

PROFESSIONAL TRAINING IN THE LEATHER-BASED INDUSTRIES

Background

Since the leather related industry has been gradually shifted to developing countries in South-America and South-East Asia, institutions, conducting training at various levels for the subject industry sector, had to close down. Some of the training schools (e.g. SOUTH FIELD COLLEGE in UK, TNO in the Netherlands, ELKE-DE in Greece, the INTERNATIONAL SCHOOL OF MODERN SHOEMAKING in the Czech Republic) turned entirely toward delivering short and medium term courses for students coming from various developing countries. *Analytical* (e.g. cutters skill development of TECHNORG, Hungary) and *computerized* (e.g. SATRA's *VisionStitch*) methods were implemented to train semi-skilled operators, whereby the training was made in the factories. Other new forms of professional training and education are the *Computer Aided Technology Training (CATT)* from the BLC Leather Technology Center (UK) and *distance training* developed in South Africa.

In most of the new tanneries, footwear, leather goods and garment factories started up in developing countries during the past three decades, training of local personnel was rather neglected. Direct labour receiving some kind of on-the-job training, a few middle-managers participated in study tours or short courses abroad. Latin-America is a unique region in this respect: whole networks of well organized and equipped leather and footwear training schools offer 1-4 year educational programmes for the young generation (e.g. SENAI in Brazil, CETEC in Colombia).

Developing countries having substantial raw hides and skins resources and giving high priority to the development of the local leather-related industries have realized the need for establishing a *local professional training system*. In many cases this objective is supposed to be achieved by setting up a training institution (if possible by using foreign aid and expertise), but no due consideration is paid to the integration of the technical training into a comprehensive and systematic scheme of the local education. At the same time, new initiatives are taken in introducing appropriate labour training methodology (e.g. the system of so-called self-paced training manuals developed at the FOOTWEAR DESIGN AND DEVELOPMENT INSTITUTE in India).

UNIDO has always been assisting developing countries in *institution building* and transferring up-to-date training methodology. National training and/or development institutes dealing with leather related technology have been set up or strengthened through UNIDO projects in Brazil, China, Costa Rica, Ethiopia, India, Indonesia, Kenya, Nigeria, Pakistan, Philippines, Sudan, Tanzania, Tunisia, Vietnam and Zimbabwe. According to the latest information, new institutes are being set up in several developing countries (e.g. in Brazil, Egypt, India, Pakistan) - using local funds, bilateral and international assistance.

When specialized training institutions are closing down in industrialized countries, at the same time new institutes are emerging in various developing countries, no coordination of professional training education systems exist neither appropriate efforts are made to this effect. The result is a chaos in the structure of schooling systems at skill development, vocational training, technical education, and scientific degree levels. Such result is a jungle of certificates and diplomas issued by various institutions, whereby entrepreneurs are kept in the dark as regards their real value. Accessibility of professional training facilities for women is another problematic area in the majority of developing countries.

So far no unique solution has been found to all the above problems. It seems, however, that introduction of new principles such as creation of *uniform (standard) syllabi* for particular industrial sub-sectors and/or introduction of *credit accumulation and transfer schemes (CATS)* would make much more transparent and flexible the professional education everywhere. The role of UNIDO in this respect cannot be overemphasized as this organization - together and/or alongside with ILO - implement training courses and systems in several developing countries. Such a key position offers excellent opportunity to elaborate,

introduce, test and refine appropriate training programmes, whereas compatibility of certificates and diplomas can be ensured in accordance with the substance and complexity of know-how transferred to trainees. On the other hand international organizations are in the best position - provided funds are made available for this purpose - to collect and integrate the most efficient and advanced methods, handouts, illustrations etc. from all over the world. (One of the obvious possibilities is to study, adapt, fine-tune and disseminate the credit earning approach used in a wide range of universities in Europe and North-America.)

The basic concept

The leather related trade has become global, the number of tanners, footwear technologists, designers, production managers, quality controllers - just to name a few categories - involved in operations requiring collaboration with foreign companies and even practical work abroad is rapidly growing. The ever broadening international cooperation gradually eliminates technical differences among different countries and regions, the technology (including CAD/CAM/CIM) implemented in different parts of the world is very much the same today. Consequently, there is no reason for having different training programmes in industrialized and developing countries, so the creation of a uniform syllabus for the leather, footwear and other leather products is not only an opportunity but also a necessity - not to mention the financial rationale (economic scale of printing text books, producing illustration materials and training software). The term uniformity, however, should not be understood as a rigid standard which would not give room for adjustments to local conditions (e.g. public education) or would not be sufficiently elastic to absorb (quickly) new developments in the technology.

