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Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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UNITED NATIONS
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PROSPECTS FOR INTEGRATION IN THE WOODWORKING INDUSTRY OF THE CARIBBEAN COMMUNITY

UC/CAR/86/201

Technical report: The situation in Trinidad and Tobago*

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 the 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 Trinidad and Tobago:

Trinidad and Tobago Industrial Development Corporation (TTIDC), Port of Spain

1.6 UNIDO Backstopping officer:

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

1.7 Period of mission in Trinidad and Tobago:

29 March to 3 April and 24 to 27 May 1987

1.8 Terms of reference:

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

1.9 Main activities:

(a) Visits to selected furniture plants;
(b) Review of shipping links with Belize, Dominica and Guyana;
(c) Review of lumber import trends;
(d) Review of local forest resources data and lumber production trends;
(e) Providing lumber importers and furniture manufacturers with lumber export contacts in Guyana and Belize;
(f) Reporting to the Guyana Forestry Commission and the Belize Forestry Department on lumber requirements of Trinidad'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 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 Trinidad and Tobago.

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; and

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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. IC/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

About 58 percent of Trinidad's total land area consists of woodland. Commercial forests cover about 202,000 hectares and include over 100 timber species. Plantation forests cover 16,000 hectares with Teak and Pine species first planted in 1913 and 1950, respectively.

Only about 8 to 10 percent of Trinidad's total annual lumber consumption is met by local production whose output dropped from 33,000 m^3 (14 million BM) in 1980 to 18,000 m^3 (7.6 million BM) in 1985. Trinidad is the largest lumber importing country in CARICOM. It imported 154,309 m^3 (65.4 million BM) lumber in 1985 of which 90 percent from sources outside CARICOM, mainly Honduras, USA, Brazil and the USSR, in that order.

The bulk of lumber imports consists of Pine, with Pitch Pine representing about 90 percent of the timber used in construction, while Brazilian Mahogany is the predominant species in furniture manufacture.

Of the existing 63 sawmills only about 50 percent are in operation due to logging problems and the stiff competition of imported lumber. The Government owns the largest forest industry enterprise in the country, TANTEAK[2/], ranging from logging to sawmilling and secondary wood processing. TANTEAK is also the most integrated woodworking company in CARICOM.

The furniture industry consists of a large number of small workshops and some of the largest and most modern furniture manufacturing plants in CARICOM, which emerged during the oil-boom period of the 1970's. The latter have been hardest hit by the current economic recession. Most of the small furniture and joinery workshops, however, operate at a low level of efficiency due to the lack of modern wood jointing machinery and basic tool maintenance equipment.

The increased price and scarcity of supply of Brazilian Mahogany opens the way to imports of furniture lumber from CARICOM sources. A specific interest was expressed by both lumber importers and furniture manufacturers in importing Hububalli and Mahogany substitutes (Determa and Crabwood) from Guyana as well as Santa Maria from Belize and, possibly Gommier from Dominica (see timber species properties in Annex II).

On the other hand, the chances of reviving the furniture import flow from CARICOM sources such as Barbados and Jamaica are very slim due to heavy non-tariff barriers introduced to protect the local furniture industry, which apply both to finished furniture and furniture parts.

2/ Trinidad and Tobago Forest Products Co. Ltd.

The following recommendations are made towards promoting the efficiency of the furniture/joinery industry and the importation of furniture-type lumber from CARICOM sources:

(a) The major furniture manufacturers should study with the Guyana Forestry Commission the possibility of importing regularly from Guyana a volume of lumber large enough to meet their requirements as a group, so as to cut down lumber cost to the end users and facilitate shipping arrangements.

(b) The Specialist Furniture Ltd. should be provided with the necessary incentives on the part of the Trinidad and Tobago Industrial Development Corporation (TTIDC) to set up a tool maintenance servicing centre in order to extend the serviceable life of expensive imported cutting tools, such as carbide-tipped circular saw blades, in use in the industry[3/]. A draft project document is provided in this respect in Annex III.

(c) The small scale furniture/joinery industry should endeavour to introduce modern wood-jointing methods so as to ensure interchangeability of parts and attain a higher operative efficiency. Reference in this respect is provided in the ad hoc report no. IO/R. 53 prepared by the consultant and dealing with the selection of woodworking equipment for the small scale furniture and joinery industry.

