SALZER-MODEL

Description

The SALZER-Model is a complex creep law originally developed to simulate the creep behaviour of salt. This model allows a proper description of the primary, secondary and inverse transient creep phase based on a special deformation-hardening approach.

A detailed description is given in the publication by Salzer et al.: *"A new creep law to describe the transient and secondary creep phase" (in: Proceedings NUMEG98, Springer Verlag, Wien, 1998, pp. 377-387).* The publication is included in the download file.

Input parameters

Property name	Description	Description in literature	Typical data set (examplary)
a_p	creep factor	A^I	$1.55*10^{-32}$
m_u	creep exponent	μ	5.67
n_p	creep stress exponent	β	6.67
t_null	recovery time	t_0	10
e0	Initial deformation (to speed up calculation time)		10^{-5}
bulk	bulk modulus		7e3
shear	shear modulus		4e3
density	density		0.0024

Practical hints

- Due to the extremely strong gradients, very small time-steps are necessary at the begin of the modelling (e.g. in the order of 10^{-30} seconds).
- To avoid very small time steps an initial deformation (primary hardening) can be set; based on the experience a value in the order of 10^{-6} to 10^{-5} is fine.
- The recovery time t_0 is in the order of 10 to 20 years for salt rocks.
- The Salzer creep law was already successfully adopted for other rock types, like overconsolidated clays.

Included documents / files

Name	Type	Description
salzer_example_1.dat	FLAC-Inputfile	Single element creep test
salzer_example_2.dat	FLAC-Inputfile	Single element creep test
salzer_example_3.dat	FLAC^{3D}-Inputfile	Pillar creep
salzer_example_4.dat	FLAC-Inputfile	Karman sample test with changing load and inverse creep
salzer_example_5.dat	FLAC-Inputfile	Deformation of a pillar
salzer.dll	Dynamic link library	Contains the Salzer creep constitutive model
salzer_publication.pdf	Publication	Describes the theoretical background of the model as well as some applications

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