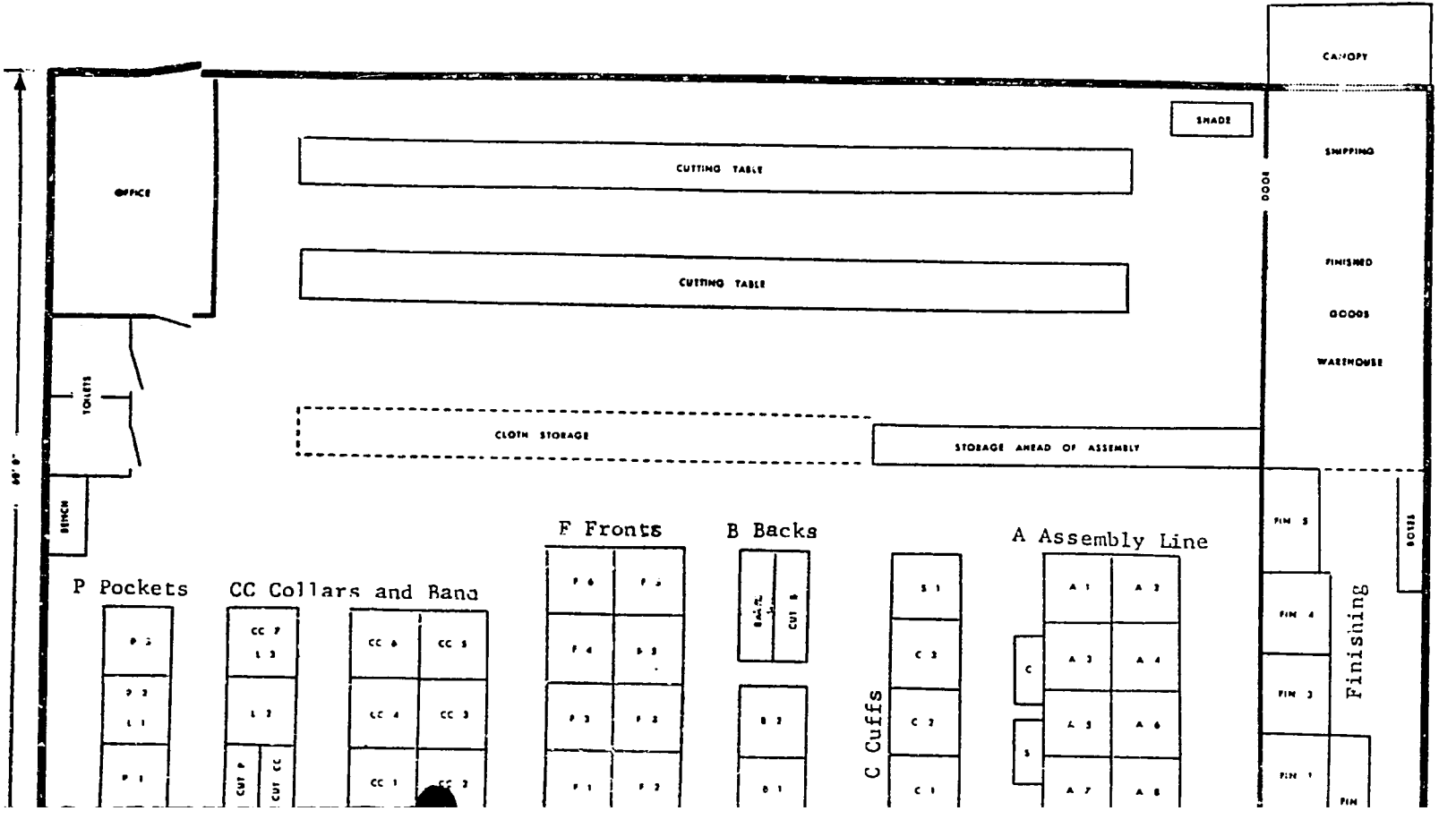
a. Annual Costs	
Direct Materials	$132,800
Direct Labor	118,000
Manufacturing Overhead(a)	39,000
Admin. Costs(b) Contingencies	7,500
Sales Costs(c), Bad Debts	11,500
Depreciation on Fixed Capital	4,700
Total	$313,500
b. Annual Sales Revenue	$375,000

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


POCKET MAKING
FRONTS
BACKS
COLLAR MAKING
SLEEVES
CUFFS
B Pockets
B Flaps
B "Buttonhole Front"
B "Button Front"
B Yoke
B Back
B Linings
B Collars
B Collar Band
B Sleeves
B Cuffs
SM Pleat
FM Crease
SM Pleat
SM Pleat
SM Stitch Label
SM Make Collar
SM Pleat and Clip
SM Make
H Clip
SM Finish Flap
SM Yoke Backs
H Trim and Turn Collar
H Turn
FM Crease
BH Button-hole
P Shape Collar
SM Stitch
BS Button Sew
SM Set Pockets and Flaps
SM Stitch Collar
SM Tack Pockets and Flaps
SM Make CB
SM Hem Bottom (Gussets inserted)
SM Stitch CB
SM Join Shoulders
BH Buttonhole
LEGEND
B Bundle
Inspect
H Operation, Hand
P Operation, Press
T Operation, Trimmer
FM Operation, Folding Machine
SM Operation, Sewing Machine
BH Operation, Buttonhole Machine
BS Operation, Button Sewing Machine
"LINE"
SM Set Collars
SM Finish Collars
SM Set Sleeves
SM Fell Sleeves
SM Set Cuffs
SM Close Cuffs
BH Button-hole
BS Sew Button-Trim
OUT
H Ship
Finished Goods Storage
H Box
FM Fold
P Press
H Button
T Inspect

MEN'S WORK SHIRTS: S.I.C. 2328

PLANT LAYOUT AND WORK FLOW



MEN'S WORK SHIRTS: S.I.C. 2328

SELECTED REFERENCES

I. TEXTBOOKS

A. Apparel Manufacturing Analysis. J. Solinger. 1961. $22.50.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, N.Y.
Devoted to the machinery and operations required to manufacture apparel.

B. 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, N.Y.
Sewing machine techniques and production methods.

II. PERIODICALS

A. Textile World. Monthly. $15.00/year.
McGraw-Hill Publishing Company
330 West 42nd Street
New York 36, N.Y.
Technical journal devoted to production of textiles, modernization of operations, equipment, and management.

B. Textile Research Journal. Monthly. $21.00/year.
Textile Reseach Institute
Prince and Lemon Streets
Lancaster, Pennsylvnia
Research on materials and process for the textile industry; studies of new processes and machinery.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Men's Work Shirts - PO-5.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D.C. 20523
Study of the production of men's shirts in American industry.

B. Clothing Industry. SS-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.

IV. OTHER PUBLICATIONS

A. Plant Production Control. C. A. Koepke. 3rd Edition. 1961. $8.95.
John Wiley and Sons, Inc.
440 Park Avenue South
New York 16, N.Y.
All phases of production control from product design and specifications to dispatching of finished product.

V. U. S. PATENTS

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

A. Patent No. 2,935,749. 1960. 6 p.
Manufacturing men's shirts.

B. Patent No. 2,915,759. 1959. 5 p.
Process for making men's shirts.

C. Patent No. 2,846,687. 1958. 5 p.
Method of making men's shirts.

D. Patent No. 2,835,898. 1958. 4 p.
Method of making shirts and the like.

E. Patent No. 2,694,202. 1954. 3 p.
Making shirts allowing full freedom of forward movements of the arms.

VI. TRADE ASSOCIATIONS

A. Textile Converters Association
1450 Broadway
New York 18, N.Y.

VII. ENGINEERING COMPANIES

A. Singer Sewing Machine Company
149 Broadway
New York, N.Y.
Manufacturers and engineering consultants to the shirt 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, N.Y.
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

PLANING MILL

I. P. No. 66063

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.

107

PLANING MILL : Standard Industrial Classification 2421

A. PRODUCT DESCRIPTION

Dimension stock, surfaced lumber, such as ceiling, partition, siding, matched and shiplap lumber, and flooring, made from rough lumber produced in local sawmills. The character of the production will naturally depend on demand in the market area concerned, but it is assumed that it will be varied, and that many different kinds of wood will be processed.

B. GENERAL EVALUATION

Capital requirements for this industry are moderate. Skilled labor requirements are fairly high. Processed lumber, as produced by this plant, is normally not shipped far, lumber more commonly being tradsported in rough form. The economic feasibility of the plant described will, therefore, depend not only on local availability of steady supplies of the proper kinds of lumber at reasonable prices, but also on the existence of a sufficiently large market within easy delivery range of the plant.

C. MARKET ASPECTS

1. USERS. Building contractors, individual homeowners, industries according to nature of product mix.

2. SALES CHANNELS AND METHODS. Sales to building contractors, building supplies houses, and user industries.

3. GEOGRAPHICAL EXTENT OF MARKET. The market area for this plant will normally be mainly local. Where lumber has to be shipped long distances, it is commonly sent in rough form and procesed as near as possible to the point where it will be used, often in small establishments. For this reason, little processed lumber is sold in international trade.

4. COMPETITION. a. Domestic Market. Normally there will be no serious competition from imports. In places on the fringe of the natural market for the plant, transport costs may be high enough to bring competition from small woodworking establishments. For some uses other materials, e.g. tiles, metals, may increasingly compete, and the relative cost of wood and such alternative materials will be an important consideration. b. Export Market. It is very unlikely that the plant would be able to sell abroad.

5. MARKET NEEDED FOR PLANT DESCRIBED. Where wood is commonly used in the construction of dwellings and other buildings a market area containing a population of the order of a million people, with average growth rate and new construction keeping pace, should be able to furnish a market for the output of this plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 750,000 Board Feet of Lumber

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 4 acres, for building & lumber storage.		$ --
Building. Main building 44'x88', 4 dry kilns 20'x26', covered area 20'x42', boiler house 20'x23'.		36,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$34,000	
Other tools & equipmt.	2,000	
Furniture & fixtures	1,000	
Transportation equipmt.	4,000	41,000
Total (excl. Land)		$ 77,000

Principal Items. Planer, molder, rip saw, cutoff saw, double end emery grinder, cutting knives & tools, 5-ton truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg Overhead(a)	60	$ 29,700
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,300
Training Costs		5,000
Total Working Capital		$ 37,000

c. TOTAL CAPITAL (EXCL. LAND) $114,000

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Lumber	1 mn. bd. ft.	$100,000

b. Supplies

Lubricants & hand tools	$ 200
Cutting tools	400
Maintenance & repair parts	1,600
Office supplies	200
Total	$ 2,400

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 60 hp.	$ 2,000
b. Fuel. Scrap wood & sawdust from manufacturing operations should be used.	
c. Water. About 1.2 mn. gals. annually for dry kilns, sanitation and fire protection.	$ 300

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5-ton truck for deliveries & general purposes.	$ 1,200

b. External Transport Facilities. Lumber is bulky & heavy. Good highway & proximity to railroad necessary.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	4	$ 24,000
Semi-skilled	2	8,000
Unskilled	8	24,000
Total	14	$ 56,000
b. Indirect Labor		
Manager	1	$ 10,000
Bookkeeper	1	5,000
Total	2	$ 15,000

c. Training Needs. Manager must have long experience. With the help of 4 skilled workers, he should be able to do all necessary labor training. Plant should reach full operation in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

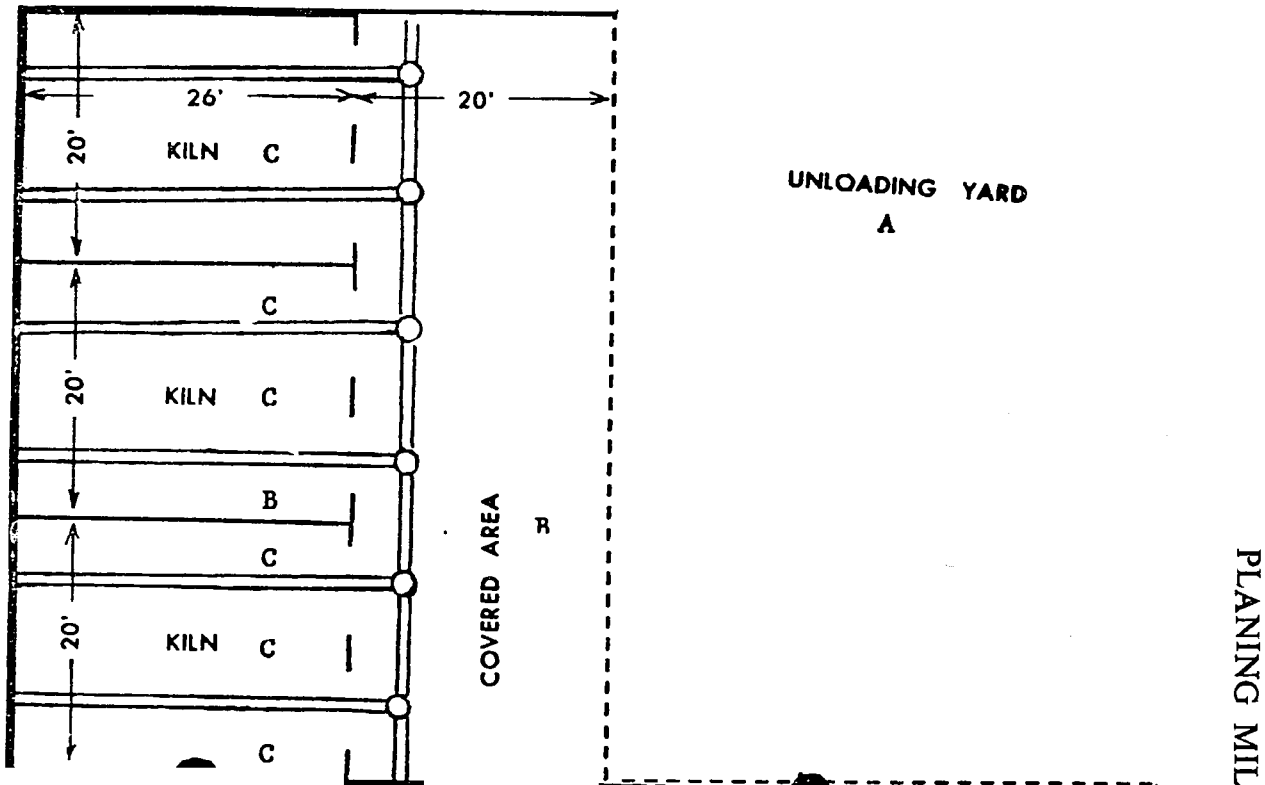
Direct Materials	$100,000
Direct Labor	56,000
Manufacturing Overhead(a)	20,900
Admin. Costs(b), Contingencies	13,000
Sales Costs(c), Bad Debts	15,000
Depreciation on Fixed Capital	6,700
Total	$211,600

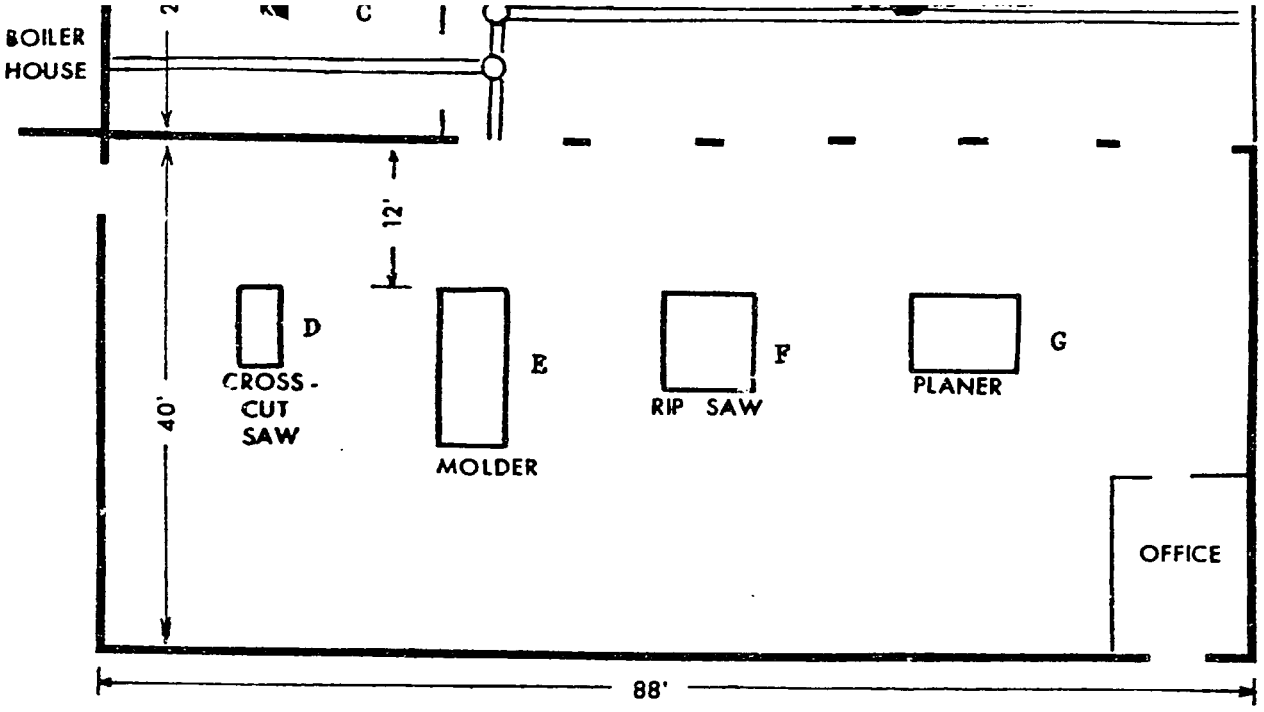
b. Annual Sales Revenue $270,000

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

PLANING MILL: S.I.C. 2421

PLANT LAYOUT AND WORKFLOW





A. Unloading yard
B. Kiln truck
C. Kilns
D. Cross cut saw
E. Molder
F. Rip saw
G. Planer

PLANING MILL : S. I. C. 2421

SELECTED REFERENCES

I. TEXTBOOKS

A. Lumber, N. C. Brown and J. S. Bethel. 1958. 379 p. Illus. $7.50.
John Wiley and Sons, Inc.
440 Park Avenue South
New York 16, N. Y.
Development of lumber industry. The sawmill : type, size, location, layout. Log storage and handling. Sawmill machinery. Manufacturing and drying lumber.

II. PERIODICALS

A. Wood and Wood Products. Monthly. $12.00/year.
Vance Publishing Corporation
139 North Clark Street
Chicago 2, Illinois
Management and production magazine for the wood industry.

B. The Lumberman. Monthly. $5.00/year.
Miller Freeman Publications.
733 S. W. Oak Street
Portland 5, Oregon
Features wood, wood processing, and wood products.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Planing Mill. PO-7. December 1956. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523
Basic information for establishing and operating a small plant to engage in the finishing of lumber as it comes in rough from the sawmill.

B Wood Wastes. TI-47. April 1958. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D.C. 20523
Methods of utilizing wood wastes.

C. Lumber Seasoning. OP-15. July 1961. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C, 20523
Equipment, techniques, and financial requirements for the lumber seasoning industry.

IV. U. S. PATENTS

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

A. Patent No. 2,780,251. 1957. 6 p.
Wood planers.

B. Patent No. 2,771,921. 1956. 2 p.
Planing machine.

C. Patent No. 2,748,184. 1956. 8 p.
Shaping and trimming machine.

D. Patent No 2,649,872. 1953. 5 p.
Planer attachment for rotary saws.

E. Patent No. 2,571,861. 1951. 8 p.
Wood surfacing and edging machine.

V. TRADE ASSOCIATIONS

A. National Lumber Manufacturers Association
1619 Massachusetts Avenue, N. W.,
Washington 6, D. C.

B. Western Lumber Manufacturers
681 Market Street
San Francisco 5, California

VI. ENGINEERING COMPANIES

A. United States Machinery Company, Inc.
90 Broad Street
New York 4, N. Y.
Designs and installs woodworking plants.

B. Forest Products Engineering Company
431 South Dearborn Street
Chicago, Illinois
Engineers to industrial lumber producing and consuming industries.

VII. DIRECTORIES

A. Abbey's Printed Mailing List—Directory of the Western Forest Products Industry, Alaska and British Columbia. Annual $25.00.
Abbey's Industrial Directory
3619 S. E. Milwaukee Avenue
Portland 2, Oregon
Lists lumber mills, saw mills, and other lumber processing plants, as well as suppliers of equipment.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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INDUSTRY PROFILES

ROUGH SAWING OF LOGS

I. P. No. 66064

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.

ROUGH SAWING OF LOGS: Standard Industrial Classification 2421

A. PRODUCT DESCRIPTION

Boards, timbers or cants, sawn from purchased logs, edged to desired widths, and trimmed to desired lengths.

B. GENERAL EVALUATION

The sawmill must be established in vicinity of logging operations. Land will be rented. Building is portable, and operations may be shifted to new site when necessary. The amount of capital required is moderate. Amount of skilled labor needed is fairly high. Economic feasibility of the industry will depend largely on access to markets. In this industry there are many different methods of operation possible, and though this is a small-scale mill, operation on a still smaller scale might in some circumstances be economically feasible.

C. MARKET ASPECTS

1. USERS. Building and construction contractors, military, government agencies, wide range of industries.

2. SALES CHANNELS. Sales to various large-scale users, and to lumber yards.

3. GEOGRAPHICAL EXTENT OF MARKET. Rough lumber may be sent long distances, particularly where there is low-cost transport by water. This product is sold worldwide.

4. COMPETITION. a. Domestic Market. Within the potential market area competition from imports would not normally be keen. For some uses alternative materials, such as wallboard, concrete, may be available. Competitive position of wood will in such cases be largely determined by relative costs. b. Export Market. An operation of the size and character described would not generally be able to export, except possibly to nearby areas of neighboring countries.

5. MARKET NEEDED FOR PLANT DESCRIBED. The uses of rough-sawn timber are so varied and the extent of the market area so dependent on the transport facilities that it is impossible to estimate the market needed in terms of any simple measure. The total capacity of this mill, however, is small for a product that is in such common demand, and many areas should be able to provide the necessary market.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 4 Million Board Feet

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

Land. Retend at estimated annual rental of $500. Included as separate item in Total Annual Costs, paragraph 6 below.

		Cost
Building. Roof shelter made from slabs. Portable framework.		$ 5,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$27,000	
Other tools & equipmt.	3,300	
Furniture & fixtures	700	
Transportation equipmt.	14,000	45,000
Total (excl. Land)		$ 50,000

Principal Items. Steam engine, 54" band saw, 3 block carriage with track & feed, edger & conveyor, sewing saw, vertical resaw, diesel tractor, saw filing equipment, 2 diesel trucks.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overheads(a)	60	$ 45,300
Admin. Costs(b), Contingencies, Sales Costs(c)	30	3,000
Training Costs		5,000
Total Working Capital		$ 53,300

c. TOTAL CAPITAL (EXCL. LAND) $103,300

2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
a. Direct Materials		
Logs	equal to 4 mn. bd. ft.	$200,000
b. Supplies		
Lubricants & hand tools		$ 300
Maintenance & parts		1,700
Office supplies		200
Total		$ 2,200

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Power supplied by steam engine.	
b. Fuel. Scrap wood.	
c. Water. About 400,000 gals. annually for general purposes.	$ 100

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. Diesel fork-lift truck & diesel trailer lumber truck for handling logs & delivering lumber.	$ 2,500

b. External Transport Facilities. Logs are bought delivered to mill, which should be located near source of logs. 16,000 bd. ft. per day to haul to mills or railroad. Maill should be on good highway.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	4	$ 20,000
Semi-skilled	5	20,000
Unskilled	5	15,000
Total	14	$ 55,000
b. Indirect Labor		
Manager & bookkeeper	1	$ 8,000
Other	1	4,000
Total	2	$ 12,000

c. Training Needs. Manager & saw filer must have long experience. 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

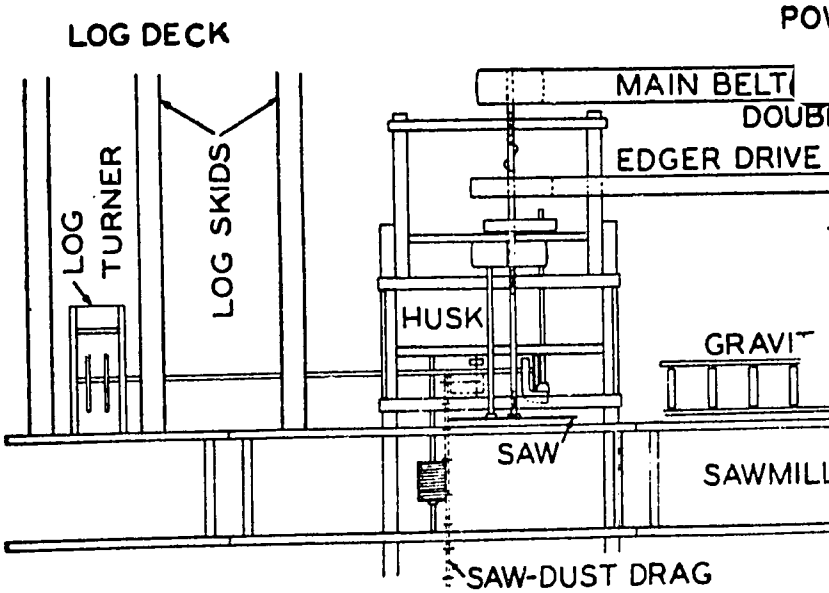
a. Annual Costs	
Direct Materials	$200,000
Direct Labor	55,000
Manufacturing Overhead(a)	16,800
Rent of Land	500
Admin. Costs(b), Contingencies	22,000
Sales Costs(c), Bad Debts	13,000
Depreciation on Fixed Capital	7,200
Total	$314,500
b. Annual Sales Revenue	$400,000

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

ROUGH SAWING LOGS: S.I.C. 2421

ROUGH SAWIN

PLANT LAYOUT



Steam engine used for power.

Sawdust, bark and scrap wood is

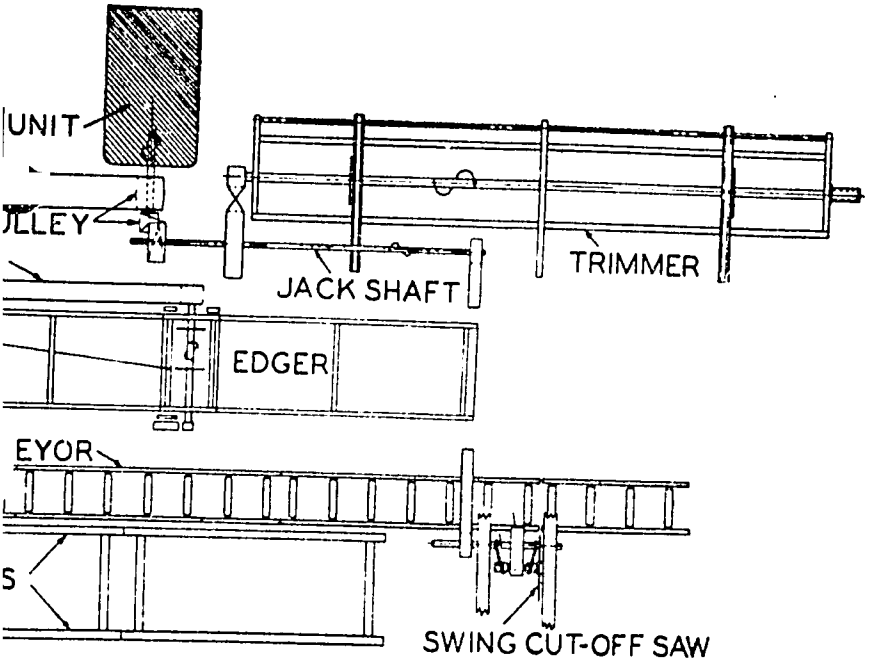
Work flows from skids to bandsaw
be cut out.

Boards having defects go from the
and trimmer.

118

F LOGS: S.I.C. 2421

) FLOW OF WORK



· fuel.

and trimmer, except when defects must

v to the cutoff saw, then to edger

ROUGH SAWING OF LOGS: S.I.C. 2421

SELECTED REFERENCES

I. TEXTBOOKS

A. Lumber. 2nd edition. N. C. Brown and J. S. Bethel. 1958. 379 p. $7.50.
John Wiley and Sons, Incorporated
440 Park Avenue South
New York 16, N. Y.
The entire lumber production story.

B. Forest Products—Their Sources, Production and Utilization.
A.J. Panshin. 2nd Edition. 1962. $12.50.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N.Y.
Origin, methods of conversion and utilization of the principal primary and secondary forest products.

II. PERIODICALS

A. The Lumberman. Monthly. $5.00/year.
Miller Freeman Publications
733 S. W. Oak Street
Portland 5, Oregon
Information covering all phases of the lumber business.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Rough Sawing of Logs. PO-9. October 1956. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523
Capital requirements, techniques, and operations for planning new industrial facilities for a logging and sawmilling operation in any country where feasible.

B. Small Sawmill Operators Manual. Agriculture Handbook No. 27. $.65.
Forest Service
U.S. Department of Agriculture
Washington, D. C. 20250
Covers every phase of log cutting and sawmill operations.

C. Small Sawmills: A Pocket Guide. 1954. AH-70. $.15.
U.S. Department of Agriculture
Washington, D. C. 20250

SELECTED REFERENCES (Continued)

IV. OTHER PUBLICATIONS

A. Fundamentals of Forestry Economics. W.A. Duerr. 1960. 579 p. $10.50.
McGraw-Hill Book Company Inc.
330 West 42nd Street
New York 36, N.Y.
Practical treatment of the ways business and economics affect forestry and the forest products industries.

V. U.S. PATENTS

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

A. Patent No. 2,875,795. 1959. 8 p.
Single slash gang sawmill.

B. Patent No. 2,873,775. 1959. 7 p.
Chain saws.

C. Patent No. 2,862,532. 1958. 10 p.
Gang sawmill.

D. Patent No. 2,740,436. 1956. 4 p.
Reciprocative, double sash, gang sawmill.

VI. TRADE ASSOCIATIONS

A. National Lumber Manufacturers Association
1619, Massachusetts Avenue
Washington, 6, D. C.

VII. ENGINEERING COMPANIES

A. Corley Manufacturing Company
Thomas Street
Chattanooga 1, Tennessee
Engineered sawmill machinery.

B. R.R. Howell Company
Malcolm Avenue S.E. and 4th Street
Minneapolis, Minnesota
Drag and gang saws and other saw mill machinery.

VIII. DIRECTORIES

A. American Lumberman and Building Products Merchandiser Buying and Product Data File. Annual. $2.00.
Triad Publishing Company
59 East Monroe Street
Chicago 3, Illinois
Lists manufacturers, producers, and suppliers of the products bought, sold and used by lumber dealers.

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

BARRELS

I. P. No. 66065

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.

BARRELS: Standard Industrial Classification 2445

A. PRODUCT DESCRIPTION

Standard slack barrels 19 1/8" x 30" with 3/4" bilge. Barrels of other sizes could be produced with a little additional equipment.

B. GENERAL EVALUATION

Capital and skilled labor requirements are moderate. These barrels have a variety of uses in agriculture and industry. The potential market will depend on how far agricultural and industrial activity has developed within an area where transport costs can be kept within reasonable limits. The market area may be extended by shipping barrels disassembled and nested into bundles. Although barrels are preferred for some uses, other types of containers can usually be substituted and barrels must be competitive in delivered price. A careful survey of the potential market should be made before undertaking this venture.

C. MARKET ASPECTS

1. USERS. Packers of such commodities as apples, frozen and cured meat, and a variety of other users.

2. SALES CHANNELS AND METHODS. Sales usually direct to users.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transport costs are high in relation to product value and generally restrict the market area to rather narrow limits. The area may be extended by making shipments of disassembled barrels nested in bundles. b. Export. Disassembled barrels might in some cases be shipped to nearby foreign areas.

4. COMPETITION. a. Domestic Market. Competition will come from other types of containers, and the main competitive factor will be delivered price. b. Export Market. Usually it will be impossible to compete in foreign markets with domestically produced barrels or alternative containers.

5. MARKET NEEDED FOR PLANT DESCRIBED. It will usually be necessary to have a fairly large complex of enterprises using these barrels with easy delivery range, to provide a market for at least the bulk of the production.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 100,000 Barrels.

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. 10,000 sq. ft.		$ --
Building. One story, 100'x150'		90,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$35,000	
Other tools & equipmt.	1,500	
Furniture & fixtures	700	
Transportation equipmt.	4,000	41,200
Total (excl. Land)		$131,200

Principal Items. Planer, jointer, tongue & groover, stave saw, double end saw, double end riser, hoop driver, head up machine, hoop riveter, hoop expander, heading turner, 2 barrel heaters, nailing machine, crozer, truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 21,800
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,000
Training Costs		1,200
Total Working Capital		$ 25,000

c. TOTAL CAPITAL (EXCL. LAND) $156,200

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Lumber	800,000 bd. ft.	$ 68,000
Steel hoops & wire	78,500 lbs.	8,000
Rivets		500
Nails		800
Total		$ 77,300

b. Supplies

Lubrication & hand tools	$ 200
Cutting tools & abrasives	300
Maintenance & spare parts	1,000
Office supplies	200
Total	$ 1,700

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 40 hp. connected load.	$ 400
b. Fuel. Gas for barrel heater.	$ 1,000
c. Water. General purposes.	$ 100

4. TRANSPORTATION

	Annual Operating Costs
a. Own Transport Equipment. Truck with special body for barrels	$ 1,000

b. External Transport Facilities. Good highways essential. Railroad siding, if possible.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	2	$ 10,000
Semi-skilled	4	16,000
Unskilled	2	6,000
Total	8	$ 32,000
b. Indirect Labor		
Manager	1	$ 9,000
Office	1	4,000
Truck driver	1	4,000
Total	3	$ 17,000

c. Training Needs. Manager should be fully experienced. With 2 skilled workers, he should be able to train other employees and reach full production in 30 days.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

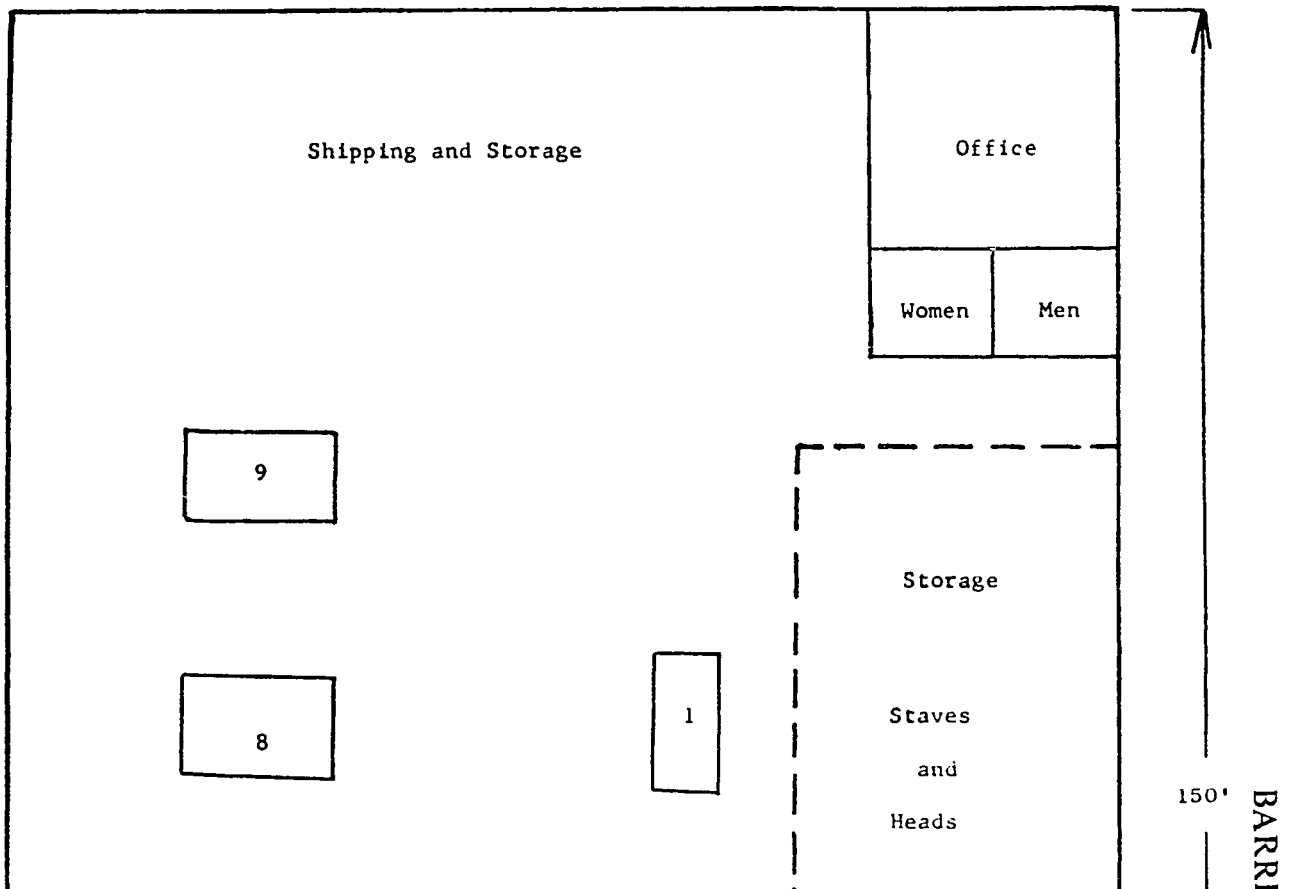
Direct Materials	$ 77,300
Direct Labor	32,000
Manufacturing Overhead(a)	21,200
Admin. Costs(b), Contingencies	10,000
Sales Costs (c), Bad Debts	15,000
Depreciation on Fixed Capital	9,400
Total	$164,900

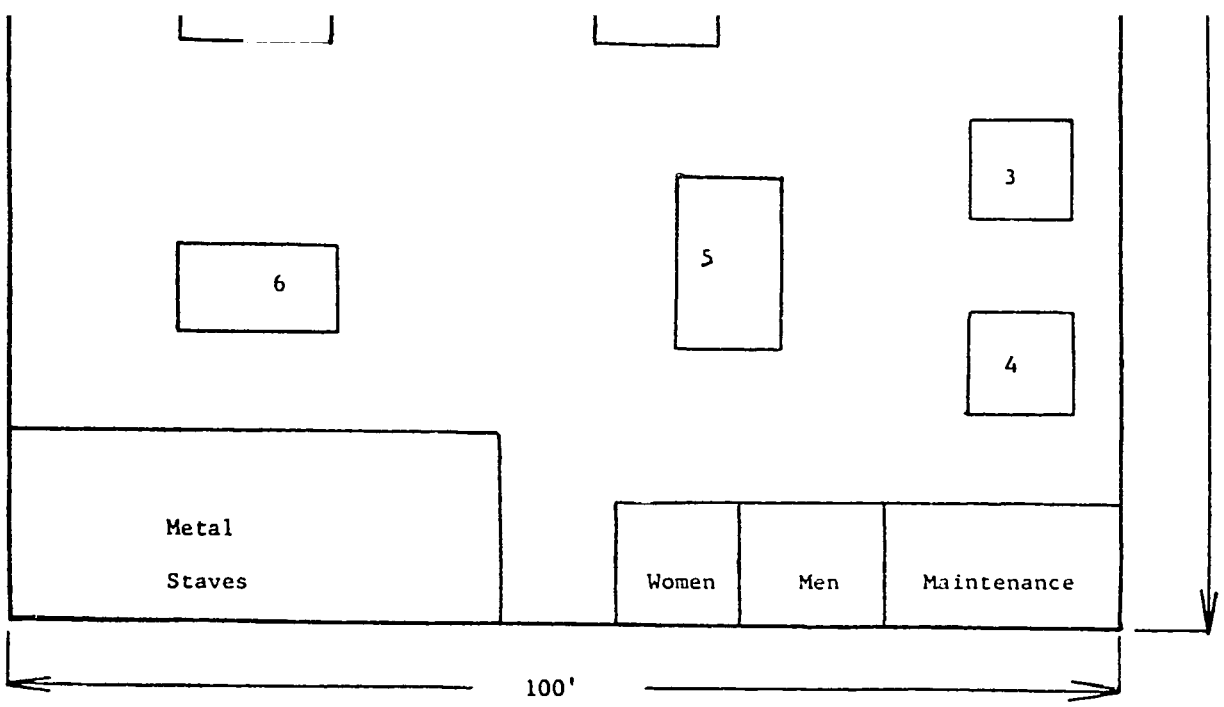
b. Annual Sales Revenue $200,000

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.

BARRELS: S.I.C. 2445

PLANT LAYOUT AND WORKFLOW





Machine numbers indicate direction of workflow

1. Tongue and groove
2. Raising machine
3. Stove
4. Stove
5. Trusser and hooper
6. Crozer
7. Header
8. Nailing machine
9. Finishing machine

BARRELS: S.I.C. 2445

SELECTED REFERENCES

I. TEXTBOOKS

A. Cooperage Handbook. A. F. P. Hankerson. 1947. $3.75.
Harlem Book Company
221 Fourth Avenue
New York 3, N.Y.
Technical data on the manufacture of all kinds of barrels.

II. PERIODICALS

A. Hitchcock's Wood Working. Monthly. $4.00/year.
Hitchcock Publishing Company
Wheaton, Illinois
Wood working methods and machinery.

B. The Wood-Worker. Monthly. $2.00/year.
S. H. Smith Company
2232 North Meridian Street
Indianapolis 7, Indiana
Pertains to wood working equipment of all kinds.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Barrels; wood, slack. PPP-B-41. February 1953. $.10.
General Services Administration
Business Service Center
7th and D Streets, S.W.
Washington, D.C. 20405
Provides basic specifications required by the U.S. Government for wooden slack barrels.

IV. OTHER PUBLICATIONS

A. Cutting Techniques for Wood Working. T. D. Perry. 1955. 50 p. Illus. $.50.
Hitchcock Publishing Company
Wheaton, Illinois
Deals with the use of woodwork cutting tools.

V. TECHNICAL PAPERS

A. The Wooden Barrel Manual. 1947. 108 p. Gratis.
Associated Cooperage Industries of America, Inc.
408 Olive Street
Saint Louis 2, Missouri
Specifications and information on wooden barrels.

VI. U.S. PATENTS

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

A. Patent No. 2,555,530. 1959. 5 p.
Method of making knockdown barrels and shipping containers.

B. Patent No. 2,545,831. 1959. 5 p.
Barrel head construction process.

C. Patent No. 2,287,658. 1942. 13 p.
Manufacture of wooden barrels, machinery and methods therefor.

D. Patent No. 2,235,271. 1941. 10 p.
Machine for manufacturing containers of wooden stave construction.

E. Patent No. 2,212,487. 1940. 12 p.
Machine for making tubs, barrels, and the like.

VII. TRADE ASSOCIATIONS

A. Associated Cooperage Industries of America
408 Olive Street
St. Louis 2, Missouri

VIII. ENGINEERING COMPANIES

A. Forest Products Engineering Company
431 South Dearborn
Chicago, Illinois
Consultants to industrial lumber producing and consuming industries.

B. Clarksville Machine Works
Clarksville, Arkansas
Manufacturers of complete line of cooperage equipment.

IX. DIRECTORIES

A. Thomas' Register of American Manufacturers. Annually. $20.00.
Thomas Publishing Company
461 Eighth Avenue
New York 1, N.Y.
Register of manufacturers, including manufacturers of all types of machinery and equipment.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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INDUSTRY PROFILES

FERTILIZER MIXING

I. P. No. 66066

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FERTILIZER MIXING: Standard Industrial Classification 2872

A. PRODUCT DESCRIPTION

Superphosphate (5%N, 10% P_2O_5, 10% K_2O, remainder conditioner such as grain hulls or tobacco stems, with limestone filler, metallic traces as needed) and triple superphosphate (same as superphosphate, except 10% N).

B. GENERAL EVALUATION

This fertilizer, is, in general, used only for dry farming. Some manufacturers supply superphosphates in somewhat different form, and prospective investor should investigate their manufacturing practices, which may require less capital expenditure, to see whether they are better suited to local conditions. Possibility also exists of starting plant using imported ammoniated phosphates, thereby reducing initial capital and skilled labor needs, and, after gaining technical and marketing experience, adding equipment for more complicated operations. In short, technical alternatives to model described exist and should be closely examined.

C. MARKET ASPECTS

1. USERS. Farmers engaged in dry farming.
2. SALES CHANNELS AND METHODS. Sales to wholesalers, farmers' cooperatives, sometimes direct to farmers. Salesmen should be able to advise on fertilizer use.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Handling presents no serious problem. In U.S., plants are scattered throughout country, as close to market as possible. Product is rarely shipped beyond points where freight rate exceeds about $5 a ton, say, on average about 100 miles, but this situation is not universal. b. Export. Export market for superphosphates is world-wide.
4. COMPETITION. a. Domestic Market. In fertilizer mixing, as opposed to manufacture of basic fertilizer materials, economies of large-scale production are not pronounced and if production conditions are resonably favorable local plant should be able to compete with imports. b. Export Market. Plant described might possibly be able to make some sales in easily accessible areas of neighboring countries but could not normally compete with large-scale fertilizer producers in major exporting countries, who can afford to maintain elaborate export organizations.
5. MARKET NEEDED FOR PLANT DESCRIBED. Size of market can be estimated only in terms of acreage. Even this presents almost insuperable difficulties except in specific cases for which precise data on conditions are available, since soil needs and use of organic fertilizers vary enormously. In U.S. every State agricultural department makes detailed recommendations, based on soil testing, for use of fertilizers on different crops in different parts of State. Potato growers in some parts use as much as 1 ton or more per acre. For green vegetables amounts of the order of 400 lbs. and for small grains 100-200 lbs. an acre are used. Where organic fertilizers are extensively used and where superphosphates are used only as a supplement it might be necessary to have continuing use of product on at least 1/4 million acres under dry farming to provide market for plant under consideration.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPICITY- ONE-SHIFT OPERATION, 30 WEEKS A YEAR: 22,500 Tons
(10,000 Tons Superphosphate, 12,500 Tons Triple Superphosphate)

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 50,000 sq. ft., level, well drained.		$ --
Building. One story, 280'x85'. Must have substantial framework and heavy concrete floors		150,000
Equipment, Furniture & Fixtures.		
Machinery & equipmt.	$151,000	
Other tools & equipmt.	8,000	
Furniture & fixtures	1,000	160,000
Total (excl. Land)		$310,000

Principal Items. 2 tractors with shovel capacity of 20 cu. ft., electric shovel, lift truck, two tractors with bucket-type shovel, car spotter, 4 floor type hoppers, 3 elevator conveyors, car unloading equipment, scale, mixer, 2 cyclone-type dust separators, cooling conveyor, cranes, curing bins, pulverizer, screens, bagging equipment, laboratory, drill press, lathe, bench grinder, welding equipment, air compressor, blower, chutes, steam boiler.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$121,500
Admin. & Sales Costs(b), Contingencies	30	5,000
Training Costs		3,600
Total		$130,100

c. TOTAL CAPITAL (EXCL. LAND) $440,100

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Tons	Annual Cost
Nitrogen solution	2,538	$135,800
Sulphate of ammonia	3,716	156,000
Superphosphate	7,770	141,400
Triple superphosphate	1,662	75,750
Muriate of potash	4,118	90,400
Magnesium limestone	1,938	3,100
Borate	48	2,000
Conditioner	1,125	13,500
Bags		56 250
Total		$674.200

b. Supplies

Maintenance materials	2 000
Spare parts	3,000
Laboratory supplies	500
Welding materials	250
Lubricants	50
Office supplies	200
Total	$ 6,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 200 hp.	$ 4,000
b. Fuel. Steam is needed for cleaning some equipment and for general purposes. Any locally available boiler fuel may be used.	$ 1,000
c. Water. About 1.6 million gals. annually	$ 400

4. TRANSPORTATION

a. Own Transport Equipment. None needed.

b. External Transport Facilities. Combined in and out shipments about 4,000 tons a month. Most of materials are bulky and normally move by railroad, to which plant should have ready access. Some of materials must be shipped by tank car.

5. MANPOWER

Note. Plant operates only 30 weeks annually. during planting and growing season. The 8 direct operators work only during this period.

	Number	Annual Cost
a. Direct Labor		
Unskilled	8	$ 16,000
b. Indirect Labor		
Manager-chemist	1	$ 10,000
Foreman	1	7,000
Maintenance Man	1	4,000
Receiving & shipping clerk	1	3,000
Office	1	5,000
Total	5	$ 29,000

c. Training Needs. Manager should be chemist. He and foreman should both be fully experienced in fertilizer production. The 8 direct operators are unskilled and need little training. Plant should reach full production in 3 weeks.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual & Costs

Direct Materials	$674,200
Direct Labor	16,000
Manufacturing Overhead(a)	40,400
Admin. Sales Costs(b), Bad Debts, Contingencies	75,000
Depreciation on Fixed Capital	24,300
Total	$ 829,900

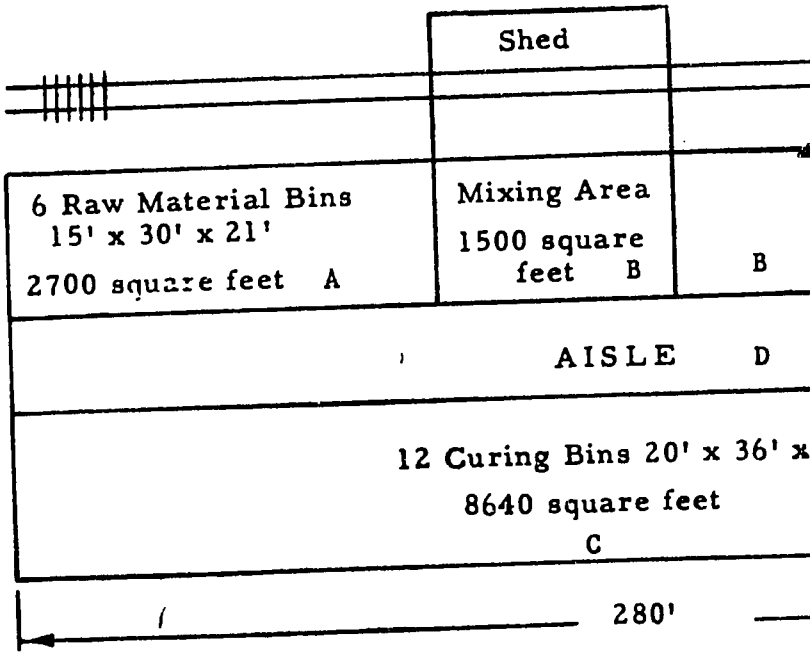
b. Annual Sales Revenue $1,000,000

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

FERTILIZER MIXING: S. I. C. 2872

FERTILIZER

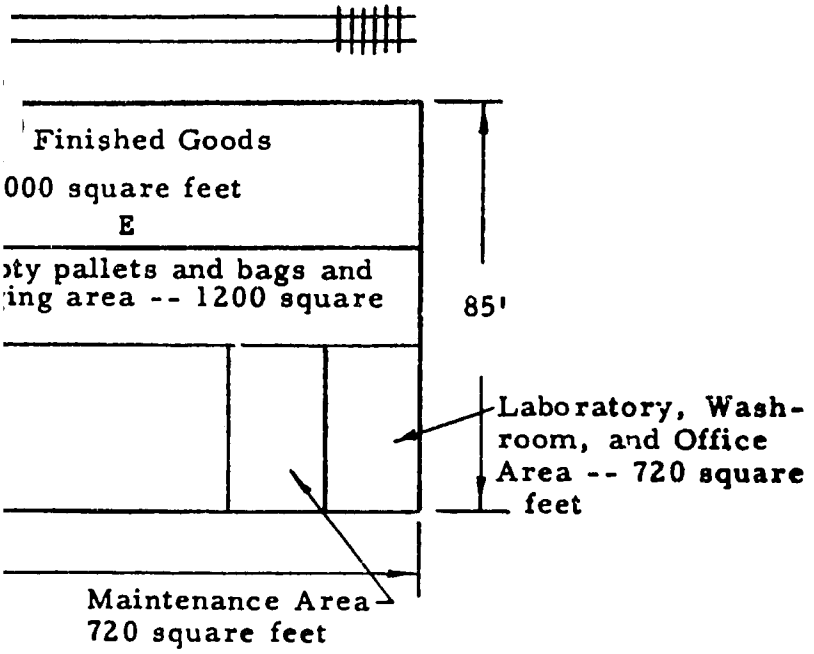
PLANT LAYOU



A. Raw materials
B. Mixing
C. Curing Bins

G: S.I.C. 2872

WORK FLOW



Bagging area
Finished goods

FERTILIZER MIXING: S.I.C. 2872

SELECTED REFERENCES

I. TEXTBOOKS

A. Handbook of Fertilizers. A.F. Gustafson. 1950. 200 p. $2.50.
Orange Judd Publishing Company, Inc.
15 East 26th Street
New York 10, New York
Technical information on fertilizers, their manufacture and use.

II. PERIODICALS

A. Commercial Fertilizer. Monthly. $3.00/year.
Walter W. Brown Publishing Company, Inc.
75 Third Street N.W.
Atlanta 8, Georgia
Provides news and information on fertilizer production and use.

B. Farm Chemicals. Monthly. $6.00/year.
Ware Brothers Company
317 North Broad Street
Philadelphia 7, Pennsylvania
Presents technical information on fertilizer manufacture.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Fertilizers Bibliography. IR-30631. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D.C. 20523

B. Production Planning and Control. TB-82. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D.C. 20523
Management training manual for industries.

IV. OTHER PUBLICATIONS

A. Commercial Fertilizers. G.H. Collings. 5th Edition. 1955. 617 p. Illus. $11.50.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, New York
Origin, development, use, and production of many fertilizers.

V. U.S. PATENTS

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

A. Patent No. 2,992, 093. 1961. 6 p.
Process for treating and mixing fertilizer materials.

B. Patent No. 2,991,170. 1961. 3 p.
Process for manufacture of fertilizers by the compounding of elements.

C. Patent No. 2,988,441. 1961. 7 p.
Method for making mixture of plant-growth medium.

D. Patent No. 2,982,394. 1961. 2 p.
Soil conditioning package of mixed fertilizers and its preparation.

E. Patent No. 2,969,280. 1961. 4 p.
Process and apparatus for producing mixed fertilizers.

VI. TRADE ASSOCIATIONS

A. National Plant Food Institute
1700 K Street, N.W.
Washington, D.C. 20006

VII. ENGINEERING COMPANIES

A. Edw. Renneberg and Sons Company
2637 Boston Street
Baltimore 24, Maryland
Installers of complete fertilizer plants.

B. Wellman-Lord Engineering, Inc.
Lakeland, Florida
Suppliers of complete fertilizer plants.

VIII. DIRECTORIES

A. Commercial Fertilizer Yearbook. Annual $10.00.
Walter W. Brown Publishing Company, Inc.
75 Third Street, N.W.
Atlanta 8, Georgia
A list of approximately 1,850 manufacturing plants with types of fertilizer produced as well as a list of materials producers.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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

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

ORDERING INSTRUCTIONS

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

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

GENERAL INFORMATION

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

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

INDUSTRY PROFILES

ASPHALT FLOOR TILES

I. P. No. 66067

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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.

ASPHALT FLOOR TILES: Standard Industrial Classification 2951

A. PRODUCT DESCRIPTION

Asphalt tiles today are commonly made from mastic rather than asphalt. The latter is now used only rarely. Mastic tile is a group of mineral fillers bound together by a mastic or resinous mass, and is known as a thermoplastic. Tiles are usually produced in squares size 9"x9".

B. GENERAL EVALUATION

Asphalt floor tiles are now used in the United States as a floor covering not only for commercial establishments but also for apartments and houses. In the United States they are the least expensive of the tiles—less expensive than rubber tile because they do not need vulcanization, which is a process requiring expensive equipment, and less expensive than vinyl tile because they have a lower resin content. While their wearing quality is lower and their appearence is not quite as attractive as that of the other tiles, they can be satisfactorily installed on concrete slab floors, where the slab rests directly on the ground. This is not true of rubber or vinyl tile. Therefore, they are particularly useful in dwellings without cellars or as a floor covering for the ground floor. They are an adequate substitute for wooden floors and would find a market primarily in areas where wood was not readily available, where cement structures are used and where the income is high enough to support the use of decorative floor coverings in either commercial or dwelling units. Where there is doubt whether the market is large enough to absorb the entire output of the plant described but demand is nevertheless substantial, the alternative of a plant using less automatic equipment but more labor may be worth study.

