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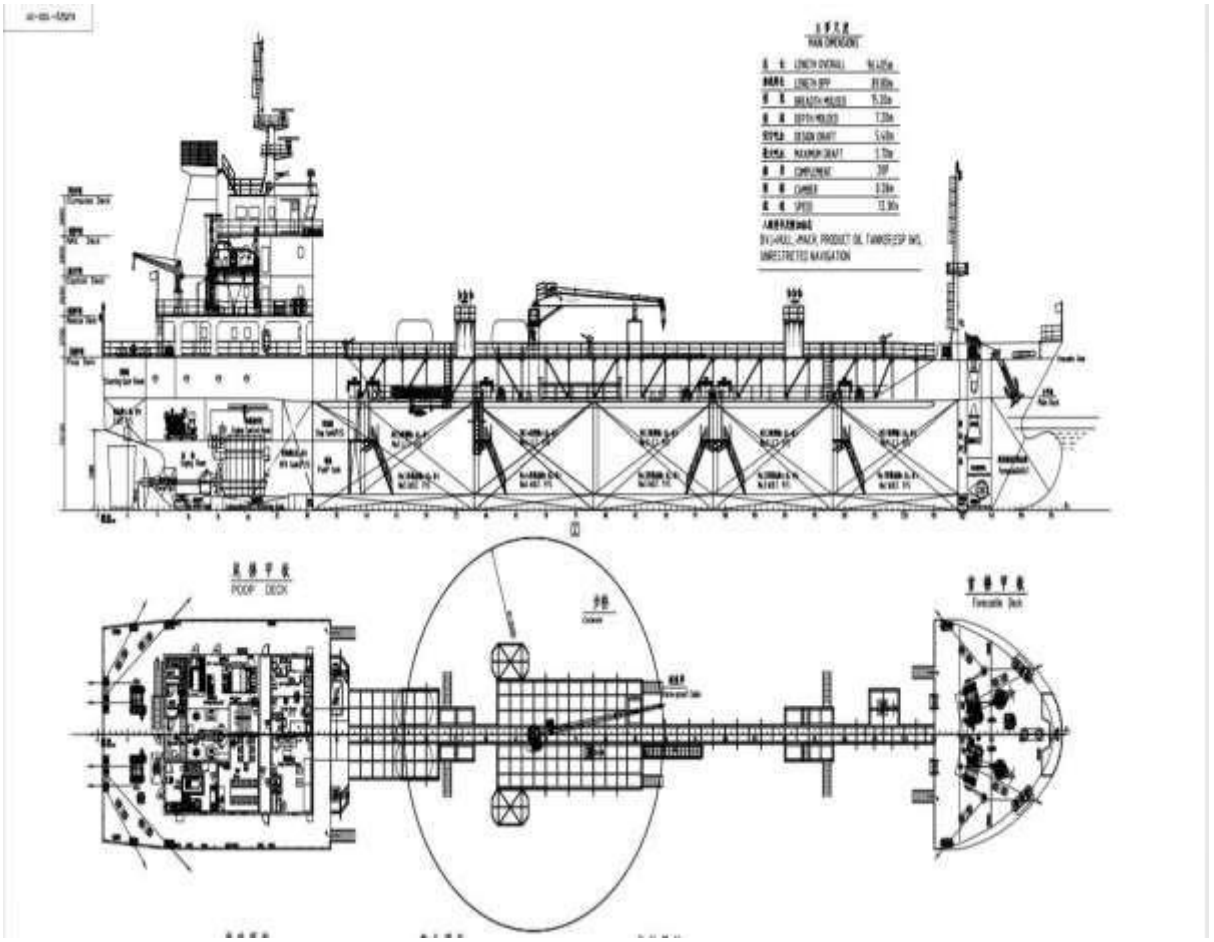
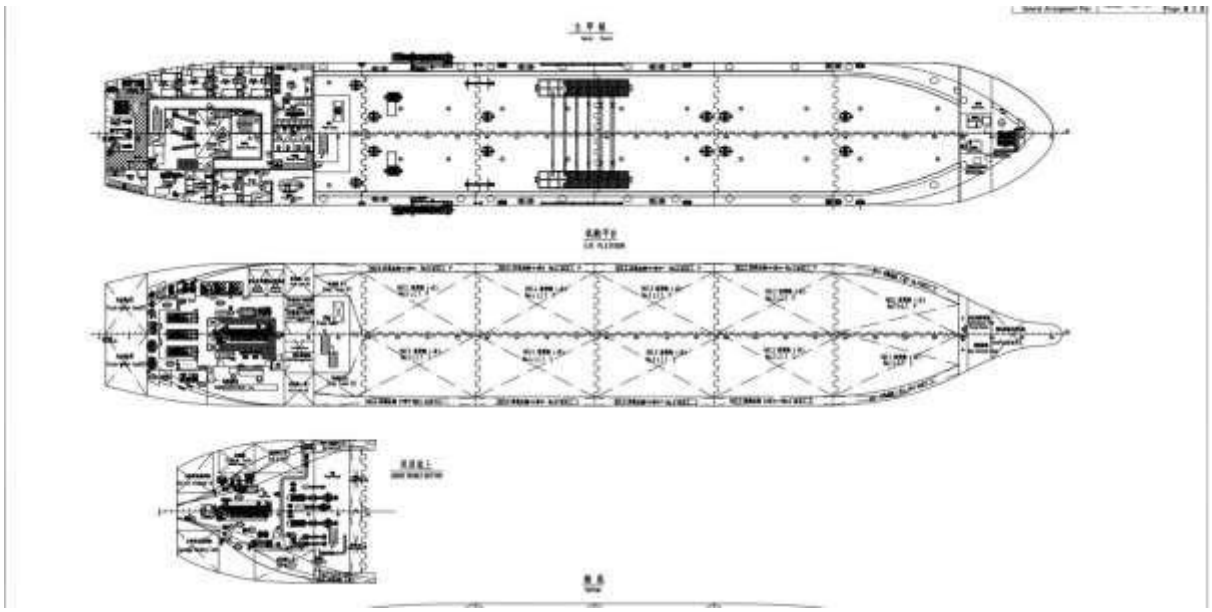
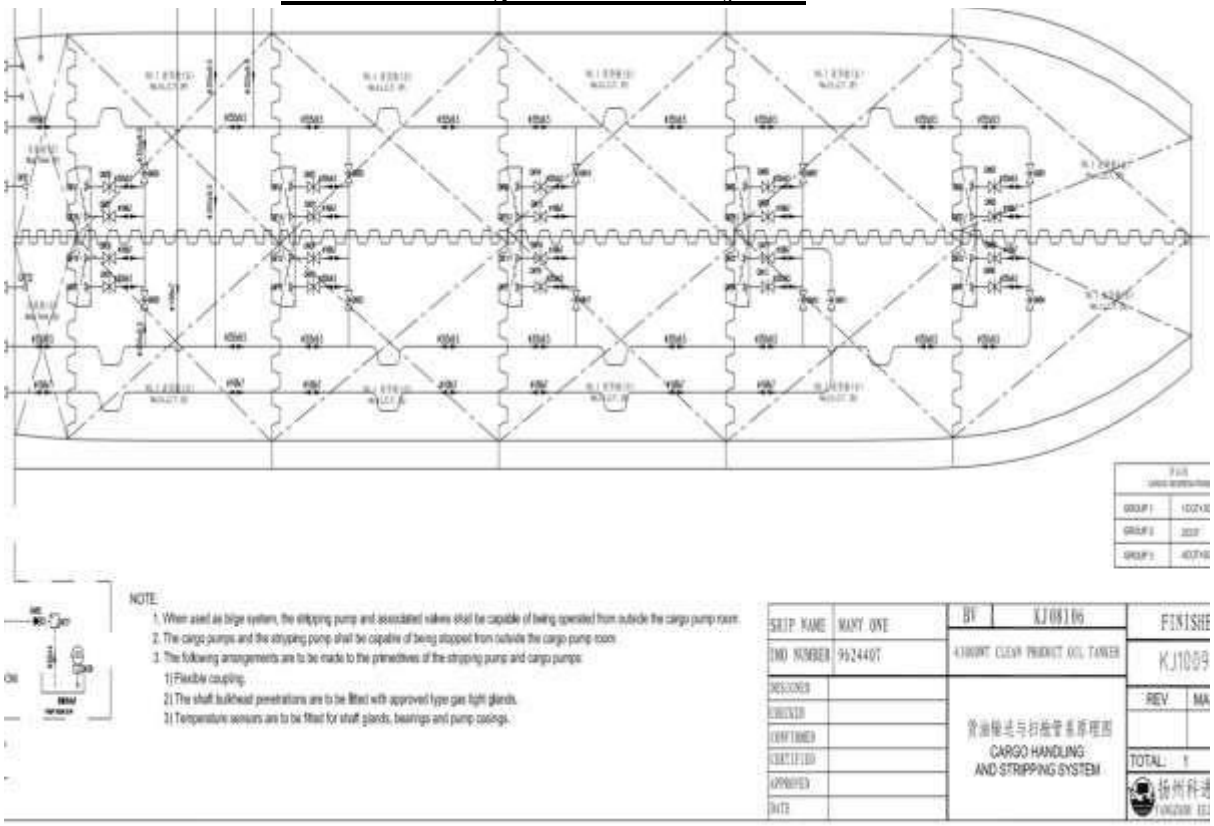
LAMPIRAN

