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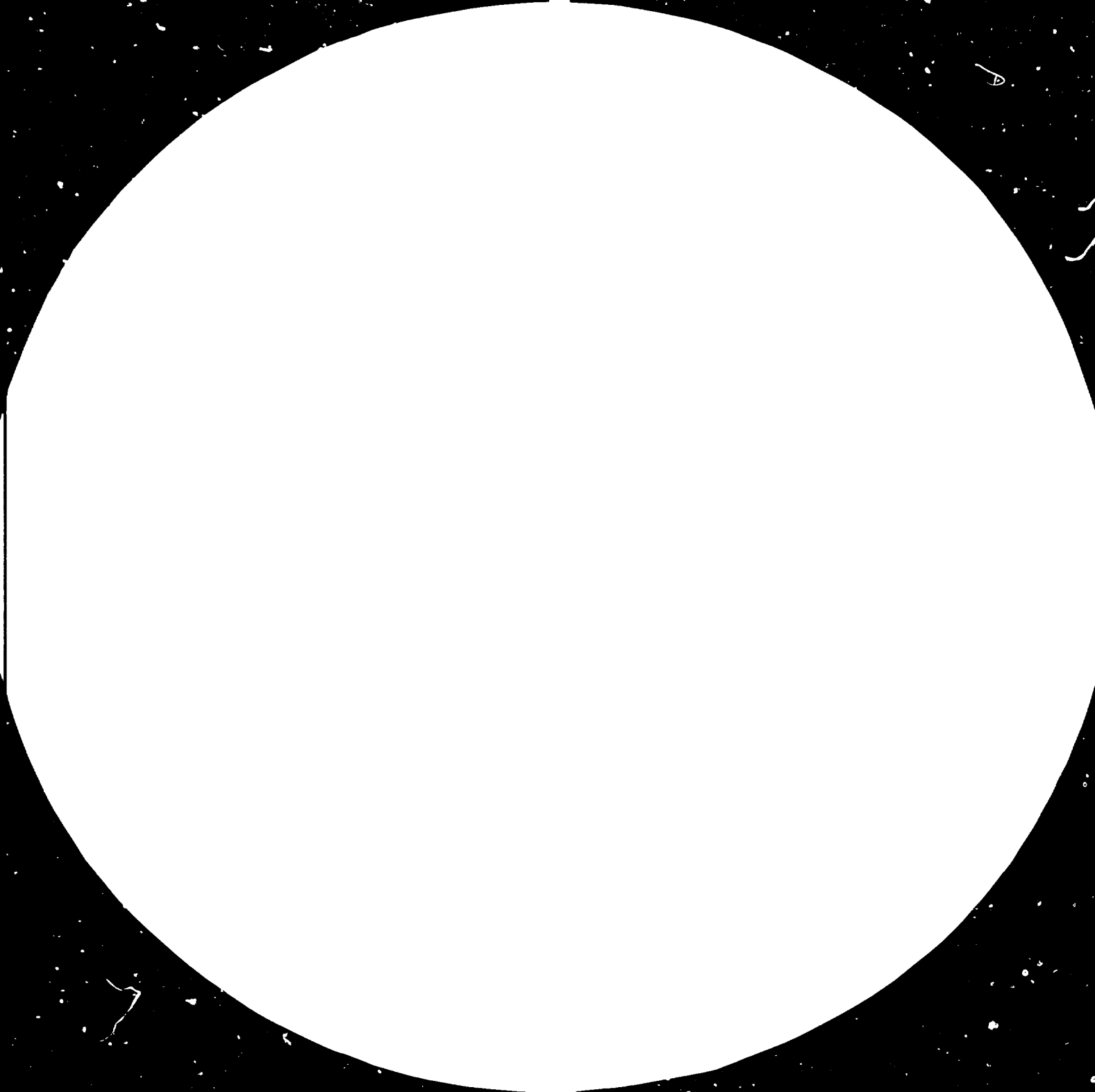
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REPORT ON THE SEMINAR ON THE ECONOMIC CRITERIA  
FOR THE SELECTION OF WOODWORKING MACHINERY AND PLANT SYSTEMS\*

Hannover, Federal Republic of Germany  
19 May to 2 June 1981

by

DESMOND CODY  
Team Leader

Industrial Engineer and UNIDO Consultant

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## 1. INTRODUCTION

A Seminar on economic criteria for the selection of woodworking machinery and plant equipment was organized and conducted jointly by the United Nations Industrial Development Organization and the Government of the Federal Republic of Germany. The Seminar was held in Hannover in conjunction with LIGNA 1981 (International Fair for Machinery and Equipment for Forestry, Primary and Secondary Wood Processing Industries) and INTERZUM 1981 (International Fair for Materials and Accessories used by the Secondary Wood Processing Industries) from 19 May to 2 June 1981.

The Association of German Woodworking Machinery Manufacturers, Section Woodworking Machinery, prepared the programme on behalf of the Government of the Federal Republic of Germany, in co-operation with the LIGNA Fair authorities. A similar Seminar was held in 1979 and in 1977 UNIDO had an office at LIGNA with three internationally recruited consultants and a staff member to provide assistance in equipment selection to participants from developing countries attending the Fair. UNIDO's presence was requested for the 1981 LIGNA Fair by the organizers to again provide impartial technical advice covering the following fields:

- 1) Machinery, equipment and toolings for primary and secondary wood processing industries;
- 2) Wood-based panel industries;
- 3) Furniture and joinery industries;
- 4) Furniture industries (case goods and chairs).

Two consultants accompanied the study tour group attending the INTERZUM for two days.

## 2. Purpose of the Seminar

The Seminar was intended to give participants from developing countries an insight into the various factors to be considered in the "economic selection of woodworking machines and plant systems" considering recent technical developments in this field.

The Seminar was also intended to provide information on economic criteria for the selection of woodworking machines and plant systems.

Concurrently with the Seminar, a consulting service was available free-of-charge for visitors to the fair from developing countries not participating in the Seminar to assist them in identifying alternatives in selecting from among the exhibiting firms, technologies appropriate to their local conditions.

Some 24 participants, selected by UNIDO, visited the INTERZUM Exhibition in Cologne (specialized in ancillary materials, hardware, fittings, etc. used by the furniture and joinery industry) on 23 and 24 May 1981.

The main objectives of the Seminar were:

- 1) To provide the participants with an insight into the latest materials and manufacturing trends and the efficient and modern techniques of woodworking production.
- 2) to offer the participants an opportunity to exchange their experiences as well as their ideas with the supplier industries, UNIDO consultants and among themselves on the woodworking industries.
- 3) to assist the participants individually with an ad hoc consultancy service on materials and equipment selection and utilization.

## 3. Programme

The programme of the seminar is given in Annex I. It consisted of

34 hours (29%) of lectures, 6 hours (5%) of panel discussions, 5 hours (4%) of assignment presentation, 3 hours (3%) of background information, opening ceremonies and administrative matters, 16 hours (13%) of plant visits and 54 hours (46%) of fair attendance. In addition there were 200 man hours of consultancy provided for the seminar participants and other visitors from developing countries attending LIGNA 1981. Two consultants accompanied the participants on the plant visits and visit to INTERZUM, Cologne.

