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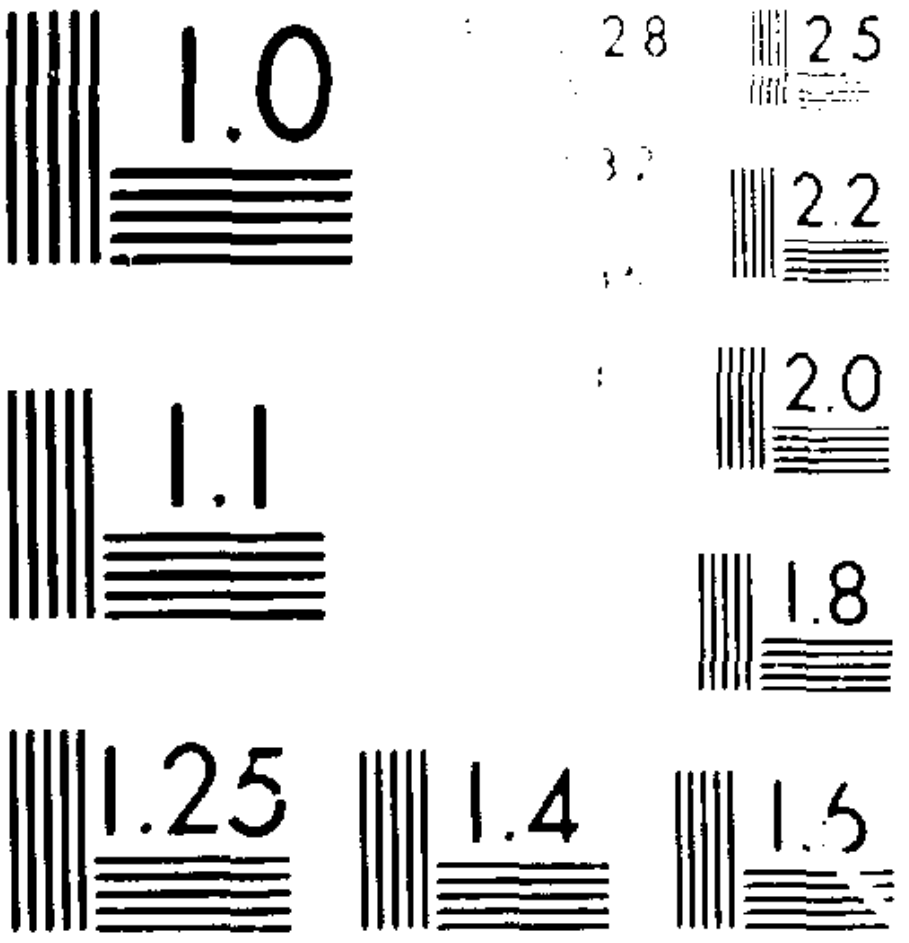
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Technical Course on Criteria for the
Selection of Woodworking Machines

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WOOD PROCESSING INDUSTRY IN BOLIVIA*

by

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* The views expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. This document has been reproduced without formal editing.

** General Manager, "Amoblart".

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Introduction:

Bolivia is a land locked located in the central part of South America. It has an area of 1,098,581 km^2 and a population of some 5,500,000 inhabitants. Our country neighbours are: Brasil, Paraguay, Argentina, Chile and Peru.

Because of our complex and varied geography, the main natural sources are:

a. minerals: from the highlands as a part of the Andes mountains. (north and south west): tin and others.
b. agriculture: from an intermediate level such as the valleys (central and middle south): Vegetables and fruits are the main products.
c. forest: from the flat land or the tropical areas (north and east): cattle raising and wood resources.

Forest:

Official studies estimates of forest lands in Bolivia around 46,344,000 hectares located in the districts of Santa Cruz, Beni, Cochabamba and Pando.

Although Bolivian forests is among the larger ones in south America, wood industries have not been developed as much as they should. More than 32 species available in considerable quantities, capable to provide different quality finished products, based on labour intensive and industrial production methods have been enumerated. However, because studies have not been made, most of these particular species are not unexploited.

