OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

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

15979

Distr.
RESTRICTED

UNIDO/IO/R.245
7 August 1986

ENGLISH

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ASSISTANCE TO TECHNICAL TRAINING IN
WOOD PROCESSING

XP/TUR/85/003

T U R K E Y

Technical Report: Survey of the Woodworking Education Department of Gazi University and the furniture and joinery industries and plan of action for their improvement.*

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

Based on the work of Manfred Kluge,
Consultant in Furniture and Wood Industry

295

* This document has been reproduced without formal editing.

V.86-59049

ABSTRACT

The Turkish furniture and joinery industry sector is a very important branch of the economy. It produces all the domestic requirements for furniture, doors and windows and has a growing share (currently approximately US$ 30 million worth in the country's exports.

The level of professional knowledge in the wood processing sector is relatively low and out-dated when compared with that of the West European countries. As a result of this, the production costs are too high, quality level of products is low and the export possibilities are limited.

The shortcomings of the Woodworking Education Department of the Faculty of Technical Education at Gazi university are identified as being an out-dated syllabus, poorly equipped laboratories and workshops, non-familiarity of teaching staff with the latest developments in technology, equipment and processes. An urgent follow-up action in up-grading the workshop facilities, laboratories and the teaching staff is recommended. As to the needs of the woodprocessing sector, the report recommends the creation of a central "Woodprocessing and Furniture Industry Development Centre" within a period of 4 years for the modernization of secondary wood processing industries. The modernization of the primary wood processing industries is also recommended.

Explanatory Notes

A. The following abreviations are used in this report:

TSKB : Industrial Development Bank of Turkey

TSE : Turkish Standards Institute

IGEME: Export Promotion Research Centre

ORUS : General Directorate of Forest Products Industries

DPT : State Planning Organization

MNEYS: Ministry of National Education, Youth and Sports

FVATC: Formal Vocational Adult Training Centers

NFVATC: Non-Formal Vocational Adult Training Centers

IPTS : Industrial Practical Trade Schools

AVHS : Anatolian Vocational High Schools

ATHS : Anatolian Technical High Schools

PC : Preparatory Course

B. The rate of exchange of the Turkish Lira (TL) to the US Dollar (US$) during March 1986 was: 1.0 $ = 600.00 TL approximately.

C. The mention of firm names and commercial products does not imply the endorsement of the United Nations Industrial Development Organization (UNIDO).

TABLE OF CONTENTS

INTRODUCTION

This report is the result of a request made by the Government of Turkey to the United Nations Development Programme (UNDP) for an expert specialized in furniture and timber industry training to advise Gazi University on ways to improve the workshop facilities and the syllabus of the Woodworking Education Department in the Faculty of Technical Education. The request was made by letter through UNDP-Ankara on 26 October 1984.

Mr. M. Kluge, expert in furniture and timber industry and training arrived in Ankara on 2 March 1986 for a 5 week mission. Mr. Kluge's main tasks were to evaluate and critically appraise the present course facilities, the syllabus and the needs of the industry, and propose improvements and make recommendations for up-grading the course and the wood processing industries sector as a whole. The expert's job description is given in Annex I.

This report gives an account of the current state of the industry, woodworking education in general and particularly in the Woodworking Education Department of the Faculty of Technical Education, identifying shortcomings affecting both the education in woodworking and the sector as a whole.

Long and short-term recommendations for future action and follow-up are also given.

CHAPTER I

SITUATION OF THE FURNITURE AND JOINERY INDUSTRIES

A. GENERAL

In Turkey, the production of furniture, doors and windows is realized both by workshops and factories. Workshop type production has a long history whereas most of the existing factories and big workshops have been installed after 1975.

The workshop owners are members of the Federation of Woodworking Artisans and Small Industries. The Federation estimates that there are around 250,000 manufacturers in the whole country. There is a continuous flux of creation and cessation of activities in the sector and also artisans not registered with the Federation.

The workshops are located mostly in Siteler-Ankara, Inegol, Istanbul and Eskisehir. Siteler-Ankara has the largest number of such workshops. They are made up of small workshops employing up to 10 workers. Workshops employing 100 workers also exist. They are mostly equipped with locally manufactured machinery. The working conditions are generally primitive.

There are also more than 30 modern factories and big workshops. The share of the factories' manufacture is around 15% of the production. Large scale furniture and joinery factories, currently operating, are listed in Annex III.

Most of the owners and workmen of the workshops have not had any proper professional education; as was the tradition, they entered this profession as young, unskilled workers without any professional support. Vocational schools have been founded between 1960 and 1965. Unfortunately these are no longer in the position to cover the education requirements of modern woodworking industries due to the following reasons:

-The new technologoies are not covered by the course syllabuses used presently in different education establishments at various levels. Therefore, the factories using modern machinery, equipment and processing methods canot make proper use of the graduates.

-Aspects related to inter-acting factors between materials, for expample, in the case of wood gluing, the inter-action between the wood-glue-tempreature-moisture-pressure-preparation of wood surface-preparation of glue are not covered and/or coordinated.

-Different syllabuses of differet teaching establishments have different approaches to the same subject and its coverage irespective of the requirements of the modern industry. Instead of covering new and modern materials, equipment and production methods, out dated technologies are being taught in detail and the workshop practices are also based on these and traditicnal equipment.

Local demand for wooden products in Turkey increased while at the same time a small export grew, mainly into Arabian countries. (See Annex IV). Bigger furniture, door and window factories were founded to produce in series to cover the demands. Since there were no educated specialists, the production problems grew, especially bacause raw materials in Turkey do not meet the requirements for mass production. Production costs are very high because of the lack of technical know-how.

The workshops are trying to solve existing problems within the production. There are some very good ones, but the majority of the smaller wood processing workshops cannot manage to overcome their production difficulties because of poor professional know-how.

B. DESIGN AND QUALITY LEVEL

Basically the Turkish furniture and joinery industry has to work intensely to improve design and quality. A training in quality control is necessary.

1. Product Design:

As for a number of other products, furniture is also continuously subject to fashion. Designers and marketing managers of big companies constantly test trends and tastes of the consumers and introduce new designs, model variations and improvements during exhibitions to ensure they enter the market or gain a bigger share of it.

It is said that basically a substantial change in furniture styles takes place every 3 to 6 years. In Turkey there is a traditional design of "style" (reproduction) furniture which largely remains unchanged. But recently this "style" furniture has been subjected to a certain change. In order to save wood, the furniture is made a bit lighter because the international customers prefer light-built "style" furniture. Furthermore, hand-carved "style" furniture is in great demand. Modern furniture is generally made of particle board: it comprises unit furniture and knock-down furniture. These are well assimilated in the Turkish market. The general level of design of this furniture is of a low standard. It corresponds to the international fashion trends only in a few points, but seems sufficient for the domestic market. More Turkish designers, who are especially trained to meet the requirements of the local market and who are able to design for industrial production, should work for the Turkish furniture industries.

2. Domestic Quality:

The quality demanded by the domestic market is not as high as that needed for entering foreign ones. For home products, price is the number one criterion. Domestic customers have only a few possibilities for comparison with the better quality in modern furniture in regard to design and manfuacture. The following processing steps and materials show the weak point in industrial production, workmanship and quality: discoloured solid wood, badly matched veneer, poor veneer joints, faulty edge treatment and insufficient edge sanding, poor fitting and difficult sliding of movable parts such as drawers and doors, poor sanding of veneer and solid wood, no soaking before staining with soluble stain, insufficient lacquer sanding mainly of solid wooden parts, application of lacquers which are viscous, poor workmanship in mounting of hardware, poor functional form and improper hardware. It is obvious that there is much to do in the field of quality improvement.

3. Export Quality:

Much work has to be done in order to achieve an acceptable export quality. A vital point is that technicians must be aware of the quality of products offered in the international markets. Even when using Turkish raw materials, it will be possible to produce better quality furniture to export after acquiring the necessary know-how.

C. AVAILABILITY AND QUALITY OF RAW MATERIALS AND OTHER INPUTS

In general, companies have immense problems in obtaining domestic raw materials in spite of their prices and low quality. These problems are mainly related to the unacceptable quality level of raw materials with respect to the required quality of the final product. This impedes works substantially. The common demand for a better quality final product, especially for export orders, sets a tough task for the production management.

In anticipation of the sector's problems in relation to cost, quality and standards, the Fifth Five Year Development Plan clearly states that in the plan period covering the years 1985 to 1989, measures will be taken to remedy these problems by the adjustment of the raw materials supply/industry relationship and the provision of raw material to use fully the existing installed capacity through integration and improved technology attained. The raw material production attained in 1978 and 1983 and the estimated Plan target for 1989 is given in Annex V. A more detailed table showing the combined production targets for the wood processing industries private and public sectors as well as for public sector mills separately are shown in Annex VI.

1. Sawn Wood:

Beech and pine solid wood of good quality are not available in sufficient quantity for industrial production. On the one hand, this is based on a distribution and sales system where the various species sizes and quality of sawn wood are not sufficiently assorted and selected for various end uses; and, on the other hand, on the basic low wood quality in Turkey. Furthermore, the supply of wood for the woodworking industry is not availalbe in the required range of species, sizes and qualities and is too expensive in comparison to the world market prices. The transport of the wood from the forest to its final destination further complicates matters and reduces quality. During this transport numerous influences occur which substantially deteriorate the wood's yield. For example, long storage in the forest after felling causes insect and fungal infestation. Poor cross-cutting in the sawmill, improper piling and insufficient seasoning cause this deterioration. Throuhgout Turkey, the staining of pine by blue fungal stain is far above average.

