

# Major Engineering Geological Problems and Treatment Measures of the Shuangjiangkou Hydropower Station on the Dadu River: Post-print

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## Abstract

The Shuangjiangkou Hydropower Station is situated in the alpine gorge region of Aba Prefecture, Sichuan Province. It represents the world's highest under-construction earth-core rockfill dam (maximum dam height 315m) and ranks among China's hydropower projects with the greatest comprehensive technical difficulty. Its key project is characterized by complex geological features of "seven highs and two developments" (high altitude, high cold, high seismic intensity, high ground stress, high steep slope, high flow velocity, high dam, and development of dangerous rock masses and rockburst), confronting world-class technical challenges including seismic resistance of ultra-high earth-rock dams in complex regional structures, dam construction on deep overburden layers, ultra-high steep slope treatment and intelligent early warning, rockburst safety control and stability of cavern groups in extremely high ground stress areas, and modification of core wall impervious soil materials. Based on achievements obtained during the survey, design, and construction of the Shuangjiangkou Hydropower Station, this paper systematically summarizes the major engineering geological problems encountered and their treatment measures, providing reference for similar engineering construction.

## Full Text

### Preamble

**Title:** Major Engineering Geological Problems and Measures for Shuangjiangkou Hydropower Station on the Dadu River

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## Abstract

The Shuangjiangkou Hydropower Station is located in the alpine canyon region of Aba Prefecture, Sichuan Province. It features the world's tallest earth-core rockfill dam currently under construction, with a maximum height of 315 meters, and represents one of China's most technically challenging hydropower projects. The project area exhibits complex geological characteristics described as "seven highs and two developments": high altitude, high cold, high seismic intensity, high ground stress, high steep slopes, high flow velocity, and a high dam, coupled with the development of unstable rock masses and rockbursts. These conditions present world-class technical challenges, including seismic design of super-high earth-rock dams in complex regional tectonic settings, dam construction on deep overburden layers, treatment and intelligent early warning of ultra-high steep slopes, rockburst safety control and stability of underground cavern groups in extremely high ground stress zones, and modification of impervious soil materials for the core wall.

Based on the achievements obtained during the investigation, design, and construction of the Shuangjiangkou Hydropower Station, this paper systematically summarizes the major engineering geological problems encountered and the corresponding treatment measures, providing valuable references for similar future projects.

**Keywords:** Shuangjiangkou Hydropower Station; super-high earth-rock dam; ultra-high steep slope; deep overburden; soil material modification

*Note: Figure translations are in progress. See original paper for figures.*

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