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PHILIPPINES

Technical report: Advisory Service in Furniture Export Quality Control
to the Wood Processing Industry of the Philippines*

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

Based on the work of Donald Lubeck
Consultant in quality control of manufactured wooden products

Backstopping Officer: Antoine V. Bassili
Agro-based Industries Branch

* This document has not been edited.

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I. INTRODUCTION

Working under the direction of the Export Development Project Phase II (PRODEX II), the objective of this assignment was to assist four furniture manufacturers in aspects of quality control.

The duties for which a duration of two and a half months is foreseen are given in Annex I. Early assessment indicated that the first part of the assignment should be for one and a half months, the second part for one month. This was agreed to by the Project Manager of PRODEX II and UNIDO. To this effect, UNIDO recruited a consultant in quality control of furniture, Donald Lubeck, to undertake the first phase of this assignment. He was in the Philippines from 26 October to 9 December 1991.

Quality control indicates that a product is being produced, that acceptance standards have been established, and that what is desired is to be sure that the quality level is maintained.

What was found is that while the end product was very attractive and for the most part acceptable, the route taken to arrive at the final results was not acceptable, and certainly not productive.

This was discussed with Mr. F. N. Lopez, the Project Manager. The objective of this assignment should be quality assurance, and how to build quality into the product. Mr. Lopez found no problem with this change in emphasis.

It was also decided that an additional two factories in Cebu should be assisted in this field.

II. ACTIVITIES

The principal activities centred around working with furniture and toy factories. Brief visits were made to governmental institutions and businesses offering infrastructure support. The objective here was to see if follow-up activities could take place after the consultant has introduced systems.

A. Factory visits

Reports by previous consultants (Messrs. W. St. G. Vernon and G. Varena) have described the various factories in some detail, so only a brief description will be given here.

J. B FURNITURE

The consultant met with Mr. Jose Bituin, the owner, and Mr. Zaldy Guinto, the Production Manager on 11 November. The parameters of the objective were discussed: they were to establish two quality control check points, one prior to finishing and the second after finishing, prior to packing.

The quality control people would report directly to the Production Manager.

Separate from the quality control check points, there would be departmental inspection stations in which the inspectors would report to their respective supervisors.

The J.B. Furniture company is well organized, and already had in operation, in addition to supervisors, monitors who were checking progress and production on an hourly basis. The set-up is as follows:

MONITOR	DEPARTMENT	SUPERVISORS
Cecile	Rough Mill Carving	Rufing Benny
Rosanna	Lamination Machine	Danny Renato
Beth	Assembly Hand Sanding	Piping/Ding Carling
Ana	Finishing	Rico

A meeting was held with first the supervisors and then the monitors to introduce the consultant, and explain the need for controlling quality etc.

The original thought was to use the monitors, in addition to their other duties, as inspectors. It soon became apparent that they were unfamiliar with the details of the various operations, and that the process of training them would take a long time.

Consideration was given to establishing final inspection or quality control prior to the delivery of the "white wood" products to the finishing department, which is located several blocks away. This could not be done immediately since there was no one available with sufficient training to be an inspector and no time to train one. Another reason was that in the finishing department, a white wood inspection station already existed.

The products produced by J.B. are highly customized, elaborate in their design and produced in small quantities. The problems encountered in production, so far outweighed the need for quality control that the limited time available was devoted to assisting J.B. in making furniture. Quality cannot be inspected into a product, it must be built in. At the present time there are too many flaws in production.

Assistance provided

Layout

The first project completed was to suggest modifications to the layout of the factory. There was little systematic flow and an abundance of wasted space. Assistance in making a new layout was requested by the owner, Mr. Bituin, as his most urgent need.

Inspection

Time was spent with the "monitors" on broad categories of defects to look out for, such as splits and tear-outs in machining, sanding, scratches, unsanded areas, holes to be filled etc in sanding; open or poor joints in assembly etc. Part of the problems of inspection lie in the present production process where workers are paid to produce a unit. Normally, all parts should be sanded prior to assembly, however in this case, the assembler is not concerned with sanding, only assembly. The problems of sanding are currently being passed on to the final sanders.

