

ANEXO I:

LISTADOS DE CÁLCULOS

1. INTRODUCCION

Seguidamente se presenta los tipos de elementos finitos, así como el modelo correspondiente al vehículo de riego y baldeo con cisterna de acero y 8.000 litros de capacidad empleados en el análisis mecánico recogido en el capítulo II.

El resto de resultados se recoge dentro de la carpeta “ANEXOIIANÁLISIS MECÁNICOS”. Los nombres de estos archivos son:

- ANALISIS MECANICO CRB ACERO.pdf
- ANALISIS MECANICO CRB POLIESTER MODIFICADO.pdf
- ANALISISMECANICOCRBPOLIESTER_PlacaT+emparrillado+falsobastidor.pdf
- ANALISIS MECANICO CRB POLIESTER_tanque+emparrillado.pdf

Por otro lado, en el interior de la carpeta ANEXOII, aparece otra con nombre “FEM” donde se recogen los elementos finitos empleados en cada uno de los análisis realizados, así como las características de éstos. Los nombres de estos archivos son:

- FEM_CRB ACERO
- FEM_CRB POLIESTER MODIFICADO
- FEM_POLIESTER_PlacaT+Emparrillado+Falsobastidor
- FEM_CRB POLIESTER MODIFICADO

2. ANÁLISIS EN ANSYS WORKBENCH

Todos los análisis mecánicos se han realizado mediante el software Ansys Workbench, recogiendo todos los archivos de cálculo dentro de la carpeta “Análisis mecánico”, incluida en el CD del presente proyecto.

Dicha carpeta se divide a su vez en tres, siendo éstas:

- CRB ACERO. Análisis mecánico del vehículo de riego y baldeo con cisterna de acero y 8000 litros de capacidad. Para acceder al análisis es necesario tener instalado el paquete Ansys en el PC, y ejecutar el archivo WBDB con nombre “CRB8000I”.

- CRB POLIESTER. A su vez se subdivide en dos carpetas, correspondientes a dos análisis diferentes del vehículo de riego y baldeo con cisterna de poliéster y 20.000 litros de capacidad.
 - o Falsobastidor+Emparrillado+PlacaT. En él se recoge un primer análisis para los elementos mencionados. Para acceder al él es necesario tener instalado el paquete Ansys en el PC, y ejecutar el archivo WBDB con nombre “sub+placa+empl”.
 - o Tanque+Emparrillado. En él se recoge el segundor análisis para los elementos mencionados. Para acceder al él es necesario tener instalado el paquete Ansys en el PC, y ejecutar el archivo WBDB con nombre “Tanque+Emparrillado”.

- CRB MODIFICADO. Análisis mecánico del vehículo de riego y baldeo con cisterna de poliéster modificada y 20.000 litros de capacidad. Para acceder al análisis es necesario tener instalado el paquete Ansys en el PC, y ejecutar el archivo WBDB con nombre “Tanque+Emp_modificado”.

Se muestra a continuación el análisis correspondiente al vehículo de riego y baldeo con cisterna de acero y 8000 litros de capacidad, así como el listado de elementitos finitos empleado en su construcción.

Import Summary

TABLE 1—FE Model Summary

Description	Quantity
Total Nodes	122661
Total Elements	113400
Total Body Elements	53134
Total Contact Elements	60266
Total Spot Weld Elements	0
Element Types	7
Coordinate Systems	0
Materials	1
Thicknesses	0
Layered Composites	0
Rod Properties	0
Bar Properties	0
Beam Properties	0
Curved Pipe Properties	0
Mass Properties	0
Spring Properties	0
Components	6
Contacts	69
Spot Welds	0
Constraint Equations	0
Constraints	1
Forces	0
Pressures	1

TABLE 2—Bodies Summary

Body Name	Nodes	Elements
falso bastidor.asm:1,cogida_chasis.par:6	652	250
falso bastidor.asm:1,cogida_chasis.par:7	650	248
falso bastidor.asm:1,cogida_chasis_mir.par:2	655	253
falso bastidor.asm:1,cogida_chasis_mir1.par:1	652	250
falso bastidor.asm:1,cogida_chasis_mir1.par:2	653	251
falso bastidor.asm:1,cogida_chasis_mir1.par:3	652	250
falso bastidor.asm:1,cogida_chasis_mir1.par:4	652	250
Tanque.asm:1,Superficie lateral.par:1	60588	29981
Tanque.asm:1,Rompeolas transversal.par:1	1318	165
Tanque.asm:1,Rompeolas transversal.par:2	1472	187
Tanque.asm:1,Superficie forntal.par:1	854	108
Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes_2.par:1	2889	1418
Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:1	4270	2083
Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:2	4349	2123
Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes_2.par:1	2714	1319
Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:1	4282	2089
Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:2	4271	2081
Tanque.asm:1,Superficie trasera.par:1	1058	134
Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1	2873	1394
Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes.par:1	4325	2108
Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes.par:2	4361	2129
Tanque.asm:1,Rigidizador Longitudinal.par:1	269	23
Tanque.asm:1,Rigidizador Longitudinal.par:2	269	23
Tanque.asm:1,Rigidizador Longitudinal.par:3	269	23
Tanque.asm:1,Rigidizador Longitudinal.par:4	269	23

Body Name	Nodes	Elements
Tanque.asm:1,Rigidizador Longitudinal.par:5	269	23
Tanque.asm:1,Rigidizador Longitudinal.par:6	269	23
Tanque.asm:1,rigidizador_transversal.par:1	1296	108
Tanque.asm:1,Refuerzo transversal.par:1	1860	816
Tanque.asm:1,Refuerzo transversal.par:2	1841	809
Tanque.asm:1,rigidizador_transversal.par:2	1296	108
falso bastidor.asm:1,largueros.par:1	1383	220
falso bastidor.asm:2,largueros.par:2	1301	209
falso bastidor.asm:2,largueros.par:3	1104	170
falso bastidor.asm:2,largueros.par:4	1276	210
falso bastidor.asm:2,largueros.par:5	828	120
falso bastidor.asm:2,largueros.par:6	863	128
falso bastidor.asm:2,largueros.par:7	924	136
falso bastidor.asm:2,largueros.par:8	924	136
falso bastidor.asm:1,cogida_chasis.par:3	656	254
falso bastidor.asm:1,cogida_chasis.par:4	654	252
falso bastidor.asm:1,cogida_chasis.par:5	651	249

TABLE 3—Element Types Summary

Generic Element Type Name	ANSYS Name	Description
10 Node Quadratic Tetrahedron	Solid187	10 Node Tetrahedral Structural Solid
20 Node Quadratic Hexahedron	Solid186	20 Node Structural Solid
20 Node Quadratic Wedge	Solid186	20 Node Structural Solid
Quadratic Quadrilateral Contact	Conta174	3D 8 Node Surface to Surface Contact
Quadratic Quadrilateral Target	Targe170	3D Target Segment
Quadratic Triangular Contact	Conta174	3D 8 Node Surface to Surface Contact
Quadratic Triangular Target	Targe170	3D Target Segment

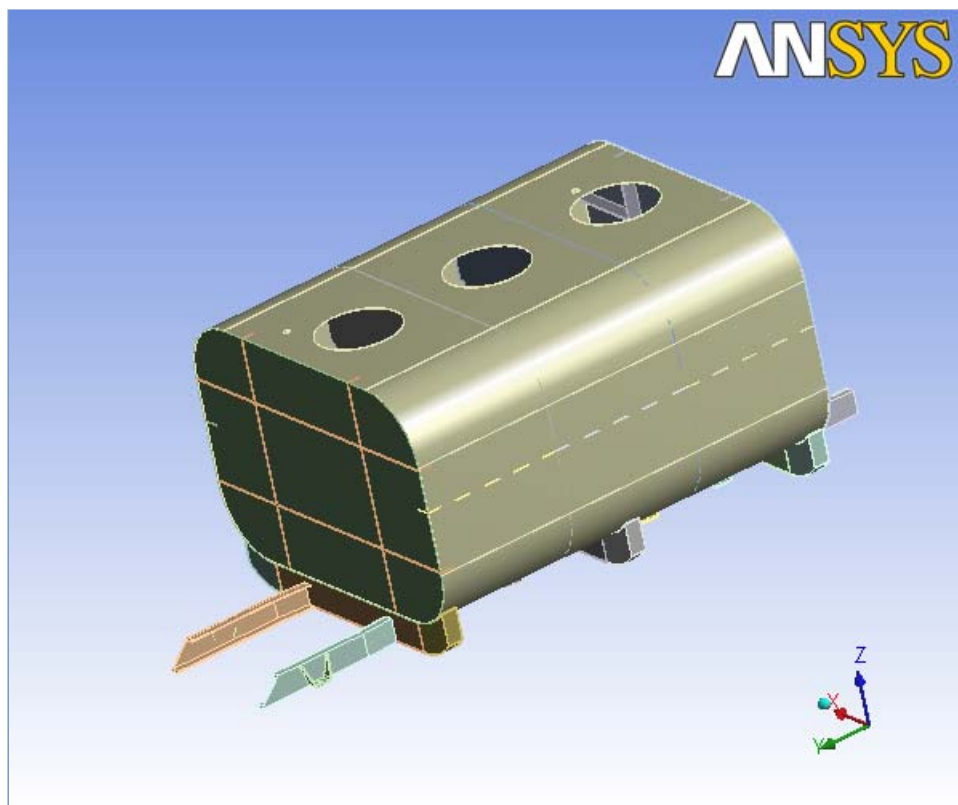
TABLE 4**Issues Raised by the Import Process**

1. Finished processing



Project

<i>First Saved</i>	<i>Friday, August 29, 2008</i>
<i>Last Saved</i>	<i>Tuesday, September 02, 2008</i>
<i>Product Version</i>	<i>11.0 Release</i>



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Units

TABLE 1

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

E.L.Ultimos

Geometry

TABLE 2
E.L.Ultimos > Geometry

Object Name	Geometry
State	Fully Defined
Definition	
Source	C:\Antonio\PFC APEREA\CRB ACERO\DATOS\Análisis Workbench 4\CRB8000I.agdb
Type	DesignModeler
Length Unit	Millimeters
Element Control	Program Controlled
Display Style	Part Color
Bounding Box	
Length X	2100, mm
Length Y	4116, mm
Length Z	1615, mm
Properties	
Volume	1,5384e+008 mm ³
Mass	1207,6 kg
Statistics	
Bodies	42
Active Bodies	42
Nodes	122661
Elements	53134
Preferences	
Import Solid Bodies	Yes
Import Surface Bodies	Yes
Import Line Bodies	Yes
Parameter Processing	Yes
Personal Parameter Key	DS
CAD Attribute Transfer	No
Named Selection Processing	No
Material Properties Transfer	No
CAD Associativity	Yes
Import Coordinate Systems	No
Reader Save Part File	No
Import Using Instances	Yes
Do Smart Update	No
Attach File Via Temp File	No
Analysis Type	3-D
Mixed Import Resolution	None
Enclosure and Symmetry Processing	Yes

TABLE 3
E.L.Ultimos > Geometry > Parts

Object Name	falso	falso	falso	
	bastidor.asm:1,cogida_chasis.par:6	bastidor.asm:1,cogida_chasis.par:7	bastidor.asm:1,cogida_chasis_mir.par:2	bastidor.asm:1,cogida_chasis_mir.par:2
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	60, mm			
Length Y	188,49 mm			
Length Z	140, mm			
Properties				
Volume	1,5714e+005 mm³			
Mass	1,2335 kg			

Centroid X	404,5 mm		-454,5 mm	
Centroid Y	1618,8 mm	2118,8 mm	4393, mm	
Centroid Z	37,292 mm			
Moment of Inertia Ip1	5669,9 kg·mm²		5670, kg·mm²	
Moment of Inertia Ip2	2061, kg·mm²			
Moment of Inertia Ip3	4131,5 kg·mm²		4131,6 kg·mm²	
Statistics				
Nodes	652	650	655	
Elements	250	248	253	

TABLE 4
E.L.Ultimos > Geometry > Parts

Object Name	<i>falso</i> <i>bastidor.asm:1,cogida_chasis_mir1.par:3</i>	<i>falso</i> <i>bastidor.asm:1,cogida_chasis_mir1.par:4</i>	<i>Tanque.asm:1,Superficie lateral.par:1</i>	<i>Tanque.asm:1,Superficie trasera.par:2</i>
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	60, mm		2100, mm	
Length Y	188,49 mm		2642, mm	
Length Z	140, mm		1415, mm	
Properties				
Volume	1,5714e+005 mm³		6,4792e+007 mm³	
Mass	1,2335 kg		508,62 kg	
Centroid X	-404,5 mm		-1,9539 mm	
Centroid Y	2118,8 mm	3044,3 mm	2535,2 mm	2
Centroid Z	37,292 mm		882,06 mm	
Moment of Inertia Ip1	5669,9 kg·mm²	5669,8 kg·mm²	4,6538e+008 kg·mm²	
Moment of Inertia Ip2	2061, kg·mm²		4,8622e+008 kg·mm²	
Moment of Inertia Ip3	4131,5 kg·mm²		6,1163e+008 kg·mm²	
Statistics				
Nodes	652		60588	
Elements	250		29981	

TABLE 5
E.L.Ultimos > Geometry > Parts

Object Name	Tanque.asm:1,Superficie forntal.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes_2.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:1	Tanque.asm:1,Superficie lateral.par:1
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	2100, mm	1340, mm	269, mm	
Length Y	4, mm	100, mm		
Length Z	1415, mm	200, mm	311,6 mm	
Properties				

Volume	1,139e+007 mm ³	3,2009e+006 mm ³	7,1984e+005 mm ³
Mass	89,413 kg	25,127 kg	5,6507 kg
Centroid X	-1, mm	13,745 mm	818,55 mm
Centroid Y	3858, mm		3790, mm
Centroid Z	907,5 mm	100, mm	143,66 mm
Moment of Inertia Ip1	1,3985e+007 kg·mm ²	1,7682e+005 kg·mm ²	30619 kg·mm ²
Moment of Inertia Ip2	4,4493e+007 kg·mm ²	4,0511e+006 kg·mm ²	77049 kg·mm ²
Moment of Inertia Ip3	3,0508e+007 kg·mm ²	3,9635e+006 kg·mm ²	65219 kg·mm ²
Statistics			
Nodes	854	2889	4270
Elements	108	1418	2083

TABLE 6
E.L.Ultimos > Geometry > Parts

Object Name	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:2	Tanque.asm:1,Superficie trasera.par:1	Tanque.asm:1,Superficie trasera.par:1
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	269, mm		2100, mm	
Length Y	100, mm		4, mm	
Length Z	311,6 mm		1415, mm	
Properties				
Volume	7,1984e+005 mm ³		1,1373e+007 mm ³	3,2009e+006 mm ³
Mass	5,6507 kg		89,281 kg	25,127 kg
Centroid X	818,55 mm	-820,55 mm	-1,8752 mm	
Centroid Y	2535, mm		1212, mm	
Centroid Z	147,66 mm		908,43 mm	
Moment of Inertia Ip1	30619 kg·mm ²		1,3932e+007 kg·mm ²	1,7682e+005 kg·mm ²
Moment of Inertia Ip2	77049 kg·mm ²		4,4393e+007 kg·mm ²	4,0511e+006 kg·mm ²
Moment of Inertia Ip3	65219 kg·mm ²		3,0461e+007 kg·mm ²	3,9635e+006 kg·mm ²
Statistics				
Nodes	4282	4271	1058	
Elements	2089	2081	134	

TABLE 7
E.L.Ultimos > Geometry > Parts

ELEMENTOS - Geometry - Parts				
Object Name	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes.par:2	Tanque.asm:1,Rigidizador Longitudinal.par:1	Tanque.asm:1,Rigidizador Longitudinal.par:2	Tanque.asm:1,Rigidizador Longitudinal.par:3
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	269, mm	100, mm		
Length Y	100, mm	878, mm		

Length Z	311,6 mm	4, mm		
Properties				
Volume	7,1984e+005 mm³	2,952e+005 mm³		
Mass	5,6507 kg	2,3173 kg		
Centroid X	-820,55 mm	-990,83 mm		
Centroid Y	1280, mm	3417, mm	2535, mm	165
Centroid Z	143,66 mm	960, mm		
Moment of Inertia Ip1	30619 kg·mm²	1,5476e+005 kg·mm²		
Moment of Inertia Ip2	77049 kg·mm²	1703,2 kg·mm²		
Moment of Inertia Ip3	65219 kg·mm²	1,5646e+005 kg·mm²		
Statistics				
Nodes	4361	269		
Elements	2129	23		

TABLE 8
E.L.Ultimos > Geometry > Parts

Object Name	Tanque.asm:1,Rigidizador Longitudinal.par:5	Tanque.asm:1,Rigidizador Longitudinal.par:6	Tanque.asm:1,rigidizador_transversal.par:1	Tanque.asm:1,Refue transversal.par:1
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	100, mm		2091, mm	
Length Y	878, mm		80, mm	
Length Z	4, mm		1407, mm	
Properties				
Volume	2,952e+005 mm³		5,5648e+006 mm³	8,63
Mass	2,3173 kg		43,684 kg	
Centroid X	988,83 mm		-0,99969 mm	
Centroid Y	2535, mm	3417, mm	3816, mm	3157,5 mm
Centroid Z	960, mm		907,5 mm	1
Moment of Inertia Ip1	1,5476e+005 kg·mm²		5,4467e+006 kg·mm²	29
Moment of Inertia Ip2	1703,2 kg·mm²		1,933e+007 kg·mm²	2,597
Moment of Inertia Ip3	1,5646e+005 kg·mm²		1,393e+007 kg·mm²	2,338
Statistics				
Nodes	269		1296	1860
Elements	23		108	816

TABLE 9
E.L.Ultimos > Geometry > Parts

ELENORAMES - Geometry - Parts				
Object Name	Tanque.asm:1,rigidizador_transversal.par:2	falso bastidor.asm:1,largueros.par:1	falso bastidor.asm:2,largueros.par:2	bastidor.asr
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				

Length X	2091, mm	83,316 mm	
Length Y	80, mm		1155, mm
Length Z	1407, mm		140, mm
Properties			
Volume	5,5648e+006 mm ³	2,1428e+006 mm ³	
Mass	43,684 kg	16,821 kg	
Centroid X	-0,99969 mm	365,26 mm	-365,26 mm
Centroid Y	1254, mm	3162,9 mm	
Centroid Z	907,5 mm	71,11 mm	71,11 mm
Moment of Inertia Ip1	5,4467e+006 kg·mm ²	1,9201e+006 kg·mm ²	
Moment of Inertia Ip2	1,933e+007 kg·mm ²	54759 kg·mm ²	54760 kg·mm ²
Moment of Inertia Ip3	1,393e+007 kg·mm ²	1,877e+006 kg·mm ²	
Statistics			
Nodes	1296	1383	1301
Elements	108	220	209

TABLE 10
E.L.Ultimos > Geometry > Parts

Object Name	falso bastidor.asm:2,largueros.par:5	falso bastidor.asm:2,largueros.par:6	falso bastidor.asm:2,largueros.par:7	falso bastidor.asm:2,largueros
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	78,164 mm		60, mm	
Length Y	930, mm		576, mm	
Length Z	140, mm			
Properties				
Volume	1,5935e+006 mm³		1,0677e+006 mm³	
Mass	12,509 kg		8,3811 kg	
Centroid X	410,43 mm	-410,43 mm	362,58 mm	-362,58 mm
Centroid Y	4270,8 mm		942, mm	
Centroid Z	67,727 mm	67,728 mm	71,111 mm	
Moment of Inertia Ip1	8,2396e+005 kg·mm²	8,2399e+005 kg·mm²	2,5606e+005 kg·mm²	
Moment of Inertia Ip2	40129 kg·mm²	40132 kg·mm²	27122 kg·mm²	
Moment of Inertia Ip3	7,9233e+005 kg·mm²	7,9235e+005 kg·mm²	2,3443e+005 kg·mm²	
Statistics				
Nodes	828	863	924	
Elements	120	128	136	

