



Developing Innovative and Attractive CVET programmes
in industrial shoe production

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Train-the-Trainer Manual Technical Development

IO 3

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1 Introduction

1.1 Aims of the DIA-CVET Project

The aims of the Erasmus+ project «Developing Innovative and Attractive CVET programmes in industrial shoe production» are

- to develop, pilot and implement comprehensive courses for the Spheres of Activity (SoA) of foremen in industrial shoe production on European level; available in English (EN) as well as in DE, RO and PT,
- and to develop a sector qualification framework level 5 and 6 and to reference existing or newly drafted national qualifications from Germany, Portugal and Romania.

1.2 Manuals to Guide Tutors and Trainers

The purpose of the manuals is to prepare designated trainers for their role and to provide content and support. Due to the nature of the SoA of foremen, they do not include specific forms of training; but we suggest a blended approach. Successful Continuous Vocational Education and Training (CVET) programmes combine theoretical lessons with application of the acquired Knowledge, Skills and Competences (KSC) in real work environments. The tasks of a trainer are to

- impart SoA-specific KSC,
- demonstrate operations which the learners are expected to learn to perform,
- introduce the learners to each new task and supervise them during their first approaches,
- organise and supervise blended activities (i. e. projects),
- guide them towards an independent performance of the tasks of the respective SoA.

The manuals are not meant to replace a textbook. They are meant to provide support to the trainers to plan and execute their teaching. The trainers are invited to gather more information from other sources.

1.3 Refer your training to the business process of industrial shoe production

Industrial production is a complex process, where the Sphere of Activity, described in this manual, is embedded in the business process. Before you start the training on a specific SoA, please make sure that the learners are familiar with the other SoA of industrial foremen in shoe production.

For example, the learners should be introduced to the types of products the company manufactures and their intended use, the different customer segments, the distribution channels etc. They should be aware of the product creation and manufacturing processes, i.e. product design, pattern making, purchasing department, production planning, and all production departments to warehouse and logistics.

The production process (not part of DIA-CVET, for insights see: <http://icsas-project.eu/>) is in the core of the business process; the SoA of DIA-CVET play a preparatory, supporting or accompanying role (see Fig. 1).

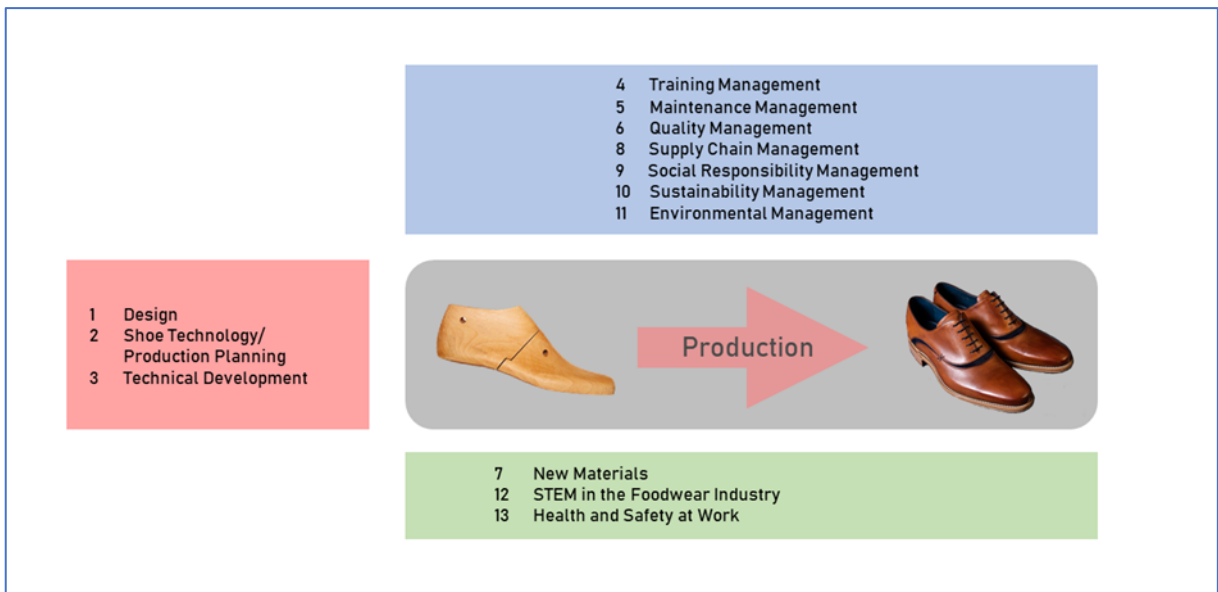


Fig. 1 Spheres of Activity of DIA-CVET and their relation to the production process.