The inspectors are young and quite shy and will need time to become really effective. For long time planning, there would need to be an inspection supervisor with sufficient background in furniture production to reinforce the programme and back up the inspectors.

Improvements in productivity

The three most apparent areas for improvement in production, apart from layout are in the areas of sanding, assembly and machining. Tooling, and, most important, tool maintenance need to be improved. This will no doubt be covered by the consultant on jigs and fixtures whose help was very beneficial to the factory.

The owner has purchased a copying lathe (not yet installed) and desires to buy another automatic linear lathe and a wide belt sander. In the consultant's opinion, there are much higher priorities to consider than the purchase of a wide belt sander, the more so as almost all production is shaped, the sander would operate only a few hours a month. As to the automatic lathe, there are not enough quantity runs to justify its purchase.

What the factory requires is an abundance of small tools, fixtures and supplies to improve and speed-up production. The following are examples:

- Nail and staple guns (a fundamental necessity).
- A range of hand clamps - different sizes, shapes, functions.
- The use of hot melt glue.
- A bandsaw welder and sharpener.
- Small disk and belt sanders, to be used in assembly for fitting parts.
- A collection of sanding heads for spindle sanders.
- Serrated belts for use on the brush back sanders.
- Pneumatic sanders for the machine sanding department.
- Small pneumatic and brush back sanders for the hand sanding department.
- Fladder sanders
- Clamps for edge gluing.
- A water cutter with wafers for spline assembly.
- A portable mortise and tenon jig to be used with hand routers.
- Sanding blocks.

Dust collection is a serious problem. The new layout would allow for the use of several small collecting units. This is more acceptable than one large unit.

Efforts have been made to convince the owner to solve the dust collection problem now. Commercial units designed for the specific application, should be purchased, and backyard mechanics should not be used.

Sanding presently is, and will continue to grow to be, one of J.B.'s big problems. Both machine and hand-sanding need serious attention. There is a lack of understanding of what the process should be, and how to achieve the desired results.

The subject of sanding is covered in the final recommendations of this report.

Summary

J. B. has grown from a small beginning to a fair-sized "craft shop". The next step is to elevate it to the status of a "factory".

J. B. Could be considered as a pilot project, for others to follow. The open mentality of the management, makes this an attractive idea.

In a "craft shop", the workers run the production. In a "factory", the management runs the production.

To make this transition requires the introduction of product engineering, which is management's tool that makes all things happen.

Product engineering is covered in the conclusion and recommendations of this report.

J. B. has agreed to build an engineering department over the present stock room. This could have great potential in serving not only J. B., but also the group of eight.

FURNITUREVILLE

When the consultant arrived to work with this factory, it had just shipped a container, and production was slow (waiting on lumber). It also seemed to suffer from the fact that it had in stock US\$ 30,000 worth of chairs that were produced, but not shipped due to the decline in demand in the U. S. market.

This factory is much smaller than J.B., however the type of problems are the same i.e. sanding, the need of small tools and the incorporation of product engineering.

Assistance provided

Dry kilns - A 12,000 bd. ft. dehumidifier type dry kiln is installed, but the plant did not know how to use it. In addition, there were shortcomings in the way the kiln was constructed.

A day was spent providing drawings on how the kiln can be used. The kiln is much too large for their needs, however, they were instructed on how to dry smaller quantities of lumber i.e. 5,000 bd.ft.

Instruction was also provided on how to use test samples, to determine what is happening in the kiln.

Sanding - Sanding is one of the major problems. Almost all sanding involves moldings and shapes. Small pieces of folded paper were used to sand, instead of using sanding blocks.

Management was instructed on how to make hand sanding blocks. There would be as many types of blocks as shapes used. Each block would have a cork or rubber lining between the sandpaper and the block, to aid in the cutting action. The use of hand sanding blocks would substantially reduce sanding time and improve the final results.

