Integrating Companies in a Sustainable Apprenticeship System

PROJECT 2017-1-DE02-KA202-004174

OUTPUT 1

Learning Station Analysis

Romania

Prepared by Partners: **Gheorghe Asachi Technical University of Iasi TUIASI,**

Angela International SRL (Papucei),

Institute Technology and Education (ITB), Universität Bremen,

International Shoe Competence Center Pirmasens gGmbH (ISC German)

Date: **April 2018**

This project has been funded with support from the European Commission.
This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

This project has been funded with support from the European Commission.
This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Erasmus+

The information and views set out in this document have been developed within the framework of the "Integrating Companies in a Sustainable Apprenticeship System "project, funded by the ERASMUS+ Programme, KA2 - Cooperation for Innovation and the Exchange of Good Practices Strategic Partnerships.

The European Commission support for the production of this publication does not constitute an endorsement of the contents, which only reflects the views of the authors, and the Commission cannot be held responsible for any use, which may be made of the information contained therein.

This project has been funded with support from the European Commission.
This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Erasmus+

CONTENT

This project has been funded with support from the European Commission.
This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Erasmus+

1. LEARNING STATION ANALYSIS MANUAL

-an instrument to connect occupational Activity Fields (AF) and Work-Based Learning (WBL)

1.1. Introduction

Learning within work processes differs in three important aspects from formal learning in schools or apprentices' workshops:

- *What can or should be learnt does not only depend on decisions of teachers or trainers, but is strongly determined by work processes;*
- *the absence of pedagogically specialised staff;*
- *the number of mentors (skilled workers accompanying the apprentices, supporting the development of their vocational competences).*

This manual 'Learning Station Analysis – an instrument to connect occupational Activity Fields (AF) and Work-Based Learning (WBL)' is an adapted version of a collaborative product of ITB (Universität Bremen) and trainers from Airbus which was developed for two pilot projects in the aeronautic sector 'Move Pro Europe' and 'AERONET'. This method has already been approved in other sectors and other European projects such as 'APPRENTSOD' or DUAL TRAIN. In particular, the form of documentation of the analytical results has been adapted with respect to the specific aims of the 'ICSAS' project. The methods proposed here are supposed to be applied to exemplary work places in shoe production, where 'activity fields' (AF) or units have been identified and selected for their suitability for the implementation of dual structures.

The 'LSA' (Learning Station Analysis) method was developed to support the training organisation at the learning places in an effective way, taking into regard business needs as well as processes requirements. Essentially, it helps users to identify the work places that are important both in terms of the significance of their operating processes and for the learning opportunities they provide. This approach emphasises the value of trainings taking place at work stations where the most significant operations are being carried out: the quality of training to prepare apprentices for the requirements of modern skilled work is considerably increased if the training takes place at the most relevant operational processes.

LSAs should not only enable the development of training processes which focus on the work process, they should also provide support for the positive development of the trainees.

The LSA method serves to examine the quality of individual work stations within a training process, and, moreover, can highlight the value of these being attended in a certain order. A simple example would be the comparison of a single-task operational work place in a workshop and a more complex operational work place in the final assembly line that offers insight into and

experience of a technology and a quality procedure that are characteristic for a professional occupation. However, prior to entering into such a more complex workplace, young people need to possess an understanding of certain production procedures. Without such preceding experience (for example if a trainee arrives at a relatively early apprenticeship stage at a challenging learning station and remains there for only for a short period of time), it is quite impossible to fully impart the actual functioning at that work station. In consequence, learning opportunities are missed. This example illustrates that the overall training organisation and the order of flow through different learning stations has an impact on the learning results and the training quality. An additional important aspect of the LSA method is that skilled work is being regarded from a beginner's perspective: elements that seem self-evident and too trivial for experienced workers to explicitly explain can pose considerable, if not insuperable problems for a trainee and need to be communicated explicitly. LSAs reveal the communication needs and the learning potential of specific workstations within the entire apprenticeship programme, and they can contribute to analyse other work stations so as to provide information on the optimal sequencing of movement through the work stations, which can be depicted in form of a flow chart. The LSA method is also suitable to assess the potential of workstations that have not yet been used for training purposes – not only the learning potential at work stations already being used in trainings.

- *The LSA method was jointly developed by researchers and trainers.*
- *Its primary objective is to evaluate learning potentials of work processes.*
- *It helps to set up training plans according to work processes, and fosters the acquisition of skills and competences by the learners.*

1.2. Procedure - Milestones

The term 'Learning Station Analysis' itself clarifies the aim of the LSA method as a tool. 'Learning stations' are places where learning to acquire skills and competences to perform work central to the occupation takes place. LSAs analyse workplaces, which cover activity fields (AF). AFs describe skilled work tasks in terms of characteristic operations and work contexts that are needed in order to make sense of learning and allow the trainee to "grow" into an occupation. They are typical for the profession and, in total, comprise a complete specification of the learning required in order to become fully skilled. With this definition vocational activity fields can be specified as follows:

No individual activities or performances are analysed, for example closing a backseam or activating an upper. Instead tasks, in the sense of complete actions, following a holistic process structure, are analysed, such as cutting or lasting. The aim is to obtain a general process structure of activity fields; containing specifications of concrete tasks, including their planning and accomplishment as well as quality inspection and assessment of work outcomes. The LSA method is based on the following criteria:

- it has to reflect the super-ordinate coherence of the occupational work process and refer to a distinct vocational profile;
- it always describes a work context and a complete work action, highlighting planning, performing and evaluating the work;
- the formulation of the documentation also emphasises the content and types of skilled work;
- it reflects function and meaning of a work-process in the context of super-ordinate operational business processes;
- particular attention is paid to the creative potential in skilled work.

LSAs assigned to activity fields are divided into the following three phases:

- *preparation of the analysis,*
- *accomplishment of the analysis,*
- *evaluation and documentation of the analysis (the results serve for developing a training schedule respecting a logical sequence of progression through learning stations).*

1.3. Learning Station Analysis – Approach

1.3.1. Preparation of a LSA

Investigation team

The selection of the LSA team is part of the preparatory phase. It is recommended to choose a group of two people, including an expert skilled worker and a researcher or teacher.

Selection of workstations

Although each LSA corresponds to a previously identified activity field, the following procedure is recommended: It is necessary to distinguish an activity field from sub-tasks. It has to be checked whether a workplace fulfils the precondition of being relevant both in terms of competence development and syllabus. The ICSAS project intents to plan a complete apprenticeship: it requires numerous individual analyses in the technical and production departments in order to achieve the desired training results – but the LSA method also reveals what ***cannot*** be learnt within the company and thus should be taught in VET-school or training workshops.

It is necessary to select operational work places as (possible) learning stations in the company and/or a department, where qualified specialists master the tasks, which are representative for the activity field. The operational representative in the LSA team is responsible for the selection of

the workstations, since he/she has detailed insight into the business and work processes and can ensure LSA performance on site.

In practice, activity fields are often not completely isolated from each other. At many work places (and therefore at learning stations or in work fields), several closely linked activity fields are mastered together. *For the analysis it is advisable to select work places with the 'core characteristics' of an activity field. Although, only one individual activity field is analysed at a time, the interfaces with other activity fields have to be observed.* Simultaneous analysis of several fields could cloud the view on the most relevant processes in different fields. When – due to work organisation – several AFs are involved in a work process, it might be necessary to perform several LSAs from different angles (for example in the case of function checks, disassembling and malfunction analysis).

An immensely influential factor in LSAs is the cooperation with the skilled workers at the respective work places. It is important to make particularly clear to them that the analysis is not conducted to prepare rationalisation measures, personnel restructuring or an assessment of their performance. The participation of specialists with substantial professional experience is crucial for devising vocational education and training programmes in practice. This central request should be clarified with the production manager who has given agreement for the planned analyses to take place.

The following four steps have to be performed to complete a LSA:

- Discussion schedule (interview);
- Preparation of a record (references);
- Preparation of photos and sketches;
- Materials and samples for visualisation (design sketches, semi-finished products, components).

- *Ideally, a LSA is conducted by a skilled worker and an external colleague.*
- *The manual for analysis should be used as a toolbox, not as a rigid rule.*
- *A LSA takes several (few) hours.*

1.3.2. Manual for the Analysis

Not only (experienced) researchers, but also the skilled staff selected for a LSA should read the LSA manual beforehand and focus on the following questions:

- In which business and working processes is the activity field integrated?
- At which workplace is the task of the activity field executed?
- Which items are being worked on during the actual performance of a task?
- Which tools, methods and organisation forms are used?
- Which requirements in terms of skilled work have to be met?
- Which interfaces to other activity fields exist?

- What are the experiences in regards to training at this workplace?

Based on these preliminary questions, the analysis categories are developed, which can then be complemented in detail by a catalogue of central questions.

Analysis category: business process

The analysis of skilled work cannot refer to the workplace without considering the context. Without consideration of the integration in business and working processes, skilled work in its full complexity cannot be appropriatelycaptured. For this analysis category, material and information flow charts as well as schematic diagrams of the order flow are very useful. This material can be examined by the LSA team in the preparatory phase, i.e. before the 'on-site-analysis' starts.

Analysis category: workplace

When describing a chosen work place, it is of special interest to identify – besides the location (department, production area and section) – the working conditions under which the specialists perform their everyday work. Relevant details are lighting conditions, noise exposure, ambient temperatures but also aspects of ergonomics at the workplace (e.g. sitting positions, work benches).

Analysis category: subject of skilled work

In order to describe the subject of skilled work, the work context and the work process need to be considered. For example, the technical realisation of a machine is very often done in such a way that the machine operator requires only few skills and knowledge. However, the work routine of the machine operator differs substantially from that of the maintenance technician, although both work processes refer to the same machine. The machine operator adjusts the necessary machine settings (e.g. model- and size-dependent), feeds parts to the machine and accomplishes simple maintenance tasks. The operator relies on the trouble-free functioning of the machine, and in general does not know much about the internal design and the technical details. In case of machine breakdown, the maintenance technician has to determine the cause for the defect and therefore, on the contrary, needs detailed knowledge of how the machine is constructed in order to identify all possible causes for malfunction.

Skilled work can contain a surprising degree of creative potential. For example: Even if two maintenance technicians proceed in a completely different way when trying to repair a machine default, their goal is the same: identification of the defect and rapid repair. LSAs identify the methodical approach of skilled workers in performing such professional tasks. Differences can be found not only in the actual work execution but also in planning the work. In many cases, different strategies are viable.

Analysis category: tools and equipment for the skilled work

Concerning the description of the tools and equipment used in the skilled work, the context of the work process is crucial. Beside the tools used, the workshop facilities that are used in the work process at the work place are also of interest.

Analysis category: organisation of the skilled work

The form of work organisation of work is a key feature of skilled work that cannot be neglected. In this respect, the operational structure and sequence organisation are at the centre of attention (e.g. group organisation, division of labour, hierarchy levels, co-operation with other professions). Co-operation with other professions (e.g. in skilled maintenance work; decentralized versus central maintenance) is an important aspect of the analysis. Varying organisational forms can lead to substantial differences in terms of occupational responsibility, task connection and co-operation and communication requirements relating to the work process. Also work time models (e.g. shift work, break times, part-time jobs) may affect the nature of skilled work considerably.

Analysis category: requirements for skilled work and its components

In this phase the demands towards the work process and the work components, made by different stake holders, are identified. For example, the company sets specific quality standards, which are necessary to stay competitive and have to be respected when performing skilled work. This may require, among others, the adherence to time and cost targets. In addition, legal requirements and standards, e.g. technical standards or the health and safety at work regulations, must be respected. The possibilities and requirements of organising and aligning technology and skilled work only become clear when these varying and partially contradictory demands are compiled in the format of a list.