The lectures covered a very wide range of subjects concerned with primary and secondary wood processing and their ancillary activities including research and development, industrial training and waste utilization. They were presented by specialists from each field dealt with and, in the main were relevant to the matters under discussion. However, since the preponderance of participants (53%) came from the furniture and joinery industry, many of the lectures were, as a consequence, only of marginal interest to them.

Individual lecturers made liberal use of visual aids to illustrate their topics including an overhead projector and film projector. During the course of the Seminar three films were shown, entitled:

- Wood Cement Particle Board Production;
- The Manufacture of Pencils; Fully Automatic Pencil Production; Lead Production;
- Mechanized Sawmilling.

#### 4. Participants

34 fellowships<sup>1/</sup> were awarded to candidates from selected developing countries. Governments in these countries were invited to

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<sup>1/</sup> Both male and female candidates could be nominated. In this connection attention is drawn to General Assembly Resolution 3010 (XXVII) designating 1975 International Women's Year, and 3342 (XXIX) calling for the full integration of women in the development process.



nominate up to three candidates who should be owners or technical managers directly responsible for the selection and subsequent operation of equipment in forestry and large woodworking plants (both primary and secondary wood processing industries) or government and investment board officials directly responsible for the allocation of "Pioneer status" to woodworking industries and/or the issuance of import licenses for forestry and for woodworking equipment; although owners or technical managers were preferred.

Candidates were requested to indicate under item 14 of the nomination form their specific interests among the items listed in the Programme of Work of the Seminar attached to an aide-mémoire issued to them and to give in the attached questionnaire and under item 12 descriptive details of past experience, indicating size of firm, range of equipment installed, the problems it faces, etc. This questionnaire, duly completed, was returned with the fellowship nomination form.

UNIDO, in consultation with the German authorities, selected participants from among the nominations received taking into account professional qualifications and other relevant considerations.

Participants were required to attend the Seminar in their individual capacity although they were officially nominated by their respective governments. They should attend the Seminar according to the schedule prepared by the host authorities and comply with the rules and regulations laid down. They were expected to contribute to the training programme whenever possible, eg. in technical discussions related to the industries in their countries.

Participants were also expected to be fully informed on the conditions of the industry in their own countries. Prior to the Seminar each participant was requested to prepare a paper of about 1,000 or 2,000 words, typewritten, describing the current status of the wood processing industries' and future prospects for development. The

restrictions for importing (if any) and possibilities for local manufacture of forestry equipment and wood-working machinery, tooling and/or their components. Emphasis should be given to the problems which may require technical assistance by UNIDO.

Two copies of this paper were brought by the participants to the Seminar. These will be reproduced and distributed to all participants after the Seminar.

5. Observers

Qualified observers from developing countries, attending at no cost to UNIDO or the Government of the Federal Republic of Germany, were welcome to attend the Seminar in Hannover at the LIGNA and participate in the discussions. The number of observers was limited. They were required to register with UNIDO at least one month before the Seminar.

6. Language Requirements:

The Seminar was conducted in English. A proficiency of the English language was required. Candidates whose mother tongue was not English were required to submit - together with their nomination forms - a language certificate indicating their proficiency in English before being considered eligible for participation.

The list of participants and observers is given in Annex II.

7. Financial and Administrative Arrangements

Financial and administrative arrangements were as follows:

UNIDO, through a voluntary contribution of the Government of the Federal Republic of Germany, provided:

- a) Round-trip economy class air transportation between the airport of departure in the participant's home country and Hannover airport, Federal Republic of Germany.
- b) b) A daily subsistence allowance in local currency at the current United Nations rate, to cover board, lodging and incidentals for the period of attendance at the seminar; (in December 1980 this rate was the equivalent of US\$ 72).
- c) Internal travel related to the seminar.

Furthermore, UNIDO provided in co-ordination with the German Association and the Fair authorities:

- a) Seminar facilities:
- b) The training course proper.

The participants' Governments or their employers were required to bear the following costs:

- a) All expenses in the home country incidental to travel abroad, including expenditure for passports, visas, medical examinations, inoculations and other such miscellaneous items, as well as internal travel to and from the airport of departure in the home countries;
- b) Salaries and related allowances for the participants during the period of the seminar.

Neither UNIDO nor the host Government assumed any responsibility for the following expenditures in connection with the participants' attendance at the Seminar:

- a) Costs incurred with respect to any insurance, medical bills and hospitalization fees;
- b) Compensation in the event of death, disability or illness;

- c) Loss and/or damage to personal property;
- d) Purchase of personal belongings and compensation for damage caused to them by climatic or other conditions.

3. Documentation

In addition to the documentation prepared by the lecturers in respect of particular aspects of each topic, the following UNIDO and other publications were supplied:

- UNIDO, an experiment in international industrial co-operation;
- Wood as packaging material;
- Pre-fabricated wooden houses;
- Sources of information on furniture and joinery, building boards from wood and other fibrous materials, utilization of agricultural resources for the production of panels, pulp and paper, and industrial maintenance and repair;
- Upholstery production for developing countries;
- Small and medium enterprises planning and building layout; (Landesgeneralamt Baden-Württemberg)
- Pneumatics in woodworking (Vogel-Verlag, Würzburg)

9. Seminar Library

Relevant reference books, catalogues and other materials were made available to the participants during the period of the Seminar.

Photocopies of articles of special interest were also made available on request.

10. Consultancy

A team of four consultants was available for visitors from developing countries to advise them on their problems in equipment

selection, production technology, etc. The expertise of the team covered practically the complete field of wood processing industry, both primary and secondary. The consultancy booth of UNIDO/FAO was located in the Service Centre of the LIGNA Fair, but was manned by UNIDO team only. FAO had not been able to send their representative due to some time problems. Two posters at the reception of Foreign Visitors were the main information on the consultancy services. The LIGNA catalogue indicated the representation of UNIDO at the fair but not the nature of services available. The posters were available in English language only although one of the team members spoke French and one Spanish, as their native language. No information material on the activities of UNIDO was available at the stand.

The aspects dealt with included the following:

- 1) Selection of equipment for furniture, joinery, and other secondary wood processing industry with given product ranges.
- 2) Re-designing of products for full utilization of existing machinery.
- 3) Information about consulting companies, represented at LIGNA, with experience in turn-key projects.
- 4) Statistical data related to marketing of certain products.
- 5) Energy generation.
- 6) Co-operation with UNIDO as consulting company or as individual expert.
- 7) Information requests on various activities of UNIDO.
- 8) Availability of UNIDO's assistance to projects in developing countries.
- 9) Requests for literature and other information published by UNIDO.
- 10) Co-operation of wood research laboratories with developing countries.

- 11) Location of and introduction to suppliers of specific types of woodworking machinery and equipment.

#### 11. Seminar Assignments

The details of the Seminar assignment work are given in Annex III. These related as far as was practicable to the work normally carried out by each participant in his own factory. Twelve working groups were formed and their work was carried out on the basis of informal discussions among themselves, visits to various stands at LIGNA and discussions with individual members of the UNIDO team.

Each group was requested to make its presentation on the last two days of the Seminar. In fact, for one reason or another four groups did not do so. Table I summarises the views of the consultants in respect of each presentation made.

