

论文

下运带式输送机液压调速软制动器特性分析及试验研究

李军霞, 寇子明, 俞晶

1. 太原理工大学 机械工程学院, 山西 太原 030024;
2. 山西省矿山流体控制工程技术研究中心, 山西 太原 030024

摘要:

根据煤矿下运带式输送机的特性, 研究了一种能够解决下运带式输送机安全制动的液压调速软制动器, 分析了该制动系统的特性和工作机理, 设计了该制动系统的动态测试试验系统, 进行了下运带式输送机在正常制动、超速保护制动、低速制动、突然停电制动及频繁制动等工况下的模拟试验。由试验结果可知, 基于恒减速、高压、无摩擦副的液压调速软制动器既实现了下运带式输送机的无摩擦安全制动, 也可保持制动过程中制动减速度的基本恒定, 降低了制动过程对输送机的冲击力, 提高了设备的使用寿命; 同时, 液压调速软制动器在非制动工况下的近似零阻尼回路, 极大地降低了系统在非制动工况下的发热量, 确保液压调速软制动器的可靠应用。

关键词: 液压调速; 安全制动; 恒减速; 零阻尼; 动态测试; 下运带式输送机

The characteristic analysis and experimental research of hydraulic speeding soft brake for downward belt conveyor

Abstract:

According to the characteristic of the coal mine downward belt conveyor, the hydraulic speeding soft brake was studied out to achieve the safety brake of downward belt conveyor and the characteristic and working mechanism of the braking system was analyzed. Then, the test system on dynamic test of the braking system was designed and simulation test of downward belt conveyor in the normal brake, over-speed protection braking, low speed braking, sudden loss of power braking and frequent braking conditions was made. From the test results, based on constant deceleration, high pressure, no friction pair, the hydraulic speeding soft brake can achieve no friction safe braking of downward belt conveyor and can maintain the braking deceleration constant during the braking process. Also, the hydraulic speeding soft brake reduces the impact force of the braking process on the conveyor and can improve the life of the equipment. Meanwhile, the approximate zero-damping circuit of non-braking conditions can greatly reduce the heat of the system in the non-braking condition and can also ensure reliable application of the hydraulic speeding soft brake.

Keywords: hydraulic speeding; safe braking; constant deceleration; zero-damping; dynamic test; the downward belt conveyor

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通讯作者: 李军霞

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