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# MODERN BUILDING MATERIALS FOR FLOOR STRUCTURES

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**Abstract**
The service life of the floor depends on the covering material. The surface layer of the floor is directly exposed to the operational impact, so it is very important to choose the right type of final covering.
The surface covering of the floor can be made from almost all construction materials (wood, polymers, ceramics, natural stone, concrete, metals, etc.). In this article, we will consider several types of modern flooring materials, their advantages and disadvantages.

**Keywords**: laminate, decorative layer, parquet, engineering board, advantages, disadvantages.

## Introduction

When choosing Polbop building materials, the following conditions should be taken into account:
- amount of mechanical loads to be covered;
- temperature and humidity conditions of floors;
- presence, duration and nature of aggressive environments in the room;
- type and thickness of the base;
- the maximum permissible interval between the completion of the work and the beginning of the operational period of the floors, etc.

Below we will consider several types of modern polbop materials, their advantages and disadvantages.
One of the modern types of laminate flooring. It got its name due to the production technology-lamination, that is, combining several layers. In appearance, it is a lamella (a board with a thickness of 7-14 mm) with a hinge joint and a unique "wooden" surface pattern, but nevertheless it is called synthetic floor coverings.
Laminate consists of several colored layers, each of which not only performs different functions, but also is made of different materials, mainly non-natural materials.

The structure of laminate layers is as follows:

**Stabilizing layer.** It is made of paper or cardboard impregnated with special synthetic resins to give strength and protect against moisture.

**The function of the load**-bearing or main layer is usually performed by a fiber board. In production, one of two types of boards is used: MDF - a light medium-density material with relatively low strength, or CDF - a denser, heavier and stronger material. Plastic can be used instead of a wooden board, for example, it serves as the basis of a waterproof laminate, because it does not absorb moisture at all.

**Decorative.** In fact, it is this layer that is responsible for how the floor covering looks. As a decorative layer in an inexpensive laminate, a patterned paper is used that imitates the structure of one of the types of wood (from ordinary oak to exotic andiroba). Kraft paper can be placed under it to increase the life expectancy. A veneer made of natural wood can be used as a decorative layer in an expensive laminate. Accordingly, the more rare and expensive wood is used for its production, the more expensive the laminate itself is.

Overlay (overlay). Paper, no matter how dense it is, is not completely resistant to mechanical damage and especially to moisture, so a strong film made of polymer resin - transparent coating is always used as the last layer. The coating can be smooth (matte, semi-glossy, glossy) or textured, imitating the unevenness of wood fibers. In addition to the protective function, it gives the laminate a "glossy finish" and at the same time performs a decorative function.

Production technology can be determined by 3-letter symbols.

DPL-direct pressing. The simplest technology used for the production of cheap laminate. In the production process, wide layers of materials are stacked on top of each other and pressed under high temperature. The resulting "plate" is cut into separate lamellae. This type of laminate is characterized by the shortest life span, because the finish layer begins to move and disintegrate over time, which soon damages the decorative layer and even the base.

HPL-high pressure pressing. Assembling the laminate is done in 2 steps: to achieve the best adhesion, the coating and the decorative layer are first pressed, and then they are pressed together with the base. The result is the best wear resistance and longevity.

CPL-Pressure with constant pressure. Similar to the previous method, but when pressing the two upper layers, an additional stiffening Kraft paper layer is placed under the decorative layer.

DPR is one of the most innovative production methods, in which the decorative paper layer is replaced by color printing directly on the base. It uses a method called sublimation printing, which allows you to transfer not only pictures, but also complete photos to almost any material.

Advantages of laminate:

- attractive appearance;
- different colors and textures;
- there are several strength classes for use in different conditions;
- simple installation technology;
- high thermal insulation properties. There are varieties designed for laying on heated floors;

- service life depends on the class of lamellas. On average, this is 15-20 years. High-end models last 30 years or more.

Disadvantages:

-sensitivity to moisture. Weakly protected ends absorb water, under its influence the lamellae are twisted and destroyed. To smooth out this defect, the elements are covered with a special filler during laying;

- the "noise" of the coating. Proper installation and additional sound absorption will remove this drawback.

Parquet is individual planks made of solid wood, on the edges of which there are grooves and ridges designed to connect them. Depending on the profile of the edges, the planks are divided into types: with ridges and grooves on opposite edges and ends, with a ridge on one edge, and with grooves on the other and ends. The boards of the first type are produced in the form of connecting from the "right" and "left" sides. Parquet without grooves and ridges is also produced

Parquet is distinguished by the presence or absence of a selection of geometric dimensions, types of wood and types of cutting, as well as monotony.

Parquet boards are produced in different thicknesses of 14, 15, 16, 22 mm and similar sizes. Not only the thickness of the parquet board, but also the thickness of the working layer, that is, the thickness of the ridges that can be smoothed during laying and repair, is also large. is important. In 15 mm boards, the thickness of the working layer is 7 mm, and in 22 mm boards, it is 9 mm. In addition, if they still have residual stresses, then they can be deformed after installation.