TABLE I

## SUMMARY OF EVALUATION OF PRESENTATION BY PARTICIPANTS

ASPECTS	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
	Kiln Drier for Furniture plant	Sawmill and K.D.	Kitchen Cabinet Plant	Flush Doors 50 units per day	Veneer and plywood plant	Furniture and joinery plant	Forestry equipment selection	Parquet Floor Plant	Handicrafts					
Group leaders:	L. Davis	Lazaroni	Bueno/Gálvez	Ashlabor	Vichi-trananda	Baluyot	Ponce	M. Grane	Mustafa					
Research and Preparation	3	3	3	3	2	3	2	3	2	The time allocation was not sufficient to present the last four assignments.				
Technical Content	2	3	3	2	2	2	2	3	3					
Cost benefits Ratio	3	2	2	2	2	1	1	3	1					
Management Content	1	1	1	1	1	1	1	3	1					
Appropriateness to Developing Countries	3	3	3	3	2	3	2	3	2					
Presentation (oral, visual aids, etc.)	1	3	3	3	1	3	2	3	1					
Employment context	1	3	2	3	1	2	1	2	2					
Marketing context	1	2	2	1	1	1	1	2	2					
Provision for training and maintenance	1	2	1	2	1	1	1	2	2					

Key 3 satisfactory

2 requires improvement

1 unsatisfactory

12. INTERZUM AND LIGNA TRADE FAIRS

INTERZUM, Cologne

This fair, also held every two years immediately before LIGNA, is concerned with materials, accessories and equipment used in the furniture, joinery and general woodworking industries. It therefore included materials and equipment for solid wood and particle board production, adhesives, lacquers, hardware, fittings, veneers, PVC foils, upholstery, joinery, timbre framed housing and other wood and wood-based products.

Twenty-four of the participants attended the fair for two days and their reactions to it may be summarized as follows:

- 1) Surprise at the wide variety of materials other than wood and re-constituted wood used by the industry, such as those made from metal, plastic, and combinations;
- 2) a growing realization of the extent to which the industry depends on "brought-in" components, their variety and high quality;
- 3) satisfaction at the discovery of so many sources of supply for hardware, fittings, surface coating materials, upholstery materials, small tools, etc.
- 4) surprise at the extent to which the upholstery sector of the industry has become mechanized, particularly in relation to fabric cutting and sewing, cushion preparation, upholstery assembly, procedures for springing and buttoning and materials handling and storage;
- 5) surprise at the large number of suppliers of wood components and as cabinet doors (framed, handled, louve-ed) cabiner drawer fronts, mouldings, maine woodwork and joinery doors and door frames. This was a sector of export markets which many had thought, up to then, to be the special reserve



of developing countries, and the one with the greatest potential.

- 6) Encouragement at finding a number of developing countries participating in the fair.

Many of the participants placed orders for materials and equipment at the fair and established very valuable contacts for future reference.

#### LIGNA, Hannover

This fair is the largest woodworking machinery exhibition in the world. It covers an area of approximately seven and a half thousand square metres and has over 900 exhibitors from many countries especially the Federal Republic of Germany, Italy, Japan, the United Kingdom, France and Scandinavia. It includes every aspect of wood machining processing with particular reference to the following:

1. Forestry machinery and equipment;
2. Sawmilling machinery and equipment;
3. Planing and moulding machinery;
4. General woodworking machinery;
5. Machines for joinery production;
6. Machines for particle board, plywood, hardboard and veneer production;
7. Panel production machinery;
8. Machines for mixed production programmes;
9. Lacquering equipment;
10. Materials handling and waste extraction equipment.

Included also are tools and tool maintenance machinery, adhesives, lacquers, wood protection agents, compressed-air line systems, environmental control equipment and energy conservation equipment.

As would be expected, participants derived considerable information and established valuable contacts from their visits to the stands of the various exhibitors and their discussions with them. Many placed orders for machinery and equipment, while others considered offers that were made to them during the course of the fair.

The following are some general comments made by Mr. J. B. Verbestel, UNIDO Consultant in connection with the latest developments in particleboard production as evidenced at LIGNA 1981:

New particleboard processes:

During the last years, we have seen great specialization of particle board. Two or three types of wood particle board existed ten years ago, now we have more than twelve (12) types on the market. The machinery makers had to meet this evolution of the market, where the problem concerns the different stages of production. Progress is so fast that a well known machinery producer did not even exhibit a system of continuous thin particle board plant, which two years ago created a sensation. The system, the Mende system, continues nevertheless, to be a success, it is improved even, but it has to give place for new, up-to-date systems.

As the periodical W.B.P.I. comments, the MDF (medium density fibre board "strikes the world". All the machinery producers, especially the press manufacturers present at the LIGNA, presented press lines for MDF. The forming stations are roughly the same principle. One of the most attractive is the Pendistor, exhibited in Hall 21. This firm has experience in fibres, due to its relations with firms involved in fibre and pulp preparation, the Swedish Defibrator Company.

Simpelkamp started with the experience collected with Washington Iron Works, inventor of MDF.

Bison presented a reliable system characterized by their usual trend of simplicity.

The press lines for MDF have incorporated a pre-press system in order to reduce the thickness of the pressed mat. A pre-press for particle board was introduced thirty years ago, but was let drop later on. Now the pre-press comes back. The HF (high frequency) heating gained success in the MDF technology. The heating is applied in the form of pre-heating or principal heating. Most of the press manufacturers have introduced the system of pre-heating in their lines. It seems that MDF production will be reserved for fairly large production capacity. A calculation shows that the production costs of one square metre of 19 mm board will be between \$ 4,40 per cubic metre for 300 tons per day capacity.

The Italian firm Pagnoni presented a press line where dry hard board can be made as well as the normal MDF board. This principle is interesting, but a careful study of the economy is necessary. The process of MDF is quite different from the particle board processes. The particles are obtained in chippers, and the knives cut the wood to make thin chips which are very fine. The fibres are obtained from disintegrating machines. The Sunds de-fibrator for fibres is a reliable machine, based on years' experience in the field.

For the particles for particle board, several systems were presented. The problem for the machinery maker consists in meeting the needs of the different types of board and the different raw materials. One important producer came up with more than 15 different types, and with capacities from a few hundred kilograms to a few tons an hour.

The trend now is to make machinery with good protection against stones, sand, metal pieces, etc. Maintenance was considered, but special attention was given to the operation of changing the knife rings, to complete the operation in the shortest time.

The glueing machines for normal particle board did not display important improvements. Special glueing machines have been developed for the wafer board and the strand board production. The glueing of fibres for MDF is generally executed by the injection of a low viscosity glue in the fibres and in some places of the air conveyors.

Concerning the glue, the firms present at the fair are still concerned with the formaldehyde release of particle board. Today a satisfactory solution to the problem has not yet become available. The molecular composition of the glue has been modified but the glue itself loses important qualities of hardening. The formaldehyde problem is being studied by several authorities in different countries.

I have referred to the press lines in the above consideration of MDF. There is a general trend to come to presses with one opening and a large size, in length and width.

Two presses for continuous pressing were shown. The Conti press, invented and built by Küsters has a continuous steel band rolling very small bearings, fixed in a continuous chain. The pressure and the heat are transferred to the steel belt through the rolling chain. Such a crude description is just enough to awake the interest of the reader and to encourage him to ask for complete information. The press operates on

a completely new system. The first press is already working in Belgium. Very important features include continuous operation, exact control of the pressing programme and the temperature programme and very good accuracy in thickness. The production is about 300 m<sup>3</sup> per day.