Analytical category	Central questions
Business and work process	- **Which business processes is the learning station part of?** - **Which products are manufactured?** - **Where do pre-products come from?** - **How are orders accepted?** - **Where in the further process are the products used?** - **How are processed orders handed over?** - **Who is client / customer of the service?**
Workplace	- **Where is the analysed workplace located?** - **What are the prevailing lighting conditions?** - **Prevailing climatic conditions (heat, cold, radiation, ventilation, gas, vapours, fog, dust)?** - **What are the postures of the workers when performing their tasks?**
Subjects and	- **What exactly is being worked on at the respective learning station (e.g.**

methods of skilled work	**technical products and processes, services, documentations, control programs)?** **- What is the role of the object produced within the working process?** **- What procedures are applied when working on the task (e.g. manufacturing / assembly operation, error tracing, quality assurance procedure)?**
Tools / equipment of skilled work	**- Which tools and equipment are used to perform the task (machines, tools, devices, software)?** **- How is the tool/equipment handled?**
Organisation of skilled work	**- Organisation of the skilled work (e.g. individual work or group work, division of labour)?** **- Which hierarchies affect the skilled work?** **- Which co-operations and boundaries with other occupations or departments exist?** **- Which qualifications come together in multi-skilled workers / teams at the respective learning station?**
Requirements of skilled work	**- Which operational requirements have to be met when performing the task?** **- Which demands are placed by the customer?** **- Which social requirements do play a role?** **- Which standards, laws and quality specifications need to be considered?** **- Which rules and standards does the community of practice require?**
Interfaces	**- What are the links and interfaces with other activity fields?** **- Which comparisons can be made with other analyses in this activity field that have already been accomplished?** **- What are the similarities / differences to other workplaces in the company or in other companies which refer to the same field of activity (perform the same tasks)?** **- How are theory (vocational school) and practical work interlinked, what are the 'vocational basics' and/or 'core competencies'?**
Training experiences	**- Is the analysed workplace actually being used in training programmes?** **- If not, why?** **- In which year of apprenticeship are the trainees at this learning station (or should they be)?** **- How long are (should be) they at the learning station and where were they before / where do they go afterwards (should have been / should go)?** **- Which preliminary conditions should the trainees meet?** **- What should a trainee learn in the opinion of the skilled workers at this respective learning station?** **- What are the experiences of the skilled workers with trainees/young skilled workers at the respective learning station?**

	- **How are the trainees coached / supported?** - **Do the trainees work on "normal" work orders do they work on separate orders (e. g. simulated work processes)?** - **What level of autonomy expected from a trainee at the end of his internship at this station? (support/under instruction/under surveillance/independently)**

Table 1: guiding questions for the Learning Station Analysis

Analysis category: interfaces

Furthermore, the analysis must be put in a broader context. Especially interfaces and overlaps with other activity fields deserve special attention. As previously mentioned, activity fields occur rarely completely isolated; they are often closely linked to others and cannot be clearly demarcated. In consequence, results of analyses concerning the chosen activity fields, which derive from other workplaces, can also be subject of critical reflection.

Analysis category: experience with training

As already mentioned, LSAs focus on the development of recommendations as to the sequential order, duration and type of training a learner can receive at work stations. The experiences of skilled workers with trainees are therefore of particular importance.

For the purposes of the ICSAS project, entries in the fields "experiences with new colleagues", "preliminary conditions" and "level of autonomy" are of particular relevance:

Experiences with new colleagues: The answers to this question might reveal relevant weaknesses of the training system, which most likely cannot be solved at the level of single activity fields.

Preliminary conditions: It strongly increases the acceptance of internships if basic skills and knowledge (i. e. health and safety regulations, working under workshop conditions) are trained in advance.

Level of autonomy: This indicates the learning outcomes that can be expected. Sometimes the highest level (autonomy) cannot be attained (legal preconditions, necessity to have of a lot of experience, etc.) – but this does not lower the potential benefit of WBL; it only indicates the possible realistic outcome. In addition, the autonomy level scale is very useful to document the achievements of trainees (cp. Tab in section 1.5): The mentor responsible for the learning station can indicate on a personal assessment sheet which performance level a trainee has attained.

The classification scheme with guiding questions for the LSA is merged in table 1 and designed as a master template to guide the analysis. The guiding questions offer suggestions for the analysis. They do not need to be strictly followed in each analysis and are not to be considered as a checklist. Their purpose is rather to provide suggestions in order to be able to produce meaningful LSA results.

1.3.3. Execution of Analysis and Documentation

At the beginning of each LSA, the specialists, i.e. the personnel working at the selected workplaces whose work will be analysed, must imperatively be informed of the aims of the LSA. They should follow their work routine as usual: the analysis does not focus on performance, but on how a skilled worker organises and carries out his/her tasks. It can happen that no 'highlights' occur on the day of the LSA, just unspectacular 'standard work'. This is not a problem for the analysis; it just reflects normality. The workplaces are visited and analysed according to the guiding questions which were conceived to get answers making the «invisible» visible. All LSA interviews must be audio-taped in order to handle the information abundance. Of course the recordings must be previously authorised. The amount of time required for the LSA interviews depends on the complexity of the tasks at each workplace. Experience shows that a LSA usually takes a couple of hours.

- The core of a LSA is to analyse daily work of a skilled worker from the perspective of an apprentice.
- LSAs are not an attempt to evaluate the individual performance of skilled workers.
- The skilled workers involved in the interviews should proofread and give their ok for publication of the documentation of a LSA before further circulation.

1.4. Evaluation

The LSA tool pursues two targets: Firstly to compare the organisation of work at the learning stations with activity fields (AF) respectively units of the curriculum, and secondly to document the learning potential of learning stations. The interviews should cover all necessary aspects to unveil the learning potential of each workplace and to describe it with the necessary clarity. However, the LSA team should give the question of what learning potential can be realistically expected at each specific learning station some initial thoughts, taking into regard the individual progress of each trainee and the requirements of vocational training.

For sure 'potential' is not a guarantee of 'learning'. The term 'potential' rather highlights that a situation or context offers (good) possibilities for substantive learning. In qualification research and professional education 'learning potential' not only has connotations of positive influences at a personal level, it also means the increase of competences in the special subject or task – in the sense that someone is enabled through the learning process to do something that he or she was not able to do before. This also means that someone who is not capable of doing something which he will be required to do later in her/his career is not behaving wrongly. He/she is just not yet able to perform the required tasks. The trainee is expected to reach the required performance level not through threats or exhortation, but by learning to do something thanks to appropriate learning opportunities. The learner has to take advantage of these opportunities in order to gain experience and expertise. Vocational training helps trainees to achieve these goals, but in order to

enable them to do so, the responsible staff for organising work-based learning in companies have to be knowledgeable about where within the work process the relevant learning possibilities are located.

The goal of work-based learning is that trainees reach the level of skilled workers in the chosen activity fields. A precondition is that the AF are correctly described and learning stations are selected correspondingly. However, the skilled work observed during LSAs is actually based on long-term experience. Hence, even under ideal conditions at a learning station, it is practically impossible for a trainee to reach the level of an experienced skilled worker within the scope of a limited training period.

Another pedagogical argument has to be considered: it is virtually impossible for an apprentice to catch up with the routine and experience that a skilled worker has acquired during 5 to 15 years of career – even if the training is organised with utmost efficiency. But this is exactly why job beginners should get in contact with skilled workers, with 'masters of their profession', and should be coached by them during the entire practical training. Even if it is not possible to become even nearly as professional as the experts within a training of several weeks at the learning station, the contents that are important for the profession can be most effectively learned from the experts in the field. A knowledge and skill gap between an expert skilled worker and even the most talented beginner will, of course, always persist. It will only diminish over time.

It is not the primary objective of a process-orientated training to turn beginners as quickly as possible into 'experts'. As we have seen, LSAs aim to identify the core features of skilled work that are present at the relevant learning stations according to the AF. A further aim of LSAs is to bring the learning stations into an appropriate order for learning purposes. Hence it is necessary to be aware of the learning potential of all learning stations. For example, consider the core work associated with cutting of upper parts from leather hides. It can be analysed how the necessary skills and competences can be acquired in an effective way. It can also be identified what prior skills, knowledge and attitudes the trainee should have for effective learning in that workplace. Having a cooperative attitude may greatly aid the learning process in cutting, as well as having theoretical knowledge about leather and being able to create a cutting layout or hold a hand cutting knife. A trainee can learn all the practical skills from involvement in the work process. In order to organise an effective progression through the different learning stations, LSAs can also serve to create a reliable assessment tool, led by two key questions:

- What skills can be acquired at the particular learning station and which elements of this skill spectrum will be required for which subsequent learning station?

- What skills and competences must the trainee already possess in order to increase the chances to achieve a substantial learning gain?

These two questions have to be answered for each LSA. It is key to identify the initial entry level requirements for each learning station a trainee must meet, as well as to identify the expected learning outcome (skills and knowledge the trainee should have acquired after the training at a particular learning station). The learning outcome of one learning station is the pre-requisite to enter into the subsequent learning station.

A comprehensively accomplished LSA in a plant will result in a logical organisation of the necessary learning steps that can be achieved by a particular progression through different organisational work processes. The evaluation should therefore take "the internal linkage of all working processes" into account. The development steps of trainees have to be aligned with how trainees can move through the organisational work processes.

The training quality will also depend on the time a trainee can spend at each learning station. Evidently, short trainings (few days/weeks) can only quickly touch on each process step will impart very little about the process itself. Short-time trainees will be able to report what he/she has heard and seen but cannot develop a deep understanding or know-how because of the lack of substantial experience. A rapid progression through work processes can only produce superficial knowledge.

The flow through learning stations is guided by a pedagogic rationale. We should be aware that the core competences may require hierarchical structuring because of increasing levels of difficulty and increasing amounts of time to learn. Therefore it makes sense if less complex component elements of a major task are learned at an earlier stage. LSAs investigate the potential of concrete work processes to provide support for competence development of apprentices.

LSAs answer the following questions:

- What can be learnt at a specific learning station?
- Which skills and knowledge should a trainee already have acquired before entering a new learning station in order to achieve optimal learning outcomes?
- Findings are recommendations; concrete implementation might be affected by frame conditions (e. g. number of placements at a time).

Abbreviations:
AF: Activity Field
LSA: Learning Station Analysis
WBL: Work-Based Learning

1.5. Template

The template below is based on table 1. It is half open, meaning that it offers at any time the possibility to make additional entries.

Description	Learning station Date	
Location / site	**Vocational profile**	
Allocation	**To curriculum**	
Process environment	Type of product/service	
	Internal supplier	
	Order- / material acceptance	
	Direct user of product/service	
	Client of product/service	
	Production steps already performed	
	Interfaces with other process steps	
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	
Process steps (detailed description)		
Workplace	Shop floor	
	Lighting conditions /	

	environment			
	Posture			
	Specifics			
Organisation	Employees at workplace per shift			
	Employees in department			
	Hierarchy			
	Cycle time			
	Shifts			
	Similar work stations			
	Cooperation			
	Specifics			
Interfaces	… to other activity fields?			
	… to other learning places?			
	Separate trainee workshops / theoretical knowledge?			
	Miscellaneous			
Vocational training	Vocational year / duration			
	Preconditions / previous stations			
	What should they learn?			
	Specifics of training (individualisation, duration, timing)			
	Experience with trainees & young skilled workers			
	Assistance / working tasks			
	Is the existing potential used?			
	Possibilities for improvement			
	Number of trainees per learning station			
Highest level of autonomy reachable	Support	With instruction and guidance	Under surveillance	Independently

2. LEARNING STATION ANALYSIS

2.1. Core spheres

2.1.1. Manual cutting

Description	Learning station Date	Manual cutting 10.01.18
Location / site	**Vocational profile**	Shoemaker/worker Manual cutting operator
Allocation	**To curriculum**	
Process environment	Type of product/service	Uppers and linings from leather and leather substitutes, insoles, cardboard patterns.
	Type of production/delivery of services: single/small series/ big series	Single and small series, samples and prototypes.
	Order- / material acceptance	All materials are recorded, encoded and stored in the warehouse. Orders are sent as production sheets containing information about the material (type, name), quantities, and anumber of pieces for each size. The warehouse keeper prepares the materials needed for each order and sends them to the cutting department together with the production records. The operator prepares the tools needed for the cutting process.
	Direct user of product/service	Stitching and pre-stitching department.
	Client of product/service	• Product development department in case of prototypes; • Commercial department in case of samples.
	Production steps already performed	Reception, checking, and registration of materials.
	Interfaces with other process steps	No

	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	Each operator is responsible for inspecting the received materials, organizing the work process, maintaining the cutting tools and checking the quality of cut pieces.
Process steps (detailed description)	The manual cutting operation (fig.1) is carried out by an operator having the following tasks: • receiving the orders (number of pairs, pieces, sizes) together with the materials to be cut and the cutting templates; • laying the material on the work table and identifying the defects; • preparing the cutting tools (knife, weight, ruler, sharpener); • identifying the nesting options on the surface of materials; • cutting pieces; • verifying the cut pieces against the order (type and number of parts), checking the quality of the cut pieces, grouping and organizing the pieces according to the order.	
Workplace	Shop floor	The main production hall, close to the product development department and the stitching department.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)
	Posture	Standing.
	Specifics	• Shelves for storing materials, cutting tools and cutting templates; • Table for checking, grouping and organizing the pieces according to the order; • Place for storing the completed orders.
Organisation	Employees at workplace per shift	1
	Employees at range	No
	Hierarchy	Foreman of the cutting department, patternmaker, designer.
	Cycle time	1
	Shifts	1
	Similar work stations	No
	Cooperation	Hierarchical superior.