C. MARKET ASPECTS

1. USERS. Construction firms, contractors and builders, and individual property owners.
2. SALES CHANNELS AND METHODS. Sales to wholesalers and sometimes direct to builders.
3. GEOGRAPHICAL EXTENT OF MARKET. Tiles must be packaged and handled with some care to avoid breakage. Nation-wide distribution is possible. There is a moderate volume of export trade in this commodity.
4. COMPETITION. a. Domestic Market. In areas where slab flooring is used which would provide a good basis for the installation of this kind of floor covering, the tiles would have to meet competition from cheaper and less permanent covering materials such as mats. In the expensive types of construction more elaborate floor coverings, such as stone tiles or wooden floors might still be preferred. The best market would probably be found in areas where the level of income is rising and these tiles could be substituted for the less permanent types of covering, such as mats. These tiles are also used widely for flooring in commercial establishments where cleanliness and apparance play an important role, such as stores, doctors' offices, etc. b. Export Market. The plant could not compete in general world trade, but some export into immediately surrounding areas without production facilities might be possible.
5. MARKET NEEDED FOR PLANT DESCRIBED. The output of the plant is sufficient for the tiling of about 5,000 smaller dwelling units of the size constructed in the U.S. However, since the tiles are also used in commercial establishments and since the rate of construction differs widely between countries, it is not feasible to estimate the population figure necessary to support the output of the plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 1.5 Million Tiles

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 1/2 acre.		$ --
Building. One story, 50'x100'.		30,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$43,400	
Other tools & equipmt.	1,000	
Furniture & fixtures	600	45,000
Total (excl. Land)		$ 75,000

Principal Items. Internal mixer, sheeting mill, calender, cutting press, compounding equipment, laboratory equipment, boiler.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 17,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	700
Training Costs		2,800
Total Working Capital		$ 20,500

c. TOTAL CAPITAL (EXCL. LAND) $ 95,500

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Resin asphalt	82 tons	$ 32,800
Fiber	182 tons	3,650
Filler	150 tons	3,000
Pigment	6 tons	500
Gel	10 tons	3,600
Plasticizer	10 tons	4,000
Cartons	18,750	3,250
Total		$ 50,800

b. Supplies

Lubricants & hand tools	$ 100
Maintenance materials & repair parts	1,500
Office supplies	100
Total	$ 1,700

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 150 hp.	$ 4,500
b. Fuel. About 3,000 gals. oil annually for calender operation and heating.	$ 400
c. Water. About 1 mn. gals. annually for general purposes.	$ 300

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. Total in and out shipments about 80 tons a month. Good highways and railroad facilities desirable.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Semi-skilled	9	$ 36,000
b. Indirect Labor		
Manager - buys, sells, keeps books & supervises	1	$ 8,000

c. Training Needs. Manager must be fully experienced. He must be able to train the workers. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

Direct Materials	$ 50,800
Direct Labor	36,000
Manufacturing Overhead(a)	14,900
Admin. Costs(b), Contingencies	3,400
Sales Costs(c), Bad Debts	5,200
Depreciation on Fixed Capital	6,100
Total	$116,400

b. Annual Sales Revenue $140,000

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

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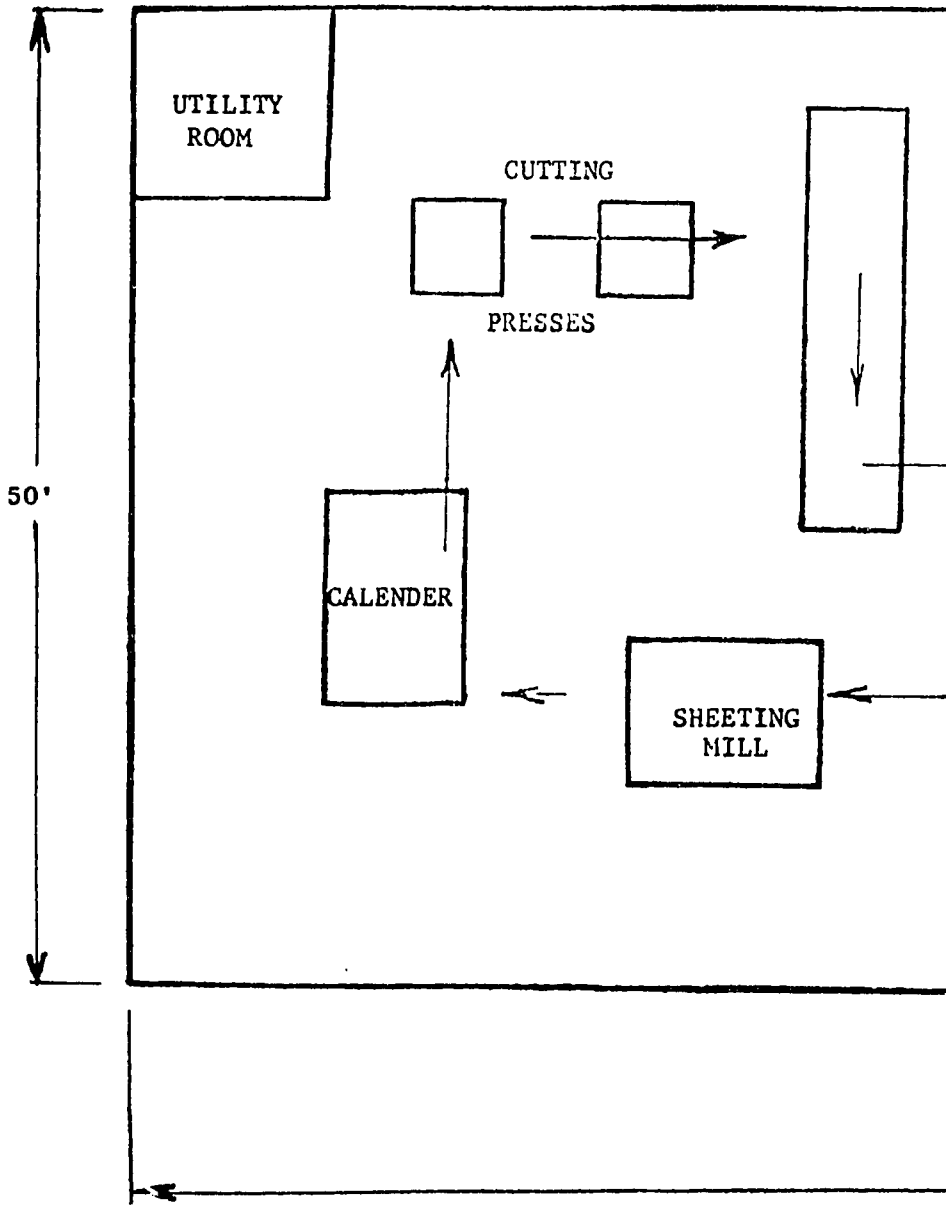
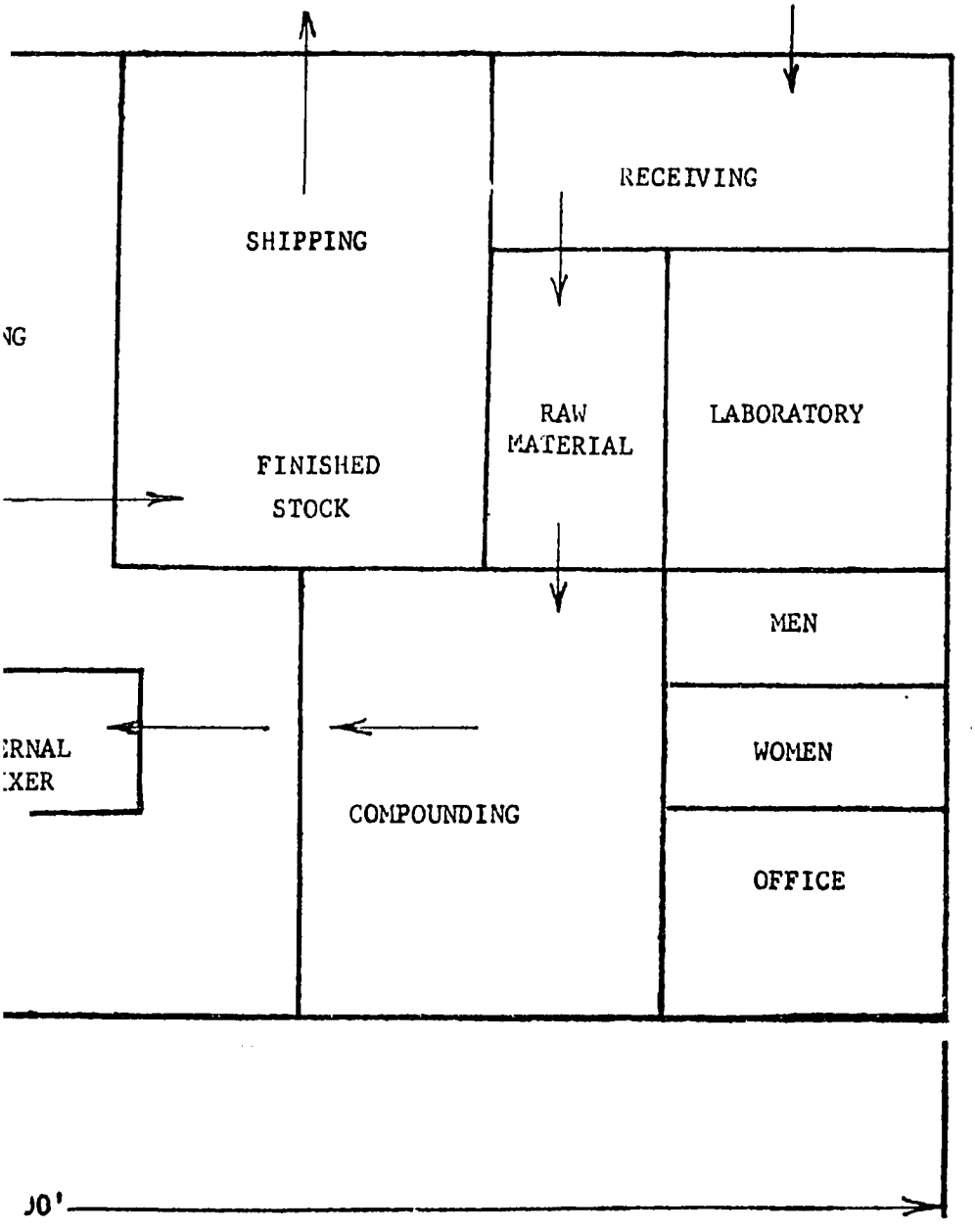


ILES: S.I.C. 2951

Work Flow



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ASPHALT FLOOR TILES: S.I.C. 2951

SELECTED REFERENCES

I. TEXTBOOKS

A. Asphalts and Allied Substances. H. Abraham. 1961. 6th Edition.
5 Vols. $10.75 each.
D. Van Nostrand Company, Inc.
120 Alexander Street
Princeton, New Jersey
Sources and uses of asphalts and allied substances.

A. Asphalt: Composition, Properties and Uses. Traxler. 1961. $10.00.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, New York
Properties of asphaltic bitumen and manufacturing methods.

II. PERIODICALS

A. Building Supply News. Monthly. $4.00/year.
Industrial Publications, Inc.
50 South Wabash Avenue
Chicago 3, Illinois
Merchandising publication for the building materials dealer.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Floor Tile Manufacture. IR-30079.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D.C. 20523

IV. TECHNICAL PAPERS

A. How Abrasives Can Work for You. E.F. Hess. p. 641 of Plant Engineering Practice. Gratis.
F.W. Dodge Corporation
119 West 40th Street
New York 18, New York
The article discusses abrasives for floor coverings.

V. U. S. PATENTS

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

A. Patent No. 2,635,054. April 14, 1953. 3 p.
An asphalt, or mastic, tile in which the plasticizer is wax tailings.

B. Patent No. 2,532,197. Nov. 28,1950. 3 p.
A novel and improved thermoplastic composition which may be used with advantage in the production of floor coverings and other commercial products.

VI. TRADE ASSOCIATIONS

A. Asphalt and Vinyl Asbestos Tile Institute
101 Park Avenue
New York 17, New York
Supplies members with latest information on products, processes, methods.

B. National Building Material Distributors Association
22 West Monroe Street
Chicago 3, Illinois
Keeps members informed on most recent developments in products, processes, markets.

VII. ENGINEERING COMPANIES

A. Giffels and Vallet, Inc.
100 Marqutte Building
Detroit 26, Michigan
Industrial engineering firm equipped plant and build asphalt tile plant.

B. Foster D. Snell, Inc.
29 West 15th Street
New York 11, New York
Consulting, chemical, designing, research, physical testing.

VIII. DIRECTORIES

A. Thomas' Register of American Manufacturers. $30.00.
Thomas Publishing Company
461 Eighth Avenue
New York 1, New York
Lists of manufacturers and suppliers of machinery, equipment, materials, and services.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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INDUSTRY PROFILES

RUBBER-SOLED FABRIC SHOES

I. P. No. 66068

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

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RUBBER-SOLED FABRIC SHOES: Standard Industrial Classification 3021

A. PRODUCT DESCRIPTION

Standard product is a circular vamp oxford shoe with rubber sole, commonly referred to in the United States as a "sneaker". Plant can, however, make almost any type of rubber-soled fabric shoe.

B. GENERAL EVALUATION

Production processes are relatively simple and not much skilled labor is needed. Even a comparatively small plant in this industry, however, needs a fairly large investment in equipment and working capital. Since competition in rubber-soled shoes is keen, a plant in a developing area would probably have little chance of breaking into the export market and would have to rely on the domestic market to provide an outlet for its production. It may be easier to maintain full production if the plant also produces shoes of a dressier type than the ordinary "sneaker", e.g. open-toed, multi-colored or wedge-heel type shoes.

C. MARKET ASPECTS

1. USERS. Populace in general. Armed services are often large purchasers.

2. SALES CHANNELS AND METHODS. Sales largely to wholesalers, but some may be made direct to large stores and large users, such as armed services. A brand name is common for this product.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is very easy to handle and transport costs are low. Potential market may be nationwide. b. Export. Market is world-wide.

4. COMPETITION. a. Domestic Market. Competition from imports is likely to be keen. If price is low enough, rubber-soled shoes of the more decorative kind may be able to compete effectively with some kinds of leather shoes.
   b. Export Market. Competition for export business is strong among large-scale producers in major producing countries. Plant of size described would have little chance in competition with established exporters.

5. MARKET NEEDED FOR PLANT DESCRIBED. Demand will depend on such factors as income levels, climate, style of clothing worn. In the average conditions of less economically advanced areas, the output of this plant might be able to meet the demand for rubber-soled shoes of a total population of the order of 5 million people.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 430,000 Pairs.

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land.		$ --
Building. 2 one-story, fireproof buildings, with total floor space of 7,500 sq. ft.		45,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$173,000	
Other tools & equipmt.	10,000	
Furniture & fixtures	1,000	184,000
Total (excl. Land)		$229 000

Principal items. Crude rubber cutting machines, two 50" mills, 40" mill with 36" cracker mill, offset roll, scale, churn for rubber cement, 10 foxing reels, clicking cutter & dies, outsole cutter, hand trucks, working tables, 28 sewing machines.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 69,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	8,000
Training Costs		19,000
Total Working Capital		$ 96,000

c. TOTAL CAPITAL (EXCL. LAND) $325,000

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Crude rubber	112.5 tons	$ 78,800
Pine oil	3.75 tons	1,150
Fillers	65.63 tons	1,300
Sulfur	5.16 tons	150
Organic accelerator	0.47 tons	500
Fabrics	136,500 sq. yds.	42,000
Bias binding	701,000 lin. yds.	7,400
Back stay tape	94,750 lin. yds.	1,000
Laces, eyelets & thread		16,000
Total		$148,300

b. Supplies

Rental equipment	$ 8,000
Spare parts & maintenance materials	4,000
Hand & cutting tools	600
Naphtha	100
Lubricants	100
Office supplies	200
Total	$ 13,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 100 hp.	$ 3,000
b. Fuel. Steam is needed in vulcanizing process. Any boiler fuel may be used.	$ 2,000
c. Water. About 2 mn. gals. annually for production and general purposes.	$ 500

4. TRANSPORTATION

a. Own Transport Equipment. None needed.

b. External Transport Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	6	$ 30,000
Semi-skilled	11	44 000
Unskilled	40	120,000
Total	57	$194,000
b. Indirect Labor		
Manager & Supervisors	3	$ 24,000
Office staff	2	8,600
Other	6	21,400
Total	11	$ 54,000

c. Training Needs. Manufacturing operations are relatively simple and can be quickly learnt. Manager and supervisors should be well experienced. With assistance of 4 skilled operators, they should be able to train all workers. Plant should reach full production in about 3 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

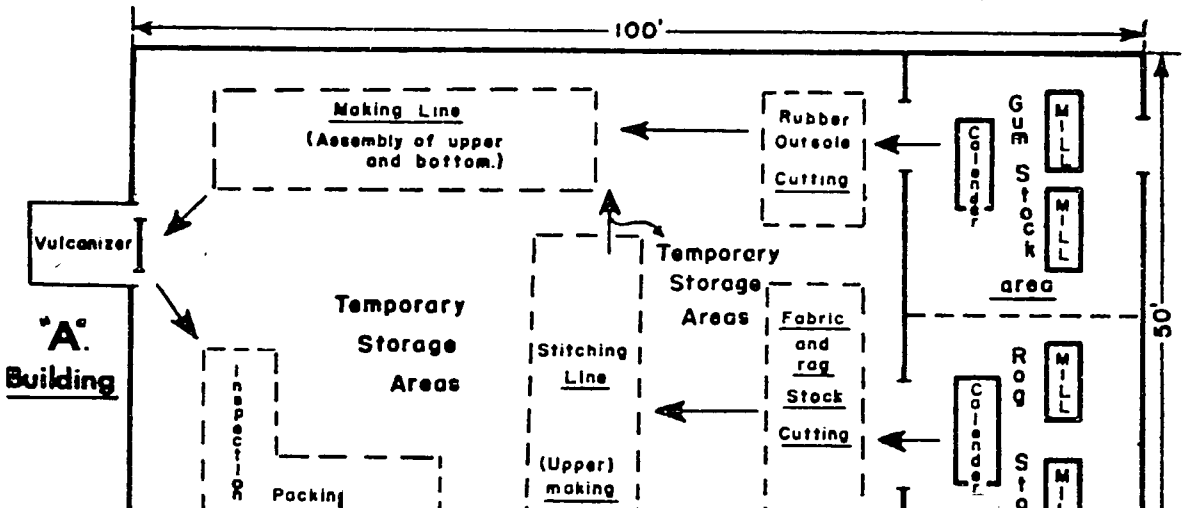
Direct Materials	$148,300
Direct Labor	194,000
Manufacturing Overhead (a)	72,500
Admin. Costs(b), Contingencies	35,000
Sales Costs(c), Bad Debts	63,000
Depreciation on Fixed Capital	21,700
Total	$534,500

b. Annual Sales Revenue $688,000

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

PLANT LAYOUT

ARROWS INDICATE WORK FLOW



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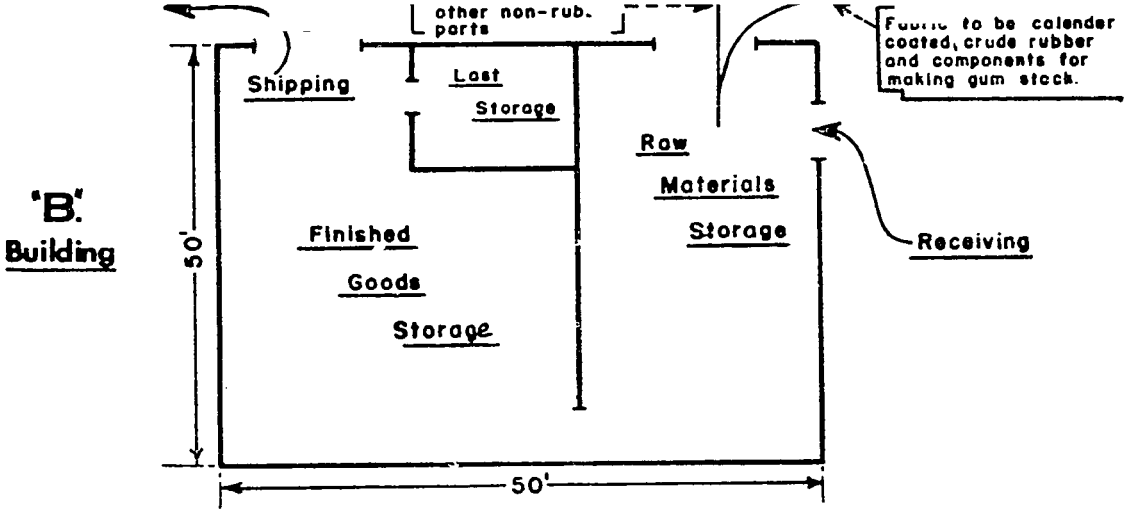

Code:

"A" Building – All manufacturing.

"B" Building – Storage facilities.

RUBBER-SOLED FABRIC SHOES: S.I.C. 3021

SELECTED REFERENCES

I. TEXTBOOKS

A. Engineering and Design with Rubber. A. R. Payne and J. R. Scott. 1960. $8.00.
Interscience Publishers, Inc.
250 Fifth Avenue
New York, New York
Chemical and physical properties of rubber. Methods and practices of engineering with rubber.

II. PERIODICALS

A. Boot and Shoe Recorder. Semi-monthly. $3.00.
Chilton Company
Chestnut and 56th Street
Philadelphia 39, Pennsylvania

B. Leather and Shoes. Weekly. $5.00/year/U. S. $6.00/yeas/Canada. $7.00/year/foreign.
Rumpf Publishing Company
300 West Adams Street
Chicago 6, Illinois

III. GOVERNMENT PUBLICATIONS, U.S.

A. Manufacture of Rubber Products. IR-15455.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523

B. Rubber Soled and Rubber Footwear.
United States Government Printing Office
Washington, D. C. 20402

IV. OTHER PUBLICATIONS

A. Textbook of Footware Manufactures. H. J. Thornton. 1954. $12.50.
Transatlantic Arts, Inc.
Hollywood-by-the-Sea, Florida

V. TECHNICAL PAPERS

A. The issue of the magazine Leather and Shoes, Vol. 140, No. 134, dated Sept. 24, 1960, is devoted to new products. A number of entries are of interest, particularly page 52, New Soles and Heels, including boys' heavy duty crepe-soles, dress crepe soles, soft top, heels, other types of soling. Source: B. F. Goodrich Co. There are also other items by other sources such as rubber, and various plastics.

VI. U. S. PATENTS

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

A. Patent No. 2,945,309. 1960. 3 p.
Process for making rubber-soled fabric shoe of athletic shoe type.

B. Patent No. 2,820,308. 1958. 5 p.
Manufacturing fabric top rubber soled shoes.

C. Patent No. 2,853,309. 1958. 2 p.
Process for making footwear with elastic material.

D. Patent No. 2,795,822. 1957. 7 p.
Method for making shoes by coating rubberized outsole onto a fabric shoe upper.

E. Patent No. 2,725,646. 1955. 3 p.
Rubber sole shoe construction with upper of canvas-like fabric.

VII. TRADE ASSOCIATIONS

A. National Shoe Manufacturers Association
342 Madison Avenue
New York 17, New York

B. Shoe Service Institute of America
222, West Adams Street
Chicago 6, Illinois

VIII. ENGINEERING COMPANIES

A. Union Special Machine Company
402 North Franklin Street
Chicago 10, Illinois
Manufacturers of Industrial sewing machines.

B. Wellman Company
Bedford, Massachusetts
Rubber sole cutting.

IX. DIRECTORIES

A. Blue Book of the Shoe and Leather Industry.
Rumpf Publishing Company
300 West Adams Street
Chicago 6, Illinois
This is an 800-page trade directory of the shoe and leather industry which includes many items of interest to those in the rubber-soled fabric shoe industry, such as dealers, exporters and statistics, with subscription to Leather and Shoes.

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INDUSTRY PROFILES

RUBBER FLOOR TILES

I. P. No. 66069

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RUBBER FLOOR TILES: Standard Industrial Classification 3069

A. PRODUCT DESCRIPTION

A vulcanized square tile, 9"x9", made of natural or synthetic rubber, used as permanent floor covering.

B. GENERAL EVALUATION

Capital and skilled labor requirements for this plant are modest. In the United States rubber floor tiling is more expensive than asphalt or vinyl asbestos tile but less expensive than vinyl tile. In rubber producing areas its price advantage vis-a-vis vinyl tiling should be greater, if the resin has to be imported. The differential between it and asphalt tile might also be less. It is more durable and more flexible than asphalt tile, but it cannot be installed on ground-contacting concrete as can asphalt tile and vinyl asbestos tile. Except for this limitation it would be used in the same fashion as asphalt tile. It could find a market in an area where cement is used widely in building construction and where the level of income is sufficiently high to permit the installation of permanent and decorative floor coverings. Since it is durable, it can be used in commercial establishments, where there is much traffic, as well as in private homes.

C. MARKET ASPECTS

1. USERS. Construction firms and individual property owners.

2. SALES CHANNELS AND METHODS. Sales to wholesalers and large users. Active sales promotion may be necessary.

3. GEOGRAPHICAL EXTENT OF MARKET. Tiles must be packaged and handled with some care to avoid damage. Market may be nation-wide. Rubber floor tiles are not important in export trade.

4. COMPETITION. a. Domestic Market. Cheaper and non-permanent floor coverings such as mats might compete. If asphalt and vinyl asbestos tiles are available, they might compete in price, particularly if there is no advantage derived from local availability of rubber. Higher priced floor coverings, such as vinyl tiles and hard-wood flooring, will also limit the market. b. Export Market. Export into nearby foreign localities might be possible.

5. MARKET NEEDED FOR PLANT DESCRIBED. Many factors will influence the size of market for this type of tile, such as the rate and type of housing and commercial construction, the level of income, the availability of competing floor coverings and the general acceptance of this relatively new product. Because of the variability of all these factors it is not feasible to give an estimate of the total population necessary to support the output of this plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 1 Million Tiles

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 1/2 acre.		$ --
Building. One story, 60'x80'.		28,800
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$31,000	
Other tools & equipmt.	2,000	
Furniture & fixtures	600	33,600
Total (excl. Land)		$ 62,400

Principal Items. 2-roll mix mill with apron, sheeting mill, hand cutter, curing press, compounding equipment, laboratory equipment, cutting machine.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 18,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	900
Training Costs		3,200
Total Working Capital		$ 22,100

c. TOTAL CAPITAL (EXCL. LAND) $ 84,500

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Rubber (smoked sheets)	62 tons	$ 43,400
Zinc oxide	4 tons	1,200
Whiting	32 tons	1,000
Clay	170 tons	3,400
Mineral oil	3 tons	350
Stearic acid	1 ton	350
Color	1 ton	4,300
Sulfur	2 tons	100
Accelerator	1 ton	200
Hard wax	2 tons	1,100
Cartons	12,500	2,200
Total		$ 57,600

b. Supplies

Lubricants & hand tools	$ 100
Maintenance materials & repair parts	1,400
Office supplies	100
Total	$ 1,600

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 125 hp.	$ 3,800
b. Fuel. About 3,000 gals. annually for heating and for process rolls.	$ 400
c. Water. About 1 mn. gals. annually for production, fire protection, and sanitation.	$ 300

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. Total in and out shipments about 60 tons a month. Good highway desirable.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Semi-skilled	9	$ 36,000
b. Indirect Labor		
Manager buys, sells, keeps books & supervises	1	$ 8,000

c. Training Needs. Manager should be fully experienced. He should be able to train the workers. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

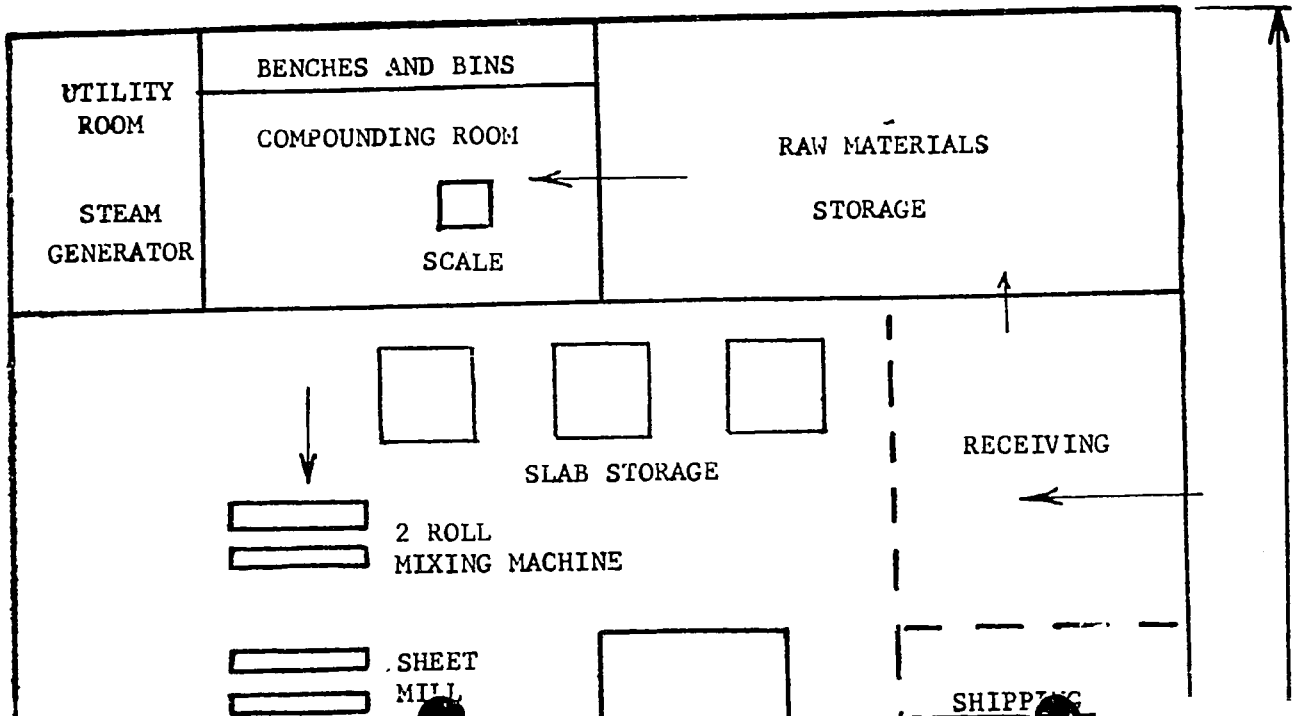
Direct Materials	$ 57,600
Direct Labor	36,000
Manufacturing Overhead(a)	14,100
Admin. Costs(b), Contingencies	5,300
Sales Costs(c), Bad Debts	5,500
Depreciation on Fixed Capital	5,000
Total	$123,500

b. Annual Sales Revenue $150,000

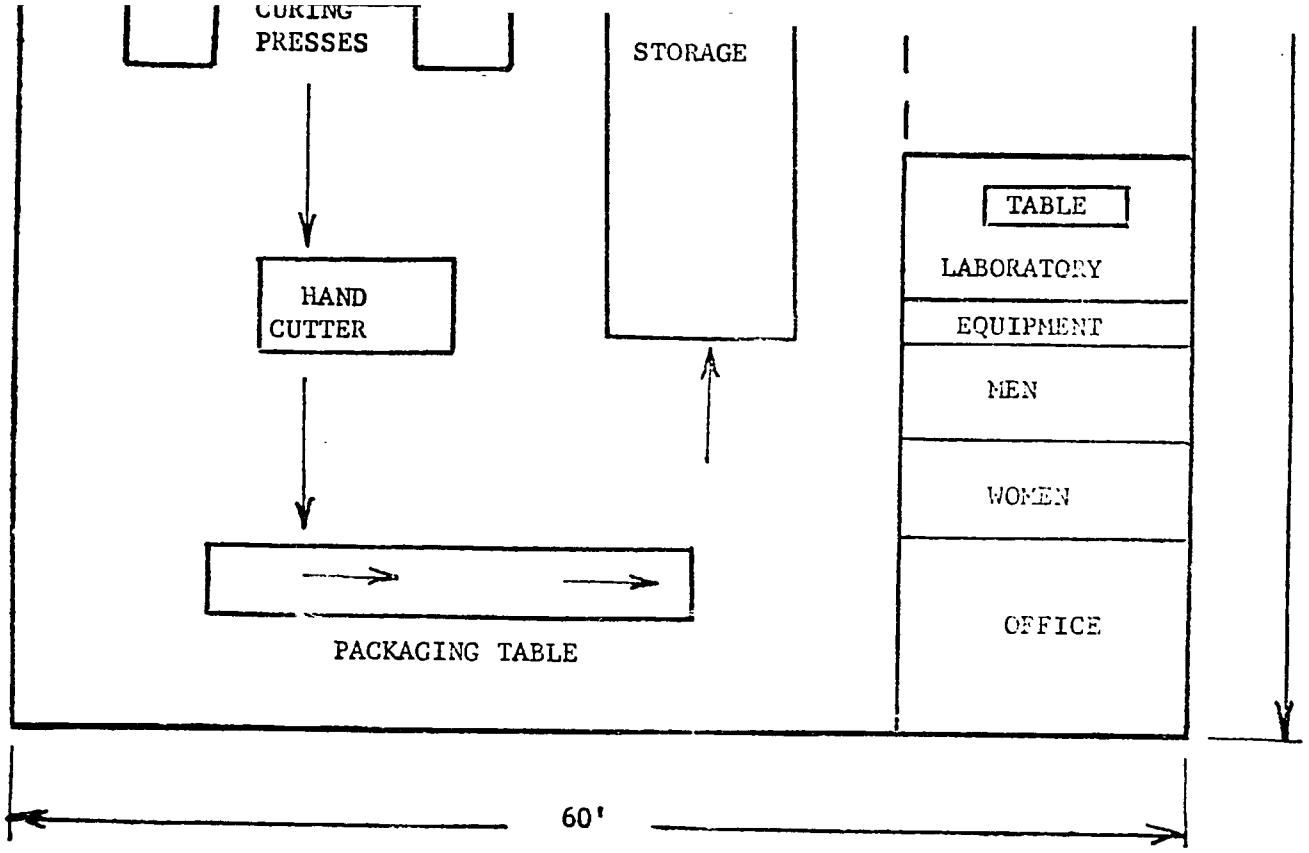
NOTES. (a) Includes Supplies. Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales, Commissions, Freight Out, Travel.

PLANT LAYOUT

ARROWS INDICATE WORK FLOW



RUBBER FLOOR


CURING
PRESSES
STORAGE
TABLE
LABORATORY
EQUIPMENT
MEN
WOMEN
OFFICE
HAND
CUTTER
PACKAGING TABLE
60'

S.I.C. 3069

RUBBER FLOOR TILES: S.I.C. 3069

SELECTED REFERENCES

I. TEXTBOOKS

A. Chemistry of Natural and Synthetic Rubbers. H. L. Fisher. 1957.
216 p. $6.50.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, New York
Commercial rubbers and their properties are surveyed, including vulcanization and polymerization.

B. Rubber in Engineering. (A symposium.) 1946. 277 p. $5.50.
Tudor Publishing Company
221-227 Fourth Avenue
New York 3, New York
General properties, technology, tables of data.

II. PERIODICALS

A. Building Supply News. Monthly. $4.00/year.
Industrial Publications, Incorporated
5 South Wabash Avenue
Chicago 3, Illinois
Merchandising publication for the material dealer.

B. Rubber Age. Monthly. $6.00/year.
Palmerton Publishing Company, Inc.
101 West 31st Street
New York 1, New York
Covers the manufacture of rubber and rubber-like products.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Floor Tile Manufacture. IR-30079.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D.C. 20523

IV. TECHNICAL PAPERS

A. Renew a Kitchen with Floor Tile. Illus. 16: p. 36-7. Workbench.
September 1960. $1.00.
Workbench Publishing Company
543 Westport Road
Kansas City 11, Missouri

V. U.S. PATENTS

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

A. Patent No. 2,940,887. 1960. 11 p.
Rubber ease floor material and method of making same.

B. Patent No. 2,893,908. 1959. 4 p.
Novel barrier layer in laminated structure.

C. Patent No. 2,777,789. 1957. 8 p.
Floor coverings made from rubber.

D. Patent No. 2,246,101. 1941. 4 p.
Rubber floor coverings.

VI. TRADE ASSOCIATIONS

A. Rubber Manufacturers Association
444 Madison Avenue
New York 22, New York

VII. ENGINEERING COMPANIES

A. Farrel-Birmingham Company, Inc.
148 Maple Street
Ansonia, Connecticut
Rubber, asphalt, plastic tile-making machinery.

B. Willam R. Thropp and Sons
552 New York Avenue
Lyndhurst, New Jersey
Mills, calenders, cutters, special machinery.

VIII. DIRECTORIES

A. Rubber Red Book. Annual. $15.00.
Rubber Age
101 West 31st Street
New York 1, New York
Products and wide coverage of other information of the rubber 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

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

PLASTIC MOLDINGS

I.P. No. 66070

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.

PLASTIC MOLDINGS: Standard Industrial Classification 3079

A. PRODUCT DESCRIPTION

Plastic moldings, consisting of finished products for consumers and finished products or components for user industries.

B. GENERAL EVALUATION

This industry needs skilled management, a modicum of highly skilled labor, and active sales promotion. For most manufacturing operations, however, little skill is necessary and operators can be easily trained. The plant is equipped to make simple dies but some dies may have to be bought. Technical and economic considerations necessitate fairly large-scale operation, and capital requirements are rather high, though plant is small by U.S. standards. Technical changes are important in this industry and necessitate continuing attention to technique. Advantages of industry are that demand for plastic products is increasing and wide range of products that can be manufactured makes industry readily adaptable to variations in demand in different places and at different times. In general, industry is suited to areas where substantial part of population can afford some small luxuries and where industries using plastics products have been established.

C. MARKET ASPECTS

1. USERS. Plant can produce finished products for consumers, e.g., tableware, ash trays, toys; and articles for use by many industries, e.g., cases for television and radio sets, clocks, razors, lipsticks, etc., knobs for radios, keys for business machines, bottles, bottle tops, dispensers. New products are constantly being introduced.
2. SALES CHANNELS AND METHODS. Sales of finished consumers' products to wholesalers or large retailers. Sales of industrial components usually direct to user industries. Since new uses are constantly being found for plastic moldings, it is important to have good salesmen.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Products are easily handled and transport costs are not burdensome. Potential domestic market usually nationwide. b. Export. World-wide market.
4. COMPETITION. a. Domestic Market. Plastic products are very largely substitutes for similar products made of wood, metal or ceramics, and their competitive position usually depends very much on their price in relation to that of goods for which they are substitutes, though for some uses they may have superior qualities. For cheap table ware, for example, plastics have advantage over ceramics of being less easily broken or chipped. Competition from imports is likely to be keen. b. Export Market. International competition very keen. Plant described might make some sales in neighboring countries but would normally be unable to compete in general international trade.
5. MARKET NEEDED FOR PLANT DESCRIBED. Some plastic products fall within category of commonly used household articles, e.g., tableware, and since price is comparatively modest a fair demand may exist even where over-all living standard is low. Many plastic products, however, are used as components of articles that are luxuries in poor areas, e.g., radio sets. Rise in over-all living standards is likely to lead to rapid increase in demand for minor luxuries, and if user industries have been established locally, this will be reflected in increased demand for plastic components. Possible uses for plastic moldings are so numerous and character of demand for them so varied that no general indication of market needed for this plant can be given in terms of population or otherwise.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: 648,000 Pounds

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land.		$ --
Building. One story, 50'x70',		21,000
Equipment, Frixtures & Furniture.		
Prodn. tools & equipmt.	$ 53,000	
Other tools & equipmt.	1,000	
Furniture & fixtures	1,000	
Transportation equip nt.	2,500	57,500
Total (excl. Land)		$ 78,500

Principal Items. 4 oz. & 8 oz. injection molding machines, air compressor, drill press, band saw, engine lathe, counting scale, oven, granulator, milling machine, dies, die stock, pick-up truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials,	90	$ 81,000
Direct Labor, Mfg. Overhead (a)	60	20,000
Admin. & Sales Costs (b), Contingencies,	30	5,500
Training Costs		3,000
Total Working Capital		$109,500

c. TOTAL CAPITAL (EXCL. LAND) $188,000

2. MATERIALS AND SUPPLIES

a. Direct Materials

Polyethylene
Polystyrene
Cellulose acetate
Cellulose acetate butyrate

Total Annual Consumption	Annual Cost
648,000 lbs.	$324,000

b. Supplies

Dies	$ 34,200
Maintenance materials & repair parts	4,000
Lubricants	150
Hand tools	150
Office supplies	200
Total	$ 38,700

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 100 hp.	$ 9,000
b. Fuel. Steam needed to heat plastic, also for general purposes. Any boiler fuel may be used.	$ 1,800
c. Water. About 15 gals. a minute needed to cool molds in production.	$ 1,500

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 1-ton pickup truck.	$ 700
b. External Transport Facilities.	No special requirements.

5 MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	2	$ 12,000
Un-skilled	10	35,000
Total	12	$ 47,000
b. Indirect Labor		
Manager	1	$ 10,000
Office staff	2	8,000
Other	1	3,000
Total	4	$ 21,000

c. Shift Operation. Manager works with unskilled labor setting up the work and making molds during day shift. Skilled workers supervise other two shifts.

d. Training Needs. Manager should be fully experienced in plastics molding. Making of molds requires high degree of skill. Remaining work can be satisfactorily done by unskilled workers with few days' training. Plant should reach full production within a month.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

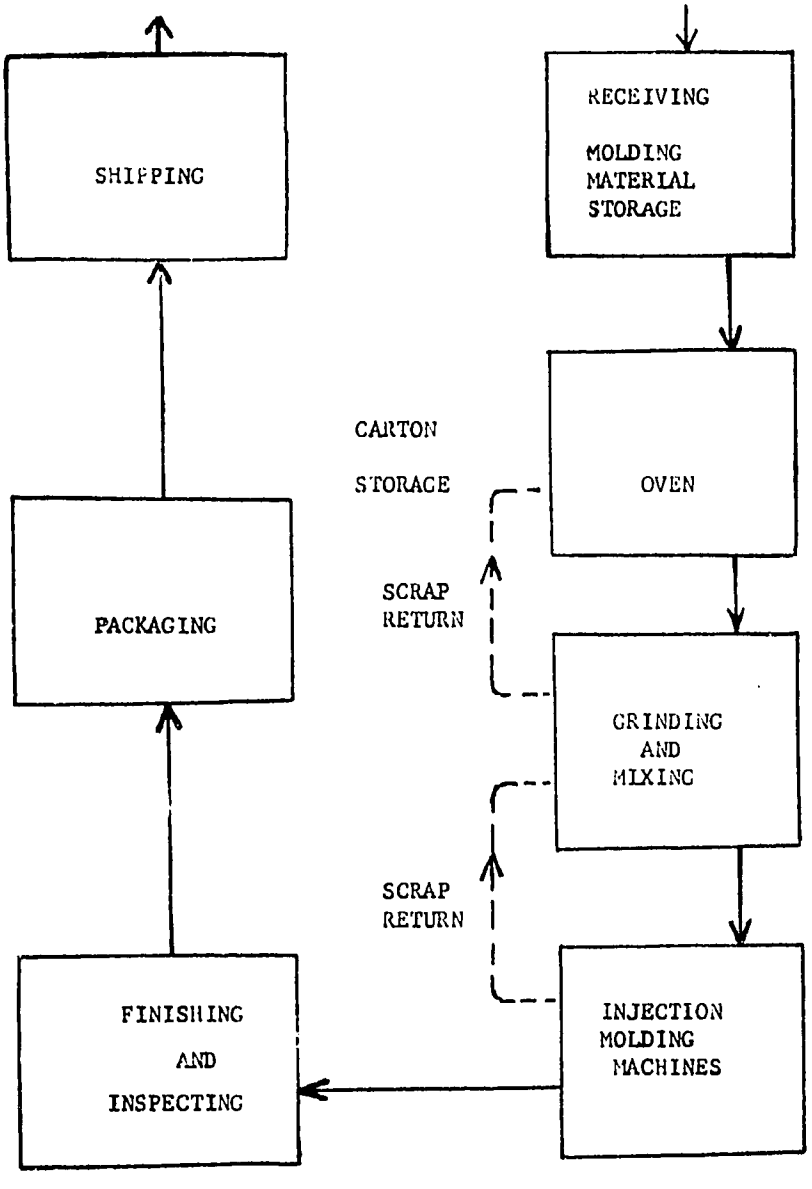
Direct Materials	$324,000
Direct Labor	47,000
Manufacturing Overhead (a)	72,700
Admin. & Sales Costs (b), Bad Debts, Contingencies	70,000
Depreciation on Fixed Capital	7,300
Total	$521,000

b. Annual Sales Revenue $648,000

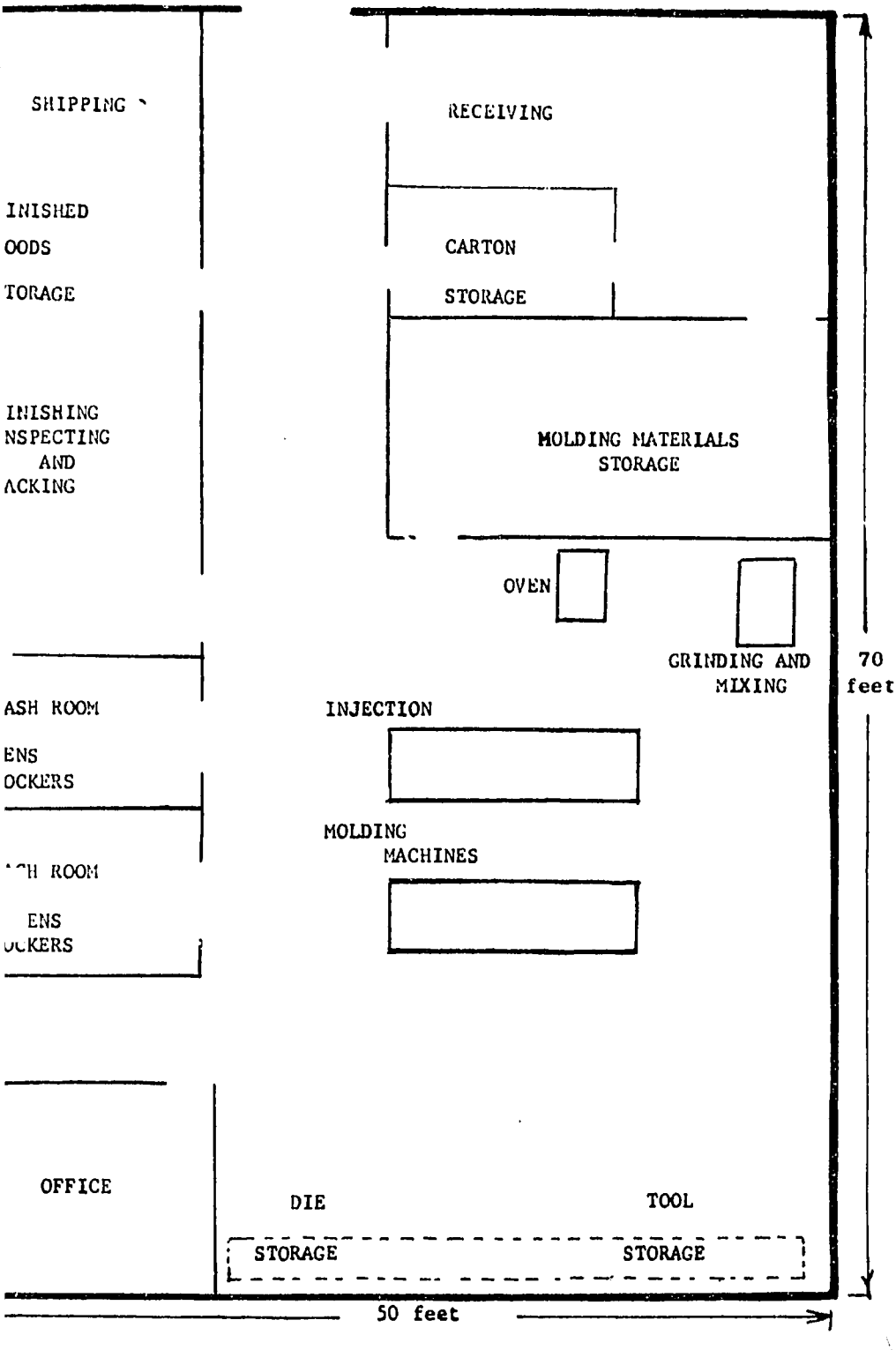
NOTES: (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges, Sales Commissions, Travel, Freight Out.

PLASTIC MOLDINGS: S.I.C. 3079

ARROWS INDICATE FLOW OF WORK



PLANT LAYOUT



PLASTIC MOLDINGS: S.I.C. 3079

SELECTED REFERENCES

I. TEXTBOOKS

A. Plastics Engineering Handbook. American Society of the Plastics Industry, Inc. 3rd Edition. 1960. 625 p. $15.00.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, New York
Classification of rigid molding materials, detailed information on all methods of plastic molding, mold and die designs.

B. Quality Control for Plastics Engineering. L.M. Debiney. 1957. 155 p. $4.95.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, New York
The use of frequency distribution in plastics molding, control charts for variables, sampling inspection.

II. PERIODICALS

A. Plastics Industry. Monthly. $3.00.
Vincent Edwards and Company
342 Madison Avenue
New York 17, New York

B. Modern Plastics Magazine. Monthly. $8.00.
Breskin Publication, Inc.
770 Lexington Avenue
New York 21, New York

III. OTHER PUBLICATIONS

A. Plastics Mold Engineering. J. H. DuBois and W. I. Pribble. 494 p. $7.50.
American Technical Society
848 East 58th Street
Chicago, Illinois
Plastics molding; types of molds; materials for mold making; compression molds; transfer molds, injection molds and other topics such as mold sampling and maintenance.

B. Compression and Transfer Moulding of Plastics. J. Butler. 1960. $8.25.
John Wiley and Sons, Incorporated
440 Fourth Avenue
New York, New York
Materials, equipment, heat, compression and transfer molds, injection molding, molding plant layout.

IV. TECHNICAL PAPERS

A. The New Approach to Quality Control.
McGraw-Hill Publishing Company
330 Weet 42nd Street
New York 36, New York

SELECTED REFERENCES (Continued)

V. U.S. PATENTS

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

A. Patent No. 2,952,034, 1960. 5 p.
Blow molding machine and process for extending and blow molding plastic materials.

B. Patent No. 2,936,481. 1960. 3 p.
Methods and apparatus for forming articles from plastic compounds.

C. Patent No. 2,926,385. 1960. 5 p.
Reformation of flat plastic sheet material into articles of various shapes by such methods as extrusion, casting, and drawing.

D. Patent No. 2,804,648. 1957. 3 p.
Machines and process for extruding and blow-molding plastic articles.

VI. TRADE ASSOCIATIONS

A. National Association of Plastic Fabricators
1108 Engineers Building
Cleveland 14, Ohio

B. Society of the Plastics Industry
250 Park Avenue
New York 17, New York

VII. ENGINEERING COMPANIES

A. Chemold Company
Colorado Avenue at 20th
Santa Monica, California
Plastic research development and production.

B. DeBell & Richardson, Inc.
10 Water Street
Hazardville, Connecticut
Laboratories on plastics and molding.

III. DIRECTORIES

A. Modern Plastics Encyclopedia. $8.00
Plastics Catalogue Corporation
Emmett Street
Bristol, Connecticut
Issue of Modern Plastics Magazine.

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.

INDUSTRY PROFILES

VINYL FLOOR TILES

I. P. No. 66071

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.

VINYL FLOOR TILES: Standard Industrial Classification 3079

A. PRODUCT DESCRIPTION

9"x9" floor tiles manufactured by combining the polyvinyl chloride or similar resin with pigments in an open or closed mixer and sheeting it on a calender.

B. GENERAL EVALUATION

The main distinction between vinyl floor tiles and asphalt and rubber tiles is that vinly tiles are generally the most expensive of these newer types of floor covering and the most wear resistant. They can be manufactured in very bright colors. Their high price, due to the high resin and asbestos content, will limit the market for them in many areas. Only where income is relatively high and where builders are interested in this type of floor covering because of its greater resistance to wear and its greater attractiveness can its price disadvantage compared to the other tile floorings be overcome. For further discussion of the properties of these tiles see Industry Profiles on Asphalt Tiles: S.I.C. 2951 and Rubber Tiles: S.I.C. 3069.

C. MARKET ASPECTS

1. USERS. Construction firms, individual property owners.

2. SALES CHANNELS AND METHODS. Sales to wholesalers and large constructors.

3. GEOGRAPHICAL EXTENT OF MARKET. Tiles have to be packaged with care. Distribution can be nation-wide. These tiles are fairly common in international trade.

4. COMPETITION a. Domestic Market. Where there are rubber and asphalt tile manufacturers in the area, vinyl tiles would have to compete with these cheaper tiles. If these other tiles are imported, the price disadvantage of vinyl tiles might not be as great. As a rather high priced article it would be in competition with such expensive materials as hardwood parquet flooring. They would also have to meet the competition of large scale foreign producers of vinyl tiles. If resin has to be imported, this competition might constitute a serious threat. b. Export Market. Plant could not compete in the international market except possibly for exports into immediately surrounding territory.

5. MARKET NEEDED FOR PLANT DESCRIBED. As in the case of other tiles, the market for the plant depends upon the rate of building construction and the acceptability of this type of floor covering for both residential and commercial construction. Because of the wide variability of these factors, no estimate of market needed in terms of total population can be given.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 1 Million Tiles

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 1/2 acre.		$ --
Building. One story, 50'x80'.		24,000
Equipment, Furniture & Fixtures.		
Produ. tools & equipmt.	$ 52,600	
Furniture & fixtures	400	53,000
Total (excl. Land)		$ 77,000

Principal Items. Internal mixer or open mill, flux mill, calender, laminating press, cutter, compounding equipment, laboratory equipment.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 24,000
Admin. Costs(b), Contingencies, Sales Costs (c)	30	800
Training Costs		2,500
Total Working Capital		$ 27,300

c. TOTAL CAPITAL (EXCL. LAND) $104,300

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Vinyl resin	72 tons	$ 28,800
Picco 100 resin	21 tons	12,600
Liquid plasticizer	18 tons	7,200
Litharge	1 ton	400
Lead stearate	2 tons	650
Whiting	72 tons	2,150
Clay	38 tons	1,500
Asbestine	72 tons	36,000
Color	4 tons	6,000
Cartons	12,500	2,200
Total		$ 97,500

b. Supplies

Lubricants & hand tools	$ 100
Maintenance materials & repair parts	1,400
Office supplies	100
Total	$ 1,600

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 150 hp.	$ 4,000
b. Fuel. About 3,000 gals. oil annually for heating & for process rollers.	$ 400
c. Water. About 1 million gals. annually.	$ 300

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. In and out shipments about 60 tons a month. Good highway desirable.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Semi-skilled	8	$ 32,000
b. Indirect Labor		
Manager buys, sells, keeps books & supervises.	1	$ 8,000

c. Training Needs. Manager must be fully experienced. He will train the workers. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

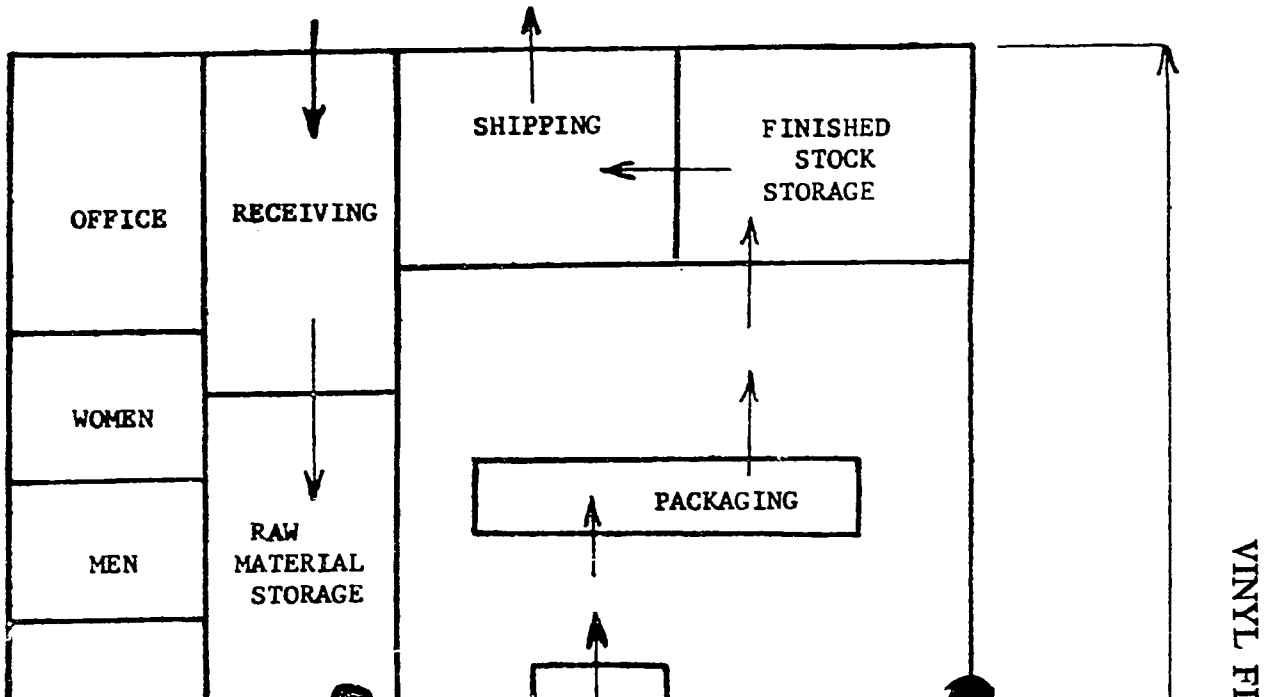
Direct Materials	$ 97,500
Direct Labor	32,000
Manufacturing Overhead(a)	14,300
Admin. Costs(b), Contingencies	5,500
Sales Costs(c), Bad Debts	5,500
Depreciation on Fixed Capital	6,500
Total	$161,300

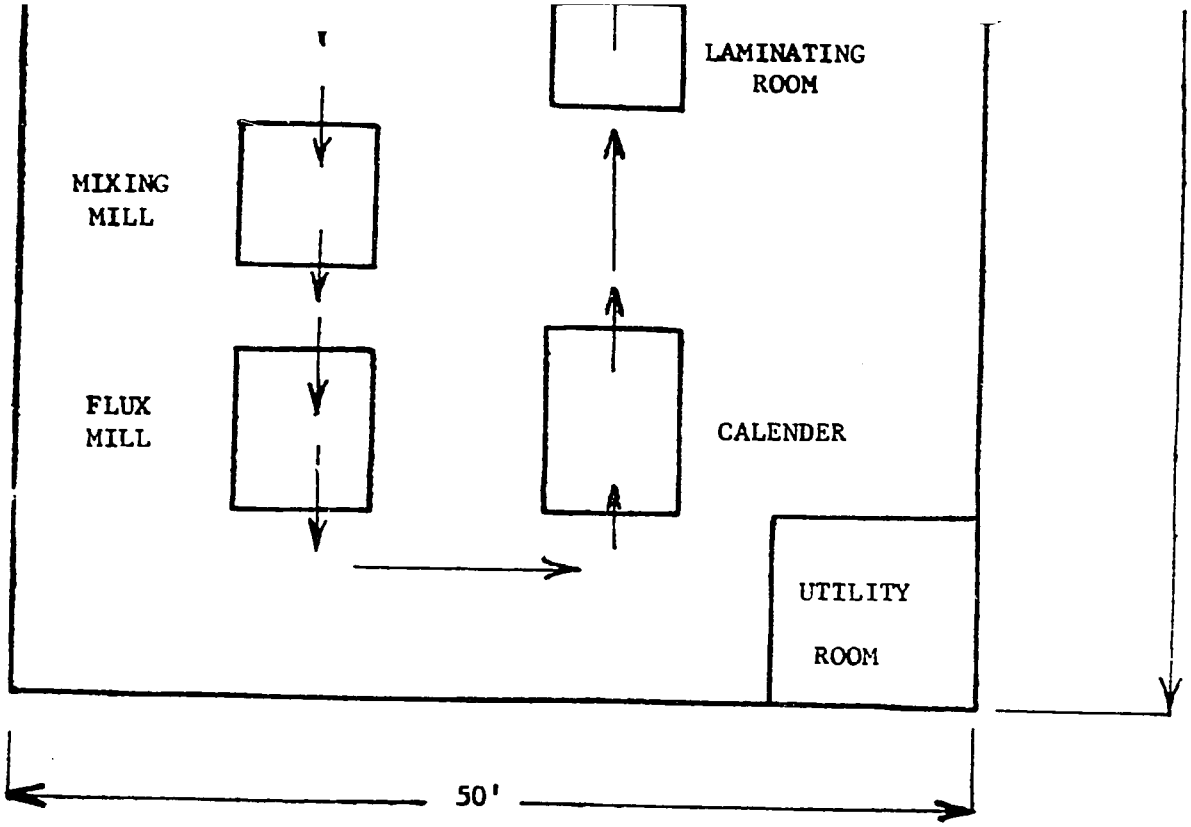
b. Annual Sales Revenue $200,000

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

PLANT LAYOUT

ARROWS INDICATE WORK FLOW




LAMINATING
ROOM
MIXING
MILL
FLUX
MILL
CALENDER
UTILITY
ROOM
50'

ES: S.I.C. 3079

VINYL FLOOR TILES: S. I. C. 3079

SELECTED REFERENCES

I. TEXTBOOKS

A. Vinyl and Related Polymers. C. E. Schildknecht. 1952. 732 p. Illus. $19.00.
John Wiley and Sons, Inc.
440 Park Avenue South
New York 16, New York
Preparation of vinyl and related polymers, their properties and applications.

B. Plastic Sheet Forming. R. L. Butzko. 1958. 191 p. $4.50.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, New York
Sheet forming applications, the fabrication process.

II. PERIODICALS

A. Modern Plastics. Monthly. $20.00/year.
Breskin Publications, Incorporated
Emmett Street
Bristol, Connecticut
Applications of plastic materials. Advances in technology.

