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INDUSTRY PROFILE #16

DIMENSION HARDWOOD

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VITA

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INDUSTRY PROFILES

Introduction

This Industry Profile is one of a series briefly describing small or medium-sized industries. The Profiles provide basic information for starting manufacturing plants in developing nations. Specifically, they provide general plant descriptions, financial, and technical factors for their operation, and sources of information and expertise. The series is intended to be useful in determining whether the industries described warrant further inquiry either to rule out or to decide upon investment. The underlying assumption of these Profiles is that the individual making use of them already has some knowledge and experience in industrial development.

Dollar values are listed only for machinery and equipment costs, and are primarily based on equipment in the United States. The price does not include shipping costs or import-export taxes, which must be considered and will vary greatly from country to country. No other investment

costs are included (such as land value, building rental, labor, etc. as those prices also vary.

These items are mentioned to provide the investor with a general checklist of considerations for setting up a business.

IMPORTANT

These profiles should not be substituted for feasibility studies. Before an investment is made in a plant, a feasibility study should be conducted. This may require skilled economic and engineering expertise. The following illustrates the range of questions to which answers must be obtained:

- * What is the extent of the present demand for the product, and how is it now being satisfied?
- * Will the estimated price and quality of the product make it competitive.
- * What is the marketing and distribution plan and to whom will the product be sold?
- * How will the plant be financed?
- * Has a realistic time schedule for construction, equipment, delivery, obtaining

materials and supplies, training of personnel, and the start-up time for the plant been developed?

* How are needed materials and supplies to be procured and machinery and equipment to be maintained and repaired?

* Are trained personnel available?

* Do adequate transportation, storage, power, communication, fuel, water, and other facilities exist?

* What management controls for design, production, quality control, and other factors have been included?

* Will the industry complement or interfere with development plans for the area?

* What social, cultural, environmental, and technological considerations must be addressed regarding manufacture and use of this product?

Fully documented information responding to these and many other questions should be determined before proceeding with implementation of an industrial project.

Equipment Suppliers, Engineering Companies

The services of professional engineers are desirable in the design of industrial plants even though the proposed plant may be small. A correct design is one that provides the

greatest economy in the investment of funds and establishes the basis of operation that will be most profitable in the beginning and will also be capable of expansion without expensive alteration.

Professional engineers who specialize in industrial design can be found by referring to the published cards in various engineering magazines. They may also be reached through their national organizations.

Manufacturers of industrial equipment employ engineers familiar with the design and installation of their specialized products. These manufacturers are usually willing to give prospective customers the benefit of technical advice by those engineers in determining the suitability of their equipment in any proposed project.

VITA

Volunteers in Technical Assistance (VITA) is a private, non-profit, volunteer organization engaged in international development. Through its varied activities and services, VITA fosters self-sufficiency by promoting increased economic productivity. Supported by a volunteer roster of over 5,000 experts in a wide variety of fields, VITA is able to provide high quality technical

information to requesters. This information is increasingly conveyed through low-cost advanced communication technologies, including terrestrial packet radio and low-earth-orbiting satellite.

VITA also implements both long- and short-term projects to promote enterprise development and transfer technology.

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GENERAL DESCRIPTION

The Product

The product is hardwood, kiln dried and machined to dimensions required by customers. Products of the mill may include cut-to-size rectangular pieces, edge-glued panels, moldings, turnings, cabinet parts, stair treads and risers, and shaped pieces, as well as by-products useful as fuel. Most customers are manufacturers of furniture, cabinetwork, doorframes and windowframes, toys, boxes, and decorative or display items. Products vary greatly among mills; some mills may produce finished articles for the consumer market.

The Facility

To illustrate costs, this Profile describes a medium-sized mill operating with one shift that produces 4,500 cubic meters of dimension hardwood per year. Some information is also provided for a mill twice as large. The annual production for a mill in a developing country is often less than 2,000 cu m; some are designed to produce more than 20,000 cu m. Some hardwood mills produce sawn lumber, which is the raw material; some grow timber to replenish this valuable natural resource.