The new Bison Hydro-press is also a continuous press. An endless steel belt glides both on the upper and on the lower heated plates. This certainly is a very important new development in the press. Compared to the Conti press it is a much simpler system. It is worth of further study on the basis of more elaborate information.

In the field of slicing, a new machine has been developed by the C.T.B. (Centre Technique du Bois, Paris). It is a vertical slicer, working at constant diameter. This gives the possibility of slicing wood of very small diameter, and of producing thick veneers without splitting (10mm). It is particularly appropriate for the production of wood tiles, sheeting, crates and floors. Similar thick veneer is exported by Roumerex. It seems that such a market development is possible.

### 3. Plant visits

Details of the plant visits are given in annex IV. With few exceptions they proved of considerable interest to the participants and were an excellent introduction to the machinery and equipment subsequently on show at LIGNA. Participants were particularly impressed with the layout of machines, internal transport systems, factory organization, quality control and productivity of each factory and many expressed the view that much of what they had seen could be implemented in their own plants.

14. Seminar evaluation

UNIDO's forms for the evaluation of the Seminar (entitled Evaluation of In-plant Group Training Programmes) were completed by 32 participants before the end of the seminar. The replies were collated and details of this are given in Annex V. It is evident the Seminar content responded only in part to the needs of the participants given their wide divergence of backgrounds and heavy concentration on furniture production. However, to this extent at least it should be instrumental in the future organization and development of their businesses.

In-plant visits and attendance at the trade fairs were particularly appreciated, the more so because of the willingness of all the personnel encountered to discuss and demonstrate in considerable detail every aspect of their activities, whether technical or managerial, and to answer fully and openly any questions put to them.

15. Assessment of the Programme

While all lectures were of the expected standard and depth, difficulties were experienced with some lecturers whose knowledge of the seminar language, namely English, was not up to that required for public speaking and who contented themselves with reading their scripts in halting English to the great discomfiture of their listeners. Some lecturers did not turn up and others commenced their sessions long after the time stated on the programmes. Many participants, with justification, complained of a lack of communication in respect of certain seminar activities which resulted in confusion and misunderstanding. The final impression gained was an over-emphasis on lecture sessions, many of which were over-long and somewhat boring. This can be more adequately appreciated when it is reflected upon, that participants on occasions spent as much as six hours listening to lectures being read to them.

ANNEX I

WORK PROGRAMME

<u>Date</u>		<u>Implementation</u>
<u>Tuesday, 19 May 1981</u>		
9:30		Registration
10:30		Opening Addresses: <u>Mr. German A. Woment</u> , Executive President of the Deutsche Messe-und Ausstellungs AG Introduction to the Seminar: <u>Mr. H. Eldag</u> , UNIDO staff member
Lunch		
14:00		Information on the German Woodworking and Wood Processing Machinery Sector.
17:30		Film on felling operations by chain saw, Messrs. Stihl.
<u>Wednesday, 20 May 1981</u>		
9:30	Not presented	Basic Principles in Selecting Log Equipment, Mr. Letourneau.
11:00		The Manufacture of Particle Board Based on Unconventional Raw Material, Mr. C.E. Vermaas.  Film on Wood Cement Particle Board Production, Messrs. Bison Bähre.
Lunch		
14:00		Wood Derived Panel Products for Developing Countries, Mr. Sitzler.
	Not presented	The Production and Use of Woodwool Light Weight Building Boards, Mr. Bory.
<u>Thursday, 21 May 1981</u>		
9:30	See Annex VI	Factory Visits Group A: Tropical Hardwood Sawmill Group B: Furniture Factories
Lunch		
14:00	See Annex IV	Group A: Veneer Production Group B: Joinery Factory
<u>Friday, 22 May 1981</u>		
9:30	See Annex IV	Factory Visits Group A: Particle Board Group B: Furniture Factories
Lunch		
14:00	See Annex IV	Group A: Prefab House Production Group B: Furniture Factories

Implementation

Friday, 22 May 1981

17:00

Participants specializing in Furniture and Joinery Production will travel to Cologne to attend the INTERZUM Fair during the weekend.

Saturday, 23 May 1981

Free day in Hannover

18:00

(Visit to INTERZUM Cologne)

At the INTERZUM: Machinery and Equipment for Quality Control of Furniture (Case goods and seating furniture), by Mr. Fink.

Sunday, 24 May 1981

Sightseeing in Hannover

(Visit to INTERZUM in Cologne - evening return to Hannover)

Monday, 25 May 1981

9:30

Safety in Woodworking - Based on Training Manual issued by the German Association of Safety Professionals for Wood Processing Industries (Holzberufsgenossenschaft).

11:00

The Development of Woodworking Machinery Industry Since 1920 and Its Influence on Industrialized Woodworking, Mr. H. Eldag.

Lunch

14:00

Appropriate Technology in Pencil Production for Developing Countries, by E. Gössel.

Film Showing: The Manufacture of Pencils  
by Messrs. Fully Automatic Pencil Production  
Ehrhardt The Lead Production for Films

Introduction to Assignment Work, conducted by Mr. H. Eldag.

Tuesday, 26 May 1981 —

9:30

Selection of Machines for Sawmill Operation in Relation to Recovery for Conditions in Developing Countries, by Mr. Heilborn.

Not presented

Film: Mechanized Sawmilling, Messrs. Canali.

Lunch

14:00

Not presented

Panel Discussion on Timber Kilns:  
- Evaluation of Heating Systems  
- Evaluation of Control Systems

15:00

Planning and Layout of Lumber Kilns, by Mr. Schmid.

16:00

State of the Art in the Development of Solar Kilns, by Trada, Mr. Hall.

18:30

Not presented

LIGNA 1981 Highlights of Technical Development (Presented by the Team of Consultants)





Friday, 29 May 1981

Implementation

15:00 to 19:00

Panel Discussion: Utilization of Forestry and Industrial Waste for Generation of Energy.

Discussion Leader - Mr. Zerbin.

Presentation of Documentation:

- (1) Economic Utilization of Wood Waste and its Value for Power Generation in Wood Processing Industries, by Ms. Schrenk.
- (2) Considerations on Wood Residue Utilization Within an Integrated Timber Complex, by Mr. Heilborn.
- (3) Multi-Purpose Energy Plants for Small Scale Forest Industries, Messrs. Spilling.
- (4) Evaluation of Wood Residues as Energy Sources for Forest Industries, by Mr. Kehr.
- (5) Industrial Manufacturing of Charcoal from Forest and Agricultural Wastes, by Mr. Emrich.
- (6) Equipment for Power Generation Based on Wood Waste Appropriate for Wood Processing Industries in Developing Countries, by Mr. Zerbin.

Postponed VDMA Reception  
1 June 81

Saturday, 30 May 1981

9:30 to 18:00

Visit to the Fairgrounds and preparation of assignment work.

Sunday, 31 May 1981

9:30 to 18:00

Visit to the Fairgrounds and preparation of assignment work.

Monday, 1 June 1981

9:30 to 12:00

Presentation of Assignment Work.  
VDMA Reception

Tuesday, 2 June 1981

9:30 to 12:00

Presentation of Assignment Work.