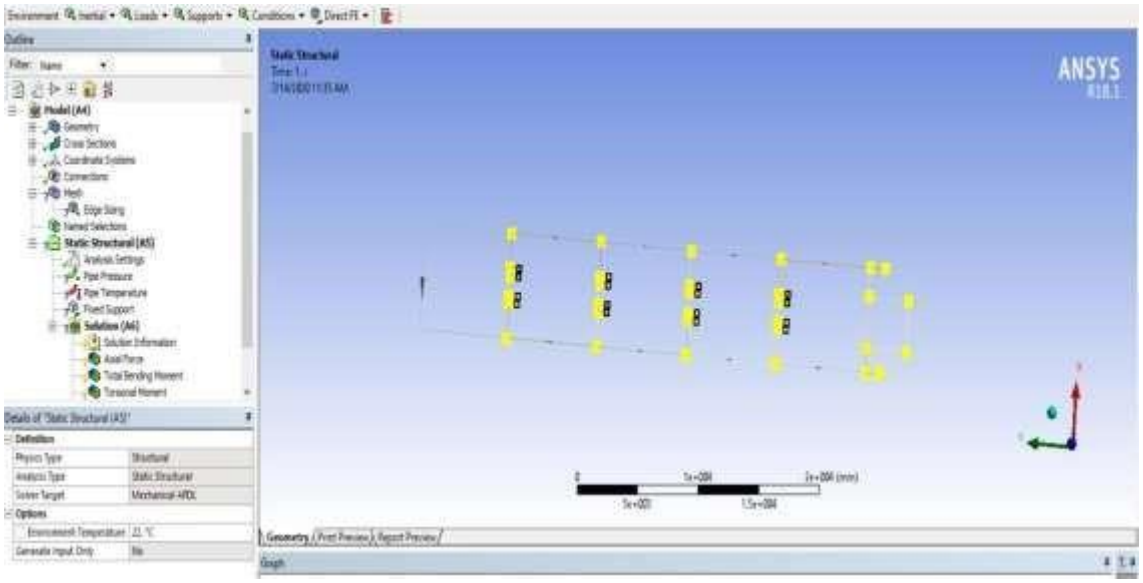




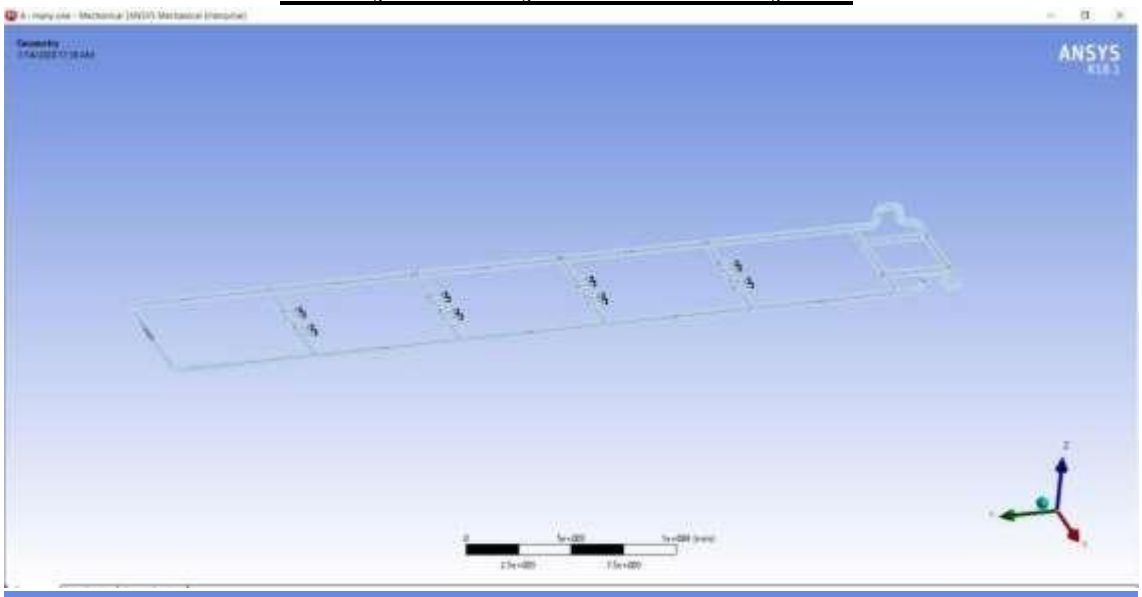
I.General Arrangement M.V Many One

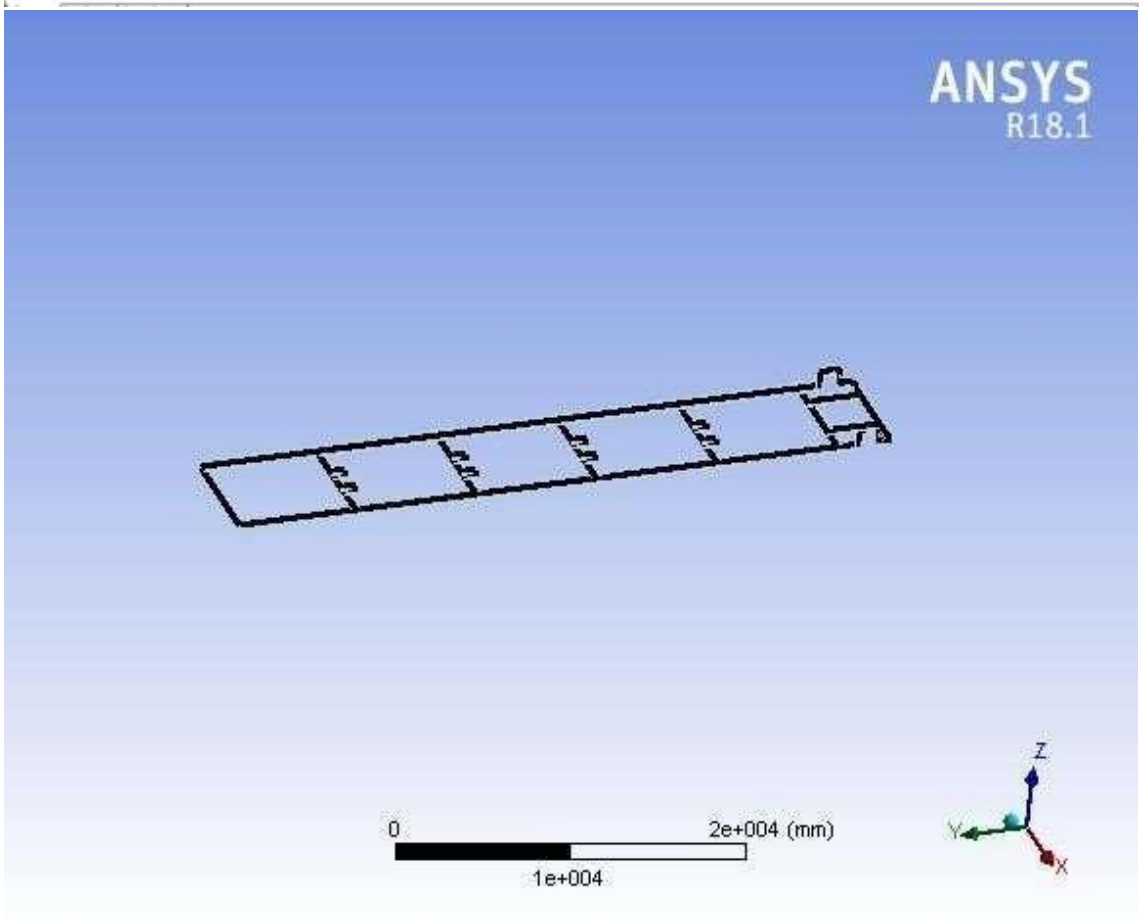


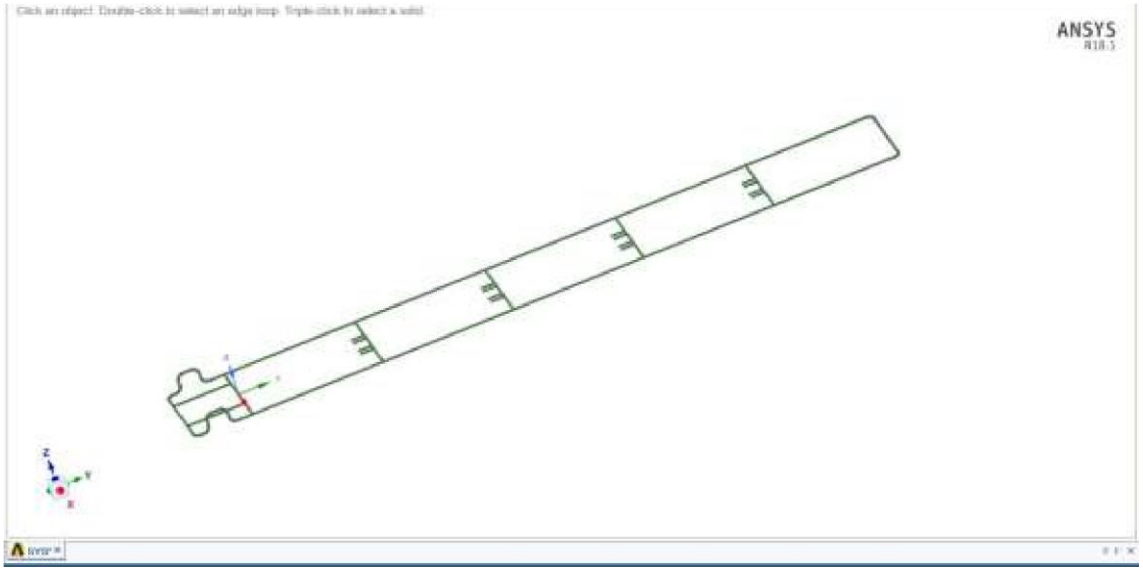
II.Instalasi Bongkar Muat M.V Many One



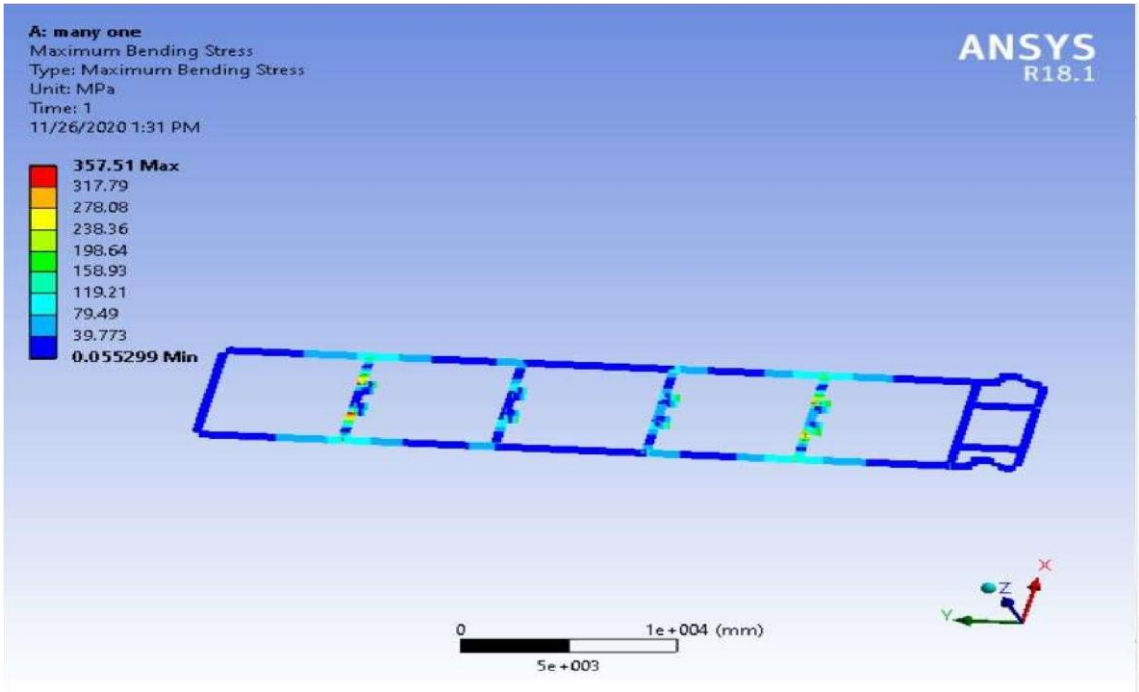
III.Ansys Geometry Model M.V Many One





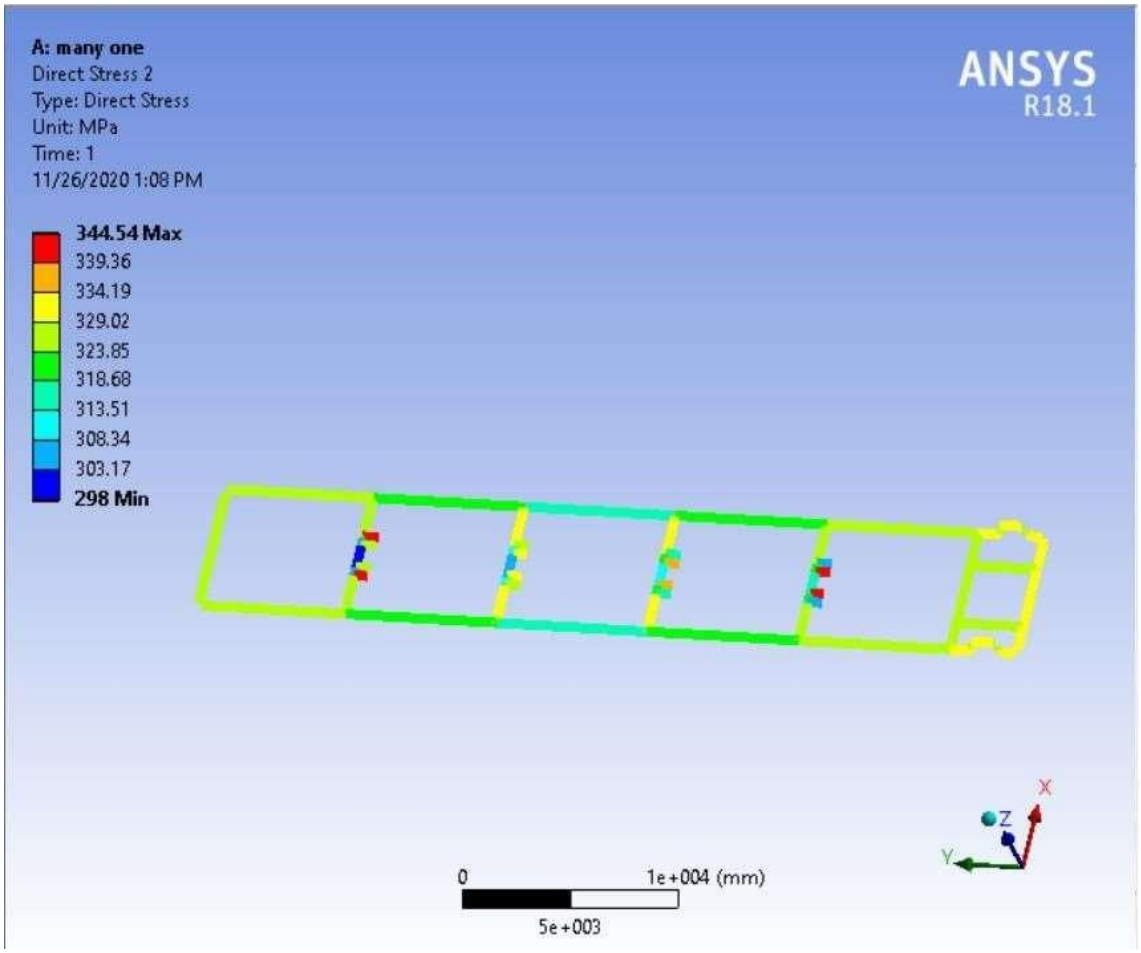


III. Ansys Geometry Model M.V Many One



IV. Total Bending Results M.V Many One

V. Torsional Moment M.V Many One



VI. ***Direct Stress M.V Many One***

VII. **Pipa Baja Kekuatan Normal dengan Standar BKI KI – R 360 (BKI vol 5, Sec**

5)

4. Testing and scope of tests

The following tests are to be performed:

4.1 Test of chemical composition

The manufacturer shall determine the chemical composition of each heat in accordance with A.8.1.

Strength category or pipe grade to Table 5.5	Corresponding pi EN 10216-1 [1] or EN 10217-1 [2]	EN 10216-3 [1] or EN 10217-3 [2]	EN 10305-1	EN 10305-2
KI–R 360	P235TR2		E235+N	E235+N
KI–R 410	P265TR2	P275NL1		E275+N
KI–R 490		P355N	E355+N	E355+N

1) seamless
2) welded

Table 5.4 Chemical composition of unalloyed steel pipes

Strength category or pipe grade	Chemical composition [%]					
	$C_{max.}$	$Si_{max.}$	$Mn_{max.}$	$P_{max.}$	$S_{max.}$	$Al_{min.}$
KI–R 360	0,17	0,35	1,20	0,025	0,020	≥ 0.020[1]
KI–R 410	0,21	0,35	1,40			
KI–R 490	0,22	0,55	1,60			

1) This requirement does not apply if the steel contains a sufficient fraction of other nitrogen absorbing elements, which is to be specified

B

Table 5.5 Mechanical and technological properties of unalloyed steel pipes

Strength category or pipe grade	Tensile strength R_m [N/mm²]	Yield strength R_{eH} [N/mm²] min.	Elongation A [%] min.		Impact energy KV [1] at 0°C [J] min.	
			long.	transv.	long.	transv.
KI–R 360	360 – 500	235	25	23	41	27
KI–R 410	410 – 570	255	21	19		
KI–R 490	490 – 650	310	19	17		

