

Research on Key Technologies of Wood Plastic Composites Recycling

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Abstract. By recycling some plastics and wood powder for the production of plastic wood, the products of the project realize the recycling of waste plastics, save forest resources and contribute to the harmonious development of the environment and society. This article attempts to solve the problems of mildew caused by high filling by adding appropriate mold inhibitor, reduces the impact of the environment on plastic wood products, and ensures the service life and appearance of plastic wood products.

1 Introduction

Wood plastic, as the name suggests, is the combination of solid wood and plastic. It not only maintains the affinity feeling of solid wood flooring, but also has good moisture resistance, water resistance, acid and alkali resistance, fungal inhibition, antistatic, insect resistance and other properties. It is another initiative of the plastic wood flooring series to cooperate with the wood flooring industry. A series of wood plastic composites produced from wood chips, straw, waste plastics and other wastes are gradually entering the decoration, construction and other fields.

1.1 Advantages of wood plastic

Wood plastic flooring is a new development direction of building materials industry. It is waterproof, moisture-proof, high environmental protection. Wood plastic board, which combines many advantages of plant fiber and plastic polymer materials, can replace wood in a large number, and can effectively alleviate the contradiction between the poverty of forest resources and the shortage of wood supply in China. It is a kind of low-carbon, green, recyclable and renewable ecological plastic wood material with great development prospects.

Wood plastic is a new material that replaces wood. It takes plant fiber as the main raw material and is synthesized with plastic. It has the advantages of plant

fiber and plastic, and has a wide range of applications. It can cover almost all the fields of log, plastic, plastic steel, aluminum alloy and other similar composite materials. At the same time, it also solves the problem of recycling waste resources in the plastic and wood industries. Its main features are: resource utilization of raw materials, plasticization of products, environmental protection in use, cost economy, recycling and rebirth.

The research and development of wood plastics is to take waste wood and waste plastics as raw materials, reuse them and manufacture new materials on the premise of considering resource recycling. After regeneration, this material can replace natural wood and other composite materials in terms of texture and hand feel.

1.2 Application fields of wood plastics

The application fields of wood plastic profile products are very wide. With the increasing voice of environmental protection, it has become an inevitable trend to find substitutes for wood products. Building materials, home decoration, industrial products, warehousing and logistics, etc. wherever wood is used, wood plastic products can be used, and even can replace some plastic products. The products are widely used and have a bright development prospect. At present, wood plastic profile products are mainly used in:

Table 1. Application fields of wood plastic profile products.

Item	Application fields of wood plastic
Building structural Materials	All kinds of indoor and outdoor planks, fences, building templates, moisture-proof partitions, stair boards, handrails, door and window frames, platforms, water buildings, road boards, wooden houses, etc.
Automotive applications	Door trim panel, bottom plate, seat back, instrument panel, armrest, seat base, top plate, etc.

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Applications in Logistics	Transportation pallets and export packaging pallets of various specifications, warehouse bedding plates, various packaging boxes, glass transportation shelves, etc.
Garden applications	Various settings in the community, outdoor tables and chairs, courtyard armrests and decorative boards, flower pots, open-air flooring, waste containers, etc.
Applications in interior decoration	Various decorative strips, decorative plates, mirror frame strips, curtain rods, curtain rings and decorative parts, movable shutters, ceilings, wallboards, etc.
Others	Outdoor dining table, cabin partition, train or truck compartment floor, toys, storage box, highway sound insulation board, movable rack, etc

1.3 Advantages of wood plastic

The industrialization and promotion of wood plastic materials originated in the United States in the 1980s and was initially applied as modified plastics. With the improvement of technical level, wood plastic gradually has the advantages of plastic, wood, metal and other simple materials, and has become a new type of material with its own system. At present, all kinds of wood plastic products have been widely used in the United States, Canada, Germany, Britain, the Netherlands, Japan and South Korea, forming a relatively standardized industry and market.

North America is the region with the fastest development and largest consumption of wood plastic materials in the world, which is mainly used for outdoor buildings with rough styles. The annual growth rate of American wood plastic market from 1990 to 2000 was more than 10%, especially in the past five years. There are about 50 wood plastic enterprises in the United States, with an annual output of more than 10000 tons. There are also more than 50 research and development institutions of wood plastic materials in the United States, forming a complete industry from product research and development, raw material collection, equipment manufacturing, mold development, product production to marketing. After more than 10 years of efforts, Canada has also formed a wood plastic industry with more than 10 enterprises as the main body and an annual output of more than 50000 tons.