3. Forest Resources

About 58 per cent of Trinidad's total land area consist of woodlands covering some 299,000 hectares. Commercial forests cover about 202,000 hectares, most of which is state-owned. The forests comprise over 100 species of timber with an estimated total volume of approximately 21.3 million m3. The exploitable volume is estimated to be about 9.8 million m3 or 46 per cent of the total.

Plantation forests include 10,526 hectares of teak and 6,092 hectares of Caribbean Pine. The annual sustainable harvest of Teak has been assessed to be in the region of 6 million BM (14,157 m3) including thinnings and mature trees. The Teak species (Tectona grandis) was first imported from Burma in 1913. Pine was first planted in 1950 and planting is continuing at the rate of approximately 242 hectares per year.

The main local species, according to volume and function of exploitable girth limit, are as follows:

- Mora;
- Hog Plum;
- Mahoe;
- Olivier (white and yellow), and
- Gommier.

3/ The selection of the equipment for the maintenance centre is provided in the following ad hoc report prepared by the consultant: Guidelines in the selection of woodworking equipment for the small scale furniture/joinery industry in the Caribbean Community. (report reference no. IO/R. 53).

4. Sawmilling Industry

There are 63 registered sawmills in the country with a total annual output of about 5 million BM (11,800 m^3). Of the total number of existing sawmills, less than 50 per cent are presently in operation. As shown in the table below, the volume of local lumber production has steadily decreased since 1980.

Table 1: Trinidad Lumber Production Trend, 1980-1985

Year	Lumber volume produced
1980	33,189 m3 (14 mil BM)
1981	30,723 m3 (13 mil BM)
1982	27,889 m3 (11.8 mil BM)
1983	27,000 m3* (11.4 mil BM)
1984	21,000 m3* (8.9 mil BM)
1985	18,000 m3* (7.6 mil BM)

Source: Industrial Development Corporation
*Estimated by Forestry Division

Lack of logging roads and difficult logging terrain are given as reasons for the decline in lumber production. A main factor is also the very competitive price of pine lumber imported from the United States and Honduras which has coaxed sawmillers into becoming lumber importers. However, the Forestry Division feels confident that steps can be taken leading to a higher degree of self-sufficiency in forest products within the next ten years and, in particular, to increased import substitution of Pine and Mahogany.

Most of the sawmills are equipped with bandsawing equipment and operate on a labour intensive basis which latter factor contributes to high operating costs, since Trinidad pays the highest wage rates in the region.

The Government of Trinidad and Tobago operates a large integrated woodworking complex (probably the largest of its kind in CARICOM): the Trinidad and Tobago Forest Products Company Ltd. (TANTEAK) having as objectives the harvesting of Teak and Pinewood timber grown on State-owned plantations and process it into wood products which are then marketed by the Company. TANTEAK also carries out thinning in the Teak plantations.

Established in 1978, the Company commenced its sawmill operation in 1982 to convert smaller size thinnings into lumber primarily for local consumption. In 1984 it began developing its woodworking complex aimed at producing finished wood products. TANTEAK's current range of products include: poles, split fencing, sawn wood, panelling, flooring boards, handrails, mouldings, pre-fab building components, joinery products and furniture. The Company employs a staff of 184 and attained a sales income of nearly TT$ 8[4/] million in 1986. Its total lumber production in 1986 was about 1.2 million BM (2,800 m3) down from 1.55 million BM (3,500 m3) in 1983.

TANTEAK has to date been utilizing only the small and medium sized thinnings from the Teak plantations. Only minor volumes of high grade Teak lumber are produced at present and nearly all are exported.

4/ At the time of the mission the exchange rate for US$ 1 was TT$ 3.60.

Both the planing mill and the furniture workshop of TANTEAK were visited in the course of the mission. The mill is equipped with heavy-duty modern moulders. The performance of the mill could be improved by utilizing solid cutters instead of traditional profiles for the production of standard moulding work such as panelling, flooring boards, etc.

