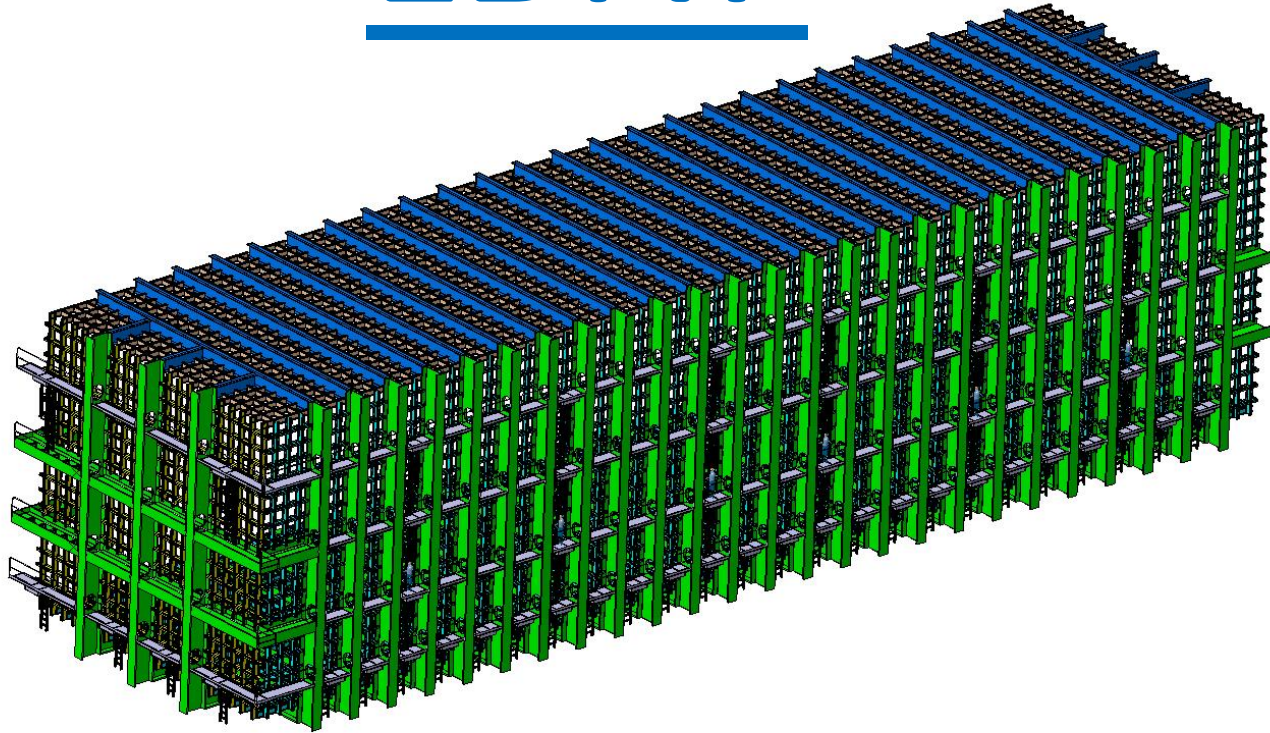


# LBNF



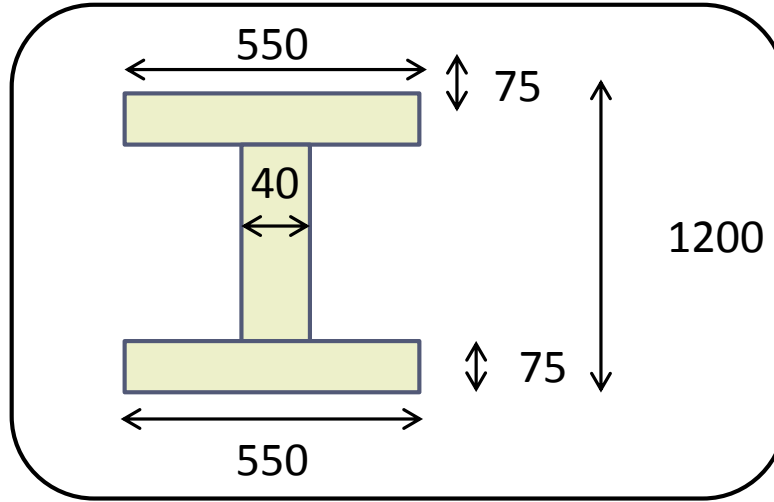
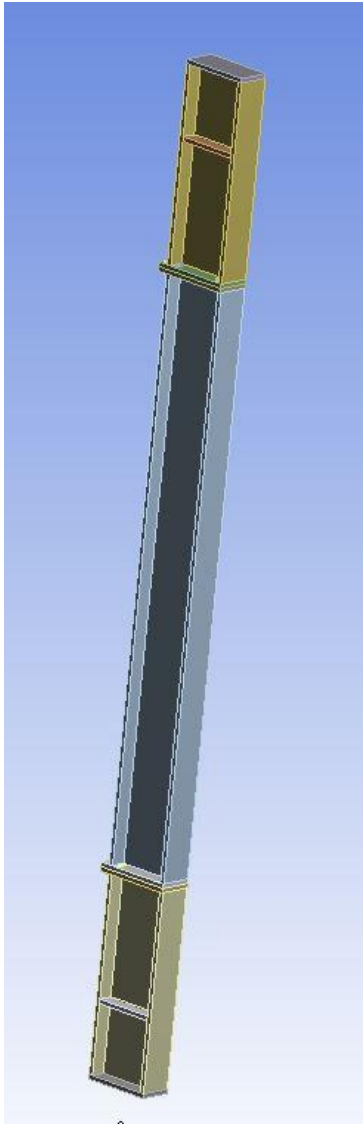
## Calculations

D. Smargianaki

- Comparison between Single Beam & Beam with Spliced connections
- Trials to reinforce the beam
- Trials to modify the beam section
- Comparison between 'Base line' and 'New line'

# Comparison Between Single Beam & Beam With Spliced Connections

# Single Beam

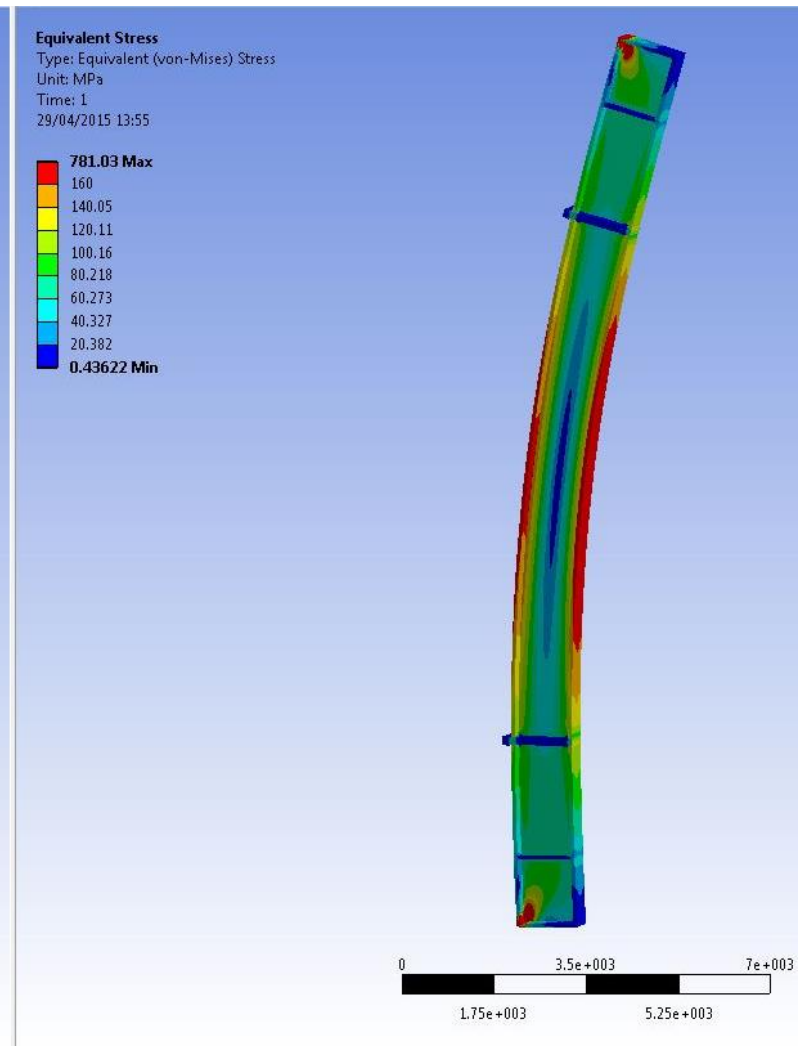
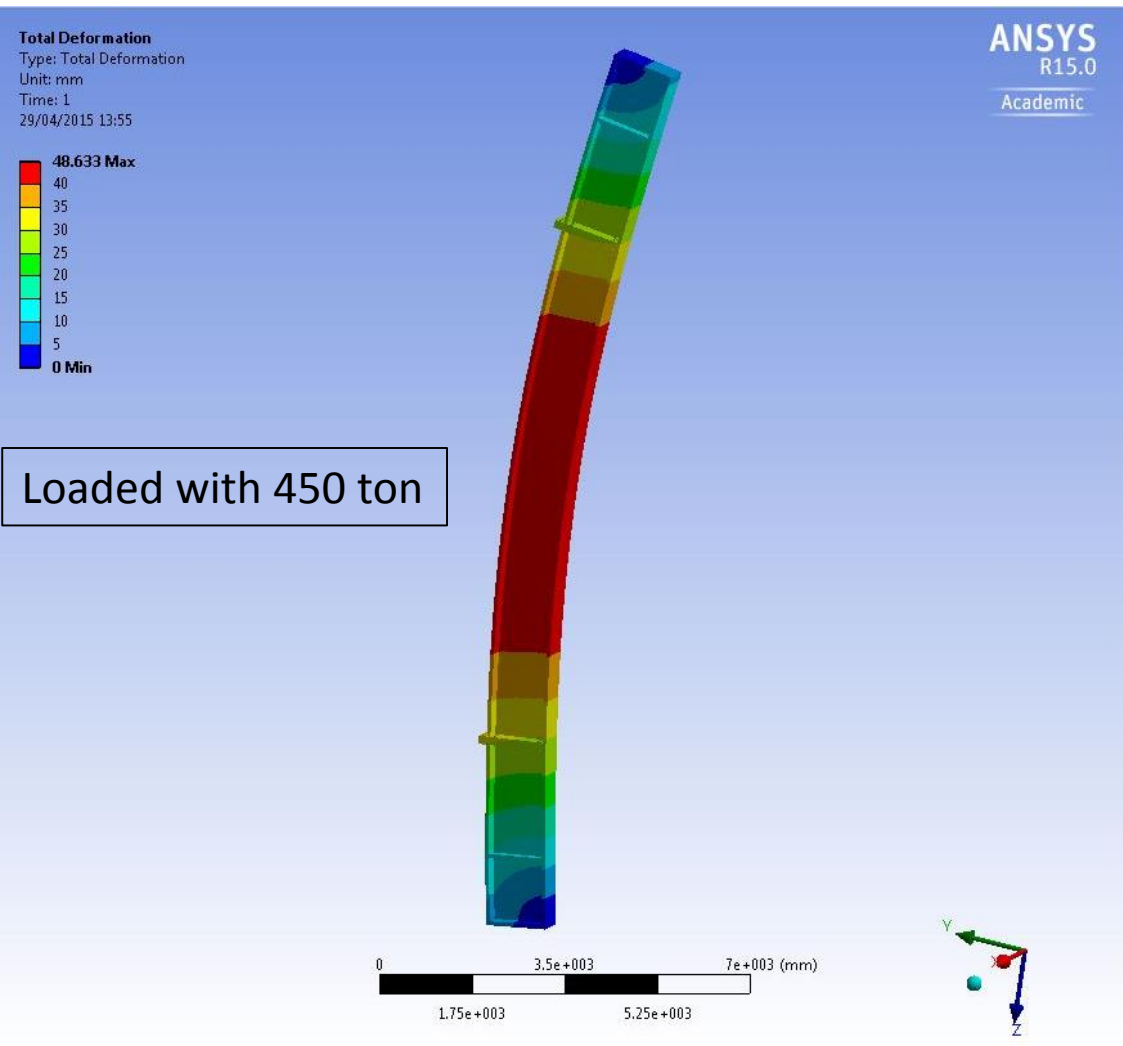