TABLE 11
E.L.Ultimos > Geometry > Parts

Object Name	falso bastidor.asm:1,cogida_chasis.par:4		falso bastidor.asm:1,cogida_chasis.par:5
State	Meshed		
Graphics Properties			
Visible	Yes		
Transparency	1		
Definition			
Suppressed	No		
Material	Structural Steel		
Stiffness Behavior	Flexible		
Nonlinear Material Effects	Yes		
Bounding Box			
Length X	60, mm		
Length Y	188,49 mm		

Length Z	140, mm	
Properties		
Volume	1,5714e+005 mm³	
Mass	1,2335 kg	
Centroid X	404,5 mm	
Centroid Y	3044,3 mm	1018,8 mm
Centroid Z	37,292 mm	
Moment of Inertia Ip1	5669,8 kg·mm²	5669,9 kg·mm²
Moment of Inertia Ip2	2061, kg·mm²	
Moment of Inertia Ip3	4131,5 kg·mm²	
Statistics		
Nodes	654	651
Elements	252	249

Connections

TABLE 12
E.L.Ultimos > Connections

Object Name	Connections
State	Fully Defined
Auto Detection	
Generate Contact On Update	Yes
Tolerance Type	Slider
Tolerance Slider	0,
Tolerance Value	12,237 mm
Face/Face	Yes
Face/Edge	No
Edge/Edge	No
Priority	Include All
Same Body Grouping	Yes
Revolute Joints	Yes
Fixed Joints	Yes
Transparency	
Enabled	Yes

TABLE 13
E.L.Ultimos > Connections > Contact Regions

Object Name	Contact Region	Contact Region 2	Contact Region 3	
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face			
Target	1 Face			
Contact Bodies	falso bastidor.asm:1,cogida_chasis.par:6	falso bastidor.asm:1,cogida_chasis.par:7	falso bastidor.asm:1,cogida_chasis_mir.par:2	bastidor
Target Bodies	falso bastidor.asm:2,largueros.par:3		falso bastidor.asm:2,largueros.par:6	falso
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 14
E.L.Ultimos > Connections > Contact Regions

E.L.Gitlinos > Connections > Contact Regions				
Object Name	Contact Region 6	Contact Region 7	Contact Region 8	Contact Region 9
State	Fully Defined			
	Scope			

Scoping Method	Geometry Selection			
Contact	1 Face		8 Faces	
Target	1 Face		14 Faces	
Contact Bodies	falso bastidor.asm:1,cogida_chasis_mir1.par:3	falso bastidor.asm:1,cogida_chasis_mir1.par:4	Tanque.asm:1,S	
Target Bodies	falso bastidor.asm:2,largueros.par:4	falso bastidor.asm:2,largueros.par:2	Tanque.asm:1,Rompeolas transversal.par:1	Tanque.a: trans
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 15
E.L.Ultimos > Connections > Contact Regions

Object Name	Contact Region 11	Contact Region 12	Contact Region 13	
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face			
Target	1 Face			
Contact Bodies	Tanque.asm:1,Superficie lateral.par:1			
Target Bodies	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes_2.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:2	D
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 16
E.L.Ultimos > Connections > Contact Regions

Object Name	Contact Region 16	Contact Region 17	Contact Region 18	Contact Region 19
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	2 Faces	1 Face		
Target	2 Faces	1 Face		
Contact Bodies	Tanque.asm:1,Superficie lateral.par:1			
Target Bodies	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:2	Tanque.asm:1,Superficie trasera.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:4,Durmientes_2.par:1
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			

	Advanced
Formulation	Pure Penalty
Normal Stiffness	Program Controlled
Update Stiffness	Never
Thermal Conductance	Program Controlled
Pinball Region	Program Controlled

TABLE 17
E.L.Ultimos > Connections > Contact Regions

Object Name	<i>Contact Region 21</i>	<i>Contact Region 22</i>	<i>Contact Region 23</i>	<i>Contact Region 24</i>	<i>Contact</i>
State	Fully Defined				
	Scope				
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	5 Faces				
Contact Bodies	Tanque.asm:1,Superficie lateral.par:1				
Target Bodies	Tanque.asm:1,Rigidizador Longitudinal.par:1	Tanque.asm:1,Rigidizador Longitudinal.par:2	Tanque.asm:1,Rigidizador Longitudinal.par:3	Tanque.asm:1,Rigidizador Longitudinal.par:4	Tanque.asm:1,Rigidizador Longitudinal.par:5
	Definition				
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
	Advanced				
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 18
E.L.Ultimos > Connections > Contact Regions

Object Name	<i>Contact Region 26</i>	<i>Contact Region 27</i>	<i>Contact Region 28</i>	<i>Contact Region 29</i>
State	Fully Defined			
	Scope			
Scoping Method	Geometry Selection			
Contact	1 Face	4 Faces	1 Face	1 Face
Target	5 Faces	8 Faces	1 Face	1 Face
Contact Bodies	Tanque.asm:1,Superficie lateral.par:1			
Target Bodies	Tanque.asm:1,Rigidizador Longitudinal.par:6	Tanque.asm:1,rigidizador_transversal.par:1	Tanque.asm:1,Refuerzo transversal.par:1	Tanque.asm:1,Refuerzo transversal.par:2
	Definition			
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
	Advanced			
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 19
E.L.Ultimos > Connections > Contact Regions

--	--	--	--	--

Object Name	Contact Region 31	Contact Region 32	Contact Region 33	Contact Region 34	Contact
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	Tanque.asm:1,Rompeolas transversal.par:1				Tanque.asm:1,transversal.par:1
Target Bodies	Tanque.asm:1,Rigidizador Longitudinal.par:1	Tanque.asm:1,Rigidizador Longitudinal.par:2	Tanque.asm:1,Rigidizador Longitudinal.par:5	Tanque.asm:1,Rigidizador Longitudinal.par:6	Tanque.asm:1,Rigidizador Longitudinal.par:3
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 20
E.L.Ultimos > Connections > Contact Regions

Object Name	Contact Region 36	Contact Region 37	Contact Region 38	Contact Region 39	Contact Region 40
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	Tanque.asm:1,Rompeolas transversal.par:2			Tanque.asm:1,Superficie fornta	
Target Bodies	Tanque.asm:1,Rigidizador Longitudinal.par:3	Tanque.asm:1,Rigidizador Longitudinal.par:4	Tanque.asm:1,Rigidizador Longitudinal.par:5	Tanque.asm:1,Rigidizador Longitudinal.par:1	Tanque.asm:1,Rigidizador Longitudinal.par:2
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 21
E.L.Ultimos > Connections > Contact Regions

Durmiendo - Connections - Contact Regions			
Object Name	Contact Region 41	Contact Region 42	Contact Region 43
State	Fully Defined		
Scope			
Scoping Method	Geometry Selection		
Contact	1 Face		
Target	1 Face		
Contact Bodies	Tanque.asm:1,Superficie forntal.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:1	
Target Bodies	Tanque.asm:1,rigidizador_transversal.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:2
Definition			
Type	Bonded		

Scope Mode	Automatic
Behavior	Symmetric
Suppressed	No
Advanced	
Formulation	Pure Penalty
Normal Stiffness	Program Controlled
Update Stiffness	Never
Thermal Conductance	Program Controlled
Pinball Region	Program Controlled

TABLE 22
E.L.Ultimos > Connections > Contact Regions

Object Name	Contact Region 47	Contact Region 48	Contact Region 49	Contact Region 50
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face			
Target	1 Face			
Contact Bodies	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes_2.par:1		Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes_2.par:1	
Target Bodies	falso bastidor.asm:2,largueros.par:5	falso bastidor.asm:2,largueros.par:6	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:1
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 23
E.L.Ultimos > Connections > Contact Regions

Object Name	Contact Region 52	Contact Region 53	Contact Region 54	Contact Region 55
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face			
Target	1 Face			
Contact Bodies	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes_2.par:1			Tanque.asm:1,Sup
Target Bodies	falso bastidor.asm:2,largueros.par:2	falso bastidor.asm:2,largueros.par:3	falso bastidor.asm:2,largueros.par:4	Tanque.asm:1,Rigidizador Longitudinal.par:3
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 24
E.L.Ultimos > Connections > Contact Regions

Object Name	Contact Region 57	Contact Region 58	Contact Region 59
State	Fully Defined		
Scope			
Scoping Method	Geometry Selection		
Contact	1 Face		
Target	1 Face		
Contact Bodies	Tanque.asm:1,Superficie trasera.par:1	Tanque.asm:1,CONJ. DURMIENTE.as	
Target Bodies	Tanque.asm:1,rigidizador_transversal.par:2	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes.par:2
Definition			
Type	Bonded		
Scope Mode	Automatic		
Behavior	Symmetric		
Suppressed	No		
Advanced			
Formulation	Pure Penalty		
Normal Stiffness	Program Controlled		
Update Stiffness	Never		
Thermal Conductance	Program Controlled		
Pinball Region	Program Controlled		

TABLE 25
E.L.Ultimos > Connections > Contact Regions

Object Name	Contact Region 63	Contact Region 64	Contact Region 69	Contact Region 70
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face		3 Faces	
Target	1 Face		4 Faces	
Contact Bodies	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1		Tanque.asm:1,Refuerzo transversal.par:1	
Target Bodies	falso bastidor.asm:2,largueros.par:7	falso bastidor.asm:2,largueros.par:8	falso bastidor.asm:1,largueros.par:1	falso bastidor.asm:2,largueros.p
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 26
E.L.Ultimos > Connections > Contact Regions

Object Name	Contact Region 72	Contact Region 73	Contact Region 74	Contact Region 75
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	3 Faces	1 Face		
Target	4 Faces	1 Face		
Contact Bodies	Tanque.asm:1,Refuerzo transversal.par:2	falso bastidor.asm:1,largueros.par:1	falso bastidor.asm:2,largueros.par:5	falso bastidor.asm:2,largueros.par:6
Target Bodies	falso bastidor.asm:2,largueros.par:4	falso bastidor.asm:1,cogida_chasis.par:4	falso bastidor.asm:1,cogida_chasis.par:3	falso bastidor.asm:1,cogida_chasis.par:2

Definition	
Type	Bonded
Scope Mode	Automatic
Behavior	Symmetric
Suppressed	No
Advanced	
Formulation	Pure Penalty
Normal Stiffness	Program Controlled
Update Stiffness	Never
Thermal Conductance	Program Controlled
Pinball Region	Program Controlled

Mesh

TABLE 27
E.L.Ultimos > Mesh

Object Name	Mesh
State	Solved
Defaults	
Physics Preference	Mechanical
Relevance	0
Advanced	
Relevance Center	Coarse
Element Size	Default
Shape Checking	Standard Mechanical
Solid Element Midside Nodes	Program Controlled
Straight Sided Elements	No
Initial Size Seed	Active Assembly
Smoothing	Low
Transition	Fast
Statistics	
Nodes	122661
Elements	53134

Named Selections

TABLE 28
E.L.Ultimos > Named Selections > Named Selections

L.E. Grupos > Named Selections > Named Selections					
Object Name	Apoyo	Apoyo Falso bastidor	Frenada	Curva	Hidrostatica
State		Fully Defined			
Scope					
Geometry	3 Faces	8 Faces	3 Faces	8 Faces	
Statistics					
Type	Manual				
Total Selection	3 Faces	8 Faces	3 Faces	8 Faces	
Suppressed	0				
Hidden	0				

TABLE 29
E.L.Ultimos > Named Selections > Named Selections

Object Name	Fondo
State	Fully Defined
Scope	
Geometry	1 Face
Statistics	
Type	Manual
Total Selection	1 Face
Suppressed	0
Hidden	0

PP + Hidrostatica

TABLE 30
E.L.Ultimos > Analysis

--	--

Object Name	<i>PP + Hidrostatica</i>
State	Fully Defined
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Options	
Reference Temp	22, °C

TABLE 31
E.L.Ultimos > PP + Hidrostatica > Analysis Settings

Object Name	<i>Analysis Settings</i>
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	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Nonlinear Controls	
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Output Controls	
Calculate Stress	Yes
Calculate Strain	Yes
Calculate Results At	All Time Points
Analysis Data Management	
Solver Files Directory	C:\Antonio\PFCA PEREA\ACRB ACERO\DATOS\Analisis Workbench 4\CRB8000I Simulation Files\PP + Hidrostatica\
Future Analysis	None
Save ANSYS db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No

TABLE 32
E.L.Ultimos > PP + Hidrostatica > Accelerations

Object Name	<i>Standard Earth Gravity</i>
State	Fully Defined
Scope	
Geometry	All Bodies
Definition	
X Component	0, mm/s ² (ramped)
Y Component	0, mm/s ² (ramped)
Z Component	-9806,6 mm/s ² (ramped)
Suppressed	No
Direction	-Z Direction

FIGURE 1
E.L.Ultimos > PP + Hidrostatica > Standard Earth Gravity

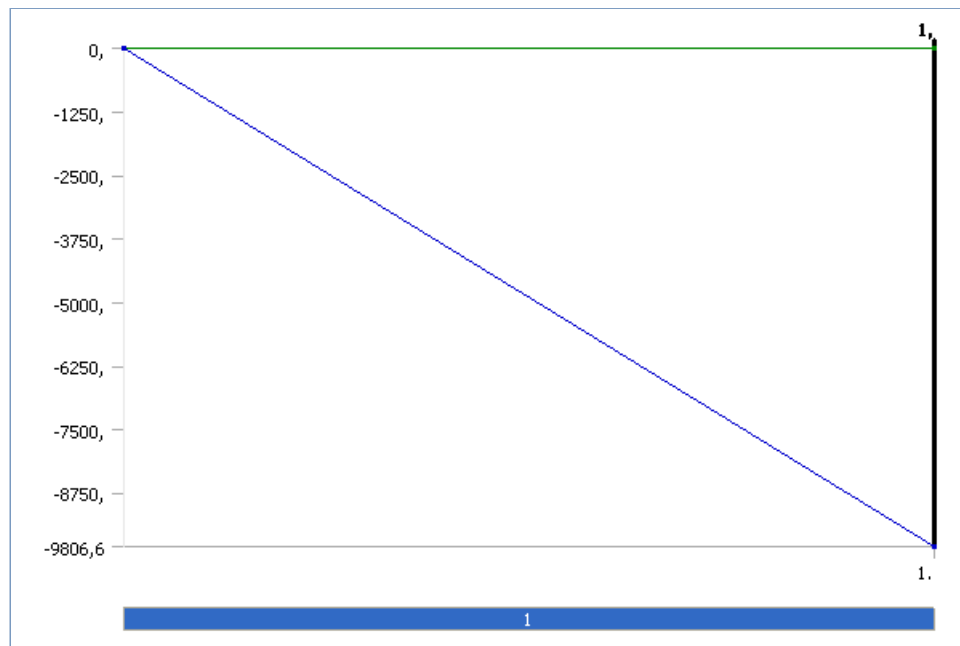
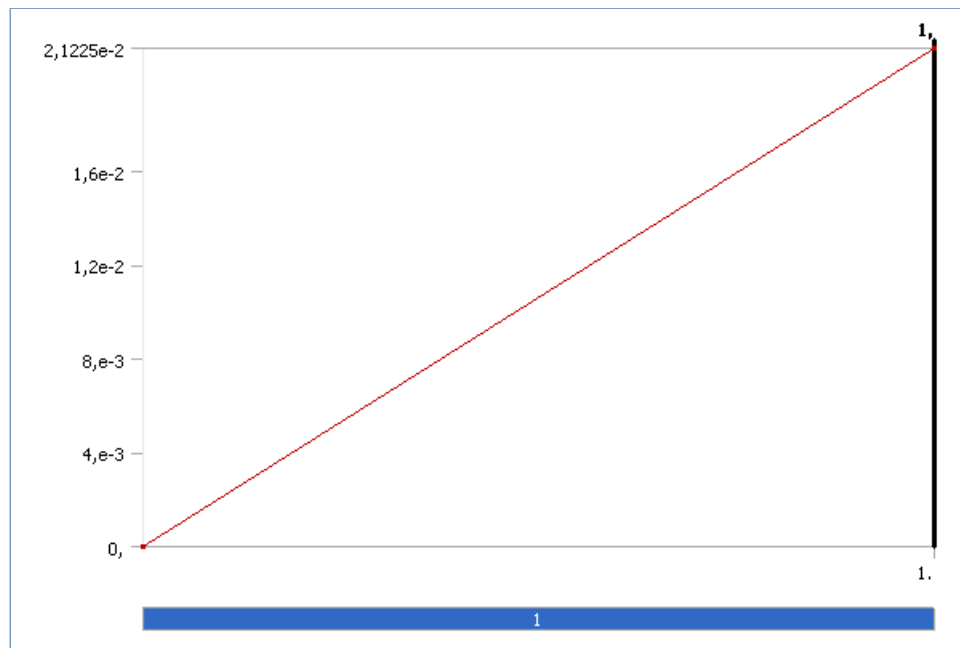


TABLE 33
E.L.Ultimos > PP + Hidrostatica > Loads

Object Name	Fixed Support	PP Agua	Hidrostática
State	Fully Defined		
Scope			
Scoping Method	Named Selection		
Named Selection	Apoyo Falso bastidor	Fondo	Hidrostatica
Definition			
Type	Fixed Support	Pressure	Hydrostatic Pressure
Suppressed	No		
Define By		Normal To	
Magnitude		2,1225e-002 MPa (ramped)	
Fluid Density			1,5e-009 kg/mm³
Hydrostatic Acceleration			
Define By			Vector
Magnitude			9810, mm/s²
Direction			Defined
Free Surface Location			
X Coordinate			-0,62317 mm
Y Coordinate			2976, mm
Z Coordinate			1609, mm
Location			Defined

FIGURE 2
E.L.Ultimos > PP + Hidrostatica > PP Agua



Solution

TABLE 34
E.L.Ultimos > PP + Hidrostatica > Solution

Object Name	<i>Solution</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1,
Refinement Depth	2,

TABLE 35
E.L.Ultimos > PP + Hidrostatica > Solution > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Update Interval	2,5 s
Display Points	All

TABLE 36
E.L.Ultimos > PP + Hidrostatica > Solution > Results

E.L. Ortinos > PP > Hidrostatica > Solution > Results				
Object Name	Equivalent (von-Mises) Stress - Tanque	Equivalent (von-Mises) Stress - falso bastido	Equivalent (von-Mises) Stress - Rompeolas	Equivalent (von-Mises) Stress - Durmientes
State	Solved			
Scope				
Geometry	3 Bodies	8 Bodies	2 Bodies	9 Bodies
Definition				
Type	Equivalent (von-Mises) Stress			
Display Time	End Time			
Results				
Minimum	8,7456e-003 MPa	9,4029e-003 MPa	7,4969e-002 MPa	3,0235e-002 MPa
Maximum	42,758 MPa	17,324 MPa	14,723 MPa	23,016 MPa
Minimum Occurs On	Tanque.asm:1,Superficie lateral.par:1	falso bastidor.asm:2,largueros.par:6	Tanque.asm:1,Rompeolas transversal.par:2	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:1
Maximum Occurs On	Tanque.asm:1,Superficie lateral.par:1	falso bastidor.asm:1,largueros.par:1	Tanque.asm:1,Rompeolas transversal.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1
Information				
Time	1, s			
Load Step	1			
Substep	1			
Iteration	1			

Number

FIGURE 3

E.L.Ultimos > PP + Hidrostatica > Solution > Equivalent (von-Mises) Stress - Tanque > Figure