19:00

UNIDO Reception

Wednesday, 3 June 1981

9:30

DEPARTURE

ANNEX II

LIST OF PARTICIPANTS

<u>COUNTRY</u>	<u>FUNCTION</u>	<u>MAILING ADDRESS</u>
<u>Argentina</u>		
Ricardo Del ALAMO	Owner-Manager	COMINDEX S.R.L. Chiclana 1085 200 Rosario (S.F.) Office furniture and Partitions
<u>Bangladesh</u>		
K.M.G. Mustafa	Development Officer and Officer in Charge	Bangladesh Small and Cottage Industry Corp. DIC. Kustia Handicrafts
<u>Bolivia</u>		
Ernesto Guzman Cardenas	Owner-Manager	Maderera Liner P.O. Box 763 Cochambaba Flush doors, panelling and furniture
Cristobal Roda Vaca	Owner-Manager	Cimal Ltda. Box 700 Santa Cruz Veneer plywood, blackboard, flush doors
Marcelo Gutierrez Rojas	Purchasing Manager for Latin America	Pittsburgh Bolivia Casilla 4112 Santa Cruz Wood Marketing
<u>Brazil</u>		
Reinaldo Herrero Ponce	Manager of Wood Processing Plant	IPT Sao Paulo P.O. Box 7141 01000 Sao Paulo S.P. Sawmilling, furniture Preserving

<u>Country</u>	<u>Function</u>	<u>Mailing Address</u>
<u>Chile</u>		
Roberto Daniel MAYER Winter	Production Manager	Industria Maderera Fernando Mayer S.A. Avda. General Velasquez 1280 Santiago Office furniture
Agustin MORENO Solar	Manager	Industria Maderera Moreno Vial Ltda. Lourdes 168 Santiago Solid wood domestic furniture
<u>People's Republic of China</u>		
Tnag Peiji	Engineer, Chief of Technical Department	Shanghai Municipal Furniture Corp. Jiznxi Jonglu Shanghai Solid furniture, wood base panels
Huang Yuyan	Chief Engineer	Beijing Woodworking Industries Corp. 12 Bei Chizi Str. Beijing Wood base panels, furniture and pre- fabricated houses
Wang Xuexiang	Research Worker for Wood Drying	Institute of Wood Industries Chinese Academy of Forestry Wan Shou Shan Beijing Investigative Forestry Institute
<u>Cyprus</u>		
George Pasialis	Assistant Production Manager	Cyprus Forest Industry P.O.Box 4043 Nicosia Particle Board
<u>Arab Republic of Egypt</u>		
Abdallah Ahmad Atia	Chief of Production and Planning Dept.	Kafr El Genal Toukh Kolubia Plywood block board and furniture

Egypt cont.

Younis Mohamed Younis	Woodworking Maint. Machinery Specialist	5 Talaat Harb st. Cairo Veneer and sawmilling
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El Salvador

Jorge Augusto Molina	Presidente y Gerente Gral.	Muebles Molina Hermonos 4a. Calle Ota.No. 7-4 Santa Tecla Solid wood domestic furniture
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Ethiopia

Aberra Abebe	Manager , Production and Technical Services	Warka Furniture Plant P.O. Box 3086 Adis Ababa Furniture
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Ghana

Xorlali Kwabla Adikpe	AG. Manager. Carpentry and Joinery	State Construction Corporation P.O.Box 2532 Accra Furniture and Joinery
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William Kofi Ashiabor	Director	Kumasi Furniture and Joinery Company Ltd. P.O. Box 300 Kumasi Furniture
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Honduras

Ramon Alvarez Lazzaroni	Operations Manager	Maderas Preciosas de Honduras, S.A. P.O. Box 765 Tegucigalpa, D.C. Sawmilling
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India

Vinod Chand Mathur	Development Officer (Engineering)	Directorate General of Technical Develop- ment Udyog Bhaven, Ministry of Industry New Dehli Production Equipment
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Jamaica

Lloyd Ayrton Davis	Head- Furniture lab	Jamaican Bureau of Standards 6 Winchester rd. Kingston 10 Furniture Standards
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<u>Country</u>	<u>Function</u>	<u>Mailing Address</u>
<u>Jamaica cont.</u>		
Mauguerite R. D. Orane	Managing Director	Douglas C. Orane ltd. 4 Nanse Pen Drive Kingston 11 Doors and parquet flooring
<u>Kenya</u>		
Owen Mwangola	Assistant Conservator of Forests (UNIDO Timber Project)	Forest Dept. Hq. P.O. Bos 30513 Nairobi
<u>Mexico</u>		
Juan Francisco BUENO Zirion	General Manager	IRGSA DM Nacional Calz. San Juan de Aragon 439 Mex. 14, D.F. Office furniture
<u>Philippines</u>		
Eduardo D. Balyut	Vice President and General Manager	S. Balyut MFG. Ltd. 3801 Cor. Liling Roces st. Pina Ave. Sta. Mesa Metro Manila Furniture
Manuel Jr. R. Galvez	President	Woodflex Philippines Inc. 2555 Taft Ave. Extension Pasay Metro Manila Domestic Furniture
E. Yrastorza	Production	Mehitabel Furniture Inc. Cebu City Manila Rattan Furniture
Zenaida D. Arce	President	UNIK International Selecta drive Quezon City Hotel and Office Furniture Japanese Altars

<u>Country</u>	<u>Function</u>	<u>Address</u>
<u>Suriname</u>		
Frans Essajas	Production Manager	Suriname Timber State Forest Industries P.O. Box 2980 Paramaribo Sawmilling
Herman K. Jankipersad	Production Manager	Bruynzeel Suriname Hourmatschappiji B.V. P.O. Box 1831 Paramaribo Sawmilling. plywood
<u>Thailand</u>		
Pairoj Vichitrananda	Manager of Admin. Dept.	Thai Plywood Co. Ltd. Ministry of Agriculture and Co-operatives. Mansion 6. Rajdamnern Ave. Bangkok 2, Thailand Plywood
<u>Tanzania</u>		
Daniel Ndesario Mmari	Woodworking Instr.	Ministry of Natural Resources Forest Division Forest Industries Training Inst. P.O. Box 1925 Moshi Solid wood domestic furniture
<u>Uruguay</u>		
Mayo Cesar Armellini Simon	Technical Manager	Darten S.A. Avenue Rondeau 1908 Esc. 17 Montevideo Independant Consultant
<u>Yugoslavia</u>		
Branislav Ljubojevic	Head of Bureau	Sour Sipad Sarajevo Ro Sipad-IRC Research and Development Centre Sour Sumaprojekt Titova Str. 64 Sarajevo Furniture

<u>Country</u>	<u>Function</u>	<u>Mailing Address</u>
<u>Zambia</u>		
Sam Chikosola	Woodworking Manager	ITT Supersonic (Z) Ltd.
<u>List of Observers</u>		
<u>Guyana</u>		
David H. Persram	Conservator of Forests	Guyana Forestry Com- mission P.O. Box 1017 Georgetown Guyana, South America Domestic furniture
<u>Papua New Guinea</u>		
E.F. Fitzgerald	Chairman	Forest Industries Council of Papua New Guinea P.O. Box 3498 Port Moresby Sawmilling and Prefabricated housing chip production
<u>Pakistan</u>		
Raza Mehdi		Forbs Product Research Div. Pakistan Forest Inst. Peshawar Research
<u>Philippines</u>		
Samie Lim	Vice President General Manager	Automatic Centre Ayala Ave. Makati Metro Manila Furniture
<u>West Germany</u>		
John Agard	Engineer (Project and Planning) (Sawmilling)	Robert Hildebrand Gmbh Nürtingen West Germany



