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Radiation Treatment Of Composite Polymer Coatings At Optimal Technological Parameters And Study Of Their Properties

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ABSTRACT

The purpose of this thesis is the development of optimal technological parameters of processing of composite coatings γ-rays, providing them with high adhesive, strength properties and wear capability, leading to increased efficiency and durability in abrasive conditions.

KEYWORDS

polymer composite, fillers, coatings, structure, properties, technology, adhesion, tensile strength, micro hardness, impact strength, radiation, γ-irradiation.

INTRODUCTION

At present, the main goal of the Republic of Uzbekistan is to accelerate the scientific and technological process, the transition to a dynamic path of development, the production of import-substituting and export-oriented raw materials and supplies. The production of polymer products plays an important role in the development of our economy. Rapid socio-economic growth of the polymer industry of Uzbekistan determines the production of certain polymer and composite materials with high physical mechanical and operational properties from physicochemical methods or the improvement of existing production methods. At present, a lot of research has been done in the field of composite polymer materials and coatings based on them, as well as physical and chemical improvements, composite polymer coatings and materials have been developed for use in various industries. However, to date, the above-mentioned composite polymer

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materials and coatings have a low place in terms of application in machines and mechanisms used under abrasive wear conditions due to their low wear resistance. These properties can be improved by improving the composition of coatings by physical processing, mainly radiation (which is widely used in the production of radiation processing of polymer and composite coatings due to their insufficient study).
Therefore, a comprehensive study on the effect of processing of composite polymer materials and coatings on g-rays, their effect on physical, chemical and operational properties and the development of optimal technological parameters of their radiation processing in complex g-rays o Transfer is a topical issue. In recent years, physical modifications, including electromagnetic, ultrasonic, and radiation modifications, have become widespread. However, little research has been done to date on the effects of physical modification, including the technological parameters of radiation reprocessing, their effect on the performance properties of polymer composite materials and coatings based on them. The possibilities of significantly increasing their longevity due to the modes of radiation effects of γ-rays on polymer and composite coatings and the choice of the optimal recipe have been poorly studied. The principles of aging, which depend on the technological parameters of the γ-radiation regime under the conditions of use of polymer composite materials and coatings in abrasive environments, have not been studied in practice.

The widespread adoption of modified polymer and composite coatings in g-rays requires extensive research in various industries and the determination of the technological parameters of the optimal g-irradiation mode of coatings, as well as the selection of appropriate polymers and fillers. The purpose of this study is to develop optimal technological parameters of processing in composite polymer coatings, providing them with high adhesion, strength properties and wear resistance, increasing work capacity and longevity in abrasive conditions of use.
Therefore, first, the production of all polymer and composite materials is one of the most pressing issues.to modify them and to recommend them for scientific research, as well as for the application of a number of works that have been done so far, based on their concentration indicators. To date, a number of issues have been identified in our work, which have studied the resistance to abrasion and abrasion in composite polymer materials and coatings under the conditions of operation of machines and mechanisms. Their level of study is insufficient, so their widespread application in the production of composite polymer coatings by increasing their durability through complex radiation modification is one of the current problems.

METHODICAL PART

We have selected the following for the research. These are thermosetting and thermoplastic polymers - high-density polyethylene (PEYUZ), pentoplast (PTP), epoxy oligomer (ED-16), and Furano-epoxy oligomer (FAED-20) and filler-iron powder, aluminum powder, graphite, talc , alighting. Also steel, aluminum, copper and other sheet surfaces the composite composition is mainly eD-16 and FAED-20, and we have selected additional softeners (DBF) and hardeners polyethylene polyamine (PEPA) to improve the properties. The goal of this research work Abrasive abrasion is the processing of composite polymeric materials and coatings with g-rays at optimal technological parameters and their high adhesion, abrasion resistance, as well as durability, strength properties.

In carrying out the research, we identified the following tasks:

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- Study of the properties of composite polymer coatings by radiation treatment in g-rays;
- Study of the properties of g-ray radiation treatment of filler composite polymer coatings;
- Study of the mechanism of the effect of radiation treatment on the structure of polymer and filler polymer coatings;
- Experiments on the durability of composite polymer coatings by radiation treatment in γ-rays;
- Radiation in g-rays on composite polymer coatings for use in the form of production in construction and decoration structures

Development of optimal technological parameters of processing and analysis of the obtained results;

Scientific and practical novelty of the research: complex research of thermo reactive and thermoplastic polymer coatings in γ-rays, as well as composite polymer coatings with optimal technological parameters.

The practical novelty of the work is the application in the production of polymer composite materials and coatings processed at optimal technological parameters and experiments based on them.

A number of issues have been identified in our work to date, which have studied the resistance to abrasion and abrasion in composite polymer materials and coatings under the operating conditions of machinery and equipment.

Their level of study is insufficient, so their widespread application in the production of composite polymer coatings by increasing their durability through complex radiation modification is one of the current problems.