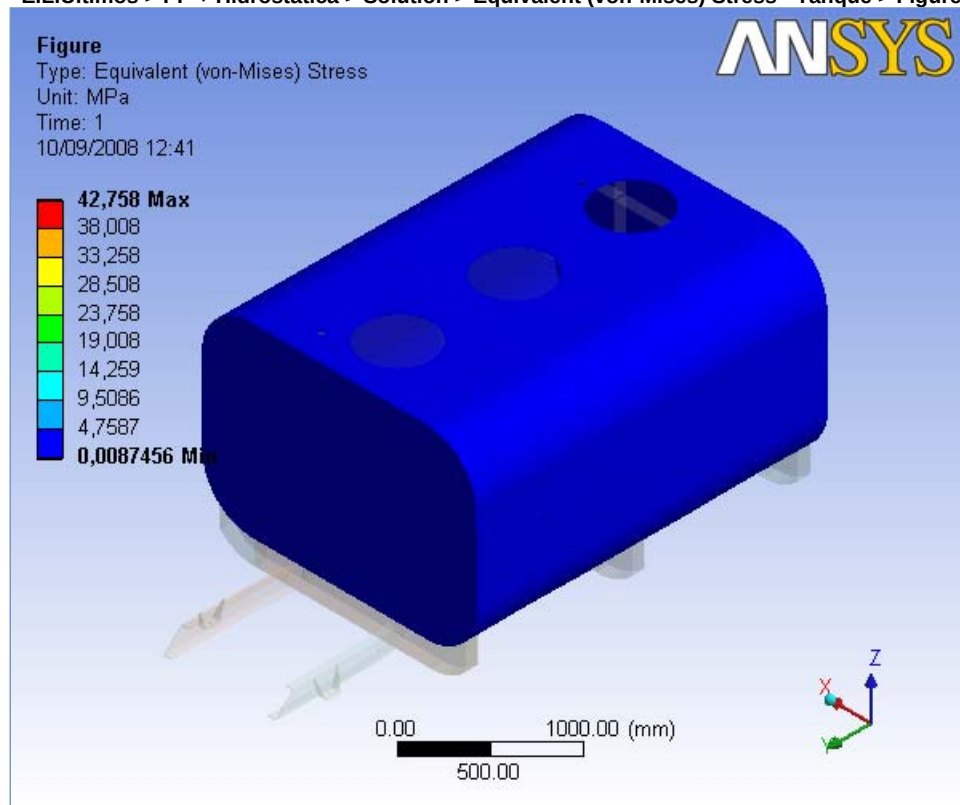


FIGURE 4

E.L.Ultimos > PP + Hidrostatica > Solution > Equivalent (von-Mises) Stress - Tanque > Image

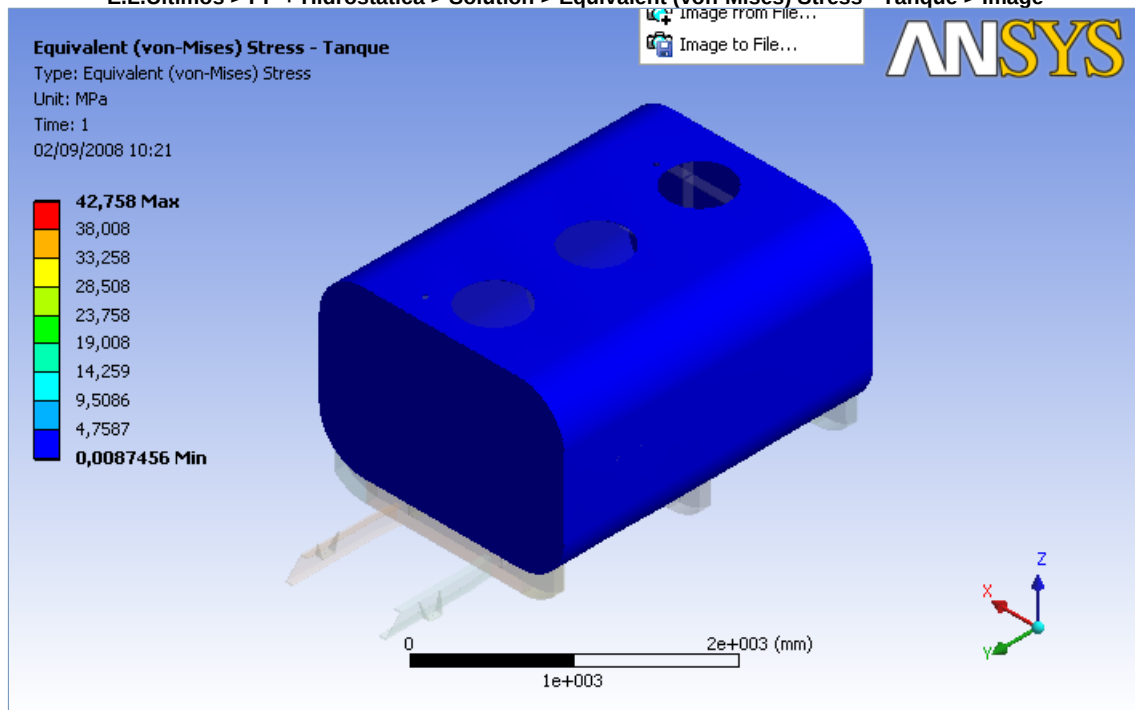


FIGURE 5

E.L.Ultimos > PP + Hidrostatica > Solution > Equivalent (von-Mises) Stress - Tanque > Figure 2

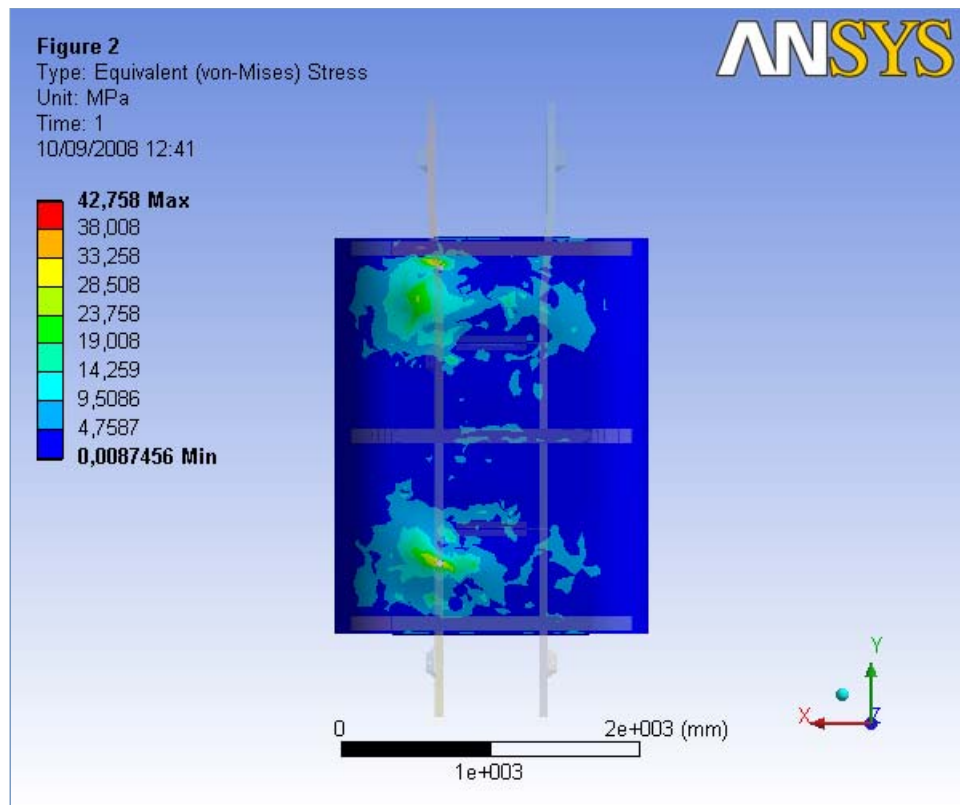


FIGURE 6

E.L.Ultimos > PP + Hidrostatica > Solution > Equivalent (von-Mises) Stress - Tanque > Image

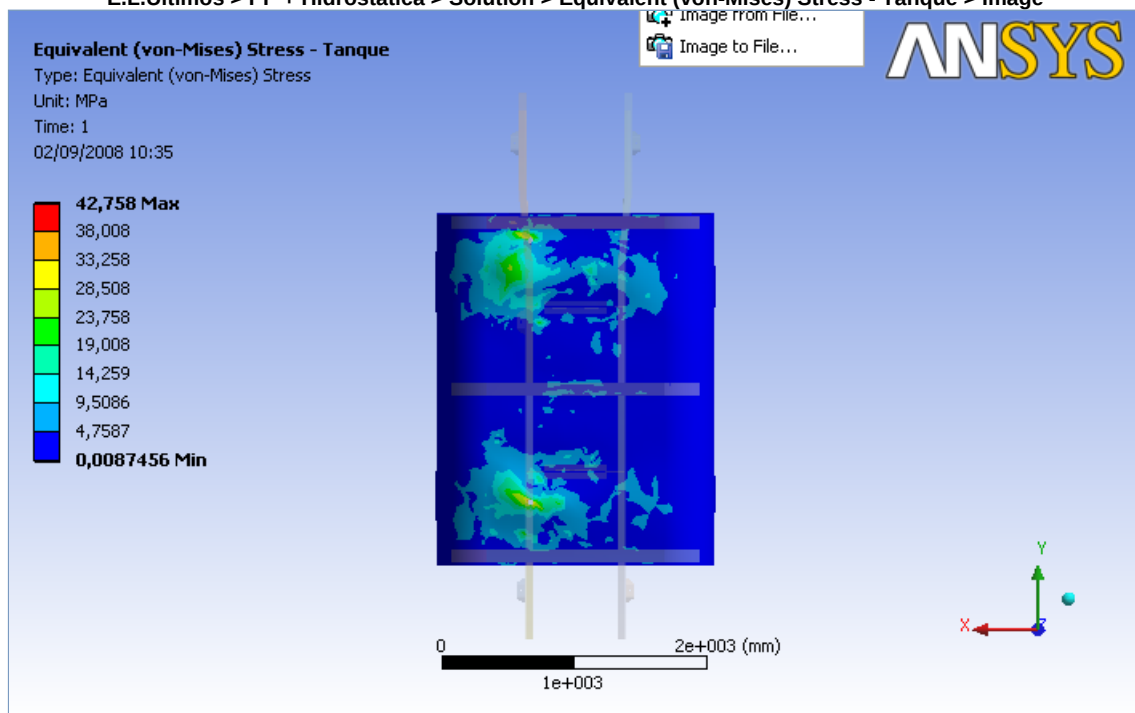


FIGURE 7

E.L.Ultimos > PP + Hidrostatica > Solution > Equivalent (von-Mises) Stress - falso bastido > Figure

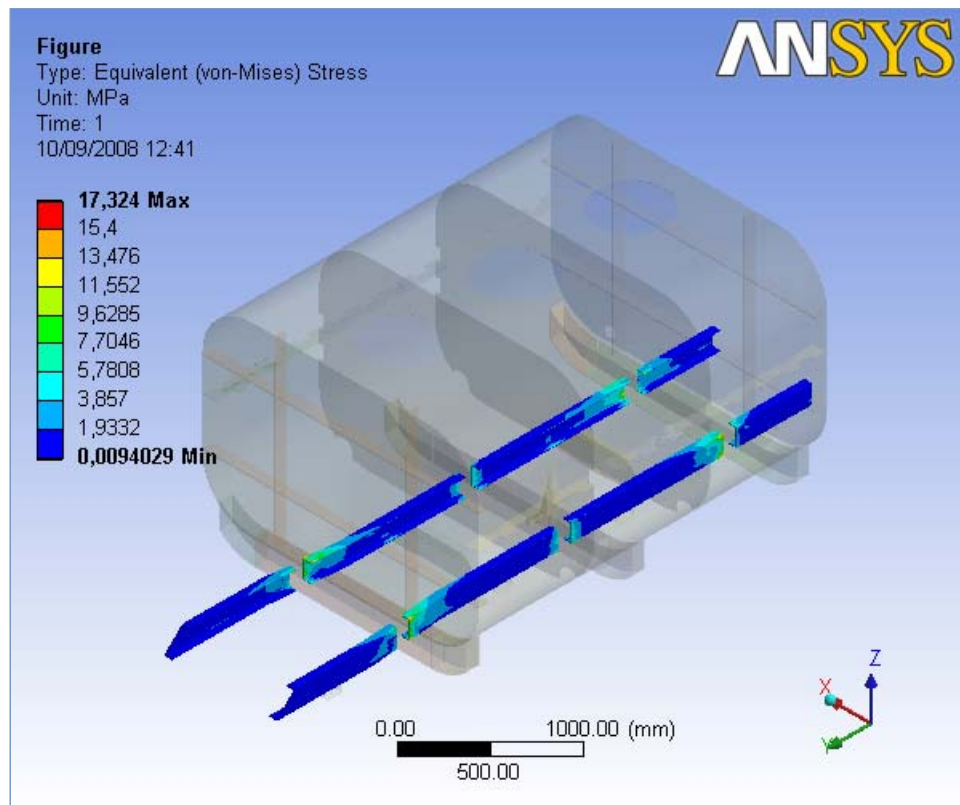


FIGURE 8

E.L.Ultimos > PP + Hidrostatica > Solution > Equivalent (von-Mises) Stress - falso bastido > Image

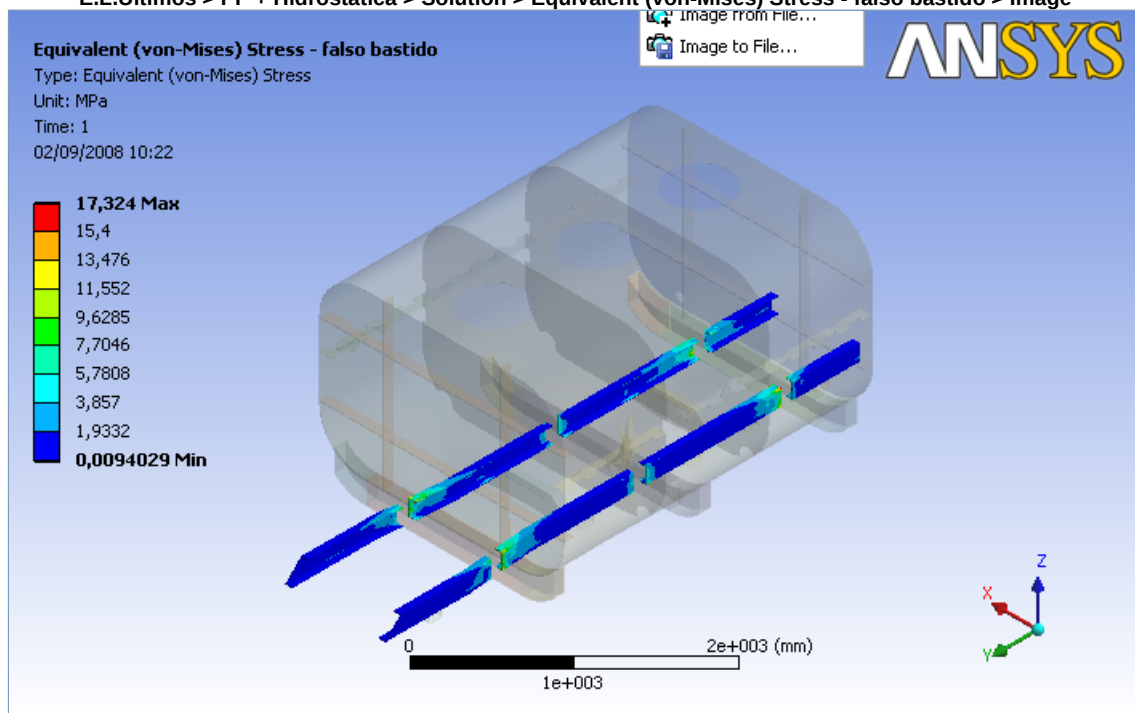


FIGURE 9

E.L.Ultimos > PP + Hidrostatica > Solution > Equivalent (von-Mises) Stress - Rompeolas > Figure

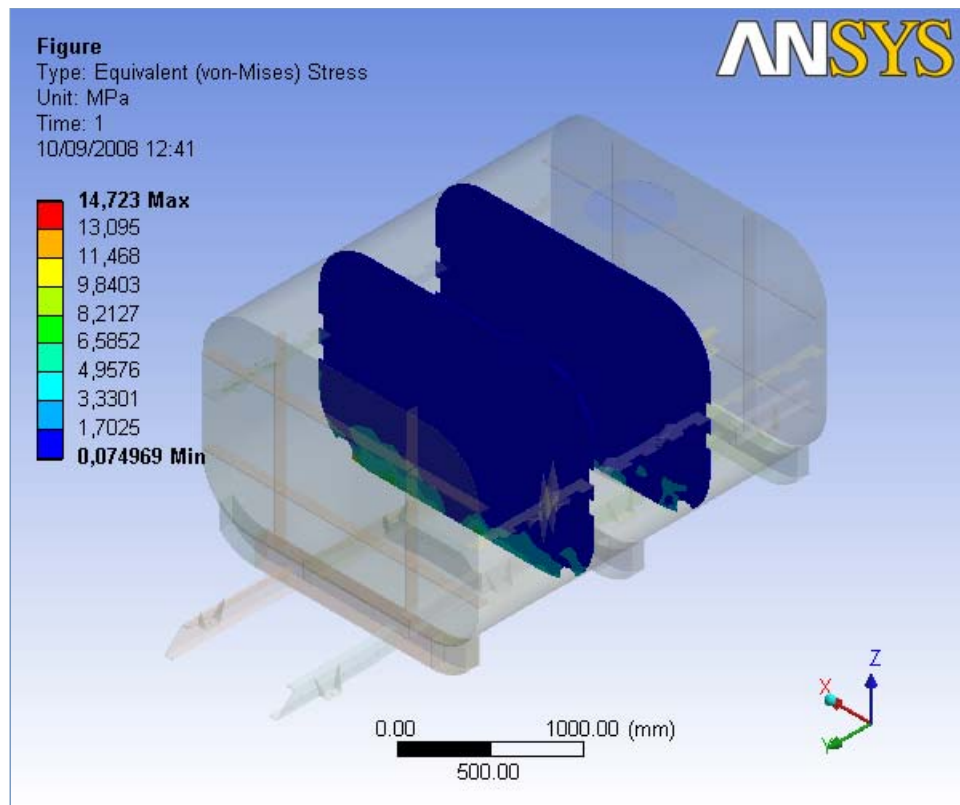


FIGURE 10

E.L.Ultimos > PP + Hidrostatica > Solution > Equivalent (von-Mises) Stress - Rompeolas > Image

