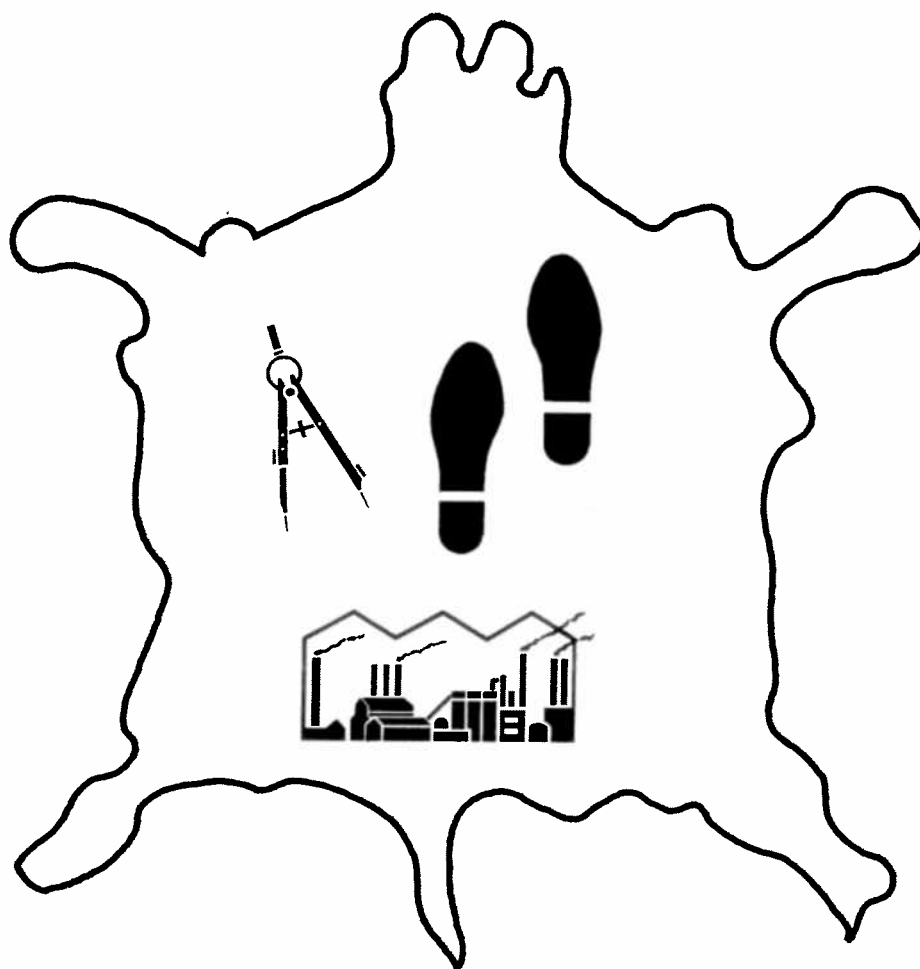


SHOE INDUSTRY DIPLOMA COURSE



ADVANCED- TECHNOLOGY*



*This document has been produced without formal editing



This learning element was developed by the UNIDO Leather Unit's staff, its experts and the consultants of the Clothing and Footwear Institute (UK) for the project US/PHI/85/109 and is a part of a complete Footwear Industry Certificate/Diploma Course. The material is made available to other UNIDO projects and may be used by UNIDO experts as training aid and given, fully or partly, as hand-out for students and trainees.

The complete Certificate/Diploma Course includes the following learning elements:

Certificate course

- Feet and last
- Basic design
- Pattern cutting
- Upper clicking
- Closing
- Making
- Textiles and synthetic materials
- Elastomers and plastomers
- Purchasing and storing
- Quality determination and control
- Elements of physics
- General management
- Production management
- Industrial Law
- Industrial accountancy
- Electricity and applied mechanics
- Economics
- SI metric system of measurement
- Marketing
- Mathematics
- Elements of chemistry

Certificate/Diploma course

- Closing
- Collection building
- Advanced technology
- Work study
- The role of the production manager
- Production planning
- Material purchasing & control
- Quality control
- Material and related science
- Adhesives
- Pattern making and engineering
- Shoe costing
- Grading