Beam Section

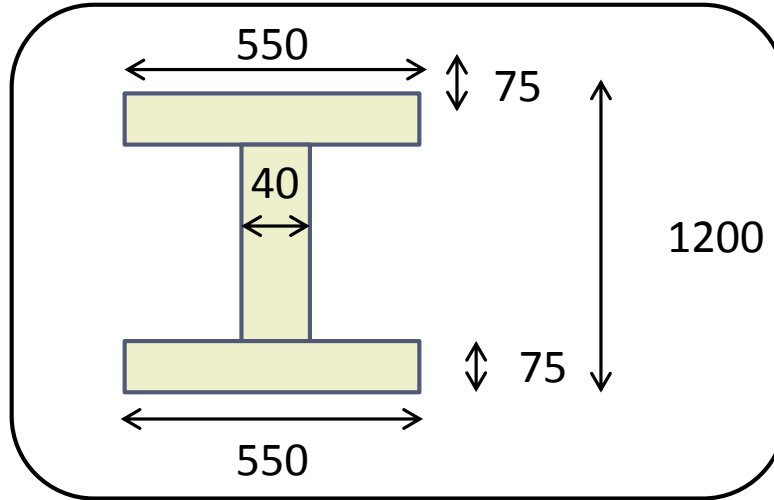
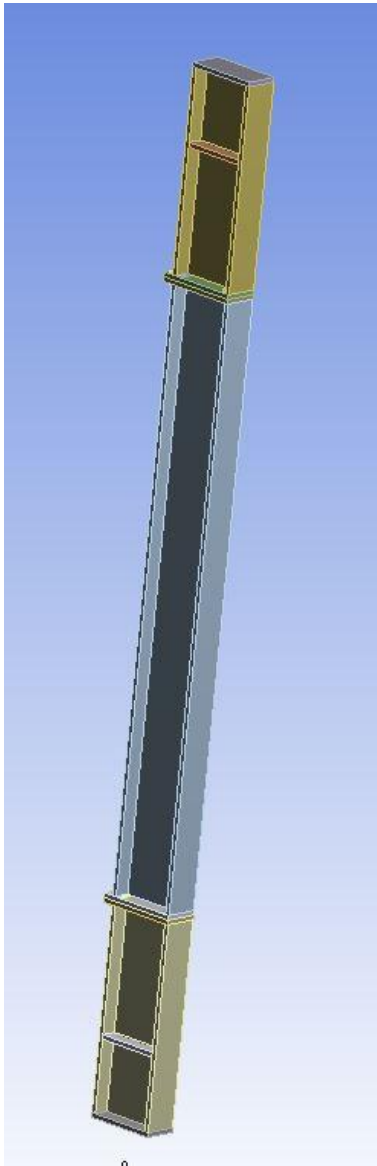
Inertia ( mm<sup>4</sup> ) : 30001000000

Weight ( Kg/m ) : 977.33

# Single Beam



# Beam With Spliced Connections

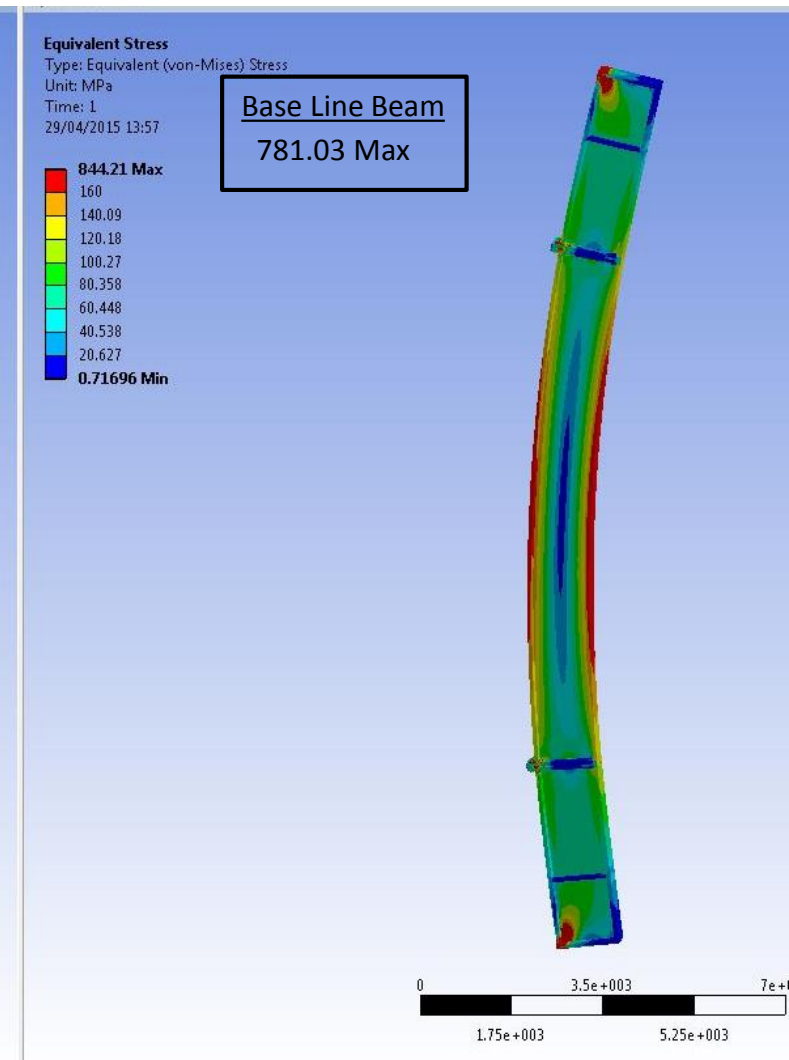
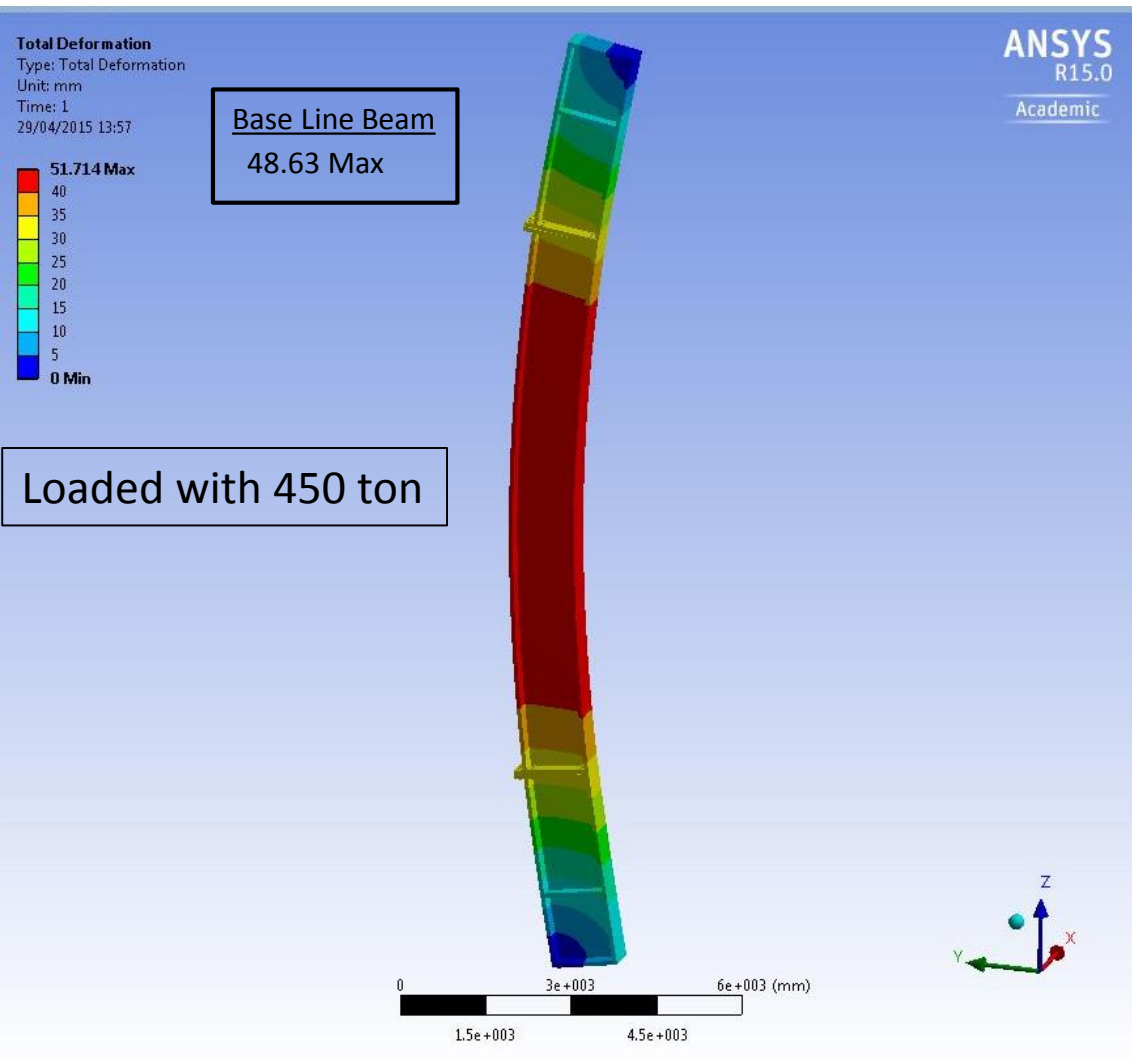