Species:

An ennumeration of the most common species (common name)

and their possible end-uses is given below:

Species	Uses
Ochoó	construction
Laurel	construction
Laurel menta	construction
Palo Maria	construction
Almendrillo	construction
Tarara	construction
Quebracho	construction
Campana	construction
Urundel	construction
Aliso	construction
Palo Amarillo	construction
Picana Negra	construction
Pino	construction
Quina-quina	construction
Chonta	construction
Sangre de Toro	construction
Timboy	construction
Sorioco	construction
Yesquero	construction
Nogal	construction + decorative
Caoba	construction + decorative
Tajibo (Lapacho)	construction + decorative
Jacarandá	fine objects
Guayacan	fine objects
Mara	fine furniture
Cedro	fine furniture
Roble	fine furniture
Morado	decorative
Moradillo	decorative, veneer
Copaibo	decorative, veneer
Vibosi	decorative, veneer

The properties of the species most commonly used are given in the table below:

Species	Color	Durability	Machinability	HZ	P.E.	M.R	CPF
Mara	red	resistant	easy	12	0.45	859	485
Roble	yellow	resistant	easy	15	0.47	805	-
Cedro	brown-red	resistant	easy	15	0.42	649	-
Jacarandá	gray-violet	very resistant	hard	15	0.52	920	287
Yesquero	white-pink	resistant	easy	15	0.55	784	418
Palo Maria	orange-red	middle	easy	15	0.57	814	412
Nogal	dark-brown	resistant	easy	15	-	-	-

Key to table:

HZ	humidity in percentage
P.E.	specific weight (gr/cc)
M.R.	modulus of rupture (kg/cm^2)
C. P. F.	comprewsion parallel to fibres (kg/cm^2)

Structure of the Industry:

The following table may not be considered up-to-date, since it is based on data computed some three to five years ago and more recent studies have not been furnished. Information was provided by the respective chambers of forests and industry.

Wood processing plants and industries:

Description	Capacity	Number
Sawmills	10,000 to 230,000 p2[1/]	147
	460,000 to 920,000 p2	62
	1,250,000 to 2,500,000 p2	12
	3,000,000 to 4,750,000 p2	4
		225
Drying plants	—	7
Wood treatment plants	—	unknown
Laminated wood plants	—	4
Plywood plants	—	2
Particle board plants	—	none
Surface improved panel plants	—	none
Match plants	—	1
Pulp and paper mills	—	1
Construction plants	?	?
Furniture Plants	?	?

Note: Only those properly registered at the chambers of forest and industry are listed.

Unregistered artisan occupied a large amount of small shops installed all over the nation. Their working conditions are not technically mechanized, and the quality of their products and performance is low.

1/ p2 = foot board measure (one square foot of lumber, one inch thick

Logs exported (1975) per m^3:

Species	Argentina	Brazil	Spain	U.S.A.	Japan	Total Quantity	Percentage
Cedro	180	--	--	--	—	180	8.0
Jacaranda	22	—	148	--	382	552	24.6
Morado	—	952	179	128	--	1,259	56,1
Nogal	--	—	200	--	—	200	8 8.9
Sorioco	—	—	53	--	—	53	2.4
Total M^3	202	952	580	128	382	2,244	
Total %	9.0	42.5	25.8	5,7	17.0	--	100.0

Sources: German Forest Mission

Exports of sawn timber by destination (1975) in m^3:

Species	Federal Republic of Germany	Argentina	Brazil	U.S.A.	Holland	Japan	Total	Percentage
Cedro	—	180	—	—	—	—	180	0.0
Mara	61	27,683	33	9,915	28	61	37,781	96,2
Almendrillo	—	827	—	--	--	--	827	2.1
Amarillo	—	56	--	--	—	—	56	0.1
Jacaranda	--	22	--	—	--	--	22	0.1
Morado	--	—	--	128	—	24	152	0.3
Ochoo	—	148	—	--	--	—	148	0.1
Roble	—	76	—	—	—	--	76	0.2
Tajibo	--	27	—	--	—	—	27	0.1
Total m^3	61	29,019	33	10,043	28	85	39,269	—
Total %	0.2	73.9	0.1	19.4	0.1	0.2	—	100.0

Source: National chamber of forests.

The local name of our finest specie is "Mara". It is well known as "Mahogany". Figures on volume sales of Mara are provided in the above table (sawn timber exports) in order to realize the demand that this particular specie has. However, this valuable material is wasted.

This is a common attitude in Bolivia since this precious and fine wood (Mara or Mahogany) is being used for door and window frames, unseen frames for upholstered chairs, etc...

At the present time, a slow industrial growth is noticable. Lack of modern machinery as well as advanced technology are the main facts hindering the set up of modern enterprises.

It is clear that there is a large number of artisans unable to improve their skills in labour intensive work, and design.

Development plans:

No research work has been carried out to this date. Such research work would be desirable in order to provide skilled technical manpower, cost reduction as well as the possibility of providing adequate facilities.

There are undoubtedly a few institutions and organizations which contribute to the development of industry, but the wood industry in Bolivia, which has a good potential, still needs further development.

In the light of the above, a large amount of private companies, are trying to shift from log of semi-finished product exports to supplying finished products.