різноманітних інституцій ринкової та виробничо-господарської інфраструктури [1].

Отже, існує два основні напрями запобігання банкрутству: зовнішній – удосконалення системи законодавчих актів, реформування організаційної складової інституту банкрутства та зміни негативного психологічного сприйняття інституту банкрутства у суспільстві; внутрішній – оптимізація системи запобігання банкрутству на засадах управління ризиками підприємства. За таких умов необхідним є вироблення методичних положень, спрямованих на формування системи запобігання банкрутству підприємств.

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FITMENTS FOR TECHNOLOGY OF SHS AND PLASMA SPRAYING

Introduction. Analysis of the literature data showed that one of the promising ways to improve the technological and service properties of materials, expanding their functional purpose is to create surfaces of materials with a composite structure obtained through combined processes that combine self-propagating high-temperature synthesis (SHS) and aluminothermic processes or plasma spraying [1]. For the implementation of the combined technologies requires a whole set of equipment, which allows to provide high quality of coating of parts surfaces [2]. One such promising complex is the development and use proposed in this work of a theoretically designed and experimentally tested device for dusting and surface doping, which can be used even in small-scale production in the processing of individual parts and workpieces.

The purpose of the work was to develop a means of dust protection for technological equipment in the processes of ion alloying and SHS in the plasma sputtering of the surfaces of the parts and use it to form coating.

Design development of the complex. The developed equipment is intended for providing by means of dust protection of technological equipment for the processes of alloying in the production of parts in serial and small-scale production. Dust cameras create an air environment in the loading area for complex spraying and alloying devices. The equipment is designed to work in industrial premises.

Dust chambers are collapsible structures that consist of ceiling dusting units mounted on racks. The working volume is limited by walls made of transparent fire-resistant hardened glass. Doors are provided for access to the work volume. The floor of the cameras is the floor of the room in which they are installed. The camera is controlled by the control panel mounted on the rack. The dust extraction unit is a frameless welded structure with a fan and filters installed.

The principle of operation of the cameras consists in the continuous supply to the working volume of a uniform vertical stream of purified air. The stream of purified air moves in the working space from top to bottom, capturing in its path the suspended particles formed during the technological operations and takes these particles out of the working volume. The chambers have high-performance filters for fine air purification with a filter cloth, which allows to ensure the purity of air in the working volume. Wedge separators used in filters increase their reliability and durability. The centrifugal fan used in the chambers is compact, low noise and provides a capacity of up to 2000 m^3/hour. To reduce noise and vibration, the fan is mounted on spring shock absorbers with a high cushioning ratio. In terms of technical level and quality of equipment, it is at the level of the best foreign samples similar to the destination and above the level of domestic products close to the destination. The equipment thus developed is intended to create an air environment in the loading area of alloying devices and SHS. The use of equipment in such complex technological processes increases the percentage of output of suitable products by 0,6%. Technical characteristics of the equipment: concentration of dust particles in the working volume amount of 4 particles/litre of air, particle size of 0,5 μm, air flow rate entering the working volume of 0,3-0,4 m/s, power consumption 1,5 kVA, overall dimensions of the working volume 1400x1010x2300 mm. For all measurements, the concentration of dust particles in the working volume of the chambers did not exceed 4 particles with a size of 0,5 μm or more in 1 litre of air.

Experimental work on the use of the complex for the manufacture of products by combined technologies. In plasma surface sputtering (PSS), SHS mixes virtually all W through oxygen-free combustion with carbon to form WC carbide. Excess carbon and a very small amount of tungsten alloy iron, forming a liquid steel of eutectoid composition, which under rapid cooling conditions turns into a cane in layers up to 80 microns thick. The thickness of the doped layer is ~500 μm. This layer consists of ~50% WC particles and ~50% (by volume) metal bond (steel “У8А”). The same figure shows that in the zone of intense thermal influence, the microstructure of the steel has acquired a very small columnar structure with a slight inclination of thin dendrites (which have almost no branches) to the opposite direction of the plasma advance. High-solid (~2000 HV) WC carbides, which occupy up to 50% of the volume of the entire carbidostal layer, are visible in the semi-floodplain. Studies have shown that the microhardness of WC carbides is almost ten times higher than that of steel. Thus, it was possible to organize the SHS process in a relatively thin layer due to the use of PNP technology at the same time to solve the following problems: for heating, melting and carbonization of iron; for melting W particles and burning them in carbon to form WC carbides.

It is important to note that no non-metallic phases and their inclusions are formed during the specified oxygen-free combustion. The hardening of the hardened layer to the base alloy is also obtained by metallurgical means.

Conclusions. As a result of the experimental design, the authors conducted a number of search works, worked out the design documentation of the experimental complex for dust protection and doping of parts in the process of plasma spraying, made prototypes and conducted their operational tests.

The combination of PSS and SHS in one operation allows to solve a whole set of technical problems for obtaining high-strength carbidostal-type materials and solid alloys on the alloy surface. The new complex technological process allows to increase the worn surfaces of parts of machines, devices and devices to a depth of up to 500 microns with materials having high mechanical, service and technological properties.

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MODERN TECHNOLOGIES OF CREATION OF HIGH-HARD SURFACES

The laser surface hardening (*LSH*) of metals was discovered in 1965. It has won strong positions in technology of metals [1]. Nowadays in the whole world hundreds of patents have been awarded to branch inventions including those dealing with combination of *LSH* with *SHS* (self-propagating high-temperature synthesis). One of them [2-6] is dedicated to combining of *LSH* with *SHS* (self-propagation high-temperature synthesis). Formerly *SHS* was combined with other technologies of surface hardening of components [1-6].

The impotent problem within the *LSH* is the decreasing of the losses of beam energy because of its reflection by the surface of metal under machining. In the given investigation, as well as in the invention [1], the mixture of powders *Ti* (65%), carbon in black state (18%) and *Fe* (14% by mass) were used in the role of light-absorbing paint. The mixture was damped by solution of 2 % latex in gasoline, and then it was put on the surface of stalls of mark 10 and 20 and was dried in an open air, forming the layer 80, 200 or 500 mkm thick. Thermochemical calculations showed that in such a mixture practically all *Ti* interacts, thanks to non oxygen combustion, with carbon, forming the carbide *TiC*. The seer plus of carbon and very small account of *Ti* alloy the iron forming liquid steel of condition, which under fast cooling turns into troostite in layers of 80 mkm thick.