ASSESSMENT OF THE WEARING PROCESS IN THE DETAILS OF THE GAS DISTRIBUTION MECHANISM

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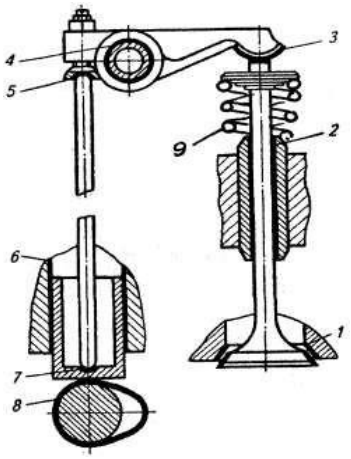
Abstract: In this article, a final conclusion is made by studying the factors that affect the elasticity of the parts that are subject to bending in the negative change of the optimal performance of the gas distribution mechanism. Factors influencing bending resistance are evaluated based on the state of coupling of pairs subjected to bending, i.e. mechanical, chemical and geometrical parameters.

Key words: Camshaft, cam, wear resistance, valve, bushing, pressure angle, cam profile, contact area, roughness, wear rate.

As a result of the wearing of the parts of the gas distribution mechanism, the wearing on their surface, wearing on the inner surface of the guide bushing, wearing of the distribution shaft chain, wearing of the gear pulley wearing of the bearings, wearing of the oil deflector covers, wearing of the valves and guide bushings and the gear wheel driving the distribution shaft as a result of the contact of the cam - follower pair.

An external sign of these parts wearing is knocking, loss of compression in the cylinders, a decrease in engine power, difficulty in starting it, and an increase in fuel consumption. Analyzing defects in parts from the point of view of ductility is a very complex process, and to do this, the factors affecting ductility are studied separately, analyzing the process in pairs of each bend.

The main reason for the wearing of the parts of the gas distribution mechanism is the roughness on the surface of the parts, the abrasive environment, the load, the component of the oil, and the temperature exceeding the standard value in a short period of time.



1-Figure.Schematic diagram of joints of the gas distribution mechanism. 1 – seat – valve face; 2 – valve stem – guide bush; 3 - cylinder bed surface - valve side; 4 - bushing - axle; 5 - adjustment screw - bar; 6 - hammer - block; 7 - barbell - hammer; 8 - thumb - pusher; 9 - spring

When analyzing the deflection of the camshaft wearing in contact with the pusher, we study the bearing surface symmetrically, three on each side, for a total of six parts. The greatest amount of wearing occurs in the upper part of the shoulder profile. We can see the graphic representation of this wearing in the section of the profile areas, in figure 2. Such uneven wearing is caused by uneven loading on the wearing surface, and this has a negative effect on the wear resistance.[1, p. 84].

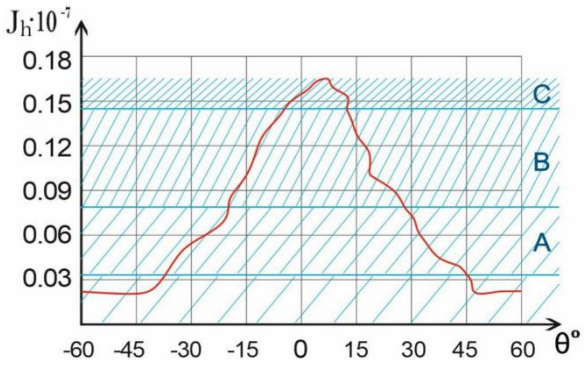


Figure 2. Graph of dependence of wearing speed on pressure angle (tension) in the profile of the cam.

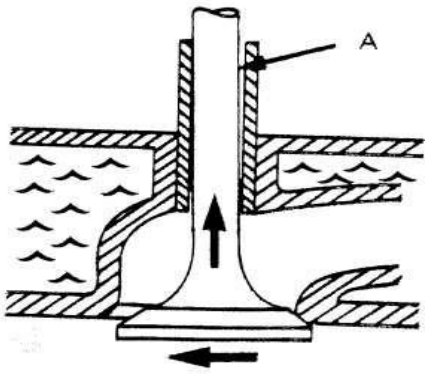
In addition, the bending that occurs as a result of sliding (being in contact) on the inner surface of the guide bush on the stem of the cams, which is one of the main

details of the gas distribution mechanism, also has negative consequences. If the intake cam is periodically cooled by the air-fuel mixture entering the cylinder when the intake cam is opened, the exhaust valve will work under more severe conditions. Opening during the exhaust stroke, it is further heated by the hot exhaust gases, and the temperature of its plate reaches 850-900 °C. This accelerates the wearing process [2, p.4].

A special hard material, stellite, is often placed on top of the chamfer to reduce warping at high operating temperatures. Sodium valve cooling is less commonly used: the sodium moving through the valve's internal cavity when it opens and closes transfers heat from the hot plate to the cooler stem.

Thus, a good connection of the plate with the seat provides two advantages at the same time: it reduces the temperature of the valve to an acceptable level, which is necessary for the operation of the valve, and ensures hermeticity, which does not adversely affect the overall engine power. Otherwise, the expansion of the thermal gaps in the valve (Fig. 3) will increase the load, and as a result, the release of gases will cause the valve to become unusable.

3-Figure. A view of the gap (A) between the guide bushing and the steering column.



Irregular and high acceleration of the valve stem can cause an increase in the rate of bending of the valve stem, breakage of the mechanism parts or shocks that adversely affect their elasticity. Especially important is the speed of the valve during

the descent to the seat - the smaller it is, the less the deflection in the chamfer and the valve seat [3,p.27].

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