液压油弹性模量提高方法与试验 Method and Experiment for Increasing Effective Fluid Bulk Modulus in Hydraulic Systems

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关键词： 闭式液压系统 有效体积弹性模量 抽真空 试验

摘 要： 分析了液压系统中含气量、工作压力等参数对油液有效体积弹性模量的影响规律，在此基础上采用抽真空除气与弹性模量检测相结合的方法提高油液弹性模量至期望值，并试验于某大型液压泵站。应用结果表明：含气量对弹性模量值影响显著，利用抽真空能够有效减小油液的含气量，将弹性模量值由821.3MPa提高至1201MPa；该方法在闭式液压系统中能够实现油液弹性模量的提高。 Effective fluid bulk modulus is an important parameter in hydraulic systems. The major factors of effective fluid bulk modulus were analyzed, and a mathematical model with entrapped air content and working pressure at constant temperature was developed. A device for removing air content based on the method of vacuum-pumping in a closed reservoir was developed to increase bulk modulus. And bulk modulus was measured by the device when vacuum-pumping had been completed. Experiments were carried out in a large hydraulic system, and the results showed that vacuum-pumping is an effective method to reduce air content, and the device increased fluid bulk modulus from 821.3MPa to 1201MPa. Bulk modulus can be improved by using this method in the closed hydraulic system.

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