

How to Implement Sustainable Manufacturing in Footwear - new
occupational profile and training opportunities
Project 539823-LLP-1-2013-1-PT-LEONARDO-LMP

“Training units on Sustainable Manufacturing in Footwear”

Deliverable number 13
Coordinated by INESCOPE

INDEX:

1. Standardization and certification systems.....	2
2. Sustainable materials and components for footwear.....	4
3. Eco-design and product engineering.....	5
4. Sustainable manufacturing technologies and processes.....	6
5. Environmental regulations and standards.....	7
6. Health and Safety at Work (HSW) in footwear industry.....	8
7. REACH and consumer safety product – legislation for footwear industry.....	9
8. Contractual, social and trade legislation.....	11
9. Sustainable packaging for footwear.....	12
10. Supply chain and logistics management in footwear companies.....	13
11. Green marketing.....	14
12. Corporate social responsibility practices.....	15

1. Standardization and Certification Systems

The unit 1 (Standardization and Certification Systems) has two main objectives:

1. Establish a knowledge base on standardization and certification systems, highlighting its importance and beneficial character for companies, consumers and countries.
2. Establish the basic knowledge to implement an environmental management system based on the UNE-EN ISO 14001.

Taking into account these two objectives we will divide the unit into two different subunits:

Subunit 1

This subunit is going to define a number of basic concepts that allow us to know what is normalization, what is a standard, what are the enforcement agencies create and certify standards (national and international) and how they built them (the steps to be followed to establish a norm), as well as a list of principal standardization organizations, European and international.

Also it defines what are the conformity assessment and the legal framework applicable to it. It will introduce the concept of "Directive" and "New Approach Directives" (these last fundamental for CE marking, mandatory for any product that you want to enter the European market or want to move freely around it), and the harmonized standard, which are specifications of voluntary compliance, but which allow to obtain quality products, ensuring that these products can enter into the market more easily.

Another aspect to analyze are the similarities and differences between the standards and patents, highlighting the pros and cons of each, and the measures taken in the EU to make patented technology more accessible to the companies.

Finally, it discussed various management systems. Management system will be defined for the product quality (ISO 9001), environmental (ISO 14001) for safety and health (OHSAS 18000) and on the working conditions (SA 8000).



Figure 1. Management systems

Subunit 2

This subunit will establish the steps that should follow a shoe company to implement an environmental management system, based on the norm UNE-EN ISO 14001. To do this we will see each and every one of the aspects that required by this standard and which are summarized as follows:

1. Environmental policy: constituent documents of the intentions and general guidelines of the organization about its environmental performance, all with the approval of the senior management of the company. This chapter shows how environmental policy is, who has the responsibility to do it and how it should be done.
2. Identification of environmental issues: consists of determining what are the harmful effects causing a footwear company activity on the environment. The concepts of aspect and environmental impact will be defined, and this information will be complemented with the main

environmental problems affecting the footwear industry (waste, emissions, discharges of water, consumption, hazardous substances and noise).

3. Evaluation of environmental issues: having identified the main environmental problems of our company will proceed to show how these should be assessed in order to determine whether its effects are significant or not. This introduces terms such as nature, magnitude and frequency, and for a better understanding, it will be displayed through examples how to make such an assessment.
4. Identification of legal requirements and environmental legislation affecting the footwear industry: at this point the legislation that applies to shoe companies be appointed for each of the environmental problems it may cause (discharges, waste, emissions...) and the main legal requirements that flow from this legislation.

