



CONTEMPORARY CHALLENGES FOR THE SUSTAINABLE PRODUCTION AND SUPPLY OF WOODEN PALLETS IN BULGARIA

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Significance of pallets for trade in goods:

- ✓ The wooden pallets have influenced international trade in goods effectively;
- ✓ As one of the key components of the warehousing and transport environment, the pallets have helped to improve trade.
- ✓ The pallets facilitate the rapid movement and storage of goods and reduce product damage;
- ✓ The pallets minimize the risk of injury to workers.
- ✓ With the use of pallets, customers have the opportunity to more easily operate and process their goods.

Wooden pallets as packaging in the international exchange of goods and quality requirements:

- ✓ The expansion of trade requires the unification and harmonization of the quality and type of transport packaging with which goods are linked to the trade process.
- ✓ Regulatory requirements in Bulgaria combine many criteria, such as those related to the quality of packaging, safety and protection of the packaged product, hygiene and transport requirements.
- ✓ Ensuring the quality of raw materials and finished products are inextricably linked to the availability of standards .
- ✓ The application of the standards guarantees the economic efficiency of the enterprises, the production and the supply of quality products, the maintenance of the market positions, the increase of the satisfaction of the clients.

Generated packaging waste by types of materials in Bulgaria:

Material	2010 (t)	2014 (t)	2018 (t)	2010 = 100%
Plastics	81978	102093	131359	160,2%
Paper / cardboard (incl. Composite)	138716	129580	168840	121,7%
Metal	15744	15998	37625	238,9%
Wood	18741	48725	65011	346,9%
Glass	63962	78251	90950	142,2%
Others	2055	4021	3708	180,4%
Total	321197	378668	497493	154,8%

- ✓ The greatest dynamics is in wood waste;
- ✓ Reusable packaging is considered to be a more effective option for reducing the impact of packaging volume and energy while preventing production emissions to the environment;
- ✓ The use of reusable packaging improves logistics and transport activities and reduces the consumption of natural resources.
- ✓ Wood is still considered to be the most environmentally friendly packaging material.
- ✓ At least 20% of plastic packaging can be replaced by reusable ones

The pallets as packaging:

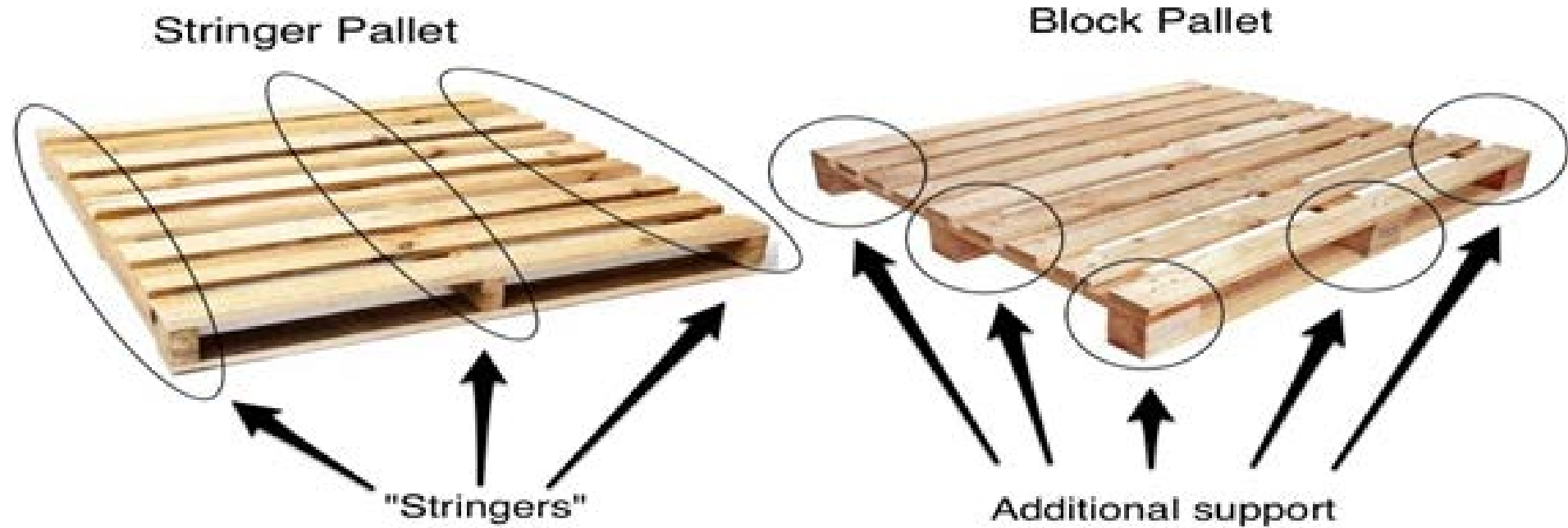
- ✓ In terms of regulations in Bulgaria, pallets are considered as reusable transport packaging.
- ✓ The main materials from which the pallets are made are wood, plastic, metal, composite and paper.
- ✓ Globally, wooden pallets are the most common type of pallets, accounting for 92% of unit demand and 83% of sales in value terms in 2019.
- ✓ International Standards for Phytosanitary Measures Number 15 (ISPM 15) address wooden packaging material is considered to be wood or a wood product used to support, protect or transport goods.
- ✓ The use of pallets as a wood packaging material is associated with the unification of the structure, size and material from which the packaging is made.
- ✓ There is a relationship between the price of pallets and the conditions that ensure the safety and durability of reusable packaging.

