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ASSISTANCE TO ARTEPRATICO FURNITURE FACTORY

SI/ECU/85/802

ECUADOR

Terminal report*

Prepared for the Government of Ecuador
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Desmond P. Cody, furniture marketing
and production consultant

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United Nations Industrial Development Organization
Vienna

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NOTES

Reference to dollars are to United States Dollars unless otherwise stated.

The monetary unit in Ecuador is the Sucre. During the period covered by this report the official value of the Sucre in relation to the United States Dollar was \$ 1 = S/. 140.

The following abbreviations and symbols are used in this report:

AIMA	Asociación de Industriales Madereros
CIF	Carriage, insurance and freight
FIRA	Furniture Industry Research Association
KD	Knock-down
MC	Moisture content
NC	Nitrocellulose
SA	Self-assembly

ABSTRACT

This report contains a description of selected furniture plants in Quito, Ecuador, together with an assessment of their potential. It also sets out some of the criteria by which it should be developed in the future with particular reference to exports. Further technical assistance is recommended with the help of the United Nations Industrial Development Organization.

Problem areas and shortcomings are identified which must be dealt with as a matter of urgency. Those refer in particular to marketing, product design, production management expertise, raw materials procurement, production technology productivity and quality control.

Reference is also made to the need for further formal training in production and marketing management.

The recommendations arrived at in respect of the foregoing are incorporated in the text and are also summarised in the chapter dealing with conclusions and recommendations.

TABLE OF CONTENTS

I	Introduction	1
II	Findings	3
	A. Background of enterprises	3
	B. Personnel aspect	3
	C. Products characteristics	4
	D. Raw materials supply	8
	E. Manufacturing	12
	F. Management and labour	15
	G. Quality standards	18
	H. Export marketing of furnitures	22
	I. Follow-up action	28
III	Conclusions and Recommendations	38
	A. Conclusions	38
	B. Recommendations	39
	Annexes	44
	Annex I: Enterprises and other Organizations that co- operated with the Con- sultant	44
	Annex II: Individual Enterprise Summary Reports and Recommendations	46

INTRODUCTION

This report is concerned with an assessment of the current management and manufacturing status of selected furniture enterprises located in the Quito region, with particular reference to their export potential. It came about as a result of the consultant's short-term availability, having earlier completed an assignment with another Ecuadorian enterprise located in Cuenca.

The project began on 18th. October 1986 and ended on 7th. November 1986, during which time an in-depth assessment of each of seven furniture enterprises was carried out with the objective of identifying their strengths and weaknesses in respect of export development and preparing a comprehensive technical development program which would enable them to establish and maintain meaningful export activities.

During the course of the assignment, some ad hoc consultancy was conducted at individual plant level and discussions were held with the relevant manufacturing organization, namely, Asociación de Industriales Madereros (AIMA) whose Executive Director, Ing. Jorge Barba selected the enterprises and arranged for all factory visits.

The enterprises and other organizations that co-operated with the consultant in his field of work or participated directly in the project are listed in Annex I.

Annex II contains brief individual reports on each of the enterprises that participated in the project.

On the afternoons of November 4 and 5, the consultant presented his findings at a seminar of furniture manufacturers which was organized by AIMA.

II. FINDINGS

A. Background of enterprises

All seven firms are located well within the Quito urban area and are therefore close to their most important domestic market. There is a good road system to the main containerised shipping port of Guayaquil.

Infrastructural facilities in respect of power supply, telephone, telegraph, telex and road connections are reasonably satisfactory.

All the firms are well established being aged between 2 and 18 years. They are all private limited companies and are engaged in both the manufacturing and retailing of furniture. Two enterprises, Maestro S.A. and Ligna S.A. are members of larger manufacturing conglomerates which include the production of plywood and particle board. They also provide marketing and financial services. The seven furniture plants have recently formed a consortium with the objective of co-operating in the production and marketing of ranges of furniture which would be suitable for export to the United States.

B. Personnel aspect.

Employment in the various enterprises ranges between 33 and 140 persons so that even the smallest is reasonably large by

international standards. Male employees predominate but in one factory there is a large number of female workers who engage in production work similar to their male counterparts.

Most of the top administrative and production management personnel have received third level education as engineers, architects and accountants, but only one has trained specifically in respect of the furniture industry as a production manager. Production workers have usually attained a primary school level of education and if they have attended a Technical Institute would have received elementary training in woodworking and woodcutting machining. This, however, is the exception rather than the rule. There is some technical training provided during the period of "learnership" or Apprenticeship for first-time employees but this is only availed of by a few manufacturers. Most say they provide "on the job" training but it is at best informal and haphazard.

Enterprises work a 40 hour, 5-day week with up to 10 hours overtime on occasion. There are two weeks annual holidays and about 6 national holidays. Gross Annual wages vary in accordance with the number of hours of overtime worked but usually average out at between US \$2,000 and \$2,500. There are many strict government labour laws in respect of conditions of employment and employee participation in the sharing of company profitability. Some factories occasionally employ contractual workers who may be paid on a piece rate basis. There are also some incentive bonus schemes in operation.

C. Product characteristics

The products manufactured by the seven enterprises may be classified as follows:

- a) Solid wood items e.g. chairs and table frames, bed-heads;
- b) Case goods e.g. storage units incorporating drawers, doors and shelves for bedroom, living room, dining-room and kitchen
- c) Panels for bed-ends and table tops;
- d) Semi-upholstered and fully upholstered seating and;
- e) Office, school and hotel furniture.

There is some degree of specialization particularly in chair and panel-based production but there is little attempt to produce ranges with a high degree of component or element interchangeability. Part of the reason for this is the predominance of "styled" furniture which may be described as a combination of traditional Ecuadorean and French Provincial styles incorporating decorative mouldings and in some instances, delicate wood carvings. One firm specializes in the production of English Regency styled furniture. Two firms produce modern type furniture based on veneered and edge-treated plywood and particle-board.

Designs are not in any way exceptional and have few discernable features which would set them apart in international markets from similar type products from, for example, the Province of Taiwan and other large exporting countries, especially to the United States. Quality of the end-product was found to vary from the excellent to the indifferent. In the case of styled furniture, many items, especially dining-room chairs were found to be too bulky and to have lost much of the delicate and finely executed features of the originals.

The lack of a distinguishable product stems mainly from the absence in Ecuador of creative and experienced designers who fully understand the place and function of design in relation to furniture. To be effective, design must not only have regard to specific market requirements but must also take account of the materials being used, the production available in the enterprises concerned as well as being technically, ergonomically and aesthetically satisfying.

Greater emphasis must therefore be placed on the design and styling of furniture to be exported from Ecuador. The exact nature of such a design programme will be a matter of taking into account the factors already referred to and should be given immediate attention in any future programme of assistance. This will thus afford the individual enterprise counterparts responsible for design the opportunity of gaining first-hand experience of and valuable insight into designing for export markets.

Other factors which must also be taken into account in designing for export include the following:

- I) Use wherever possible of KD (knock-down) and SA (self-assembly) constructions made with best quality fittings;
- II. A high degree of component and sub-assembly interchangeability;
- III. High surface-finishing standards using appropriate finishing systems e.g. acid catalysed or polyurethane lacquers;

- IV. The use of some labour-intensive features such as wood carving, inlay of wood and metal and high quality decorative veneering and crossbanding.
- V. The use of other suitable indigenous materials such as leather and ceramic tiles (to decorate table tops etc.);
- VI. High capacity containerisation in order to achieve low unit freight costs;
- VII. Competitive CIF pricing.