List of Consultants

<u>Name</u>	<u>Function</u>	<u>Mailing address</u>
<u>Belgium</u>		
Jean B. Verbestel	Owner	Scientific and Technical Consultant for Wood Industries J. Van Maerlant str. 8500 B-Kortrijk
<u>Finland</u>		
Pekka J. Paavola	Head. Dept. of Wood Technology	Lahti Institute of Technology (Training College) Stahlberginkatu 10 15110 Lahti 11
<u>Ireland</u>		
D.P. Cody	Senior Partner	Desmond Cody and Associates Industrial Consultants Leopardstown rd. Dublin Furniture and Wood Industr, Consultant
<u>Philippines</u>		
Horatio Brion	Chairman	Expertise Industrial Corporation 29 Linaw st. San Francisco del Monte Quezon City Metro Manila Consultancy in wood processing

ANNEX III

DETAILS OF SEMINAR ASSIGNMENT WORK

1. Objectives

The organizers of the Seminar attach great importance to this part of the programme. The participants' involvement in preparing and presenting the assignment work in small groups assists greatly in the subsequent solution of the many problems which they face in their own countries. Such work also facilitates exchanges of views and experiences with fellow participants.

2. Methodology

Early in the course participants were required to indicate their interest in at least two and not more than four of the following topics: The economic criteria in selecting machines and equipment for the manufacture of:

- a) lumber and sawn timber goods;
- b) plywood and veneer;
- c) flush doors;
- d) louvered shutters and doors;
- e) prefabricated house components;
- f) kitchen cabinets;
- g) solid wooden school furniture;
- h) plywood or upholstered chairs;
- i) parquetry;
- j) furniture and joinery products.

Evaluation of equipment for:

- k) dust and chip exhaust;
- l) lumber kilns;
- m) forestry;
- n) selection of ancillary material;
- o) energy generation.

Details of the technical specifications of each product must be drafted by participants.

Groups will be formed and group leaders chosen. On the last two days of the seminar each group will be given two hours to present its work. They will be requested to determine and evaluate the type of equipment they recommend for the production process, draft the layout of machines selected, and prepare a machine and equipment list to explain in detail the evaluation criteria.

Participants will visit the LIGNA Exhibition and a select group will visit the INTERZUM Exhibition to obtain technical and economic data on the various types of machines available on the market.

The UNIDO staff and the experts at the Consultancy Service Centre will be available throughout the duration of the Fair to guide the groups in their work. They will also be able to discuss technical problems with the lecturers.

In presenting their group's work, the group leaders are encouraged to make full use of the audio-visual material.

### 3. Specifications for the assignment work

#### 3.1 Selection of machinery and equipment for sawmills

Draft a layout, select machinery and equipment for log break-down.

Log input: 10,000 m<sup>3</sup> per year of tropical species.

Log dimension: maximum diameter 120 cm

average diameter 80 cm

maximum length 6 m

minimum length 2 m

Tentative cost: US\$ 80,000

Output:

Sawn lumber according to European standards - 25 percent of lumber will be kiln dried. Select a lumber kiln for the following conditions: Red wood species (Sapelli, etc.) 25 mm thick, length 6 m, initial moisture content 20 percent (air seasoned) and final moisture content 12 percent (kiln dried).

3.2 Selection of machinery for plywood and veneer production

Draft a layout, select machinery for a plywood plant and a sliced veneer plant.

Log input: 10,000 m<sup>3</sup> per year of tropical species.

Log dimension: maximum diameter 120 cm  
average diameter 80 cm  
maximum length 6 m  
minimum length 2.5 m

Manufacture of plywood: 2,000 m<sup>3</sup>

Panel size: 4' x 8'

Thickness: 3, 5, 8, 12, 16 mm (average 5mm)

Manufacture of sliced veneer: 1,000,000 m<sup>2</sup>

Length: up to 3a and thickness 0,8 mm

4. Selection of machinery for flush door production

Draft a layout, select machinery for a flush door manufacturing plant.

4.1 Production capacity

50 flush doors per day application of appropriate technology for small scale industries - tentative costs US\$ 50,000.

#### 4.2 Production capacity

150 flush doors per day application of intermediate technology for medium-sized industries with the view of doubling the production within two or three years.

Choose the appropriate raw material based on low grade lumber and/or using off-cuts (waste material) - tentative cost US\$ 150,000.

#### 5. Selection of machinery for the production of louvered shutters and doors.

Select and evaluate machines available on the market and calculate the production capacity based on the average size for:

- louvered shutters: height 142 cm  
width 70 cm
- louvered doors: height 210 cm  
width 1000 cm

The production area is 60 m x 25 m. Machines are laid out so that the hall can be extended to install further facilities for a production increase according to market requirements. The first stage includes labour intensive facilities.

#### 6. Selection of machinery for the production of kitchen cabinets

Draft a layout, select machinery for the production of KD kitchen cabinets based on a modular system.

The case good material should be plastic laminated.

The doors should be of solid wood (paneled doors, slatted doors or louvered doors).

The production is based on 45,000 cabinet units per year  
Tentative costs at US\$ 25,000.

7. Selection of machinery for the production of school furniture  
(pupils' chairs, desks and college desks)

Draft a layout, select machinery for the production of solid wooden school furniture.

Production capacity: chairs	20,000 per year
desks	40,000 per year

The plant is to use air-seasoned tropical species.

Machinery and equipment has to be chosen which is suitable for labour intensive manufacturing processes.

Tentative costs of machines at US\$ 50,000.

8. Selection of machinery for the production of solid wood chairs  
with and without upholstered seats and backs

Draft a layout, select equipment for the manufacture of 10,000 chairs per year.

The production is based on solid wooden frames made of tropical species.

4,000 chairs are of upholstered type.

5,000 chairs are of solid wood only (seats and backs are glued-up stock)

500 of these chairs have carved components.

Tentative costs of machinery at US\$ 50,000.

9. Selection of an appropriate lumber kiln for a furniture and join-  
ery plants

List wood species.

Capacity per month in cubic metres.

Lumber dimensions: length in metre

thickness in millimetres (minimum-maximum-  
average)

Kiln loading facilities (truck, forklift, etc.)  
Heating system to be provided or available?  
Choice of manual or automatic control?  
Will prefab or brick built chamber be installed?  
Compare different kiln operation systems.

10. Small scale wood processing industries

10.1 Selection of machinery for prefab house components (wall units, partitions, roof trusses, etc.) (17 employees)

Production range: wall units and partitions: 40 percent  
joinery products: 40 percent  
(wall cladding, stair treads)  
roof trusses: 20 percent  
(with the possibility of using nail plates)

Extend the building and facility so that wooden bridges and jetty production could be included.

10.2 Selection of machinery, tooling and equipment for a plant manufacturing furniture and joinery products

Individual furniture, small batches of furniture and flush doors and panel doors.

Number of employees: 1 manager  
1 foreman  
4 skilled labourers  
8 unskilled labourers.

Prepare the machinery, tooling and equipment list.

