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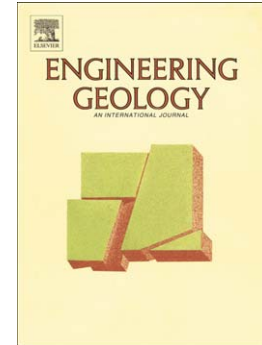
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## Influence of cyclic wetting and drying on physical and dynamic compressive properties of sandstone

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**Abstract:** The cyclic wetting-drying phenomenon, which is a part of weathering processes, plays a vitally important role in affecting the properties of rock materials. To investigate the effect of wetting and drying cycles on the physical and dynamic compressive properties of rocks, some essential physical properties of sandstone specimens including density, water absorption, porosity, P-wave velocity and slake durability index (SDI) were measured after every 10 cycles (for a total of 50 cycles). Dynamic compressive tests were conducted using a modified split Hopkinson pressure bar (SHPB) technique for rock specimens. Laboratory tests results showed that, with the increase of wetting and drying cycles, the porosity and water absorption of rock increases while the density, P-wave velocity, SDI, dynamic compressive strength and elastic modulus decrease. In addition, the surface microscopic morphological characteristics of specimens were examined by scanning electron microscope (SEM). It was observed that the micro-cracks grow and expand in rock after cyclic wetting-drying treatments, which is the main cause of the reduction in dynamic compressive strength. Based on experimental results, an empirical equation was established to describe the effect of strain rate and number of wetting and drying cycles on the dynamic compressive strength of rock materials.

**Keywords:** sandstone, cyclic wetting and drying, physical properties, SHPB, rock dynamics

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