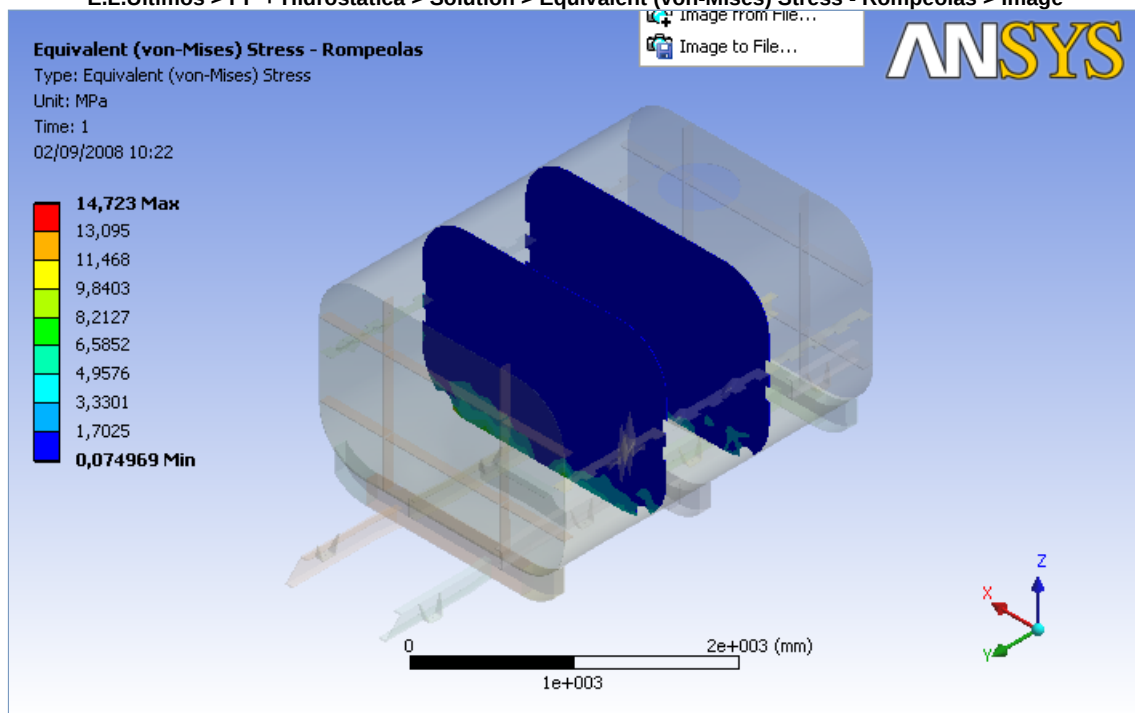


FIGURE 11

E.L.Ultimos > PP + Hidrostatica > Solution > Equivalent (von-Mises) Stress - Durmientes > Figure

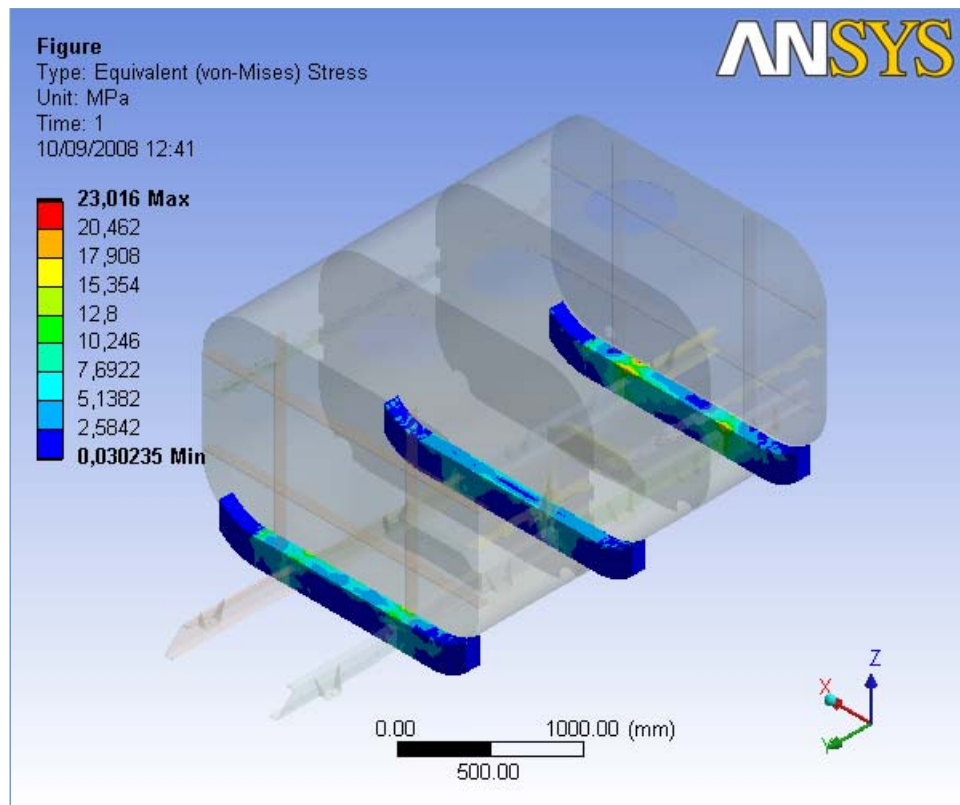
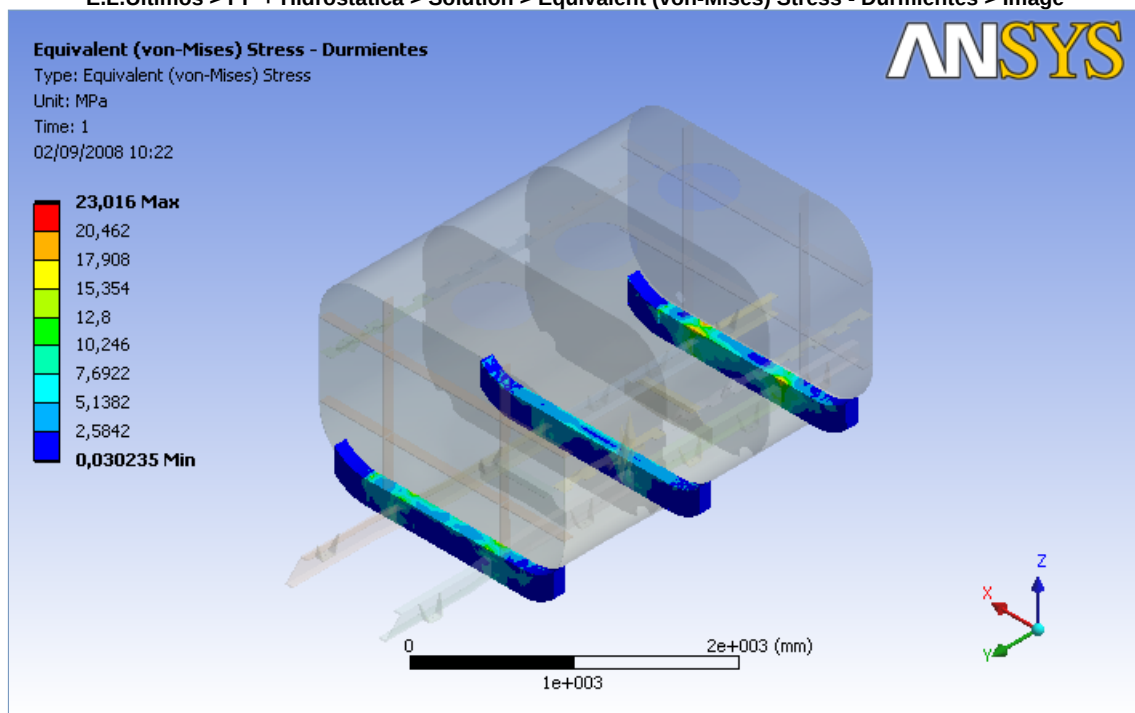


FIGURE 12

E.L.Ultimos > PP + Hidrostatica > Solution > Equivalent (von-Mises) Stress - Durmientes > Image



PP + Hidrostatica + Frenada

TABLE 37
E.L.Ultimos > Analysis

Object Name	PP + Hidrostatica + Frenada
State	Fully Defined
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Options	
Reference Temp	22, °C

TABLE 38
E.L.Ultimos > PP + Hidrostatica + Frenada > Analysis Settings

Object Name	<i>Analysis Settings</i>
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	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Nonlinear Controls	
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Output Controls	
Calculate Stress	Yes
Calculate Strain	Yes
Calculate Results At	All Time Points
Analysis Data Management	
Solver Files Directory	C:\Antonio\PFC APEREA\CRB ACERO\DATOS\Analisis Workbench 4\CRB8000I Simulation Files\PP + Hidrostatica + Frenada\
Future Analysis	None
Save ANSYS db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No

TABLE 39
E.L.Ultimos > PP + Hidrostatica + Frenada > Accelerations

Object Name	<i>Standard Earth Gravity</i>
State	Fully Defined
Scope	
Geometry	All Bodies
Definition	
X Component	0, mm/s ² (ramped)
Y Component	0, mm/s ² (ramped)
Z Component	-9806,6 mm/s ² (ramped)
Suppressed	No
Direction	-Z Direction

FIGURE 13
E.L.Ultimos > PP + Hidrostatica + Frenada > Standard Earth Gravity

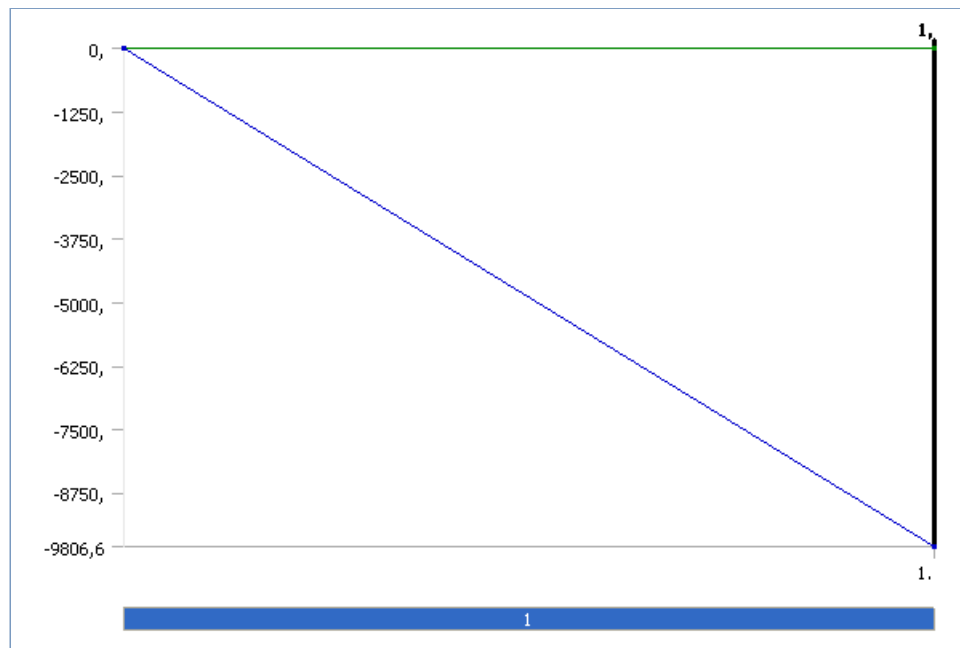


TABLE 40
E.L.Ultimos > PP + Hidrostatica + Frenada > Loads

Object Name	Fixed Support	PP Agua	Hidrostatica	Frenada
State	Fully Defined			
Scope				
Scoping Method	Named Selection			
Named Selection	Apoyo Falso bastidor	Fondo	Hidrostatica	Frenada
Definition				
Type	Fixed Support	Pressure	Hydrostatic Pressure	Pressure
Suppressed	No			
Define By		Normal To		Normal To
Magnitude		2,1225e-002 MPa (ramped)		1,1696e-003 MPa (ramped)
Fluid Density			1,5e-009 kg/mm³	
Hydrostatic Acceleration				
Define By			Vector	
Magnitude			9810, mm/s²	
Direction			Defined	
Free Surface Location				
X Coordinate			-0,62317 mm	
Y Coordinate			2976, mm	
Z Coordinate			1609, mm	
Location			Defined	

FIGURE 14
E.L.Ultimos > PP + Hidrostatica + Frenada > PP Agua

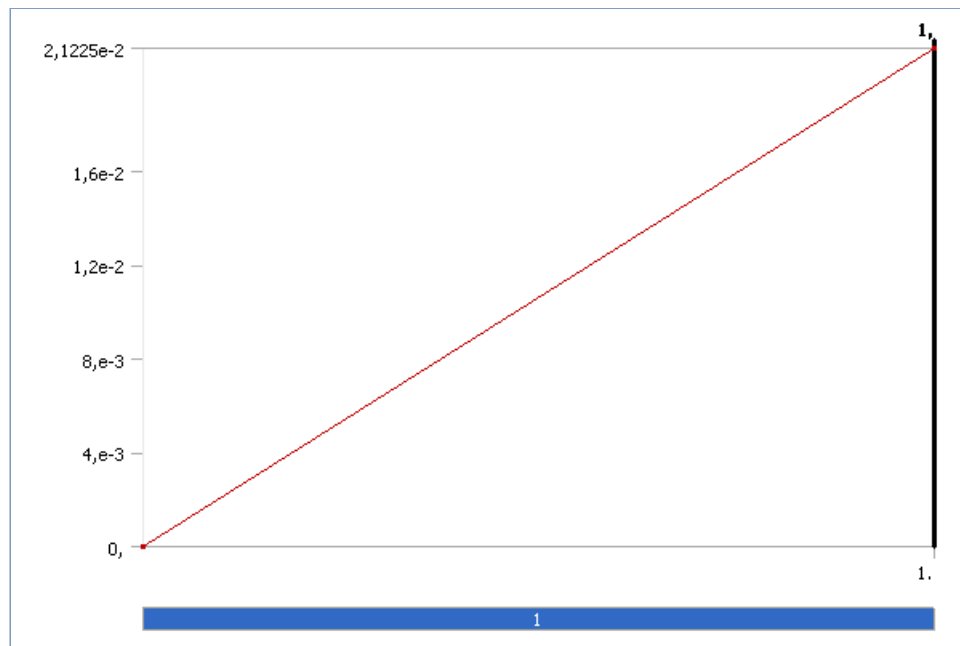
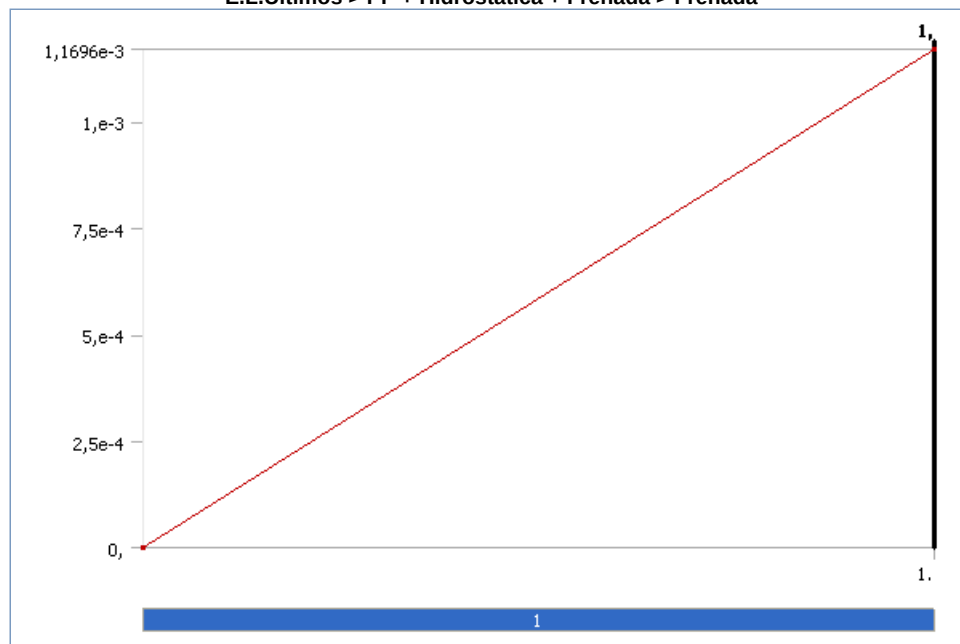


FIGURE 15
E.L.Ultimos > PP + Hidrostatica + Frenada > Frenada



Solution

TABLE 41
E.L.Ultimos > PP + Hidrostatica + Frenada > Solution

Object Name	<i>Solution</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1,
Refinement Depth	2,

TABLE 42
E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Update Interval	2,5 s
Display Points	All

TABLE 43
E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Results

E.L.Ordinos > PP > Hidrostatica > Frenada > Solution > Results				
Object Name	Equivalent (von-Mises) Stress - Tanque	Equivalent (von-Mises) Stress - falso bastido	Equivalent (von-Mises) Stress - Rompeolas	Equivalent (von-Mises) Stress - Durmientes
State	Solved			
Scope				
Geometry	3 Bodies	8 Bodies	2 Bodies	9 Bodies
Definition				
Type	Equivalent (von-Mises) Stress			
Display Time	End Time			
Results				
Minimum	4,9723e-002 MPa	9,3782e-003 MPa	0,2023 MPa	2,4216e-002 MPa
Maximum	43,25 MPa	20,872 MPa	69, MPa	26,505 MPa
Minimum Occurs On	Tanque.asm:1,Superficie lateral.par:1	falso bastidor.asm:2,largueros.par:6	Tanque.asm:1,Rompeolas transversal.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:2
Maximum Occurs On	Tanque.asm:1,Superficie lateral.par:1	falso bastidor.asm:1,largueros.par:1	Tanque.asm:1,Rompeolas transversal.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1
Information				
Time	1, s			
Load Step	1			
Substep	1			
Iteration Number	1			