Before going deeper into the problematic area of industrial human resources development, a clear distinction has to be made between professional *training* and *education*. The former is applicable to courses or individual efforts when special - manual or mental - *skills* (e.g. operating sewing machines, sketching, negotiating contracts) are being *developed*. In contrast, professional education focuses on transferring a knowledge base (composed of data capturing, storing and retrieving, as well as inference capabilities) and empowering students for handling concepts.

Uniformity should come together with complexity, systematic approach and integration of aspects related to training and education. In fact, there are three basic facets: professions (branch within the leather trade), modules (disciplines) and levels (roles or rather target ranks in a company hierarchy) which should be brought into relations when designing a comprehensive professional training *system*. *Table 1* offers a possible breakdown of each of these facets.

Table 1

Profession (Branch)	Discipline (Module)	Level (Function)	
Tanner Shoemaker Leather goods Leather gloves Harness/saddlery	Product development Material knowledge Technology Equipment Management Environment	Operator	Semi-skilled Skilled
		Craftsman, specialist	
		Supervisor Manager	Designer - stylist, creator - pattern cutter Technologist (prod. cont.) Quality specialist Marketing specialist Maintenance engineer

As it is seen in the above table, the relation between different interpretations or clarifications of functions which will eventually be undertaken by trainees and/or students of professional training courses needs further elaborations. *Table 2* demonstrates a scheme which puts these categories in their places, connects the specialization with levels of engagement (subsequently with levels of professional education).

Table 2

	Designer	Technologist	Quality specialist	Maintenance
Operator	grader	manual/machine operator		machine operator
Skilled worker	pattern cutter	key worker	inspector, tester	technician
Supervisor	chief modeleur	line supervisor, instructor	laboratory chief	maintenance chief
Manager	range builder	plant supervisor, prod. controller	quality manager	

These two tables together indicate that regardless of the level and specialty of function to be carried out by trained labour and/or staff, they all need certain subset(s) of the *special knowledge base* of leather and leather products technology. *Annex 1* shows an attempt to systematize the most important components of such a knowledge base.

To build up a specific syllabus two basic criteria should be defined: the profession or manufacturing *branch* (e.g. leather goods production) and the targeted *function* (e.g. product development ≈ design). The next step is to encounter the kind of *tasks* involved at the - expected or requested - *level* of employment (i.e. position to be held in the technical management), from which it is not difficult to derive manual and intellectual *skills*, as well as the volume and range of *information* required for coping with the given responsibility. These are the main factors influencing the **subset (scope) of the knowledge base** to be included in the training programme.

The time allocated for each selected unit again depends on two things: the function (i.e. perfection of skills, depth of knowledge, ability to deduct new information) and the basis on which the training can be built. The volume of training should be split into two parts: theoretical and practical (for higher levels of professional education a certain amount of time may be assigned for individual and/or project work).

To be able to absorb (understand, save and interpret) the information transferred through the training process, trainees or students should have certain abilities (they can be measured by aptitude tests) and should have some educational background (it may be assumed by judging the previous grades or degrees achieved). Therefore, each syllabus should have thoroughly prescribed entry level requirements.

In certain cases - especially when international courses are designed or syllabi are made for (sub)regional institutes - supplementary or refreshing training should be provided in subjects of general nature such as *mathematics* (e.g. advanced arithmetics, equations, statistics), *physics* (e.g. mechanics, thermodynamics, electrotechnics), *chemistry* (e.g. reactions, colloids, organic chemistry, analysis), art (e.g. perspective, projections, painting), *economics* (e.g. taxes and custom duties, borrowing and interests), *computing* (e.g. word processing, use of spreadsheets and databases, graphing).

Annex 2 gives an example of a syllabus outline and the description of one of the units (it is a copy of the training programme prepared by the TEXTILE INSTITUTE, London and implemented in two CENTRAL FOOTWEAR TRAINING CENTRES in India).