Finishing - An attempt was made to provide help in the field of finishing, however, the air compressor was so small that all the materials had to be diluted with thinner so that they could be sprayed. With this handicap, an acceptable product is produced. However, both the productivity and costs are affected.

Quality control - Discussions were held with the employees on quality control. There were enough examples of defects to make the point. The major emphasis was to establish a lighted inspection station prior to finishing. It was pointed out that all defects, especially in machining be brought to the attention of the specific operator.

Summary - Furnitureville has a long way to go to get into exporting. The biggest problem is cash flow. Money must be spent to upgrade production and purchase raw materials.

In the near future, they will need to be introduced to product engineering. For the present, by improving their sanding and paying more attention to the quality of the work in process, they can improve on productivity and final appearance.

GRASSROOTS

Grassroots is a company that, wherever you turn, there is something to be done. The factory is filthy, with poor to no lighting. In the sanding room, there is so much dust, that with a light on, one cannot identify workers, only ghostly forms. The machines in the factory are not in a proper sequence, are old and not maintained.

An estimated 40 to 50 percent of the total factory area is wasted space. There are boxes and piles of rejects numbering into the thousands. At final inspection, prior to finishing, the rejects rate appears to be around 25 to 40 percent depending upon the model. There are no record, and no one seems concerned.

The reject rate could immediately be reduced by inspecting parts prior to assembly. In this manner the rejected parts could be repaired, or discarded prior to assembly.

The subassembly area has children, 10 to 15 years old working on the floor, putting parts together, almost in the dark, covered with dust.

Material handling is a major problem. There are thousands of little parts for toys. They have to be machined, sanded, sub-assembled, assembled, finished and packed. This requires a system of material handling.

At Grassroots, some torn boxes are used for small parts, but the bulk of the handling is done by moving piles by hand from one place to another (causing damage). After final assembly the parts are grabbed and dumped on the floor in the inspection area to be passed or rejected.

Painted finishes are sub-contracted to outsiders. An airplane that has camouflage is painted by one contractor, camouflaged by another, decals applied by a third and then returned to Grassroots for a coat of clear lacquer. All this handling is done without using any handling containers or boxes.

The majority of the work is done by "contractors". There is a rough mill contractor who prepares the lumber, the machine contractor shapes the parts, then on to the sanding and assembly contractors.

There are advantages to this system in that the management pays for completed parts, and it is up to the worker to produce. These are serious disadvantages also. At the time of the visit there were about three hundred model display platforms being machined, each one defective. The contractors must be accountable for the quality of their work, not just concerned with numbers.

Assistance provided

In working with Ms. Theresa Hallare (sister of the owner, Mr. Joselito Hallare) and Mr. "Bot" Quizon, the Production Manager, the consultant had the feeling that something was wrong: that there was no response. Upon questioning this, he was informed that "there have been several consultants making recommendations, but nothing is even done". No one seemed interested in what he had to say, so the assistance provided was in the form of recommendations.

Quality control

There is a great deal that can immediately be done to reduce rejects. The first thing is to inspect the parts prior to sub-assembly and assembly. This can easily be done by having an inspection table "well lighted", and all parts pass through this station.

The second step is to control the amount of glue that is applied to assemblies. There is too much glue squeezed out. Unless there is a reason for using powder glue, a polyvinyl assembly glue should be used along with plastic squeeze bottles or small brushers.

Consideration should be given to an assembly line. It could consist of a long table 20 ft or 30 ft. long and 3 ft. wide. Trays that would slide along the table should also be made.

At right angles to the table, sub-assembly stations that feed the assembly line would be located. The models would be assembled, placed in trays and moved on to be inspected. Racks can be made to accept the trays for delivery to finishing.

With this system, there would be a minimum of work in process, positive control and nothing on the floor.

Summary

Grassroots has not made any attempt to make corrections or follow recommendations of previous consultants. They were not interested in the consultant's contribution.

AKKAWOOD

Akkawood recently moved into a new location. They have a fair amount of machines which are currently being used to make doors.

