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Technical report: Improving the production planning and control in the Philippines furniture industry*

Prepared for the Government of the Philippines
by the United Nations Industrial Development Organization

Based on the work of Sinan Cinar, consultant in production planning and control for furniture and joinery plants

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* This document has not been edited.

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1. INTRODUCTION

The wood processing industry of the Philippines is considered a mature industry with immense potential for export. However, this potential has not been utilized fully due to many interrelated factors. The existence of manpower with creativity and design flair, availability of craft skills in rattan weaving and solid wood carving, availability of wood raw material in sufficient quantity and quality are some of the positive contributors to its strength. Despite the above, the industry is not achieving a great success in the quantity and value of its export potential due to the following reasons:

- Low productivity levels,
- Design not suitable for serial production,
- Unavailability of precise and modern production equipment,
- Poor tool and machine maintenance,
- Inefficient production layout and flow,
- Insufficient premises and working conditions,
- Unavailability of appropriate work benches and hand tools,
- Undeveloped support and service industries,
- Unavailability of suitably trained and experienced technical personnel, especially at the middle management level.

The wood processing industry of the Philippines must remedy the above mentioned shortcomings to attain the competitiveness required for achieving success in the target export markets. Since the country's existing raw material reserves are being exhausted, immediate action is required for its revival and survival.

In a comprehensive technical cooperation programme for export development started in 1982, the United Nations Development Programme (UNDP) is assisting the wood processing industries sector of the Philippines to alleviate the shortcomings of the individual firms taking part in the project. In the project's first phase, national and international experts had undertaken a supply verification and material research for the furniture industry as a base for export strategy formulation.

This report covers the findings and recommendations of an advisory mission to selected furniture manufacturers with export potential, carried out in a split mission from 2 April to 3 May and from 4 October to 5 November 1991, undertaken by Sinan Cinar, a UNIDO consultant in production planning and control for furniture and joinery plants. The consultant's job description is given in Annex I. Although it was not stressed in the consultant's terms of reference, he also provided ad hoc advice to the companies he visited on such aspects as:

- Equipment selection,
- Tool selection,
- Production technology,
- Production management,
- Factory layout.

The list of persons met by the consultant is given in Annex II.

In addition to on-the-job advice to, and training of managers of the individual companies visited, the consultant organized two seminars on production planning and control. The first (lasting one day) was held in Cebu on 18 October, while the second, in Manila (lasting half a day) was on 29

October 1991. The seminars were attended by 18 participants in Cebu and 19 participants in Manila. The programme of the seminars is given in Annex III.

The Production Planning and Control Manual (PPC) prepared by the consultant as part of his terms of reference has been issued as a separate UNIDO document.

2. FINDINGS

A. AB Woodcraft Co.

This company is in operation since 1972 and manufactures varied wooden items such as chairs, table legs, pedestals, mirror frames and animal figures with intricate hand carvings. In 1989, the company moved its machining, carving, assembly and sanding operations to a new building with a covered area of about 2500 m². The previous site is used for final finishing and shipping.

The species used is Philippines mahogany.

Total number of workers consists of 215 regulars and 100 outside carvers.

During his stay at the factory, the consultant has covered all aspects of production planning and control in sufficient detail and trained the production manager on the job. In particular he has carried out the following related activities:

1. He drew-up a full account of processing of orders, in the form of a flow chart (Fig. 1), showing the involvement of different departments, namely marketing, PPC and production and the information flow among these departments.
2. He drew-up a full account of planning and controlling of production, in the form of a flow chart, to show the steps of work to be done and the information flow between the PPC and other departments (Fig. 2).
3. He drafted a set of basic documentation that is needed for PPC for work preparation and transfer of information coming to and going out of the PPC department. These documents were the materials and parts list, the fittings and hardware list, the templates and jigs list as well as the cutters list and routing sheet. These documents can be found in the PPC manual.
4. He drafted a basic cost estimation sheet that could be used for pre- and post-production costing. This document is also to be found in the PPC manual.
5. He introduced to, and informed the management about modern production planning, machine loading, production scheduling, order scheduling, production monitoring and production control boards as they are used in Europe.
6. He introduced a simple, but effective, Gantt chart that can be used for production capacity planning, production scheduling, machine loading and production monitoring if the ready-made planning, scheduling and monitoring boards are difficult or expensive to obtain. (Fig. 3).

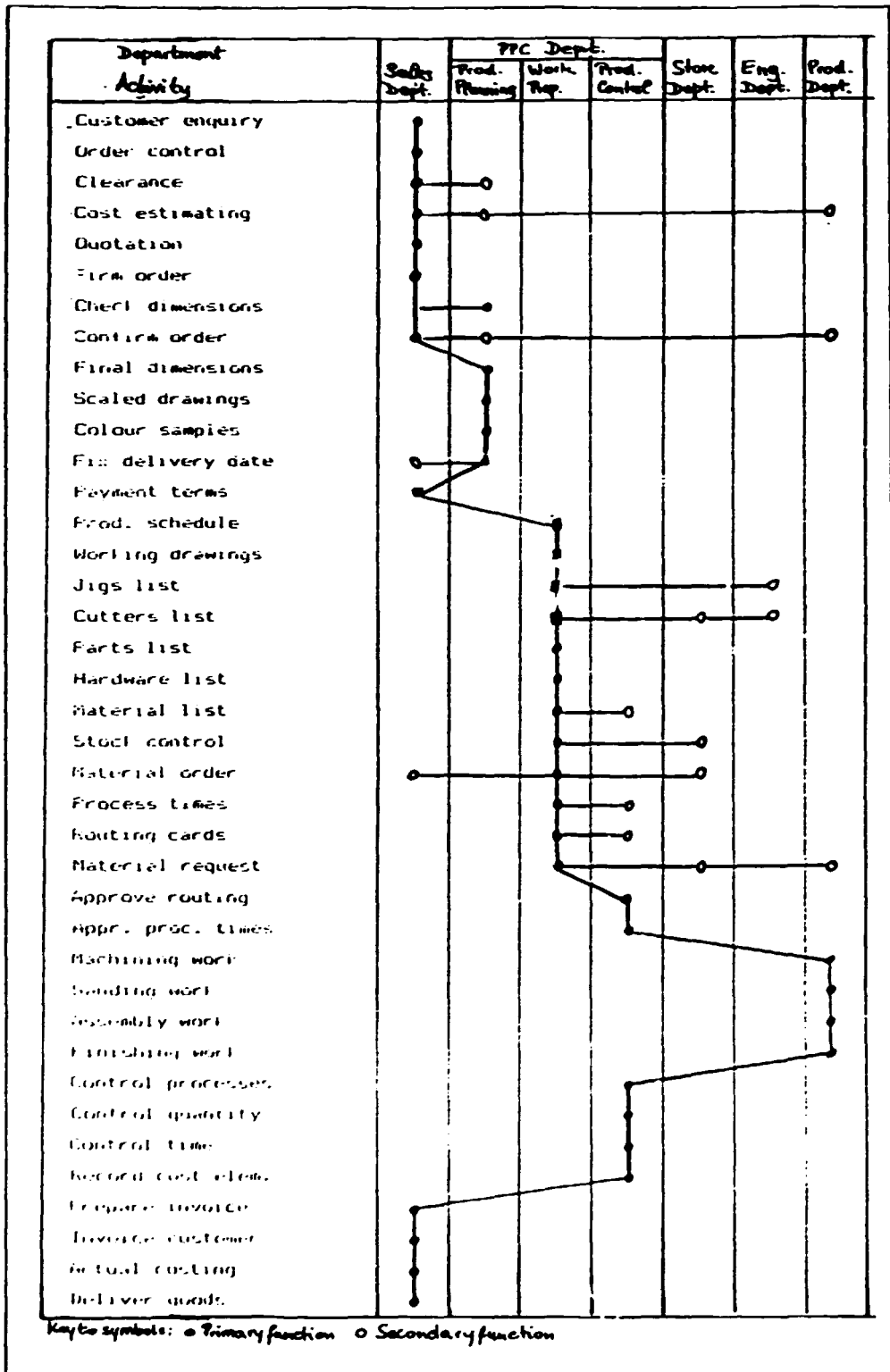


Fig. 1: Order Processing Flow Chart.