B. Plastics Industry. Monthly. $5.00/year.
Vincent Edwards and Company
130 Clarendon Street
Boston, Massachusetts
Includes material on manufacture of plastic products as well as on management, machinery, and operation of manufacturing plants in the plastics industry.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Floor Tile Manufacture. IR-30079.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523

IV. TECHNICAL PAPERS

A. Renew a Kitchen with Floor Tile. Illus. 16: p. 36-7. Workbench. September 1960. $1.00.
Workbench Publishing Company
543 Westport Road
Kansas City, Missouri

SELECTED REFERENCES (Continued)

V. U. S. PATENTS

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

A. Patent No. 2,987,102. 1961. 11 p.
Decorative plastic surface covering and process therefor.

B. Patent No. 2,835,260. 1958. 3 p.
Method of preparing vinyl resin granules and covering containing same.

C. Patent No. 2,816,852. 1957. 4 p.
Vinyl floor coverings.

D. Patent No. 2,803,573. 1957. 4 p.
Resilient hard surface covering.

VI. TRADE ASSOCIATIONS

A. Plastic Products Manufacturers Association
1133 Broadway
New York 10, New York

VII. ENGINEERING COMPANIES

A. Farrel-Birmingham Company, Inc.
148 Maple Street
Ansonia, Connecticut
Rubber, asphalt, plastic tile-making machinery.

B. Booker and Wallestad, Incorporated
3334 Gorham Avenue
Minneapolis, Minnesota
Plastic product design.

VIII. DIRECTORIES

A. Floor Covering Profits Annual Directory. Annual $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

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ORDERING INSTRUCTIONS

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Technical Information, 410.12
Springfield, Virginia 22151

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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

LEATHER TANNING

I. P. No. 66072

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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.

LEATHER TANNING: Standard Industrial Classification 3111

A. PRODUCT DESCRIPTION

Upper shoe leather, made by processing raw hides by two-bath chrome tanning process. Best upper leather is obtained from light cattle hides weighing approximately 54 pounds each.

B. GENERAL EVALUATION

This plant requires a fairly large capital and a considerable amount of skilled labor. In highly industrialized areas big tanneries often use imported hides, but in developing areas it would generally only be appropriate to establish a plant such as that described where there is a steady supply of suitable locally-produced hides.

C. MARKET ASPECTS

1. USERS. Makers of leather footwear, luggage, purses, garments, etc.

2. SALES CHANNELS AND METHODS. Sales mostly direct to user industries, but also sometimes to wholesalers.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is easy to handle and transport costs are low in relation to value of product. In country of moderate size and with reasonably good transportation network, potential market may be nation-wide. b. Export. Product is exported world-wide.

4. COMPETITION. a. Domestic Market. If suitable hides are produced locally and good quality of finished product is maintained, plant should be able to compete effectively with imports. Imitation leather and other materials compete strongly with leather for some uses, and such competition may well increase in future. However, in a country producing hides at reasonable cost leather is likely to maintain an important place even for such uses, particularly if, as will often be the case, alternative materials must be imported. b. Export Market. If costs are reasonable and quality good this plant should be able to compete in general international trade. Demand for good quality leather is usually fairly steady.

5. MARKET NEEDED FOR PLANT DESCRIBED. Where substantial quantities of hides are produced at reasonable cost, leather is likely to be in fairly common use. Hides of the kind required for this plant are mostly produced in quantity in areas with moderate climates where leather goods are suitable for many everyday uses. However, in low income areas, taking into account that plant is designed to produce high quality leather, leather factories producing for several million customers might be needed.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 3.5 Million Square Feet

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 50,000 sq. ft.		$ --
Building. One story, 120'x150'.		108,000
Equipment. Furniture & Fixtures.		
Prodn. tools & equipmt.	$ 82,900	
Other tools & equipmt.	2,500	
Furniture & fixtures	1,600	87,000
Total (excl. Land)		$195,000

Principal Items. Monorail system & other hidehouse equipment, 15 liming reels, unhairing machine, fleshing machine, de-liming vat, bating reel & other beamhouse equipment, 2 tanning drums, setting out machine, splitting machine, shaving machine, oiling off machine, measuring machine, 2 staking machines, 2 buffing machines, 2 glazing machines, ironing machine, & other tanning & finishing equipment, 2 fork-lift trucks.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$127,400
Admin. & Sales Costs(b), Contingencies	30	11,000
Training Costs		16,000
Total Working Capital		$154,400

c. TOTAL CAPITAL (EXCL. LAND) $349,400

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Hides	4 mn. lbs.	$520,000

b. Supplies

Chemicals & oils	$ 13 000
Sawdust & wood sweepings	100
Soap	100
Burlap, rope & twine	1,000
Cane sugar glucose	400
Maintenance materials & repairs	1,600
Office supplies	200
Total	$ 16 400

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. About 140 kw-hr a day.	$ 900
b. Fuel. For production, etc.	$ 700
c. Water. Water for production should be analyzed, as contaminated water will impair quality of leather. Water also needed for sanitation & fire protection.	$ 600

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b External Transport Facilities. Total in and out shipments about 800 tons a month. Plant should be located on good highway and, if possible, on railroad siding.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	14	$ 70,000
Semi-skilled	14	56,000
Unskilled	12	36,000
Total	40	$162,000
b. Indirect Labor		
Manager & supervisors	4	$ 31,000
Office staff	3	12,000
Other	6	21,000
Total	13	$ 64,000

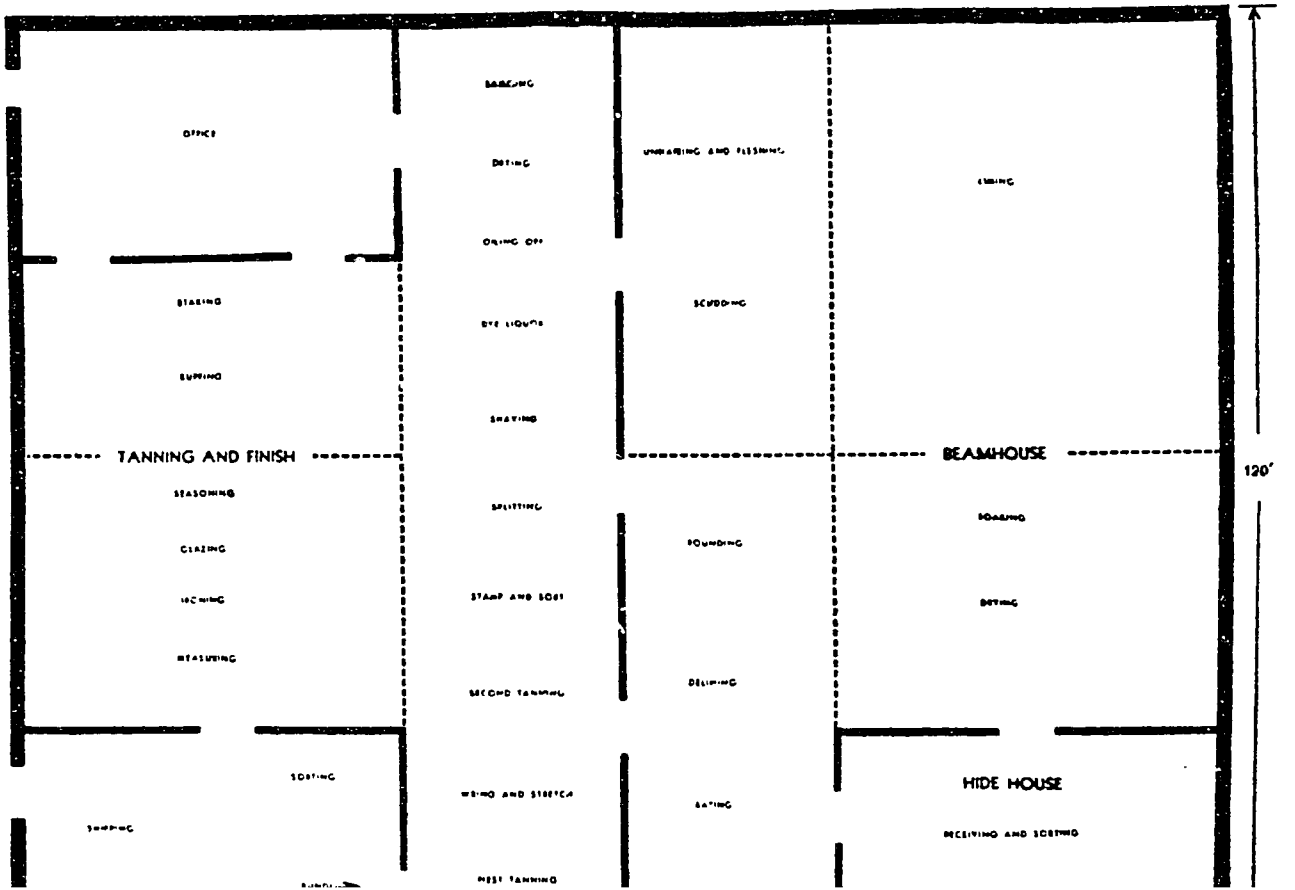
c. Training Needs. Manager & supervisors should be fully experienced. With assistance of 7 skilled operators, they should be able to do all necessary training of workers. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

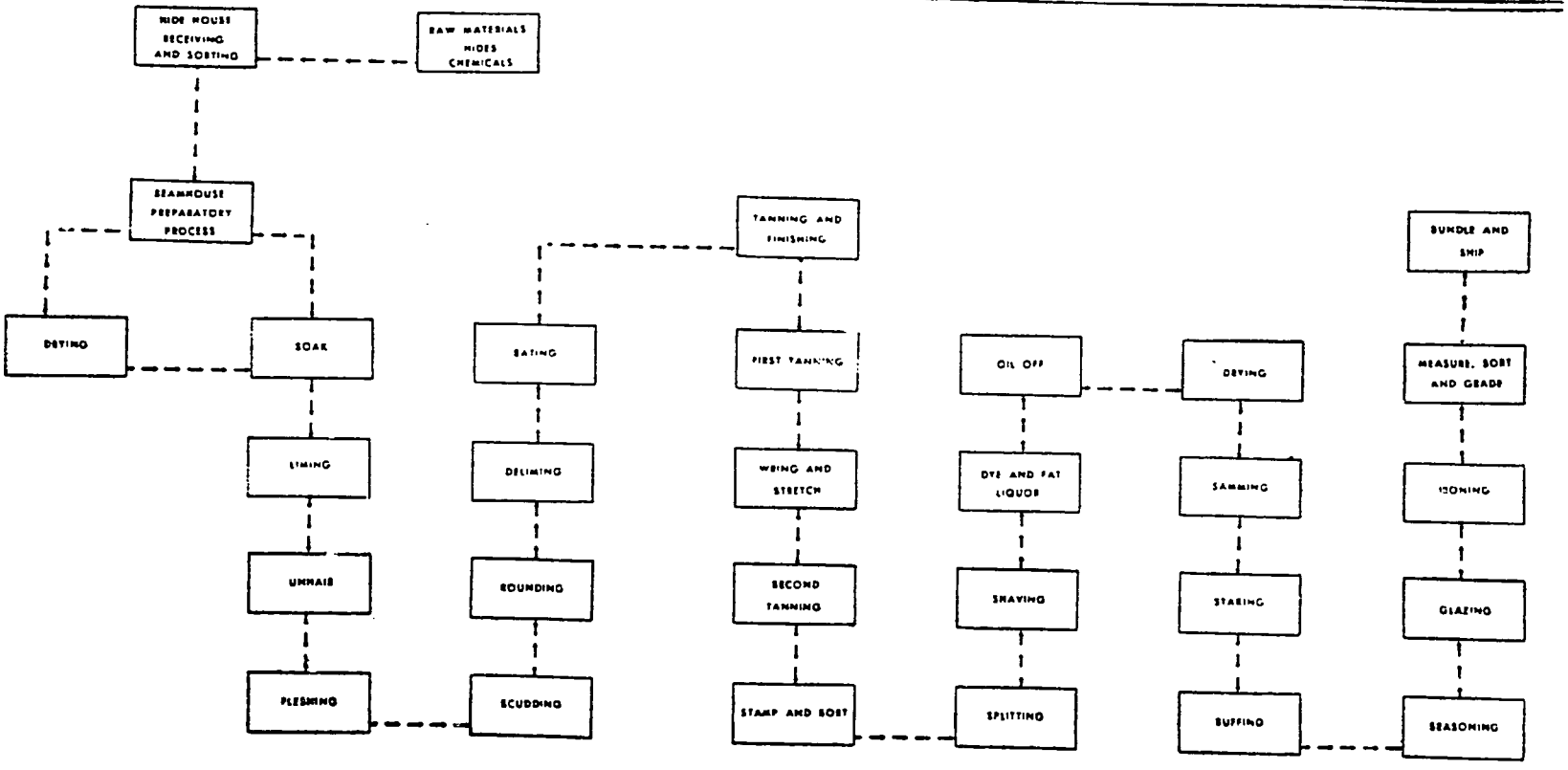
a. Annual Costs	
Direct Materials	$520,000
Direct Labor	162,000
Manufacturing Overhead(a)	82,600
Admin. & Sales Cost(b), Bad Debts, Contingencies	140,000
Depreciation on Fixed Capital	14,400
Total	$919,000
b. Annual Sales Revenue	$1,225,000

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

DIAGRAMMATIC LAYOUT



SCHEMATIC FLOW CHART



LEATHER TANNING: S.I.C. 3111

SELECTED REFERENCES

I. TEXTBOOKS

A. Chemistry of Tanning Processes. K. H. Gustavson. 1956. 403 p. Illus. $12.50.
Academic Press, Inc.
111 Fifth Avenue
New York 3, New York
Materials, equipment, and processes used in the tanning of leathers.

B. Economics of Cattlehide Leather Tanning. M. A. Watson. 1950. 248 p. Illus. $7.50.
Rumpf Publishing Company
300 West Adams Street
Chicago 6, Illinois
Equipment, materials, plant layout and operational costs of tanning cattle hides.

II. PERIODICALS

A. Luggage and Leather Goods. Monthly. $3.00/year.
Haire Publishing Company, Inc.
111 Fourth Avenue
New York 3, New York
Includes periodic information on leather production and markets.

B. Leather and Shoes. Weekly. $5.00/year.
Rumpf Publishing Company
300 West Adams Street
Chicago 6, Illinois
Manufacturing and marketing information on leather and leather products.

III. GOVERNMENT PUBLICATIONS, U.S.

A. Leather Tanning. IR-18386.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523
Plant layout and operation of a leather tanning establishment.

IV. OTHER PUBLICATIONS

A. Chemistry and Technology of Leather. F. O'Flaherty and others. Vol. III. 1962. 495 p. Illus. $15.00.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, New York
Preparing the skins for tannage, and materials used in the process.

B. Tanning Processes. A. C. Orthmann. 1945. 414 p. Illus. $12.50.
Rumpf Publishing Company
300 West Adams Street
Chicago 6, Illinois
Detailed descriptions and illustrations of chrome and other tanning processes.

V. TECHNICAL PAPERS

A. Case History of Statistical Quality Control in Chrome Tranning. F. L. Collins and G. M. Oliensis. American Leather Chemists Association Journal. February 1958. Vol. 53. p. 72-6. $1.50.
American Leather Chemists Association
University of Cincinnati
Cincinnati 21, Ohio
Description of chrome tanning process, tests, and final tannage inspection.

VI. U.S. PATENTS

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

A. Patent No. 2,942,930. 1960. 4 p.
Method for tanning leather.

B. Patent No. 2,829,943. 1958. 3 p.
Tanning agent and process for its use.

C. Patent No. 2,826,477. 1958. 3 p.
Process for tanning skins and hides.

VII. TRADE ASSOCIATIONS

A. Tanners Council of America
411 Fifth Avenue
New York 16, New York

B. National Industrial Leather Association
230 South East Court
Pompano Beach, Florida

VIII. ENGINEERING COMPANIES

A. Sterling Engineering Company
46 West Peddie Street
Newark, New Jersey
Consulting services for manufacturers and processing plants.

IX. DIRECTORIES

A. Leather and Shoes Blue Book. $3.00.
Rumpf Publishing Company
300 West Adams Street
Chicago 6, Illinois
Includes data on supplies, materials, and equipment used in tanning.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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INDUSTRY PROFILES

MEN'S DRESS SHOES

I. P. No. 66073

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MEN'S DRESS SHOES: Standard Industrial Classification 3141

A. PRODUCT DESCRIPTION

Goodyear welt leather dress shoes for men.

B. GENERAL EVALUATION

Although, by the general standards of the factory-made shoe industry, the plant described is a small unit, it nevertheless requires a moderately large investment of capital and a considerable amount of skilled labor. The market for the output of such a plant would almost certainly be mainly domestic. These shoes are comparatively high-priced and careful investigation of the potential market is needed to ascertain whether there is sufficient demand for such shoes, in competition with cheaper substitutes and the products of small markers.

C. MARKET ASPECTS

1. SALES CHANNELS AND METHODS. Sales are mostly made to retail stores. Manufacturers often use a special brand name. In some areas large manufacture have their own retail outlets, but this would almost certainly not be economical for a plant of this size.

2. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. These products are easily handled and transport costs are low in relation to unit price. In countries of moderate size and with a reasonably well developed transport system the potential domestic market area should be nation-wide. b. Export. These products are distributed world-wide, particularly by major manufacturers in the United Kingdom, other Western European countries, and the United States.

3. COMPETITION. a. Domestic Market. Economies of large-scale operation a marked in this industry, and large-scale manufacturers will usually supply keen competition. In areas with very low labor earnings, the small shoemaker who makes to customers' orders can often compete effectively with the mechanized factory. b. Export Market. A plant of the size described could not compete the export trade with large-scale manufacturers in advanced industrial areas.

4. MARKET NEEDED FOR PLANT DESCRIBED. By the consumption standards of economically less developed areas, the products under consideratio are in the luxury category for much of the populace. Those who can afford to wear shoes of this kind will often have been served by small shoemakers, who may continue to obtain at least a part of the business. The wealthier few may also prefer imports, if they can get them, since the foreign maker can often offer style features that the comparatively small-scale local factory can not. Taking all these factors into consideration, it seems likely that, in economically less developed areas, this plant would need an urban population of two million or more to provide it with a market.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION : 50,000 Pairs

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 1 acre.		$ --
Building. One story, 100'x200'.		120,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$46,000	
Other tools & equipmt.	6,000	
Furniture & fixtures	1,000	53,000
Total (excl. Land)		$173,000

Principal Items. Machines - sewing (26), marking, skiving, clicking (2), heel scouring (2), welting, edge setting, edge trimming, buffing, leather splitting, perforating, inner sole, lasting (2), sole sewing (2), nailing (2), lasts, last trucks, leather racks, dies.

b. WORKING CAPITAL

	No of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 51,600
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,500
Training Costs		14,400
Total Working Capital		$ 68,500

c. TOTAL CAPITAL (EXCL. LAND) $241,500

2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
a. Direct Materials		
Leather	80,000 ft.	$ 46,800
Linings	18,000 yds.	3,600
Findings, eyelets, laces		14,000
Packaging (cases, cartons, etc.)		5,600
Total		$ 70,000

b. Supplies

Lubricants & hand tools	$ 200
Cutting tools	200
Dies & adhesives	600
Maintenance & repair parts	1,300
Office supplies	200
Total	$ 2,500

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 100 hp.	$ 3,000
b. Fuel. About 7,000 gals. oil, or equivalent in other fuel, annually.	$ 900
c. Water. About 800,000 gals. annually for general purposes	$ 200

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

a. Direct Labor	Number	Annual Cost
Skilled	15	$ 75,000
Semi-skilled	22	88,000
Unskilled	10	30,000
Total	47	$193,000

b. Indirect Labor		
Manager & supervisors	4	$ 28,000
Office staff	2	8,000
Other	1	4,000
Total	7	$ 40,000

c. Training Needs. Manager & supervisors should have long experience. With 3 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. Annual Costs	
Direct Materials	$ 70,000
Direct Labor	193,000
Manufacturing Overhead(a)	46,600
Admin. Costs(b), Contingencies	13,000
Sales Costs(c), Bad Debts	22,000
Depreciation on Fixed Capital	9,000
Total	$353,600

b. Annual Sales Revenue $400,000

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

MEN'S DRE

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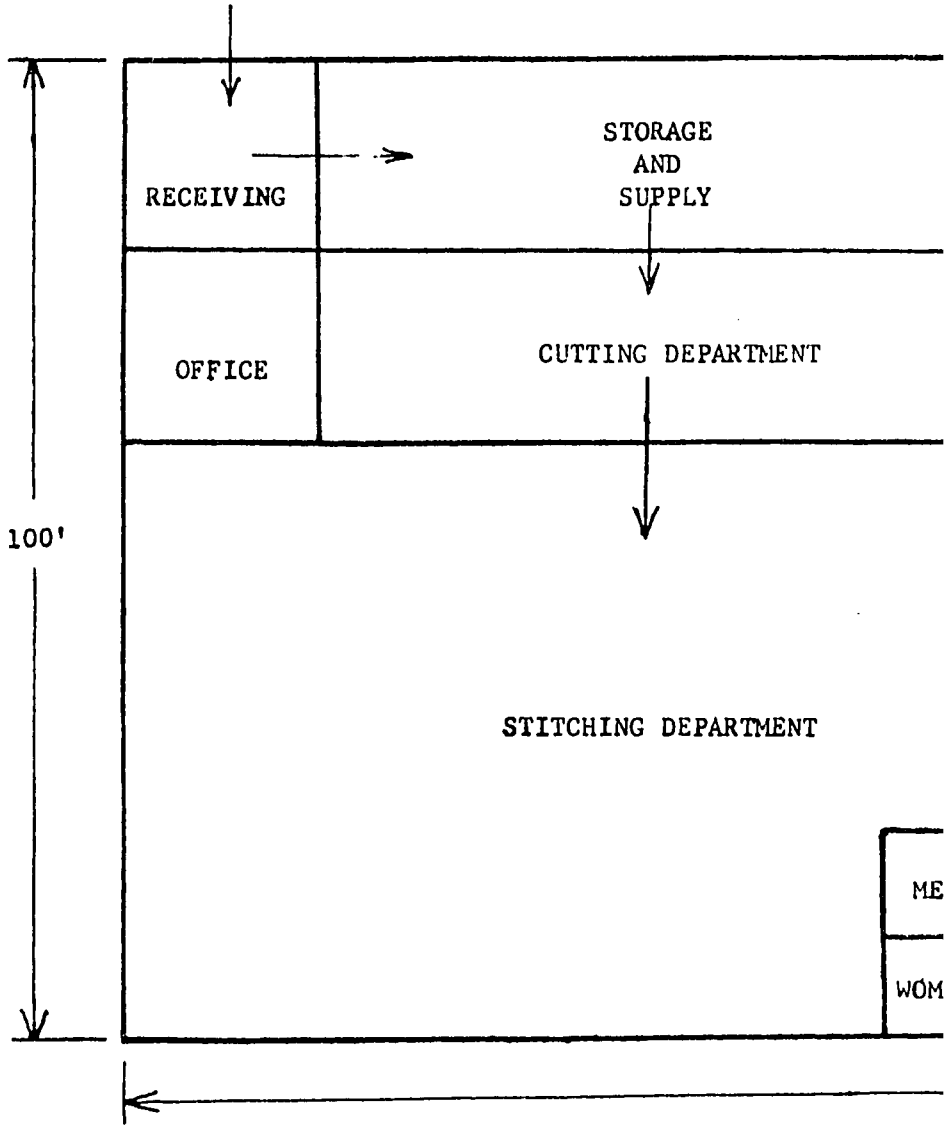
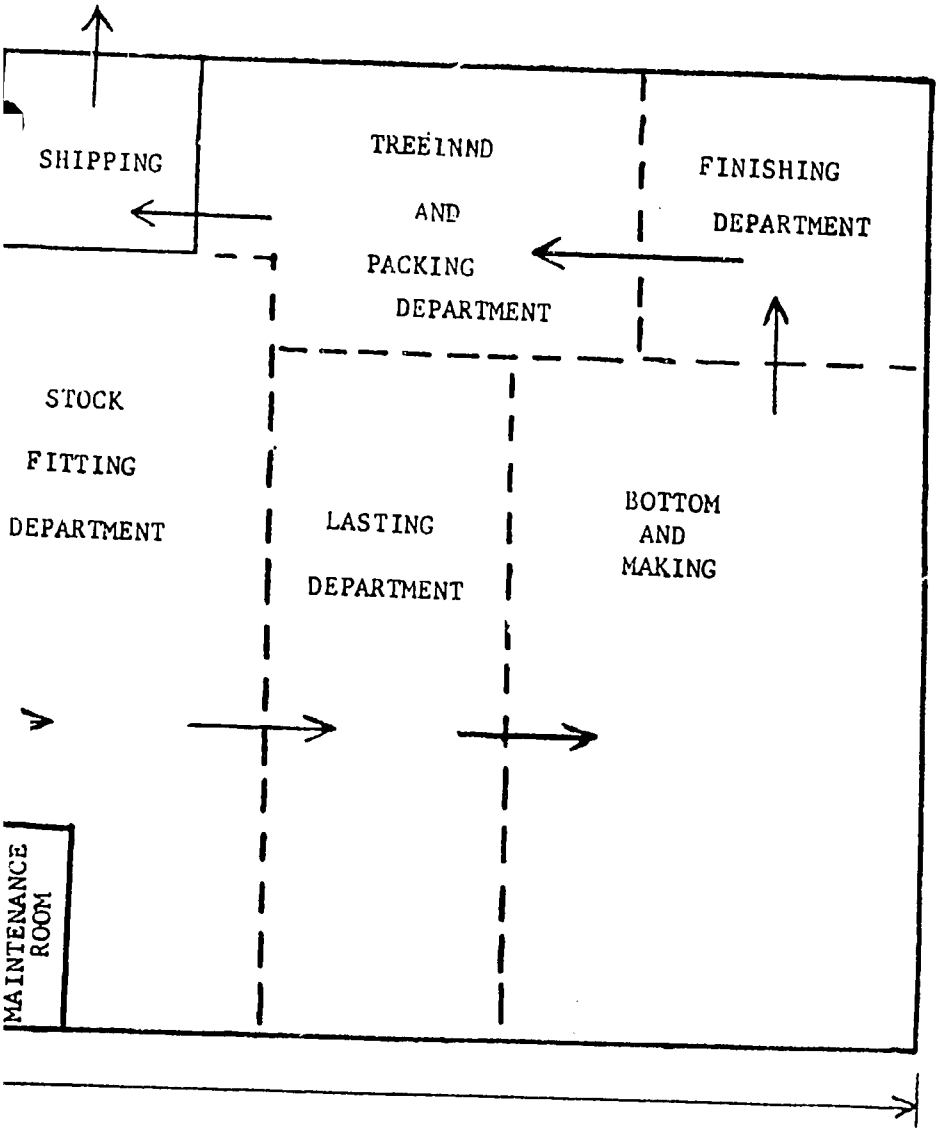
ARROWS IN



ES : S.I.C. 3141

OUT

WORK FLOW



MEN'S DRESS SHOES: S.I.C. 3141

SELECTED REFERENCES

I. TEXTBOOKS

A. Textbook of Footwear Manufacture. J. H. Thornton, editor. 1959. 611 p. Illus. $11.25.
Transatlantic Arts, Inc.
Hollywood-by-the-sea, Florida
Machinery, equipment, and processes in the manufacture of shoes.
Includes section on dress shoes for men.

B. Shoe Machinery. R. N. Anthony. 1955. 91 p. Illus. $3.50.
National Shoe Manufacturers Association
342 Madison Avenue
New York 17, New York
Describes and illustrates machinery used in making different kinds and styles of shoes.

II. PERIODICALS

A. American Shoemaking. Weekly, $5.00/year.
Shoe Trades Publishing Company
683 Atlantic Avenue
Boston 11, Massachusetts
Topics and information of interest to the shoe manufacturer.

B. Leather and Shoes. Weekly. $7.00/year.
Rumpf Publishing Company
300 West Adams Street
Chicago 6, Illinois
Covers materials, machinery, products and markets of the shoe industry.

III. GOVERNMENT PUBLICATIONS. U.S.

A. Shoe Factories. IR-27804.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523

IV. OTHER PUBLICATIONS

A. Boot and Shoe Production. J. Korn. 1953. 627 p. Illus. $11.00.
Pitman Publishing Company
2 West 45th Street
New York 36, New York
Covers materials, equipment, processes, and markets of the boot and shoe industry.

V. TECHNICAL PAPERS

A. Men's Dress Shoes. Consumers Reports. March 1960. Vol. 25. p. 126-30. $.50.
Consumers' Research, Inc.
Washington, New Jersey
Specifications, requirements, and composition of men's dress shoes.

VI. U.S. PATENTS

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

A. Patent No. 2,862,216. 1958. 5p.
Shoes and method of producing same.

B. Patent No. 2,835,908. 1958. 6 p.
Manufacture of shoes to improve fitting quality and appearance.

C. Patent No. 2,832,975. 1958. 6 p.
Method of making welt shoe.

VII. TRADE ASSOCIATIONS

A. National Shoe Manufacturers Association
342 Madison Avenue
New York 17, New York

B National Shoe Institute
50 Rockefeller Plaza
New York 20, New York

VIII. ENGINEERING COMPANIES

A. United Shoe Machinery Corporation
140 Federal Street
Boston 7, Massachusetts
Furnishes complete technical advice on all phases of shoe manufacture.

B. Sterling Engineering Company
46 West Peddie Street
Newark, New Jersey
Consulting and engineering service for leather, shoe, and related industries.

IX. DIRECTORIES

A. Leather and Shoes Blue Book. Annual. $3.00.
Rumpf Publishing Company
300 West Adams Street
Chicago 6, Illinois
Indicates shoe manufacturers and sources of supply of materials and equipment used in shoe production.

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INDUSTRY PROFILES

LADIES' HANDBAGS AND LEATHER SPECIALTIES

I. P. No. 66074

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LADIES' HANDBAGS AND LEATHER SPECIALTIES:
Standard Industrial Classification 3171/2

A. PRODUCT DESCRIPTION

Handbags and small leather articles, such as wallets, glass cases, etc., machine sewn.

B. GENERAL EVALUATION

The leather articles produced in this plant are luxury goods which in economically less developed areas might find their market primarily in the tourist and export trade. In this trade attractive and characteristically local designs are necessary. The capital required for this plant is very small. A high standard of workmanship is necessary, but it may be assumed that in any area in which leatherwork is done, such skill would be available. Leather would not have to be produced but design and handling skills are more likely to be found in areas where there is local production of leather.

C. MARKET ASPECTS

1. SALES CHANNELS AND METHODS. Plant would sell to wholesale and retail distributors, and might make some direct sales.

2. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Products are very easily transported and value is high relative to transport costs. Distribution may be nation-wide. b. Export. Such items are traded widely in the international market.

3. COMPETITION. a. Domestic Market. Since these items are primarily luxury goods, they will find a domestic market only in relatively high income areas. Substitutes of cheaper materials will compete. Since these items are readily produced in small plants or made completely by hand, competition from handicraft producers may be strong. b. Export Market. If good designs are used, these products should find a market in the export and tourist trade.

4. MARKET NEEDED FOR PLANT DESCRIBED. Because of the dependence of this plant upon the tourist and export trade no estimate can be given of the market required in terms of population.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 3,000 Handbags, 7,500 Small Leather Articles

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 1,000 sq. ft.		$ --
Building. One story, 20'x30'.		$ 4,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$ 1,500	
Other tools & equipmt.	300	
Furniture & fixtures	200	2,000
Total (excl. Land)		$ 6,000

Principal Items. Cutting table, 3 sewing machines, hand punch, line roller, skiver, hand splitter.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 8,200
Admin. Costs(b), Contingencies, Sales Costs(c)	30	400
Total Working Capital		$ 8,600

c. TOTAL CAPITAL (EXCL. LAND) $ 14,600

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Leather	15,000 sq. ft.	$ 20,000
Lining & Thread		1,000
Metal ornaments		1,000
Total		$22,000

b. Supplies

Hand tools	$ 100
Maintenance & repair parts	200
Office supplies	200
Total	$ 500

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 2 hp.	$ 300
b. Fuel. For heating, if necessary	$ 200
c. Water. Sanitation & fire protection.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

a. Direct Labor

	Number	Annual Cost
Skilled	2	$ 10,000
Semi-skilled	2	8,000
Total	4	$ 18,000

b. Indirect Labor

Manager - buys, sells, keeps books, supervises & does production work.	1	$ 8,000

c. Training Needs. The manager must be well experienced. With aid of 2 skilled workers, he would maintain full production while training the other 2 operators.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

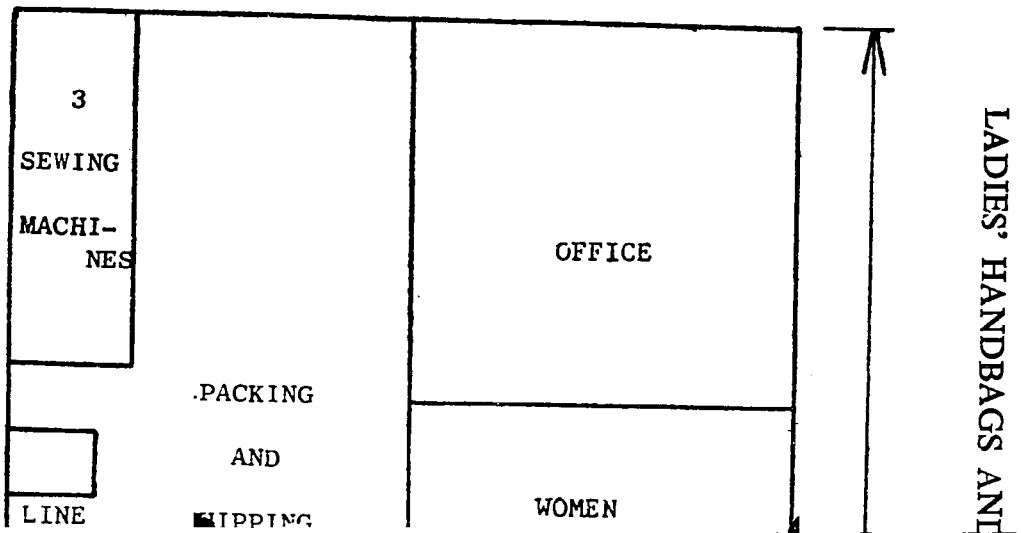
a. Annual Costs

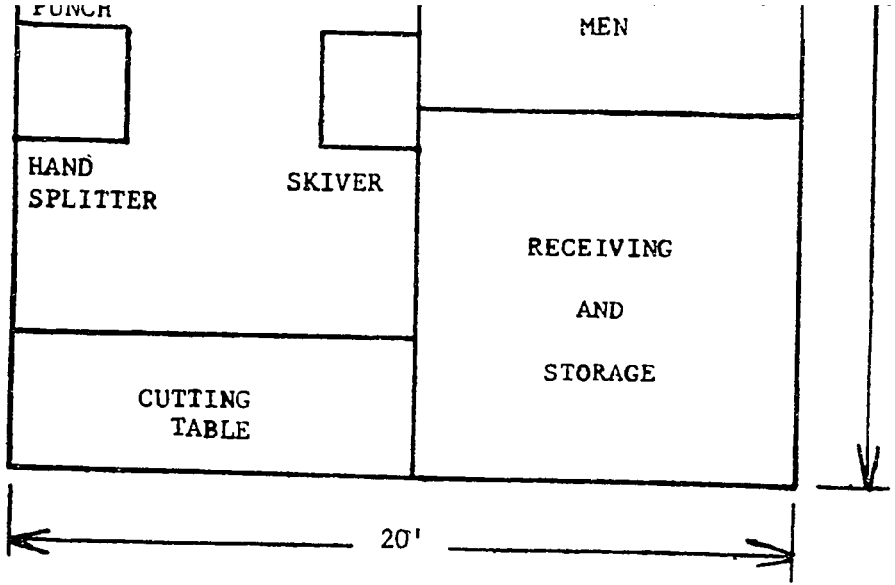
Direct Materials	$ 22,000
Direct Labor	18,000
Manufacturing Overhead(a)	9,100
Admin. Costs(b), Contingencies	1,300
Sales Costs(c), Bad Debts	3,500
Depreciation on Fixed Capital	500
Total	$ 54,400

b. Annual Sales Revenue $ 70,000

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

PLANT LAYOUT





ER SPECIALTIES; S.I.C. 3171/2

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LADIES' HANDBAGS AND LEATHER SPECIALTIES: S. I. C. 3171/2

SELECTED REFERENCES

I. TEXTBOOKS

A. Design and Construction of Handbags. W. C. Double. 1960. 238 p. Illus. $6.70.
Oxford Press
417 Fifth Avenue
New York 16, New York
Material, machinery, equipment, and manufacturing operations.

B. Leatherwork. F. J. Christopher. 1952. 111 p. Illus. $1.50.
Wehman Brothers
712 Broadway
New York 3, New York
Includes information on the making of leather handbags, glasses containe and similiar items.

II. PERIODICALS

A. Handbags and Accessories. Monthly. $3.00/year.
Haire Publishing Company
111 Fourth Avenue
New York 3, New York
Materials, manufacturing innovations, and products, and markets.

B. Luggage and Leather Goods. Monthly. $3.00/year.
Haire Publishing Company
111 Fourth Avenue
New York 3, New York
Production processes, products, raw material sources and costs, and merchandising outlets.

III. GOVERNMENT PUBLICATIONS. U.S.

A. Clasps for Handbags. IR-26929. May 1961. Gratis.
Office of Technical Cooperation and Research
Agency for International Development.
Washington, D. C. 20523
Describes processes for making clasps for ladies' handbags and attachin same thereto.

IV. OTHER PUBLICATIONS

A. Leatherwork Procedure and Designs. W. P. Klingensmith. 1957. 136 p. Illus. $3.50.
Bruce Publishing Company
400 North Broadway
Milwaukee 1, Wisconsin
Preparation of leather and its utilization in the making of leather handb and other such articles.

B. Leatherwork and Leathercraft Fundamentals. J. Fowler. 1954. 104 Illus. $1.75.
Leather specialties Shop
358, East Broadway
Long Beach 2, California
Instructions in the making of leather products.

SELECTED REFERENCES (Continued)

V. TECHNICAL PAPERS

A. Some Leather Materials and Products. Materials in Design Engineering. 1960. Vol. 52. p. 137-40 $.35.
Reinhold Publishing Corporation.
430 Park Avenue
New York 22, N. Y.
Describes leathers suitable for such items as handbags, and similar products, and their manufacture.

VI. U S. PATENTS

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

A. Patent No. 2,984,278. 1961. 3 p.
Making ladies' handbags.

B. Patent No. 2,858,870 1957. 6 p.
Method for producing leather wallets.

C. Patent No. 2,698,639 1955. 3 p.
Making a leather receptacle having key and article pockets.

VII. TRADE ASSOCIATIONS

A. National Authority for the Ladies Handbag Industry
347, Fifth Avenue
New York 16, N. Y.

B. Leatner Industries of America
411 Fifth Avenue
New York 16, N. Y.

VIII. ENGINEERING COMPANIES

A. Singer Sewing Machine Company
149 Broadway
New York, N. Y.
Designers of equipment used in the sewing and production of leather articles.

IX. DIRECTORIES

A. Women's Accessories - National. $15.00.
The Salesman's Guide
1182 Broadway
New York 1, N. Y.
Roster of all buyers of women's accessories including handbags and small leather goods.

LADIES' HANDBAGS AND LEATHER SPECIALITIES: S.I.C. 3171/2

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

GLASS CONTAINERS

I. P. No. 66075

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

GLASS CONTAINERS: Standard Industrial Classification 3221

A. PRODUCT DESCRIPTION

Molded glass bottles and containers of various sizes and shapes.

B. GENERAL EVALUATION

This industry requires a large amount of capital and a fair amount of skilled labor. However, since glass containers are articles of very common use and the cost of importing them is high, and, furthermore, since the basic materials needed to manufacture them are found in many places, several of the less developed areas have established or plan to establish modern glass container plants. The growing use of bottled beverages and medicinal and toilet preparations and establishment of industries requiring glass containers are increasingly providing the necessary markets and making establishment of glass container plants economically feasible.

C. MARKET ASPECTS

1. USERS. Beverage and foodstuffs bottlers, producers of medicines and toilet preparations, pharmacists, clinics, etc., chemical industry, households for home bottling and other uses.

2. SALES CHANNELS AND METHODS. Sales are made direct to industries; to drug supply houses, which sell to pharmacists, clinics, etc. ; to stores selling kitchen wares.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Though transport costs on glass containers are rather high in relation to their value, economies of large-scale manufacturing and advantage of locating plants near raw materials sources are so pronounced in this industry that glass containers are quite commonly sent long distances from plant to user. Even in the United States there are fewer than 100 producing establishments, and most of the plants are very large. In a country of moderate size and with a reasonably good transportation network the potential market may be nation-wide. b. Export. Glass containers are shipped all over the world by plants producing on a large scale.

4. COMPETITION. a. Domestic Market. Unless costs are abnormally high, plant should be able to compete effectively with imports. For some uses metal containers now compete strongly with glass containers. However, in developing areas glass containers may be preferred if they are produced locally, since metal containers, or the material for them, will often have to be imported. b. Export Market. Though the plant described could not compete with large-scale manufacturers in general world market, some sales to nearby areas of neighboring countries that do not have glass container manufacturing facilities might be feasible.

5. MARKET NEEDED FOR PLANT DESCRIBED. In the United States about $4 per capita is spent annually on glass containers, so that the plant described could, on the average, meet the needs of about a quarter of a million people. Demand in any particular market will depend on income level, climate, extent of industrial development, etc.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: 6,000 Tons

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land.		$ --
Building. 400'x60', Cost includes mixing tower. Fireproof.		250,000
Equipment, Furniture & Fixtures.		
Building equipmt.	$322,000	
Prodn. tools & equipmt.	482,000	
Other tools & equipmt.	2,000	
Furniture & fixtures	2,000	
Transport equipmt.	4,000	812,000
Total (excl. Land)		$1,062,000

Principal Items. Water storage tank, cooling tower, boiler, air compressors, vacuum pump, standby diesel generator, ejector type stock, glass melting tank, bottle forming machines & molds, transfer conveyors, lehr loader, lehrs, carton conveyor, lift truck, machine shop equipment, cullet crusher, tank & mold cooling fans, temperature controls & recorders, welding equipment, delivery truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials	90	$ 32,300
Direct Labor, Mfg. Overhead(a)	60	62,400
Admin. & Sales Costs(b), Contingencies,	30	16,300
Training Costs		27,000
Total Working Capital		$138,000

c. TOTAL CAPITAL (EXCL. LAND) $1,200,000

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirement	Annual Cost
Sand	3,500 tons	$ 28,000
Soda ash	1,190 tons	47,600
Limestone	980 tons	31,350
Feldspar	294 tons	11,750
Cullet	1,050 tons	10 500
Total	7,014 tons	$129,200

b. Supplies

Maintenance materials & parts	$ 6,400
Lubricants	200
Hand tools	125
Cutting tools	250
Welding rods	125
Office supplies	300
Total	$ 7,400

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 800 hp. A 350 kw. standby diesel power plant is included in equipment to keep essential plant operating in case of power failure.	$ 15,000
b. Fuel. About 450,000 gals. Bunker B oil & about 105,000 gals. diesel oil.	$ 32,000
c. Water. About 550 gals. a minute needed. Much of this is drained into cooling ponds & re-used Makeup water needed about 16 mn. gals. a year.	$ 4,000

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5-ton delivery truck.	$ 2,000

b. External Transport Facilities. Total in & out shipments about 1,000 tons a month. Plant should be located on rail siding and on good all-weather highway.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	8	$ 52,000
Semi-skilled	14	70,000
Unskilled	21	84,000
Total	43	$ 206,000
b. Indirect Labor		
Manager & supervisors	6	$ 52,000
Office	5	20,000
Other	7	35,000
Total	18	$ 107,000

c. Training Needs. Melting operations automatic but need at least 5 skilled men. Glass forming operations semi-automatic but need at least 3 skilled men. Manager, supervisors & chemist should be fully experienced in glass industry & able to train all employees. At least 5 skilled operators should assist in training. Full production in about 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

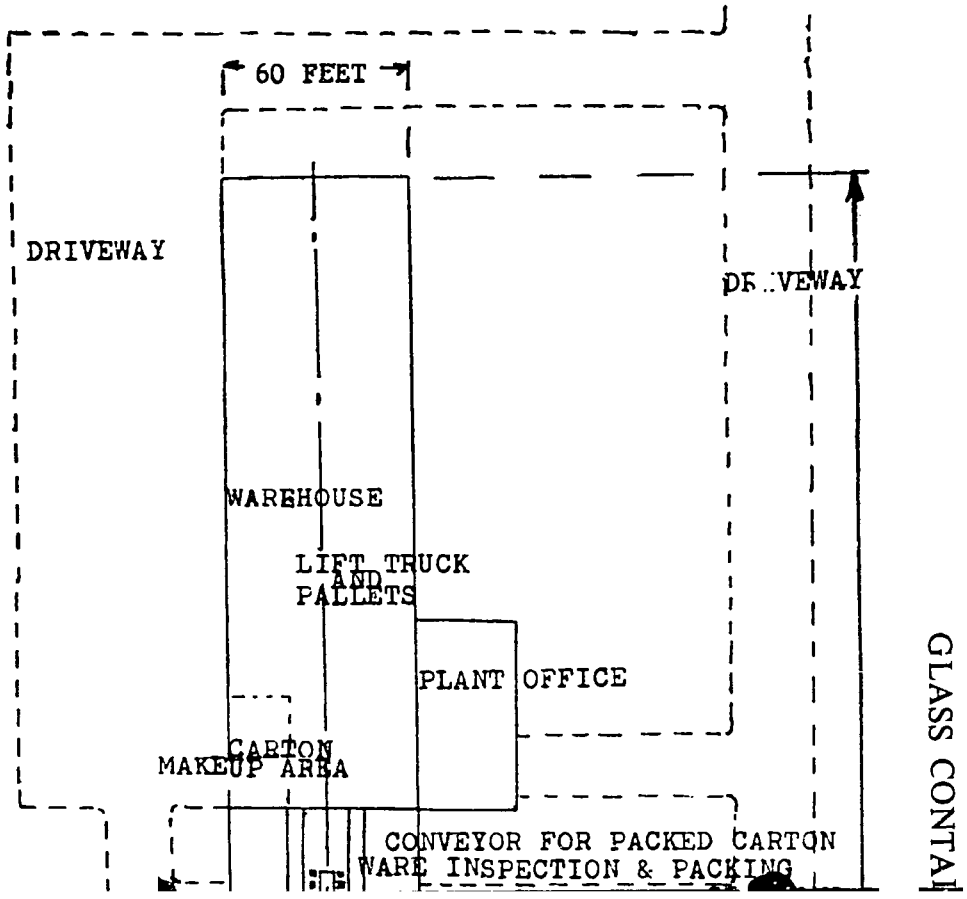
a. Annual Costs

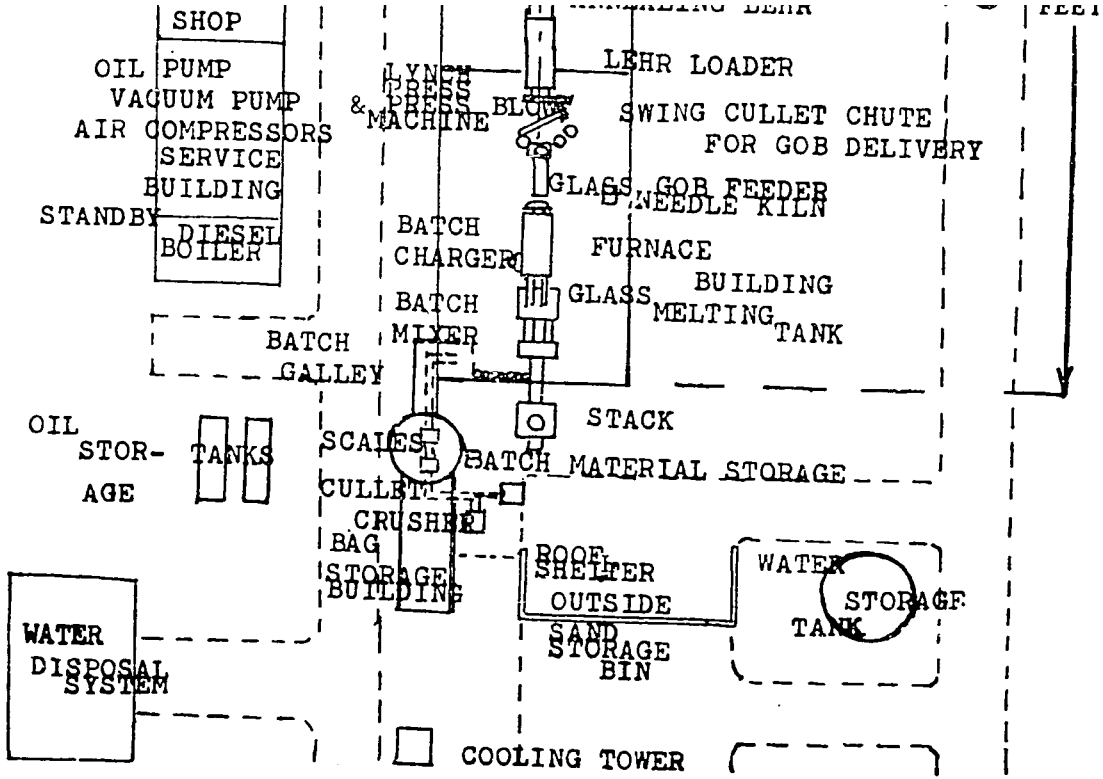
Direct Materials	$ 129,200
Direct Labor	206,000
Manufacturing Overhead(a)	167,400
Admin. & Sales Costs(b), Bad Debts, Contingencies	196,000
Depreciation on Fixed Capital	90,000
Total	$ 788,600

b. Annual Sales Revenue $1,140,000

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

PLANT LAYOUT





I.C. 3221

PRODUCTION FLOW IS CONTINUOUS FROM THE BATCH MIXING TO THE PACKAGING OF THE FINISHED PRODUCT.

GLASS CONTAINERS: S. I. C. 3221

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TEXTBOOKS

A. The Properties of Glass. 2nd Edition. Geogre W. Morey. 1954.
600 p. Illus. $16.50.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, N. Y.
Presents a broad coverage of his history, composition, qualities, physical characteristics, and electrical properties of glass.

B. Handbook of Glass Manufacture. Edited by Fay V. Tooley.
Two Vols.-Vol. I $15.00. Vol. II $10.00.
Ogden Publishing Company
55 West 42nd Street
New York 36, N. Y.
Composition, properties of glass, raw materials and complete manufacturing operations.

II. PERIODICALS

A. Glass Industry. Monthly. $5.00/year
Ogden Publishing Company
55 West 42nd Street
New York 36, N. Y.
Articles relative to manufacturing process and information pertinent thereto.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Glass Manufacture IR-21980. May 1959. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523

IV. OTHER PUBLICATION

A. Glass Engineering Handbook. E. B. Shand, 1959. $12.50.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N. Y.
Describes the processes of glass manufacture, composition, chemical and physical properties, and methods of testing glass.

V. TECHNICAL PAPERS

A. Crystalite: The New Refractory. Bulletin CR-11. 1953. Gratis.
Richard C. Remmey Son Company
Philadelphia 37, Pennsylvania
Discusses the use of synthetic mullite for glass furnaces.

SELECTED REFERENCES (Continued)

VI. U. S. PATENTS

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

A. Patent No. 2,905,987. 1959. 3 p.
Glass molding machine.

B. Patent No. 2,893,542. 1959. 4 p.
Glass working machine for containers.

C. Patent No. 2,662,346. 1953. 13 p.
Method and apparatus for forming glass.

D. Patent No. 2,576,191. 1951. 18 p.
Glass molding machine.

VII. TRADE ASSOCIATIONS

A. National Association of Manufacturers of Pressed and Blown Glassware
818 Empire Building
Pittsburgh 22, Pennsylvania

B. American Glassware Association
630 Third Avenue
New York 17, N. Y.

VIII. ENGINEERING COMPANIES

A. Frazier-Simplex, Inc.
P. O. Box 493
436 East Beau Street
Washington, Pennsylvania
Engineers to the glass and steel industries. Design and install complete glass plants.

B. National Engineering Company
610 Machinery Hall Building
Chicago, Illinois
Mixing machinery and mulling equipment.

IX. DIRECTORIES

A. Glass Factory Directory. Annual. $3.00.
National Glass Budget
916 Empire Building
Pittsburgh 22, Pennsylvania
List of approximately 400 glass manufacturers in the United States and Canada, including their main products.

GLASS CONTAINERS. S.I.C. 3221

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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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

BEVERAGE BOXES

I. P. No. 66076

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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.

-21

BEVERAGE BOXES Standard Industrial Classification 2441

A. PRODUCT DESCRIPTION

Nailed, unsanded wooden boxes partitioned to hold two dozen bottles in separate compartments. Variations from this standard type are possible, according to demand.

B. GENERAL EVALUATION

Consumption of bottled drinks is rising and modern bottling plants continue to be set up in many areas, often by large corporations selling soft drinks. Demand for beverage boxes will depend on how far this development has proceeded. A potential investor in this industry should consult bottlers in order to see whether he can meet their requirements for beverage boxes better than they are being currently met and should attempt to obtain from them agreement to use his plant as source of supply. Capital requirements for this industry are moderate and not much skilled labor is required, and in these respects industry should be within the capacity of many developing areas.

C. MARKET ASPECTS

1. USERS. Beverage bottlers.

2. SALES CHANNELS AND METHODS. Sales direct to beverage bottlers. Manufacture will usually enter into contracts with large bottlers.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Usually plant will make only for local bottlers, since transport costs are generally too high for long-distance shipping. b. Export. This product is occasionally exported to nearby foreign areas where it is not made at least in sufficient quantity, but bottlers normally prefer to obtain supplies locally. Sometimes newly-established plant will obtain initial stock abroad and then obtain replacements and additions from local manufacturers.

4. COMPETITION. a. Domestic Market. Mechanized plant should have distinct advantage over small producers for fairly well standardized product such as this, even in low-wage areas. Competition from imports is normally unimportant. b. Export Market. Normally unimportant.

5. MARKET NEEDED FOR PLANT DESCRIBED. Product is fairly durable. Demand estimates must be based on replacement rate of expansion of bottling industry. These figures should not be difficult to obtain from local bottlers. Demand will depend on extent to which consumption of bottled drinks is met by local producers, on climate, degree of urban concentration making it possible to supply bottled drinks at low price, level of income. Assuming that local bottlers supply substantially all requirements for bottled drinks, that climate is warm, that there are large urban concentrations where income level is high enough to permit majority to afford at least occasional purchases of bottled drinks, plant described might meet need for replacements and additions of beverage boxes of bottlers catering to a total population of the order of 4 million people. Because of the many factors influencing demand for bottled drinks, however, demand for beverage boxes in particular cases may vary greatly from this estimate.

D. PRODUCTION REQUIREMENTS

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

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. 2 acres, including lumber-yard.		$ --
Building. One story, 50'x80'.		24,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$57,400	
Other tools & equipmt.	500	
Furniture & fixtures	700	58,600
Total (excl. Land)		$ 82,600

Principal Items. Resaw, planer, cutoff saw, hand hole machine groover with fluting attachment, notcher, printing machine strapping machine, conveyors, factory trucks, fork-lift trucks.

b. WORKING CAPITAL

	No. of Days	
Direct Materials Direct Labor, Overhead(a)	60	$ 21,400
Admin. & Sales Costs(b), Contingencies	30	1,000
Training Costs		6,600
Total Working Capital		$ 29,000

c. TOTAL CAPITAL (EXCL. LAND) $111,600

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Lumber	381,000 bd. ft	$ 32,400
Strapping		10,000
Nails		4,000
Total		$ 46,400

b. Supplies

Maintenance & spare parts	$ 2,000
Lubricants & hand tools	200
Printing plates	300
Cutting tools	200
Office supplies	200
Total	$ 2,900

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 50 hp.	$ 1,000
b. Fuel. Scrap lumber.	
c. Water. Sanitation and fire protection.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. Large part of outward shipments will be picked up by purchasers. Balance will be shipped by truck and rail. Good highway necessary.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	4	$ 20,000
Semi-skilled	4	16,000
Unskilled	8	24,000
Total	16	$ 60,000
b. Indirect Labor		
Manager	1	$ 8,000
Office	1	4,000
Other	2	6,000
Total	4	$ 18,000

c. Training Needs. Manager should be fully experienced. With 3 skilled workers he should be able to train all workers. Plant should reach full production in 3 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

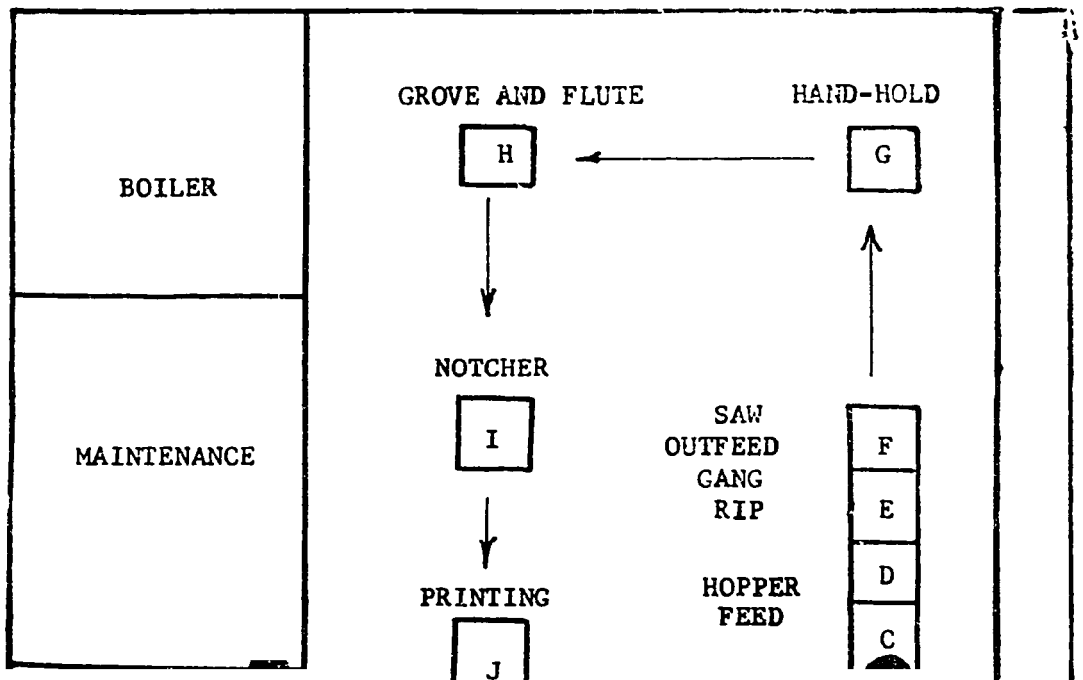
a. Annual Costs

Direct Materials	$ 46,400
Direct Labor	60,000
Manufacturing Overhead(a)	22,000
Admin. & Sales Costs(b), Bad Debts, Contingencies	12,500
Depreciation on Fixed Capital	7,100
Total	$148,000

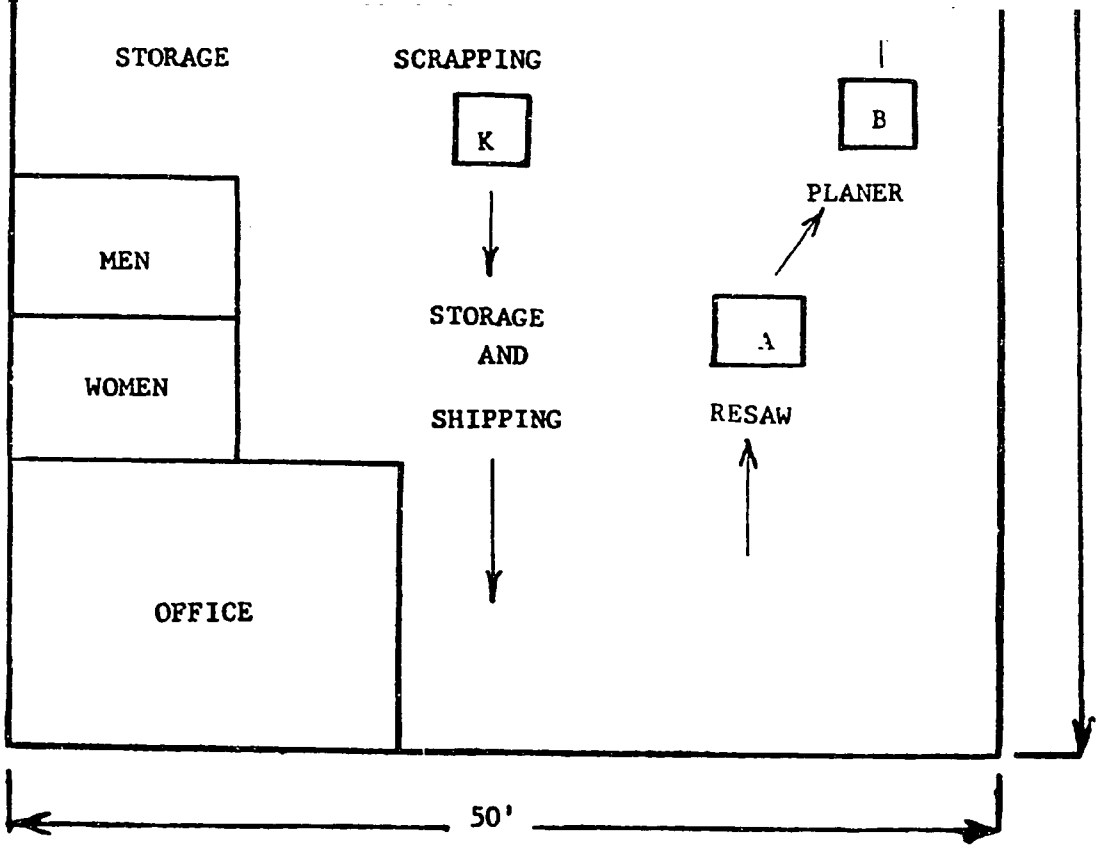
b. Annual Sales Revenue $185,000

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

PLANT LAYOUT
ARROWS INDICATE WORK FLOW



BEVERA


STORAGE
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AND
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A
RESAW
OFFICE
50'

XES : S.I.C. 2441

BEVERAGE BOXES: S. I. C. 2441

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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 36, N. Y.
Hand tool processes, machine tool processes, portable tool processes, finishing, upholstering, related information.