They have the beginnings of a good line of wall shelves and need much more design assistance.

They are preparing to set-up their own finishing, as the company "Made Philippines" which previous did their finishing was wiped out by the volcano's eruption.

Summary

There was not much to assist them with except to advise on the preparation of the finishing department and talk about product engineering.

BERBEN WOOD INDUSTRIES, INC. - CEBU

This is a factory in every sense of the definition. Their products are engineered, they closely control production. They have inspection systems as well as quality control.

Berben started in 1980 selling lumber. When this became difficult because of restrictions, they moved into supplying mouldings. Looking for more value added, they expanded into "garden type" furniture.

The factory covers about 6000 m² and employs 200 persons.

Assistance provided

Quality control

A review was made of their present inspection system and comments made where appropriate. A particular weakness was in inspection prior to assembly: too many repairs were being made after assembly.

A program was set up for colour matching parts prior to assembly. A proposal was made to establish a permanent "repair station", where all rejects would go. The idea is to repair immediately, and not let the rejects accumulate.

Sanding

Like most furniture factories, Berben is weak in machine sanding. As for hand sanding, they were sanding too much.

It was hard to convince the management and workers that "more is not better". Several tests were run and they provided that they were sanding too much and using too fine a paper. The 120 grit was enough and that using 240 and 400 grits were just a waste of time and energy. Hand sanding blocks were introduced. Cork was glued to wood and then cut into blocks of different sizes. The use of blocks reduced sanding time and resulted in a more uniform surface finishing.

A review was made of the sanding machines that were required. An effort must be made to reduce hand sanding. Examples of the machines needed are edge sanders with bobbins, pneumatic drum, brush back and fladder sanders. The plant already has three wide belt sanders. The weakness is in sanding parts.

Plant layout

They requested assistance in plant layout. As the furniture section is an add-on product, the machines were placed wherever there was room, rather than in sequence. A rough layout was provided. With increases in production, the necessity of making changes in the layout will become more important.

Finishing

Suggestions were made on how to improve the finishing area. These changes primarily involved the flow of product and the use of sanding blocks.

The finishing material used is not correct. They had to apply four and five coats where two would be sufficient. They will look into the matter.

Summary

This is a well run and efficient factory. People there listened to comments and reacted.

The areas for improvement are machine sanding, improving on the finishing materials used and revising the furniture production layout.

Discussions were held in relation to product engineering. They were very interested in a system that would improve their present one.

CARLOS ANTONIO DISENOS, INC. - CEBU
(Mr. Mark Cancio - Operations Manager)

This company is presently producing furniture in wicker and rattan. At one time they were deeply involved in wood furniture, however the factory located in Manila was totally wiped out by fire. This is when they switched to rattan and wicker.

The present factory in Cebu has a wide selection of machines, all very old. They want to return to furniture but need advice on what to produce.

Until there is something specific to talk about in terms of production, there was little assistance that could be provided.

D'OR DESIGNS, INC. - GUADALUPE, MAKATI

A spontaneous visit was made to this company. Discussions were held with the two principals, Ms. Dely Fernandez and Ms. Clarita Maget.

D'or has a most unusual line of products which include very fancy bird cages, table top items such as rustic Russian churches, Chinese towers etc. In their factory, they had examples of many other unusual items that had character and a unique appeal. All products were attractively finished.

Because of the lack of sales volume of the "unique" items, they were thinking of getting into small items of furniture.

At the time of the visit, the consultant felt that small table top items would be good for them. Upon further reflection, while the furniture items

are a good thing, the emphasis should still be on the "unique" items. Again, the problem is the ability to market Philippine items.

Their new production manager is very knowledgeable and quite impressive. The owners are on the floor every day. Given the market, this company has an excellent export potential.

B. INFRASTRUCTURE VISITS

Short visits were made to three institutions whose activities support the furniture industry. These visits were made to see what was available to carry out the recommendations of consultants.

