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Technical Course on Criteria for the
Selection of Woodworking Machines

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REPORT ON THE GHANA TIMBER INDUSTRY ^{1/}

by

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^{1/}The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO.

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1. (a) Present Situation of the Woodworking Industry

The Ghana Timber Industry is second only to the Cocoa Industry in importance in terms of foreign exchange earnings. The timber industry contributes about 18.5 per cent of the nation's foreign exchange earnings and forms about 20.5 per cent of Africa's timber product exports to the World timber trade.

There are at present 9 veneer and plywood mills, 75 sawmilling establishments, about 600 log producing contractors, 82 current overseas exporters, about 33 overland exporters and over 120 accredited overseas marketing agents whose operational activities constitute the timber industry and trade. The industry currently employs over 60,000 persons.

(b) Statistics on Production

The estimated annual production of timber and other wood products is indicated in the following table for the period 1970-1975.

Total Output in Million Cu.ft.

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975*</u>
Logs	55.24	57.50	66.33	73.29	50.80	48.95
Sawn Timber (Lumber)	12.68	12.19	12.28	13.05	16.05	18.52
Plywood	1.11	1.38	1.65	1.88	2.09	2.02
Veneer	0.08	0.23	0.02	0.24	0.65	0.55

*Provisional

It has been established that 56.4 per cent of the total logs produced enter processing mills with only about 25 per cent recovery in the form of lumber and plywood for both export and domestic consumption. This low output is an indication of the poor state of majority of the mills which can be said to be the result of poor layout, poor selection of machinery, and frequent down time due to poor maintenance and lack of vitally needed spareparts

(c) Foreign Trade

The industry is more favourably inclined towards the export market than the home market. The main buying countries are the European Economic

Community countries. However, intensive export promotional activities recently embarked upon by the Ghana Timber Marketing Board is helping to open up new markets in the Middle East, Far East and North America. Export statistics on timber and timber products for the period 1971-1975 is as follows:

	1971 Tonnage	1972 Tonnage	1973 Tonnage	1974 Tonnage	1975 Tonnage
Logs	499.853	708.984	629.200	327.547	413.352
Lumber	116.919	130.864	153.907	94.168	105.037
Plywood and Others	--	17.888	26.866	15.000	11.912
Total Tonnage	616.832	857.734	879.973	436.715	530.301
Total Earnings in Million US\$	34.08	73.62	150.40	90.30	85.78

Others consist of Veneer, Mosaic Flooring, Furniture Parts, etc.

From the above table, it can be seen that the 1973 export earnings were exceptionally high due to the boom period for timber. 1974 and 1975 which show comparatively low figures were due to the worldwide recession, the energy crisis and over-stocking by the buying countries. The figures are however likely to change for the better in the current year as seen from recent market survey.

1. (d) Direction of Trade

Round log Exports -- The leading importing country for this product is Italy with 34 per cent, 19 per cent and 22 per cent during 1973, 1974 and 1975 respectively. About 15 per cent of the total log exports go to West Germany with relatively lower percentages going to UK., Spain, Holland and Japan, respectively.

Lumber Exports: The UK is the leading buyer of the lumber exports from Ghana. In the years 1973, 1974 and 1975 the UK imported 52.4 per cent, 35 per cent and 38 per cent respectively of the total lumber exports. Ireland, USA and Holland are other major importers of lumber from Ghana.

Plywood: Again the UK plays a dominant role in the importation of Ghana's plywood. The UK imported 81 per cent, 51 per cent and 75 per cent

in the years 1973, 1974 and 1975 respectively.

I. (e) Incentives for Industrialization

The Ghana Timber Marketing Board was instituted with the prime objective of encouraging and promoting the development of the Ghana Timber Industry. In this respect the Timber Marketing Board has been very active in granting soft loans directly and helping prospective investors to secure soft loans to establish wood-based industries. Other incentives such as tax holidays for new industries, export bonuses for exported processed wood products exist for the encouragement of pure log exporters to gradually move into the processing sector of the industry.

I. (f) Problems Facing the Industry

As a developing country, the main problems stem from the absence of local machinery and equipment and spare parts manufacturers. Lack of technical experts to advise on the suitability or otherwise of machinery and equipment, and the low level of maintenance, know-how generally plague the industry.

Most machinery, equipment and spare parts have to be imported through the use of Import Licenses whose procedures are inherently cumbersome and time consuming. The need for extra careful planning for the procurement of spare parts, accessories and some raw materials, such as glue (which is imported) cannot be over emphasized. Most mills therefore tend to over-stock with spares in order to ensure minimum breakdown time throughout the year as a result of uncertainty in procurement which is sometimes associated with Import Licenses.