FIGURE 16

E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Stress - Tanque > Figure

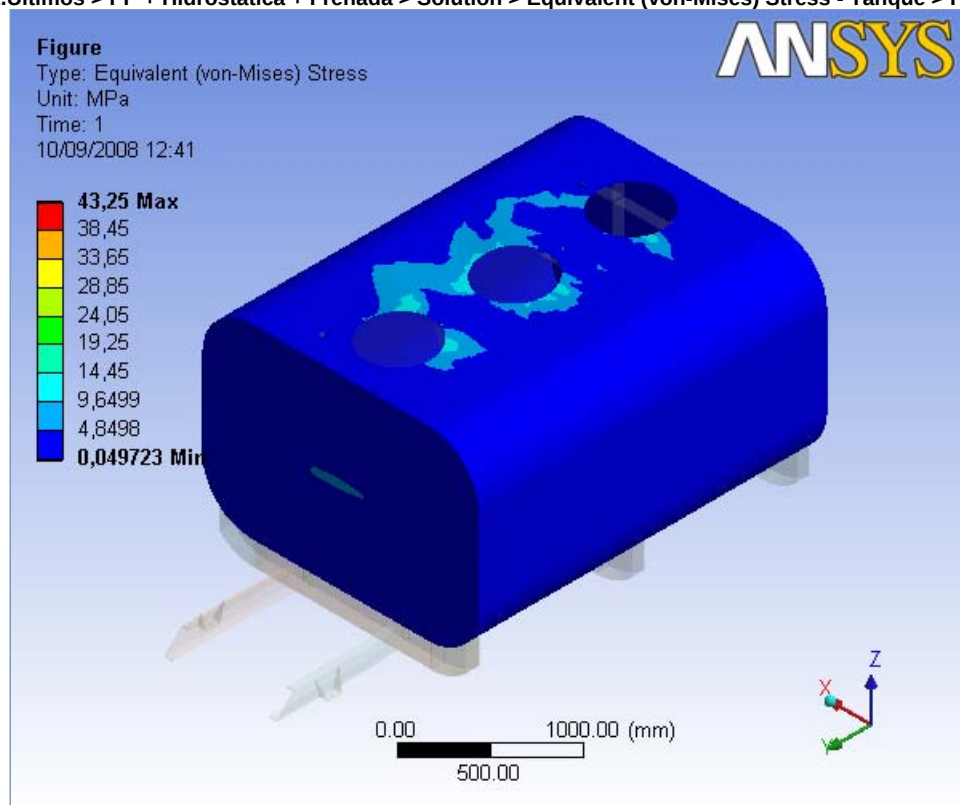


FIGURE 17

E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Stress - Tanque > Image

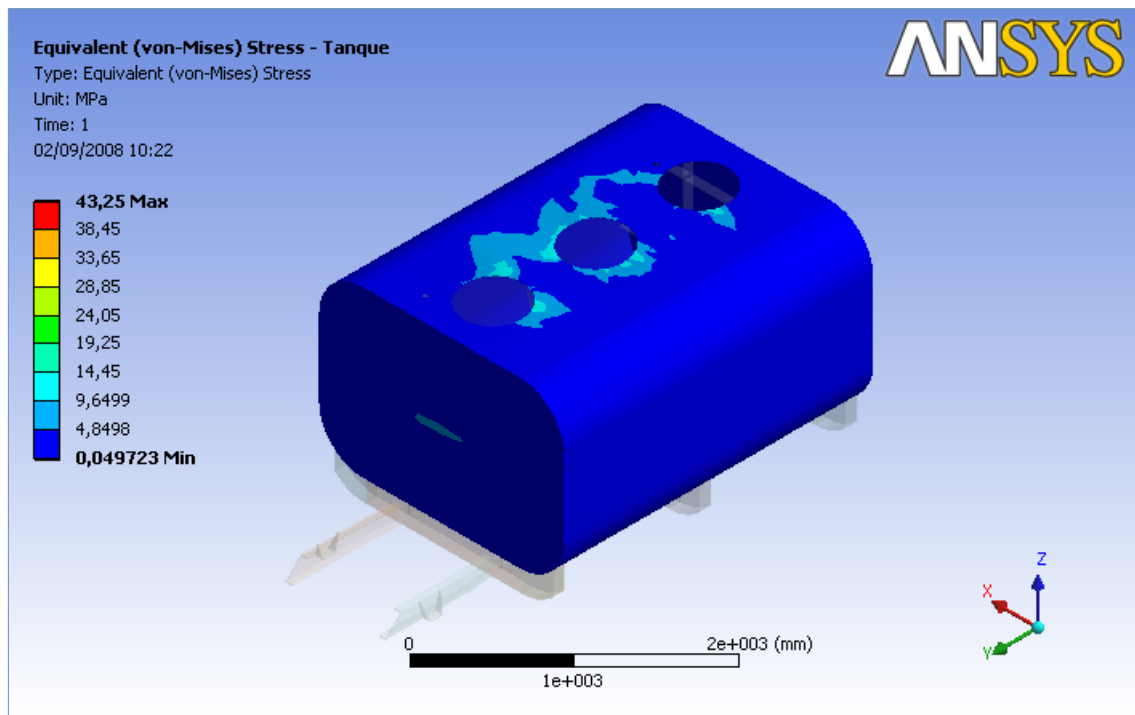


FIGURE 18

E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Stress - Tanque > Figure 2

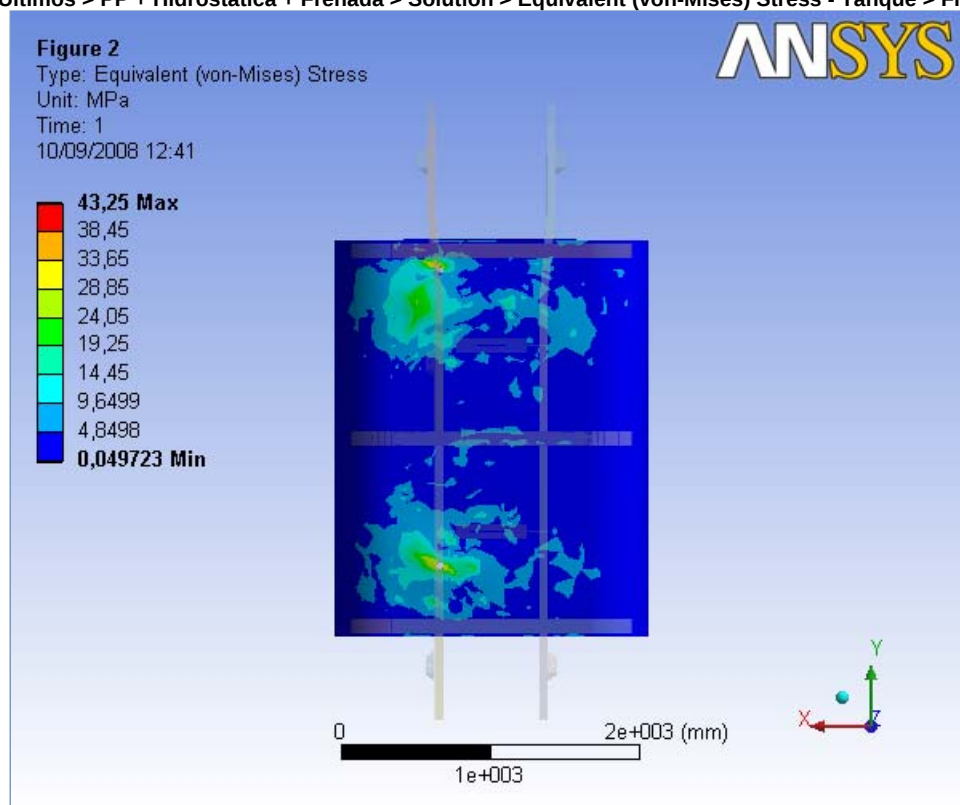


FIGURE 19

E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Stress - Tanque > Image

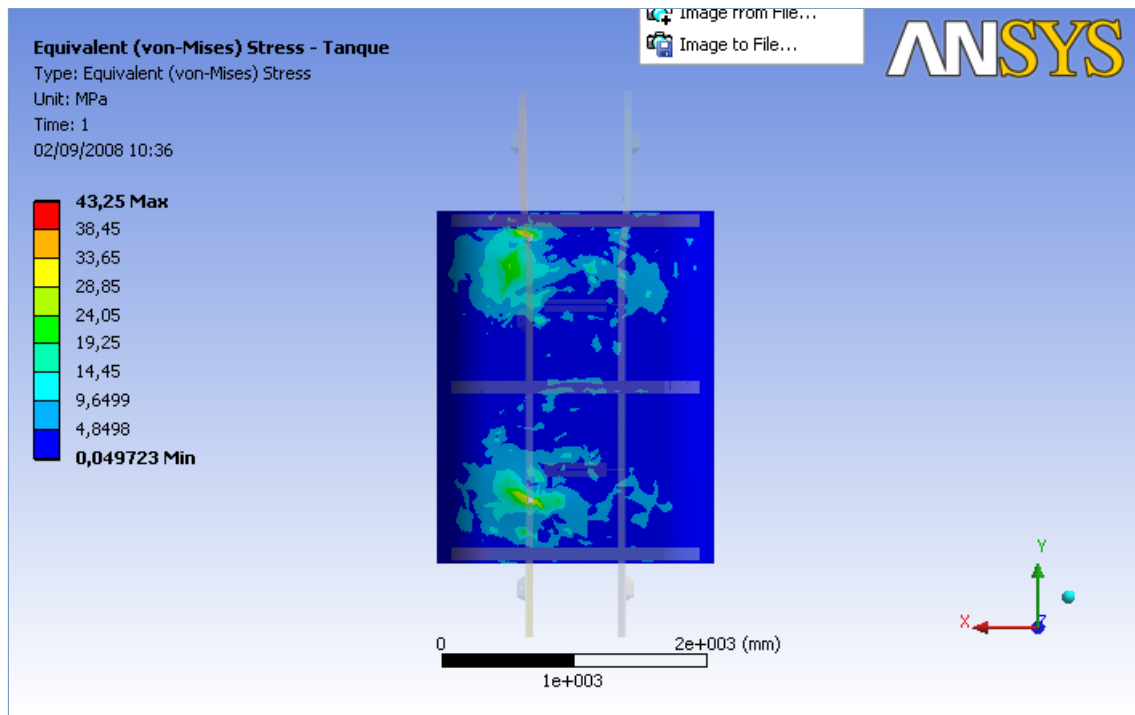


FIGURE 20

E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Stress - falso bastido > Figure

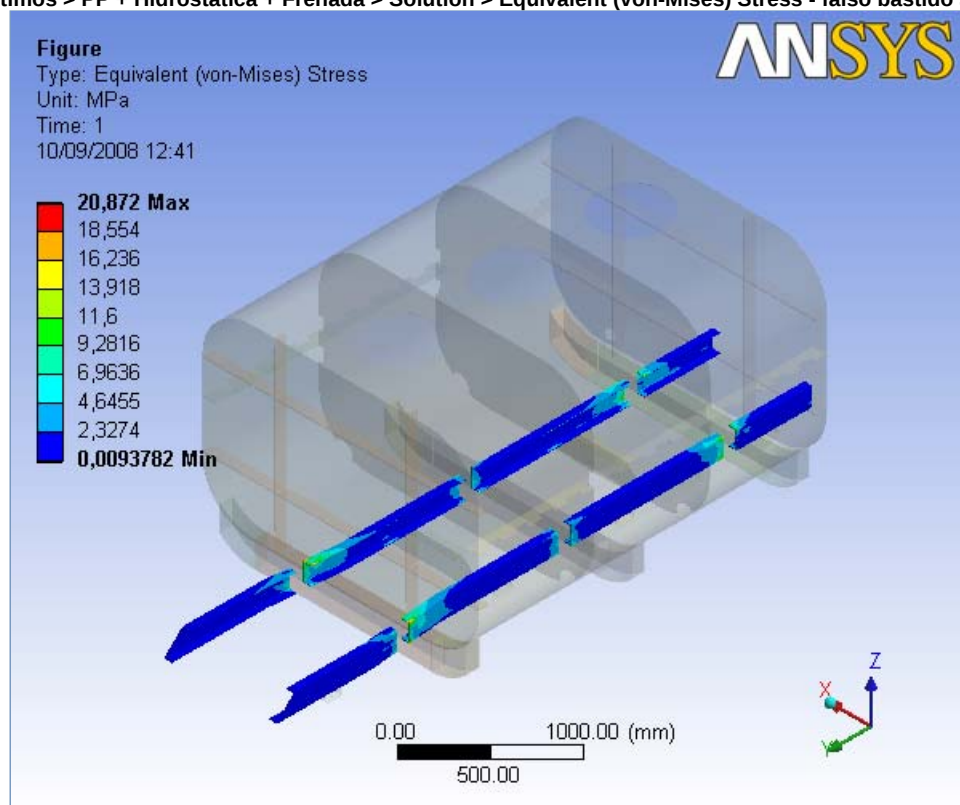


FIGURE 21

E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Stress - falso bastido > Image

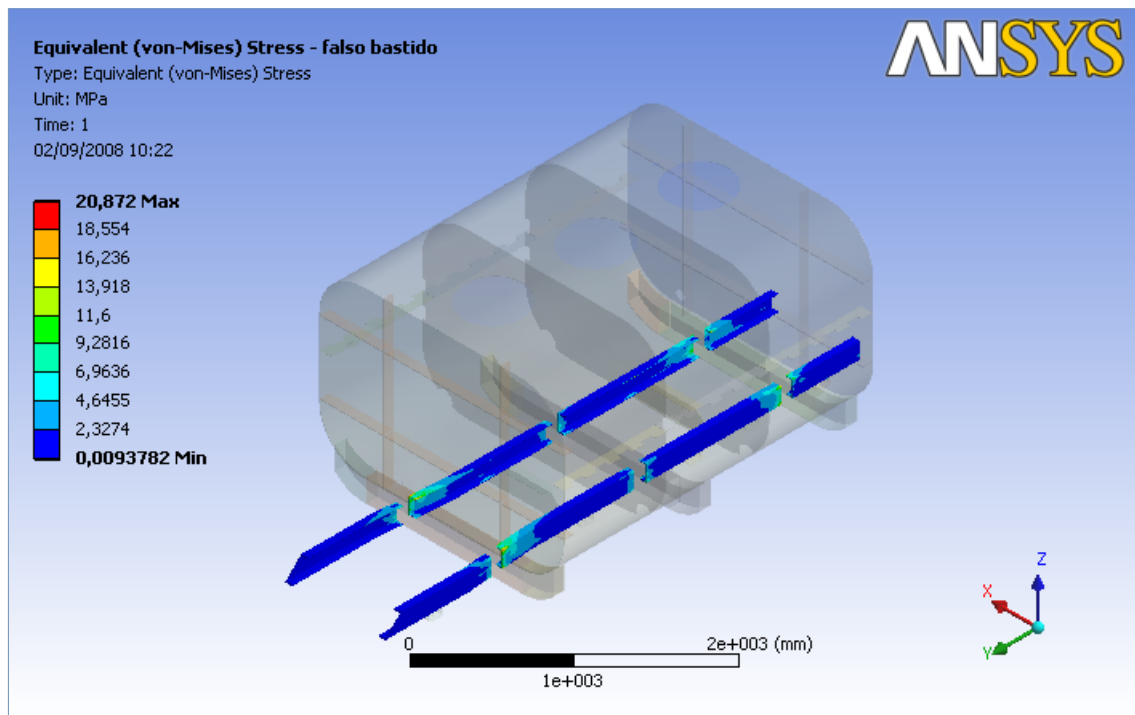


FIGURE 22

E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Stress - Rompeolas > Figure

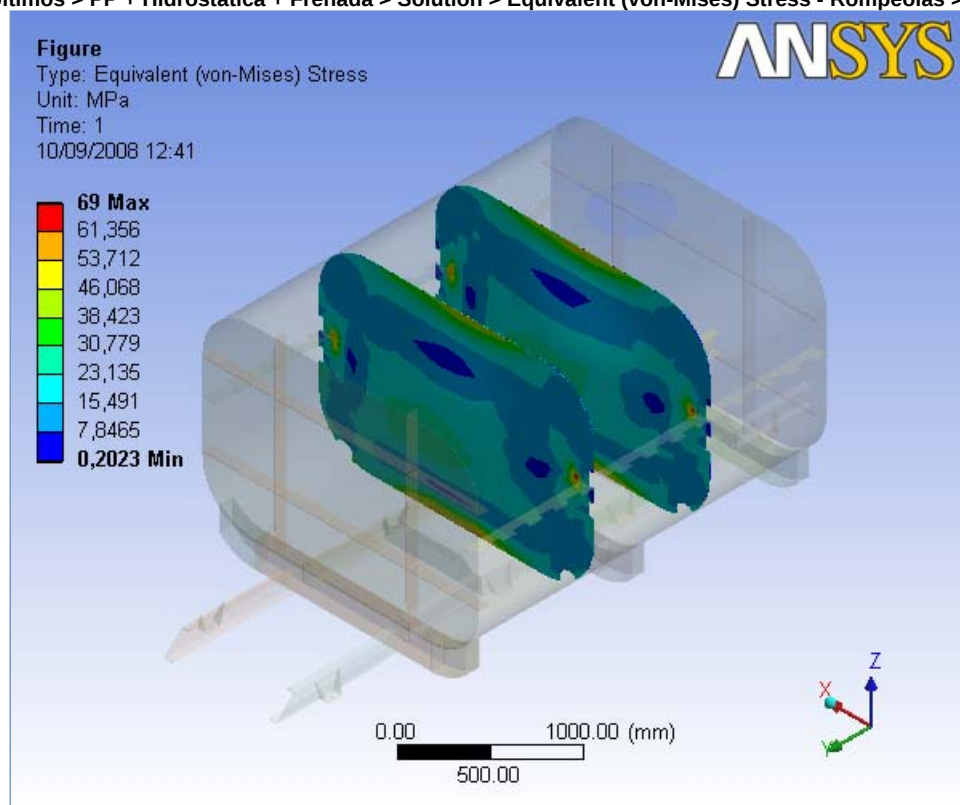


FIGURE 23

E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Stress - Rompeolas > Image

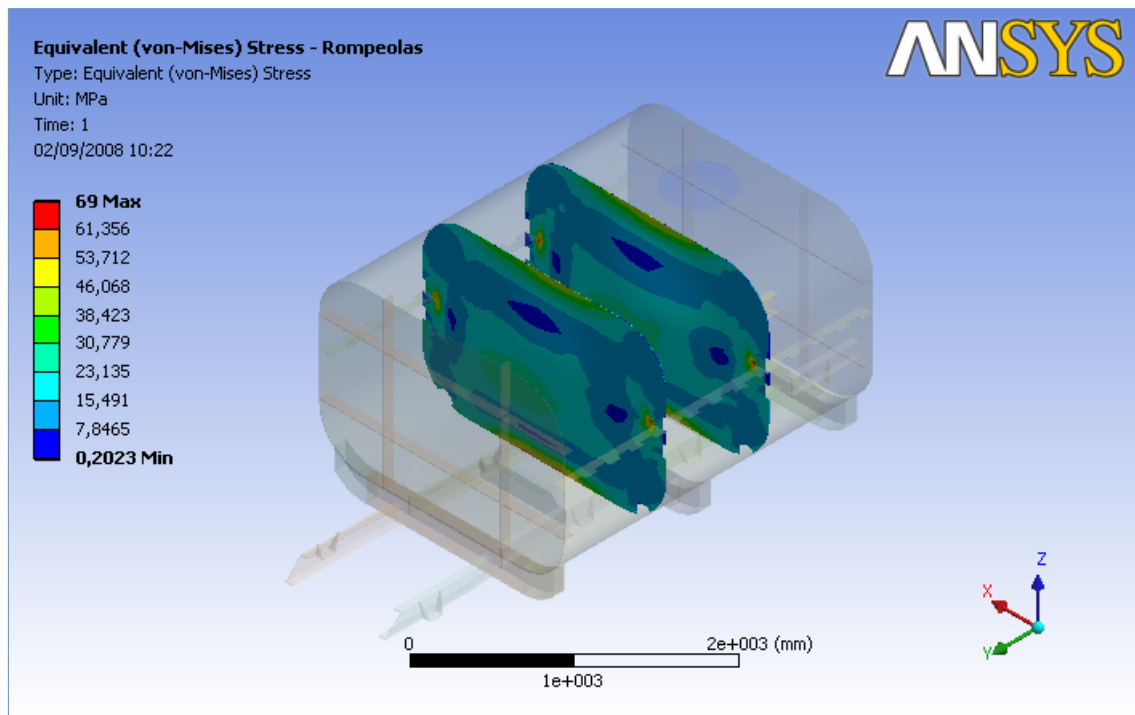


FIGURE 24

E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Stress - Durmientes > Figure

