

论文

基于负载自适应的煤矿用钻机卡盘动态夹紧理论

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摘要:

针对现有煤矿用钻机胶套式液压卡盘(胶套卡盘)夹紧回路的缺陷, 运用负载自适应的基本原理, 将钻机回转与给进的负载变化与卡盘夹紧力动态关联, 提出了胶套卡盘动态夹紧理论及计算方法, 建立了系统的传递函数并进行了响应分析。并以某型钻机为例, 运用仿真软件AMESim对系统在特殊载荷条件下仿真验证, 通过实验室验证及现场实验验证, 结果表明: 采用所提出的理论及计算方法设计的胶套卡盘能显著的提高卡盘的使用可靠性并成倍的提高胶套使用寿命, 可为此类钻机胶套式液压卡盘设计提供理论依据和方法。

关键词: 煤矿用钻机; 负载适应; 胶套卡盘; 动态夹紧

Dynamic clamping theory of chuck used in collieries drilling rig-based on load self-adaptation

Abstract:

To counter the defects of the clamping circuit of the existing rubber sleeved chuck and by using the basic principle of load self adaptation, the load change of the rotation and feeding of the drilling rig was associated with the dynamic clamping force of the chuck, the dynamic clamping theory and calculation method for the rubber sleeved chuck were put forward, the transfer function of the system was established and the response analysis was carried out. By taking some type of drilling rig as an example, the simulation verification was conducted for the system by using the simulation software AMESim under special load conditions. The verification results both in the laboratory and at the site show that the rubber sleeved chuck which was designed by using the proposed clamping theory and calculation method can significantly improve the serviceability of the rubber sleeved chuck and considerably prolong the service life of the rubber sleeve, this thus provided the theoretical basis and method for the design of the rubber sleeved hydraulic chuck of such drilling rigs.

Keywords: collieries drilling rig; load adaptation; rubber sleeved chuck; dynamic clamping

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