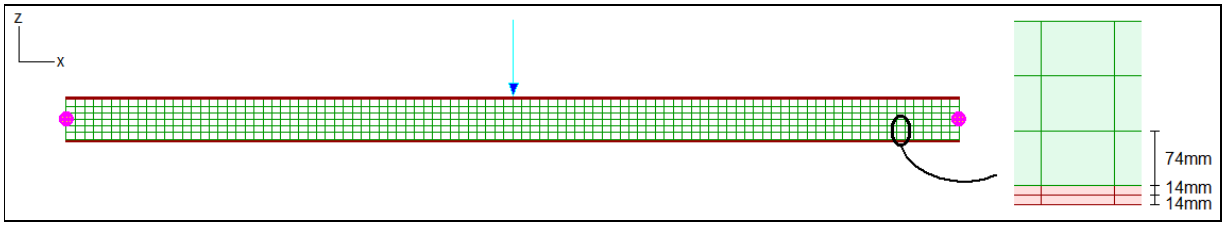
Validation of Sargon Nonlinear solver (CURAN, version 9.60)			
TEST MB023	VALIDATION, CROSS CHECKS, RELIABILITY, BENCHMARK	Marco Croci	26/11/2010

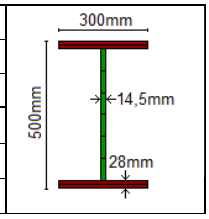


Test description
Constitutive law of membranes material: linear elastic. Solution should coincide with a linear elastic solution.
Theoretical check and cross-check with Sargon linear solver (CLEVER)
Test model: **curanMB_023.WSR** Target model: **C023MB_CLEVER.WSR**

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

Model data

Beam		Constraints	Load (z direction)	
LENGTH	SHAPE SIZES	LEFT / RIGHT	APPLICATION P.	FORCE
10000mm	See image	Simple support	Middle point	-100000N
Membrane elements		Type	Thicknesses	d.o.f.
1000(10x100)		QUAD4SRI	See image	2218



CROSS CHECK

Displacement in the middle of the beam is $\delta=FL^3/48EI+L\chi T/2GA$ where χ is shear factor and T is internal shear force

Load case	Value	Unit	CURAN	TARGET	KIND	% diff.
1	Node 127 displacement (z)	mm	-9,931E+00	-9,943E+00	theoretical	-0,12
1	σ_{VM} element 248, node 266	N/mm^2	4,431E+01	4,431E+01	cross-check	0,00
1	τ_{zx} element 50, node 107	N/mm^2	-8,269E-02	-8,269E-02	cross-check	0,00

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

Precision of limit multiplier for the analysis: 0.005
QUAD4SRI: bilinear isoparametric element with selective integration

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