Calculate the FOB prices for: machinery  
toolings  
additional equipment  
dust exhaust equipment  
compressor and equipment

11. Selection of machinery and equipment for the manufacture of strip flooring (parquetry: tongued, grooved and matched)

Production capacity: 500 m<sup>2</sup> per day tropical species.

Grade packaged per square metre.

Parquetry strips to be machined according to standard sizes.

Tentative cost of machines at US\$ 100,000 (185,000)

12. Selection of equipment for forestry

Describe the logging site and select appropriate felling, logging, and skidding equipment.

Compare individual and/or combined equipment for logging, skidding and road building, in respect of suitability and total investment costs.



ANNEX IV

DETAILS OF PLANT VISITS

Group I- (Those interested in primary wood processing plants)

Thursday, 21 May 1981

- A. Name of company: HAIDAPAL-Gruppe  
Steinheim, Sandelbeck, FRG
- Type of factory: Integrated chipboard, panel laminating and panel-based furniture plant.

Comments:

Highly advanced and fully conveyORIZED operations which are not readily applicable to developing countries. These operations represent a set-up which is just good to be aware of in the future for developing countries. However, some features of the furniture assembly line, eg. use of air-operated tools and assembling jigs and fixtures, may be worthy of application to medium size furniture plants in more advanced developing countries.

- B. Name of company: GEBA, FRG
- Type of factory: Fully automated panel-based furniture plant with four complete machinery lines (laminating chipboard, edge-banding, machining and assembling and packing) with fully conveyORIZED finished goods handling and ware-housing systems.

Comments:

Too far advanced technology for developing countries. The factory's very high output cannot be matched by the domestic market in developing countries. The plant was NOT operating

during the day of the visit.

C. Name of company: RUDOLPH AND STUDIER G.m.b.H.  
Minden/Westfallen

Type of factory: Veneer slicing plant, with fully automated veneer slicing and drying lines. Machine complement includes vertical, horizontal canted veneer slicers; pneumatic veneer feeding and discharging systems on the veneer driers; special veneer lathes (eccentric), and modern veneering (sizing) and veneer bundling machines.

Comments:

Too highly advanced technology for developing countries at present. However, their set-up for chain-saw break-down of logs with very large diametres into smaller quarters or flitches manageable at the lathes should be of interest to participants from developing countries which produce logs with diametres above one (1) metre.

D. Name of company: Möbelfabrik Wilhelm  
Wilkening, Bad Oeynhausen

Type of factory: Medium size furniture factory with small veneer sizing and splicing section. Its capacity would be about equal to the largest furniture plants in developing countries at present. Its product lines include both solid wood and panel-based furniture items, like similar plants in developing countries, this plant accepts orders for furniture sets outside of their regular line of products.

Comments:

This plant should prove of interest to participants from more advanced developing countries since it typifies the transition from the usual multi-product system of production (commonly practiced by furniture plants in developing countries) to a more selective complement of furniture products. The plant also shows the effects of the use of formal technical furniture design in the rationalization of the production line. The versatility of individual specialized machines is very evident in this plant. The extensive use of production jigs and fixtures, machining templates and patterns should prove of interest to participants from developing countries.

Friday, 25 May 1981:

- a. Name of company: Not furnished.  
Type of factory: Small family-owned and operated joinery plant, producing doors and door sashes; windows and window frames, sashes; shelvings, etc. on order. This plant is quite typical of present production operations in developing countries, with only 16 workers, including the plant manager.

Comments:

A very good example of limited mechanization suitable for small and medium furniture plants in developing countries. The extensive use of jigs and fixtures, and clamping devices in the production line should prove worthy of emulation in similar plants in developing countries.

B. Name of company: Not furnished.

Type of factory: Small family owned and operated furniture plant, producing furniture sets on order. Mainly wood-based operations, using specialized individual machines; also produces panel-based furniture on order.

Comments:

The intensive use of individual specialized machines should be of great interest to participants from developing countries. Assembling techniques for different product models and types were also good examples for developing countries. More could have been learned from this factory if there had been more translators to help bridge the language barrier between the plant personnel and the seminar participants.

C. Name of company: BEECK Furnitures

Type of factory: Highly automated production lines (from laminating panels to assembling and warehousing operations), principally panel-based production system for kitchen cabinets.

Comments:

The factory is typical of the highly advanced furniture production plants in highly industrialized countries. This visit should be good for stimulating the ambitions of participants from developing countries concerning the expansion and modernization of their plants in the future, should it become viable and feasible to do so. A duplicate of the other two kitchen cabinet and panel-based furniture factories visited the previous day and therefore having little relevance to developing countries at present.

D. Name of company: TORWEGGE G.m.b.H.

Löhne, FRG

Type of factory: Furniture machinery manufacturing plant.

Comments:

Not of special interest to developing countries, except to provide them with an insight into the techniques that are used in producing high quality machinery.

Group II - (those interested in furniture production)

Thursday, 24 May 1981

Plants visited:

1. August Kesemeyer KG. Elze, FRG  
small sawmill.
2. Golswerk Osterwald, Elze, FRG  
parquetry production.

Friday, 25 May 1981

Plants visited:

1. Bison plant - Springe, FRG
2. Glue laminating plant.
3. Pre-fabricated log cabin plant.

ANNEX V

SUMMARY OF RESULTS  
GROUP TRAINING PROGRAMME EVALUATION

I. PRE-COURSE INFORMATION:

1. How was the introductory information you received in your home country presented: (please mark an x in the suitable column)

	<u>Sufficient</u>	<u>Not sufficient</u>	<u>Missing</u>
Aim of the training	<u>26</u>	<u>3</u>	<u>0</u>
Content of the programme	<u>28</u>	<u>2</u>	<u>1</u>
Level of the programme	<u>20</u>	<u>7</u>	<u>3</u>
What, if any, other information do you feel should have been included:			
None	<u>29</u>		
Hotel information	<u>2</u>		
Routes to host country	<u>1</u>		

2. How many weeks before the beginning of the training programme did you receive the following information:

Information about the programme:	No answer	<u>1</u>
	Two weeks or less	<u>6</u>
	Three to five weeks	<u>5</u>
	Six to ten weeks	<u>16</u>
	More than ten weeks	<u>2</u>
Being accepted to the programme:	No answer	<u>2</u>
	Less than two weeks	<u>14</u>
	Two to five weeks	<u>15</u>
	More than five weeks	<u>1</u>

Comments:

No comments	<u>17</u>
Need earlier notice of acceptance	<u>12</u>
No formal reply	<u>1</u>
No answer	<u>2</u>

II. PROGRAMME CONTENT AND ORGANIZATION:

3. What is your opinion of the total duration of the course?

Too long  Just right  Too short

If not "Just right", what, in your opinion, would be the most suitable duration for the course?