	Specifics	A large variety of materials which differ by nature, colour, finishing, characteristics, andphysical and mechanical characteristics.
Special requirements:		• Rational use of materials; • Correct positioning of the cutting knife, perpendicular to the material; • With respect to the shape and size of patterns.
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Pre-stitching and stitching; • Design; • Patternmaking.
	Separate trainee workshops / theoretical knowledge?	• Characteristics of materials; • Footwear structure; • Nesting; • Materials cutting; • Quality control procedures and standards.
	Miscellaneous	No
Vocational training	Vocational year / duration	• Theoretical knowledge; • Work-based learning
	Preconditions / previous stations	-
	What should they learn?	• The use and maintenance of the cutting tools • Practical nesting of patterns on different types of materials; • Cutting of leather and leather substitutes.
	Specifics of training (individualisation, duration, timing)	Gradually increase the difficulty of tasks.
	Experience with trainees & young skilled workers	Basic concepts are quickly acquired, but practical grounding is required to substantiate them.

	Assistance/working tasks		• analyse the materials and identify the defects; • nesting; • cutting; • verifying the cut pieces; • organising the pieces according to the orders; • grouping and storing the orders.	
	Is the existing potential used?		yes	
	Possibilities for improvement		• Theoretical knowledge and practical skills of the operator; • Training methodology; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

Fig. 1 Manual cutting process

2.1.2. Press cutting

Description	Learning station Date	Cutting by clicking press 11.01.18
Location / site	**Vocational profile**	Shoemaker/worker Clicking press operator
Allocation	**To curriculum**	
Process environment	Type of product/service	Uppers and linings from leather and leather substitutes, stiffeners, toe caps, insoles and insoles cover.
	Type of production/delivery of services: single/small series/ big series	Small and big series.
	Order- / material acceptance	All materials are recorded, encoded and stored in the warehouse. Orders are sent as production sheets containing information about the material (type, name), quantities and number of pieces for each size). The warehouse keeper prepares the materials needed for each order and sends them to the cutting department together with the production records. The worker prepares the tools needed for the cutting process.
	Direct user of product/service	Stitching and pre-stitching department.
	Client of product/service	• Product development department in case of prototypes; • Commercial department in case of samples.
	Production steps already performed	Reception, quality control and registration of materials.
	Interfaces with other process steps	No
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	Each operator is responsible for inspecting the received materials, organizing the work process, checking and maintaining the cutting machines and checking the quality of cut pieces.

Process steps (detailed description)	The cutting press is serviced by an operator who has the following tasks: • receiving the orders (number of pairs, pieces, sizes), together with the materials to be cut and the cutting templates; • laying the material on the work table and identifying the defects; • setting the parameters of the cutting machine according to the shape and dimension of the materials and depending on the shape and dimensions of the cutting knives (height, cutting depth, type) (fig.3); • preparing the cutting knives on the workbench next to the press; • identifying the nesting options on the surface of the materials; • cutting the pieces; • verifying the cut pieces against the order (type and number of pieces), verifying the quality of the items, grouping and organizing the pieces according to the order. The operator of the cutting press is responsible for the proper maintenance of the cutting machine.	
Workplace	Shop floor	Separate workspace.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)
	Posture	Standing.
	Specifics	• Shelves for storing materials, cutting tools and cutting templates; • Table for checking, grouping and organizing the pieces according to the order; • Place for storing the completed orders.
Organisation	Employees at workplace per shift	2
	Employees at range	No
	Hierarchy	Foreman of the cutting department.
	Cycle time	2
	Shifts	1
	Similar work stations	No
	Cooperation	Hierarchical superior.
	Specifics	A large variety of materials to be used, which differ by nature, colour, finishing, characteristics andbehaviour.

Special requirements:		• Rational use of materials; • Properly adjustment of the cutting press parameters.
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Pre-stitching and stitching; • Patternmaking.
	Separate trainee workshops / theoretical knowledge?	• Characteristics of materials; • Footwear structure; • Various models for nesting; • Cutting process; • Cutting machines; • Quality control procedures and standards.
	Miscellaneous	No
Vocational training	Vocational year/duration	• Theoretical knowledge; • Work-based learning.
	Preconditions / previous stations	Manual cutting
	What should they learn?	• Practical nesting of patterns on different types of materials; • The use and maintenance of the cutting machines; • Cutting process of leather and leather substitutes.
	Specifics of training (individualisation, duration, timing)	Gradually increase the difficulty of tasks.
	Experience with trainees & young skilled workers	Basic concepts are acquired quickly, but practical grounding is required to substantiate them.
	Assistance / working tasks	• analyse the materials and identify the defects; • nesting; • cutting pieces; • verifying the cut pieces; • organising the pieces according to the orders; • grouping and storing the orders.

	Is the existing potential used?		No	
	Possibilities for improvement		• Theoretical and practical knowledge of operators; • Training model; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

Fig. 2
Reception and organizing of materials for cutting

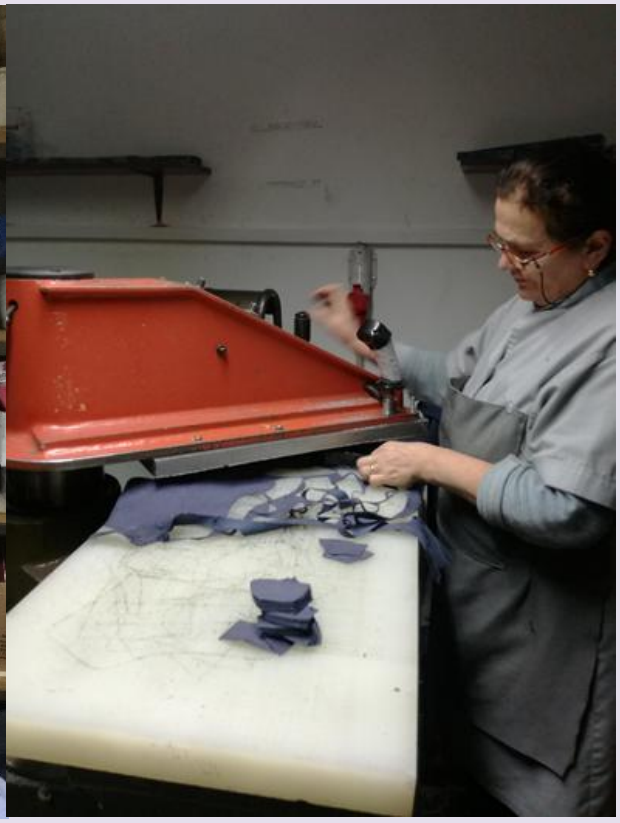


Fig. 3
Cutting operation using press machine

2.1.3. Automatic cutting

Description	Learning station Date	Automatic cutting 12.01.18
Location / site	**Vocational profile**	Shoemaker/worker Machine operator for footwear production-automatic cutting machine
Allocation	**To curriculum**	
Process environment	Type of product/service	Uppers and linings from leather and leather substitutes, insoles, cardboard patterns.
	Type of production/delivery of services: single/small series/ big series	Small and big series.
	Order- / material acceptance	All materials are recorded, encoded and stored in the warehouse. Orders are sent as production sheets containing information about the material (type, name, quantities), and number of pieces for each size). The warehouse keeper prepares the materials needed for each order and sends them to the cutting department together with the production records. The worker prepares the tools needed for the cutting process.
	Direct user of product/service	Stitching and pre-stitching department.
	Client of product/service	• Product development department in case of prototypes; • Commercial department in case of samples.
	Production steps already performed	Reception, quality control and registration of materials.
	Interfaces with other process steps	No
	Specifics of work process related to the	Each operator is responsible for inspecting the received materials, organizing the work process, checking and maintaining the cutting machines

	duration of execution, work process organisation, quality assurance etc.	and checking the quality of cut pieces.
Process steps (detailed description)	The automatic cutting machine is serviced by 2 operators who have the following tasks: **Cutting the pieces** • receiving the orders (number of pairs, pieces, sizes, materials) and together with the materials to be cut and the cutting templates; • saving the electronic models into the cutting machine computer; • entering the production sheet's details on the computer; •organising the material on the work table and identifying the defects; •setting the parameters of the cutting machine (height, cutting depth, type of cutting tool) according to the materials characteristics; • identifying the nesting options on the surface of the materials; • nesting the virtual pieces on the surface of the materials and launching the cutting process. **Checking the pieces** • removing the pieces from the cutting table; • checking the compliance to the order (type and number of pieces); • checking the quality of the cut parts; • grouping and organizing the pieces according to the order (fig.4, fig.5). The operator of the cutting machine is responsible for checking and maintaining the machine: replacing the marking mine, oil level, dusting, cleaning the cutting knife, checking the protection sensors, etc.	
Workplace	Shop floor	Separate workspace.
	Lighting conditions /	Natural light (outside windows) and artificial light (light bulbs directed towards the working area).

		environment	The machine is equipped with its own light source.
		Posture	Standing.
		Specifics	• Shelves for storing materials, cutting tools and cutting templates; • Table for checking, grouping and organizing the pieces according to the order; • Place for storing the completed orders.
Organisation		Employees at workplace per shift	2
		Employees in department	No
		Hierarchy	Foreman of the cutting department.
		Cycle time	1
		Shifts	1
		Similar work stations	No
		Cooperation	Hierarchical superior.
		Specifics	A large variety of materials by their nature, colour, finishing, physical and mechanical characteristics.
Special requirements:			• Rational use of materials; • Properly adjust the machine parameters.
Interfaces	… to other activity fields?		• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?		• Pre-stitching and stitching; • Patternmaking.
	Separate trainee workshops / theoretical knowledge?		• Characteristics of materials; • Footwear structure; • Nesting; • Cutting process; • How the automatic cutting machine works. • Quality control procedures and standards.
	Miscellaneous		No
Vocationa	Vocational year / duration		• Theoretical knowledge;

l training			• Work-based learning.	
	Preconditions / previous stations		Manual cutting	
	What should they learn?		• Practical nesting of patterns on different types of materials; • The use and maintenance of the cutting machines; • Cutting of leather and leather substitutes; • Basic computer operating knowledge.	
	Specifics of training (individualisation, duration, timing)		Gradually increase the difficulty of tasks.	
	Experience with trainees & young skilled workers		Basic concepts are quickly acquired, but practical grounding is required to substantiate them.	
	Assistance/working tasks		• analyse the materials and identify the defects; • nesting the pieces; • cutting the pieces; • verifying the cut pieces; • organising the pieces according to the orders; • grouping and storing the orders.	
	Is the existing potential used?		No	
	Possibilities for improvement		• Theoretical and practical knowledge of operators; • Methodology for practical training; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

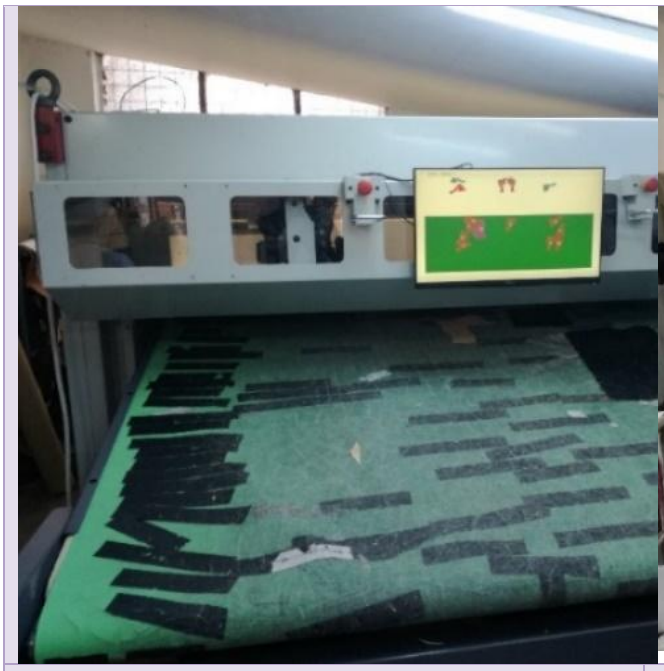


Fig. 4 Organizing, moving, arranging and rearranging the pieces

Fig. 5 Checking and grouping the cut pieces

2.1.4. **Pre-stitching**

Description	**Learning station** **Date**	Pre-stitching 15.01.18
Location / site	**Vocational profile**	Shoemaker/worker Machine operator for footwear production-closing room
Allocation	**To curriculum**	
Process environment	Type of product/service	Leather and synthetic materials upper and lining parts.
	Type of production/delivery of services: single/small series/ big series	Single, small and big series, prototypes and samples.
	Order- / material acceptance	Orders are received from the cutting department in boxes containing cut pieces and production technical sheets.
	Direct user of product/service	Stitching department.
	Client of product/service	• Product development department in case of prototypes; • Commercial department in case of samples.

