WTNV137 - Triaxial compression test drained with the model VISC_DRUC_PRAG

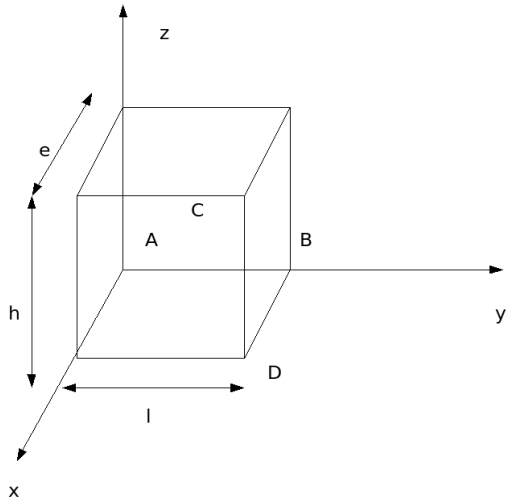
Summary

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: $h=1\,m$
width: $l=1\,m$
thickness: $e=1\,m$

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
$A=1.5.10^{-12}$ in s^{-1}

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

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

1.3 Initial conditions, boundary conditions, and loading

Phase 1:

One brings the sample in a homogeneous state: $\sigma^0_{xx} = \sigma^0_{yy} = \sigma^0_{zz}$, 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 $5\ MPa$.

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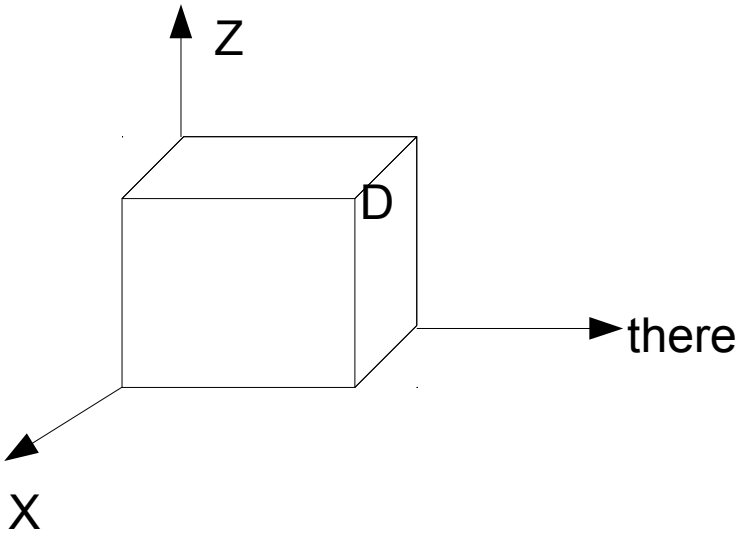
2 Modeling A

2.1 Characteristics of modeling

3D :



Cutting: 1 in height, in width and thickness.

Loading of phase 1:
Confining pressure: $\sigma^0_{xx}=\sigma^0_{yy}=\sigma^0_{zz}=-5\ MPa$
Coefficient of biot: 1
UN_SUR_K water: 0

Modeling: 3D_HM

2.2 Characteristic of the grid

Many nodes: 20
Many meshs and types: 1 HEXA20 and 6 QUA8

2.3 Sizes tested and results

Localization	Moment	Displacement	Aster
Not D	13000.	DX	3.4589 10^{-2}

Localization	Moment	Constraint (MPa)	Aster
Not D	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.