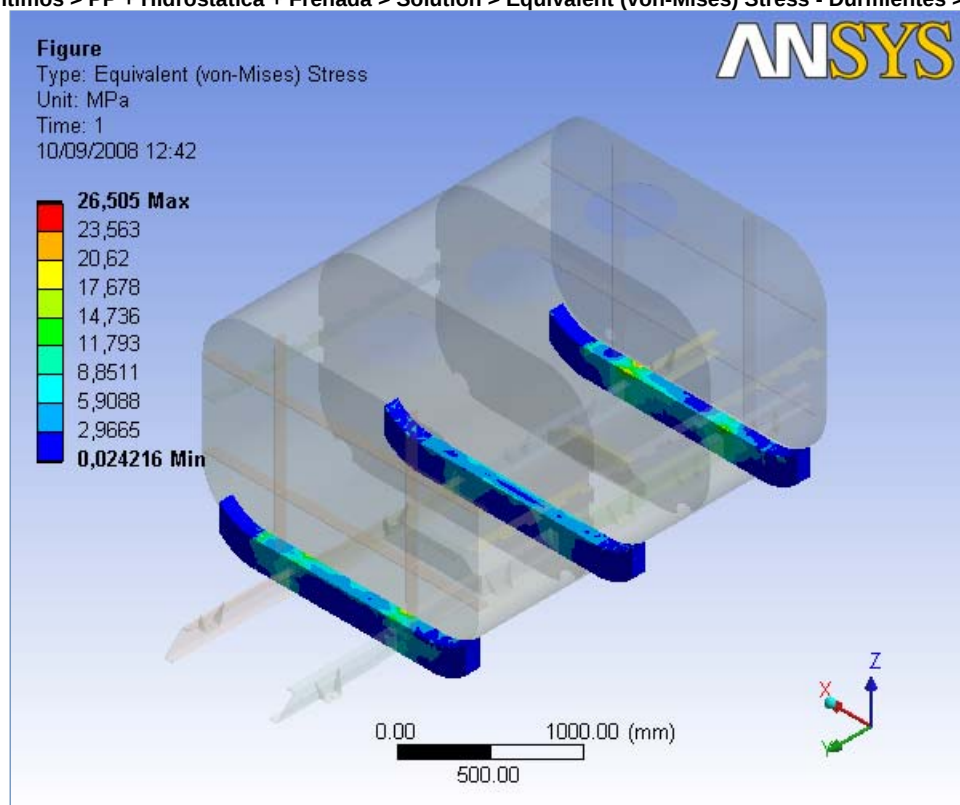
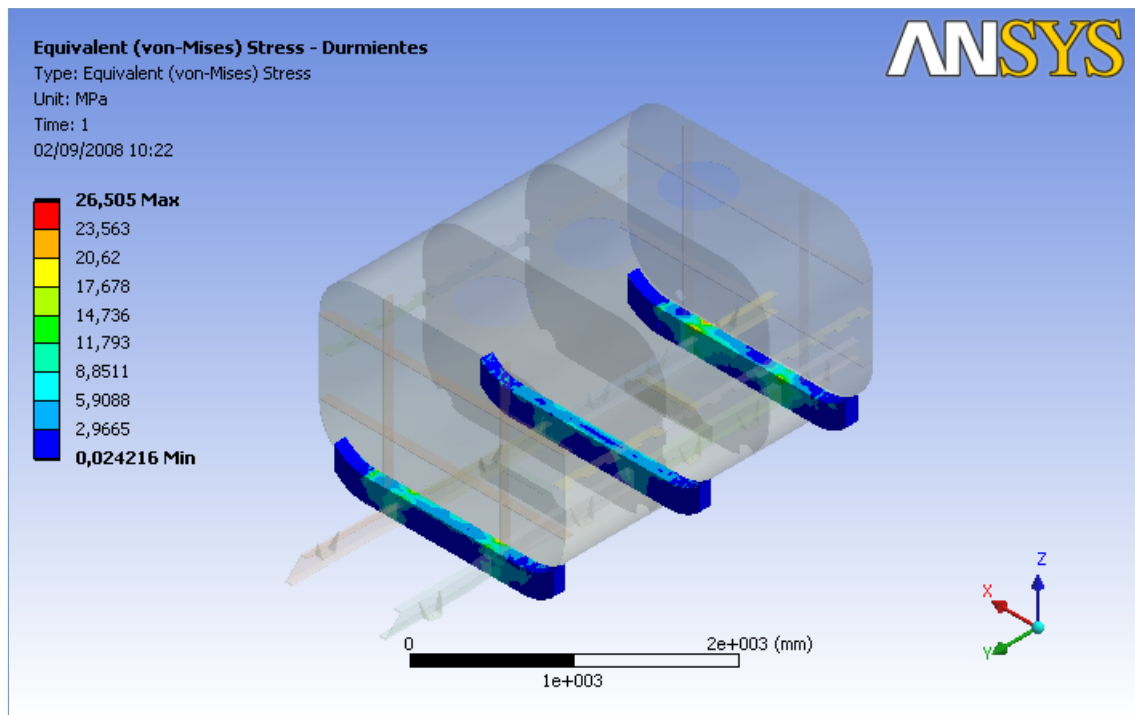


FIGURE 25

E.L.Ultimos > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Stress - Durmientes > Image



PP + Hidrostatica + Curva

TABLE 44
E.L.Ultimos > Analysis

Object Name	PP + Hidrostatica + Curva
State	Fully Defined
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Options	
Reference Temp	22, °C

TABLE 45
E.L.Ultimos > PP + Hidrostatica + Curva > 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	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Nonlinear Controls	
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Output Controls	
Calculate Stress	Yes
Calculate Strain	Yes
Calculate Results At	All Time Points
Analysis Data Management	
Solver Files Directory	C:\Antonio\PFC APEREA\CRB ACERO\DATOS\Analisis Workbench 4\CRB8000I Simulation Files\PP + Hidrostatica + Curva\
Future Analysis	None
Save ANSYS db	No

Delete Unneeded Files	Yes
Nonlinear Solution	No

TABLE 46
E.L.Ultimos > PP + Hidrostatica + Curva > Accelerations

Object Name	Standard Earth Gravity
State	Fully Defined
Scope	
Geometry	All Bodies
Definition	
X Component	0, mm/s ² (ramped)
Y Component	0, mm/s ² (ramped)
Z Component	-9806,6 mm/s ² (ramped)
Suppressed	No
Direction	-Z Direction

FIGURE 26
E.L.Ultimos > PP + Hidrostatica + Curva > Standard Earth Gravity

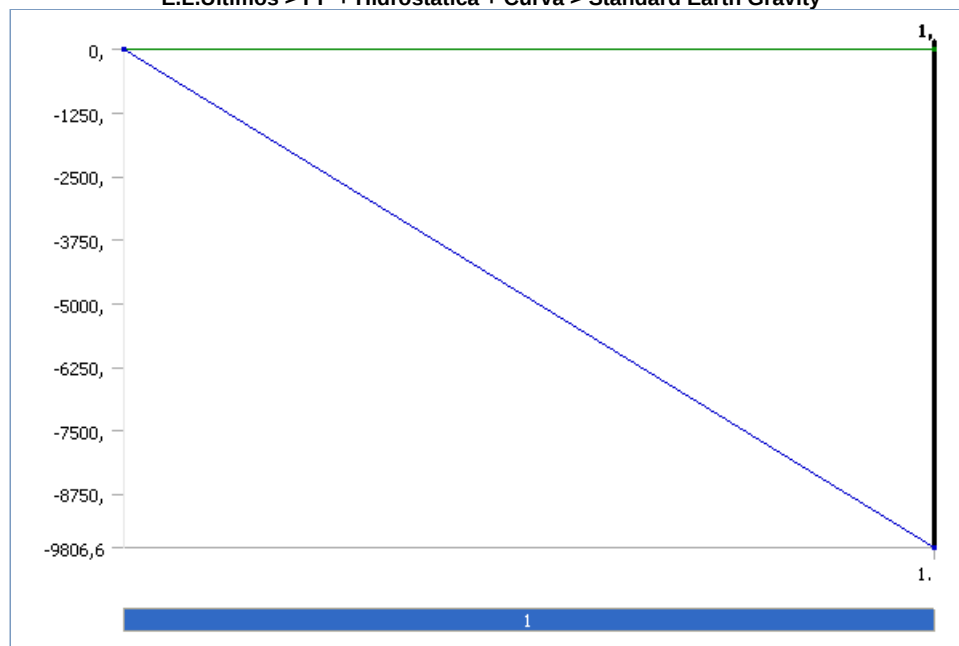


TABLE 47
E.L.Ultimos > PP + Hidrostatica + Curva > Loads

Object Name	Fixed Support	PP Agua	Hidrostática	Curva
State	Fully Defined			
Scope				
Scoping Method	Named Selection			
Named Selection	Apoyo Falso bastidor	Fondo	Hidrostatica	Curva
Definition				
Type	Fixed Support	Pressure	Hydrostatic Pressure	Pressure
Suppressed	No			
Define By		Normal To		Normal To
Magnitude		2,1225e-002 MPa (ramped)		5,3763e-003 MPa (ramped)
Fluid Density			1,5e-009 kg/mm³	
Hydrostatic Acceleration				
Define By			Vector	
Magnitude			9810, mm/s²	
Direction			Defined	
Free Surface Location				
X Coordinate			-0,62317 mm	
Y Coordinate			2976, mm	
Z Coordinate			1609, mm	
Location			Defined	

FIGURE 27
E.L.Ultimos > PP + Hidrostatica + Curva > PP Agua

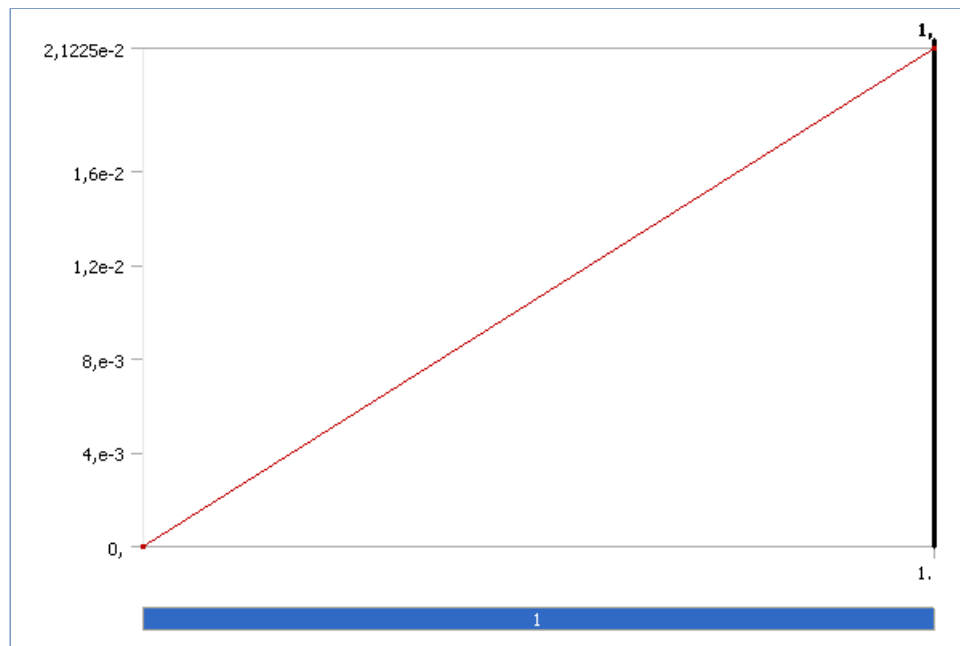
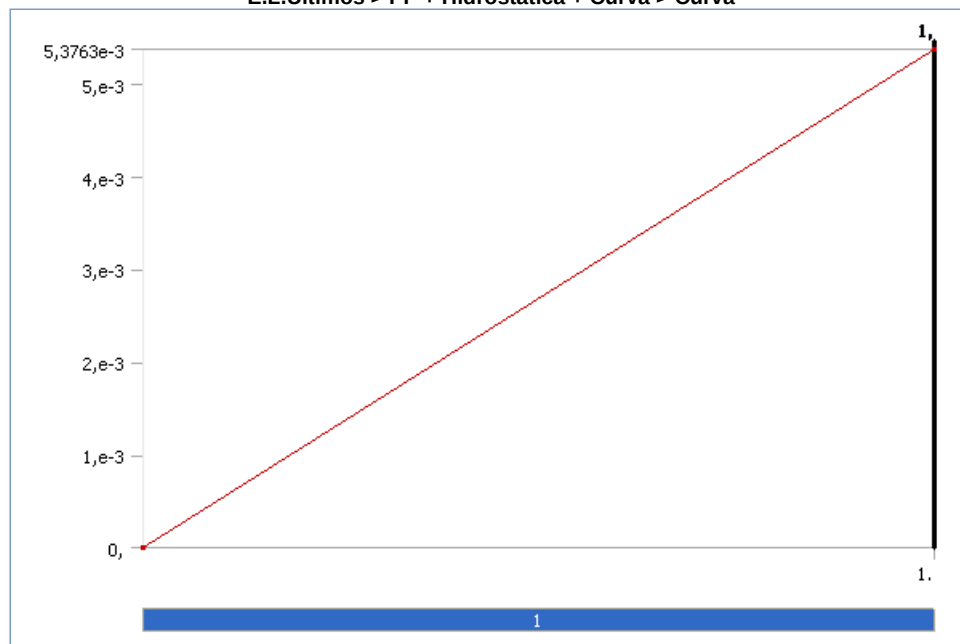


FIGURE 28
E.L.Ultimos > PP + Hidrostatica + Curva > Curva



Solution

TABLE 48
E.L.Ultimos > PP + Hidrostatica + Curva > Solution

Object Name	<i>Solution</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1,
Refinement Depth	2,

TABLE 49
E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Update Interval	2,5 s
Display Points	All

TABLE 50
E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Results

Object Name	Equivalent (von-Mises) Stress - Tanque	Equivalent (von-Mises) Stress - falso bastido	Equivalent (von-Mises) Stress - Rompeolas	Equivalent (von-Mises) Stress - Durmientes
State	Solved			
Scope				
Geometry	3 Bodies	8 Bodies	2 Bodies	9 Bodies
Definition				
Type	Equivalent (von-Mises) Stress			
Display Time	End Time			
Results				
Minimum	1,5431e-002 MPa	9,6254e-003 MPa	2,8561e-002 MPa	9,7654e-003 MPa
Maximum	42,138 MPa	20,665 MPa	15,652 MPa	25,446 MPa
Minimum Occurs On	Tanque.asm:1,Superficie lateral.par:1	falso bastidor.asm:2,largueros.par:8	Tanque.asm:1,Rompeolas transversal.par:2	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:2
Maximum Occurs On	Tanque.asm:1,Superficie lateral.par:1	falso bastidor.asm:1,largueros.par:1	Tanque.asm:1,Rompeolas transversal.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1
Information				
Time	1, s			
Load Step	1			
Substep	1			
Iteration Number	1			