		• Final clients in case of finished products.
	Production steps already performed	Cutting.
	Interfaces with other process steps	No
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	Each operator is responsible for inspecting the received pieces according to the technical specification, organizing the work process and checking the machines.
Process steps (detailed description)	**Skiving** • receiving and checking the pieces against the production technical sheets (number of pairs, pieces, sizes, materials, technical information); • setting the skiving parameters depending on piece's shape, thickness, and type of skiving; • skiving the pieces (fig.6); • grouping the pieces. **Reinforcing the uppers** • receiving and checking the pieces against the production sheets (number of pairs, pieces, sizes, materials, technical information); • setting the machine parameters (temperature, pressing force and time) (fig.7); • reinforcing the uppers; • checking and grouping and the pieces according to the order. **Folding** • receiving and checking the pieces against the production sheets (number of pairs, pieces, sizes, materials, technical information); • setting machine's parameters depending on piece's material (temperature, pressing force and time); • folding piece's edges (fig.8); • checking the quality of folded edges; • checking and grouping and the pieces according to the order. **Stitch marking** • receiving and checking the pieces against the production sheets (number of pairs, pieces, sizes, materials, technical information);	

	• marking position of the stitches on the footwear pieces; • checking and grouping and the pieces according to the order. **Pre-moulding the vamp** • receiving and checking the pieces against the production sheets (number of pairs, pieces, sizes, materials, technical information); • pre-moulding the vamp; • re-cutting the pieces according to the re-cutting pattern. • checking and grouping and the pieces according to the order. The operator is responsible to perform equipment and tools cleaning processes and basic maintenance procedures(de-dusting, knife sharpening, waste removal). Also, the operators are responsible for the quality of the operations.	
Workplace	Shop floor	The main production hall, near the stitching line in the stitching department.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)
	Posture	Seated.
	Specifics	• Table for storing pieces, production sheets, and samples and for checking and grouping the pieces; •
Organisation	Employees at workplace per shift	2 for skiving. 1 for folding. 1 for reinforcing. 1 for pre-moulding.
	Employees in department	No
	Hierarchy	Foreman of the stitching department.
	Cycle time	1
	Shifts	1
	Similar work stations	No
	Cooperation	Hierarchical superior.
	Specifics	A large variety of pieces by shape,

		dimensions, and their nature.
Special requirements:		No
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Cutting; • Design; • Technical drawing; • Stitching.
	Separate trainee workshops / theoretical knowledge?	• Characteristics of materials; • Footwear structure; • pre-stitching operations; • setting, operating and maintaining the machinery; • quality control procedures and standards.
	Miscellaneous	No
Vocational training	Vocational year / duration	• Theoretical knowledge; • Work-based learning and practicing
	Preconditions / previous stations	No
	What should they learn?	• samples analyses and interpreting the technical information on the production technical sheets; • how to perform the pre-stitching operations and quality control; • setting, operating and maintaining the machinery.
	Specifics of training (individualisation, duration, timing)	Identification of footwear parts and type of operation required based on the analysis of the sample and technical specifications.
	Experience with trainees & young	Basic concepts are acquired, but

	skilled workers		practical grounding is required to substantiate them.	
	Assistance / working tasks		• Theoretical and practical training; • Practicing the pre-stitching operations on different types of materials.	
	Is the existing potential used?		No	
	Possibilities for improvement		• Theoretical and knowledge of operators; • Methodology for practical training; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

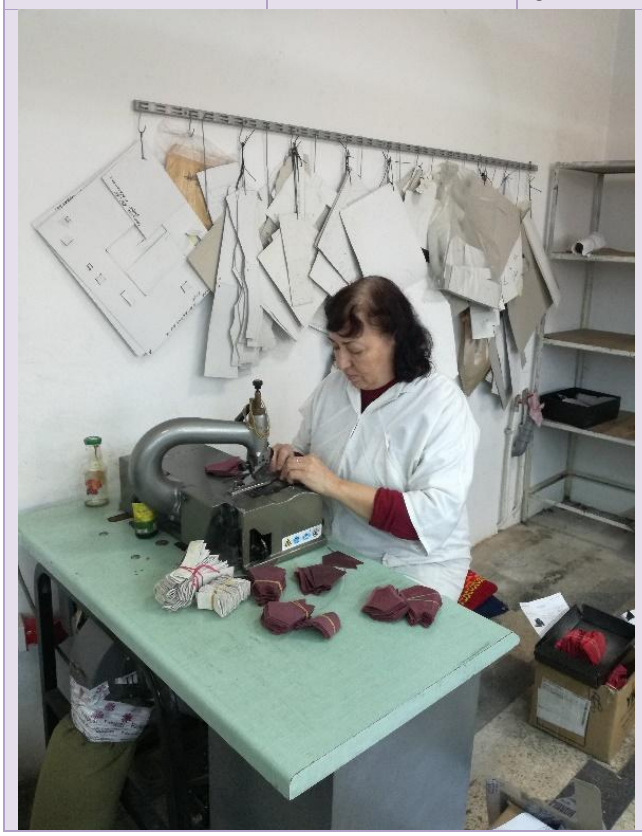


Fig. 6 Skiving operation	*Fig. 7 Press for reinforcement operation*
	

Fig. 8 Edge folding operation

2.1.5. **Stitching**

Description	Learning station Date	**Stitching** **16.01.18**
Location / site	**Vocational profile**	Shoemaker/worker Sewing machine operator
Allocation	**To curriculum**	
Process environment	Type of product/service	Semi-product (uppers).
	Type of production / delivery of services: single/small series/ big series	Single, small and big series, prototypes and samples.
	Order- / material acceptance	Orders are received from pre-stitching in boxes containing pieces and production technical sheets.
	Direct user of product/service	Pre-lasting and lasting.
	Client of product/service	• Product development department

		in case of prototypes; • Commercial department in case of samples. • Final clients in case of finished products.
	Production steps already performed	Pre-stitching.
	Interfaces with other process steps	No
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	Each operator is responsible for inspecting the received pieces according to the specification, organizing the work process and checking the equipment.
Process steps (detailed description)	The operators from stitching department are organized in groups of 3-4 persons, who have the following tasks: preparing and organizing the pieces, stitching the pieces according to the model specifications, checking the quality of sewing operations and grouping the pieces/uppers. **Preparing the pieces** • receiving and checking the pieces against the production sheets (number of pairs, pieces, sizes, materials, technical information); • performing assisting operations for sewing, such as: marking stitches, pieces assembling by gluing, application of reinforcement tape, thread cutting, etc. (fig. 9, fig. 10); • grouping and organizing the pieces (fig. 11). **Stitching** • receiving and checking the pieces against the production sheets (number of pairs, pieces, sizes, materials, technical information); • setting the equipment according to the material, model and technical specifications; • stitching the uppers (fig.12); • self quality control, grouping and organizing the uppers according to the order. In some cases, the application of the thermoplastic toe puff is made in the same department (fig. 13).	
Workplace	Shop floor	The main production hall, stitching department.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)

	Posture	Seated.
	Specifics	• Sewing machine; • Table for preparing, checking and organizing the pieces according to the specifics of operations.
Organisation	Employees at workplace per shift	3-4
	Employees in department	No
	Hierarchy	Foreman of the stitching department, Senior operator.
	Cycle time	1
	Shifts	1
	Similar work stations	5
	Cooperation	Hierarchical superior.
	Specifics	A large variety of pieces and semi-products by shape, dimensions, materials.
Special requirements:		No
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Cutting; • Design; • Technical drawing; • Lasting.
	Separate trainee workshops / theoretical knowledge?	• characteristics of materials for uppers; • auxiliary materials (glue, treads, needles) • footwear structure and components; • pre-stitching operations; • setting, operating and maintaining the machinery; • sewing techniques; • manufacturing processes; • quality control procedures and standards.

	Miscellaneous	No
Vocational training	Vocational year/duration	• Theoretical knowledge; • Work-based learning and practicing in the real working environment.
	Preconditions / previous stations	No
	What should they learn?	• checking and handling needles, threads, and scissors to perform the stitching operations; • setting the sewing machines according to the material and the technical requirementsinorder to perform a qualitative operation; • performing various stitching using flat-bed or cylinder-arm stitching machines; • performing all the pre-stitching operations
	Specifics of training (individualisation, duration, timing)	• Identification of footwear components and the required type of operation based on the analysis of the sample and technical specifications • Exercising various types of stitching
	Experience with trainees & young skilled workers	Basic concepts are acquired, but practical grounding is required to substantiate them.
	Assistance/working tasks	• Theoretical knowledge; • Practicing the stitching skills with different sewing machines on different types of materials.
	Is the existing potential used?	No
	Possibilities for improvement	• Theoretical knowledge of operators; • Training for to acquire practical skills; • Independence and responsibility degree of the operator.

	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

Fig. 9 Pre-stitching operations

Fig. 10 Stitch marking

Fig. 11 Uppers grouping

2.1.6. **Pre-assembling**

Description	**Learning station** **Date**	Pre-assembling (pre-lasting) 17.01.18
Location / site	**Vocational profile**	Shoemaker/worker Machine operator for footwear production-assembling room
Allocation	**To curriculum**	
Process environment	Type of product/service	Semi-product (uppers)
	Type of production / delivery of services: single/small series/ big series	Single, small and big series, prototypes and samples.
	Order- / material acceptance	Semi-products (uppers) orders are received from the stitching department, accompanied by the production technical sheets. The lasts and intermediate components (stiffener and toe puff) could be received from warehouse.
	Direct user of product/service	Lasting department
	Client of product/service	• Product development department in case of prototypes; • Commercial department in case of samples. • Final clients in case of finished products.
	Production steps already performed	Stitching
	Interfaces with other process steps	No
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	Each operator is responsible for inspecting the received pieces according to the technical specification, organizing the work place, checking the equipment and the quality of the semi-products.
Process steps (detailed description)	The process of pre-assembling (pre-lasting) the semi-finished materials for lasting includes the following steps and operations: **1. Preparing the orders**	

- receiving and checking the pieces against the production technical sheets (fig. 14);
- preparing the components needed for lasting and sole attaching (insole, midsole, heel, stiffener, toe puff) (fig. 15);
- grouping the uppers and the components according to the size and subsequent operations.

2. Applying the toe puff

Steps:

- inserting the toe puff between the upper and lining in the front region of the shoe. Depending on the type of shoe, the shoe may be reinforced or not; if thicker materials are used, the edge of the toe is previously skived) (fig.16).
- the application of toe puff using hot press machine;

Observations:

- the toe puff should be centered and evenly spaced relative to the edges and crease folds should be avoided.

Defects:

- the toe isn't properly fixed, it is not centered, the distance to the edge of the margins is not even, the uppers are thermally affected by the hot pressing, presence creases.

3. Back part pre-moulding

Steps:

- inserting the stiffener between the uppers and lining (fig. 17);
- forepart/ back partpre-moulding.

Observations: the technological parameters of the machine (pressure, temperature, time) must be adjusted according to the type of stiffener used.

Defects: deformation or improper fixing the counter, creases, and folds.

Dressing the insole (in some models, especially sandals**)**

- preparing and dressing the midsole edges according to the production sheet and model specifications;
- the operation is performed for open models opened in the back and/or back regions;
- the operation is done manually and involves applying the adhesive on the insole and strip surfaces and sticking;
- the work area is ventilated to remove the solvent vapours.

4. Applying the insole to the last

	• the insole must be perfectly laid on the last, its contour should overlay exactly to edge of the last; • fixing the insole on the plantar surface of the last (fig. 18); • this operation consists in temporarily fixing the insole on the plantar surface of the last with tacks. Operators are responsible for adjusting machine's working parameters, checking and maintaining the machine, receiving components and materials, verifying and regrouping the components according to the order.	
Workplace	Shop floor	The main production hall, separate space within the lasting department.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)
	Posture	Standing and seated.
	Specifics	• Working table for checking and grouping the components; • Shoe racks for storing the completed orders; • Hot press machine; • Pre-moulding machine; • Insole mounting machine.
Organisation	Employees at workplace per shift	3
	Employees in department	No
	Hierarchy	Foreman of the lasting department
	Cycle time	1
	Shifts	1
	Similar work stations	No
	Cooperation	Hierarchical superior.
	Specifics	Whatever the large variety of models is, the pre-lasting operations are the same.
Special requirements:		The adequate setting of equipment and machines according to materials and specifications from the technical sheets.

Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Stitching; • Lasting; • Sole attachment.
	Separate trainee workshops / theoretical knowledge?	• characteristics of materials for uppers and insole; • auxiliary materials (glue, solvent based or thermosetting adhesives) • footwear structure and components; • shoe lasts; • pre-assembling operations; • setting, operating and maintaining the machinery; • manufacturing processes; • quality control procedures and standards.
	Miscellaneous	No
Vocational training	Vocational year/duration	• Theoretical knowledge; • Work-based learning and practicing in the real working environment.
	Preconditions / previous stations	No
	What should they learn?	• inserting and moulding the stiffener and the toe puff, using adequate equipment • attaching the insole to the last • checking the uppers prepared according to the given production order and quality standards.
	Specifics of training (individualisation, duration, timing)	• Correctly applying the stiffener; • Correctly positioning the uppers into the pre-moulding machine; • Properly fixing the insoles to the lasts; • Identification and correction of defects.
	Experience with trainees & young skilled workers	Basic concepts are acquired, but practical grounding is required to substantiate them.

