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PROSPECTS FOR INTEGRATION IN THE WOODWORKING
INDUSTRY OF THE CARIBBEAN COMMUNITY

UC/CAR/86/201

Technical report: The situation in Antigua and Barbuda*

Prepared for the CARICOM Secretariat
by the United Nations Industrial Development Organization

Based on the work of Pietro Borretti, woodworking consultant

Backstopping officer: A. V. Bassili
Industrial Management and Rehabilitation Branch

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1. Introduction

1.1 Title and number of the project under which this country report has been prepared:

Development of integrated industry programme for the woodworking and furniture industry sector in CARICOM - UC/CAR/86/201

1.2 Cooperating Agency:

Caribbean Community Secretariat, Georgetown, Guyana

1.3 UNIDO consultant:

Pietro Borretti, Consultant in Woodworking Industry Sector.

1.4 CARICOM counterpart:

Ivor Carryl, Industrial Economist, Economics and Industry Division.

1.5 Main institutional contact in Antigua:

C. A. Edwards, Permanent Secretary, Ministry of Foreign Affairs, Economic Development, Tourism and Energy.

1.6 UNIDO Backstopping officer:

Antoine V. Bassili, Senior Industrial development Officer, Industrial Management and Rehabilitation Branch, IIS

1.7 Period of mission to Antigua:

2 to 8 May 1987

1.8 Terms of reference:

To survey selected furniture plants in order to establish their requirements for imported lumber and evaluate the efficiency of these plants in the utilization of timber inputs.

1.9 Main activities:

- (a) Visits to selected furniture plants;
- (b) Review of shipping links with Guyana, Belize and Dominica;
- (c) Review of lumber and furniture import trends;
- (d) Providing lumber importers and furniture manufacturers with lumber and furniture export contacts in Guyana, Belize, Dominica and Jamaica;
- (e) Reporting to the Guyana Forestry Commission on the lumber requirements of Antigua's furniture and joinery industry.

1.10 Background:

Among the primary aims of the Caribbean Community Secretariat (CARICOM), established in 1973, are the coordination of economic policies and development planning, and the setting up of a special regime for its less developed members. In line with these aims, the CARICOM has developed an industrial programme for the industrial development of its 13 member states. The emphasis is on the production of goods and services for the regional market with a view to minimizing costly imports.

The development of the timber industries sector - and in particular the promotion of the supply of wood products from within the Region - has been assigned a priority role by the CARICOM secretariat, since the Caribbean Community as a whole is heavily dependent on extra regional sources of supply to meet its lumber demand.

A regional project of assistance to CARICOM - entitled 'Development of Integrated Industry Programme for the Woodworking and Furniture Industry Sector in CARICOM' - was undertaken in this connection in 1987 by the UNIDO consultant Pietro Borretti who visited nine of the twelve CARICOM countries together with his counterpart Ivor Carryl.

As a result of the missions the consultant prepared eleven reports to highlight the situation to the CARICOM Secretariat and the authorities of the member states the situation of the sector and its potential. He also recommended certain immediate measures for the development of the sector. This report concerns the mission undertaken by the consultant in Antigua.

1.11 Related reports prepared under project UC/CAR/86/201:

The eleven reports prepared under the project include the following:

- (a) The project's terminal report (reference No. IO/R. 52) entitled 'Prospects for Integration in the Woodworking Industry of the Caribbean Community' dealing with the situation in the region as a whole. The report proposes, inter alia, the implementation of three projects of regional scope:
 - (i) Study on the establishment of a timber distribution centre in Barbados or Trinidad to facilitate the supply of lumber from within CARICOM;
 - (ii) Holding a regional WOODTECH course/exhibition of woodworking machinery in Barbados in order to promote the transfer of technology for the small-scale furniture and joinery industry in the Caribbean.
 - (iii) Intra-regional tool maintenance training programme for the furniture/joinery industry.
- (b) Nine country reports covering the CARICOM member states^{1/} visited by the consultant and his counterpart in the course of the project travel; and

^{1/} Antigua, Barbados, Belize, Dominica, Guyana, Jamaica, St. Lucia, St. Vincent, Trinidad and Tobago.

- (c) A technical report on the selection of woodworking equipment for the small-scale furniture/joinery industry in the Caribbean Community (report No. IO/R. 53). The report covers both wood processing and tool maintenance equipment. It also includes sawdoctoring equipment for the maintenance of inserted teeth of circular saw blades, gang saw blades and band resaw blades.

2. Summary

Antigua is totally dependent on imports for its lumber supply, having no forests of its own. The country enjoys the second highest tourism income per capita in CARICOM (US\$ 821/cap. as compared to Barbados' US\$ 1,123/cap), and is still engaged in establishing major tourism-related building facilities. Moreover, contrary to the general CARICOM trend, timber frame housing is still very popular in Antigua. As a result, according to 1984 and 1985 statistics, Antigua has attained the highest timber consumption per capita in the Region (0.34 m³/cap. followed by Barbados with 0.20 m³/cap.).

Lumber imports increased from 5 million EM (11,935 m³) in 1981 to 24.9 million EM (58,814 m³) in 1984. The bulk of lumber imports consists of Pine and is supplied by the USA, Nicaragua and Canada.

Lumber imports from within CARICOM are limited to hardwoods supplied from Guyana and have considerably declined over the years. In fact, only 383,962 EM (9906 m³) 61,365 EM (143 m³) of lumber was imported from that country in 1986 as against in 1981. A main factor of this negative trend is the deterioration of shipping links between Guyana and most of the Eastern Caribbean islands resulting from the precarious financial situation of the West Indies Shipping Company (WISCO).

As in the other timber-deficit CARICOM countries visited in the course of the project's travel, keen interest was expressed by Antigua furniture manufacturers in importing Mahogany substitutes as well as Hububalli from CARICOM sources. Based on past experience, however, doubts were expressed that lumber could be supplied from Guyana on as regular a basis, as that supplied (on a weekly schedule) from Puerto Rico's lumber depots.

The furniture industry is characterized by a great disparity among the various plants in the level of available technology. Some plants are equipped with modern equipment of an automatic type and with a high production capacity. These machines, however, appeared to be largely under-utilized because of the almost complete absence of serial production. The main obstacle to the local mass-production of low cost furniture for the lower-income groups is the very high wage rate for skilled wood-workers (EC\$ 6.25 or US\$ 2.30 per hour), the second highest in CARICOM after that of Trinidad and Tobago. Furniture of the type required in new hotel facilities is imported in its near totality from overseas, mainly from the USA, while the main source of furniture imported from CARICOM sources is Jamaica.

After the collapse of the furniture importing opportunities offered by Trinidad during its oil-boom period, Antigua provides, at its favourable economic juncture - and for the foreseeable future - the only meaningful intra-CARICOM export outlet to countries such as Jamaica, Barbados, Guyana and possibly Dominica.

Recommendations:

- (a) To study the feasibility of establishing a timber distribution centre in Barbados to allow frequent delivery of limited volumes of furniture type lumber from Guyana and Belize to Antigua as well as to the other Windward and Leeward islands. A draft project document has been prepared by the consultant in this respect. See Annex VII of the project's terminal report (reference No. IO/R. 52).
- (b) The main furniture importer in Antigua, Plastic Foam and Furniture Co., should further the contacts established with the assistance of this consultant with potential furniture exporters in Jamaica, Guyana and Dominica towards substituting current imports of low cost furniture from Brazil with products of CARICOM origin.
- (c) To provide guidance to the furniture and joinery industry on the selection of modern yet appropriate woodworking and tool maintenance equipment to enable the sector to increase its efficiency and productivity in the light of high wage rates. A separate report has been prepared by the consultant in this respect entitled: "Guidelines for the Selection of Woodworking Equipment for the Small-scale Furniture/Joinery Industry in the CARICOM Community" (report reference No. IO/R. 53).

3. Antigua lumber imports

Antigua has no forest resources of its own and imports all of its lumber requirements.

The average annual lumber consumption, taking into account the years 1980, 1981 and 1984 can be estimated at 27,000 m³ or 11.4 million EM. The value of lumber imported in 1984 was EC\$ 5 million (US\$ 1.9 million).

The majority of imported lumber is utilized in building construction related to new hotel facilities as well as to low-cost timber houses which are still popular in Antigua. Buildings with exterior walls made of timber account for about 50 percent of total residential construction.