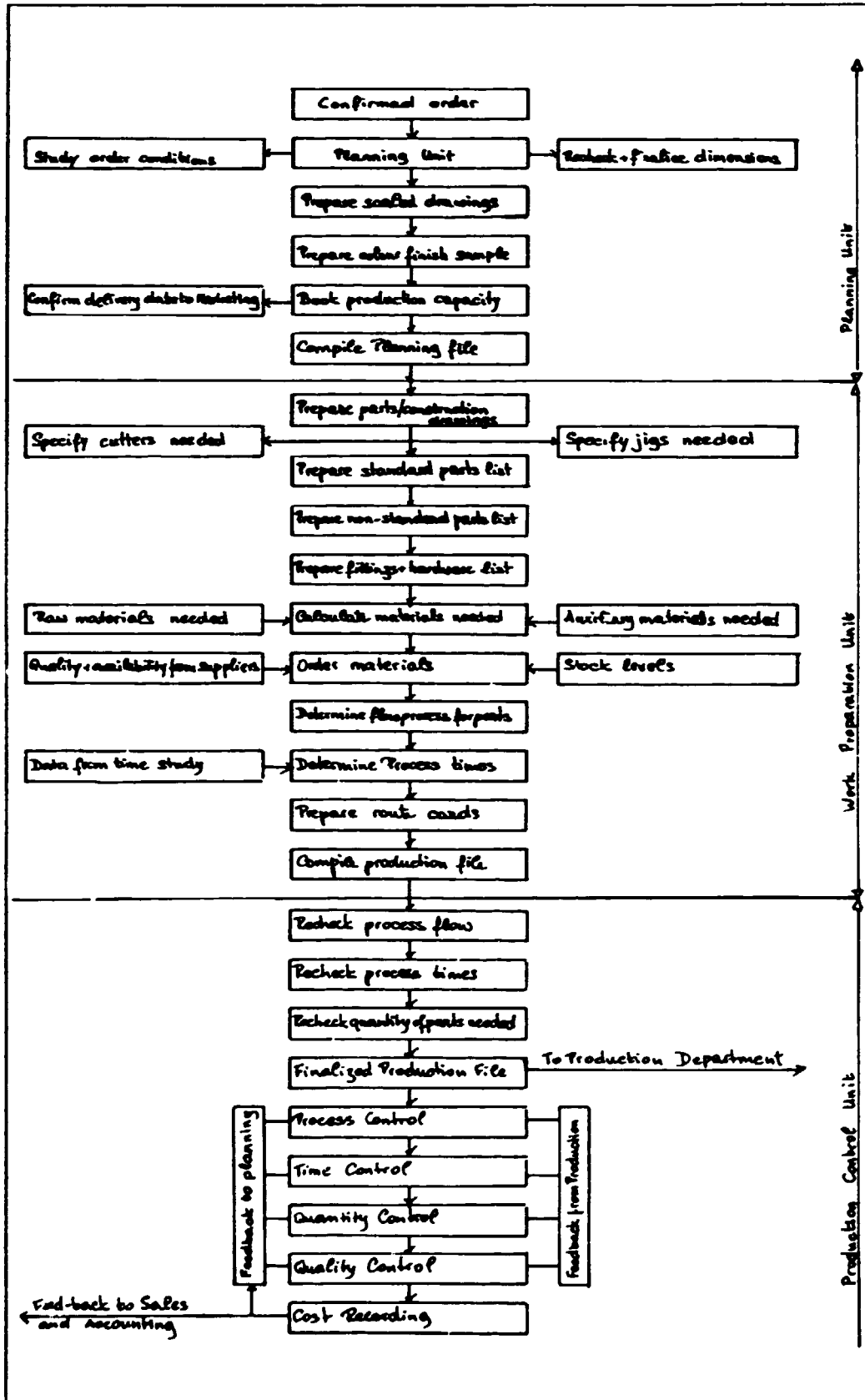


Fig. 2: PPC Work Flow Chart.

PRODUCTION SCHEDULE

Production Department	NOVEMBER 1991				DECEMBER 1991			
	Week: 45	46	47	48	49	50	51	52
1	_____							
2		_____						
3	_____							
4		_____						
5		_____			_____			
6			_____		_____			
7				_____		_____		

Key for production departments:

- 1. Rough milling
- 2. Fine milling
- 3. Laminating
- 4. Carving
- 5. Hand sanding
- 6. Assembling
- 7. Finishing

WORK SCHEDULE FOR ROUGH MILLING SECTION

23 October 1991

(For work orders from No. 1668 to 1671)

Machine No.	No. of workers	WORKING HOURS									
		730	830	930	1030	1130	1200	1300	1430	1500	1630
1	1	_____									
2	1		_____								
3	2			_____							
4	1				_____						
5	2					_____					
6	1						_____				

Key for machine numbers:

- 1. Surface planer (rough)
- 2. Radial arm saw
- 3. Surface planer (fine)
- 4. Thicknesser (rough)
- 5. Thicknesser (fine)
- 6. Tracing and bandsawing

Fig. 3: Production schedule using a Gantt Chart.

7. He recommended, on a selective basis, the additional tool maintenance and sanding equipment needed (i.e. universal tool grinder, bandsaw blade butt welder, brush and mop sanders).
8. He trained the counterpart staff on how to use the documentation designed.
9. He explained to, and convinced the members of the management in individual and in joint meetings and on an ad hoc basis, of the need to have a functional and coherent PPC system and how to use the proposed one.

Those aspects of PPC that the consultant covered and the written material he used at this factory form the basis of the PPC manual issued separately.

