



Vibration character of the multi-cords rub hoist

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Abstract

Using simulated vibration parameter to identify time domain and frequency domain, the authors make the following tests and measurements: testing the intrinsic static vibration property of driving installation, main cords, overhead pulley and headframe of hoisting system by knocking with a hammer to stimulate vibration; testing dynamic vibration property of the bearing of the pulley; testing the system's response to supply interruption in operation; measuring stator winding voltage and rotor excited current. Using FFT analyzer to transform the time domain signal got in the test into frequency domain signal, the authors combine time domain analysis with frequency domain analysis and range domain analysis to find out the causes of hoisting system's vibration and to put forward some countermeasures against hoisting system's vibration.

Key words: Hoisting system, Vibration test, Main cord

1. Introduction

The vibration of hoisting system is a chief problem of the safety in production, directly affecting the production capacity of the mine and the safety of the staff and equipment (Wang and Su, 2003). As we learn in the worksite, the main hoist in a mine once vibrated violently in starting and stopping, with the rotary tube, overhead pulley, main cord, and the strut all had some vibration. Bucket loaders also once had twisting vibration horizontally with steel cable in the cage swaying, and some loaders even once hit down the directive log. Some hoists in real run even vibrated well beyond the allowed scope especially during starting and stopping (Zhang *et al.*, 2003). The focus of this study, therefore, is on these hidden dangers existing in mine hoisting system, to make an

overall test for the system and make comprehensive data processing and analysis to find out causes of the vibration and problems in the system to make the system reach designed hoisting capacity.

2. Fundamentals of the vibration test

In the present paper, the authors study vibration characters of multi-cord rub hoisting system in connection with vibration problems of a hoister in practical running, making tests on the spot. The authors get respective inherent frequencies of driving devices, main cords, head pulley, and derrick by testing their vibrations in modal analysis. The vibrations in dynamic state are tested with supply interruption.

Basic tenet of the Vibration Test is to install the vibration pickup on the vibration point. Use the impact