Attention is also drawn to the dimensional and ergonomic requirements for various types of seating including dining room chairs and upholstery. The following is a useful guide to dining chairs dimensions and comfort: *

Seat height	: 400 - 450 mm.
Seat depth	: 400 mm.
Back Rest (lumbar)	:
height	: 200-300 mm.
width	: 300-380 mm.
Slope of seat	: 3° - 5°
Slope of seat angle and backrest at lumbar region.	: 100° - 105°

In general, the design of an armchair or couch should ensure that the spine is kept in its normal shape with minimum pressure on the vertebral discs and the greatest possible relaxation of the back muscles. Research has shown that upholstered seating should have a backrest with a lumbar pad, the main support of which is 80-140 mm vertically above the occupied seat. Arm chairs should be well upholstered to distribute the body weight over a large area of the buttocks but should not be over soft or

* The Furniture Industry Research Association (FIRA) of Great Britain.

the support: will be lost.

The following dimensions are recommended * for general use in upholstery.

Height of seat	:	380-410 mm.
Depth of seat	:	420-470 mm.
Slope of seat	:	20°-25°
Angle between seat and backrest	:	105°-110°

Improvements in the softness of seats and backrests is recommended for the United States market. This is achieved by the use of lower density polyether or rubber foams or a layer of polyether of between 5% and 10% thick, wrapped around the foam. This would provide for a much improved level of comfort.

A final point with regard to function concerns dining table heights. If the comfortable dining-working chair height is between 400 and 450 mm, then the table top height should be between 710 and 750 mm. maximum.

D. Raw materials supply

All the enterprises visited indicated that raw materials generally accounted for between 40% and 50% of the total cost of production. They are, therefore, of paramount importance in both design and production considerations, bearing in mind that any savings affected in their procurement and use are immediately reflected in increased profitability. They include solid wood, sheet materials (e.g. plywood and particle board) adhesives, lacquers and hardware.

* The Furniture Industry Research Association (FIRA) of Great Britain.

1. Solid wood

Ecuador has reasonable supplies of solid wood which would, in fact, be much improved if greater attention to harvesting and conversion was paid by the sawmilling sector of the wood industry. According to the furniture producers, the following species are most commonly used:

<u>Species</u>	<u>Frequency of use by the seven manufacturers</u>
Cedro (Cedrela Odorata)	3
Laurel (Cordia Alliadora)	5
Colorado	3
Tangare (Corapa guimensis)	2
Canela (Lauraceal family)	2
Roble (Platymiscium family)	2
Capirona	2
Fernan Sanchez (Triplaris Guayaquilensis)	1

They all appear to have reasonably good working and surface coating characteristics but there are wide variations in grain marking and colour shading which make matching of components difficult. Nevertheless, it is essential that manufacturers ensure that such matching is maintained at a satisfactory level in order to minimize the problem and avoid negative consumer reaction, especially in the United States market.

Most of the enterprises have satisfactory timber-drying facilities and those which have not such facilities themselves have access to others in Quito. Since this aspect of production will play a vital role in the development of successful exports, especially of solid wood furniture, particular attention should be paid to the following basic principals of wood drying:

- I) Avoidance of drying mixed species or varying thickness in the same kiln load.

- II) Conversion to blank standard sizes (e.g. squares and wide boards) after air-drying and before kiln drying;
- III) Theory of radial, tangential and longitudinal shrinkage and movement of wood;
- IV) Calculation of percentage shrinkage and movement;
- V) Calculation of percentage moisture content;
- VI) The effects of atmospheric humidity and temperature and moisture content of wood and the concept of equilibrium moisture content;
- VII) Methods of measuring moisture content;
- VIII) Rates of drying different species and different timber thicknesses;
- IX) Moisture contents required for different end uses and locations;
- X) Selection and operation of suitable kiln drying equipment;
- XI) Building, orientation and air-drying of timber stacks.

It should be noted that moisture content values for wood used in the United States vary considerably according to geographical location, ranging from 11% on the south-east and west coasts to 8% in the mid-west and dropping to 6% in the Rocky Mountains. As a general rule furniture manufacturers in the United States dry their timber down to 6% mc.

2. Board materials (mainly particle board, plywood and block board)

Manufacturers in the main, expressed satisfaction with

quality and price of both plywood and particle board, both of which are manufactured in accordance with accepted international standards. Block board, however, because of its poor core construction poses surface marking problems which often only become evident after lacquering. If at all possible its use should be avoided.

3. Surface coating materials

The most important finishing system in use by the industry is nitrocellulose (NC) lacquer. This system, which is manufactured locally, has relatively low resistance to heat and solvents spillage on it and there continues to be considerable negative consumer reaction to it especially among United States importers.

Acceptable alternatives would be the use of polyurethane and acid-catalysed lacquers which combine flexibility and toughness with high resistance to damage by heat, solvents and mechanical effects. While the initial costs of using those materials is somewhat higher than for NC lacquers it is more than compensated for in economy of use and quality of finish. The consultant understands that local lacquer manufacturers are seriously considering the manufacturing of these materials possibly in association with a U.S. manufacturer. This should be actively encouraged by both the furniture manufacturers and their association AIMA.

4. Fittings and accessories

These include constructional fittings (usually associated with knock-down (KD) or self-assembly (SA) techniques), handles

hinges, stays locks and castors. They are particularly important especially for storage-type furniture and their selection and use can enhance or inhibit the saleability of furniture as well as influencing its economic and efficient production.

Most of the fittings in use, especially handles and hinges are manufactured in Ecuador and are not of a particularly high standard. Others, which are used mainly in corpus or case goods construction and trim are imported, mainly from suppliers in West Germany. The planned development of new designs ranges of both solid wood and panel production will occasion their increased usage and further research into their application and availability is strongly recommended. AIMA should also take up this matter with the appropriate government agency with a view to liberalising the importation of these materials.

No problems are experienced in the availability of adhesives which include urea-formaldehyde, hot melts for edge veneering application and rubber-based contact adhesives.

E. Manufacturing

Despite having, in general, good manufacturing facilities, (i.e. buildings, machinery, auxilliary equipment, including dust exhaust and compressed air line systems and machine maintenance facilities) productivity, measured in this instance, by the annual value of the output per direct worker, was found to be somewhat low. It ranged between a high of US\$ 9,233 to a low of US\$ 3,151 which

by international standards, would render the furniture of even the most productive of the seven enterprises uncompetitive in world markets. The figures referred to compare with, for example, productivity in the Province of Taiwan which is about US\$ 30.000 per worker per year. This country's furniture would be in direct competition with furniture from Ecuador in the United States market.

There are many causes which contribute to this situation in the factories concerned. Many were evident during the consultant's visit to individual plants, while others emerged during subsequent discussions with the management of each. They may be summarized as follows:

1. The absence, in many instances, of standardised and rationalised ranges of furniture consistent with market and production requirements;
2. A wide variety of individual models (in one case up to 150 different designs) being manufactured, indicating the absence of a suitable marketing and product policy;
3. Unsatisfactory plant organization as evidenced by poor machine and work station layout, absence of clearways for the unimpeded flow of work-in-progress, unsatisfactory arrangements for internal transport and intermediate storage, unsatisfactory use of production space and poor housekeeping, (e.g. accumulation of waste materials permanently occupying valuable production space) and ineffective supervision and progress-chasing.

4. Shortages or the wrong choice of essential production machines;
5. Unduly large stocks of air-dried timber and the use of insufficiently dried timber in production;
6. Inadequate and inaccurate wood-machining arrangements leading to unduly labour-intensive and expensive assembly arrangements (e.g. it is the normal practice in most factories to sand after assembly instead of before and there is excessive use of gap-filling materials.
7. Unsuitable surface finishing systems and materials.
8. Unsatisfactory dust control especially in the finishing departments;
9. Uneconomic batch sizes in production and,
10. Shortage of working capital.

There was also found to be evident a lack of resourcefulness on the part of technical management in attempting to solve many of the technical and technological problems that arise from time-to-time on the factory floor. For example, machines have to be adapted for specific types of processing especially with the aid of jigs, formers and fixtures; special gauges and other measurement aids have to be devised in order to ensure the accuracy and close tolerances necessary for trouble-free assembly. In many instances such valuable aids to high volume production were either missing or so poorly executed as to be almost ineffective.