Beam Section

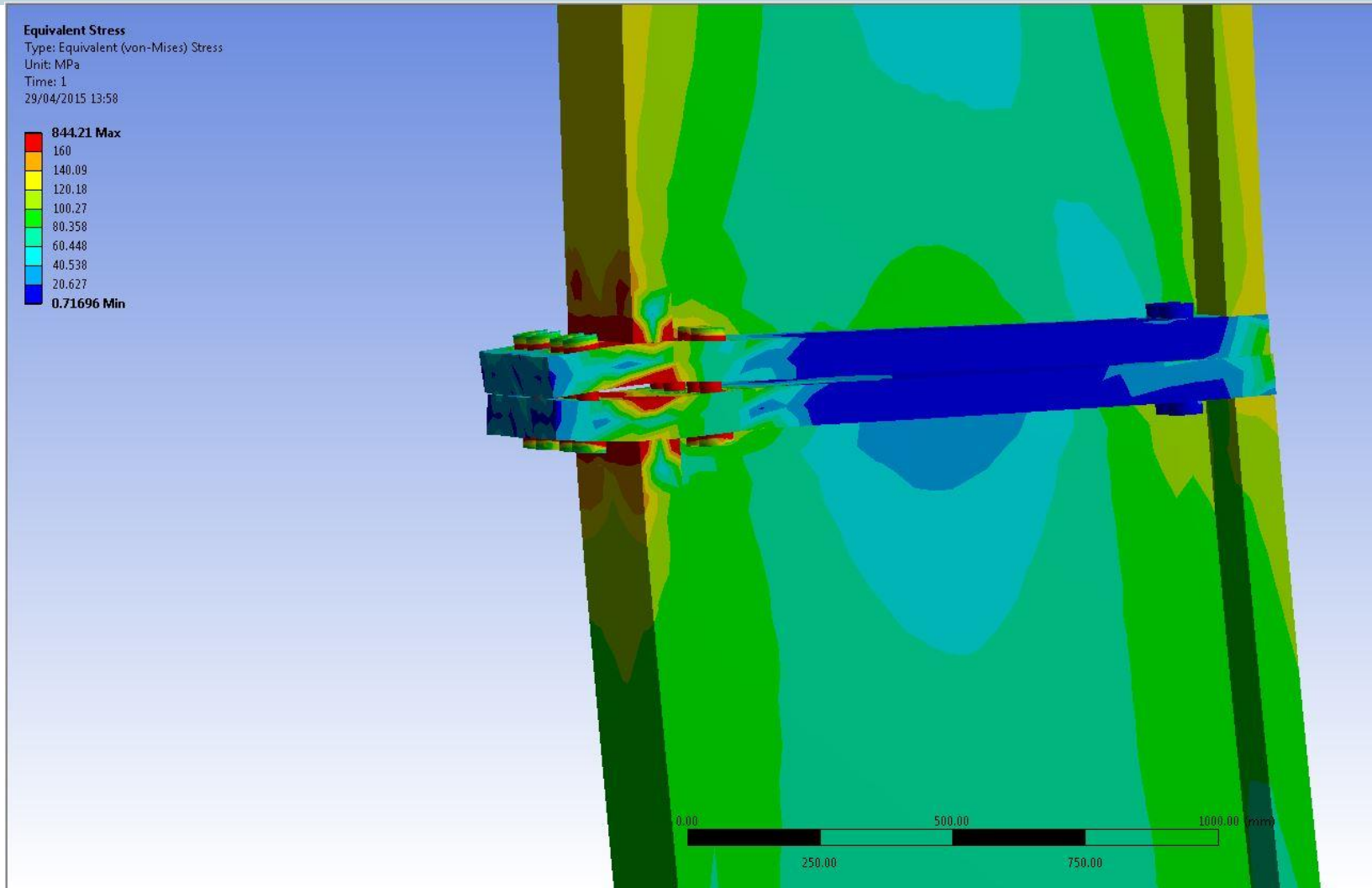
Inertia ( mm<sup>4</sup> ) : 30001000000  
Weight ( Kg/m ) : 977.33



# Beam With Spliced Connections



# Beam With Spliced Connections- Connection Area

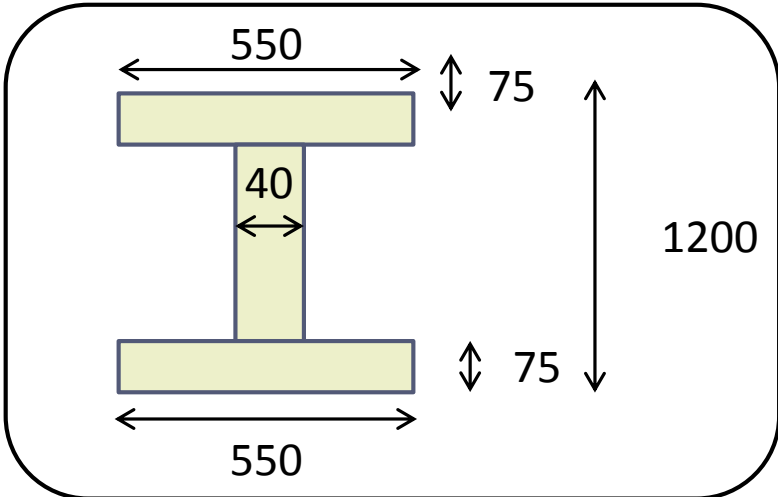
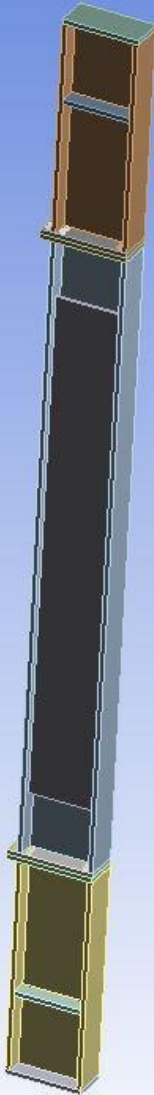