A D V A N C E D T E C H N O L O G Y

Table Of Content

	<u>Page</u>
1. Advanced Technology Development	3
2. Specific Aspects of Advanced Technology	3
2.1 Computer Assisted Design (CAD)	3
2.2 Computer Assisted Manufacturing/Machining (CAM)	3
2.3 Robotics	3
2.4 Numerically Controlled Machines	3
2.5 Automation	3
2.6 Use of new energies	3
2.7 Graphic and other reproduction means	3
2.8 Interface systems	3
2.9 communication systems	3
3. Advanced Technology Application in the Shoe Industry	4
3.1 Product Development thru the use of CAD	4
3.2 Cutting	6
3.3 Upper Preparation	6
3.4 Upper Sewing	6
3.5 Lasting	6
3.6 Sole Prefinishing	7
3.7 Making	7
4. Consequences of the development of these technologies	7
5. Composition of a CAD System	7
5.1 Hardware	7
5.2 Software	8
6. Some of the Companies Producing CAD/CAM Equipment	8

ADVANCED TECHNOLOGY

1. Advanced Technology Development

Most of the important technology developments occurring in the shoe industry are related to the evolution of electronics and the generalization of the use of computers, micro processors, printers, plotters, sophisticated high definition screens, communication means including interface systems for patterns cutting, lasts turning/grading, moulds machining and shoe manufacturing automatic machines operation.

2. Specific Aspects of Advanced Technology

2.1 Computer Assisted Design (CAD)

2.2 Computer Assisted Manufacturing/Machining (CAM)

2.3 Robotics

Dealing with the development of industrial robots.

Industrial Robots are mechanisms made to act like men.

In the shoe industry they are more particularly used for:

2.3.1 positioning the shoe on a machine

2.3.2 removing the shoe

2.3.3 evacuating the shoe

2.3.4 manufacturing operation such as:

2.3.4.1 roughing of the lasted shoe upper

2.3.4.2 cement applying

etc.

2.4 Numerically Controlled Machines

Of which operation is monitored thru digital pre-established programmes

2.5 Automation

Automatically controlled operation of apparatus, processes or systems by mechanical and/or electronical devices.

Most of the time automation is achieved thru the constitution of automatized nucleus regrouping a certain number of machines combined with robots and automatic handling and transportation systems.

- 3.1.7 material allocation/requirements
- 3.1.8 sequence of operation
- 3.1.9 cutting operation time and labor cost
- 3.1.10 sewing operation time and labor cost
- 3.1.11 product cost, etc.

In addition, from the data available programmes can be elaborated for the automatic operation of:

- 3.1.12 patterns cutter
- 3.1.13 last turning machine
- 3.1.14 sole moulds milling machine
- 3.1.15 leather/man-made material cutters
etc.

Apart from these:

- 3.1.16 pallets for automatic sewing operations
- 3.1.17 sewing machines programmes
- 3.1.18 shoe making machines programmes

can be derived from the CAD/CAM system.

Models can be designed and shown in different colors and presentations on the monitor screen.

They can be printed or photographed for submission to clients before having been produced. They also can be reproduced thru video tapes.

The latest developments in CAD introduce the possibility of working in three dimensions (3D).

The communication systems inherent to this technology permit the transfer of information, including drawings, not only from one area to another within the company but also from a country to another thru a telephone net work. Two different systems are used:

- L A N system for Local Area Network
- MODEM system for long distance data transmission.

3.6 Sole Prefinishing

Complete set of automatic machines including automatic transfer of the components.

3.7 Making

- 3.7.1 bottom roughing with
 - 3.7.1.1 automatic machines
 - 3.7.1.2 robots
- 3.7.2 cement applying
 - 3.7.2.1 automatic machines
 - 3.7.2.2 robots

4. Consequences of the development of these technologies.

Advanced technologies are modifying completely the concept of shoe manufacture. Shoe manufacturing becomes more and more a components assembling industry and a very sophisticated undertaking. Thereafter are some of the results which can be expected:

