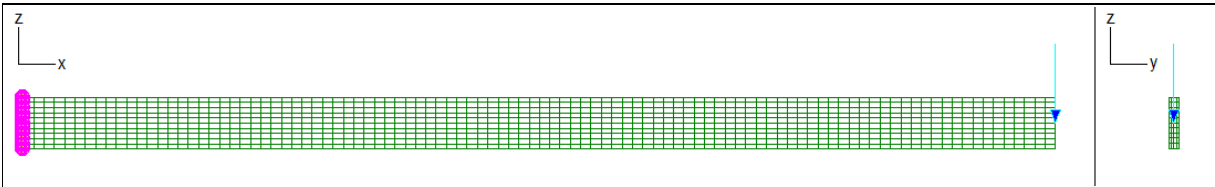


Validation of Sargon Nonlinear solver (CURAN, version 9.70)			
TEST SO004	VALIDATION, CROSS CHECKS, RELIABILITY, BENCHMARK	Marco Croci	Rev.2-08/04/2011



Test description	
Constitutive law of membranes material: linear elastic. Solution should coincide with a linear elastic solution.	
Theoretical check and cross-check with Sargon linear solver (CLEVER)	
Test model: curanSO_004.WSR	Target model: C004SO_CLEVER.WSR

Material properties		
Name	ν	E
S235LE	0,3	210000N/mm ²

Model data

Beam			Constraints		Load (z direction)	
LENGTH	HEIGHT	THICKNESS	LEFT	RIGHT	APPLICATION POINT	FORCE
10000mm	500mm	100mm	Fixed	Free	Right end	-100000N

Solid elements	Type	d.o.f.
4000 (100x10x4)	BRICK8WI	16500

CROSS CHECK

Displacement in the middle of the beam is $\delta = FL^3/3EI + L\chi T/2GA$ where χ is shear factor and T is internal shear force

Load case	Value	Unit	CURAN	TARGET	KIND	% diff.
1	Node 2844 displacement (z)	mm	-1,523E+02	-1,527E+02	theoretical	-0,25
1	σ_{vm} element 3027, node 3393	N/mm ²	1,985E+02	1,985E+02	cross-check	0,01
1	τ_{zx} element 3027, node 3393	N/mm ²	-5,568E-01	-5,568E-01	cross-check	0,00
1	Node 2229 reaction (x)	N	1,516E+05	1,516E+05	cross-check	0,00

% difference = (CURAN - TARGET) / TARGET * 100

Precision of limit multiplier for the analysis: 0.005
BRICK8WI: isoparametric element with Wilson-Ibrahimbegovic modification