The consultant therefore strongly recommends a radical

overhaul of most of the enterprises technological base with a view to modernizing and adapting it for today's requirements in respect of efficiency, accuracy and productivity. This should begin with an assessment of the product range itself, its overall design, its raw materials input, the methods used in processing each component the means used for joining components, their individual and collective constructional rigidity, procedures for intermediate and final assembly and for surface finishing.

Each factory should set aside a small section for prototyping and product development where these essential pre-production planning activities can be carried out without interfering with normal production. It should be staffed with skilled workers and no model should be manufactured in series until all production difficulties have been solved and all production aids have been perfected.

F. Management and labour

1. Management

In order to attain the efficiency required for export viability of each of the enterprises, it will be necessary to improve the management and technology capability of the personnel concerned. A high level of technology and professional knowledge is required at all levels of the industry if it is to operate successfully and produce products of the kind and quality demanded by the export mar-

kets and at a cost which allows for an acceptable profit margin. It would be wrong to assume that a high level of academic qualifications is necessary. It is rather the scope and depth of knowledge and the ability to put that knowledge into practice that constitutes competence. This competence has three aspects, each of which is complementary to the others, namely managerial, technical and vocational.

At the managerial level the basic skill required is the ability to organise, control and make decisions. This involves matters of product policy, finance and marketing, as they are applied to daily routine matters of administration and production. Technical knowledge is also essential at this level to ensure that such problems are thoroughly understood and dealt with in practical manner. It is also necessary that the financial implications of activities at factory floor level be properly interpreted and applied. While managers need not be experienced accountants they should, nevertheless, have a working knowledge of costing and cost control and be able to read cost accounts so that they can correctly judge efficiency and economy of choice of methods and products.

Trained and qualified junior levels of management, namely supervisors, technicians and foremen are hard to come by in the Ecuadorean furniture industry. This is because there is a reluctance at all levels of management to correctly delegate responsibility and authority and as a consequence, there appears to be a reluctance among production personnel to accept such responsibility.

Neither of these reasons, however, are acceptable for

allowing a vacuum in the management structure of any reasonably-sized enterprise. As things stand at present, this means that problems which are encountered in production are left to employees to overcome and top management is seldom aware that they even exist. Furthermore, it is necessary to continuously see that orders and instructions are rightly being interpreted and implemented, that problems and bottlenecks are anticipated and action taken to ensure an even flow of acceptable quality products; this can only be done with competent floor supervisors and technicians working to an agreed and well documented production programme. The latter being the responsibility of top management.

The weaknesses referred to manifest themselves in a lack of management skills particularly of analysis and decision-making and a complacency with regard to the need to make improvements in performance. Part of the reason for this problem is the lack of formal training on the part of most managers in the furniture industry. Unless this matter is tackled urgently, the consultant sees little prospect of its fulfilling its ambitions particularly in respect of exports.

Accordingly he strongly recommends as an immediate follow to this project, that in conjunction with international assistance, a special course of two weeks duration be organized in furniture industry management and production technology. This course should be attended only by managers and supervisory levels and should be run on the basis of lecture sessions and the practical application

of the principles of production and administrative management in each of the participating factories.

The syllabus for this course would include the following:

1. Marketing and sales management;
2. Product design and construction
3. Wood processing;
4. Plant design and layout;
5. Plant organization and manufacturing controls;
6. Materials technology
7. Management systems and procedures;
8. Computerisation;
9. Production supervision;
10. Quality control
11. Export procedures.

A tentative programme for this technical and management training course is given in Annex III.

2. Labour

The consultant is satisfied from his observations of labour in the various plants that it can be sufficiently productive provided it is properly trained, matured and directed. This is the function of management.

The cost of labour is much lower than in Europe and the United States and, as a consequence, this would be expected to be reflected in lower operating costs and higher levels of productivity. As has already been emphasised in Chapter E, manufacturing, this is not the case and the means for righting this situation lies squarely on the shoulders of management.

G. Quality standards

The ability of a product to compete on a market is direct-

ly related to its overall quality and to a lack of variation in that quality. In the furniture industry there are very many sources of quality variations including the following:

- Properties and conditions of timber and other materials;
- Dimensional accuracy of machined components;
- Dimensional accuracy of partly or fully assembled products;
- Quality of surface finishing;
- Durability and performance of finished products.

Control of quality implies comparing what is achieved with what is required, seeking the causes of any disparity and taking action. There are two main aspects of control of quality:

- a) Regulating the process to maintain quality;
- b) Adapting the process to achieve new and often higher levels of quality.

The most effective and economical approach is for the skilled workers to control their own quality and to inspect their own work. This is an expression of management's ability to delegate, i. e. to define what quality is required and provide the conditions necessary for the worker to achieve this standard consistently.

The conditions are:

- the worker needs a clear definition of the quality

to be achieved;

- the materials must be to the required specification;
- the tools and equipment used must be capable of achieving the required quality;
- the worker must possess the necessary skills and ability;
- he must know whether or not he is achieving quality and, if not, be able to adjust the operation or process to achieve it;
- he must be motivated to achieve quality;

It is important to note that these conditions need to be satisfied at each stage of operation in the process, whether the worker is machining, assembling or polishing. Consistent failure to satisfy any one of these will mean that a chronic problem is present.

A strategy for quality improvement.

The principles and concepts outlined are basic and practical. Together they can form the basis for reviewing and upgrading quality in manufacture by considering the main areas of quality and testing the level of performance, the level of control, identifying the obstacles and defining the role of supervisors and craftsmen.

This approach spans all functions and in particular the following areas:

- Quality standards - how they are defined and understood.
- Supplier relations - control of incoming materials through reliable inspection.
- Process capability - including factory capability, worker skills, control and motivation.
- Management control - through product design and development, provision of appropriate equipment and skills, careful production planning, supervision, and communication.
- Customer relations - through effective monitoring of customer reaction and customer needs. Quality is not absolute. It is comparative and part of the value judgment is made by the customer. Knowing where quality standard and performance stands relative to competitors is also necessary in order to improve quality of design and to adopt the manufacturing process to achieve it consistently.

The activities of the quality control department in each of the enterprises should be the subject to a detailed analysis during the course of the proposed follow-up programme. Meanwhile, in the light of the foregoing it is evident that where this activity is in operation, it is not carrying out its functions satisfactorily. Part of the reason for this is that since it is usually part of the production department, it cannot exercise a sufficient degree of objectivity in carrying the quality control function.

Ideally, it should be part of marketing since, in effect, it is ensuring that customer reaction is positive, leading to increased purchasing of the company's products. Since this is not possible in present circumstances, this department should report directly to the Executive President of the company so that due weight and appropriate follow-up action are given to its findings and recommendations.

H. Export marketing of furniture

1. What is marketing?

Marketing includes all the necessary activities in conceiving a product and in profitably moving that product from producer to consumer.

The important primary furniture marketing functions include market research, product design, sales, advertising, sales promotion, distribution and pricing. Supporting activities include

physical distribution, financing and after-sales service.

The product-oriented approach to furniture marketing entails focusing on a product that has been designed and produced by a manufacturer and attempting to sell this product to a potential customer. The consumer-oriented approach means focusing on the needs of consumers and producing a product to satisfy those needs.

Marketing planning entails defining objectives and formulating both short and longer-term strategies to achieve such objectives. It therefore includes planning, organising, staffing, directing and controlling. Marketing planning must have regard to such factors as the pertaining level of economic activity in the region concerned, competition, technological change, social factors, fashion trends, relevant bye-laws and consumer demand.

2. Furniture products for import.

(i) General requirements.

The world demand for fine hardwoods such as those which are available in Ecuador, will continue for the foreseeable future. A very high proportion of the export volume is used by the furniture industry abroad and it is therefore logical that Ecuador should seriously consider the production of furniture for export in a variety of forms.

