

SSNV157 - Test of the method of delocalization per regularization of the strain on a variable bar of section in tension

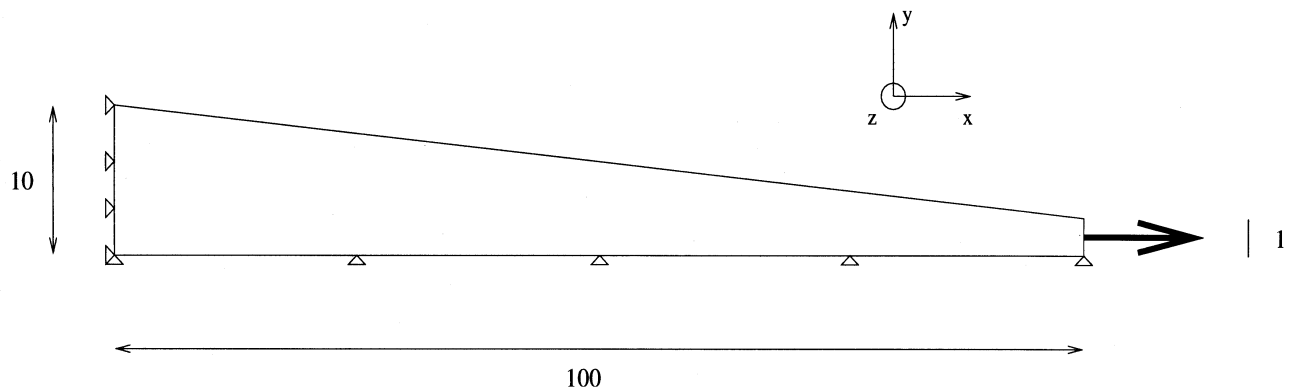
Summarized:

One presents several tests of uniaxial tension on a variable bar of section for 3 constitutive laws (ENDO_FRAGILE, ENDO_ISOT_BETON and MAZARS), in the case of the model not room per regularization of the strain.

1 Problem of reference

1.1 Geometry and boundary conditions

One considers a bar with variable section length 100m , thickness 1m , greater section 10m and smaller section 1m .



Appear 1.1-a: Geometry and boundary conditions of the uniaxial tests

1.2 Properties of the materials

Behavior elastic.

Length characteristic of the delocalization: 3m

2 Reference solution

This test is a test of non regression.

3 Modelization A

3.1 Parameters of the model/Characteristic of material

ECRO_LINE: SY=3.0
D_SIGM_EPSI=-2000

3.2 Characteristic of the modelization

Modelization 3D_GRAD_EPSI

Element MGCA_TETRA10

3.3 Characteristic of the mesh

Many nodes: 507
Number of meshes and 54 TRIA6
types: 174 TETRA10

3.4 Functionalities tested

constitutive law ENDO_FRAGILE
Type of control: PRED_ELAS

3.5 Quantities tested and results

Time	Name of the field	Component	Aster	Place
24	DEPL	<i>DX</i>	<i>N2</i>	6.66251E-03
24	VARI_ELGA	<i>VI</i>	<i>M169</i> , point 2	9.89289E-01

4 Modelization B

4.1 Parameters of the model/Characteristic of material

ECRO_LINE: SY=3.0
D_SIGM_EPSI=-2000

4.2 Characteristic of the modelization

Modelization C_PLAN_GRAD_EPSI

Element MGCA_TRIA6

4.3 Characteristic of the mesh

Many nodes: 153
Number of meshes and 27 SEG3
types: 50 TRIA6

4.4 Functionalities tested

constitutive law ENDO_FRAGILE
Type of control: PRED_ELAS

4.5 Quantities tested and results

Time	Name of the field	Component	Aster	Place
31	DEPL	<i>DX</i>	<i>N2</i>	9.22566E-03
31	VARI_ELGA	<i>VI</i>	<i>M3I</i> , point 2	9.97526E-01

5 Modelization C

5.1 Parameters of the model/Characteristic of material

ECRO_LINE: SY=3.0
D_SIGM_EPSI=-2000

5.2 Characteristic of the modelization

Modelization D_PLAN_GRAD_EPSI

Element MGCA_TRIA6

5.3 Characteristic of the mesh

Many nodes: 153
Number of meshes and 27 SEG3
types: 50 TRIA6

5.4 Functionalities tested

constitutive law ENDO_FRAGILE
Type of control: PRED_ELAS

to optimize under-cuttings of time step in the event of NON-convergence of the residue, one activates event DIVE_RESI of DEFI_LIST_INST.

