
PERFE02 – Non regression of the computation of tenacity on test-tube CT of Summarized platform

PERFECT:

This test validates the commands used by modulus CT of the platform PERFECT which makes it possible to simulate the effects of irradiation on the components of engines.

One is interested here in tenacity of a steel of tank irradiated.

One considers a test-tube CT, made up of an elastoplastic material, from which curve of tension is resulting from a polycrystalline computation (treated by test PERFE01A), or of a computation of aggregate (treated by PERFE03A).

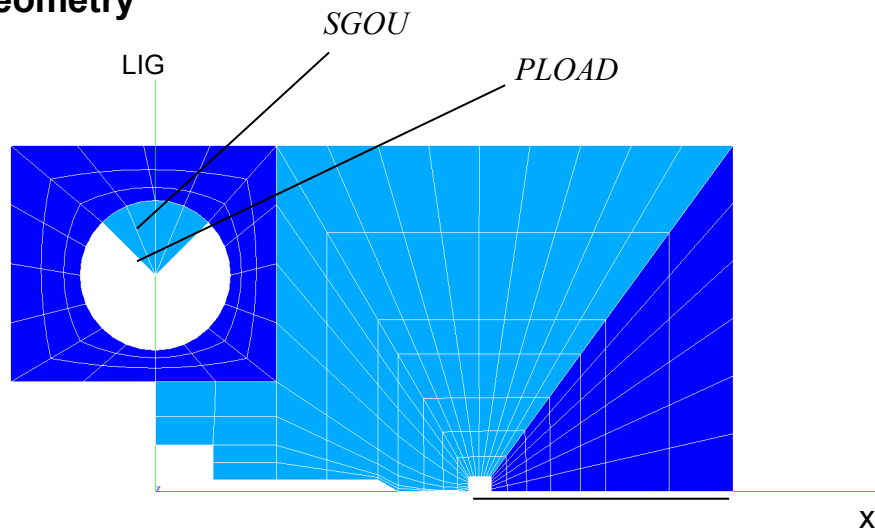
Test-tube CT is requested by a loading of opening.

One carries out then a calculus probability of fracture (postprocessing of Beremin).

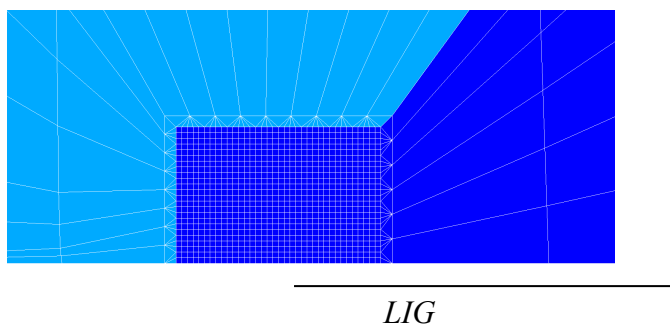
The modelization A tests curved force-displacement obtained and the probability of fracture.

1 Problem of reference

1.1 Geometry



test-tube CT is represented there by the mesh above, with a very fine zone in crack tip:



The triangular zone *SGOU* located in circular hole makes it possible to apply the force of opening in a way distributed, without having to model the unilateral contact between the pin and the test-tube

1.2 Material properties

the material composing the test-tube is elastoplastic, with isotropic hardening: **VMIS_ISOT_TRAC**, curve of tension being provided by a homogenized computation of type *BZ* (see test *PERFE01A*).

The material composing the pin *SGOU* is regarded as infinitely rigid.

1.3 Boundary conditions and loadings

Node <i>PLOAD</i>	$DX = 0$
Nodes of the ligament	$DY = 0$
Node <i>PLOAD</i>	FY

the loading FY is increasing of 0 with 2915.0 N , in 25 increments.

2 Reference solution

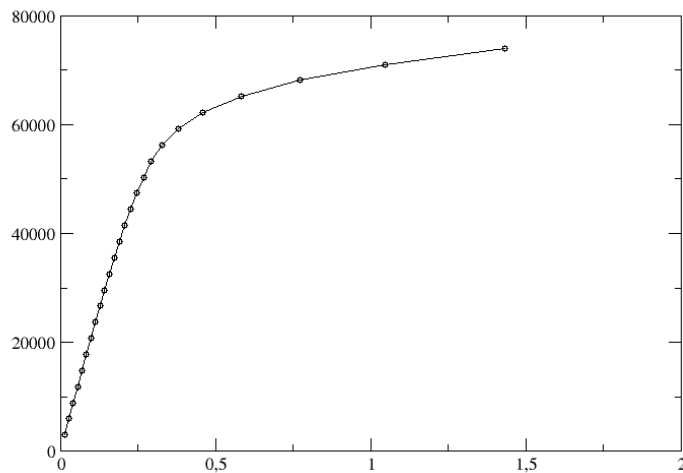
2.1 Method of calculating

the tests are of NON-regression.

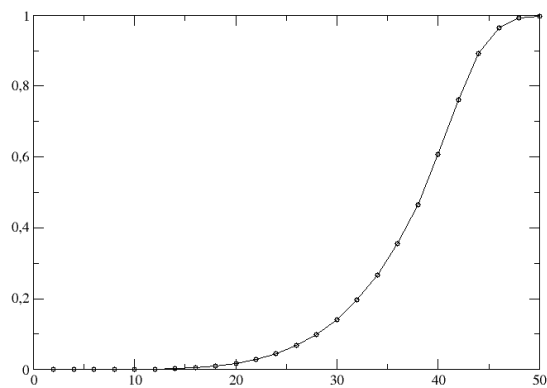
2.2 Results of reference

One tests curved force-displacement obtained, as well as the probability of fracture.

CT : courbe force-deplacement



Proba. rupture Weibull- Eprouvette CT



3 Modelization A

3.1 Characteristic of the mesh

Many nodes: 3556.

Modelization D_PLAN : 1079 meshes QUAD8 and 111 meshes TRIA6.

3.2 Quantities tested and results.

Commands	Options
DEFI_MATERIAU	TENSION
STAT_NON_LINE	COMP_INCR RELATION=' VMIS_ISOT_TRAC ' DEFORMATION=' SIMO_MIEHE '

Last point of curved force-displacement (inst=49.993923025):

Identification	Reference	Aster	% component
difference <i>DY</i> of the field <i>DEPL</i>	-	1.43159	Non regression
composantedu <i>DY</i> field FORC_NODA * width of <i>CT</i>	-	74041.0	Non regression.

Probability of fracture of Weibull (inst= 49.993923025):

Identification	Reference	Aster	% difference
PROBA_WEIBULL	-	0.998212	Non regression

4 Summary of the Test

results of non regression.