	Assistance / working tasks		• Pre-moulding the uppers; • Setting the machine parameters according to the characteristics of the materials.	
	Is the existing potential used?		No	
	Possibilities for improvement		• Theoretical knowledge of operators; • Training for to acquire practical skills; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

Fig. 14 Reception of components

Fig. 15 Preparing the components needed for lasting and sole attachment

Fig. 16 Applying toe puff using hot press

Fig. 17 Backpart pre-moulding

Fig. 18 Fixing the insole on the plantar surface of the last

2.1.7. **Lasting**

Description	**Learning station** **Date**	Lasting

		18.01.18
Location / site	**Vocational profile**	Shoemaker/worker Lasting machine operator
Allocation	**To curriculum**	
Process environment	Type of product/service	Semi-product (lasted uppers)
	Type of production/delivery of services: single/small series/ big series	Single, small and big series, prototypes and samples.
	Order/material acceptance	The orders are received in boxes, including the production sheet and semi-products (uppers and lasts with fixed insole on it).
	Direct user of product/service	Soling department
	Client of product/service	• For prototypes - design department; • For samples- sells department; • For production- external customers.
	Production steps already performed	Pre-lasting
	Interfaces with other process steps	No
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	Each operator is responsible for inspecting the received pieces according to the technical specification, organizing the work process, checking the equipment and the quality of semi-products.
Process steps (detailed description)	The lasting process includes a number of operations performed by different operators. There are 2 types of lasting in the company, manual and mechanical. **Manual lasting:** • conditioning the uppers (fig.19) by moistening the uppers, the lasting is done more easily and also the tensile stress of some materials during the lasting process is decreased; • positioning the uppers on the last and fixing the height of the back part(fig. 20); • front lasting (fig. 21); • side lasting (fig. 22); • heel seat lasting; • flattening (hammering) the creases on upper and margins. **Mechanical lasting includes the following steps:** **Toe lasting** (fig. 23)	

	• pulling the uppers is performed with lasting machines with pincers and plates; • the pulling strength should be adjusted according to the uppers deformability; • the gluing can be previously or simultaneously performed with the pulling process. **Defects:** the uppers are not symmetrically positioned on the last, cracking and tearing of the uppers, inadequate gluing of the lasting allowance on the insole. **Side lasting** • before side lasting operation the worker has to check if the uppers are centered on the back part; • the pulling of the uppers sideward is performed by using roller stretching machines which take the lasting allowance and press it over the insole and gluing it. **Defects:** folds in the quarter area, the stitching lines of the component parts (for example, the line between the quarter and the vamp) do not have a symmetrical position on the pair, the width of the allowance is not uniform, the allowance is not glued properly. **Heel seat lasting** • the upper's pulling at the heel seat is performed on the pulling machine with plates; • the allowance fixing is performed by gluing or with tacks, depending on the model. **Defects:** the shoe height at the heel seat is inappropriate, the stitching lines of the components (for example, the line between the quarter and the vamp) do not have a symmetrical position on the pair, the quarter/counter is not centred on the back-symmetry line, the width of the lasting allowance is not uniform or the allowance is not fixed properly. The operator is responsible for setting machines parameters, checking and maintaining the equipment.	
Workplace	Shop floor	The main production hall, lasting department.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)

	Posture	Standing and seated.
	Specifics	• Conveyor belt; • Specific equipment and machinery for lasting; • Shoe racks for storing the completed orders;
Organisation	Employees at workplace per shift	4
	Employees in department	No
	Hierarchy	Foreman of lasting department
	Cycle time	1
	Shifts	1
	Similar work stations	No
	Cooperation	Hierarchical superior.
	Specifics	A large variety of models.
Special requirements:		• correctly setting the equipment and machines; • avoiding possible defects.
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Pre-assembling; • Sole attachment.
	Separate trainee workshops / theoretical knowledge?	• Characteristics of materials for uppers and insoles and other rigid components; • Auxiliary materials (glue, solvent-based, solvent-free or thermosetting adhesives) • Footwear structure; • Shoe lasts; • Lasting technology; • Quality control procedures and standards.
	Miscellaneous	No
Vocational training	Vocational year / duration	• Theoretical knowledge; • Work-based learning and practicing in the real working environment.
	Preconditions / previous stations	Pre-assembling (pre-lasting)

	What should they learn?		• How to set lasting machine parameters according towith characteristics of materials (main and auxiliary); • How to operate the lasting equipment including setting and maintaining the machinery; • How to perform themanual lasting operations • How to identify and correct possible defects	
	Specifics of training (individualisation, duration, timing)		Practicing the manual lasting, forepart, side and back part lasting	
	Experience with trainees & young skilled workers		Basic concepts are acquired, but practical grounding is required to substantiate them.	
	Assistance/working tasks		• understand the technical specifications of the orders; • correctly position the upper on the last; • adjust the equipment according to the upper materials and the shape of the last; • to perform all the machine lasting operations; • to apply the quality control standards.	
	Is the existing potential used?		No	
	Possibilities for improvement		• Theoretical knowledge of operators; • Training for to acquire practical skills; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

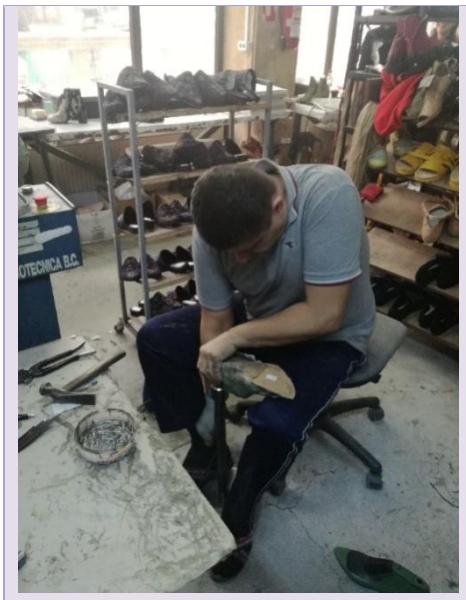


Fig. 19 Positioning the uppers on the last

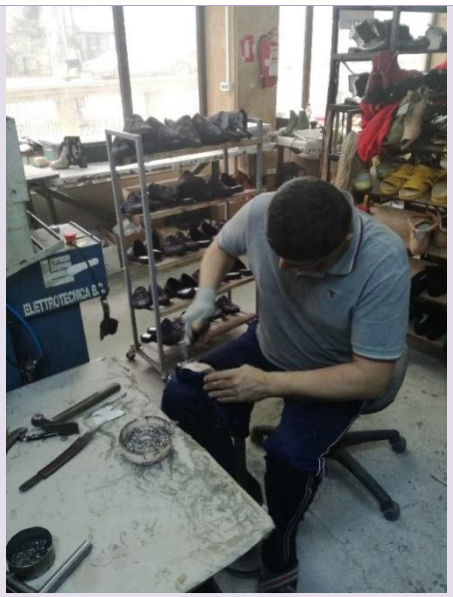


Fig. 20 Toe lasting

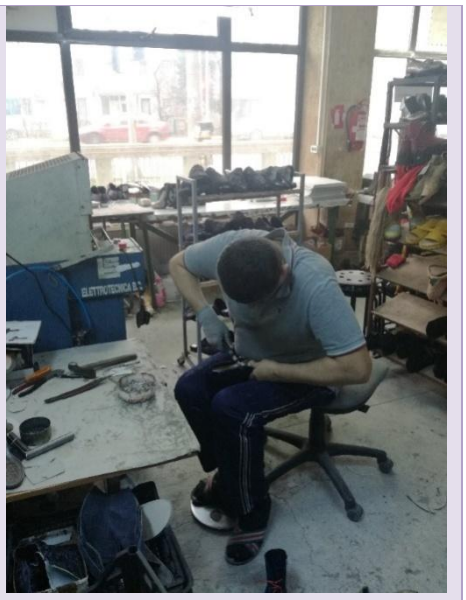


Fig. 21 Side lasting

Fig. 22 Mechanical toe lasting

Fig. 23 Mechanical side and heel seat lasting

2.1.8. Heat setting of uppers

Description	Learning station Date	Heat setting of uppers 19.01.18
Location / site	**Vocational profile**	Skilled worker (Shoemaker)
Allocation	**To curriculum**	
Process environment	Type of product/service	Semi-product (lasted uppers).
	Type of production / delivery of services: single/small series/ big series	Single, small and big series, prototypes and samples.
	Order- / material acceptance	The orders are received in boxes, including the production sheet and the semi-products (upper).
	Direct user of product/service	Sole attachment (soling)
	Client of product/service	• Product development department in case of prototypes; • Commercial department in case of samples. • Final clients in case of finished products.
	Production steps already performed	Lasting
	Interfaces with other process steps	No
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	Each operator is responsible for inspecting the received pieces according to the specification, organizing the work process, checking the equipment and the quality of products.
Process steps (detailed description)	Heat setting of uppers is performed by a single operator who, depending on each model, performs the following operations: **1. Knocking the uppers** • the aim of this operation is to eliminate the creases resulting after lasting process; • also, by knocking, the bottom edge of the uppers is outlined; • the operation is performed mechanically using the knocking machine with rollers. **Defects:** upper damage.	

	2. Ironing the uppers • is a finishing / correction operation which removes the creases from the uppers; • the operation is done manually with an iron or mechanical with hot air blower. **Defects:** burning the stitches and the uppers. **3. Heat setting** • the operation is performed in installations that allows to control the humidity, temperature and duration of the process; • stabilization helps to reduce the internal stresses of the semi-products and promotes a better visual aspect of the shoe. **Defects:** upper contraction, cracking or tearing.	
Workplace	Shop floor	The main production hall, lasting department.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)
	Posture	Standing.
	Specifics	• Conveyor belt; • Specific equipment and machinery (heat setter, knocking machine, iron); • Shoe racks for storing the completed orders;
Organisation	Employees at workplace per shift	1
	Employees in department	No
	Hierarchy	Foreman of lasting department
	Cycle time	1
	Shifts	1
	Similar work stations	No
	Cooperation	Hierarchical superior.
	Specifics	No
Special requirements:		No
Interfaces	… to other activity fields?	• Environment protection;

		• Quality assurance; • Occupational safety standards.
	… to other learning places?	• Pre-assembling • Lasting; • Sole attachment.
	Separate trainee workshops / theoretical knowledge?	• characteristics of materials for uppers; • setting, operating and maintaining the machinery; • heat setting processes; • quality control procedures and standards.
	Miscellaneous	No
Vocational training	Vocational year / duration	• Theoretical knowledge; • Work-based learning and practicing in the real working environment.
	Preconditions / previous stations	No
	What should they learn?	• to check the uppers prepared according to the given production technical sheets and quality requirements; • to apply iron the uppers in order to get a better final visual aspect of the shoe • to set the parameters of the heat setter according with characteristics of materials used for uppers (temperature, humidity, timing)
	Specifics of training (individualisation, duration, timing)	No
	Experience with trainees & young skilled workers	Basic concepts are acquired, but practical grounding is required to substantiate them.
Assistance / working tasks	Assistance / working tasks	• Settingthe parameters of machines; • Exercising of each operation; • Recognizing defects and removing

			them.	
Is the existing potential used?	Is the existing potential used?		No	
Possibilities for improvement	Possibilities for improvement		• Theoretical knowledge of operators; • Training for to acquire practical skills; • Independence and responsibility degree of the operator.	
Number of trainees per learning station	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

2.1.9. Sole and heel attaching

Description	**Learning station Date**	Sole and heel attaching 22.01.18
Location / site	**Vocational profile**	Shoemaker/worker Machine operator for footwear production-assembling room
Allocation	**To curriculum**	
Process environment	Type of product/service	Semi-product, final product.
	Type of production / delivery of services: single/small series/ big series	Single, small and big series, prototypes and samples.
	Order- / material acceptance	Semi-products are sent from one workstation to the next one by conveyors.
	Direct user of product/service	Finishing.
	Client of product/service	• For prototypes- design department; • For samples- sells department; • For production- external customers.
	Production steps already performed	Lasting and heat setting of uppers
	Interfaces with other	Insole preparation

<table>
<tr><td></td><td>process steps</td><td></td></tr>
<tr><td></td><td>Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.</td><td>Each operator is responsible for inspecting the received pieces according to the specification, organizing the work process, checking the equipment and the quality of products.</td></tr>
<tr><td>Process steps (detailed description)</td><td colspan="2">Sole attachment operations follow the lasting and fixing processes. The sequence of operations is influenced by the nature of the materials from which the uppers and soles are made and the nature and characteristics of the adhesives.
1. Preparing the surfaces for gluing
• bottom roughing on lasting allowance (fig. 24);
• drawing the outline of the sole on the shoe lateral sides;
• roughing the uppers up to outline of the soles previously drawn;
• dusting rough surfaces.