In addition to covering the aspects of PPC, the consultant also carried out a general evaluation of the factory. His specific findings were:

1. The factory's layout needs to be improved considerably, especially in the solid wood preparation area. The production flow in this area should be reversed so that there is a logical and sequential process flow.
2. The raw material storage area for timber is enclosed like a drying chamber. The ceiling is about 2 m high which limits storage capacity and the manipulation of timber during receiving and issuing.
3. The tool sharpening equipment is inadequate for the tools currently used. Although a possibility exists for subcontracting tool maintenance, the firms providing this service do not have the necessary technical knowledge and expertise.
4. Existing equipment is not correctly installed, levelled and maintained. Those machines that still are on pallets and/or on metal legs are unstable and vibrate during operation.
5. The dust extraction equipment used on some of the solid wood processing machinery is inadequate. Most of the machines have no dust extraction at all.
6. The factory's floor area is congested with obsolete equipment, overruns and cancelled orders. Aisles and pallet transport lanes are not marked. There are no buffer stocks between the departments for work-in-process.
7. The carving station, which is using hand carving only, is misplaced in a noisy and dusty area which is affecting adversely the productivity and creativity of workers. The work-in-process is moving to and fro between assembly, carving and sanding areas.
8. Long boards of timber are planed on one face by three workers before cross-cutting. Planing should be done after cross-cutting.
9. Because of the slow manual sanding methods used, there is a bottleneck in the sanding of carvings. Sanding with brushes and mops

using stationary and portable equipment will help decrease the sanding time.

10. Corner blocks of chairs and tables are machined in the assembly area instead of the machining area.
11. Housekeeping is very poor: the machines and floor are not cleaned thoroughly.
12. In the pricing of timber, the price is calculated on the dimensions that are used instead of the net quantity of timber needed (i.e. full waste is charged to the first product irrespective of whether it will be subsequently used or not).

B. Akka Wood Inc.

Akka Wood Inc. was established in 1986. Manufactured products that are made to order comprise joinery, furniture, architectural building components, cornices and mouldings for the local market and a range of wall shelves and brackets for the export markets.

The timber used in production is Philippine mahogany.

The total number of workers is 18 of which 10 have good carpentry skills.

During his stay at this factory, the consultant trained the counterpart staff on the job and carried out the following PPC-related activities:

1. He evaluated the wall shelf, model No. 72602 in terms of production flow, process involved, process times, construction details and dimensions of parts.
2. On the basis of the above, he replaced all mortise and tenon joints using the 32 mm system; standardized and improved the designs of some of the parts, consequently simplified their production.
3. He planned the production of 125 units of model No. 72602, using simple documentation and methods as shown in the PPC manual issued separately.
4. He scheduled the production of 125 units and determined the labour requirements of each operation. Although the calculated production capacity is 125 units per week of 6 working days, the production throughput per batch is 12 days. If the batches are scheduled on a weekly basis so that the two routers can work all the time, then the output is 125 units per 6 or 7 days, ready for lacquering.
5. He explained to and practised the above with the management and the counterpart staff so that they can do the same PPC work for other products and models.
6. He identified bottlenecks in the production, hence the required additional equipment for sanding, dowel hole boring and wood drying. Provided illustrative brochures of similar equipment.

7. He calculated the production cost of wall shelf model No. 72602 using a custom designed cost calculation sheet as shown in the PPC manual, by using the cost data provided by the management. Explained to the counterpart staff the method used so that they can also use it for other products.

Due to existing orders on hand for the local market and the unavailability of the necessary attachments and jigs for lathe, routers and vertical drill as well as the additional equipment needed, the actual production of the above planned production was not carried out.

In addition to the above activities, the consultant carried out a general evaluation of the factory. His specific findings were:

- i. Premises: The existing premises on the new factory site which the company occupies after the destruction of its premises by the Mount Pinotubo eruption, are only big enough for a correctly laid out production equipment. Additional floor area is needed for the sanding, assembly and finishing departments and for the storage of finished goods.
2. Production equipment: The production equipment owned by the company is general purpose carpentry equipment; additional equipment is needed, as identified by the consultant, to replace the excessively used hand tools.
3. Timber used: Air dried Philippine mahogany is used for production. However its moisture content varies between 10 and 40 percent.
4. Equipment layout: An overall production flow exists in the factory. But there are interruptions and congestions especially between rough milling and fine milling sections and in the fine milling section mainly due to the close proximity of the machines and wrong feeding directions.
5. Production programme: The current production programme includes various joinery and furniture items for the local market. The management wants to develop a range of wall shelves and brackets for the export markets.
6. Production methods: The jobbing production method is employed for made-to-order products produced to the customer's design requirements. Machining jigs are relatively well made and widely used, but no assembly and go-no-go control jigs and gauges are used.
7. Tool and machine maintenance: The use of badly maintained and unsharpened sawblades, drilling bits and cutters is common. Generally, there is no preventive maintenance until the breakdown of the equipment.
8. Production management: The firm does not employ any middle management personnel with appropriate training and adequate experience to undertake this task.

9. Production planning and control: At present no activity concerning production planning and control is carried out, and it is unlikely to be introduced until when the firm will employ a qualified industrial engineer.
10. Cost estimating: The method of cost estimating used currently is based on hypothetical guesstimates of material, labour and overheads.
11. Housekeeping: The factory is relatively cleaner and tidier than the other factories visited by the consultant.

C. Vera Wood Industries Co.

Vera Wood Industries, managed by the owner, manufactures relatively cheap items such as storage boxes, trunks, baskets etc. made of mixed materials of wood, rattan and wicker. Currently, the company is developing a range of new models to be produced in combination with steel and rattan. Most of the production machinery is self-made and simple. The existing factory building is becoming congested as the volume of production increases. The management is considering expansion of the buildings either on the same site or to a new site.

The consultant's main task was to carry out an overall evaluation of the factory in terms of production management expertise and PPC system used, plant layout, equipment and production methods, and to make suggestions towards their improvement and/or development.

The consultant's specific findings are given hereunder:

1. Premises: The existing premises occupy a land area of roughly 4,500 m² (82 m x 55 m) including offices, showrooms, production halls, loading and unloading ramps. The buildings for the production area consist of several low sheds, inconsistent with each other and the production work flow. In areas allocated to raw material storage, carpentry, sorting and cutting to length, framing and weaving the ceilings are too low, the floor is too rough, dirty, untidy and congested. These shortcomings, coupled with insufficient light and air circulation, make it unpleasant for workers to work thus affecting their productivity. It is necessary to have a master plan for the improvement of the premises step by step over a specific period. The minimum height of the eaves recommended for such buildings is 5 m and the minimum span should be 15m.
2. Equipment layout: The equipment layout follows the same inconsistency as the buildings. Due to this fact and the inadequate space available, a logical production flow cannot be seen clearly and easily. Such operations as weaving, sanding and finishing have to be done in two different places. Aisles for workers and products are clogged by equipment (such as the new spray booth) and by work-in-process lying on the floor. Turning lathes have to be placed against the wall, in other words, the machine should be between the operator and the wall, mainly for safety reasons.
3. Equipment maintenance: During the consultant's visit, there was no indication of any preventive maintenance and lubrication of the

machines being carried out. This, perhaps, is the main reason for the existing machinery's rundown conditions.

The consultant also noted that the sawdust, chips, shavings and dirt accumulated on the equipment had not been cleaned, probably for days, if not weeks.

Almost all the equipment is self-made, but it lacks even the minimum safety attachments required for the safety of the operators. This fact is more clear on the self-made circular saws.

None of the equipment has any kind of scales or measuring tapes fixed on them to facilitate its setting.

4. Tool maintenance: During the consultant's visit, the tools used on the equipment, such as circular saw blades, band saw blades and planer knives were badly maintained. One of the reasons for their being blunt is that the workers do not want to spend time on tool grinding or order to meet the fixed delivery dates. Secondly, the original cutting angles and teeth heights have been lost because of uneven grinding by hand using bench-type grinding wheels. This problem was clearly visible on the circular saw blades. The existing TCT circular saw blades have their TC bits either ground or broken off. These blades should be replaced with new ones.