2. Particleboard:

In general, the quality of Turkish particleboard is low. Boards have more than acceptable thickness, width and length variations disproportionate particles and do not have the same particle density everywhere. When these boards are subsequently processed in the furniture factory, a calibrating sander unit is necessary to sand the board to the required thickness. This results in further investment and production costs due to the additional working time needed.

3. Plywood:

Due to the poor quality of domestic logs for plywood production, the plywood produced is mostly of low quality.

4. Veneer:

Veneer is manufactured from some domestic woods (mostly beech and walnut). Beech veneer could be of better quality, provided the beech timber is processed correctly. Due to faulty processing immense differences in colour and shades of beech veneer occur. Also thickness deviations of veneers are too great. In general it can be said that veneer producing companies could achieve better standardization of veneers and a better quality by correct processing, although raw materials are not so suitable -low diameter and poor quality on reaching the mill.

5. Lacquer:

Competition in the field of lacquer manufacturing which can lead to improvement of quality is restricted. There is room for improving and developing new lacquers.

6. Accessories:

Hardware available on the Turkish market can often not be used for furniture production because of the use of sub-standard and improper material and poor or no quality control in their production. Their design is poor and the quality of handles is very poor (rough-poor deburing). Also the quality of locks and hinges is so bad that they only function for a short time. It would not take too much effort for producers to improve the quality of hardware. Due to the bad quality of Turkish hardware, many furniture producers are forced to buy hardware from abroad in order to maintain the quality of their products.

D. PRODUCTION FACILITIES

1. Location of Factories:

Turkey's forest regions cover 26% (approximately 20 million hectares) of the country's total area. They are subdivided into two categories: good and bad quality. Good quality forests are situated mainly in northern regions throughout the Black Sea Coast and in western and southern parts of Turkey. Most of the particleboard plants are built in and/or near the forests. This is not a criterion for locating furniture factories, since the sawnwood is sold by the Government offices all over the country. The selling procedure is in the form of auctions. Other raw materials such as particle boards, veneers and lacquers are procured also at factories which are situated in different parts of Turkey.

Factories are generally built in the regions which have the following characteristics:

-bing potential for demand, in highly populated areas and/or in the areas where the rate of urbanisation is high.

-in those regions where there is a history of furniture, door and window production.

-in the areas where there are combinations of the above mentioned characteristics.

One can say that all existing factories are mostly situated in the central and western part of the country.

2. Production Equipment and Layout:

Some of the companies in Turkey are well equipped. Some of these new factories were fully planned and some are equipped with progressive woodworking machinery and installations imported from West European countries. Lay-outs are generally according to the required process flow. Because of their existing technical equipment there are with few exceptions, the necessary preconditions to produce rationally and profitably with high efficiency.

The degree of mechanization in the field of "solid wood processing", in a traditional furniture producing company is yet not very high. In the factories, machines are usually loaded manually by operators and because no kiln dryers exist, wet wood is often being processed.

Very modern machinery connected with transport systems are in use for the processing of panels. As particleboards are produced in Turkey, it is possible to make furniture rationally in a progressive way with specially developed, mechanized production lines. Because of the small size of the factories, some of the companies are still working with semi-mechanised machinery. nevertheless, these small machines are running economically due to low wages and relatively low financing costs -when compared to the more automated lines.

A comparative view of the workshops shows the following situation: small workshops are scattered all over the country but are mainly concentrated in the area of Ankara, Bursa, Istanbul, Gaziantep. Partly they use very simple technical equipment. Conditions regarding space are very often bad. There is not dust extraction, and working in the varnishing department is detrimental to health. Many stages of processing are done by hand and it is common to employ children. Sometimes a company is specialized in producing just one model of furniture. This type of workshops produce very simple models, as well as those with a very high standard.

3. Utility Installations:

Utility installations such as boiler house, tool sharpening department, generator, supply of compressed air, dust extraction and ventillation are not suitable in some factories because of either non existance of air filters, pressure regulators, and oiling units in the compressed air system or poor or unfunctioning of those existing chip combustion plants, dust filters, dust extraction plants, generators and shaperning equipment due to poor or no maintenance of these installations and lack of know-how in their operation. The main reason for this unsatisfactory situation is the lack of appreciation by the management of the contributions of these utility installations to the quality of final products, overall productivity, workers's satisfaction and safety at work.

The exploitation of raw material wastes, which in Turkey are far above average, is not carried out economically: they are not used as a source of energy or for making wooden briquettes. Tool sharpening should be given the importance it deserves because sharp tools improve the quality of the furniture. Furthermore, the technique of air supply and extraction is not applied properly. This leads to dust formation, mainly in the finishing rooms.

4. Production Control:

The production control deals with the control of:

-materials
-time
-quality
-cost

and should aim to avoid intolerable deviations from plans, to identify reasons for problems and to take remedial actions required by the markets. Such a systematic production control does not yet exist in many companies. The bigger companies however seem to have taken steps in this direction. Material control is difficult in Turkey since a number of defects and lower qualities have to be accepted because there is no alternative source of supply for the materials.

This means that what should normally be rejected, cannot always be rejected in practice. For export production, a better preselection within the range of materials purchased would be advisable, so that at least requirements for exports can be met. Otherwise the material control should result in the importation of the materials needed for export production.

The time control becomes important the nearer the production output approaches the capacity limitation, i.e. the better the marketing staff the more the production department will be provided with orders.

All the companies where enquiries were made reported that they have a quality control programme. Quality is usually controlled before lacquering and after assembling. Controls are also taking place at many individual work places. However, it appears that the such controls are often not strong enough, a larger tolerance span is accepted (or has to be accepted because of raw material problems) and the educational/remedial effect of the control leaves much to be desired. The main reasons are, in the opinion of the consultant, that the Turkish furniture industry did not yet have to face strong quality requirements in the domestic market and that the quality requirements of foreign -particularly European markets- are not sufficiently known by the workers or by the supervisors.

Another factor is that some companies have a great variety of products which makes a constant high quality production mor difficult and which leads to the internal acceptance of lower quality levels. For more successful export business, at least the quality controls for export production should be strenghtened. Costing and its control is only done to a limited extent and this is mainly in the bigger companies.

5. Technological Level:

Some of the modern Turkish furniture factories are well informed of technical developments in Western Europe in the field of woodworking machinery and are interested in all progressive technologies of potential use to the Turkish furniture industry. The following trends in production have been identified:

-People are open-minded towards artificial wood drying. This is an extensive field to be worked on.

-The capacity of hand-carved "style" (reproduction) furniture will be increased, mainly for export.

-By the introduction of standardization in the construction sector, the production of doors and windows will be simplified and more economical.

In future it will be possible to produce better quality and inexpensive furniture for a wider consumer group.

-The present production ratio between factories and workshops is 15 to 85 and it will change in favour of the factories and the bigger workshops.

-Technical education, preparation of work and costing will become more effective.

E. MANAGEMENT AND PERSONNEL

The manufacturing units producing furniture, doors and windows may be divided into three main categories: small workshops and/or joiners, big workshops and factories.

Workshops are generally owned by one person whose background is somewhat related to the industry, such as architects, joiners and those having a furniture shop or who are marketing materials related to furniture. The main organizational activities are carried out by these persons whose professional qualification is not always sufficient.

Most of the big factories began operating in 1978 and 1982. These companies and their management are more or less new in the industrial production of furniture, doors and windows. Their previous experience was mostly acquired in workshops and sales outlets or in other business sectors, e.g. the metalworking (metallurgy-casting) industry. Most of them do not yet have enough experience to work in foreign languages which is a handicap for acquiring know-how from foreign countries. Systematic planning and control exists only to a limited extent. So far, very few companies attempted seriously to implement or improve their planning and control operations.

The management of furniture companies in Turkey has to face more difficulties in procurement, production, marketing, financing, etc. than most European countries. These functions and problems are mastered to a varying extent by the companies and some companies are to be admired for their performance under the conditions prevailing in Turkey.

In general, there is a lack of sufficient skilled and well informed employees. The better companies manage to have at least part of the key positions filled by skilled employees, sometimes by recruiting them from competing companies. Formal training -on-the-job and partly in foreign factories would be advisable for most of the companies.

The share of trained wood specialists in the workshops, as a percentage of total employees, is very low or nil. Thus, the workshops sometimes do not perceive their problems and do not know what is possible to achieve with regard to production engineering and economics in wood processing.

There are no technical or market oriented publications on the furniture and joinery industry in Turkish. Exchange of information in intercompany meetings is seldom and seems to be more an exception than the rule.

A furniture organization looking after the interests of woodworking and furniture industries, providing technical and market information, arranging seminars on practical business matters does not yet exist. The establishment of such an organization should be seriously considered by the Turkish authorities.

F. INSTITUTIONAL SET-UP

At present there is no institution which can provide specialized services to the wood processing industries in Turkey.

In discussions with Government Officials and representatives of Professional Associations as well as the representatives of the industry, (persons' names appear in Annex II), it has been stated by them that in order to modernize the furniture and joinery industry, a central Development Centre is very much needed. This should be accessible to every wood processor to get advice, help and information. It has been agreed that Government and industry shall give their support to increase the contribution of the wood processing industry to the economy and also to increase the export chances of the woodworking sector.

