

Research of Wood-Polymer Compositions of DMTA Methods

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Abstract

The article presents the results of polymer-wood composites, as well as the excretion of tritium woods and leaves. The base of the composite was made of thermoplastic polypropylene. Three composites prepared by the volume of filling content (25, 50 and 70%) and the various fractions of the used slags were prepared for research. The test is prepared with the use of spray technology. One of the methods of thermal DMTA analysis is used for research. Accompanied studies of dynamic mechanical properties have been chosen to determine the effect of filling and the size of the traces on the properties of the cured composites. The obtained results were invited to determine the design of these materials, as well as the determination of the amount and the alternative level for materials applied to large-scale elements made of polymeric materials.

Keywords: *Polymer Composites, Wood-PP Composites, Dynamic DMTA Tests.*

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A. INTRODUCTION

The rising prices of raw materials produced from plastics (petroleum and gas) and the huge demand for these materials give rise to a growing interest in new composite materials on polymers as a basis. Wood is a widely used structural material, both on the basis of its price and on the coldness of the water, its tendency to deformation and hardening, and also the working workmanship cannot be applied to it. However, the deep impregnation with oil-permeable substances does not give the intended effects and sufficient resistance to water. For all, the structure of the wood, which is compared and the best possible chamber of the water, is significant with significant amounts of water [1-8]. State of the examination of material on wood, wood and water resistance.

One of such materials is WPC (wood-polymer composites). The carrier is a polymer, and the filler can be different wood fractions. Wood as a waste material is stucco-melting and can be used as a result of 70% filling of the composite. In view of the growing interest of producers in this material, work is ongoing to improve the technology of their processing.

Extrusion or blasting technology is most important for the creation of elements made of WPC material. In addition, we print profiles about the permanent device and do not end the long time. The main customer is the furniture and finishing industry, for which it was developed with a different type of sheet, profile, connectors, etc. This is because the technology of spraying is used to create a

different type of elements, from very small to the furniture industry (handles, handles, hangers) on the big ones.

Thermoplastic polymers based on polyolefin (polypropylene PP, polyethylene PE) and PVC vinyl chloride [9-16] are used for the production of wood-polymer composites. Otherwise, due to the heating temperature exceeding 200 ° C, it cannot be used for the preparation of WPC composites.

Waste from wood processing plant foundations can be used as a filler. It can be animals, trenches, wood pollen and other factions. The size of the fraction fraction depends on the gabars produced by the body and elements and the used technology and parameters of the construction machines.

According to the elements on price lists, a hundred small fractions of wood or wood pollen are used. It is possible to use a large number of wooden parts for large-scale elements with a connection. On the one hand, it must be borne in mind that, in each case, it is final to have documented testing of the elements thus created under a mechanical structure.

B. METHOD

1. The Goal and Scope of the Research

A very common knowledge of the point of view of the expansion of composite materials for post-limitation and wood is a documentary knowledge of the properties of mechanically prepared materials. The same effect has the same type of filling, its structure (number of special numbers), the size of the fraction, the percentage of filling and the conditions of the processing process.

The preparation of composite raw materials is filled with a level of filling with wood pulp and a fraction of these pulp, and then the evaluation of the properties of dynamic and prepared materials in the process of dynamic analysis of mechanical testing methods The DMA 242C device from Netzsch (Germany) was used for research, and the samples were prepared with the use of a Krauss-Maffei KM-65 130C4 two-pipe thermoplastic blower.

2. Prepared materials

Due to the thermal decomposition of wood in the application of blast furnaces, the temperature of the process must not exceed $190 \div 200$ ° C. As a base for WPC composites, materials with a melting temperature of less than 200 ° C can also be used. For the preparation of WPC composites and injection molding, it is necessary to apply a volume with a mass flow rate of $MFR > 15 \text{ g} / 10 \text{ min}$, if the filling content results in a significant reduction of the problem and can reduce the

problem. Polypropylene with a mass flow indicator MFR = 25 g / 10 min from Slovnaft was chosen for the bath.

Fulfillment of enough traces remained guaranteed through one of the largest companies of the Slovak-German government, which involved wood processing at the same time as wood trees, both ingots. Sufficient trunks were characterized by the welfare rate and the purpose of their good sieving and fractionation, and their drying was finally dried for 6 hours at 105 ° C. The material in the trunks was further divided into fractions with a mixture of sieves with the following values: 0.75; 1.5; 2 mm. Thus, separate fractions were subsequently supplied in such a way as to ensure that two thirds were responsible for: 25, 50 and 70% of the total volume of the prepared composite. In view of the change in the cost of production, which is very important in industrial words, the filler (trumpet) is not subject to any preparation by pro-adhesive agents. Only wood pollen was separated during the screening.

3. Preparation of research tests

At the same time, as well as the filling was measured in a laboratory plant with a floor and loaded with a used weight of 0.002 kg, with a dry wood density per m³ of 480 kg. After preparing the appropriate proportions, mix the ingredients in the dough mixer for about 5 minutes for each of the prepared recipes. It is then approached to inspect the spray test tubes. For the first time, clean PP was sprayed in order to reduce the amount of the damaged WPC composite with the original base material.

