COMPOSITE MATERIALS AND TECHNOLOGY OF PRODUCTION OF PROTECTIVE COVERINGS ON FRICTION SURFACES OF MECHANICAL RUBBER PRODUCTS

Description
The technology is applied to formation of additional sheetings on surfaces in friction pairs steel-rubber. Application of technology allows to increase a running cycle of compactions and shafts of industrial equipment working in the water environment.

Composite materials consist of several functionally different materials. The basis of inorganic materials is made up of silicates of magnesium, iron and aluminium modified by various additives. Phase transitions in these materials occur under high local loadings close to ultimate strength of metal. The high-strength ceramic-metal layer is formed on the surface in a zone of high local loadings thus permitting to change structure of the metal surface.

Polymeric materials on the basis of polytetrafluorethylene are modified by ultradisperse diamond-graphitic powders produced from explosive materials, as well as ultradisperse powders of soft metals. Material plasticization is carried out under rather low (less than 300 °C) temperatures.

Metalloorganic materials produced from natural fat acids contain a significant amount of acid functional groups. Therefore interaction with surface atoms of metal can be carried out in a rest mode. Frictional energy accelerates the process and stimulates occurrence of cross-section links.

Technical specifications
A sheeting can be characterized by the following properties depending on composition of a material:

- thickness up to 100 microns
- class of surface smoothness of a shaft up to 9
- size of pores 1-3 microns
- factor of friction up to 0,01
- high adhesion to surface of metal and rubber

Technical appraisal and economic benefits
- high-strength ceramic-metal layer is formed on the surface in a zone of high local loadings;
- the layer formed on the surface of polytetrafluorethylene has a low factor of friction and low abrasive deterioration resistance;
- metalloorganic coverings are soft, have a small factor of friction and a porous surface, thickness of an additional layer is measured in units of micron.

Application areas
Drawing on working surface of compactions to diminish the friction and create a dividing layer excluding sticking of rubber on a shaft during a rest period.

Development stage
Pilot batches of composite materials were produced. Laboratory and industrial tests were carried out at the Siberian Tool Factory (Krasnoyarsk) and the Plant of Mechanical Rubber Products (Krasnoyarsk). The technology is adopted at the ore-dressing factory of the Mine Metallurgical Combine «Norilsk Nickel» (Norilsk).

Patent situation
Patents can be grunted but not yet applied for.
Commercial offers
Joint development of a semi-industrial plant. Technology adaptation to new raw materials according to the customer request.

Estimated cost
Contractual price.

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