The first requirement, therefore, would be to do as much as possible of the processing of the wood as near as possible

to its origins and thus avoid having to transport the waste. Secondly, the timber should be carefully kiln-dried down to 6 per cent humidity and then machined, drilled and sanded so that all parts are ready for easy assembly and lacquering. During production, the wood components will re-absorb some moisture and precautions should be taken to reduce this as much as possible. The most effective means is to complete all processing as quickly as possible and as a further precaution all work in process should be covered in polythene or preferably polyethylene. Finally, the furniture (in parts or in whole) should be packed in air-tight or moisture-proof packaging at a moisture content that is guaranteed to be at least well under 10 per cent.

(ii) Product types.

(a) Dimensioned stock or sized blanks which are straight-sawn for square-edged components, e. g., shaped chair legs, arms and backs. These may be shipped out in this form and finally machined by the importer/manufacturer if the skills and equipment are not available locally.

(b) Fully machined and sanded components which are manufactured to the customer's specifications and are ready for assembly. Further value may be added by introducing turnery and wood carving where appropriate.

(c) Fully assembled framed, panelled and louvered doors which are used in the production of a wide variety of storage cabinets for kitchen, living-room, dining-room and bedroom furniture. These would also be manufactured in accordance with the customers specifications.

(d) Completely or partly knocked-down (KD) furniture, especially dining room chairs, show-wood seating and tables which are lacquered and ready for assembly. These could be, again, in accordance with a customer specifications or designed and produced by the Ecuador manufacturer on the basis of market research and knowledge of specific market requirements.

(e) Fully knocked-down (KD) garden and patio furniture for domestic and hotel use.

(f) Fully assembled occasional furniture which is well designed and packs economically.

(g) Panel-based storage furniture in wood veneers for domestic use incorporating solid wood edge-lipping for moulding purposes and incorporating decorative features appropriate to this kind of product. Design and styling should be the responsibility of a competent furniture designer in collaboration with marketing management.

(h) wide range of fully-assembled, high-value, traditionally styled furniture which responds to the U. S. consumers tastes and preferences. There are many such styles to choose from, but the final choice will be based on marketing knowledge and individual manufacturers capabilities. Traditional English, French and American styles are acceptable to a greater or lesser extent in the United States market.

3. Methods of distribution.

Selling through a domestic agent or preferably a manufacturer/importer is preferred to individual companies attempting to do their own selling. This provides easier and faster access to

the market and, in the end, is far less expensive. An added advantage is that an importer/manufacturer can be of considerable assistance in locating and shipping much needed technology, raw materials, spares and accesories to the Ecuadorean manufacturer who in other circumstances might well find it impossible to do so himself. He can also provide vital feedback on consumer reaction, competitor activity and developing technological trends.

4 Export procedures

The successful export of furniture does not end with having saleable and competitively-priced merchandise. If the transshipment is not accompanied by supportive and trouble-free documentation and other procedures, especially at the point of departure, all other efforts way will be negatived.

1) Finance:

In this connection, it is essential that all financial implications concerned with trading are made clear to the importer from the outset, so that he can proceed with his subsequent trading arrangements sure in the knowledge that prices are firm and delivery will be as scheduled. Many importers will be doing business with Ecuador, possibly for the first time and a good performance at that stage will create a lasting impression of satisfaction and be the best guarantee of continued good business.

2. Export packaging.

Special attention should be given to export packaging to ensure that the furniture reaches its destination in perfect condition.

- a) Edges and corners of all surfaces should be well protected with foam or other protective material.
- b) all wrapping materials should be smooth and of a type which cannot harm surface finishes.
- c) Cartons should be sufficiently strong and of a type which allow for re-shipment by the importer without re-packaging.
- d) Packaging should be exactly in accordance with importer's instructions.

3. Documentation.

Proper documentation and prompt dispatch of all original documents is essential to efficient forwarding.

- a) Original bills of lading, detailed packaging lists and customs invoices should be sent by registered mail immediately after shipment so as to arrive well in advance of the goods.
- b) Careful attention should be given to the product description on all invoices such as the chief value of the materials used in the manufacture of the furniture (e.g. solid wood, upholstery materials, etc.).

I. Follow-up action

A. Integrated consultancy programme.

The consultant recommends immediate follow-up action in the shape of international technical assistance for the enterprises that participated in this study. This should take the form of an integrated consultancy programme of adaptation at individual plant level which takes account of the technical and managerial needs already identified, the requirements for successful export market orientation and penetration and the possibility of establishing joint production and marketing activities.

Naturally, some manufacturers, especially those already engaged or about to engage in export, will be expected to progress at a faster rate than others so that there should be sufficient flexibility built into the programme to allow for this eventuality. There are, however, only marginal differences between enterprises in this respect and all should benefit considerably from professional advice and assistance in marketing orientation, product design and adaptation, factory organization and production technology, management systems and procedures, quality control, industrial training and as a result, increased productivity.

The programme of consultancy should be result-orientated with clear cut and unmistakable objectives being aimed at. These should include for each participating enterprise, the development of a competitively based range of furniture suitable for the chosen markets and capable of being produced efficiently and profitably in a manufacturing environment which has been structured for this

purpose in respect of management capability, manufacturing facilities, production organization, quality standards and productivity. Actual market penetration should also be planned for initially through appropriate market investigation so that the right products are being developed and are subsequently being promoted through trade fair participation and direct contact through selected importers, distributors and retail sales outlets.

In tandem with the in-plant consultancy there should also be a continuing training component which would deal in a practical manner with the technical and technological problems confronting management in implementing the consultancy programmes. Each course would be set out to meet an identified need in either a relevant management or technical area and through a modified seminar-workshop approach would encourage active participation by the enterprise personnel participating in such courses.

Topics would therefore include design and product development, materials and production technology especially relating to timber conditioning and surface coating, management systems and procedures, health and safety, quality control, production supervision, work planning and allocation, finance and marketing.

Training would also include market orientation tours and technical study tours in order to provide participants with first-hand experience of key markets and market requirements for their products as well as enabling them to make personal contact with potential customers. The opportunity thus afforded should also be

used to pay visits to furniture manufacturing plants similar in size and structure to their own in order to compare and contrast manufacturing and productivity levels.

B. Consultancy Programme Details.

(a) Marketing

Analyse chosen export markets in order to determine exactly what products will be in demand in the near future. This must provide accurate data on design preferences, consumers, competitors, price structures and the market coverage offered by different trade channels.

Establish coherent and efficient marketing policy. This would include market planning; the definition of the market segment to which individual or collective manufacturers products would be aimed; product pricing; the establishment of specific sales targets; methods of distribution; co-operative design, production and marketing; quality sales literature sales presentation, point-of-sale display literature, brand advertising and participation in home and international trade fairs.

Evaluate potential of new product range and project its profitability.

Advise on market penetration through pre-selling

market analysis and test marketing.

Analyse each enterprise's export management and marketing activities and advise on it's re-organization and development where appropriate. Establish suitable marketing/production liaison between the marketing organization and the enterprise for which it is providing an export marketing service.

Prepare and provide direct training programmes on all aspects of export marketing to the personnel of each of the enterprises concerned.

(b) Product design

Review and assessment of current product range in respect of export marketing requirements, raw materials and technological inputs, manufacturing facilities, quality standards and pricing.

Explore the extent of possible design solutions in circumstances of acknowledged limitations in materials, production skills and manufacturing facilities.

Advise on future design and product policy.

In collaboration with the marketing consultant and

in-plant designers, design rationalised ranges of wood furniture consistent with the product policy referred to above and the need to present to the market integrated design collections which enable possible co-operative marketing and production activities.

Prepare detailed working drawings of new designs and advise on prototyping and the development of each model to the stage when it is produced in series.