The following blasting conditions are available:

- a. Tempera temperature, dyss: 40, 120, 160, 190, 170 ° C
- b. Jet velocity 60 cm³ / s
- c. Or docking at 0 and 35 MPa (for pure PP)
- d. Docas time 0 and 20 s (for pure PP)
- e. Cooling time 20 s
- f. Mold temperature: 20 and 60 ° C

In addition to the assessment of mechanical properties, standard test tubes are used to ensure that they have a cross-sectional diameter of less than 10 × 4 mm. Of these, the tests were prepared for research with the use of the DMTA thermal analysis method. Thermal analysis of dynamic mechanical properties accompanied by the use of NETZSCH DMA 232A, taking into account the increasing parameters: frequency of withdrawals: 1 and 10 Hz, average amplitude 180 μm, temperature plot from -50 to 130 ° C.

C. RESULT AND DISCUSSION

The proposed results relate to the inflow of the filling agent and the dimensions of its amounts. In each of the drawings, thermograms are presented for composites filled with 25 and 70% wood pulp and as removal - pure PP (filling rate 0%).

The performance of the filling agent marked the height of the maintenance module in comparison with the first, pure PP. For a material filled with 25% of a wood filler, the height ranged from 3500 MPa for pure PP to 5000 MPa, and for a material filled with 70% in a volume with an increase in the value of MP 600. At a temperature of 120 ° C, or at the end of the operation, the range between these materials is no longer as significant, but even so the material is not filled with the lower values of the E-preservation module. Analyzing due to changes in mechanical loss, it is common to show that all the materials tested show an overgrowth of glass at the same temperature (around 10 ° C), the same being the same as the intent. Unfilled material shows a greater value of $\text{tg}\delta$ in the whole range of the scale.

From a temperature of -20 to 10 ° C, the current rate is related to the relaxation of the relaxation. In the whole course of the course there is also one extra $\text{tg}\delta$ corresponding to the temperature range between 40 ÷ 80 ° C. Do not see what can be said about this response in the course of the conservation module E ' same diameter or sample preparation.

The DMTA passage for 1.5 mm fractions is presented on line 2. The material filled with 70% wood shows the highest value of the conservation module E '. In the case of a fixed base load (PP), it yields close to 2000 MPa, whereas the composite has a filling level of 25% of 1200 MPa, which is due to the greater stability of this material. Analyzing the course of changes in the mechanical loss range of the $\text{tg}\delta$, it is common ground that the material, which is unfulfilled, shows significantly more corrosive properties that fluctuate throughout the temperature range. The WPC is filled with 25% wood in the remaining two research areas as part of the operating system. On the basis of this drawing, even if, in the course of the operation, the changes in filling performance do not significantly change the translucent properties.

In the case of a solid wood filling of 25% wood, there is an extreme extravagance corresponding to a temperature range of 40 ÷ 80 ° C, which means that it is not only poor and can otherwise be treated as a material (in PP).

The rail of the analyzed fraction is the fraction with a diameter of 2 mm. To see the drawing, the material filled with 70% wood for this size of the filling fraction obtained the value of the conservation module at a range of 5500 MPa, but this was only the first design limit. At a temperature close to 0 ° C, the drawing is carried out

as far as the 1.5 mm fraction. At a composite content of 25%, the filling value E' at the beginning of the ratio was 4500 MPa.

Analyzing the above research results in the case of free-standing ditches, it can be ensured that delivery to the polypropylene filler in the case of unprepared wood-based trunks will increase the dynamic module of the tested composites in the right-hand comparison.

The supply of 70% wood filler in the volume range will increase the E' average by more than 1500 MPa, which is a significance of the increase of this parameter. Analyzing the whole course of the modified conservation module E' is widely known that for a fully loaded compound in the WPC, 70% of the fraction size does not have a certain effect on this value. The maximum value of the preservative module E' was obtained by a material filled with wood with a fraction of 0.75 mm, which was 6000 MPa. Otherwise, the situation is presented when we analyze this parameter for WPC filled by 25%. For this material, the size of the fraction affects the results of the research. The most mechanically mechanical properties of the material, which were blown into a mold with a temperature of 60 ° C, filling with a fraction of 0.75 mm - in the overall ratio of the ratio, it was higher than the value of about 500. WPC 25% occupying other fractions of filling.

D. CONCLUSION

After examining the DMTA research, it can be concluded that wood-polymer (WPC) composites have achieved an alternative for pure poly-row (non-filled) and the same wood. The wood panel possesses many years, before all it is a natural material, it can be obtained from technological waste, the supply of wood in a pile of 70% will significantly increase the mechanical properties, but it is even more difficult to do so. The connection of wood chips with a polymer limits the coldness of the water without the need for varnishing as in the case of wood. In addition, a huge WPC package is a low price for clean rooms. It is possible to admit that in recent times, new industries will be interested in these materials as well as find new responsibilities.

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