The bulk of construction lumber consists of Pine, mainly Southern Yellow Pine from the USA. A large quantity of Pitch Pine was once imported from Honduras but the trend, as recorded in 1984, has shifted to Yellow Pine. The main suppliers of coniferous Pine are now the USA, Nicaragua and Canada, in that order. A total amount of 169,943 EM (401 m³) Mahogany lumber was imported from Puerto Rico but it must have originated from Belize, Brazil or Honduras. The lumber import figures for the years 1981 and 1984 are shown in the following table:

Table 1: Antigua's Lumber Imports, 1981 and 1984

Country of origin	1981		1984	
	EM	m ³	EM	m ³
USA	2,048,416	4,833	12,748,327	30,081
Nicaragua	—	—	8,192,477	19,331
Canada	726,393	1,714	2,227,791	5,257
Honduras	1,626,760	3,838	1,493,895	3,525
Other countries	656,484	1,550	262,883	620
Total	5,058,053	11,935	24,925,373	58,814

Source: Antigua Custom Records

Minor quantities of lumber are imported from Guyana. Trends in this respect are shown in the following table:

Table 2: Antigua's Lumber Imports from Guyana, 1981 to 1986

	1981	1983	1984	1985	1986
Rough lumber	n.a.	10,657 EM (25 m ³)	19,935 EM (44 m ³)	17,450 EM (41 m ³)	22,395 EM (52 m ³)
Planed and moulded lumber	383,962 EM (906 m ³)	133,798 EM (315 m ³)	70,019 EM (165 m ³)	n.a.	38,970 EM (91 m ³)
Total	383,962 EM (906 m ³)	144,455 EM (340 m ³)	89,054 EM (209 m ³)	17,450 EM (41 m ³)	61,365 EM (143 m ³)

Source: Guyana Forestry Commission

4. Lumber Prices, Import Duty and Landing Charges

Lumber prices/EM

- Pine (Pitch and Southern Yellow Pine)	EC\$	US\$
CIF	1.40	0.51
Retail	2.25	0.83
- Mahogany		
Retail	4.00	1.50

The duty on lumber imported from outside CARICOM is EC\$ 1.20 (US\$ 0.44) per cubic meter plus 3 percent surcharge on the CIF value. Lumber retail price also reflects a 17 percent purchase tax, which is the only tax applied to lumber imported from CARICOM.

5. Shipping Links

- A. Belize-Antigua (Tropical Shipping, Belize). Weekly service: Belize-Antigua via West Palm Beach. Freight charge: US\$ 3,412 per 40 ft. container, excluding loading and unloading charges.
- B. Belize-Antigua (TMT Shipping): (with transshipment at Puerto Rico) through their weekly Roll on/Roll off service to the Leeward and Windward Islands. Containers of 40 ft. size.

- C. Guyana-Antigua (WISCO): Monthly service. Freight rates: US\$ 1,800 per 20 ft. container, consisting of basic cost (US\$ 1,175), Guyana handling (US\$ 175) and LSD destination (US\$ 450).
- D. Dominica-Antigua (TMT Shipping): Weekly service with transshipment of Roll On/Roll Off trailers (containers on flat beds) at Puerto Rico.
- E. Jamaica-Antigua (WISCO): Monthly service by MV 'Mini Liner' with on-route call at St. Kitts.

6. Antigua's Furniture Imports

The continuously expanding tourism facilities have provided a considerable and steady demand for furniture. However, due to the under-developed status of the local furniture industry and its high wage rates, most furniture required by new hotel projects is supplied from overseas sources, mainly the USA. The main furniture supplier from CARICOM is Jamaica, followed by Barbados; while Puerto Rico has remained the main non-CARICOM furniture supplier from the Caribbean Region. The value of furniture imports increased from EC\$ 3.4 million (about US\$ 1.3 million) in 1981 to EC\$ 4.8 million (about US\$ 1.8 million) in 1984. The trend in Antigua's furniture imports for the period 1981-1984 is shown hereunder:

Table 3: Antigua's Furniture Imports 1981 and 1984

Country of Origin	1981		1984	
	EC\$	US\$	EC\$	US\$
USA	1,536,062	590,793	2,795,249	1,075,095
Jamaica	557,993	214,612	732,565	281,755
United Kingdom	215,609	89,926	87,163	33,524
Canada	265,333	102,051	157,556	60,598
Puerto Rico	50,313	19,351	173,531	66,742
Barbados	53,970	20,757	16,759	6,445
Above as a percentage of total imports		80 percent	81 percent	

Source: Antigua Customs Records.

7. Antigua's Furniture Industry

The following main furniture workshops were visited in the course of the mission:

- (a) Pigott's Woodworking;
- (b) Renford's Woodworking;
- (c) Plastic Foam and Furniture;
- (d) Carib Unlimited Furniture Manufacturer; and
- (e) H.C. Benjamin Woodworking Shop.

7.1 Pigott's Woodworking

There is a great disparity among the various plants in the level of available technology. At the top end is the Pigott's Woodworking operation which is equipped with a modern range of woodworking machines including, among

others, an automatic double-head table shaper; an automatic double-table round-end tenoner, a wide belt sander, a semi-automatic turning machine and an automatic multi-boring machine.

However, Pigott's advantage of having modern equipment is minimized by the following factors:

- (a) at present, the factory produces mostly individual pieces of furniture on customer's specifications, thus limiting the utilization of automatic equipment - whose considerable setting-up time makes it uneconomical for the production of single furniture pieces;
- (b) lack of furniture designed and structured for optimum, mechanized wood processing;
- (c) lack of tool maintenance equipment, which obliges the factory to send tools for sharpening to Puerto Rico - now that the only tool maintenance servicing centre in Antigua has closed down.

Pigott's estimated lumber input per year is 70,000 BM (165 m³). It employs 13 persons.

7.2 Renford's Woodworking

The second best equipped furniture factory is the one operated by Renford's Woodworking. The plant has a full range of basic woodworking equipment as well as a single-end-tenoner, a router, a fully automatic turning lathe and a carving machine. The lathe's capacity, however, is so high that in two to three hours it can produce the factory's weekly requirements. The router is out of order, possibly on account of lack of proper routine lubrication of its high-speed bearings. The advantage of Renford's Woodworking compared to most other furniture workshops in the island is that it concentrates on the production of a standard range of furniture. However, like most of the other furniture operations in Antigua this factory suffers from the problems of cramped facilities and the lack of a streamlined production flow. Renford's estimated lumber input per year is 35,000 BM (82 m³). Its manpower is 15.

7.3 Plastic Foam and Furniture Co.

The Plastic Foam and Furniture Company is the largest producer of mattresses in Antigua. Its main furniture line consists of upholstered furniture - with hidden timber frame and bedroom sets made of melamine-faced particle board. The Company imports low-cost living and dining room furniture from Brazil. The plant absorbs some 80,000 BM (189 m³) of Canadian Red Pine lumber per year, which is utilized mainly for hidden frames of living room arm chairs and beds. Total manpower is 42.

The wood processing operation of Plastic Foam has yet to attain a proper degree of efficiency and utilization of industrial working methods. However, it could develop a basis for the final processing of furniture imported in semi-assembled form from CARICOM countries such as Guyana, Jamaica, Dominica, etc.

7.4 Etinoff Enterprises

The furniture operation of Etinoff Enterprises was established in 1985, gives employment to 17 workers and has an average input of 100,000 BM (236 m³) lumber per year (mainly Pine). It is the main supplier of standard school furniture in Antigua and plans to produce standard household furniture, with bedroom furniture as the main line. The plant lacks proper wood jointing equipment. It recently imported lumber from Belize via Puerto Rico.

7.5 H. L. Benjamin Woodworking

Finally, the smallest furniture workshop visited, H. L. Benjamin Woodworking Shop, was found to be equipped only with a few pieces of old, hobby-type, machinery. However, its owner and manager appeared to possess a remarkable potential for developing the present facilities into a proper small-scale industrial unit. Annual lumber input is 24,000 BM (56.6 m³). It employs 7 persons.

8. Selected Technical Assistance Requirements of the Furniture Industry

A. Requirements by H. L. Benjamin Woodworking Shop, Bennett Street, Villa Area, St. John's, Antigua and Barbuda, W. I., Tel.: 23432 (contact person: Mr. H. L. Benjamin, owner and manager).

- Selection of basic woodworking and tool maintenance equipment. Information provided by the consultant in the separate report listed in paragraph 1.11(c) of this report. ^{2/}
- Information on space requirements of basic woodworking machines as a basis for proper plant layout. Information provided by the consultant as Annex III of this report .

B. Requirements of Etinoff Enterprises Ltd., Cassada Garden, Antigua and Barbuda, Tel.: 20793, Cable: ETPRIN (Contact person: Mr. Walter Etinoff, Managing Director).

- Selection of following equipment: boring machine, round-end tenoner, slot mortiser machine, edge banding machine, automatic turning machine. Information provided in the separate report listed in paragraph 1.11(c) of this report^{2/} with the exception of the edge bander whose specifications are given in Annex IV of this report.

C. Requirements by Plastic Foam and Furniture Co., P.O.Box 1050, Market Street, St. John's, Antigua and Barbuda, Tel.: 462 1452 (Contact person: Mr. Aziz Hadeed, Managing Director).

- Selection of a boring machine and basic tool sharpening equipment. Information provided by the consultant in the separate report listed in paragraph 1.11(c) of this report ^{2/}.

^{2/} Report entitled: Guidelines for the Selection of Woodworking Equipment for the Small-scale Furniture/Joinery Industry in the Caribbean Community (report reference No. IO/R. 53).