FIGURE 29

E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Stress - Tanque > Figure

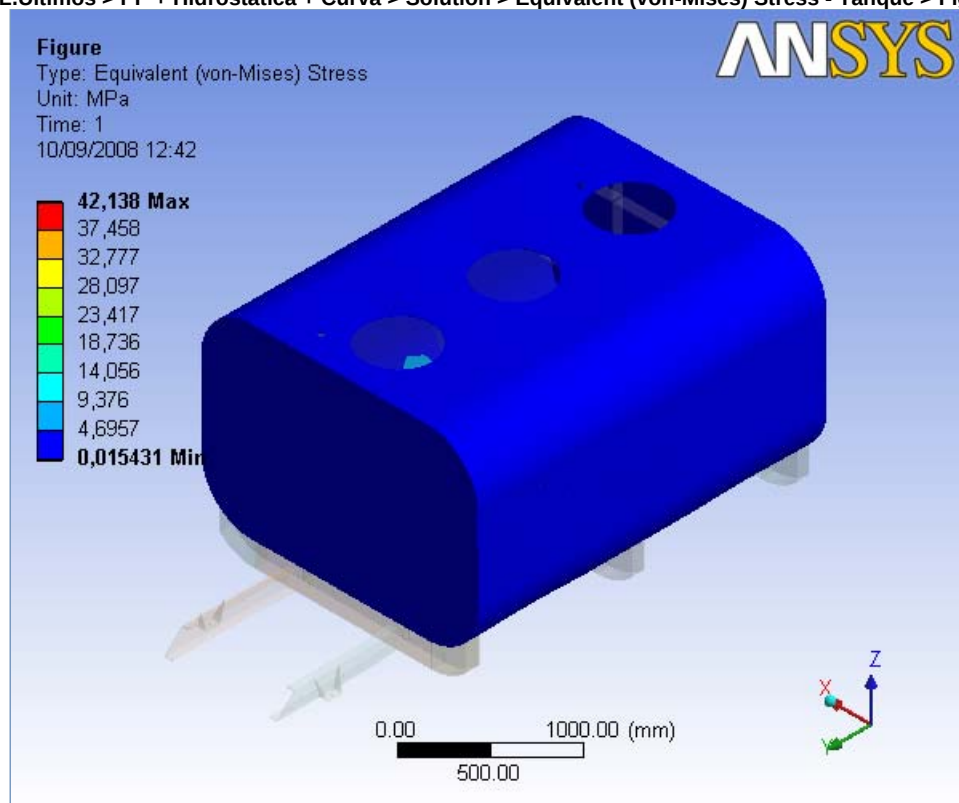


FIGURE 30

E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Stress - Tanque > Image

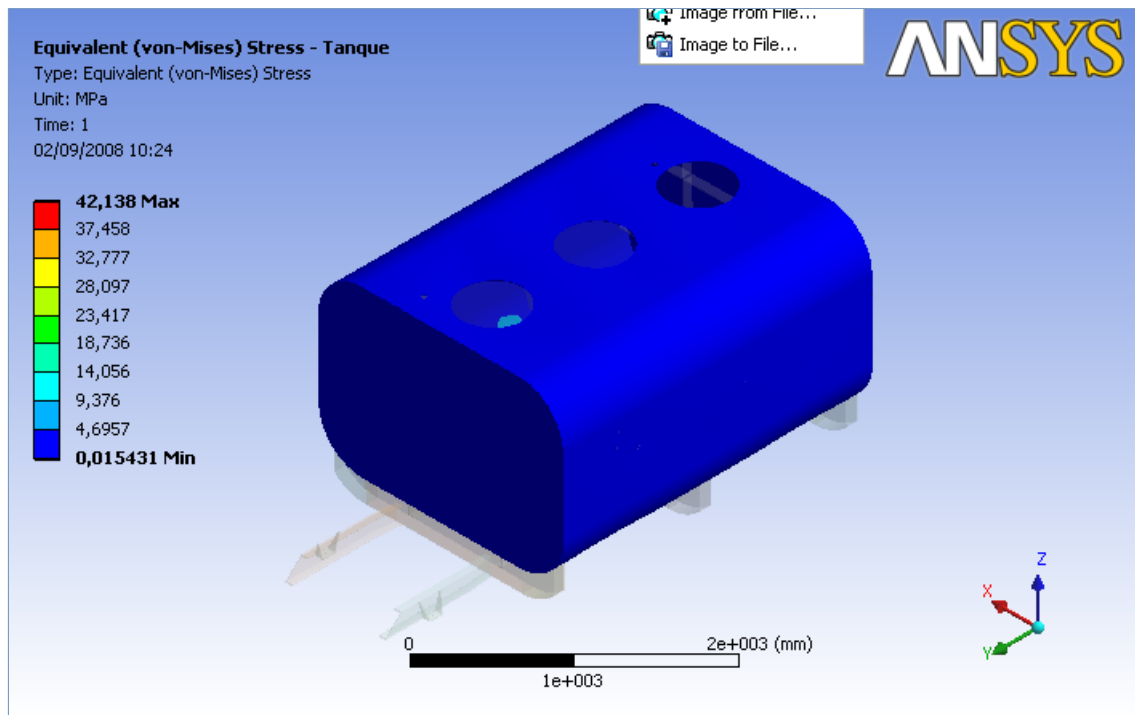


FIGURE 31

E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Stress - Tanque > Figure 2

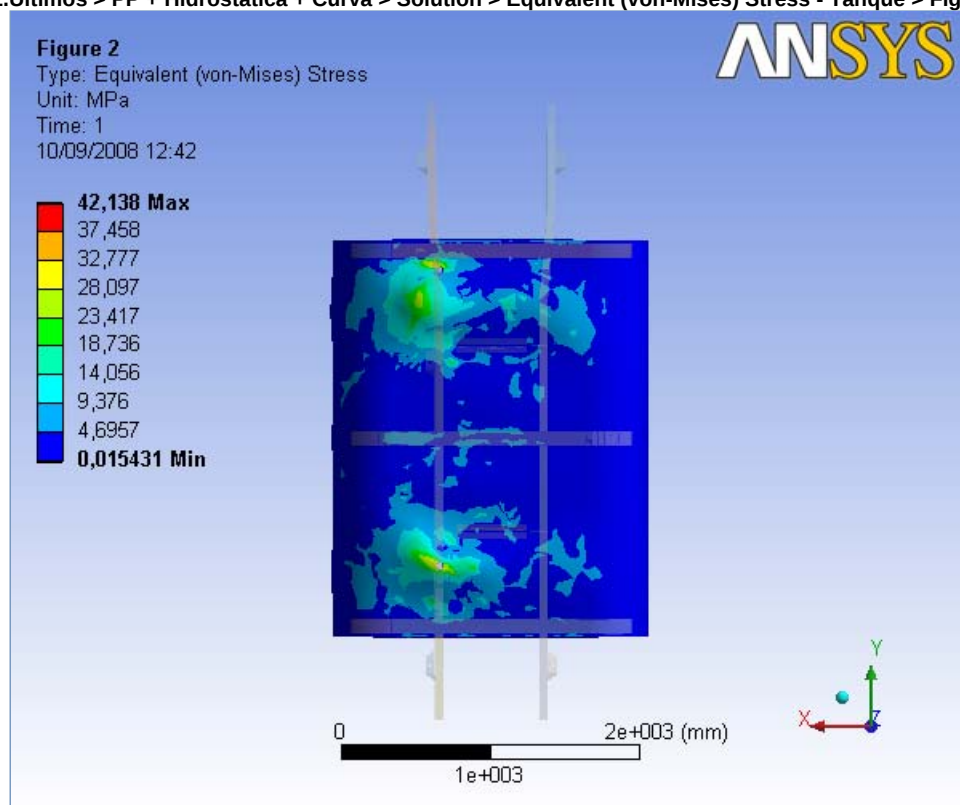


FIGURE 32

E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Stress - Tanque > Image

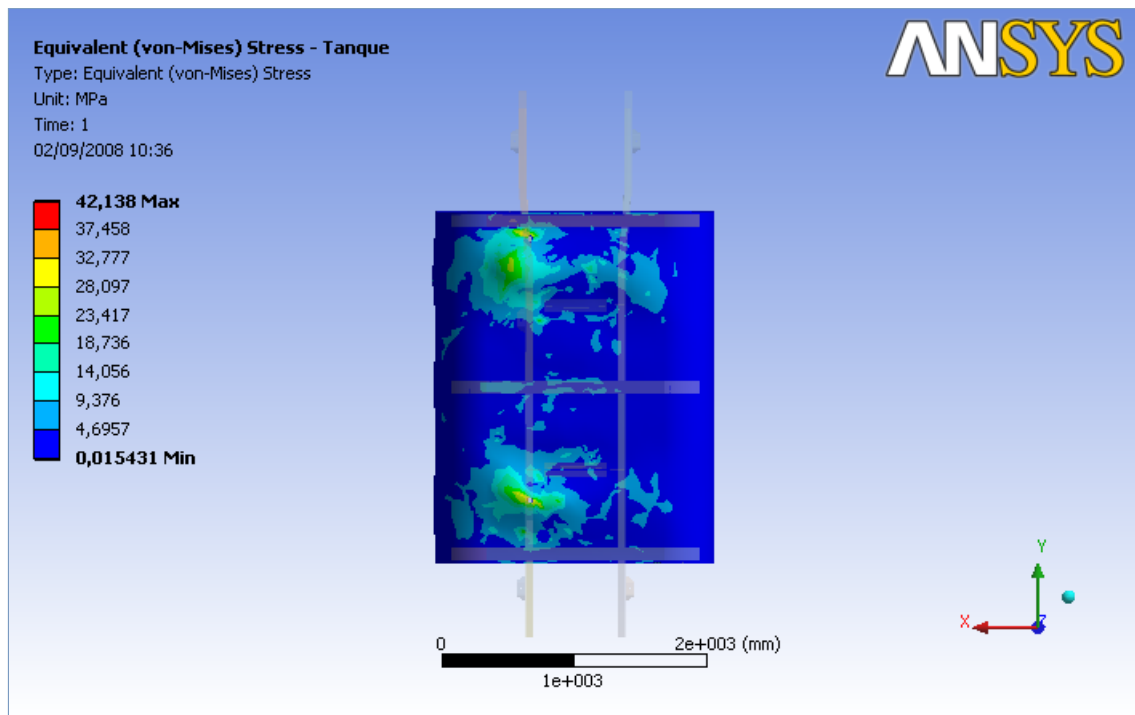


FIGURE 33

E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Stress - falso bastido > Figure

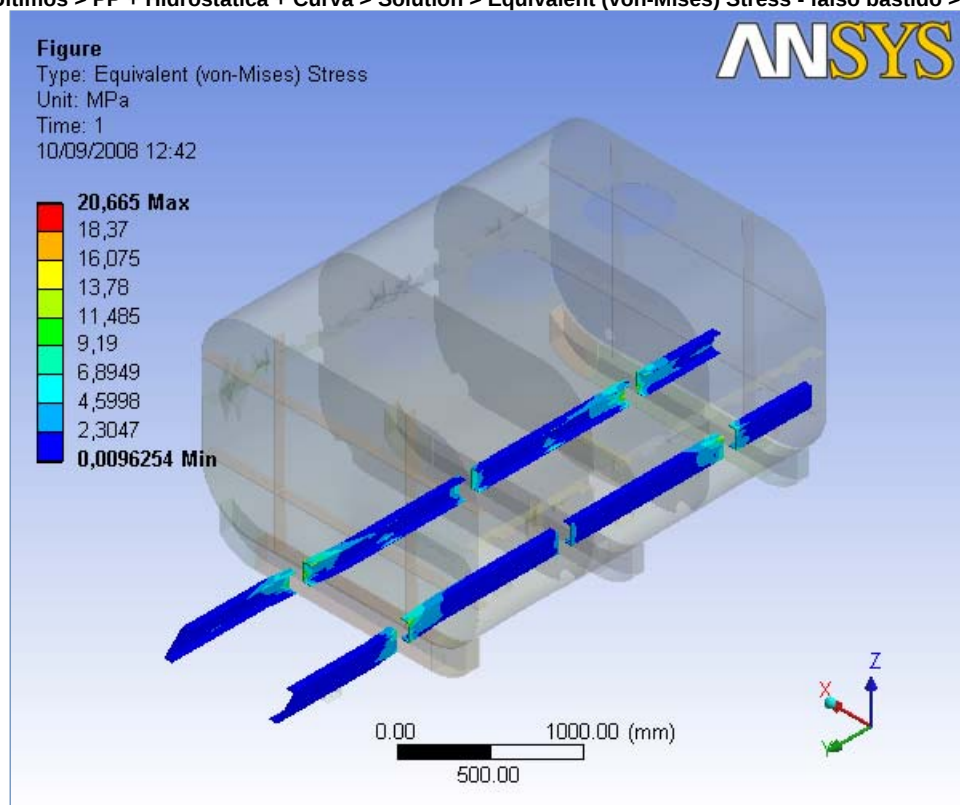


FIGURE 34

E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Stress - falso bastido > Image

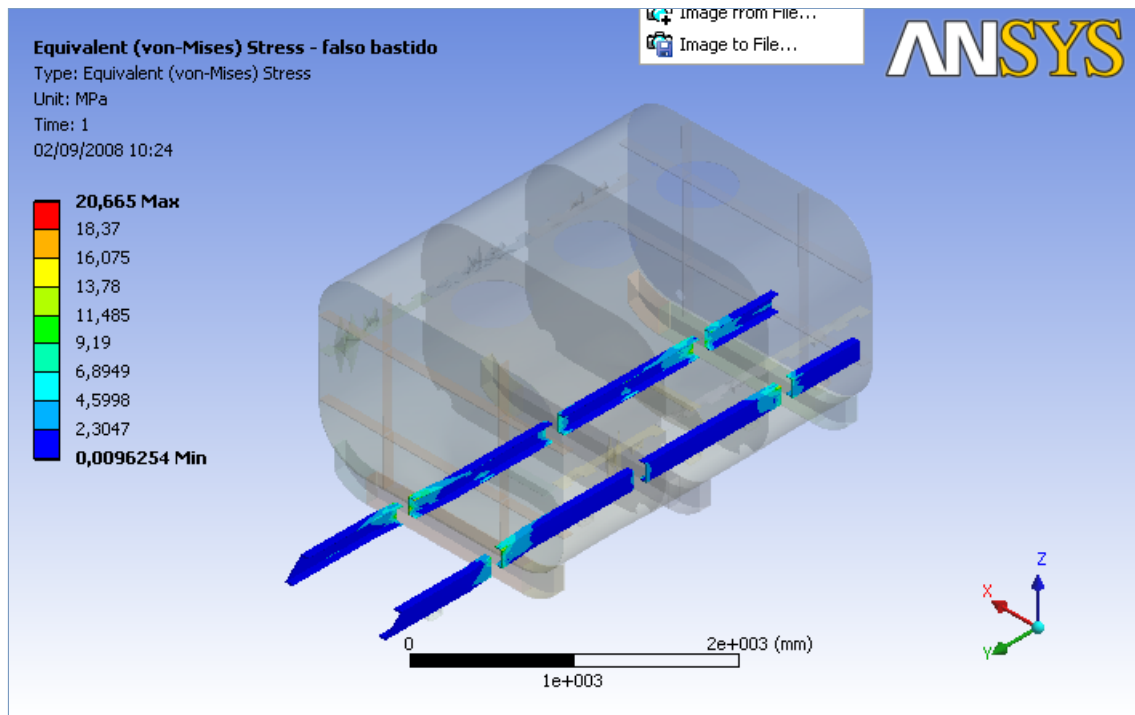


FIGURE 35

E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Stress - Rompeolas > Figure

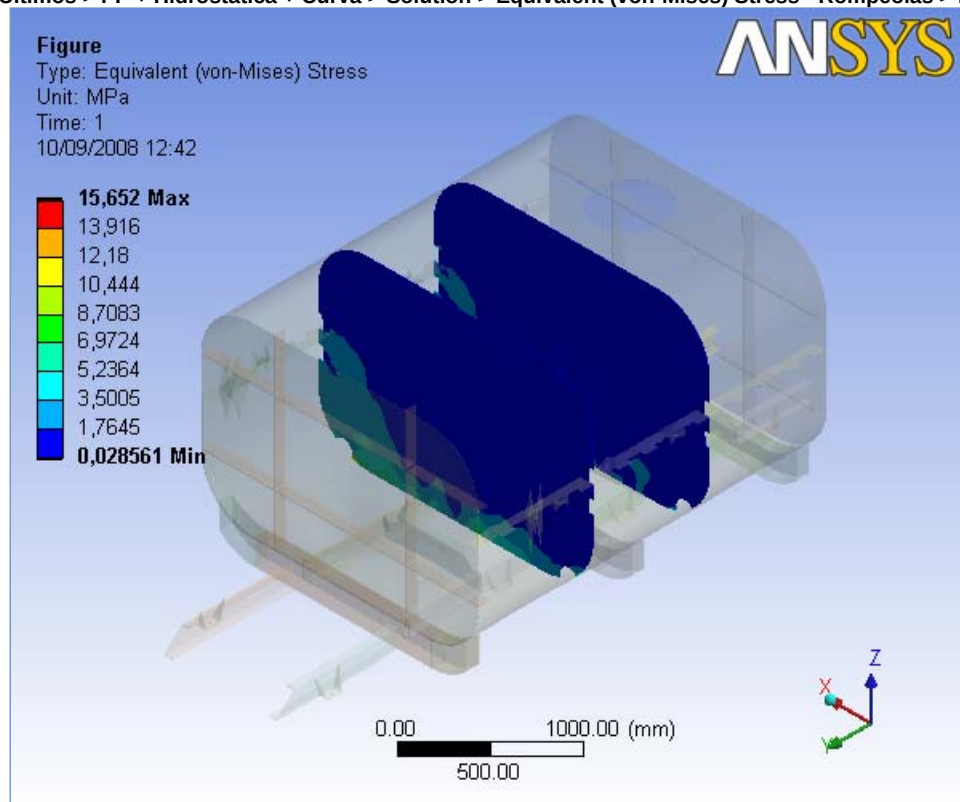


FIGURE 36

E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Stress - Rompeolas > Image

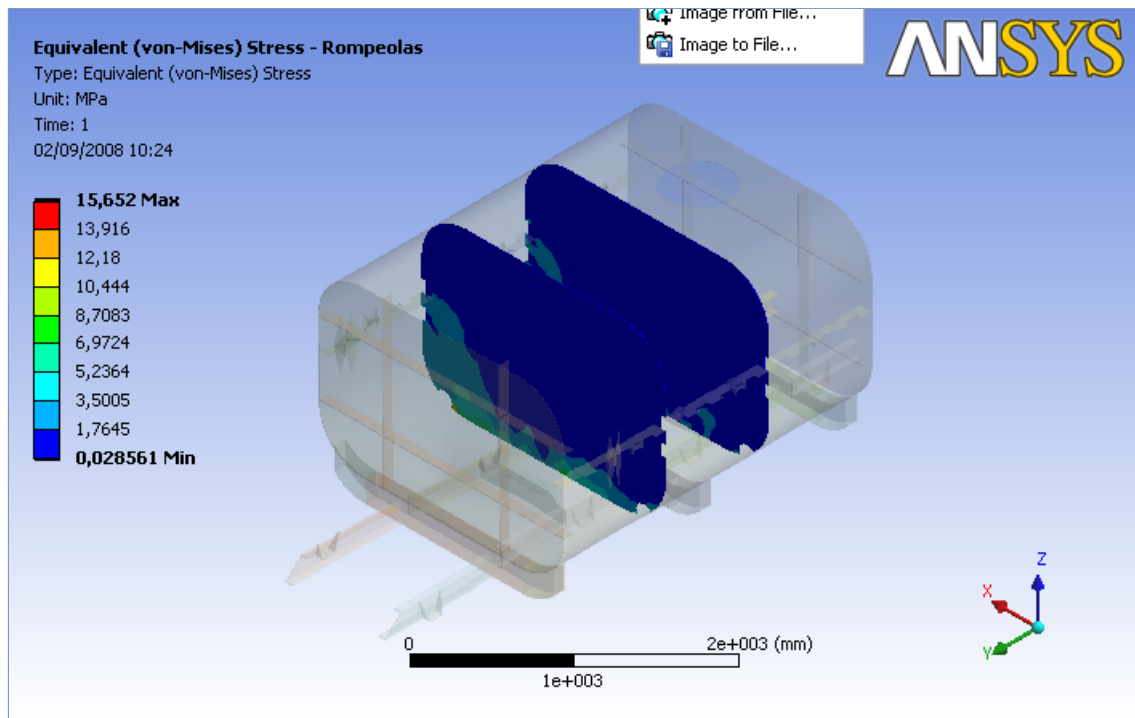


FIGURE 37

E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Stress - Durmientes > Figure

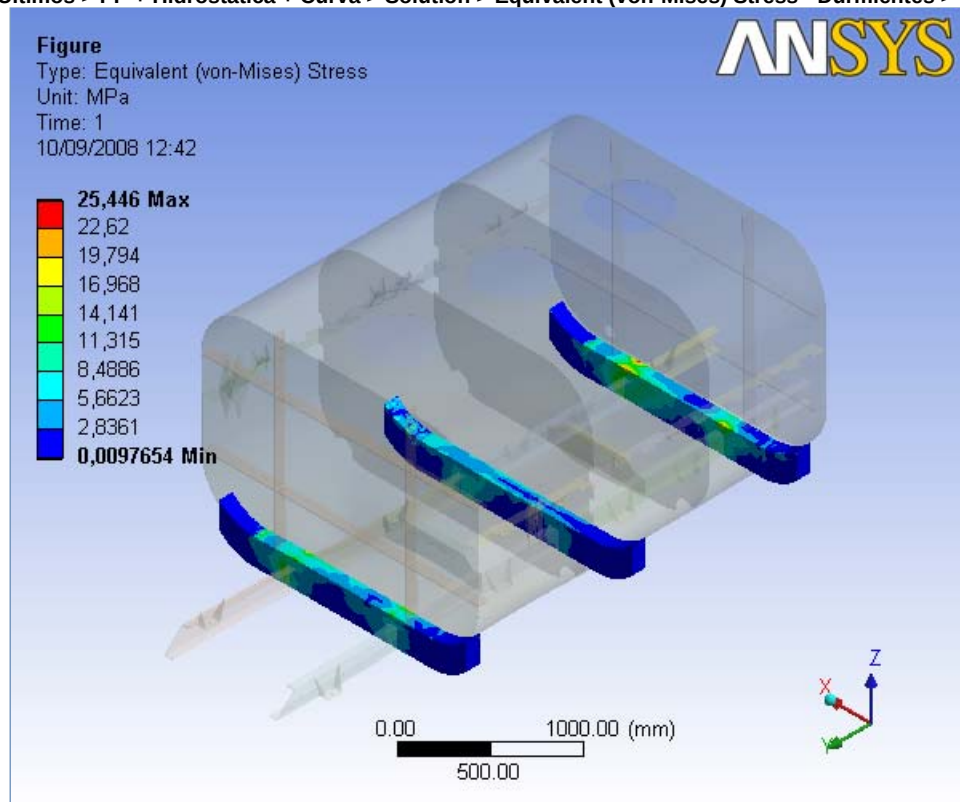
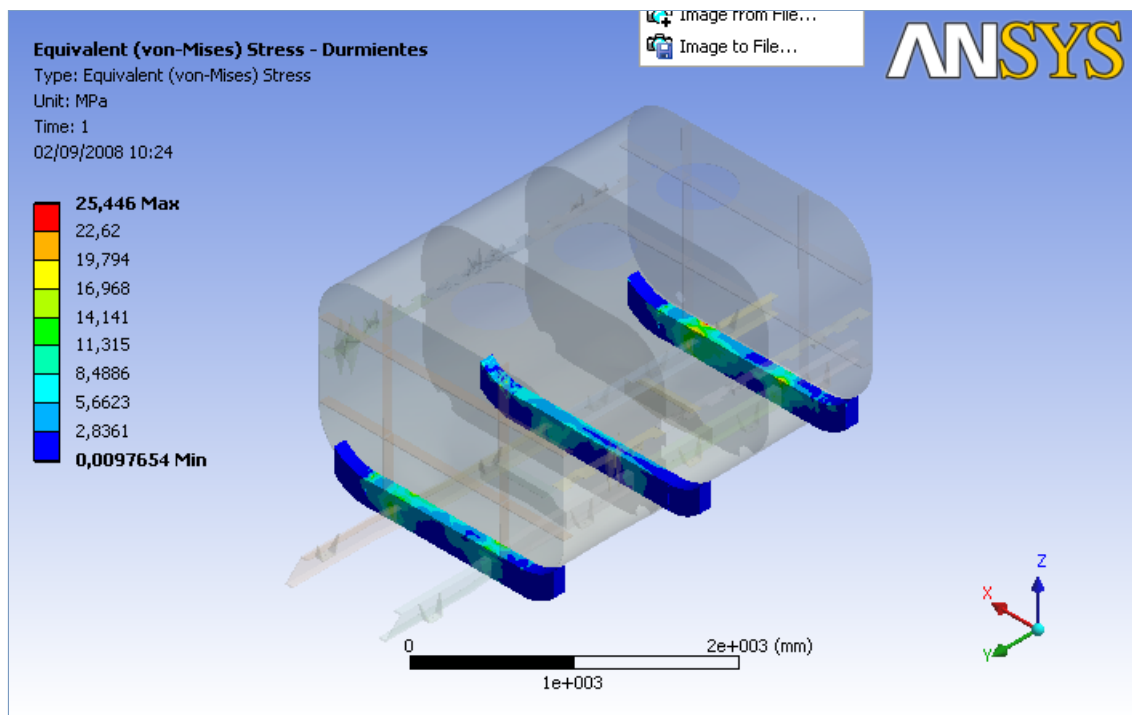


FIGURE 38

E.L.Ultimos > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Stress - Durmientes > Image



E.L.Servicio

Geometry

TABLE 51
E.L.Servicio > Geometry

Object Name	Geometry
State	Fully Defined
Definition	
Source	C:\Antonio\PFC APERIA\CRB ACERO\DATOS\Analisis Workbench 4\CRB8000I.agdb
Type	DesignModeler
Length Unit	Millimeters
Element Control	Program Controlled
Display Style	Part Color
Bounding Box	
Length X	2100, mm
Length Y	4116, mm
Length Z	1615, mm
Properties	
Volume	1,5384e+008 mm ³
Mass	1207,6 kg
Statistics	
Bodies	42
Active Bodies	42
Nodes	122661
Elements	53134
Preferences	
Import Solid Bodies	Yes
Import Surface Bodies	Yes
Import Line Bodies	Yes
Parameter Processing	Yes
Personal Parameter Key	DS
CAD Attribute Transfer	No
Named Selection Processing	No
Material Properties Transfer	No
CAD Associativity	Yes
Import Coordinate Systems	No
Reader Save Part File	No
Import Using Instances	Yes
Do Smart Update	No
Attach File Via Temp File	No