5.5 Quantities tested and results

Time	Name of the field	Standard	Component	Place of reference	Value of reference	Tolerance
42	DEPL	<i>DX</i>	<i>N2</i>	"NON_REGRESSION"	9.54359E-03	0.1%
42	VARI_ELGA	<i>VI</i>	<i>M31</i> , point 2	"NON_REGRESSION"	9.97659E-01	0.1%

6 Modelization D

6.1 Parameters of the model/Characteristic of material

ECRO_LINE: SY=3.0
D_SIGM_EPSI=-2000

6.2 Characteristic of the modelization

Modelization 3D_GRAD_EPSI

Element MGCA_TETRA10

6.3 Characteristic of the mesh

Many nodes: 507
Number of meshes and 54 TRIA6
types: 174 TETRA10

6.4 Functionalities tested

constitutive law ENDO_ISOT_BETON
Type of control: PRED_ELAS

6.5 Quantities tested and results

Time	Name of the field	Component	Aster	Place
37	DEPL	<i>DX</i>	<i>N2</i>	6.56702E-03
37	VARI_ELGA	<i>VI</i>	<i>M169</i> , point 2	9.40876E-01

7 Modelization E

7.1 Parameters of the model/Characteristic of material

MAZARS: K = 0.7
EPSD0 = 9.375E-05
AC = 1.15
AT = 1.0
BC = 1391.3
BT = 10000.

7.2 Characteristics of the modelization

Modelization 3D_GRAD_EPSI

Element MGCA_TETRA10

7.3 Characteristic of the mesh

Many nodes: 507
Number of meshes and 54 TRIA6
types: 174 TETRA10

7.4 Functionalities tested

constitutive law MAZARS
Type of control: DEFORMATION

7.5 Quantities tested and results

Time	Name of the field	Component	Aster	Place
17	DEPL	<i>DX</i>	<i>N2</i>	3.11578E-03
17	VARI_ELGA	<i>VI</i>	<i>M169</i> , point 2	4.33175E-01

8 Modelization F

8.1 Parameters of the model/Characteristic of material

MAZARS: K = 0.7
EPSD0 = 9.375E-05
AC = 1.15
AT = 1.0
BC = 1391.3
BT = 10000.

8.2 Characteristics of the modelization

Modelization C_PLAN_GRAD_EPSI

Element MGCA_TRIA6

8.3 Characteristic of the mesh

Many nodes: 153
Number of meshes and 27 SEG3
types: 50 TRIA6

8.4 Functionalities tested

constitutive law MAZARS
Type of control: DEFORMATION

8.5 Quantities tested and results

Time	Name of the field	Component	Aster	Place
51	DEPL	<i>DX</i>	<i>N2</i>	2.27206E-03
51	VARI_ELGA	<i>V1</i>	<i>M31</i> , point 2	9.37885E-01

9 Modelization G

9.1 Parameters of the model/Characteristic of material

MAZARS: K = 0.7
EPSD0 = 9.375E-05
AC = 1.15
AT = 1.0
BC = 1391.3
BT = 10000.

9.2 Characteristics of the modelization

Modelization D_PLAN_GRAD_EPSI

Element MGCA_TRIA6

9.3 Characteristic of the mesh

Many nodes: 153
Number of meshes and 27 SEG3
types: 50 TRIA6

9.4 Functionalities tested

constitutive law MAZARS
Type of control: DEFORMATION

9.5 Quantities tested and results

Time	Name of the field	Component	Aster	Place
51	DEPL	<i>DX</i>	<i>N2</i>	2.39773E-03
51	VARI_ELGA	<i>VI</i>	<i>M31</i> , point 2	9.16055E-01

10 Modelization K

10.1 Parameters of the model/Characteristic of the material

It act of the same models and materials that for the modelization *C* .

10.2 Characteristics of the modelization

They are identical to the modelization *C* , put except for one activates the event `ERREUR`, which allows when computation diverges to test convergence with the second solution of the equation of control before subdividing (confer to the documentation [U4.34.03]).

10.3 Characteristics of the mesh

Many nodes: 153
Number of meshes and 27 `SEG3`
types: 50 `TRIA6`

10.4 Quantities tested and results

the values of reference are those of the modelization *C* . The fact is validated that the activation of `ERREUR` makes it possible to accelerate computation (33 iterations instead of 42) while finding same the result final one.

Urgent	Name of the field	Standard	Component	Place of reference	Value of reference	Tolerance
33	DEPL	<i>DX</i>	<i>N2</i>	"NON_REGRESSION"	9.54359E-03	0.1%
33	VARI_ELGA	<i>VI</i>	<i>M3I</i> , point 2	"NON_REGRESSION"	9.97659E-01	0.1%