The furniture-making workshop annexed to the planing mill is equipped only with basic machinery. It produces simple types of household furniture but has yet to introduce serial production. In view of its development scope, TANTEAK could introduce in its furniture/joinery workshop for demonstration and training purposes, critical items of second-generation wood jointing equipment and of industrial-type multi-purpose machines suitable for the small-scale woodworking industry. This could also apply to the introduction of basic but efficient tool maintenance equipment.

5. Lumber Consumption and Imports

Local production of sawn lumber accounts for approximately 8 to 10 per cent of the total lumber consumption, which amounted in 1985 to 73 million BM (172,309 m^3), a figure including both sawn lumber and dressed lumber.

An amount of 65.4 million BM (154,309 m3) of lumber, worth TT$ 81.9 million, was imported in 1985. Over 90 per cent of the lumber imported was supplied from outside the CARICOM Region, resulting in a considerable drain on the country's foreign exchange resources. As a reflection of Trinidad's general economic downtrend, a considerable decline has occurred in lumber imports since 1983 when a record of 99 million BM (467,192 m3) lumber was imported.

Imports of coniferous species have consistently accounted for the major share in lumber imports, whereas Mahogany has remained the main non-coniferous imported species. Trends in lumber imports in the period 1981-1985 are shown in table 2 below.

Table 2: Trinidad and Tobago Lumber Imports Trends, 1981-1985, Quantities and Species

Quantities in m3

	1981	1982	1983	1984	1985
Coniferous	44,701	109,267	380 928	187,227	112,808
Mahogany	2,691	3,904	3,044	3,505	2,256
Greenheart*	1,268	507	294	167	128
Cedar	530	737	822	295	106
Mora				1,597	
Other species	51,628	50,531	82,104	76,077	39,011
m^3	200,818	164,946	467,192	287,253	154,309
Totals BM	85 mil	69.9 mil	1.98 mil	1.2 mil	65.4 mil

Source: Trinidad Customs Records
*Figures from Guyana Forestry Commission

Records for 1985 show that lumber imports of CARICOM origin amount to 5.3 million BM (12, 480 m3) consisting of Caribbean Pine and other species from Belize (87.7 per cent) and the rest from Guyana (3.3 million BM or 779 m3). However, no lumber exports to Trinidad are listed on the 1985 Belize Customs Records. The main sources of lumber imports in 1985 were as follows:

		BM	m3
(a)	Honduras	30.4 million	71,664
(b)	USA	18.5 "	43,614
(c)	Canada	9.8 "	23,111
(d)	Belize	9.9 "	11,701
(e)	Brazil	1.2 "	2,976

The bulk of lumber imports (69 per cent of total in 1985) consists of lumber either dressed or processed in the form of tongue-and-grooved boards for the building construction sector, which utilizes about 80 per cent of imported coniferous lumber. Pitch Pine represents 90 per cent of the timber used in construction.

The main local timber species utilized in furniture manufacture are Teakwood, Crabwood, Mahogany, Cedar and, to a limited extent, Pine.

6. Timber Prices, Import Duty and Landing Charges

		Retail Prices	
		TT$	US$
A	Imported Lumber		
	- Mahogany	6.00 to 6.95	1.66 to 1.93
	- Pine (CIF)	1.60 to 1.80	0.44 to 0.50
B	Local Lumber		
	- Mahogany	4.50 to 5.00	1.25 to 1.38
	- Crabwood and Cedar	2.00 to 2.50	0.55 to 0.69
	- Teakwood	5.00 to 8.00	1.38 to 2.22

The duty on lumber from non-CARICOM sources is TT$ 1.27 per cubic metre. In addition, there is a 20 per cent upliftment tax payable on all lumber imports plus a 10 per cent purchase tax.

The L.S.D. landing charges at Port-of-Spain are US$ 500 per 20 ft. container or US$ 25 per metric ton (for break-bulk cargos).