D. Requirements by Renford's Woodworking, Nevis Street, St. John's, Antigua and Barbuda, W.I., Tel.: (809) 46/24537 (Contact person: Mr. Renforu Daley, proprietor).

- Selection of boring machine ^{3/}.

E. Requirements by Pigott's Woodworking, P.O.Box 345, Cassada Gardens, Antigua and Barbuda, W.I., Tel.: 462 0200 (contact person: Mr. George Pigott, Managing Director).

- Selection of tool sharpening machine ^{3/}.

9. Antigua's Lumber Imports Potential from Guyana and Belize

Of the nearly 25 million BM (about 59,000 m³) lumber imported by Antigua in 1984, only an insignificant fraction (61,365 BM or 143 m³) was supplied by Guyana, down from 383,962 BM (906 m³) in 1981, while Antigua's total lumber imports had increased by about 393 percent in the same period. An even more drastic downtrend developed in the same period in lumber imports from Belize (down to nil from 413,301 BM or 975 m³ in 1980 although minor quantities of lumber might have been imported through Puerto Rico from Belize, as is currently the case in 1987.

There is therefore a significant scope for promotion of lumber imports from both Belize and Guyana. In particular, imports from Belize could be made very attractive by the establishment by a lumber agent such as the Costel Commercial Corp.^{4/} of a lumber depot in Puerto Rico, thus taking advantage of the weekly frequency of the TMT's shipping service between Puerto Rico, Antigua and the other Leeward and Windward Islands. Perhaps a similar arrangement could be introduced with regards to lumber imports from Guyana, but with a depot in Barbados and utilizing the same TMT's weekly shipping service.

Keen interest was expressed in the course of the mission on the part of furniture manufacturers in utilizing the following timber species:

- Mahogany and Caribbean Pine from Belize;
- Mahogany substitutes, Hububalli and Pine substitutes from Guyana.

(Crabwood would not be suitable for use in Antigua unless properly dried before shipment, because warping problems have been experienced with sample shipments of lumber from this species).

^{3/} Purchase specifications provided in the separate report prepared by the consultant entitled: Guidelines for the Selection of Woodworking Equipment for the Small-scale Furniture/Joinery Industry in the Caribbean Community (report reference No. IO/R. 53).

^{4/} Costel Commercial Corporation
65 Infanteria Etrade, Carolina
P.O.Box 899, Carolina,
Puerto Rico 00829, Tel.: (809) 723 7633

Pine and Pine substitutes would be required for use in hidden framework of upholstered living room chairs.

10. Specific requests for quotations/samples for Guyana and Belize Timber Species

Requirements by Benjamin Woodworking Shop

- (a) Hububalli samples as follows:
5 pieces 2" x 10" x 6'
- (b) Quotation CIF for trial order of 200 BM of Hububalli as per above sizes.
- (c) One set of small samples of main Guyana timber species suitable for furniture making.

Requirements by Renford's Woodworking

- (a) Hububalli and Determa lumber; samples as follows:
5 pieces each species, size 1" x 6" x 6'
5 pieces each species, size 1" x 4" x 6'
5 pieces each species, size 1" x 10" x 6'
- (b) CIF quotation for trial order of Determa and Kereti Silverballi lumber as per above sizes for a total shipment of 13,985 BM (33 m³).
- (c) CIF quotation for trial order of one 20 ft. container (13,985 BM) of Mahogany from Belize as per sizes in (a) above.

Requirements by Etinoff Enterprises Ltd.

- (a) CIF quotation for trial order of one 20 ft. container (13,985 BM) of Santa Maria lumber, sizes as follows:
1" x 6" x 6'
1" x 4" x 6'
1" x 10" x 6'
- (b) CIF quotation for Caribbean Pine lumber, specifications as above.

11. Antigua's Potential for Importing Semi-finished Furniture from CARICOM Countries

The very high wage rate for skilled woodworkers in Antigua - EC\$ 6.25 or US\$ 2.30 per hour, second only to Trinidad - prevents this sector from catering for the furniture needs of the low-income groups. In fact, the Plastic Foam and Furniture Company is presently importing badly made, low cost furniture from Brazil to fill this gap.

Thus, there should be a good potential for Antigua to import low-cost furniture either in parts or in semi-assembled form from selected furniture plants in CARICOM countries such as Jamaica, Guyana and possibly Dominica who offer the advantage of lower wage rates and local timber resources. The following timber species could be utilized in this respect:

- Determa and Hububalli from Guyana;
- Spanish Elm from Jamaica; and
- Gommier from Dominica

In view of Antigua's ongoing considerable, tourism-related, building activities, it might also be worth investigating the possibility of importing panel doors and flush doors from the following CARICOM sources:

- (a) E. H. Charles & Co. Ltd.
P.O.Box 213
Roseau, Dominica, W.I.
- (b) Caribbean Woodcraft Manufacturing Co. Ltd.
P. O. Box 38
Kingston 10, Jamaica, W.I.

12. Specific Request for Import of Furniture Components

Requirements by Plastic Foam and Furniture Co. (Furniture Manufacturer and importer)

CIF quotation for the following furniture items:

- (a) 5-piece dining room set (one square table and four chairs);
- (b) 7-piece dining room set (one rectangular table and six chairs);
- (c) 5-piece living room set (one 3-seater settee, two easy chairs and one coffee table) excluding cushions;
- (d) beds of width 4'5" and 3'6" (headboard, foot board and two side rails).

Quotations for the above should include the following alternatives:

- (a) Furniture supplied in the form of machined parts;
- (b) Furniture supplied in the form of parts and sub-assemblies such as individual parts of chairs (back rests, back rails and front rails) to be combined to pre-assembled side frames.

The furniture could be supplied either unfinished or lacquered.

Some of the potential suppliers are listed hereunder:

- 1. Fairway Furniture Factory Ltd.
Nanse Pen, Weymouth Close
Washington Gardens, W. D. O.
Saint Andrew, Jamaica, W.I.
Tel.: 923 5419

2. Ogheden Industries Ltd.
Cockrane, Roseau
Dominica, W.I.
Tel.: 91285

3. Precision Woodworking Ltd.
35 Industrial Estate
Ruinveldt, Georgetown
Republic of Guyana
Tel.: 56366
Telex 3043 GY

ANNEX I

Persons met in Antigua

Mr. C. A. Edwards	Permanent Secretary, Ministry of Foreign Affairs, Economic Development, Tourism and Energy, Queen Elisabeth Highway, St. John's, Antigua
Ms. A. Aflak	Marketing Officer, Ministry of Foreign Affairs, Economic Development, Tourism and Energy.
Mr. E. Western	Senior Industrial Development Adviser, Ministry of Foreign Affairs
Mr. R. Dally	Nevis Street, St. John's, Antigua
Mr. A. Hadeed	Managing Director, Plastic Foam and Furniture Co., P.O.Box 1050, St. John's, Antigua
Mr. W. E. Phoenix	Managing Director, Carib Unlimited Furniture Manufacturer, P.O.Box 44, St. John's Antigua
Mr. G. Pigott	Managing Director, Pigott's Woodworking (furniture manufacturer), P.O.Box 345, Cassada Gardens, Antigua
Mr. W. Etinoff	Managing Director, Etinoff Enterprises Ltd. (Furniture Manufacturer), Cassada Garden, Antigua
Mr. H. L. Benjamin	Managing Director, Benjamin Furniture Woodworking Shop, Bennett Street, Villa Area, St. John's, Antigua
Mr. B. Osborne	Purchasing Manager, Antigua Shipping Ltd. (lumber importer), P.O.Box 576, St. John's, Antigua
Mr. E. Francis	Managing Director, Francis Trading Agency Ltd. (Shipping Agents), P.O.Box 194, St. John's, Antigua
Mr. F. Schwartz	Director, Caribbean Forwarders Co. Ltd, (Agents for Tropical Shipping), P. O. Box 530, St. John's, Antigua
Mr. V. G. Edwards Jr.	Shipping Agent, P.O.Box 82, St. John's, Antigua

ANNEX II

Properties of Selected Guyanese, Belizean and Dominican
Timber Species suitable for Furniture Manufacturing

Contents

A. Guyana Species

1. Andiroba (Crabwood)
2. Courbaril (Locust)
3. Determa
4. Hububalli
5. Purpleheart
6. Silverballi
7. Simarupa

B. Belize Species

8. Santa Maria

C. Dominica Species

9. Gommier

D. Exporting contacts

1. Andiroba (Crabwood)

- Scientific name: Carapa guianensis (family: Meliaceae)
- Other names: Krapa, Guino, Figueroa, Tangare, Carapa, Crappo
- Wood appearance: Heartwood varies from pale pink to rich red-brown when freshly sawn, darkening to a fairly uniform dull reddish-brown.
- Sapwood pale brown or oatmeal coloured, not always sharply defined. Wood resembles a plain mahogany in appearance, but lacks its natural lustre. Texture medium to coarse; grain generally straight but sometimes interlocked.
- Bole 50-80 feet long; diameter 16-20 inches.
- Physical and mechanical properties: Comparable in strength to European Beech (Fagus spp.). Weight about 610 kg/m³ (39 lb/ft³) seasoned. Small movement. Moderately hard with good mechanical properties and is fairly stable in use.
- Natural durability: Heartwood is moderately durable and fire resistant. Logs liable to attack by ambrosia (pinhole-borer) beetles.
- Timber processing: Drying: Dries fairly well but rather slowly with a tendency to split in the initial stages. Kiln schedule C.
- Working: Saws without difficulty. Interlocked grain makes planing difficult. Works easily and turns well, finishing smoothly.
- Assembly: Glues and holds nails well. Tendency to split on nailing.
- Finishing: Takes stain and polishes satisfactorily.
- Uses: Suitable for general carpentry, furniture, cabinet work, turnery and interior joinery.
- Supplies: Occurs in reasonable quantities in Guyana. Regular supplies possible.

