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DYNAMIC MECHANICAL COMPRESSION OF ROCK MATERIAL WITH DIFFERENT WEATHERING DEGREES

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Abstract

Rock dynamic mechanical characteristic is the basic information to study the damage of rock structures under dynamic loads induced from earthquake or blasting. A nuclear power plant site is a granite mountain of the same active tectonic period. Dynamic triaxial compression experiments need to be conducted on the drill cores of different project parts according to the design requirements. These drill cores were formed in the same active tectonic period, but as a result of the different buried depth or outcrop, the weathering degree is various. According to the physical and mechanics parameters and the longitudinal wave velocity, the drill cores are divided into six weathering degrees. The dynamic triaxial compression tests were conducted on different loading rates (10^0 MPa/s ~ 10^5 MPa/s) and same confining pressure (3 MPa). Then, the relationship of compressive strength, Young's modulus and loading rate are studied based on the experimental results. The weathering degree influence on above variations was also discussed. The study found that the compressive strength, Young's modulus of granite specimens with different weathering degrees are all increased with the increase of loading rate, while Poisson's ratio is decreased with the increase of loading rate. As the increase of weathered degree of the granite specimens, the rising rate of compressive strength is increased, while the rising rate of Young's modulus remains unchanged.

Key words: dynamic triaxial compression, weathering degree, loading rate

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