# Trials To Reinforce The Beam

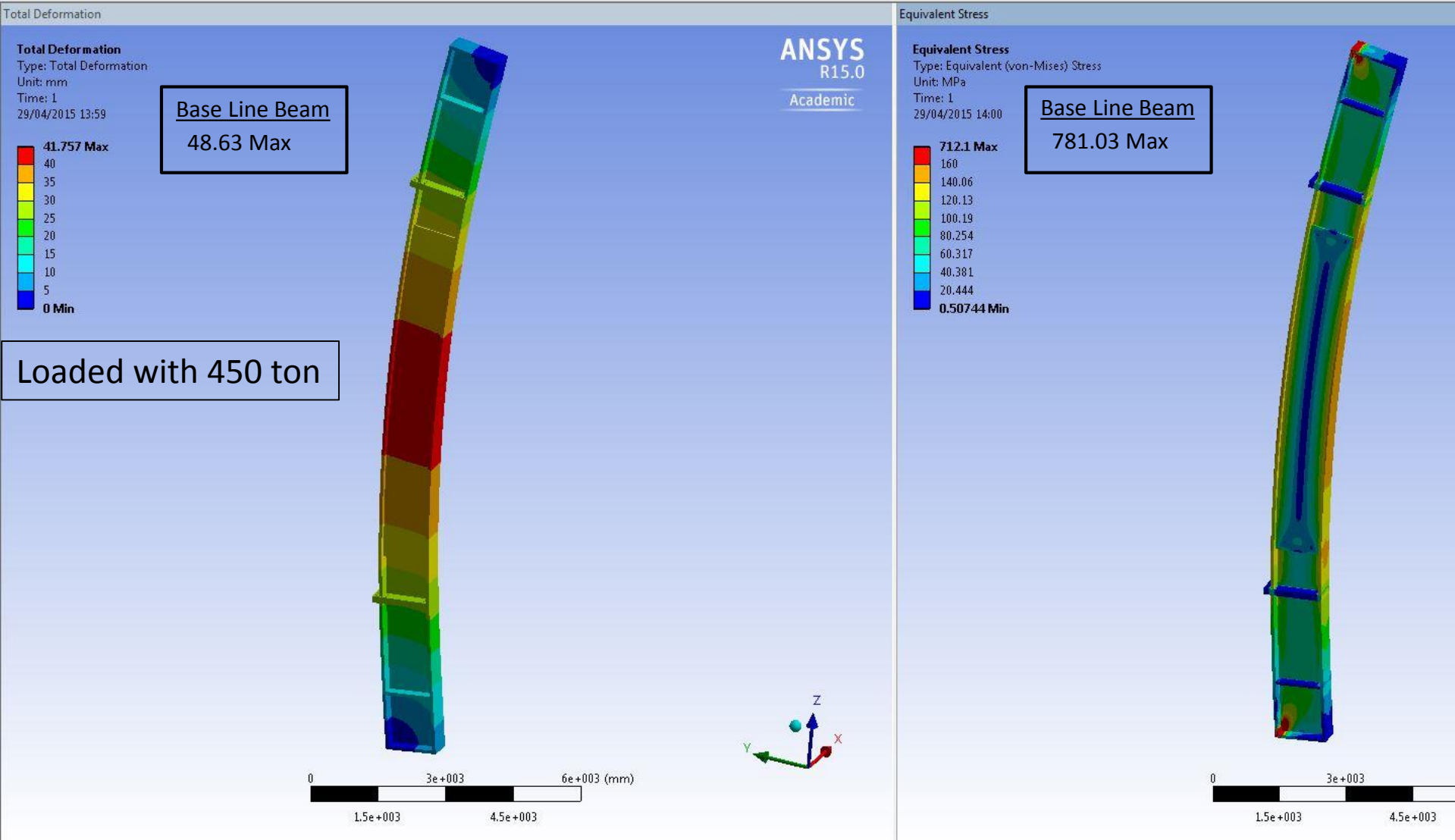
# Reinforcement 1



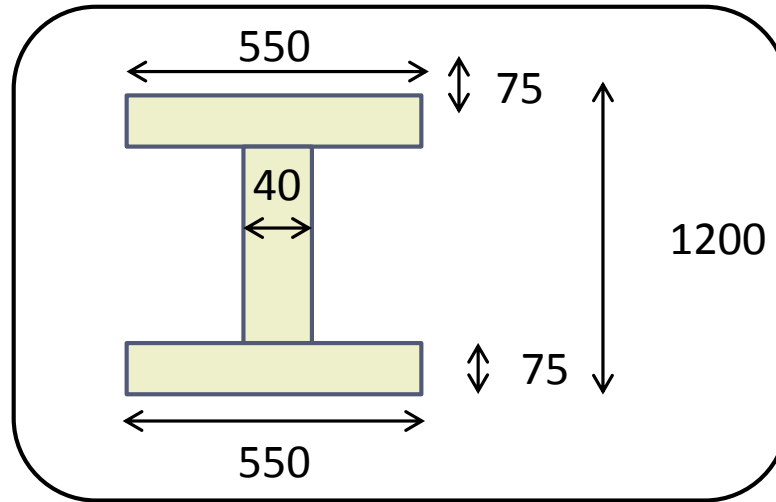
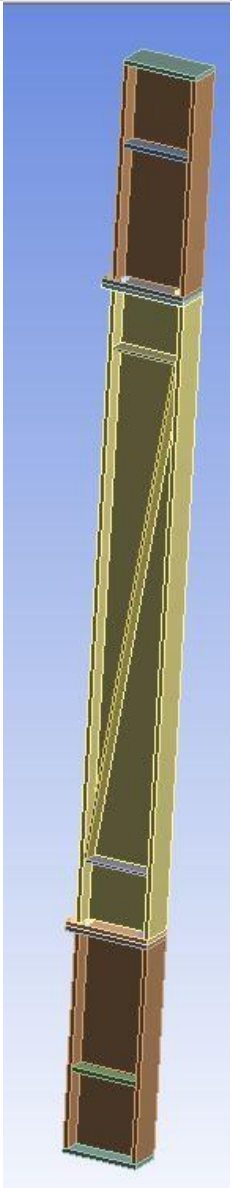
Beam Section

Inertia ( mm<sup>4</sup> ) : 30001000000  
Weight ( Kg/m ) : 977.33

# Reinforcement 1



# Reinforcement 2

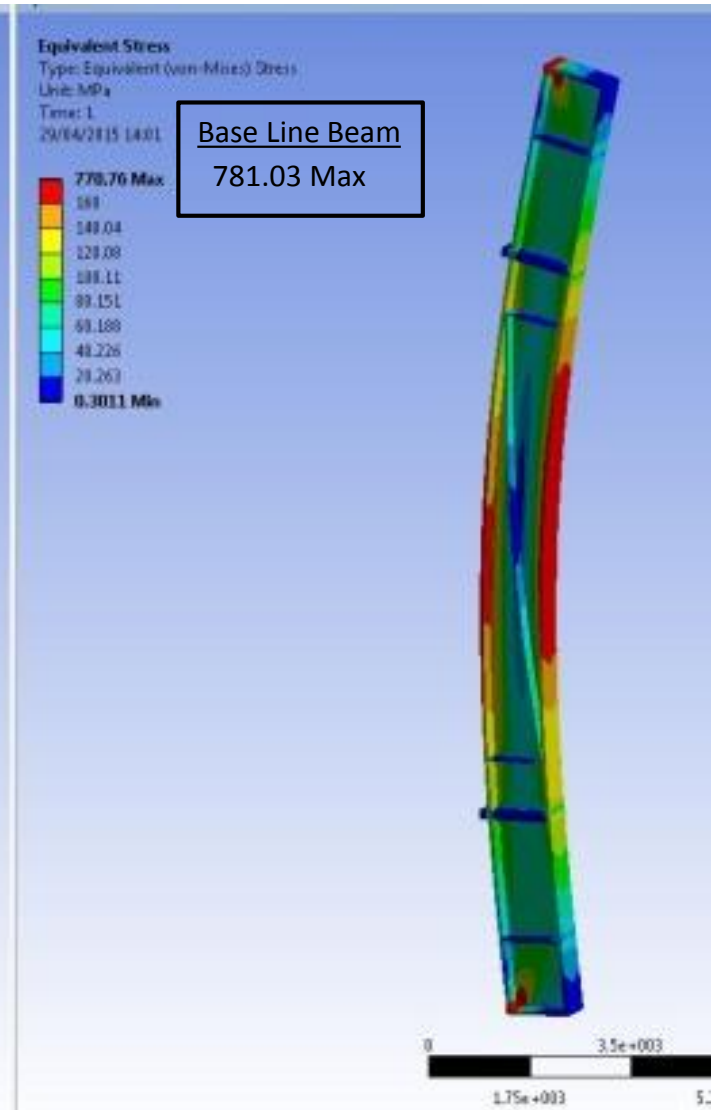
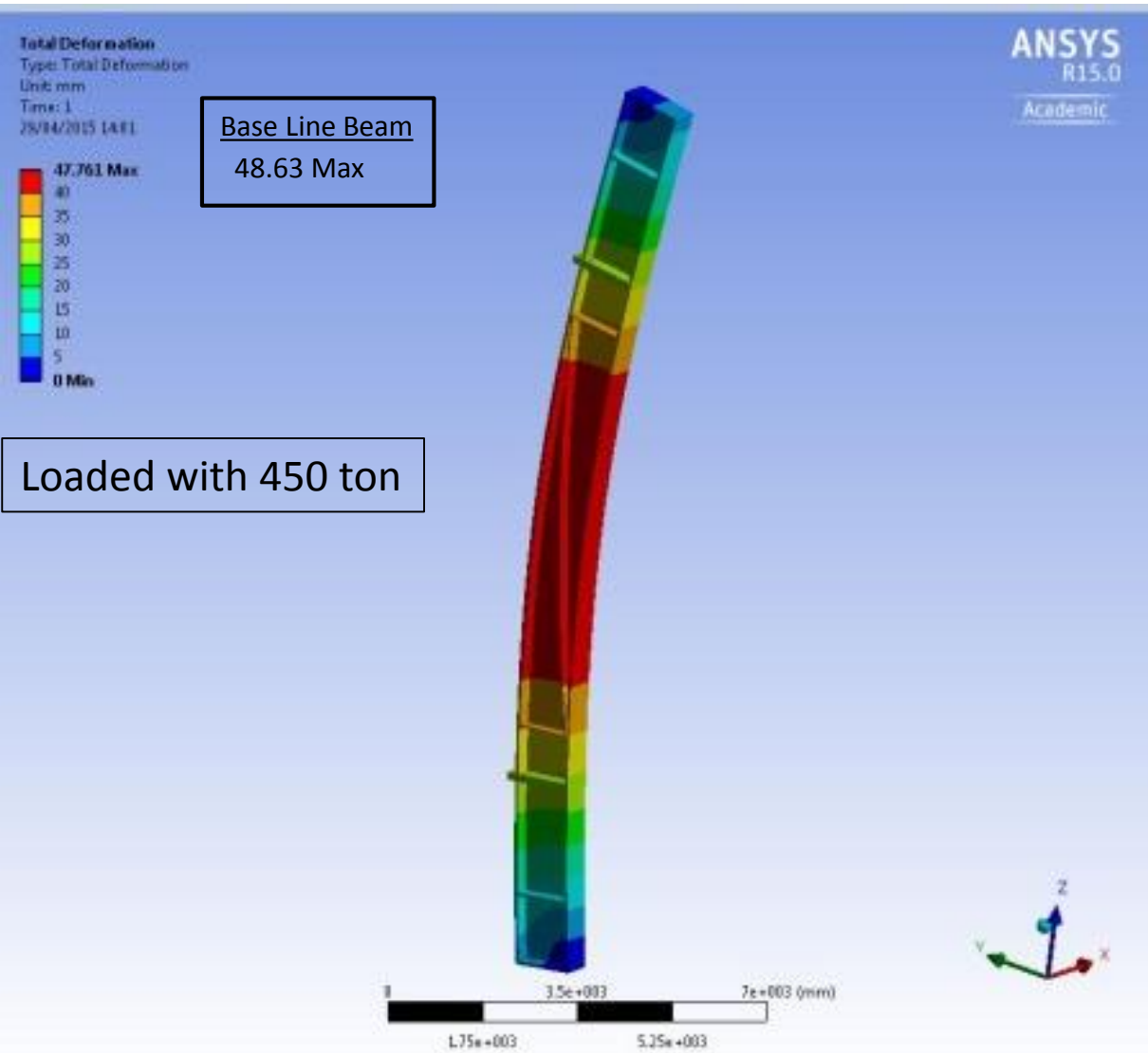