2. (a) Timber: Forest Resource

As one of the most important incentives to industrialization in the timber industry in Ghana, the forest abounds in good quality timber. The forest zone measures about 32,000 square miles and covers approximately a third of the total land area of the country.

About 20 per cent of the forest area is under permanent forest estates and operated on a 15 year generative felling cycle. The remainder is under commercial timber exploitation by numerous timber contractors.

There are over 250 different species of timber in the forest of which about 30 species are commercially known. The Ghana Timber Marketing Board is actively pursuing a policy of popularising the lesser known species with the help of the Forest Products Research Institute of Ghana.

2. (b) Indigenous Timber of Major Importance to Furniture and Joinery Industries.

There are over 50 species of timber of major importance to the furniture and joinery industries. Currently exploited species are mentioned below:

Afromosia (Kokrodua)	Mansonia
Abura (Subaha)	Niangon
Acajou (Sapele)	Ogea
Afara (Ofram)	Ehinam
Ayan	Odum
Baku (Makore)	Ceiba
Bubinga (Guibourtia)	Ilomba
Canarium	Dahoma
Candollei	Guarea
Avodire	Nawa
Danta	African Walnut
Eneri	Utile

2. (c) Imported Timber

There is very little import in the form of finished products such as paper, cellulose wood panels and formica.

2. (d) Seasoning of Timber

About 75 per cent of the sawn timber is air-dried. Only a few well established furniture and joinery factories which are geared for export of knocked-down furniture have drying kiln facilities.

2. (e) Problems:

Encroachment of forest lands by farmers for the raising of food crops tends to threaten the survival of the forest as far as timber is concerned.

However, nevertheless lack of serious re-afforestation programmes has taken a toll of the timber forest. There is therefore the need to pursue a very vigorous re-afforestation policy to ensure the perpetuity of wood as a raw material source.

3. Primary Wood Processing Industries - (Sawn Wood and Wood Based Panels)

(a) Importance of Sector

This sector is the primary source of timber required for all building projects in the country, as well as the raw material in the form of sawn timber for the Furniture and Joinery industry of the country. Besides, the bulk of the sawn goods are exported to fetch the country vitally needed foreign exchange.

Other derived benefits of this sector are the creation of avenues of employment, development of rural areas to stop the "drift" of labour into the cities, and increased earnings for the investor and country as a whole.

3.(b) Statistics on Number of Firms, Size, Number Employed Volume and Value of Production.

Paragraph 1 (a) gives an indication of the number of sawmills in the country. Their sizes range from a plant of 10 employees, producing about 150 cubic feet per 8-hour shift with an investment capital of US\$ 80,000, to a plant of about 500 men producing about 5000 cubic feet with an investment capital of over US\$ 2 million.

3.(c) Range of Products Manufactured

Lumber of various species, sizes, and grades are produced and air dried. Plywood and veneer, also of various species, facing, thickness and grades are available. Flush doors, profile boards, parquet and finger floorings, corestock and carvings, all of various species and sizes are also produced.

3.(d) Equipment Installed in a typical mill

A typical sawmill consists of the following:

- i) Gantry/Derrick Crane 15 ton capacity
- ii) A Chain Conveyor system to feed logs to the bandmill carriage

- iii) A bandmill with 1800 mm. wheel using a blade of 260 mm width
- iv) System of roller conveyor to carry the sawn flitches to a Resaw or an Edger
- v) A Cross-cut machine to cross-cut to a specific length
- vi) A dipping tank for treatment of the finished lumber before storage for air-drying.

3. (e) Development Trends

The development trend in the primary wood processing sector is mainly in the field of labour saving devices and the replacement of old and cumbersome machinery with new and improved designs.

Automatic one-man operated bandmills with remote controlled set-works and hydro-electrically controlled carriage log dogs are gradually replacing the old bandmills with several hands on the carriage and board take-off positions. Dead rollers are gradually giving way to live rollers and manual sawdust conveying is giving way to live rollers and manual sawdust conveying is giving way to chain conveyor sawdust extraction. With the cheap electricity in Ghana as a result of the hydro-electric scheme, this trend is bound to continue.

3. (f) Problems

Waste in the form of sawdust abounds in the mills and tends to occupy quite a sizeable land area which could be put to better use. There are very few mills which have the capacity to utilize the sawdust mixed with chips as fuel material to raise steam for kilns and other purposes. The incorporation of steam turbines to generate electricity and the integration of the existing mills with particle board and chipboard factories will eventually result in greater recovery from the wood raw material.

4. Secondary Wood Processing Industries

(a) The following represents the range of products:

Furniture for all kinds of household use;

Furniture for offices, institutions hospitals and out-door use;

Boat building

Window and door frames

Knocked-down furniture for export

Elements for the construction of prefabricated wooden buildings.