The raw material and the product are heavy and bulky. Thus, the mill should be located on a railroad or waterway, or near an all-weather road that can be used for motor transport.

GENERAL EVALUATION

Prospects for development are good if the source of rough lumber is far from the mill's customers (assembly plants) and the transportation facilities are average. Then the customers profit from reduced shipping costs from the mill, because kiln drying and sawing to size usually involve a weight loss of up to two thirds. In addition, the lumber is delivered in needed sizes, kiln dried and ready for use; users need not stockpile lumber or dispose of large amounts of waste. Prospects are favorable if the cost of labor near the source of raw material is low relative to its cost in the customers' area.

Outlook

Economic. The market should be analyzed to determine whether existing conditions will produce sufficient sales in the target area. The economic outlook is good if the trend is toward the use of dimension hardwood by assembly plants to take advantage of lower labor or transportation costs.

Technical. Sound, nonbrittle hardwood must be available. In tropical areas, the characteristics of some wood species may have to be learned by experience. The mill manager must be thoroughly experienced. Once the plant has started operating, the manager and three skilled workers should be able to train the other workers and reach full production in several months. A mill can readily meet its training and management requirements under conditions that prevail in most developing countries.

Manufacturing Equipment Flexibility

The machinery is versatile. A few machines can produce a wide range of lumber sizes and a variety of products for which there is a market.

Knowledge Base

Personnel should have or acquire knowledge of species characteristics; operation and maintenance of woodworking machinery, including saw sharpening and tensioning; wood-moisture relationships (drying); storage, packing, and shipping; and, especially,

plant safety and quality control at every stage.

Quality Control

Product concerns include size tolerances, moisture content of the wood (measured with a meter), and consistent visual quality to meet customer specifications. Process concerns include giving high priority to preventive maintenance of tools and machinery, and to proper wood handling, stacking, storing, and shipping.

Constraints and Limitations

Marketing, the key to success, must be budgeted into the operations from the start; otherwise the enterprise will fail. Efficient utilization of capacity is also important to success.

Formal training in mill safety and attention to hazardous conditions are essential to guard against serious accidents and injuries. Hazards include inadequate preventive maintenance of tools, improper disposal of wastes, inhalation of sawdust and of formaldehyde used in glues, insufficient protection of eyes and ears, and incorrect handling of lumber and sharp tools.

MARKET ASPECTS

Users

A market potential exists only where there is developed manufacturing sector or an export prospect. Marketing effort is

usually needed in order to reach builders, as well as assemblers and marketers of furniture, cabinetwork, and other items that use wood components.

Suppliers

Sawmills produce the raw material, which is sawn lumber that may be air dried or kiln dried. Knowledgeable persons from the dimension plant must be prepared to visit the sawmill at the time of purchase. The cost of raw lumber transport to the dimension mill helps to set the selling price of the finished dimension product. All needed materials and supplies are expected to be available locally. If the rough-sawn lumber has been dried before delivery, it is then cut to size.

Sales Channels and Methods

Sales generally are directly to manufacturing industries according to their specifications of dimensions, moisture content, and degree of machining. Such standard items as moldings may be marketed through brokers.

Geographic Extent of Market

Markets, including export markets, depend on strong consumer acceptance of the processed species of wood.

Competition

For several decades there has been a slow increase in the substitution of softwood for hardwood for many applications. The substitution has not overtaken the absolute growth in hardwood demand. Success in meeting all forms of competition requires, the following capabilities:

- o Delivering commercial volumes of product.
- o Delivering quality to meet commercial specifications.
- o Meeting delivery dates.
- o Maintaining competitive prices.
- o Customer service.

PRODUCTION AND PLANT REQUIREMENTS

Requirements are given for a medium plant. If planning for a larger plant, merely scale up the version of the medium plant. However, equipment, supplies, and labor requirements of the larger plant vary greatly according to the degree of product diversification.

