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Learning Unit 1: Materials for the European furniture industry

MODULE 7.1 : Materials



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Materials

Training Unit 1: Materials for the European furniture industry

1.1: General Overview

1.2: Materials commonly used for the production of the furniture in Europe

1.3: Criteria for the classification of materials currently used in the European furniture industry

1.4: Main elements of the technical specifications of new materials for the European furniture industry

1.5 Current trends of materials for the European Furniture industry

1.6 Changes in materials for the European furniture industry by 2020

1.7 New and Eco-sustainable materials for the furniture sector

AFTER COMPLETION OF THIS UNIT, YOU WILL KNOW OR YOU WILL CAPABLE TO DO

| Knowledge | Skill | Competence |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Development a basis for systematization of new materials for the European furniture industry• Identification of new and eco-sustainable materials for the European furniture industry• Definition of future trends in the development of materials for the European furniture industry | <ul style="list-style-type: none">• Good reading comprehension skills with the topic of Materials Management.• Flexible attitude towards changing circumstances (sectoral, design, production, innovation, history etc.) and acknowledgement of the constant need to learn new skills and new concepts in a changing environment;• problem identification, creative search for solutions | <ul style="list-style-type: none">• Basic knowledge of new materials for furniture• Eco-sustainability properties of new materials;• Capacity to identify future trends about materials for furniture. |



1.1 General Overview

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TOPICS 1.

1. General Overview
2. Materials commonly used in furniture sector
3. Examples of materials
4. Classification criteria
5. Technical specifications
6. New and eco-sustainable materials

- “Material” is understood as the matter from which a thing is or can be made.
- Materials science: Study of materials
- Materials are an indispensable element of the furniture making process.

1. Basic

2. Complementary

New materials are those which have entered the market recently or the materials previously used, which have been significantly improved, which are already used for the furniture production or will be used in the future in Europe.



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1.2: Material commonly used for the production of the furniture in Europe and their classification

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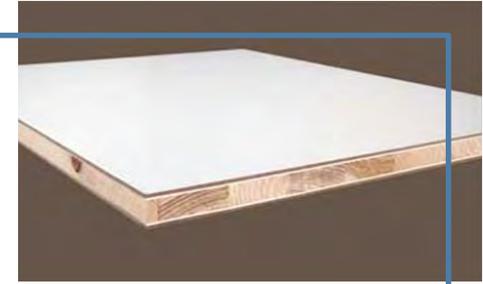
- Typologies of materials in furniture sector :
 - **Raw materials:** wooden materials, natural solid wood, sliced wood, wood-based panels, metallic Materials (steel, aluminium, iron, metal alloys, etc.), plastic materials (PVC, ABS, PU, MLM, PS, etc.)
 - **Auxiliary Materials:** glue-adhesives, paints, glass, marble, metal accessories



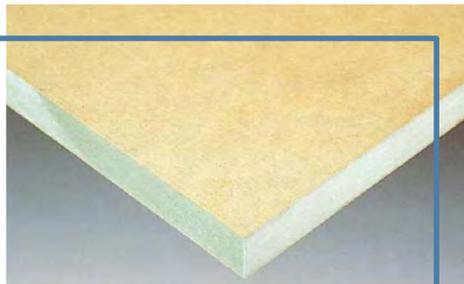
Plywood



Particleboard



Melamine



Fibreboard panels



Laminated



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1.3: Criteria for the classification of materials currently used in the European Furniture industry

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Criteria for the classification of materials

New or improved

New or improved/changed

New or changed applications of materials

In relation to causes:

Demand-related– stimulated by the market needs

Supply-related
initiated by science and being a result of scientific research.

Strategic
Key importance for the development of the furniture industry,

Tactical: slight changes in materials and/or technologies of their production, which allow an increase in the effectiveness of furniture production.

Novelties can be also classified as:



- Radical– occurring relatively seldom and being revolutionary and a breakthrough (most often they are connected with a technical-technological “breakthrough” in the furniture industry);
- streamlining– so-called incremental, consisting in slight changes to previously used materials or their production technology.

“**Novelties**” are new or improved:

- materials of solid wood;
- materials and processes used for solid wood finishing;
- wood-based panels, including panels with finished surface (as a result of the use of new or improved finishing materials and processes);
- finishing materials for wood-based panels;
- upholsterer’s materials.



