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INFLUENCE OF CARBIDIC PHASE ON WEAR OF 110X18M STEEL

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It is considered Influence of carbidic phase on wear steel 110X18M. Patterns of change of the wear volume from the quantitative factors of consolidating phase are distinguished. The interval of volume content of carbides within the limits of 18…21 % at middle distance between carbides more than 8 mcm is recommended, that results in the minimum indexes of wear degree.

Keywords: bearing 110X18M steel, carbidic constituent, wear, size of carbides, distance between carbides

At the option of material for bearing a basic value has their wearproofness, and, consequently, life cycle. The wear of underlayment's for bearing over a possible size is disturbed accuracy of interference location of shaft with working organs and carcass, results to his dynamic instability and vibration, possibilities of destruction for bearing on-the-run. A wear increases with the increase of pressure (contact tensions), and the coefficient of friction goes down or remains constant to the critical value, corresponding to the catastrophical wear. Physics-mechanical properties of bearing material must provide most high wearproofness and resilient contact at a friction, minimum coefficient of friction, absence of propensity to the tears, and also good conformability.

In the process of work of bearing every area of working surface of marble or roller, and also races of rings, test multiple loadings, distributed within the limits of very small bearing surface. As a result on every area there are local contact alternating-sign tensions about 3-5 MN/m^2 [1], which is squeezed on the surface of contact and stretching's at her contour. The multiple reiteration of deformation results to appearance of fatigue cracks as a result there are shots at rolling, under the action of which destructions increase and bearing falls out [2]. Part fatigue destruction, paths of bearing rings and bodies of rolling (marbles and rollers) are exposed to the wear [3]. Reasons of wear are tangential tensions, frictions caused by forces of friction at sliding of contacting surfaces. As a result of abrasion thin scales move away from the surface of metal, that causes the increase of gap between rings and bodies of rolling and intensification of abrasive wear.

As is generally known [4], properties, qualificatory the action of metal at the conditions of exploitation of bearing (contact endurance, wear, resistance to development of cracks), depend on the row of structural parameters of bearing steels (nature, quantity and size of nonmetallics; carbidic heterogeneity; size of grain). These parameters are determined by technology of production.

From the physical point of view by basic constituent steel, having influence on exploitative characteristics, there are large primary carbides, therefore requirements are pulled out on limitation of their maximal size (no more than 15 мкм) [5]. However, quantitative data about the degree of influence of carbides of different sizes on wearproofness steel 110X18M is small in numbers and not systematized.

It is determined influence of quantitative indexes a carbidic constituent 110XI8M steel on the degree of wear. Microsections were made with the use of samples, passing a test on a wear according to the methods of A-RSRIBI (instruction I 22-54-45-73). Samples to in a quantity 120 piece with the different degree of wear exposed to tests. As a criterion of wear was chosen the change of working diameter size of sample after the tests [3].

The quantitative analysis of carbides was produced on the structural analyzer of «*Epiquantum*» (at the increase (x 250). For a sensitisation the threshold of discrimination was mionectic from 5.0 to 2.5 V. Speed of scan-out made 20 mcm·s^{-1} on the field measuring 1.8 x 1.8 mm, width of stripe defection is 22 Hertz's.

As exploitative characteristic description chose the index of size of wear steel, the value of which in investigational samples had changed from 0.25 to 2.0 mcm. For the exposure of cross-correlation dependence between the parameters of carbidic phases and size of steel wear the samples of metal investigated on the structural analyzer of «*Epiquantum*» with registration of next characteristics of carbides: volume; carbidic heterogeneity (along the length and across axes of rolling); middle linear distance between carbides (along the length and across axes of rolling): quantity of carbides more than 11.2 mcm.

From got at the experiments of data it is necessary, that close connection with a wear have volume stake of carbides, quantity of carbides, with measuring more than 11.2 mcm, distance between carbides along the length and across rolling. Most influence on the increase of degree of wear is rendered the volume of carbidic phase at content in an interval 25-28 %. Optimal value of content of carbides is in an interval 18-21 %, as here are minimum indexes of degree of wear steel.

It is found out a tendency to the height of wear with the increase of quantity of large carbides by size more than 11.2 mcm. Different influence renders distance between carbidic particles in area of small distances (to 7 mcm, where basic influence on this size fine-dispersed carbides render), shortcut of distance results in the decline of wear; in area of large distances (more than 8 mcm) influence on a wear not found out.

Shortcut of distance between carbides is reduced the wear of material, and an increase him over to the removal of influence of fragile destruction and abrasive wear steel, as a matrix brings plastic characteristics in the mechanism of destruction. Thus, at the production of the above-mentioned material it is necessary to pick up the regimes which will result in the increase of distance between carbides more than 8 mcm.

Because of small manifestation of carbidic heterogeneity influence on the size of wear can be conditioned by character of location of carbides, certain distance both along and across deformation. It is, possibly, contingently by the insignificant varying of degree of carbidic heterogeneity within on frame TC 14-1-3045-80. In same time connection of carbidic heterogeneity is set along the axis of rolling with a

wear, however these parameters are insignificant, that does not enable to consider reliable the indicated results.

Conclusions It is set that an optimal volume of carbides in bearing 110X18M steel for the receipt of minimum size of wear is 18-21 %. It is found out a tendency to the increase of degree of wear 110X18M steel with the increase of size of carbides more than 11.2 mcm. It is educed the increase of size of wear with shortcut of distance between carbides. For the receipt of commodity products of 110X18M steel it is necessary to provide the next parameters of carbides: volume of carbides – 18-21 %, their sizes to be not more than 11.2 mcm, and distance between them - to be less 7-8 mcm.

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