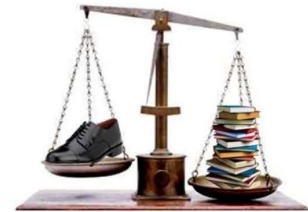


Figure 2. Environmental legislation in footwear industry

5. Objectives, targets and environmental program: from the identification of environmental problems, their assessment and the legal requirements required by environmental legislation, will be shown as establish environmental objectives (general environmental goals that a company sets itself for successfully improving a specific environmental aspect over a specific period of time) and environmental targets (detailed action requirements, quantified where possible, applicable to the organisation or to part of it, based on the environmental objectives) for elaborating an environmental program (realization of the logistics necessary to achieve these objectives and goals). All this will be exemplified to facilitate the understanding of the student.
6. Structure and responsibilities of environmental management: In this chapter we are taught to determine who should be the personnel responsible for environmental management, organization and what should be its functions. Training that each person should receive as environmental responsibility and propose, by example, how to develop an appropriate plan for environmental training is also specified. Finally, we show what is a environmental communication, to whom it is addressed and how should be done, and distinguishing between internal and external communication.
7. Documentation and records in environmental management, operational control, monitoring and measurement. Audit and management review: At this point nothing is meaningless if it is not documented, so in this chapter we are taught to make and maintain adequate environmental documentation, distinguishing between environmental document (material witnesses to a fact or act performed and it can be modified if circumstances change) and record (testimony material containing information which reflects a situation at a given time and therefore can not and should not be modified). It will also show how to make a planning of all transactions that may influence the environment, to ensure they are carried out under specific conditions, avoiding potential environmental impacts (operational control), and how to control and proper monitoring of these operations (check that they comply with what was planned in the corresponding operational control procedures, using measurements and or checks). To end, this chapter instruct us on what is an audit, who has the responsibility to perform and how to plan and execute (both internal and external audits). Finally, we show the management review (requirements to be it performed objectives and importance of it...).
8. EMAS: this thematic unit will be end defining what an EMAS (voluntary tool designed by the European Commission for registration and public recognition of those companies and organizations that have implemented an environmental management system that allows them to evaluate, manage and improve their environmental impacts , ensuring excellent performance in this area) and as a company can adhere to it.

2. Sustainable Materials and Components for Footwear

Footwear products combine a great variety of materials and components that are selected by considering the design, application and performance required. The most common type of materials and components (MaC) actually used include:

- Leather, canvas, polyurethane, PVC, some textiles and synthetic materials in the upper part.
- Leather, vulcanized rubber, thermoplastic rubber (TPR), polyurethanes (PU), thermoplastic polyurethanes (TPU) or Ethylene vinyl acetate) in lower part.
- Shanks, nails laces, eyelets threads, velcro/catches, foams, heels, toe cap as grindery.

Additionally, new solutions are being developed to enhance the products properties and functionalities.



Figure 3. Scheme of shoe parts

To develop, produce and commercialize more ecological and sustainable products, the companies need to have for each of type of MaC, knowledge and competences regarding the following topics that are tackled in the present training unit:

- Type & origin of MaC – renewable materials, natural, recyclable or biodegradable;
- MaC manufacturing – environmental impact of the process;
- New MaC;
- Quality control requirements and durability of the MaC.

This unit will therefore focus on footwear MaC that are available and in development and that may be used in footwear production, as well as their potential environmental impact.

Complementarily, to be used as an holistic tool to support footwear technicians in the selection of most suitable MaC to develop more ecological and sustainable footwear products, the unit introduces the students to Eco labelling and eco certification, Life cycle analysis and Carbon footprint concepts.

3. Eco-design and product engineering

Behind the realization of a sustainable product, there is certainly its design. Most of the environmental impacts of a product are determined at the design stage.

This training unit analyses how to apply various eco-design concepts, tools and techniques for designing environment friendly footwear with a view to optimizing material consumption and manufacturing processes.

The paragraph dedicated to “Sustainable materials” will introduce the materials used in the footwear sector, offering some “food for thought” to anticipate and reduce environmental impacts, by analyzing their characteristics and functions, pros-and-cons of their use, and examining some existing case histories.

“Design for manufacturing” will show you how to achieve better material consumptions and reduce lead-times, while keeping the investments on physical samples under control with a mix of merchandising practices and with the use of 3D computer-aided design tools.

“Design for Recycling” will cover topics such as: collection of the products at the end of their cycle of life, separability of the components depending on their type of construction, the recyclability/ biodegradability of the single components.

