

CYCLIC FATIGUE EFFECTS ON THE MECHANICAL PROPERTIES OF SALT

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Abstract

Standard triaxial compression laboratory tests were performed to provide insight regarding the effects of cyclic loading on salt. The testing consisted of cycling the stress difference about 1,000 psi while holding the confining pressure constant at a frequency of one cycle per minute for as many as 20,040 cycles. Stress differences varied from a minimum of 50 psi to a maximum of 2,800 psi. During the tests, the specimens were subjected to stress conditions that are believed to be both greater than and less than the expected onset of dilation. Young's modulus and volumetric strain were monitored during each cycle to assess the effects of cycling. No evidence of fatigue or softening was exhibited during the tests performed. For the number of cycles tested, relatively insignificant levels of volumetric strain were measured for those tests conducted at stress differences greater than the expected dilation limit.

Key words: Cyclic Fatigue, Laboratory Tests, Caverns for Gas Storage, Caverns for Liquid Storage, Salt Dilation, Avery Island Salt, Compressed Air Energy Storage (CAES), Salt Properties