Beam Section

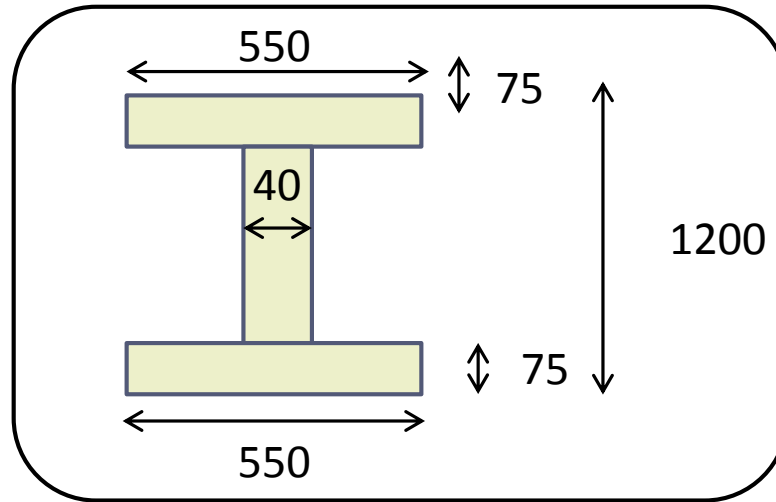
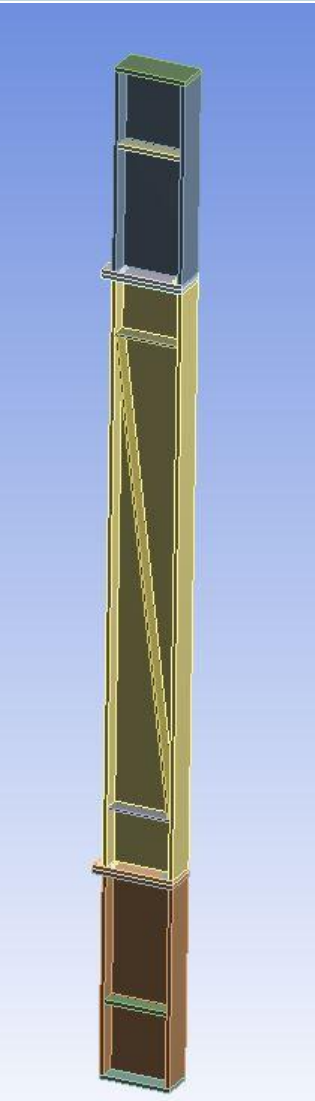
Inertia ( mm<sup>4</sup> ) : 30001000000

Weight ( Kg/m ) : 977.33

# Reinforcement 2



# Reinforcement 3

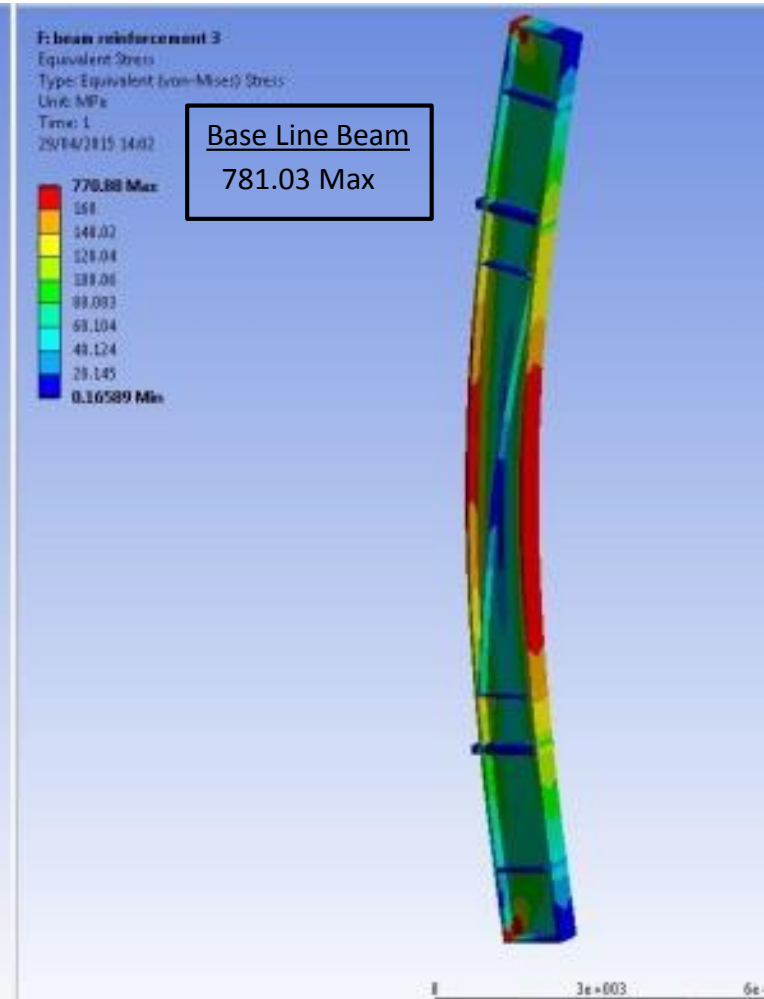
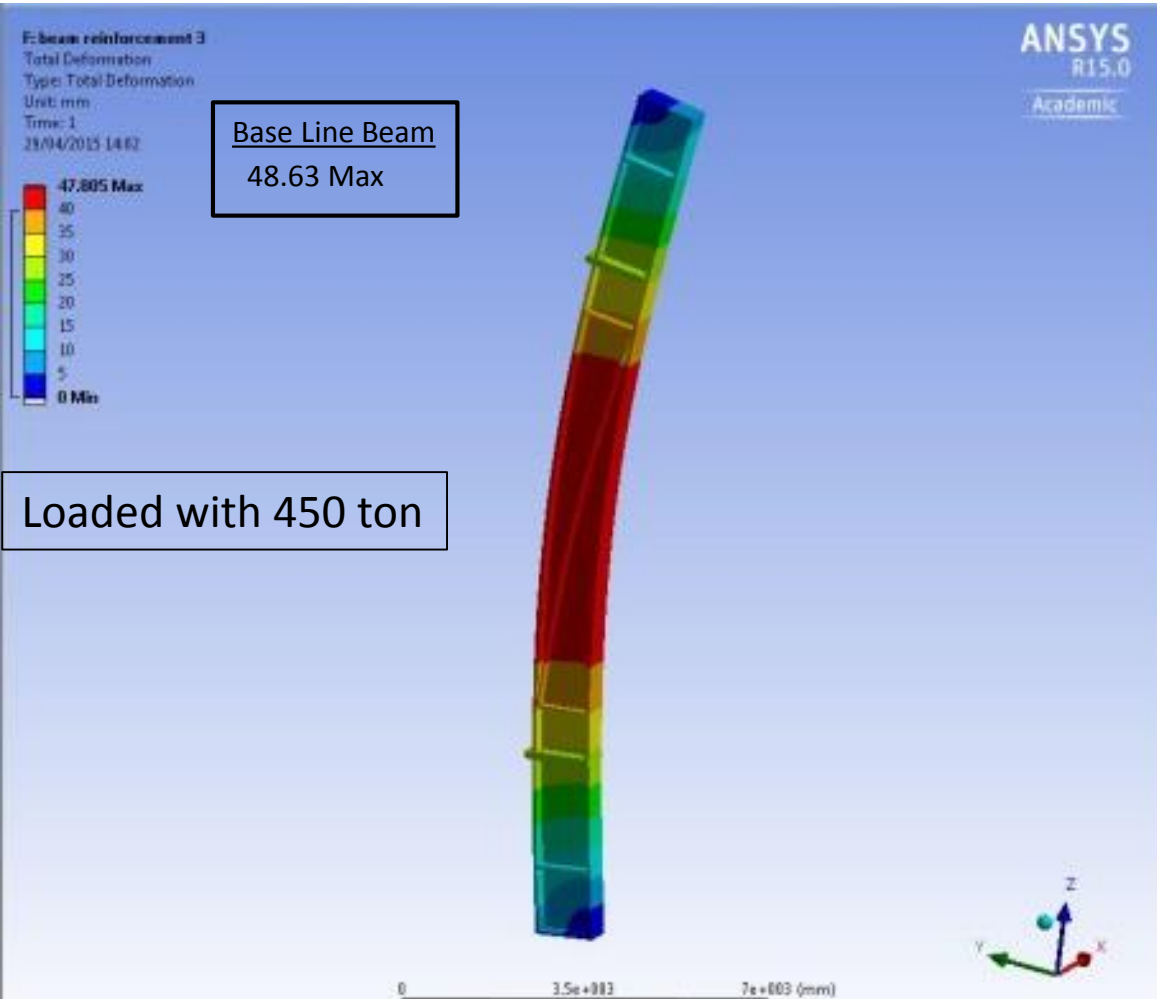