A uniform knowledge base such as the one enclosed as *Annex 1* serves also as a basis for setting up a **credit accumulation scheme**. When a person, after having successfully completed a particular course wants to acquire additional knowledge or skills within the leather based trade, there is a high probability that the knowledge bases of the two courses overlap. To save time, efforts and costs it is quite natural expectation that the units covered earlier should not be repeated by the incumbent. The equivalence, however, will depend on the level and duration of the completed training or education, therefore appropriate schemes should be established to assist in deciding on acknowledging previous results. The scheme should take into consideration the level of the comparable courses, time spent earlier and required in the new course, as well as the grade achieved by the candidate when completing the subject unit.

A well formulated syllabus should also prescribe the training *methodology*, specify the conditions and *equipment* (tools, software etc.) used in the training process and *assessment* criteria. Reference should be made on the technical literature, handouts, audio-visual aids used in training.

Recommendations

UNIDO should launch a project with the objective of establishing a detailed uniform knowledge base for the leather and related industry training - with special references to a credit accumulation and transfer scheme. Based on these two major components and taking into account the available technical literature an inventory to be made on missing elements. The same study could also offer recommendations on implementation of new types of training media (e.g. complete kits, self-paced training manuals and software, video tapes, distant training).

12LP_95:LP95_TRN.ISS

Module	Unit	Core knowledge		Optional studies	
		Subject	Hours	Subject	Hours
Design	Art and industrial design	Sketching, painting Color theory Decorating		Modeling National art	
	Fashion appreciation	Information sources Trend contents		Clothing fashion Fashion history	
	Styling and range building	Product groups Range concepts Model sketching		Inspirations	
	Foot and shoe lasts	Foot anatomy Sizing systems Shoe lasts		Orthopedics Clothing hygienic Last design	
	Pattern engineering	Last moulds Pattern standards Trims and furniture Component patterns Grading Documentation		Special products Pull-overs	
	Tool design	Basic tools Moulds		Tool making	
Materials	Genuine leather	Raw materials Histology Wet processing Tanning Finishing		Hides and skins improvement Special leather and tannage Biology/bacteriology	
	Plastics and rubber	Simulated leather Rubber (natural, synthetic) PVC, TPR, EVA, PE, PS etc.		Composite materials	
	Other basic materials	Textile Leather and cellulose board Wood/paper/metal			
	Auxiliaries	Adhesives Threads, laces Finishing agents			
	Testing	Test methods Assessment		Certification	
Technology	Types of constructions	Basic constructions		History of the sector	
	Cutting	Material properties Type of wastes Layouts Manual and die cutting Cutting tools		Jet cutting	
	Sewing and closing	Component preparation Interlining, reinforcing Seams and sewing Closing/lining methods Sewing automates		Welding Transport systems	
	Components	Sheet material based Moulding			
	Assembling	Lasting Preparation for soling Sole attaching		Line production	
	Finishing	Cleaning Finishing Packaging			
	Technological processes	Operation sequences Flowcharts		Traditional technologies	

Module	Unit	Core knowledge		Optional studies	
		Subject	Hours	Subject	Hours
Equipment	Basic mechanisms	Mechanics		Numeric control	
		Pneumatics and hydraulics			
	Component and parts	Electronics, automation			
		Main component groups			
	Evaluation and selection	Specifications			
Evaluation of bids					
Utilities	Power, compressed. air, steam		Energetic		
Maintenance		Preventive maintenance		Spare-part stocks	
		Tooling			
Management	Industrial engineering	Time studies		Ergonomics	
		Work-place organization			
	Costing	Cost components		Overhead analysis	
		Job costing			
	Stock control	Inventory management		Just in time	
	Plant organization	Plant layouts		Sub-contracting Sourcing	
		Synchronization			
		Line production			
		Rink systems			
		Production control			
Logistics					
Financial control	Financial resources		Taxation		
	Accounting				
Human resources	Feasibility studies				
	Wages and incentives		Career development		
Quality control	Staff training/development				
	Management structures				
Marketing	Quality systems		Public Relations Advertising Branding		
	Control methods				
	Market research				
	Purchasing				
	Pricing policy				
Industrial law	Order control		Entrepreneurship		
	Channeling				
	After sale service				
Environment	Work safety	Trade contracts			
		Employment affairs			
	Licensing				
	Pollution control	Working conditions		Ecology	
		Health and safety			
		Fire prevention			
		Clean technology			
		Waste processing			
		Recycling			