TCT tools must be ground with diamond grinding wheels using a cooling liquid and a circular saw grinding machine. Grinding of HSS tools with cooling liquid is also recommended. The existing bench type grinding wheels are suitable only for the grinding of hand tools, and to a limited extent, for planer knives.

5. Production methods: A characteristic of rattan furniture production is that more handwork (consequently labour) is required than for solid furniture production. However, the amount of labour used by Vera Wood can be reduced considerably if more suitable equipment, work benches, jigs, sanding and working methods are used.

Many workers are working on the floor only due to the lack of work benches. This work position is not comfortable over long periods of time and it is the least productive work method.

Adjusting equipment by trial and error without using measuring tapes (because the machines have none fitted for set-up) is causing a loss of productive time. For example, the currently used pendulum type cross-cut saws are not adjustable for angle cutting. The wooden blocks nailed on the table for angle cutting are not precise enough and allow one cut per pull. Extra time is also spent to adjust the work piece for the second cut. Much productive time is thus lost when compared to that needed using an adjustable radial arm saw or a tilting arbor circular saw with a travelling table, which can cut up to 10 pieces at a time if suitable jigs are used.

The existing jigs can be further improved and new ones can be made. Instead of using a circular saw and a disk sander to round the corners of the frames, a jig can be made for the band saw and the two operations can be combined.

Probably more labour is used for hand sanding of the items before and after spraying than any other operation in the production. The excessive labour used for this operation can be reduced by utilizing pneumatically driven cylindrical sanders. This will no doubt produce a better and more consistent quality.

For the attachment of non-structural trims, hot melt glue guns could probably also be used instead of nails. (This needs to be tested.) This would eliminate some of the work of sinking the nail heads, filling them with putty (or wood mastic) and re-sanding.

6. Production planning and control: Production planning at Messrs. Vera Wood consists of the scheduling of incoming orders by production departments such as carpentry, machining, framing, weaving and finishing in terms of materials, labour and time needed at each department based on the estimates of the supervisor of each department. Production control is limited to the weekly meeting with the department supervisors to check if the production times and volumes have been met.

Ideally, the production scheduling is to be done operation by operation, based on justified time and labour requirements of each operation per piece or operation. On the other hand, production control should be based on feed-back information from each operation on a daily basis. The progress of production should be reflected on a planning board to enable visual monitoring. In this way, any necessary corrective action can be taken early enough - on a daily instead of a weekly basis.

D. Carlos Antonio Diseños Inc.

Carlos Antonio Diseños Inc. has been in the contract furniture business since 1960. The company is currently producing rattan and wicker furniture on wood frames. The factory has two divisions:

The solid woodworking division, with a workforce of 15 workers produces the solid wood components required for the rattan furniture.

The rattan division, with a workforce of 45 regular and between 50 and 150 temporary contract workers, weaves rattan and clads it on to the solid wood frames.

During the Consultant's visit to the factory, this firm was not ready for on-the-job training in PPC due to the unavailability of counterpart staff. The Consultant therefore did an overall evaluation of its strengths and weaknesses and discussed them with the management. The consultant's specific findings are listed hereunder:

1. Premises: The premises consist of two main buildings with a total floor area of approximately 5000 m². One of these buildings is occupied by the solid wood production department and the other by the rattan production department. Each building has enough floor area for storage of raw materials and finished goods, surface finishing and shipping in addition to the existing production area.

Free access to the timber storage area and the production hall by the nearby residents should be stopped, if only for fire danger and safety reasons.

2. **Production equipment:** This factory is the best equipped among the factories visited by the Consultant. Its equipment inventory includes general purpose woodworking equipment as well as specialized equipment such as stroke belt sanders, automatic copying lathes etc. However none of the equipment has any safety attachments.

There are many surplus machines which need a complete overhaul before they can be reused.

There is also a timber drying kiln with two chambers, each with about 25m³ capacity.

3. **Timber used:** The principal wood species used is Philippine mahogany, kiln dried by the sawmillers. Moisture content of timber used is not checked prior to production.

Timber piles in the raw material storage area stay on the ground. In most cases, stickers which, if used, would facilitate the air drying of timber and eliminate degrading, are not used.

The waste factor of timber is relatively high.

4. **Equipment layout:** There is a non-sequential production flow in the solid wood processing department. The layout of the rough milling, fine milling and panel processing sections has to be corrected as a matter of priority.

A block layout for the solid wood processing factory (Fig. 4), and equipment layout for the rough milling section (Fig. 5) and panel processing section (Fig. 6) was prepared by the consultant and recommended to the management.

The unused surplus machinery, compressors, electric power generators, machine maintenance and sharpening department and production monitoring office are blocking the flow of production. In their present location the compressors are getting much of the sanding dust from the rattan sanding machine. The boiler used for the rattan pole steaming chambers inside the production hall is dangerous from the fire risk point of view.

5. **Production programme:** Carlos Antonio's present production programme includes chairs, double seaters, coffee tables, headboards, bedside chests with wood and/or plywood frames and rattan cladding. Products are of good design and high quality.
6. **Production methods:** Production is on order and in batches. Although there are all kinds of production machinery, hand tools and hand fitting are widely used during the assembly stage. Assembly jigs for drawer runners and drawer slides are not used.

