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Increasing Resource of Wolves of Matrices of Drawing Mills

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ABSTRACT: On the topic: Increasing the life of fiber dies of drawing mills.This paper presents the recommended method for increasing the die arrays of drawing mills using an electro thermomechanical treatment under the influence of a donor.

KEYWORDS:dragging, filler,mill,bar,wire,output cone, exit zone,working channel, steel rope,identity,structure, metallization, recovery, warping, spherical, indentation, mandrel,donor,die die, badass, scratches, microgeometry, micro hardness, electricity, design, roller, cartridge, caliper, introduction, diffusion, roughness.

I. INTRODUCTION

In the machine-building and instrument-making industries, as well as in the electric power industry, wires and cables of various sizes and purposes made in various ways from the corresponding metals of the required sizes, with different mechanical properties and chemical composition are widely used. All the necessary parameters that determine the nature of the wire are taken based on the service purpose and the climatic conditions of the operating environment. Mostly wires are produced in metallurgical workshops by means of rolling and drawing from the corresponding steel and non-ferrous metals. Drawn production is more preferred since this method allows the production of wires with more accurate dimensions and high-quality surfaces of the required roughness than rolling. As we know, the wire production process consists in increasing the length of the wire by reducing the cross section of the workpiece, i.e. the bar. According to the size of the cross section, the wires are divided into thick, medium, thin and ultra-thin. Thin and ultra-thin wires are mainly made of non-ferrous metals and alloys and they are indispensable in instrumentation, electronic technology and in the cable industry.

II. LITERATURE SURVEY

Currently, the need for the use of cable products has increased, which requires an increase in the volume of production of these products. Wires for cable products are mainly made from non-ferrous metals on drawing machines, where matrix dies made of expensive carbide materials such as VK5 and VK6 with a certain design forming the shape, size and quality of the wire are used to form the necessary shape and size of the wire Fig. 1.

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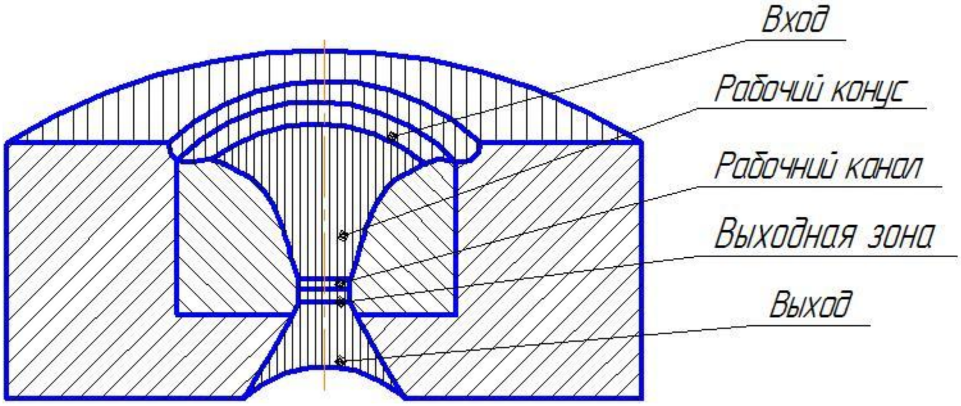

III. MATERIAL AND METHODS

The design of the die die consists of an input part, a working cone, a working channel, an output zone and an output. It should be noted that the working channel is a calibrating element of this tool. In order to save expensive hard-alloy materials, the matrix die designs based on wire sizes are made whole and prefabricated.In the process of drawing the blank the bar drags through the working channel at a speed of 5 meters per second. With this movement of the rod, friction is formed in the contact zone between the surfaces of the rod and the working channel, which leads to wear of the working surface of the working channel. Deterioration of the surface layer is manifested in the types of seizure, scratches, spalling of the die, etc. The resulting defects in the tool negatively affect the dimensional accuracy and roughness of the manufactured products, which reduces the quality of the wire. To eliminate these undesirable factors and extend the life of an expensive tool i.e. fiber matrix is required to carry out certain restoration work. At the same time, it is required to maintain the operability of this surface of the tool.For this reason, the authors propose to perform die die restoration in the following order: before die restoration, die die is removed, broken spinnerets are replaced by new ones, scoring and scratches are subjected to metallization. For the implementation of surface metallization, the proposal used the method of electrothermal mechanical processing (ETMO). In order to provide the necessary diffusion, i.e. the introduction of donor metal particles on the working surface of the die die used plastic deformation with a ball tool - mandrel.

