STRESS ANALYSIS AND SIZING OF CAVERNS MINED BY DISSOLUTION OF HALITE OF THE EVAPORITIC BASIN AT THE STATE OF ALAGOAS IN BRAZIL

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ABSTRACT: This paper covers the application of Rock Mechanics and Numerical Methods in the stress analysis and sizing of caverns mined by dissolution of halite at the State of Alagoas in Brazil.

The stress analysis and sizing is conducted by the application of the finite element method. The first sizing of the caverns is done through an elastic-plastic analysis and the final dimensions of the caverns and pillars, in the case of an isolated cavern or a cluster, are confirmed by a quasi-static analysis using a visco-elastic model. In order to be very close to the actual behavior of the caverns the evolution of the dissolution process is simulated by the excavation of elements of the mesh, using the mesh-rezoning technique specially developed for non-linear analysis.

Due to the simulation of the creep behavior of the caverns at the time domain, predictions of surface subsidence are also obtained.