Source: Guyana Forestry Commission.

2. Courbaril (Locust)

- Scientific name: Hymenaea courbaril (family: Caesalpiniaceae)
- Other names: Copalier, Algarrob, Gaupinal, Jatoba.
- Wood appearance: Heartwood light brown to brown often with dark streaks and with a subdued golden glow. Sapwood of whitish grey colour is sharply defined. Texture medium coarse.
- Grain straight, lustre medium, uniform vessel lines distinct.
- Bole 60-80 feet long, diameter 24-36 inches.
- Physical and mechanical properties: Very hard and strong. Weight varies from 910 to 1000 kg/m³ (57-62 lb/ft³) seasoned. Moderate shrinkage, relatively stable once dry. Good mechanical properties, especially elasticity.
- Natural durability: Very resistant to decay.
- Timber processing: Drying: dries readily without distortion or splitting.
Working: moderately difficult to work but finishes smoothly. Planes and turns without difficulty. Good bending to steaming process.
Assembly: glues well, but difficult to nail. Fastenings are held well.
Finishing: Finishes smoothly. Polishes and varnishes without difficulty
- Uses: A wood of decorative appearance suitable for use in the manufacture of high grade furniture, cabinet work, decorative joinery and veneer. Also used for ship-building, general construction, and the making of tool handles and croquet mallets.
- Supplies: Occurs widely but not abundantly in the Guyana forests. Regular supplies in modest quantities are available.

Source: Guyana Forestry Commission.

3. Determa

Scientific name:

Ocotea rubra (family: Daumecae)

A.T.I.B.T. standard name:

Louro Vermelho

Other names:

Wama, Grignon Franc, Red Louro

Wood appearance:

Pale reddish-brown with subdued golden lustre. Grain straight to irregular, texture rather coarse. Bears some similarity to a dense grade of African Mahogany. Bole 60-80 feet long, cylindrical; diameter 24-36 inches.

Physical and mechanical properties:

Average weight about 620 kg/m³ (39 lb/ft³). Hardness - soft to medium. Strength class 5/4, generally below the average for its density. Movement low to moderate. Determa responds extremely slowly to atmospheric changes and is thus very stable in use.

Natural durability:

Determa heartwood is rated durable in graveyard and pure culture tests. The wood equals Honduras Mahogany in its resistance to termites, and is also fairly resistant to marine borers.

Determa is highly resistant to moisture absorption and has excellent weathering characteristics.

Timber processing

Drying: kiln schedule E. Because of the slow diffusion rate of the moisture in the wood Determa is difficult to season.

Working: saws well, works easily with all tools; turns and carves well.

Finishing: stains and polishes well after filling.

Uses:

A general utility timber, widely used for all kinds of indoor and outdoor work. Uses include boat and ship building (keelframe, planking and decking); carriage and wagon building; building construction both interior and exterior (framing, stairs, windows, sash frames, flooring strips, interior trim); cooperage, furniture and cabinet work. The wood is suitable for bending to a moderate radius of curvature.

Supplies:

Available in considerable quantities. Supplies adequate to meet all likely requirements, both in quality and quantity. The timber is available in large sizes.

4. Hububalli

- Scientific name: Loxopterygium sagotii (fam.: Anacardiaceae)
- A.T.I.B.T. Standard name: Slangenbout
- Other names: Koika, Onotillo. Kocel pialli
- Wood appearance: The wood is brown to reddish-brown, attractively figured; contains numerous narrow to rather wide darker stripes and streaks. Lustre medium. Texture medium, uniform. Grain straight, sometimes interlocked or wavy.
- Physical and mechanical properties: Weight about 50 lb/ft³. Strength class 4, moderately hard; toughness medium to rather brittle. Movement rather low. Air dry Hububalli compares closely with Burma Teak in all strength properties except compression and tension perpendicular to grain.
- Natural durability: Resistant to decay; moderately resistant to termites. The wood is highly resistant to moisture absorption.
- Uses: Because of its attractive figuring and relative scarcity the wood is best suited for panelling, high-grade furniture and cabinet work.
- Supplies: The wood is frequently found in the far interior. Moderate quantities are available for export.

5. Purpleheart

Scientific name: Peltogyne pubescens and P. venosa
(family: caesalpiniaceae)

A.T.I.B.T. standard name: Amarante

Other names: Amaranth, Morado, Pau Roxo, Bois Violet, Barabu

Wood appearance: Dull brown when freshly cut, rapidly oxidizes to violet-purple on exposure to light and gradually toning down in course of time to dark purplish-brown. Sapwood whitish or cream coloured. Grain generally straight, sometimes wavy or interlocked. Texture moderate to fine. Bole 50-90 feet long, cylindrical; diameter 20-44 inches.

Physical and mechanical properties: Wood is very tough, strong and resilient. Weight about 860 kg/m^3 (54 lb/ft^3) seasoned. Movement small bending strength 147 N/mm^2 (21399 lbf/in^2) modulus of elasticity 1600 N/mm^2 ($2420,00 \text{ lbf/in}^2$) compression parallel to grain 78.5 N/mm^2 (11380 lbf/in^2). Shock resistance medium.

Natural: Highly resistant to decay, termites and fire. Heartwood very durable and extremely resistant to preservative treatment, but sapwood is permeable.

Timber processing: Drying: dries well and fairly rapidly with little degrade. Kiln schedule E.
Working: not difficult to work. Saws, planes and turns well, finishing smoothly; takes a high polish.
Assembly: it takes glue well and holds nails and screws satisfactorily.
Finishing: gives good results when lacquered or polished.

Uses: Possesses high strength and very good durability and is an excellent structural timber suitable for heavy outdoor constructional work such as bridges, dock work and park benches. As

flooring it has high wearing qualities and is suitable for most conditions of traffic. Has been used successfully in chemical plants for vats, filter press plates and frames. Suitable for high-grade furniture and turnings. Also used for making billiard cue butts, tool handles, interior and exterior joinery. A valuable wood for its attractive appearance and its strength.

Supplies:

Regular supplies are available.

6. Silverballi (Group)

<u>Family:</u>	Lauraceae
<u>Scientific names:</u>	Brown: <u>Licaria canella</u> Kereti: <u>Ocotea puberula</u> , <u>Ocotea wachenheimii</u> , <u>Ocotea oblonga</u> Kurahara: <u>Ocotea glomerata</u> Swizzlestick: <u>Ocotea schomburgkiana</u> White: <u>Ocotea canaliculata</u> Yellow: <u>Aniba ovalifolia</u>
<u>A.T.I.B.T. standard name:</u>	Canela
<u>Other names:</u>	Pisie, Caralou, Canelo, Louro Branco, Inamui, Preto
<u>Wood appearance:</u>	In Guyana the Silverballi group is divided into 'hard' and 'soft', with the dividing line being put at an air dry specific gravity of 585 kg/m ³ (37 lb/ft ³ .) The heartwood ranges from greyish through yellowish buff to light brown and darkens on exposure. Lustre medium to high. Texture rather fine to moderately coarse. Grain straight. The wood usually has a pleasant aromatic odor. Bole 60-70 feet long; diameter 16-24 inches.
<u>Physical and mechanical properties:</u>	The 'hard' Silverballi is rather light to heavy with densities from 22 to 37 lb per cubic foot. The group is generally in strength class 2. Movement rather low; the lighter species shrink less than the heavier types.
<u>Natural durability:</u>	Moderately resistant to insects and decay, but susceptible to termites. Highly resistant marine borers. Difficult to impregnate.
<u>Timber processing:</u>	<u>Drying:</u> kiln schedule G. Silverballi air dries well with little degrade <u>Working:</u> saws well and works easily. <u>Assembly:</u> holds nails, screws and glue well. <u>Finishing:</u> Finishes smoothly unless grain is severely interlocked. Paints well.

Uses:

'Hard' Silverballi: General carpentry, boat building (planking), suitable for both interior and exterior work in house building; furniture and cabinet work; suitable for veneer and plywood.

'Soft' Silverballi: general carpentry, interior work, light furniture; suitable for utility plywood.