RESEARCH METHOD

The dependence of the radiation dose on the adhesion strength of the filled pentoplast coatings

The scientific novelty of the work is the complex study of thermosetting and thermoplastic polymer coatings, as well as composite polymer coatings with optimal technological parameters, on the basis of which they reveal their durability, strength and high adhesion properties under operating conditions. The practical novelty of the work is the application in the production of polymer composite materials and coatings processed at optimal technological parameters and experiments based on them. The purpose of the study The research purpose of this article abrasive corrosion involves the processing of composite polymeric materials and coatings with g-rays in optimal technological parameters and their high adhesion, abrasion resistance, as well as durability and strength properties.3.

CONCLUSION AND DISCUSSION

The dependence of the radiation dose on the adhesion strength of the filled pentoplast coatings The results of the study on the adhesion strength of composite furano epoxy coatings filled with ferromagnetic, diamagnetic and paramagnetic fillers up to 10 mg are presented. Irradiation dose for graphite-filled (2.5 kN / m) coatings is 100 120 Mrad, irradiation dose for iron powder-filled coatings (120 kN / m) is 90 100 Mrad, talc-coated coatings (1, For 9 kN / m), their adhesion strength is highest when the irradiation dose is 100 to 110 Mrad. The dependence of the radiation dose on composite pentoplast coatings filled with graphite, iron powder and talc is shown in Figure 3.1. At the same time (188 MPa), high growth values of all coatings filled with iron powder (158 MPa), talc (107 MPa) occur when

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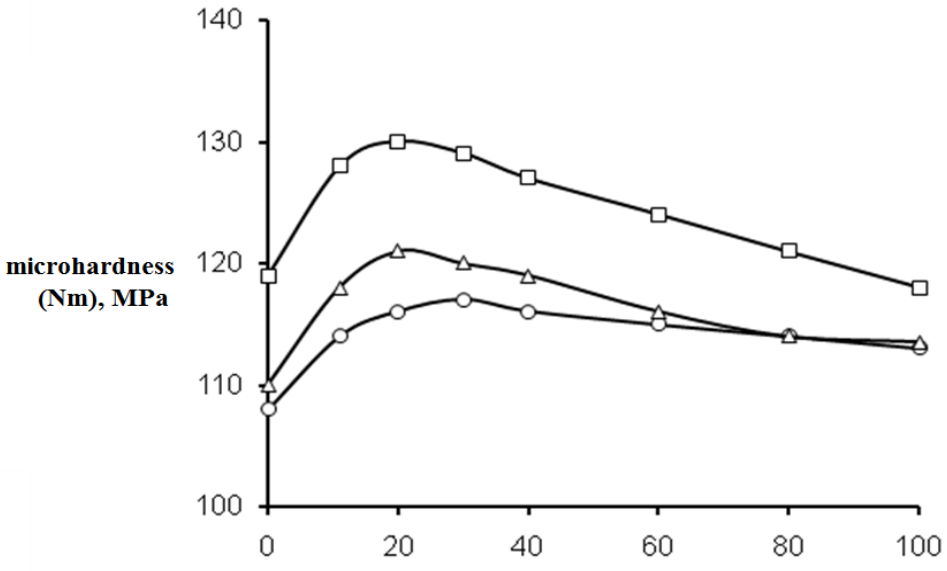
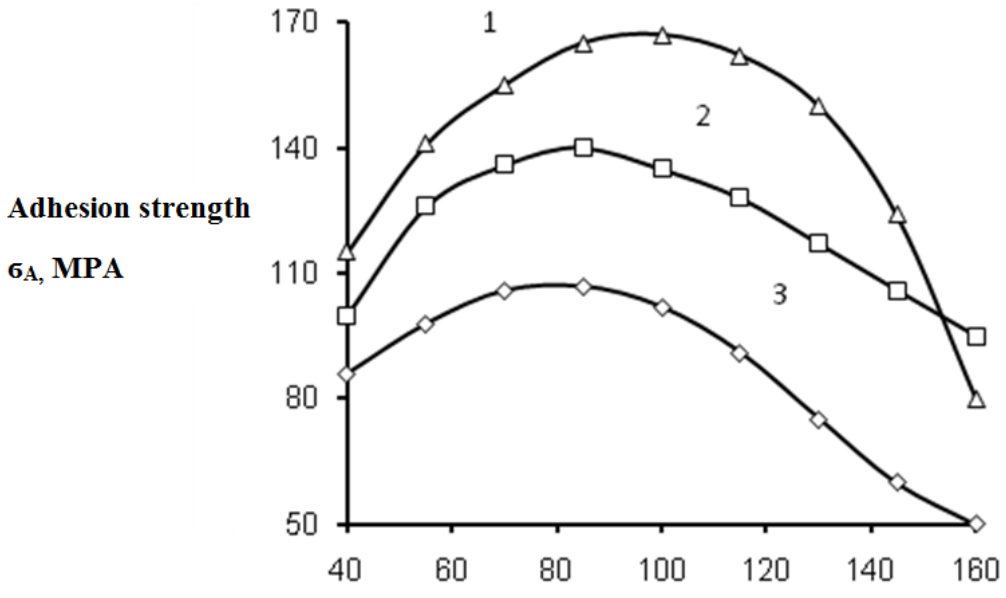
irradiated in the range of 90-130 Mrad in g- rays.