7. Furniture Imports

During the boom years, furniture imports accounted for one-third of the total furniture market, estimated at US$ 60 million in 1982. Imports began to drop dramatically in 1984 - a trend which is still continuing. The hardest hit of the CARICOM furniture suppliers are Barbados - the main Caribbean source - and Jamaica. The furniture import trends for the period 1983-1985 are shown in the following table:

Table 3: Trinidad and Tobago Wooden Furniture Imports, 1983-1985

Main Countries of Origin	1983		1985	
	Pieces	TT$	Pieces	TT$
Barbados	477,853	10,107,690	26,015	759,010
Taiwan Province	436,915	5,760,432	72,990	1,267,637
Jamaica	197,574	5,528,599	88,227	1,028,126
USA	318,594	4,082,513	62,190	829,458
Antigua	49,378	765,526	4,542	74,004
Guyana	59,020	555,179	14,964	259,092
Hong Kong	16,530	258,545	11,805	115,356
UK	1,831	68,998	3,778	95,907
Canada	76	39,501	23,790	137,690
Italy	66	4,970	14,787	588,513
Total Imports	1.6 mn	28.3 mn	0.3 mn	5.2 mn

Source: Trinidad and Tobago Customs Records

8. Shipping Links

(a) Belize to Trinidad

(i) Three times per month service Belize-Trinidad through Puerto Rico by the Harrison Line (Agents in Trinidad: Huggins Services Ltd.).

(ii) Weekly service (12 days voyage) Belize-Trinidad through West Palm Beach, by Tropical Shipping Ltd. Freight charges (including loading of containers at ship side): US$ 3,062 per 40 ft. container of 65 m3 capacity (27,547 BM).

(b) Dominica to Trinidad

- Service of 7 days frequency by RO/RO Vessel (loading either container or flat bed trailers) by the Trailer Transport (TMT). Freight charges (including loading and unloading costs): US$ 1,575 and US$ 2,150 for 20 and 40 ft. containers, respectively.

(c) Guyana to Trinidad

i Twice a month service by WISCO. Freight charges:
- for 20 ft. container US$ 1,650, including basic rate (US$ 1,100); Guyana handling (US$ 175) and destination L.S.D. (US$ 375);
- for break-bulk cargoes US$ 110.00 per metric ton, including basic rate (US$ 75); Guyana handling (US$ 10) and destination L.S.D. (US$ 25);

ii Monthly service by vessels EDAM and SEATRE handled by the Guyana National Shipping Corporation (GNSC).

iii Non-regular tramp boat services normally employed by the Forestry Commission to ship lumber to CARICOM destinations. Boat capacity is 300 to 600 tons. Lumber shipped in bundles. Freight charges: US$ 78.70 (basic rate not including loading and unloading charges).

9. The Furniture Industry

The furniture industry in Trinidad and Tobago consists of a large number of small workshops and a few highly mechanized plants. Prior to the economic recession, the sector provided employment to a total of 800 workers (1981 statistics).

The following furniture plants were visited in the course of the mission:

- Bell Furniture Industries Ltd.
- Davis Furniture Mfg. Ltd.
- Horizon Products Ltd.
- Specialist Furniture Ltd.
- TANTEAK
- Unit Furniture Store
- Woodworking Industries Ltd.

The upper end of the sector developed in the later years of the economic boom aiming at substituting the considerable volume of imported furniture with local products. The more modern plants are equipped with up-to-date automatic equipment and rank amongst the most advanced in the Region.

The small workshops visited by the Consultant averaged 10 to 15 workers and were equipped with an adequate range of basic woodworking equipment extending to stroke belt sanders and provided with sprayroom facilities. One of the sprayrooms visited was equipped with exhaust-filter panels. Invariably, however, the small plants were producing tenon joints by using circular saw benches. Mortises were produced by chain or square-chisel mortising machines. The use of circular saws for producing tenons makes it difficult to attain dimensional precision of joints which are essential for interchangeability of parts in the assembly of furniture.

On the other hand, the larger plants visited were equipped with round-end tenoners of the European type which would produce four-side-shoulder tenons in one single operation. The mortised part of the joint was machined in one operation on automatic slot-mortice machines. These plants were also utilizing the dowel joining technique using automatic boring machines.

Among other sophisticated machinery seen in operation in the larger plants were the "HELMA"-type double automatic shaper; the more sophisticated "Balestrini"-type of automatic double-side automatic shaper; automatic routers and the high-capacity "GIBEN"-type automatic panel saw .

A major drawback observed in the operation of the smaller plants was the lack of simple inexpensive equipment for the proper sharpening of cutting tools. Even larger plants lacked a comprehensive range of tool maintenance equipment. A common problem observed in both small and large plants was the lack of easy-to-maintain profile cutters for standard moulding work.