B. Fasteners Handbook. Julius Soled. 1957. 438 p. Illus. $12.50.
Reinhold Publishing Co.
430 Park Avenue
New York 22, N. Y.
Comprehensive presentation of standard and proprietary fasteners, their uses and supply sources.

II. TECHNICAL PAPERS

A. Cutting Techniques for Woodworkers. Thomas D. Perry. 1955.
53 p. $50. Technical Series Reprint No. 107.
Hitchcock Publishing Company
Wheaton, Illinois
Descriptions of cutting techniques in woodworking and the tools used therein.

III. PERIODICALS

A. Woodworking. Monthly. $4.00/year.
Hitchcock Publishing Company
Wheaton, Illinois
A leading U. S. publication in the woodworking field, covering all phases of the subject.

B. Wooden Box and Crate. Quarterly. $1.60/year.
National Wooden Box Association
1619 Mass. Ave., N. W.,
Washington, D. C. 20036
Promotion, industry news, uses of wooden containers.

IV. U. S. PATENTS

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

A. Patent No. 2,865,526. Dec. 23, 1959. 4 p.
Improvements in all types of wood boxes such as those widely used in the soft drink trade for delivering such merchandise in bottles to the retailer.

B. Patent No. 2,588,824. March 11, 1952, 5 p.
Improvements in the construction of portable boxes and cases of the type which are provided with an interior partition structure that defines individual cell or compartments for bottles, and the like, containing beverages or other packaged goods.

V. TRADE ASSOCIATIONS

A. National Wooden Box Association
1619 Massachusetts Avenue, N. W.,
Washington, D. C. 20036
Supplies members with industry news on promotion, uses of wooden containers, markets.

VI. ENGINEERING COMPANIES

A. Forest Products Engineering Company
431 South Dearborn Street
Chicago, Illinois
Consulting service to lumber producing and consuming industries.

VII. DIRECTORIES

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

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
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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

BLOCK ICE

I. P. No. 66077

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BLOCK ICE: Standard Industrial Classification 2097

A. PRODUCT DESCRIPTION

Ice sold in blocks.

B. GENERAL EVALUATION

Capital requirements are modest. Some fairly skilled labor is needed. A special requirement is a good supply of pure water. Assuming production needs can be met, question for consideration is whether there is large enough market for production of plant described within area that can be covered by regular truck deliveries. In considering desirability of investing in this industry, account should be taken of the fact that while, on the one hand, demand for ice tends to rise with improvement in living standards, the demand is increasingly met by user-owned, small electric refrigeration units. In the United States generally making block ice for sale (but not the making of ice cubes and crushed ice) is a declining industry, though this will, of course, not necessarily be the case in all areas.

C. MARKET ASPECTS

Sales are made to industries, commerial establishments and households. Deliveries are made by truck, and the market will be limited to the area within which regular truck deliveries are feasible. Demand for block ice is influenced by such factors as income levels, climate, and kind of food usually consumed. However, an ice plant of the capacity described would generally be able to find a market in an urban area with a population of the order of half a million.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION : 1,825 Tons

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 1 acre.		$ --
Building. One story, 33'x75',		15,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$25,000	
Other tools & equipmt.	3,800	
Furniture & fixtures	700	
Transportation equipmt.	4,000	33,500
Total (excl. Land)		$ 48,500

Principal Items. Compression side, freezing system, air system, water circulating, equipment, storage room piping, boiler, 5-ton truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 4,900
Admin. Costs(b), Contingencies, Sales Costs(c)	30	350
Training Costs		450
Total Working Capital		$ 5,700

c. TOTAL CAPITAL (EXCL. LAND) $ 54,200

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements.	Annual Cost
Ammonia	500 pounds	$ 150
Salt	10 tons	50
Total		$ 200

b. Supplies

Lubricants & hand tools	$ 100
Maintenance & repair parts	400
Office supplies	200
Total	$ 700

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load 10 hp.	$ 500
b. Fuel. Heating only.	$ 300
c. Water. Good supply of pure water is needed. About 2.7 mn. gals. annually.	$ 700

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5-ton truck for deliveries.	$ 1,000

b. External Transport Facilities. Total in & out shipments about 160 tons a month. Plant should be located on good highway.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	3	$ 15,000
b. Indirect Labor		
Manager - buying, selling and office	1	$ 7,000
Truck driver	1	4,000
Total	2	$ 11,000

d. Training Needs. Manager must be fully experienced. With 1 skilled worker, he should be able to do all labor training. Plant should reach full production in 2 weeks.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

Direct Materials	$ 200
Direct Labor	15,000
Manufacturing Overhead(a)	14,200
Admin. Costs (b), Contingencies	2,600
Sales Costs (c), Bad Debts	1,400
Depreciation on Fixed Capital	5,300
Total	$ 38,700

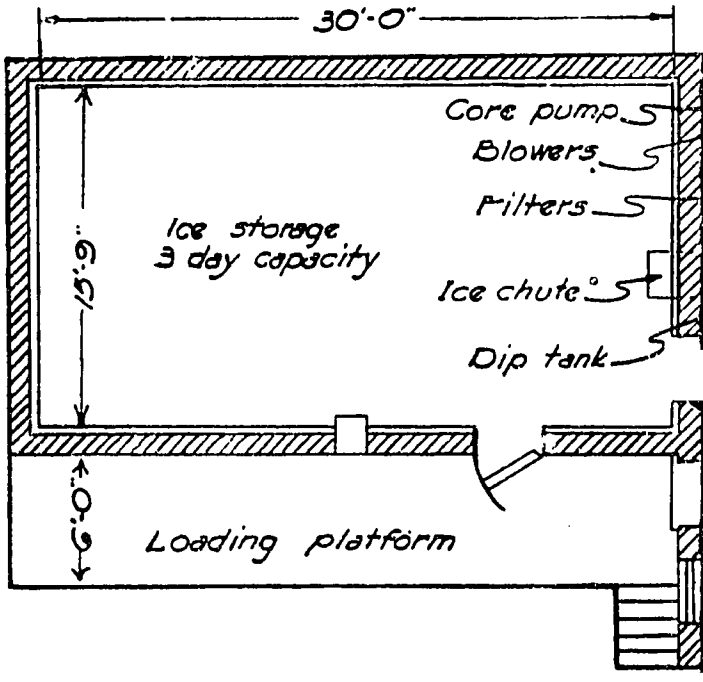
b. Annual Sales Revenue $ 50,000

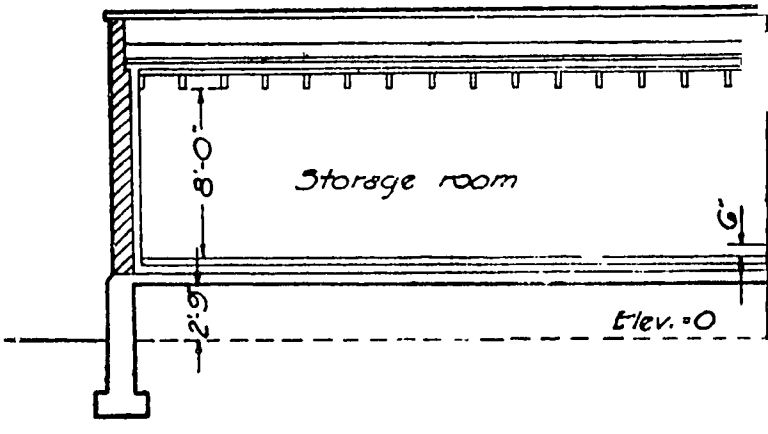
NOTES: (a) Includes Supplies, Power, Fuel, Water Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Travel.

BLOCK ICE: S.I.C. 2097

BLOCK

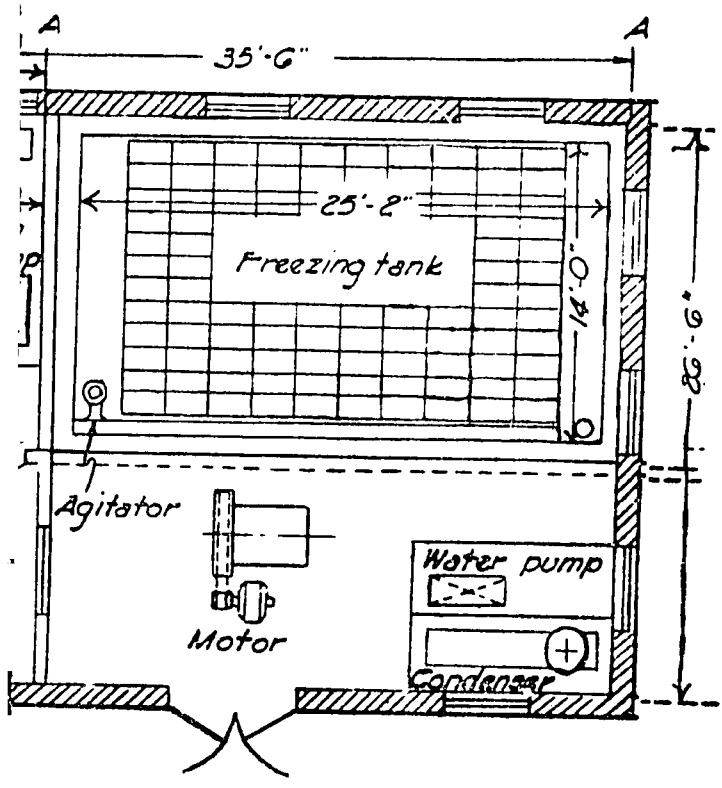
PLANT LAY

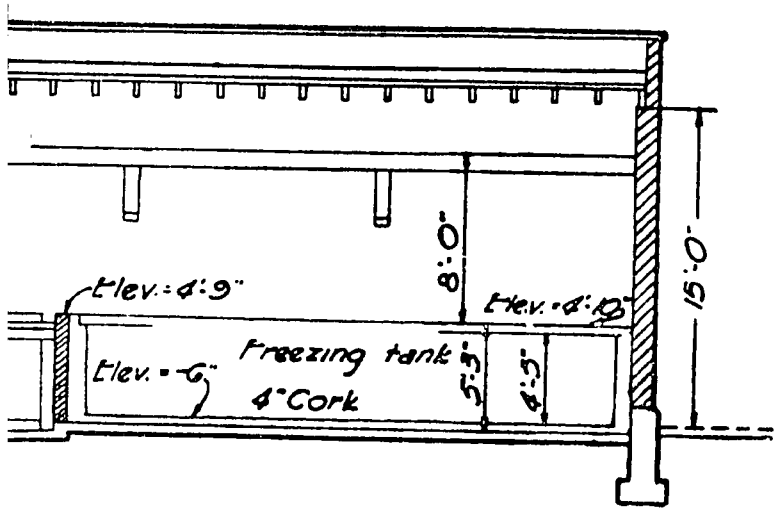




I.C. 2097

WORKFLOW





BLOCK ICE: S.I.C. 2097

SELECTED REFERENCES

I. TEXTBOOKS

A. Basic Refrigeration. G. R. King. 1951. 526 p. Illus. $6.00.
Nickerson and Collins Company
433-435 North Waller Avenue
Chicago 44, Illinois
Properties, processes, and elements of refrigeration systems.

B. Refrigeration Engineering. H. J. Macintire and F. W. Hutchinson. 1950. 610 p. Illus. $10.50.
John Wiley and Sons, Inc.
440 Fourth Avenue
New York 16, N. Y.
Refrigeration equipment, machines and household and commercial manufacture of ice.

C. Modern Manufacturing Processes. J. L. Morris. 1955. 533 p. Illus. $7.00.
Prentice-Hall, Inc.
Route 9W
Englewood Cliffs, New Jersey
Equipment, materials, methods in the production of various commercial items.

D. Production Control. F. G. Moore. 2nd edition. 1959. Illus. $8.95.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N. Y.
Production control: types, initiation of, flow charts.

II. GOVRENMENT PUBLICATIONS, U. S.

A. Refrigerators and Refrigeration Equipment. $.10.
Office of Technical Services
U. S. Department of Commerce
Washington, D. C. 20230

III. PERIODICALS

A. Refrigeration Engineering. Monthly. $5/year.
American Society of Heating, Refrigeration and Air Conditioning Engineers
234 Fifth Avenue
New York, N. Y.
Latest developments in equipment, manufacturing, and marketing of interest to the refrigeration industry.

B. Industrial Refrigeration. Monthly. $2/year.
Nickerson and Collins Company
433-435 North Waller Avenue
Chicago 44, Illinois
Most recent advances in fields of refrigeration and ice making.

IV. U. S. PATENTS

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

A. Patent No. 2,942,430. 1960. 12 p.
Methods and devices for freezing large solid blocks of ice, and other related items.

B. Patent No. 2,800,456. 1957. 5 p.
Process for making ice.

V. TRADE ASSOCIATIONS

A. National Ice Association
1901 Pennsylvania Avenue, N. W.,
Washington, D. C. 20006

B. Commercial Refrigerator Manufacturers Association
111 West Washington Street
Chicago 2, Illinois

VI. ENGINEERING COMPANIES

A. Rust Engineering Company
930 Fort Duquesne Boulevard
Pittsburgh, Pennsylvania
Design, engineer, and provide construction management for ice-making and related refrigerating facilities.

VII. DIRECTORIES

A. Air Conditioning and Refrigerating Data Book. $10.00.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N. Y.

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INDUSTRY PROFILES

BOXES AND SHOOKS

I. P. No. 66078

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221

BOXES AND SHOOKS. Standard Industrial Classification 2441

A. PRODUCT DESCRIPTION

Unsanded nailed wooden boxes, of any required design or size, and shooks, i. e. knocked-down boxes, ready for assembling and nailing. Boxes are usually ordered in the form of shooks if they are to be shipped far. If sanded boxes are required, it is necessary to purchase sanding equipment in addition to equipment listed below.

B. GENERAL EVALUATION

Capital and skilled labor requirements are moderate. An experienced manager, superintendent and machine-setter are needed, but many operations are automatic and can be performed by unskilled workers. It is advantageous to have locally produced lumber, but use of imported lumber is not ruled out. If lumber needs to be imported, the relative cost of importing lumber and making boxes or shooks locally as against importing shooks should be investigated. Since boxes are usually made to particular specifications, buyers will, other things being equal, prefer to deal with local manufacturers, as they can more readily assure that their individual needs are met and deliveries made as and when required. Where industrial and trading activity provides a large enough market for a mechanized plant of the type described, this industry appears suited to the conditions of many developing areas.

C. MARKET ASPECTS

1. USERS. Wooden boxes are used for packing many industrial products, e.g. household articles (china, glass, enamel, aluminum, etc.), toys, hardware, machine parts, small machines, soft goods for long distance shipment, etc. Overseas shippers are particularly large users.
2. SALES CHANNELS AND METHODS. Sales to user industries and delivery and storage concerns.
3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Box factories are normally located in industrial centers as near as possible to their principal customers. Boxes are commonly made to order, and customers generally prefer nearby supplier. Transport costs are high in relation to value, and boxes of this type are rarely shipped far, except in the form of shooks. b. Export. Since wooden boxes of this type are standardized to only a limited extent and since freight costs on them are high, even in form of shooks, they are not a major export item. If a country needs a substantial number of wooden boxes but lacks domestic supplies of lumber it is generally more convenient and about as economical to import lumber and make boxes locally. Exports to neighboring countries may in some cases be feasible.
4. COMPETITION. a. Domestic Market. Since boxes are simple to make, in outlying areas where demand is unlikely in any case to be great, it will often be cheaper and more convenient to have them made locally by small establishments than buy from a distant factory and pay transport costs. For some purposes cartons are now made that are effective substitutes for wooden boxes. In low-income areas, buyers of merchandise often like to receive goods in wooden boxes because they can be re-used. Competition from imports is not generally important. b. Export Market. Since exports are limited by factors mentioned in 3 (b) above, they are usually possible only to nearby areas. In favorable circumstances plant described might be able to export some shooks to neighboring countries.
5. MARKET NEEDED FOR PLANT DESCRIBED. Capacity of plant is measured in terms of boxes and shooks with inside dimensions 12"x14"x24". In fact, however, most of plant's production will be made to customers' specifications, and actual number of units produced will, of course, vary with demand Since demand for these products comes almost entirely from industries, outlet for production of this plant will exist only within area where it can supply users more cheaply and/or give better service than other sources. In U. S. a comparatively small city, with population of perhaps a quarter of a million, might well have an industrial complex large and varied enough to absorb output of this plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 100,000 each of boxes and Shooks

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. 3 acres, including lumber-yard.		$ --
Building. One story, 60'x100',		36,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$ 58,400	
Other tools & equipmt.	1,000	
Furniture & fixtures	700	
Transportation equipmt.	2,400	62,500
Total (excl. Land)		$ 98,500

Principal Items. Resaw, planer, cutoff saw, transfer hopper feed, gang rip saw, outfeed sorting table, matcher with glue spreader, squeezer, chain feed printer, factory trucks, conveyors, fork-lift truck, 1-ton pickup truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 42,800
Admin. & Sales Costs(b), Contingencies,	30	1,800
Training Costs		8,400
Total Working Capital		$ 53,000

c. TOTAL CAPITAL (EXCL. LAND) $151,500

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Lumber	1,525,000 bd. ft.	$120,600
Glue		1,000
Nails & corrugated fasteners		8,400
Total		$130,000

b. Supplies

Maintenance & repair parts	$ 2,000
Lubricants & hand tools	200
Printing plates	500
Cutting tools	400
Office supplies	200
Total	$ 3,300

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 172 hp. Peak demand about 140 hp.	$ 1,400
b. Fuel. Waste wood & sawdust can be used.	
c. Water. For general purposes.	$ 100

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 1-ton truck for local deliveries & pickup-up.	$ 800
b. External Transport Facilities. No special requirements.	

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	3	$ 15,000
Semi-skilled	3	12,000
Unskilled	23	69,000
Total	29	$ 96,000
b. Indirect Labor		
Manager	1	$ 8,000
Office	2	8,000
Other	3	9,000
Total	6	$ 25,000

c. Training Needs. Many of operations are automatic. Set-up man sets most of machinery and operators feed or remove most of stock. Manager, factory superintendent and machine setter-foreman should be fully experienced and able to train other workers. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

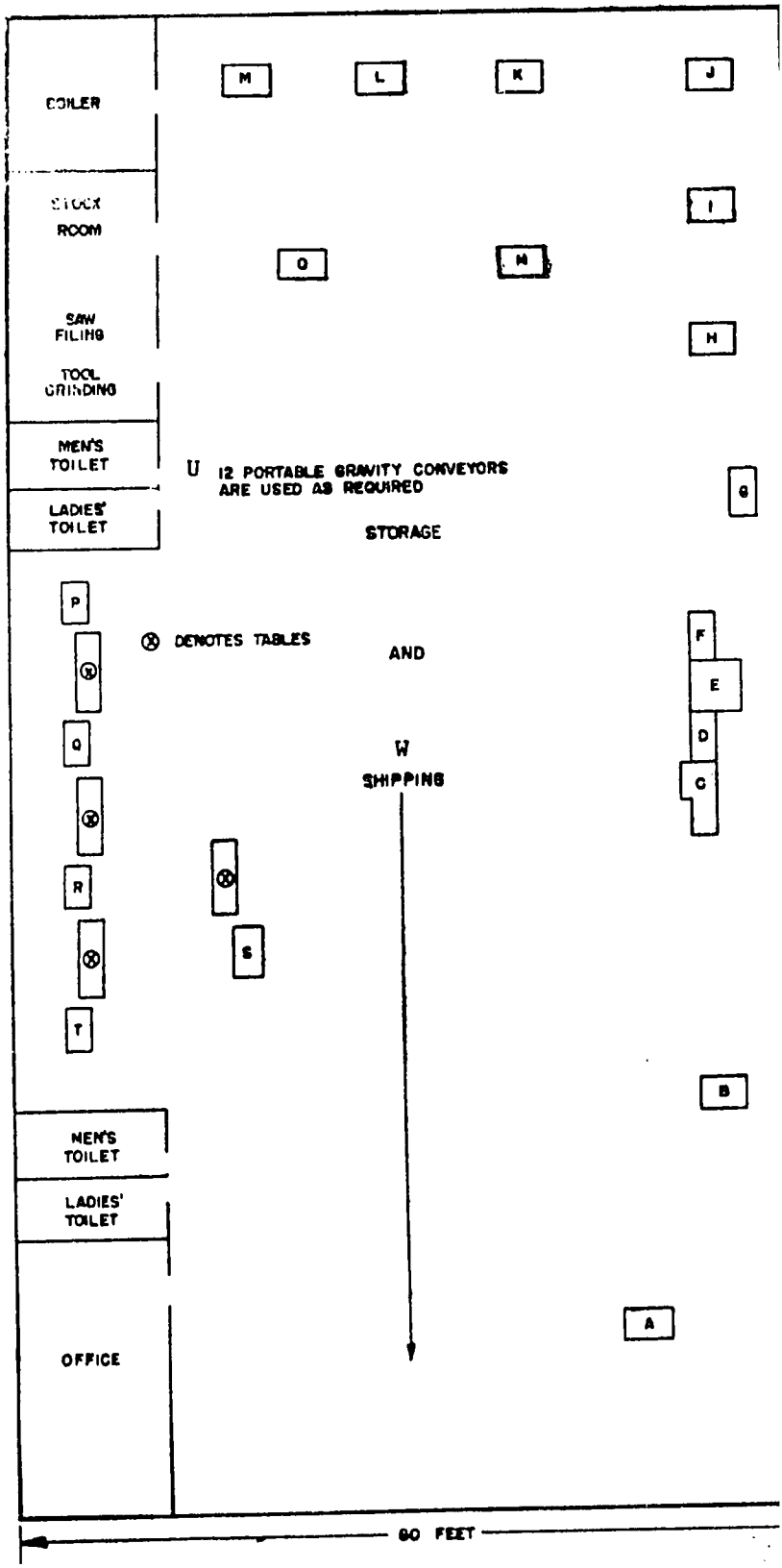
a. Annual Costs

Direct Materials	$130,000
Direct Labor	96,000
Manufacturing Overhead(a)	30,600
Admin. & Sales Costs(b), Bad Debts Co. tingencies	21,000
Depreciation on Fixed Capital	8,500
Total	$286,100

b. Annual Sales Revenue $350,000

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

BOXES AND SHOOKS : S.I.C. 2441



WORK FLOW

A. 54-inch Resaw (single band)

B. Double surface planer

C. Automatic Cutoff Saw

D. 72-inch Transfer Hopper Feed

E. 12-inch Gang Rip Saw, with Center roll and 3 saw sleeves

F. Saw Outfeed and Sorting Table driven from Rip Saw
Note : Items C, D, E and F comprise one unit

G. 2-Head Corrugated Fastener Driver, Foot Controlled

H. Hand Hole Machine with Equalizer. Jump Dado and Sanitary Attachments

I. Groover with Fluting Attachment

J. Notcher

K. Matcher with Glue Spreader for Tongue and Groove Joints, or other Finished Edges

L. 32-inch by 48-inch Squeezer

M. 2-Color Chain Feed Printer

N. 10-Track Open Back Cleater with Clincher, Foot Controlled

O. 8-Track Closed Back Cleater with Clincher, Foot Controlled

P. 6-Track Closed Back Nailer, Foot Controlled

Q. 8-Track Closed Back Nailer, Foot Controlled

R. 10-Track Closed Back Nailer Foot Controlled

S. Bottle Box Strapping Machine, Foot Controlled

T. 10-Track Closed Back Internittant Nailer

U. 10-Ten Foot Portable Gravity Conveyors

V. O table for assembling before nailing

W. Storage and shipping space

BOXES AND SHOOKS: S. I. C. 2441

SELECTED REFERENCES

I. TEXTBOOKS

A. A Guide to Good Construction of Nailed Wooden Boxes. 22 p. Gratis.
Freight Loading and Container Section
Association of American Railroads
59 East Van Buren Street
Chicago 5, Illinois
Basic construction designs.

B. General Shop Woodworking. 4th edition. V. C. Fryklunk and A. J. Laberge. 1964. $4.80.
McKnight and McKnight Publishing Co.
Market and Center Streets
Bloomington, Illinois
Woodwork shop practices.

C. Cutting Techniques for Woodworkers. Thomas D. Perry. 1955. 53 p. $.50. Technical Series Reprint No. 107.
Hitchcock Publishing Company
Wheaton, Illinois
Descriptions of cutting techniques in woodworking and the tools used therein.

II. PERIODICALS

A. Woodworking. Monthly. $4.00/year,
Hitchcock Publishing Company.
Wheaton, Illinois
A leading U. S. woodworking publication covering all phases of the subject, including fasteners and finishing.

B. The Wood-Worker. Monthly. $3.00/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.

III. U.S. PATENTS

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

A. Patent No. 2,865,526. Dec. 23, 1958. 4 p,
Improvements in all types of wood boxes.

B. Patent No. 2,743,835. May 1, 1956. 5 p.
This invention relates to an improved knock-down crate, the construction being such that the assembled crate presents a smooth unbroken interior surface.

C. Patent No. 2,493,701. Jan 3, 1950. 4 p.
Improvements in a box or crate composed of prefabricated wall members applicable to wooden boxes of the solid wall type or to crates of the slatted wall type.

IV. TRADE ASSOCIATIONS

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23

INDUSTRY PROFILES

COARSE WRAPPING PAPER (6,000 TONS ANNUALLY)

I. P. No. 66079

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COARSE WRAPPING PAPER (6,000 Tons Annually): Standard Industrial Classification 2621

A. PRODUCT DESCRIPTION

Coarse wrapping paper in various widths and sizes, weight 30 pounds per 500 sheets 24"x36".

B. GENERAL EVALUATION

Generally it will be advisable to establish a plant of this kind only where there is a local supply of pulpwood, or other suitable raw material, such as bagasse or straw. Also, it is essential to have an ample and regular supply of clean water. If such conditions exist, this industry has the advantages for a developing area that manufacturing operations are comparatively simple, and the product is one for which demand is likely to rise sharply with increasing prosperity. (For a larger plant see Industry Profile, Coarse Wrapping Paper (12,500 Tons Annually): S.I.C. 2621).

C. MARKET ASPECTS

1. USERS. Wholesale and retail stores and a wide range of indus ies.

2. SALES CHANNELS AND METHODS. Sales generally to wholesalers but also direct to large users.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is easy to handle and transport costs fairly low in relation to value. Potential market may be nation-wide. b. Export. Market world-wide.

4. COMPETITION. a. Domestic Market. Competition from imports. b. Export Market. Keen competition in world markets. Plant of size describe would stand little chance of developing an export market, except possibly in easily accessible areas in adjacent countries.

5. MARKET NEEDED FOR PLANT DESCRIBED. In U. S. per capita consumption (highest of any country) is about 50 pounds annually, so productio of plant described would supply a quarter of a million people. However, this ratio cannot be applied to low-income areas, in which demand is very elastic an wrapping paper is frequently dispensed with altogether, or some substitute used Variance of conditions prevents general estimates of population needed to provi market for this plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: 6,000 Tons

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 3 acres.		$ --
Building. One story, 60'x150'.		54,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$875,000	
Other tools & equipmt.	13,000	
Furniture & fixtures	1,000	
Transport equipmt.	4,000	893,000
Total (excl. Land)		$947,000

Principal Items. Wood shavers, hammermill & screen, screw press, digester pulp refiner, pulp screen, pulp washer thickener, consistency regulator, chemical meter, fourdrinier press, dryer, calender stack, reel winder & slitter, pumps, valves, piping, starters, delivery truck.

. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 80,700
Admin. & Sales Costs(b), Contingencies	30	9,200
Training Costs		18,100
Total Working Capital		$108,000

TOTAL CAPITAL (EXCL. LAND) $1,055,000

MATERIALS AND SUPPLIES

	Annual Cost
Direct Materials	
Pulp wood	$132,000
Caustic soda, cornstarch, rosin, alum	168,000
Steel strapping	300
Total	$300,300
Supplies	
Lubricants	$ 300
Welding rods & gas	200
Maintenance materials & spare parts	8,000
Hand tools	200
Office supplies	200
Total	$ 8,900

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 500 hp.	$ 15,000
b. Fuel.	$ 24,000
c. Water. About 2,000 gals. are used per minute, but much is returned and re-used. Some water also needed for general purposes. Water supply and waste disposal are of major importance in selection of plant site.	$ 3,000

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5-ton delivery truck.	$ 1,000

b. External Transport Facilities. Combined in & out shipments about 1,000 tons a month. Plant should be located on good all-weather highway and, if possible, near railroad.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	9	$ 45,000
Semi-skilled	9	36,000
Unskilled	6	18,000
Total	24	$ 99,000
b. Indirect Labor		
Manager & foreman	2	$ 17,000
Office	1	4,000
Other	3	12,000
Total	6	$ 33,000

c. Training Needs. Manager & foreman should be fully experienced. With 9 skilled workers, they should be able to train all workers & reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

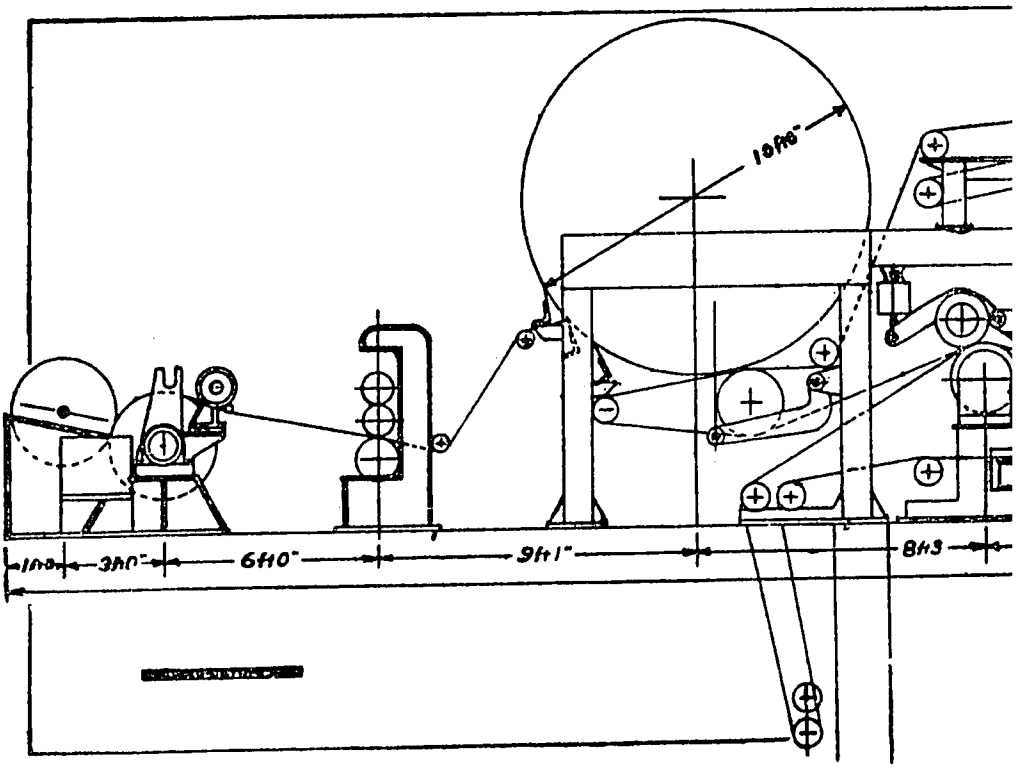
a. Annual Costs	
Direct Materials	$300,300
Direct Labor	99,000
Manufacturing Overhead(a)	84,900
Admin. & Sales Costs(b), Bad Debts, Contingencies	110,000
Depreciation on Fixed Capital	93,900
Total	$688,100
b. Annual Sales Revenue	$800,000

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

COARSE WRAPPING PAPER (6,000 Tons Annually): S.I.C. 2621

COARSE WRAPPING PAPER

PLAN



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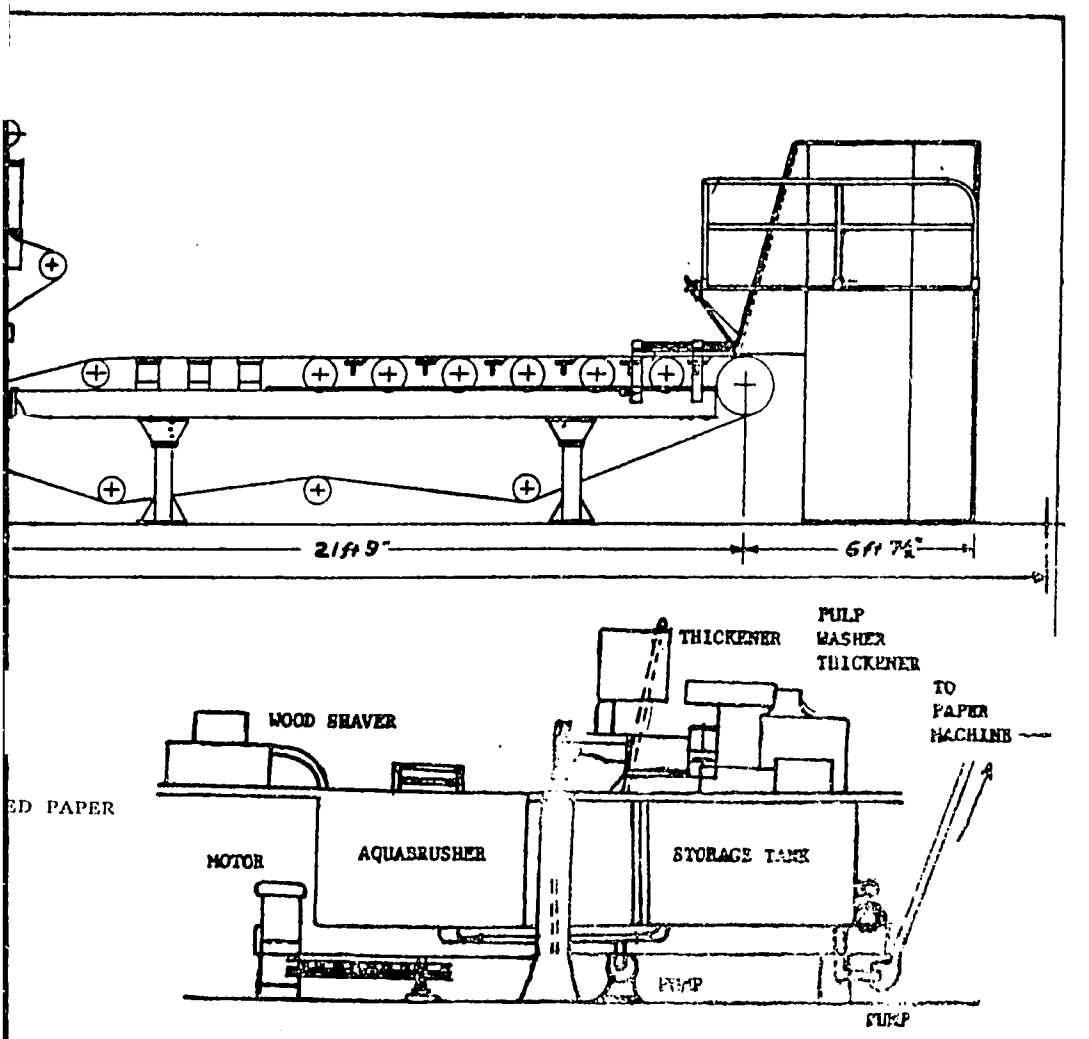
DNS ANNUALLY) : S.I.C. 2621



COARSE WRAPPING PAPER (6,000 TONS ANNUALLY): S.I.C. 2621

SELECTED REFERENCES

I. TEXTBOOKS

A. From Trees to Paper. Harry B. Lent. 1953. Illus. $3.75.
Macmillan Company
60 Fifth Avenue
New York 11, N. Y.
Deals with the manufacture of paper from wood.

B. Pulp and Paper
Miller Freeman Publications, Inc.
1791 Harvard Street
Chicago, Illinois

C. Modern Pulp and Paper Making. J. B. Calkin. 1957. 558 p. $10.00.
Reinhold Publishing Company
430 Park Avenue
New York. N. Y.
Gives fundamental principles of modern pulp and paper making.

D. Pulp and Paper Chemistry and Chemical Technology. J. P. Casey.
2 Vols. $33.00.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, N. Y.
Cellulose and hemicellulose fibers and paper.

E. Pulp and Paper Manufacture. J. N. Stephenson. 1950. Illus. 1,043 p.
$10.00.
McGraw-Hill Publishing Company
330 West 42nd Street
New York 36, N. Y.
Includes paper making machines.

F. Quality Control System. Gratis.
Greater New York Box Company
New York, N. Y.
Deals with quality control of pulp and paper.

II. PERIODICALS

A. Paper Trade Journal. Weekly. $20.00/year.
Lockwood Trade Journal, Inc.
49 West 45th Street
New York 36, N. Y.

B. Paper Mill News. Weekly. $4.00/year.
L. D. Post, Inc.
1440 Broadway
New York, N. Y.

III. U. S. PATENTS

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

A. Patent No. 2,952,580. 1960. 9 p.
Process for the fabrication of coarse opaque paper.

B. Patent No. 2,916,413. 1959. 6 p.
Method for producing various types of paper having improved strength.

IV. TRADE ASSOCIATIONS

A. Paper Industry Management Association
10 North Clark Street
Chicago 2, Illinois

B. National Paper Trade Association
220 East 42nd Street
New York 17, N. Y.

C. Technical Association of the Pulp and Paper Industry
360 Lexington Avenue
New York 17, N. Y.

V. ENGINEERING COMPANIES

A. American Paper Machinery and Engineering Works, Inc.
Post Office Box No. 1
Glens Falls, New York

B. Sandy Hill Iron and Brass Works
Hudson Falls, New York

C. Alvin H. Johnson and Co. Inc.
415 Lexington Avenue
New York 17, N. Y.

VI. DIRECTORY

A. The Source of Supply Directory. $6.00.
Peacock Business Press, Inc.
200 South Prospect Avenue
Park Ridge, Illinois
1,268 pages, 20,000 listings, 5,000 changes since 1959. Seven directories in one. Paper mills, converters, classified products, paper merchants, manufacturers' representatives, brokers, exporters, importers, supplies, 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.

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

ORDERING INSTRUCTIONS

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

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

GENERAL INFORMATION

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

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

INDUSTRY PROFILES

COARSE WRAPPING PAPER (12,500 TONS ANNUALLY)

I. P. No. 66080

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.

COARSE WRAPPING PAPER (12,500 Tons Annually): Standard Industrial Classification 2621

A. PRODUCT DESCRIPTION

Coarse wrapping paper in various widths and sizes, weight 30 pounds per 500 sheets 24″×36″.

B. GENERAL EVALUATION

Generally it will be advisable to establish a plant of this kind only where there is a local supply of pulpwood, or other suitable raw material, such as bagasse or straw. Also, it is essential to have an ample and regular supply of clean water. If such conditions exist, this industry has the advantages for a developing area that manufacturing operations are comparatively simple, and the product is one for which demand is likely to rise sharply with increasing prosperity. (For a smaller plant see Industry Profile, Coarse Wrapping Paper (6,000 Tons Annually): S. I. C. 2621).

C. MARKET ASPECTS

1. USERS. Wholesale and retail stores and wide range of industries.

2. SALES CHANNELS AND METHODS. Sales generally to wholesalers but also direct to large users.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is easy to handle and transport costs are fairly low in relation to value. Potential market may be nation-wide. b. Export. Market is world-wide.

4. COMPETITION. a. Domestic Market. Competition from imports. b. Export Market. Keen competition in world markets. Plant of size described would have litttle chance of developing an export market, except possibly in easily accessible areas in adjacent countries.

5. MARKET NEEDED FOR PLANT DESCRIBED. In the U. S. per capita consumption (highest of any country) is about 50 pounds annually, so production of plant described would supply about 500,000 people. However, this ratio can not be applied to low income areas, in which demand is very elastic and wrapping paper is frequently dispensed with altogether, or some substitute used. Variance of conditions prevents general estimates of population needed to provide a market for this plant.

D. PRODUCTION REQUIREMENTS

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

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 4 acres.		$ --
Building. One story, 100'x150'; basement, 100'x60'.		90,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$1,530,000	
Other tools & equipmt.	25,000	
Furniture & fixtures	2,000	
Transportation equipmt.	4,000	1,561,000
Total (excl. Land)		$1,651,000

Principal Items. Wood shavers(2), hammermill & screen(2), double quick pulper(2), 6" centrifugal pumps(8), digester pulp refiner(2), pulp screen, pulp washer thickener, consistency regulator, 2 chemical meters.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$146,600
Admin. Costs(b), Contingencies, Sales Costs(c)	30	19,000
Training Costs		24,400
Total Working Capital		$190,000

c. TOTAL CAPITAL (EXCL. LAND) $1,841,000

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Wood pulp		$ 330,400
Chemicals		295,000
Steel strapping	4 tons	600
Total		$626,000

b. Supplies

Lubricants & hand tools	$ 800
Cutting tools & abrasives	200
Maintenance & spare parts	15,000
Welding rods & gas	300
Office supplies	300
Total	$ 16,600

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 700 hp.	$ 21,000
b. Fuel.	$ 40,000
c. Water. Make-up water & water for general purposes. Water supply & waste disposal are of major importance in selection of site.	$ 4,500

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5-ton delivery truck.	$ 1,000

b. External Transport Facilities. In and out shipments about 100 tons per day. Good highway essential, and railroad facilities, if possible.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	9	$ 45,000
Semi-skilled	9	36,000
Unskilled	9	27,000
Total	27	$108,000
b. Indirect Labor		
Manager & supervisors	4	$ 34,000
Office	3	12,000
Maintenance, truck, laborers	4	16,000
Total	11	$ 62,000

c. Training Needs. Manager & 3 superintendents should be fully experienced. With 9 skilled workers, they should be able to train all workers & reach full production in 2 months.

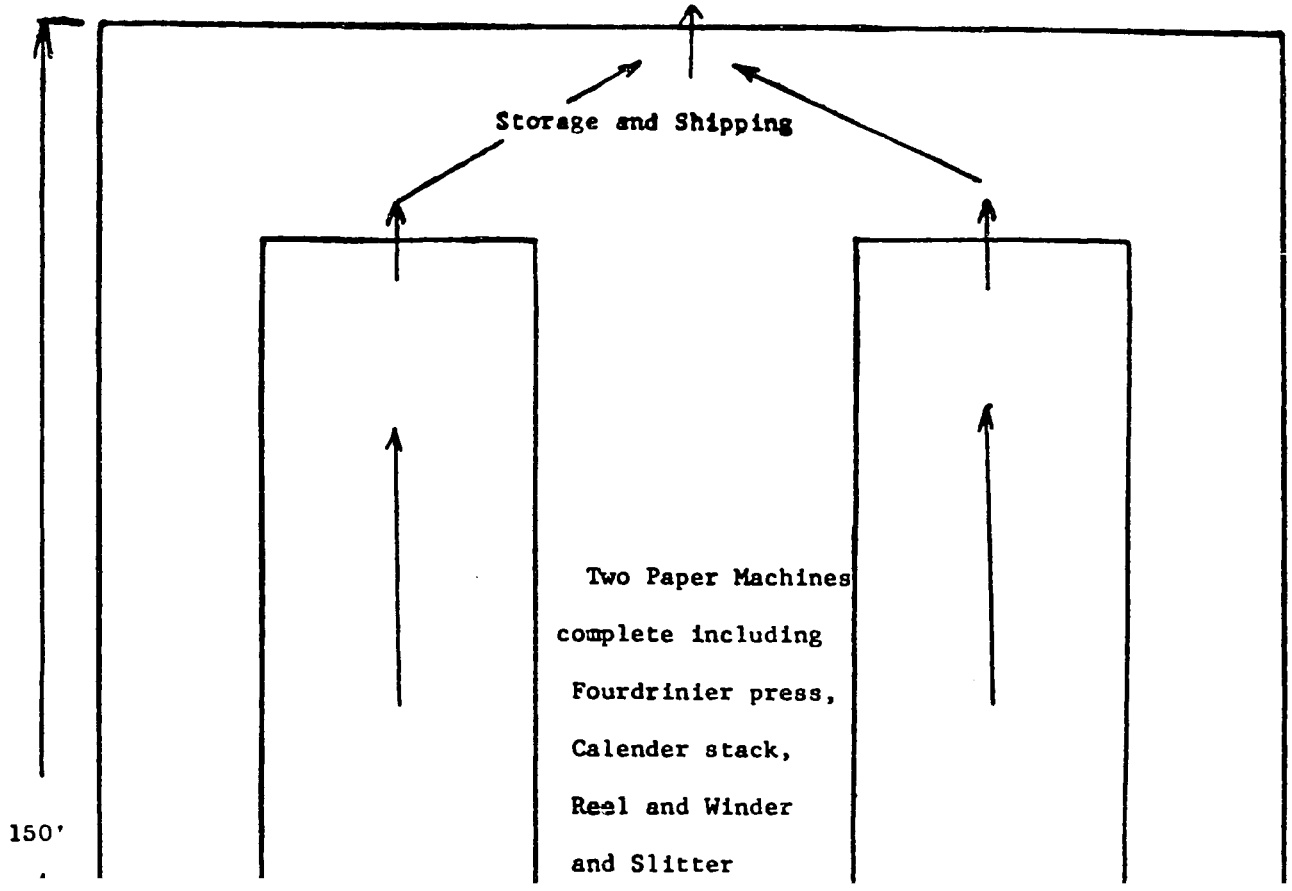
6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	$626,00(
Direct Labor	108,00(
Manufacturing Overhead (a)	145,10(
Admin. Costs(b), Contingencies	168,00(
Sales Costs(c), Bad Debts	60,00(
Depreciation on Fixed Capital	163,70(
Total	$1,270,80(
b. Annual Sales Revenue	$1,670,00(

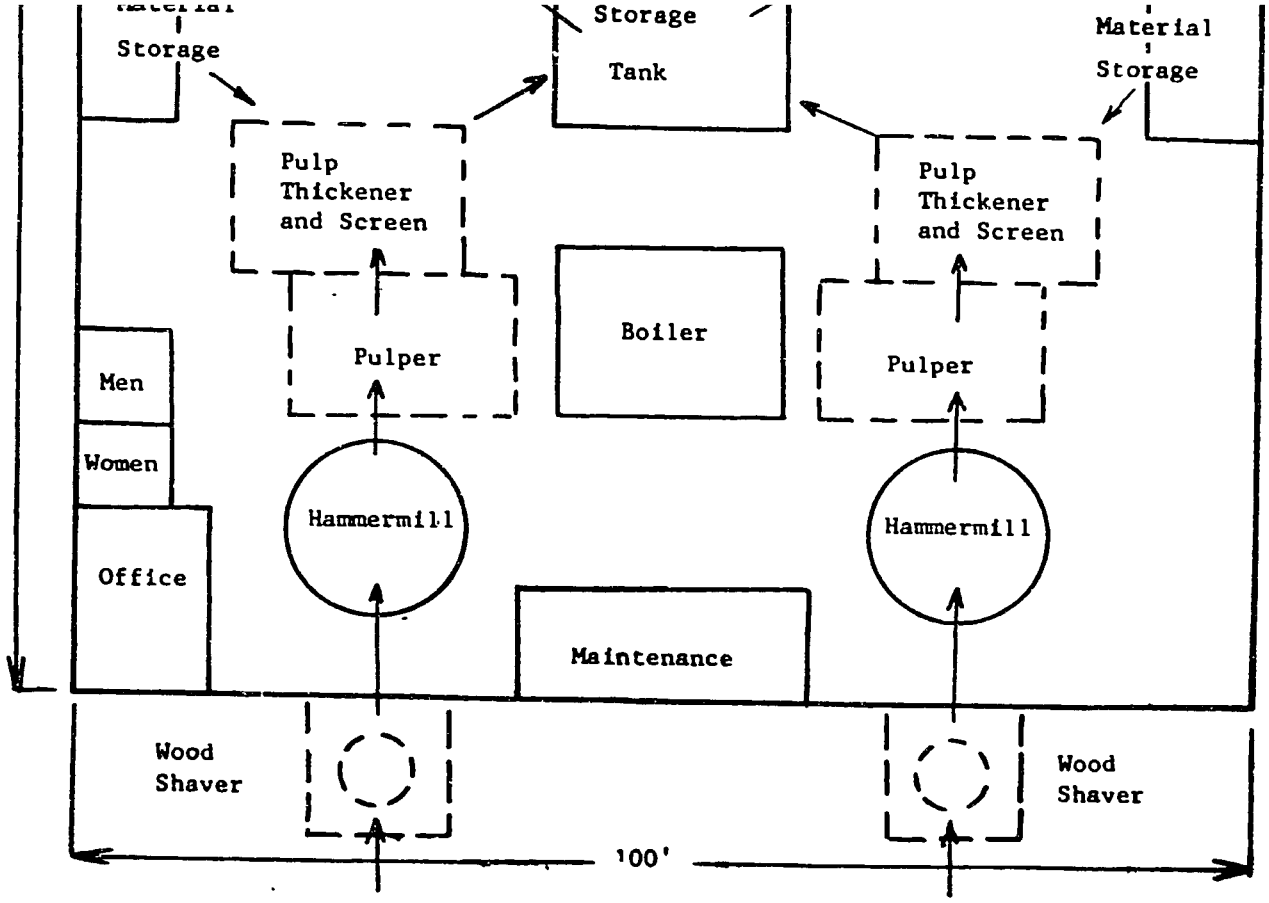
NOTES. (a) Includes Supplies, Power, Fuel, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

COARSE WRAPPING PAPER (12,500 Tons Annually): S.I.C. 2621

PLANT LAYOUT AND WORKFLOW



COARSE WRAPPING PAPER



Pulpwood Yard

COARSE WRAPPING PAPER (12,500 TONS ANNUALLY): S.I.C. 2621

SELECTED REFERENCES

I. TEXTBOOKS

A. From Trees to Paper. Harry B. Lent. 1953. Illus. $3.75.
Macmillan Company
60 Fifth Avenue
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Deals with the manufacture of paper from wood.

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D. Pulp and Paper Chemistry and Chemical Technology. J. P. Casey.
2 Vols. $33.00.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, N. Y.
Cellulose and hemicellulose fibers and paper.

E. Pulp and Paper Manufacture. J. N. Stephenson. 1950. Illus. 1,043 p.
$10.00.
McGraw-Hill Publishing Company
330 West 42nd Street
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Includes paper making machines.

F. Quality Control System. Gratis.
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III. U. S. PATENTS

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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 PAPER CARTONS

I. P. No. 66081

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.

CORRUGATED PAPER CARTONS: Standard Industrial Classification 2653

A. PRODUCT DESCRIPTION

Corrugated paper cartons of various shapes and sizes made from purchased corrugated sheet board. The maximum size blank sheet board that could be used would be 55"x128".

B. GENERAL EVALUATION

Capital requirements are moderately high, but very little skilled labor is needed. U of corrugated cartons is in general increasing, and a plant such as this should be suitable for many developing areas.

C. MARKET ASPECTS

1. USERS. A large variety of industries packing and forwarding agents, etc.

2. SALES CHANNELS AND METHODS. Sales mostly direct to users, though some may be made to distributors.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. These products are esay to transport and shipping charges are normally small. Sales over a wi area are possible. b. Export. There is a fair volume of international trade in these products, the great bulk of which is done by large-scale concerns in the major paper-producing countries.

4. COMPETITION. a. Domestic Market. Unless costs are abnormally high, it should be possible to compete with imports. b. Export Market. A plant this size would be unable to compete in the general international market but might make some exports to nearby areas of neighboring countries.

5. MARKET NEEDED FOR PLANT DESCRIBED. It is necessary to make a comprehensive study of the potential market area to determine whether there are sufficient user industries and establishments within the area to absorb the plant's production.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: Approximately 1,664,000 Units

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. about 1 acre.		$ --
Building. 50'x150'.		45,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$72,500	
Other tools & equipmt.	10,000	
Furniture & fixtures	1,000	
Transportation equipmt.	2,500	86,000
Total (excl. Land)		$131,000

Principal Items. Slitter, rotary slotter-printer, semi-automatic taper, band saw, fork lift truck, pickup truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 86,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	11,600
Training Costs		6,000
Total Working Capital		$103 000

c. TOTAL CAPITAL (EXCL. LAND) $234,000

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Sheet board	10,800,000 sq. ft.	$324,000
Corner tape	2,000,000 lin. ft.	60,000
Total		$384,000

b. Supplies

Lubricants & hand tools	$ 4,000
Cutting tools & abrasives	1,500
Maintenance & spare parts	5,000
Office supplies	1,000
Total	$11,500

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. About 1 mn. kwh.	$ 20,000
b. Fuel. About 15,000 gals. heating oil.	$ 2,000
c. Water. About 2 mn. gals.	$ 500

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. Pickup truck.	$ 1,000

b. External Transport Facilities. Heavy trucking and rail facilities needed for deliveries.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Semi-skilled	9	$ 40,500
Unskilled	6	21,000
Total	15	$ 61,500
b. Indirect Labor		
Manager	1	$ 10,500
Plant foreman	1	7,500
Maintenance	2	11,000
Clerical	1	4,500
Total	5	$ 33,500

c. Training Needs. With the employment of an experienced foreman, there is no need to train skilled labor. The semi-skilled labor will have to be trained to operate the machines. Full production could be reached in 60 to 90 days.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

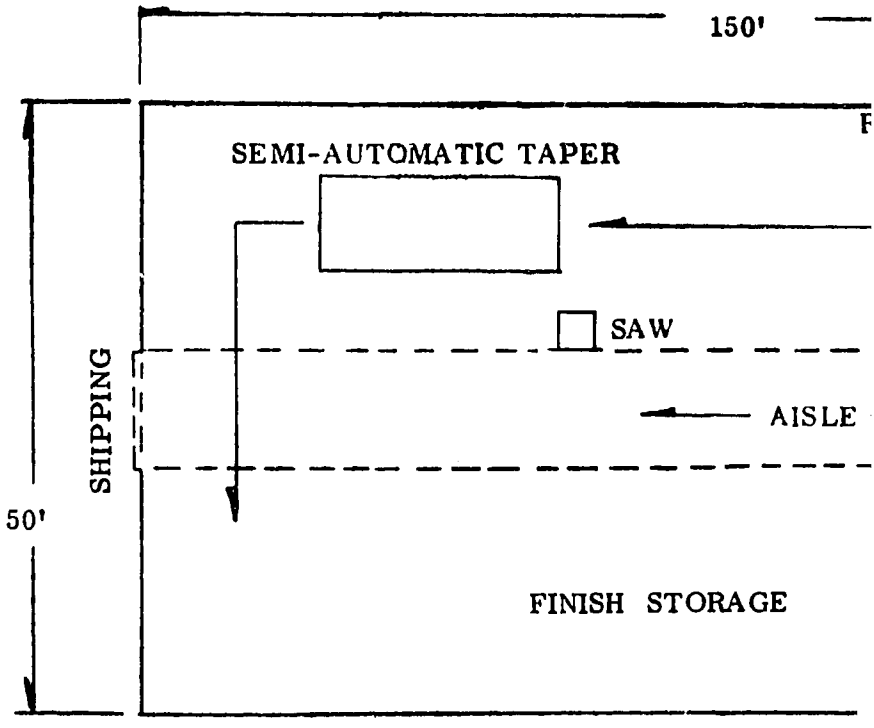
Direct Materials	$384,000
Direct Labor	61,500
Manufacturing Overhead(a)	68,500
Admin. Costs(b), Contingencies	86,000
Sales Costs(c), Bad Debts	44,000
Depreciation on Fixed Capital	12,700
Total	$656,700

b. Annual Sales Revenue $830,000

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

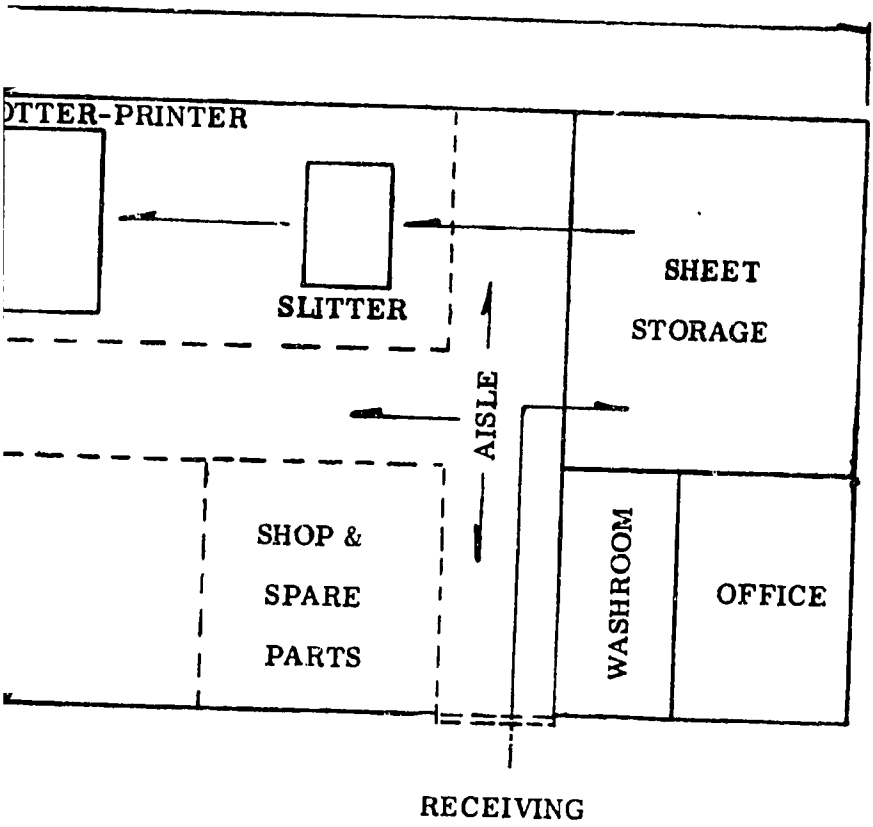
CORRUGA

PLANT LAY



R CARTONS

VORK FLOW



CORRUGATED PAPER CARTONS: S.I.C. 2653

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I. TEXTBOOKS

A. Modern Packaging Encyclopedia '62. 1961. 851 p. Illus. $8.00.
Modern Packaging Corporation
770 Lexington Avenue
New York 21, N. Y.
Has sections on cartoning equipment, fabricating processes, materials, standard tests, marketing considerations, and sources for supplies, equipment, and services.