1-iron powder; 2-graphite; Figure 3 (3-1)

The radiation dose depends on the microhardness of the filled pentoplast coatings



1-graphite; 2-iron powder; Figure 3 (3-2)

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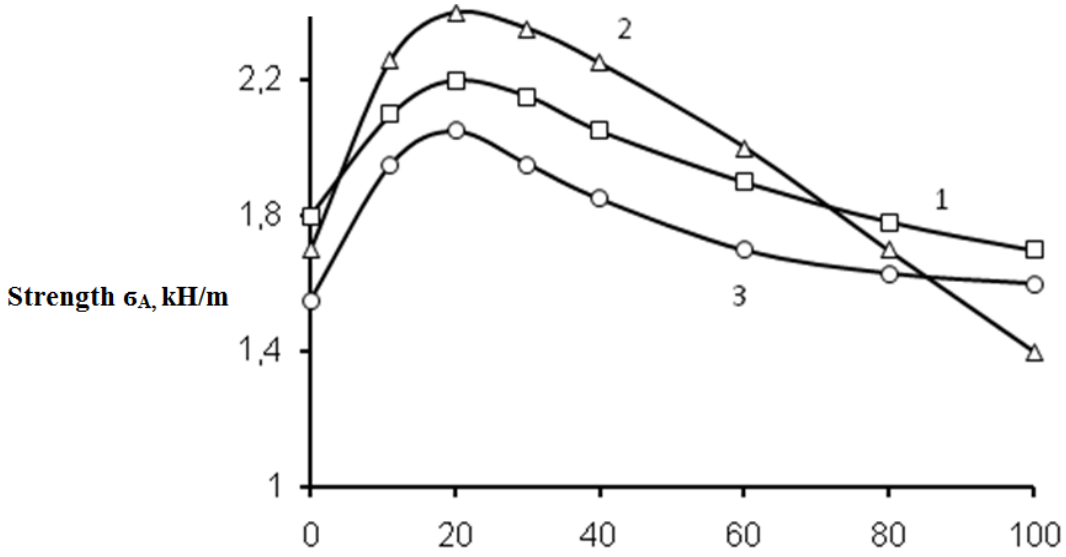
The dependence of the radiation dose on the adhesion strength of the filled pentoplast coatings

The results of the study on the adhesion strength of composite furano epoxy coatings filled with ferromagnetic, diamagnetic and paramagnetic fillers up to 10 mg are presented.

Irradiation ND dose for graphite-filled (2.5 kN / m) coatings is 100 120 Mrad, irradiation dose for iron powder filled coatings (120 kN / m) is 90 100 Mrad, talc-filled coatings (1 , For 9 kN / m), when the radiation dose is 100 to 110 Mrad, their adhesion strength is highest.



1-iron powder; 2-graphite; Figure 3 (3-3)

The radiation dose depends on the adhesion strength of the filled pentoplast coatings

As can be seen from Figure 3.3, composite pentoplast coatings filled with graphite, iron powder, and talc have an extreme nature depending on the radiation doses.

The optimal irradiation dose for pentoplast coatings is 10-30 mrad. The adhesion strength of pentoplastic coatings filled with graphite, iron powder and talc is 130, 121 and 118 MPa.

Summary of Conclusions and Recommendations: The alteration of the adhesion and strength properties of pentoplast, epoxy and furanoepoxide coatings by irradiation with γ-rays depends on It was found that radiation treatment has a beneficial effect on polymer-based coatings.

Our completed research shows that the recycling of multi-sample epoxy composition provides an increase in the working capacity of the mold 24 - 25 times without the use of lubrication for anti-adhesive coating on the working surface of the formwork and for the production of reinforced concrete. The workability of the decorative structure in the market is significantly increased their nature and structure.

CONCLUSION

As a result of our research, we have identified the technical and economic effects of processing the composition in the analysis and experimental experiments, their use in radiation and physical modification. The cost of the obtained composite polymer coating in

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the composition is given. It describes in detail the composition of the composition, the cost of 1 kg of component, the share of the component in the composition and the cost of components in the composition. The expected annual economic efficiency of the application of our composite coatings to the slabs of the road repair enterprise of the Fergana regional department of UZAVTOYOL SJSC is as follows.

25482.16soums for lubrication, 51 219 100 000 (fifty one billion two hundred nineteen million one hundred thousand) for 2010000 (two million ten thousand) When we use the composition, it is 25,440 soums, and when we calculate the number of items to be obtained at 201,000,000 (two million ten thousand), it is 51,134,400,000 (fifty-one billion one hundred thirty-four million four hundred). thousand) soums.

When we calculated the difference, it amounted to 84,741,600 (eighty-four million seven hundred forty-one thousand six hundred) sums in relation to the number of items received. It is estimated that the expected annual economic efficiency will be about 85 million sums.

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