No answer   
Four weeks   
Four and a half weeks

Comments:

No comments   
Time too short   
Time for personal needs too short

4. State your opinion about the daily schedule:

Too heavy  Just right  Too light

Comments:

None   
No free periods   
Too many topics   
More factory visits instead of lectures   
No time to read papers before lectures   
Identify lectures for mandatory or optional attendance   
Heavy schedule   
Better choice of hotel rooms would help

5. Would you suggest any changes in the general nature of the training programme?

No answer   
No change   
More and/or better plant visits   
Better planning and organization of Seminar   
Better accomodations   
More social activities   
More free time for participants   
Technology in printing

6. Do you feel that the training corresponded to your professional needs?

To a very large extent	<input type="text" value="3"/>
To a large extent	<input type="text" value="12"/>
To a sufficient extent	<input type="text" value="16"/>
To a small extent	<input type="text" value="1"/>
To a very small extent	<input type="text" value="0"/>

Please comment:

None	<input type="text" value="14"/>
Improvement on programme	<input type="text" value="7"/>
Satisfactory	<input type="text" value="1"/>

7. Please give your opinion about the study visits (if any):

None	<input type="text" value="6"/>
Very good	<input type="text" value="8"/>
Good	<input type="text" value="4"/>
Language barrier problems	<input type="text" value="1"/>
Choice of plants visited poor	<input type="text" value="3"/>

Please suggest other study visits that might have been valuable:

None	<input type="text" value="11"/>
Improve plant visit programme	<input type="text" value="7"/>
Include upholstery and polishing machines	<input type="text" value="2"/>
Visits to furniture show-rooms	<input type="text" value="1"/>
Visits more relevant to needs of participants	<input type="text" value="2"/>

8. What do you think of the general level of the training?

Much too high	<input type="text" value="0"/>	Too high	<input type="text" value="2"/>	Adequate	<input type="text" value="25"/>
Too low	<input type="text" value="3"/>	Much too low	<input type="text" value="0"/>		

Comments:

None	<input type="text" value="15"/>
Satisfactory	<input type="text" value="8"/>
For improvement of programme	<input type="text" value="6"/>
Others	<input type="text" value="3"/>



9. Which subjects of the programme did you find most valuable?  
(please state reason; for example new subject, my speciality, relevant to my work, new information, etc.)

Subject:	Planning integrated wood processing industry	<u>7</u>
	Pneumatics	<u>5</u>
	Product components process development	<u>3</u>
	Machinery selection and plant lay-out	<u>3</u>
	Fibreboards	
	All other topics received one or two votes each	
	No answer	<u>3</u>
Reasons:	New information	<u>9</u>
	Relevant to current activities/work	<u>17</u>
	Other reasons	<u>8</u>
	No answer	<u>3</u>

10. Which subjects of the programme did you find least valuable?  
State why (for example too elementary, inadequate instruction, irrelevant to my work, etc.)

Subject:	Pre-fabricated houses	<u>3</u>
	Primary wood processing	<u>5</u>
	None, all subjects valuable	<u>1</u>
	All other topics received one vote each, eg.:	
	Production and process flow	
	Quality control	
	Sawmilling and particle board manufacturing	
	Energy	
	Woodworking tools	
	No answer	<u>7</u>
Reasons:	Not relevant to present work	<u>8</u>
	Lecturer could not be understood	<u>3</u>
	Others	<u>14</u>
	No answer	<u>7</u>

11. Were there in your opinion any relevant subjects that were not adequately covered in the programme?

Yes 12 No 18 No answer 1

If yes, what did you miss?

Economics of selecting machinery	<u>5</u>
Financing methods of import of machinery	<u>2</u>
Upholstery and polishing	<u>2</u>
Hardware use techniques	<u>1</u>
Energy Development and re-cycling	<u>1</u>
Others	
No answer	<u>7</u>

12. Which changes would you have preferred in the methods of instructions?

	<u>No changes</u>	<u>more</u>	<u>less</u>
a) lectures	<u>14</u>	<u>3</u>	<u>10</u>
b) group work	<u>15</u>	<u>12</u>	<u>2</u>
c) demonstrations	<u>7</u>	<u>19</u>	<u>0</u>

Comments:

None	<u>11</u>
More group discussions	<u>6</u>
More audio-visuals	<u>2</u>
More reas case studies	<u>3</u>

13. How did you find the general standard of the instructor with respect to:

	<u>i)Command of English</u>	<u>ii)method of instruction</u>
Very good	<u>19</u>	<u>16</u>
Rather good	<u>5</u>	<u>11</u>
Fair	<u>5</u>	<u>2</u>
Poor	<u>1</u>	<u>1</u>
Very poor	<u>0</u>	<u>0</u>

Please comment:

None	<u>26</u>
They tried to explain in simple English	<u>2</u>
Visual aids useful	<u>1</u>
Less reading of lectures needed	<u>1</u>

14. Did you have sufficient time for professional exchange of views with:

	<u>1) the programme staff</u>	<u>ii) fellow participants</u>
Yes	<u>19</u>	<u>24</u>
No	<u>9</u>	<u>9</u>

Comments:

None	<u>23</u>
No time	<u>4</u>
More discussions with speakers	<u>1</u>
More lectures read	<u>2</u>
Good exchange	<u>3</u>

15. How much did you benefit from these exchanges of views with:

	<u>1) the programme staff</u>	<u>ii) fellow participants</u>
A great deal	<u>9</u>	<u>9</u>
Much	<u>13</u>	<u>13</u>
Somewhat	<u>6</u>	<u>6</u>
Little		
Not at all	<u>1</u>	<u>1</u>

Please comment:

None	<u>25</u>
No time	<u>1</u>
Views exchanged with other participants mostly during mealtime	<u>3</u>
Seminar staff tried hard to explain matters to be understood	<u>2</u>

### III. RELEVANCE AND APPLICABILITY:

16. Did you find the contents of the programme relevant to conditions in your company (institute)?

To a very great extent	<u>3</u>
To a great extent	<u>16</u>
To a sufficient extent	<u>12</u>
To a small extent	<u>2</u>

Please state why:

No answer	17
Lectures were mostly on large scale operations and primary wood industry, not relevant or hardly applicable to developing countries	4
Relevant to present work	8

17. Do you feel that by participating in this training programme you have benefitted professionally?

To a very great extent	8
To a great extent	8
To a sufficient extent	19
To a small extent	1
To a very small extent	0

Please state why:

No answer	22
Will help in present job	10

18. Do you think that you will have an opportunity to apply your newly acquired knowledge and experience in your present job?

To a very great extent	8
To a great extent	6
To a sufficient extent	17
To a small extent	2
To a very small extent	0

Please state the difficulties that you expect to meet if any:

No answer	24
Information received not relevant to present job	1
Inputs needed not available in developing countries	3
Reluctance of some manufacturers in developing countries to change their ways	1
Needs adjustment period	1

19. Will you be in a position to transfer your acquired knowledge to others in your home country?

- To a very great extent
- To a great extent
- To a sufficient extent
- To a small extent
- To a very small extent

20. How will this transfer be done?

- a) In day-to-day work with colleagues and subordinates
- b) In specific training activities inside present employment
- c) In specific training activities outside present employment

What difficulties, if any, would you expect to meet?

- No answer
- No difficulty
- Demonstration aids needed
- Problem of adaptation to local conditions

IV. SOCIAL ASPECTS OF THE PROGRAMME:

21. Please state your opinion about the leisure time activities organized by the programme staff:

- No answer
- Very good
- Good
- Not sufficient
- Very poor
- No leisure time, at all

What additional activities would you have appreciated?

- No answer
- More sports and fellowship activities
- Introduction of participants to one another on first day
- More plant visits
- Learn host country's language
- More discussions with lecturer
- Brief city/country tour in between session days
- No additional activities

22. Please give any comments you choose on aspects not adequately covered by this questionnaire:

No comments	19
More organization needed	6
Need for more practical work	2
More consideration for health and welfare of participants	2
Generally useful	2