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1.4: Main elements of the technical specifications of new materials for the European furniture industry

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Elements of
technical
specification:

- Description of the material: Name, basic characteristic, structure,
- Properties of the material: a list of its most important features, advantages
- Technical data on the material values of physico-mechanical parameters such as:



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1.5: Current trends of materials for the European furniture industry

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Innovativeness of the materials for the furniture industry concerns:

- material and raw material solutions (e.g. modification of the structure of composite wood materials and wood composites),
- the introduction of new materials/binders, surface improving materials, and finishing materials.

News or improved materials:

- materials of solid wood (Lamellas, LVL, Veneer Sheets Panels)
- materials and processes used for solid wood finishing (Wood texturing, Whitewashing of wood, Lacquering)
- wood-based panels, including panels with improved finishing materials for wood-based panels (Flexible plywood, 3D veneers, 3D panels, HPL, Gloss panel)
- upholsterer's materials (Modern upholsteries, Artificial leather)



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1.6: Changes in materials for the European Furniture industry

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Main trends:

Increasing the share of tailor-made products

Increasing the share of high-quality finished materials

The emergence of so-called purpose-made materials, both wooden and structurally mixed,

The increasing importance of modified wood materials

Interesting in unique designs, thanks to the new possibilities of already used technologies,

The development of the production technology of materials within the scope of intelligent customization (lot as one);

DIY (do it yourself)

Design pursuing the stylistic harmony of furniture



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1.7: New and eco-sustainable materials for the furniture sector

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Eco-Design

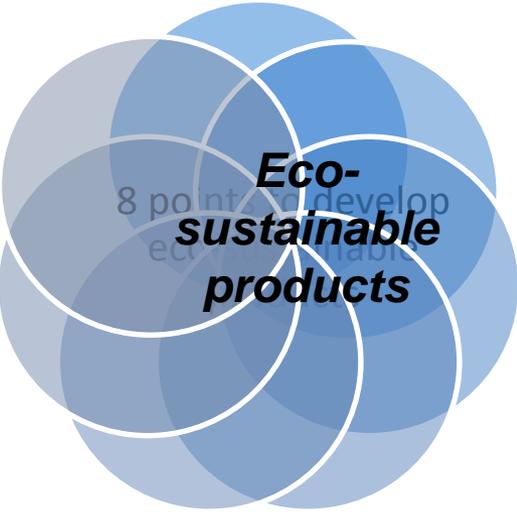


Environmentally friendly design for a sustainable future.

Reduction of impact during use

Optimization of the distribution system

Optimization of production techniques



Development of a new concept

Selection of low impact materials

Reduction in the use of materials



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Learning Unit 2: The main environmental problems

MODULE 7.1: Materials



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TOPICS 2.

1. Main environmental problems
2. The reduction of Co2 emissions
3. The carbon footprint

"A development that meets the needs of the present without compromising the ability of future generations to meet their needs"
(WCED, 1987).

Sustainable development: **long-term economic development** that included environmental protection in investment and production decisions, which aimed at reducing environmental degradation by acting on causes rather than effects, anticipating and preventing environmental damage, producing more with less and using renewable and efficient energies.



 **Mfuture**

- Energy is essential for the development of all human activities of production, consumption and use of leisure time.

- The use of alternative, clean and renewable sources will be a valuable tool in the near future to diversify the energy mix, sustain energy consumption and mitigate the effects of climate change.



- World footprint
- Ecological Footprint
- Global climate change
- Global warming potential



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Learning Unit 3. Materials with reduced environmental impact

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TOPICS 3.

1. Recycled materials
3. Natural Materials
4. Paper
5. Glass
6. Aluminium
7. Plastic

"Recycling"

refers to the process of valorisation of goods at the end of their life or of processing waste through reprocessing in a new production process, in order to obtain other materials or goods that can perform the original function or different purposes.

In the recycling process the waste product or production waste is transformed into raw material called secondary (flakes, dust or granule) and then re-processed.

Post-Consumer recycled

Recycled pre-consumption

Paper

Originally produced from rags, scraps of clothes, used fabrics and cordages, paper is a material made up today of different types of vegetable fibres and of inert mineral fillers that give it shine, brilliance and ease of printing.



Honeycomb panel



Material made of recycled paper through a particular process that allows you to use any type of paper



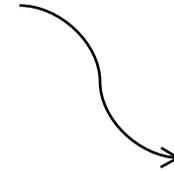
Cellulose fibre obtained from post-consumer paper recycling



100% recycled post consumer newspaper



Panel obtained from cellulose fibres thermo- bonded



Due to the progressive deterioration of the technical performances, the fibres can undergo the recycling process **from five to seven times**, until completely losing the consistency necessary to produce other paper and become waste, to be usefully used for energy recovery in the form of fuel.