Beam Section

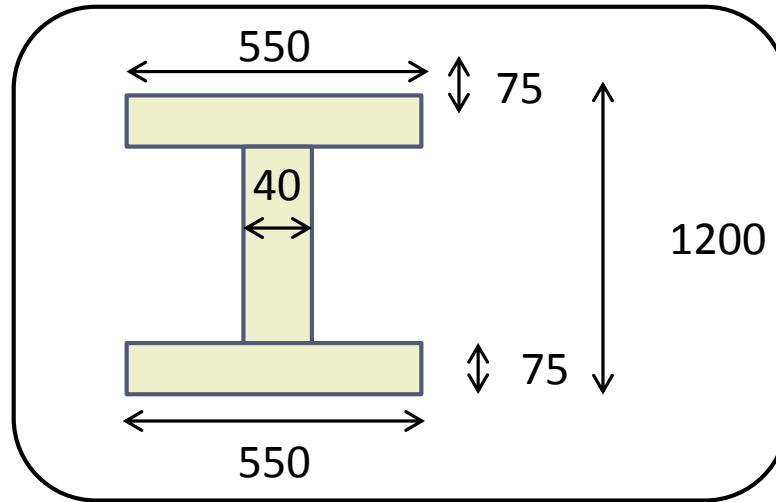
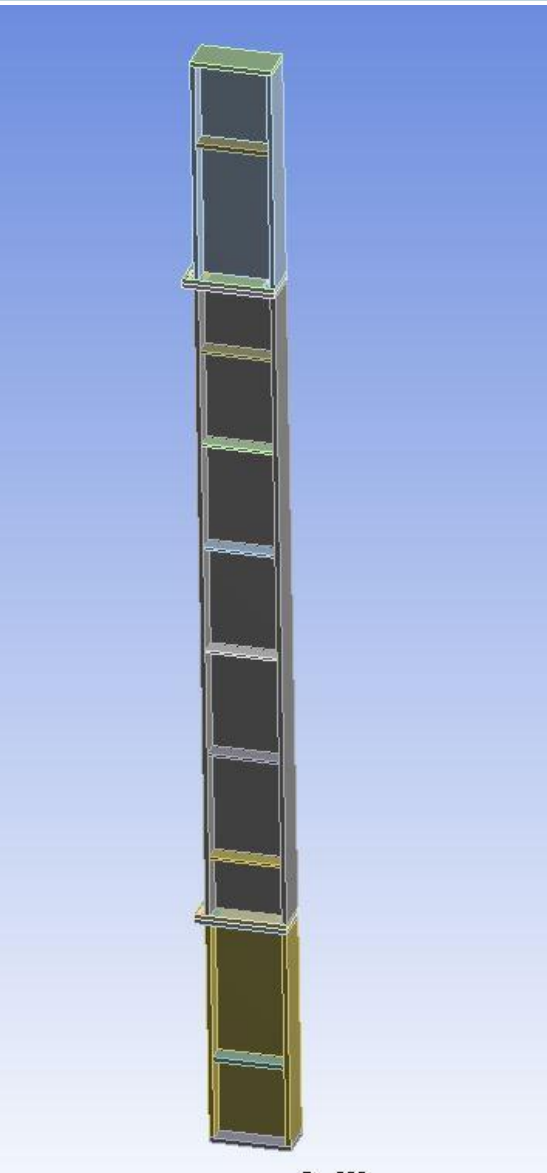
Inertia ( mm<sup>4</sup> ) : 30001000000

Weight ( Kg/m ) : 977.33

# Reinforcement 3



# Reinforcement 4



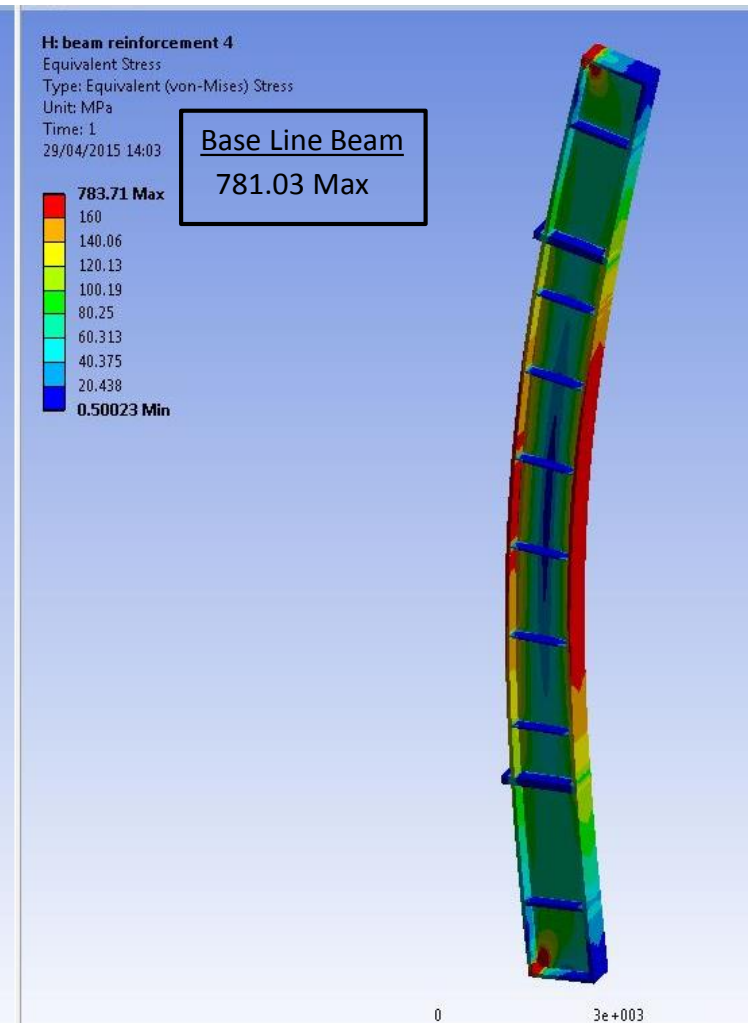
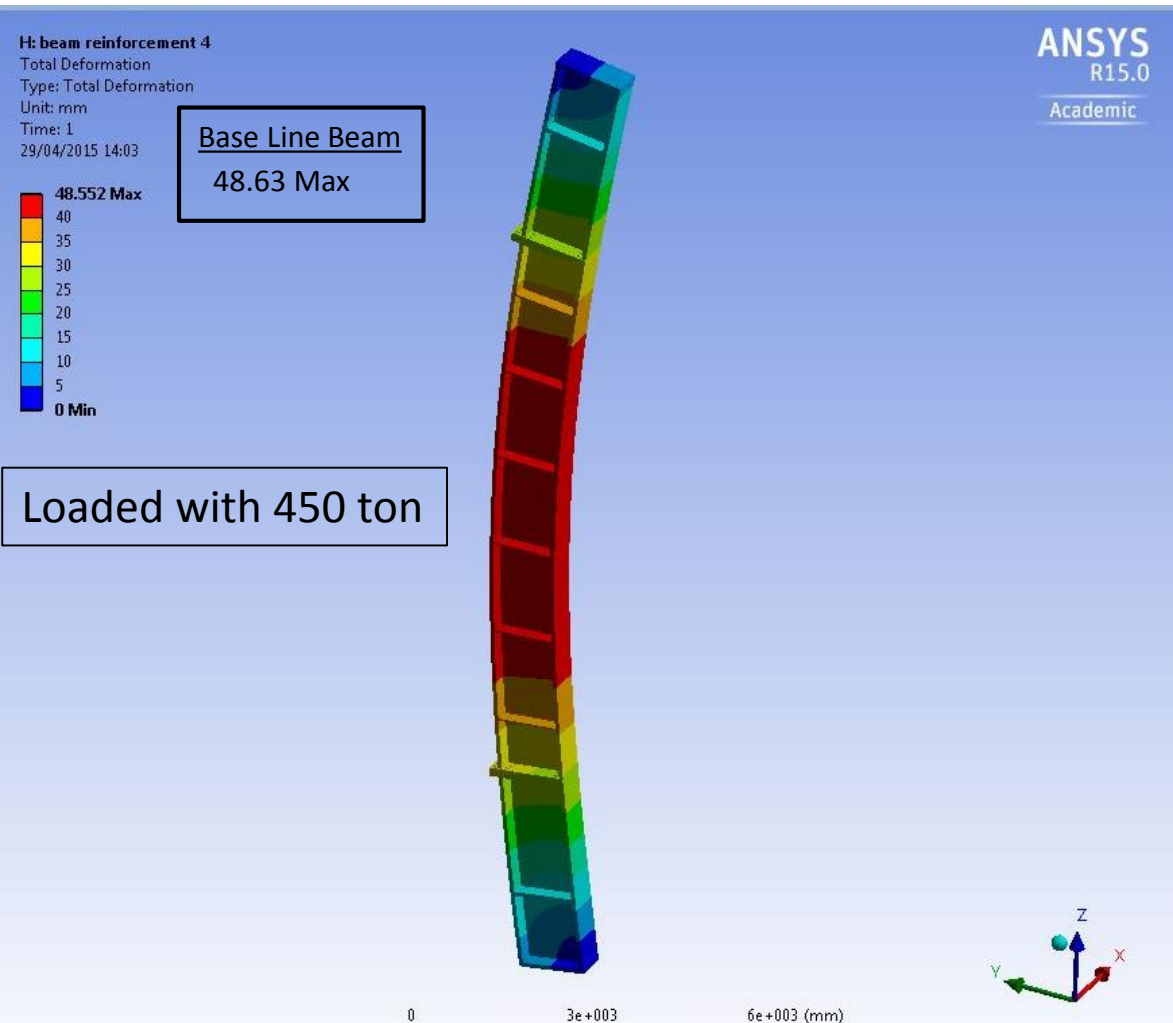
Beam Section