Supplies:

Occurs frequently in the Guyana forests. Regular supplies are available for orders placed in the Silverballi group.

7. Simarupa

Scientific name:
A.T.I.B.T. Standard name:

Simaruba amara (family: Simarubaceae)
Marupa

Other names:

Aceituno, Acajou blanc, Scemardepa,
Bitterwood.

Wood appearance:

Heartwood whitish, not differentiated from the whitish or straw coloured sapwood. Wood has a slightly bitter taste, but is odourless. Grain straight. Texture is medium, uniform and lustrous. Bole 70-90 feet long; diameter 20-24 inches.

Physical and mechanical properties:

A very light, soft timber. Weights about 430 kg/m³ (27 lb/ft³) seasoned. In several respects very similar to Obeche (Triplochiton scleroxylon). Movement small. Low in bending strength stiffness, crushing strength and shock resistance.

Natural durability:

Timber of low durability, blue stains easily. Green converted timber can easily be treated by short dipping and diffusion.

Timber processing:

Drying: dries very rapidly and very well. Kiln schedule L

Working qualities: Easy to work with both manual and machine tools.

Assembly: glues well. Can be easily nailed with good holding qualities.

Finishing: easy to paint, stain or varnish.

Uses

Suitable for use where a light, easily worked hardwood is required and where its lack of durability and low strength are not important. Examples are in furniture for interior use, drawer slides, and some types of cabinet framing; interior joinery and shoe heels. Excellent qualities for model making, utility woodware and toy manufacture. Simarupa peels well and makes attractive plywood.

Supplies:

Adequate supplies available in commercial quantities.

Source: Guyana Forestry Commission

8. Properties of a Belizean Timber Species suitable as a substitute to Mahogany in furniture production

<u>Names</u>	Trade: Santa Maria, Botanical: <u>Calophyllum brasiliense var. Rekoi Standl. Guttiferae.</u> Local name: Santa Maria, Leche Maria, Jacareuba (Brazil).
<u>Range</u>	Mexico to Brazil and through the West Indies.
<u>Description of Wood:</u>	Sapwood - pale pink, 1-2 inches wide. Heart - light pinkish to reddish brown. Odour and taste - not distinctive. Grain - generally interlocked. Texture - medium. Growth rings - indistinct, usually limited by a fine line of parenchyma. Pores - medium, visible, in diagonal to radial chains and in irregular groups, rather numerous. Vessel lines - distinct, darker than background. Rays - very fine, invisible to naked eye on cross section; fine but distinct on radial surface, darker than background; faintly visible on tangential. Gum Veins - often associated with calcium carbonate deposits, rather frequent. Parenchyma - in concentric or broken tangential lines, indistinct on cross section; distinct because of darker colour than background on longitudinal surfaces, where an irregular pattern is produced.
<u>Physical properties</u>	Density: 540-715 kg/m ³ (34-45 lb/ft ³) at 15 per cent moisture content. Hardness: moderate, about equal to that of English Oak. Shrinkage - above average. From green state to about 11 per cent moisture content: tangentially 5/8 inch per foot radially 3/8 inch per foot. Distortion: There is some tendency towards distortion in seasoning unless the logs are suitably converted, preferably by the semi-quartered method. But given this, and careful seasoning, the wood has been observed to give satisfactory results in good class joinery trials over a period of eight years.

Durability:

Resistance to fungal and insect attack moderately high. Heartwood moderately durable in contact with the ground. Constructional material in exposed situations very durable. Not readily attacked by termites. Not resistant to marine borers.

Resistance to impregnation with preservatives: Sapwood readily amenable to impregnation, but heartwood extremely resistant.

Mechanical properties

In resistance to static bending, shock load and splitting, the timber is slightly superior to English Oak. It has poor bending qualities and cannot be compressed without buckling.

Working qualities

Works with moderate ease in most operations with both hand and power tools and is comparable with medium quality English Oak in resistance to cutting. Saws: Flat-sawn green wood may cast off the saw. Planing: For the dressing of seasoned stock cutter knives require to be kept in good condition while the rate feed should be relatively low in order to obtain the best results. Unless this care is taken pronounced pick-up may occur in the stripe figure of fully quartered stock, thus causing extra sanding prior to finishing and polishing. If obtainable, a cutting angle of less than 20 degrees materially improves the finished surface. Drilling: The wood tends to tear at the exit hole and the wood must be carefully supported to minimize damage. Turns: readily to a reasonably good finish. Stains and finishes: well but quarter-sawn stock requires much sanding to remove 'picked-up' grain. Nailing: The wood is rather hard to nail and, in dimension stock, nails once driven are very difficult to pull. Where the darker coloured gum streaks are present the associated calcium carbonate tends to dull the cutter edges.

Laboratory tests:

(a)

One small log of Santa Maria was tested at Imperial Institute, London in 1922.

- (b) A preliminary test on 5 logs was made at the U.K. Forest Products Research Laboratory in 1932 and a major test on some 1400 cubic feet in 1933.
- (c) Four bolts from different parts of the same tree were tested at Yale School of Forestry in 1932.

Trade trials:

(a) Veneer and plywood:

Material from the major test was tried by woodworking firms.

The interlocked grain persisting throughout the wood caused tearing of rotary cut-stock. Gum streaks were present. Veneers showed a tendency to buckle and in drying the interlocked grain caused splitting both at the ends and middle of the sheets. Plywood showed open end-split, torn grain and gum streaks while distortion was pronounced.

(b) Plywood:

A short log taken from the parcel described in laboratory test (b) above was examined by a firm of decorative veneer manufacturers, who stated that interlocked grain was present and caused tearing of rotary cut veneer, and that gum streaks were present, thus causing a tendency towards splitting and buckling in the veneer when drying. Nevertheless plywood made up from these veneers and kept under observation for some years has remained flat and shows a fairly decorative appearance. For future plywood manufacture care should be taken to select at source logs which are the most suitable in size and shape, and as far as possible free of the defects mentioned.

c) Trials as general purpose furniture

A favourable report was made on a parcel of about 500 cubic feet by a furniture manufacturer. The wood was used for turnings, light articles of furniture, small tables, chairs, mattress sides, couches. It was noted that the condition was very fair and comparable with other commercial Empire timbers. Defects and distortion after resawing were not more than 5 percent, which is reasonable. The timber had good 'standing' qualities during manufacture and final assembly.

Source: Notes on Forty Two Secondary Hardwood Timbers of British Honduras, 1946, Forest Department of British Honduras.

9. Properties of a Dominican Timber Species suitable
for Furniture/Joinery Making

Gommier

- Scientific name: Dacryodes excelsa Vahl. D. hexandra
(Hamilt. Griseb) (family: Burseraceae)
- Other names: Gommier blanc, Gommier montagne
(Guadeloupe and Martinique); Tabonuco
(Puerto Rico)
- Distribution Gommier occurs in Puerto Rico and the
Lesser Antilles, generally in small
groups along ridge-tops and upper slopes
of the rain forests in Dominica, Saint
Lucia, St. Vincent, Grenada, Guadeloupe
and St. Kitts.
- The tree: Gommier is a large to very large
evergreen tree reaching a height of 36.0
m and a diameter of 1.0 m to 1.5 m
although mature trees are more commonly
18.0 to 24.0 m tall and 0.5 to 0.75 m in
diameter. They are deep rooted, without
buttresses, and able to stand up well to
the numerous hurricanes of the
Caribbean. The boles are straight and
well formed.
- The timber: Gommier is variously reported to
resemble birch (Betula, mahogany, and
sometimes yellow poplar (Liriodendron).
It is perhaps closer in appearance to
the botanically associated gaboon or
okoume (Aucoumea), but harder, heavier
and much finer textured.
- The sapwood is narrow, greyish in colour
and not clearly demarcated from the
heartwood which is uniform pale brown
with a purplish cast when freshly cut,
turning a pinkish brown when dried, and
a lustrous brown on exposure. The grain
is sometimes interlocked, producing an
attractive ribbon stripe. The lustre is
high and often satiny in appearance.
The texture is fine to medium and
uniform, and in general is somewhat
finer textured than mahogany.
- The wood weighs about 640 kg/m³ when
dried.

Drying: It dries easily with no appreciable distortion or other defects. Its volumetric shrinkage from green to oven dry is 10.5 percent; tangentially it is 6.4 percent and radially 4.1 percent, which is superior in terms of drying to those values for African and Honduran mahogany.

Durability:

Moderate.

Working qualities:

The timber is easy to work but with a tendency to dull cutting edges due to the high silica content of the wood. When sharp cutting edges are maintained, the wood finishes smoothly and takes glue and all finishes effectively. It is good wood for turning and for holding nails.

Uses:

Gommier is used extensively in the Caribbean area for furniture and cabinet making, and in Puerto Rico is often stained and sold as 'mahogany'. It is also used for boat-building, shingles and crates. In the Caribbean, it is considered very susceptible to termite attack, and for exacting purposes not as good as mahogany with its known resistance to termites. Gommier also produces very good veneer. Tests made at the Centre Technique du Bois indicate that gommier is suitable for plywood, with selected stock suitable for decorative veneer. This was substantiated by other tests carried out in Canada with the recommendation that eccentric peeling produced better quality veneer.