The Development Centre should be in a position to pass on coordinated and up-to-date knowledge on wood technology. Once it has been established and is operating successfully, special courses should be held when appropriate to provide information on developments in technology to foreign experts, especially from Arab countries. This Development Centre should gradually be extended so as to be able to cater for the needs of a greater number of manufacturers in the country through the possible establishment of up to 6-8 satellite service centres preferably located in Istanbul, Izmir, Eskisehir, Gaziantep, Bursa, Trabzon and in other cities where these industries predominate and/or play an important role in the economy of the region.

Regarding the tasks, the main priorities of the Development Centre shall be:

-Adaptation and transfer of correct processing techniques
-Better material economy and treatment
-Support in design and quality improvement
-Suggestions to reduce production costs
-Training in technical and managerial fields
-Documentation centre and research
-Organization of permanent exhibitions of samples of inputs
-Publication of technical journals and manuals in Turkish
-Cooperation with the industry and foundation of professional communities of interest. Suggested associations would be for: the Woodworking Education Department of the Faculty of Technical Education at Gazi University, the woodworking machinery manufacturers, the wood products exporters, the works managers of the woodworking factories and so on. The primary aims of these associations should be: to support a particular institution either existing or to be established, to promote cooperation and exchange of experience, to represent views of the members in Government and in other relevant national and international bodies and last but not least, to promote positive developments in the techno-managerial fields in the interest of their members.
-Market research and export promotion.

Ankara has been found to be the best location for the proposed Development Centre for the Woodworking and Furniture industry because of its very central location. As to the site of the Centre, the Gazi University offers the best possibilities because of its long standing professional experience and its location.

Enough rooms with a separate entrance for public associations are available on the Gazi University estate. It is also in a position to offer a vacant site for an eventual larger expansion of the Development Centre.

CHAPTER II

SITUATION OF EDUCATION IN WOOD PROCESSING

A. GENERAL

Education in primary and secondary wood processing and in wood technology is conducted either by the Ministry of National Education, Youth and Sports or by the Universities.

1. Woodworking Education conducted under the auspices of the MANEYS:

Vocational and technical education which includes also the courses in furniture and joinery making is delegated to the General Directorate of Vocational and Technical Education for Men. This directorate operates woodworking courses at the following levels:

(a) Post Primary School Level:

This includes:

1. Industrial Practical Trade Schools:

These schools are designed to train youth and adults.

2. Non-Formal Vocational Adult Training Centres:

These centres are designed to train adults who completed primary school and were not able to continue their further formal education, either to prepare for a vocation or to up-grade their skills and knowledge.

(b) High School Level:

This include

1. Industrial Vocational High Schools:

These are three-year high schools, specially designed to train young people. In this respect they are very much distinct from general high schools.

2. Anatolian Vocational High Schools:

This type of school is a four-year high school to train skilled workers for industry. The main difference between Industrial Vocational High Schools and Anatolian Vocational High Schools is the teaching medium. At the latter schools, some of the subjects are taught in English.

3. Technical High Schools:

These are four-year schools to train lower level technicians for industry.

4. Anatolian Vocational High Schools:

These are five-year high schools to train lower level technicians in industry.

5. Formal Vocational Adult Training Centres:

High school graduates who wish to get a job or who are not able to get into the higher education, may apply to these centres to be trained in a programme offered such as woodworking.

Positions of these vocational and technical education schools and centres in the general school system as well as the duration of the courses and the age groups for which they are designed are shown in Annex VII.

2. Woodworking Education Conducted by the Universities:

These include:

(a) University of Istanbul, Faculty of Forestry Büyükdere, Istanbul:
Forestry engineers are being trained in forest management sciences and in primary wood processing industries.

(b) Karadeniz University, Faculty of Forestry, Trabzon:
Forestry engineers are being trained in general forestry sciences with options in forest economics, management and forest industries.

(c) Hacettepe University, Beytepe Campus, Beytepe, Ankara:
this University is conducting a course in woodworking industrial engineering since 1974. The first graduates entered the industry in 1978.

(d) Gazi University, Ankara:

Until 1982, as the Industrial Teacher's School for Men and since 1982 as the Faculty of Technical Education at Gazi University, teachers are trained in Woodworking.

At present, the above mentioned educational institutions do not quite accomplish the requirements to educate qualified specialists which are needed by the wood processing industry.

In order to pass on modern, progressive professional knowledge, the educational institutions should be more cooperative among each other and should be working closer with the industry. Also the professional federations should increasingly serve as a media for transferring the required knowledge from the Universities to the workshops.

8. GAZI UNIVERSITY

The faculty of Technical Education was founded in 1937 originally as an Industrial Teacher's training school for men with departments for metalworking, woodworking and fitting. In 1982, in accordance with the new law of higher education, this school was turned into a faculty of Gazi University. The Faculty occupies an area of 140,000 m2. About 3,500 students are enrolled and there are about 110 full time and 70 part time staff members. The Faculty consists of the following main departments:

1. Machinery Education Department
2. Electrical and Electronics Education Department
3. Construction Education Department
4. Metallurgy Education Department
5. Woodworking Education Department
6. Higher School of Industrial Education.

The Department of Machinery Education offers the following options: Technical Drawing and Construction, Thermal and Energy Sciences, Automotive and Manufacturing Processes. The Department of Metallurgy offers options for the study of: Foundry Technology, Patternmaking and Metalworking.

Currently about 200 students are being educated in the Woodworking Department whose courses last four years. Approximately 50 students graduate per year and 50% of these graduates take up a job in governmental teaching institutions as teachers of special subjects as well as at national institutes. Most of the remaining graduates enter the Furniture and Joinery Industry as technical experts. The graduates have very good vocational chances since education is very practice oriented. There are in all about 3,000 professionals in this sector in Turkey who have finished their studies at the Woodworking Education Department of the Gazi University.

The weak aspects of the wood processing industry are well known to the Woodworking Department. The technology used by the furniture industry in Turkey has developed very rapidly, as new plants, using the latest know-how were created. This new technology could not be passed on to the students because of the Faculty's lack of financial means and technical support. It has been noticed that the growing technology gap has also partially contributed to the increase of the workshops' problems.

There is no programme for the systematic up-grading of the teaching personnel. Because of financial restraints, educational aids as well as up-to-date literature is missing and the study of new techniques in the wood processing sector cannot be undertaken. The only way whereby the University lecturers get to know about the new processing techniques is from private enterprises.

In spite of this, the Gazi University has a good international reputation. It receives inquiries from Iran, Libya and Algeria to educate more foreign students. It could also be used for special short training courses for foreign students and people from the industry during the holidays.

Efforts should be made to provide the graduates with a recognized technical teacher title in order to underline the qualifications of the graduates. It must be realized that in these courses more emphasis is placed on wood technology than educational methodology, hence the title of teacher is not really relevant. It is also being considered in future, to educate not 50 but 100 students per year in order to meet the requirements for graduates for positions in both the governmental departments and the industry.

1. SYLLABUS AND PERSONNEL

The existing syllabus of the woodworking course at the Gazi University does not comply with modern technical demands to satisfy the need for knowledge for the education of professional experts and to help the furniture and joinery industry, created in the last five years, solve its problems.

The present syllabus (Annex VIII) is a very traditional one and does not give enough importance to the new technologies and does not cover to a sufficient depth economical educational subjects. A new syllabus is currently being prepared in order to better meet todays requirements in practice.

Most of the time, the teaching staff is overstressed because of too many lecturing hours. There is very little time left for self study and research to keep abreast of technical developments in the sector. There is too little cooperation with the industry and too little exchange of experience between the University and the industry.

Besides their teaching activities, the lecturers are busy translating technical books published in Europe or the United States. Also during the final year of the course the students are taught the new production methods which are not convered by the present syllabus.

The teaching staff of the Woodworking Department currently consists of 6 lecturers and 3 assistants as well as 8 craftsmen in the workshops (Annex IX). In order to fulfill the education requirements, more teaching personnel is necessary. A few part-time lecturers are supporting the teaching staff at the moment. Further positions for lecturers and assistants are being planned for the future.

2. LABORATORIES AND WORKSHOP FACILITIES

The Gazi University has too litle technical equipment in its Woodworking Department. Furthermore this equipment is too old and new wood processing technologies are not being considered. The workshops are equipped with simple basic machines (Annex X) and laboratories, necessary to pass basic knowledge, hardly exist. Also the demonstration material is old fashioned and does not correspond to modern production engineering of today's furniture and joinery industry.

The processing techniques of new up-to-date materials cannnot be demonstrated. There is no demonstration equipment and laboratory utensils for

-wood drying

-lacquer technology

-glueing technique

-impregnation

-tool maintenance

-machining technology

The existing machines and equipment in the workshops are being used intensely. It is not only for demonstrations but also for producing and selling orders. The low profit earned by this type of work serves to make small investments.

The workshops in the Woodworking Department, inlcuding the laboratory areas have a total area of approximately 200 m2. It is planned to expand this area in the future. Present locations of the Woodworking Education Department in the Faculty of Technical education are shown in Annex XI.

CHAPTER III

CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions:

1. Positive aspects:

1. Turkey has a geographic location that provides easy access to potential Middle Eastern markets and -in comparison to non-European competitors- also to European markets.

2. The growing importance of Turkey's economic potential and its increased business and social/cultural relations, particularly with Middle Eastern countries, have also a positive effect on the furniture industry.

