GCPC001 - Summarized test-tube

CTJ25:

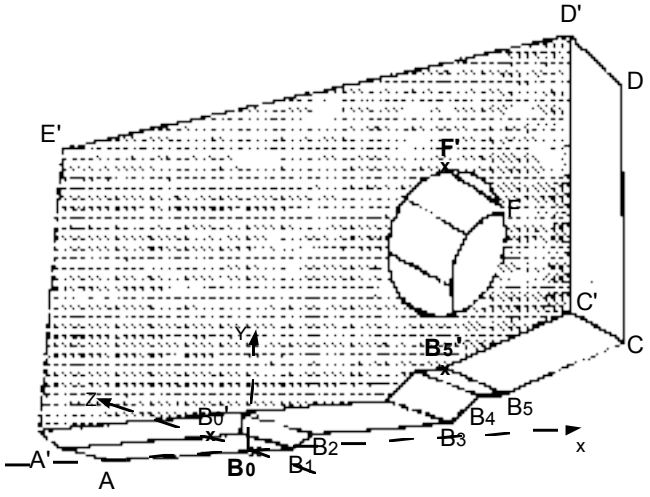
The purpose of this test is to make sure of non regression of the method of resolution of the linear problem of elasticity with the solver PCG with 2 preconditioners LDLT_INC and LDLT_SP.

The test comprises 1 3D modelization 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 symmetry plane test-tube CTJ25: $(x\,B_0\,y)$ and $(x\,B_0\,z)$

Thickness: $DD'=12.5\,mm$

Face1: $(A, B0, B1, B2, B3, B4, B5, C, D, E)$

Face2: $(A, B0, B0', A')$

Coordinates of the points (mm):

	min	max	$B0$	F'	$B5'$
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

$E=2.027027\,10^{11}\,Pa$

$\nu=0.3$

1.3 Boundary conditions and loadings

All nodes of the face1: $DZ=0$

All nodes of the face2: $DY=0$

All nodes of 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 mesh with the code PERMAS, computations carried out in 1997.

2.2 Quantities and results of reference

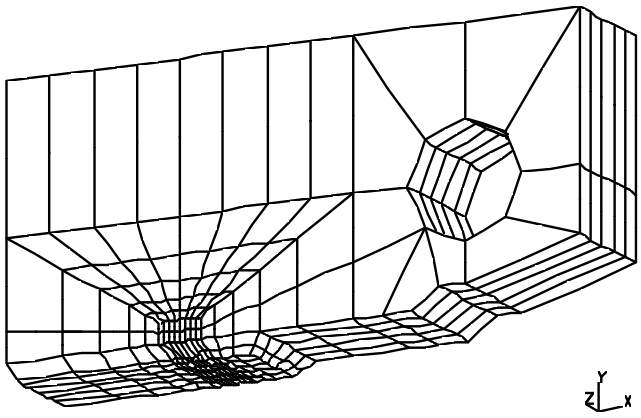
Localization		Reference (mm)	Accuracy (%)
Point F'	DY	1. 10-2	1.5E-4
	DZ	1.0296 10-4	1.5E-4
Point $B5'$	DX	4.3006 10-3	1.5E-4
	DY	9.2890 10-3	1.5E-4
	DZ	-2.9173 10-5	1.5E-4

3 Modelization A

3.1 Characteristic of the modelization

The modelization is 3D elastic.

3.2 Characteristic of the mesh



Many nodes: 3323
Number of meshes: 630 HEXA20

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

3.3 Functionalities tested

Commands
AFFE_MODELE

	"MECANIQUE"	"3D"
DEFI_MATERIAU	ELAS	

3.4 Quantities 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 preconditioners make it possible to obtain the same level of accuracy.