

WOOD PLASTIC COMPOSITE

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Abstract

This paper presents the importance of using plasticized wood, which emits no toxic gases and releases no harmful substances in the environment (from fiberboard materials using formaldehyde-based adhesives). WPC material is able to remove any undesirable characteristics of wood and production technology has extreme durability and resistance to almost all external factors, without the need for maintenance. Plasticized wood is made from sawdust coming from recycling of wood, making it an ecological product.

Key words: wood plastic composite, wood recycling.

INTRODUCTION

What is plasticized wood?

Plasticized wood (WPC) is a generic name for wood and polymer composites. The technology was invented more than fifteen years ago in North America, becoming a standard in the construction of outdoor terraces. The purpose and main idea behind the WPC material was able to remove any undesirable characteristics of wood (rot, mold, insect infestation, discoloration, shrinkage, twisting, inequality, chips, the negative impact of the sun, frost, water, etc.) but maintaining the visual appearance of the wood surface.

WPC is an artificial product "wood", a two-thirds as sawdust mixed with polymers, providing an optimal balance between these two materials. The production technology of this material is extremely durable and resistant to almost all external factors, without the need for maintenance. WPC is the material of the future, which saves you money, worry and time.

MATERIAL AND METHODS

In the world there are many manufacturers of plasticized wood. Base remains in North America, but recently manufacturers have emerged in China foreground with a range of products economically advantageous (ADHIKARY, K. B., et al., 2008). Basic differences between products are mainly in the following areas:

Technology used

Wood can be of variable quality, but above all, the nature and contribution of the polymer influence the final properties of the material.

The optimal ratio between wood and polymer is about 60% - 70% wood and 30% - 40% of the polymer.

This report provides a high degree of visual reproduction of the wood surface. A higher intake of polymer will give the final product looks plastic. Plasticized polymers are used in wood HDPE (high density polyethylene) or PP (polypropylene). HDPE is more resistant to fluctuations in temperature, especially frost affecting the overall strength of plasticized wood (Byong H. Lee, et al. 2009).

Finishing

Plasticized wood goal is to imitate as best qualities of wood while retaining strength of plastics. Individual plasticized wood products differ in surface finishing (small ditches, pits large, smooth, polished finish, etc.) and natural surface appearance. In this case, the rule is simple.

The more content all the wood is more natural look of wood is reproduced exactly. Plasticized wood quality can be easily noticed by its visual appearance special.

Profiles

Plasticized wood floor is divided into two groups depending on their form. The most common are floor profiles. They are produced in various lengths, colors and surface finishes (KLYOSOV, A.A., 2007).

The profiles are divided according to the structural composition of empty and full. Bare boards have a lower load capacity and there is a risk that they will crack due to frost. On the other hand, are usually lighter and cheaper than full.

A second category of products is the plasticized wood boards (usually square) which is mounted also gritstone.

RESULTS AND DISSCUSION

Cleaning and maintenance of surface

Plasticized wood terraces requires minimal maintenance, usually associated only with the elimination of impurities resulting from human activities or climatic influences.

Usually, it is recommended once a year (spring), wash surfaces with soap or detergent water. The space between the boards should be kept clean to ensure efficient drainage .

The attention of oil and grease stains, such as those resulting from the grill.

Because wood materials include plasticized wood components that have a natural water absorption, they can cause permanent traces of oil stains. If staining is important to clean the place with water, detergent and degreasing agent. Do not use solvent.

Removing scratches

If the surface is scratched, either with a brush to remove the wire or using light sandpaper fine, but always in the direction of fibers. Plasticized wood surface hardness is often compared to the hardness of oak wood.

Traditional wooden terraces are beautiful, but not for long.

After a certain period, depending on the type of wood will notice a natural change of color and uniformity of surface.

Most of the wood comes from waste wood (fig. 1), waste that can be better exploited in manufacturing plasticized wood than in traditional capitalization (bark can be burned or composted sawdust can be harnessed in the form of FAP , fuel, or in agriculture as animal litter and shavings that can be used for wood boilers, panel of chipboard or paper pulp).

