

## عنوان مقاله:

(Effect of freeze-thaw cycle on strength and rock strength parameters (A Lushan sandstone case study

## محل انتشار:

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## خلاصه مقاله:

In an era of continued economic development around the globe, numerous rock-related projects including mining and gas/oil exploration are undertaken in regions with cold climates. Winters in the Iranian western and northwestern provinces are characterized by a high precipitation rate and a cold weather. Under such conditions, rocks are exposed to long freezing periods and several freeze-thaw (F-T) cycles. It is thus necessary to examine the impact of these cycles on the physical and mechanical properties of rocks. Considering the abundant sandstone resources in Iran, in this work, we focused on the Lushan sandstone by investigating the effects of F-T cycles and freezing temperatures on the uniaxial and triaxial compressive strengths, cohesion, internal friction angle, and elastic modulus of the rocks. To study the impact of the number of F-T cycles on the strength of rocks, the specimens frozen at  $-16^{\circ}\text{C}$  were subjected to 1, 4, 8, 16, and 32 F-T cycles. Similar tests were also carried out on the specimens frozen at  $-24^{\circ}\text{C}$ . Furthermore, a number of tests were undertaken at the ambient temperature ( $25^{\circ}\text{C}$ ) on specimens that did not undergo an F-T cycle. According to the results obtained, an increase in the number of F-T cycles and freezing temperatures reduced the uniaxial and triaxial compressive strengths, cohesion, internal friction angle, and elastic modulus due to the growth of the existing cracks and the nucleation of new cracks in the rock. Consequently, the effective porosity increased, whereas the dry specific gravity decreased with more F-T cycles and lower freezing temperatures.

## کلمات کلیدی:

Freeze-Thaw Cycle, Sandstone, Strength Parameters, Triaxial Compressive Strength

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