The absolute values of flexibility and deformation are also affected by the length of the planks (planks longer than 350 mm have the same elasticity problems as thicker planks). Parquet collects moisture mainly along the edges, protected from above and below. 22 mm parquet feels more moisture and therefore deformation, which shortens the service life of the coating. The wider the parquet planks, the less seams there are on the floor. However, with poor quality drying and the presence of residual stresses in the wood, the possibility of deformation and warping increasesA necessary condition for obtaining a smooth and flat covering of the floor is the production of parquet planks with the necessary groove and ridge parameters, with minimal errors in dimensions and angular characteristics, almost unaffected by changes in temperature and humidity regime.

Usually, parquet boards are sold without a finish layer. Only after laying them on the base, they are sanded, varnished and the floor has a finished look. Parquet can be laid in different ways: "fir", "bottom", "woven" and others. It can be supplemented by adding a simple pattern from the parquet (a rosette, a border). In the artistic laying of parquet, not only straight lines, but also curved shapes from different types of wood are used, as a result of which complex drawings can be created.

Advantages:

- ecologically clean;
-good heat and sound absorption;
- long service life. If properly laid, it will last more than 50 years;
-very nice looking.

Disadvantages:

-sensitivity to temperature and humidity differences;
- complex and expensive installation;
- high price.

Parquet boards are a multi-layer construction consisting of three main layers glued together:

- the upper part is decorative, made of solid wood and covered with decay-resistant varnish or impregnated with oil, thickness 1-4 mm;
- the middle layer made of spruce or pine bars laid along the load-bearing board;
- lower-compensation, made of veneer, the fibers are located along the board.

The total thickness of the board is 7-22 mm. the board is grooved and ridged and easily assembled into a solid finish that does not require sanding and finishing.

Advantages of parquet boards:

- simplicity of installation technology. Under certain conditions, laying in the heating system is allowed;
- styling variability; .
- a large selection of textures and colors;
- high strength, resistance to bending loads;
- stability and security;
- routine care and maintenance.

Disadvantages:

- sensitivity to moisture. Prolonged direct contact with water is not possible;
- sensitivity to excessive heat and aggressive environment

Among the floors made of natural wood, the engineered board has a special place. The products not only match the appearance of the wooden floor, but also excel in terms of technical characteristics, resistance to mechanical factors and service life.

Engineering board is a wooden covering for installing floors in residential and public buildings. The construction of planks consists of several layers glued together. The plank is glued to the plinth or plywood with glue.

The engineering board is produced in two forms, which differ in terms of structure:

Two-story. The lower layer is made of high-strength birch plywood or HDF board, the upper layer represents a valuable type of wood: oak, walnut, etc. Due to the stable layer of plywood, the coating is resistant to moisture and temperature changes. The thickness of the main layer can vary from 0.8 to 1.1 cm.

Three floors. The most common structural option similar to parquet board. Oak, ash, walnut or exotic wood is used as an outer layer (2-4 mm thick). At the bottom there is a thin layer of conifer or birch plywood, and between them are parallel lamellas from conifers or birch.

Depending on the thickness of the decorative coating, the preservation of the floor and its service life are determined. The thicker the cut of the tree, the more flooring there is to restore and renew its appearance. Veneer with a thickness of 3-4 mm is the most common, and it can be renewed 3-4 times.

Like other natural wood floors, engineered wood has advantages and disadvantages, which we will consider in more detail below.

Advantages of engineering board:

- stability. Due to the layers glued together, the material shows resistance to deformations under the influence of humidity and temperature difference. Compared to other options of parquet, the

engineered board has geometric stability and retains the shape of the lines throughout the entire working period;

- endurance. The service life of the plank exceeds 30 years, subject to the maintenance rules and recommendations of the manufacturer. The coating can be polished and rotated, thereby renewing its appearance;

- engineering board is also used for laying heated floors: if the temperature does not exceed 27 degrees;

-boards are not dismantled in the process of restoring the appearance, which facilitates the restoration process;

- the variety in the size and thickness of the material allows you to choose products for placing all floor coverings in the building at one height;

- it is not necessary to lay the plywood on the base for installation, laying can be done on a screed;

- laying is carried out with any pattern: classic spread, Hungarian and French arch, as well as the possibility of using decorative additions is not excluded;

- the sound absorption of the room can be increased using the adhesive installation method;

- compared to parquet, it does not require such careful maintenance of special microclimatic conditions in the room;

- various decorations and design solutions.Planka is not only available in standard sizes and colors, but can also create shaped lamellas or customized colors.

Disadvantages of engineering board:

- high installation cost compared to closed coatings. The work itself is more expensive and parquet chemistry is also required: soil and glue;

- it is not possible to collect the floor by the floating method;

-difficulties in restoring individual parts, because the coating is fixed with glue;

-complexity of choosing a material of the same color;

-that the gluing process can be performed only by professionals.

In conclusion, it can be said that, in addition to technical and economic requirements, modern floors must also fulfill decorative requirements as a part of the interior. In the market of modern building materials, you can find a variety of flooring materials that meet the above requirements.

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