

**Scale Effect on Long-Term Rock Strength Using Constant Load in Laboratory**  
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**ABSTRACT**

Based on the information gathered, it can be said herein that scale effects on creep test parameters have never been studied. Thus, it is important to conduct such kind of study at laboratory with different specimen diameters and a number types of rock. The study was carried out based on UCS and creep tests on sandstone obtained from the coal interburden (B2-C) at the Air Laya Open Pit mine, South Sumatra. The diameters of specimen tested were of 25 mm, 50 mm, 70 mm, and 100 mm. The UCS tests revealed that strong evidences existed on the scale effect for failure strength, failure strain, elastic modulus, long-term strength, and long-term strain. Relationships between these parameters and various diameters were appropriately fitted to power law equations and, their values decrease as the diameter increase. Strong existence of the scale effects on parameters obtained from the creep tests were only applicable to the following; failure strength, long-term strength, and long-term strain, whereas the failure strain, elastic modulus, and rate of delayed elasticity had little evidence on the their relationships with diameter. Both of these contradictory evidences showed negative power law relationships. On the other hand, there were no strong evidences on scale effect of the viscous flow and rate of delayed elasticity and their trends could be estimated using positive power law equations. Mean values of long-term strength and elastic modulus obtained from the UCS test were much larger than that of creep test, whereas the mean values of failure strength and failure strain obtained from the UCS test were greater than that of creep test. Thus, failure strain of the UCS test was smaller than that of creep one.