Inertia ( mm<sup>4</sup> ) : 30001000000

Weight ( Kg/m ) : 977.33



# Reinforcement 4

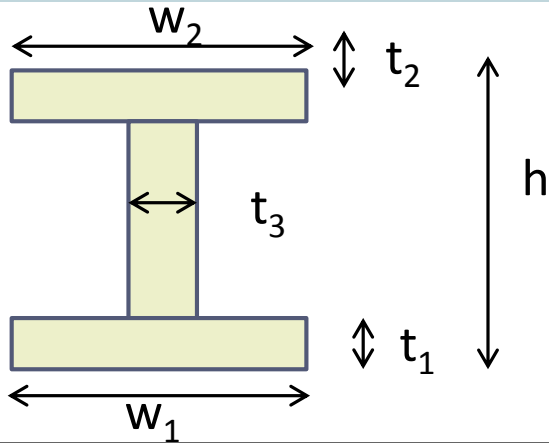




# Trials To Modify The Beam Section



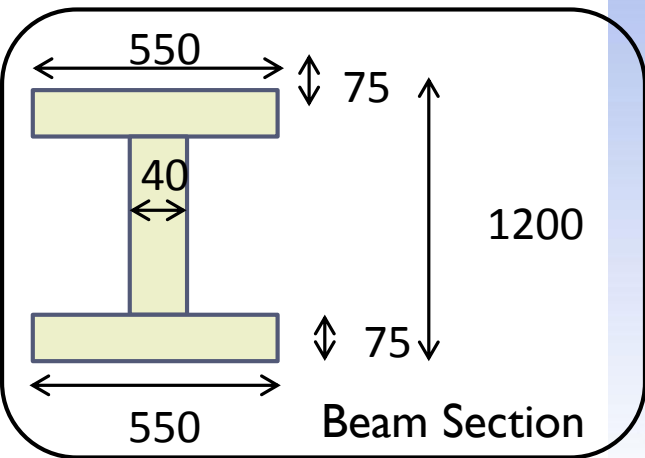
# Test for the beams



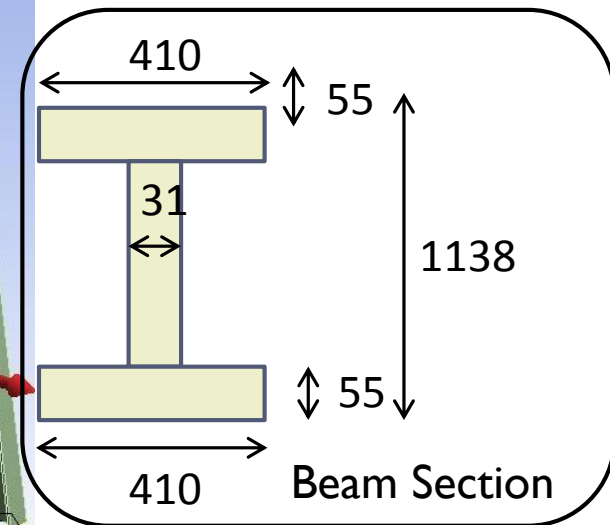
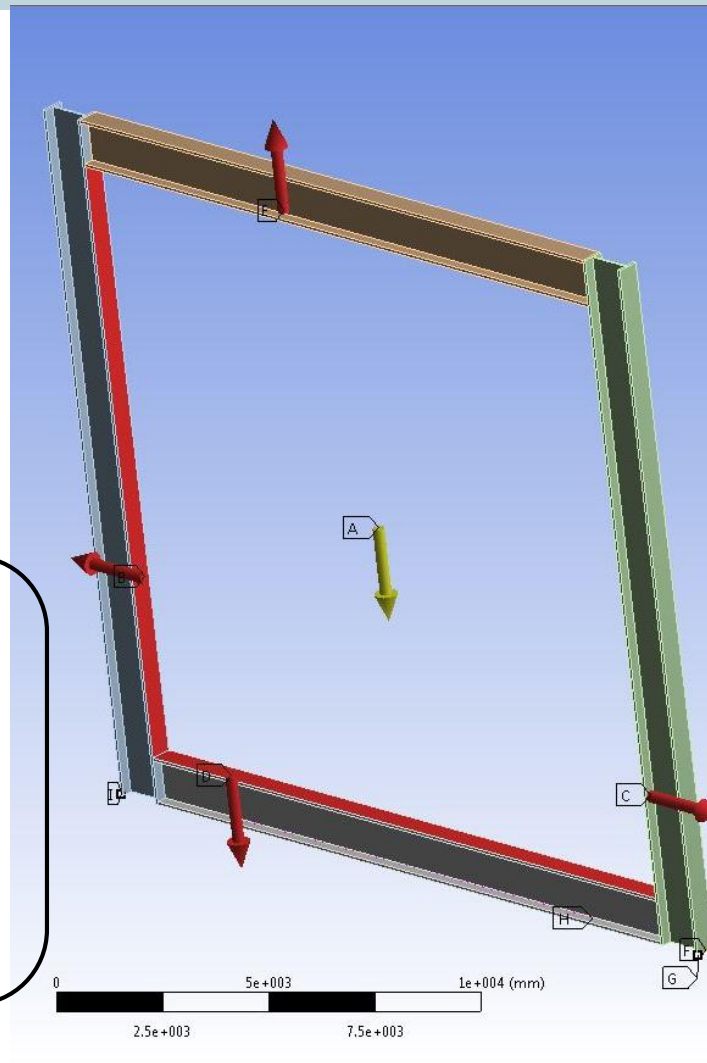
$W_1$ (mm)	$W_2$ (mm)	$h$ (mm)	$t_1$ (mm)	$t_2$ (mm)	$t_3$ (mm)	Inertia (mm <sup>4</sup> )	Area (mm <sup>2</sup> )	Steel density (kg/mm <sup>3</sup> )	Weight (kg/m)	Maximum Deformation (mm)	Von Equivalent Stress Maximum (Mpa)
550	550	1200	75	75	40	30001000000	124500	0.00000785	977.33	49.88	706.27
550	550	1200	70	75	40	29277000000	121950	0.00000785	957.31	51.23	759.08
550	550	1200	65	75	40	28507000000	119400	0.00000785	937.29	52.71	770.14
550	550	1200	60	75	40	27690000000	116850	0.00000785	917.27	54.33	788.65
550	550	1200	55	75	40	26821000000	114300	0.00000785	897.26	56.17	857.32
550	550	1200	50	75	40	25896000000	111750	0.00000785	877.24	58.26	899.59
550	550	1210	75	75	40	30578000000	124900	0.00000785	980.47	49.04	683.20
550	550	1220	75	75	40	31162000000	125300	0.00000785	983.61	48.22	715.96
550	550	1200	75	75	45	30483000000	129750	0.00000785	1018.54	48.91	725.65
550	550	1200	75	75	50	30966000000	135000	0.00000785	1059.75	47.97	732.19