None of the plants visited were equipped with kiln drying facilities. In recognition of this problem, the Industrial Development Corporation has undertaken to construct a prototype solar kiln in cooperation with the Caribbean Industrial Research Institute (CARIRI) and the Forestry Division. It would be desirable in this respect that the experience gained by the Guyana Forestry Commission in establishing a solar kiln, with assistance from UNIDO, be shared by the Industry in Trinidad and Tobago.

Both small and large furniture plants offer a range of standard furniture designs. However, only two larger plants, the Specialist Furniture Ltd. and the Horizon Products Ltd. would normally produce standard components for stock to cover in advance one or two months of sales requirements. The current difficulty in predicting well in advance the market requirements for given furniture ranges is partly due to the serious decline in demand for consumer goods.

As a result of the negative overall economic trends, the output of the furniture manufacturing sector has decreased by as much as 40 to 60 per cent since 1983, causing a drastic reduction in employment and the closing-down of several plants. Hardest hit have been the larger operations, whereas the smaller plants have shown more resilience in the wake of recession. By having to cut down on quantities of pieces produced in each production batch, the larger plants stand to lose much from the benefits of serial production.

The most popular furniture style is the colonial type featuring an extensive use of turnings and spindles. However, because of the decreased purchasing power of end-users, simpler lower-cost furniture is now being developed. A particularly interesting design has been developed in this respect by Bell Furniture. It consists of living room chairs made of straight components with a simple decorative feature recessed by a routing operation.

Locally produced furniture is made from imported and local Mahogany as well as local species such as Crabwood, Cedar and Teakwood. Of late, however, two of the larger plants have introduced the use of Mahogany-veneered panels of Medium Density Fibreboard (MDF) imported from New Zealand, to serve as a substitute to solid Mahogany in applications such as table tops and case-wood panels. The Specialist Furniture Plant has achieved a remarkable quality of finish in the processing of this panel material which, unlike particle board, requires no edge treatment and offers machining workability similar to that of solid wood.

10. Selected Technical Assistance Requirements of the Furniture/Joinery Industry

(a) Selection of modern woodworking equipment for the small scale furniture/joinery industry to include: multi-boring machines, round-end tenoners and heavy-duty multi-purpose machines.5/

(b) Selection of tool maintenance equipment for the establishment of a Tool Maintenance Centre by the Specialist Furniture Ltd.5/

11. Lumber Import Potential from CARICOM Sources

The increased price and the scarcity of supply of Brazilian Mahogany provides a major opportunity for increased lumber imports from CARICOM sources such as Guyana, Dominica and Belize.

A keen interest was identified during the mission on the part of both furniture manufacturers and lumber importers in the introduction in the market of the following species from Guyana:

(a) Hububalli
(b) Determa
(c) Crabwood (to be dried to 20% MC prior to shipment)
(d) Kereti Silverballi
(e) Simarupa

Hububalli seems to have the largest potential as a furniture timber and is seen as an attractive alternative to local Teakwood on account of its pronounced decorative grain and apparent ease of finish.

Determa and Crabwood are seen as possible alternatives to Brazilian Mahogany. Kereti Silverballi and Simarupa were considered by a major lumber importer, Dansteel Ltd., as possible alternatives to White Pine.

Practically all furniture manufacturers rejected the possibility of a wide use of Purpleheart as a furniture timber due to its hardness and resulting machining difficulties, such as abnormal wear of cutting tools. However, limited quantities of Purpleheart spindles have been imported for use in staircase handrails. The possibility should be advertised to furniture manufacturers of producing knock-down bookshelves incorporating Purpleheart spindles - which are easy to machine - and shelf panels made of species of contrasting colour, such as local Pine.

5/ Equipment specification in this respect are provided in a 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).

12. Specific Requests for Lumber Quotations and Samples

(a) Requirements by Specialist Furniture Ltd
(Furniture Manufacturer)
Lot 26A, O'Meara Industrial Estate,
Arima, Trinidad. Tel: 642-3183
Cable: SPECFUR

CIF quotations are required as follows:

Equal interest was expressed in the utilization of Santa Maria species from Belize and Gommier from Dominica as possible substitutes to Mahogany. Properties of selected furniture-type species available from Guyana, Belize and Dominica are given in Annex II.