3. Activities of Turkish construction companies in Arab countries have often paved the way for direct or indirect furniture exports.

4. A complete range of equipment is available locally for furnishing hotels, universities, etc.

5. Some companies are equipped with good machinery which allow the production of good export quality products.

6. In comparison with many other countries, the level of wages and salaries is low.

7. Turkish companies have a particular advantage in hand carved style furniture because of skilled craftsmen and their relatively low wages.

8. The Turkish furniture sector has available highly skilled craftsmen for reproduction furniture. Such skills are rare in western countries because of mechanization and automation and the cost of skilled craftsmen is very high in these countries.

9. The Turkish furniture industry is a young industry in a non-saturated market so a good future potential can be assumed if some bottlenecks can be eliminated at sectoral and company level.

2. Negative aspects:

1. In Turkey there is a lack of sound technical information and sources able to provide advice in technical and market aspects, particularly for export related production.

2. The handling, storage and distribution of wood from the forest to the furniture factory creates difficulties (quality, waste, cost, species preferred by the market) for the smooth operation of an export oriented furniture company.

3. Because of the young history of industrial furniture production there is still a lack of skilled workers and often also of key personnel (specially at the middle management level) with sufficient experience in this sector.

4. in Turkey the available range of materials (e.g. veneers) is small and this limits the chances to satisfy customers' preferences.

5. The quality level of furniture produced industrially is still mostly low in comparison with that on international markets because of high overheads and the production costs (also in comparison with furniture made in small workshops).

6. There is a lack of well designed furniture, mainly because the industry does not fully appreciate the function of design in this context. Most items tend to be custom-built and are copies from the catalogues of foreign manfuacturers. There are no trained furniture designers.

7. Capacities of many companies are at present underutilized which creates a high burden of fixed costs.

8. Costing and its control is lacking in most companies.

9. Financial costs are very high in Turkey, a fact which reduces the competitiveness of companies with low equity/debt ratios.

10. Delivery times for exports are often long.

11. Management know-how, organization and active marketing skills are not yet sufficient in most of the companies, particularly for export-oriented operations.

12. Systematic export marketing approaches are often missing. This goes for obtaining market information and contacts for planning and control of activities as well as in respect of the range of products offered, promotion activities, sales organization and distribution.

8. Recommendations:

The strong and weak points of the Turkish furniture and joinery industry mentioned above indicate that there is a considerable potential for development and improvement. There are recommendations which are referring to activities at the sectoral level (i.e. activities beyond the direct influence of an individual firm or referring to group activities) as well as those addressed at the individual company level.

I. At the sectoral level:

1. An effective association of woodworking/furniture and joinery industries should be set-up to take care of the interests of the sector. Such an association could serve as an information source on markets, material supply, production, cost and other aspects, organize technical and commercial seminars, take an active role in international representation (symposia, fairs and exhibitions, trade delegations, etc.) and advise governmental institutions on furniture related policy and regulation matters, particularly also with regard to export business.

2. Procedures for obtaining wood and its handling from felling in the forest to delivery to the factories should be improved to avoid insect and fungal attack resulting in a lower quality of wood and the furniture made thereof, substantial waste and a big loss of natural resources. Special diagnostic studies are recommended about handling of wood and recommendations made on ways to overcome the delays.

3. In order to reach an optimum allocation of wood to the end users, the authorities concerned should establish a rational production and distribution system . The currently used system for selling logs and timber should be improved and attempts should be made to organize the sale of wood without creating any intermediary and/or artificial price increases.

4. It is recommended to the General Directorate of Forests to ensure an adequate reforestation according to the needs of the user industries bearing in mind that the need for higher quality pine wood will be increasing in the future.

5. Technical assistance should be provided concurrently with the modernization of the Turkish furniture and joinery industry, to the primary wood processing industries to achieve reduced raw material waste, high capacity utilization, high product quality and cooperation with the end user industries.

6. A monthly sectoral publication in Turkish specially catering for the furniture and joinery industries in particular should be launched as soon as possible as a medium for the dissemination of technical, managerial and marketing information and for the transfer of new technologies.

7. A specialized institution such as Woodworking, Furniture and Joinery Industries Development Centre should be set-up to support the speedy modernization of the wood processing industries as a whole through the provision of specialized services directly. These would be documentation, extension, training and testing services, etc. A project concept for technical assistance for the creation of such an institution is given in Annex XII. Full cooperation of the public as well as private industry should be secured before the start of such a project.

2. At the company-level:

1. With respect to the raw material supply, companies should give more importannce to obtain fully air dried sawn wood, where feasible investing in kiln drying facilities should be considered.

2. Veneer manufacturers should be asked to handle and pre-treat logs correctly to avoid splitting and discoloration, etc., and exercise tigth quality control procedures during processing, sorting, drying and storage to produce better quality veneer with maximum yield. If no veneer of acceptable quality is available it may have to be imported to cover the needs of export production.

3. The quality and design of hardware and fittings must be improved. For exports, better quality and better designed hardware and fittings (e.g. handles, hinges, etc.) should be purchased. If this is not available on the local market, these materials would have to be imported.

4. The quality consciousness at all levels of the companies has to be improved. Since the quality aspects do not yet play a major role in the local market, the companies have to train their staff on quality aspects to be able to meet international requirements.

5. Firms must be on the look for developments in international design. Design and production should be developed according to the wishes and tastes of the target group. Special importance should be given to get designers with good training and good knowledge of market expectations and on raw material and production conditions. Training in Turkey (e.g. seminars) and abroad should be considered.

6. Special attention has to be given to comfortable products which are suitable for physical requirements of the human body (i.e. ergonomic aspects) especially in the case of armchairs and sofas.

7. Most of the small firms require to have their plant layout re-planned in accordance with the logical work flow for solid wood processing. They also require the installation of dust and wood-waste extraction systems and compressed air lines.

8. The introduction of purpose-designed and more rationalized ranges with standardized and inter-changeable parts matched with the objectives of using economically and fully the existing machines and equipment, should allow for greater specialization and the introduction of series production. This in turn should lead to improved quality, higher productivity and lower costs.

9. Knowledge about mass production furniture, management techniques and organization should be improved.

10. Measures for increasing productivity should be developed, particularly for companies working at a higher capacity utilization rate. Time and motion studies could be introduced and work preparation and its organization should be improved.

11. Utilization of waste for energy should be considered particularly in bigger companies.

12. Companies should make an internal assessment of training needs for all key functions and at all levels and arrange for training in Turkey and abroad (attending seminars and on-the-job training).

13. Knowledge of foreign languages should be increased for those company members involved in international operations.

14. The know-how in international and market oriented managements should have to be widened in most of the comapnies looking for export business. Smaller companies may seek the cooperation of bigger furniture sales organizations or of the export organizations of the big holdings to benefit from additional tax rebates.

15. Management and marketing training should be strengthened through internal and external seminars, appropriate literature, a look at "how the others do" and at success and failure stories, through active cooperation and work with market-partners.

16. Most of the companies would have to be more active in getting market information and making contacts with customers. A more systematic approach and stratagey for exporting is advisable, even for companies already successfully exporting. Market requirements particularly with regard to quality, design, taste, etc., have to be identified and then observed during the whole production process, so that products are obtained in line with these requirements. This will often necessitate new product development or variations of existing furniture products.

17. A better costing and control is recommended to improve the information and decision basis for production planning, product selection, pricing, etc.

18. Systematic cost reduction investigations (e.g. through value analysis) should be considered to increase the price competitiveness in international markets.

19. Companies should regularly appraise their own strengths and weaknesses against market potentials and try to find a market segment which corresponds to the stregnths of the company and its existing or planned product range. Active marketing activities with regard to product policy, pricing, sales and payment conditions, promotion campaigns esttablisment of close personal contacts with existing and potential customers, distribution channels and after sale services have to be carried out. The assistance of conulstants may have to be sought for the initial systematic planning and activity steps.

20. Export cooperation (joint export marketing groups) to cut export overhead costs should be investigated. The possibility of cooperation with foreign producers should be investigated (e.g. sub-contracting for the production of furniture parts, production of furniture components ready for assembly by the large importers, the creation of retail organization's own plant for assembling, etc).

21. Participation in international fairs should be increased and joint exhibitions representing the Turkish furniture and/or joinery industry (or group of companies) should be pursued.

3. At the Gazi University Level:

1. The present syllabus of the Woodworking Education Department has to be revised to meet the requirements of the wood processing industries and the revised syllabus should include such new subjects as plant layout and design, woodworking equipment, industrial wood processing, engineering economics, industrial furniture and joinery design and other aspects as applied to the secondary wood processing, production planning and control, quality control and foreign languages.

2.Teaching staff should undergo a systematic in-service training to familiarize themselves with the new developments in technology materials, processing methods, equipment, etc. Study tours and short-term fellowships in research and development establishments in West European countries should be an integral part of such in-service training programmes.

3.Immediate action should be taken to enlarge and equip the laboratories and workshops at the Woodworking Education Department with modern equipment and machinery. In this respect a step by step approach should be pursued. Details of such an approach are given in Annex XIII.

4.The Woodworking Education Department should strengthen its existing ties and contacts with the industry as well as with its former students on a wider basis through newsletters, symposia, seminars and regular gatherings with former students.

UNITED NATIONS

Annex I

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO

Assistance to technical training in wood processing

JOB DESCRIPTION

RP/TUR/85/003/11-01/31.7.A.

