FINITE ELEMENT MODELING TECHNIQUE FOR CONTROL OF SURFACE SUBSIDENCE OVER SOLUTION CAVERN FIELDS

Prepared for:

Spring Meeting
Solution Mining Research Institute
Atlanta, Georgia
April 29-30, 1991

Prepared by:

Serata Geomechanics, Inc.
4124 Lakeside Drive
Richmond, CA 94806

FINITE ELEMENT MODELING TECHNIQUE FOR CONTROL OF SURFACE SUBSIDENCE OVER SOLUTION CAVERN FIELDS

1.0 INTRODUCTION

The method of analyzing surface subsidence has advanced greatly in recent years through development of a finite element modeling technique which realistically simulates long-term creep behavior of underground salt openings. The modeling technique was devised, tested, calibrated, and first successfully applied for dry mining of salt and potash during two decades of extensive field validation work.

The modeling technique established in dry mines in the 1960s and 1970s was found to be equally applicable to solution mining in both bedded and domal salt formations in the mid-1970s. Long-term surface subsidence was used to field-calibrate the model for solution mining. By comparing the model prediction and field measurements, the method's usefulness for cavern field modeling has been established quantitatively.

This paper uses field examples to present an overview of the principles and applications of the modeling technique.

©2023 - Solution Mining Research Institute
Full Paper is Available in the SMRI
Library (www.solutionmining.org)