CENTRAL FOOTWEAR TRAINING CENTRES
CFI CERTIFICATE
FIRST YEAR COURSE SYLLABUS
COMMENCING 1993

SUMMARY OF TIME REQUIRED FOR EACH COURSE SUBJECT

MODULE	UNIT	COURSE SUBJECT	TIME REQUIRED		
			THEORY	PRACTICAL	TOTAL
1 DESIGN & PATTERN CUTTING	1	Art and Design (Fashion Appreciation)	-	20	20
	2	Pattern Cutting	10	130	140
	3	Design & Pattern Cutting	20	20	40
2 CLICKING & MATERIALS	4	Clicking & Materials Technology (1)	20	100	120
	5	Clicking & Materials Technology (2)	75	40	115
3 CLOSING	6	Closing Technology	20	100	120
4 MAKING	7	Making Technology	20	100	120
5 SCIENTIFIC MANAGEMENT	8	Purchasing & Stores Control	20	-	20
	9	Costing & Quality Control	40	5	45
	10	Science, Health & Safety, Maths	10	-	10
	11	Applied Management	30	10	40
6 MANAGEMENT	12	Production Management	60	20	80
	13	Industry	20	20	40
	14	Market	30	20	50
TOTAL COURSE HOURS					960

CFI DIPLOMA
SECOND YEAR COURSE SYLLABUS
CORE AND TECHNOLOGY OPTION

<u>UNIT</u>	<u>COURSE SUBJECT</u>	<u>THEORY</u> <u>TIME REQUIRED</u>	<u>PRACTICAL</u> <u>TIME REQUIRED</u>	<u>TOTAL</u> <u>HOURS</u>
	<u>PATTERN & DESIGN</u>			
* 15	PRODUCT SKETCHING AND DESIGN		20	20
* 16	PRACTICAL SHOE DESIGN & PATTERN CUTTING		40	40
* 17	PATTERN MAKING		40	40
* 18	RANGE BUILDING	20		20
	<u>TECHNOLOGY</u>			
* 19	ADVANCED TECHNOLOGY	20		20
* 20	FOOT COMFORT	20		20
	<u>MANAGEMENT</u>			
21	PRODUCTION MANAGEMENT/ORGANISATION	40		40
T 22	PRODUCTION CONTROL	60		60
T 23	INDUSTRIAL ACCOUNTANCY & COSTING	20		20
T 24	FACTORY SURVEY & PROJECT		80	80
25	MARKETING MANAGEMENT	20		20
26	COMMUNICATION	20		20
27	PERSONNEL MANAGEMENT	20		20
28	CLICKING PRACTICAL		80	80
29	MATERIALS AND RELATED SCIENCE	54	26	80
T 30	CLOSING PRACTICAL		140	140
31	LASTING TO SHOE ROOM - PRACTICAL		120	120
T 32	FINAL PROJECT		120	120
	TOTAL COURSE HOURS			960

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CENTRAL FOOTWEAR TRAINING CENTRES
INDIA
CFI CERTIFICATE
FIRST YEAR COURSE SYLLABUS

ANNEX 2.2

- MODULE : FOUR(4) Making Technology
- UNIT : SEVEN(7) HOURS : 120
- TITLE : Lasting to Shoeroom.
- OBJECTIVES :
- i. To provide the knowledge and impart the skills required to understand the principles and practice of the lasting, making, finishing and shoerooming processes, their own place in the manufacturing chain and the use of hand and machine techniques and equipment.
 - ii. To provide the student with the necessary skills and understanding of the essential elements and concepts fundamental in the principles and practice of footwear manufacture.
- METHODOLOGY : Lectures/Demonstrations and Practical Workshops. -
- ASSESSMENT :
- Project (3 pairs lasted to a time limit).
2 Exams -
1 Theory Exam
1 Practical Exam (12 pairs).
- COURSE CONTENT :

7.1 LASTING

- a. Types and uses of toe-puffs and stiffeners.
- b. Identification of methods of attachments.
- c. Methods of conditioning uppers and components.
- d. Lasting principles and methods of application.
- e. Lasting and bottoming systems for different types of construction in general use.
- f. Heeling processes, including heel building and heel finishing, covering systems and methods of heel attachment.
- g. Systems of work transportation and track management.
- h. Combined lasting systems.