B. Modern Pulp and Paper Making. John B. Calkin, editor. 1957. 558 p. Illus. $10.00.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, N. Y.
Information on machinery, materials, and processes used in the manufacture of corrugated paper cartons and allied products.

C. Package Engineering Handbook. Walter Stern. 1954. 320 p. Illus. $10.00.
Board Products Publishing Company
228 North LaSalle Street
Chicago 1, Illinois
Describes components and processes of manufacturing fiber boxes, including corrugated paper cartons.

II. TECHNICAL PAPERS

A. Structural Design Notes for Corrugated Containers. Package Engineering. Vol. 5. March 1960, p. 122-4, April, p. 122-3, May, p. 90-1. $.75.
Angus J. Ray, Publisher
185 North Wabash Avenue
Chicago 1, Illinois
Deals with triple-wall corrugated cartons suited for difficult, heavy loads requiring exceptionally large containers.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Boxes, Folding, Fiberboard, Corrugated, Triple-Wall.
Federal Specification PPP-B-0064a. January 14, 1958. $.10.
General Services Administration
Seventh and D Streets, S. W.,
Washington, D. C. 20405
Covers the principal requirements for acceptable corrugated paper cartoı and related products.

IV. PERIODICALS

A. Modern Packaging. Monthly. $8.00/year.
Modern Packaging Corporation
770 Lexington Avenue
New York 21, N. Y.
Latest developments in machinery, materials, and processes in the container and carton industry.

IV. PERIODICALS (Continued)

B. Boxboard Containers. Monthly. $7.00/year.
Haywood Publishing Company
6 North Michigan Avenue
Chicago 2, Illinois
Covers current machinery, material, and manufacturing activities in the paper box and fiber container industry.

V. U. S. PATENTS

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

A. Patent No. 2,456,483. 1948. 4 p.
Materials and process for making fiber containers.

B. Patent No. 2,165,083. 1939. 16 p.
The fabrication of corrugated cartons for fragile articles.

VI. TRADE ASSOCIATIONS

A. Corrugated Container Institute
P. O. Box 1752
Lakeland, Florida

VII. ENGINEERING COMPANIES

A. Giffels and Rossetti
Marquette Building
Detroit, Michigan
Architectural services, process development, plant layout, equipment design in paper and allied fields.

B. Walter Kidde Constructors Inc.
476 Main Street
Belleville 9, New Jersey
Design, technical and economic, business and financial studies and reports on the paper industry.

C. Tampa Bay Engineering Co.
151 Treasure Island Causeway
St. Petersburg 6, Florida
Engineering, design, plant layout, machinery installation, plant start-up in industrial field.

VIII. DIRECTORIES

A. Lockwood's Directory of the Paper and Allied Trades. Annual. $15.00.
Lockwood Trade Journal Company Inc.
49 West 45th Street
New York 36, N. Y.
Lists mills and converters together with their products, also merachants and suppliers of equipment and services.

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INDUSTRY PROFILES

COSTUMERS, LAMPS AND PICTURE FRAMES

I. P. No. 66082

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

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COSTUMERS, LAMPS, AND PICTURE FRAMES: Standard Industrial Classification 2499

A. PRODUCT DESCRIPTION

Costumers, square and turned upright; floor and table lamps, square and turned upright; picture frames of various sizes and molded shapes; all made of wood. The lamps are supplied without shades or bulbs.

B. GENERAL EVALUATION

This plant requires only a moderate amount of capital. The manager should have ability to produce attractive designs, as well as skill in carrying out instructions by customers, since the products are mostly not strandardized and much of the work will be executed to fill special orders. The market will be localized and a sizable urban community with a fairly high income level would be needed to absorb the plant's output.

C. MARKET ASPECTS

1. USERS. Housholds, Hotels, offices, etc.

2. SALES CHANNELS AND METHODS. Sales to stores and possibly direct to hotels and institutions.

3. GEOGRAPHICAL EXTENT OF MARKET. Because of transport costs the market will generally be fairly localized and there will be no export business.

4. COMPETITION. Small establishments using little or no mechanized equipment may provide competition in some of the lines of production.

5. MARKET NEEDED FOR PLANT DESCRIBED. Usually it will be necessary to have a population of upward of a million people to provide a market for this plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 50,000 Units

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. 1 acre.		$ --
Building. One story, 60'x80'.		28,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$44,000	
Other tools & equipmt.	1,300	
Furniture & fixtures	700	46,000
Total (excl. Land)		$ 74,000

Principal Items. Cutoff saw, planer jointer, ripsaw, molder, glue reel, turning lathe, trim saw, boring machine, shaper, 3 drum sanders, table belt sander, factory trucks, spray booth.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 15,500
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,500
Training Costs		1,500
Total Working Capital		$ 18,500

c. TOTAL CAPITAL (EXCL. LAND) $ 92,500

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Lumber	183,000 bd. ft.	$ 28,000
Wire & fittings		2,000
Glue & paint		800
Packaging material		3,200
Total		$ 34,000

b. Supplies

Lubricants & hand tools	$ 100
Cutting tools & abrasives	800
Maintenance & spare parts	900
Office supplies	200
Total	$ 2,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 50 hp. connected load.	$ 500
b. Fuel. Scrap wood.	
c. Water. For general purposes.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. In and out shipments about 1.4 tons a day. Good highways necessary.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	3	$ 15,000
Semi-skilled	3	12,000
Unskilled	4	12,000
Total	10	$ 39,000
b. Indirect Labor		
Manager	1	$ 9,000
Office	1	4,000
Maintenance	1	4,000
Total	3	$ 17,000

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

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

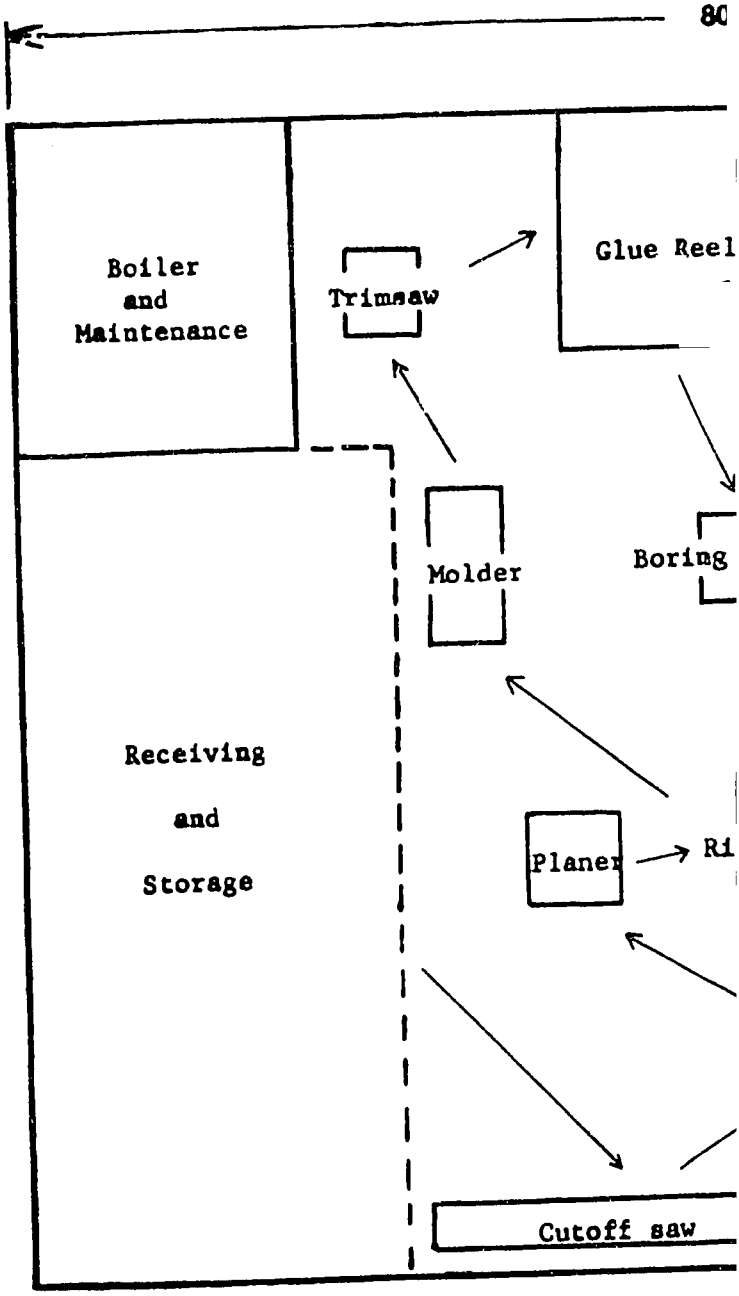
Direct Materials	$ 34,000
Direct Labor	39,000
Manufacturing Overhead(a)	19,600
Admin. Costs(b), Contingencies	6,000
Sales Costs(c), Bad Debts	12,000
Depreciation on Fixed Capital	6,200
Total	$116,800

b. Annual Sales Revenue $150,000

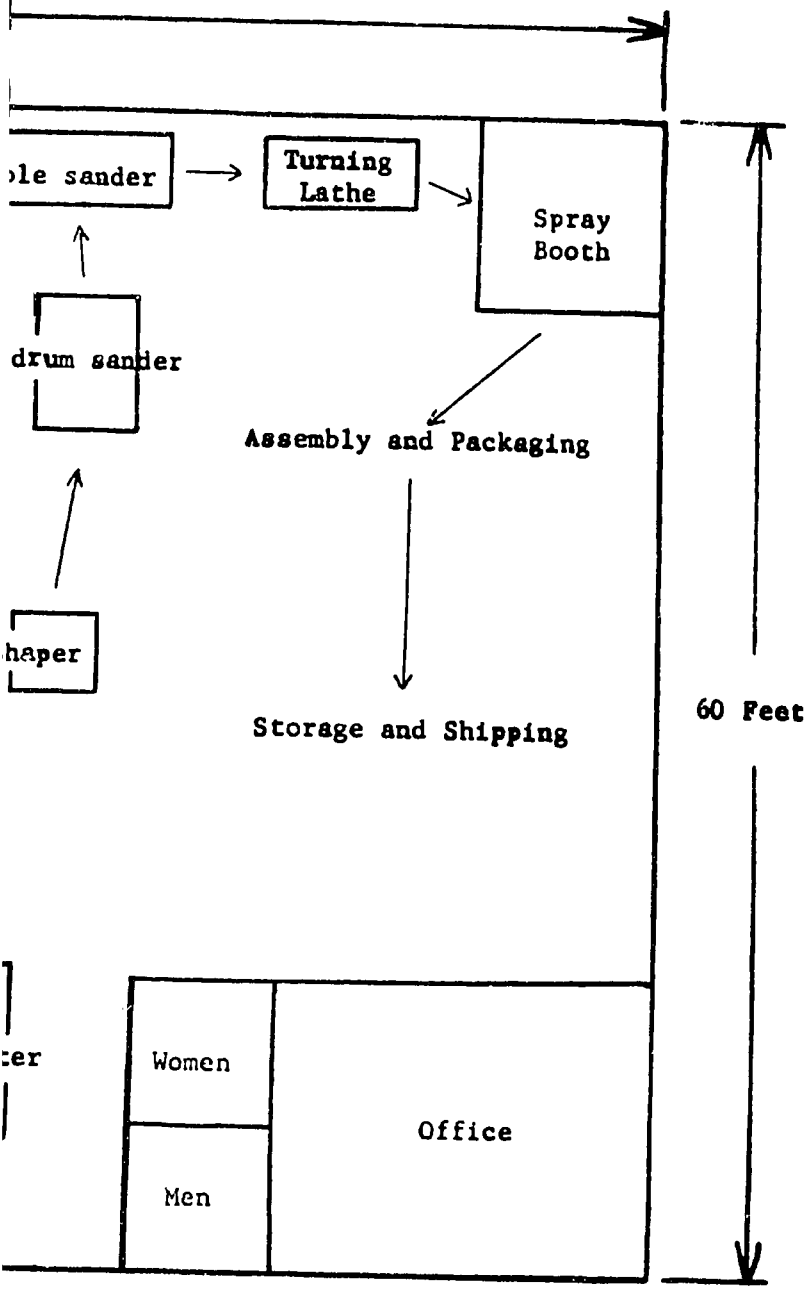
NOTES. (a) Includes Supplies, Power, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

COSTUMERS, LAMPS, AND PICTURE FRAMES: S.I.C. 2499

COSTUMERS, LAMPS,



CTURE FRAMES : S.I.C. 2499



COSTUMERS, LAMPS, AND PICTURE FRAMES: S. I. C. 2499

SELECTED REFERENCES

I. TEXTBOOKS

A. Furniture Making and Cabinet Work. B. W. Pelton. 1961.
2nd edition. $7.95.
D. Van Nostrand Company, Inc.
120 Alexander Street
Princeton, New Jersey
Actual constructions with step by step directions for the manufacture of many types of furnishings.

B. Complete Book of Wood Finishing. R. Schariff. 1956. 277 p. Illus.
$4.95.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N. Y.
Covers all kinds of wood finishes and methods of finishing.

C. Gluing Technique for Woodworking. T. D. Perry. 1955. 50 p.
Illus. $.50.
Hitchcock Publishing Company
Wheaton, Illinois
Presents methods of cutting, fitting, and gluing joints for wood workers.

II. GOVERNMENT PUBLICATIONS, U.S.

A. Production Planning and Control. TB-82. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523
Training manual for plant personnel covering the subject of production planning and control.

III. PERIODICALS

A. The Wood-Worker. Monthly. $3.00/year.
S. H. Smith Company
2232 North Meridian Street
Indianapolis 3, Indiana
Wood fabrication techniques, machines and maintenance, product development, and reporting of wood working industry news.

B. Woodworking. Monthly. $5.00/year.
Hitchcock Publishing Company
Wheaton, Illinois
Covers major branches of wood products industry.

SELECTED REFERENCES (Continued)

IV. U. S. PATENTS

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

A. Patent No. 2,993,290. 1961. 8 p.
Panel mounting apparatus for pictures and similar objects.

B. Patent No. 2,971,282. 1961. 3 p.
Picture display means.

C. Patent No, 2,966,755. 1961. 8 p.
Ensemble for displaying picturers and the like.

V. TRADE ASSOCIATIONS

A. Lamp and Shade Institute of America
15 East 26th Street
New York 10, N. Y.

B. Picture and Frame Institute
20 North Wacker Street
Chicago 6, Illinois

VI. ENGINEERING COMPANIES

A. Mattison Machine Works
200 Blackhawk Park Avenue
Rockford, Illinois
Manufactures equipment for production of furniture and household items.

B. Oliver Machinery Company
Grand Rapids 2, Michigan
Erects complete plants for the manufacture of wood products.

C. U. S. Machinery Company, Inc.
Industrial Woodworking Machinery
90 West Broad Street
New York, N. Y.
Designs and installs woodworking plants.

VII. DIRECTORIES

A. Hichcock's Woodworking Directory. Biennial. $10.00.
Hitchcock Publishing Company
Wheaton, Illinois
Lists manufacturers and suppliers of over 800 products used in the woodworking industry.

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INDUSTRY PROFILES

COTTON ROLL-EDGED MATTRESSES

I. P. No. 66083

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COTTON ROLL-EDGED MATTRESSES: Standard Industrial Classification 2515

A. PRODUCT DESCRIPTION

Cotton-stuffed mattresses, tufted and ventilated, covered with ticking and finished with a rolled edge: made in two sizes, 38"x74" and 54"x74".

B. GENERAL EVALUATION

These mattresses are inexpensive. In a less industrialized area with a rising standard of living, such a mattress might find an expanding market as people are able to substitute it for even cheaper types of bedding. The capital required is moderate, and the degree of labor skill needed is not great. The establishment of such an industry should be within capacity of many less developed areas.

C. MARKET ASPECTS

1. USERS. Households, institutions, millitary establishments, hospitals, hotels.

2. SALES CHANNELS AND METHODS. Sales direct to large users, and to retail distributors.

3. GEOGRAPHICAL EXTENT OF MARKET. While the product is bulky, shipment presents no major problems. Distribution may be nation-wide. This product is not common in international trade, since most countries produce for themselves the mattresses or substitutes therefor that are used by the bulk of the populace.

4. COMPETITION. Where the income level is rising, more expensive types of mattresses will increasingly compete.

5. MARKET NEEDED FOR PLANT DESCRIBED. The size of population needed to support the output of this plant will depend upon the level of income which will influence the rate of bedding replacement and the type of bedding used; the rate of population growth, etc. Where this type of mattress is in common use a population of about a quarter of a million would generally provide a large enough market.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 8,000 Large, 4,000 Small Mattresses

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 10,000 sq. ft.		$ --
Building. One story, 50'x80'.		24,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$ 7,600	
Other tools & equipmt.	2,000	
Furniture & fixtures	700	
Transportation equipmt.	2,500	12,800
Total (excl. Land)		$36,800

Principal Items. Rolled edge machine, hand tufting press, power filling machine, cotton picker, 4 sewing machines, cutting table, electric cutter, electric drill, pickup truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 14,400
Admin. Costs(b), Contingencies, Sales Costs(c)	30	700
Training Costs		3,400
Total Working Capital		$ 18,500

c. TOTAL CAPITAL (EXCL. LAND) $55,300

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Cotton	300,000 lbs.	$ 19,200
Ticking	60,000 yds.	21,000
Tufts, ventilators & thread		800
Packaging		300
Total		$ 41,300

b. Supplies

Lubricants & hand tools	$ 100
Maintenance & spare parts	700
Office supplies	200
Total	$ 1,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 15 hp.	$ 500
b. Fuel. For heating building, if necessary.	$ 300
c. Water. Sanitation & fire protection.	$ 100

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 1-ton truck for pickup & delivery.	$ 1,000

b. External Transport Facilities. Total in & out shipments about 35 tons a month. Good highway desirable.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	2	$ 10,000
Semi-skilled	2	8,000
Unskilled	3	9,000
Total	7	$ 27,000
b. Indirect Labor		
Manager	1	$ 8,000
Office	1	4,000
Other	1	3,000
Total	3	$ 15,000

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

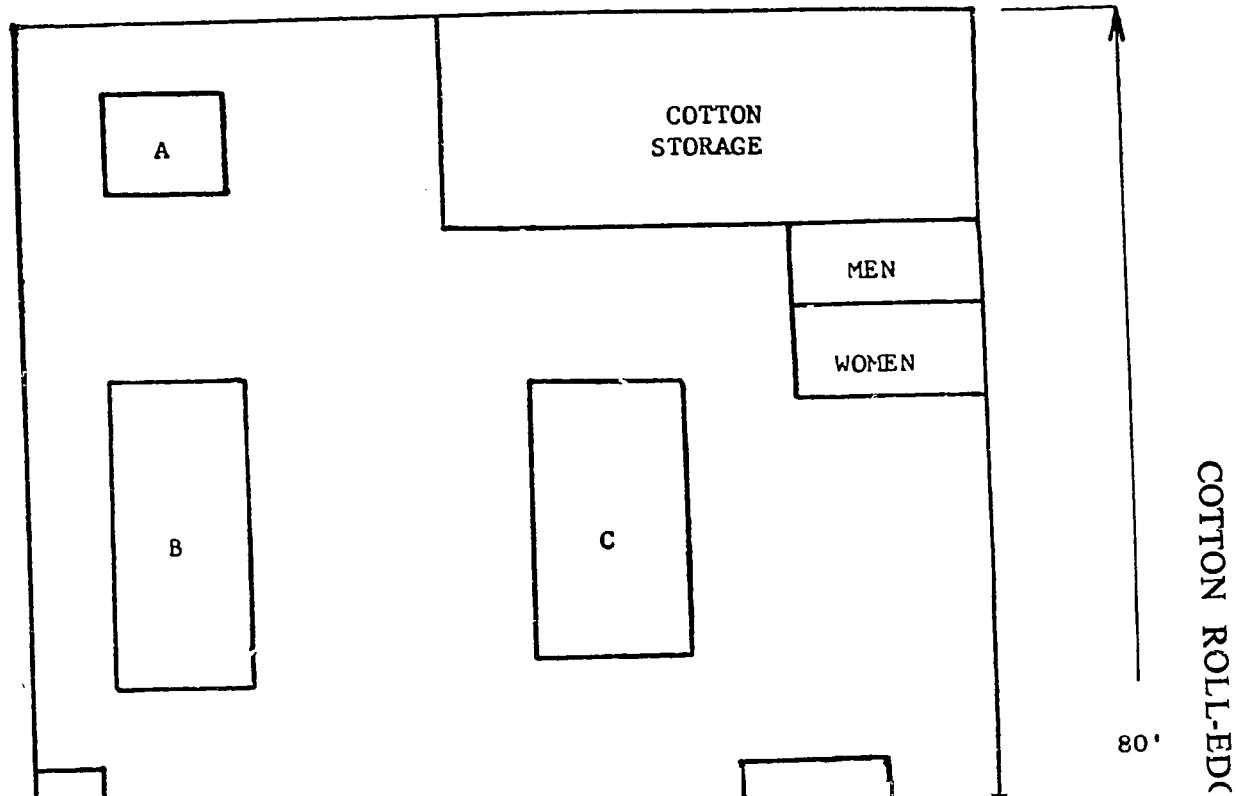
a. Annual Costs

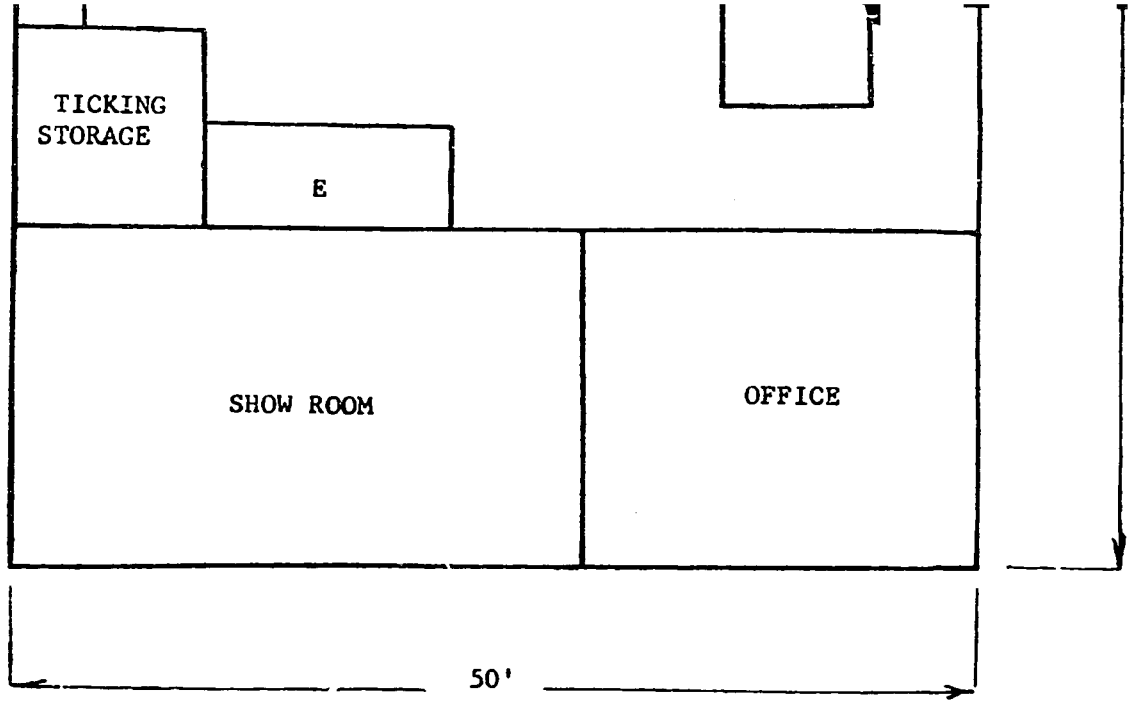
Direct Materials	$ 41,300
Direct Labor	27,000
Manufacturing Overhead(a)	17,900
Admin. Costs(b), Contingencies	4,000
Sales Costs (c), Bad Debts	4,000
Depreciation on Fixed Capital	3,200
Total	$ 97,400

b. Annual Sales Revenue $120,000

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

PLANT LAYOUT AND WORK FLOW





A. Cotton picker
B. Power filling machine
C. Roll edge machine
D. Hand tufting press
E. Cut ticking
F. Sew mattress covers

COTTON ROLL-EDGED MATTRESSES: S.I.C. 2515

SELECTED REFERENCES

I. TEXTBOOKS

A. Practical Guide to Health and Sleep Equipment. 1960. $.10.
National Association of Bedding Manufacturers
Merchandize Mart Plaza
Chicago 54, Illinois
Information on the construction of mattresses relative to sleep and health.

II. GOVERNMENT PUBLICATIONS, U. S.

A. Specifications for Roll-Edged Cotton Mattresses. Y-N-81C. Gratis.
General Services Administration
7th and D Streets, S. W.,
Washington, D. C. 20405
Complete U. S. Government specifications for roll-edged cotton mattresses.

III. PERIODICALS

A. Bedding. Monthly. $6.00.
National Association of Bedding Manufacturers
Merchandize Mart Plaza
Chicago 54, Illinois
Lists manufacturers of bedding, bedding materials and bedding equipment. New and improved methods of manufacture.

IV. U. S. PATENTS

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

A. Patent No. 2,963,716. 1960. 3 p.
Roll-edged mattress and cord for same.

B. Patent No. 2,940,089. 1960. 3 p.
Mattress structure.

C. Patent No. 2,927,330. 1960. 3 p.
Mattress structure with border strip or roll-edge.

D. Patent No. 2,871,925. 1959. 6 p.
Edge-roll mattress and method of assembling.

V. TRADE ASSOCIATIONS

A. National Association of Bedding Manufacturers
Merchandize Mart Plaza
Chicago 54, Illinois

VI. ENGINEERING COMPANIES

A. James Cash Machine Company, Inc.
125 West Hill Street
Louisville 8, Kentucky
Manufactures and installs mattress equipment.

B. United Mattress Machinery Company
Quincy, Massachusetts
Manufactures and installs a complete line of bedding machinery.

VII. DIRECTORIES

A, Davidson's Mattress, Bedding, and Upholstered Furniture Register.
Annual. $6.00.
Davidson Publishing Company
Ridgewood, New Jersey
Lists manufacturers, dealers, jobbers, and suppliers in the mattress industry.

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INDUSTRY PROFILES

CRATES, BASKETS AND HAMPERS

I. P. No. 66084

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CRATES, BASKETS AND HAMPERS: Standard Industrial Classification 2442/3

A. PRODUCT DESCRIPTION

Orange crates, bushel baskets, regular fruit hampers. Product type and product mix can be adapted to meet local demand within fairly wide limits.

B. GENERAL EVALUATION

Capital and labour skill requirements are moderate. The products are designed primarily for the packing of fruit, but they can be adapted to other purposes. A plant of this kind is particularly suited to areas where lumber is available from local production and where large quantities of fruit and vegetables are sent considerable distances to central markets.

C. MARKET ASPECTS

1. USERS. Fruit and vegetable growers, stores, industries.

2. SALES CHANNELS AND METHODS. Most sales direct to users.

3. GEOGRAPHICAL EXTENT OF MARKET. Transport costs on these products are rather burdensome, and they are not usually shipped very far. Plant should be located as near as possible to users of the products, such as fruit and vegetable growers. Products are not important in international trade.

4. COMPETITION. a. Domestic Market. Competition from imports is unlikely to be important. Alternative means of packaging, such as straw containers, may compete in certain uses in some areas. b. Export Market. It is unlikely that any export business could be developed.

5. MARKET NEEDED FOR PLANT DESCRIBED. A plant of this character and size could service a fruit and vegetable growing area capable of supplying an urban population of upward of a million people. The size of the population needed will depend on income levels, consumption habits, and so forth.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 300,000 Crates, 200,000 Baskets, 200,000 Hampers

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 2 acre, including log storage.		$ --
Building. one story, 100'x100' Lean-to shed with vats 20'x30'		60,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$90,000	
Other tools & equipmt.	4,000	
Furniture & fixtures	1,000	
Transportation equipmt.	4,000	99,000
Total (excl. Land)		$159,000

Principal Items. 6 log vats, veneer lathe, steam engine drive, veneer clipper, single head planer, swing saw, heading rounder, roll feed rounder. 3 rip saws, band saw, 2 two-saw equalizers, 2 hoop coilers, 2 hamper machines, 2 top staplers, tub loop machine, handle machine, automatic stapler, hoop dye vats, two-color printer, boiler, knife grinder, automatic veneer kiln, 12 factory trucks, chain falls and track set, veneering racks, delivery truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 37,400
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,300
Training Costs		13,300
Total Working Capital		$ 53,000

c. TOTAL CAPITAL (EXCL. LAND) $212,000

2. MATERIALS AND SUPPLIES

	Annual Cost
a. Direct Materials	
Logs for veneer & lumber	$ 34,000
Nails & staples	1,000
Total	$ 35,000
b. Supplies	
Lubrication & hand tools	$ 100
Cutting tools	600
Maintenance & spare parts	3,000
Office supplies	300
Total	$ 4,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 70 hp.	$ 2,000
b. Fuel. Waste wood may be used.	
c. Water. About 1.6 million gals. annually.	$ 400

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5 ton truck for deliveries.	$ 1,000

b. External Transport Facilities. Good highway desirable.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	5	$ 25,000
Semi-skilled	15	60,000
Unskilled	22	66,000
Total	42	$151,000
b. Indirect Labor		
Manager & supervisor	2	$ 14,000
Office	2	8,000
Other	3	9,000
Total	7	$ 31,000

c. Training Needs. Manager & supervisor should have long experience. With 2 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

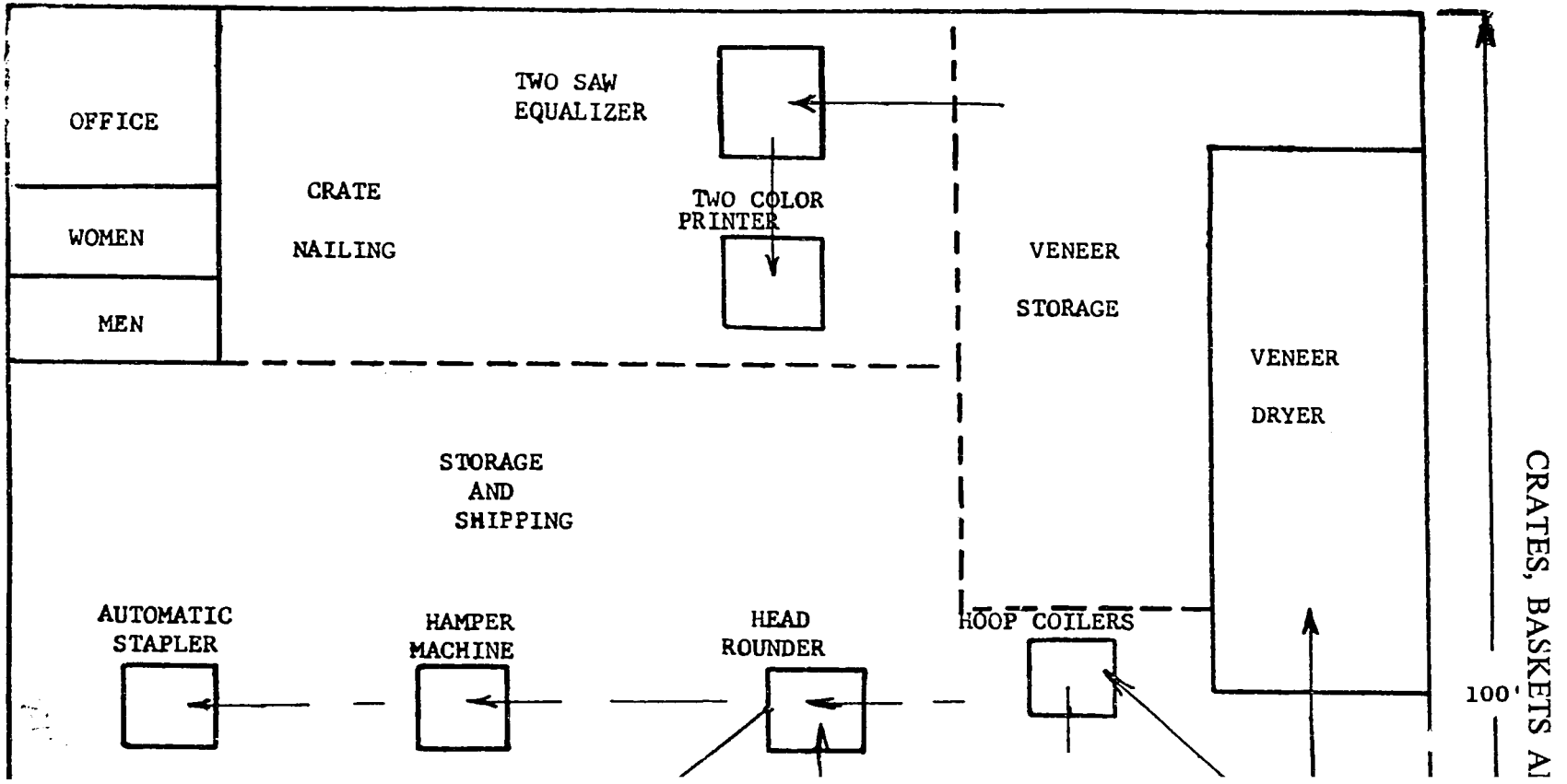
a. Annual Costs	
Direct Materials	$ 35,000
Direct Labor	151,000
Manufacturing Overhead (a)	38,400
Admin. Costs(b), Contingencies	10,000
Sales Costs (c), Bad Debts	17,000
Depreciation on Fixed Capital	12,900
Total	$264,300
b. Annual Sales Revenue	$ 320,000

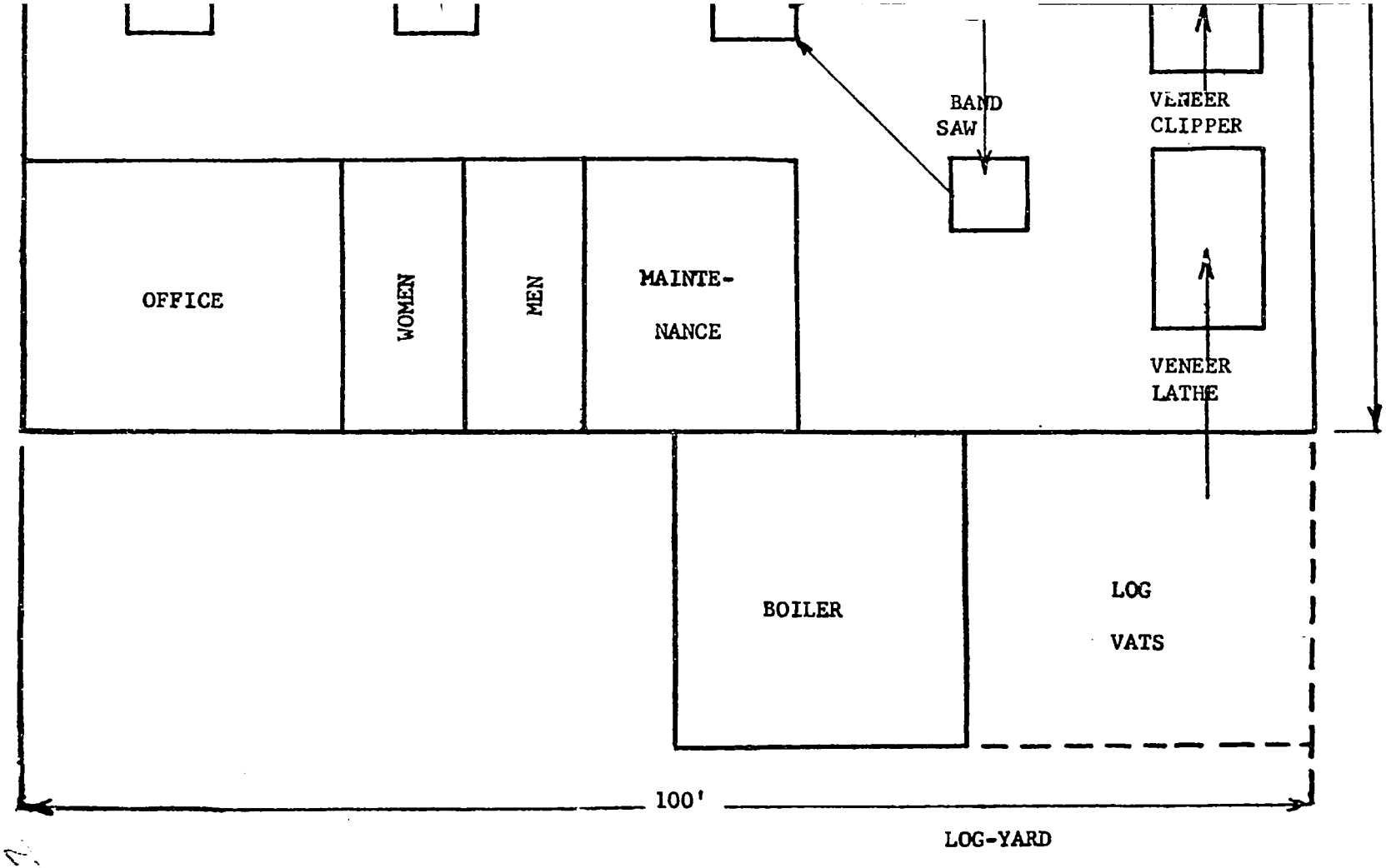
NOTES. (a) Includes Supplies, Power, Water, Transportation, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

CRATES, BASKETS AND HAMPERS: S.I.C. 2442/3

PLANT LAYOUT

ARROWS INDICATE FLOW OF WORK





PERS : S. I. C. 2442/3

CRATES, BASKETS AND HAMPERS: S.I.C. 2442/3

SELECTED REFERENCES

I. TEXTBOOKS

A. Basketry and Related Arts. M. L. Lee. 1948. 189 p. Illus. $4.95.
D. Van Nostrand Company, Inc.
120 Alexander Street
Princeton, New Jersey
Basketry materials and tools. Basket making. Basket weaving.

B. Practical Veneering. C. H. Hayward. 1950. Illus. $2.75.
J. B. Lippincott Company
East Washington Square
Philadelphia 5, Pennsylvania
Deals with making of veneers and their uses.

II. GOVERNMENT PUBLICATIONS, U. S.

A. Quality Control. TB-66. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523
Manual providing information in the field of control and training

III. PERIODICALS

A. Woodworking. Monthly. $4.00/year.
Hitchcock Publishing Company
Wheaton, Illinois
Pertains to all forms of wood working.

B. The Wood-Worker. Monthly. $3.00/year.
S. H Smith Company
2232 North Meridian Street
Indianapolis, Indiana
Deals with techniques in the wood working trade.

IV. U. S. PATENTS

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

A. Patent No. 2,790,544. 1957. 7 p.
Process for manufacturing crates.

B. Patent No. 2,787,821. 1957. 4 p.
Method of making baskets.

C. Petent No. 2,776,773. 1957. 3 p.
Shipping container (crate).

D. Patent No. 2,543,157. 1951. 4 p.
Process and materials for making baskets.

E. Patent No. 2,478,678. 1949. 6 p.
Laundry hamper and method of manufacturing.

250

V. TRADE ASSOCIATIONS

A. Wirebound Box Manufacturers Association
222 West Adams Street
Chicago 6, Illinois
The above association is identified with crates. No association is known to be identified with baskets and hampers.

VI. ENGINEERING COMPANIES

A. United States Machine Company, Inc.
90 Broad Street
New York 4, N. Y.
Industrial woodworking machinery. Designs and installs woodworking plants.

B. Mereen-Johnson Machine Company
4400 North Mississippi Drive
Minneapolis, Minnesota
Manufacturers of wood working machinery for box and crate production.

VI. DIRECTORIES

A. Hitchcock's Wood Working Directory. Biennial. $10.00.
Hitchcock Publishing Company
Wheaton, Illinois
Lists manufacturers, suppliers, and equipment for over 800 wood products.

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

CRUDE OLIVE OIL

I. P. No. 66085

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.

CRUDE OLIVE OIL: Standard Industrial Classification 2096

A. PRODUCT DESCRIPTION

Virgin and second oil from olives.

B. GENERAL EVALUATION

This industry is suitable only for areas producing olives. Olive-growing is largely confined to Mediterranean countries and a few areas with climates approximating that of Mediterranean countries. Olive-pressing is a very ancient industry and is still carried on largely by hand operations. The plant described is by no means elaborate. Capital requirements are modest and are largely accounted for by the building. A rather large building is needed because space is required for sizable tanks and for a considerable number of storage casks. The work does not call for much skill, and it may be presumed that in olive-growing areas labor with suitable experience will be readily available. Competition from other vegetable oils is strong, but olive oil is preferred for some uses by many people who are prepared to pay the higher price that is usually obtained for it. Typically, much of the virgin oil, after being refined, is exported to high-income countries, while the second oil may be largely consumed within the producing country. In spite of competition from other vegetable oils, demand for high-grade olive oil is steady, and expansion of the industry appears possible. The plant described produces only crude oil and would normally not have any direct export business. A possible exception might be where crude olive oil is shipped to a neighboring olive-growing country for refining.

C. MARKET ASPECTS

1. SALES CHANNELS AND METHODS. Sales to refiners and local distributors. it is a common practice for the olives to be placed on consignment and for payment for them to be made in oil and/or cash when the oil is sold. This practice reduces need for working capital.

2. GEOGRAPHICAL EXTENT OF MARKET. Crude olive oil producers usually sell to nearby refiners and distributors. Export trade is largely in refined high-grade olive oil.

3. COMPETITION. There are substitutes for lower-grade olive oil, e. g. cottonseed, peanut, soybean oils, but high-grade olive oil is usually preferred for certain uses by those who can afford it. In countries producing olive oil, the latter can often compete successfully in the local market with other vegetable oils. In countries that produce other vegetable oils but not olive oil, the latter is usually regarded as a semi-luxury item. Plant described would not compete directly in export trade, but demand for its output would generally depend to some degree on export demand.

4. MARKET NEEDED FOR PLANT DESCRIBED. Since crude olive oil is a primary product that needs some further processing before use, and since it is used in a variety of products, there is no way of estimating demand for it in terms of total population. The plant described is quite small, and even if it addedentirely new capacity to the industry, rather than replaced existing capacity, could hardly make much difference to the over-all supply situation. Presumably a plant of this type would be established where olive production is increasing, and it may be assumed that this will be taking place, at least to some degree, in response to increased demand.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION, 40 WEEKS A YEAR: 89,100 Pounds (9,100 Pounds Virgin Oil, 80,000 Pounds Second Oil)

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 10,000 sq. ft.		$ --
Building. One story, about 4,000 sq. ft. floor space.		24,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$12,800	
Furniture & fixtures	500	13,300
Total (excl. Land)		$ 37,300

Principal Items. Storage casks (200), wooden frames (2), wooden chute, pan mill, horizontal screw presses (6), sheet metal pans (6), wooden settling tanks (2) - 5 sections for virgin oil, 10 sections for second oil, hand pumps (2), wooden storage tanks (2).

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a), Admin. Costs(b), Contingencies, Sales Costs(c)	30	$ 2,700

c. TOTAL CAPITAL (EXCL. LAND) $ 40,000

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Olives	196,000 lbs.	$ 8,000

b. Supplies

Maintenance & repairs	$ 400
Lubricants & hand tools	100
Office supplies	100
Total	$ 600

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 2 hp.	$ 100
b. Fuel. For heating, if necessary.	$ 100
c. Water. For general purposes.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None needed.

b. External Transport Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	1	$ 4,000
Unskilled	2	5,000
Total	3	$ 9,000
b. Indirect Labor		
Manager	1	$ 7,000
Office	1	4,000
Other	1	2,500
Total	3	$ 13,500

c. Training Needs. Manager should be fully experienced. He should be able to train all workers. Plant should reach full production almost from the start.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

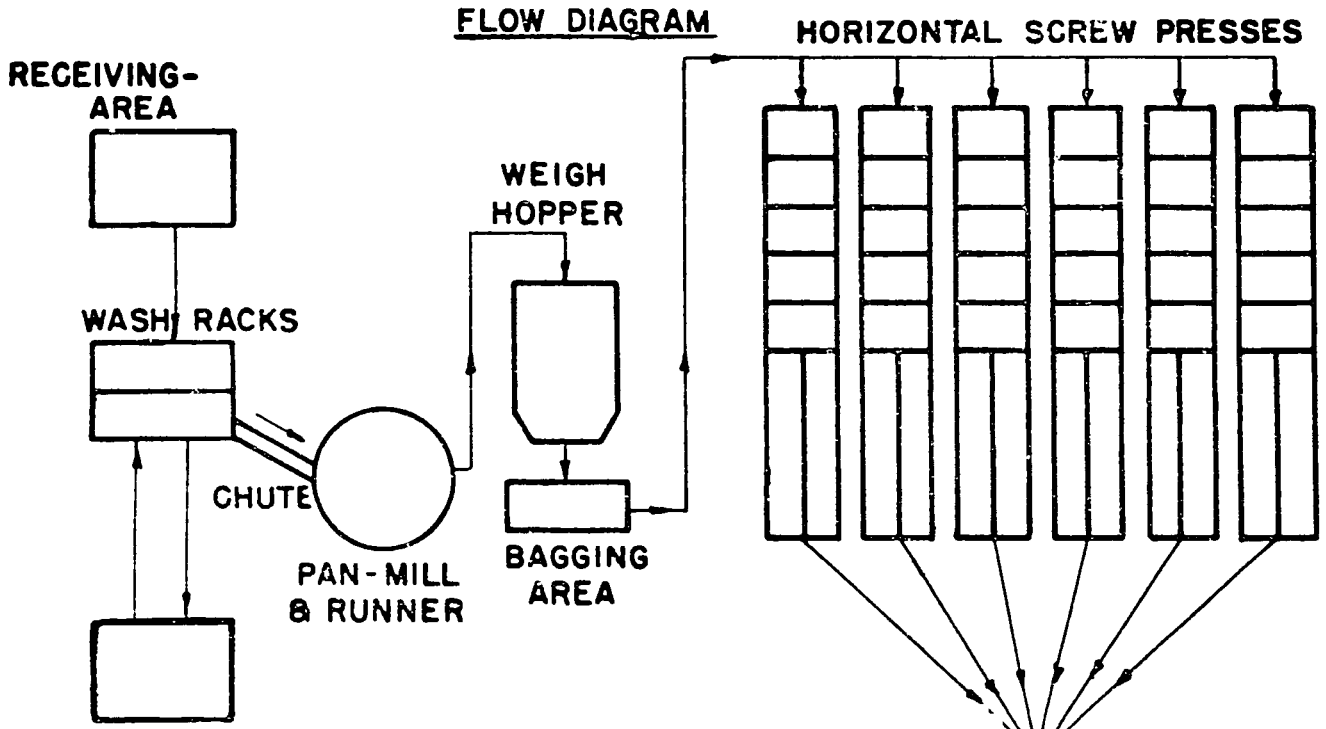
Direct Materials	$ 8,000
Direct Labor	9,000
Manufacturing Overhead(a)	14,400
Admin. Costs(b), Contingencies	1,400
Sales Costs(c), Bad Debts	700
Depreciation on Fixed Capital	2,500
Total	$ 36,000

b. Annual Sales Revenue $ 50,000

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

PLANT LAYOUT

ARROWS INDICATE WORK FLOW



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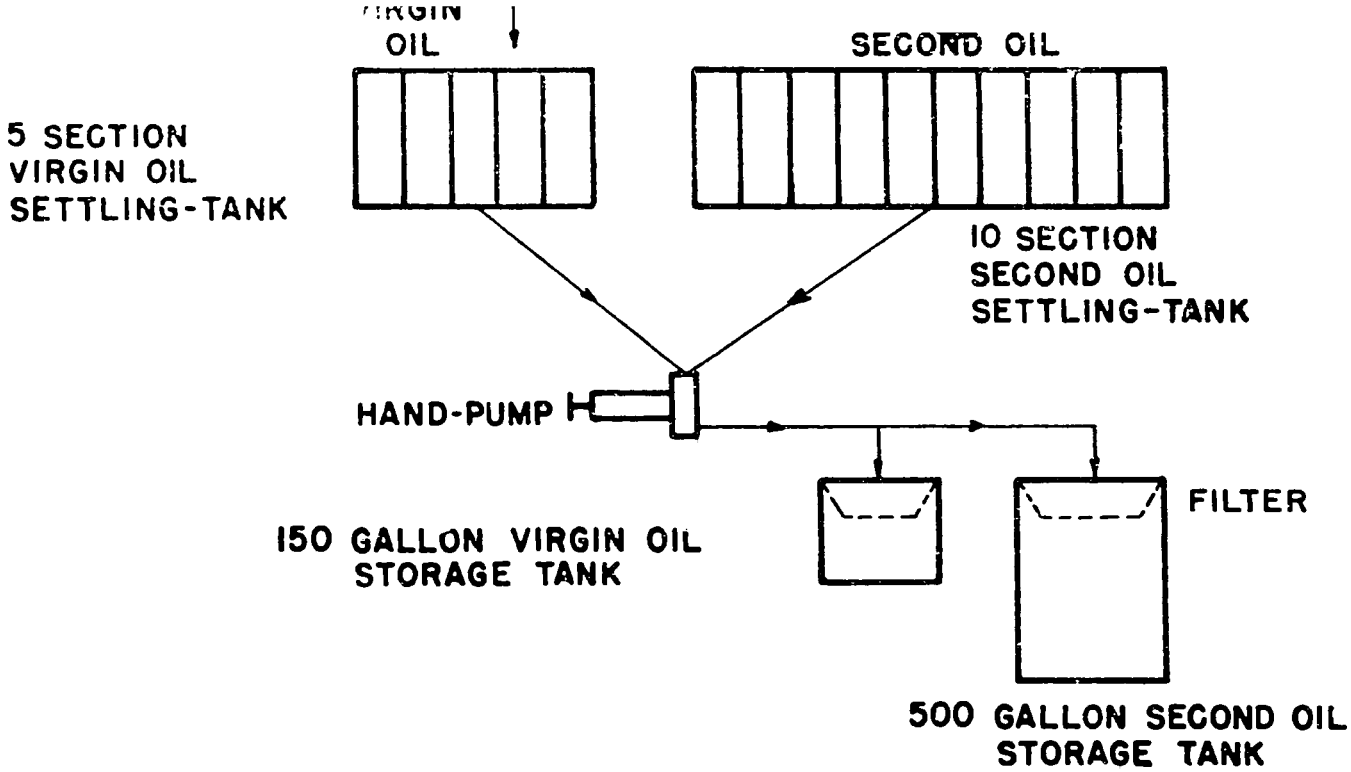

A one story building 60′ × 70′ is required.

S.I.C. 2096

CRUDE OLIVE OIL: S. I. C. 2096

SELECTED REFERENCES

I. TEXTBOOKS

A. Vegetable Fats and Oils. E. W. Eckey. 1954. 836 p. Illus. $17.50.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, N. Y.
Equipment and production methods for the marketing of vegetable, fruit and other oils.

B. Forest Products. N. C. Br[illegible]n. 1950. 399 p. Illus. $6.50.
John Wiley & Sons, Inc.
440 Fourth Avenue
New York 16, N. Y.
Includes information on the processing of tree products, such as olives.

C. Industries Oil and Fat Products. A. E. Bailey. 1951. 967 p. Illus. $16.50.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 2, N. Y.
Descriptions of process of extraction of various vegetable and fruit oils.

D. The Chemistry and Technology of Food and Food Products. M. B. Jacobs, Editor. Vol. II. 1951. 960 p. Illus. $20.00.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 2, N. Y.
Operations, equipment and processes in the preparation of foods including oils, fats, and related products.

II. TECHNICAL PAPERS

A. The New Approach to Quality Control. Gratis.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N. Y.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Foreign Crops and Markets. Monthly Supplement. April 27, 1961. 31 p. Gratis.
Foreign Agriculture Service
Department of Agriculture
Washington, D. C. 20250
Statistics on world production of olive oil, particularly in the Mediterranean area which produces approximately 95 percent of the world's supply.

SELECTED REFERENCES (Continued)

IV. PERIODICALS

A. Industrial and Engineering Chemistry. Monthly. $5.00/year.
American Chemical Society
1155 16th Street, N. W.,
Washington, D.C. 20036
Articles on latest processes relating to fruits, vegetables, and nuts preparing for the market.

B. Journal of the American Chemical Society.
American Chemical Society
1155 16th Street, N. W.,
Washington, D.C. 20036
Includes research reports and other technical data on methods and equipment in the production of vegetable and fruit oils.

V. U. S. PATENTS

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

A. Patent No. 2,917,992. 1959. 11 p.
Multi-chamber press for separating oil from vegetable and fruit oil bearing materials.

B. Patent No. 2,799,218 1957. 6 p.
Oil extraction apparatus and process.

C. Patent No. 2,538,591. 1951. 8 p.
Method and apparatus for extracting juice and oil.

VII. TRADE ASSOCIATIONS

A. Institute of Shortening and Edible Oils.
2000 K Street, N.W.,
Washington, D.C. 20036

B. Olive Oil Association of America
51 Chambers Street
New York 7, N.Y

VIII. ENGINEERING COMPANIES

A. Morris and Van Wormer
25 Broad Street
New York 4, N.Y.
Designs and constructs crude olive oil processing plants.

IX. DIRECTORIES

A. Olive Oil Processors List. Free to Association Members.
Olive Oil Association of America
New York 7, N.Y.

CRUDE OLIVE OIL: S.I.C. 2096

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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Springfield, Virginia 22151

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GENERAL INFORMATION

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

INDUSTRY PROFILES

KITCHEN CABINETS

I. P. No. 66086

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.

KITCHEN CABINETS: Standard Industrial Classification 2511

A. PRODUCT DESCRIPTION

Kitchen cabinets, made of wood, of various designs and sizes.

B. GENERAL EVALUATION

Capital requirements for this industry are modest. Labor skills needed are moderately high, but workers familiar with woodworking can usually be found without much trouble. The market for this product will be domestic only, and the potential market area will generally be rather restricted geographically. Many areas may not provide markets capable of absorbing the total capacity of this plant if it is concentrated solely on production of kitchen cabinets. However, such a plant can be used for the making of other kinds of wooden equipment, and it may in some cases be feasible to combine production of kitchen cabinets with that of other articles.

C. MARKET ASPECTS

1. USERS. Households, eating places of various kinds.

2. SALES CHANNELS AND METHODS. Sales to building contractors, and to stores supplying household equipment.

3. GEOGRAPHICAL EXTENT OF MARKET. These products are cumbersome and rather expensive to transport. Normally the market will be domestic only and within the country will be mainly restricted to an area that can be easily covered by truck delivery, although some deliveries may be made to places easily accessible by rail. Such factory-made wooden products can bear only a limited amount of transport costs since they generally soon meet competition from small woodworking establishments that may be quite competitive in their own localities.

4. COMPETITION. No competition need be expected from imports. Competition from small woodworking establishments may restrict the makret area of a factory making products of this kind. Metal cabinets increasingly compete with wood ones. But in many economically less developed areas wood is more readily procurable than metal, and is often relatively cheaper.

5. MARKET NEEDED FOR PLANT DESCRIBED. As mentioned above, the geographical area of the market for a plant like this is often quite limited. Also for less developed areas these cabinets are somewhat high-priced and they may be suitable for only a percentage of the homes. In such conditions a fairly modern urban area, with at least average growth rate and new construction keeping up with population, and containing a total population of the order of two million people, may be needed to provide a market for this plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 5,000 Units

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 7,500 sq. ft.		$ --
Building. One story, 50'x60'.		18,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$9,000	
Other tools & equipmt.	2,300	
Furniture & fixtures	700	12,000
Total (excl. Land)		$ 30,000

Principal Items. Cutoff saw, jointer, rip saw, planer, trim saw, band saw, drill press, dado heat, glue reel, hand belt table sander, hand groover, electric drill, electric screwdriver, assembly press, spray booth.

b. WORKING CAPITAL

	No. of Days	
Direct Materials Direct Labor, Mfg. Overhead(a)	60	$ 23,800
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,300
Training Costs		4,900
Total Working Capital		$ 31,000

c. TOTAL CAPITAL (EXCL. LAND) $ 61,000

2. MATERIALS AND SUPPLIES

a.

Direct Materials	Annual Requirements	Annual Cost
Lumber	650,000 bd. ft.	$ 65,000
Hardware		2,000
Glue		2,000
Finishing materials		3,000
Total		$ 72,000

b. Supplies

Lubricants & hand tools	$ 100
Cutting tools & sandpaper	1,500
Maintenance & spare parts	900
Office supplies	200
Total	$ 2,700

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 40 hp.	$ 1,200
b. Fuel. Scrap wood.	
c. Water. For glue, sanitation & fire protection.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. Good highway & easily accessible railroad desirable.

5. MANPOWER

a.

Direct Labor	Number	Annual Cost
Skilled	3	$ 15,000
Semi-skilled	7	28,000
Unskilled	2	6,000
Total	12	$ 49,000

b.