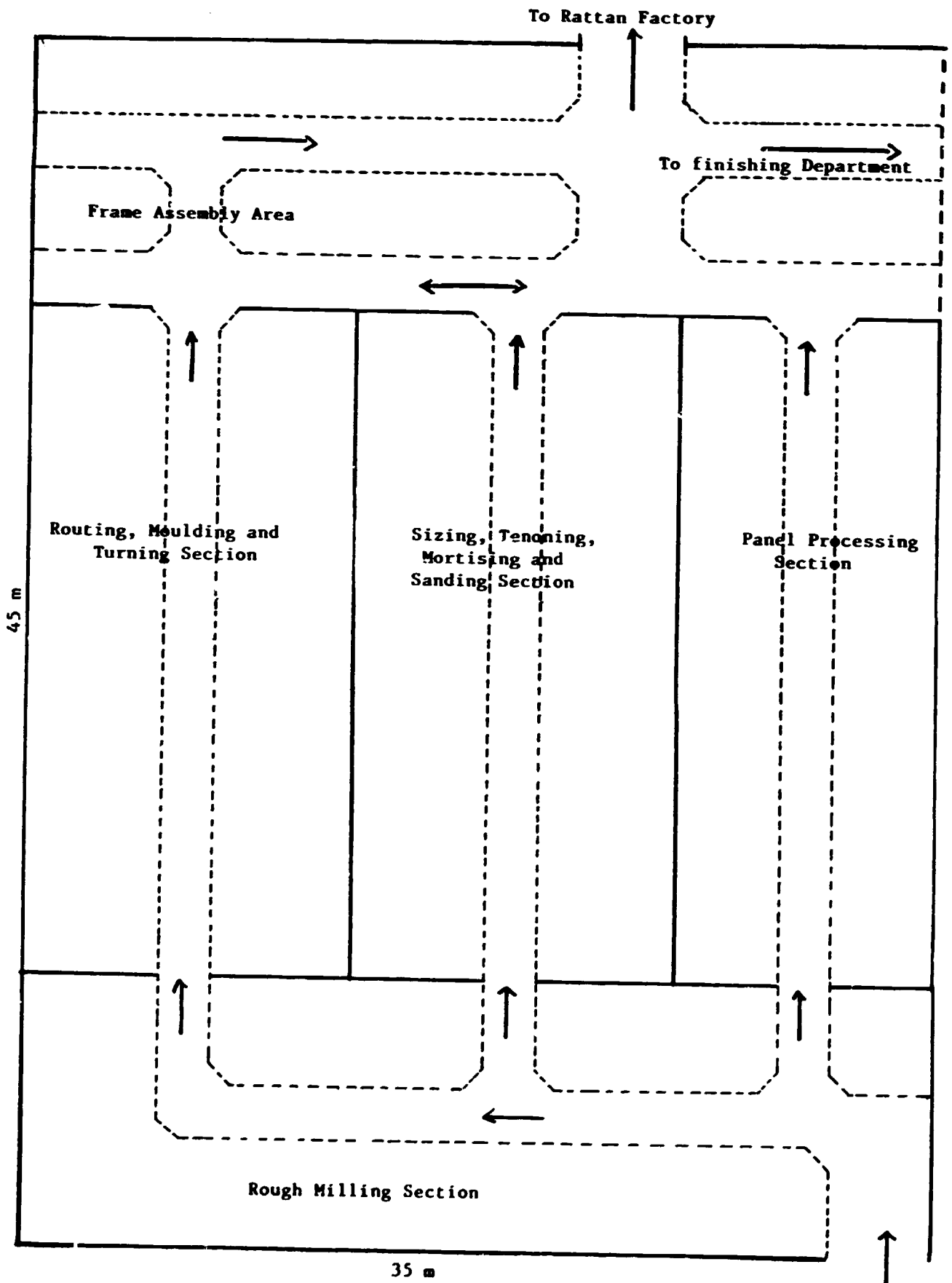


Fig. 4: Block layout for the whole solid wood processing factory.

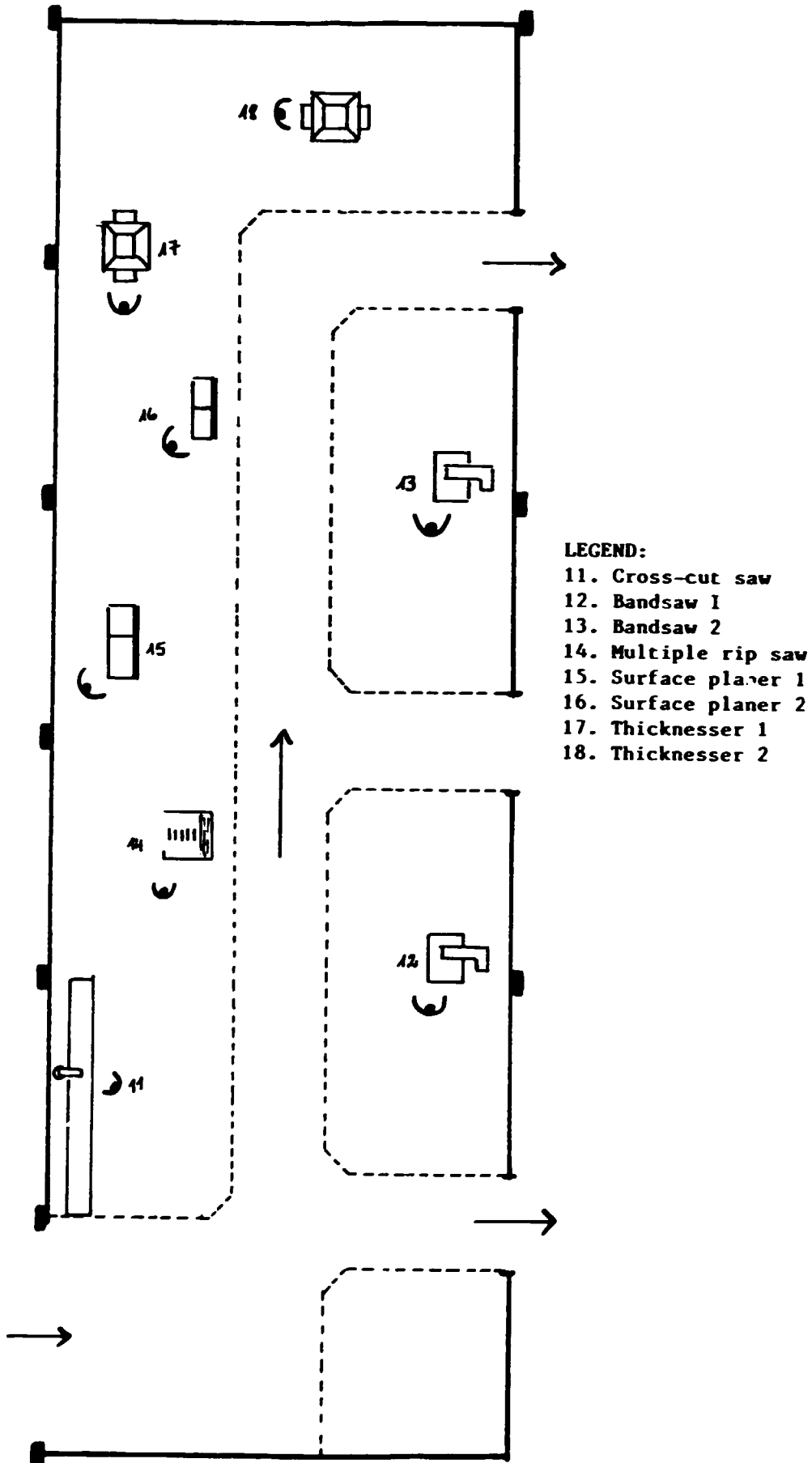


Fig. 5: Equipment layout for rough milling section.