Philippine Trade and Training Centre

This centre was funded by the Government of Japan. The basic function is to provide a venue for training.

From the furniture point of view, there was an elaborate laboratory for training people how to test finishing materials, and a machine to test the strength of chair backs.

What they had to offer is too scientific to be of help to the furniture industry at this stage. They do not actually perform tests, only instruct on how to do testing, and the industry is not ready to invest in testing equipment nor do the tests.

Bureau of Product Standards

The Bureau, which is under the Department of Trade, is a focal point for the furniture industry. They maintain a library of standards published throughout the world on the specifications relating to furniture and other products.

It is the Bureau of Product Standards that should have the equipment at the Trade and Training Centre so that it could be put to good use. One example is to assist local paint manufacturers through a programme of standards testing, to ensure that local products equal those of imported materials.

The Bureau is not in a position to provide product testing or performance services. They are a member of ISO and have available standards issued by other countries.

Design Centre

The Design Centre is in a position to provide direct assistance to the furniture industry. The two areas that it is felt the Design Centre can assist the industry in are in instructing in the use of product engineering and in furniture finishing.

The Design Centre is presently working with PRODEX II in developing the designs to be shown at the forthcoming furniture show in February 1992. It would be a natural development to carry that service one step further and product engineer the products for production.

Small factories that do not have drafting departments could pay a service fee to the centre to engineer products for them.

The design has already been active in the area of furniture finishing. It is felt that this activity should be reinforced so that, in the future, it could be used as a training centre that would provide a short, one week, course on furniture finishing.

III. CONCLUSION

In each of the factories visited, the subject of quality control was discussed with the management, supervisors and a selection of the workers.

A review of the operations was made and specific recommendations were outlined relative to each factory. Most factories had similar problems in that parts were not being sanded or inspected prior to assembly. This led to further quality problems.

One of the major inspection problems came from the "job-shop" approach of production. If the company is producing twenty wall shelves, they will give five each to four men. Even if this practice (which is not correct) is followed, all parts can still be sanded prior to assembly. It is a management decision!

All factories were weak on machine and hand-sanding. Machine sanding is virtually non-existent. This is the most critical area in the manufacture of furniture. If these companies want to export they must invest in machines to sand. There are small machines on the market that do not require large investments.

The area of hand sanding is misunderstood in all factories. In general, they are using too fine grits. In most cases, on solid wood, there is no need to go finer than 120 grit. The hand sanders are using 400 grit on white wood and wasting a lot of time.

It is felt that what the furniture industry needs most is assistance on how to make furniture.

There is a need to introduce product engineering (PE) into the Philippines. What PE states is that every question relative to how a product is to be made is answered BEFORE it enters production.

PE does not require a graduate engineer, rather a person who is familiar with the machines and operational sequences. PE is the only way to produce furniture at the higher productive and profitable level.

The basic elements of product engineering are as follows:

- | | |
|-------------------|---|
| Drawing: | The purpose of drawing is to provide overall dimensions and a numbering of each part. |
| Bill of material: | Outlines everything required to produce the product, i.e. materials, tools, hardware, nails, etc. |

- Route sheet: The route sheet has a detailed drawing of the part and a listing of every operation required to produce the part.
- Production schedule: This is a control sheet that follows the progress of each part through the manufacturing process.

IV. RECOMMENDATIONS

It is recommended that the second half of this project be devoted to assisting the manufacturers in upgrading their operations.

Product engineering must be introduced into the Philippines. What is proposed is a series of "workshops", where the participants would each "engineer" a product from their factory (forms provided). This would include group discussions and comments on the approaches taken for each product.

The second series of lectures would be on sanding. This series would introduce factories to what pieces of equipment are available to do specific jobs. The sanding series would emphasize what is to be accomplished, and how to go about getting the job done.

The third series would be on quality control. This series would outline what is required to maintain the level of quality performance for the various products produced, at the various work stations.

ANNEX I

JOB DESCRIPTION

DG/PHI/87/007/11-56 (J-12209)

Post title: Consultant in quality control of manufactured wooden products.