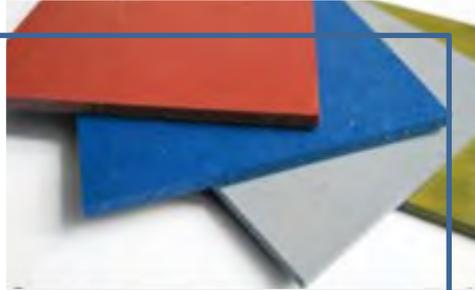
imfuture

Plastic

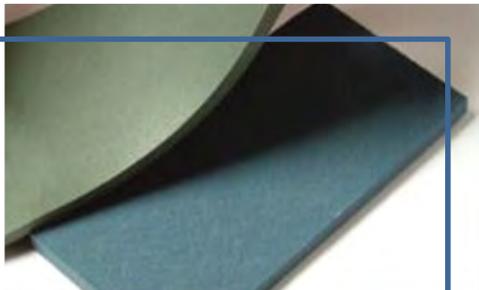
Pliable, versatile, transparent when necessary, becoming synonymous with modernity and consumption, plastic is a synthetic organic substance obtained mainly from petroleum by polymerization and polycondensation.



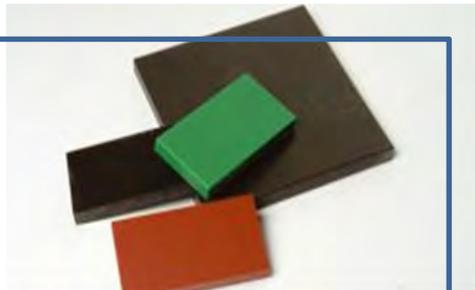
Material deriving from the recycling of HDPE packaging for detergents



Material obtained from the mixing of the exhausted pomace, processing residue of olive oil, with polypropylene.



Material obtained from the recycling of PVC and polyester fibres from pool covers, industrial roofing membranes and car upholstery waste.

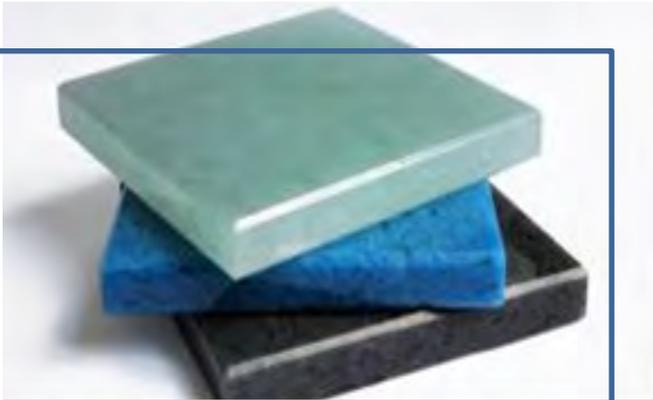


Panel made of recycled polyethylene and polypropylene, with different percentages of pre and post-consumption.

- Mechanical recycling is the main process of valorisation of thermoplastic polymers
- The success of mechanical recycling and the consequent quality of the products obtained mainly depends on the selection process made in the recovery phase on the collected plastics

Glass

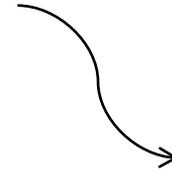
Flexible material with infinite potential and multiple industrial and domestic applications, glass is a solid product of very wide use and consumption.



Material obtained by heating and melting glass splinters



Mosaic made of glass with recycled content



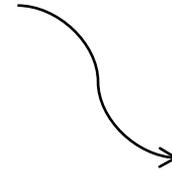
- To optimize the glass recycling process, separate waste collection should take place by colour.

Rubber

The elasticity, the shock absorption capacity, the thermo-acoustic insulation make recycled rubber a material particularly used in the construction and civil engineering sectors



Material made of black SBR rubber granules recycled from tires and coloured EPDM rubber granules.



Recycled rubber comes mainly from the recovery of used tires and lends itself to numerous applications.

Wood

Wood is a material of natural origin derived from the trunk of trees, it is a raw material and a renewable energy source. The use of wood in almost all commodity sectors is due to its simple and economic finding, its ease of processing and the multiplicity of aspects and forms it can take.