2. Cementing
• the adhesive is applied manually;
• the adhesive is applied over the: sole, heel, filling, allowance;
• a single layer of adhesive is applied to sole and heels;
• two layers of adhesive are applied to the uppers;
• depending on the nature of the adhesive, after applying each layer it is necessary to observe the specific evaporation time of the solvent;
• applying the filling;
• dressing the heels (fig. 25, 26).

3. Sole and heel attaching
• The dried films of cement (adhesive) on both upper and sole must be heat activated before sole attaching(fig. 27); the activation is made using a heat activator which allow the setting of temperature and time;
• Attaching the sole to the uppers;
• Pressing the sole is performed using pneumatic press with air cushion (fig. 28);
• Heel attaching - performed using special machine for heels fixing (fig. 29);
• Last slipping (removing the last from the footwear- manually)
The operator is responsible for setting machine’s parameters, checking and maintaining the equipment.</td></tr>
<tr><td>Workplace</td><td>Shop floor</td><td>The main production hall, lasting room.</td></tr>
</table>

	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)
	Posture	Standing.
	Specifics	• Working table; • Conveyor belt; • Specific equipment and machinery for sole attaching (activator, press machine for sole/heel); • Shoe racks for storing the completed orders; • Other specific devices and tools.
Organisation	Employees at workplace per shift	4
	Employees in department	No
	Hierarchy	Foreman of lasting department
	Cycle time	1
	Shifts	1
	Similar work stations	No
	Cooperation	Hierarchical superior.
	Specifics	Variety of models with different components. Ventilation of the working space
Special requirements:		Proper setting the parameters of the sole/heel press machine and activator.
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Lasting; • Finishing.
	Separate trainee workshops / theoretical knowledge?	• Characteristics of materials for uppers and soles; • Auxiliary materials (adhesives and chemicals for sole preparation- primers) • Footwear structure; • setting, operating and maintaining the machinery; • sole attaching process; • cementing technology and adhesives;

		• quality control procedures and standards.		
	Miscellaneous	No		
Vocational training	Vocational year / duration	• Theoretical knowledge; • Work-based learning and practicing in the real working environment.		
	Preconditions / previous stations	No		
	What should they learn?	• How to rough the upper and bottoms; • How to apply adhesives onto bottom and upper; • How to dry, reactivate the films of adhesive; • How to attach the sole and the heel • How to take out the last from the shoe • How to check the quality of final product.		
	Specifics of training (individualisation, duration, timing)			
	Experience with trainees & young skilled workers	Basic concepts are acquired, but practical grounding is required to substantiate them.		
Assistance / working tasks	Assistance / working tasks	• Setting the parameters of the sole/heel press machine, • Setting the parameters of activator		
Is the existing potential used?	Is the existing potential used?	No		
Possibilities for improvement	Possibilities for improvement	• Theoretical knowledge of operators; • Training to acquire practical skills; • Independence and responsibility degree of the operator.		
Number of trainees per learning station	Number of trainees per learning station	1		
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

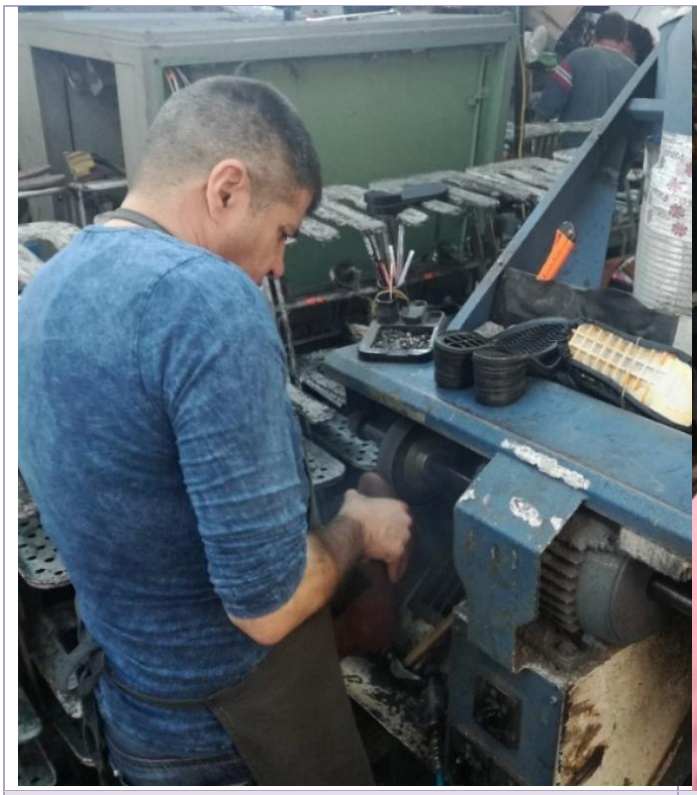


Fig. 24 Bottom roughing (lasting allowance and sole)

Fig. 25 Applying the adhesive on the sole and allowance

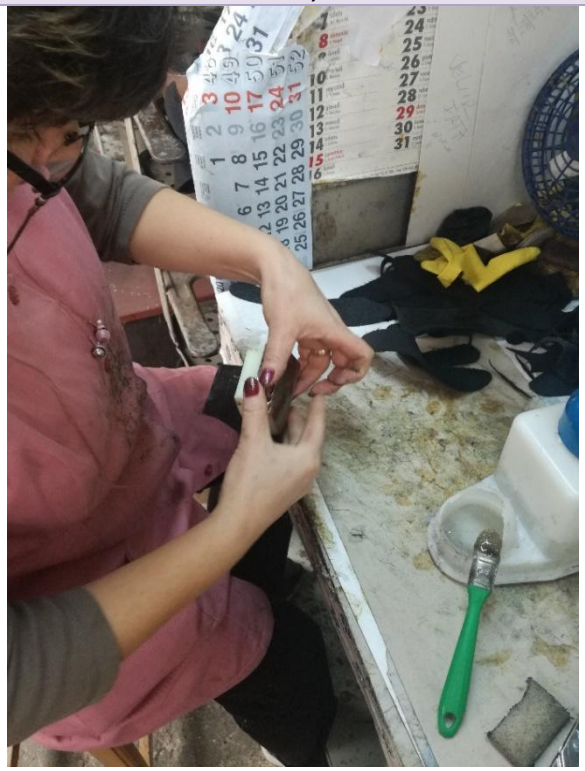
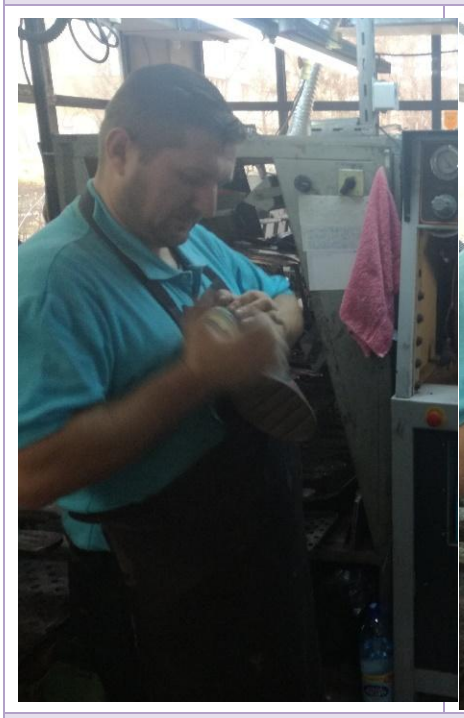


Fig. 26 Applying the leather on the heel

Fig. 27 Thermal activation of the adhesive film



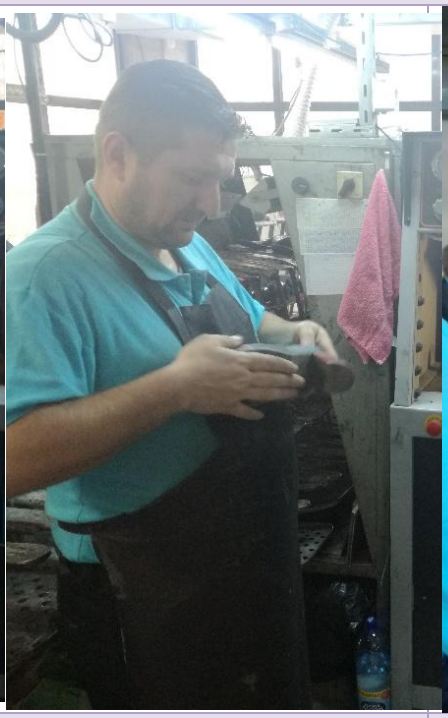


Fig. 28 Sole attachment and pressing

Fig. 29 Machine for heel attachment

2.1.10. Finishing

Description	Learning station Date	Finishing 23.01.18
Location / site	**Vocational profile**	Shoemaker/worker Machine operator for footwear production-assembling room
Allocation	**To curriculum**	
Process environment	Type of product/service	Finished shoe product
	Type of production / delivery of services: single/small series/ big series	Single, small, big series, samples and prototypes.
	Order- / material acceptance	Finished shoe products, after the lasting and sole attachment processes, are stored on the racks accompanied by the production technical sheet.
	Direct user of product/service	Final quality control, labelling and packaging of products.
	Client of product/service	• Technical modelling department in case of prototypes. • Commercial department in case of samples • Final clients in case of finished products.
	Production steps already performed	Lasting, sole and heel attachment
	Interfaces with other process steps	No
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	Each operator is responsible for checking the compliance of the received products, for checking and organizing the working tools and for the quality of the operations performed. Any problems should be reported to the superiors.
Process steps (detailed description)	The finishing process includes the following operations: • heel paring/ sole edge paring (fig. 29); • heel roughing /scouring/ smoothing; • inking/dying (fig. 30); • removing the grain surface of sole; • bottom polishing; • cold/hot wax burnishing; • cleaning; • slipping the last used for finishing operations. Operators are responsible for the quality of the operations.	
Workplace	Shop floor	The main production hall, lasting department.

	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)
	Posture	Sitting or/and standing.
	Specifics	• working table; • Shoe racks for storing the completed orders
Organisation	Employees at workplace per shift	3
	Employees at range	Nu
	Hierarchy	Foreman of lasting department.
	Cycle time	1
	Shifts	1
	Similar work stations	Nu
	Cooperation	Hierarchical superior.
	Specifics	Large variety of models (design, materials, texture) and finishing materials/chemicals
Special requirements:		• Good visual perception and attention to details.
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Stitching; • Lasting; • Sole attaching.
	Separate trainee workshops / theoretical knowledge?	• Characteristics of materials for upper and bottom • Good knowledge about footwear manufacturing • Finishing chemicals • Footwear finishing techniques • Quality control procedures and standards
	Miscellaneous	Nu
Vocational training	Vocational year / duration	• Theoretical knowledge; • Work-based learning and practicing in the real working environment.
	Preconditions / previous stations	Nu
	What should they learn?	• to perform all finishing operations; • to operate the specific machines for footwear finishing • to identify and to properly use the finishing materials (auxiliary and chemicals) according to technical specification sheets. • to follow quality standards and technical specifications.
	Specifics of training	

	(individualisation, duration, timing)			
	Experience with trainees & young skilled workers		Basic concepts are acquired, but practical grounding is required to substantiate them.	
	Assistance / working tasks		• To clean, to polish, to wax, to brush, to iron uppers and lining, to paint and treat surfaces, to ink the edges, to insert insole covers.	
	Is the existing potential used?		Nu	
	Possibilities for improvement		• Theoretical knowledge of operators; • Training for to acquire practical skills; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