Exporting Contacts

Guyana

Mr. H. E. Cort, Marketing Manager,
Guyana Forestry Commission, 1 Water
Street, Kingston, Georgetown, Guyana,
Telex: 2262 WALABA GY, Tel.: 02-54191

Belize

Mr. H. Flower, Chief Forest Officer,
Forestry Department, Ministry of Natural
Resources, P. O. Box 148, Belmopan,
Belize, Telex: 102 FOREIGN BZE,
Telephone: (08) 2415

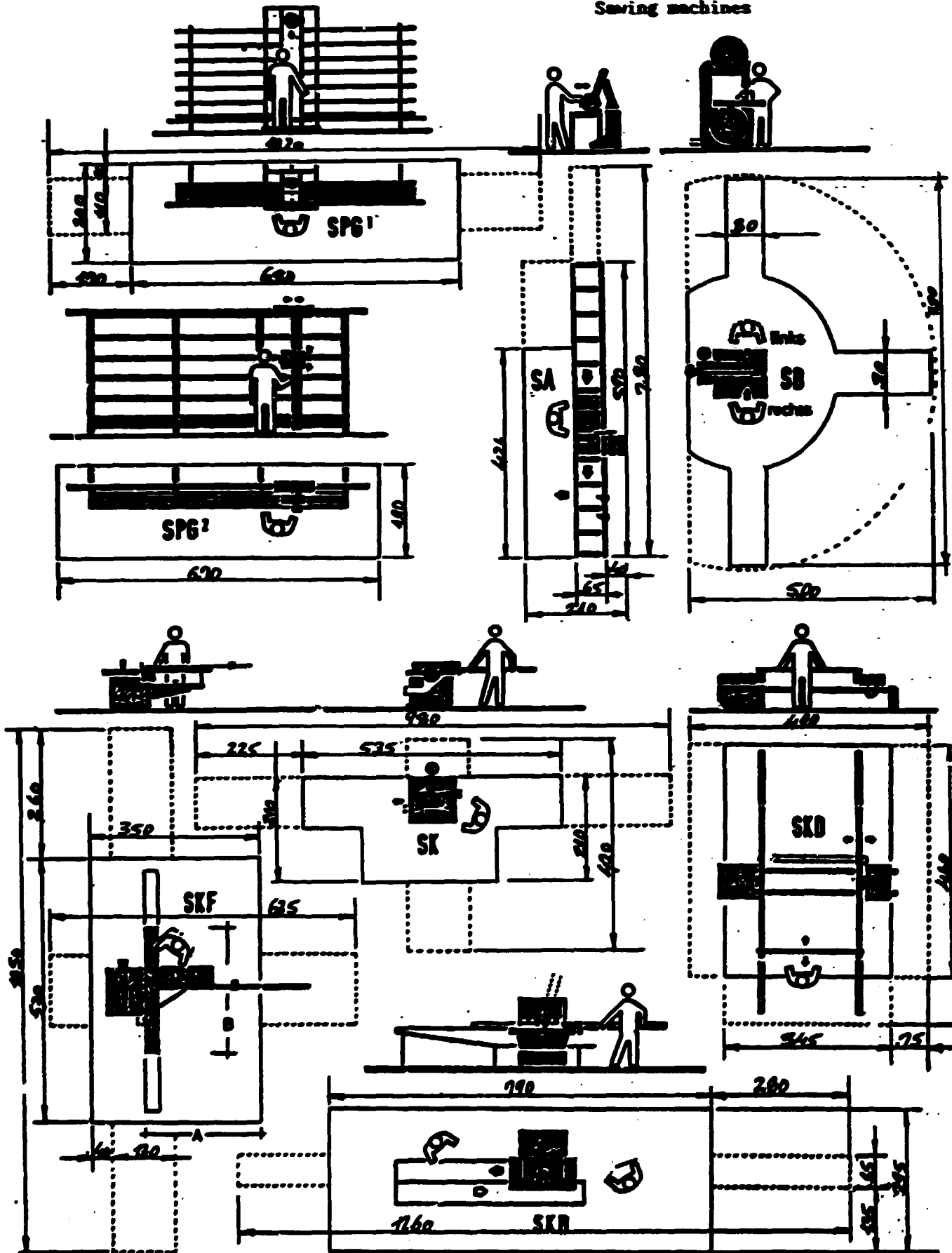
Dominica

Mr. E. W. B. Jerome, Manager, North
Eastern Timbers Sasmill Palm
Tree-Woodford Hill, Dominica Tel.:
809-449-7042

Mr. D. Southwell, Managing Director,
Dominica Timbers Ltd. Sasmill
(Portsmouth), P. O. Box 198, Roseau,
Dominica

