
PERFE02 – Not regression of the calculation of tenacity on test-tube CT of platform PERFECT

Summary:

This test validates the orders used by module 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 the traction diagram is resulting from a polycrystalline calculation (treated by test PERFE01A), or of a calculation of aggregate (treated by PERFE03A).

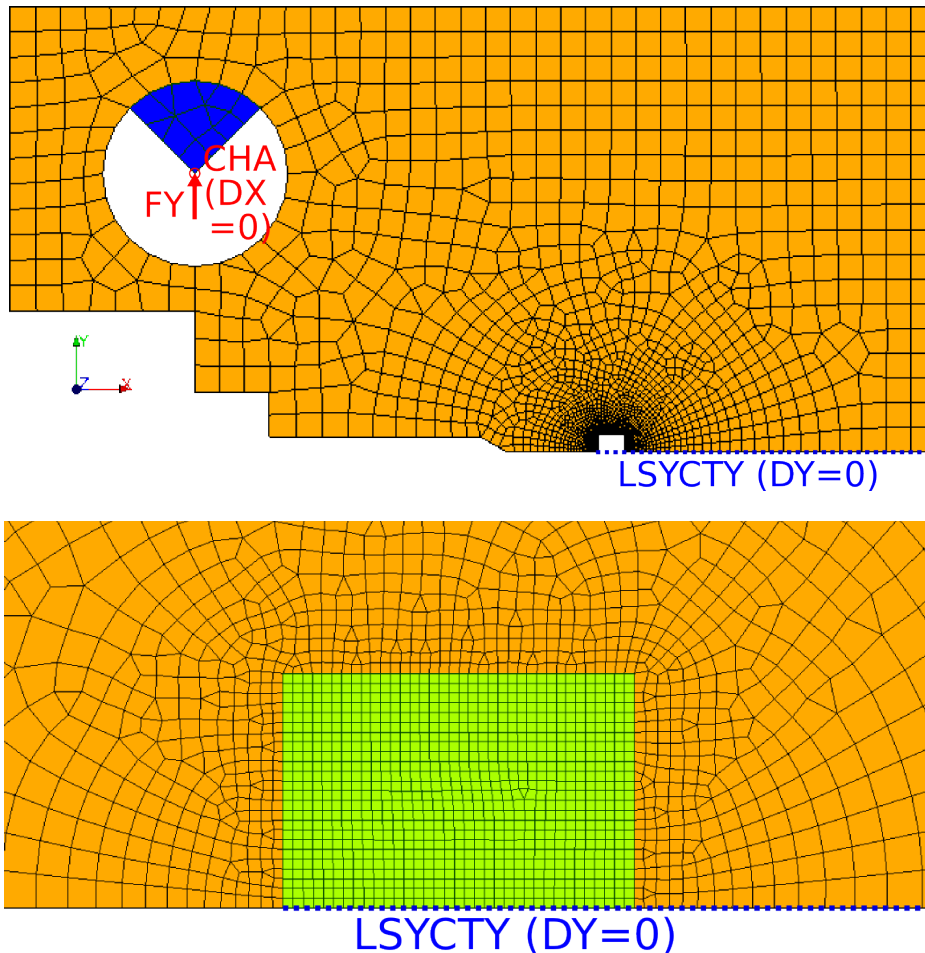
Test-tube CT is requested by a loading of opening.

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

Modeling A tests curved force-displacement obtained and the probability of rupture.

1 Problem of reference

1.1 GéométrieG



Test-tube CT is represented by the grid above, with a very fine zone in bottom of crack:

The triangular zone (in blue) located in the circular hole makes it possible to apply the effort 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 work hardening: `VMIS_ISOT_TRAC`, the traction diagram being provided by a homogenized calculation of type `BZ` (see test `PERFE01A`).

The material composing the pin is regarded as infinitely rigid.

1.3 Boundary conditions and loadings

Node CHA	$DX = 0$
Nodes of ligament LSYCTY	$DY = 0$
Node CHA	FY

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

2 Reference solution

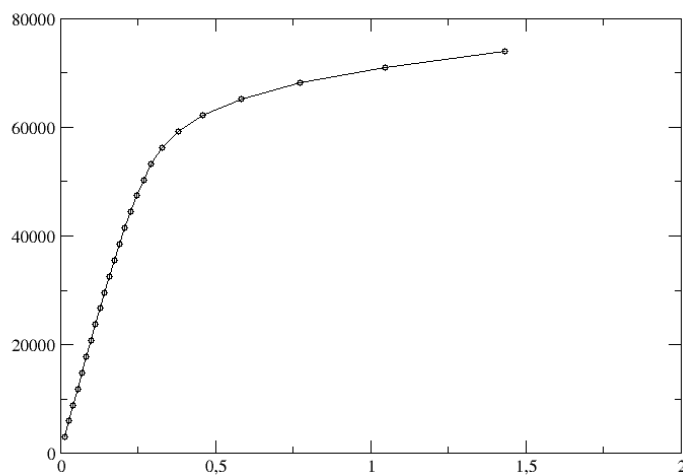
2.1 Method of calculating

The tests are of not-regression.

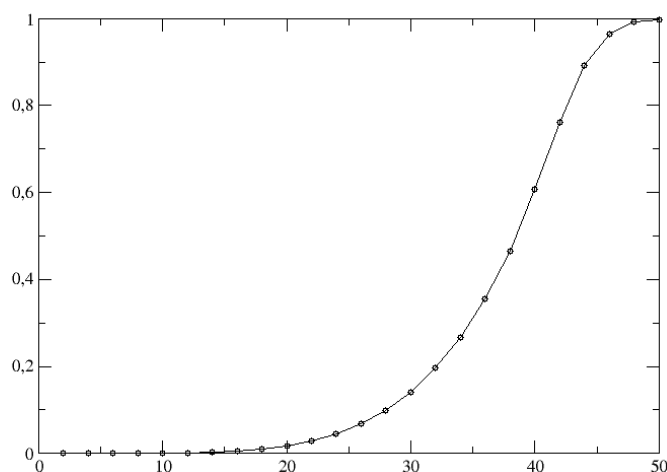
2.2 Results of reference

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

CT : courbe force-deplacement



Proba. rupture Weibull- Eprouvette CT



3 Modeling A

3.1 Characteristics of the grid

Many nodes: 8924.

Modeling D_PLAN : 2842 meshes QUAD8 and 88 meshes TRIA6.

3.2 Sizes tested and results.

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

Identification	Reference	Aster	% difference
component <i>DY</i> field <i>DEPL</i>	-	2.9973457362	Not regression
component <i>DY</i> field FORC_NODA * width of <i>CT</i>	-	74041.0	Not regression.

Probability of rupture of Weibull (*inst*=49.993923025):

Identification	Reference	Aster	% difference
PROBA_WEIBULL	-	0.783372368758	Not regression

4 Summary of the results

Test of nonregression.