Provide advice and assistance in the preparation of promotional literature, house-styling and graphics generally. Design and plan stands for international trade fair participation and advise on layout and presentation.

Provide direct training on all aspects of new product design and development in the context of market and technology identification, product specification, evaluation, (value analysis and cost reduction) quality standards and performance testing.

(c) Organization of Production and Product Development.

(i) Manufacturing audit

Detailed assessment of every aspect of each plant

concerned with products, manufacturing facilities, production, management systems and procedures, productivity, management and labour.

(ii) Plant re-organization, including:

Re-layout of the entire manufacturing areas including the design of appropriate processing and storage areas, special emphasis on break down mill, general machining, sub and final assembly, surface coating and upholstery.

Additional machinery and equipment location, selection and utilization where appropriate.

Design of and provision for internal transport and materials handling systems.

Establishment of good housekeeping and general working conditions.

(iii) Production, including:

Satisfactory work flow and machine loading in all departments.

Production technology particularly related to product construction and use of appropriate raw materials

machining, assembly, sanding, surface coating and upholstery.

Improved machining and assembly procedures with particular emphasis on machine adaptation and the use of special production aids such as measuring gauges, jigs, formers and templates.

Productivity levels based on full implementation of the re-organization programme.

(iv) Management, including:

Establishment of suitable management structure with clear definitions of function and levels of responsibility;

Appropriate documentation for the following management systems and procedures; target setting, production planning and programming production control, costing and quality control;

Provision of technical information in respect of wood processing, surface coating and upholstery production.

Selection and training of production managers who will be responsible for implementing the re-orga-

nization proposals and taking over production management function.

(d) Special technical consultancy

(i) Timber drying for furniture for export

Assess current status of timber-drying facilities and drying practice in each of the enterprises.

Advise on the upgrading of both where appropriate.

Establish kiln-drying requirements for each of the enterprises.

Advise on the future selection of suitable kiln-drying facilities and auxillary equipment.

Establish drying characteristics and drying schedules for timbers species currently used in export production.

Organise a number of training sessions concerned with wood properties and wood drying for export production to various locations.

(ii) Furniture finishing for export

Assess current status of furniture finishing systems

and expertise in each enterprise.

Advise on the upgrading of both where appropriate.

Advise on the future selection of suitable furniture finishing and ancillary equipment.

Establish furniture finishing requirements for different applications, consistent with the standards required for specific export markets.

Introduce and establish up-to-date finishing systems and equipment especially for acid-catalysed lacquers, precatalysed lacquers and polyurethane lacquers.

Organise a number of training sessions and demonstrations concerned with furniture finishing materials and techniques.

(e) Export marketing and production orientation training

Organisation of fact-finding study mission to selected European countries for personnel from enterprises concerned, having the following major objectives;

To gain first hand experience of furniture markets and their specific requirements, by attendance at

an internationally recognized furniture fair;

To study the latest techniques in factory planning, production, technology and quality standards by visiting well organised and highly productive plants similar in size and scope to those in Ecuador.

To gain up-to-date knowledge of materials and equipment used in furniture production by attendance at international trade fairs catering for that purpose;

To establish personal relationships with prospective customers.

To study industrial training, research activity and product performance standards for furniture by visiting appropriate training and research establishments.

III Conclusions and Recommendations

A. Conclusions

1. There is a strong tradition of period-styled furniture making in Ecuador whose history can be traced back over many years. Modern furniture manufacturing, however, is a relatively recent innovation.
2. This sector of the industry has most, but not all, of the facilities required for export. It also has reasonable supplies of hardwood species suitable for this purpose.
3. Demand for furniture in the domestic market is fairly static and the industry has yet to make substantial inroads in world markets.
4. The main reasons for this may be summarised as follows:
 - (I) The absence of marketing policy and marketing expertise in the industry;
 - (II) Lack of detailed knowledge of export marketing requirements;
 - (III) The unsatisfactory standard of design and product development at some enterprise level;
 - (IV) The need for a rational production policy for each individual enterprise;
 - (V) Unsatisfactory supply of suitable lacquers and fittings which are required for export;
 - (VI) Some shortages for essential equipment for wood processing, wood drying and surface finishing;
 - (VII) The need for further education and training of management, both technical and administrative in

- all aspects of furniture marketing and manufacturing;
- (VIII) The need to upgrade technician and operative skills in the industry and to raise the standards of labour productivity.
- (IX) The need to substantially improve the flow of up-to-date technical information to the industry;
- (X) The need to transform the industry from product to consumer orientation.
5. State provided industrial training facilities do not appear to be adequate to the developing needs of the industry.
6. The industry is not well catered for in respect of standard specifications and performance testing for furniture. This is essential for export development.
7. The future export potential of the industry lies mainly in the full exploitation in respect of value-added, of Ecuadorean hardwoods, especially those which enjoy ready acceptability in export markets. Much can also be made of the inherent and special skills of the workforce.
8. If the industry accepts and implements the recommendations contained in this report, there is little doubt that it can establish for itself continuing and worthwhile export performance.

B. Recommendations

1. This should play a vital role in the future development of the industry especially for exports. Special training courses and seminars should be organised by AIMA in export marketing for all relevant personnel so that they can fully understand and exercise its function.
2. If necessary further international assistance in marketing, over and above that contained in the proposed technical assistance programme detailed in this report, should be sought.
3. The export market of furniture from Ecuador should initially concentrate on supplying importer-manufacturers in the United States with products manufactured in accordance with the latter's designs and specifications.
4. Gradually and as further experience in exporting is obtained, this type of product should be replaced with distinctive, high quality, native designed furniture which incorporates all that is best in Ecuadorean skills and materials but is, nevertheless, consistent with international marketing requirements.
5. Initial export marketing endeavours should concentrate on the United States, where Ecuadorean hardwoods have already a foothold and where these materials are used by the local industry there.
6. Distribution arrangements should initially be in the hands of an experienced and knowledgeable importer/manufacturer who would also be prepared to assist in obtaining essential materials and equipment which is not currently available in Ecuador, possibly on a counter-trade basis.

7. In the longer term Ecuadorean enterprises should set up their own import and distribution company in the United States.

Design

8. In order to raise the general level of design in the industry, particular emphasis should be placed on design training especially for exports.
9. Design training programmes should have particular regard for the basic elements of successful furniture design, namely the market, the raw materials, the manufacturing facilities and the skills of the enterprises concerned.
10. Ecuador should endeavour to seek its own individual identity in furniture design and in doing so should exploit the special skills of the people and special materials for which it is known.
11. The initial design programme envisaged in this report should concentrate on furniture manufacturing in accordance with customer requirements. This should be quickly replaced by the industry's own design programme.
12. Individual enterprises which are engaged in exports should endeavour to co-operate in producing non-competing but complementary ranges of furniture.
13. These ranges should be highly rationalised and should incorporate KD (knock-down) and SA (self-assembly) features for economical shipping.

14. Particular attention should also be paid to catalogue and brochure design and to house styling generally.

Raw Materials

15. AIMA should ensure the availability of an adequate supply of suitable timber for all enterprises engaged in exports.
16. For their part, the enterprises should augment their present timber-drying facilities to cope with their export production requirements.
17. Similar observations apply in respect of surface finishing facilities and materials.
18. Both timber-drying and surface finishing techniques should be substantially upgraded.
19. Other materials, especially fittings and accessories should be imported tax-free until suitable alternatives are produced in Ecuador.
20. The introduction of purpose-designed and more rationalised product ranges should allow for greater enterprise specialisation and the establishment of series production. This, in turn, should lead to improved quality standards, higher productivity and lower costs.
21. The industry's technological base should be strengthened by greater awareness of established production techniques particularly in relation to panel and solid wood processing.
22. This can best be achieved by the envisaged programme of technical consultancy, professional product design, marketing and management training.