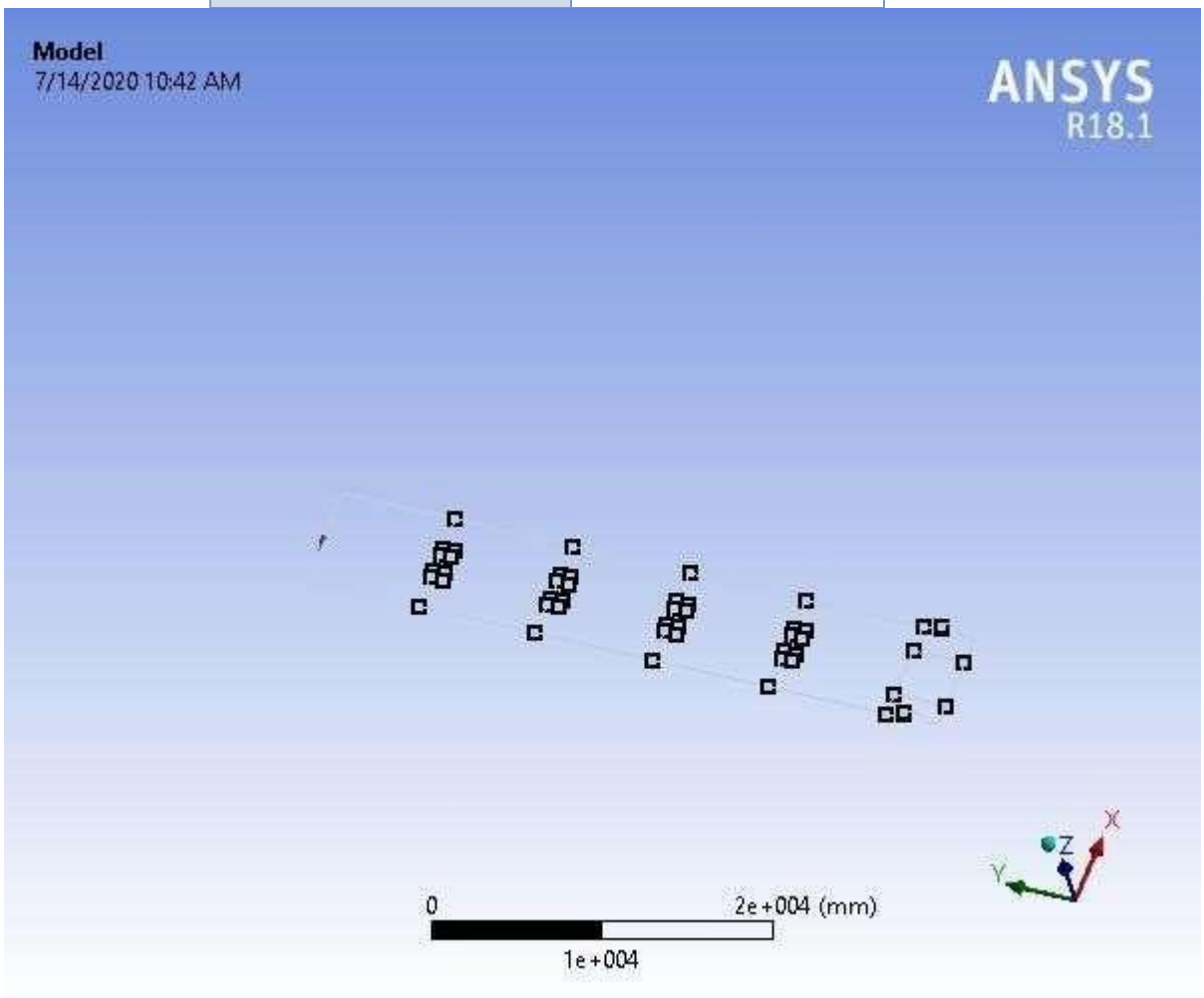
1) For pipes with wall thickness > 10 mm.

4.2 Tensile test

VIII. Anys report

Project

First Saved	Saturday, March 7, 2020
Last Saved	Monday, July 13, 2020
Product Version	18.1 Release
Save Project Before Solution	No
Save Project After Solution	No



Contents

Report Not Finalized

Not all objects described below are in a finalized state. As a result, data may be incomplete, obsolete or in error. View first state problem. To finalize this report, edit objects as needed and solve the analyses.

Units

TABLE 1

Unit System	Metric (mm, kg, N, s, mV, mA) Degrees rad/s Celsius
Angle	Degrees
Rotational Velocity	rad/s
Temperature	Celsius

Model (A4)

Geometry

TABLE 2
Model (A4) > Geometry

Object Name	*Geometry*
State	Fully Defined
Definition	

Source	D:\cad bobby\many one marge_files\dp0\SYS\DM\SYS.agdb
Type	DesignModeler
Length Unit	Meters
Element Control	Program Controlled
Display Style	Body Color
Bounding Box	
Length X	6175.9 mm
Length Y	40119 mm
Length Z	955.17 mm
Properties	
Volume	1.7157e+009 mm³
Mass	13468 kg
Scale Factor Value	1.
Statistics	
Bodies	1
Active Bodies	1
Nodes	21542
Elements	7183
Mesh Metric	None
Basic Geometry Options	
Parameters	Independent
Parameter Key	
Attributes	Yes
Attribute Key	
Named Selections	Yes
Named Selection Key	
Material Properties	Yes
Advanced Geometry Options	
Use Associativity	Yes
Coordinate Systems	Yes
Coordinate System Key	
Reader Mode Saves Updated File	No

Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Attach File Via Temp File	Yes
Temporary Directory	C:\Users\dabudeee\AppData\Local\Temp
Analysis Type	3-D
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

TABLE 3 Model
(A4) > Geometry > Parts

Object Name	*Beam (#dn 365)*
State	Meshed
Graphics Properties	
Visible	Yes
Transparency	1
Definition	
Suppressed	No
Stiffness Behavior	Flexible
Coordinate System	Default Coordinate System
Reference Temperature	By Environment
Cross Section	CircularTube1
Offset Mode	Refresh on Update
Offset Type	Centroid
Model Type	Pipe
Material	
Assignment	Structural Steel
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Bounding Box	
Length X	6175.9 mm
Length Y	40119 mm
Length Z	955.17 mm
Properties	
Volume	1.7157e+009 mm^3
Mass	13468 kg
Length	1.4345e+005 mm
Cross Section Area	11960 mm^2
Cross Section IYY	1.7765e+008 $mm^2 \cdot mm^2$
Cross Section IZZ	1.7765e+008 $mm^2 \cdot mm^2$

Pipe Internal Diameter	333.5 mm
Pipe External Diameter	355.6 mm
Pipe Thickness	11.05 mm
Statistics	
Nodes	21542
Elements	7183
Mesh Metric	None
CAD Attributes	
Color:143.175.143	

TABLE 4
Model (A4) > Cross Sections

Object Name	*Cross Sections*
State	Fully Defined

TABLE 5
Model (A4) > Cross Sections > CircularTube1

Object Name	*CircularTube1*
State	Fully Defined
Dimensions	
Ri	166.75 mm
Ro	177.8 mm
Physical Properties	
Beam Section	CircularTube1
Type	CTUBE
A	11960 mm²
Iyy	1.7765e+008 mm²·mm²
Izz	1.7765e+008 mm²·mm²

Coordinate Systems

TABLE 6
Model (A4) > Coordinate Systems > Coordinate System

Object Name	*Global Coordinate System*
State	Fully Defined
Definition	
Type	Cartesian
Coordinate System ID	0.
Origin	
Origin X	0. mm
Origin Y	0. mm
Origin Z	0. mm

Directional Vectors	
X Axis Data	[1. 0. 0.]
Y Axis Data	[0. 1. 0.]
Z Axis Data	[0. 0. 1.]

Connections

TABLE 7
Model (A4) > Connections

Object Name	*Connections*
State	Fully Defined
Auto Detection	
Generate Automatic Connection On Refresh	Yes
Transparency	
Enabled	Yes

Mesh

TABLE 8
Model (A4) > Mesh

Object Name	*Mesh*
State	Solved
Display	
Display Style	Body Color
Defaults	
Physics Preference	Mechanical
Relevance	0
Element Order	Quadratic
Sizing	
Size Function	Adaptive
Relevance Center	Coarse
Element Size	Default
Initial Size Seed	Assembly
Transition	Fast
Span Angle Center	Coarse
Automatic Mesh Based Defeaturing	On
Defeature Size	Default
Minimum Edge Length	229.0 mm
Quality	
Check Mesh Quality	Yes, Errors
Error Limits	Standard Mechanical

Target Quality	Default (0.050000)
Smoothing	Medium
Mesh Metric	None
Inflation	
Use Automatic Inflation	None
Inflation Option	Smooth Transition
Transition Ratio	0.272
Maximum Layers	5
Growth Rate	1.2
Inflation Algorithm	Pre
View Advanced Options	No
Advanced	
Number of CPUs for Parallel Part Meshing	Program Controlled
Straight Sided Elements	No
Number of Retries	Default (4)
Rigid Body Behavior	Dimensionally Reduced
Mesh Morphing	Disabled
Triangle Surface Mesher	Program Controlled
Topology Checking	No
Pinch Tolerance	Please Define
Generate Pinch on Refresh	No
Statistics	
Nodes	21542
Elements	7183

TABLE 9
Model (A4) > Mesh > Mesh Controls

Object Name	*Edge Sizing*
State	Fully Defined
Scope	
Scoping Method	Geometry Selection
Geometry	57 Edges
Definition	
Suppressed	No
Type	Element Size
Element Size	20. mm
Advanced	

Behavior	Soft
Bias Type	No Bias

Named Selections

Static Structural (A5)

TABLE 10
Model (A4) > Analysis

Object Name	*Static Structural (A5)*
State	Solved
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	Mechanical APDL
Options	
Environment Temperature	22. °C
Generate Input Only	No