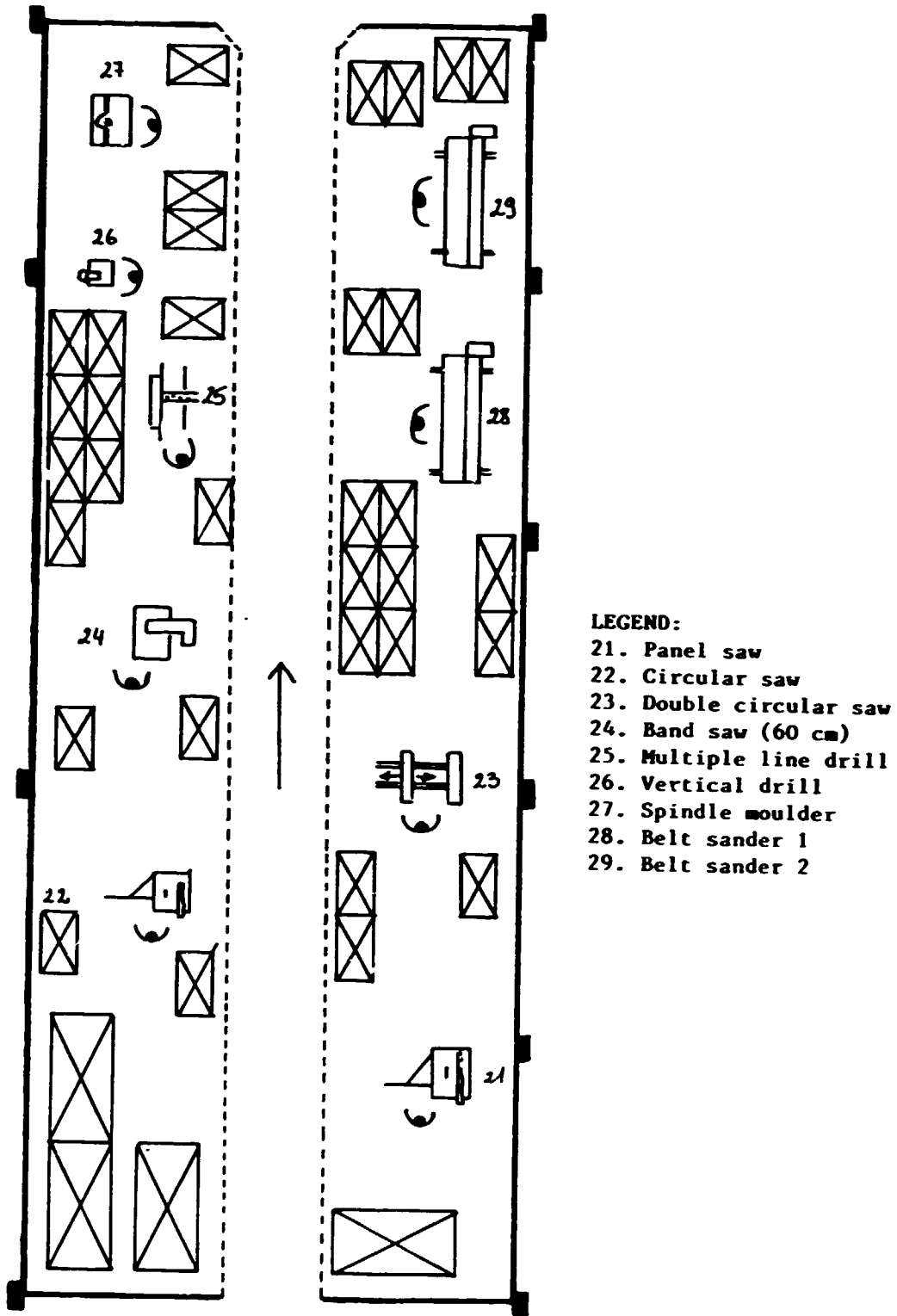


Fig. 6: Equipment layout for panel processing section.

7. Production management: There is no middle management between the factory manager and the supervisors other than the production monitoring staff.
8. Production planning and control: Any kind of systematic production planning and control is lacking. The orders are passed to the department supervisors who do all the planning and production. The status of production is controlled by the monitoring staff.
9. Tool and machine maintenance: The equipment is not the object of any kind of greasing, oiling, inspection and maintenance. Some of the machines are operated on wooden pallets or blocks without being fixed to the floor and levelled. Most of the circular saw blades need immediate repair and sharpening. They are being used unsharpened and with broken teeth.
10. Cost estimating: Product costing is based on rough estimates and is not systematic. Since actual costing is not done, a product's profitability cannot be determined.
11. Housekeeping: Cleaning of workplaces and tidying up the timber stacks in the raw material storage are probably the most neglected tasks in this factory.

The non-existence of any kind of dust extraction equipment in the production departments is aggravating the situation. Waste boxes of a suitable size for off-cuts are needed for cross-cutting saws, band saws, rip saws and circular saws.

Large stocks of solid wood and rattan waste accumulated in the courtyard of the factory should be disposed off immediately or placed further away from the buildings because of the high fire risks they represent.

Stocks of overrun parts have to be cleared out of the way of the production flow.

E. Berben Wood Industries Inc.

Berben Wood Industries Inc. established in 1978, started to produce mouldings and furniture components with a workforce of 289 workers. Due to the rising raw material prices, Berben Wood is now diversifying into production of more value-added products such as furniture and accessories.

During his visit to the factory, the consultant has noted the management's positive attitude and their willingness to upgrade their existing PPC system and to implement suggestions made.

However the time allocated for this factory was very short (4 days only) for the consultant to conduct a thorough on-the-job training for the PPC staff. Instead, a short evaluation of their PPC system was done, and a brief meeting was held with the staff concerned to present suggestions for the improvement of the PPC used presently. During that meeting a summary of the PPC manual was also given.

In addition to the above, the consultant did an overall evaluation of the factory and discussed his findings with the management. Specific findings are listed hereunder:

1. Premises: The factory site of Berben Wood Industries consists of three separate buildings for production and one for storage and offices.

At present, two of the buildings are used for the production of mouldings, components, louvre doors and finger jointed boards. The third building with an area of 2,824m² will be laid out as a general purpose furniture factory. The building has no side walls. Therefore, sand, debris and sawdust is easily carried into the building by the wind. The surface finishing area where spraying and drying of lacquer will take place, has still to be separated from the rest of the factory and put under positive pressure to keep the dust out.

2. Production equipment: More or less all types of woodworking equipment, including wide belt sanders, four-side planers and moulders, a double-end tenoner and a veneering press exist in the factory.

Some additional equipment would be needed, depending on the line and design of furniture in which the company will specialize.

3. Timber used: Kiln dried Philippine rosewood and mahogany supplied by their sawmill operations are used in the production.

4. Equipment layout: The furniture production line is still being developed and therefore the layout has not yet been finalized. In the aftermath of the last typhoon, some of the machines have been placed temporarily in different parts of the factory. After the finalization of the layout, aisles also have to be marked. During the available short time, the consultant prepared a block layout for the management's use (Figs. 7 and 8).

5. Production programme: The present production programme of Berben Wood includes mouldings, components, louvre doors, finger jointed wall panels and chairs. A garden furniture line for export is under development. However, it is hoped that the number of designs will be kept to a minimum and that the factory will specialize in a particular product range.

6. Production methods: Production of furniture is in small batches of different designs fulfilling mainly the trial orders. Therefore, the amount of manual work and fitting is high and the use of jigs is minimal. After the finalization of the factory layout and when producing for regular orders, all the parts should be produced as final products and fully machine sanded before surface finishing. Hand sanding should be used for de-nibbing only where necessary. If hand sanding is heavy, then sanding blocks are needed. Prototypes and jigs should be produced in a separate workshop in order not to disrupt the normal production.