- i. The theory and practice of heat setting - moist and dry heat effects on materials and adhesives.
- j. The use of hot-melt adhesive in lasting and bottoming.
- k. Lasting faults and effects upon subsequent operations.

7.2

BOTTOMING

- a. Correct techniques for sole attachment.
- b. Composition, characteristics and uses of insole and soling materials for different constructions.
- c. Machine cutting direct/caster and planet rounding operations.
- d. Preparation of cut stock and bottom components including prefinishing and assembly of pre-fabricated and Louis heel bottom units.
- e. Assembly and storage of lasts and components.
- f. Standardisation of components.
- g. Multiple thickness cutting of components.
- h. Pre-moulded shanked insole assemblies.
- i. Insole conforming equipment.
- j. Departmental management.
- k. Control of components and raw materials.
- l. Fitting up to ticket requirements.

7.3

FINISHING

- a. Procedure and processes for various soling and heeling materials and units.
- b. Top-piecing methods of attaching and types and characteristics of material available.
- c. The objectives and methods of finishing - types and functions of machines and equipment used. Finishing processes for both leather and non-leather soles and heels. Effects of faults in preceding operations on the finishing processes. Selection of appropriate processes.

- d. Comparisons between various finishing systems - pre-finishing vs finishing on the shoe. Cutters, irons, abrasives, inks, stains, waxes and finishes used. Decorative treatments and randing.
- e. Statutory requirements concerning general, fire, mechanical and electrical safe working conditions will be emphasised.

7.4

SHOE ROOMING

- a. The functions and processes of the shoe room; their importance to sales appeal. Shoe room operations and techniques - socking, cleaning, repairing, dressing, top spraying, trim attaching, quarter reforming, irons, inspection procedures, boxing etc., for leather and non-leather materials. Machine adjustments.
- b. Fault identification, diagnoses of cause and defects in work. Application of decorative treatments, e.g. antique, shadow spray etc. Final examination and inspection procedures - quality control. Packaging and presentation techniques. Storage of boxed footwear to prevent ageing.
- c. Statutory requirements : general, fire, mechanical and electrical safe working conditions in relation to the above.

CENTRAL FOOTWEAR TRAINING CENTRES
INDIA
CFI DIPLOMA SECOND YEAR COURSE SYLLABUS

MODULE	:	ONE(1) Design and Pattern Cutting
UNIT	:	EIGHTEEN(18) HOURS : 20
TITLE	:	Range Building.
OBJECTIVES	:	<ul style="list-style-type: none"> i. To provide the participants with a knowledge of the basic concepts and principles of "Range Building". ii. To provide the participants with the techniques and expertise required to plan a critical path network in the production unit for samples, styles and pathfinders.
METHODOLOGY	:	Lectures/Workshop Discussions/ Practical Projects.
ASSESSMENT	:	1 examination 1 joint project with module 13 to create drawings for a range of footwear (or leathersgoods) and product development schedule.
COURSE CONTENT	:	

18.1 COLLECTION BUILDING

- a. Marketing strategy and guidelines.
 - the fashion phenomenon
 - fashion and style trends
 - new materials and colours
 - new lasts, bottoms and component materials
 - new equipment and tools
 - purchase requirements for prototypes
 - fashion sources
- b. Critical Path Network process.
 - style specification
 - techniques involved in processing
 - costing sequence
 - production sequence

- c. Style creations.
 - sketches
 - drawings
 - pullovers
 - photographs
- d. Product development (first assessment).
 - assessment of style trends (prototypes)
 - fitting tests
 - estimate of product costs
 - selection of styles for further development
 - purchase requirements for "collection"
- e. Sample processing (sales representatives)
- f. Product development (second assessment).
 - review of pathfinders
 - shoe fitting tests
 - final cost structure
 - final specifications
 - final approval of styles
 - initial sales forecast
 - initial purchase requirements for production
- g. Product development (final review)
 - review of complete collection
 - final manufacturing specifications
 - final quality standards
 - final costs
 - final sales forecasts
 - purchase requirements (based on second sales forecast)
- h. Fast Response
 - importance of fast response to customer need.