IV. SIMULATION & RESULTS

The essence of the metallization method is to increase the working life of the reconstructed surface of the dieofthematrix. The method of electrothermomechanical processing (ETMO) is to diffuse the surface of the restored part of the donormetal. When choosing the brand of the dono rmaterial, all metal properties should be taken into account, for example: electrical conductivity, heatresistance, wearresistance, strength, hardness , the melting temperature and it is necessary to take into account the chemical composition. As a donormaterial, it can be made of bezolyannoybronze grade Br.AZhN 10-4-4LalternativelycanbeappliedBr.AZhMts 10-3-1,5 andBr.AZhN11-6-6. The rolling mandrel is made of alloyed steel of the ШХ-15 grade, and the steel rope is made of high-carbon steel of the St.60 and St.80 brands with a tearresistance of 1568 - 1862 MPa.

V. EXPERIMENTAL RESULTS

(Before starting restoration work, a special flexible tool is made, consisting of a flexible rope in which a deforming ball (mandrel) and a donor of a spherical shape in a certain sequence of the mandrel and donor are installed with an internal hole.To perform the metallization process, the part whose surface you want to restore is installed in the chuck, is attached, and a special flexible tool is passed through the internal hole of the part to be restored, then the initial end of the rope is attached to the tool holder. The tool holder is located on the support of a screw-cutting lathe, when the reverse longitudinal feed is turned on, the support pulls the steel rope together with the tool holder in the horizontal direction along the X axis towards the tailstock. At the same time, an electric current of a certain force and voltage resulting in a closed electrical circuit. Electrons flowing along the chain carry particles of the donor metal with them, which are separated off due to the friction force Ft.s from the spherical donor to the working surface of the die of the matrix. Following the walking mandrel, which has the necessary hardness and a larger diameter than the leading donor in front, these particles are pressed onto the reconstructed surface of the die of the matrix.

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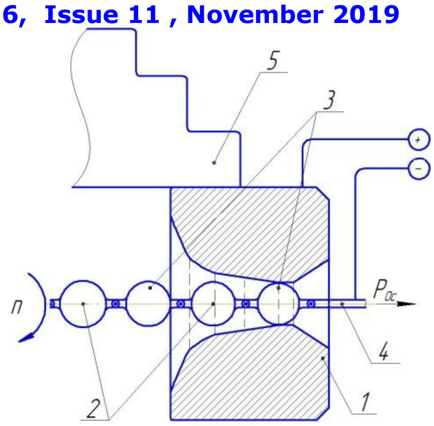

Fig. 2.

By combining these two actions, transferring the metal with an electric current and introducing it onto the worn surface of the die die with hardening using a rolling ball deforming tool, tears and scratches are filled, as a result of which the working surface of the die die is restored.Fig. 2.Schematic diagram of the implemented method.Where. 1- die dies; 2 - Roller (mandrel); 3- donor; 4- steel rope; 5- chuck cam.

VI.CONCLUSION

The application of this method allows to improve the quality indicators of both micro geometry and micro hardness of the layer of the working surface of the die channel of the matrix. As a result, the quality of cleanliness of the treated surface is improved by reducing the roughness parameters as well as the dimensional accuracy of the wire produced.It makes metallization on a screw-cutting lathe economically feasible in single and small-scale production, and in large-scale and mass production special equipment is required.

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