Indirect Labor		
Manager & supervisor	2	$ 14,000
Office	1	4,000
Total	3	$ 18,000

c. Training Needs. Manager & supervisor should be well experienced. With 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. Annual Costs

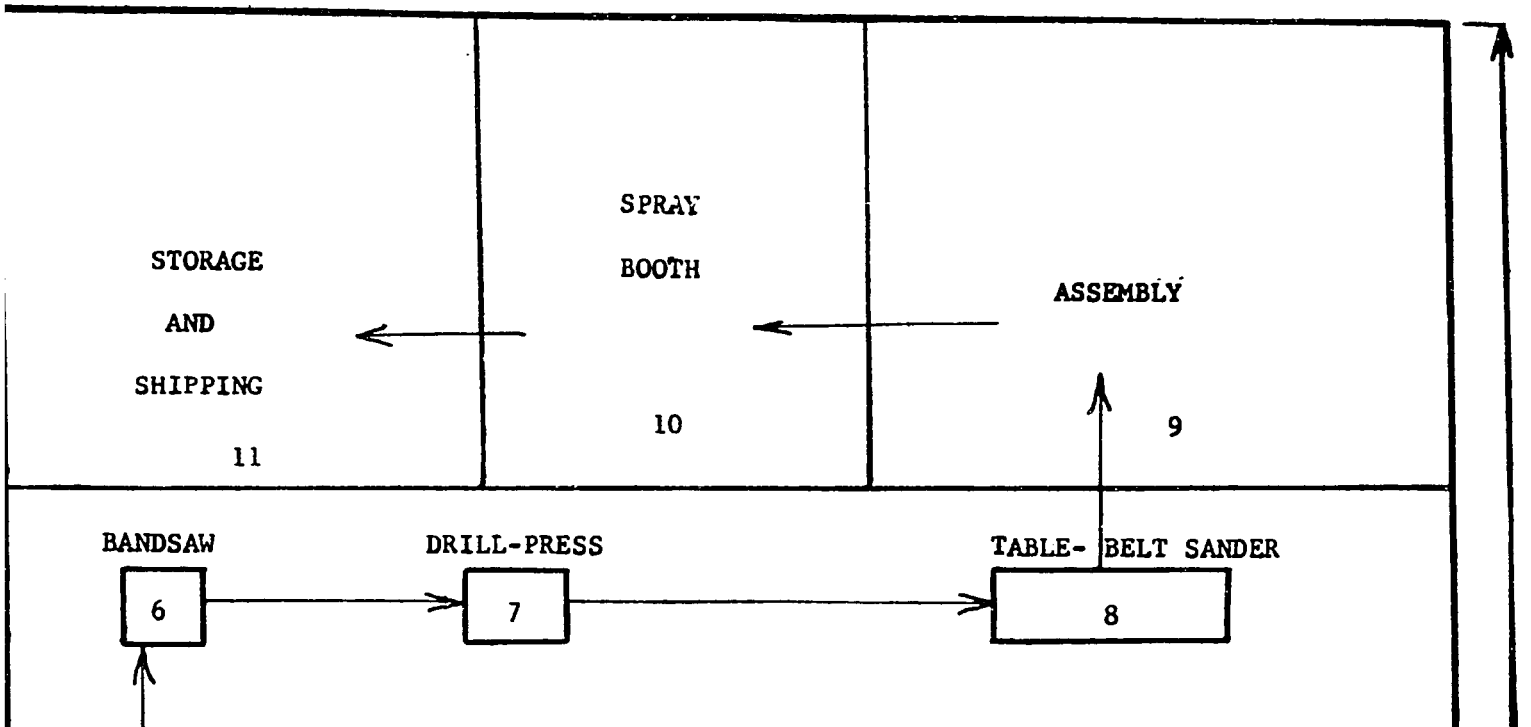
Direct Materials	$ 72,000
Direct Labor	49,000
Manufacturing Overhead (a)	22,000
Admin. Costs(b), Contingencies	9,000
Sales Costs(c), Bad Debts	20,000
Depreciation on Fixed Capital	2,300
Total	$174,300

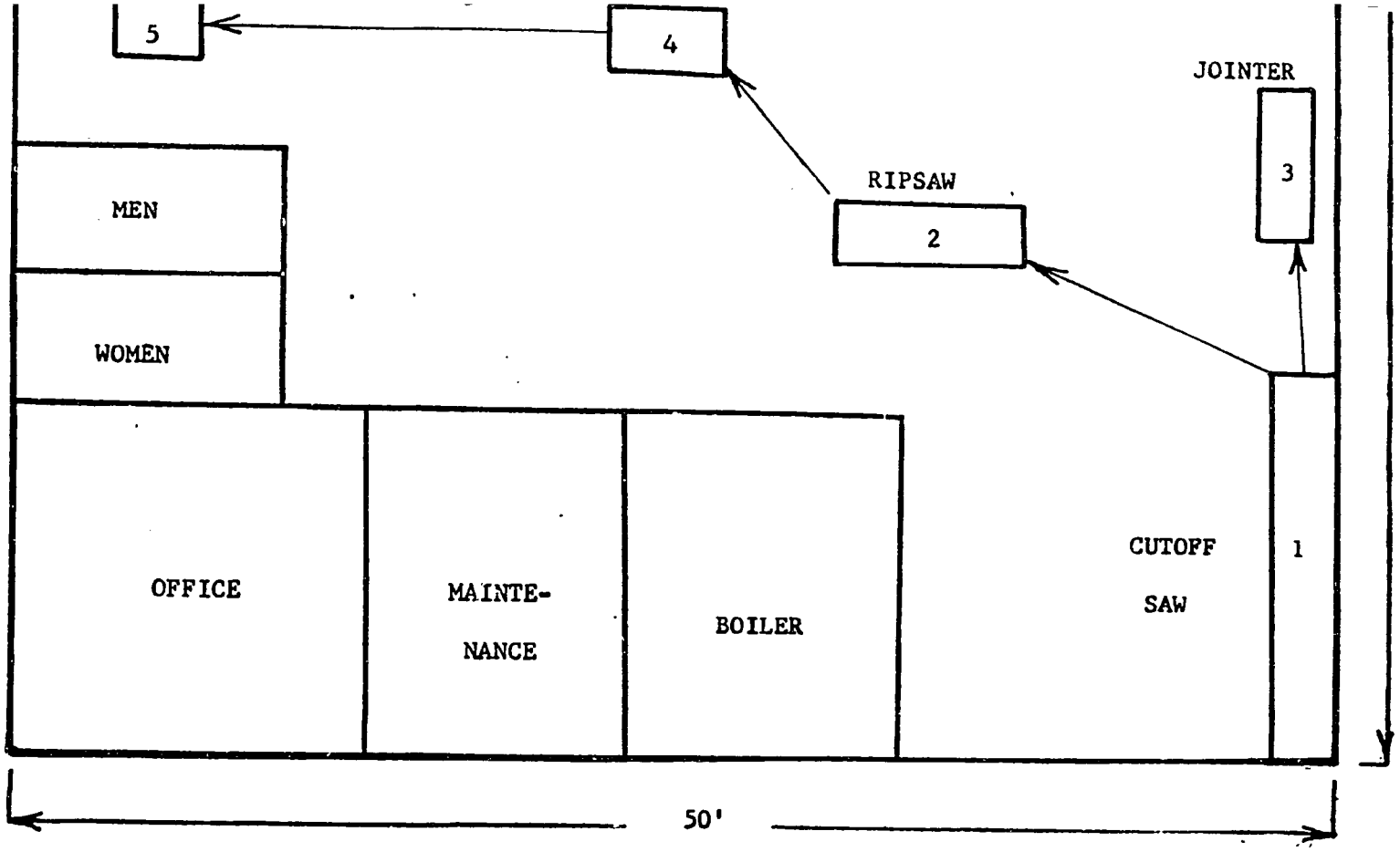
b. Annual Sales Revenue $225,000

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

PLANT LAYOUT

ARROW INDICATES WORK FLOW




5
4
JOINTER
3
RIPSAW
2
MEN
WOMEN
OFFICE
MAINTE-
NANCE
BOILER
CUTOFF
SAW
1
50'

TS: S.I.C. 2511

KITCHEN CABINETS: S.I.C. 2511

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I. TEXTBOOKS

A. Cabinet Making and Millwork. A. Dahl and J. D. Wilson. 1956. 352 p. Illus. $6.50.
American Technical Society
848 East 58th Street
Chicago 37, Illinois
Toolt, layout, lumber, materials, and construction of cabinets.

B. How to Build Modern Kitchen Cabinets. J. Gunnerman. 1948. 41 p. Illus. $2.00.
Home Craftsman Publishing Corporation
115 Worth Street
New York 13, N. Y.
Detailed description of materials, tools, and processes for the making of kitchen cabinets.

C. Woodworking for Everybody. J. G. Shea. $4.96.
D. Van Nostrand Company
120 Alexander Street
Princeton, New Jersey
Describes tools, techniques, and working directions.

D. Woodwork Visualized. R. C. Cramlet. 1950. 158 p. Illus. $3.00.
Bruce Publishing Company
400 North Broadway
Milwaukee 1, Wisconsin
Common hand woodworking operations, and the tools with which they are performed.

II. GOVERNMENT PUBLICATIONS, U. S.

A. Kitchen Cabinets - Wood and Steel. 1961. Gratis.
Bureau of Yards and Docks
Department of the Navy
Washington, D. C. 20370
Specifications for kitchen cabinets for family housing.

III. PERIODICALS

A. Woodworking. Monthly. $4.00/year.
Hitchcok Publishing Company
Wheaton, Illinois
Current information on tools, materials, and processes in the woodworking field.

B. The Wood-Worker. Monthly. $3.00/year.
S. H. Smith Company
2232 North Meridian Street
Indianapolis 7, Indiana

IV. U. S. PATENTS

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

A. Patent No. 2,474,101. 1949. 4 p.
The manufacture of a kitchen cabinet having compartment with pedal operated closure.

B. Patent No. 1,621,491. 1927. 4 p.
Manufacture of kitchen cabinets.

V. TRADE ASSOCIATIONS

A. National Kitchen Cabinet Association
1924 Commonwealth Building
Louisville 2, Kentucky

VI. ENGINEERING COMPANIES

A. Forest Products Engineering Company
431 South Dearborn Street
Chicago, Illinois
Consultants, design-engineers for lumber consuming industries.

VII. DIRECTORIES

A. Kitchen Business Directory Issue. $1.00.
Gralla Publications
75 West 45th Street
New York 36, N. Y.
Lists 1,000 suppliers to kitchen cabinet industry.

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
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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

MAYONNAISE

I. P. No. 66087

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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.

MAYONNAISE: Standard Industrial Classification 2035

A. PRODUCT DESCRIPTION

Emulsified semi-solid food made from egg yolk, salad oil, vinegar and seasonings, and containing not less than 65 percent of vegetable oil by weight. Packaged in half-pint and quart glass containers.

B. GENERAL EVALUATION

This industry requires only a modest investment. Labor skills needed are of a moderately high order. Local production of most important materials is not essential, though advantageous. The plant described is a small unit, but since the product is a semi-luxury the number of economically less developed areas that will be able to supply a market for its output may be small.

C. MARKET ASPECTS

1. USERS. Households, eating places.

2. SALES CHANNELS AND METHODS. Sales usually to wholesale food distributors. A well chosen brand name is desirable.

3. GEOGRAPHICAL EXTENT OF MARKET. a Domestic. Transport costs are moderate in relation to value. Market area may be nationwide. b. Export. Most of the countries in which mayonnaise is eaten in substantial quantities are capable of making their own, and exports are minor.

4. COMPETITION. a. Domestic Market. Competition from imports will not be important if the domestic product is of good quality. b. Export Market. The export market is very limited and it is highly unlikely that a plant on this scale would be able to make any export sales.

5. MARKET NEEDED FOR PLANT DESCRIBED. The demand for this produ will depend not only on income levels but the food habits of the people. This plant might need a total population of the order of a million to provide it with a market.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION : 250,000 Pounds

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 5,000 sq. ft.		$ --
Building. One story, 1,600 sq. ft. & with 15' clearance. Floor must be concrete & sloped for drainage. Walls & ceilings whitewashed concrete.		10,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipment. $13,000		
Furniture & fixtures	700	13,700
Total (excl. Land)		$ 23,700

Principal Items. Batching meter, platform scale, spice scale, jar screw-capper, jar cleaning machine, jar labeling machine, sanitary transfer pails, sanitary drum emptying pump, edible oil blending & feed tank, batch mixer, sanitary product transfer pump, filling machine - non-automatic, sanitary piping & fittings, storage freezer & cold box, washing sink & racks.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 13,100
Admin. Costs(b), Contingencies, Sales Costs(c)	30	900
Total Working Capital		$ 14,000

c. TOTAL CAPITAL (EXCL. LAND) $ 37,700

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Egg yolk	17,000 lbs.	$ 8,750
Salad oil	198,250 lbs.	33,700
Vinegar (10%)	10,000 lbs.	300
Mustard flour	2,250 lbs.	565
Salt	2,750 lbs.	55
Sugar (pure cane)	3,750 lbs.	375
Pepper (white)	275 lbs.	140
Paprika	225 lbs.	125
Nitrogen gas (purified)	50,000 cu. ft.	2,000
Containers, labels & packaging		14,340
Total		$ 60,350

b. Supplies

Lubricants & hand tools	$ 100
Maintenance & spare parts	300
Office supplies	100
Total	$ 500

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. About 77 kw-hr daily.	$ 400
b. Fuel. About 4,000 gals. oil, or equivalent, annually for hot water in production, and for general purposes.	$ 500
c. Water. Process, 2,500 gals. Cooling & washing, 250,000 gals. All water must be potable.	$ 200

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	2	$ 10,000
b. Indirect Labor		
Manager	1	$ 7,000

c. Training Needs. Manager should be well experienced. No training time required.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

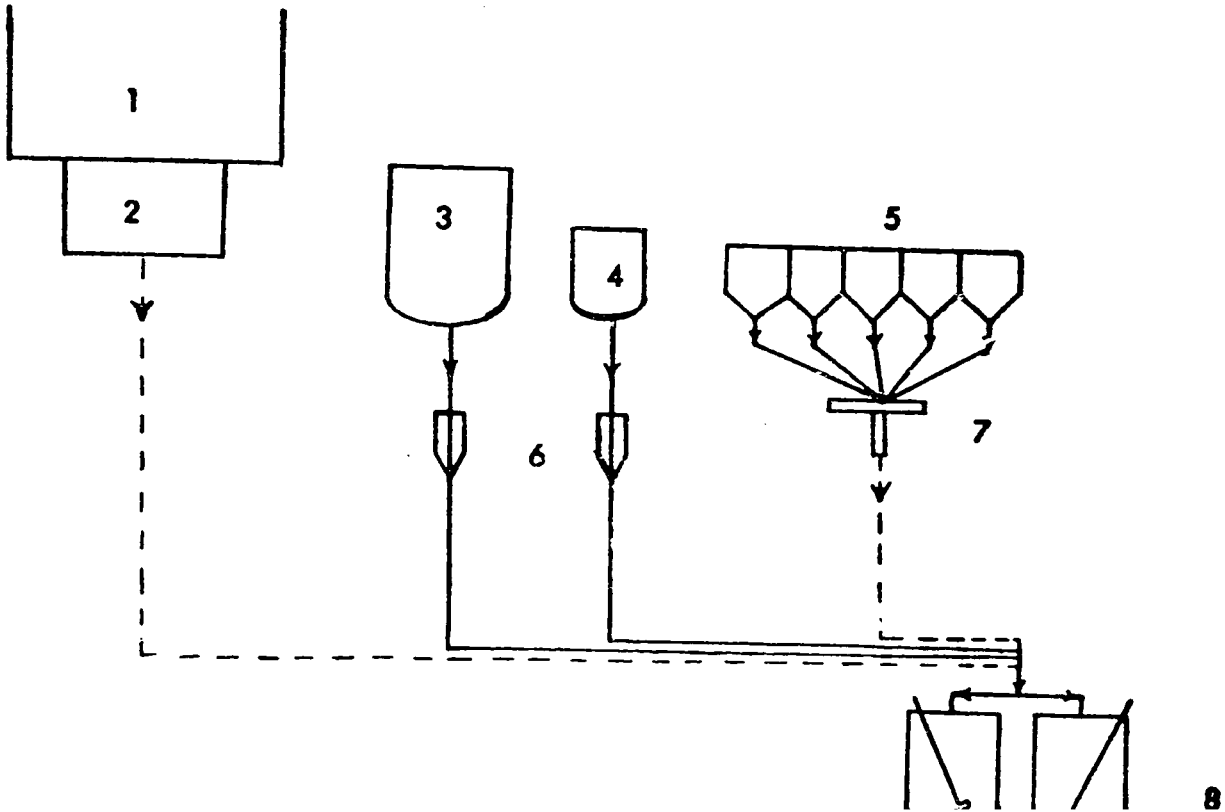
Direct Materials	$ 60,350
Direct Labor	10,000
Manufacturing Overhead(a)	8,600
Admin. Costs(b), Contingencies	2,800
Sales Costs(c), Bad Debts	8,200
Depreciation on Fixed Capital	1,900
Total	$ 91,850

b. Annual Sales Revenue $120,000

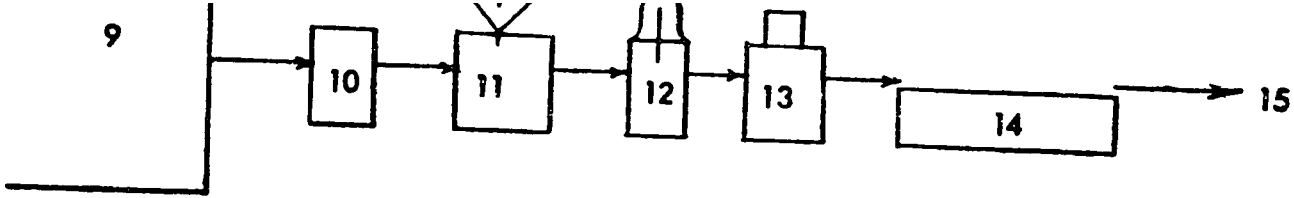
NOTES. (a) Includes Supplies, Power, Water, Fuel, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Freight Out, Travel.

MAYONNAISE: S.I.C. 2035

ARROWS INDICATE FLOW OF WORK



MAYO



KEY

1. Egg Yolk Frozen Storage
2. Yolk Thawing Chamber
3. Oil Feed Tank
4. Vinegar Feed Tank
5. Condiment Bins
6. Fluid Meters
7. Condiment Scale
8. "Continuous" Processing Unit
9. Jar & Case Storage
10. Jar Cleaner
11. Product Filler
12. Jar Capper
13. Jar Labeller
14. Case Filling & Sealing
15. To Shipping

DIMENSIONS OF BUILDING 40′ × 40′

MAYONNAISE: S.I.C. 2035

SELECTED REFERENCES

.I TEXTBOOKS

A. Food Technology. S. C. Prescott and B. E. Proctor. 1937. 630 p. Illus. $12 00.
McGraw-Hill Book Company
330 West 42nd Street
New York 36, N. Y.
Devoted to the technology of food, including mayonnaise. Covers sources, methods of handling and manufacture.

II. PERIODICALS

A. Food Technology. Monthly. $12.00/year.
The Institute of Food Technologists
510 North Hickory Street
Champaign, Illinois
Scientific journal dealing with processing and research on food materials.

B. Food Engineering. Monthly. $20.00/year.
McGraw-Hill Publishing Company, Inc.
330 West 42nd Street
New York 36, N. Y.
Technical magazine for management in manufacturing, packeging and marketing food products.

III. GOVERNMENT PUBLICATIONS, U. S.

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 quality control in industry.

IV. OTHER PUBLICATIONS

A. Vegetable Fats and Oils. E. W. Eckey. 1954. 864 p. $17.50.
The Avi Publishing Company, Inc.
P. O. Box 388
Westport, Connecticut
Devoted to the chemistry and uses of vegetable fats and oils.

V. U. S. PATENTS

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

A. Patent No. 2,944,906. 1960. 4 p.
Mayonnaise product and method of manufacture.

B. Patent No. 2,781,270. 1957. 4 p.
Manufacture of mayonnaise.

C. Patent No. 2,264,593. 1941. 4 p.
Mayonnaise and method of manufacturing same.

D. Patent No. 1,883,367. 1932. 1 p.
Method of stabilizing the consistency of mayonnaise.

VI. TRADE ASSOCIATIONS

A. National Association of Food Equipment Manufacturers,
333 No. Michigan Avenue
Chicago, Illinois 60601

VII. ENGINEERING COMPANIES

A. The Hobart Manufacturing Company
1221 Hobart Road
Troy, Ohio
Manufacturers of machinery and equipment for the production of mayonnaise.

B. Chemicolloid Laboratories
55 Herricks Road
Garden City Park
Long Island, N. Y.
Mayonnaise consultants.

VIII. DIRECTORIES

A. Directory of the Edible Oil Industry in the United States. Published every three years. $1.00.
Institute of Shortening and Edible Oils, Inc.
1145 19th Street, N. W.
Washington 6, D. C.
Lists companies processing edible oils in the United States.

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INDUSTRY PROFILES

NYLON HOSIERY

I. P. No. 66088

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NYLON HOSIERY: Standard Industrial Classification 2251

A. PRODUCT DESCRIPTION

Full-fashioned nylon hosiery, made from purchased nylon yarn.

B. GENERAL EVALUATION

This plant requires a moderately large capital. It also calls for a fair amount of skilled labor. A plant of this size would have little chance of competing successfully in international trade with large-scale plants. Suitability to a particular area will almost certainly depend on volume of local demand. In low-income areas nylon hosiery falls within the luxury goods category, and though the capacity of this plant is small by the general standards of the industry, in some areas it may be difficult to find a market for its output. Market potential should therefore be carefully investigated.

C. MARKET ASPECTS

1. SALES CHANNELS AND METHODS. Large stores may be supplied direct. Most sales, however, will probably be made to wholsalers. A distinctive and attractive brand name is desirable. Some advertising, e.g. in suitable magazines, will often be useful.

2. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Product is very easy to handle and transport costs are low in relation to value. Domestic market is normally nationwide. b. Export. This product has a world-wide market.

3. COMPETITION. a. Domestic Market. Competition is likely to be keen. If other hosiery materials should be developed as a substitute for nylon, knitting plants could probably be readily adapted to their use. b. Export Market. Competition is keen between large-scale manufacturers of this product in U.S., Western Europe and Japan. This plant could not be expected to compete successfully with large exporting concerns in these countries, with their large resources and extensive experience in overseas markets.

4. MARKET NEEDED FOR PLANT DESCRIBED. Demand will be influenced among other things, by income, extent of urbanization, climate, type of dress usually worn, age structure of the population. In tropical areas, women even in the relatively high income groups rarely wear stockings. In many other place only a small proportion of the population can afford to wear nylon hosiery. In terms of total population, therefore, in many areas this plant would meet the needs for nylon hosiery of several million people.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: 30,000 Dozen Pairs

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 8,000 sq. ft.		$ --
Building. One story, 40'x80'.		19,200
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$154,000	
Other tools & equipmt.	1,000	
Furniture & fixtures	800	155,800
Total (excl. Land)		$175,000

Principal Items. Full fashion machines - 20 heads(4), seaming machines(3), automatic inspection machine, dye machines - 25 lb capacity(2), dye machine - samples, extractor, pre-setting cabinet, pre-boarding machine, welt printers, box printer, boiler.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 30,100
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,400
Training Costs		8,500
Total Working Capital		$ 41,000

c. TOTAL CAPITAL (EXCL. LAND) $216,000

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements.	Annual Cost
15 Denier Nylon(body)	7,854 lbs.	$ 41,300
40 Denier Nylon(welt)	7,854 lbs.	31,700
Packing materials		5,000
Total		$ 78,000

b. Supplies

Maintenance & repair parts	$ 700
Lubricants & hand tools	100
Office supplies	200
Total	$ 1,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 40 hp.	$ 1,200
b. Fuel. Small steam boiler needed in production.	$ 300
c. Water. For boiler & general purposes.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	6	$ 30,000
Semi-skilled	6	24,000
Unskilled	6	18,000
Total	18	72,000
a. Indirect Labor		
Manager & supervisors	3	$ 20,000
Office	1	4,000
Other	1	4,000
Total	5	$ 28,000

b. Training Needs. Manager & 2 supervisors should be fully experienced. Together with 3 skilled workers they should be able to train all operators. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

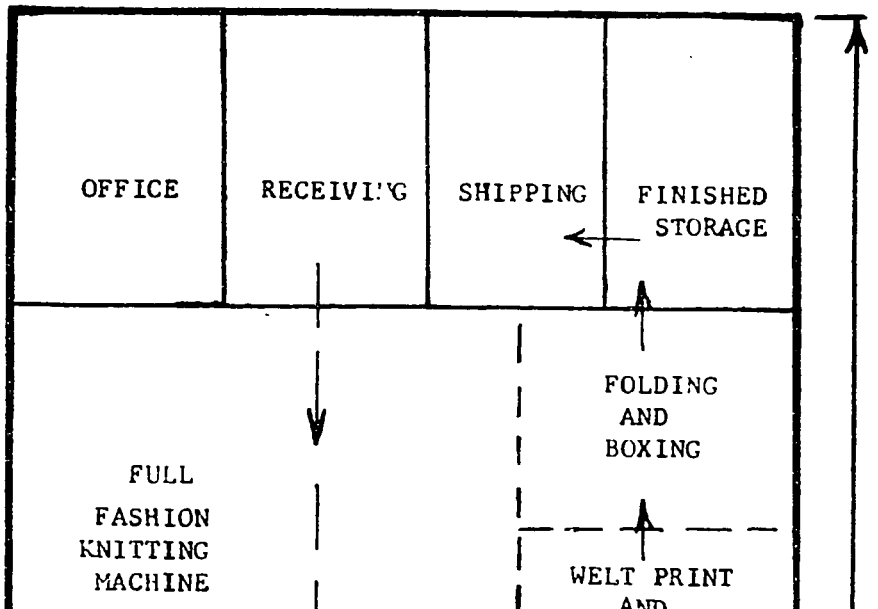
Direct Materials	$ 78,000
Direct Labor	72,000
Manufacturing Overhead(a)	30,600
Admin. Costs(b), Contingencies	15,000
Sales Costs(c), Bad Debts,	18,000
Depreciation on Fixed Capital	16,700
Total	$230,300

b. Annual Sales Revenue $300,000

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

PLANT LAYOUT

ARROWS INDICATE WORK FLOW



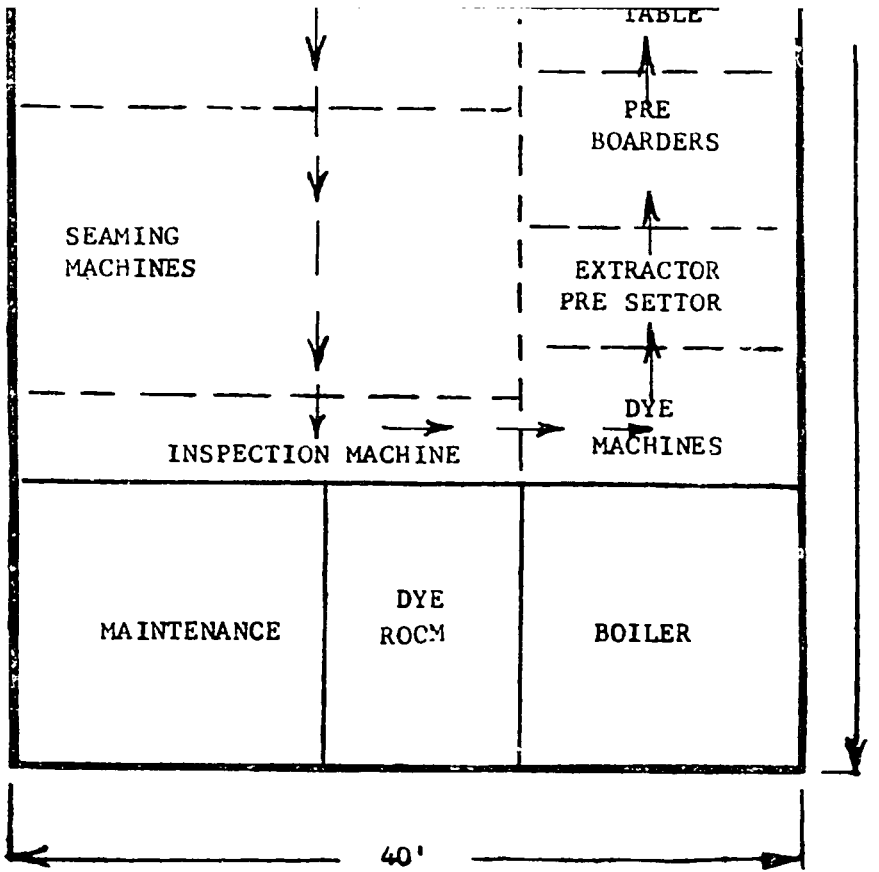


TABLE
PRE
BOARDERS
SEAMING
MACHINES
EXTRACTOR
PRE SETTOR
DYE
MACHINES
INSPECTION MACHINE
MAINTENANCE
DYE
ROOM
BOILER
40'

NYLON HOSIERY: S.I.C. 2251

SELECTED REFERENCES

I. TEXTBOOKS

A. Nylon Technology. K. H. Inderfurth. 1953. 335 p. Illus. $6.50.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N. Y.
Development of nylon. Includes nylon full-fashioned hosiery knitting.

B. Fiber to Fabric. M. D. Potter and B. P. Corbman. 3rd edition.
1959. 342 p. $5.20.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N. Y.
Weaving and finishing of many natural, manmade, and synthetic fibers and fabrics. Discussion includes nylon.

C. American Handbook of Synthetic Textiles. H. R. Mauersberger. 1952.
1277 p. Illus. $9.80.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, N. Y.
Manufacture of nylon yarns and staple. Manufacture of synthetic fibers, filaments and yarns (other than nylon). Warping and ward sizing. Grey goods construction.

II. GOVERNMENT PUBLICATIONS, U. S.

A. Quality Control. TB-66. May 1960. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523
Training manual on the subject of quality control in industry.

III. PERIODICALS

A. Hosiery Industry Weekly. $5.00/year.
Howes Publishing Company, Inc.
44 East 23rd Street
New York 10, N.Y.
Covers all phases of the hosiery industry.

B. Hosiery and Underwear Review. Monthly. $10.00/year.
The Knit Goods Publishing Co.
307 Fifth Avenue
New York 16, N.Y.
Covers the manufacture and distribution of hosiery and underwear.

SELECTED REFERENCES (Continued)

IV. U.S. PATENTS

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

A. Patent No. 2,980,981. 1961. 9 p.
Method of making nylon hosiery.

B. Patent No. 2,980,918. 1961. 6 p.
Method of making hosiery from nylon and other fine denier yarn.

C. Patent No. Re 24737. 1959. 6 p.
Manufacturing ladies full-fashioned nylon hosiery.

D. Patent No. 2,729,824. 1956. 3 p.
Manufacture of hosiery from nylon or other polyamide silk fabric.

V. TRADE ASSOCIATIONS

A. National Association of Hosiery Manufacturers
901 Johnston Building
Charlotte 2, North Carolina

VI. ENGINEERING COMPANIES

A. Textile Machine Works
Reading, Pennsylvania
Manufacturers of machinery for full-fashioned hosiery.

B. Scott and Williams, Inc.
Laconia, New Hampshire
Machinery for nylon hosiery.

VII. DIRECTORIES

A. Davison's Knit Goods Trade. Annual. $7.75.
Davison Publishing Company
Ridgeway, New Jersey
Lists 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 for the knitting industry.

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NDUSTRY PROFILES

OFFICE CHAIRS

I. P. No. 66089

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OFFICE CHAIRS: Standard Industrial Classification 2521

A. PRODUCT DESCRIPTION

Standard type wooden swivel office chairs.

B. GENERAL EVALUATION

Skilled labor needs are moderate. From the production viewpoint, this industry wou probably be within the capabilities of many economically less developed areas. Ho ever, the market for this product is predominantly local, and a fairly large commer- cial and administrative area within easy delivery range is usually necessary to provi a sufficiently large market.

C. MARKET ASPECTS

1. USERS. Offices of various kinds.

2. SALES CHANNELS AND METHODS. Bulk of sales will be made to dealer in office furniture. Some direct sales may be made to large users, such as gover nment offices.

3. GEOGRAPHICAL EXTENT OF MARKET. This product is cumbersome t transport and the market will generally be mainly a local one. This product is rare in international trade.

4. COMPETITION. Competition from imports is unlikely. Main competition wil come from cheaper kinds of chairs.

5. MARKET NEEDED FOR PLANT DESCRIBED. A market for the produ tion of a plant of this type and size will exist only in a large and comparativel modern commercial and administrative center.

PRODUCTION REQUIREMENTS

INUAL CAPACITY - THREE-SHIFT OPERATION : 12,500 Chairs

CAPITAL REQUIREMENTS

FIXED CAPITAL

		Cost
Land. About 2- acres.		$ --
Building. One story, 80'x100'.		
Drying kiln.		50,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipment	$40,000	
Other tools & equipmt.	4,000	
Furniture & fixtures	1,000	45,000
Total (excl. Land)		$ 95,000

Principal Items. Cutoff saw, rip saw, ointer, planer, band saw, 2 trim saws, haper, horizontal boring machine, up-ight boring machine, single end tenoner hain mortiser chain mortiser grinder, nife grinder, saw filer, bench grinder, lue reel, tongue & groover, 3-drum ander, table belt sander, bending quipment, boiler, assembling presses, pray booth, drum sander.

WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 29,400
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,500
Training Costs		8,600
Total Working Capital		$ 40,500

TOTAL CAPITAL (EXCL. LAND) $ 135,500

MATERIALS AND SUPPLIES

Direct Materials	Annual Requirements	Annual Cost
umber	200,000 bd. ft.	$ 46,000
lardware, including swivels		10,000
ilue		2,000
inishing materials		5,000
Total		$ 63,000
upplies		
ubricants & hand tools		$ 100
utting tools & abrasives		600
andpaper		1,500
laintenance & spare parts		2,000
ffice supplies		300
Total		$ 4,500

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 100 hp.	$ 3,000
b. Fuel. Scrap wood.	
c. Water. For glue, heating, sanitation & fire protection.	$ 200

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. Good highway & easy access to railroad desirable.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	6	$ 30,000
Semi-skilled	8	32,000
Unskilled	4	12,000
Total	18	$ 74,000
b. Indirect Labor		
Manager & supervisors	3	$ 20,000
Office	1	4,000
Other	2	7,000
Total	6	$ 31,000

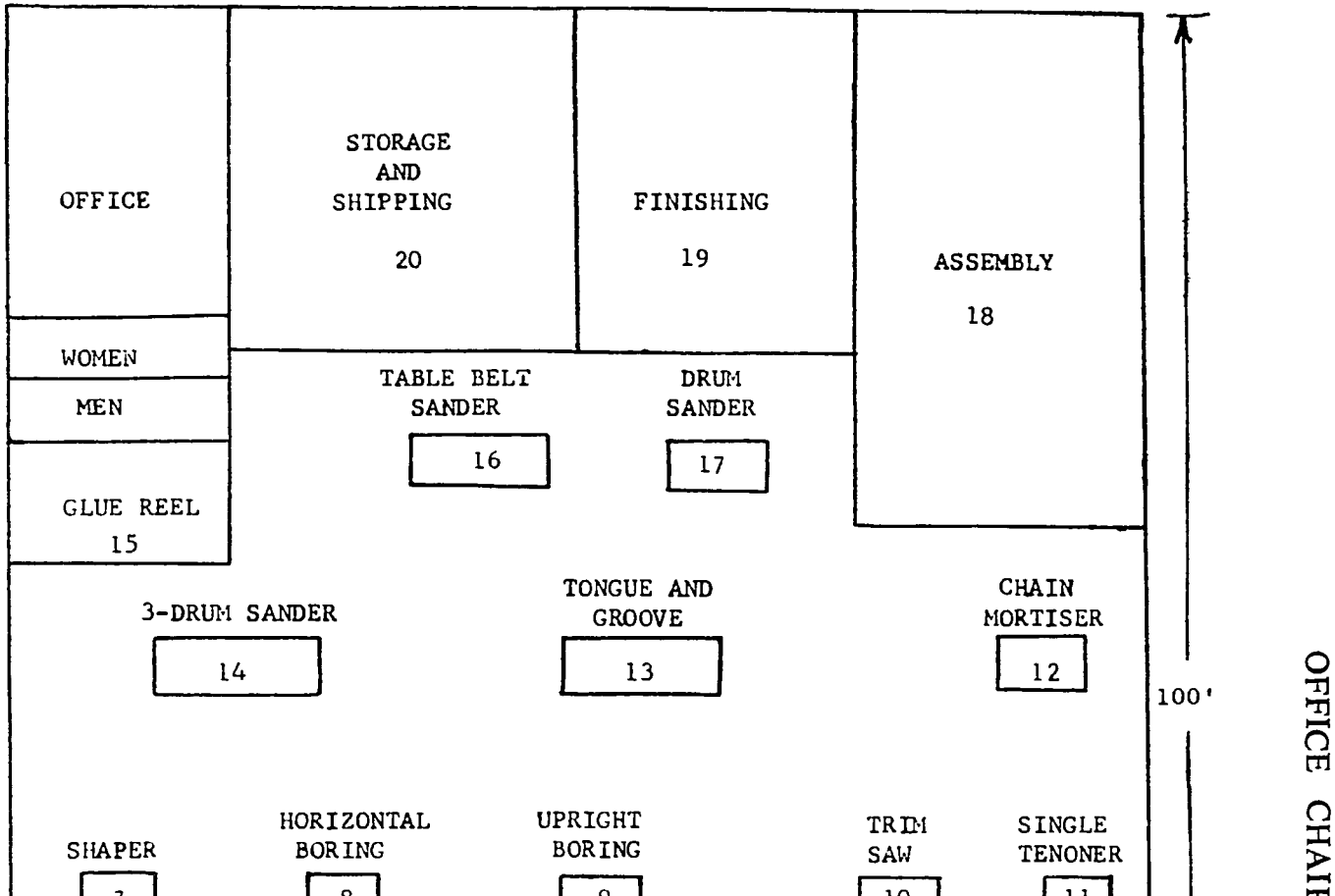
c. Training Needs. Manager and 2 supervisors must be experienced. With help of 3 skilled workers, they should be able to do all necessary labor training. Plant should reach full production in 2 months.

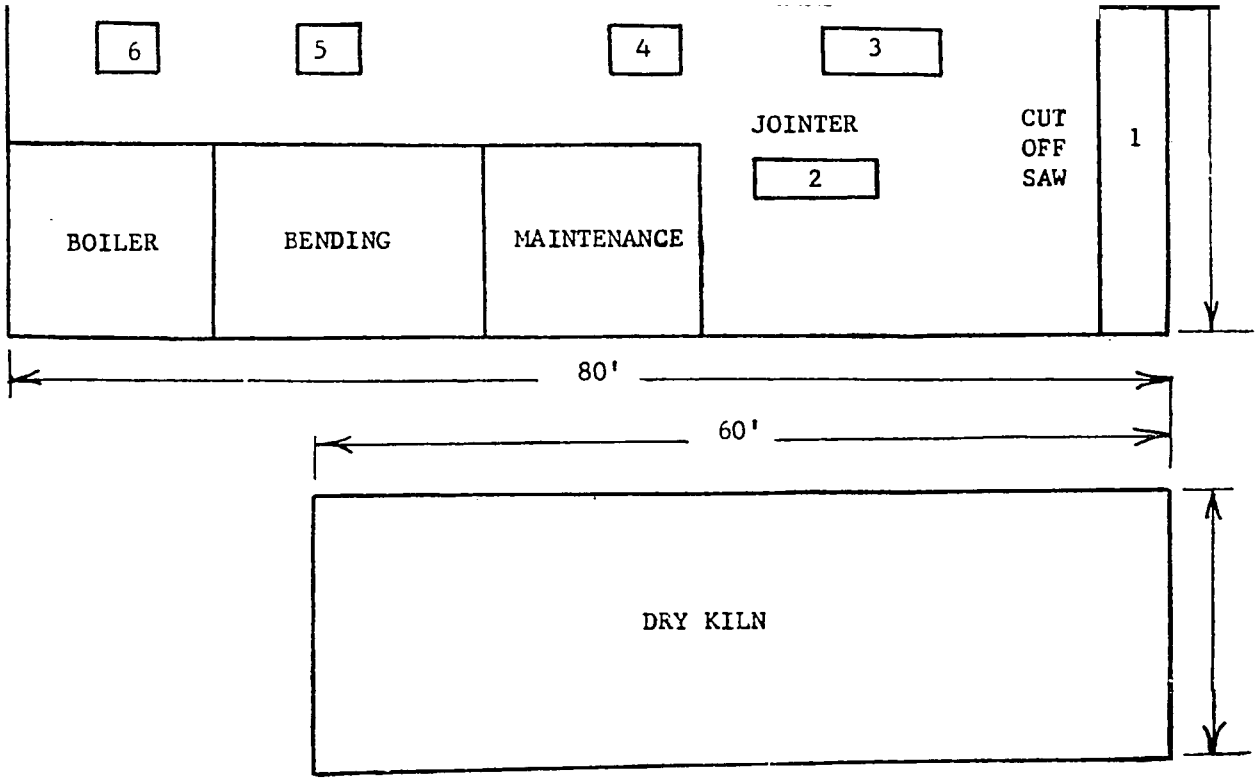
6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	$ 63,000
Direct Labor	74,000
Manufacturing Overhead(a)	38,700
Admin. Costs(b), Contingencies	10,500
Sales Costs(c), Bad Debts	20,000
Depreciation on Fixed Capital	7,100
Total	$213,300
b. Annual Sales Revenue	$ 250,000

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

PLANT LAYOUT AND WORK FLOW





The flow of production in this plant can not be considered as a constant straight line flow, since some of the parts will not require operations on every machine. The flow will always start with 1 and end at 20, but some parts will require only a few operations. However, there will not be any backtracking.

OFFICE CHAIRS: S. I. C. 2521

SELECTED REFERENCES

I. TEXTBOOKS

A. Chairs. G. Nelson. 1953. 174 p. Illus. $10.00.
Franklin Watts
575 Lexington Avenue
New York 22, N. Y.
Materials, tools, construction operations.

B. The Cabinetmakers Treasury. F. E. Hoard and A. W. Marlow. 1952. 267 p. Illus. $6.50.
The Macmillan Company
60 Fifth Avenue
New York 11, N. Y.
Fundamental operations and detailed procedures for making chairs and other furniture.

C. Modern Office Appliances. V. E. Jackson. 1950. 372 p. Illus. $3.75.
Edward W. Sweetman Company
1 Broadway
New York 4, N. Y,
Specifications and production of office appliances and furniture.

D. Woodworking with Machines. J. H. Douglass. 1960. 181 p. Illus. $4.20.
Taplinger Publishing Co., Inc.
119 W. 57th Street
New York, N. Y. 10019
Materials, equipment, production operations for various pieces of furniture including home and office chairs.

II. GOVERNMENT PUBLICATIONS, U. S.

A. Office Chair-Wood-Rotary. No. AA-C-00-400. 1961. 21 p. Illus. Gratis.
General Services Administration.
Washington, D. C. 20405
Drawings, description, and specifications of wooden office chairs of swivel type.

III. PERIODICALS

A. Furniture Manufacturer. Monthly. $5.00/year.
Vincent Edwards, Inc.
342 Madison Avenue
New York, N. Y.
Materials, equipment, products, and markets for home and office furniture.

B. Geyer's Dealer Topics. Monthly. $3.00/year.
Geyer-McAllister Publications
212 Fifth Avenue
New York 10, N. Y.
Features office machines, typewriters and various items of office equipment including chairs.

IV. U. S. PATENTS

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

A. Patent No. 2,859,799. 1958. 4 p.
Swivel chair with functional posture controller.

B. Patent No. 2,784,767. 1957. 6 p.
Swivel chair with control for tilting seat and back.

V. TRADE ASSOCIATIONS

A. Wood Office Furniture Institute
1414 Eye Street, N.W.
Washington, D.C. 20005

VI. ENGINEERING COMPANIES

A. United States Machinery Company, Inc.
90 Broad Street
New York 4, N.Y.
Industrial woodworking machinery. Designs add installs woodworking plants.

B. Forest Products Engineering Company
431 South Dearborn Street
Chicago, Illinois
Engineering and consulting for industrial lumber consuming industries.

VII. DIRECTORIES

A. Directory of Suppliers. Annual. $.50.
Phillips Publishing Company
Suite 104, 1516 Westwood Boulevard
Los Angeles 24, California
Manufacturers and suppliers to the furniture industry in the west.

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

ORANGE JUICE, CANNED

I. P. No. 66090

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.

ORANGE JUICE, CANNED: Standard Industrial Classification 2033

A. PRODUCT DESCRIPTION

Single strengh orange juice in 32-ounce cans.

B. GENERAL EVALUATION

An adequate and steady supply of suitable locally-grown oranges is necessary. The plant would operate on a ten-hour day for about 160 days a year. Capital requirements are high and a careful market survey should be made before undertaking this enterprise. Where refrigeration facilities are available for goods in transit, while on sale, and on the consumers' premises, frozen canned juice and juice in cartons offer competition, as does fresh juice where oranges are available cheaply. However, ordinary canned juice continues to have a large market. Competition within the industry is rather keen, so that active sales promotion is necessary.

C. MARKET ASPECTS

1. USERS. Households, bars, restaurants, etc.

2. SALES CHANNELS AND METHODS. Sales to wholesalers and large retailers. An attractive brand name and active sales promotion are necessary.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. This product is easily and cheaply transported, and a nation-wide market is possible.
   b. Export. Market is world-wide.

4. COMPETITION. a. Domestic Market. Chilled orange juice in waxed containers (see Industry Profile, Chilled Orange Juice in Waxed Containers, S.I.C. 2033) and frozen orange juice may offer competition where these products have been developed, as may fresh oranges in orange-growing areas if they are cheap enough. b. Export Market. Competition from large-scale and well-known producers is likely to be keen, and only a high-quality product at a competitive price will stand a chance of breaking into the market.

5. MARKET NEEDED FOR PLANT DESCRIBED. The market for this product is generally highly variegated, and no estimate in terms of the total population required is feasible.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE 10 HOUR SHIFT, 160 DAYS ANNUALLY: 20,500,000 Cans

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 4 acres.		$ --
Building. One story, 21,000 sq. ft.		126,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$290,000	
Other tools & equipmt.	6,000	
Furniture & fixtures	1,000	
Transportation equipmt.	100,000	397,000
Total (excl. Land)		$523,000

Principal Items. Conveyors, elevators, fruit bins, roller graders, scald tank, washer, distributing belt, roller spreads, roll sizers, 8 extractors, screw conveyors, stainless steel tanks, heat exchanger, canning equipment, spinner can closer, cases palletizer, filling equipment, cold room, packer, peel meal equipment.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	30	$ 506,600
Admin. Costs(b), Contingencies, Sales Costs(c)	30	12,100
Training Costs		3,300
Total Working Capital		$ 522,000

c. TOTAL CAPITAL (EXCL. LAND) $1,045,000

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Oranges	1,600,000 Boxes	$5,120,000
Cans-32 oz	20,500,000	549,000
Cartons	812,000	128,000
Labels		11,000
Total		$5,808,000

b. Supplies

Lubricants & hand tools	$ 200
Cutting tools & abrasives	500
Maintenance & spare parts	22,000
Office supplies	300
Total	$ 23,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 200 hp. connected load.	$ 1,000
b. Fuel. About 50,000 gals. oil annually.	$ 6,000
c. Water. For production, sanitation and fire prevention.	$ 400

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 10 trucks & 15 trailers.	$ 10,000

b. External Transport Facilities. Fruit must be trucked to plant. Good highway necessary.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	4	$ 16,000
Semi-skilled	23	76,700
Unskilled	23	61,300
Total	50	$154,000
b. Indirect Labor		
Manager & supervisor	2	$ 18,000
Office & inspector	6	22,000
Truck drivers	11	36,700
Total	19	$ 76,700

c. Training Needs. Manager & supervisor must be well experienced. With 4 skilled workers, 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

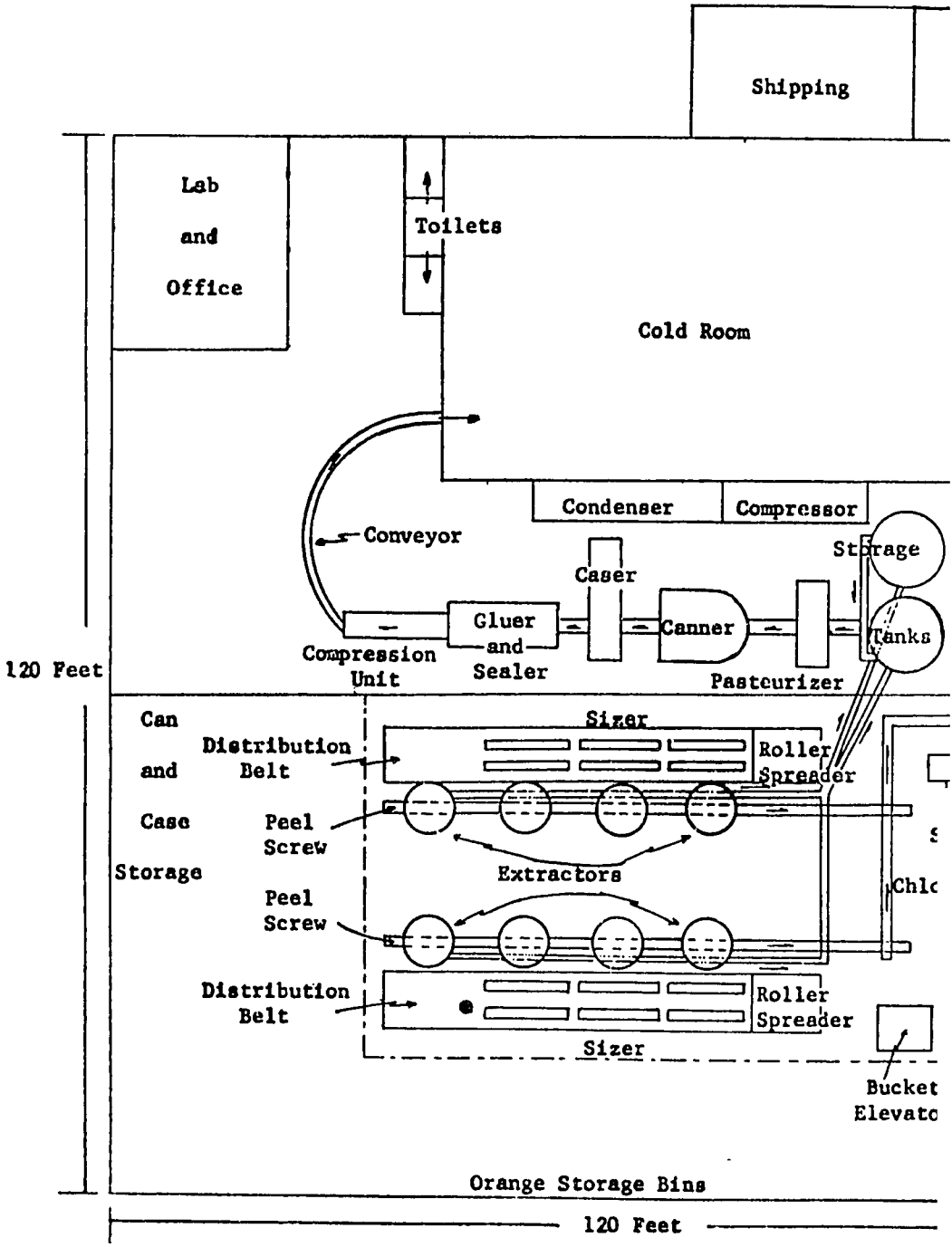
Direct Materials	$5,808,000
Direct Labor	154,000
Manufacturing Overhead(a)	117,100
Admin. Costs(b), Contingencies	75,000
Sales Costs(c), Bad Debts	70,000
Depreciation on Fixed Capital	61,600
Total	$6,285,700

b. Annual Sales Revenue $6,800,000

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

ORANGE JUICE,

PLANT



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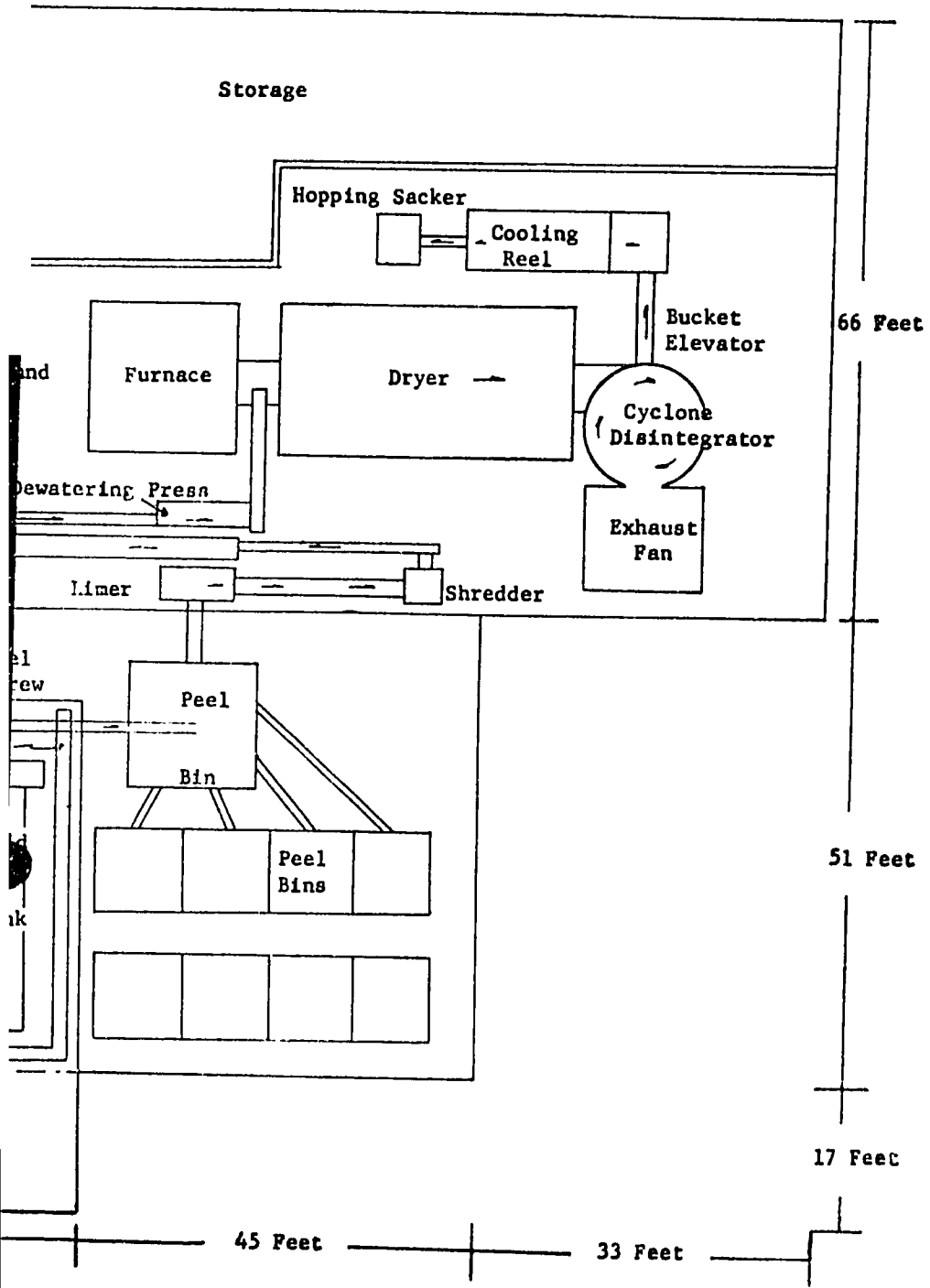

ORANGE JUICE CANNED: S.I C. 2033

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 i, N. Y.
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 of fruits, fruit juices, and jellies.

II. PERIODICALS

A. California Fruit News. Weekly. $6.00/year.
Howard C. Rowely
405 Montgomery Street
San Francisco, California
Canning of citrus and other kinds of fruit juices.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Vegetable and Fruit Canning IR-19082.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523

IV. OTHER PUBLICATIONS

A. Commercial Canning in Florida. Bulletin Number 117. August 1960.
Gratis.
State of Florida
Department of Agriculture
Tallahassee, Florida
Description of the canning industry in Florida including citrus fruit canning.

V. TECHNICAL PAPER

A. Influence of Storage Conditions on Ascorbic Acid Content and Quality o
Canned Orange Juice. Food Technology. May 1950. Vol. 4. No. 5.
p. 190-193. J. F. Feaster and others. $1.00.
The Institute of Food Technologists
510 North Hickory Street
Champaign, Illinois
Paper on the effects of storage conditions on the content and quality of ascorbic acid in canned orange juice.

VI. U. S. PATENTS

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

A. Patent No. 2,956,887. 1960. 3 p.
Method and system for producing canned orange juice.

B. Patent No. 2,919,991. 1960. 11 p.
Method of controlling purification process of orange and other juices, in preparation for canning.

C. Patent No. 2,916,386. 1959. 3 p.
Preparation of citrus juices for canning.

VII. TRADE ASSOCIATIONS

A. Florida Citrus Mutual
P. O. Box 499
Lakeland, Florida
All areas of citrus fruit production, including growing, canning of fruits, fruit juices, concentrates, and shipping.

B. Florida Canners Association
P. O. Box 780
Winterhaven, Florida 33881
Membership includes canners of citrus fruits, juices and concentrates.

VIII. ENGINEERING COMPANIES

A. Citrus Machinery Company, Inc.
2211 West Washington Street
Orlando, Florida
Consulting engineers, designers and builders of citrus canning plants.

IX. DIRECTORIES

A. Canners Directory. Biennial. $3.50.
National Canners Association
1133 20th Street, N. W.,
Washington, 6, D. C.
Lists 1,300 canning firms that are members of the National Canning Association and other commercial canners. Office address and products canned are included.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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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

ORANGE JUICE CONCENTRATE

I. P. No. 66091

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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 CONCENTRATE: Standard Industrial Classification 2033

A. PRODUCT DESCRIPTION

Concentrated orange juice in 6 and 12 ounce cans.

B. GENERAL EVALUATION

The plant can operate only 18 to 20 weeks a year because the oranges must have a high sugar content and be fully ripe. During this period it would operate 24 hours a day. The first requisite is a sufficient and assured local supply of suitable oranges. The second is a supply of seasonal workers for both factory and transport work. Capital requirements are high, and very careful studies of both the adequacy of materials and labor and the market potential should be made before undertaking this project.

C. MARKET ASPECTS

1. USERS. Households, restaurants, soft drink vending establishments.

2. SALES CHANNELS AND METHODS. Sales to wholesale distributors and large retail establishments. An attractive brand name and active sales promotion are necessary.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Shipping presents no special problems and transport costs are moderate in relation to the value of the product. The domestic market might be nation-wide. b. Export. Market may be world-wide.

4. COMPETITION. a. Domestic Market. The product must be competitive in price with orange juice in other forms and with fresh oranges, taking into account the advantages and disadvantages of each. A high-quality product should be able to meet import competition. b. Export Market. Established concerns with their extensive sales organizations and well-known brand names would offer keen competition.

