

PRODUCTION OF GLUED WOOD MATERIALS IS THE BASIS FOR EFFECTIVE USE OF FOREST RESOURCES

Shevchuk K.A.

Keywords: wood, bonding, production, plywood, glued wood materials.

Abstract. The article deals with the production of glued wood materials, processing of low-grade wood. The classification is presented, the prospects for the development of the use of glued wood in comparison with solid wood are substantiated.

ПРОИЗВОДСТВО КЛЕЕНЫХ МАТЕРИАЛОВ ИЗ ДРЕВЕСИНЫ ОСНОВА ЭФФЕКТИВНОГО ИСПОЛЬЗОВАНИЯ ЛЕСНЫХ РЕСУРСОВ

Шевчук К.А.

Ключевые слова: древесина, склеивание, продукция, фанера, клееные древесные материалы.

Аннотация. В статье рассматриваются вопросы производства клееных древесных материалов, переработки низкосортной древесины. Представлена классификация, обоснованы перспективы развития использования клееной древесины в сравнении с массивной древесиной.

In many developed countries, there has been a trend over the years to promote wood as a natural, renewable, environmentally friendly material. However, the use of forest resources as raw materials carries not only the risk of causing irreparable damage to nature, but also is a labor-intensive process. Thus, the availability of the Russian Federation's forest resource base is significantly limited. In the vicinity of large cities, in adjacent cutting areas along the railway, as well as highways, low-bonitetny forest grows, harvesting of which for the purpose of producing high-quality lumber is not effective. It is necessary to build roads to undeveloped forest regions for harvesting high-quality wood, which leads to a significant increase in the cost of the final product.

Artificial composite wood materials Engineered Wood Products (EWP), known as glued wood materials in Russia, can meet the growing demand for woodworking products and at the same time preserve the reserves of the forest resource base with the development of woodworking technologies.

Application of the bonding process is an important technological stage of woodworking production [1], which makes it possible to manufacture household products, large-sized building structures from high-quality, low-quality and small-sized wood raw materials. Gluing is also used in the repair and restoration of interior items, furniture and joinery. In comparison with solid wood products, glued wood materials have a number of advantages, such as the possibility of complex structural applications, operation of products in conditions of increased climatic influences (high humidity, high and low temperature), resistance to impact loads, use of low-grade raw materials, and improved aesthetic appearance associated with the possibility of veneering valuable wood species.

Glued wood materials are classified into four main groups:

1. Glued solid wood, these are products made from lumber blanks (moldings, glued boards, beams)
2. Glued laminated wood (plywood, plywood boards, wood-layered plastics).
3. Glued laminated material from crushed wood chipboard (CHIPBOARD), medium density fiberboards (MDF), monostructural Board PMA products (presspass).
4. Glued combined wood, combines the use of solid and laminated wood.

Production of glued wood and composite materials made of wood or composite materials based on it abroad is much wider.

1. Glued laminated Timber (Glulam) – wood products.
2. Wood Panels - Wood Panels – wood-based Panels:
 - Structural – wood boards used in construction and products made from them (plywood, OSB and wood-polymer composites);
 - Industrial – wood boards used in the main furniture production (DSTP, fiberboard, PMV).
3. Structural Composite Lumber (SCL) – construction composite timber:
 - Laminated Veneer Lumber (LVL) – timber glued from veneer;
 - Parallel Strand Lumber (PSL) – timber glued from parallel strips of veneer;
 - Oriented Strand Lumber (OSL) – a bar glued together from oriented large-size shavings;
 - Laminated Strand Lumber (LSL) – water-resistant OSL timber.
4. Glued Members With Lumber and Panels, for example, I-beams – I-beams made of OSB and LVL, glued wood and plywood.
5. Structural Sandwich Construction – building structures using wood such as sandwich panels.

Production of glued solid wood, mainly represented by the production of glued beams, furniture boards, mouldings. The technological process is based on gluing short-sized wood blanks, depending on the requirements of the size of the final product, onto a mini spike along the length, then gluing along the layer. It is widely used in the production of Windows, house construction (glued beams), furniture production (furniture Board) and joinery (gluing wood elements into the structure). This type of product implies the use of short-sized wood blanks, which makes it possible to process low-grade saw logs, use split cutting methods, reduce gradations in length, use thin side boards, which increases the useful yield of lumber, and makes it possible to use sorting, especially valuable wood, more efficiently at the sawmill and woodworking enterprise.

