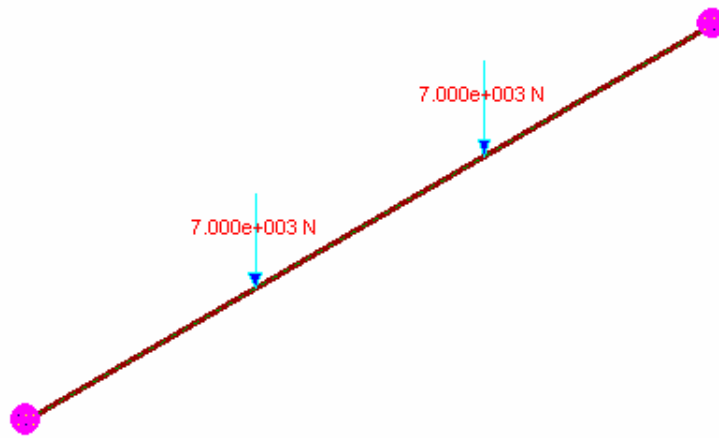
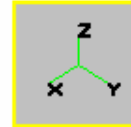


TEST SCHEDULE CASTALIA_STAT013BIS		
SOLVING	BEAM PROBLEM	SOL.SAR.STAT013BIS
FINITE ELEMENT	SOLVER	CLEVER (SARGON ©)



**Problem description:**

Simply supported beam with two equal internal shear forces

**Keywords (english):** validation, benchmark, statics, finite elements, fem, solver, precision, reliability, quality control, beam, error measure

**Keywords (italian):** validazione, benchmark, statica, elementi finiti, fem, solutore, precisione, affidabilità, controllo qualità, travi, misura di errore

**Editorial note:**

Target values are based on theoretical values, cross check values or accepted values. Where “theoretical” values are used, target values have been computed using well known formulae and/or published results.

**Note:**

Shear area is not used, that is shear energy neglected. Dxi and Dzi are the offsets from lower Z alignment leftmost available node.

TEST SCHEDULE CASTALIA_STAT013BIS		
SOLVING	BEAM PROBLEM	SOL.SAR.STAT013BIS
FINITE ELEMENT	SOLVER	CLEVER (SARGON ©)

GEOMETRY & CONSTRAINTS				
Full Length [mm]	Dx1 [mm]	Dx2 [mm]		Constraints
3000	1000	2000	-	As shown

LOAD			
Type	Value	Point of application	
force concentrated	7.000e+003	Dx1	
force concentrated	7.000e+003	Dx2	
		-	
		-	

MATERIAL					Fe360
$f_y$ [N/mm <sup>2</sup> ]	$f_u$ [N/mm <sup>2</sup> ]	E [N/mm <sup>2</sup> ]	$\nu$	$\alpha$	
2.350e+002	3.600e+002	2.060e+005	3.000e-001	1.200e-005	

CROSS-SECTION					IPE200
A [mm <sup>2</sup> ]	$J_2$ [mm <sup>4</sup> ]	$J_3$ [mm <sup>4</sup> ]	$J_t$ [mm <sup>4</sup> ]	$W_2$ [mm <sup>3</sup> ]	$W_3$ [mm <sup>3</sup> ]
2.981e+003	2.051e+007	1.540e+006	6.254e+004	2.051e+005	3.081e+004
$W_{pl2}$ [mm <sup>3</sup> ]	$W_{pl3}$ [mm <sup>3</sup> ]	$i_2$ [mm]	$i_3$ [mm]	$i_t$ [mm]	
2.597e+005	4.776e+004	8.296e+001	2.273e+001	2.887e+001	

OTHER DATA					

TARGET VALUES	vs	COMPUTED VALUES
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Description	$T_v$	$T_{vK}$	$C_v$	$(C_v - T_v)$	$100 \frac{T_v - C_v}{C_v}$
Shear T3, I extreme. Beam # 1. Load case # 1	7.0000e+003	Th	7.0000e+003	-9.0949e-013	-0.0000
Shear T3, J extreme. Beam # 1. Load case # 1	7.0000e+003	Th	7.0000e+003	0.0000e+000	0.0000
Bending M2, I extreme. Beam # 1. Load case # 1	0.0000e+000	Th	1.8626e-009	1.8626e-009	0.0000
Bending M2, J extreme. Beam # 1. Load case # 1	0.0000e+000	Th	-9.3132e-010	-9.3132e-010	-0.0000

$C_v$  computed value  
 $T_v$  target value  
 $T_{vK}$  target value kind (theoretical, cross check, accepted).  
     Th theoretical value  
     Cr cross check value (theoretical target value is not known, results obtained with a different program are used as target values).  
     Ac accepted value (a value which, on the basis of some argument, can be considered acceptable).  
 $100(T_v - C_v) / C_v$  relative error percentage

Computational notes:

**Authors:** Ing. Marco Croci, Ing. Paolo Rugarli  
**Computed errors:** checksolvers.exe, by Castalia srl.