5. MARKET NEEDED FOR PLANT DESCRIBED. The market is likely to be mainly outside the growing area and very dispersed. The various market areas may have very differing characteristics and no estimate of the total population required is feasible.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION, 18 TO 20 WEEKS ANNUALLY: 17 Million 6-oz. and 2.67 Million 12-oz. Cans

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 4 acres.		$ --
Building. One story, 21,000 sq. ft.		126,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$787,000	
Other tools & equipmt.	9,000	
Furniture & fixtures	1,000	
Transportation equipmt.	72,000	869,000
Total (excl. Land)		$995,000

Principal Items. Conveyors, elevators, fruit bins, roller graders, scald tank, washer, distribution belt, roller spreads, roll sizers, 8 extractors, screw conveyors, stainless steel tanks, heat exchanger, canning equipment, spinner can closer, cases palletizer, filling equipment, packer, refrigeration, evaporators, peel meal machine.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead (a)	30	$334,600
Admin. Costs (b), Contingencies, Sales Costs(c)	30	14,400
Training Costs		5,000
Total Working Capital		$354,000

c. TOTAL CAPITAL (EXCL. LAND) $1,349,000

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Oranges	100 million	$3,200,000
Cans 6 oz.	17,000,000	352,000
Cans 12-oz.	2,670,000	67,000
Cartons 6-oz.	500,000	35,500
Cartons 12-oz.	111,250	7,900
Labels		9,000
Total		$ 3,671,400

b. Supplies

Lubricants & hand tools	$ 200
Cutting tools & abrasives	500
Maintenance & spare parts	24,000
Office supplies	300
Total	$ 25,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 300 hp. connected load.	$ 2,000
b. Fuel. About 50,000 gals. oil annually.	$ 6,000
c. Water. For production, sanitation aud fire prevention.	$ 400

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 7 trucks & 11 trailers.	$ 7,000

b. External Transport Facilities. Fruit must be trucked to plant. Good highway necessary.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	9	$ 27,000
Semi-skilled	60	120,000
Unskilled	60	90,000
Total	129	$237,000
b. Indirect Labor		
Manager & supervisor	2	$ 18,000
Office & inspector	2	11,000
14 truck drivers &	15	37,000
maintenance	19	$ 66,000

c. Training Needs. Manager & supervisor must be fully experienced. With 9 skilled workers, they should be able to train others & reach full production in 2 weeks.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

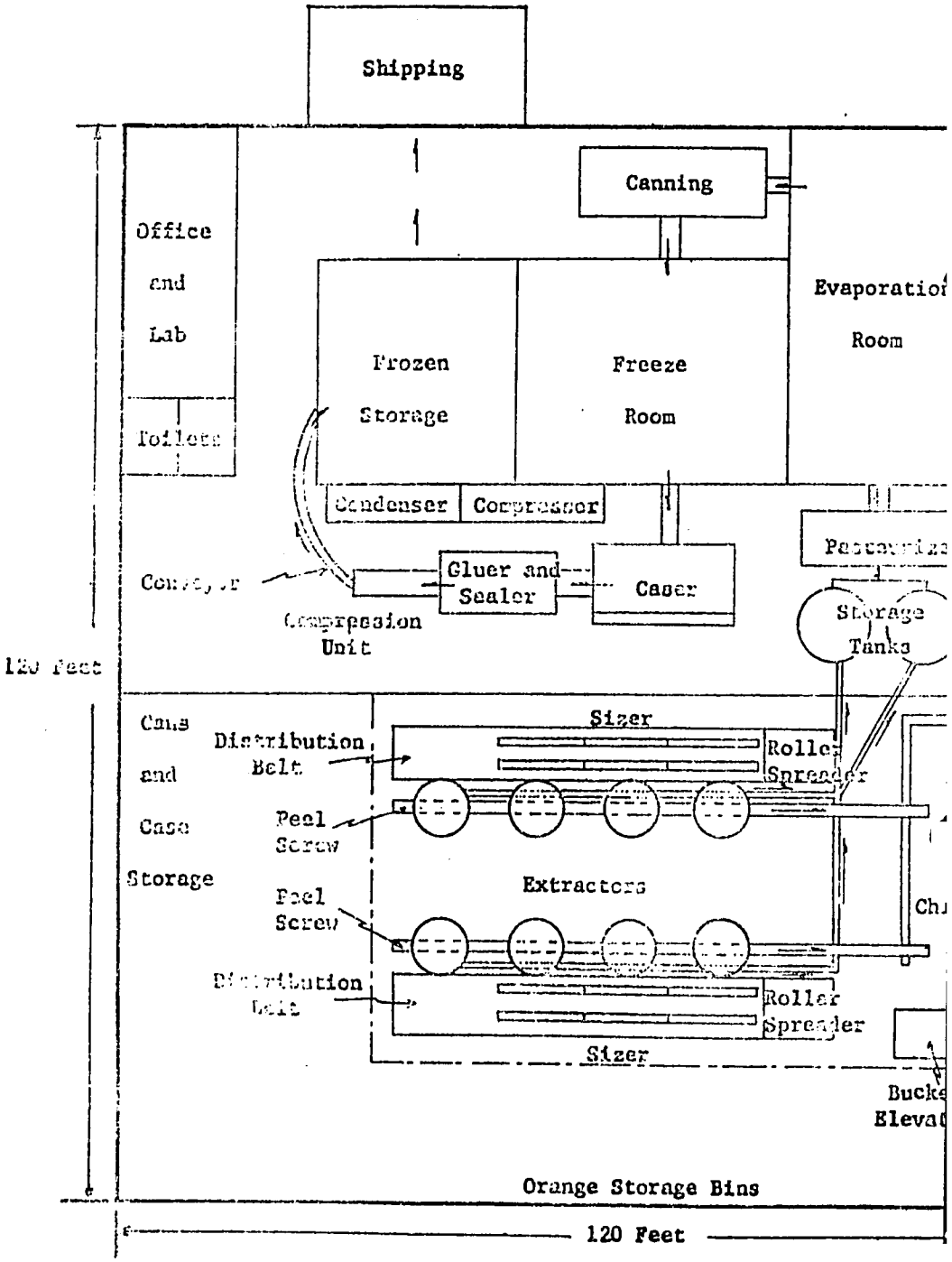
Direct Materials	$3,671,400
Direct Labor	237,000
Manufacturing Overhead (a)	106,400
Admin. Costs (b), Contingencies	116,000
Sales Costs(c), Bad Debts	60,000
Depreciation on Fixed Capital	105,400
Total	$4,296,200

b. Annual Sales Revenue $5,000,000

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

ORANGE JUICE C

PLAN



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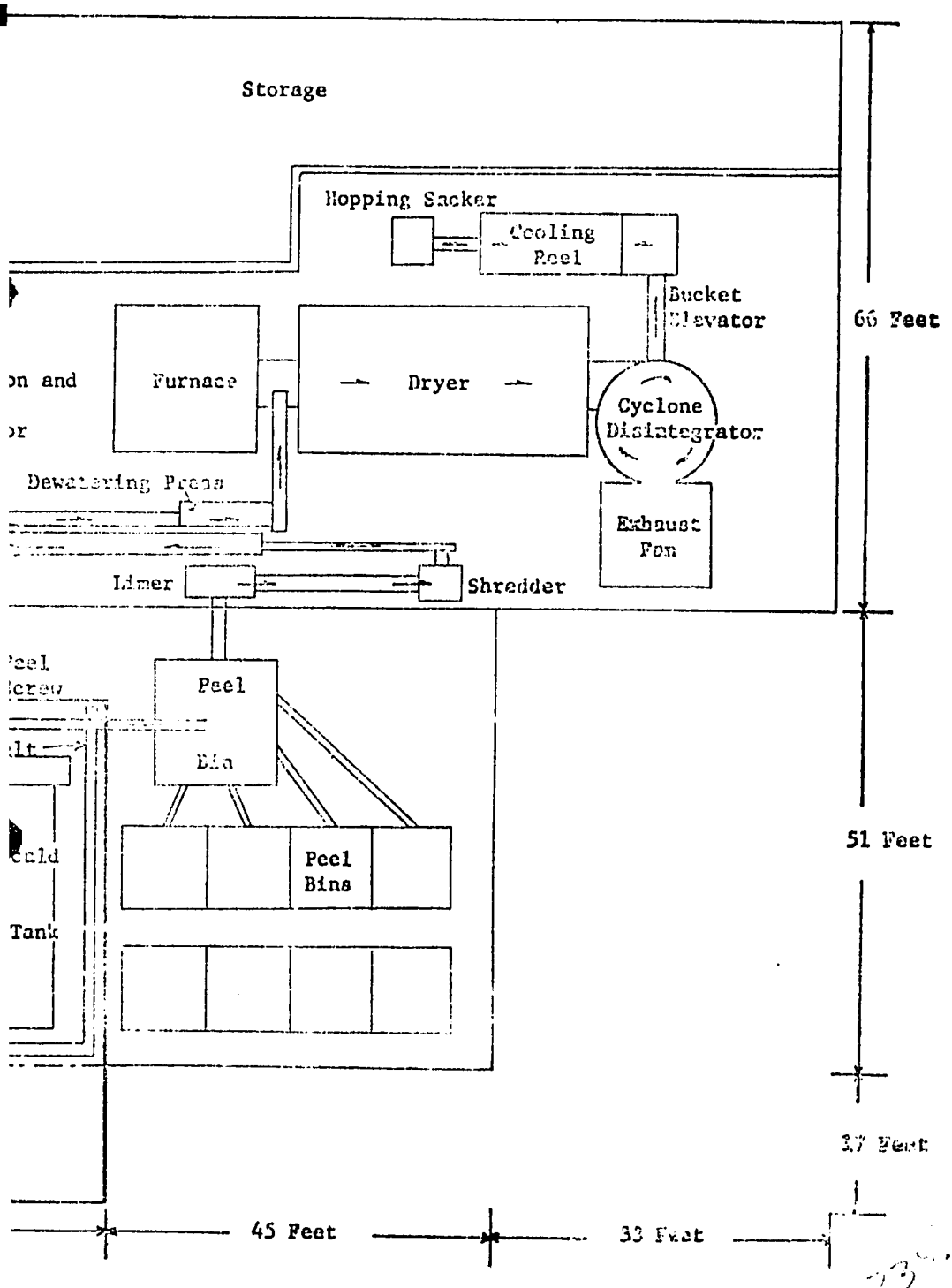
WORKFLOW



ORANGE JUICE CONCENTRATE: 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, N. Y.
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 of fruits, fruit juices, and jellies.

II. PERIODICALS

A. California Fruit News. Weekly. $6.00/year.
Howard C. Rowley
405 Montgomery Street
San Francisco, California
Canning of citrus and other kinds of fruit juices.

B. Quick Frozen Foods. Monthly. $8.00/year.
E. W. Williams Publications, Inc.
82 Wall Street
New York 5, N. Y.
Preparation, packaging, storing of frozen foods including citrus fruits.

III. GOVERNMENT PUBLICATIONS, U. S.

A. Vegetable and Fruit Canning IR-19082.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523

IV. 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 fruit canning.

V. TECHNICAL PAPERS

A. Packing Frozen Citrus Concentrates.
D. W. Riester and T. B. Ayres. Quick Frozen Foods. January 1956.
Vol. 18. No. 6. p. 56-66. $1.00.
Quick Frozen Foods
E. W. Williams Publications, Inc.
82 Wall Street
New York 5, N. Y.
Article covering the packing of forzen citrus concentrates.

VI. U. S. PATENTS

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

A. Patent No. 2,984,992. 1961. 5 p.
Apparatus for freeze dehydration of citrus juice into concentrate.

B. Patent No. 2,977,234. 1961. 4 p.
Method of concentrating citrus juices.

C. Patent No. 2,967,778. 1961. 4 p.
Method for making citrus juice concentrate.

VII. TRADE ASSOCIATIONS

A. Florida Citrus Mutual
P. O. Box 489
Lakeland, Florida
All areas of citrus fruit production, including growing, canning of fruits, fruit juices, concentrates, and shipping.

B. Florida Canners Association
P. O. Box 780
Winterhaven, Florida
Membership includes canners of citrus fruits, juices and concentrates.

VIII. ENGINEERING COMPANIES

A. Citrus Machinery Company, Inc.
2211 West Washington Street
Orlando, Florida
Consulting engineers, designers and builders of citrus canning plants.

IX. DIRECTORIES

A. Canners Directory. Biennial. $3.50.
National Canners Association
1133 20th Street, N. W.,
Washington 6, D. C.
Lists 1,300 canning firms that are members of the National Canning Association and other commercial canners. Office address and products canned are included.

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
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Springfield, Virginia 22151

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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

PULP FROM BAGASSE FOR WALLBOARD

I. P. No. 66092

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.

PULP FROM BAGASSE FOR WALLBOARD: Standard Industrial Classification 2611

A. PRODUCT DESCRIPTION

Pulp made from sugar cane residue (bagasse), suitable for manufacture of wallboard.

B. GENERAL EVALUATION

The plant will be economically feasible only where it can be located near a plant making sugar from sugar cane. A large and dependable water supply is necessary. The plant described is designed to produce pulp suitable for the manufacture of wallboard, and it is assumed that it will be associated with a wallboard manufacturing plant or plants. Manufacturing wallboard from bagasse, or from any other raw material, is, in fact, often a continuous production process (see Industry Profile on Wallboard from Bagasse: S. I. C. 2661).

C. MARKET ASPECTS

The purchaser of this product will be the wallboard industry. Since wallboard can be made from several different raw materials, pulp from bagasse is not very likely to be required by foreign countries for wallboard manufacture. If, therefore, a plant such as this is to be practicable, it will normally be necessary to have local wallboard manufacturing facilities within easy reach, sufficiently large to absorb the plant's output. For information on the market aspects of the finished wallboard, see Industry Profile on Wallboard from Bagasse: S. I. C. 2661.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: Pulp for 23 Million Square Feet

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 2 acres.		$ --
Building. One story, 60'x150', with basement under one half. Steel frame.		54,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$198,000	
Other tools & equipmt.	5,700	
Furniture & fixtures	700	
Transportation equipmt.	4,000	208,400
Total (excl. Land)		$262,400

Principal Items. Hammermill & screen, pulper, 5 centrifugal pumps 6", screw press, digester & refiner, pulp screen, pulp washer & thickener, consistency regulator, storage tank, agitator, wet machine, boiler, starters, valves, piping & spare parts, 5-ton truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead (a)	60	$ 65,100
Admin. Costs (b), Contingencies, Sales Costs(c)	30	5,300
Training Costs		14,900
Total Working Capital		$ 85,300

c. TOTAL CAPITAL (EXCL. LAND) $347,700

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Bagasse	7,000 tons	$112,000
Chemicals		90,000
Total		$202,000

b. Supplies

Maintenance & spare parts	$ 2,000
Welding gas & rods	300
Lubricants & hand tools	300
Office expenses	200
Total	$ 2,800

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 250 hp.	$ 9,000
b. Fuel. About 86,000 gals. oil annually.	$ 9,000
c. Water. 1,600 gals. a minute. Water is returned & re-used. Cost of make-up water & water for non-production purposes is estimated at	$ 2,000

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5-ton truck.	$ 1,000

b. External Transport Facilities. Total in & out shipments about 1,400 tons a month. Product is heavy & bulky. Plant should be situated near railroad, if possible.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	15	$ 75,000
Unskilled	12	36,000
Total	27	$111,000
b. Indirect Labor		
Manager & supervisors	4	$ 26,000
Office	1	4,000
Other	6	24,000
Total	11	$ 54,000

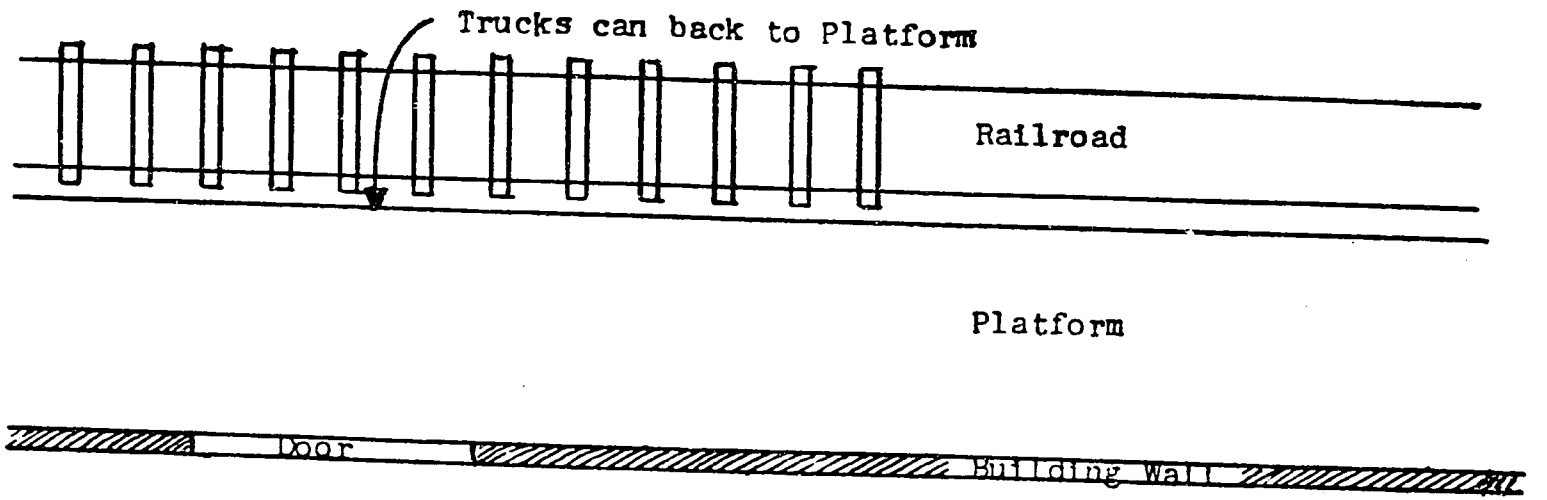
c. Training Needs. Manager & supervisors must be fully experienced. With assistance of 5 skilled workers, they should be able to do all labor training. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	$202,000
Direct Labor	111,000
Manufacturing Overhead (a)	77,800
Admin. Costs (b), Contingencies	24,000
Sales Costs (c), Bad Debts	40,000
Depreciation on Fixed Capital	26,000
Total	$480,800
b. Annual Sales Revenue	$630,000

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

PLANT LAYOUT



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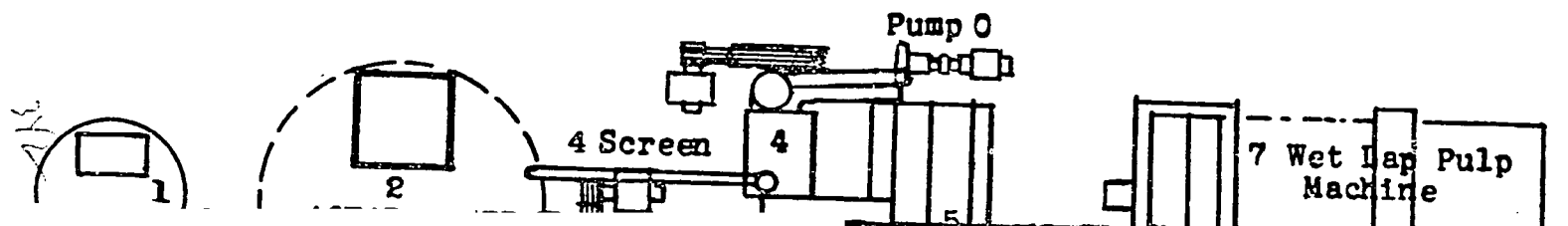
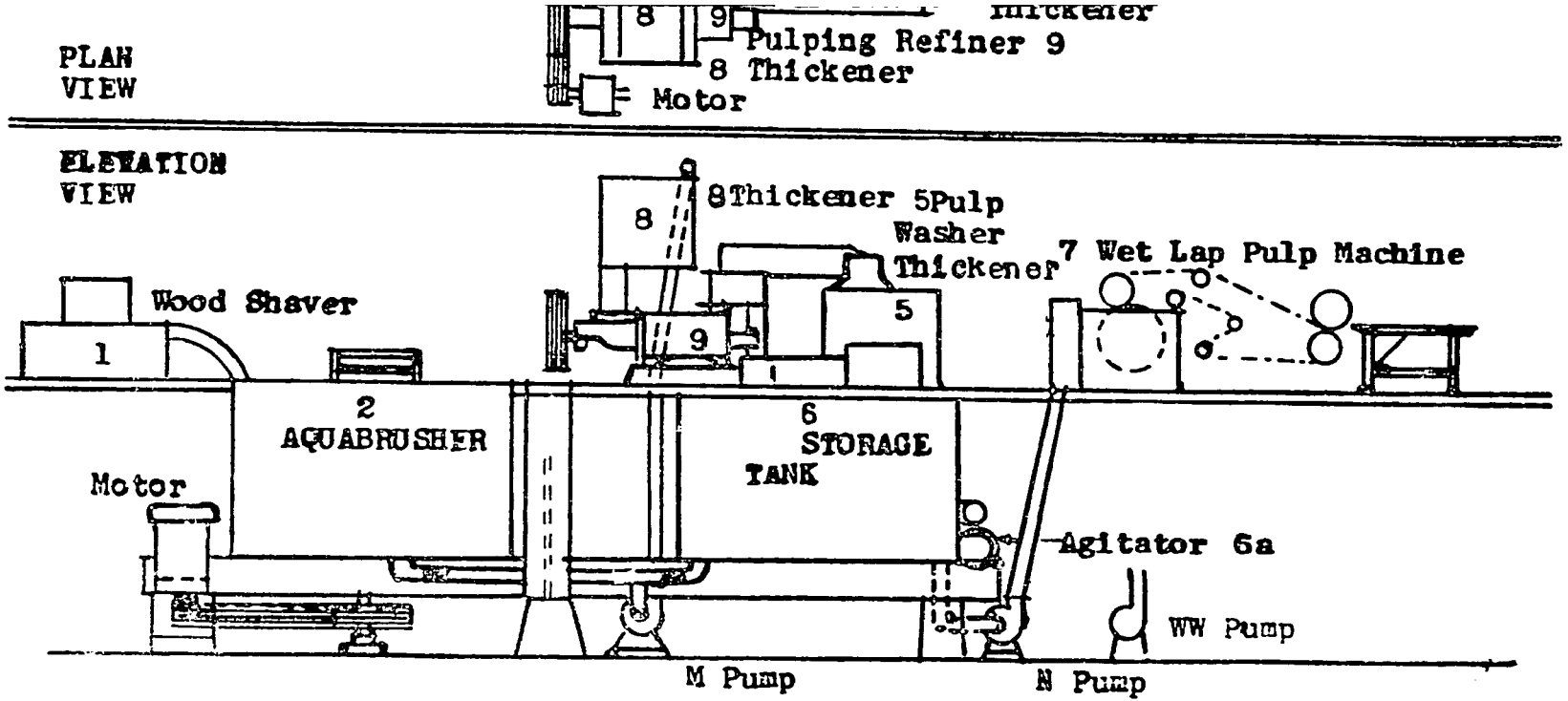


PULP FROM BAGASSE FO



DIMENSION OF BUILDING 60′ × 150′

WORK FLOW CONTINUOUS FROM BAGASSE CONVEYOR TO THE WET LAP PULP MACHINE

OARD : S. I. C. 2611

PULP FROM BAGASSE FOR WALLBOARD: S. I. C. 2611

SELECTED REFERENCES

I. TEXTBOOKS

A. Pulping Processes. C. J. West. 4 volumes. 1949-54. Vols. 1-3, $5.00 each. Vol. 4, $10.00.
Institute of Paper Chemistry
Appleton, Wisconsin
Describes methods and processes for the manufacture of pulp.

B. Pulp and Paper. 2nd edition. J. P. Casey. 1960. 3 volumes. Set, $19.50.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, N.Y.
Contains methods and processes of pulp manufacture.

C. Pulp and Paper Manufacture. J. N. Stephenson, editor. Volume II. 1951. 587 p. $8.50.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N.Y.
Information on the manufacture of pulp from rag and other fibers other than wood. Boardstock preparation.

II. GOVERNMENT PUBLICATIONS, U. S.

A. Pulp, Paper, and Board. Quarterly. $1.00/year.
Government Printing Office
Washington, D.C. 20402
Economic studies, trends, and statistics of production and consumption of pulp and related products.

B. Wallboard Manufacture from Bagasse. IR-19569.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D.C. 20523

III. PERIODICALS

A. Pulp and Paper. Monthly. $5.00/year.
Miller Freeman Publications, Inc.
500 Howard Street
San Francisco, California
Manufacture of pulp and paper, new developments in the industry.

B. Tappi. Monthly. $13.00/year.
Technical Association of the Pulp and Paper Industry
360 Lexington Avenue
New York 17, N.Y.
Technical journal devoted to basic research and technology of the pulp and paper industry.

IV. U. S. PATENTS

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

A. Patent No. 2,796,807. 1957. 4 p.
Method and apparatus for pulping fibrous materials.

B. Patent No. 2,707,420. 1955. 4 p.
Pulp preparing apparatus.

C. Patent No. 2,682,810. 1954. 5 p.
High-low speed disk type pulping unit.

V. TRADE ASSOCIATIONS

A. United States Pulp Producers Association
122 East 42nd Street
New York 17, N.Y.

B. Technical Association of the Pulp and Paper Industry
360 Lexington Avenue
New York 17, N.Y.

VI. ENGINEERING COMPANIES

A. Apmew, Inc.
3360 Bay Street
Glens Falls, New York
Pulp machinery and equipment.

B. Von Kohorn International Corporation
Von Kohorn Building
White Plains, New York
Installation of complete plants for manufacture of pulp.

VII. DIRECTORIES

A. World Market Pulp Directory. Annual. $2.00.
Pulp and Paper
1791 Howard Street
Chicago 26, Illinois
Lists producers of pulp for paper and other products.

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INDUSTRY PROFILES

PULP FROM SCRAP WOOD FOR WALLBOARD

I. P. No. 66093

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PULP FROM SCRAP WOOD FOR WALLBOARD: Standard Industrial Classification 2611

A. PRODUCT DESCRIPTION

Pulp made from scrap wood and sawdust, suitable for manufacture of wallboard.

B. GENERAL EVALUATION

This plant will be economically feasible only where it can be located near sawmills from which the necessary supply of scrap wood and sawdust can be procured. A large and dependable water supply is necessary. The plant described is designed to produce pulp suitable for the manufacture of wallboard, and it is assumed that it will be associated with a wallboard manufacturing plant or plants. Manufacturing wallboard from scrap wood and sawdust is, in fact, often a continuous process. (See Industry Profile on Wallboard from Bagasse: S.I.C. 2661).

C. MARKET ASPECTS

The purchaser of this product will be the wallboard industry. Since wallboard can be made from several different raw materials, pulp from scrap wood and sawdust is not very likely to be required by foreign countries for wallboard manufacture. If, therefore, a plant such as this is to be practicable, it will normally be necessary to have local wallboard manufacturing facilities within easy reach and sufficiently large to absorb the plant's output. For information on the market aspects of the finished wallboard, see Industry Profile on Wallboard from Bagasse: S.I.C. 2661.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: Pulp for 20 Million Square Feet of Wallboard

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 2 acres.		$ --
Building. One story, 60'x150', with basement under one half. Steel frame.		54,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$201,000	
Other tools & equipmt.	5,700	
Furniture & fixtures	700	
Transportation equipmt.	4,000	211,400
Total (excl. Land)		$265,400

Principal Items. Wood shaver, hammermill & screen, pulper, 5 centrifugal pumps 6", screw press, digester & pulp refiner, pulp washer & thickener, consistency regulator, storage tank, agitator, wet machine, boiler 100 hp. 125 p. s. i., starters, piping, valves & spare parts, 5-ton truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 61,500
Admin. Costs(b), Contingencies, Sales Costs(c)	30	4,500
Training Costs		14,900
Total Working Capital		$ 80,900

c. TOTAL CAPITAL (EXCL. LAND) $346,300

2. MATERIALS AND SUPPLIES

	Annual Cost
a. Direct Materials	
Scrap wood & sawdust (Wood bark may be used if black spots in board are permissible.)	$ 90,000
Chemicals	90,000
Total	$180,000
b. Supplies	
Maintenance & spare parts	$ 2,000
Welding gas & rods	300
Lubricants & hand tools	300
Office supplies	200
Total	$ 2,800

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 250 hp.	$ 9,000
b. Fuel. About 86,000 gals. oil annually.	$ 9,000
c. Water. 1,600 gals. per minute. Water is returned & re-used. Cost of make-up water & water for non-production purposes is estimated at	$ 2,000

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5-ton truck.	$ 1,000

b. External Transport Facilities. Total in & out shipments about 1,300 tons a month. Product is heavy & bulky. Plant should be situated near railroad, if possible.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	15	$ 75,000
Unskilled	12	36,000
Total	27	$ 111,000
b. Indirect Labor		
Manager & supervisors	4	$ 26,000
Office	1	4,000
Other	6	24,000
Total	11	$ 54,000

c. Training Needs. Manager & supervisors must be fully experienced. With assistance of 5 skilled workers, they should be able to do all labor training. Plant should reach full production in 2 months.

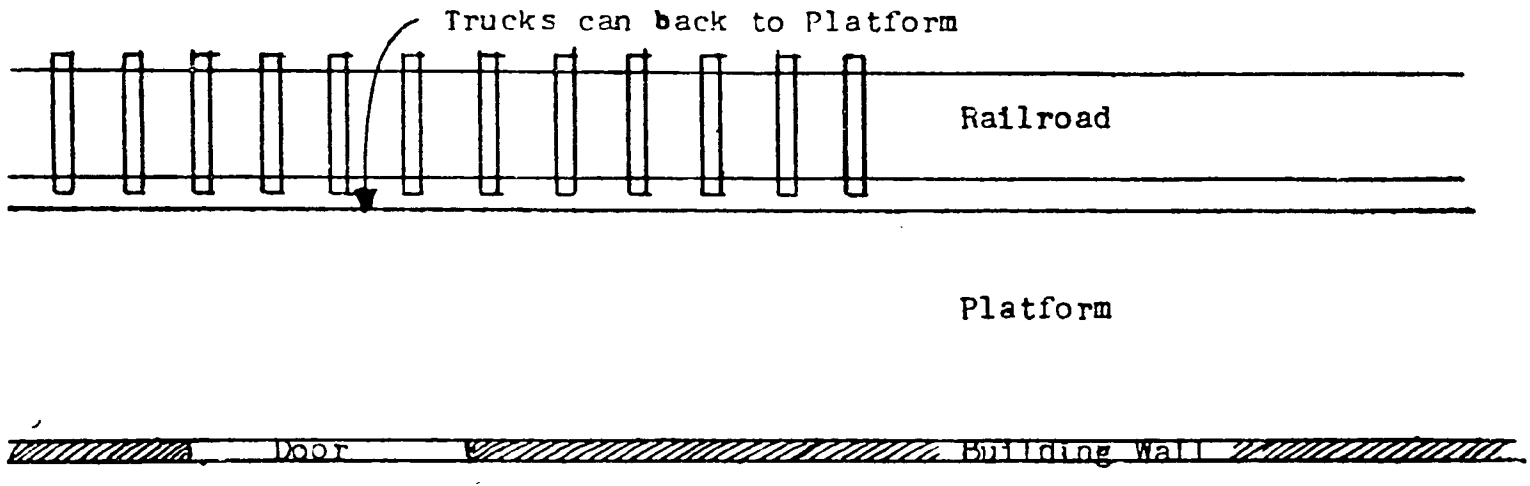
6. TOTAL ANNUAL COSTS AND SALES REVENUE

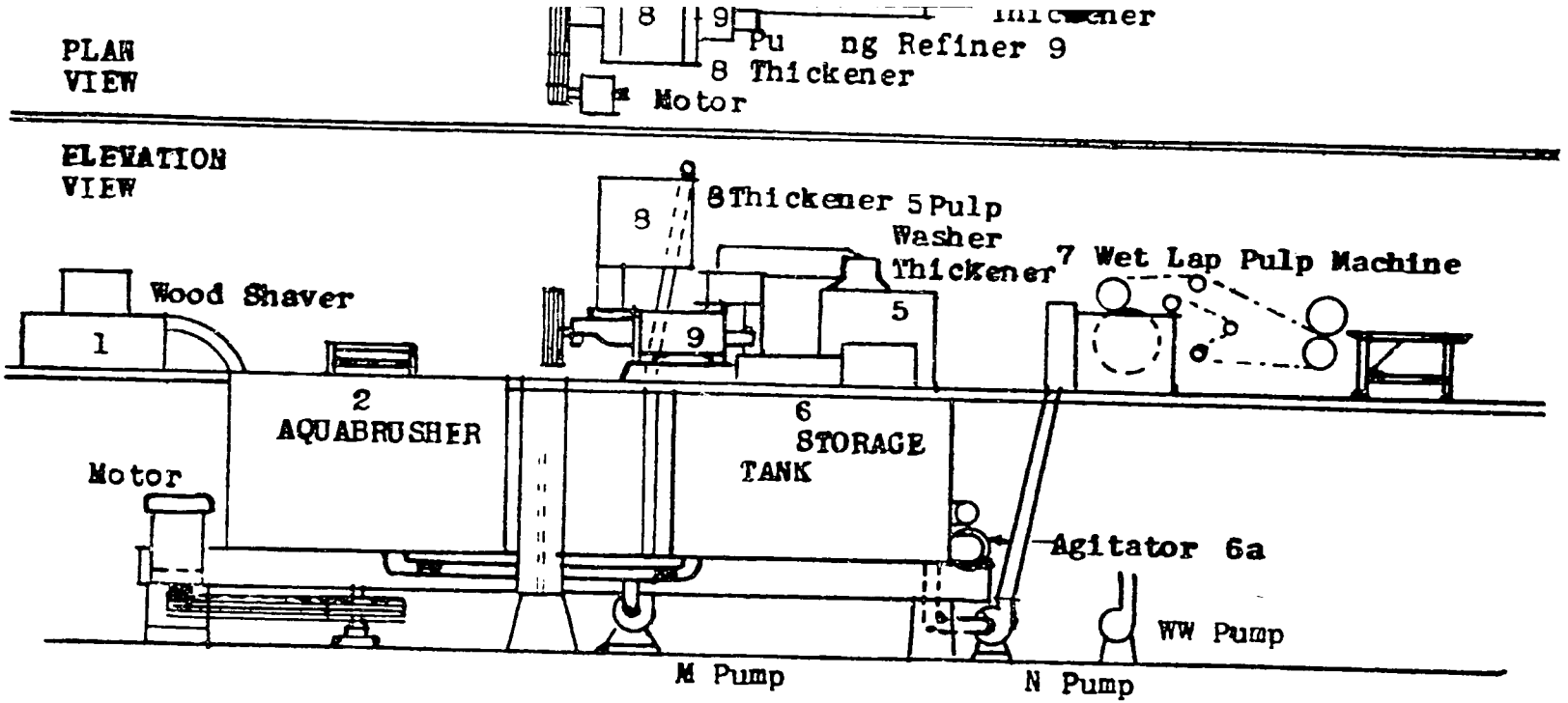
a. Annual Costs	
Direct Materials	$ 180,000
Direct Labor	111,000
Manufacturing Overhead(a)	77,800
Admin. Costs(b), Contingencies	20,000
Sales Costs(c), Bad Debts	36,000
Depreciation on Fixed Capital	25,300
Total	$ 450,100
b. Annual Sales Revenue	$ 550,000

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

PULP FROM SCRAP WOOD FOR WALLBOARD: S.I.C. 2611

PLANT LAYOUT





DIMENSION OF BUILDING 60′ × 150′

WORK FLOW CONTINUOUS FROM WOOD SHAVER TO THE WET LAP PULP MACHINE

PULP FROM SCRAP WOOD FOR WALLBOARD: S.I.C. 2611

SELECTED REFERENCES

I. TEXTBOOKS

A. Pulping Processes. C. J. West. 1949-54. 4 volumes. Vols. 1-3, $5.00 each. Vol. 4, $10.00.
Institute of Paper Chemistry
Appleton. Wisconsin
Describes methods and processes for the manufacture of pulp.

B. Pulp and Paper. 2nd edition. J. P. Casey. 1960. 3 volumes. Set $19.50.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, N. Y.
Describes methods and processes of pulp manufacture.

C. Pulp and Paper Manufacture. J. N. Stephenson, editor. Volume I. 1950. 1,043 p. Illus. $11.00.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N. Y.
Information on the manufacture of pulp from wood. Manufacture of mechanical pulp.

II. GOVERNMENT PUBLICATIONS, U. S.

A. Pulp, Paper and Board. Quarterly. $1.00/year.
Government Printing Office
Washington, D. C. 20402
Economic studies, trends, and statistics of production and consumption of pulp, paper, and related products.

B. Wallboard from Wood Waste. IR-21517.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523

III. PERIODICALS

A. Pulp and Paper. Monthly. $5.00/year.
Miller Freeman Publication, Inc.
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Technical Association of the Pulp and Paper Industry
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Technical journal devoted to basic research and technology of the pulp and paper industry.

IV. U. S. PATENTS

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

A. Patent No. 2,950,064. 1960. 5 p.
Machine for pulping wood scraps.

B. Patent No. 2,812,790. 1957. 5 p.
Preparation of shredded wood pulp.

C. Patent No. 2,796,807. 1957. 4 p.
Methods and apparatus for pulping fibrous material.

D. Patent No. 2,707,420. 1955. 4 p.
Pulp preparing apparatus.

E. Patent No. 2,682,810. 1954. 5 p.
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B. Technical Association of the Pulp and Paper Industry
360 Lexington Avenue
New York, 17, N. Y.

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Pulp machinery and equipment.

B. Von Kohorn International Corp.
Von Kohorn International Building
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VII. DIRECTORIES

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PULP FROM SCRAP WOOD FOR WALLBOARD: S.I.C. 2611

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INDUSTRY PROFILES

REED AND RATTAN FURNITURE

I. P. No. 66094

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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.

REED AND RATTAN FURNITURE: Standard Industrial Classification 2519

A. PRODUCT DESCRIPTION

Chairs and davenports made of reed and rattan, with bamboo frames, upholstered seats and woven rattan or upholstered backs.

B. GENERAL EVALUATION

This furniture is of good quality and fairly expensive. In some economically less developed areas only a small proportion of the people may be able to afford furniture of this type. In some cases, however, it should be possible to develop an export market, especially if the furniture is well designed. Capital requirements for the plant described are moderate and in areas where rattan grows the labor skills required will usually be readily available.

C. MARKET ASPECTS

1. USERS. Households, hotels, clubs, etc.

2. SALES CHANNELS AND METHODS. Sales to furniture stores and also possibly direct to large purchasers such as hotels.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Although cumbersome to transport, with special precautions necessary to avoid damage, the value of the product is high enough to bear fairly large transport costs, and the market area may be quite extensive. b. Export. This type of furniture is sometimes exported.

4. COMPETITION. a. Domestic Market. In low wage areas small furniture makers might provide competition in their own immediate vicinity. Wooden and metal furniture may provide competition in some areas, depending on relative costs. b. Export Market. Foreign orders might be received through furniture stores and exporters. Design and quality will be highly important in developing exports.

5. MARKET NEEDED FOR PLANT DESCRIBED. The domestic market is likely to be primarily among the well-to-do section of the urban population. If exports are not important, a total population of the order of 5 million might be required to support this plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 4,000 Units

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 1/2 acre.		$ --
Building. One story, 100'x100'.		60,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$20,000	
Other tools & equipmt.	2,000	
Furniture & fixtures	800	22,800
Total (excl. Land)		$ 82,800

Principal Items. Cutoff saw, jointer, planer, rip saw, 2 trim saws, drill press, 6 sewing machines, spray booth & equipment, hand trucks.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 32,000
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,300
Training Costs		8,700
Total Working Capital		$ 43,000

c. TOTAL CAPITAL (EXCL. LAND) $125,800

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Bamboo, reed, rattan & lumber		$ 12,000
Upholstering fabrics	40,000 yds.	60,000
Nails, tacks, wood screws		1,000
Braids & trimmings		1,000
Total		$ 74,000

b. Supplies

Lubricants & hand tools	$ 100
Cutting tools	200
Maintenance & repair parts	1,000
Office supplies	300
Total	$ 1,600

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 30 hp.	$ 900
b. Fuel. For heating, if required.	$ 300
c. Water. For sanitation & fire protection.	$ 100

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

a. Direct Labor

	Number	Annual Cost
Skilled	4	$ 20,000
Semi-skilled	10	40,000
Unskilled	8	24,000
Total	22	84,000

b. Indirect Labor

Manager & supervisors.	3	$ 20,000
Office	2	8,000
Other	1	3,000
Total	6	$ 31,000

c. Training Needs. Manager & supervisors must be well experienced. Together with 2 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. Annual Costs

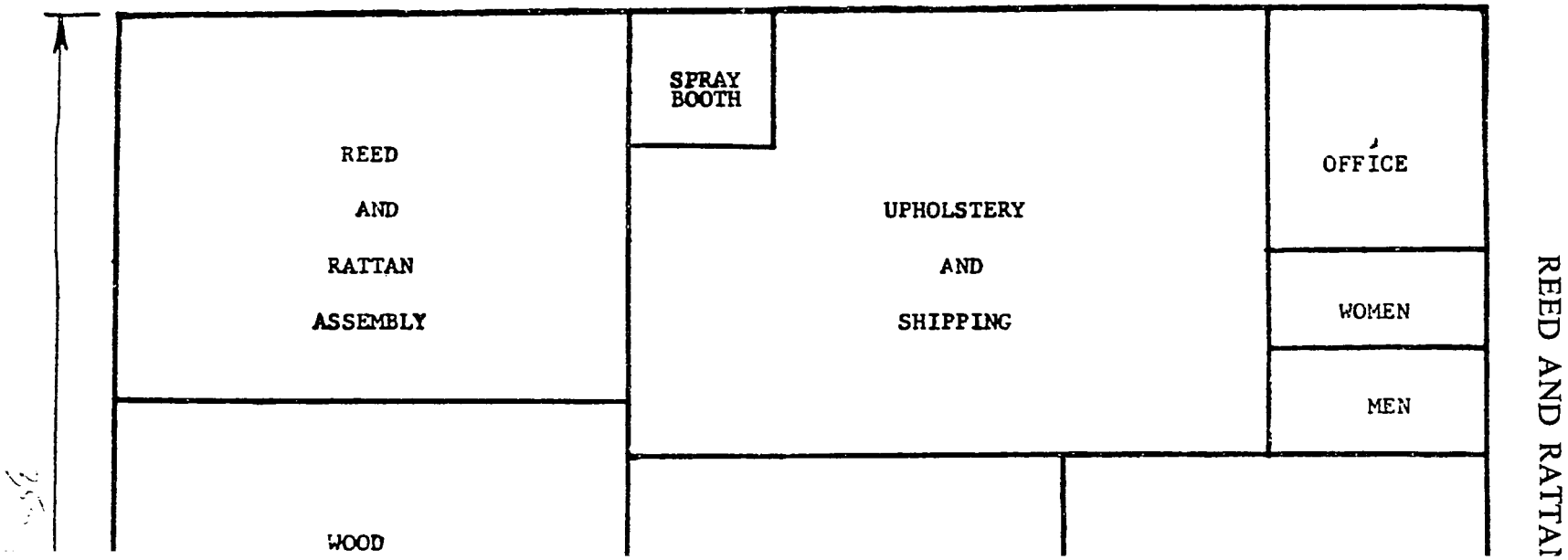
Direct Materials	$ 74,000
Direct Labor	84,000
Manufacturing Overhead(a)	33,900
Admin. Costs(b), Contingencies	8,000
Sales Costs(c), Bad Debts	20,000
Depreciation on Fixed Capital	5,600
Total	$225,500

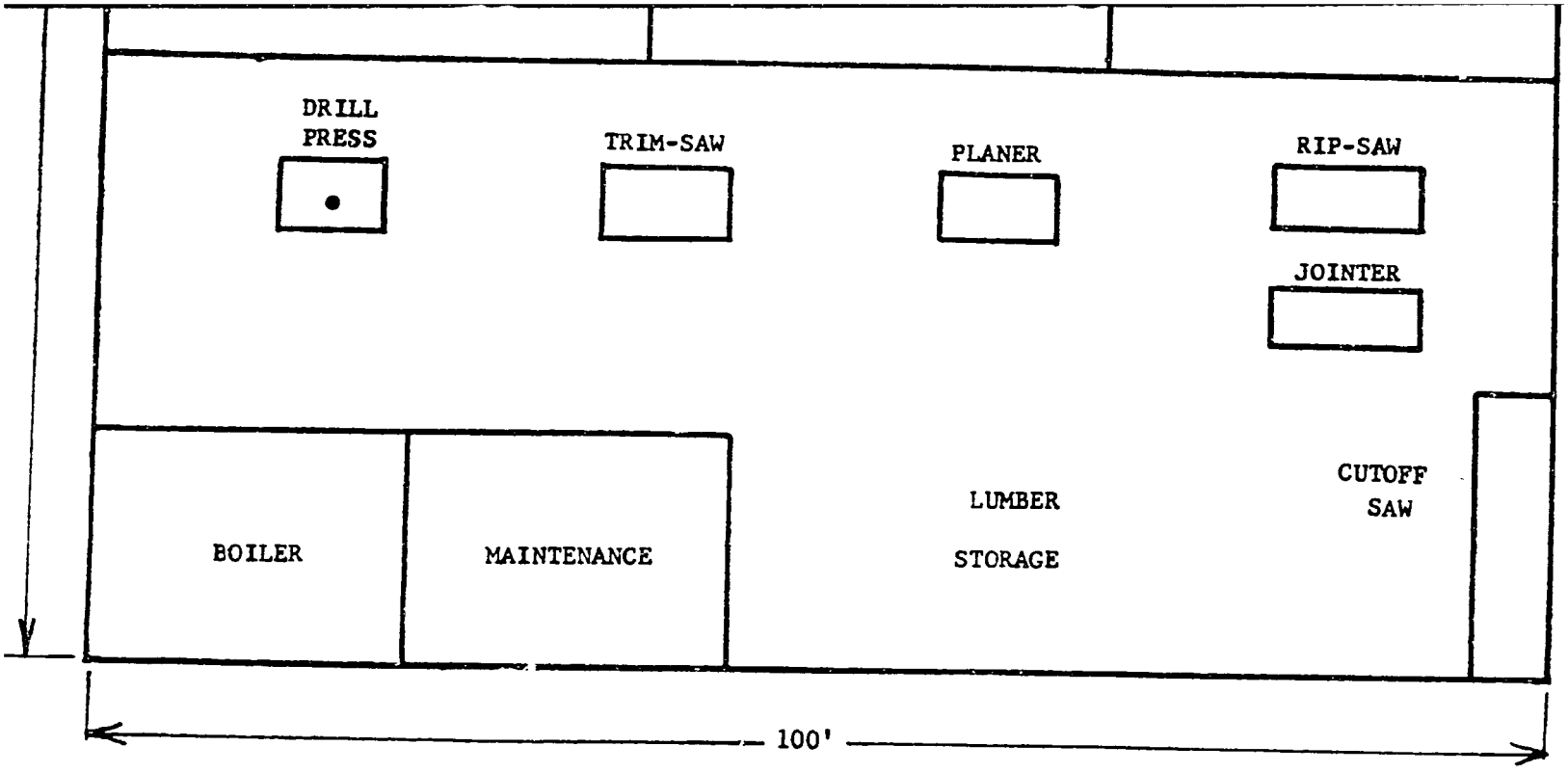
b. Annual Sales Revenue $260,000

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

PLANT LAYOUT

ARROWS INDICATE WORK FLOW





TURE: S.I.C. 2519

REED AND RATTAN FURNITURE: S. I. C. 2519

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 36, N.Y.
Machine tool processes, portable tool processes, and hand tool 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, N.Y.
Covers design, machinery, construction, and upholstering of furniture.

C. Cutting Techniques for Woodworkers. T. D. Perry. 1955. 52 p. $.50.
Hitchcock Publishing Company, Inc.
Wheaton, Illinois
Wood cutting tools and techniques.

II. 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.

III. PERIODICALS

A. The Wood-Worker. Monthly. $3.00/year.
S. H. Smith Company
2232 North Meridian Street
Indianapolis 7, Indiana
Devoted to the woodworking industry.

B. Woodworking. Monthly. $4.00/year.
Hitchcock Publishing Company, Inc.
Wheaton, Illinois
Covers the woodworking field.

IV. U. S. PATENTS

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

A. Patent No. 2,979,122. 1961. 10 p.
Chair frame and supporting structure.

B. Patent No. 2,936,009. 1960. 4 p.
Method of making rattan furniture.

C. Patent No. 2,877,832. 1959. 10 p.
Covers for chairs.

V. TRADE ASSOCIATIONS

A. Upholstered Furniture Manufacturers Association
276 Fifth Avenue
New York 1, N.Y.

B. Woodworking Machinery Manufacturers Association
1900 Arch Street
Philadelphia 3, Pennsylvania

VI. ENGINEERING COMPANIES

A. United States Machinery Company, Inc.
90 Broad Street
New York 4, N.Y.
Designs and installs woodworking plants.

B. Mattison Machine Works
200 Blackhawk Park Avenue
Rockford, Illinois
Designs and builds large line of woodworking machinery.

'II. DIRECTORIES

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

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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INDUSTRY PROFILES

VANILLA EXTRACT

I. P. No. 66095

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.

VANILLA EXTRACT: Standard Industrial Classification 2087

A. PRODUCT DESCRIPTION

Pure vanilla extract from ground vanilla beans.

B. GENERAL EVALUATION

This plant is particularly suitable for an area producing vanilla beans, although large-scale producers of food extracts in industrialized countries import the beans. Though the plant is a small operation, requiring very little labor and equipment, annual production capacity is large for this commodity, and it is essential to ascertain that such an amount can be marketed at a profitable price before setting up this enterprise. Where an area has previously exported vanilla beans it is possible that markets for the extract can be found in areas which imported beans, especially if the exporting area can offer a lower price for the extract than users formerly had to pay.

C. MARKET ASPECTS

1. USERS. Various food manufacturing industries, eating places, households.

2. SALES CHANNELS AND METHODS. Sales to wholesalers and industrial users.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Transport costs are low in relation to product value. Market could be nation-wide. b. Export. World-wide.

4. COMPETITION. a. Domestic Market. Where beans are grown locally, very small producers may provide competition. b. Export Market. The product is more or less standard and delivered price is the main factor in export competition

5. MARKET NEEDED FOR PLANT DESCRIBED. Sales outlets are likely to be distributed over a wide area and it is not feasible to estimate the market in terms of total population.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 60,000 Gallons

. CAPITAL REQUIREMENTS

. FIXED CAPITAL

		Cost
Land. 1/2 acre.		$ --
Building. One story, 20'x60'.		7,200
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$31,000	
Other tools & equipmt.	500	
Furniture & fixtures	800	32,300
Total (excl. Land)		$ 39,500

Principal Items. 3 percolators, 2 graduated vats, weighing scales, hand trucks.

. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 87,800
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,800
Training Costs		400
Total Working Capital		$ 91,000

TOTAL CAPITAL (EXCL. LAND) $130,500

MATERIALS AND SUPPLIES

Direct Materials	Annual Requirements	Annual Cost
Ground vanilla beans	45,000 lbs.	$472,500
190 pf. grain alcohol	30,000 gals.	16,800
Granulated sugar	57,000 lbs.	5,000
Gallon jugs & cartons		13,500
Total		$507,800

Supplies	
Lubricants & hand tools	$ 100
Maintenance & spare parts	600
Office supplies	100
Total	$ 800

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. 6 hp. connected load plus 24,000 kw-hr	$ 300
b. Fuel. Heating, if necessary.	$ 100
c. Water. Production, sanitary purposes and fire protection.	$ 200

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	1	$ 5,000
Unskilled	1	4,000
Total	2	$ 9,000
b. Indirect Labor		
Manager	1	$ 9,000

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

6. TOTAL ANNUAL COSTS AND SALES REVENUE

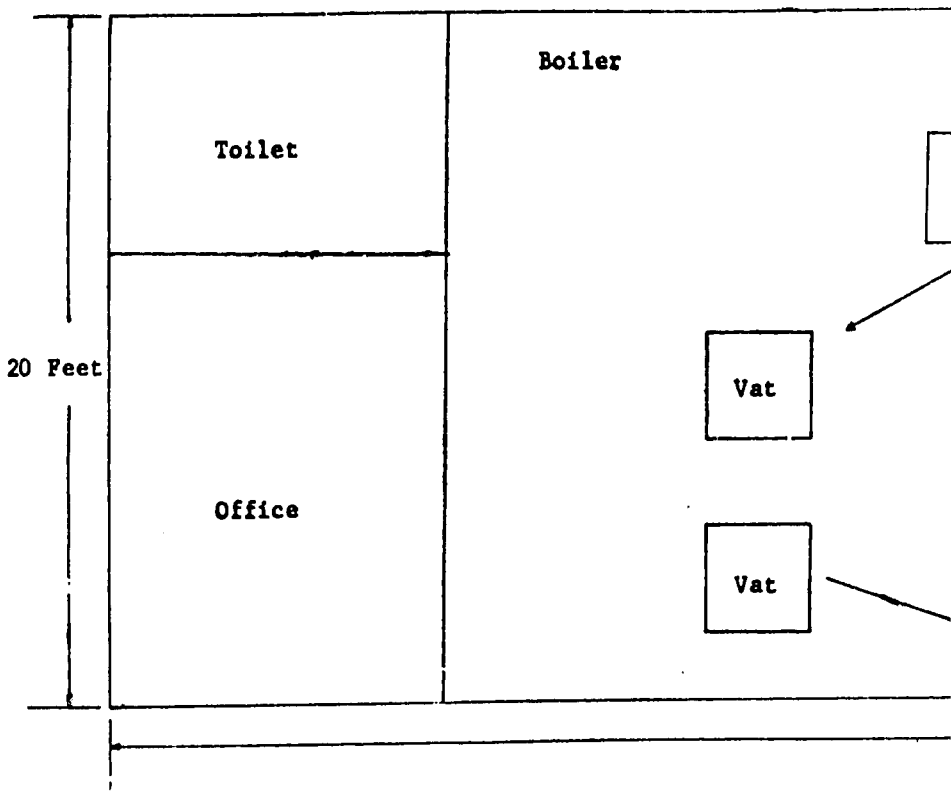
a. Annual Costs	
Direct Materials	$507,800
Direct Labor	9,000
Manufacturing Overhead(a)	10,400
Admin. Costs(b), Contingencies	18,000
Sales Costs(c), Bad Debts	16,000
Depreciation on Fixed Capital	3,600
Total Annual Costs	$564,800
b. Annual Sales Revenue	$690,000

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

VANILLA EXTRACT: S.I.C. 2087

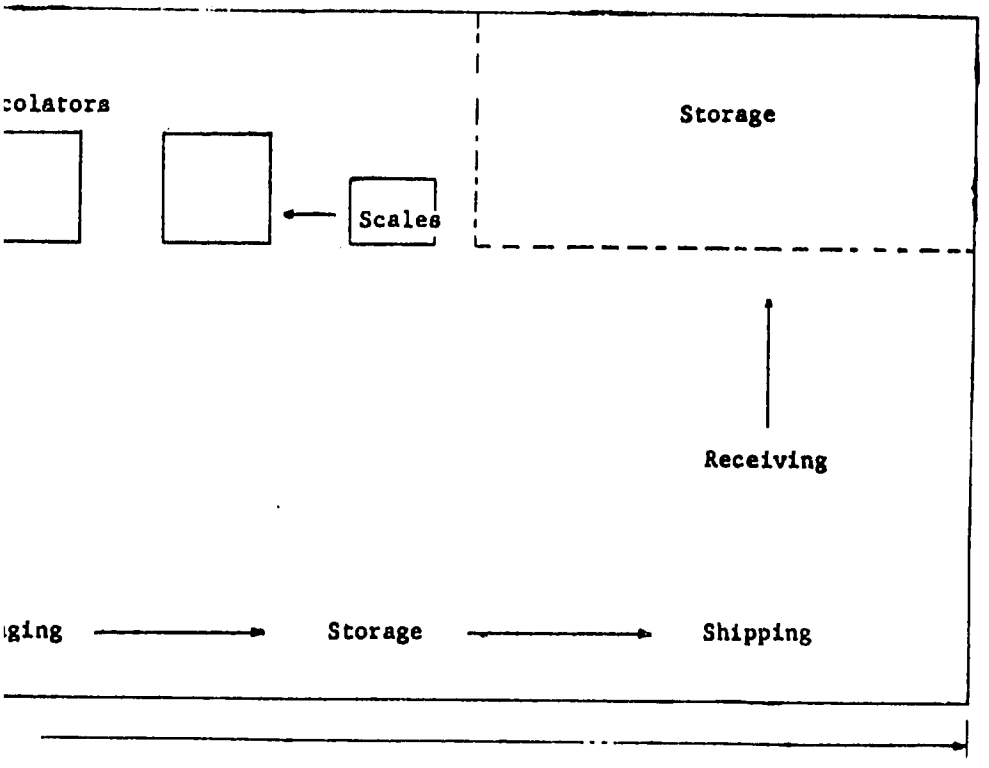
VANILLA

PLANT LA



: S.I.C. 2087

WORKFLOW



VANILLA EXTRACT: S. I. C. 2087

SELECTED REFERENCES

I. TEXTBOOKS

A. Food Flavorings. J. Merory. 1960. 370 p. $13.50.
The Avi Publishing Company, Inc.
P. O. Box 388
Westport, Connecticut
Composition, manufacture, and use of flavorings, including vanilla.

B. Food Analysis. 4th edition. A. G. Woodman. 1941. 607 p.
Illus $13.00.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N.Y.
Covers extracts and flavorings including vanilla.

II. GOVERNMENT PUBLICATIONS, U S.

A. Food Specifications for Extract Flavoring and Non-Alcoholic Flavors.
EE-E9-11D. $.25.
Superintendent of Documents
Government Printing Office
Washington, D. C. 20401

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 production planning and control in industry.

III. PERIODICALS

A. Chemical Engineering Progress. Monthly. $6.00/year.
American Institute of Chemical Engineers
25 West 45th Street
New York 36, N.Y.
Devoted to chemical engineering.

B. Chemical Engineering. Bi-weekly. $25.00/year.
McGraw-Hill Publishing Company, Inc.
330 West 42nd Street
New York 36, N.Y.
Intended for chemical engineers and technical management in the chemical process industries.

IV. U.S. PATENTS

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

A. Patent No. 2,949,368. 1960. 3 p.
Purification of fruit essences.

B. Patent No. 2,942,985. 1960. 5 p.
Process and apparatus for the preparation of flavor bases.

C. Patent No. 2,934,437. 1960. 4 p.
Flavouring substances and their preparation.

D. Patent No. 2,752,394. 1956. 3 p.
Method of manufacturing vanillin.

V. TRADE ASSOCIATIONS

A. Flavoring Extract Manufacturers Association of the United States
38 South Dearborn Street
Chicago 3, Illinois

B. National Manufacturers of Beverage Flavors
38 South Dearborn Street
Chicago 3, Illinois

VI. ENGINEERING COMPANIES

A. Technical Enterprises, Inc.
31 South Street
New York 4, N. Y.
Designs and installs complete chemical processing plants.

B. Pfaudler Company, Inc.
West Avenue and Clark Street
Rochester, New York
Manufactures machinery and equipment for the processing of vanilla beans.

VII. DIRECTORIES

A. Chemical Week Buyer's Guide. Annual. $20.00.
McGraw-Hill Publishing Company, Inc.
330 West 42nd Street
New York 36, N.Y.
Lists manufacturers and distributors of equipment, supplies, and materials for chemical processing industries.

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INDUSTRY PROFILES

WOOD FIBER SOUVENIRS

I. P. No. 66096

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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.

WOOD FIBER SOUVENIRS: Standard Industrial Classification 2499

A. PRODUCT DESCRIPTION

Small jewelry items, table decorations, etc., made of molded material consisting of wood flour, resins and inner fillers and finished with the same type of finish normally applied to wood products.

B. GENERAL EVALUATION

The wood flour required in the molded material is a sawmill by-product and can be produced readily from sawdust. Investment in fixed capital is modest and the necessary labor skills can be easily acquired. Production can be further diversified and readily increased, if demand warrants it.

C. MARKET ASPECTS

1. USERS. Individual consumers, particularly women.

2. SALES CHANNELS. Sales to wholesalers, for resale to gift shops and other stores.

3. GEOGRAPHICAL EXTENT OF MARKET. The finished product is easily transported, provided proper care is used in packaging, and transport cost will not be important in limiting the market area.

4. COMPETITION. a. Domestic Market. If the level of income in the domestic market is high enough to support the consumption of such items, hand-made jewelry and knickknacks as well as plastic items will compete. b. Export Market. If costs are low enough production for foreign sale is a possibility, particularly for items of attractive and original design.

5. MARKET NEEDED FOR PLANT DESCRIBED. Market outlets may be very diversified, and the market needed cannot be estimated in terms of total population.

). PRODUCTION REQUIREMENTS

NNUAL CAPACITY - ONE-SHIFT OPERATION : 240,000 Units

CAPITAL REQUIREMENTS

FIXED CAPITAL		Cost
Land. About 3,000 sq. ft.		$ --
Building. One story, 40'x40'.		9,600
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$ 15,500	
Other tools & equipmt.	1,000	
Furniture & fixtures	500	17,000
Total (excl. Land)		$ 26,600

Principal Items. Heating unit and vessels, electroplating equipment, drill press, shaper, mechanical mixer, hydraulic press and motor, dry kiln with heating unit, mechanical sander with wire brush, spray booth complete, dollies, and drying racks, cleaning equipment.

WOR..ING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 14,700
Admin. Costs(b), Contingencies, Sales Costs(c)	30	1,000
Training Costs		4,700
Total Working Capital		$ 20,400

TOTAL CAPITAL (EXCL. LAND) $ 47,000

MATERIALS AND SUPPLIES

Direct Materials	Annual Requirements	Annual Cost
Wood flour, resins & inner fillers	15 tons	$ 12,000
Copper plating		1,200
Wax		300
Back-up metal	50 tons	7,000
Paint & lacquers	500 gals.	2,500
Packaging		3,600
Total		$ 26,600

Supplies	
Hand & cutting tools	$ 250
Maintenance & repair parts	1,600
Office supplies	200
Total	$ 2,050

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 60 hp.	$ 1,800
b. Fuel. About 2,000 gals. oil annually.	$ 250
c. Water. About 800,000 gals. annually.	$ 200

4. TRANSPORTATION

a. OwnTransport Equipment. None necessary.

b. External Transport Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	3	$ 15,000
Semi-skilled	5	20,000
Unskilled	3	$ 9,000
Total	11	$ 44,000
b. Indirect Labor		
Manager buys, sells, & supervises	1	$ 8,000
Office	1	4,000
Total	2	$ 12,000

c. Training Needs. Manager should be experienced. With the 3 skilled workers he should be able to train all other direct labor. Plant should reach full production in 2 months.