23. Quality standards should be rigidly applied especially in the key areas of machining, sanding and surface finishing.
24. Design draughting, prototyping and product development should be a feature of each enterprises' production preparation.
25. Each should be fully outfitted and staffed in accordance with its function.

Industrial training

26. All levels of management, both technical and administrative require further and intensified training in the marketing and manufacturing of furniture for export.
27. This should include an understanding of marketing and its relationship with design and production; marketing techniques and their relevance to furniture and; the establishment and maintenance of a continuing marketing programme.
28. Training in manufacturing should include product design, factory planning, management systems and procedures, production technology, production supervision and quality control.
29. Greater attention should be paid to the provision by AIMA of internationally sourced technical and marketing information to the various branches and enterprises engaged in exports.
30. This information, which relates to products, materials, processes, equipment and performance is essential if the industry is to remain abreast of world-wide developments.

ENTERPRISES AND OTHER ORGANIZATIONS THAT
CO-OPERATED WITH THE CONSULTANTS



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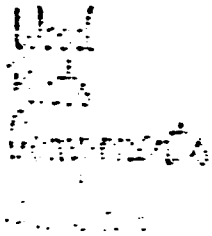
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ANNEX II

INDIVIDUAL ENTERPRISE SUMMARY REPORTS AND RECOMMENDATIONS

1. Heritage S.A.
2. Servimadeco S.A.
3. Fadel Muebles
4. Industrias Amazonas S.A.
5. Maestro S.A.
6. Britany Muebles
7. Ligna S.A.

Company : HERITAGE C. LTDA

Employees: Office 7, production 60

Products: Range of domestic furniture based on traditional Ecuadorean/French Provincial styles. Ecuadorean market only, but anxious to develop exports.

Design: Traditional and classic and generally manufactured to high quality standards. Some items, especially chairs need to be re-designed especially in relation to dimensional accuracy and slimming down of components in order to achieve greater elegance.

Production facilities: Generally satisfactory and capable of considerably increased output.

Factory Organization: Could be improved considerably. At present most work stations are too congested mainly because of lack of space. Particularly evident in machining section, where at least double the space is needed. Similar observations apply in respect of all other departments.

Management Capability: Very satisfactory in respect of administration and technology but weaknesses or inexperience evident in factory planning, layout and production floor.

Production: Somewhat inhibited mainly because of absence of "open planning" in No. 1 plant. Not sufficient attention paid to machining and pre-sanding of components, thus increasing significantly the labour intensity of assembly procedures and subsequent surface finishing.

Special Skills: Delicate and well executed wood carving.

Comment: This is a company with a good product and generally experienced management. Because of the strong traditional nature of the furniture industry in Ecuador it tends to run it's production unit more like a workshop, even though it has most of the facilities needed for factory production. The main stumbling block to a changeover is the present main production plant. All machining activities should be transferred to plant No. 2 and No. 1 should be used only for assembly, finishing, upholstery and dispatch.

Export Potential: Good, if recommended changes are implemented.

Recommended Technical Assistance

1. Market identification and marketing
Target markets, access, distribution, pricing commercial practices, transport and packaging, promotion, trade fair and exhibition participation, preparation of marketing plans, marketing management, market orientation co-operative marketing.
2. Product design and development
Introduction of new designs and/or adaption of existing ones in line with requirements in 1 above. Design development to series production stage including prototyping, preparation of working drawings and appropriate production aids. Value analysis.
3. Raw material supply and technology
Suitable timber species supply and conditioning; availability and use of other essential materials including sheet materials, adhesives, lacquers, fittings and accessories and other hardware.
4. Plant organization

- Efficient plant layout; design of dust exhaust, compressed air-line, and internal transport systems; design of individual work station for all sub-activities including machining, sanding assembling, surface coating, upholstering, dispatch and intermediate storage. Selection and location of additional processing equipment.
5. Production technology and quality control
Processing of drying, glueing and finishing (surface coating) wood. Constructional details for solid wood furniture assembly. Techniques related to machining, sanding and finishing. Use of knock-down (KD) and self-assembly (SA) techniques. Establishment of quality standards related to tolerance determination, performance and attention to detail.
6. Production control and productivity
Development of procedures and documentation of control of materials, manpower and costs inventory control, capacity utilization and work study aimed at much increased levels of productivity. Product rationalization, progress-chasing.
7. Financial control
Levels of investment and ratio of investment return. Fixed and working capital requirements cost control. Wage classification and cost reduction programmes. Budgetary control. Target setting.
8. Management training
Marketing planning and management. Production planning and control. Work allocation and scheduling. Supervision. Target setting. Cost and quality control. Production documentation. Exporting procedures. Co-operative production activities.
9. Skills Development
Appropriate to the production of high quality furniture and furniture parts. Improved machine utilization leading to high levels of productivity. Development of special skills for veneering and inlay work, marquetry and wood carving.

Company: SERVIMADECO S.A.

Employees: 70

Products: Modern domestic and office furniture.

Design: Generally copyist in nature but well executed.

Production Facilities: Good, with excellent buildings and equipment including kiln drying and machine maintenance facilities.

Factory Organization: Considerable improvement required in departmental and plant layout especially for general machining and veneering. The latter should be physically separated from other processing because of dust hazard. Because of haphazard layout, work flow is unsatisfactory and there is a lot of back-trading. Internal transport and waste control also require more attention.

Management Capability: Requires improvement, especially in relation to factory organization, production programming, target setting and achieving substantially higher level of productivity

Production : Weaknesses in factory planning are seriously affecting production, particularly in relation to work flow. Not sufficient attention is paid to accurate machining and pre-sanding so that there is excessive manual work at both assembly and finishing stages. The finishing department is not well organized in relation to the major finishing activities, namely sealing, de-nibbing, base coat application and finishing. Exhaust fans in the spraying section are not effective

because they are too high above the ground. They should not be higher than 450 mm in order to satisfactorily exhaust the solids content of the over-spray. Greater use should also be made of turntables in each spray section.

Special skills: None

Comment: This company's overall performance is not consistent with the excellent production facilities available. It also is being managed rather more like a workshop, principally because the latter tends to follow sales in the company's retail outlets and other distributors. More attention needs to be paid to marketing, product policy, design, factory organization and production supervision.

Export potential: Good if above factors are dealt with satisfactorily.

Recommended Technical Assistance

1. Market identification and marketing

Target markets, access, distribution, pricing, commercial practices, transport and packaging, promotion, trade fair and exhibition participation, preparation of marketing plans, marketing management, market orientation, co-operative marketing.

2. Product design and development

Introduction of new designs and/or adaption of existing ones in line with requirements in 1 above. Design development to series produc-

tion stage including prototyping, preparation of working drawings and appropriate production aids. Value analysis.

3. Raw material supply and technology

Suitable timber species supply and conditioning; availability and use of other essential materials including sheet materials, adhesives, lacquers, fitting and accessories and other hardware.

4. Plant organization

Efficient plant layout; design of dust exhaust, compressed air-line, and internal transport systems; design of individual work station for all sub-activities including machining, sanding, assembling, surface coating, unholstering, despatch and intermediate storage. Selection and location of additional processing equipment.

5. Production technology and quality control

Processing of drying, glueing and finishing (surface coating) wood. Constructional details for solid wood furniture assembly. Techniques related to machining, sanding and finishing. Use of knock-down (KD) and self assembly (SA) techniques. Establishment of quality standards related to tolerance determination, performance and attention to detail

6. Production control and productivity

Development of procedures and documentation of control of materials, manpower and costs inventory control, capacity utilization and work study aimed at much increased levels of productivity. Product rationalization, progress-chasing.

7. Financial control

Levels of investment and ratio of investment return. Fixed and working capital requirements cost control. Wage classification and cost reduction programmes. Budgetary control. Target setting.

8. Management training

Marketing planning and management. Production planning and control. Work allocation and scheduling. Supervision. Target setting. Cost and quality control. Production documentation. Exporting procedures. Co-operative production activities.