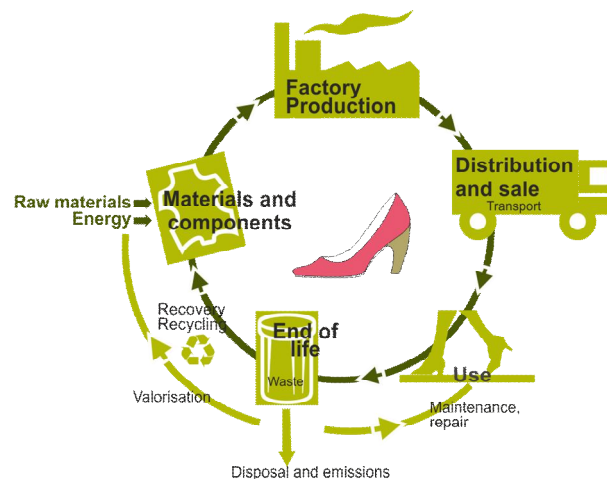


Figure 4. Footwear life cycle assessment

The last paragraph analyzes the strategies that some brands adopted to communicate their being sustainable, providing you with some sources of inspiration to be an “eco-designer”.

4. Sustainable manufacturing technologies and processes

STEP TO SUSTAINABILITY started out with a survey to identify the training needs of footwear companies in terms of sustainable manufacturing. The survey analysis resulted in a list of issues causing problems in terms of sustainability (such as poor technical design, poor process organization, skill gaps in terms of resource-efficient best practices, inadequate machine settings and poorly organized work places leading to rework and reject, inadequate utilization of materials and machines, or insufficient management skills to lead teams to better results).

Training Course Aimed at Production Technicians

The contents of Unit 4 are based on the survey results. Unit 4 focuses on best practices providing footwear technicians with skills and knowledge to make footwear manufacturing more sustainable.

Unit 4 is all about striving for optimum quality while eliminating waste, reworks and rejects; it is about the importance of correct settings and maintenance of machines, tools and equipment; about finishing orders in time to avoid air shipping; about organizing processes, operations and work places in a way to enable efficient handling and a smooth work flow, and about being inventive when there is no off-the-peg solution.

Certainly this training course cannot cover all areas and all possible production environments; therefore the intention is to impart the right approach.

Contents of the Chapters

After a short introduction to “Sustainability in the Footwear Industry” in chapter 1, chapter 2 explains what the important points in the pre-production phase are. Chapters 3 to 8 focus on the production departments from Cutting to Finish, giving explicit recommendations for technicians and workers.



Figure 5. Eco-friendly soling solutions

Chapters 9 and 10 explain how production organization and production planning can foster the sustainable approach. Chapter 11 illustrates methods which facilitate to achieve and maintain a sustainable production, whereas chapter 12 incites the course participants to learn more about appropriate management tools to leverage team performance in terms of sustainability.

5. Environment

“Environment” in the modern context of sustainable development encompasses the physical and social factors of the surroundings of human beings and includes land, water, atmosphere, climate, sound, odour, taste, energy, waste management, coastal and marine pollution, the biological factors of animals and plants, as well as cultural values, historical sites, and monuments and aesthetics.

The sequential operations the materials, components and footwear products are subjected to, give added value to numerous resources but result also in volatile organic compounds (VOC), liquid effluents and solid wastes, among other minor emissions. In this module these aspects will be introduced in the context of the applicable European legal framework, complemented with management options and best practices.

The module is structured in the following chapters:

- General structure of the environment legislation – describes the evolution of the European environmental legislation, introduces the major European policies by policy area, and explains and promotes the use of legislative databases and search engines as critical tools to be up to date;
- Emissions to the atmosphere – includes volatile organic compounds and waste gases emissions evaluation and management;
- Water consumption - indicates the main sources of consumption, management options and good practices;
- Liquid effluents – identifies the main liquid effluents generated, management options and good practices;
- Wastes – presents the main wastes generated in a typical footwear company, wastes management principles, footwear companies waste management and implementation of management options;
- Environmental noise – introduces the usual main sources of noise emissions associated to footwear production, monitoring requirements and limits values and options for noise prevention and minimization;
- Energy efficiency – presents measures to promote energy efficient use in footwear industry;
- Greenhouse gases emissions and Environment labels and declarations – describes the principles associated to carbon footprint estimation;



Figure 6. Environmental Product Declaration

- Environmental Responsibility – introduces the concept and associated legal framework.

6. Health and Safety at Work (HSW) in footwear industry

This unit presents a comprehensive overview of the issue of health and safety at work (HSW), including links to legal requirements.