European Pallet Association (EPAL):



- ✓ The main proposals of the EPAL system are to achieve security and quality assurance of pallets.
- ✓ Only licensed companies can produce pallets and mark them in accordance with the instructions of the system.
- ✓ Marked euro pallets with the EPAL mark allow identifying its manufacturer and the legal origin of the product.
- ✓ EPAL also licenses pallet repair companies, manufacturers of pallet components, as well as nails and equipment used for pallet production.
- ✓ The EPAL system enables the exchange of over 500 million pallets traded worldwide, market access for over 1,600 production operators, uniform quality standards worldwide, standardized pallet sizes throughout the supply chain, transparency of costs, the more neutral balance of CO₂, optimal transport routes of goods, etc.

Basic types of wooden pallets:



ISO-determined sizes of Euro pallets used in different regions:

<i>ISO Pallet Dimensions (mm)</i>	<i>Regions Commonly Used</i>	<i>Euro Pallet Type</i>	<i>Euro Pallet Dimensions (mm)</i>
1016 × 1219	North America	EUR, EUR 1	800 × 1200
1000 × 1200	Europe and Asia	EUR 2	1200 × 1000
1165 × 1165	Australia	EUR 3	1000 × 1200
1067 × 1067	North America, Europe, Asia	EUR 6	800 × 600
1100 × 1100	Asia	Quarter size	600 × 400
800 × 1200	Europe	Eighth size	400 × 300

The most common pallet size used in Europe is the EUR pallet, with dimensions 1000 x 1200 x 144mm.

Requirements of the International Standard for Phytosanitary Measures Number 15 :

- ✓ The productivity and strength of wooden pallets can be affected by several of factors, including the weight that the wood can carry and the ability to bend. Other factors for the efficiency of pallets are pressure strength, resistance, defects in the wood, resistance to rot and others.
- ✓ To achieve safety and reduce the risk of introduction and spread of quarantine pests in wooden pallets used in international trade and produced from raw wood, they need to be treated and marked according to the International Standard for Phytosanitary Measures Number 15 (ISPM 15, 2013).
- ✓ The scope of the ISPM 15 includes the requirements for repair and reuse of wood packaging material, its thermal treatment and marking.



Economic challenges of wooden pallets for the industry in the World:

- ✓ Globally, over the past decade, the production and consumption of wooden pallets have left a significant impact on economic growth, especially in developing countries such as the United States, Canada, and the EU.
- ✓ The expected global demand for pallets will grow by about 3.7-3.8% per year, reaching 5,8 billion units in 2024. The pallet market is estimated at about \$ 52.5 billion.
- ✓ The world market is dominated by block pallets compatible with automatic systems.
- ✓ The development of the pallet market will grow, despite the slowdown in worldwide sales due to COVID-19.
- ✓ The most dynamic markets are expected to be Asia-Pacific, with forecasts in 2024 to reach 40%.
- ✓ The lower price of wooden pallets will continue to define them as a leading product over metal and plastic.
- ✓ The growth of regional demand for pallets will be supported by the development of industries and logistics systems in developing countries.
- ✓ E-commerce will further increase the need for storage pallets.
- ✓ India and China are expected to determine global demand for pallets in the coming years.