2 Technical Development of Shoes

In order to consolidate the understanding of a department foreman in the shoe industry for the "technical development" of the shoe models and to point out and understand the importance of technical development in the course of the production process and in order to also solve any problems, every foreman should already have a basic knowledge of technical shoe model development. Through their increasing understanding of workflows and processes, they acquire the ability to adapt to or introduce changes in methods and systems in design and production, new structures in work organisation and new requirements in organisational development, and to help shape technical or organisational change in the company.

The department supervisor must internalize the knowledge of the structure of a basic model and understand the designs.

The foundation for the creation of the basic model is laid in the last copy. Built on that last copy the technical "model" is developed.

The prospective master in the shoe industry will practice this process in the same way as a trainee in the shoe industry (compare ICSAS project).

The subsequent fit of the upper parts in production also depends to a large extent on this work process.

After the creative department/designers, have drawn their ideas on paper or on so-called "plastic cover", a last copy is made, which brings the last from its 3-dimensional state into a processable 2-dimensional template. The tape copy with adhesive tape has the advantage that a model can be drawn directly and the proportions are immediately visible.



Fig. 2: Last and taped last for last copy © PFI

2.1 Upper development – upper department

A model design is broken down into producible parts and production instructions are created for them. The technical modellers (employees) in this department work closely with the designers to ensure an efficient, producible production process. A model design is created in a medium size, e.g. for women's shoes in size UK-4 ½.

1. Step 1 is to create a basic model - depending on the type of construction with allowances for the lasting edge in case of cemented or Strobel construction.
2. Step 2 is the detailing, the breaking down of the basic model into the individual cutting templates with allowances such as folded edges, closing seams, under edges, reductions, preliminary drawings and various markings for eyelets, rivets, etc. This method of working is usually created digitally using a CAD systems. This working step is usually conducted digitally via the CAD systems. The data is then transferred to the cutting table.

