

GCPC001 - Test-tube CTJ25

Summary:

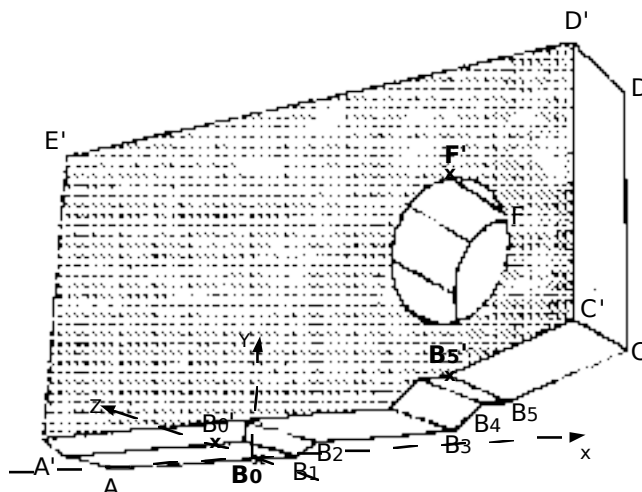
The objective of this test is to make sure of nonthe regression of the method of resolution of the linear problem of elasticity with the solvor GCPC with 2 préconditionneurs LDLT_INC and LDLT_SP.

The test comprises 1 modeling 3D of a quarter of test-tube CTJ25 in 630 hexahedrons for a loading of imposed displacement.

In the previous models this test was named SSLV101 then YYYY108.

1 Problem of reference

1.1 Geometry



The geometry represents only one quarter of test-tube CTJ25
symmetry planes: $(x B_0 y)$ and $(x B_0 z)$

Thickness: $DD' = 12.5 \text{ mm}$

Face1: $(A, B_0, B_1, B_2, B_3, B_4, B_5, C, D, E)$

Face2: (A, B_0, B_0', A')

Coordinates of the points (mm):

	min	max	B_0	F'	B_5'
x	-20.	42.5	0.	30.	30.
y	0.	30.	0.	20.25	3.5
z	0.	12.5	0.	12.5	12.5

1.2 Material properties

$$E = 2.02702710^{11} \text{ Pa}$$

$$\nu = 0.3$$

1.3 Boundary conditions and loadings

All nodes of the face1: $DZ = 0$

All nodes of the face2: $DY = 0$

All nodes of the line FF' : $DX = 0$ $DY = 0.01$

2 Reference solution

2.1 Method of calculating used for the reference solution

The reference solution is that obtained on the same grid with the code PERMAS, calculations carried out in 1997.

2.2 Sizes and results of reference

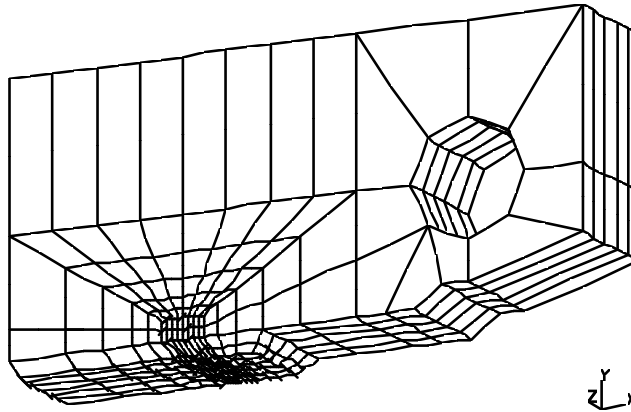
Localization	Reference (mm)	Precision (%)
Not F' DY	$1. 10^{-2}$	1.5E-4
DZ	$1.0296 10^{-4}$	1.5E-4
Not $B5'$ DX	$4.3006 10^{-3}$	1.5E-4
DY	$9.2890 10^{-3}$	1.5E-4
DZ	$-2.9173 10^{-5}$	1.5E-4

3 Modeling A

3.1 Characteristic of modeling

Modeling is 3D elastic.

3.2 Characteristic of the grid



Many nodes: 3323
Many meshes: 630 HEXA20

Cutting:	Face1 (A, B1, ..., B5, C, D, E)	428 nodes
	Face2 (A, B0, B0', A')	198 nodes
	Segment FF'	11 nodes
Name of the nodes:	Not F' = NO2958	Not B5' = NO2974

3.3 Features tested

Orders

AFFE_MODELE	'MECHANICAL'	'3D'
DEFI_MATERIAU	ELAS	

3.4 Sizes tested and results

GCP + LDLT_INC

Localization	Reference	Tolerance
DY (NO2958)	0,010	0,015%
DZ (NO2958)	1.0296E-04	0,015%
DX (NO2974)	4.3006E-03	0,015%
DY (NO2974)	9.289E-03	0,015%
DZ (NO2974)	-2.9173E-05	0,020%

GCP + LDLT_SP

Localization	Reference	Tolerance
DY (NO2958)	0,010	0,015%
DZ (NO2958)	1.0296E-04	0,015%
DX (NO2974)	4.3006E-03	0,015%
DY (NO2974)	9.289E-03	0,015%
DZ (NO2974)	-2.9173E-05	0,020%

4 Summaries of the results

The resolutions with the two préconditionneurs make it possible to obtain the same level of precision.