Study on Collapse Mechanism and Stability Technology

of Furrow Pit High Slope

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Abstract

Two methods for open-pit mining, mainly open-pit mining and underground mining, are adopted for the mining of solid mineral resources. According to statistics, two-thirds of the world's solid mineral resources adopt open-pit mining, the proportion of domestic open-pit mining is also much larger than the other way of exploitation. Furrow pit slope is a special geological and geomorphologic forms in the process of open solid mining. The normal conduct of social production and living has seriously affected by furrow pit slope collapse phenomena. Therefore, study on open pit slope stability is a key problem of mine production safety, mining sustainable development and significant economic benefits of mining development.

The paper took the stope of Jinduicheng Molybdenum Company as an example, the main reason of a large area of collapse in this open pite high slope was identified by analysing rock physical properties. Using three dimensional finite element numerical simulation methods to complete analysis of the open pit high slope collapse mechanism, carry out research on the high slope stabilization treatment technology, and give father advice to provide scientific guidance for sustainable exploitation of the open-pit mine.

(1) According to investigation of open pit scene rock physical properties, the survey analysis reveals that the main reason of collapse of culvert is developed cranny.

(2) Using ANSYS software to carry out three-dimensional finite element numerical simulation calculation for South Slope, the open south slope of the force, displacement and strain variation are analysed, the results show that South open pit slope bear the compressive stress, the stress does not exceed the compressive strength of the rock before and after grouting for the top of the water diversion culvert collapse, and little change appeared in the horizontal displacement, but the vertical displacement reduced significantly.

(3) According to the three-dimensional finite element numerical simulation, can determine the equivalent strain is significantly smaller around the grouting around the tunnel near the top of the water diversion culvert collapse part of the slope, the compressive stress concentration in the tunnel around the tunnel near the slope the vertical direction displacement has been reduced, the open pit slope collapse has been checked.

Grouting processing, contribute to the stability of the surrounding rocks in tunnels and throughout the South to help the stability of the slope above the landslide area of the diversion culvert.

Keywords: Tunnel, Slope, Stability, Numerical simulation.