

SHOE INDUSTRY CERTIFICATE COURSE



QUALITY DETERMINATION AND CONTROL*



* 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 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 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

QUALITY DETERMINATION
& CONTROL

" FINISHED PRODUCT "

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QUALITY DETERMINATION & CONTROL

"FINISHED PRODUCT"

The Quality Concept from the Consumer's Point of View

The consumer criteria to determine the quality of a product are different from the ones of the trader or the manufacturer.

They are essentially based on what is visible of the products, general appearance, aesthetic, balance, style.

Also feeling, touching, flexing, even smelling will help the consumer to further assess the quality of the product.

Next, will come fitting and comfort sensation particularly for footwear.

Later on, product reaction to wear and usage as well as durability will complete the consumer's judgement.

Of course the consumer will establish a relation between quality and price.

But there will be a lot of subjectivity in his judgement which will certainly be affected by publicity, opinions of friends or relatives, fame of the manufacturer or supplier.

The consumer will frequently use such words as bad, fair, good, excellent to express the level of quality of a product.

The Quality Concept from the Trader's Point of View

The trader will have a more objective view of quality based on his professional experience and on his relations with manufacturers.

He will be able to express quality requirements, some times in very specific and technical terms some times in very vague and general ones. This will depend on the technical proficiency and competence of the contract negotiator.

In some cases product quality standards will be well detailed and supported by samples and specifications. The buying agency may even exert quality control on materials bought by the manufacturers and on the manufacturing process itself. This is true for enterprises producing for army markets and firms producing under license.

However, in many cases a simple description of the product with or without sample will be the only reference for further quality control of the goods delivered.

In that case the trader will assess the quality of the finished product through visual inspection and despite the fact that such an inspection may be done as seriously as possible it cannot be entirely free from subjectivity.

The trader will assess further the quality of the product by observing if there is any fading, mould appearance or any other undesirable aging phenomenon occurring during storage.

Later on he will complete his assessment through feed back he may receive from consumers for what concerns wear, durability, resistance, etc.

The Quality Concept from the Manufacturer's Point of View

The manufacturer should try to eliminate subjectivity as much as possible in order to apply only objectivity. For the manufacturer quality should be understood as the

"Conformity of the finished product with pre-established specifications within the limits of determined tolerances"

In the factory there should not be any concept of bad, fair, or good quality.

The concept is that all products meeting the pre-established specification requirements are of the corresponding quality standard level. The products not meeting the requirements are not of that quality standard level.

The Relation between Quality Standard Levels and Price Standard Levels

Some people may not be able, or may not wish, to pay a certain amount of money for a specific product when others could afford and be willing to pay much more.

Therefore, it is necessary to provide the market with that specific product (shoe for example) at different price levels so that all potential customers can find the product at a price they can afford and are willing to pay for.

However, it is clear that for every price level will correspond a quality standard level because there is a direct relation between quality level and product cost. As a matter of fact some materials may present a higher resistance to wear or tear but their cost will

be higher, some products may be lined or specially reinforced to provide a longer usage but the cost of lining and reinforcements to be used will increase the product cost. This also may be true for technical processes.

The Main Factors Intervening in the Quality of a Product

These factors are many and are all very important:

- Intrinsic qualities of the materials and components used such as leather, man-made materials, heels, unit soles, threads, stiffeners, metal accessories, adhesives, etc.
- The suitability of the said materials and components in relation with the type of product, the technical process to be used and the final use of the product.
- The suitability of the technical process itself in relation with the final use of the product.
- The suitability of the equipment in relation with the technical process and the condition of that equipment.
- The conception, design and technical development of the product in relation with its final use, the available materials, equipment, technology and skills. A product should not be put through mass production before all technical and manufacturing problems have been solved.
- The skill, competence and care of operatives in the manufacturing process, in other words the workmanship.
- The selection of operatives considering their competence and ability in relation with the tasks difficulties and skill requirements.
- The production organization and methods.
- The in-plant quality control methods and means including product specifications which shall be the base of quality control.

Quality Control

Quality control may be defined as being an activity of which objective is to verify that the finished products are in conformity with the pre-established specifications within the limits of determined tolerances. This implies the ideas of quality determination through quality standards.

It also introduces the idea of tolerances without which any quality control is unapplicable.

Quality control can be considered as a function of the enterprise although we should rather say that, quality as such is the function (like production for example) and quality control is only a part of that function.

Quality control is in fact a management tool.

Quality Determination

Many people speak of quality control but less speak of quality determination.