Fig.29 Heel paring/ sole edge paring

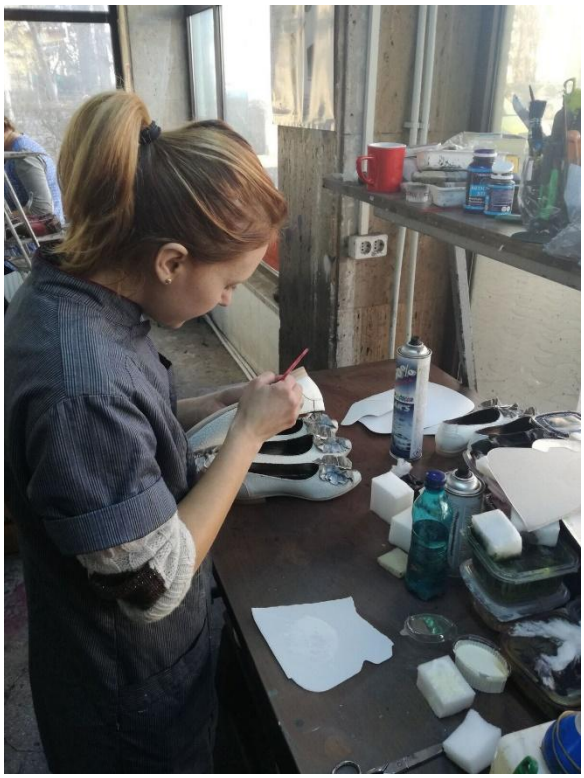


Fig.30 Inking/dying

2.1.11. Quality Control, Labelling and Packaging

Description	Learning station Date	Quality Control, Labelling and Packaging 24.01.18
Location / site	**Vocational profile**	Shoemaker/worker Quality controller
Allocation	**To curriculum**	
Process environment	Type of product/service	Finished shoe product
	Type of production / delivery of services: single/small series/ big series	Single, small, big series, samples and prototypes.
	Order- / material acceptance	Products are received from the finishing room.
	Direct user of product/service	• Commercial department in case of samples; • Final clients in case of finished products.
	Client of product/service	• Commercial department in case of samples; • Final Clients in case of finished products.
	Production steps already performed	Finishing
	Interfaces with other process steps	No
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	At this stage, final product verification, labelling and packaging are carried out. No errors are allowed.
Process steps (detailed description)	**Final quality control** • products are examined individually and by pairs; • the appearance, colour and finish of the uppers, symmetry, dimensions and positioning of the joint lines are checked against the samples; • products are compared to samples; • the compliance with the technical sheet is verified. **Labelling and packaging of products**	

	• wrapping the products in paper sheets; • packaging of products in individual boxes (fig. 31); • marking the boxes by labelling, indicating the model, colour and size; • packaging the shoe boxes in collective boxes according to the order form and the requirements of the beneficiaries; • tagging the collective boxes: customer, model, and number of pairs in the box.	
Workplace	Shop floor	The main production hall, lasting department.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)
	Posture	Standing.
	Specifics	• working table; • shoe racks for storing the completed orders.
Organisation	Employees at workplace per shift	2
	Employees at range	Nu
	Hierarchy	Foreman of lasting room
	Cycle time	1
	Shifts	1
	Similar work stations	Nu
	Cooperation	Hierarchical superior
	Specifics	Final quality control of the products, no errors are allowed.
Special requirements:		•
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Stitching; • Lasting; • Sole attaching.
	Separate trainee workshops / theoretical knowledge?	• Characteristics of materials for uppers; • General knowledge about footwear manufacturing; • Quality control procedures and

			standards.	
	Miscellaneous		Nu	
Vocational training	Vocational year / duration		• Theoretical knowledge; • Work-based learning and practicing in the real working environment.	
	Preconditions / previous stations		Nu	
	What should they learn?		• How to control the quality of the finished products against technical sheets and samples; • Quality procedures and standards • Labelling and packaging techniques;	
	Specifics of training (individualisation, duration, timing)			
	Experience with trainees & young skilled workers		Basic concepts are acquired, but practical grounding is required to substantiate them.	
	Assistance / working tasks		• to follow the quality control procedure, • to comply with the quality standards, technical sheets and sample; • to label and package the finished products.	
	Is the existing potential used?		Nu	
	Possibilities for improvement		• Theoretical knowledge of operators; • Training for to acquire practical skills; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

Fig. 31Packing and making the orders

2.2. Business orientated spheres

2.2.1. Product design and development

Description	Learning station Date	Product design and development 25.01.18
Location / site	**Vocational profile**	Footwear Designer
Allocation	**To curriculum**	
Process environment	Type of product/service	Sketches, prototypes.
	Type of production / delivery of services: single/small series/ big series	Prototypes, samples.
	Order- / material acceptance	Own branded collections, Collections ordered by clients. Materials from the company warehouse are used.
	Direct user of product/service	Modelling and pattern making department.

	Client of product/service	• Modelling and pattern making department in case of prototypes; • Commercial department in case of samples.
	Production steps already performed	No
	Interfaces with other process steps	Technical modelling; Product manufacturing.
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	Product design process is more artistic and creative; the employees express themselves in a freeway and organize their work accordingly.
Process steps (detailed description)	• Footwear design starts by researching market needs, analysing trends and attending dedicated fairs. Based on findings and observations from the research activities, the company owner sets the bases for the next collection and the designers develop their ideas based on the indication they receive (fig. 32); • Designers are responsible for manufacturing the prototypes; depending on the complexity of the models they are advised by the colleagues from technical modelling and manufacturing departments.	
Workplace	Shop floor	Dedicated office in close proximity with the stitching department.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area).
	Posture	Free choice.
	Specifics	• Working deck; • Shelves and cabinets for storing designs, materials and prototypes.
Organisation	Employees at workplace per shift	2
	Employees at range	No
	Hierarchy	Company owner
	Cycle time	1
	Shifts	1
	Similar work stations	No

	Cooperation	Company owner, patternmaker, production engineer, workers (for manufacturing prototypes.
	Specifics	No
Special requirements:		• Design and arts competences.
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Patternmaking; • Cutting; • Stitching; • Lasting; • Finishing.
	Separate trainee workshops / theoretical knowledge?	• materials characteristics; • foot anatomy and biomechanics; • footwear structure and functions; • manufacturing processes; • footwear pattern making; • footwear design and product development.
	Miscellaneous	No
Vocational training	Vocational year / duration	• Theoretical knowledge; • Work-based learning and practicing in the real working environment.
	Preconditions / previous stations	No
	What should they learn?	• to analyse market and fashion trends; • to select materials and components based on design requirements; • to draw shoe sketches; to produce footwear concepts, to design and develop collection lines • to assist the operators in making the prototypes.
	Specifics of training (individualisation, duration,	

	timing)			
	Experience with trainees & young skilled workers		Basic concepts are acquired, but practical grounding is required to substantiate them.	
	Assistance / working tasks		• developing concepts and collection lines according with the business strategy of the company • to produce, analyse and to evaluate the prototypes	
	Is the existing potential used?		No	
	Possibilities for improvement		• Theoretical knowledge; • Training for to acquire practical skills; • Independence and responsibility degree.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

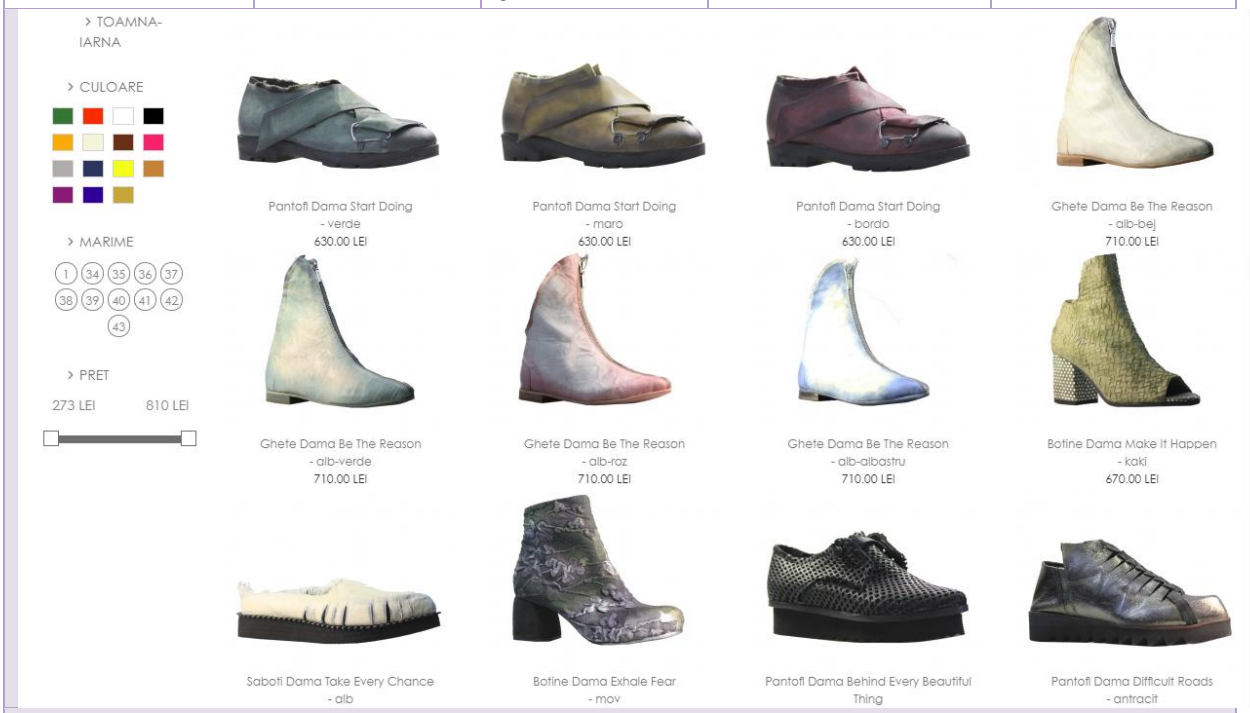


Fig. 32Collection line of the brand Papucei (www.papucei.ro)

2.2.2. Modelling and pattern making

Description	Learning station Date	Modelling and pattern making 26.01.18
Location / site	**Vocational profile**	Footwear pattern maker
Allocation	**To curriculum**	
Process environment	Type of product/service	Patterns, prototypes, samples.
	Type of production / delivery of services: single/small series/ big series	Prototypes, samples.
	Order- / material acceptance	Footwear pattern making is based on the sketches and prototypes, together with the associated material samples, submitted by the design department.
	Direct user of product/service	Cutting department.
	Client of product/service	• Commercial department in case of samples; • Clients in case of final products.
	Production steps already performed	Design
	Interfaces with other process steps	Design; Product manufacturing.
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	• pattern making for the shoe models received from the design department, taking in consideration the technological and functional requirements specific to the footwear products; • nesting and patterns grading; • modifying the existing models according to the observations received by the manufacturer.
Process steps (detailed description)	The pattern making process involves the following steps (fig. 33): • receiving the sketches and prototypes developed by the design department, together with associated technical specs, shoe lasts and materials samples; • preparation and maintenance of the working tools (cutters, digitiser, computer and dedicated software);	

	• comply with the design requirements; • establishing manufacturing details (types of stitches, allowances, edge treatments) if they have not been previously specified or if changes are necessary; • producing the technical drawings (mean form, design standard and master pattern); • grading and obtaining the size series; • producing cutting patterns; • manufacturing samples and making changes to the designs as needed; • manufacturing the sample series; The patternmaker is responsible for placing and tracking the samples during the manufacturing process.	
Workplace	Hală	The main production hall, dedicated office in close proximity with the stitching department.
	Iluminare / mediu	Natural light (outside windows) and artificial light (light bulbs directed towards the working area)
	Postură	Seated.
	Specificul	• Working deck; • Shelves and cabinets for storing designs, materials and prototypes.
Organisation	Angajați stabili	2
	Angajați la distanță	No
	Ierarhie	Company owner, technical modelling engineer.
	Ciclu	1
	Schimburi	1
	Locuri similare de producție	No
	Cooperare	Hierarchical superior.
	Specificul	No
Special requirements:		• Complying with the functional requirements of the footwear; • Rational material consumption
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance;

		• Occupational safety standards.
	… to other learning places?	• Design; • Cutting; • Stitching; • Lasting; • Sole attachment; • Finishing.
	Separate trainee workshops / theoretical knowledge?	• materials characteristics; • foot anatomy and biomechanics; • footwear structure, comfort characteristics; • manufacturing processes; • footwear patternmaking;
	Miscellaneous	No
Vocational training	Vocational year / duration	• Theoretical knowledge; • Work-based learning and practicing in the real working environment.
	Preconditions / previous stations	No
	What should they learn?	• obtaining the mean form • making the master pattern • making final patterns • grading patterns and nesting
	Specifics of training (individualisation, duration, timing)	
	Experience with trainees & young skilled workers	Basic concepts are acquired, but practical grounding is required to substantiate them.
	Assistance / working tasks	• How to produce the mean forme for various lasts and styles; • How to produce the master pattern; • How to modify the patterns and to produce the cutting patterns • How to produce the entire series by grading the patterns • How to optimize the design by nesting and estimate the material consumption

	Is the existing potential used?		No	
	Possibilities for improvement		• Theoretical knowledge of operators; • Training for to acquire practical skills; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