9. Skills Development

Appropriate to the production of high quality furniture and furniture parts. Improved machine utilization leading to high levels of productivity. Development of special skills for veneering and inlay work, marquetry and wood carving.

Company: FADEL MUEBLES

Employees: Office 15, Production 65

Products: Traditional Ecuadorian/French Provincial styled domestic furniture which is sold only in Ecuador. Includes dining-room, living room, upholstered and some office furniture.

Design: Mainly copyist in origin, from foreign catalogues, etc. Quality could be improved.

Production Facilities : Mainly suited for solid wood production so that associated panel production poses occasional problems and is usually done manually. Building requires to be extended in order to accommodate all production activities satisfactorily. Machinery and equipment needs some augmentation, especially for planing and moulding.

Factory Organization: Generally unsatisfactory. Whole production area needs to be re-laid out in accordance with established work-flow for mainly solid wood processing with provision for clearways, internal transport and access to individual work station.

Management Capability: Requires to be improved considerably at all levels, especially of production supervision. Improved performance also needed in marketing and the development of a suitable product policy.

Production: The absence of initial suitable planning of the whole factory has resulted in dis-organized production activities. There is no clear-cut division between, in particular, machining and assembly, with each something of an extension of

the other. This means that it is much more a workshop environment and results in rather too much dependance on individual skills which may be good but are often bad. Machining of components does not play the paramount role in processing, which it should, with the result that assembly is far too labour intensive and often badly executed. The dust exhaust system is not effective because of poor machine layout. The finishing department should be physically separated from the remainder of production, especially sanding. It should also have proper spray booths fitted with suitable exhaust fans.

Special Skills: Wood carving.

Comment : This company requires to have its whole marketing, product and manufacturing base re-organized in accordance with modern manufacturing and management concepts in the furniture industry.

Export Potential: Not promising, unless immediate steps are taken to redress current factory and management weaknesses.

Recommended Technical Assistance:

1. Market identification and marketing

Target markets, access, distribution, pricing, commercial practices, transport and packaging, promotion, trade fair and exhibition participation, preparation of marketing plans, marketing management, market orientation co-operative marketing.

2. Product design and development

Introduction of new designs and/or adaption of existing ones in line with requirements in 1 above. Design development to series production stage including prototyping, preparation of working drawings and appropriate production aids. Value analysis.

3. Raw material supply and technology

Suitable timber species supply and conditioning; availability and use of other essential materials including sheet materials, adhesives, lacquers, fittings and accessories and other hardware.

4. Plant organization

Efficient plant layout; design of dust exhaust, compressed air-line and internal transport systems; design of individual work station for all sub-activities including machining, sanding, assembling, surface coating, upholstering, despatch and intermediate storage. Selection and location of additional processing equipment.

5. Production technology and quality control

Processing of drying, glueing and finishing (surface coating) wood. Constructional details for sold wood furniture assembly. Techniques related to machining, sanding and finishing. Use of knock down (KD) and self assembly (SA) techniques. Establishment of quality standards related to tolerance determination, performance and attention to detail.

6. Production control and productivity

Development of procedures and documentation of control of materials, manpower and costs inventory control, capacity utilization and work study aimed at much increased levels of productivity. Product rationalization, progress-chasing.

7. Financial control

Levels of investment and ratio of investment return. Fixed and working capital requirements cost control. Wage classification and cost reduction programmes. Budgetary control. Target setting.

8. Management training

Marketing planning and management. Production planning and control. Work allocation and scheduling. Supervision. Target setting. Cost and quality control. Production documentation. Exporting procedures. Co-operative production activities.

9. Skills Development

Appropriate to the production of high quality furniture and furniture parts. Improved machine utilization leading to high levels of productivity. Development of special skills for veneering and inlay work, marquetry and wood carving.

Company: INDUSTRIAS AMAZONAS S.A.

Employees: Production 30 - Administration 3

Products: Traditional Ecuadorean/French Provincial styled furniture, mainly for domestic market.

Design: Mainly copyist in nature.

Production Facilities: Mainly suited for solid wood production but limited in scope for specific machining operations. Company plans to augment machinery in near future. Current building is small and congested and requires to be increased by 1 1/2 times its existing size. This would provide proper machining, sanding, finishing and assembly departments. The company has a small timber-drying kiln the capacity of which needs to be doubled.

Factory organization: Since the plant is little more than a large workshop at present, the possibility of organizing production satisfactorily hardly arises. However, there are indications that management would, with direction, be capable of understanding and implementing such a system.

Management Capability: Reasonably satisfactory on the sides of administration and sales but requires further training in all the other management disciplines.

Production: As already indicated, the management planning and technology associated with furniture production requires to be upgraded considerably if the undoubted capability of the workforce is to be fully exploited. In passing, it should be said that this includes, in particular, good quality standards.

Special skills: Wood carving.

Comment: If the company implements fully its expansion plans for its factory in accordance with accepted norms in the furniture industry, there is no reason why it should not become viable both on domestic and export markets.

Export Potential: Promising, provided it fulfills its re-organization and development plans.

Recommended Technical Assistance:

1. **Market identification and marketing**

Target markets, access, distribution, pricing, commercial practices, transport and packaging, promotion, trade fair and exhibition participation, preparation of marketing plans, marketing management, market orientation co-operative marketings.

2. **Product design and development**

Introduction of new designs and/or adaption of existing ones in line with requirements in 1 above. Design development to series production stage including prototyping, preparation of working drawings and appropriate production aids. Value analysis.

3. **Raw material supply and technology**

Suitable timber species supply and conditioning; availability and use of other essential materials including sheet materials, adhesives, lacquers, fittings and accessories and other hardware.

4. Plant organization

Efficient plant layout; design of dust exhaust, compressed air-line, and internal transport systems; design of individual work station for all sub-activities including machining, sanding, assembling, surface coating, upholstering, despatch and intermediate storage. Selection and location of additional processing equipment.

5. Production technology and quality control

Processing of drying, glueing and finishing (surface coating) wood. Constructional details for solid wood furniture assembly. Techniques related to machining, sanding and finishing. Use of knock-down (KD) and self-assembly (SA) techniques. Establishment of quality standards related to tolerance determination, performance and attention to detail.

6. Production control and productivity

Development of procedures and documentation of control of materials, manpower and costs inventory control, capacity utilization and work study aimed at much increased levels of productivity. Product rationalization, progress-chasing.

7. Financial control

Levels of investment and ratio of investment return. Fixed and working capital requirements cost control. Wage classification and cost reduction programmes. Budgetary control. Target setting.

8. Management training

Marketing planning and management. Production planning and control. Work allocation and scheduling. Supervision. Target setting. Cost and quality control. Product documentation. Exporting procedures. Co-operative production activities.

9. Skills Development

Appropriate to the production of high quality furniture and furniture parts. Improved machine utilization leading to high levels of productivity. Development of special skills for veneering and inlay work, marquetry and wood carving.

Company: MAESTRO S. A.

Employees: Production 120; Office 20

Products: Wide range of domestic and office furniture based on traditional French/English styles, especially Provincial, Nelson and Regency. Quality standards good but many models unduly bulky in appearance and could benefit considerably by reducing the sectional dimension of components, particularly dining-room chairs.

Designs: Largely derivative. Company has its own resident designer, draughtsman.

Production facilities: Very comprehensive, if somewhat outdated, occasioning many problems in setting-up and maintenance. Buildings also suitable if somewhat congested. company plans to purchase more up-to-date processing equipment in near future. Should also enlarge substantially its finishing department. Excellent kilning facilities.

Factory organisation: The factory seems to be well organised and managed and production planning systems appear to operate effectively.

Management Capability Marketing management in respect of product policy and sales requires to be improved. Production management within the limits imposed by a severe shortage of working capital appears to be effective.