Medium Plant

Annual Output: 4,500 cu m

REQUIREMENTS

Infrastructure, Utilities

Land 0.8 ha

Building 432 sq m
Electric Power (local) 35 kW
Fuel (can be scrap wood)
Water (sanitation, fire)
Dry kiln(s), capacity . . . 240 cu m
dimensions . . . 6 m by 12 m

Major Equipment & Machinery

Tools Machinery

Cutoff saw 1

Ripsaw 1

Molder 1 \$175,000

3-drum sander 1

Trim saw 1

Planer 1

Boiler (for dry kiln, 20 kW;
can be oil fired) 25,000

Support equipment parts

Factory truck 2,000

Forklift 25,000

Estimated Costs:

Equipment and machinery \$227,000

Dry kiln 350,000

***TOTAL ESTIMATED COSTS \$577,000**

Materials & Supplies

Raw Materials

Hardwood lumber 5,700 cu m

Supplies

Lubricants & hand tools

Cutting tools & abrasives

Maintenance & spare parts

office supplies

**Gas (petrol), oil & maintenance
of truck**

Packaging

pallets, boxes, cartons

strapping, tarps

Labor

Skilled, direct

Machine operators 3

Semiskilled 3

Unskilled 3**Indirect Labor****Manager/sales 1****office****Maintenance/set-up mechanic 1****Truck Driver 1****Distribution/Supply Flow****Amount in per day 24 cu m****Amount out per day 12 cu m****(+ 8-10 tons of residue)****Market Requirements**

The medium plant could supply 100 family furniture enterprises or fewer larger companies.

*Based on \$US 1987 prices. These are guidelines to equipment costs; they are not intended to be used for budgeting. Actual costs must be determined for the time and place of purchase.