ANNEX III
WORKING SPACE REQUIREMENTS OF SELECTED WOODWORKING MACHINES

Sawing machines

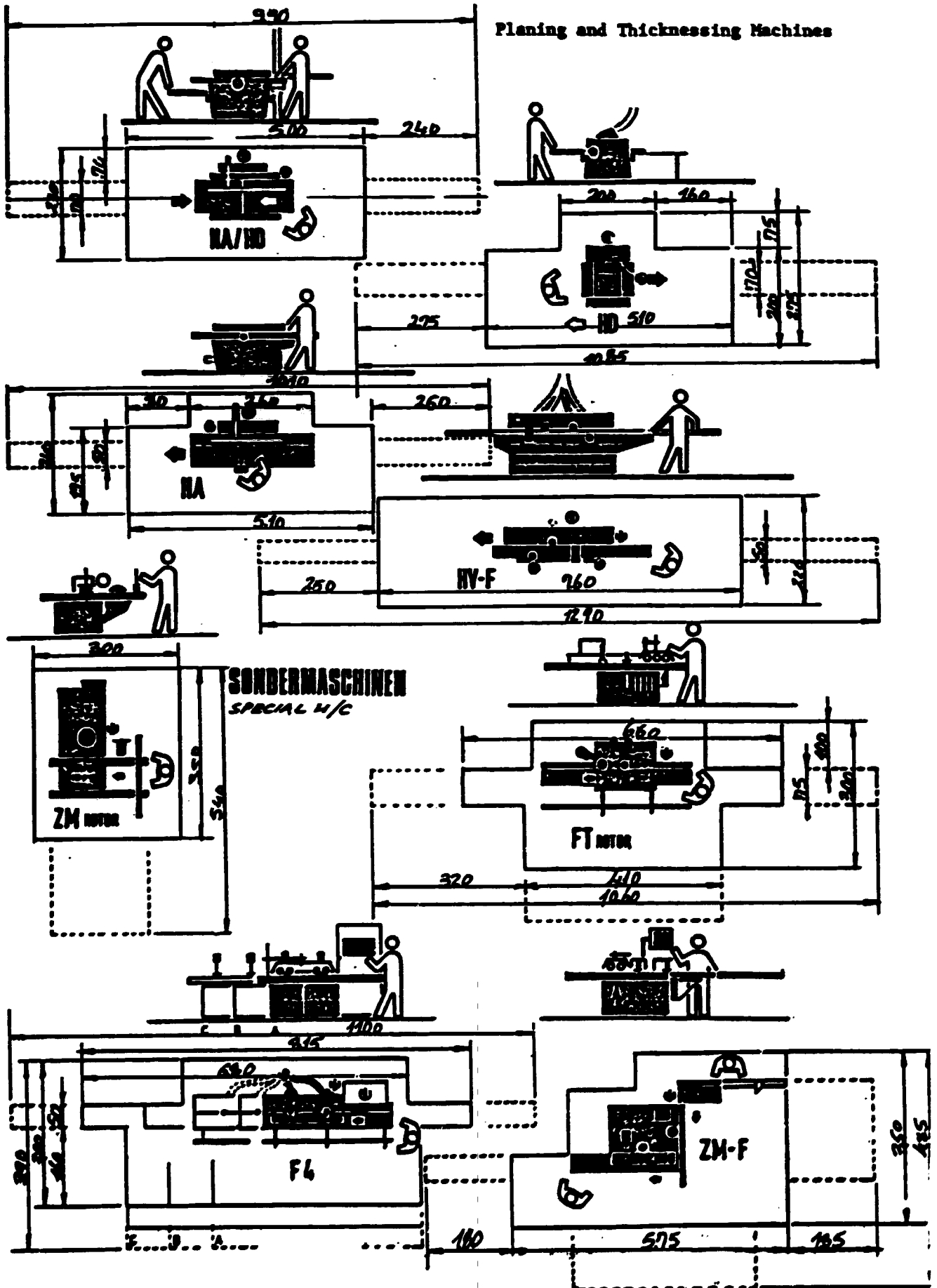


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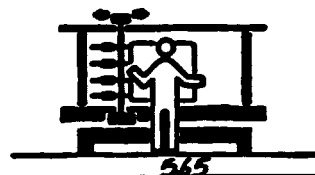
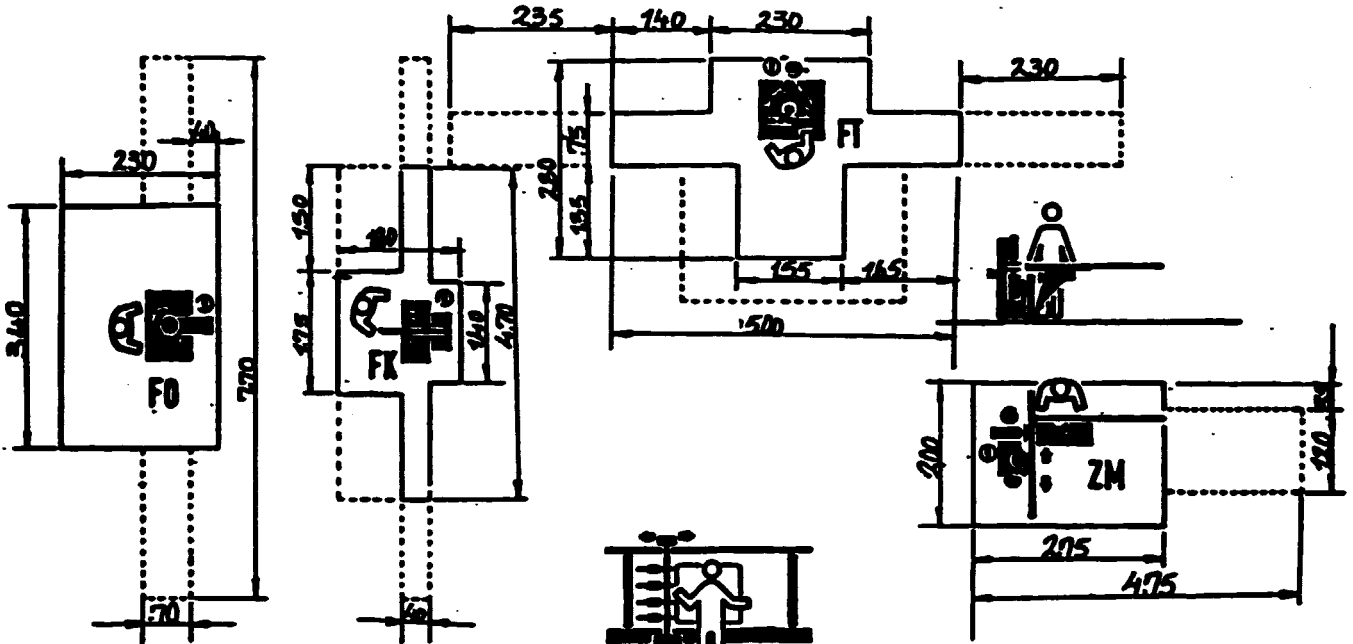
Planing and Thicknessing Machines



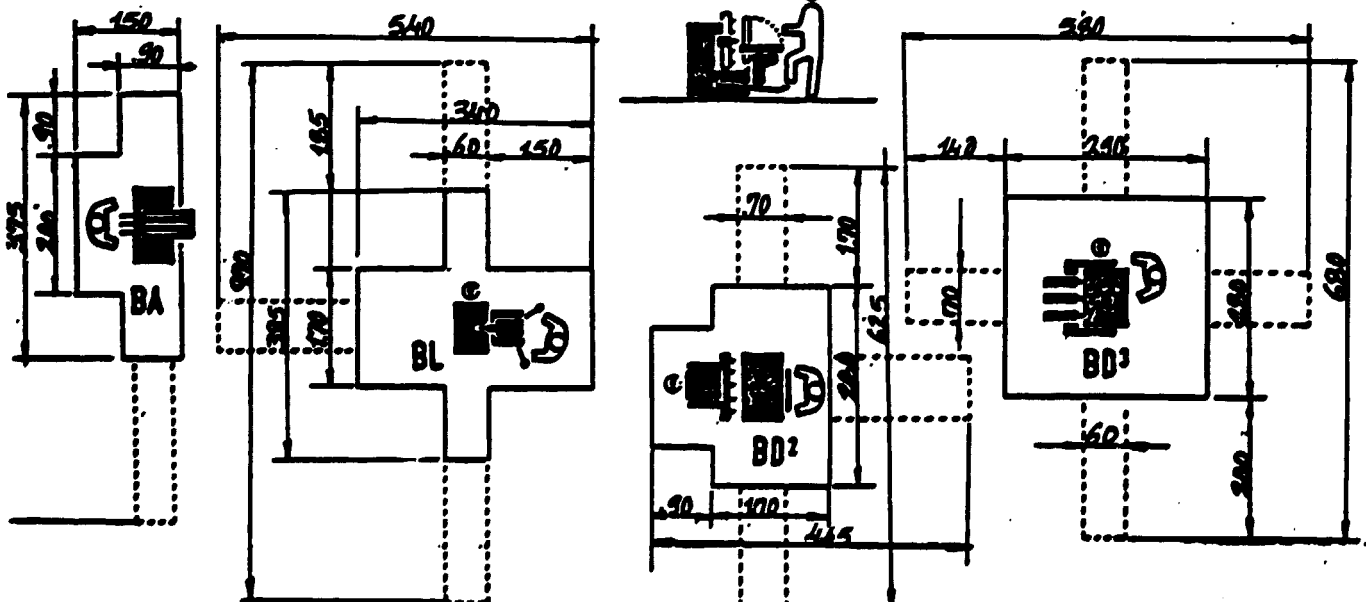
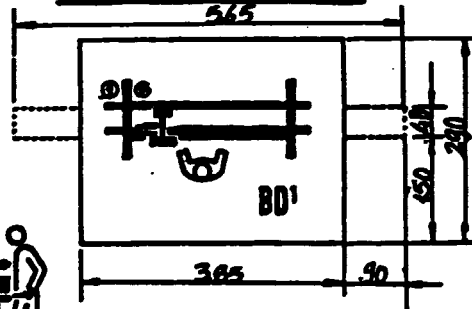
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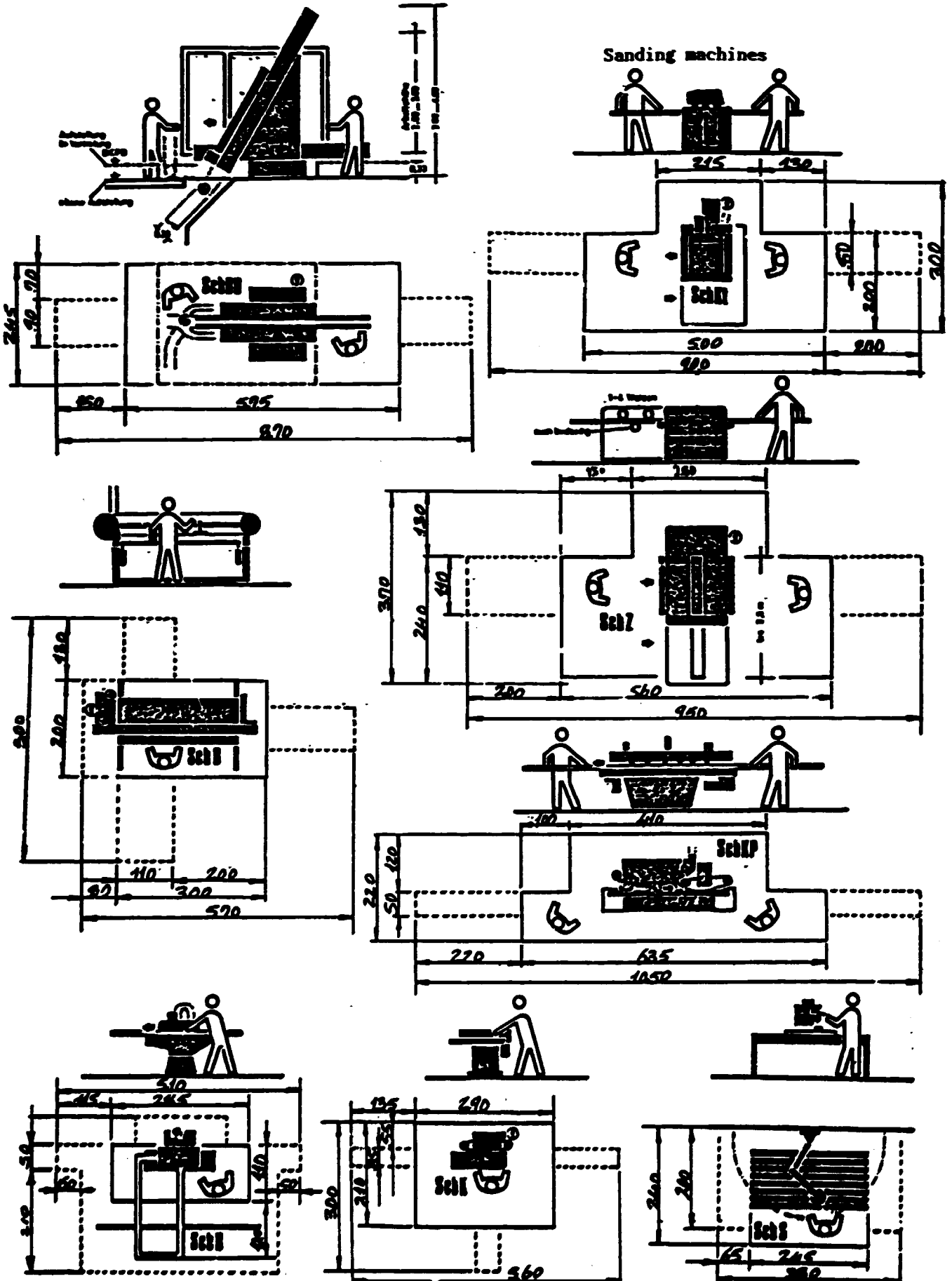