# Comparison Between '3x1 Base Line' vs '2x1 New Line'

# 3x1 Base Line vs 2x1 New Line

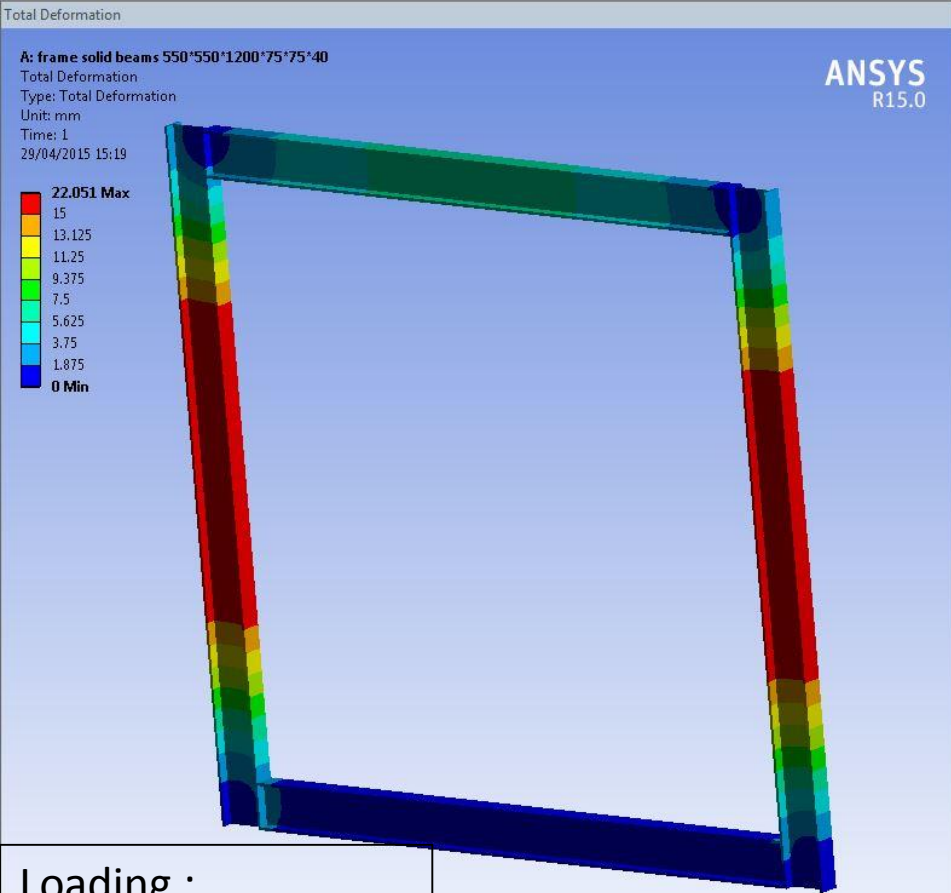


Inertia ( mm<sup>4</sup> ) :  
30001000000  
Weight ( Kg/m ) : 977.33

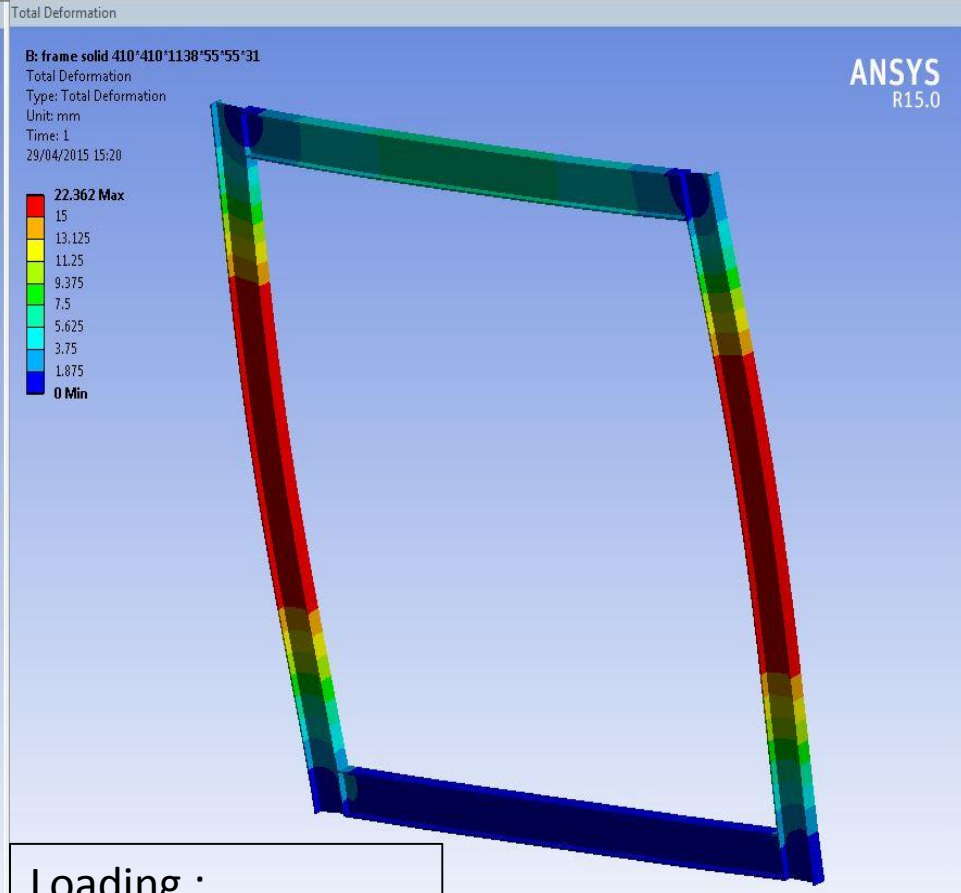


Inertia ( mm<sup>4</sup> ) :  
16042000000  
Weight ( Kg/m ) : 604

# 3x1 Base Line vs 2x1 New Line

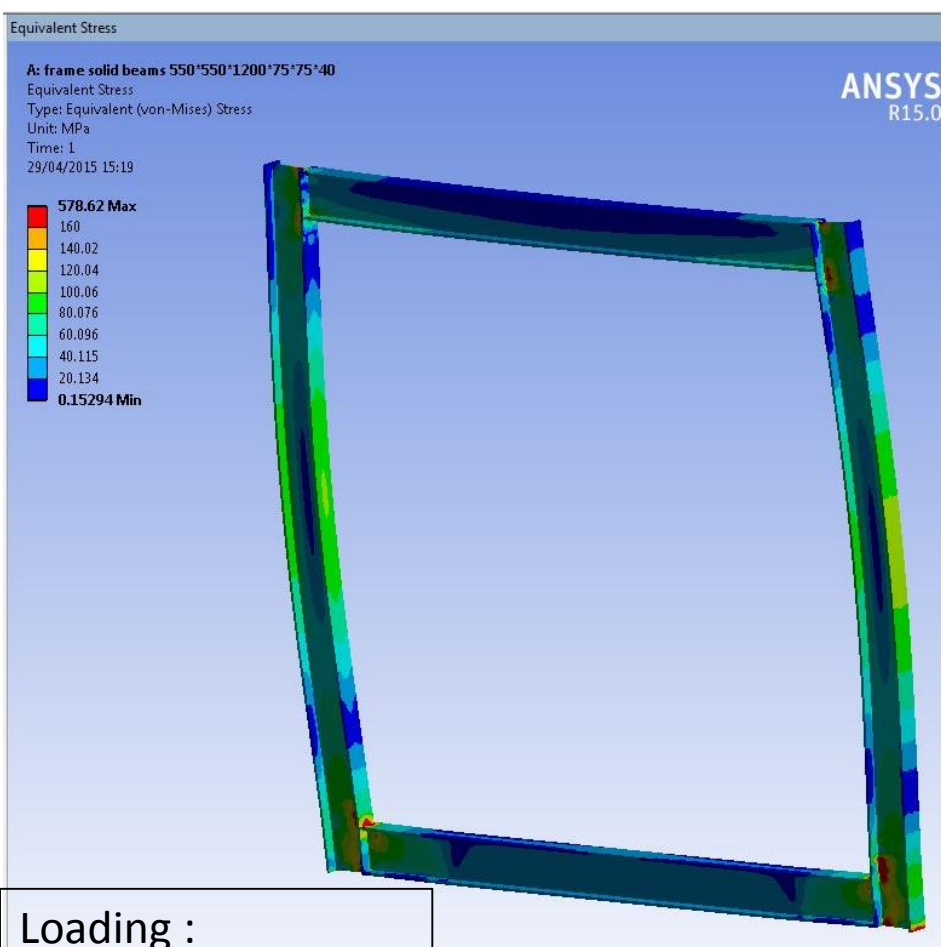


Loading :  
 Floor : 800 ton  
 Roof : 130 ton  
 Sides : 450 ton each

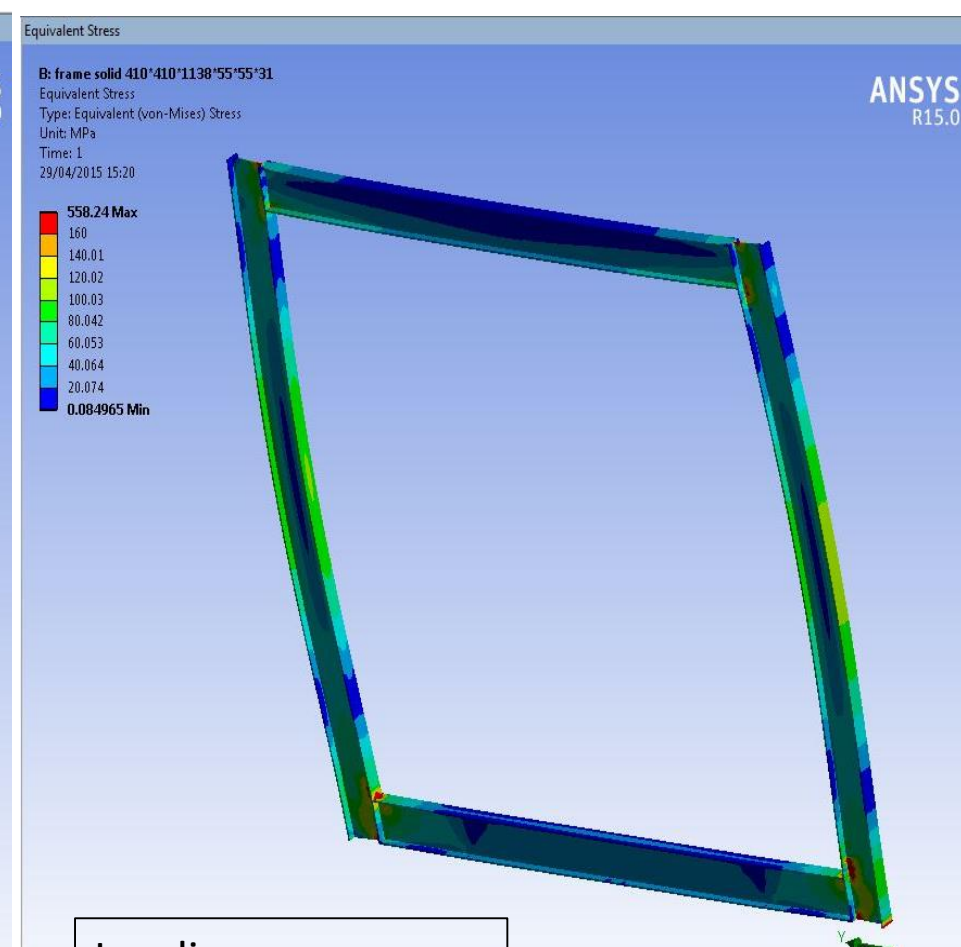


Loading :  
 Floor : 533 ton  
 Roof : 87 ton  
 Sides : 300 ton each

# 3x1 Base Line vs 2x1 New Line



**Loading :**  
Floor : 800 ton  
Roof : 130 ton  
Sides : 450 ton each



**Loading :**  
Floor : 533 ton  
Roof : 87 ton  
Sides : 300 ton each