7. Production management: At present there is a gap between the general management and the production supervisors.

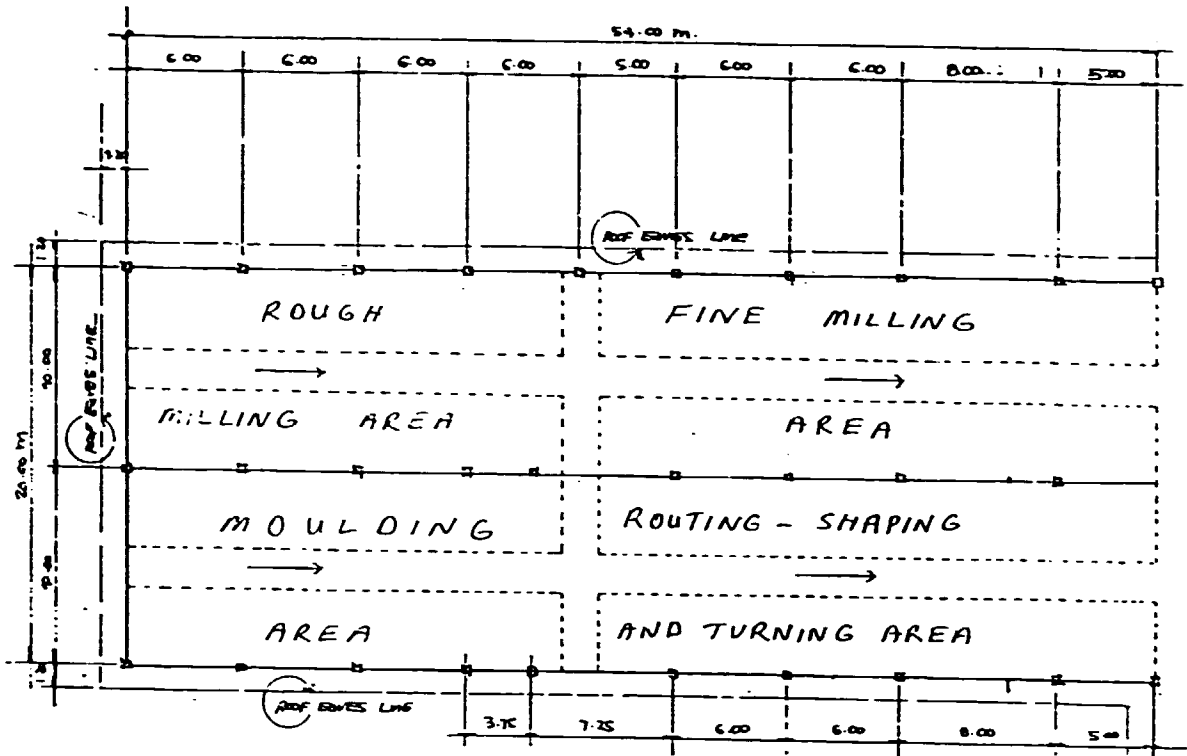


Fig. 7: Ground Floor Plan of machining area of the Furniture Factory of Berben Wood.

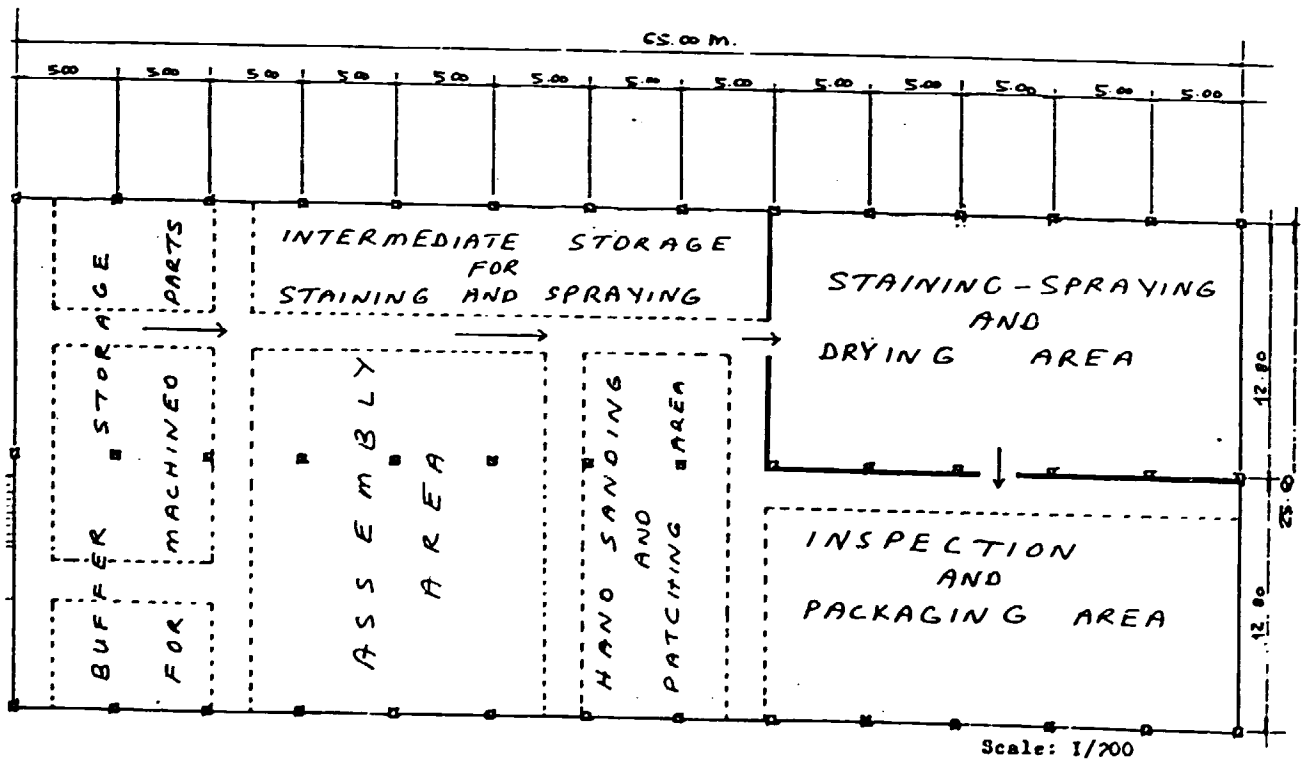


Fig. 8: Ground Floor plan of assembly and surface finishing area of the Furniture Factory of Berben Wood.

8. Production planning and control: The personnel are unexperienced but their good basic training and the existing positive attitude are a big advantage for the company. After a short period of familiarization and with the direction and support of the management, the PPC system proposed by the consultant can be implemented easily at this factory.
9. Tool and machine maintenance: Most of the existing equipment is worn out and run down due to poor preventive maintenance. At the end of each working day, the equipment used needs proper cleaning, oiling and greasing. Bearings, driving belts and chains and electric motors should be inspected periodically based on maintenance plans. Machines should be fixed to the floor and levelled before they are used.

Existing circular saw blades and drill bits are badly damaged and have to be repaired immediately.

Covers of electric distribution panels and fuse boxes should be closed and kept free from dust for safety reasons.

10. Housekeeping: Although a dust extraction system exists, it is not fully functional. Saw dust that is not extracted, is carried around by the wind blowing through the factory. This is a big concern especially in the surface finishing and drying area. The floor of the spray room should preferably be cleaned with a portable dust extractor using a broom attachment.