Special skills: Wood carving and the ability to produce accurate and well-worked components in large quantities.

Comment: This factory fulfills most of the requirements for the successful and profitable production and sale of reproduction furniture. That it is not succeeding in doing so at present is largely due to unsatisfactory marketing and insufficient provision for working capital requirements. This should always be based on a factor of 29%, related to ex-factory sales volume.

Export potential: Very promising, especially for furniture parts which incorporate hand carving where appropriate.

Recommended Technical Assistance

1 **Market identification and marketing**

Target markets, access, distribution, pricing commercial practices, transport and packaging, promotion, trade fair and exhibition participation, preparation of marketing plans, marketing management market orientation co-operative marketing.

2 **Product design and development**

Introduction of new designs and/or adaption of existing ones in line with requirements in 1 above. Design development to series production stage including prototyping, preparation of working drawings and appropriate production aids. Value analysis.

3 **Raw material supply and technology**

Suitable timber species supply and conditioning;

availability and use of other essential materials including sheet materials, adhesives, lacquers, fittings and accessories and other hardware.

4

Financial control

Levels of investment and ratio of investment return. Fixed and working capital requirements cost control. Wage classification and cost reduction programmes. Budgetary control. Target setting.

5

Management training

Marketing planning and management. Production planning and control. Work allocation and scheduling. Supervision. Target setting. Cost and quality control. Production documentation. Exporting procedures. Cooperative production activities.

6

Skills development

Appropriate to the production of high quality furniture and furniture parts. Improved machine utilization leading to high levels of productivity. Development of special skills for veneering and inlay working, marquetry and wood carving.

Company: BRITANY MUEBLES

Employees: Production 60; office 8

Products: Attractive range of reproduction Regency styled domestic furniture which is finely executed.

Design: Furniture manufacturers catalogues.

Production Facilities At present very limited but company has plans to move its current production to a new and suitable building in the near future.

Factory Organization Principles of production organization will have to be learned and applied even with the current production set-up.

Management Capability : Very inexperienced, particularly in relation to technology, factory organization and management in furniture production. Nevertheless, remarkable progress has been achieved in the two short years in business which augers well for the future.

Production: Despite having 60 workers, production generally is based on the workshop concept with considerable emphasis on machine and handwork on an individual basis. All this is expected to change in the new factory, when production will be planned with the assistance of good factory organization and appropriate production equipment.

Special Skills: None

Comment: Performance to date should encourage this company to implement its development plans in the shortest possible time. It has chosen a very saleable product range which should do equally well in both domestic and export markets.

Export potential: Promising if and when development plans are brought to fruition.

Recommended Technical Assistance

1. Market identification and marketing

Target markets, access, distribution, pricing, commercial practices, transport and packaging, promotion, trade fair and exhibition participation, preparation of marketing plans, marketing management, market orientation co-operative marketing.

2. Product design and development

Introduction of new designs/and adaption of existing ones in line with requirements in 1 above. design development to series production stage including prototyping, preparation of working drawings and appropriate production aids. Value Analysis.

3. Raw material supply and technology

Suitable timber species supply and conditioning, availability and use of other essential materials including sheet material, adhesives, lacquers, fittings and accesories and other hardware.

4. Plant organization

Efficient plant layout; design of dust exhaust, compressed air-line and internal transport sys-

tems; design of individual work stations for all sub-activities including machining, sanding, assembling, surface coating, upholstering, dispatch and intermediate storage. Selection and location of additional processing equipment.

5. Production technology and quality control.

Processing of drying, glueing, and finishing (surface coating) wood. Constructional details for solid wood furniture assembly. Techniques related to machining, sanding and finishing. Use of knock-down (KD) and self-assembly (SA) techniques. Establishment of quality standards related to tolerance determination, performance and attention to detail.

6. Production control and productivity

Development of procedures and documentation of control of materials, manpower and costs inventory control, capacity utilization and work study aimed at much increased levels of productivity. Product rationalization, progress-chasing.

7. Financial control

Levels of investment and ratio of investment return. Fixed and working capital requirements cost control. Wage classification and cost reduction programmes. Budgetary control. Target setting.

8. Management training

Marketing planning and management. Production planning and control. Work allocation and scheduling. Supervision. Target setting. Cost and quality control. Production documentation. Ex-

porting procedures. Co-operative production activities.

9.

Skills Development

Appropriate to the production of high quality furniture and furniture parts. Improved machine utilization leading to high levels of productivity. Development of special skills for veneering and inlay work, marquetry and wood carving.

Company : LIGNA S.A.

Employees: Production 37; office 13

Products: Range of domestic storage units for living-room, bedroom, kitchen and office, based on melamine faced (plain and imitation wood grain) and edge banded particle board.

Design: Largely derived from Italian designs which were developed about 10 years ago.

Production Facilities: Relatively new and fully-linked panel processing line incorporating double-end tenoners, double sided edge-banders; multiple boring equipment and some more conventional woodworking machines. Spacious, well planned building, with good material handling, internal transport (mainly roller conveyors) and machine maintenance facilities.

Factory Organization: The physical arrangements are quite satisfactory but the organization for production requires considerable up-grading.

Management Capability: General unsatisfactory. Some of the personnel involved have yet to grasp the full significance of managing a plant of this nature. Its success is based on an aggressive marketing policy which is founded on highly rationalized ranges capable of volume production and very high throughput.

Production: Production tempo in a factory of this nature is set more by the production equipment, which should produce various types of panels on a continuous basis. Since this is not the case for the reasons already referred to, output is slow and laboured

and there is an unacceptably high build up of work-in-progress and finished goods.

Special skills: None.

Comment: This plant urgently needs more effective management endeavour especially in relation to marketing, product design and production and supervisory management. No amount of adjustment of a management organization chart will alter this basic fact of survival and the sooner this is recognized and acted upon, the sooner will the company come to terms with a rather serious performance situation. The company is strongly urged to provide additional veneering facilities so that it can offer a more interesting and varied end-product.

Export potential: Reasonably good if above aspects are satisfactorily dealt with.

Recommended Technical Assistance

1. Market identification and marketing

Target markets, access, distribution, pricing, commercial practices, transport and packaging. Promotion, trade fair and exhibition participation, preparation of marketing plans, marketing management market orientation co-operative marketing.

2. Product design and development:

Introduction of new designs and/or adaption of existing ones in line with requirements in 1 above. Design development to series production stage

including prototyping, preparation of working drawings and appropriate production aids.
Value analysis.

3. Raw material supply and technology

Suitable timber species supply and conditioning, availability and use of other essential materials including sheet materials, adhesives, lacquers, fittings and accessories and other hardware.

4. Plant organization

Efficient plant layout; design of dust exhaust, compressed air-line and internal transport systems; design of individual work stations for all sub-activities including machining, sanding assembling, surface coating, upholstering, dispatch and intermediate storage. Selection and location of additional processing equipment.

5. Production technology and quality control

Processing of drying, glueing and finishing (surface coating) wood. Constructional details for solid wood furniture assembly. Techniques related to machining, sanding and finishing. Use of knock-down (KD) and self-assembly (SA) techniques. Establishment of quality standards related to tolerance determination, performance and attention to detail.

6. Production control and productivity

Development of procedures of documentation of control of materials, manpower and costs inventory control, capacity utilization and work study aimed at much increased levels of productivity. Product rationalization, progress-chasing.

7

Financial control

Levels of investment and ratio of investment return. Fixed and working capital requirements cost control. Wage classification and cost reduction programmes. Budgetary control. Target setting.

8

Management training

Marketing planning and management. Production planning and control. Work allocation and scheduling. Supervision. Target setting. Cost and quality control. Production documentation. Exporting procedures. Cooperative production activities.

9

Skills development

Appropriate to the production of high quality furniture and furniture parts. Improved machine utilization leading to higher levels of productivity. Development of special skills for veneering and inlay work, marquetry and wood carving.