Rock Mechanics and Rock Engineering

Case studies of four extremely intense rockbursts in deep tunnels

ABSTRACT

In the process of excavating seven parallel tunnels at the Jinping II Hydropower station, several extremely intense rockbursts occurred, killing and injuring construction workers and damaging several sets of equipment. Each tunnel was 17 km long with a maximum depth of 2,525 m. Based on the characteristics and mechanisms of these rockbursts, four typical events were selected and their temporal and spatial characteristics are here described alongside the support and geological conditions. A numerical simulation method based on FAI and LERR was used to analyze the macromechanisms of these events. Special attention was given to the mechanisms of formation of the two extremely intense rockbursts that occurred on the tunnel floors. The analysis of the results not only provides an important reference for understanding the development mechanisms of rockbursts but also a basis for the selection and development of rockburst prevention measures in deep hard rock tunnels.

Keywords: Deep tunnel, hard rock, rockburst, damage mechanism, FAI, LERR

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