Post title Adviser in furniture and timber industry training

Duration 2 months (split mission)

Date required As soon as possible

Duty station Ankara (with local travel)

Purpose of project To improve facilities at Gazi University in Ankara for the training of technicians by upgrading and modernizing their workshop and by training staff on the use of new equipment; the curriculum will also be revised.

Duties

The adivser will be attached to the Woodworking Education Department within the Faculty of Technical Education at the Gazi University. He will be expected to help the staff of the Woodworking Education Department to upgrade the existing training facilities and to improve the course syllabus to be more in line with the demands of the modern wood processing industry.

In particular, he will be expected to:

1. Evaluate and critically appraise the present course and equipment.
2. Hold discussions with industry representatives to determine their needs in terms of technicians in the foreseeable future.
3. Draw up the technical specifications for the equipment to be purchased in Turkey and abroad for the workshop.
4. Train the counterpart staff and instructors in the use of the machinery and in the new curriculum.
5. Prepare a detailed report outlining his findings and recommendations.

..../..

Applications and communications regarding this Job Description should be sent to:

Project Personnel Recruitment Section, Industrial Operations Division
UNIDO, VIENNA INTERNATIONAL CENTRE, P.O. Box 300, Vienna, Austria

V.81-33106

UNITED NATIONS NATIONS UNIES

Qualifications: Engineer or wood technologist with extensive knowledge and experience in secondary wood processing (furniture and joinery production) and training.

Language: English (some Turkish an asset)

Background Information:

Turkey possesses a significant forest resource and the wood processing industries have attained a fair degree of development. Nevertheless, the secondary wood processing sector is still in great and urgent need of modernization and of well trained technical personnel. The Government is anxious to provide the necessary technical advice to the Gazi University which is the main center of technical education in woodworking.

In this respect, the Government has turned to UNIDO for assistance in the required technical expertise for the University of Gazi to develop its ability to serve the modernization of the wood industry in general, where the University has a large potential in this field. Its Faculty of Technical Education was founded in 1937 as an industrial teachers' school. In 1982, it became a facultyof Gazi University with 180 staff members for 3500 students. It has six departments, one of which is the Department of Woodworking Education/Wood Processing which has been targetted for strengthening and improving teaching purposes and to provide training and extension services for industry.

Annex II

LIST OF PERSONS MET

GAZI UNIVERSITY

Mr. Ramazan Ozen, Dean and Head, Faculty of Technical Education.

Mr. Abdullah Sonmez, Associate Professor, Woodworking Education Dept.

Mr. Mustafa Altinok, Assistant Lecturer, Woodworking Education Dept.

plus many other teaching staff of the Woodworking Education Dept.

STATE PLANNING ORGANIZATION

Mr. Baykan Suberker, Wood Sector Expert.

MINISTRY OF NATIONAL EDUCATION

Mr. Ahmet Sevgi, Assistant General Director, Vocational and Technical Education for Men.

MINISTRY OF AGRICULTURE, FORESTS AND VILLAGE AFFAIRS

Mr. Faruk Gurcan

Mr. Pamir Erten

TURKISH STANDARDS INSTITUTE

Mr. I. Erdem.

EXPORT PROMOTION RESEARCH CENTRE (IGEME)

Mr. H. Erol Ozenc, Expert.

PEOPLE'S BANK OF TURKEY (HALK BANKASI)

Mr. Wolfram Gehr, Project Manager, Turk-Alman Kucuk Sanayi Teknik Yardim Projesi.

INDUSTRIAL DEVELOPMENT BANK OF TURKEY (ISKB)

Mr. Aytar

Mr. Gunduz Ugural

Mr. Orkan Beskok

IEPE FURNITURE FACTORY

Mr. Oner Ersay

Mr. Mehmet Ceyran

Mr. Mehmet Odabasi

ORSAN FURNITURE FACTORY

Mr. Naci Doganlar

KORAY FURNITURE AND JOINERY CO.

Mr. Tuncer Basacar

DEYAS CO.

Mr. Yasar Somunkiran

METIN MOBILYA CO.

Mr. Metin Buyukcivgin

GENTAS CO.

Mr. Zafer Eroglu

UNDPD

Mr. W. Dreusch

UNIDO

Mr. L. F. Biritz

Ms. G. Roces

Annex III

MAJOR FURNITURE AND JOINERY FACTORIES IN TURKEY

Company	Location	Product range and capacity
1. Tepe Mobilya	Ankara	2,000 Bedroom sets 12,000 Dining room sets 7,200 Wall units 100,000 Doors
2. Orsan	Ankara	4,200 Dining room sets 4,200 Bedroom sets 4,200 Living room sets
3. Ozsan	Ankara	2,500 Living room sets 12,000 Chairs
4. Yontas	Ankara	2,500 Sets of various furniture
5. Cetin Mobilya (*)	Ankara	3,000 Bedroom sets 3,000 Wall units 3,000 Tables 50,000 Chairs
6. Domsan	Ankara	2,000 Sets of various furniture
7. Mostas (*)	Manisa	3,300 Bedroom sets 900 Dining room sets
8. Gurer Mobilya	Istanbul	2,000 Living room sets
9. Kelebek Mobilya	Istanbul (Duzce)	50,000 Sets of various furniture
10. Tekirdag Agac (*)		3,000 Living room sets 100,000 Doors
11. Istas (*)	Inegol	15,000 Sets of various furniture 5,000 Chairs
12. Tamsan (*)	Bolu (Hendek)	15,000 Bedroom sets 2,500 Wall units 3,000 Dining room sets 35,000 Doors
13. Yonga Mobilya	Denizli	3,000 Bedroom sets 2,750 Living room sets 1,500 Wall units 1,500 Coat hangers

14. Mosan (*)	Gaziantep	2,000	Living room sets
		2,000	Dining room sets
		2,000	Bedroom sets
		100,000	Doors
15. Emistas (*)	Eskisehir	5,600	Bedroom sets
		2,800	Living room sets
		2,800	Dining room sets
		11,200	Coat hangers
16. Tetas	Afyon	422,400	Drawers
		42,000	Chairs
17. Kuzey Mobilya (*)	Trabzon	7,000	Sets of various furniture

---

* Established through TSKB financing.

THE VALUE OF FURNITURE EXPORTS TO SELECTED COUNTRIES FROM TURKEY

	1980	1981	1982	1983	1984
Dubai	-	-	351.671	150.944	278.765
Germany F. R.	261.685	156.997	406.267	522.231	30.088
Iraq	3.793	35.88	182.583	308.575	283.822
Jordan	196.145	459.160	453.960	624.885	226.806
Kuwait	143.656	34.454	341.894	691.471	839.968
Libya	77.097	6.780.095	6.342.336	1.974.982	13.155.563
Saudi Arabia	325.181	1.670.329	6.884.736	11.429.929	13.487.105
Syria	8.875	65.000	436.991	92.874	77.353
United Kingdom	7.000	65.157	1.150.540	908.097	39.331
Other countries	683.659	673.176	417.347	1.112.987	2.147.279
T o t a l :	1.706.441	9.940.251	16.950.319	17.816.975	30.566.086

FORESTRY INDUSTRY PRODUCTION(1)

V : Mill. TL
At 1983 Prices

COMMODITIES	Achieved 1978		Achieved 1983		Quant.	Value	Quant.	Value	1978 - 83	1984 - 89
	Quant.	Value	Quant.	Value	Estimates 1984		Plan Target 1989		Ann. Perc. Incr.	
Saw-mil Ind. (cu. m.)	4.385	241.175	4.338	238.425	4.506	247.940	5.485	296.675	—0,2	3,7
Veneer Ind. (Ton)	380	26.600	525	36.750	573	40.110	830	56.100	6,7	6,9
Furniture Ind. (Unit)	6.640	172.640	8.035	208.910	8.525	221.650	11.462	295.455	3,9	5,9
Others	—	36.208	—	51.200	—	58.573	—	111,770	7,2	13,9
Total	—	476.623	—	535.285	—	568.273	—	760.000	2,4	6,0

