

WTNV137 - Triaxial compression test drained with the model VISC_DRUC_PRAG

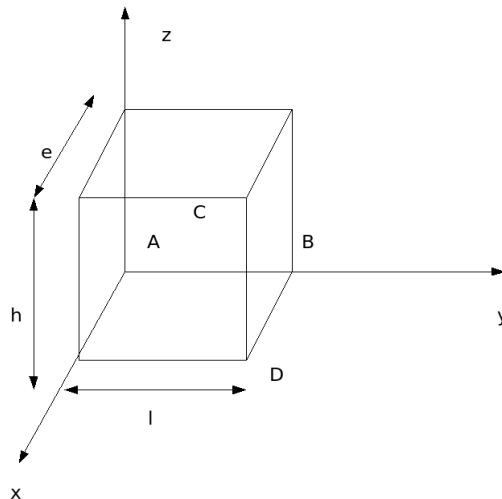
Summary

This test makes it possible to validate the model VISC_DRUC_PRAG within the framework of a hydraulic modeling. It is about a triaxial compression test in drained conditions.

By reason of symmetry, one is interested only in the eighth of a sample subjected to a triaxial compression test. The level of containment is of 5 MPa .

1 Problem of reference

1.1 Geometry



height: $h = 1 \text{ m}$
width: $l = 1 \text{ m}$
thickness: $e = 1 \text{ m}$

Coordinates of the points (in meters):

	A	B	C	D
x	0.	0.	0.5	1.
y	0.	1.	0.5	1.
z	0.	0.	0.5	0.

1.2 Material property

elastic properties under the keyword ELAS:

$E = 5000.0$ in MPa
 $\nu = 0.12$
 $\alpha = 0.0$

viscoplastic properties under the key VISC_DRUC_PRAG:

$P_{ref} = 0.1$ in MPa
 $A = 1.5 \cdot 10^{-12}$ in s^{-1}
 $n = 4.5$
 $p_{pic} = 0.015$
 $p_{ult} = 0.028$
 $\alpha_0 = 0.065$
 $\alpha_{pic} = 0.26$
 $\alpha_{ult} = 0.091$

$$\begin{aligned}R_0 &= 1.3021 \text{ in } MPa \\ R_{pic} &= 6.24808 \text{ in } MPa \\ R_{ult} &= 1.30808 \text{ in } MPa \\ \beta_0 &= -0.15 \\ \beta_{pic} &= 0. \\ \beta_{ult} &= 0.13\end{aligned}$$

1.3 Initial conditions, boundary conditions, and loading

Phase 1:

One brings the sample in a homogeneous state: $\sigma_{xx}^0 = \sigma_{yy}^0 = \sigma_{zz}^0$, by imposing the corresponding confining pressure on the front, side right-hand side and higher faces. Displacements are blocked on the faces postpones ($u_x = 0$), side left ($u_y = 0$) and lower ($u_z = 0$).

Phase 2:

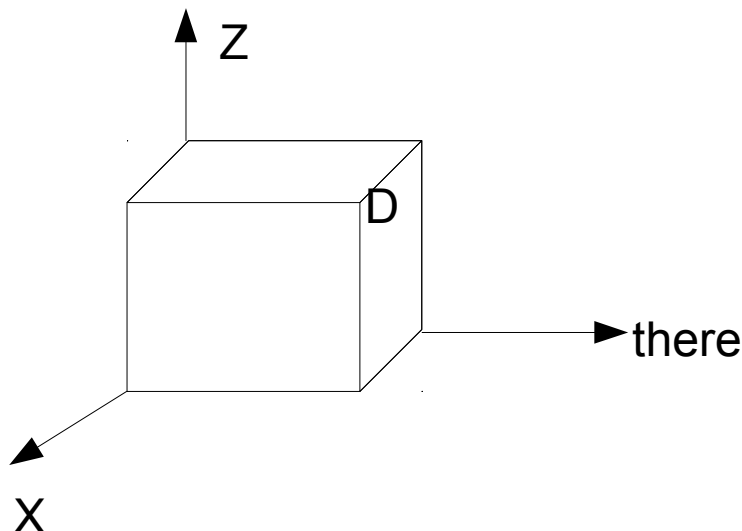
One maintains displacements blocked on the faces postpones ($u_x = 0$), side left ($u_y = 0$) and lower ($u_z = 0$). On all the faces, the pressure of water is worthless.

One applies a displacement forced to the higher face in order to obtain a deformation $\varepsilon_{zz} = -0.06$ (counted starting from the beginning of phase 2). On the front faces and side right-hand side, one imposes a constraint of $5 MPa$.

2 Modeling A

2.1 Characteristics of modeling

3D :



Cutting: 1 in height, in width and thickness.

Loading of phase 1:

Confining pressure: $\sigma_{xx}^0 = \sigma_{yy}^0 = \sigma_{zz}^0 = -5 \text{ MPa}$

Coefficient of biot: 1

UN_SUR_K water: 0

Modeling: 3D_HM

2.2 Characteristic of the grid

Many nodes: 20

Many meshes and types: 1 HEXA20 and 6 QUA8

2.3 Sizes tested and results

Localization	Moment	Displacement	Aster
Not <i>D</i>	13000.	<i>DX</i>	3.4589 10 ⁻²
Localization	Moment	Constraint (MPa)	Aster
Not <i>D</i>	13000.	σ_{yy}	-11.7448

3 Summary of the results

This case test is a test of nonregression developed to validate the model VISC_DRUC_PRAG in hydromechanics in drained conditions.