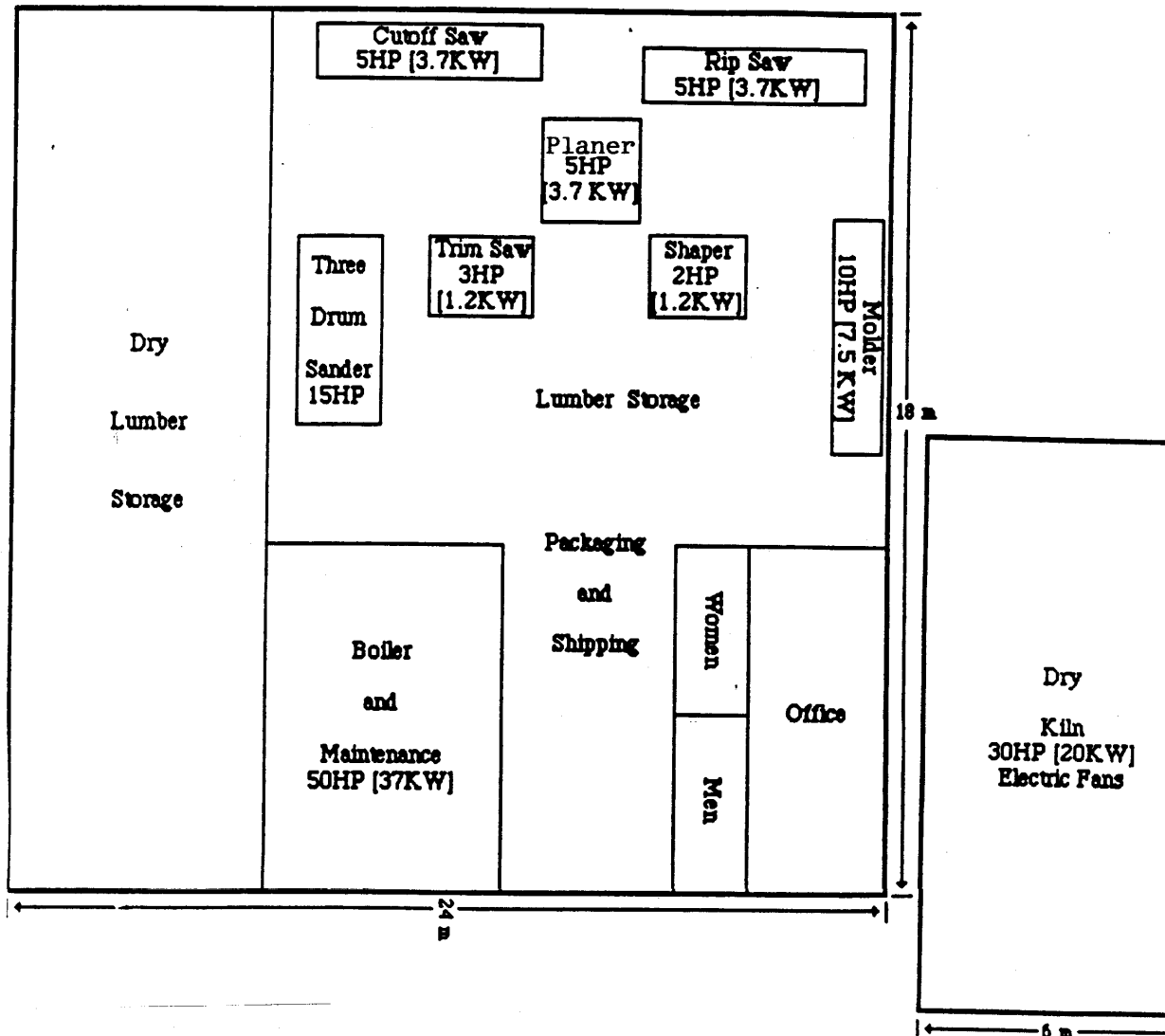
Remarks

The Diagram shows a sample layout approximately 18 by 24 meters,

dhx6.gif (600x600)

PROCESS DESCRIPTION.

Diagram.



not including the dry kiln. The general workflow in the main area is from dry lumber storage to processing to shipping. Management

and maintenance space are also shown.

REFERENCES

Unless otherwise stated, addresses are in the United States. In U.S. publications, lumber volume is expressed in board feet (foot board measure, fbm, or bd. ft. The abbreviation mbf usually means thousands of board feet). 1,000 fbm = 2.3598 cu m; 1 cu m = 423.76 fbm.

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Furniture Dimension Stock Report. Industrial Extension Service, School of Engineering, North Carolina State University at Raleigh, Raleigh, North Carolina 27695 USA.

Wood and Wood Products. Vance Publishing Co., 400 Knightsbridge Parkway, Lincolnshire, Illinois 60069 USA.

Woodworking Digest. Hitchcock Publishing Co., Wheaton, Illinois 60188 USA.

Trade Associations

Association Technique des Bois Tropicaux, 8 rue de Colonel Moll, F-75017 Paris, France

International Hardwood Products Association, Inc., P.O. Box 1308, Alexandria, Virginia 22313 USA.

Woodworking Machinery Manufacturers Association, 1900 Arch Street, Philadelphia, Pennsylvania 19103 USA.

Directories

Directory of the Forest Products Industry. Annual. Miller-Freeman

Publications, Inc., 500 Howard Street, San Francisco, California
94105 USA.

Hitchcock's Woodworking Directory and Handbook. Annual. Hitchcock
Publishing Co., Wheaton, Illinois 60188 USA.

VITA Resources

VITA has volunteer specialists available in wood products, as
well as documents on file and in microfiche dealing with the wood
industries.

VITA Venture Services

VITA Venture Services, a subsidiary of VITA, provides commercial
services for industrial development. This service-for-fee includes
the following: technology and financial information,
technical assistance, location and brokerage of used manufacturing
equipment, marketing, and joint ventures. For further information,
contact VITA.

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