- Subsequent to the collection phase the waste of wood coming from pallets, fruit crates, processing waste, old furniture and other items is transported to recycling centers where it undergoes chemical-physical checks and selection for the elimination of all impurities such as iron, plastic, paper, glass.



Panel made of post-consumer recycled wood from pallets, shavings, old furniture, tree pruning, wooden packaging, processing waste and fruit crates

Textile

Very old in use, the textile materials are still today characterized by treatments and traditional molds.



Fabric made of 100% recycled cotton from weaving scraps, threads and cut-outs



80% cotton yarn made from recycled cotton, obtained through a process that uses the processing waste of pretreated cotton items

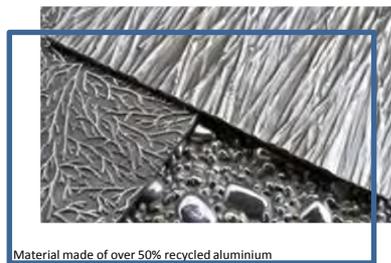
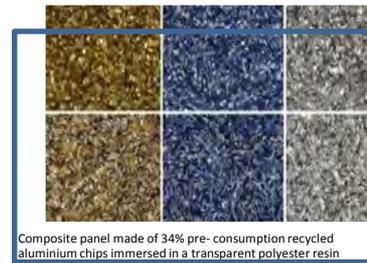
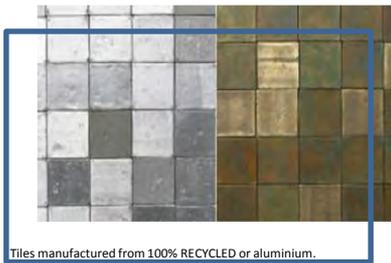
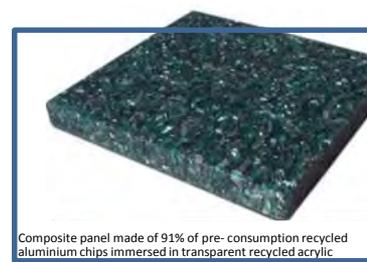
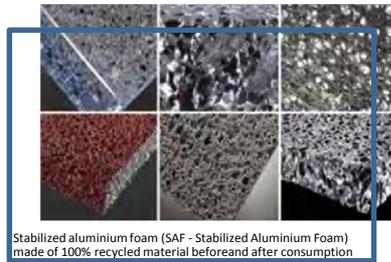


Cotton blend yarn made with the scraps of clothing items coming from the production of knitwear, socks, shirts and other items in cotton and polyester fibres.

- The recovered textile fibres may consist of waste, waste and processing residues from the packaging industry as well as products at the end of their life cycle, which include home textiles (sheets, pillowcases, blankets, pillows and duvets of cotton, ...), clothing or accessories (t-shirts, pants, ...).

Aluminium

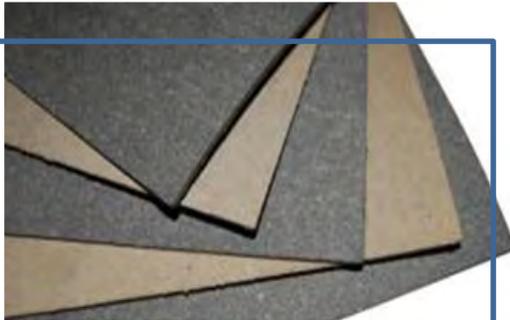
It is a light, corrosion-resistant material, easily workable at both high and low temperatures, characterized by high mechanical properties and thermal and sound conductivity, it is reflective, non-magnetic and recyclable infinite times without losing its original properties.



- For technical, economic and environmental reasons, the recycling option has always been, since the first marketing of aluminium products, an integral part of the production strategy of the aluminium industry itself.

Inert

The inert recycled materials belong to two large categories: those deriving from the extraction and ceramics processing (powders, crushed stone, cutting residues, tiles and other products not suitable for commercialization) and those deriving from construction and demolition activities on construction sites (bricks, concrete and mixed rubble)



Material obtained from vegetable tanned leather scraps from the footwear industry.