TABLE 11
Model (A4) > Static Structural (A5) > Analysis Settings

Object Name	*Analysis Settings*
State	Fully Defined

Step Controls	
Number Of Steps	1.
Current Step Number	1.
Step End Time	1. s
Auto Time Stepping	Program Controlled
Solver Controls	
Solver Type	Program Controlled
Weak Springs	Off
Solver Pivot Checking	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Rotordynamics Controls	
Coriolis Effect	Off
Restart Controls	
Generate Restart Points	Program Controlled
Retain Files After Full Solve	No
Combined Restart Files	Program Controlled
Nonlinear Controls	

Newton-Raphson Option	Program Controlled
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Stabilization	Off
Output Controls	
Stress	Yes
Strain	Yes
Nodal Forces	No
Contact Miscellaneous	No
General Miscellaneous	No
Store Results At	All Time Points
Analysis Data Management	
Solver Files Directory	D:\cad bobby\many one marge_files\dp0\SYS\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save MAPDL db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No
Solver Units	Active System
Solver Unit System	nmm

TABLE 12
Model (A4) > Static Structural (A5) > Loads

Object Name	*Pipe Pressure*	*Pipe Temperature*	*Fixed Support*
State	Fully Defined		
Scope			
Scoping Method	Geometry Selection		
Geometry	57 Edges		16 Vertices
Definition			
Type	Pipe Pressure	Pipe Temperature	Fixed Support
Magnitude	12. MPa (ramped)	15. °C (ramped)	
Suppressed	No		
Loading	Internal		

FIGURE 1
Model (A4) > Static Structural (A5) > Pipe Pressure

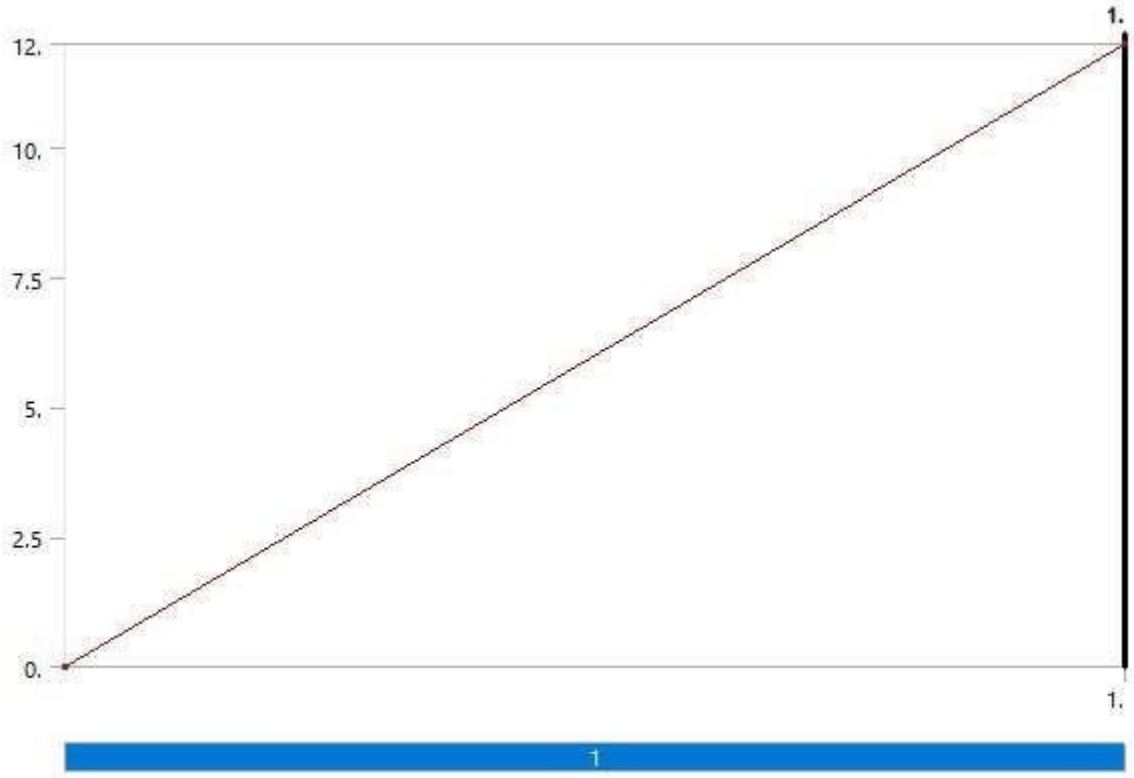
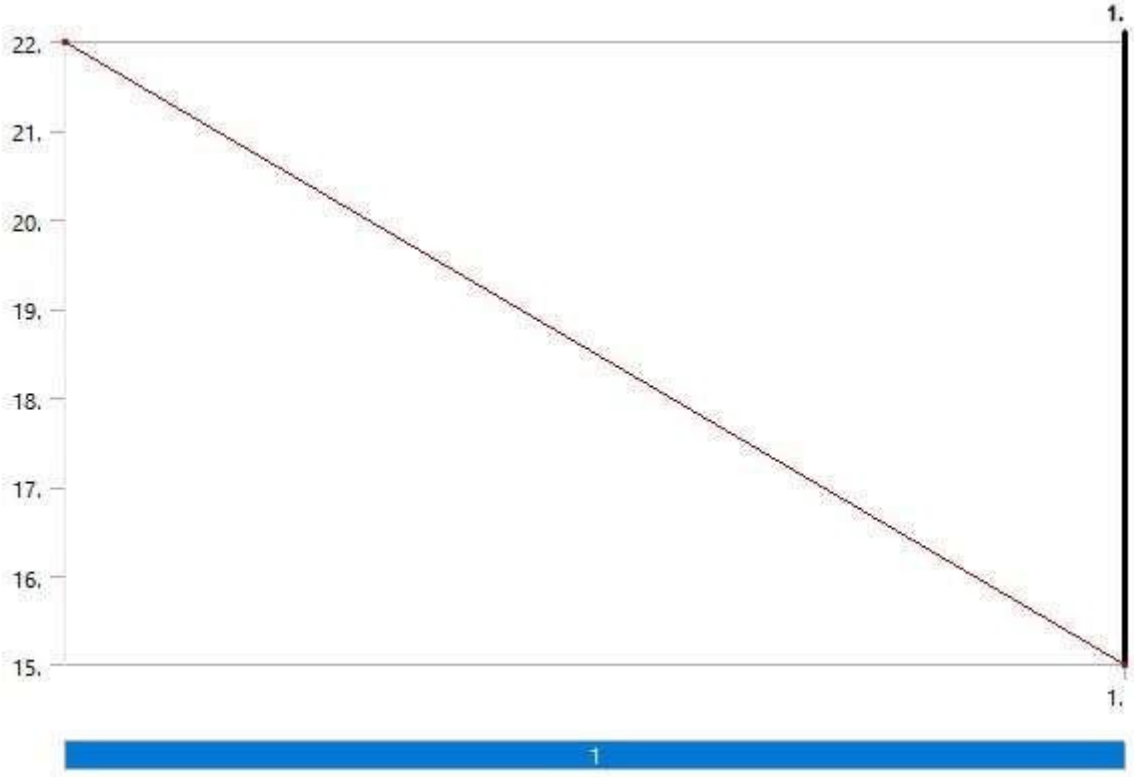


FIGURE 2
Model (A4) > Static Structural (A5) > Pipe Temperature



Solution (A6)

TABLE 13
Model (A4) > Static Structural (A5) > Solution

Object Name	*Solution (A6)*
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.
Information	
Status	Done
MAPDL Elapsed Time	7. s
MAPDL Memory Used	303. MB
MAPDL Result File Size	22.688 MB
Post Processing	
Beam Section Results	No

TABLE 14
Model (A4) > Static Structural (A5) > Solution (A6) > Solution Information

Object Name	*Solution Information*
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Identify Element Violations	0
Update Interval	2.5 s
Display Points	All
FE Connection Visibility	
Activate Visibility	Yes
Display	All FE Connectors
Draw Connections Attached To	All Nodes
Line Color	Connection Type
Visible on Results	No
Line Thickness	Single
Display Type	Lines

TABLE 15
Model (A4) > Static Structural (A5) > Solution (A6) > Results

Object Name	*Axial Force*	*Total Bending Moment*	*Torsional Moment*
State	Solved		

Scope			
Scoping Method	Geometry Selection		
Geometry	All Line Bodies		
Definition			
Type	Directional Axial Force	Total Bending Moment	Directional Torsional Moment
By	Time		
Display Time	Last		
Coordinate System	Solution Coordinate System		Solution Coordinate System
Calculate Time History	Yes		
Identifier			
Suppressed	No		
Integration Point Results			
Display Option	Unaveraged		
Results			
Minimum	9.6783e+005 N	683.26 N·mm	-9.1618e+005 N·mm
Maximum	1.0889e+006 N	3.3593e+007 N·mm	8.9426e+005 N·mm
Minimum Occurs On	Beam (#dn 365)		
Maximum Occurs On	Beam (#dn 365)		
Information			
Time	1. s		
Load Step	1		
Substep	1		
Iteration Number	1		

