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THEORETICAL BACKGROUND IMPROVE EFFICIENCY OF INJECTION VALVES OF DIESEL FUEL EQUIPMENT FORAGE HARVESTERS

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Theoretically justified criteria evaluation unload ability injection valves. Proposed estimate efficiency of the discharge valve to carry out than the density (gap) compound "hole - unloading belt valve" and the actual volume of fluid displaced by valve technology. The proposed criterion for evaluating the ability to unload the volume of liquid displaced is implemented in an apparatus for diagnosing the state of fuel injection valves of diesel pumps harvesting. In the developed device received a patent for a utility model "Device for determining the discharge of the fuel pump unload valve capacity".

Theoretically substantiated stiffening effect of the spring on the performance of the injection valve. Loss of stiffness of the spring causes a reduction of the valve closing speed. In this duration low residual pressure in the feed line increases, which entails the likelihood fuel and diesel smoke.

The formula for determining the length of the return of the locking rib of the discharge valve seat in the housing.

The equation of motion of the valve when the discharge belt it enters the opening of the saddle, the formula:

$$B_k(h_k - h_k') + A_k + F_k P_ш = m_k \frac{d^2 h_k'}{dt^2} + P_n F_k,$$

where B_k, A_k - respectively stiffness and pre-compression valve spring;

h_k, h'_k - respectively unloading valve stroke and the current value of the position of the coursemaximum lifting it to the seat;

f_k - cross-sectional area of the discharge valve the girdle;

P_{sh}, P_n - accordingly the fuel pressure in the pressure fitting and the pump chamber;

m_k -valvemass.

$$m_k \frac{d^2 h_k'}{dt^2} + B_k h_k' = B_k h_k + A_k + F_k (P_ш - P_n),$$

In final form, the law of motion of the valve is determined by the formula:

$$h_k' = h_{k0} + \left((h_{km} - h_{k0}) + \frac{A_k + F_k (P_ш - P_n)}{B_k} \right) \left(1 - \cos\left(\sqrt{\frac{B_k}{m_k}} t \right) \right) =$$

$$= h_{k0} + \left(h_{km} - h_{k0} + \frac{A_k + F_k (P_ш - P_n)}{B_k} \right) 2\sin^2\left(\frac{1}{2} \left(\sqrt{\frac{B_k}{m_k}} t \right) \right).$$

From this formula it follows that the valve will perform an oscillating motion with a period $\frac{1}{2}\sqrt{\frac{B_k}{m_k}}T = \pi$ and consequently, the live and return valve T is determined by the formula: $T = 2\pi\sqrt{\frac{m_k}{B_k}}$.

From the formula it follows that with a decrease in stiffness of the valve spring is increased *T*.

The difference? T = T1 - T0 is defined by the formula:

$$\Delta T = 2\pi\left(\sqrt{\frac{m_k}{B_k}}\right)'_{Bk} \cdot \Delta B_k = -\pi\frac{\sqrt{m_k}}{B_{k1}\sqrt{B_k}}\Delta B_k.$$

Analysis of the obtained formula shows that an increase in the spring rate is reduced and the valve closing duration of the release period is reduced by the residual pressure in the injection line and thus reduces the likelihood fuel and diesel engines as a result of smoke.