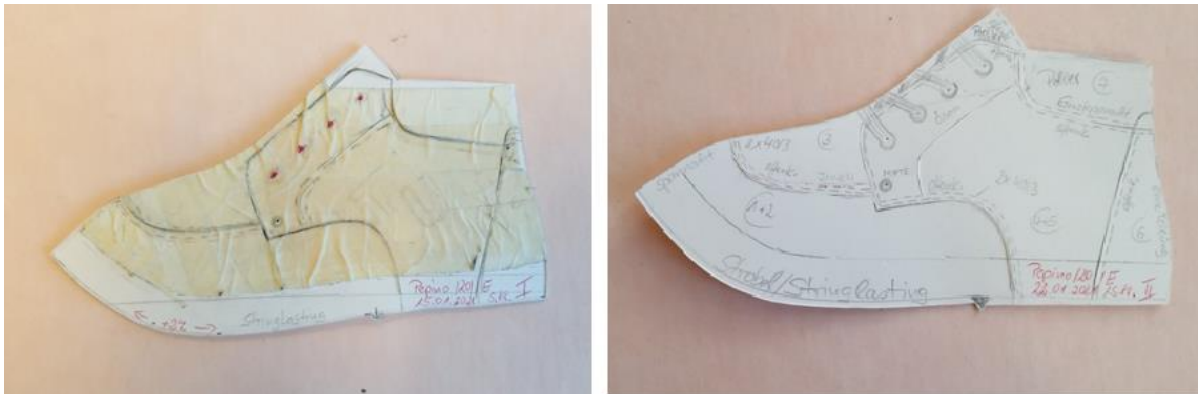


Fig. 3: Basic model for cutting templates © PFI

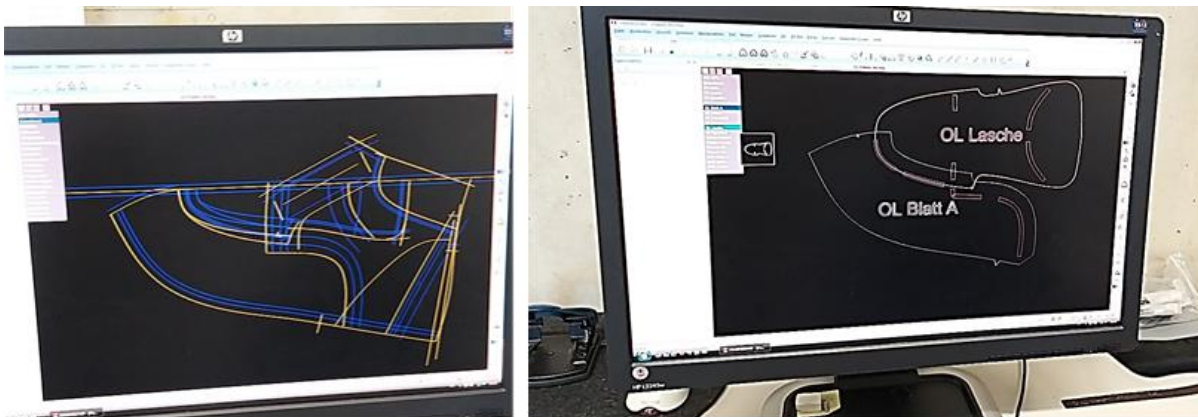


Fig. 4: Cutting template for individual parts in the CAD system © PFI

3. Step 3 occurs at the cutting table where the cut for the upper leather, lining leather, reinforcing materials is made.