FIGURE 3
Model (A4) > Static Structural (A5) > Solution (A6) > Axial Force

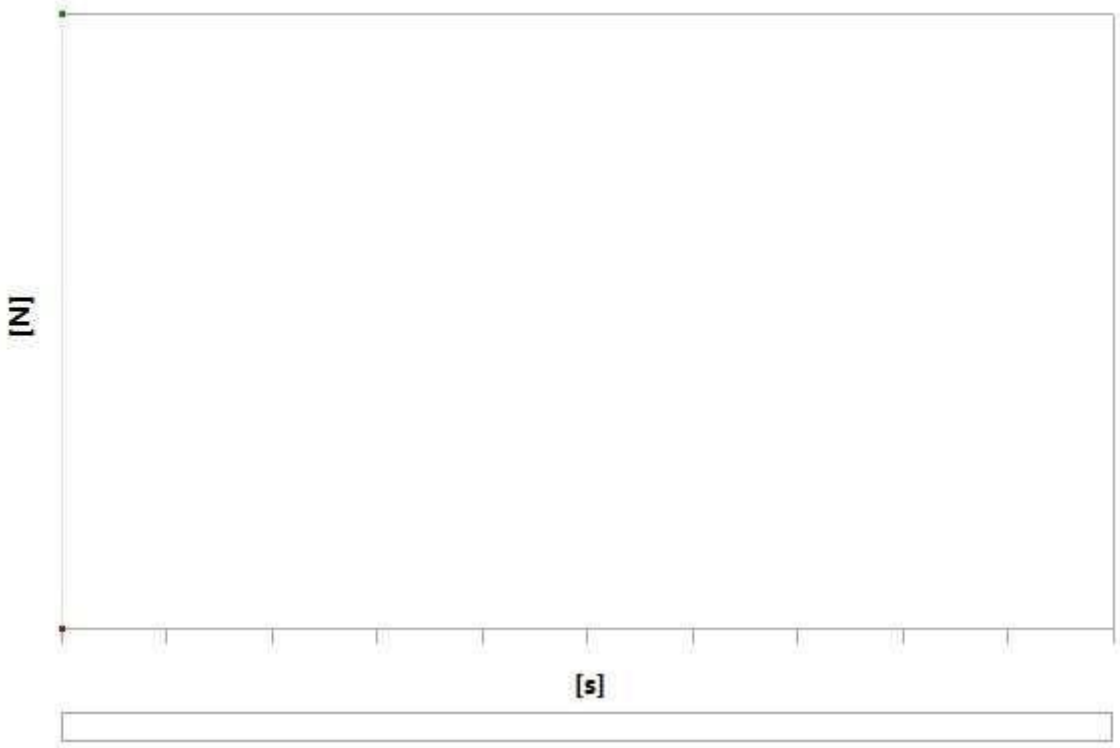


TABLE 16
Model (A4) > Static Structural (A5) > Solution (A6) > Axial Force

Time [s]	Minimum [N]	Maximum [N]
1.	9.6783e+005	1.0889e+006

FIGURE 4
Model (A4) > Static Structural (A5) > Solution (A6) > Total Bending Moment

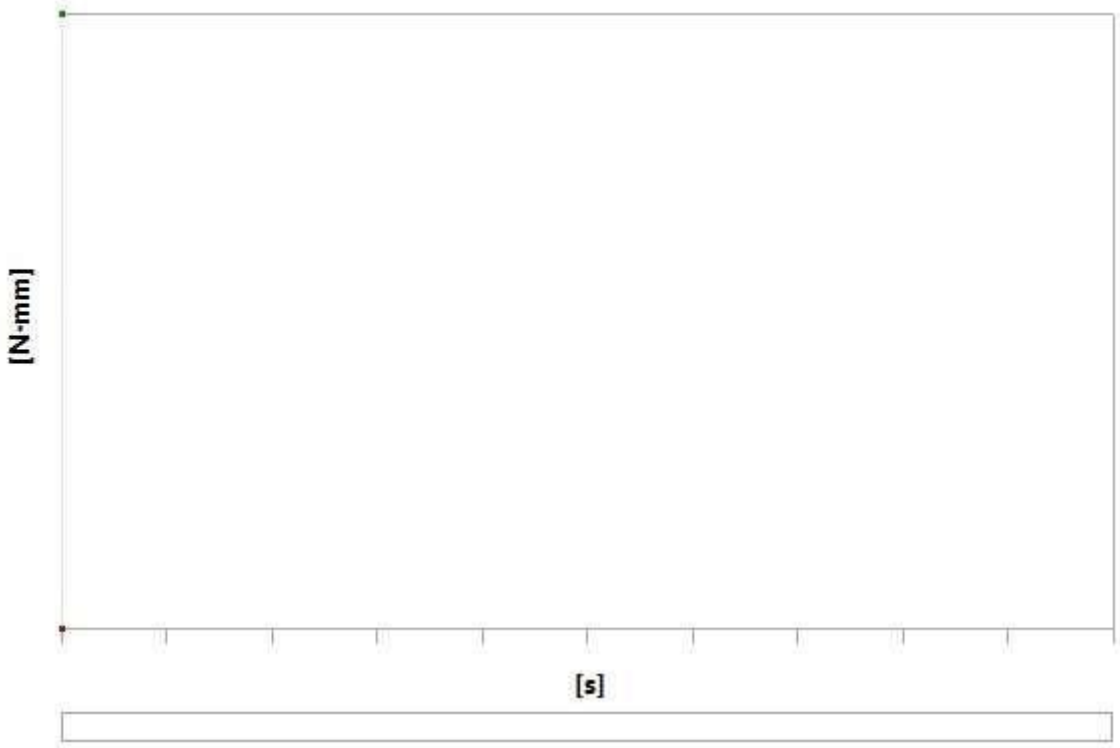


TABLE 17
Model (A4) > Static Structural (A5) > Solution (A6) > Total Bending Moment

Time [s]	Minimum [N·mm]	Maximum [N·mm]
1.	683.26	3.3593e+007

FIGURE 5
Model (A4) > Static Structural (A5) > Solution (A6) > Torsional Moment

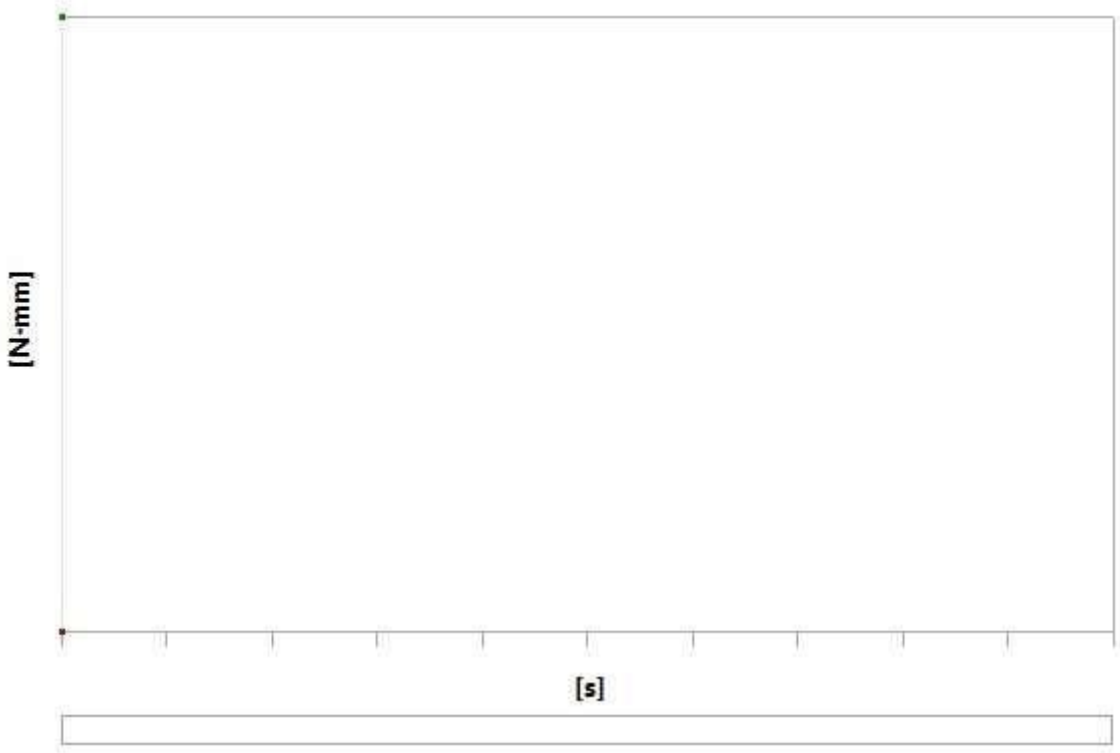


TABLE 18
Model (A4) > Static Structural (A5) > Solution (A6) > Torsional Moment

Time [s]	Minimum [N·mm]	Maximum [N·mm]
1.	-9.1618e+005	8.9426e+005

TABLE 19
Model (A4) > Static Structural (A5) > Solution (A6) > Beam Tool

Object Name	*Beam Tool*
State	Solved
Scope	
Geometry	All Line Bodies

TABLE 20
Model (A4) > Static Structural (A5) > Solution (A6) > Beam Tool > Results

Object Name	*Direct Stress*	*Minimum Combined Stress*	*Maximum Combined Stress*
State	Solved		
Definition			
Type	Direct Stress	Minimum Combined Stress	Maximum Combined Stress
By	Time		

Display Time	Last		
Calculate Time History	No	Yes	
Identifier			
Suppressed	No		
Integration Point Results			
Display Option	Nodal Difference	Nodal Fraction	
Results			
Minimum	0. MPa	0.	
Maximum	7.437 MPa	0.31274	0.27204
Minimum Occurs On	Beam (#dn 365)		
Maximum Occurs On	Beam (#dn 365)		
Information			
Time	1. s		
Load Step	1		
Substep	1		
Iteration Number	1		