3. RECOMMENDATIONS

Most of the shortcomings identified by the consultant during his visits to individual companies, seem to be common. Therefore, the following recommendations apply to all:

1. The industry as a whole lacks appropriately trained and sufficiently experienced production managers and technicians. More graduates of subjects related to woodworking and industrial engineering should be employed and the existing ones should be exposed to the state-of-the-art of wood processing through visits to appropriate trade fairs, exhibitions and factories in the USA and Europe.
2. The industry should lobby with the appropriate government departments for the development of a contemporary woodworking course with options in machining, production engineering and management.
3. The industry, through its Chamber (CFIP) being the driving force, should develop and organize short training seminars with the help of international organizations covering various aspects of woodworking and production management, PPC and cost estimating, equipment selection and plant layout etc.
4. Timber with more than 10 percent moisture content should not be used for indoor furniture produced for export in order to overcome production and quality problems. Moisture content checks have to be made prior using the timber in production.
5. Factory layouts should be improved, taking into account the sequential production flow, stock areas for work-in-process between the

machines, and intermediate stock areas between different production areas.

6. Production and auxiliary equipment should be cleaned, oiled and greased daily and inspected and maintained regularly to prevent breakdown and hence a loss of production time in view of long delays and of the difficulty of obtaining spare parts.
7. The worn-out or damaged cutters should be replaced or repaired and subsequently sharpened correctly.
8. The labour force should be trained in machine woodworking skills to increase labour productivity, machine and capacity utilization and to attain the production precision necessary to permit interchangeability of parts and to eliminate hand fitting and use of hand tools during the assembly stage.
9. A critical process and dimensional control should be carried through all the stages of production by using the appropriate measuring tools and go-no-go gauges.
10. Such PPC functions as capacity planning, order control, scheduling, manpower planning, cost estimating, work preparation, machine loading, production control, materials planning and stock control should be performed systematically and continuously by the adequately trained staff.

ANNEX I

25 September 1990

PROJECT OF THE GOVERNMENT OF THE PHILIPPINES

JOB DESCRIPTION

DG/PHI/87/007/11-10 (J-12209) Rev.1

Post title: Consultant in production planning and control for furniture and joinery plants.

Duration: 2 months (split mission)

Date required: As soon as possible

Duty station: Manila, with travel in the Philippines.

Purpose of project: To develop and implement export strategies for four products (natural fibres, wooden furniture, builders' woodwork and wooden toys), to develop product adaptation, improve production and disseminate the experience to the industry and build-up an improved trade information and collection system and procedures.

Duties: Under the direction of the National Project Manager and in collaboration with the national experts, and other project staff, he will be expected to review and assess the production planning and control procedures used in the wooden furniture, joinery and toys factories cooperating with the project and advise on improvements.

In particular he will be expected to:

Phase I

(1) Review the reports on the three wood-based industries as gathered by ITC consultants during the earlier phases of the project, including other relevant information materials.

(2) Visit the firms participating in the programme (manufacturing wooden furniture, builders' woodwork and wooden toys) to appraise their range of products, product batch sizes, production methods and production planning and control methods.

(2) Advise each plant on the most effective production planning and control procedures, using time-and-motion principles, design efficient production systems and control methods, and adapting them to the existing operations, resources and capabilities.

(3) Prepare relevant documentation to serve as operational manuals for production planning and control procedures in the manufactured wooden products industry.

(4) Study the possibility of improving production efficiency through cooperation between the participating companies, in line with the specialization thrust.

(4) Conduct technical seminars in Manila and Cebu for the managers and supervisors of the plants on proper resource management and on maximizing the benefits of effective production control mechanisms.

Phase II

(1) Visit again the participating companies to assess whether his recommendations were properly implemented and whether improvements were introduced to the production plan and to the control systems of the individual companies.

(2) Advise the companies on what measures should be adapted on problems that may have arisen since his last visit.

(3) Allocate time with each company to monitor closely at factory-floor level the implementation of the measures suggested, identifying gaps and critical production paths and ensuring that the companies are able to solve their problems.

(4) Prepare the relevant documentation which will serve as operational manuals for production planning and control procedures in the secondary wood processing industries.

(5) Prepare a technical report with his findings and recommendations to maintain or further improve the production processes and control systems of the participating companies.

Qualifications:

Wood technologist or engineer with considerable experience in serial production of a wide range of manufactured wooden products in small and medium plants. Experience in production planning and control procedures essential. Experience in developing countries highly desirable.

Language requirements:

English.

Background information: Although wood processing is considered a mature industry in the Philippines, the low productivity level in the majority of companies is evident. Some factors are ineffective production layout, under-utilization of the existing equipment, improper selection of machinery. The wood industry must take measures to increase productivity and value added to its operations, thus attaining the competitiveness required on international markets. Since the raw material reserves of the industry are dwindling, an efficient production and an improvement in quality are the keys to its survival. The object of this consultancy is to assist individual enterprises in achieving these goals.

Under its Expert Development Project, the authorities of the Philippines are taking all possible measures to improve the productivity levels of individual wood-processing firms and to strengthen the export possibilities of their products. The project staff, together with internationally recruited experts from ITC and national consultants, undertook a supply verification and a market research for each wood-based industry as a base for the export strategy formulation phase of the project. The project is taking a cohesive approach for the three wood-based industries, since the findings of the previous phases reveal inter-related problems for all industries (wooden furniture, builders' woodwork and wooden toys).

ANNEX II

List of persons met

Bureau of Export Trade Development, DTI:

Mr. Francis Norman O. Lopez, Project Manager
Ms. Emma S. Monteagudo, Senior Planning Officer

Chamber of Furniture Industries of the Philippines, CFIP:

Mr. Eduardo D. Baluyut, National President

JB Woodcraft Co.:

Mr. Jose C. Bituin, Manager
Mrs. Myrna Bituin, Marketing Manager
Mr. Rizaldy O. Guintu, Production Manager

Akka Wood Inc.:

Mr. Armin D. Tinio, President
Ms. Angela G. Trinidad, Cost Accountant

Vera Wood Industries Co.:

Mr. Resty de Vera, General Manager
Mrs. de Vera, Marketing Manager

Carlos Antonio Diseños Inc.:

Mr. Mark G. Cancio, Operations Manager

Berben Wood Industries Inc.:

Mr. Antonio N. Chiu, General Manager
Mr. Lip Koon Goh, Works Manager

ANNEX III

PROGRAMME OF THE SEMINAR ON PRODUCTION PLANNING AND CONTROL
IN WOODEN FURNITURE PRODUCTION

SEMINAR ON :

**PRODUCTION PLANNING AND CONTROL
IN WOODEN FURNITURE PRODUCTION**

**October 18, 1991
9:00 a.m. - 5:00 p.m.
DTI Conference Room**

Brought to you by :

**CHAMBER OF FURNITURE INDUSTRIES OF THE PHILS.
DEPARTMENT OF TRADE AND INDUSTRY
EXPORT DEVELOPMENT PROJECT**

DTI Conference Room, 2/F WDC Bldg.
Juan Luna cor. P. Burgos Sts.
Cebu City

October 18, 1991

Speaker :

Mr. Sinan Cinar
UNIDO Consultant

9:00 am: Opening
9:15 am Introduction of Wood Furniture
Production Planning and Control
10:30 am Break
10:45 am Work Preparation
12:00 nn Lunch
1:00 pm Production Control
2:00 pm Workshop/Exercise
3:00 pm Break
4:00 pm Open Forum
5:00 pm Closing

ANNEX IV

Substantive Officer's Comments

The consultant has provided assistance not only in production planning and control - as per his job description - but he has also provided general evaluations of the factories he visited. The advice given was sound and to the point.

The Manual on Production Planning and Control he has prepared describes methods compatible with the factories' size and level of development.