Fabric made with pulverized leather waste and used to reinforce a polyurethane fabric base



Fabric made with leather waste

- The inert material coming from processing waste from the ceramic industry is normally reused in the same production cycle, post-consumer inert waste has different origins and has very variable composition and characteristics

Leather

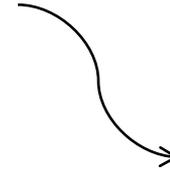
Used mainly for the production of garments and in the furniture industry, hides are still largely characterized by traditional and almost handcrafted treatments and molds



Material consisting of pebbles or recycled stone splinters and glass and mother-of-pearl splinters bound with a Portland cement base



Material composed of 70% natural stone powder, partly recycled, from acrylic resin and natural pigments.



- In addition to waste, scraps and processing residues from the tanning industry, all those products which have reached the end of their life cycle and which can not be reused as second-hand goods because of their condition, are part of the leather recovered. clothing (jackets, skirts, trousers, ...) and accessories (footwear, belts, bags, ...).



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Learning Unit 4: Converting quality demand into schedules for inventory acquisition

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TOPICS 4.

1. MPS
2. MRP and its components
3. MRP Advantages and processing

Master Production Scheduling (MPS) is necessary to generate a master plan for what is needed to produce, how much and when to do it, based upon supply and demand

In detail, **material requirements planning (MRP)** is a computer-based inventory management system designed to assist production managers in scheduling and placing orders for items of dependent demand

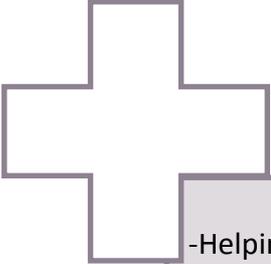
Components:

Bill of materials

Master schedule

Inventory records file





-Helping production managers to minimize inventory levels and the associated carrying costs, track material requirements, determine the most economical lot sizes for orders, compute quantities needed as safety stock, optimise production time among various products, and plan for future capacity needs

-. The information generated by MRP systems is useful also for the other areas.

-If not uploaded correctly, it can causes missing parts and excessive order quantities to schedule delays and missed delivery dates if

-Systems can be difficult, time consuming, and costly to implement.

-Some companies may encounter resistance from employees when they try to implement MRP



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Learning Unit 5. Inventory Management

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TOPICS 5.

1. Inventory Management
2. Inventory Management Metrics
3. Key inventory Metrics

In the supply chain one of the key variables which has to be managed is the inventory, which includes a vast spectrum of materials that is being transferred, stored, consumed, produced, packaged, or sold in one way or another during a furniture firm`s normal course of business.

- Planning
- Storing
- Moving
- Accounting for inventory

Inventory Management Objectives

- Service objectives- Setting stocking levels so that there is only a specified probability of running out of stock
- Cost objectives - Balancing conflicting costs to find the most economical replenishment quantities and timing

| KPM | Function | Formula |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Inventory Turnover | The number of times that a company's inventory cycles per year. Practically, it's about how quickly the inventory is replaced as it's sold. | Cost of goods sold/average inventory |
| Supply Cycle time | The time it would take to fill a customer order if inventory levels were zero. | Sum of the longest lead times for each stage of the cycle |
| GMROI | Gross Margin Return on Investment, and it tells the amount of money you got back (i.e. ROI) for every dollar you spent on inventory. | Gross Margin/Average Inventory Cost |
| Item fill rate | The percentage of a customer's order that is filled on the first shipment | $(1 - ((\text{total items} - \text{shipped items}) / \text{total items})) * 100$ |
| Shrinkage | This refers to the difference between the amount of stock on paper and the actual stock available | $\frac{\text{Ending Inventory Value} - \text{Physically Counted Inventory Value}}{\text{Beginning Inventory Value}}$ |
| Sell-through rate | Sell through is the percentage of units sold versus the number of units that were available to be sold. | Number of Units Sold / Beginning Inventory x 100 |
| Lost Sale | The lost sales metric measures how many customers ask for an item, then go elsewhere because you don't have it in stock | the days a SKU is out of stock X the average or expected sales rate. (Chris Peterson, Integrated Marketing Solution) |

Key Inventory Metrics



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Learning Unit 6: Communication with supplier and with company department

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TOPICS 6.

1. Supply chain Management
2. Internal communication
3. Key inventory Metrics

Communication is crucial to supply chain success especially nowadays that the relation between the suppliers and the procurement function has changed.

If we consider communication issues in supply chains, there are some steps that procurement professionals need to consider:

- Priorities stakeholders/suppliers.
- Regularly meet with stakeholders and suppliers. feedback to the supplier as well as asking for it yourself.
- Always offer options.



Supplier Relationship Management, is a systematic approach for developing and managing partnerships.