(b) Product Design

This is a field which in spite of its vital importance to the industry has yet to receive due prominence. Most designs have either been tailor made to suit a customer or have evolved from individual innovative skills.

(c) Technical Level

In general, the technical level in furniture and joinery has been within acceptable limits and it is improving with the advent of new machinery and further training in the Technical Institutes.

(d) Automation in Manufacture

Automation, even at its low cost level, does not exist in most of the furniture and joinery shops in the country. There is a need to encourage this trend in this sector to enable production to be boosted and consequently reduce costs. Local furniture prices have of late become so high that the low income group cannot afford a decent set of furniture without credit facilities.

(e) Specific Technological Problems of Furniture and Joinery Industries.

Lack of knowledgeable expertise to consult on the selection and matching of machinery, lack of expertise to design layouts, lack of local manufacturers of woodworking machinery and spares are some of the problems confronting this sector of the industry. Often, prospective investors in this sector tend to mistake equipment suppliers/agents/salesmen for technical experts and request them to prescribe what machinery should be purchased. This state of affair naturally results in higher production costs.

(f) Equipment Installed in a typical Furniture Factory

The following equipment may be found in one of the better established furniture and joinery factories in Ghana:

Narrow Bandsaw	Dowel Borer
Cross-cut Saw	Drilling Machine
Planer	Spraying Equipment
Wood Turning Lathe	Cyclone Sawdust Exhausting Equipment
Spindle Moulder	Drying Kilns

Mortising Machine	Lacquering Equipment
Belt Sanding Machine	Upholstering Equipment
Tanning Machine	

(g) Development Trends

With the positive demand trend for knocked-down furniture parts for overseas markets, there is a tendency for new factories to be set up based upon careful assessment by Consultants from overseas countries. Such factories are starting off using the most modern machinery, including copying machines and others with varying degrees of automation incorporated in them.

At the time of writing there are two such factories being constructed and both will be integrated with sawmills.

Labour

5. (a) Quality and Availability

Through a vigorous technical educational policy, pursued since independence when there were only 3 qualified engineers in the country, there are now over 1,000 qualified engineers in the country. This has been achieved through training in local and overseas institutions. Similarly the low level skilled personnel have also increased as a result of several polytechnic institutions having been established in the country. The level of attainment in all the institutions has been maintained as high as will be found in similar institutions, in particular the United Kingdom.

(b) Vocational Training

There are several establishments capable of providing a good grounding in practical carpentry and joinery. Apart from the National Vocational Training Centre, there are 8 Junior Technical Institutes, 4 Polytechnics, 2 Canadian Technical Institutes (provided by Canadian Government Aid), 1 German Vocational Training Institute (Aid from the West German Government), some Secondary Technical Institutions are also equipped to provide this training.

(c) Higher Technical Education

The Polytechnics, in addition to the country's only University of Science and Technology, provide the middle and higher level training required. The first group of graduates pursuing studies in wood technology to M.Sc. level are expected to complete their training this year.

Local Manufacture and/or Import of Woodworking Machines

6. (a) Range of machines, tools and spare parts manufactured locally.

Pendulum, cross-cut machines of all steel or partly in wood and partly in metal, multiple saw edgers with single adjustable saw fabricated from steel plates and shafts which are imported, rollers and bushings for roller conveyor systems, sprockets, gears, and a few simple cast iron castings cover the range of machinery and spare parts that may be made locally. However, since the workshops making these parts are not properly tooled up, their rate of production is rather low and parts manufactured by them could be very expensive.

The quality of such locally produced parts, if the correct material is obtainable, is as high as the imported equivalent.

(b) Value of Local Production

The value of a locally produced spare part is however appreciated where the machinery is obsolete and the original manufacturers no longer provide the spares and also where an Import Licence is difficult to obtain.

(c) Imports of Wood Working Machines

Where possible, all the machinery requirements of mills are imported. Restrictions are only imposed by either inadequate funds or inadequate allocation of Import Licence. With inflation, the prices for imported machinery and equipment are increasing rapidly. A piece of equipment which was obtainable at US\$ 75.000 barely two years ago is now US\$ 120.000.

Belgium, France, Italy, UK, USA and West Germany are traditional suppliers of our woodworking machinery.

(d) Marketing Channels

Having known the source of machinery and obtained proforma invoices a firm order is placed and an irrevocable Letter of Credit opened through the

Bank of Ghana with an appointed bank in the country of origin. Upon shipment, the machinery supplier presents his documents to the appointed bank for payment. However, in an emergency situation where a mill is likely to close down due to the collapse of a vital piece of machinery, the Timber Marketing Board comes to the rescue of the mill through the use of its London Funds. The system of establishing Letters of Credit is however too cumbersome and time consuming to be used in such an emergency.