Shaping machines

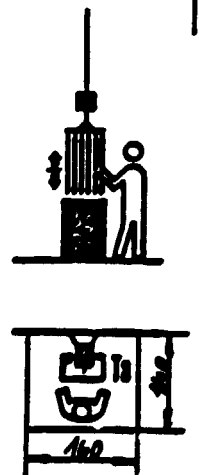
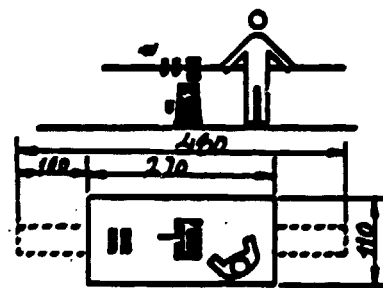
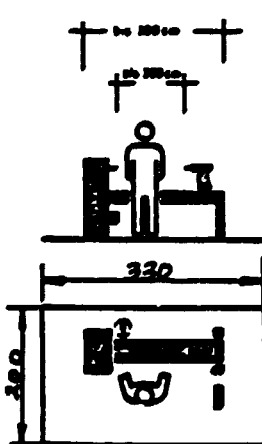
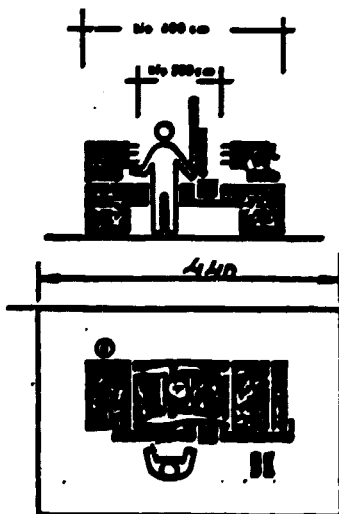
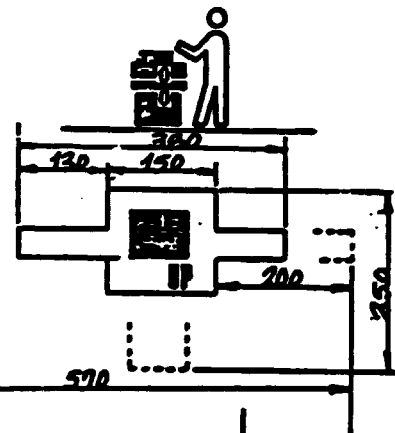
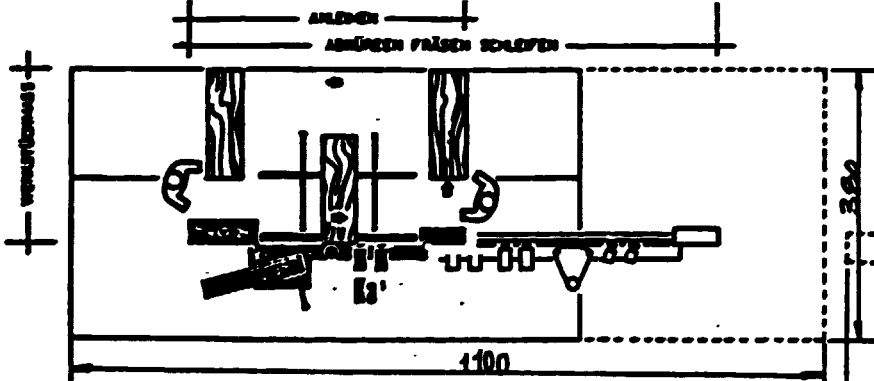
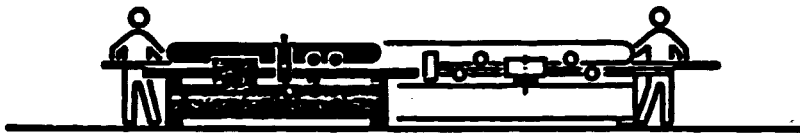
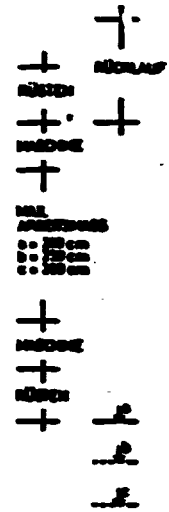
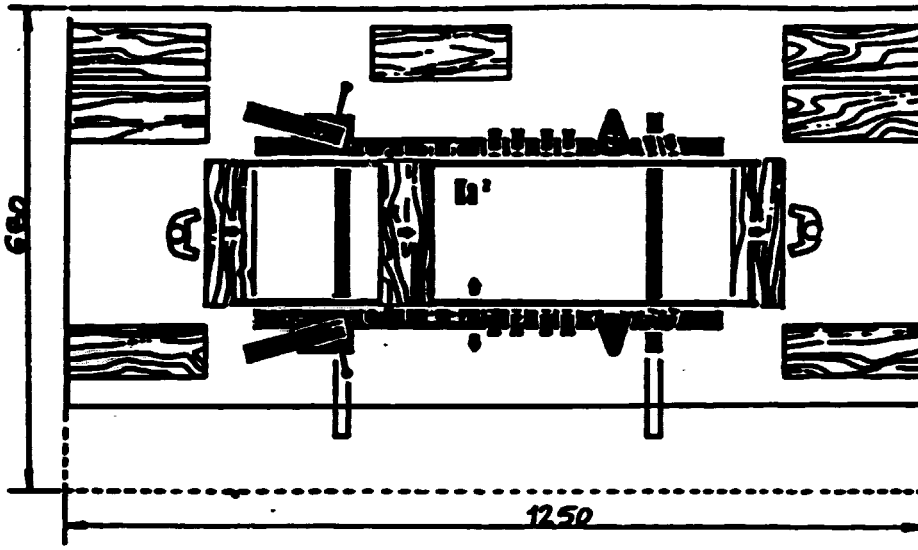
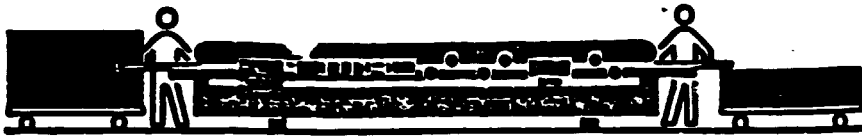


BOHRMASCHINEN
BORING M/C





Gezeichnet Blatt Nr.	Raumbedarf für Betriebsmittel- Holzbearbeitung M 1:100	ERKLÄRUNG A. B. RICHTIG	LGA	2	6	1	1	1	1
5060	Bitte zur Veranschaulichung beachten: Angaben unverbindlich, Gewicht, Verordnungen, Erlöse, Änderungen, Marken sind nach dem neuesten Stand herzustellen.		Stumpen 75						



DREHMASCHINEN

TURNING LATHES I

COPYING LATHES

Größe	1
Blatt nr.	5082

Raumbedarf für Betriebsmittel - Holzverarbeitung M 1:100

Plan zur Veranschaulichung bestimmter Angaben über Umfänge, Sorten, Vorklärungen, Erträge, Bedürfnisse, Mengen, etc. mit dem gesamten Stand anzuwenden.

LGA

Summary

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2	6	1	5	1	1

ANNEX IV

Details of Edge Banding Machine

Equip.	Description
	1. Specifications:
1.1	Suitable for solid lippings, veneer and plastic edges
1.2	Working length: upto 2000-2500 mm
1.3	Panel thickness: upto 50 mm
1.4	Solid lipping thickness: upto 25 mm
1.5	Edge pressure applied by a pneumatic pressure bar
1.6	Pre-heating attachment for solid lippings
1.7	Pressure bar with adjustable angle to accomodate solid lippings with inclined edge.
	2. Typical equipment
	Supplier: Stegherr (F.R.G.), Mod. Kpp
	Address: Stehgerr Maschinenbau GmbH & Co. KG;
	Bahnweg 1-5; Postfach 246; D-8413 Regenstauf;
	Federal Republic of Germany; Tel.: (09402) 8081/82; Telex 652627

Edge bander