This online course comprise 8 lessons which provide knowledge, skills and competences in order to understand the main concepts, principles and rules of so-called "Best practice in the management of health, environment and safety in industrial enterprises".

It includes mainly legislation on HSW, corporate health and safety policy and strategy, HSW planning and risk management, emergencies and reporting procedures, fire protection in the workplace, principles of safety work on machines and technical equipment, handling of hazardous chemicals and products in the workplace and process risks in the footwear industry.



Figure 7. Health and safety signage

Ensuring adequate levels of HSW and environmental protection in organizations is not only a guarantee of maintaining the health of their employees. It also has a positive effect on increasing of productivity and quality of work, greater prosperity of the organization and performance of the national economy.

Raising the standard of care for HSW and environmental protection, as well as the prevention of accidents and damage to employees' health should be an integral part of company policy to ensure the sustainability of one of the pillars of the footwear industry in Europe.

The means to achieve this goal is primarily a systematic approach to managing HSW and environment protection, that will be taken into account by the organizations management in the context of management acts and measures taken in relation to the prevention of emergency events (accidents), while creating conditions for increasing the level of work culture and overall well-being of employees.

This course will help to understand that the introduction of effective HSW management system will always depend on the capabilities of the organization's management to persuade all employees to cooperation in activities that increase the level of safety and health. That is what brings corporate social responsibility to the sustainable development of the footwear companies.

7. REACH and consumer safety product – legislation for footwear industry

This unit compiles the regulation enforced by the European Commission to ensure the protection of consumer health and safety (General Product Safety Directive 2001/95/EC) including the requirements that products must meet to be able to be placed on the market by manufacturers and distributors. In addition, this unit also deals with the REACH Regulation (Regulation No. 1907/2006 of the European Parliament and of the Council), which is the European Regulation relative to the registration, evaluation, authorisation and restriction of chemicals that is in force since 1st of June 2007 and reforms the legislative framework for chemicals in the European Union.

The main objective of the REACH Regulation is to ensure a high level of protection of human health and the environment.

The REACH Regulation places responsibility on industry to manage the risks from chemicals and to provide safety information on the substances produced, imported, marketed and used in the processes. Therefore, each company must meet one or several requirements established in the Regulation according to the type of chemicals or preparations produced, used and/or imported, their origin (whether they come from the European Union or not) and how they are applied in the industrial processes. The future of the footwear and footwear components industries, such as tanneries, adhesives manufacturers, and soles manufacturers, among others, is determined in the European Union by this Community Regulation.

Therefore, this unit provides a detailed explanation of the requirements that must be met by each of the actors that are part of the footwear supply chain for the correct compliance with the REACH Regulation.

This unit gathers together the necessary information to submit the application for registration of a substance as well as information on the evaluation of the registration dossiers, and it explains how to carry out the request for authorisation of a substance for a specific use, which substances require authorisation and who should apply.

In addition, it also collects the restrictions of substances that could affect footwear and its components and that are set out in Annex XVII of the REACH Regulation, which may restrict or prohibit the manufacture, placing on the market and use of a substance on its own, or in a mixture or article.

Likewise, reference is made to the importance of communication among the actors in the supply chain as well as their obligation to inform about the presence of substances of very high concern (SVHC) and substances subject to authorisation in footwear components. In order to help businesses in the footwear sector to establish communication between the actors in the supply chain, the unit provides sample letters to be sent to suppliers and customers in order to communicate and ask for the necessary information about the presence of substances regulated by the REACH Regulation in mixtures, components and articles.

The REACH Regulation lists three groups of critical substances that may be found in components and preparations used for the manufacture of footwear and that lead to legal obligations for the actors in the footwear supply chain. The substances to be considered are: Substances of Very High Concern (SVHC) (list published on the website of the European Chemicals Agency), substances subject to authorisation (list in Annex XIV of the REACH Regulation) and restricted substances (list in annex XVII of the REACH Regulation). Each list provides details of the possible uses of each substance in footwear components.



Figure 8. Website of the European Chemicals Agency

Furthermore, this unit describes some authorities and competent inspection bodies established in the European Union to control the compliance with the REACH Regulation.

The unit includes a glossary to look up some of the definitions included in the REACH Regulation that are relevant for understanding in the footwear sector.