Determa, Crabwood, Hububalli, Simarupa and Kereti Silverballi species:
- thickness range: 7/8", 1", 1 1/2", 2"
- squares: 3" x 3" and 4" x 4"
- width range: 8", 10" and 12"
- lengths: random starting from 6'
- moisture content: 12 to 15 per cent
- grade: No. 1 Common and Better
- quantity: 150,000 BM (354 m3)

(b) Requirements by Dansteel Ltd.
(Lumber Importers)
2 and 1/2 Miles South Trunk Road
La Romain, via San Fernando, Trinidad
Tel: 652-8562 Telex: 3233" DANSTEL WG

A CIF quotation is required as follows:
- Species: Simarupa and Kereti Silverballi (as possible substitutes to White Pine);
- should quote both rough and dressed lumber
- thickness range: 7/8", 1", 1 1/2", 2"
- squares: 3" x 3" and 4" x 4"
- random widths
- random lengths 6'and up
- moisture content: 12 to 15%
- grade: No. 1 Common

(c) Requirements by Bwagwansingh's Ltd.
(Lumber Importers)
1 Development Circular Road, Beetham Highway,
Sea Lots, Port-of-Spain, Trinidad, W.I.
Telephone: 62-36731

A CIF quotation is required as follows:
- species: Determa and Crabwood
- specifications: Same as for Furniture's requirements listed under (a) above.

(d) Requirements- by Trans Antilles Agencies (Lumber Importers)
P.O. Box 1176, Trinidad
Telephone: 642-4404

A CIF quotation is required as follows:
- species: Determa in rough lumber form
- thickness: 1", 1 and 1/2", 2"
- squares: 3" x 3" and 4" x 4"
- width: 8" and up
- length: 6" and up
- quantity: 50,000 BM (117 m^3)

13. Potential Import of Furniture and Furniture Parts

Despite the trade imbalance between Guyana and Trinidad and Tobago, Trinidad's current Government policy prevents the imports of finished wooden furniture from CARICOM sources through non-tariff barriers. In fact, furniture is listed among the products in the import "Negative List". Moreover, during discussions at the Industrial Development Corporation (IDC) it emerged that the Government would equally discourage the imports of furniture parts for assembly in Trinidad, as this would deprive the local furniture industry value-added opportunities in a situation of drastic decline in the capacity utilization of the sector.

The Government would give favourable consideration to the importation of furniture stock - that is, of furniture parts dried, planed and trimmed to rough sizes - for further processing in Trinidad, as this would avoid incurring wastage normally associated with processing of rough lumber. However, of all the furniture manufacturers contacted, only one - the Specialist Furniture Ltd. - expressed interest in importing dimension stock, on the longer term.

ANNEX I

Persons Met

Ms. A. Abu Bakr	Manager, Promotion Division, Trinidad and Tobago Industrial Development Corporation (TTIDC), 10 Independence Square, Port Of Spain
Mr. M. Moniquette	Director, Economic Studies and Planning Division, TTIDC
Mr. D. Nicholson	Business Development Assistant, Promotion Division, TTIDC
Ms. S. Dardaine	Deputy Conservator of Forests, Forestry Division, P.O. Bag 30, St. James, Port of Spain, Trinidad
Mr. N. Lackhan	Director, Northern Range Reafforestation Project, Forestry Division
Mr. I. Younglao	General Manager, Trinidad and Tobago Forest Products Co. Ltd., Connector Road, Carlsen Field, Port of Spain, Trinidad
Mr. R. Belfonte	Managing Director, Specialists Furniture Ltd., Lot 26A, O'Meara Industrial Estate, Arima
Mr. R. Segobin	Managing Director, Horizon Products Ltd. (furniture factory), 4 La Croix Road, Malabar, Arima
Mr. F. Melville	Managing Director, Woodworking Industries Ltd. Lot 19 B O'Meara Industrial Estate, Arima
Mr. C. Thomas	Managing Director, Bell Furniture (Ansa Group), Lot 8 Trinity Industrial Estate, Macoya
Mr. S. Davis	Managing Director, Davis Furniture Manufacturing Ltd., Guapo Road, Fyzabad
Mr. A. M. Sampat	Managing Director, Flush Door Factory, Eastern Main Road, Mt. Hope, Port of Spain
Mr. L. S. Herbert 6/	Secretary, Trinidad Lumber Association, P.O.Box 1176, Port of Spain

6/ Also Managing Director of Trans Antilles Agencies (lumber importers).

