

反应堆工程

控制棒水压驱动机构水压缸步降过程研究

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摘要 水压缸是控制棒水压驱动机构的关键部件, 根据水压缸步降运动过程特点, 将水压缸步降过程缸内压力变化划分为步降前卸压过程和步降降压过程两个阶段, 分别建立了两个阶段压力变化理论模型。其中, 步降降压过程理论模型结合水压缸步降运动学模型, 又得到了水压缸步降过程动力学模型。理论模型计算结果与控制棒水压驱动机构单缸步进性能实验结果进行了对比, 结果表明, 在实验配重载荷工况下, 理论压力变化和位移曲线很好地符合了实验曲线, 从而为水压缸步降压力变化过程影响因素的确定及控制棒水压驱动系统步进时间的获得提供了理论基础。

关键词 [控制棒水压驱动机构](#); [水压缸](#); [步降过程](#)

分类号

Study on StepDown Dynamic Process of Hydraulic Cylinder for Control Rod Hydraulic Drive Mechanism

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Abstract Hydraulic cylinder (HC) is the key component of the control rod hydraulic drive mechanism (CRHDM). According to the characteristics of HC stepdown process, the pressure transients in the HC during stepdown process can be divided into two processes, that is, the pressure transients before stepdown motion and the pressure transients during stepdown motion. Theoretical dynamic pressure models of these two processes were built. And among them, the theoretical dynamic pressure model during HC stepdown motion can be combined with the HC stepdown kinematics model to establish a complete HC stepdown dynamic model. The comparison between the theoretical results and the CRHDM single cylinder experiment shows that, under the experimental loadings, the theoretical dynamic pressure transients during the HC stepdown process and the HC stepdown displacements agree with the experimental results. The research results have laid the theoretical foundation for the acquisition of the key factors affecting the pressure transients of the HC during stepdown process and the step motion time of the CRHDM.

Key words [control rod hydraulic drive mechanism](#) [hydraulic cylinder](#) [step down process](#)

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