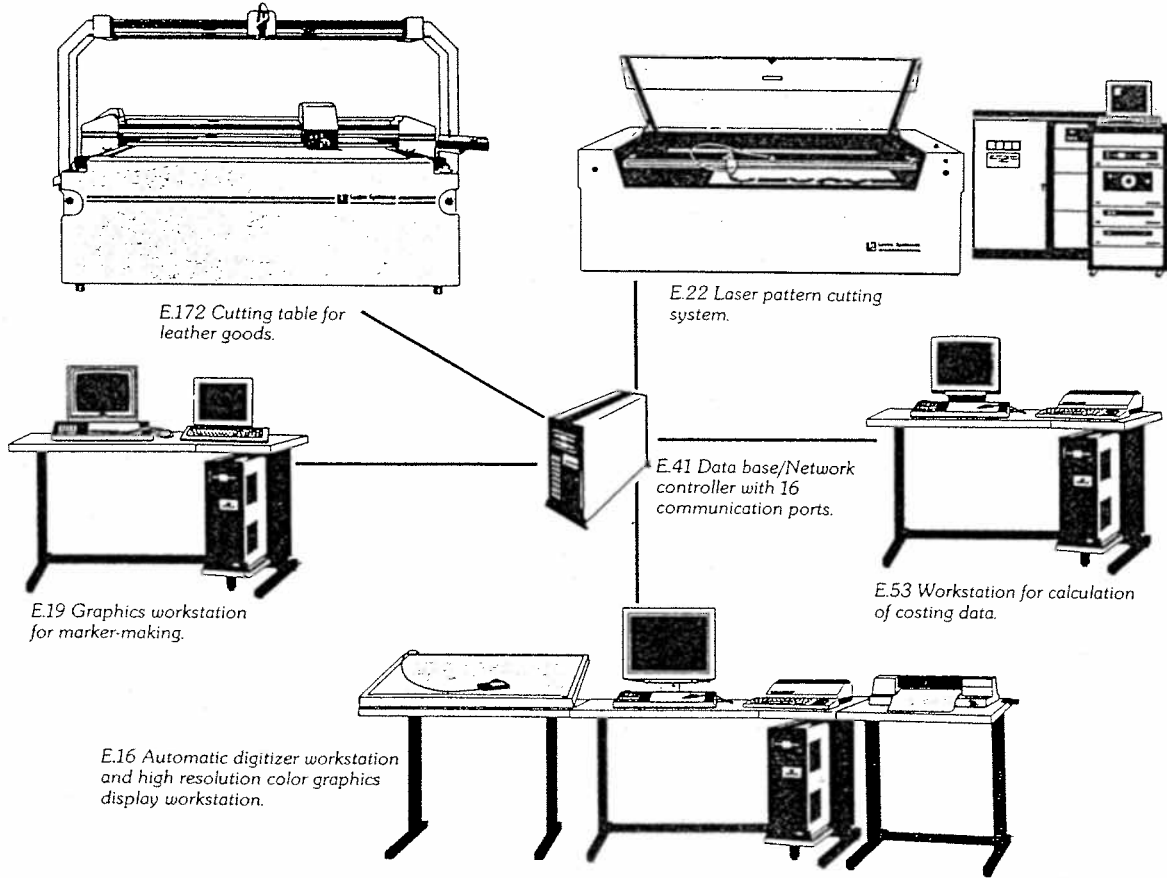
- 4.1 better use of the technicians competence
- 4.2 fastest response to market demand
- 4.3 increased possibilities to develop much more styles faster than ever before
- 4.4 possibility to treat in an industrial manner relatively small quantities per style
- 4.5 increased accuracy
- 4.6 improved patterns engineering
- 4.7 suppression of certain operations
- 4.8 reduction of tools
- 4.9 materials stock reduction
- 4.10 material economy
- 4.11 time savings
- 4.12 improved productivity
- 4.13 possibility of producing small series economically