Mr. K. E. Dukhie	General Manager, Care Farm Sawmill, Lumber Dealers, Sewcherran St., Tacarigua
Mr. M. Seukeran	Managing Director, Hardwoods (1985) Ltd. Sawmill, 2 Union Road Cross Crossing, San Fernando
Mr. K. Baksh	Proprietor, Mount Hope Sawmill
Mr. R. Singh	Marketing Manager, West Indies Shipping Corporation, 48-50 Sackville Street, Port of Spain
Mr. C. Edghill	Manager, Shipping Department, Huggings Services Ltd., 72-74 South Quay Port of Spain
Mr. W. M. Barne	Owner's Representative, Harrison Line, 72-74 South Quay, Port of Spain
Mr. E. Arneaud	General Manager, The Shipping Corp. of Trinidad and Tobago Ltd., P.O.Box 852, Port of Spain
Mr. D. Mahabir	Assistant Managing Director, Dansteel Lumber Importer Ltd., 2 1/2 miles South Trunk Road, La Romain, via San Fernando
Mr. H. Bhagwansingh	Managing Director, Bhagwansingh Lumber Importer, 1 Development Circular Road, Beetham Highway, Sea Lots, Port of Spain

ANNEX II

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

Contents

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.). Density about 610 kg/m^3 (39 lb/ft^3) 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. Density varies from 910 to 1000 kg/m^3 (57-62 lb/ft^3) 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:	Wana, Grignon Franc, Red Louro
Wood appearance:	Pale reddish-brown with subdued goldeon 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 density about 620 kg/m^3 (39 lb/ft^3). 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 (keel frame, planking and decking); carriage and waggon 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.

Source: Guyana Forestry Commission.

4. Hububalli

Scientific name:	Loxopterygium sagotii (family: Anacardiaceae)
A.T.I.B.T. Standard name:	Slangenhout
Other names:	Koika, Onotillo, Kooel 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:	Density about 800 kgs/m^3 (50 lb/ft^3). 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 durabilitiy:	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.

Source: Guyana Forestry Commission.

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. Density 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 (242,000 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 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.

Source: Guyana Forestry Commission

6. Silverballi (Group)

Family: Lauraceae

Scientific names:
Brown Silverballi (Canella): Licaria canella
Kereti Silverballi: Ocotea puberula, Ocotea wachenheimii. Ocotea oblonga
Kurahara: Ocotea glomerata
Swizzlestick: Ocotea schomburgkiana
White Silverballi: Ocotea canaliculata
Yellow Silverballi: Aniba ovalifolia

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

Other names: Pisie, Caralou, Canelo, Louro Branco, Inamui, Preto

Wood appearance: In Guyana the Silverballi group is divided into 'hard' and 'soft', with the dividing line being put at an air dry density 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.

Physical and mechanical properties: The 'hard' Silverballi is rather light to heavy with densities above 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.

Natural durability: Moderately resistant to insects and decay, but susceptible to termites. Highly resistant marine borers. Difficult to impregnate.

Timber processing: Drying: kiln schedule G. Silverballi air dries well with little degrade.

Working: saws well and works easily.

Assembly: holds nails, screws and glue well.

Finishing: 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.

Source: Guyana Forestry Commission.

7. Simarupa

Scientific name:	Simaruba amara (family: Simarubaceae)
A.T.I.B.T. Standard name:	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. Density about 430 kg/m^3 (27 lb/ft^3) 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. Timber converted while still green 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

Names	Trade name: Santa Maria Botanical name: Calophyllum brasiliense var. rekoi Standley Guttiferae Local name: Santa Maria, Leche Maria, Jacareuba (Brazil).
Range	Mexico to Brazil and through the West Indies.
Description of Wood:	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.
Physical properties	Density: 540-715 kg/m^3 (34-45 lb per cubic foot) 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 of 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 necessitating 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: Material from the major test was tried by woodworking firms.