Duration: 2.5 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 quality control procedures currently used in the wooden furniture, joinery and toys factories cooperating with the project. He will advise on the establishment of controls in the quality of inputs, work in progress (at all stages) and of finished products, ensuring consistency in quality standards based on market requirements.

In particular he will be expected to:

Phase I

- (1) Review the findings and recommendations of ITC consultants prepared in earlier phases of the project, including other relevant information.
- (2) Visit the firms participating in the programme (manufacturing wooden furniture, builders' woodwork and wooden toys) to assess their range of products, production methods, quality of their products and quality control procedures used by them.
- (3) Inform companies on pertinent quality standards in target export countries.
- (4) Identify possible deficiencies in the existing quality control system and recommend remedies.
- (5) Advise each plant on the improvement of their quality control procedures at all stages of production (raw materials, production processes, finished products).

Convince producers and their staff that quality control is to be done at all stages of production.

(6) Work with an under-study (Filipino technician) and train him on the rudiments of quality control so that he may become a professional consultant to the wood-based companies in the country.

Phase II

(1) Visit again the companies to assess the changes made and the improvements introduced since his last visit.

(2) Advise on any problems that may have arisen and offer recommendations on how to further improve the quality control process.

(3) Conduct seminars in Manila and Cebu for supervisors, technicians and managers on the fundamental principles of quality control and the quality standards required in specific export markets for wood-based products.

(4) Prepare relevant documentation to serve as operational manuals for quality control in the manufactured wooden products industry.

(5) Prepare a technical report assessing the impact of quality control methods applied by the companies and outline other recommendations that are necessary to maintain the implementation of such controls.

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 quality control procedures and in developing countries highly desirable.

Language requirements: English.

Background information: One problem that export buyers experience with Filipino suppliers is inconsistency in quality of products. After producing a high-quality 'sample', the typical manufacturer is not able to mass produce the same product of a same quality. This results in export rejects. The primary reason for this is the lack of effective quality control measures in every step of the production process. Many manufacturers think that quality is checked at the end of the production line. They miss the point that the end product can only meet the standards of international buyers if the quality is controlled as early as in the first step of the production process.

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

SUBSTANTIVE OFFICER'S COMMENTS

The Consultant has visited factories that have already received assistance from other specialists provided by the project.

The sequence of the consultant missions were arranged with quality control at the end so that this consultant could have introduced quality control in plants that had already solved their problems in the fields of product development, manufacturing technology (use of jigs, surface finishing etc.) management (layout, equipment selection and production planning and control).

Unfortunately, partly due to the explosion of the Pinatubo Volcano (for some plants), to lack of interest of the management of others, and to lack of confidence in the validity of the advice received, the consultants were often asked to cover again topics already covered by another specialist or their advice was ignored.

This also happened on this assignment: some of the plants needing quality control were not yet ready for it because they did not implement the recommendations of former consultants, while others wanted the consultant in quality control's advice on such topics as layout and surface finishing.

Summing up, this report covers not only quality control, but also fields already covered by other consultants. This was done at the specific request of the factory managers, on an ad hoc basis. The advice given is sound.

The recommendations made are valid, the introduction of product engineering is basically the watershed between craft (or mechanized craft) and serial production. Before embarking on the course recommended, however, the contents, level of participants etc. will have to be studied in depth. The project's counterpart staff would have to also ascertain local interest - preferably from the industry at large and not from the firms selected by the project to receive assistance.

The lectures on sanding should preferably be given by the consultant on surface finishing, if and when he does the additional one month mission.

We fully agree with the need for lectures on quality control. These should cover: what to test, when and where to test and how to test, not only during the production process but also the inputs and the finished products.

This type of programme should have been done on behalf of the Chamber of Furniture Industries, but they alas, do not seem to recognize its importance.

Finally, the consultant has some reservations on the receptiveness of some of the firms receiving the assistance, a reservation which we regretfully share, the substantive officer having had the opportunity to visit many of those referred to.