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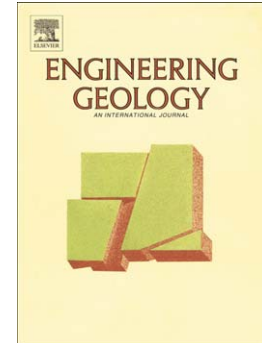
A new semi-deterministic block theory method with digital photogrammetry for stability analysis of a high rock slope in China

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Title: A new semi-deterministic block theory method with digital photogrammetry for stability analysis of a high rock slope in China

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Abstract: This study proposed a new semi-deterministic block theory (NSDBT) method, in which the sizes and spatial positions of discontinuities along with their orientations were incorporated. Hence, the locations, volumes, and sliding forces of key rock blocks could be obtained, which could directly provide quantitative reference for support design. The NSDBT method was applied to analyze the stability of a high rock slope of Changhe dam located in Sichuan province, southwest China. Required geological data for the analyses was obtained from field and laboratory investigations. The mechanical parameters of discontinuities were obtained by laboratory direct shear tests, and geometric characteristics of discontinuities were obtained by digital photogrammetry. A total of 3540 discontinuities were identified. The analysis results showed that: (a) 57.7% key blocks were excluded owing to taking the formation probability of key blocks into consideration; (b) comparing the results of the calculation and field investigation, it was found that the calculated locations of dangerous discontinuities were in good agreement with the failed blocks investigated in the field (note: the failed blocks include blocks that have developed into real

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