

NONLINEAR MOVEMENT OF MULTISTAGE HYDRAULIC CYLINDER

S. P. Kulinich, V. P. Chuiko,
L. P. Yarmak – EL Adviser

When maintaining large-sized pumps, operations with basic parts are performed. The main outlet of the pump is pressurized. To perform these operations, it is required to apply special equipment which includes hydraulic wrenches to provide the necessary sealing force. The integral part of such a wrench is a multistage hydraulic cylinder which pulls the stud out. Coaxial hydraulic cylinder should be applied to achieve the necessary level of force in radial limited size of the wrench. The sealing of the outlet is performed in the following way: first pulling out of the stud, tightening up the nut, decreasing the applied force on the stud. A basic diagram of such a cylinder is represented on figure 1.

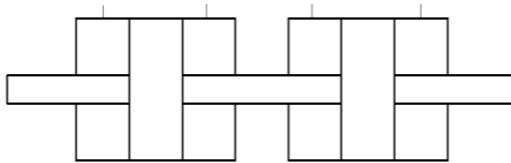


Figure 1 – The diagram of the multistage hydraulic cylinder under investigation

When fluttering, the fluctuating force appears in the system and leads to damaging of the outlet surface of the pump. When pulling out the stud, the impact load and vibration level must remain within the permitted limits. To provide the latter, the linear movement of driven element of hydraulic cylinder is required. The method of successive pressure increase in cavities is suggested, while the closed camera performs the function of a damper. A mathematical model of the drive operation when fluttering was developed which considers variable compression of fluid and undissolved gas in the system.

Theoretical analysis of the system which operates under the similar scheme enables to substantiate the construction choice and drive modes.

Соціально-гуманітарні аспекти розвитку сучасного суспільства : матеріали IV Всеукраїнської наукової конференції викладачів, аспірантів, співробітників та студентів факультету іноземної філології та соціальних комунікацій, м. Суми, 19-20 квітня 2013 р. / Відп. за вип. В.В. Опанасюк. — Суми : СумДУ, 2013. — Ч.4. — С. 24-25.