(1) Covering the wood and cork industries and the wooden furniture industry

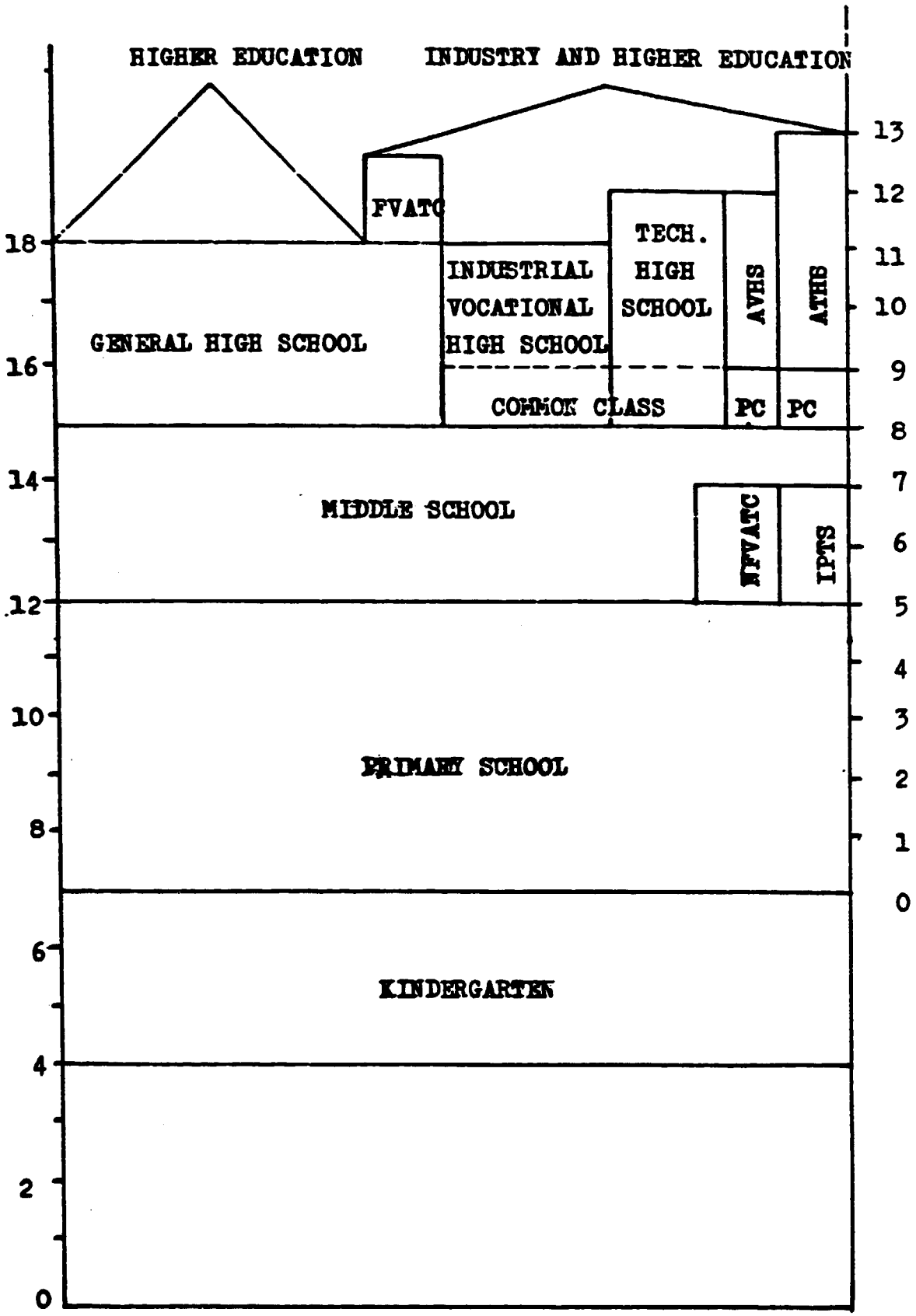
(source: The Fifth Five Year Development Plan, 1985-1989).

Production Targets in the Wood Industry

Product	1975	1976	1977	1978	1979	1980	1981	1982	1983-1985	Percentage increase (average/year)
Sawn timber (1,000 m^3)	-	-	3,302	3,923	4,276	4,276	4,461	5,086	6,286	9
Parquet (1,000 m^2)	-	-	3,190	3,457	3,748	4,063	4,405	4,785	4,785	8.4
Plywood (1,000 m^3)	-	-	129	137	145	155	164	174	208	6.2
Cooperage (1,000 pieces)	-	-	101.6	105.3	109.2	113.3	117.5	121.9	121.9	3.7
Fibre board (1,000 tons)	-	-	69	69	69	69	69	89	89	5.2
Particle board (1,000 m^3)	-	-	439	456	475	494	513	533	533	4
Furniture (1,000 pieces)	-	-	1,066	1,148	1,236	1,332	1,434	1,544	3,760	7.7
Veneer (1,000 m^2)	-	-	5,000	5,625	6,328	7,119	8,009	9,010	9,010	12.5
Production of ORUS mills										
Sawn logs (1,000 m^3)	110	152	152	187	222	232	279	309	414	
Sawn timber (1,000 m^3)	189	189	189	235	282	322	361	400	400	
Matched parquet (1,000 m^2)	500	500	500	600	700	800	950	1,100	1,100	
Mosiac parquet (1,000 m^2)	100	100	100	200	200	200	400	400	400	
Cooperage (1,000 pieces)	2.5	2.5	2.5	4.0	5.0	5.0	5.0	5.0	5.0	
Fibre board (1,000 tons)	-	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	
Particle board (1,000 m^3)	-	30	30	30	70	70	70	70	220	
Plywood (1,000 m^3)	-	-	-	9	27	27	27	27	54	
Household furniture (1,000 pieces)	-	-	-	-	-	-	20	20	20	
School furniture (1,000 pieces)	-	-	-	-	-	-	50	50	50	
Prefab houses (1,000 pieces)	-	-	-	-	-	-	2.5	2.5	2.5	
Cooperage (barrel) (1,000 pieces)	-	-	-	-	-	10	10	10	10	
Bee hives (wood)	2	2	2	2	2	2	2	2	2	

Source: ORUS

SCHOOL SYSTEM IN TURKEY



Source: General Directorate of Vocational and Technical Education for Men, MNEYS.

Annex VIII

EXISTING COURSE PROGRAMME OF THE WOODWORKING EDUCATION DEPARTMENT OF GAZI UNIVERSITY

Year - Semester	Subjects	Credit Hours
1 - 1	Mathematics	4
	Physics	3
	Chemistry	3
	Wood Design and Construction I	2
	Drawing Geometry	2
	Equipment Science	2
	Practical Woodworking	8
1 - 2	Mathematics II	4
	Physics II	3
	Chemistry II	3
	Materials Science	2
	Furniture Design	3
	Practical Woodworking	10
2 - 1	Statics	3
	Statistics	2
	Wood Technology	2
	Woodworking Machines I	3

Year - Semester	Subjects	Credit Hours
2 - 2	Electric Science	3
	Building Science	2
	Furniture Styles I	2
	Woodworking Machines II	3
	Materials Science II	2
	Furniture Design II	3
	Practical Woodworking	10
3 - 1	Technology of Surface Treatments	3
	Furniture Styles II	2
	Project I	4
	Perspective and painting Techniques I	2
	Practical Woodworking	10
3 - 2	Economics	2
	Technology of Surface Treatments II	3
	Project II	3
	Perspective and Painting Techniques II	2
	Esthetics	2
	Technology of Decoration	2
	Practical Woodworking	10

Year - Semester	Subjects	Credit Hours
4 - 1	Technology of Serial Production	2
	Project III	5
	Perspective and Painint Techniques III	3
	Practical Woodworking	10
4 - 2	Quality Control in Wood Industry	3
	Project IV	5
	Perspective and Paint Techniques IV	3
	History of Art	2
	Practical Woodworking	10

Annex IX

List of Existing Staff of the Woodworking Education Department

Lecturers

Prof. Dr. Ramazan Ozen

-wood impregnation
-standardization
-strength tests
-laboratories (physics, chemistry, microscopy, wood physic)
-glueing technique

Doz. Mehmet Memis

-construction
-material information
-workshop practice
-literature, video, documentation, samples
-quality improvement (quality test)

Doz. Hilmi Gozeneli

-machinery technique
-window production
-mass production
-safety at work
-tool maintenance techniques

Doz. Rahmi Aras

-inlays
-wood carving
-workshop practice
-furniture styles

Doz. Zafer Turk

-drawings
-project layout
-perspectives
-painting techniques
-paints
-interior decoration

Doz. Abdullah Sonmez

-lacquer technology
-laboratory for lacquer techniques
-workshop practice

Assistants

Mustafa Altinok (Mehmet Memis)

Ihsan Kureli (Ramazan Ozen)

Ismail Karagul (Zafer Isik)