FIGURE 6
Model (A4) > Static Structural (A5) > Solution (A6) > Beam Tool > Direct Stress

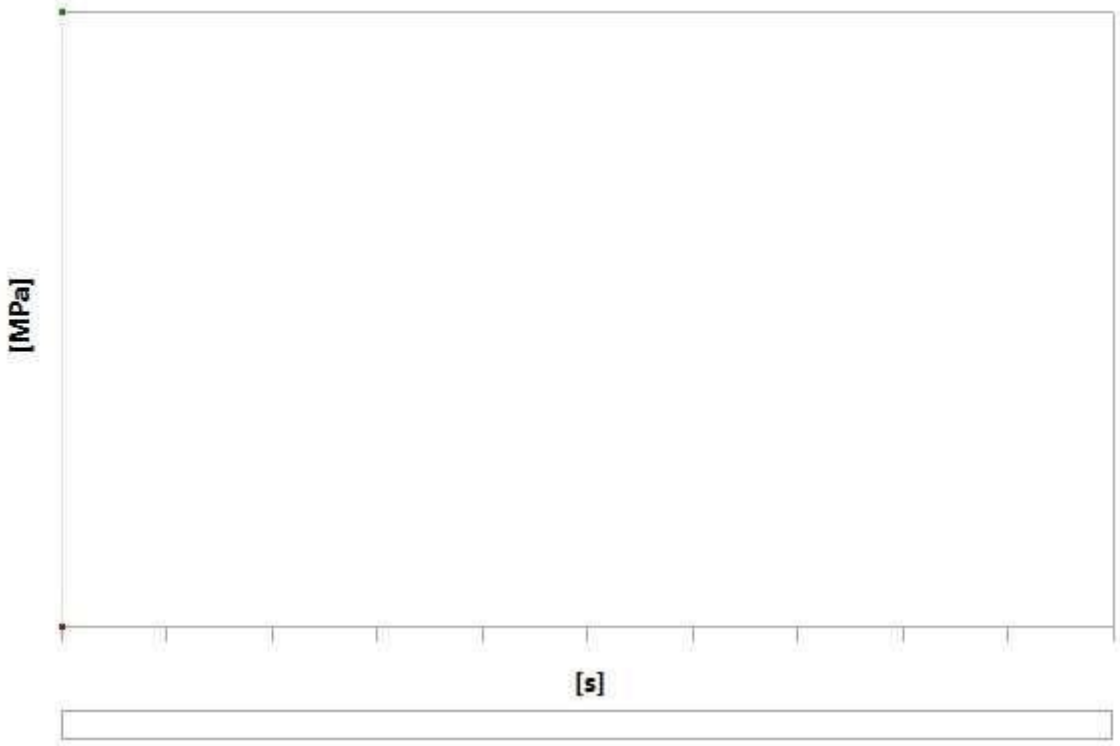


TABLE 21
Model (A4) > Static Structural (A5) > Solution (A6) > Beam Tool > Direct Stress

Time [s]	Minimum [MPa]	Maximum [MPa]
1.	0.	7.437

FIGURE 7
Model (A4) > Static Structural (A5) > Solution (A6) > Beam Tool > Minimum Combined Stress

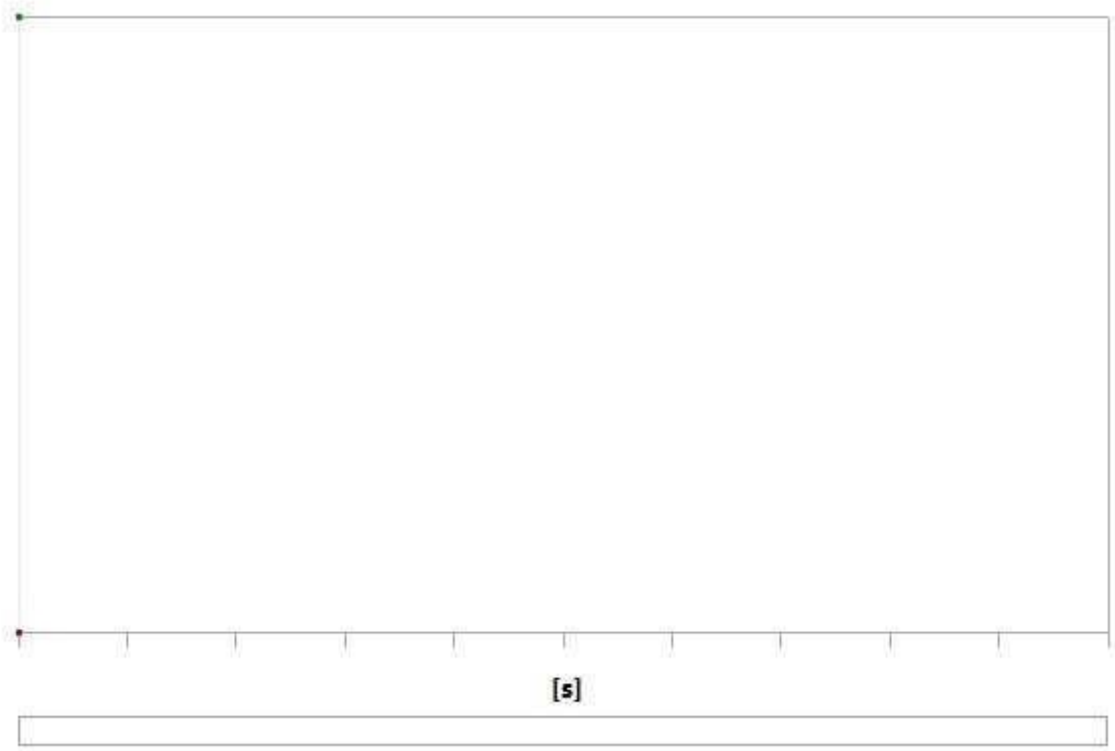


TABLE 22 Model (A4) > Static Structural (A5) > Solution (A6) > Beam Tool > Minimum Combined Stress

Time [s]	Minimum	Maximum
1.	0.	0.31274

FIGURE 8
Model (A4) > Static Structural (A5) > Solution (A6) > Beam Tool > Maximum Combined Stress

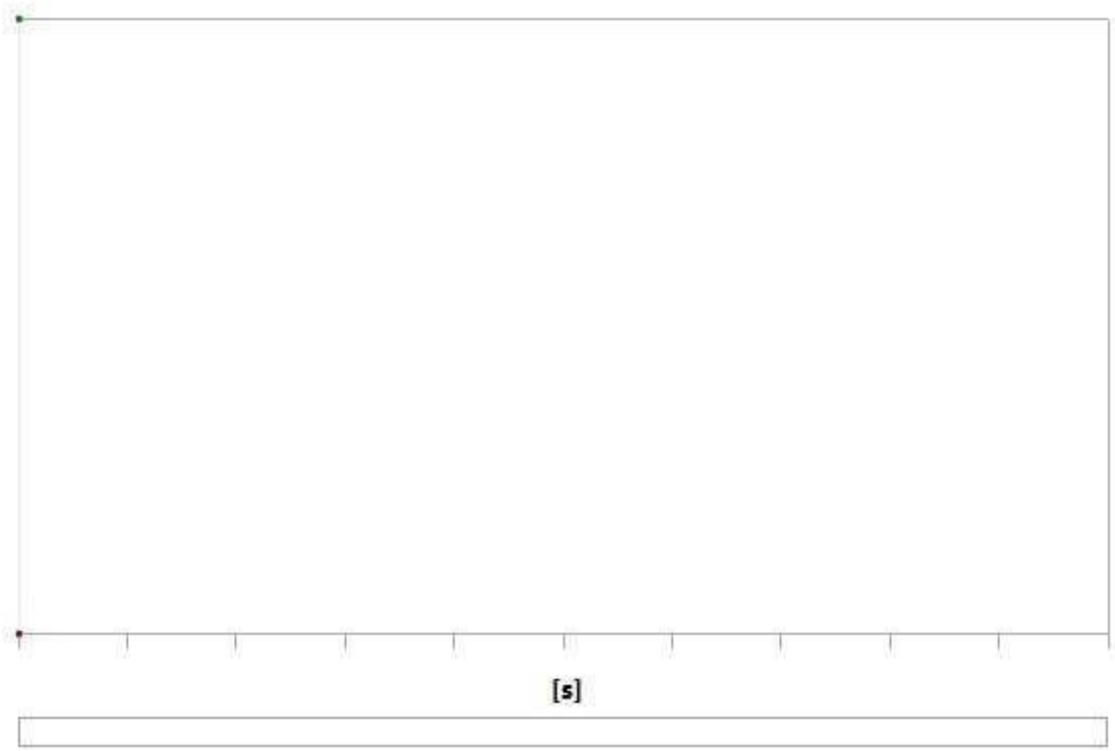


TABLE 23 Model (A4) > Static Structural (A5) > Solution (A6) > Beam Tool > Maximum Combined Stress

Time [s]	Minimum	Maximum
1.	0.	0.27204

TABLE 24
Model (A4) > Static Structural (A5) > Solution (A6) > Probes

Object Name	*Force Reaction*	*Moment Reaction*
State	Solved	
Definition		
Type	Force Reaction	Moment Reaction
Location Method	Boundary Condition	
Boundary Condition	Fixed Support	
Orientation	Global Coordinate System	
Suppressed	No	
Summation		Centroid
Options		
Result Selection	All	
Display Time	End Time	
Results		