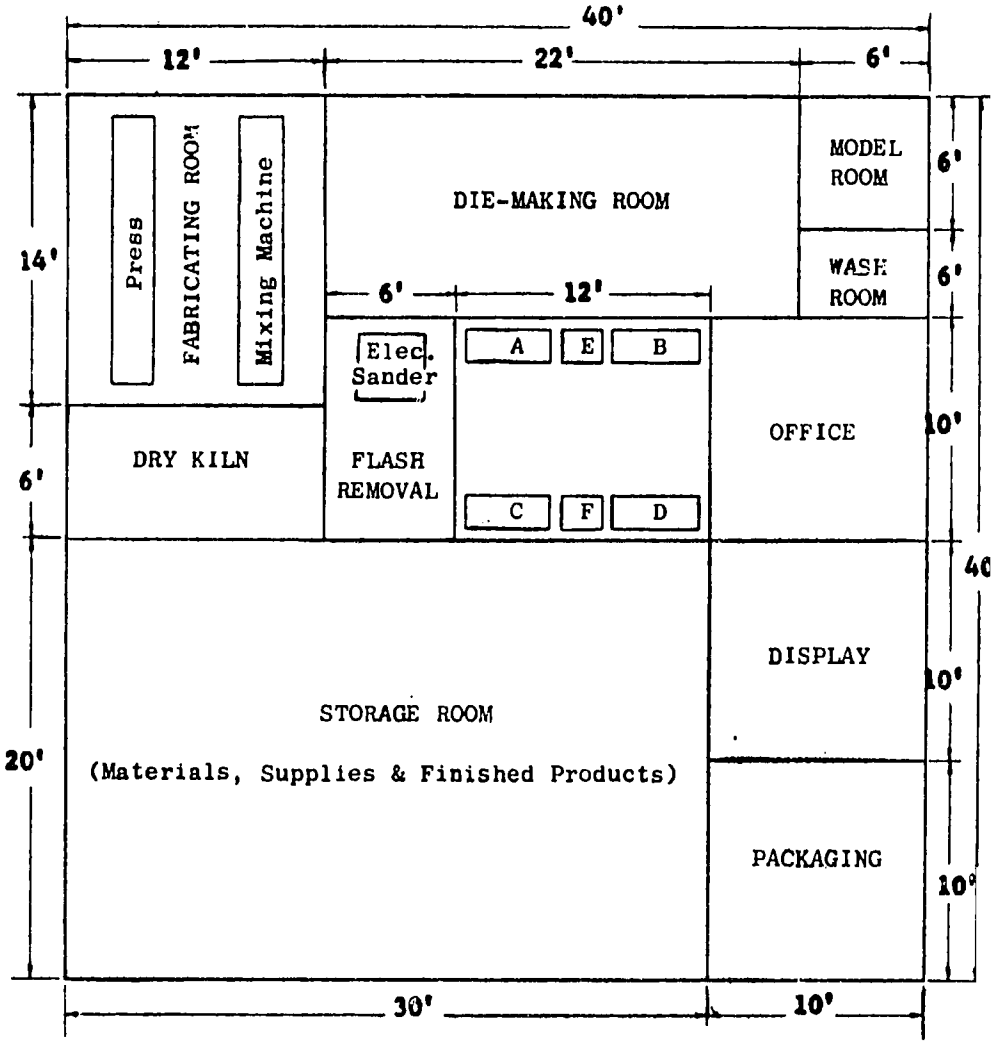
6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs	
Direct Materials	$ 26,600
Direct Labor	44,000
Manufacturing Overhead(a)	16,300
Admin. Costs(b), Contingencies	5,000
Sales Costs(c), Bad Debts	7,000
Depreciation on Fixed Capital	2,300
Total	$101,200
b. Annual Sales Revenue	$130,000

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

WOOD FIBER

PLANT LA



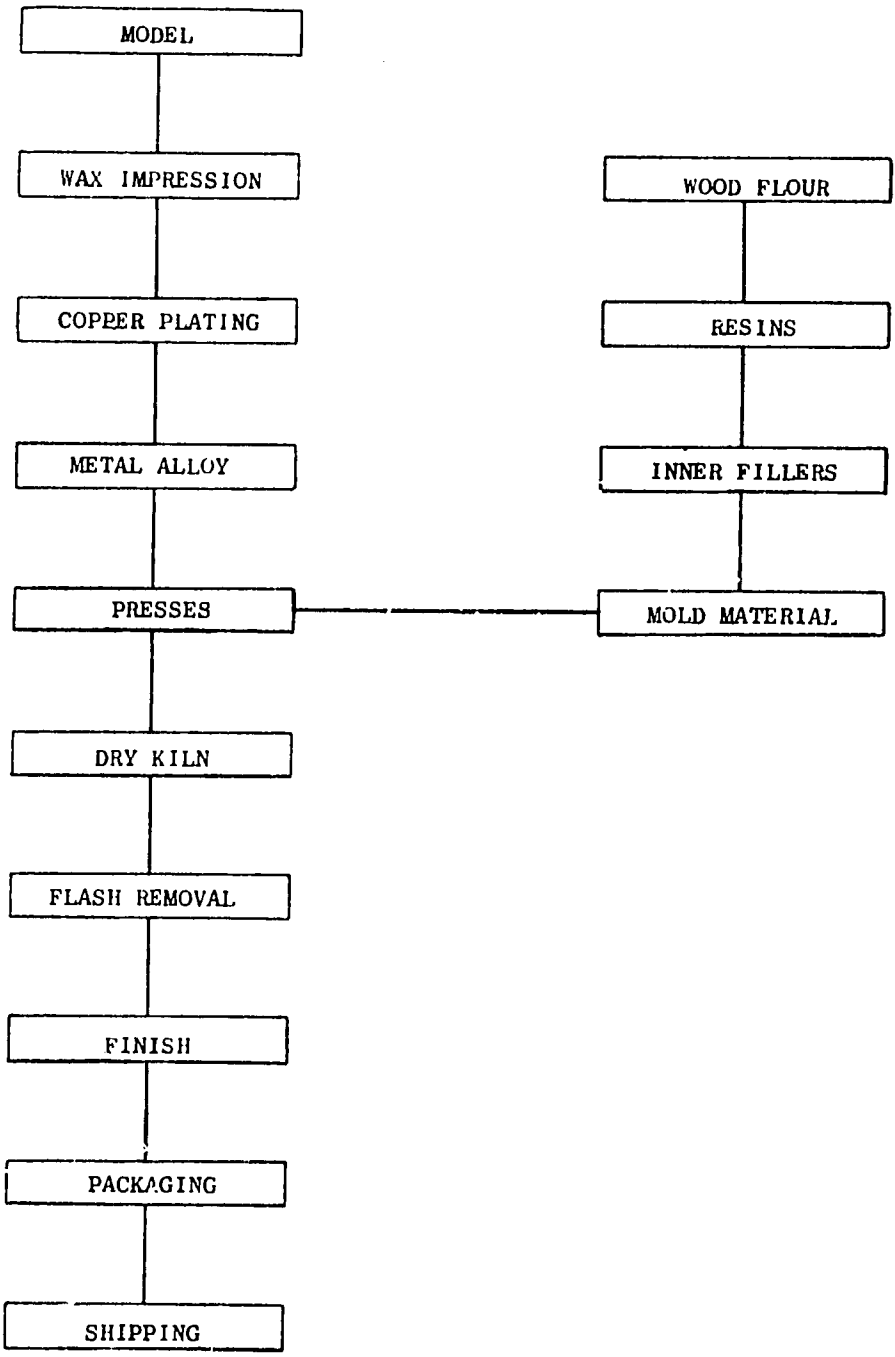
A & B -- Finishing Rooms (lacquer booths with exhaust equipment).

C & D -- Paint spraying booths with exhaust equipment.

E & F -- Hand painting booths.

RS : S.I.C. 2499

VORKFLOW



WOOD FIBER SOUVENIRS: S. I. C. 2499

SELECTED REFERENCES

I. TEXTBOOKS

A. Electroplating Engineering Handbook. A. K. Graham. 1955. 670 p. $10.00.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, N. Y.
A comprehensive study on the subject of electroplating.

B. General Woodworking. 2nd edition. C. H. Groneman. 1959. 256 p. Illus. $6.75.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N.Y.
Machine tool processes, portable tool processes, and hand tool processes.

C. Furniture Furnishing. H. B. Gatslick. 1956. 82 p. $1.00.
Hitchcock Publishing Company
Wheaton, Illinois
Deals with finishing furniture. Wood fiber souvenirs require the same type of finishing.

II. GOVERNMENT PUBLICATIONS, U. S.

A. Quality Control. TB-66. March 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 quality control in industry.

III. PERIODICALS

A. Plating. Monthly. $8.00/year.
American Electroplaters' Society, Inc.
445 Broad Street
Newark 2, New Jersey
Devoted to the advancement of metal finishing, electroplating, and allied arts.

B. The Wood-Worker. Monthly. $3.00/year.
S. H. Smith Company
2232 North Meridian Street
Indianapolis 7, Indiana
Concerned with wood working techniques.

IV. TRADE ASSOCIATIONS

A. National Woodwork Manufacturers Association
Barr Building, N.W.,
Washington D.C. 20006

V. ENGINEERING COMPANIES

A. United States Machinery Company, Inc.
90 Broad Street
New York 4, N.Y.
Designs and installs complete woodworking plants.

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INDUSTRY PROFILES

WOOD PULP FOR COARSE WRAPPING PAPER

I. P. No. 66097

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WOOD PULP FOR COARSE WRAPPING PAPER: Standard Industrial Classification 2611

A. PRODUCT DESCRIPTION

Wood pulp made from pulp wood suitable for the manufacture of coarse wrapping paper.

B. GENERAL EVALUATION

This plant will be economically feasible only where there is a local supply of suitable wood. A large and dependable water supply is also necessary. The plant described is designed to produce pulp for making coarse wrapping paper, and it is assumed that it will be associated with a local coarse wrapping paper plant or that it will have a potential market abroad in a paper manufacturing country that needs to import wood pulp. Manufacturing coarse wrapping paper is often a continuous process carried out in a single plant. See Industry Profile on Coarse Wrapping Paper: S. I. C. 2621.

C. MARKET ASPECTS

The purchaser of this product will be the coarse wrapping paper making industry, either domestic or possibly foreign. For information on the market aspects of the finished product see Industry Profile on Coarse Wrapping Paper: S. I. C. 2621

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: 6,000 Tons

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 2 acres.		$ --
Building. One story, 60'x150', with basement under one half. Steel frame.		54,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$201,000	
Other tools & equipmt.	5,700	
Furniture & fixtures	700	
Transportation equipmt.	4,000	211,400
Total (excl. Land)		$265,400

Principal Items. Wood shaver, hammermill & screen, pulper, 5 6" centrifugal pumps, screw press, digester & pulp refiner, pulp washer & thickener, consistency regulator, storage tank, agitator, wet machine, 100 hp. boiler 125 p. s. i., starters, piping, valves & spare parts, 5-ton truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 75,100
Admin. Costs(b), Contingencies, Sales Costs(c)	30	5,200
Training Costs		14,900
Total Working Capital		$ 95,200

c. TOTAL CAPITAL (EXCL. LAND) $360,600

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Pulp wood for	6,000 tons pulp	$162,000
Chemicals		100,000
Total		$262,000

b. Supplies

Maintenance & spare parts	$ 2,000
Welding gas & rods	300
Lubricants & hand tools	300
Office supplies	200
Total	$ 2,800

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 250 hp.	$ 9,000
b. Fuel. About 86,000 gals. oil annually.	$ 9,000
c. Water. About 1,600 gals. a minute. Water is returned & re-used. Annual cost of make-up & water for other purposes is estimated at	$ 2,000

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5-ton truck.	$ 1,000

b. External Transport Facilities. Total in & out shipments about 1,200 tons a month. Product is heavy & bulky. Plant should be located near railroad, if possible.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	15	$ 75,000
Unskilled	12	36,000
Total	27	$111,000
b. Indirect Labor		
Manager & supervisors	4	$ 26,000
Office	1	4,000
Other	6	24,000
Total	11	$ 54,000

c. Training Needs. Manager & supervisors must be fully experienced. With assistance of 5 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

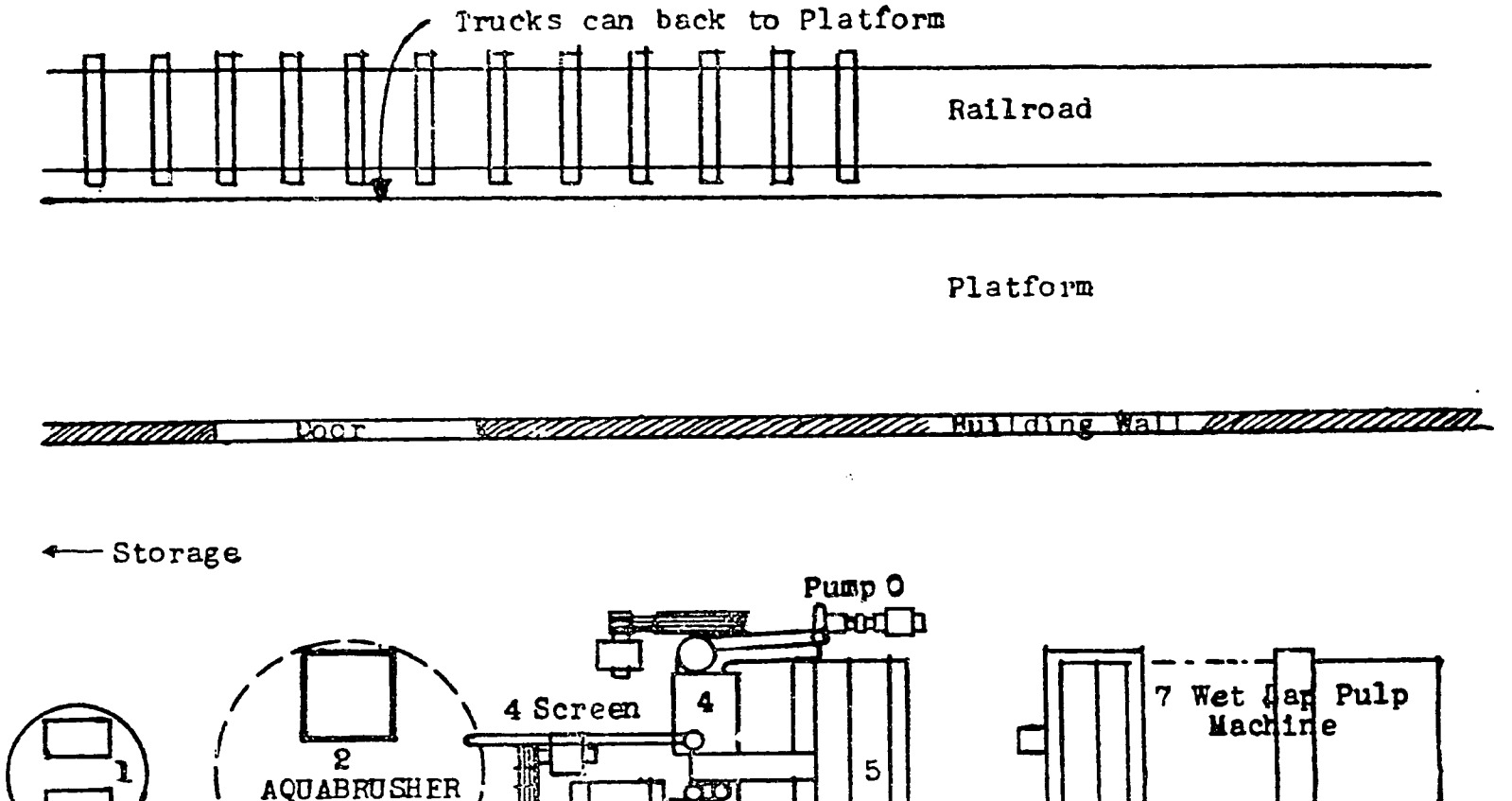
a. Annual Costs

Direct Materials	$262,000
Direct Labor	111,000
Manufacturing Overhead(a)	77,800
Admin. Costs(b), Contingencies	22,000
Sales Costs(c), Bad Debts	45,000
Depreciation on Fixed Capital	25,300
Total	$543,100

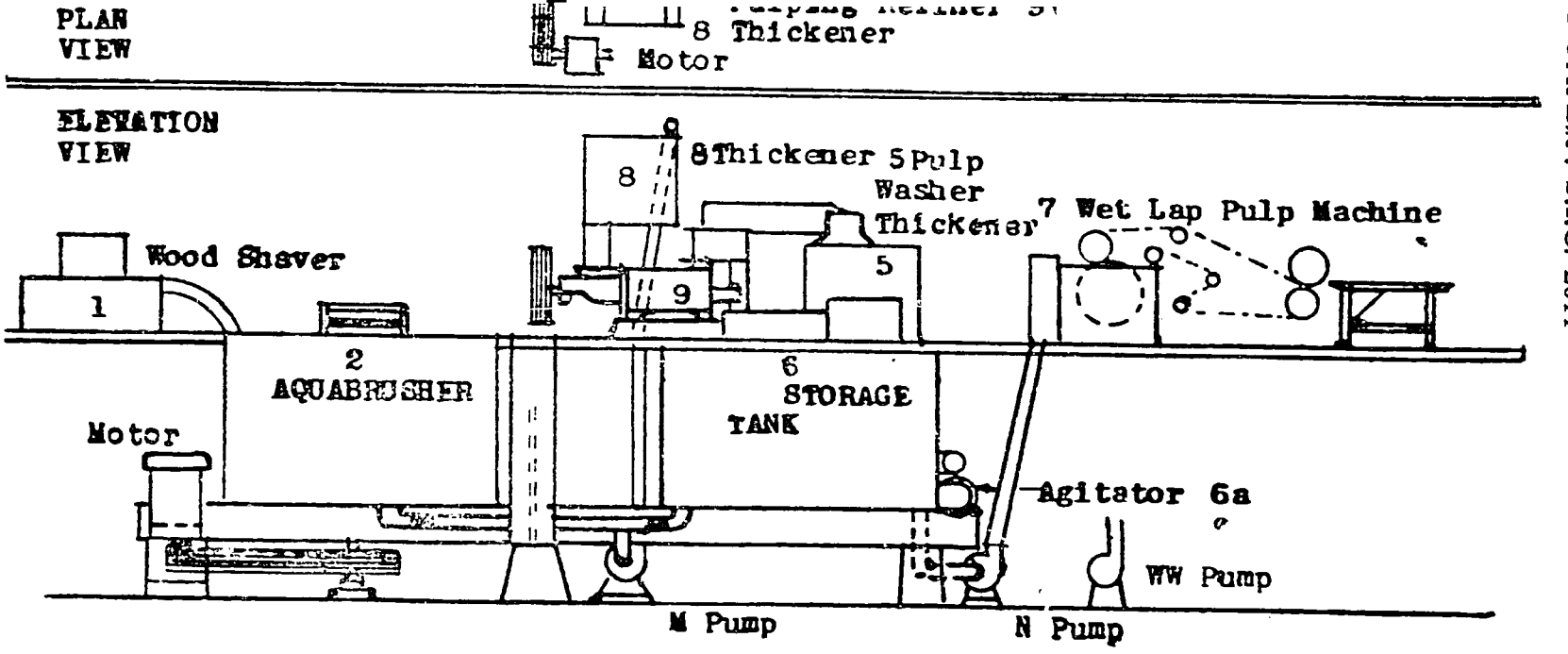
b. Annual Sales Revenue $690,000

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

PLANT LAYOUT



WOOD PULP FOR COARSE WE



DIMENSIONS OF BUILDING 60′ × 150′

WORK FLOW IS CONTINUOUS FROM WOOD SHAVER TO THE WET LAP PULP MACHINE

WOOD PULP FOR COARSE WRAPPING PAPER: S.I.C. 2611

SELECTED REFERENCES

I. TEXTBOOKS

A. Pulp and Paper. 2nd edition. J. P. Casey. 1960. 3 volumes.
Set $19.50.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, N. Y.
Describes methods and processes of pulp manufacture.

B. Modern Pulp and Paper Making. J. B. Calkin, editor. 1957. 558 p.
$10.00.
Reinhold Publishing Corporation
430 Park Avenue
New York 22, N. Y.
Covers principles of modern pulp manufacture.

C. Pulping Processes. C. J. West. 1949-54. 4 volumes. Vols. 1-3,
$5 each. Vol. 4, $10.00.
Institute of Paper Chemistry
Appleton, Wisconsin
Describes methods and processes for the manufacture of pulp.

D. Pulp and Paper Manufacture. J. N. Stephenson, editor. Volume I.
1950. 1,043 p. Illus. $11.00.
McGraw-Hill Book Company, Inc.
330 West 42nd Street
New York 36, N. Y.
Information on the manufacture of pulp from wood.

II. GOVERNMENT PUBLICATIONS, U. S.

A. Wood Pulp Production—Bibliography. IR-29295. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523

B. Wood Pulping. IR-17171EP. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523

C. 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 quality control in industry.

SELECTED REFERENCES (Continued)

III. PERIODICALS

A. Pulp and Paper. Monthly. $5.00/year.
Miller Freeman Publications, Inc.
500 Howard Street
San Francisco, California
Manufacture of pulp and paper, new developments in the industry.

B. Tappi. Monthly. $13.00/year.
Technical Association of the Pulp and Paper Industry
360 Lexington Avenue
New York 17, N. Y.
Devoted to basic research and technology in the field of pulp production.

IV. U.S. PATENTS

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

A. Patent No. 2,950,064. 1960. 5 p.
Machine for pulping wood scraps.

B. Patent No. 2,812,790. 1957. 5 p.
Preparation of shredded wood pulp.

C. Patent No. 2,707,420. 1955. 4 p.
Pulp preparing apparatus.

D. Patent No. 2,682,810. 1954. 5 p.
High-low speed disk type pulping unit.

V. TRADE ASSOCIATIONS

A. American Paper and Pulp Association
122 East 42nd Street
New York 17, N. Y.

B. Technical Association of the Pulp and Paper Industry
360 Lexington Avenue
New York 17, N. Y.

VI. ENGINEERING COMPANIES

A. Apmew, Inc.
3360 Bay Street
Glens Falls, New York
Pulp mill equipment.

B. Von Kohorn International Corporation
Von Kohorn Building
White Plains, New York
Installation of complete plants for manufacture of pulp.

VII. DIRECTORIES

A. World Market Pulp Directory. Annual. $2.00.
Pulp and Paper
1791 Howard Street
Chicago 26, Illinois
Lists producers of wood pulp for paper and other products.

WOOD PULP FOR COARSE WRAPPING PAPER: S.I.C. 2611

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

WOOD PULP FOR WALLBOARD

I. P. No. 66098

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.

WOOD PULP FOR WALLBOARD: Standard Industrial Classification 2611

A. PRODUCT DESCRIPTION

Pulp made from lumber, suitable for manufacture of wallboard.

B. GENERAL EVALUATION

The plant will be economically feasible only where there is a local supply of pulpwood. A large and dependable water supply is necessary. The plant described is designed to produce pulp suitable for the manufacture of wallboard, and it is assumed that it will be associated with a wallboard manufacturing plant or plants. Manufacturing wallboard from lumber, or any other material, is, in fact, often a continuous process carried on in a single plant. See Industry Profile on Wallboard from Bagasse: S. I. C. 2661.

C. MARKET ASPECTS

The purchaser of this product will be the wallboard industry. Since wallboard can be made from several different raw materials, pulp from wood is not very likely to be required by foreign countries for wallboard manufacture. If, therefore, a plant such as this is to be practicable, it will normally be necessary to have local wallboard manufacturing facilities within easy reach and sufficiently large to absorb the plant's output. For information on the market aspects of the finished wallboard, see Industry Profile on Wallboard from Bagasse: S. I. C. 2661.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - THREE-SHIFT OPERATION: Pulp for 23 Million Square Feet of Wallboard.

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 2 acres.		$ --
Building. One story, 60'x150', with basement under one half. Steel frame.		54,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$201,000	
Other tools & equipmt.	5,700	
Furniture & fixtures	700	
Transportation equipmt.	4,000	211,400
Total (excl. Land)		$265,400

Principal Items. Wood shaver, hammermill & screen, pulper, 5 6" centrifugal pumps, screw press, digester & pulp refiner, pulp washer & thickener, consistency regulator, storage tank, agitator, wet machine, 100 hp. boiler 125 p. s. i., starters, valves, piping & spare parts, 5-ton truck.

b. WORKING CAPITAL

	No. of Days	
Direct Materials, Direct Labor, Mfg. Overhead(a)	60	$ 71,800
Admin. Costs(b), Contingencies, Sales Costs(c)	30	5,000
Training Costs		14,900
Total Working Capital		$ 91,700

c. TOTAL CAPITAL (EXCL. LAND) $357,100

2. MATERIALS AND SUPPLIES

a. Direct Materials

	Annual Requirements	Annual Cost
Pulp wood for 23 mn. sq. ft. board		$162,000
Chemicals		80,000
Total		$242,000

b. Supplies

Maintenance & spare parts	$ 2,000
Welding gas & rods	300
Lubricants & hand tools	300
Office supplies	200
Total	$ 2,800

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 250 hp.	$ 9,000
b. Fuel. About 86,000 gals. oil.	$ 9,000
c. Water. About 1,600 gals. a minute. Water is returned & re-used. Annual cost of make-up water & water for other purposes is estimated at	$ 2,000

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 5-ton truck.	$ 1,000

b. External Transport Facilities. Total in & out shipments about 1,400 tons a month. Product is heavy & bulky. Plant should be located near railroad, if possible.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	15	$ 75,000
Unskilled	12	36,000
Total	27	$111,000
b. Indirect Labor		
Manager & supervisors	4	$ 26,000
Office	1	4,000
Other	6	24,000
Total	11	$ 54,000

c. Training Needs. Manager & supervisors should be fully experienced. With assistance of 5 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

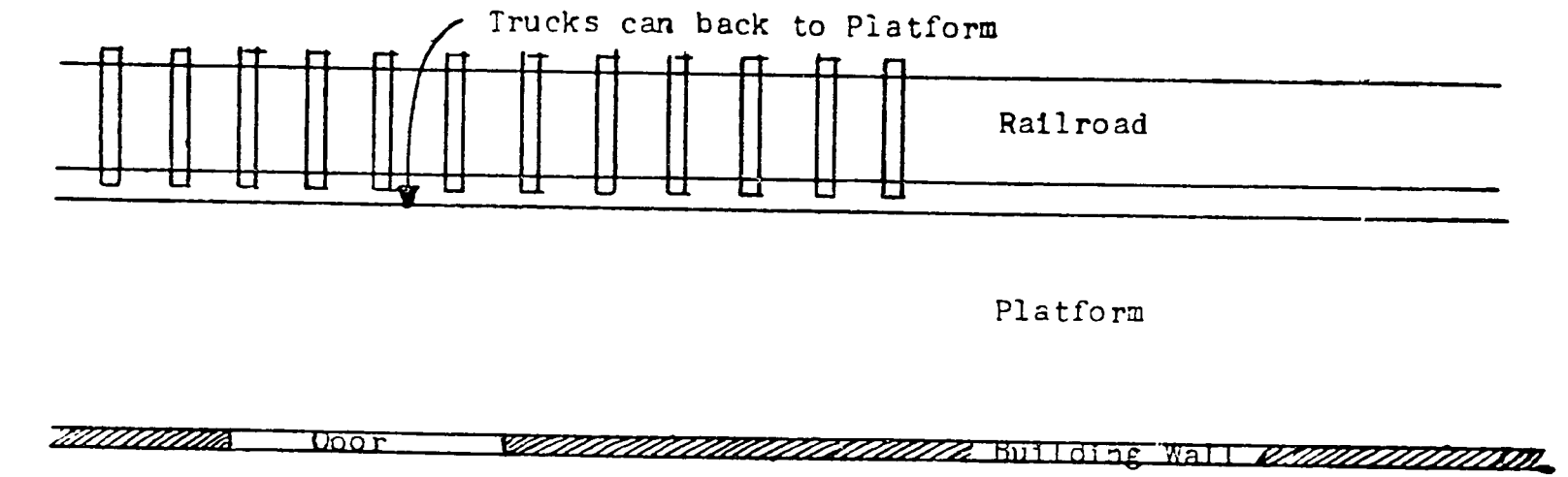
a. Annual Costs

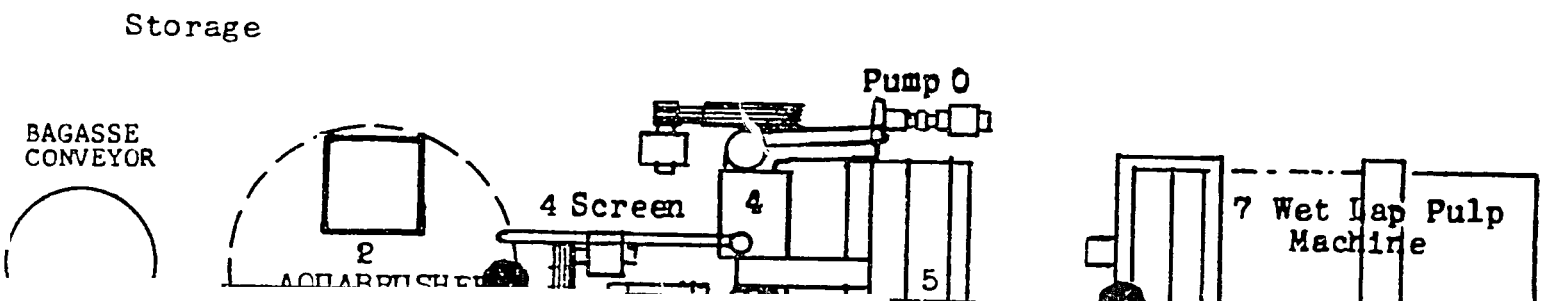
Direct Materials	$242 000
Direct Labor	111,000
Manufacturing Overhead(a)	77.800
Admin. Costs(b), Contingencies	24,000
Sales Costs(c), Bad Debts	40,000
Depreciation on Fixed Capital	25.300
Total	$520,100

b. Annual Sales Revenue $865,0000

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

PLANT LAYOUT





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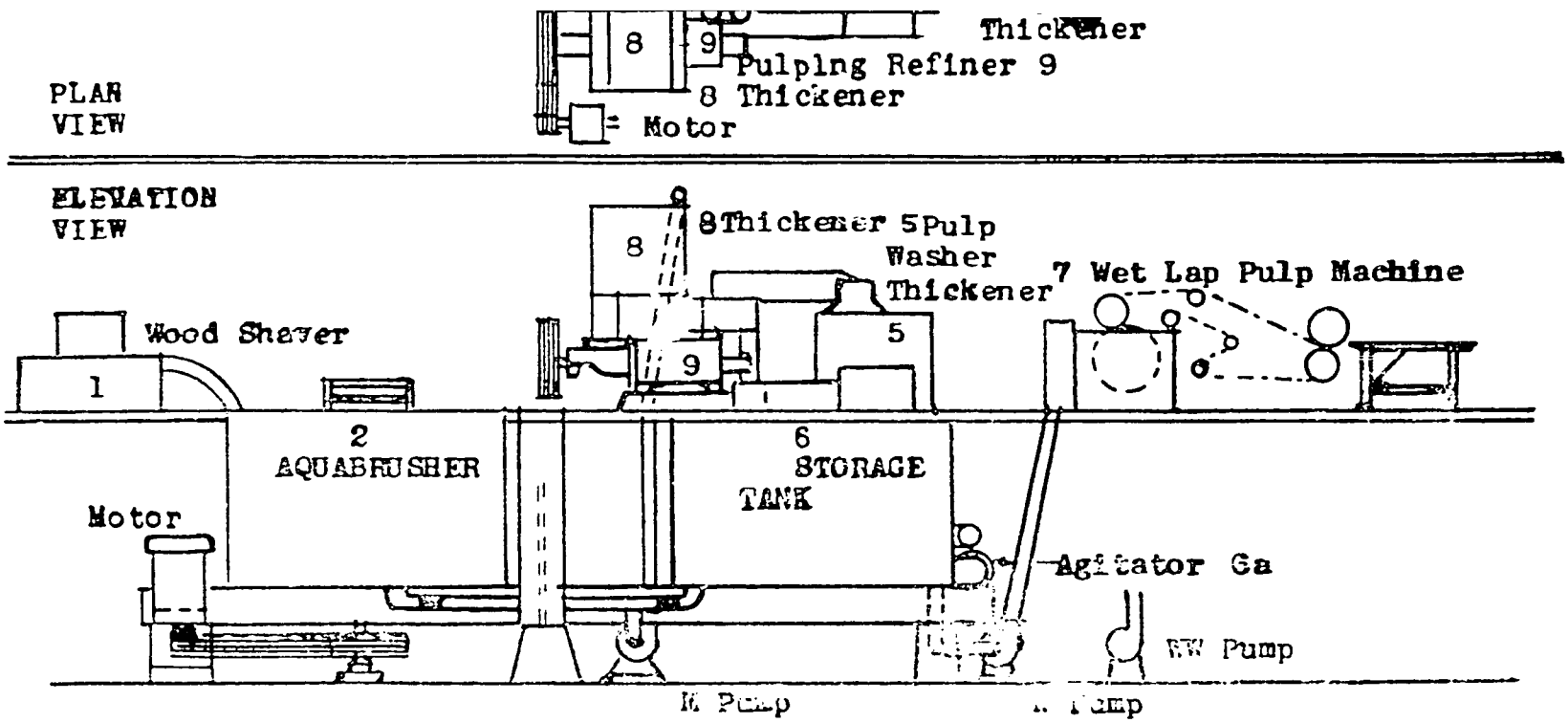

DIMENSIONS OF BUILDING 60′×150′

WORK FLOW IS CONTINUOUS FROM WOOD SHAVER TO THE WET LAP PULP MACHINE

WOOD PULP FOR WALLBOARD: S. I. C. 2611

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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.

WOOD TABLES AND CHAIRS

I. P. No. 66099

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WOOD TABLES AND CHAIRS: Standard Industrial Classification 2511

A. PRODUCT DESCRIPTION

Wood tables, chairs and arm chairs of simple design. For shipment painted or unpainted.

B. GENERAL EVALUATION

Manufacturing processes are relatively simple and capital requirements comparatively modest. Many areas have a supply of workers accustomed to making things of wood, and it will usually not be difficult to train such labor in operations of a mechanized furniture factory. The main problem for consideration is potential market. In most areas this industry will only be an innovation in the sense of using a considerable amount of power-driven machinery. The plant would commonly be competing with small workshops using little or no power-driven equipment.

C. MARKET ASPECTS

1. USERS. Households, schools, assembly halls, restaurants, hotels, clubs, etc.

2. SALES CHANNELS AND METHODS. Sales for household use to retail stores, usually direct to other users.

3. GEOGRAPHICAL EXTENT OF MARKET. a. Domestic. Products are bulky and not particularly easy to handle. Transport costs are rather high in relation to value. In exceptional conditions large-scale manufacture and special freight rates make is possible to sell over a wide area. But, in general, makers of low-priced furniture cannot sell very far from plant. This disability is likely to be important in low-wage areas, where the small furniture maker can often compete comfortably in his own immediate vicinity with products of a distant factory, especially as he can more readily make to customers' special requirements. b Export. Because of high freight costs low-priced furniture of this type is rare in international trade.

4. COMPETITION. a. Domestic Market. Relatively high freight costs on these products provide substantial protection against imports. Competition from small furniture-makers likely to be keen in low-wage areas. Where rattan is produced, it competes strongly with wood as material for chairs and tables. Metal furniture also increasingly competes with low-priced wooden furniture of this type. b. Export Market. Normally no export business will be possible.

5. MARKET NEEDED FOR PLANT DESCRIBED. Taking into account competition from furniture made of other materials and from small makers, a developing urban area within easy delivery range and with a populatic of at least a million would probably be necessary to assure a market outlet for this plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - ONE-SHIFT OPERATION: 29,750 Pieces (21,250 Chairs, 4,250 Arm Chairs, 4,250 Tables)

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. 80,000 sq. ft. lumberyard		$ --
Building. One story, about 6,000 sq. ft.		36,000
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$ 9,000	
Other tools & equipmt.	3,500	
Furniture & fixtures	800	
Transportation equipmt.	2,500	15,800
Total (excl. Land)		$ 51,800

Principal Items. Radial cutoff saw, jointer, planer, drill press, pickup truck, band saw, trim & rip saw, table belt sander, single end tenoner, chain mortiser, paint spraying, work benches, assembling presses.

b. WORKING CAPITAL

	No. of Days	
Direct Materials,	90	$ 9,800
Direct Labor, Mfg. Overhead(a)	60	18,100
Admin. & Sales Costs(b), Contingencies,	30	1,500
Training Costs		7,800
Total		$ 37,200

c. TOTAL CAPITAL (EXCL. LAND) $ 89,000

2. MATERIALS AND SUPPLIES

	Annual Requirements	Annual Cost
a. Direct Materials		
Lumber	256,700 bd. ft.	$ 33,350
Nails		1,700
Woodscrews		950
Glue		850
Paint		2,150
Total		$ 39,000

b. Supplies

Maintenance & repair parts	$ 500
Cutting tools	450
Lubricants & hand tools	250
Office	200
Total	$ 1,400

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. About 80 kw-hr a day.	$ 500
b. Fuel. Scrap wood & sawdust.	
c. Water. Production, heating & sanitary purposes.	$ 200

4. TRANSPORTATION

	Annual Operating Cost
a. Own Transport Equipment. 1-ton pickup & delivery truck.	$ 1,000

b. External Transport Facilities. No special requirements.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	8	$ 40,000
Semi-skilled	8	32,000
Total	16	$ 72,000
b. Indirect Labor		
Manager & supervisor	2	$ 15,000
Office	1	4,000
Other	3	10,500
Total	6	$ 29,500

c. Training Needs. Manager & supervisor should be fully experienced. With 3 skilled operators, they should be able to train all workers. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

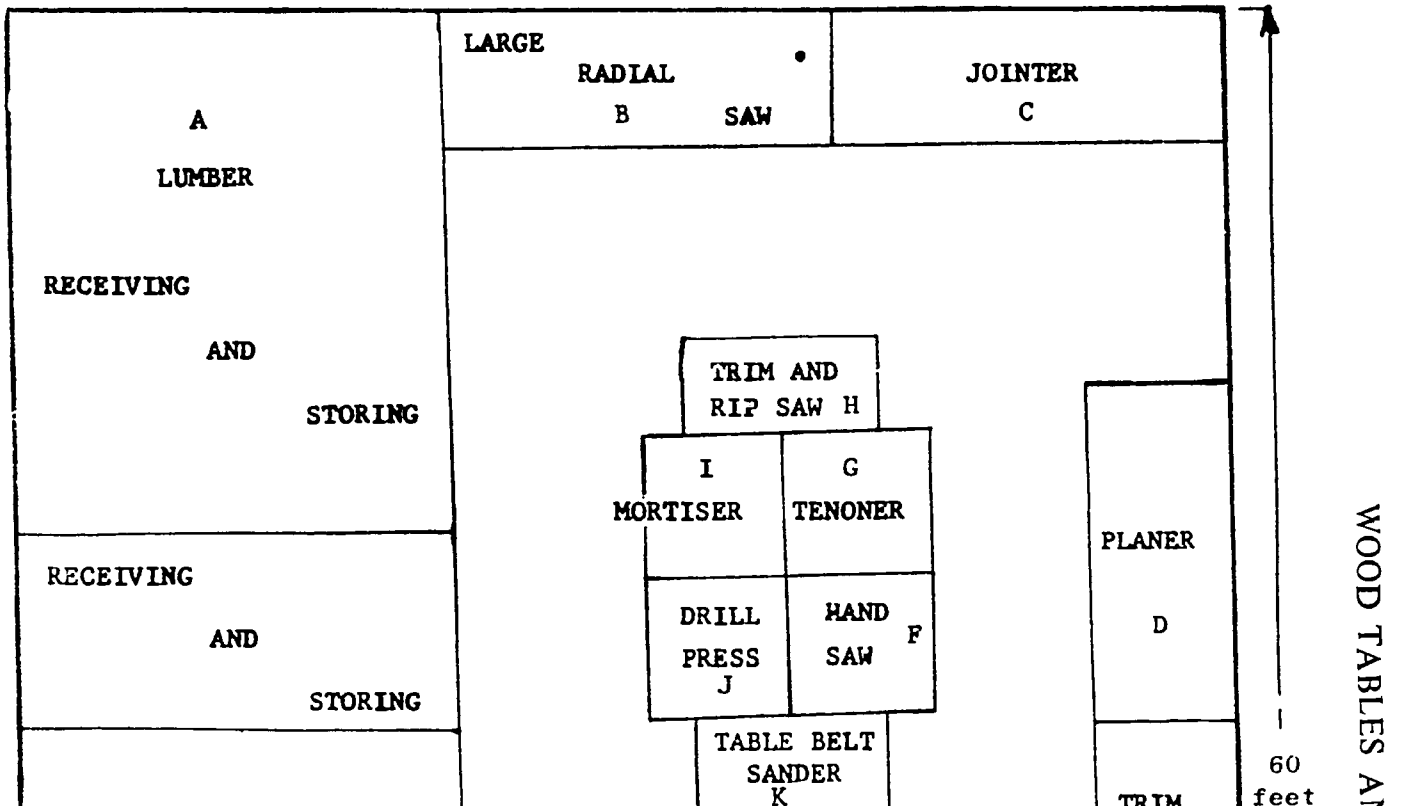
a. Annual Costs

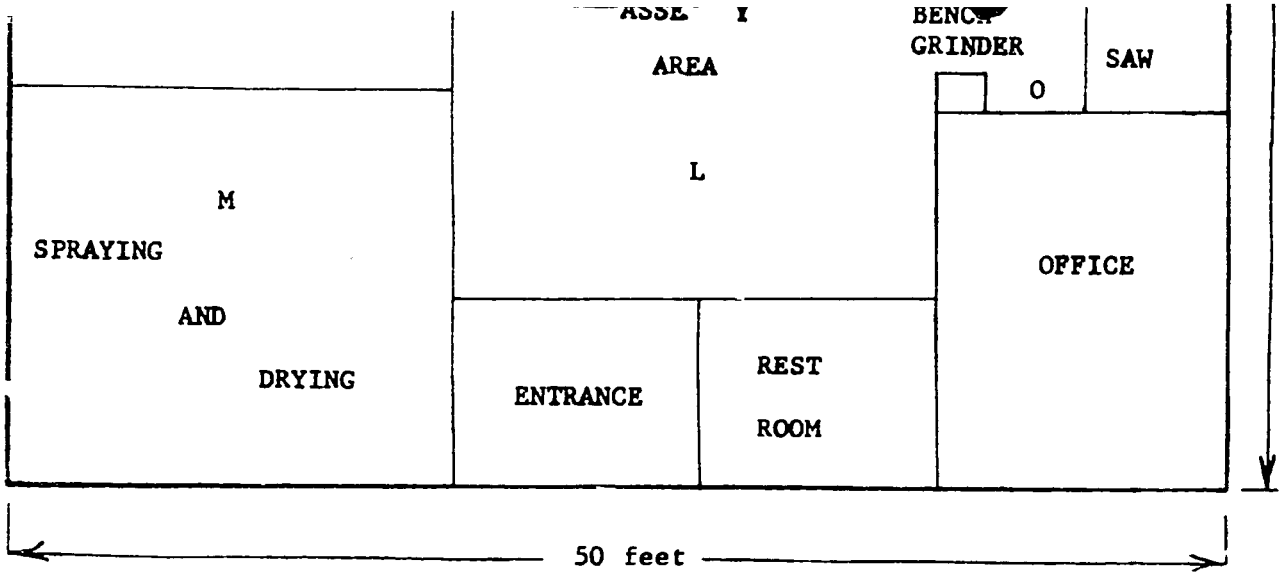
Direct Materials	$ 39,000
Direct Labor	72,000
Manufacturing Overhead(a)	32,600
Admin. & Sales Costs(b), Bad Debts, Contingencies	18,000
Depreciation on Fixed Capital	4,100
Total	$165,700

b. Annual Sales Revenue $210,000

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

PLANT LAYOUT





FLOW DIAGRAMS

A - LUMBER STORAGE
B - CUT TO LENGTH
C - JOINT FACE OR EDGE
D - PLANE
E - RIP TO SIZE AND/OR ROUGH TRIM
F - BANDSAW
G - TENON
H - FINISH TRIM
I - MORTISE
J - DRILL SCREW HOLES
K - SAND
L - ASSEMBLE
M - SPRAY AND DRY
N - FINISH STORES AND SHIPPING
O - TOOL GRINDER

AIRS : S.I.C. 2511

WOOD TABLES AND CHAIRS: S.I.C. 2511

SELECTED REFERENCES

I. TEXTBOOKS

A. Modern Machine Woodworking. Herman Hjorth. 1960. $5.00.
Bruce Publishing Company
400 North Broadway
Milwaukee, Wisconsin

B. Cabinet Making and Millwork. Dahl, Alf and Wilson. 1956. 357 p. Illus. $6.50.
American Technical Society
848 East 58th Street
Chicago 37, Illinois
Modern cabinet making and millwork. Has sections on glues.

C. Staining and Polishing. Charles Hayward. 198 p. 1959. $3.75.
J. B. Lippincott Company
East Washington Square
Philadelphia 5, Pennsylvania
Finishes for furniture; preparing the wood; staining; filling in the grain; and other finishing data including agents used in wood polishing.

D. Furniture Making and Cabinet Work; A Handbook. B. W. Pelton. 1961. 602 p. Illus. $7.95.
D. Van Nostrand Company, Inc.
120 Alexander Street
Princeton, New Jersey
Many actual constructions are given, with detailed plans and step by step directions, for making various articles of furniture.

II. GOVERNMENT PUBLICATION, U. S.

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

III. PERIODICALS

A. The Wood-Worker. Monthly. $3.00/year.
The S. H. Smith Company
2232 North Meridian Street
Indianapolis 7, Indiana
Concerned with wood fabrication techniques.

B. National Furniture Review. $3.00/year/U.S.
National Retail Furniture Association
666 Lake Shore Drive
Chicago, Illinois
Markets, sales, merchandizing, management of furniture stores, information on styling and trends in furniture design, new lines, and other information of interest to executive and management personnel in furniture business.

IV. U. S. PATENTS

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

A. Patent No. 2,688,524. 1954. 8 p.
Machinery, equipment, and process for manufacturing tables with drop leaf.

B. Patent No. 2,973,806. 1961. 5 p.
Process for manufacturing chairs.

C. Patent No. 2,757,715. 1956. 5 p.
Processes used in making chairs, particularly of the folding type.

V. TRADE ASSOCIATIONS

A. National Retail Furniture Association
666 Lake Shore Drive
Chicago 11, Illinois

B. National Furniture Warehousemen's Association
175 W. Jackson Boulevard
Chicago 4, Illinois

VI. ENGINEERING COMPANIES

A. The Enterprise Company
Thomas Street
Columbiana 1, Ohio
Woodworking machinery builders and engineers.

B. Union Tool Corporation.
East Market and Carl Streets
Warsaw, Indiana
Woodworking machinery designers and manufacturers.

VII. DIRECTORIES

A. Annual Directory of the Summer and Casual Furniture Industry. $1.50.
Summer and Casual Furniture Magazine
114 East 32nd Street
New York 16, N. Y.

PRE-INVESTMENT FEASIBILITY STUDY SUGGESTED

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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

WOOL SCOURING

I. P. No. 66100

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.

WOOL SCOURING: Standard Industrial Classification 2297

A. PRODUCT DESCRIPTION

Converting grease wool into scoured wool, ready for further processing, by a series of dusting and washing operations.

B. GENERAL EVALUATION

Many yarn and weaving mills do their own scouring, partly because a certain blending of the fibers necessary for the production of particular kinds of yarn can be done in the sorting and scouring process and partly because scouring on the premises as needed may be cheaper than sending the wool out to be scoured. The process is subject to great variations in cost, depending upon the type of chemicals used, which, in part, depends upon the type of wool scoured, the number of processes included in the whole scouring operation and, very importantly, the volume of wool scoured, since unit costs dscrease rapidly as volume of production rises. Therefore a careful investigation of the demand for wool scouring is necessary before such a plant is established. Total capital requirements are fairly large and the plant needs a good supply of water. Skilled labor requirements are not great, but careful supervision must be exercised to meet quality specifications.

C. MARKET ASPECTS

1. USERS. Local wool industry and wool exporters.

2. SALES CHANNELS AND METHODS. Plant works on a commission basis for owners of wool. Grease wool is delivered at plant and scoured wool taken from the plant by owner.

3. GEOGRAPHICAL EXTENT OF MARKET. Almost half the weight of grease wool consists of impurities to be removed in the scouring process. Transport costs are therefore significant, and plant should be located close to supply of grease wool. Finished product is easily transportable and can be shipped abroad.

4. COMPETITION. a. Domestic Market. Plant is sizable and can operate economically. Therefore competition from small plants would be unlikely. However, market would be limited by the existence of integrated mills in the area.
   b. Export Market. Since this plant would not own the wool it scours, it would have no export market, although the wool owners might.

5. MARKET NEEDED FOR PLANT DESCRIBED. In many of the smaller wool-growing countries 5 million pounds of grease wool represent a significant percentage of the total clip. Local scouring of good quality would increase the export potential of raw wool. Domestic consumption of wool varies widely, depending on level of income, climate and type of clothing worn. Furthermore, not all wool would be scoured in such a separate scouring plant.

D. PRODUCTION REQUIREMENTS

ANNUAL CAPACITY - TWO-SHIFT OPERATION, 2.5 Million Pounds

1. CAPITAL REQUIREMENTS

a. FIXED CAPITAL

		Cost
Land. About 20,000 sq. ft.		$ --
Building.		
One story, 8,000 sq. ft.	$ 48,000	
Warehouse, 6,250 sq. ft.	37,500	85,500
Equipment, Furniture & Fixtures.		
Prodn. tools & equipmt.	$158,000	
Other tools & equipmt.	20,000	
Furniture & fixtures	700	178,700
Total (excl. Land)		$264,200

Principal Items. 48" automatic feed for opener, duster-opener, 48" automatic feed for scouring train, 5-bowl scouring train, 72' automatic feed for drier, 8' drier-six sections, conveyor, elevator, 48"x24" hydraulic baling press, 150 hp. boiler.

b. WORKING CAPITAL

	No. of Days	
Direct Labor, Mfg. Overhead(a)	60	$ 14,500
Admin. Costs(b), Contingencies, Sales Costs(c)	30	2,500
Training Costs		4,000
Total Working Capital		$ 21,000

c. TOTAL CAPITAL (EXCL. LAND) $285,200

2. MATERIALS AND SUPPLIES

a. Direct Materials	Annual Requirements	Annual Cost
Wool	5 mn lbs.	$ 0

b. Supplies

Lubricants & hand tools	$ 200
Chemicals (alkali & detergent)	6,600
Maintenance & repair parts	2,000
Office supplies	200
Total	$ 9,000

3. POWER, FUEL AND WATER

	Annual Cost
a. Electric Power. Connected load about 83 hp.	$ 5,000
b. Fuel. About 100,000 gals. oil annually.	$ 10,000
c. Water. About 6 mn. gals. annually in scouring process and for general purposes.	$ 1,500

4. TRANSPORTATION

a. Own Transport Equipment. None necessary.

b. External Transport Facilities. Total in & out shipments about 400 tons a month. Plant should be located on railroad siding, if possible.

5. MANPOWER

	Number	Annual Cost
a. Direct Labor		
Skilled	2	$ 10,000
Semi-skilled	6	24,000
Unskilled	4	12 000
Total	12	$ 46,000
b. Indirect Labor		
Manager	1	$ 8,000
Office	1	4,000
Other	1	3,000
Total	3	$ 15,000

c. Training Needs. Manager must be experienced. With 1 skilled worker, he will be able to train all other direct labor. Plant should reach full production in 2 months.

6. TOTAL ANNUAL COSTS AND SALES REVENUE

a. Annual Costs

Direct Labor	$ 46,000
Manufacturing Overhead(a)	40,500
Admin. Costs(b), Contingencies	16,000
Sales Costs(c), Bad Debts	13,000
Depreciation on Fixed Capital	25,100
Total	$140,600

b. Annual Sales Revenue $185,000

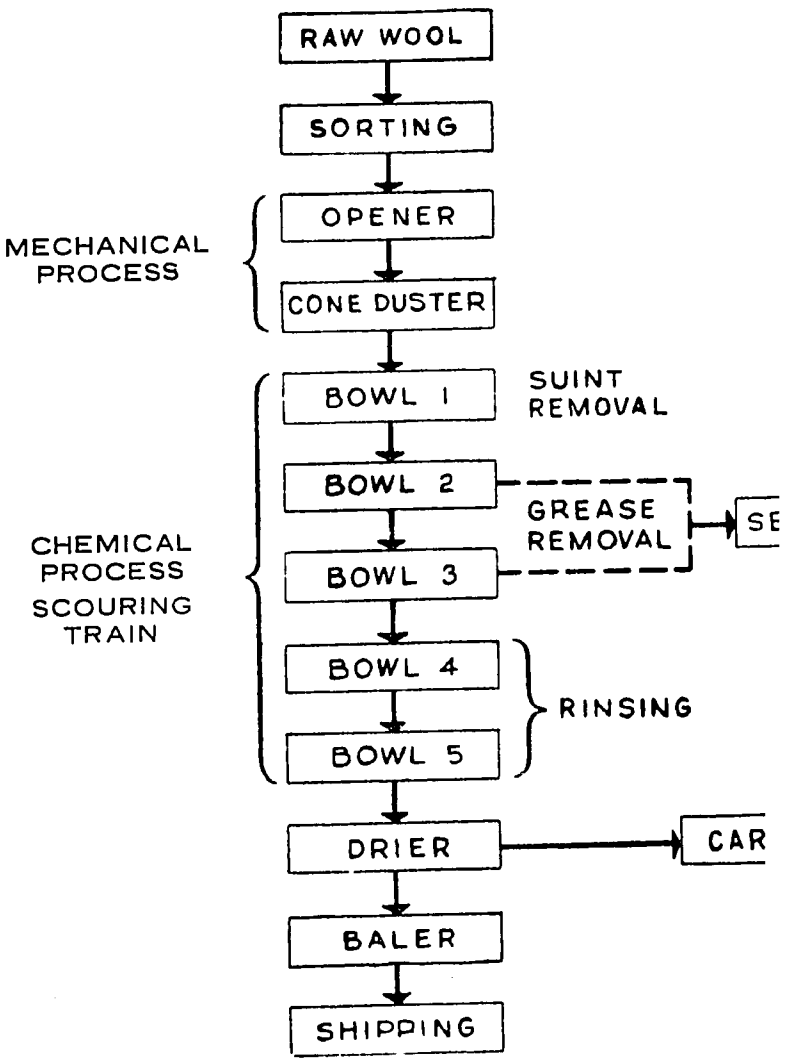
NOTES. (a) Includes Supplies, Power, Fuel, Water, Indirect Labor. (b) Includes Interest, Insurance, Legal & Audit Charges. (c) Includes Sales Commissions, Travel.

W

WORK-FLOW CHA

WAREHOU

PLANT D



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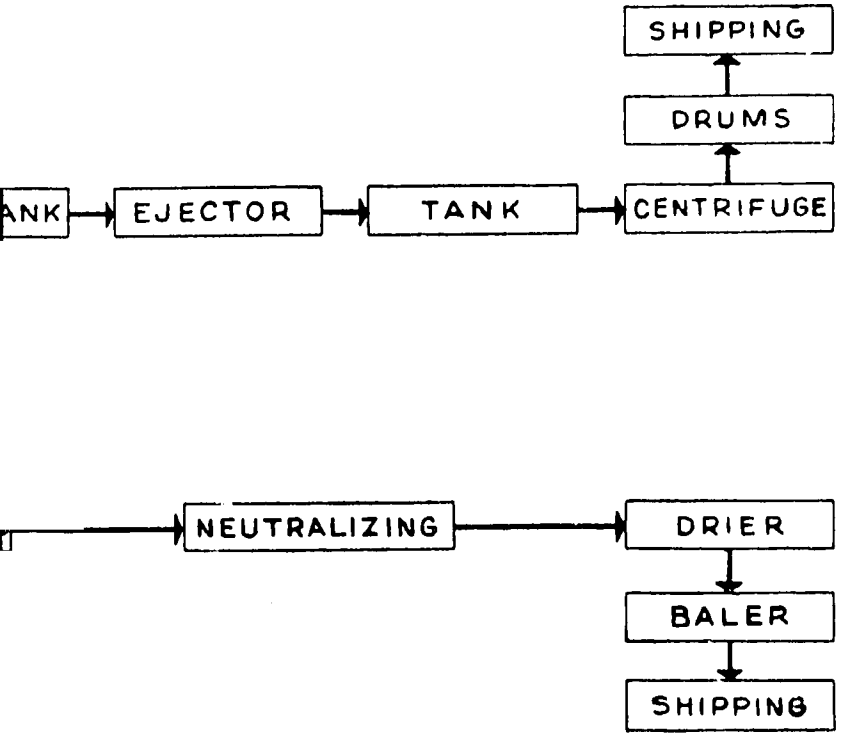
URING: S.I.C. 2297

F WOOL SCOURING PLANT

NSIONS ..... 80'×100'

IS ..... 50'×125'



WOOL SCOURING: S. I. C. 2297

SELECTED REFERENCES

I. TEXTBOOKS

A. Wool Handbook. 3rd edition. W. von Bergen. 1963. $22.00.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, N.Y.
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, So.
New York 10, N.Y.
Comprehensive treatment of the chemical, physical, and biological characteristics of wool.

C. Advances in Textile Processing. J. E. Lynn and J. J. Press.
Interscience Publishers, Inc.
250 Fifth Avenue
New York 1, N.Y.
Covers textile processing, including wool scouring.

II. GOVERNMENT PUBLICATIONS, U. S.

A. Wool Scouring. IR 28105. May 1957. Gratis.
Office of Technical Cooperation and Research
Agency for International Development
Washington, D. C. 20523
Requirements for establishing and operating a plant for wool scouring.

B. 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.

III. 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.

B. American Textile Reporter. Weekly. $4.00/year.
Frank P. Bennett and Company, Inc.
286 Congress Street
Boston 10, Massachusetts

IV. U. S. PATENTS

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

A. Patent No. 2,925,639. 1960. 6 p.
Method of pulling and scouring wool.

B. Patent No. 2,897,043. 1959. 4 p.
Wool scouring.

C. Patent No. 2,762,681. 1956. 3 p.
Wool scouring.

V. TRADE ASSOCIATIONS

A. National Association of Wool Manufacturers
386 Fourth Street
New York 16, N.Y.

VI. ENGINEERING COMPANIES

A. Proctor and Schwartz, Inc.
7th Street and Tabor Road
Philadelphia, Pennsylvania
Manufacturers of machinery and equipment for the wool industry.

B. Riggs and Lombard, Inc.
Suffolk Street
Lowell, Massachusetts
Manufacturers of machinery and equipment for the wool industry.

VII. DIRECTORIES

A. World Wool Trade. Annual. $10.00.
World Wool Guide, Inc.
138 North 7th Street
Philadelphia 6, Pennsylvania
Worldwide coverage of the wool industry.

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