Economic challenges of wooden pallets for the industry in the EU:

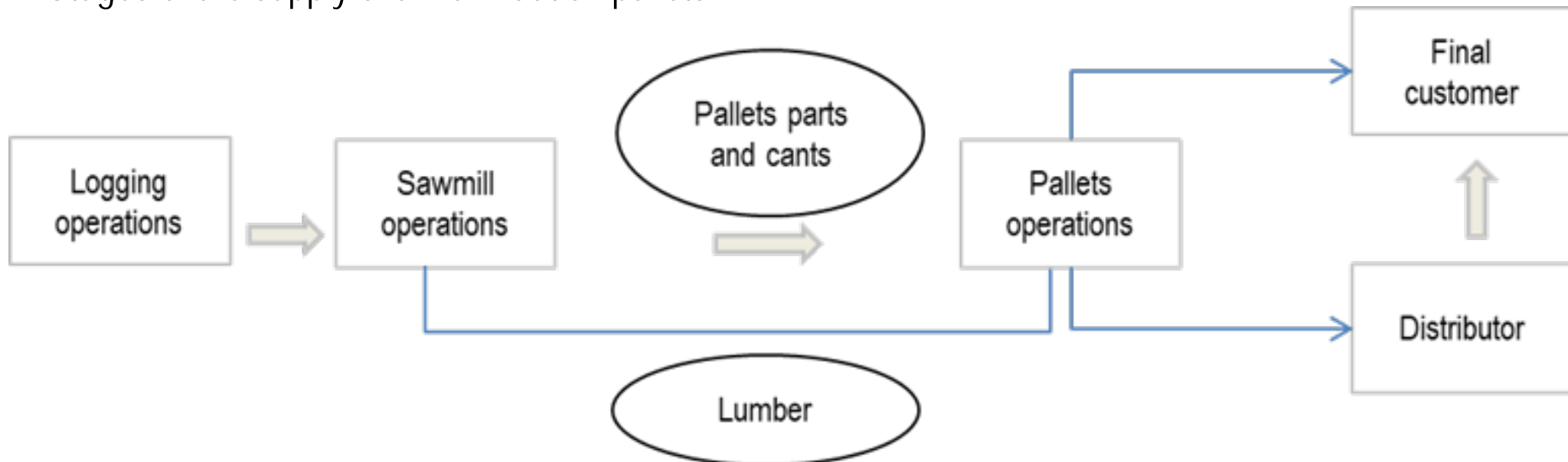
- ✓ In EU over 25 million cubic meters of timber each year they are used for pallets and wooden packaging.
- ✓ The average lifespan of a wooden pallet is between 5-7 years, with a high percentage of wooden pallets being recycled and recovered.
- ✓ The production of pallets and wooden packaging is fragmented in Europe, with a large number of small and medium-sized enterprises operating.
- ✓ There is a tendency for production to gradually shift to Eastern European countries, where costs are lower.
- ✓ Pallet production in Western Europe is becoming increasingly automated, with the industry incorporating more robotics into production and repair.
- ✓ The sector has consolidated in recent years with fewer and larger companies, and several of the larger groups have begun to operate internationally.
- ✓ In descending order, the main producers of flat pallets in Europe are France, Poland and Germany, with production growing at the highest rate in Poland.
- ✓ The number of pallets produced increased from 339 million units in 2006, to 371 million units in 2010, to 401 million units in 2013 and almost 500 million in 2018.
- ✓ Pallet prices have been relatively stable in recent years, although commodity prices have fluctuated.

Economic challenges of wooden pallets for the industry in Bulgaria :

- ✓ The production of wooden pallets is organized in about 1000 smaller and medium-sized companies.
- ✓ The production of wooden pallets is promising for Bulgaria, given the lower production costs compared to Western European countries.
- ✓ Proof of this is the increased export of pallets from the country to 129 thousand tons in 2016.
- ✓ The production of pallets is a business that can be organized for the implementation of various technological solutions, according to the size of the company. In small family businesses, the production of pallets can be carried out by manual assembly of pallets or by applying semi-automatic lines. In medium and large enterprises, production opportunities are increasing.
- ✓ The profitability of the production of wooden pallets is determined mainly by the price of raw materials and the volume of production.
- ✓ With the right organization of production, the pallet business can be very profitable. It is accepted that the return on investment in semi-automated production is within two to three years, while the payback period for automated lines for the production of pallets can be within three to four years.

