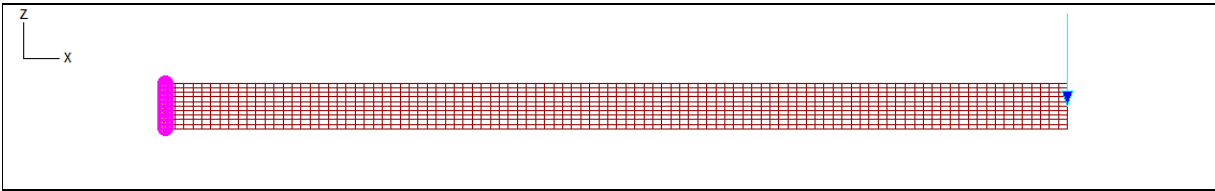


Validation of Sargon Nonlinear solver (CURAN, version 9.70)
TEST MB025 VALIDATION, CROSS CHECKS, RELIABILITY, BENCHMARK Marco Croci Rev.1-18/03/2011

Test description

 Constitutive law of membranes material: elastic-perfectly plastic.
 When limit load is exceeded there is a collapse.

 Test model: **curanMB_025.WSR**
Material properties

Name	ν	f_y	E
S235PP	0,3	235N/mm ²	210000N/mm ²

Beam			Constraints		Load (z direction)	
LENGTH L	HEIGHT h	THICKNESS b	LEFT	RIGHT	APPLICATION POINT	FORCE F
10000mm	500mm	100mm	Fixed	Free	Right end	-200000N

Model data

Membrane elements	Type	Thickness	d.o.f.
1000 (10x100)	QM6WI	100mm	2200

CHECK

 Theoretical limit load is $F_{lim} = bh^2/4 * f_v / L = 146875N$. Load multiplier is $F_{lim} / F = 0,7344$

Load case	Value	Unit	CURAN	TARGET	KIND	% diff.
1	Load multiplier	/	7,291E-01	7,344E-01	theoretical	-0,72

$$\% \text{ difference} = (\text{CURAN} - \text{TARGET}) / \text{TARGET} * 100$$

Precision of limit multiplier for the analysis: 0.005

QM6WI: 4 nodes incompatible element with Wilson-Ibrahimbegovic modification