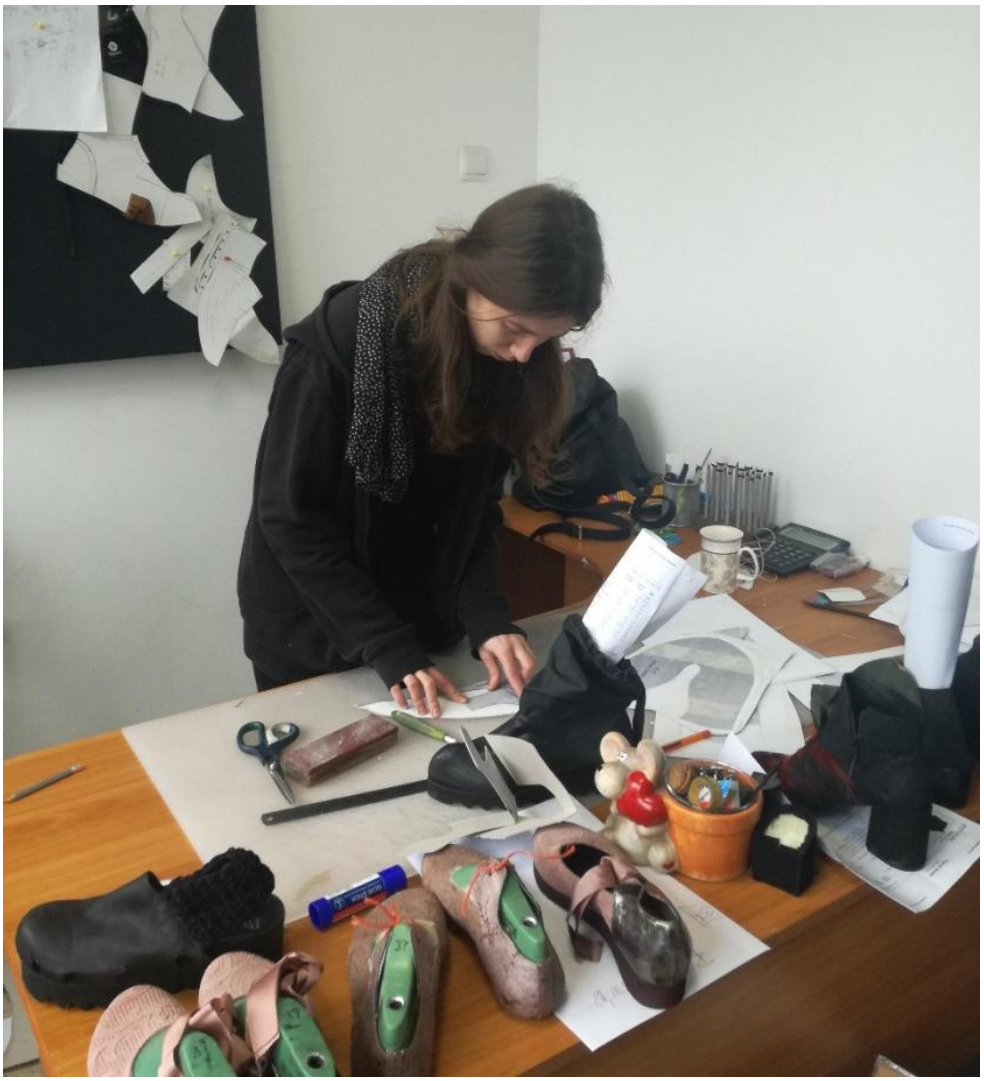


Fig. 33Pattern making department

2.2.3. Production planning

Description	Learning station Date	Production planning 29.01.18
Location / site	**Vocational profile**	Production planer
Allocation	**To curriculum**	
Process environment	Type of product/service	Production planning.
	Type of production / delivery of services: single/small series/ big series	Single, small, big series, samples and prototypes.
	Order- / material acceptance	Orders are received from sales agents or are contracted at dedicated fairs. Materials are purchased based on ordered models.
	Direct user of product/service	Production department.
	Client of product/service	• Final clients in case of final products.
	Production steps already performed	Prototypes, samples zero series.
	Interfaces with other process steps	Design and Modelling & Pattern making department Manufacturing departments
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	The production planning process requires a lot of attention with regard to technological data sheets and the purchase of the materials.
Process steps (detailed description)	Production planning is a complex process whose progress depends on orders and contracted a variety and complexity of the models. **Registering the orders in the database:** • client name; • contracted models; • number and size of the models; • delivery date. **Filing the technical sheet of the shoe models:** • is done using a specialized management program (ERP); • the data sheet includes the sketch of the model, the description, the type of basic and auxiliary materials needed and the specific	

	material consumption; • the software calculates automatically the required quantities of materials for each order; **Materials acquisition:** The materials are purchased both from internal suppliers (soles, linings and insoles) and from external ones (leather and textile). Production planning is based on customer location (orders that have the same country as destination), the ordered models, complexity of the models and ordered quantities. Depending on these conditions, the delivery deadline is set.	
Workplace	Shop floor	Administrative area, dedicated office.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area).
	Posture	Seated.
	Specifics	• Working deck; • Shelves and cabinets for storing designs, materials and prototypes. • Computer.
Organisation	Employees at workplace per shift	1
	Employees at range	No
	Hierarchy	Company owner.
	Cycle time	1
	Shifts	1
	Similar work stations	Nu
	Cooperation	Hierarchical superior.
	Specifics	No
Special requirements:		• Digital competences; • Knowledge about footwear components; • Linguistic competences (at least English).
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance;

		• Occupational safety standards.
	… to other learning places?	• Warehouse • Design, modelling and pattern making department • Manufacturing departments: Cutting; Closing; Assembling; Finishing.
	Separate trainee workshops / theoretical knowledge?	• Digital competences; • Knowledge about footwear materials and components; • Knowledge about manufacturing process • English language
	Miscellaneous	No
Vocational training	Vocational year / duration	• Theoretical knowledge; • Work-based learning and practicing in the real working environment.
	Preconditions / previous stations	No
	What should they learn?	• How to identify materials and components, including their characteristics; • Footwear structure; • Footwear manufacturing • How to elaborate the technical sheets (design specification sheet); • How to organise the orders and production flow.
	Specifics of training (individualisation, duration, timing)	
	Experience with trainees & young skilled workers	Basic concepts are acquired, but practical grounding is required to substantiate them.
	Assistance / working tasks	• To make orders for acquisition of materials; • To elaborate the technical sheet (design specification sheets);

			• To organize the orders and production flow	
	Is the existing potential used?		No	
	Possibilities for improvement		• Theoretical knowledge; • Training to acquire practical skills; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

2.2.4. Quality assurance

Description	Learning station Date	Quality assurance 30.01.18
Location / site	**Vocational profile**	Footwear quality controller - technician
Allocation	**To curriculum**	
Process environment	Type of product/service	Materials, components and final product
	Type of production / delivery of services: single/small series/ big series	Single, small, big series, prototypes, samples.
	Order- / material acceptance	Orders are received as samples, prototypes and production sheets containing the technical specifications of the models.
	Direct user of product/service	Production - Manufacturing rooms
	Client of product/service	• Final clients in case of final products.
	Production steps already performed	Sampling and prototyping, Production manufacturing: cutting, closing, assembling, finishing.
	Interfaces with other process steps	• Production planning • Design, modelling and Pattern Making • Organizing the manufacturing processes

	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	The quality check is done with a periodicity established by a number of national and international standards
Process steps (detailed description)	Both the quality control officer and each operator must ensure that every office, workshop, section, workstation and each product meets the quality standards requirements. Quality assurance is done by carrying out periodic inspections and tests of the employees, checking regularly the machinery by the maintenance operator and by checking the finished products manufactured by the company. Relating to quality control of products, each operator is trained how to comply with the quality requirements during operations.	
Workplace	Shop floor	Administrative area, dedicated office.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area).
	Posture	Seated.
	Specifics	• Working deck; • Computer.
Organisation	Employees at workplace per shift	1
	Employees at range	4
	Hierarchy	Company owner.
	Cycle time	1
	Shifts	1
	Similar work stations	No
	Cooperation	Hierarchical superior.
	Specifics	No
Special requirements:		
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Cutting • Closing (Pre-stitching and Stitching) • Assembling (Pre-lasting, Lasting; Sole attachment) • Finishing • Packing

	Separate trainee workshops / theoretical knowledge?		• Knowledge about footwear components; • Linguistic competences (at least English); • Footwear manufacturing processes; • Quality standards; • Technical standards; • Health and safety regulations.	
	Miscellaneous		No	
Vocational training	Vocational year / duration		• Theoretical knowledge; • Work-based learning and practicing in the real working environment.	
	Preconditions / previous stations		No	
	What should they learn?		• To analyse the materials, components or model/product specifications and quality criteria, • How to perform the quantitative control of the leather in the warehouse. • How to interpret the reclaims and defected products • To define and to apply the corrective measures	
	Specifics of training (individualisation, duration, timing)		Quality standards and regulations for footwear (national, European/international).	
	Experience with trainees & young skilled workers		Basic concepts are acquired, but practical grounding is required to substantiate them.	
	Assistance / working tasks		Theoretical and practical training	
	Is the existing potential used?		No	
	Possibilities for improvement		• Theoretical knowledge; • Training to acquire practical skills; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….

2.2.5. Organizing the manufacturing processes

Description	Learning station Date	Organizing the manufacturing processes 31.01.18
Location / site	**Vocational profile**	Production manager/ assistant
Allocation	**To curriculum**	
Process environment	Type of product/service	Materials, components and final product
	Type of production / delivery of services: single/small series/ big series	Single, small, big series, prototypes, samples.
	Order- / material acceptance	Orders are received as production sheets containing the technical specifications of the models.
	Direct user of product/service	Manufacturing rooms: cutting, closing, assembling, finishing.
	Client of product/service	• Product development department in case of prototypes; • Commercial department in case of samples; • Final clients in case of finished products.
	Production steps already performed	Production planning.
	Interfaces with other process steps	All departments
	Specifics of work process related to the duration of execution, work process organisation, quality assurance etc.	The manufacturing process is organized based on existing orders, customers, models, and deadlines.
Process steps (detailed description)	Manufacturing of footwear products involves the carrying out of complex processes that are organized according to the registered orders and the complexity of the models. Orders are grouped and launched based on the following criteria: • similarity of the models (from a constructive point of view, used materials and technological process); • quantity of products; • orders' deadline;	

	• stock of materials. The manufacturing process includes footwear-specific workshops, divided as follows: • Cutting; • Closing (Pre-stitching; Stitching) • Assembling (Pre-lasting; Lasting; Sole and heel attachment) • Finishing; • Quality control and packaging. If possible, workstations are organized so that an operator with no experience is closed to senior operator in the field, which makes him/her easier to adapt to the models variety and complexity.	
Workplace	Shop floor	Administrative area, dedicated office.
	Lighting conditions / environment	Natural light (outside windows) and artificial light (light bulbs directed towards the working area).
	Posture	Seated.
	Specifics	• Working deck; • Computer.
Organisation	Employees at workplace per shift	2
	Employees at range	No
	Hierarchy	Company owner.
	Cycle time	1
	Shifts	1
	Similar work stations	No
	Cooperation	Hierarchical superior.
	Specifics	No
Special requirements:		
Interfaces	… to other activity fields?	• Environment protection; • Quality assurance; • Occupational safety standards.
	… to other learning places?	• Cutting; • Closing (Pre-stitching and Stitching); • Assembling (Pre-lasting, Lasting;

		Sole attachment; • Finishing • Quality control and Packing
	Separate trainee workshops / theoretical knowledge?	• Footwear structuring, materials and components; • Footwear manufacturing;
	Miscellaneous	No
Vocational training	Vocational year / duration	• Theoretical knowledge; • Work-based learning and practicing in the real working environment.
	Preconditions / previous stations	No
	What should they learn?	• To read and to interpret design specification sheets; To understand how materials and components are selected according with the footwear structure and its design/model specifications; • How to establish the technological parameters for each manufacturing operation, from cutting to finishing and packing. • How to organize the working places • To define working methods and times of production for each model, in order to improve productivity and reducing production costs. • To assist the workers and operators.
	Specifics of training (individualisation, duration, timing)	Competence about work safety rules according with national regulation and legislation.
	Experience with trainees & young skilled workers	Basic concepts are acquired, but practical grounding is required to substantiate them.
	Assistance / working tasks	Theoretical and practical training.

			• To follow how the prototypes are made and to propose changes/modifications according to the manufacturing requirements • To establish the technological parameters for each operation and to elaborate the technological sheet foe each manufacturing room; • To organize the orders and production flow	
	Is the existing potential used?		No	
	Possibilities for improvement		• Theoretical knowledge; • Training to acquire practical skills; • Independence and responsibility degree of the operator.	
	Number of trainees per learning station		1	
Highest level of autonomy reachable	Support 0-6	With instruction and guidance 6-12	Under surveillance 12-24	Independently 24-….