X Axis	-9.9417e-004 N	2.0228 N·mm
Y Axis	3.1965e-003 N	-0.70305 N·mm
Z Axis	-1.0133e-004 N	-24.208 N·mm
Total	3.3491e-003 N	24.302 N·mm
Maximum Value Over Time		
X Axis	-9.9417e-004 N	2.0228 N·mm
Y Axis	3.1965e-003 N	-0.70305 N·mm
Z Axis	-1.0133e-004 N	-24.208 N·mm
Total	3.3491e-003 N	24.302 N·mm
Minimum Value Over Time		
X Axis	-9.9417e-004 N	2.0228 N·mm
Y Axis	3.1965e-003 N	-0.70305 N·mm
Z Axis	-1.0133e-004 N	-24.208 N·mm
Total	3.3491e-003 N	24.302 N·mm
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	

FIGURE 9
Model (A4) > Static Structural (A5) > Solution (A6) > Force Reaction

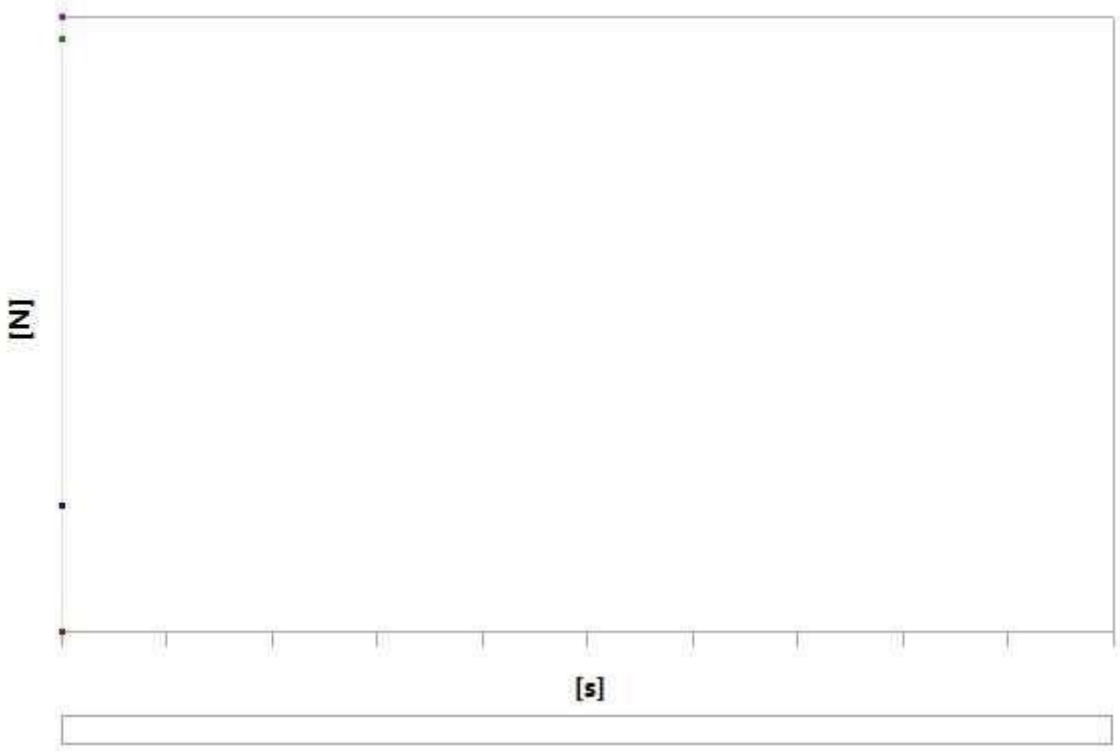


TABLE 25
Model (A4) > Static Structural (A5) > Solution (A6) > Force Reaction

Time [s]	Force Reaction (X) [N]	Force Reaction (Y) [N]	Force Reaction (Z) [N]	Force Reaction (Total) [N]
1.	-9.9417e-004	3.1965e-003	-1.0133e-004	3.3491e-003

FIGURE 10
Model (A4) > Static Structural (A5) > Solution (A6) > Moment Reaction

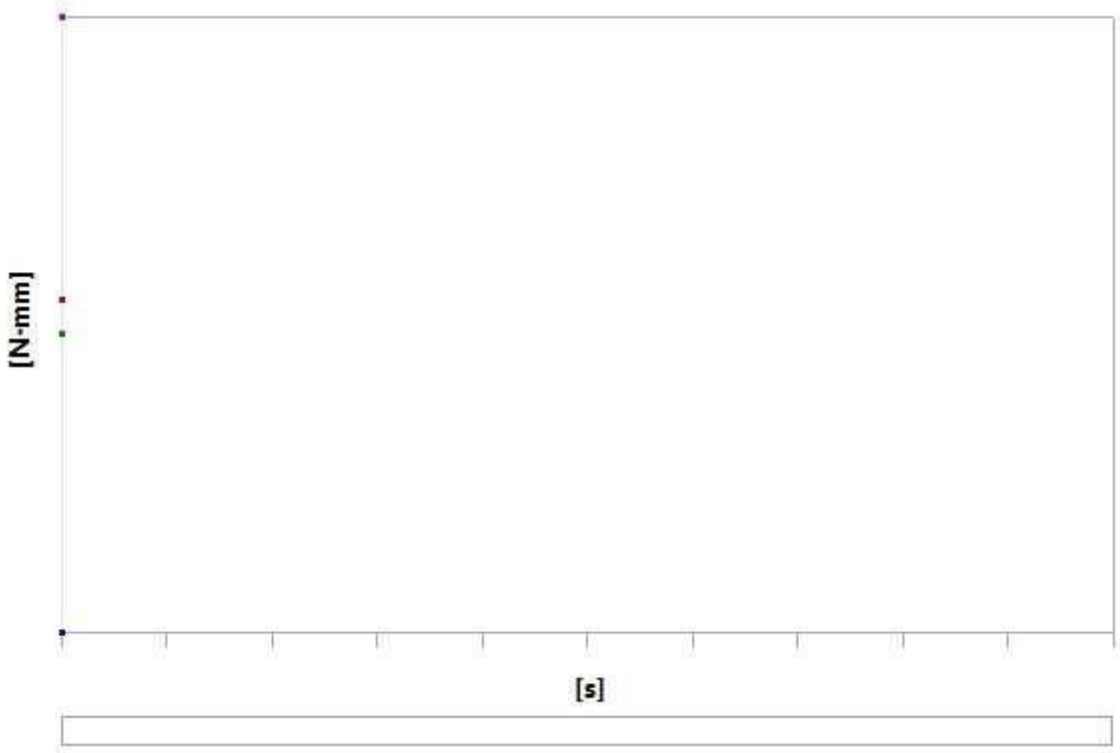


TABLE 26
Model (A4) > Static Structural (A5) > Solution (A6) > Moment Reaction

Time [s]	Moment Reaction (X) [N·mm]	Moment Reaction (Y) [N·mm]	Moment Reaction (Z) [N·mm]	Moment Reaction (Total) [N·mm]
1.	2.0228	-0.70305	-24.208	24.302

Material Data

Structural Steel

TABLE 27
Structural Steel > Constants

Density	7.85e-006 kg mm^-3
Specific Heat	4.34e+005 mJ kg^-1 C^-1
Isotropic Thermal Conductivity	6.05e-002 W mm^-1 C^-1
Isotropic Resistivity	1.7e-004 ohm mm

TABLE 28
Structural Steel > Appearance

Red	Green	Blue
132	139	179

TABLE 29
Structural Steel > Compressive Ultimate Strength

Compressive Ultimate Strength MPa
0

TABLE 30
Structural Steel > Compressive Yield Strength

Compressive Yield Strength MPa
250

TABLE 31
Structural Steel > Tensile Yield Strength

Tensile Yield Strength MPa
250

TABLE 32
Structural Steel > Tensile Ultimate Strength

Tensile Ultimate Strength MPa
460

TABLE 33
Structural Steel > Isotropic Secant Coefficient of Thermal Expansion

Coefficient of Thermal Expansion C^-1	Temperature C
1.2e-005	20
1.47e+005	450
Zero-Thermal-Strain Reference Temperature C	
22	

TABLE 34
Structural Steel > Alternating Stress Mean Stress

Alternating Stress MPa	Cycles	Mean Stress MPa
3999	10	0
2827	20	0
1896	50	0
1413	100	0
1069	200	0
441	2000	0
262	10000	0
214	20000	0
138	1.e+005	0
114	2.e+005	0
86.2	1.e+006	0

TABLE 35
Structural Steel > Strain-Life Parameters

Strength Coefficient MPa	Strength Exponent	Ductility Coefficient	Ductility Exponent	Cyclic Strength Coefficient MPa	Cyclic Strain Hardening Exponent
920	-0.106	0.213	-0.47	1000	0.2

TABLE 36
Structural Steel > Isotropic Elasticity

Temperature C	Young's Modulus MPa	Poisson's Ratio	Bulk Modulus MPa	Shear Modulus MPa
75	2.e+005	0.3	1.6667e+005	76923
450	1.87e+005	0.3	1.5583e+005	71923

TABLE 37
Structural Steel > Isotropic Relative Permeability

Relative Permeability
10000