Technical challenges of wooden pallets for industry and logistics:

- ✓ Pallets are a critical component of logistics infrastructure.
- ✓ Wooden pallets represent 90-95% of the market. Plastic pallets are about 4-6% of the total pallets, and their purpose is for specific industries (pharmaceutical).
- ✓ Stages of the supply chain of wooden pallets:



Technical challenges of wooden pallets for industry and logistics:

- ✓ There are *three pallet management strategies*:
 1. **Single use expendable pallets strategy** - ownership of a pallet is transferred with the load it carries. In this case, the pallets are not returned to the distributor or the manufacturer. Such pallets are usually wooden and are chosen for lower costs. After their use, such pallets are used briefly and collected in landfills. In terms of cost, this is the most expensive strategy.
 2. **Buy-sell strategy** - pallets are sold to customers and subsequently, he manages them. Once the pallet reaches the end of its useful life, their owner recycles them. The activities of repair, proper disposal and sorting are the responsibility of the buyer of the goods.
 3. **Leased pallet pooling strategy** - in which the customer leases the pallets from the distribution company and agrees to manage them further in the supply chain, using them back down the chain or recycling them. This strategy is cheaper in terms of costs.
- ✓ The challenge in choosing a specific pallet management strategy is to choose from the most efficient option from an economic, technical or environmental point of view
- ✓ From the point of view of costs, it is necessary to analyze the type of material, the method of production and use, life expectancy, the nature of the product, the possibilities for ensuring safety, etc.

Technical challenges of wooden pallets for industry and logistics:

- ✓ The most significant factor for pallet users was the purchase price (61%), strength (56%), durability (54%) and reusability (44%).
- ✓ When buying wooden pallets, 65% prefer used pallets and 54% prefer new pallets.
- ✓ Regarding the use of wooden pallets, 46% of respondents use the same number as the previous year, and 42% use more than the previous year. Only 12% use fewer pallets than the previous year.
- ✓ Regarding pallet management strategies, only 7% of respondents use pallet rental companies.
- ✓ Only 23% use automated palletizing equipment, and the majority of companies continue to use manual pallet storage and handling systems.
- ✓ The increased desire to automate the supply chain creates prospects for the growth of smart pallets. The use of pallets with microchip RF identification allows easier tracking of goods in the supply chain and improves inventory management.

Environmental benefits of wooden pallets:

- ✓ The wooden pallets are made entirely in compliance with the highest environmental criteria.
- ✓ Wooden pallets fit very well into the circular economy.
- ✓ Pallet manufacturers and users are expanding their pallet repair and recycling programs.
- ✓ Waste from recycled pallets is a good raw material for animal bedding, for the production of furniture or paper, which increases the lifespan of the wood.
- ✓ Also, reusable pallets are heat-treated, which reduces the need for pesticides.
- ✓ Wooden pallets have much greater environmental advantages over plastic pallets, mainly because they are easier to recycle, although they wear out more and are more resistant to pests.
- ✓ Plastic pallets have been found to have a greater impact on climate change than wooden pallets, and wooden pallets have a negative carbon footprint.
- ✓ 108 billion kg CO₂ are stored in pallets circulating in the EU.

Environmental benefits of wooden pallets:

- ✓ It is a misconception that the use of wood for pallets leads to deforestation.
- ✓ Although wooden pallets are also made from new wood, much of the unattractive wood unsuitable for furniture and construction is used for the production of wooden pallets.
- ✓ Although the wooden pallet sector uses forest resources (which are renewable), it fits well into the EU's action plan for the transition to a sustainable, low-carbon and competitive economy.
- ✓ Given the EU's proposal to recycle 65% of packaging by 2025 and 75% to 2030 the importance of wood as reusable packaging is growing.

CONCLUSION :

- 1) In the coming years, wooden pallets will continue to have a positive effect on international trade by improving the operation and handling of goods.
- 2) The requirements for guaranteeing the quality and safety of the goods subject to trade are increasing and wooden pallets can meet these challenges.
- 3) The market of wooden pallets is dynamically developing and Bulgarian producers can take advantage of the favorable opportunities they have to produce at lower costs.
- 4) The contribution of wooden pallets for logistics solutions for delivery and for inventory management in warehouses is in the direction of increasing automation in the supply chain.
- 5) The environmental benefits of using wooden pallets are great and they fit very well into modern EU policy for the development of a sustainable and low-carbon economy.

THANK YOU FOR ATTENTION!

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