Research and application of the slope stability under mining in the South of the Antaibao open-pit mining, China

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Summary

Aiming at the limitation and the insufficiency of the research methods for the slope stability in the open-pit and underground combined mining, firstly according to the characteristic of the slope stability in the open-pit and underground combined mining, and the limit analysis method of the slope stability based on the upper bound theorem of the plasticity mechanics, the maneuvering displacement field for the subsidence rock mass of the underground long-wall mining is established, for the subsidence rock mass the function equation is established using the plastic limit analysis method. Secondly, using this method this paper researches the surface subsidence rock mass caused by the shaft mining under the dumping site at the Antaibao south slope, and analyzes the influence brought by the subsidence brings which is caused by the shaft mining for the subsidence stability and slope stability of the surrounding rock mass, especially the slope rock mass. Meanwhile this article also proposes that determining of the boundary parameter for the open-pit and underground combined mining should take the vertical safe distance between the working surface and the slope stairs as the basis, and the position of the open-off cut for the working surface should take Y=74160 (horizontal displacement with the open-pit slope is 231m) as the boundary. This can guarantee that the safe height is above 105 meters, and using FLAC numerical calculating method proves the above research result. The result shows: the result using plastic limit analysis and numerical calculating solves the slope stability problem of open-pit and underground combined mining in the South of Antaibao open-pit mine, and reaches an good economic efficiency.