(a) Veneer and plywood: 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 British Commonwealth 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 alorg 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/m^3 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.

Source: Timbers of the World, Central America and the Caribbean, 1979, TRADA, UK.

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 Sawmill, Palm Tree, Woodford Hill, Dominica, Tel.: (809)449-7042
	Mr. D. Southwell, Managing Director, Dominica Timbers Ltd., (Portsmouth) Sawmill, P. O. Box 198, Roseau, Dominica

ANNEX III

Draft project document

Country: Trinidad and Tobago

Title of the project:	Assistance to the specialist Furniture Ltd. in setting up a tool maintenance servicing centre.
Company address and contact:	Specialist Furniture Ltd., Lot 26 A O'Meara Industrial Estate, Arima, Trinidad, West Indies, Cable SPECFUR, Tel.: 642 3183 (Mr. Romeo Belfonte, Managing Director)
Government implementing agency:	Trinidad and Tobago Industrial Development Corporation; 10-12 Independence Square, Port of Spain, Trinidad and Tobago, Tel.: 62-37291; Tlx: 22255 TTIDC WG
Executing Agency	United Nations Industrial Development Organization (UNIDO)
Duration	3 months
Estimated starting date:	
External inputs	US$ 25,000
Government inputs	In kind.

PART I LEGAL CONTEXT

To be indicated in final project document.

PART II THE PROJECT

PART II A - Development objective

To promote the operative efficiency of the furniture and joinery industry in Trinidad and Tobago.

PART II B - Immediate objective

To enable the specialist Furniture Ltd. to provide tool maintenance services to Trinidad's furniture and joinery industry.

PART II C - Background and justification

The furniture industry in Trinidad and Tobago consists of a large number of small workshops and a few highly modernized plants. Prior to the economic recession the sector provided employment to a total of about 800 workers. However, as a result of the post oil-boom economic down trend the output of the sector has decreased by as much as 40 to 60 percent since 1983 causing a drastic reduction in employment and the closing down of several plants. Hardest hit have been the larger operations whereas the smaller plants have shown more resilience in the wake of the recession.

Reduced outputs and swindling profits have driven home to the industry the need for improved efficiency and reduced operating costs. An awareness has developed in this respect towards the introduction of rational maintenance methods. In fact most small and medium woodworking plants and even some of the larger factories share the problem of lacking in appropriate tool-maintenance equipment. This results in greatly reduced serviceable life of expensive cutting tools, such as carbide tipped circular saws, and contributes to defective quality of processed parts.

One of Trinidad's leading furniture manufacturers, the Specialist Furniture Ltd. has expressed keen interest in upgrading its own tool maintenance workshop and setting up a tool maintenance servicing centre for the benefit of Trinidad's other furniture/joinery plants as well.

This project proposes to provide the necessary know-how with respect to the establishment of the Centre.

PART II D - Outputs

1. The tool maintenance equipment purchased for the tool maintenance servicing centre commissioned and operational; and
2. Three technicians trained in the operation of the equipment.

PART II E - Activities

1. Preparation of plant layout of the Maintenance Centre;
2. Supervision of the installation and trial operation of the equipment.

3. Calculation of appropriate servicing charges for standard maintenance work;
4. setting up a simplified costing system to monitor the Centre's expenditure and income; and
5. Training in the operation of the equipment in the process of providing maintenance services.

PART II F - Inputs

		man/months	US$
1.	External inputs		
11-01	Tool maintenance expert (split mission)	3	24.000
51-00	Miscellaneous expenses		1.000
	total external inputs		25.000

2. Government inputs

2.1 Local transport
2.2 Secreterial services
2.3 Counterparts

3. Inputs by Furniture Woodworking Ltd.
Cost of the tool maintenance equipment
Cost of auxilliary equipment consumed

PART II G - Related activities

1. Selection of tool maintenance equipment

The selection of the equipment is provided in the ad hoc report prepared under the UNIDO project UC/CAR/86/201 and entitled Guidelines on the selection of woodworking equipment for the small scale furniture/joinery industry in the Caribbean Community (report reference no. IO/R.53).

Prior obligations

The equipment must be purchased before the final approval of this technical assistance project.