If we accept the concept that quality, from the manufacturer point of view, is the conformity of the product with pre-established specifications and if we accept the ideas that quality control is the verification of that conformity then it becomes obvious that there cannot be actual quality control without prior quality standards determination.

Unfortunately in many cases quality standards do not exist or when they do exist they are not always well elaborated.

There are many criteria on which to base the quality standards in the footwear and leathergoods industries. To only mention some of them we can indicate:

Aesthetic - fashion - practicability, fitting, comfort, durability, resistance to wear, to tear, to strain and stress, dyes fastness, leather finishes resistance to flexion, metal accessories finish resistance to oxydation, etc.

This will concern all factors including product design and development, materials selection, manufacturing process, etc., as mentioned earlier.

Quality determination and control in the footwear and leathergoods industry present some difficulties due to:

- Always changing styles in relation with fashion trends,
- Use of heterogeneous material, (leather)
- Difficulty to measure, compare, control products which have no determined measures and no geometrical shapes and volumes.

Nevertheless, the quality standards have to be as precise as possible, complete and detailed as maybe necessary.

They can be in the form of samples, drawings, tables, scales, written specifications, etc.,

They have to be understandable by all parties without any risks of misinterpretation.

Production management and marketing management need to be familiarized with the fundamental problems and the philosophy of quality so that they can cooperate in the determination of the quality standard levels of the firm.

The quality standards determined should be attainable with the available materials and with the firm's facilities (technology, equipment and labour) otherwise they are meaningless.

To a certain extent quality standards are a kind of contract between suppliers and buyers.

Main Aspects to be considered when establishing an In-Plant Quality Control System

- First of all it is important to realize that as already said, quality determination, attainment and control is an important function of the enterprise.

It is not easy to gain a market and build up a reputation but it is facil and quick to lose the market and spoil the name just by delivering goods of which quality does not correspond to the standards agreed upon.

- Being a function it needs to be financed but the profits it can bring back or rather the losses it may avoid represent without any doubt a higher value, without speaking of the firm's fame which is priceless.

Well functioning quality control structure will:

Save materials and time,

Reduce manufacturing cost,

Reduce rejects,

Build up a good reputation and as a result open markets.

Expenses for quality determination and control as any other factory expenditure have to be included in the product cost.

What to Control?

Producing leathergoods and shoes is the cutting, assembling, moulding and finishing of components made of different materials.

These operations and components are all interrelated and if one operation is not done properly the following ones will be affected, if a

component is not satisfactory the whole product will be altered. There is always a chain reaction.

Anything which may directly or indirectly, have an influence on quality has to be controlled. That includes all factors already mentioned before, such as materials, equipment suitability and condition, labour force capability, etc.,

For what concerns the product itself everything should be checked, during manufacturing process, which appear on the product specifications sheet.

In each factory quality control check points have to be determined either for a specific product, a line of products or a manufacturing process to insure that the key operations, from the point of view of quality, are well executed.

When shall quality control be applied

Quality control is necessarily an a posteriori activity as we cannot control something which as not yet been done.

If we apply quality control on the finished product we will be in a position to assess either that the product is acceptable because it presents the expected characteristics or that it is not acceptable because it is not conformable to the specifications.

This is what we may call the final quality control. . -

It is an essential control as it will prevent the firm from sending goods which do not meet the quality standards requirements agreed upon with the buyer.

But, this is not enough because - the firm may be left with too many unsaleable finished products - the final control has no effect on the manufacturing process - only visible defects on the finished product can be identified.

Therefore, it is necessary to apply quality control not only at the final stage but also during the whole manufacturing process and even before as the first step should be the control of materials and supplies.

However, it is necessary to distinguish between what we may call quality control operations and quality standards application in manufacture.

Quality control operations are specific activities carried out by qualified persons and at determined stages of the manufacturing process to ensure that the product is being fabricated according to specifications.

These quality control operations have to be determined firm by firm according to the needs but some few rules may be mentioned.

Quality control should be applied:

- a. Before manufacturing to ascertain the conformity of materials and accessories with specifications, for example:
 - compatibility of counter material solvent with leather finish.
 - compatibility of adhesive with soling materials.
 - materials resistance to flexion - abrasion - wear, permeability.
- b. During manufacturing:
 - After a delicate or difficult operation,
 - Before a costly operation,
 - When a product passes from an area of responsibility to another.
- c. After manufacturing as final control before packing.
- d. After sale to follow up the reactions of the goods during storage and wear.

In addition to the compulsory quality control of materials and finished product we may mention, as an example, some few possible quality control operations:

- Control of leather cut components because of the nature of the material and the various factors which may affect the quality of the finished product - colour, grain, defects, stretch - texture.