Finally, there is a bibliography section with links to the necessary information about the General Products Safety Directive and the REACH Regulation. In these links it is possible to check the requirements and obligations that the actors in the footwear supply chain must meet for the registration, authorisation and restriction of substances. There are also some guidelines for the preparation of a safety data sheet (SDS), a chemical safety report (CSR), an application for registration and a request for authorisation.

8. Contractual, social and trade legislation

This unit describes the Corporate Social Responsibility (CSR) with respect to the sustainability of the enterprise. CSR aims to embrace responsibility for corporate actions and to encourage a positive impact on the environment and stakeholders including consumers, employees, investors, communities, and others.

Sustainable manufacturing contains a whole range of topics specific for the sector, in which the company is active. It is often used as synonym to CSR, however the view is much more complex and primary it is a new way of company management, which takes into account different social, environmental, economic and ethic factors in business strategy.

Eco-labels and Green Stickers are labelling systems for food and consumer products. They are a form of sustainability measurement directed at consumers, intended to make it easy to take environmental concerns into account when shopping. The EU Ecolabel helps you identify products and services that have a reduced environmental impact throughout their life cycle, from the extraction of raw material through to production, use and disposal. Recognised throughout Europe, EU Ecolabel is a voluntary label promoting environmental excellence which can be trusted.



Figure 9. Ecolabel brand

CE marking product legislation offers manufacturers a number of choices and requires decisions to determine which safety/health concerns need to be addressed, which conformity assessment module is best suited to the manufacturing process, and whether or not to use EU-wide harmonized standards. The CE marking addresses itself primarily to the national control authorities of the member states, and its use simplifies the task of essential market surveillance of regulated products.

The EU is a customs union that provides for free trade among its 28 member states. Members of the European Union apply the EU common external tariff (CET) to goods imported from non-EU countries. Goods imported from non-EU states are subject to an import turnover tax.

The Consumer Product Safety Improvement Act ("CPSIA") regulates specific substances in children's products including children's footwear. The CPSIA sets limits for lead content and phthalates in children's products.

European Union legislation and standards created under the New Approach are harmonized across the member states and European Economic Area countries to allow for the free flow of goods. While harmonization of EU legislation can facilitate access to the EU Single Market, manufacturers should be aware that regulations (mandatory) and technical standards (voluntary) might also function as barriers to trade if their standards are different from those of the European Union. Many standards in the EU are adopted from international standards bodies such as the International Standards Organization (ISO).

Conformity Assessment is a mandatory step for the manufacturer in the process of complying with specific EU legislation. The purpose of conformity assessment is to ensure consistency of compliance during all stages, from design to production, to facilitate acceptance of the final product.

Independent test and certification laboratories, known as notified bodies, have been officially accredited by competent national authorities to test and certify to EU requirements.

9. Sustainable packaging for footwear

Packaging must meet several functions. It is an extremely important element in the supply chain, distribution system, and finally the method of use or handling of the product. It also contributes significantly to a more secure and long-term use of products. Despite this, packaging has a negative connotation in the general public's perspective due to the huge accumulation of packaging waste on landfills.

Packaging manufacturing companies and companies that use packaging for their products will be less competitive in the future if they ignore the obviously increasing trend of the environmental requirements in product development. Therefore, the question arises on how to tackle the planning, design, development, and deployment of environmentally friendly packaging. What are the criteria they should comply with?

This online course is designed in such a way that the problem of packaging in relation to the environmental protection in the footwear industry is presented in a comprehensive manner, from the basic to the wider aspect of its development. The purpose of this course is also to present case studies from the footwear industry and to provide guidance for the design and development of modern packaging, because the process of development without using environmental criteria does not suffice any more.



Figure 10. Eco-friendly shoe box

The concept of sustainable packaging development has become a worldwide trend. But, unfortunately, sustainability is very often neglected, and the economic aspects of packaging are given priority. During the planning and developing of new packaging, the companies should always make compromises between the environmental, social and economic aspects of packaging.

10. Supply chain and logistics management in footwear companies

A sustainable supply chain is increasingly recognized as one of the key ingredients of responsibility of individual companies to surrounding area. Correct and successful management of social, environmental, and economic impacts inside the supply chain is more and more important for individual companies.