Technicians

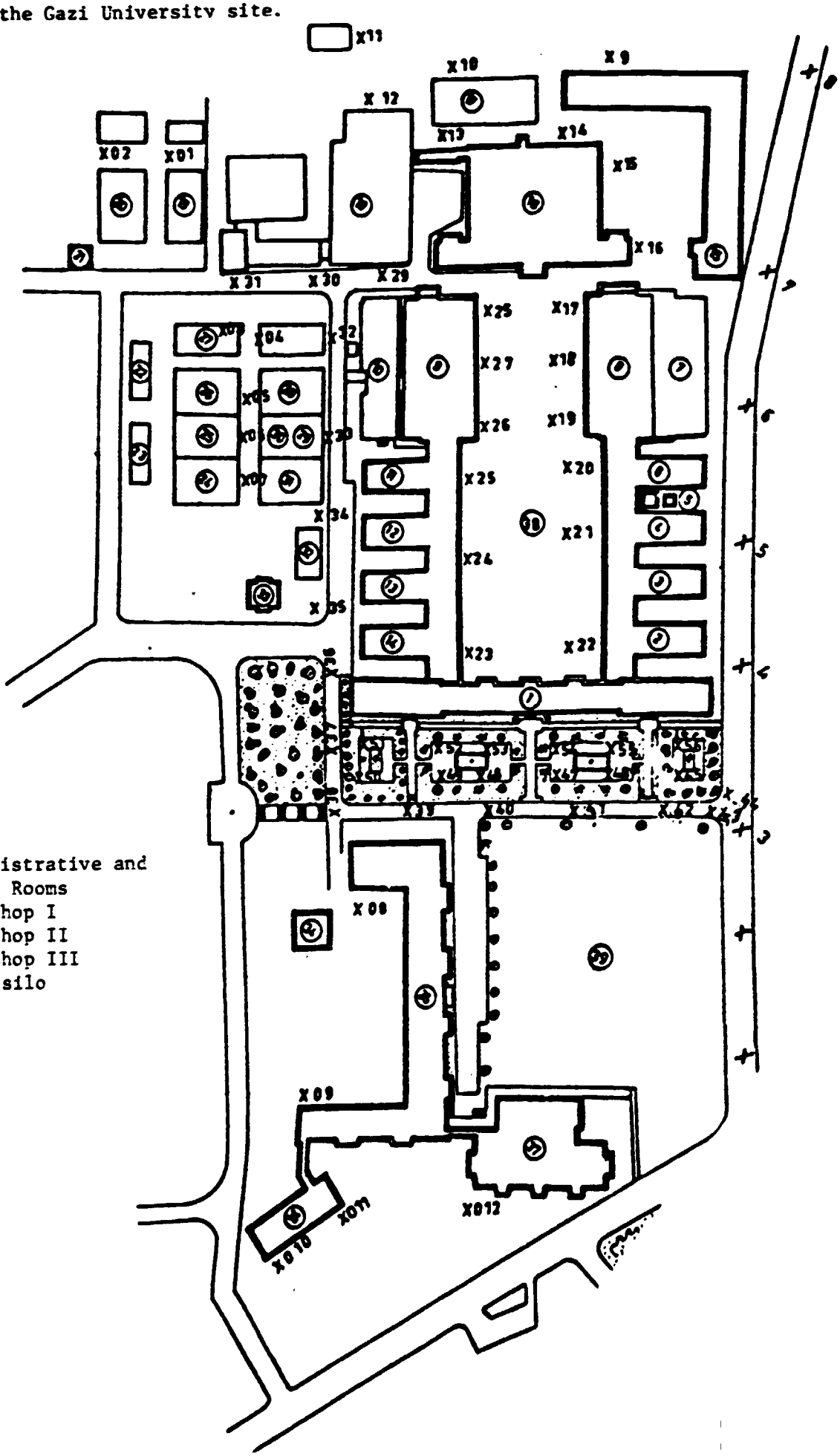
Ali Kaya	-Workshop
Hayri Belge	-Workshop
Faruk Celik	-Workshop and production
Mehmet Kog	-Stockroom and press shop
Aziz Deniz	-Production
Hudaver Yaman	-Production
Abdurrahman Sahin	-Finishing shop
Hasan Aslan	-Tools stockroom

Annex X

LIST OF EXISTING MACHINES AND EQUIPMENT IN THE WOODWORKING EDUCATION DEPARTMENT

Quantity	Machine Description
8	Wood turning lathes
6	Bandsaws
3	Surface planers
4	Circular saws
2	Thickness planers
4	Spindle moulders
10	Boring machines
1	Dovetailing machine
1	Jig saw
1	Belt sanding machine
1	Grinder for knives
1	Band saw grinding machine

Location of the Woodworking Education Department
at the Gazi University site.



Legend:

1. Administrative and Class Rooms
2. Workshop I
3. Workshop II
4. Workshop III
5. Chip silo

Annex XII

MODERNIZATION OF THE FURNITURE AND JOINERY INDUSTRY

It is recommended that UNDP/UNIDO technical assistance be sought to help modernize the Turkish Furniture and Joinery Industry through the technical assistance project described hereunder.

Development Objectives:

To create a national capability for product development, extension services, testing and quality control, training and dissemination of technical know-how to furniture and joinery industries to improve product quality and productivity leading to an increase in production and export.

Immediate Objectives:

To establish a national centre to provide services to the furniture and joinery industries leading to their development. (This centre could, once established, eventually have satelite service centres in regions where these industries predominate).

Background Information:

Furniture manufacturing at the artisan and craftsman level has a long history in Turkey. It is only after 1975 that production of furniture in factories of medium and large size began on an industrial basis.

The number of workshops operating at the artisan and craftsman level is estimated to be about 250,000. The majority of these are located around large cities like Ankara, Bursa, Eshisehir and Istanbul. The workshop owners are members of the Federation of Woodworking Artisans and Small Industries, which is a statutory body. Its main function is to maintain a dialogue with the government and look after commercial and legal interests of the members. It is estimated that the small workshops produce about 85% of the total furniture and joinery output of the country.

Since the 1970s, the Government is pursuing a policy in the 5-year development plans to create a national export capacity in the furniture and joinery industries sector equipped with modern machinery and technology. As a result of the incentives given to the export oriented furniture and joinery factories with modern equipment and technology, there are today at least 20 medium to large size factories established between 1975 and 1984. Their share in the total furniture production is estimated to be about 15% when operating at full capacity.

Only some of these factories are able to utilize 70 - 80% of their installed capacity and are already working on a two shift basis. Others are operating at much lower capacities and producing only for odd jobs. Their products have little chance to compete in the export markets due to poorly copied designs, low quality, high prices and poor marketing techniques.

On the other hand, furniture and joinery factories have many internal problems forcing them to operate at far below the optimum levels. Some of these problems are poor management, production planning and control, insufficient working capital, the non-existance of a quality label for furniture and joinery products and, the last but not least, the inability to keep up with new developments in the sector also compound the issue. These firms are all members of the local Chambers of Commerce and Industry, which cover all sectors, so they are not in a position to provide any technical services to the furniture and joinery industries.

In addition to the above, small workshops have other problems which relate to those of the larger factories.

They use mainly basic universal woodworking machines manufactured in the country, employing traditional methods and designs. Although they have a federation, it too is not in a position to provide any technical and managerial advice to the industry.

In fact, there is no institutional set-up in Turkey to serve the specific needs of the industry and maintain the transfer of know-how and technology to the industry on a continuous basis, except to a certain extent SEGEM, 1/ which gives advisory and training services to the small scale industry in general.

Turkey has an adequate supply of locally manufactured raw materials (sawn wood, wood based panels), hardware and fittings and other auxiliary inputs required by the furniture and joinery industries. The availability of manpower with basic training is no problem. The future of the furniture and joinery industries lies with their ability to compete within the EEC, if and when the country enters into full membership, and the export markets in the Middle East.

It is expected that the Turkish construction firms operating outside the country will become potential buyers of the Turkish furniture and joinery products if these products are able to comply with certain quality standards to carry a quality label like "Mobelfakta", as used in Sweden.

There are many specialized institutions which carry out testing and award quality labels to furniture and joinery products in Europe. Examples are "FIRA" in the United Kingdom, "Mobel Institut" in Sweden, "CTB" in France, "Teknologisk Institut" in Denmark and "Deutches Institut" for furniture technique in West Germany and others.

Because of the interrelationship between wood and plastics in furniture the possibility of doing something for Turkey's plastic industry should be considered when planning a training programme.

1/ Industrial Training and Development Centre, Ankara.

Outputs_Expected:

To create an institution that will provide the following services directly to the furniture and joinery industries:

Documentation_Centre:

A specialized documentation centre, publishing a specialized monthly publication in Turkish on new processes, products, materials, machinery, designs and furniture standards as well as on market intelligence information. The Centre will maintain a library of related books, journals, directories, standards, manufacturers' and suppliers' catalogues as well as of films, slides and other visual aids. In addition to the monthly publication, manuals on various aspects of the industry will be published on an ad-hoc basis.

Specific_Inputs:

International experts (6 m/m)	$ 48,000
National experts (18 m/m)	27,000
Training (2 fellowships)	18,000
Equipment	100,000

Extension_Services:

The centre wil give ad-hoc specialist advice to individual firms on queries in production, management, marketing, design, plant lay-out and machine and tool selection aspects through its own technical staff.

Outside consultants will also be recruited on an ad-hoc basis by the centre to introduce new technologies to the industries at large.

It will provide common service facilities to the industry in such fields as computer applications, specialized machining (copying lathes, edge banding and veneering of panels, machine carving, etc.) and services such as tool maintenance, wood drying and surface finishing. Special jigs and simple machines could also be produced for sale to the industry. (To achieve this, UNDP/UNIDO should provide equipment etc., that is imported, while the Turkish authorities should provide locally produced machines, tools, etc.).

Specific_Inputs:

International experts (12 m/m)	$ 96,000
National experts (18 m/m)	27,000
Training (5 fellowships)	54,000
Equipment	200,000

Training:

The Centre will develop training courses and seminars to meet the industry's special needs in production planning and control, product design, wood technology, surface finishes, quality control and machine and tool maintenance aspects. The courses and seminars will be aimed at updating and increasing the participants' knowledge and their technical awareness in the above fields.

The courses and seminars will be conducted in a workshop environment to enable participants to contribute and discuss various aspects of their own knowledge and problems. Study tours to specialized fairs abroad will also be organized. It would also organize design competitions to identify latent local talent and train local designers in the specific requirements of the furniture industry.

Specific Inputs:

International experts (2 m/m)	$ 16,000
Training (1 fellowship)	10,000
Equipment	20,000

Testing:

The centre will have a comprehensive testing facility and will conduct routine and ad-hoc testing of complete items of furniture and joinery, components and materials using standard test methods to recognized test levels to assess the fitness for purpose. The centre will -by the end of the project- be in a position to operate a quality assurance system and a quality label for furniture and joinery produced in Turkey and represent the industry in the committees of relevant standards prapred by the Turkish Standards Institute (TSE).