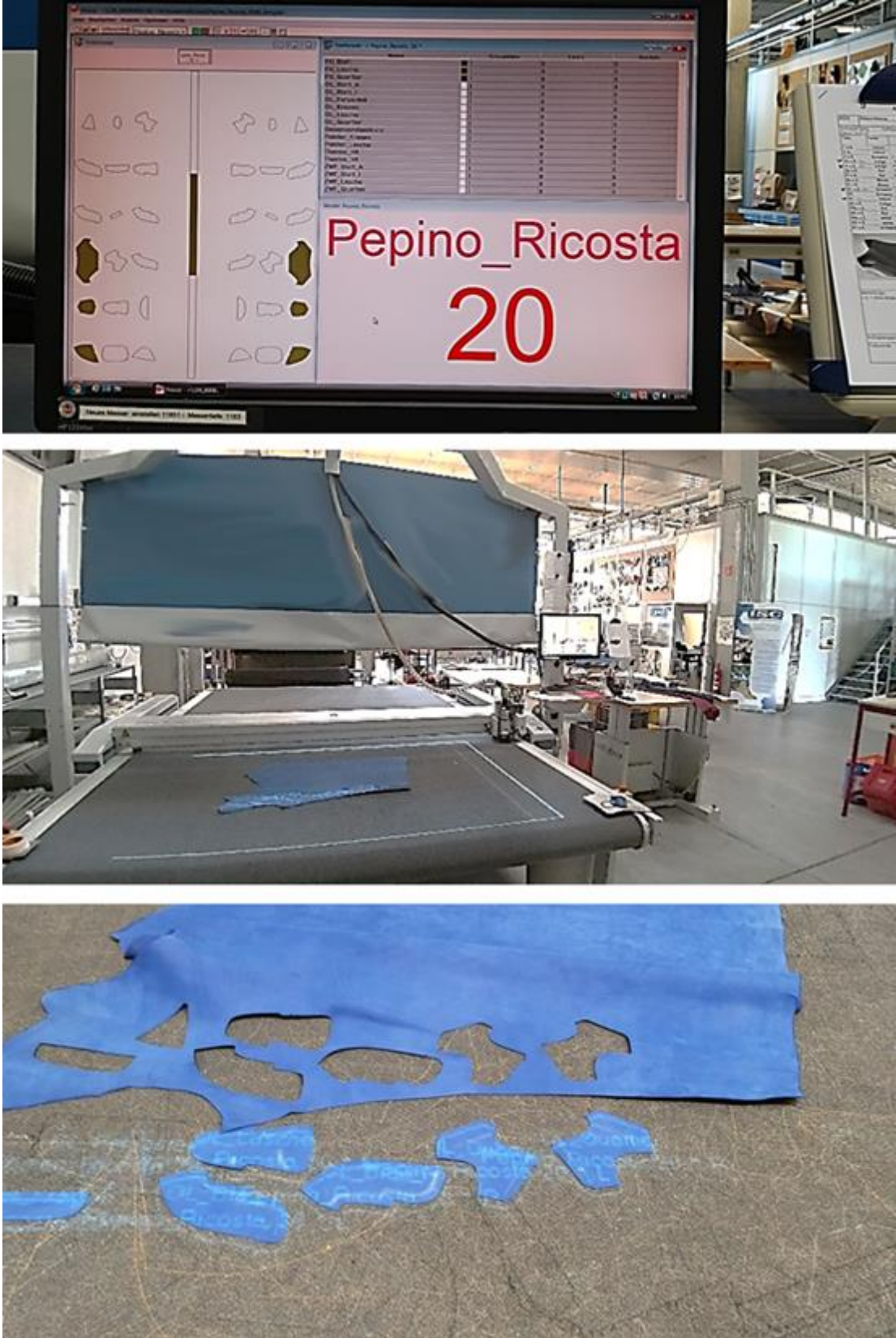


Fig. 5: Automatic cutting table © PFI



Fig. 6: Assembled pieces © PFI

If a model design is included in the collection, the duplication into the assortment sizes must be created - the so-called grading - i.e. the model design must be created proportionally smaller and larger in length and width. The grading is often done in the technical department. Together with the plant manager, the department supervisor are also involved in creation of the work flow charts of each model. They must determine the optimal and most efficient work flow for the sample model and for the subsequent production.

Another important aspect is the choice of reinforcement materials in a shoe / upper model - depending on different upper materials, the plant manager and supervisor will determine the respective reinforcement material. These decisions will have a decisive influence on the production process, with the corresponding machinery and know-how of the production staff.

Not only the designs / upper parts are created and developed by the creative department, but also the outsole design and heel design complete a shoe model. This is usually done in the same department, but by different employees.

2.2 Technical Development Bottom/Bottom Department

This department is responsible for transforming the creative ideas into physical objects - i.e. prototyping outsoles or heels and all additional bottom components (insoles, cover soles, inlay insoles, heel covers, wedges and cover patches).

The outsoles and heels, wedges

According to a design template, a construction is created on the CAD which, e.g. for a moulded sole made of PU or rubber, already has the correct dimensions for the corresponding injection mould. The first model cast is called a "Maquette" (Italian). After this cast, the appearance and proportions are examined, possibly revised and further processed for series production.

The insoles

The insoles are made according to the type of construction and the heel cracks. There are often standard specifications for this, such as the material thickness of the insole (Texon), steel joints or the reinforced panels, to be made with milling angles.

The cover soles, footbeds

Shock absorbers are also developed in this department. These bottom parts are then made ready for series production.

Both developments - upper design and bottom design are worked out in CAD systems



Fig. 7: CAD Outsole rendering © PFI

Production readiness

For the production readiness these bottom parts are also graded and again processed in the respective departments by technical designers.

After the sample development of the bottom parts, e.g. outsoles, heels, etc. in the sample sizes (for women's shoes 4 ½ or 37, for men's shoes 7 ½ or 41), the so-called group sizes are graded - i.e. separate samples are sent through all departments of the company before the actual production. These group sizes - small, medium, large - are the dress rehearsal for series production to ensure the correct proportions of the finished upper/shoe and to correct any errors or discrepancies. The department foremen are significantly involved in this phase/work process. The department foremen help to decide on an efficient work sequence and may also give the designers advice on how to optimise production.

Usually, at least the group sizes pass through the company for each new bottom group. In a fashion-oriented company, this can mean 20 or more new bottom groups.

The industrial and department supervisors are in close contact with the responsible staff in the technical development department and closely monitor the accuracy of fit of the upper and lower parts and their progress over time, which in turn is important for production planning.

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