A sustainable supply chain means to manage those impacts and promote management of good practices in the entire life cycle of goods and services. The objective of such chain is to create and protect long-term environmental, social, and economic values for all parties involved in the production, sale, and implementation of individual services on the market.

The course presents many different reasons why individual companies start to introduce sustainable supply chains. The first and often the main reason is to ensure compliance with the laws and other regulations that which apply on the market where individual companies sell their products or provide services. The other reason for adopting such measures is that individual companies are trying to show themselves as socially, economically, and environmentally friendly companies.

This online course is trying to show the main factors that affect the successful implementation of the sustainable supply chain of individual companies in the footwear industry. It addresses the issue of the procurement, production, inventories, transportation, information flow as well as sustainable role of various sub-contractors, suppliers, customers, and service technicians. Since we are living in an era of rapid changes, on which most companies have no significant impact, flexibility of the entire supply chain is one of the key factors.

The course also presents, that the concept of the sustainable supply chain is becoming a true global trend. Nevertheless, the environmental aspect is still too often neglected compared to the economic benefit of individual company.



Figure 11. Sustainable supply chain

11. Green Marketing

Definitely, the Green Marketing has an important place in the company's strategy for a sustainable development. The eco-friendly footwear is produced and promoted to fulfil the consumers' expectations for quality, price and performance, as well as their concern on the environmental issues. This online course comprise 8 lessons which provide knowledge, skills and competences in order to understand the main concepts and principles of Green Marketing, as well to plan, implement and control concrete actions in this respect.

The course presents the Green Marketing paradigm, as well as the related concepts, definitions and principles. The course cover topics, such as: what are the green companies?; the reasons and benefits to be green and what should do the footwear producers to emphasize the product's green features? The segmentation of consumer for green products is analyzed in terms of the innovative approach toward integrated brands able to satisfy the increasing demands for green products and services. The new trends and lifestyles determine footwear companies to think broadly about consumers considering their behaviour and motivations.

To incorporate sustainable marketing strategies in footwear companies, knowledge about the new business models, such as Business to Business (B2B), Business to Consumer (B2C) and e-commerce are necessary. Sometime, the brands fail in implementing the green marketing. Therefore, examples of risks, ethical green claims and "green-washing" attacks are introduced in this course.

In order to be sustainable, the companies should reformulate their Marketing Mix to greener product, price, place and promotion. The student/trainee learn how to communicate sustainability and to promote green products through various channels, such as advertising, public relations, personal selling, social media, events, digital and mobile marketing.

This course presents case studies and successful stories of the footwear brands on sustainability and green marketing. How to elaborate a Green Marketing Plan for the eco friendly footwear produced by the own company is the project activity recommended to be followed at the end of this course.

ECO-FRIENDLY BOOTS



Figure 12. Example of eco-friendly boots

12. Corporate social responsibility practices

What drives the change in footwear enterprises towards sustainability, competitiveness, and innovation is the commitment for applying the Corporate Social Responsibility (CSR) practices in their daily activities. This online course comprise 8 lessons which provide knowledge, skills and competences in order to understand the main concepts and principles for taking responsibility of the company's impact on society, as well to plan, implement and control concrete actions in this respect.

Corporate Social Responsibility is applied by companies on volunteering basis. However the legal background and the EU supporting initiatives are explained. The consumer perspectives on CSR are investigated in terms of their reaction, awareness and trust.

Nowadays, the footwear companies are becoming more and more interested in waste management, water resources, energy efficiency, recycling and reusing. Thus, the environmental sustainability, apart from being a necessity because of the limited available resources, it is a social responsibility too. The good practices of the footwear companies for supporting local economic growth and employability, as well as charities, volunteering and sponsorships actions change the perception and motivate the consumer to choose brands that demonstrate fair trade practices.

Developing and implementing a socially responsible marketing plan is beneficial for the growing businesses in the footwear sector.



Figure 13. Corporate Social Responsibility chart

Implementing synergic CSR actions adds value and brings advantages for footwear companies at various levels, such as: improved relationships with employees, suppliers and consumers, brand differentiation, good effects on cost savings, innovation, productivity and quality, lower risks in accessing new capital and markets etc.

We encourage top and middle managers to take this course in order to understand what brings Corporate Social Responsibility to the sustainable development of the footwear companies.