Plywood, as a structural material that has high strength characteristics, is currently the most popular in the housing construction industry. Russia ranks seventh among the top ten plywood producing countries and is on the same level in terms of finished product output as countries such as Japan and Canada, while significantly ahead of Finland. So [2], the level of domestic production from year to year shows a high dynamics of up to 15% increase in the volume of finished products annually. This is primarily due to the large rise in low-rise frame

construction, as well as the use of plywood in the monolithic construction of residential apartment buildings. Of the total volume of domestic plywood produced, the share of domestic market consumption is 43%, the rest is exported to countries where there is a stable demand for Russian products. Analyzing the increase in production, we can say that the plywood industry in comparison with other slab materials is one of the most promising in the domestic timber industry. At the same time, plywood raw materials are currently the most scarce [3], since the production of plywood requires raw materials of the first and second grade, and such material in plantings makes up 10 – 15% of the total volume of harvested wood, so the production of wood boards using crushed wood is the most cost-effective.

For the production of boards with oriented chip arrangement LSL, OSL and OSB [4], in comparison with the production of plywood does not require the use of wood raw materials of the first grades. Thin-grained low-quality products are used low-quality hardwood of low density, mainly aspen and poplar, plywood production waste is also used, this is the use of illiquid peeled, planed veneer. Despite the fact that wood waste and low-grade wood LSL, OSL and OSB are used as raw materials, it has high physical and mechanical properties, which makes it possible to use the material in load-bearing structures of housing construction, since the density of the material is from 680 to 720 kg/m³, while the proportion of binder does not exceed 6%, fire resistance is higher than that of natural wood, for example, the charring rate is 0.7 mm/min.

Of all types of glued wood products, the production of WOOD-chipboard, fiberboard, and PMV is the least demanding to the quality of the wood raw materials used. For the manufacture of plates [5], raw materials are used, the requirements of which are defined by OST 13-79-79 "wood raw materials for technological processing", which makes it possible to use wood with all defects except internal rot. Waste from logging enterprises is widely used in the form of raw material, which is up to 40% of the volume of solid logging. The waste obtained during cutting into sawn timber of the wood assortment (hump, survey rails, lumpy illiquid waste and sawdust), has 100% use as raw materials, plate production. It is also worth noting the processing of furniture industry waste and the production of joinery, while using shavings, sawdust, wood dust, which makes up 30% of the total mass of wood raw materials in demand.

From the above, it should be concluded that the production of glued wood materials provides a significant reduction in the cost of using solid wood as a raw material in the woodworking industry. It also increases the range of products with a significant margin of safety under operating loads, which makes it possible to use materials in various sectors of the national economy. Covering the surface of low-grade parts with precious wood veneer gives the products a high aesthetic appearance. Accordingly, gluing, as a method of producing wood materials, now and in the future, is the main way to meet the growing demand of the population for quality products. With the development of the segment of production of glued materials in the woodworking industry, the development of forest resources is taking place more efficiently, this is an opportunity to process fine-grained, low-

grade wood, fast-growing wood species, and the use of waste from the logging process. Effectively use illiquid sorting of care cabins.

All this determines the process of preserving forest natural resources, as a result of significant savings in the use of first-grade wood as raw materials in woodworking and furniture production, which is the most significant issue of the state policy for the development of the forest resource base at present.

References

1. Volynsky V.N. technology of glued materials: Textbook for universities. – Arkhangelsk: GTU, 2003. – 280s.
2. Lukichev A. branch of great opportunities // Дерево.RU. – 2007. – No. 2. – P. 114-120.
3. Sarattsev M. The development trend of the plywood industry. Sarattsev // Дерево.RU. – 2007. – No. 1. – P. 90-101.
4. Bubnov. V. Structural Composite Lumber – what is it? // Дерево.RU. – 2004. – No. 3. – P. 74-78.
5. VolynskyI V.N. Technology of chip and fiberboard tree boards. – Textbook for universities. – Tallinn: Desiderata, 2004. – 192 p.

Список литературы

1. Волинский В.Н. Технология клееных материалов: Учебное пособие для вузов. – Архангельск: ГТУ, 2003. – 280с.
2. Лукичев. А. Отрасль больших возможностей // Дерево.RU. – 2007. – №2. – С. 114-120.
3. Саратовцев. М. Тенденция развития фанерной промышленности // Дерево.RU. – 2007. – № 1. – С. 90-101.
4. Бубнов. В. Stuctural Composite Lumber – что это такое? // Дерево.RU. – 2004. – № 3. – С. 74-78.
5. Волинский В.Н. Технология стружечных и волокнистых древесных плит: Учебное пособие для вузов. – Таллин: Дезидерата, 2004. – 192с.

Шевчук Константин Александрович – кандидат технических наук, доцент, Тихоокеанский государственный университет, Хабаровск, Российская Федерация, k.shevchuk@inbox.ru	Shevchuk Konstantin Aleksandrovich – candidate of technical sciences, associate professor, Pacific National University, Khabarovsk, Russian Federation, k.shevchuk@inbox.ru
---	--

Received 12.09.2021