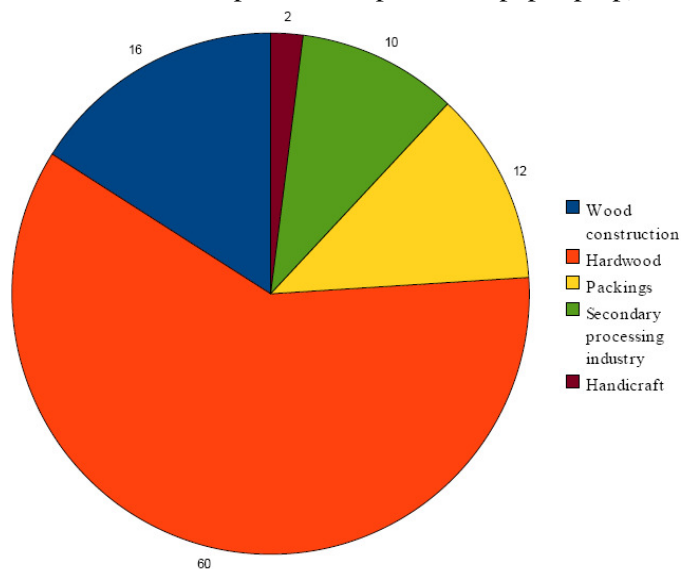


Fig. 1 Source of Wood Waste from Wood Processing

Waste wood can have many destinations and can be used more for good than for environmental degradation (Vădineanu, A., 1999).

The wood is polluting itself unless that is not used in its natural form.

Waste wood can be dangerous for the environment (Pickin, J., 2008,).

European laws do not allow to be brought to the landfill to ensure that:

- It is flammable;
- Can be sold and only waste that can not enter into a process of recycling can go to landfill (Wehry A., M. Orlescu, 2000);
- Can be exploited for sub-products and fuel wood which can be

considered an advantage both economically and ecologically.

Plasticized wood is a composite based on sawdust and plastic, looks almost like wood, at first sight is impossible to differentiate. It features excellent conservation, eliminating all wood defects.

This provides a guarantee of 20 to 25 years. Moreover, it is also resistant to chlorine in pool water.

By nailing wood plastic composite profiles one can obtain benches, garden tables, fences, gazebo, in an unlimited variety of colours and textures.

For assembling wood plastic composite profiles one can use the same tools as for carpentry.

Wood plastic composite profiles can be easily drilled or milled and sawed or fixed with wood screws.

The objects produced from wood plastic composite are exceptionally resistant to water, UV, molds, bugs, high or low temperatures (CUI Y., et al., 2008).

Wood plastic composite profiles can be aditivated with flame retardants on request, obtaining a times higher fire resistance than impregnated wood.

These profiles do not need paint or coating and are weather proof guaranted for at least 15 years (9).

If necessary, wood plastic composite can be specially surface treated in order to be painted or coated. By embossing, napping or sanding, wood plastic composite profiles almost match the texture of natural wood.

The bending strength is minimum 3 times higher compared to wood for same thickness. Wood plastic composite profiles are mass coloured so even bluntness doesn't affect the surface look as it happens after intense use of laminated products.

Usually rectangular profiles are obtained by extrusion, most commonly used for deckings (70% of world wood plastic composite production of 1 500 000 tones, near 350 millions square meters).

These profiles are used for exterior deckings and floors for gardens and terraces, pontoons, playing grounds in parks and stadiums.

A great advantage of wood plastic composite profiles is their very low variation of dimensions by exposure to sun light and temperature, the expansion coefficient of wood plastic composite being close to aluminium (10).

Other extruded profiles are used for pillars, fences, tiles, wallpanels, heavy duty pallets, windows and doors systems.

Being exceptionally resistant to weather conditions, wood plastic composite products are the perfect solution for city exterior furniture (benches, garden tables, carbage bins, bridges and boat pontoons, gazebo).

CONCLUSIONS

Plasticized wood is made from sawdust coming from recycling of wood, making it an ecological product.

Commercial view

Wood plastic composite products need no maintenance, saving costs for painting and protection coatings. Compared to impregnated wood which costs almost the same, wood plastic composite decking profiles are amortized in first two years.

Even compared to much cheaper normal wood, wood plastic composite has a overwhelming technical superiority , and initial investment is recovered latest in ten years.

An eco friendly material

Due to his structure and composition, wood plastic composite doesn't affect environment by emissions of toxic gases or harmful substances, unlike other wood based materials which use formaldehyde glue (Kirkeby, J. T., et al., 2005).

Wood plastic composite doesn't produce second grade pollution, technological waste can be easily processed again.

The life of a wood plastic composite product is at least 15 years, thus saving timber and wood with a much shorter life.

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