Specific Inputs:

International experts (30 m/m)	$240,000
Training (2 fellowships)	18,000
Equipment	180,000

Total inputs required and approximate budget:

	m/m	US$
International experts	50	400,000
Administrative support personnel	84	42,000
National experts	66	100,000
Training (fellowships)		100,000
Equipment		500,000
Miscellaneous		10,000
Approximate Total Cost:		1,512,000

Duration of the assistance: The duration of the UNIDO's technical assistance to this centre should be of the order of 4 years.

Annex_XIII

MODERNIZATION OF THE WOODWORKING EDUCATION DEPARTMENT

It is strongly recommended that the Woodworking Education Department of the Faculty of Technical Education of Gazi University seek immediate technical assistance from UNDP/UNIDO to modernize its laboratory and workshop facilities so that the training that students receive be more in line with the actual requirements of the industry. It is also recommended that the proposed technical assistance be given in three phases so that each new phase can use the previous one as its starting point. The specific objectives, outputs and inputs of each phase are described below:

A. First phase:

1. Objectives:

-To introduce modern woodworking technology to the Woodworking Education Department.

-To improve the teaching means in the wood drying and surface finishing fields.

-To facilitate the revision of the existing course syllabus.

-To develop a wider appreciation of the needs of the Turkish woodworking industry and of the subsequent action to be taken in the next two phases.

2. Outputs:

-Partially strengthened teaching means and a better course syllabus in the fields of:

-Wood drying
-Surface finishing
-Quality testing of furniture
-Technical and professional documentation
-Availability of additional textbooks and audio-visual teaching materials

3. Inputs:

Consultants in wood drying, surface finishing and quality testing of furniture) (3 x 1 m/m)	3 m/m	$24,000
Expendable equipment (testing material and technical literature)		2,000
-Non-expendable equipment (wood drying, surface finishing and quality testing equipment) as per following specifications.		6,065 (30,065*)
-Individual fellowships (1 x 15 days)		4,000
Total inputs in Phase 1:		$30,065 (60,065*)

* Including the estimated cost of wood drying kiln ($24,000).

Specifications of non-expendable laboratory equipment:

Description/Model	Quantity	Est.Cost US$
a) For wood drying		
1. Drying oven (similar to model: Heraeus T5042)	1	500
2. Electronic scale (similar to model: Sartorius W 3600)	1	1,000
3. Electric moisture meter (similar to model: GANN,Type HT95)1	1	360
4. Wood drying kiln with 3 m3 drying capacity (with manual, semi-automatic and automatic control. Only if additional funds are avialable.	1	24,000
b) Laboratory Equipment for surface finishing:		
1. Wet felting thickness knife (Rossmann) (similar to mod.: Erichsen*, type: 333/II).	1	55
2. Microtest (Similar to model:: Erichsen III F)	1	320
3. Scoring cutter for grid cutting test. (similar to model:. Erichsen, Type: 295/I)	1	190
4. Viscosity testing unit. (similar to model: Erichsen, Type: 243/II/4)	1	90
5. Support for item 4 above		70
6. Applicator -wedge testing unit (Meier SBB) (similar to model: Erichsen, Type: 314)	1	520
7. Pycno meter with weight (similar to model: Erichsen, Type: 290/T)	1	130
8. Fourfold coat draw frame. (similar to model: Erichsen, Type: 360/60, 30/60/90/120 MY)	1	165
9. Rod for hardness test. (similar to model: Erichsen, Type: 318)	1	225
10. Schmiss hardness tester (Oesterle) (similar to model Erichsen, Type: 435)	1	310
11. Thorn tester. (similar to model: Erichsen, Type: 266)	1	810
12. Corrosion testing units. (similar to model: Erichsen Type: 434)	2	390
13. Glossmeter (similar to model: Erichsen, Type: 507-M/60o)	1	930
Sub-total:		4,205

---

* Erichsen GmbH and Co. K.G.,
Postfach 720
D 5870 Hemer-Sundwig, FRG

B. Second phase:

1. Objectives:

a) To deepen the knowledge concerning woodworking technologies currently not used at Gazi University in Turkey.

b) To train lecturers in the above fields.

c) To assist fully in the completion of the revision of the corresponding syllabus.

d) To develop a programme and the capability to train foreign students from the countries in the region.

e) To develop a programme and the capability to provide ad-hoc assistance and short training courses by the staff of the Woodworking Education Department to catter for the specific needs of the industry.

f) To train counterparts in the quality control of wood manufactured products and their inputs.

g) To improve production methods throughout the woodworking industry.

h) To pass on to the local industry the required know-how to improve productivity.

i) To the extent possible to provide direct expert services to selected enterprises on an ad-hoc basis.

j) To improve overall woodworking technologies of the industry.

2. Outputs:

a) Fully strengthened teaching means, laboratories and course syllabuses in the following fields:

-Wood drying
-Surface finishing
-Industrial design
-Documentation
Including technical literature, catalogues, samples, slides and audio-visual aids (Video, etc).

b) Partially strengthened teaching means, laboratories and course syllabuses in the following fields:

-Glueing techniques
-Tool maintenance and selection
-Wood machining technology
-Window production technology
-Laboratory for quality testing of furniture
-Standardization
-Plant layout and factory planning
-Industrial production technology

3. Inputs:

-Short-term consultancies in fields to be determined*	18 m/m	$ 144,000
-Individual fellowships in furniture testing	3 m/m	15,000
-Study tour (for 6 lecturers to visit professional schools, institutes and industry in European countries)		20,000
-Technical literature and audio-visual aids		10,000
-Urgently needed laboratory, demonstration equipment and machines as per following specifications.		60,000
-Additional technical equipment as per following detailed specifications.		106,000
Sub-total:		(355,000)

Urgently needed laboratory equipment and demonstration equipment:

Description/Model	Quantity	Est. Cost US
a) Equipment for surface finishing:		
1. Curtain coating machine with 2 lacquering heads Working width: 600 mm.	1	12,000
2. Paint spraying booth with water-wash system and turntable. Working width: 2500 mm.	1	6,000
3. Airless spraying equipment	1	1,200
4. Lacquer drying tunnel with adjustable temperature control up to 80 C.	1	15,000
b) Equipment for glueing techniques:		
1. Single sided edge banding machine with hot-melt glue system. Working thickness 30 mm. max.	1	19,000
c) Equipment for tool maintenance:		
1. Sharpening machine for carbide tipped circular saw blades. Saw blade diameter: from 100 mm to 600 mm.	1	5,500
2. Manual tooth setting machine for band saw blades. Working width: up to 50 mm.	1	1,300
	Sub-total:	60,000

---

* Mainly in fields under 2.a and 2.b above.

Specifications of additional laboratory equipment and demonstration equipment.

Description/Model	Quantity	Est.Cost $
a. Equipment for wood drying:		
1. Wood drying kiln* (conventional) with manual, semi-automatic and automatic control. Capacity: 5 m3 per charge.	1	24,000
b. Equipment for surface finishing:		
1. Conditioning test cupboard for testing cold check of lacquering.	1	9,000
2. Roller coating machine. Working width: 600 mm.	1	25,000
c) Equipment for glueing technology:		
1. Laboratory type hot press. Electrically heated with closed circuit cooling. Size: 500 x 500 mm approx. Pressure max: 30 kp/cm2 approx.	1	22,000
d) Equipment for window production:		
1. Pair of machines for finger jointing -Finger jointing moulder (machining of finger joint) Workpiece width: 200 mm. max. Workpiece thickness: 150 mm. max.	1	12,000
-Finger jointing press Maximum pressure: 6 Kp/cm2 Maximum length: 2500 mm.	1	14,000
	Sub-Total:	106,000

C. Third phase:

1. Objectives:

-To furnish completely the Woodworking Education Department with all the necessary wood processing machines.

2. Outputs:

-A fully functioning wood processing demonstration and training workshop.

3. Inputs:

-Non-expendable woodworking machinery as per following specifications: $277,000

---

* If not purchased during Phase 1.

Description/Model	Quantity	Est. Cost US
a) Machinery for surface finishing:		
1. Filler application machine with simple operation. Working width: 600 mm.	1	10,000
b. Machinery for reproduction ("style") furniture:		
1. Copying lathe, manually operated. No. of spindles: 2 Max. workpiece length: 1200 mm.	1	16,000
2. Jig saw. Working stroke: 60 mm. Arm span: 550 mm.	1	5,000
c) Machinery for maintenance of cutting tools:		
1. Universal tool grinding machine for grinding of TCT groove milling cutters, slotting and tenoning cutters, blank knives, dowel drills, router cutters, mortise chains, hollow tooth on TCT circular saw blades and others.	1	9,000
d) Equipment for testing of furniture:		
Various testing equipment for testing assembled furniture and its inputs up to a value of		35,000
e) General purpose woodworking machinery:		
1. Panel sawing machine with pressure beam Max. panel size: 2200 x 3100 Max. cutting height: 70 mm.	1	30,000
2. Wide-belt sanding machine with two sanding units, one for calibrating sanding with rubber contact roller and the other for smooth sanding with smoothing bar (shoe). Sanding width: 1100 mm.	1	50,000
3. Double-end tenoning machine with 2 pre-scoring and 4 machining units. Max. working width: 2500 mm.	1	60,000
4. Mortising machine with one oscillating spindle.	1	8,000
5. Multi-purpose edge belt sanding machine. Sanding belt width: 150 mm.	1	4,000
f) Various cutting tools, spare parts and other contingencies up to a value of:		50,000
Sub-total:		277,000