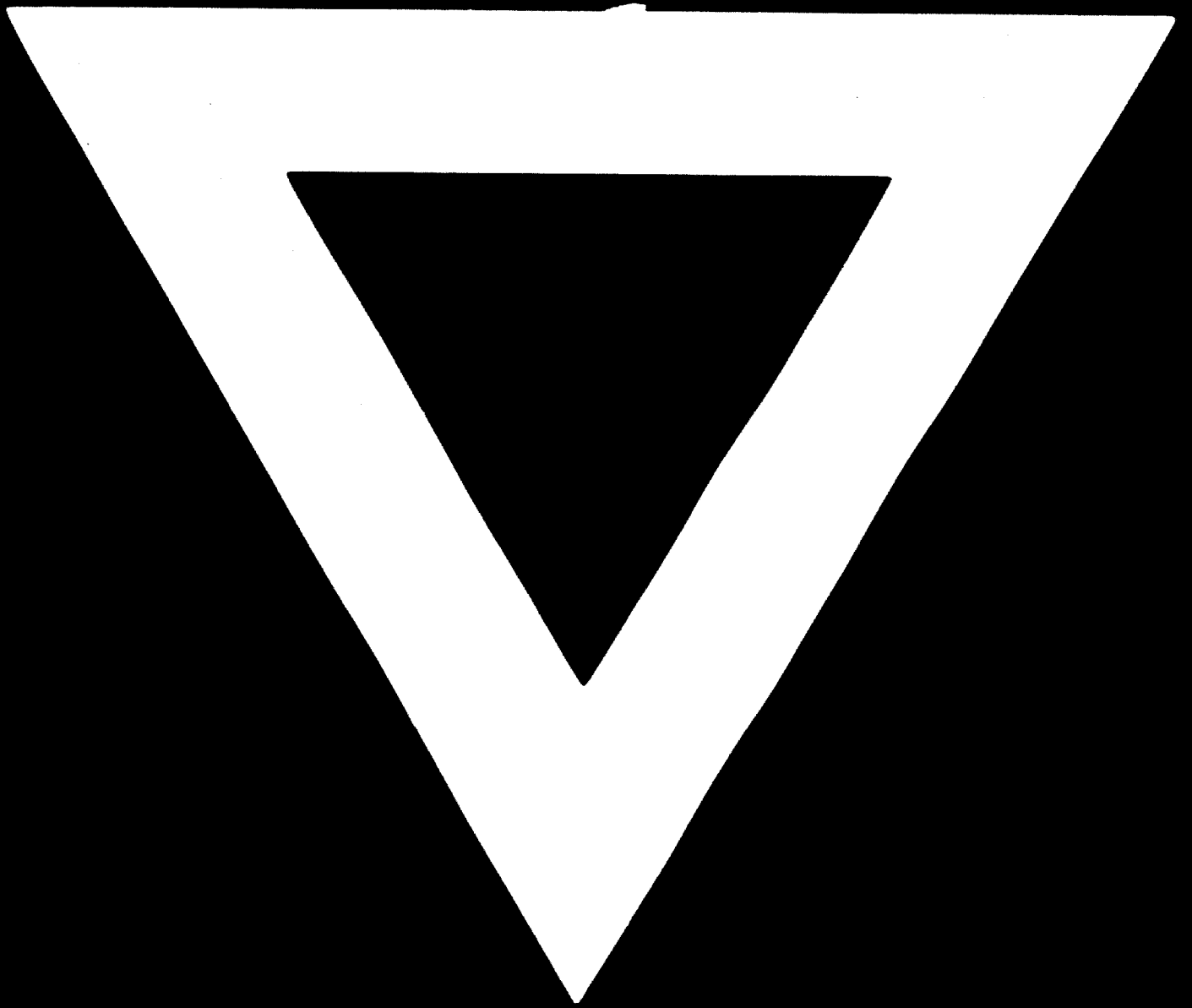
6. (e) Availability and Quality of after Sales Service.

After Sales Service in its true meaning does not exist. Any such service must be done by the mills themselves and the quality of the service is therefore dependent upon the resources of the mill concerned.

(f) Problems

Spare parts provisionary for all the machinery in the industry would have been an easy problem to be undertaken by a Central Organization such as the Ghana Timber Marketing Board if there had been a certain degree of standardization. Unfortunately this is not the case and the Board therefore tries to identify areas where bulk purchases of items may be made for such action to be taken. Individual mills therefore obtain their annual allocation to initiate their own orders. If the allocation is not enough to meet the requirements of that particular mill then there is trouble. There is also a certain amount of uncertainty associated with the allocation of Import Licence as it is tied up with the general performance of the country's economy. When the Government earns more foreign exchange, then more licences are allocated and vice versa.

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