5. Composition of a CAD system

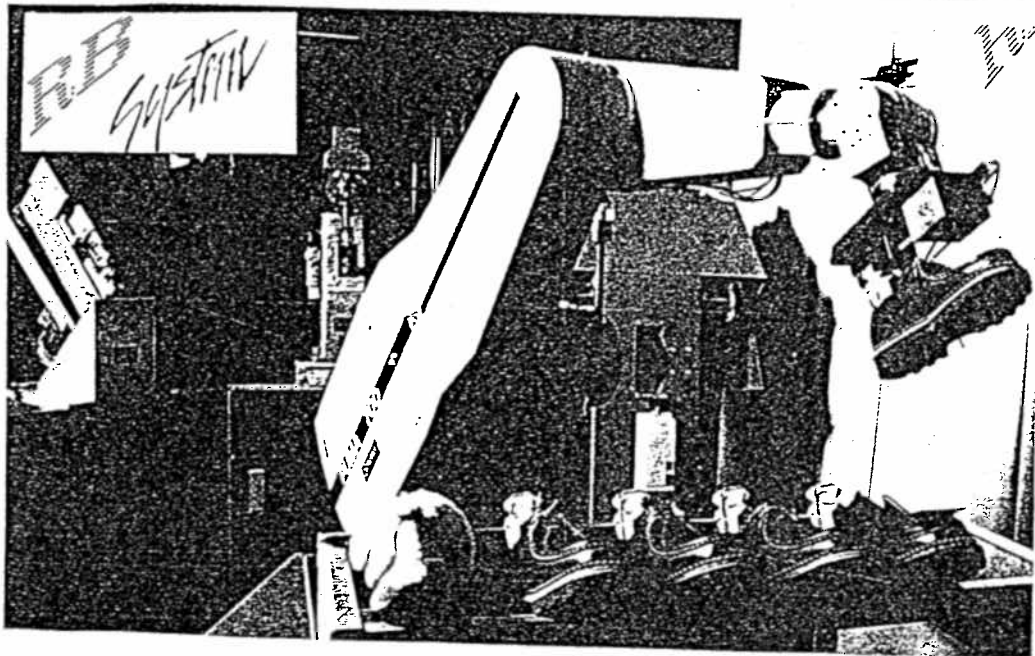
Basically a CAD system is composed of the following items:

- 5.1 Hardware
 - 5.1.1 processor (Central Processing Unit)
 - 5.1.2 keyboard

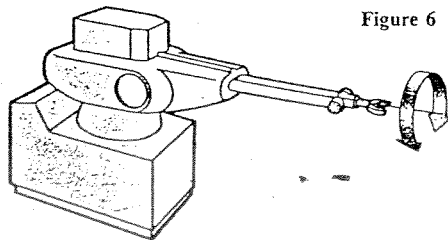
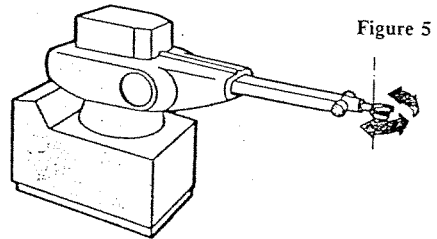
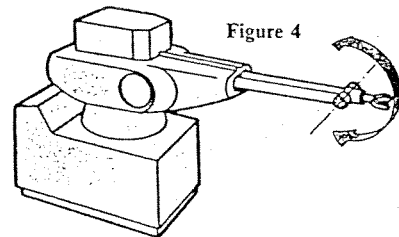
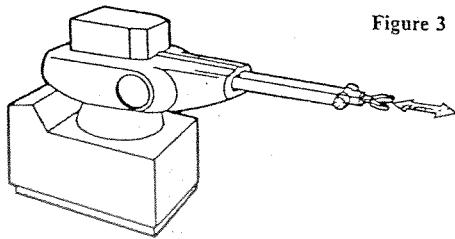
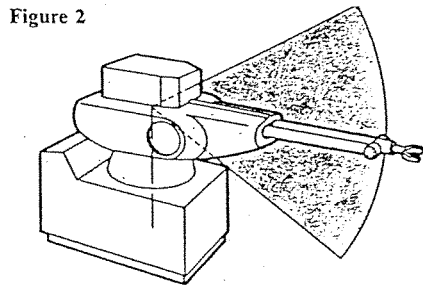
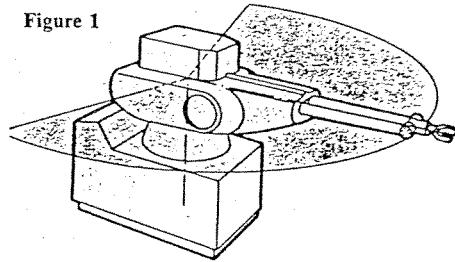
LECTRA'S 250 IS COMPATIBLE WITH AND CAN BE UPGRADED TO ALL OTHER LECTRA SYSTEMS



Last Equipped with Special Device for
Automatic Machine Operation



ROBOTS MOVEMENTS



Basic Axis

Supplementary Axis

[extract from TECHNIQUE CHAUSSURE MAROQUINERIE]

CLASSIC CUTTING PRESS



[requires an operator]

AUTOMATIC SEWING MACHINE MPCS
From USMC

