

WTNV137 - Triaxial compression test drained with the model VISC_DRUC_PRAG

Summarized

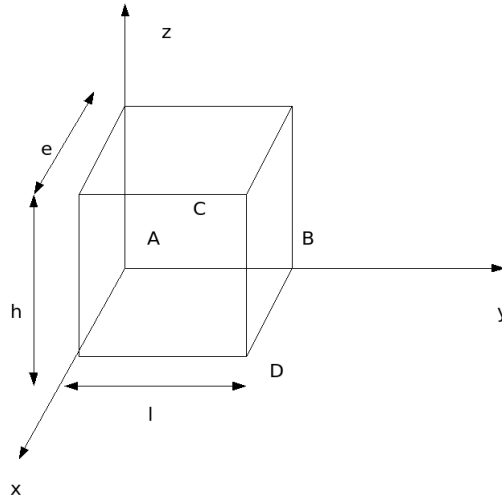
This test makes it possible to the model validate VISC_DRUC_PRAG in the frame of a hydraulic modelization. It is about a triaxial compression test in drained conditions.

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):

	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
<i>x</i>	0.	0.	0.5	1.
<i>y</i>	0.	1.	0.5	1.
<i>z</i>	0.	0.	0.5	0.

1.2 Material property

elastic properties under key word ELAS:

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

viscoplastic properties under word VISC_DRUC_PRAG:

$P_{ref} = 0.1$ in MPa
 $A = 1.5 \cdot 10^{-12}$ of s^{-1}

$n = 4.5$
 $p_{pic} = 0.015$
 $p_{ult} = 0.028$
 $\alpha_0 = 0.065$
 $\alpha_{pic} = 0.26$
 $\alpha_{ult} = 0.091$

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

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 and higher sides. Displacements are blocked on the sides postpones ($u_x=0$), side left ($u_y=0$) and lower ($u_z=0$).

Phase 2:

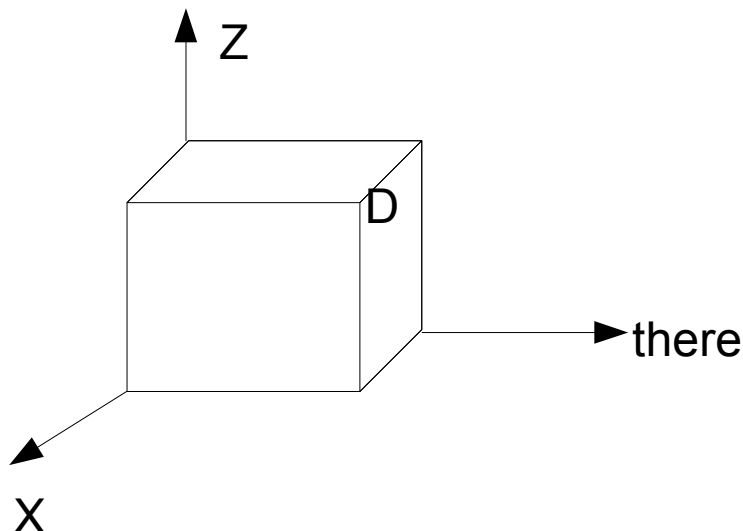
One maintains displacements blocked on the sides postpones ($u_x=0$), side left ($u_y=0$) and lower ($u_z=0$). On all the sides, the pressure of water is null.

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

2 Modelization A

2.1 Characteristic of modelization

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 of water: 0

Modelization: 3D_HM

2.2 Characteristic of the mesh

Many nodes: 20

Number of meshes and types: 1 HEXA20 and 6 QUA8

2.3 Quantities tested and results

Localization	Time	Aster	Displacement
Point <i>D</i>	13000.	<i>DX</i>	3,4589 10-2
Localization	Time	Forced (MPa)	Aster
Point <i>D</i>	13000.	σ_{yy}	-11,7448

3 Summary of the results

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