Only one leather component which may not be of the required quality standard may spoil the entire finished product.

- After lasting in the case of the footwear as it is yet time to correct a fault before attaching the sole.
- After pre-assembling and before sewing for the leathersgoods for the same reason that it is still possible to change a defective component.
- After roughing in the cemented process because if this is not correctly done we can be sure that there will be returns from the customers and buyers due to separation of the components (separation of sole from upper in the footwear for instance).

Also some controls may have to be instaurated to check, equipment, processes, formulas. This applies when pressure, temperature, timing, compounding etc., is involved.

- As already mentioned these specific quality control activities have to be determined firm by firm and case by case. It is easy to understand that a firm working with leather will have different controls or check points than a firm using man made materials. Also what applies for footwear may not apply for leathersgoods.

- Quality standards application in manufacture is something based on a different principle. When quality control operations are implemented only at determined stages of the manufacturing process by quality control specialists, the quality standards application in manufacture introduces the notion of permanent quality control. This means that it is then the concern of each operative who, in addition to the actual execution of the operation, shall exercise a constant quality control on what he/she is doing, of what his/her machine is producing, on what the material he/she is handling looks like and on how is the product or component coming from the previous workshop or operation bench.

This of course means that operatives have to be educated and trained accordingly.

The main ideas behind this notion of permanent quality control is that it associates everybody in the process. Also it is the only way to stop a product, or a component as soon as something wrong happens in order to take immediate action. Many examples exist of hundreds and even thousands of products returned because a defect was not detected immediately.

How to Apply Quality Control

There are many ways to apply quality control, simple ones and sophisticated ones. Again every enterprise will have to:

1. Determine the most appropriate methods in relation with the size of the firm, the technology involved, the desired quality standard level, for example:
 - control by visual inspection,
 - control by measurement,

- destructive control through testing and experiment,
 - control of all products or components,
 - control of a determined number of products or components at random or based on a systematic selection.
2. Determine, provide and even devise the necessary means according to the methods applied:
- measuring tools, gauges, apparatus, scales, graphs, documents, magnifiers, laboratory equipment for chemical and physical tests, etc.
3. Determine where the various quality control operations shall take place:
- in plant on the spot or in a special area.
 - in a specialized laboratory.

The degree of control has to be related to the degree or level of quality required.

Who shall be Involved in Quality Determination Attainment and Control

Quality shall be the concern of all from manager to operatives including marketing personnel. But there should be one person having the responsibility of this important function.

Here again it will depend on the size and the structure of the firm. In big enterprises the staff member accountable for quality will have no other responsibility. In medium and small firms the person in charge of quality may have to assume other tasks. In this case, it seems preferable that the person in charge for quality be not responsible for production as these can be conflicting responsibilities.

A part from the head of the quality determination, attainment and control department, marketing and product development specialists shall cooperate in the determination of the quality standard levels. Then the product development service shall determine the specifications for each product making sure that the technical supervisors and foremen are involved to obtain their full cooperation and commitment.

Specialists in charge of specific quality control operations will act under the authority of the head of the quality department. In small firms they may of course be employed part time as quality controller and part time for other tasks.

Finally all operatives as already mentioned have to be involved and fully committed in the operation.

It is important to have a positive attitude and avoid to reject the fault on somebody on something else, on the materials, on the workers, on the buyers who return products even if it is not justified, etc.,

Quality control should be a dynamic undertaking. When quality control determines the existence of defects not only the defective component of finished product should be stopped but corrective action has to be taken which pre-supposes the analysis of the defects to determine the possible causes.

Control of the evolution or trend of quality standard level attainment has to be follow-up statistically particularly for what concerns the returns.

Human Aspect

The human aspect in quality achievement and quality control is very important.

If production people are associated in the process of quality achievement, if they are well informed about the possible consequences of quality deficiencies and if they are trained accordingly they will play the key role as far as manufacturing is concerned because they will feel responsible. If they are involved in the quality control process they will not consider it any more as a lack of confidence towards them and a source of difficulties. Then the result of their cooperation maybe beyond all expectations. Also incentives need to be considered as it will motivate the employees whereas critics and threat may, in some cases, only lead the workers to hide what was wrongly done instead of showing it.

The Quality Function

It is of paramount importance to recall that quality should be a function of the enterprise and that quality control is only a part of it.

The objective of the quality function is to achieve quality while the objective of quality control is to verify that all quality requirements are met.

Quality control alone will not achieve quality it is only an assessment tool. Therefore what is important is to create the conditions and secure the means which will enable the firm to produce goods of the expected quality standard level.

To that end a quality function has to be established in every enterprise small or big.