The overall development of wood plastic industry in Europe is not as good as that in North America, but it has accelerated in recent years. There are not many wood plastic enterprises in Europe, but they have strong equipment manufacturing capacity, and their development potential cannot be underestimated. Europeans have more delicate requirements for wood plastic materials, and their demand for varieties and colors is also higher than that of North America. Indoor decoration and outdoor buildings go hand in hand, but the application technology and commodity market are

not very mature, and there is still much room for growth. Due to geographical reasons and environmental awareness, the application of wood plastic materials is relatively common in Japan, and the product quality is also relatively good. After more than ten years of efforts, wood plastic research institutions represented by EIN Wood Co., Ltd. have developed high-quality wood plastic materials. Its products have natural wood color and texture, and have been widely used in the field of building decoration. It is one of the highest quality products in the world at present, representing the quality level and development direction of wood plastic materials replacing natural wood.

2 Research on new technology of plastic wood composites to realize social sustainable development

2.1 Urgent requirements of environmental protection for the upgrading of plastic wood composite industry

From the 1960s, the plastic industry began to impact the wood, metal, paper, leather, cloth and other material industries, occupying an important position in building materials, packaging and other fields. Plastic has excellent physical properties, and can change the properties of plastic by adding different additives according to the needs of product use. It is cheap and easy to process. Plastics are widely used, bringing progress and civilization to human life. However, due to the superior physical properties of plastics, after being discarded, they have been floating around for years, causing "white pollution" to the ecological environment, which has raised the hottest topic of environmental protection materials since the 1990s. In this context, the use of recycled and mixed plastic mixtures as its basic resin system, plastic wood composites, has emerged, and has environmental and economic benefits.



Fig. 1. Plastic wood recognized and promoted green environmental protection material

2.2 Alleviating the contradiction between domestic wood supply and demand is in line with the requirements of China's sustained and stable economic development

In recent years, with the sustained and stable development of China's economy, the continuous promotion of urban and rural reconstruction and construction, the unprecedented prosperity of the real estate industry and building materials and decoration industry, the contradiction between wood supply and demand has become prominent. In fact, China's green space coverage is relatively low in the world. Due to the large population base, the per capita forest area is less than 1/4 of the world average, and the per capita forest savings are less than 1/6 of the world average. In this situation, plastic coated composites, as a new building material that can replace wood, have great development potential and promising market.

In order to alleviate the contradiction between domestic wood supply and demand, the State adopts two measures to regulate and control. On the one hand, we should increase the area of artificial afforestation and increase the import of wood. On the other hand, we should strengthen the recycling and reuse of waste wood, improve the utilization rate of wood and save wood. To this end, in 2004, the national development and Reform Commission issued the document "development and Reform Office high technology (2004) No. 1277", which listed plastic wood composites as a major industrial technology development project. In 2005, the State Council issued the notice on doing a good job in the recent work of building an energy-saving society and the document No. 2 "opinions on accelerating the promotion of wood energy conservation and substitution", which laid a macro development direction for wood plastic composites.

To sum up, environmental protection industry and resource development industry are both sensitive hot topics in the world today, and they are sunrise industries in the 21st century. The new environmental protection material project conforms to the requirements of social development and the guidance of national policies. It not only meets the requirements of environmental protection, but also opens up a new resource treasure house. It is the latest economic and technological hot spot that investors and entrepreneurs pay attention to. It can be said that the project fully meets the requirements of new industrialization, and is a new and good project of resource-saving, environment-friendly, circular economy, scientific and technological innovation and sustainable development.

2.3 Market prospect of plastic wood composites

This paper aims to achieve a breakthrough in high-performance and cost-effective wood plastic products by studying the key technologies of advanced processing and manufacturing technology of plastic wood composites, establish a technical platform, realize industrialization, support and promote the provincial environment-friendly material - plastic wood composite industry, and promote the development of related pillar industries (such as building materials, automobile manufacturing, logistics and transportation, furniture manufacturing, etc.).

The project has great profit space and high economic benefits for wood plastic production enterprises. It can not only effectively use natural wood fibers and improve the comprehensive utilization efficiency of wood resources, but also reduce the pollution of waste to the environment, realize the full utilization of resources, and have important practical significance for the coordination between man and nature, national economy and social sustainable development.



Fig. 2. Examples of plastic wood composite wallboard

3 Conclusion

The article takes waste plastics and waste natural fibers such as wood flour and rice husk as raw materials, turns waste into treasure, and can maximize the use of waste resources, reduce the environmental pollution caused by waste plastics and agricultural and plant wastes, reduce the pressure of environmental pollution, and protect the ecological balance. At the same time, it drives the development of the whole industrial chain of construction industry, decoration industry and energy-saving industry. Supporting and stimulating a number of downstream deep-processing enterprises will play a very positive role in social and economic development and social stability.

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