Analysis Type	3-D
Mixed Import Resolution	None
Enclosure and Symmetry Processing	Yes

TABLE 52
E.L.Servicio > Geometry > Parts

Object Name	falso bastidor.asm:1,cogida_chasis.par:6	falso bastidor.asm:1,cogida_chasis.par:7	falso bastidor.asm:1,cogida_chasis_mir.par:2	bastidor.asm:1,cogida_chasis_mir.par:3
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	60, mm			
Length Y	188,49 mm			
Length Z	140, mm			
Properties				
Volume	1,5714e+005 mm³			
Mass	1,2335 kg			
Centroid X	404,5 mm		-454,5 mm	
Centroid Y	1618,8 mm	2118,8 mm	4393, mm	
Centroid Z	37,292 mm			
Moment of Inertia Ip1	5669,9 kg·mm²		5670, kg·mm²	
Moment of Inertia Ip2	2061, kg·mm²			
Moment of Inertia Ip3	4131,5 kg·mm²		4131,6 kg·mm²	
Statistics				
Nodes	652	650	655	
Elements	250	248	253	

TABLE 53
E.L.Servicio > Geometry > Parts

Object Name	<i>falso</i> <i>bastidor.asm:1,cogida_chasis_mir1.par:3</i>	<i>falso</i> <i>bastidor.asm:1,cogida_chasis_mir1.par:4</i>	<i>Tanque.asm:1,Superficie lateral.par:1</i>	<i>Tanque.asm:1,Superficie superior.par:2</i>
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	60, mm		2100, mm	
Length Y	188,49 mm		2642, mm	
Length Z	140, mm		1415, mm	
Properties				
Volume	1,5714e+005 mm ³		6,4792e+007 mm ³	
Mass	1,2335 kg		508,62 kg	
Centroid X	-404,5 mm		-1,9539 mm	
Centroid Y	2118,8 mm	3044,3 mm	2535,2 mm	2
Centroid Z	37,292 mm		882,06 mm	
Moment of Inertia Ip1	5669,9 kg·mm ²	5669,8 kg·mm ²	4,6538e+008 kg·mm ²	
Moment of Inertia Ip2	2061, kg·mm ²		4,8622e+008 kg·mm ²	

Moment of Inertia Ip3	4131,5 kg·mm ²	6,1163e+008 kg·mm ²	
Statistics			
Nodes	652	60588	
Elements	250	29981	

TABLE 54
E.L.Servicio > Geometry > Parts

Object Name	Tanque.asm:1,Superficie forntal.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes_2.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:1
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	2100, mm	1340, mm	269, mm	
Length Y	4, mm	100, mm		
Length Z	1415, mm	200, mm	311,6 mm	
Properties				
Volume	1,139e+007 mm³	3,2009e+006 mm³	7,1984e+005 mm³	
Mass	89,413 kg	25,127 kg	5,6507 kg	
Centroid X	-1, mm	13,745 mm	818,55 mm	
Centroid Y	3858, mm	3790, mm		
Centroid Z	907,5 mm	100, mm	143,66 mm	
Moment of Inertia Ip1	1,3985e+007 kg·mm²	1,7682e+005 kg·mm²	30619 kg·mm²	
Moment of Inertia Ip2	4,4493e+007 kg·mm²	4,0511e+006 kg·mm²	77049 kg·mm²	
Moment of Inertia Ip3	3,0508e+007 kg·mm²	3,9635e+006 kg·mm²	65219 kg·mm²	
Statistics				
Nodes	854	2889	4270	
Elements	108	1418	2083	

TABLE 55
E.L.Servicio > Geometry > Parts

Object Name	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:2	Tanque.asm:1,Superficie trasera.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:1
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	269, mm		2100, mm	
Length Y	100, mm		4, mm	
Length Z	311,6 mm		1415, mm	
Properties				
Volume	7,1984e+005 mm³		1,1373e+007 mm³	3,2009e+006 mm³
Mass	5,6507 kg		89,281 kg	25,127 kg
Centroid X	818,55 mm	-820,55 mm	-1,8752 mm	
Centroid Y	2535, mm		1212, mm	
Centroid Z	147,66 mm		908,43 mm	
Moment of Inertia Ip1	30619 kg·mm²		1,3932e+007 kg·mm²	1,7682e+005 kg·mm²

Moment of Inertia Ip2	77049 kg·mm ²	4,4393e+007 kg·mm ²	4,051
Moment of Inertia Ip3	65219 kg·mm ²	3,0461e+007 kg·mm ²	3,963
Statistics			
Nodes	4282	4271	1058
Elements	2089	2081	134

TABLE 56
E.L.Servicio > Geometry > Parts

Object Name	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes.par:2		Tanque.asm:1,Rigidizador Longitudinal.par:1		Tanque.asm:1,Rigidizador Longitudinal.par:2		Tanque.asm:1,Rigidizador. Longitudinal.par:3	
State	Meshed							
Graphics Properties								
Visible	Yes							
Transparency	1							
Definition								
Suppressed	No							
Material	Structural Steel							
Stiffness Behavior	Flexible							
Nonlinear Material Effects	Yes							
Bounding Box								
Length X	269, mm		100, mm					
Length Y	100, mm		878, mm					
Length Z	311,6 mm		4, mm					
Properties								
Volume	7,1984e+005 mm³		2,952e+005 mm³					
Mass	5,6507 kg		2,3173 kg					
Centroid X	-820,55 mm		-990,83 mm					
Centroid Y	1280, mm		3417, mm		2535, mm		165	
Centroid Z	143,66 mm		960, mm					
Moment of Inertia Ip1	30619 kg·mm²		1,5476e+005 kg·mm²					
Moment of Inertia Ip2	77049 kg·mm²		1703,2 kg·mm²					
Moment of Inertia Ip3	65219 kg·mm²		1,5646e+005 kg·mm²					
Statistics								
Nodes	4361		269					
Elements	2129		23					

TABLE 57
E.L.Servicio > Geometry > Parts

Object Name	Tanque.asm:1,Rigidizador Longitudinal.par:5	Tanque.asm:1,Rigidizador Longitudinal.par:6	Tanque.asm:1,rigidizador_transversal.par:1	Tanque.asm:1,Refue transversal.par:1
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	100, mm		2091, mm	
Length Y	878, mm		80, mm	
Length Z	4, mm		1407, mm	
Properties				
Volume	2,952e+005 mm³		5,5648e+006 mm³	8,63
Mass	2,3173 kg		43,684 kg	
Centroid X	988,83 mm		-0,99969 mm	
Centroid Y	2535, mm	3417, mm	3816, mm	3157,5 mm
Centroid Z	960, mm		907,5 mm	1

Moment of Inertia Ip1	1,5476e+005 kg·mm ²	5,4467e+006 kg·mm ²	29
Moment of Inertia Ip2	1703,2 kg·mm ²	1,933e+007 kg·mm ²	2,597
Moment of Inertia Ip3	1,5646e+005 kg·mm ²	1,393e+007 kg·mm ²	2,338
Statistics			
Nodes	269	1296	1860
Elements	23	108	816

TABLE 58
E.L.Servicio > Geometry > Parts

Object Name	Tanque.asm:1,rigidizador_transversal.par:2	falso bastidor.asm:1,largueros.par:1	falso bastidor.asm:2,largueros.par:2	bastidor.asr
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	2091, mm	83,316 mm		
Length Y	80, mm			1155, mm
Length Z	1407, mm			140, mm
Properties				
Volume	5,5648e+006 mm³	2,1428e+006 mm³		
Mass	43,684 kg	16,821 kg		
Centroid X	-0,99969 mm	365,26 mm	-365,26 mm	36
Centroid Y	1254, mm	3162,9 mm		
Centroid Z	907,5 mm	71,11 mm	71	
Moment of Inertia Ip1	5,4467e+006 kg·mm²	1,9201e+006 kg·mm²		
Moment of Inertia Ip2	1,933e+007 kg·mm²	54759 kg·mm²	54760 kg·mm²	
Moment of Inertia Ip3	1,393e+007 kg·mm²	1,877e+006 kg·mm²		
Statistics				
Nodes	1296	1383	1301	
Elements	108	220	209	

TABLE 59
E.L.Servicio > Geometry > Parts

E.L.Servicio > Geometry > Parts				
Object Name	falso bastidor.asm:2,largueros.par:5	falso bastidor.asm:2,largueros.par:6	falso bastidor.asm:2,largueros.par:7	falso bastidor.asm:2,largueros
State	Meshed			
Graphics Properties				
Visible	Yes			
Transparency	1			
Definition				
Suppressed	No			
Material	Structural Steel			
Stiffness Behavior	Flexible			
Nonlinear Material Effects	Yes			
Bounding Box				
Length X	78,164 mm		60, mm	
Length Y	930, mm		576, mm	
Length Z	140, mm			
Properties				
Volume	1,5935e+006 mm³		1,0677e+006 mm³	
Mass	12,509 kg		8,3811 kg	
Centroid X	410,43 mm	-410,43 mm	362,58 mm	-362,58 mm

Centroid Y	4270,8 mm		942, mm
Centroid Z	67,727 mm	67,728 mm	71,111 mm
Moment of Inertia Ip1	8,2396e+005 kg·mm ²	8,2399e+005 kg·mm ²	2,5606e+005 kg·mm ²
Moment of Inertia Ip2	40129 kg·mm ²	40132 kg·mm ²	27122 kg·mm ²
Moment of Inertia Ip3	7,9233e+005 kg·mm ²	7,9235e+005 kg·mm ²	2,3443e+005 kg·mm ²
Statistics			
Nodes	828	863	924
Elements	120	128	136

TABLE 60
E.L.Servicio > Geometry > Parts

Object Name	false bastidor.asm:1,cogida_chasis.par:4 false bastidor.asm:1,cogida_chasis.par:5		
State	Meshed		
Graphics Properties			
Visible	Yes		
Transparency	1		
Definition			
Suppressed	No		
Material	Structural Steel		
Stiffness Behavior	Flexible		
Nonlinear Material Effects	Yes		
Bounding Box			
Length X	60, mm		
Length Y	188,49 mm		
Length Z	140, mm		
Properties			
Volume	1,5714e+005 mm³		
Mass	1,2335 kg		
Centroid X	404,5 mm		
Centroid Y	3044,3 mm	1018,8 mm	
Centroid Z	37,292 mm		
Moment of Inertia Ip1	5669,8 kg·mm²	5669,9 kg·mm²	
Moment of Inertia Ip2	2061, kg·mm²		
Moment of Inertia Ip3	4131,5 kg·mm²		
Statistics			
Nodes	654	651	
Elements	252	249	

Connections

TABLE 61
E.L.Servicio > Connections

Object Name	<i>Connections</i>
State	Fully Defined
Auto Detection	
Generate Contact On Update	Yes
Tolerance Type	Slider
Tolerance Slider	0,
Tolerance Value	12,237 mm
Face/Face	Yes
Face/Edge	No
Edge/Edge	No
Priority	Include All
Same Body Grouping	Yes
Revolute Joints	Yes
Fixed Joints	Yes
Transparency	
Enabled	Yes

TABLE 62
E.L.Servicio > Connections > Contact Regions

Object Name	Contact Region	Contact Region 2	Contact Region 3	
State	Fully Defined			
	Scope			
Scoping Method	Geometry Selection			

Contact	1 Face			
Target	1 Face			
Contact Bodies	falso bastidor.asm:1,cogida_chasis.par:6	falso bastidor.asm:1,cogida_chasis.par:7	falso bastidor.asm:1,cogida_chasis_mir.par:2	bastidor
Target Bodies	falso bastidor.asm:2,largueros.par:3		falso bastidor.asm:2,largueros.par:6	falso
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 63
E.L.Servicio > Connections > Contact Regions

Object Name	Contact Region 6	Contact Region 7	Contact Region 8	Contact Region 9
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face		8 Faces	
Target	1 Face		14 Faces	
Contact Bodies	falso bastidor.asm:1,cogida_chasis_mir1.par:3	falso bastidor.asm:1,cogida_chasis_mir1.par:4	Tanque.asm:1,Superficie lateral.par:1	
Target Bodies	falso bastidor.asm:2,largueros.par:4	falso bastidor.asm:2,largueros.par:2	Tanque.asm:1,Rompeolas transversal.par:1	Tanque.asm:1,Superficie superior.par:1
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 64
E.L.Servicio > Connections > Contact Regions

Object Name	Contact Region 11	Contact Region 12	Contact Region 13	
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face			
Target	1 Face			
Contact Bodies	Tanque.asm:1,Superficie lateral.par:1			
Target Bodies	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes_2.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:2	D
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			

Normal Stiffness	Program Controlled
Update Stiffness	Never
Thermal Conductance	Program Controlled
Pinball Region	Program Controlled

TABLE 65
E.L.Servicio > Connections > Contact Regions

Object Name	Contact Region 16	Contact Region 17	Contact Region 18	Contact Region 19
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	2 Faces	1 Face		
Target	2 Faces	1 Face		
Contact Bodies	Tanque.asm:1,Superficie lateral.par:1			
Target Bodies	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:2	Tanque.asm:1,Superficie trasera.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:4,Durmientes_3.par:1
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 66
E.L.Servicio > Connections > Contact Regions

Object Name	Contact Region 21	Contact Region 22	Contact Region 23	Contact Region 24	Contact Region 25
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	5 Faces				
Contact Bodies	Tanque.asm:1,Superficie lateral.par:1				
Target Bodies	Tanque.asm:1,Rigidizador Longitudinal.par:1	Tanque.asm:1,Rigidizador Longitudinal.par:2	Tanque.asm:1,Rigidizador Longitudinal.par:3	Tanque.asm:1,Rigidizador Longitudinal.par:4	Tanque.asm:1,Rigidizador Longitudinal.par:5
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 67
E.L.Servicio > Connections > Contact Regions

Object Name	Contact Region 26	Contact Region 27	Contact Region 28	Contact Region 29
State	Fully Defined			

Scope				
Scoping Method	Geometry Selection			
Contact	1 Face	4 Faces	1 Face	
Target	5 Faces	8 Faces	1 Face	
Contact Bodies	Tanque.asm:1,Superficie lateral.par:1			
Target Bodies	Tanque.asm:1,Rigidizador Longitudinal.par:6	Tanque.asm:1,rigidizador_transversal.par:1	Tanque.asm:1,Refuerzo transversal.par:1	Tanque.asm:1,Refuerzo transversal.par:2
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 68
E.L.Servicio > Connections > Contact Regions

Object Name	Contact Region 31	Contact Region 32	Contact Region 33	Contact Region 34	Contact Region 35
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	Tanque.asm:1,Rompeolas transversal.par:1				Tanque.asm:1,transversal.par:1
Target Bodies	Tanque.asm:1,Rigidizador Longitudinal.par:1	Tanque.asm:1,Rigidizador Longitudinal.par:2	Tanque.asm:1,Rigidizador Longitudinal.par:5	Tanque.asm:1,Rigidizador Longitudinal.par:6	Tanque.asm:1,Rigidizador Longitudinal.par:7
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 69
E.L.Servicio > Connections > Contact Regions

Object Name	Contact Region 36	Contact Region 37	Contact Region 38	Contact Region 39	Contact
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	Tanque.asm:1,Rompeolas transversal.par:2			Tanque.asm:1,Superficie fornta	
Target Bodies	Tanque.asm:1,Rigidizador Longitudinal.par:3	Tanque.asm:1,Rigidizador Longitudinal.par:4	Tanque.asm:1,Rigidizador Longitudinal.par:5	Tanque.asm:1,Rigidizador Longitudinal.par:1	Tanque.asrr Longitudinal.par:2
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				

Suppressed	No
	Advanced
Formulation	Pure Penalty
Normal Stiffness	Program Controlled
Update Stiffness	Never
Thermal Conductance	Program Controlled
Pinball Region	Program Controlled

TABLE 70
E.L.Servicio > Connections > Contact Regions

Object Name	<i>Contact Region 41</i>	<i>Contact Region 42</i>	<i>Contact Region 43</i>
State	Fully Defined		
	Scope		
Scoping Method	Geometry Selection		
Contact	1 Face		
Target	1 Face		
Contact Bodies	Tanque.asm:1,Superficie forntal.par:1	Tanque.asm:1,CONJ. DURMIENTE.as	
Target Bodies	Tanque.asm:1,rigidizador_transversal.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes.par:2
	Definition		
Type	Bonded		
Scope Mode	Automatic		
Behavior	Symmetric		
Suppressed	No		
	Advanced		
Formulation	Pure Penalty		
Normal Stiffness	Program Controlled		
Update Stiffness	Never		
Thermal Conductance	Program Controlled		
Pinball Region	Program Controlled		

TABLE 71
E.L.Servicio > Connections > Contact Regions

Object Name	<i>Contact Region 46</i>	<i>Contact Region 47</i>	<i>Contact Region 48</i>	<i>Contact R</i>
State	Fully Defined			
	Scope			
Scoping Method	Geometry Selection			
Contact	1 Face			
Target	1 Face			
Contact Bodies	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes_2.par:1		Tanque.asm:1,CONJ. DURMIENTE	
Target Bodies	falso bastidor.asm:2,largueros.par:5	falso bastidor.asm:2,largueros.par:6	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:1	Tanque.asi
	Definition			
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
	Advanced			
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 72

E.L.Servicio > Connections > Contact Regions

Object Name	Contact Region 51	Contact Region 52	Contact Region 53	Contact Region 54
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face			
Target	1 Face			
Contact Bodies	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes_2.par:1			Tanque.asm:1,Sup
Target Bodies	falso bastidor.asm:2,largueros.par:2	falso bastidor.asm:2,largueros.par:3	falso bastidor.asm:2,largueros.par:4	Tanque.asm:1,Rigidizador Longitudinal.par:3
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

TABLE 73**E.L.Servicio > Connections > Contact Regions**

Object Name	Contact Region 56	Contact Region 57	Contact Region 58
State	Fully Defined		
Scope			
Scoping Method	Geometry Selection		
Contact Target	1 Face		
	1 Face		
Contact Bodies	Tanque.asm:1,Superficie trasera.par:1	Tanque.asm:1,CONJ. DURMIENTE.as	
Target Bodies	Tanque.asm:1,rigidizador_transversal.par:2	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes.par:2
Definition			
Type	Bonded		
Scope Mode	Automatic		
Behavior	Symmetric		
Suppressed	No		
Advanced			
Formulation	Pure Penalty		
Normal Stiffness	Program Controlled		
Update Stiffness	Never		
Thermal Conductance	Program Controlled		
Pinball Region	Program Controlled		

TABLE 74**E.L.Servicio > Connections > Contact Regions**

Object Name	Contact Region 61	Contact Region 62	Contact Region 63	Contact Region 64
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face		3 Faces	
Target	1 Face		4 Faces	
Contact Bodies	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1		Tanque.asm:1,Refuerzo transversal.par:1	
Target Bodies	falso bastidor.asm:2,largueros.par:7	falso bastidor.asm:2,largueros.par:8	falso bastidor.asm:1,largueros.par:1	falso bastidor.asm:2,largueros.p
Definition				

Type	Bonded
Scope Mode	Automatic
Behavior	Symmetric
Suppressed	No
Advanced	
Formulation	Pure Penalty
Normal Stiffness	Program Controlled
Update Stiffness	Never
Thermal Conductance	Program Controlled
Pinball Region	Program Controlled

TABLE 75
E.L.Servicio > Connections > Contact Regions

Object Name	Contact Region 66	Contact Region 67	Contact Region 68	Contact I
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	3 Faces	1 Face		
Target	4 Faces	1 Face		
Contact Bodies	Tanque.asm:1,Refuerzo transversal.par:2	falso bastidor.asm:1,largueros.par:1	falso bastidor.asm:2,largueros.par:5	fa bastidor.asm:2
Target Bodies	falso bastidor.asm:2,largueros.par:4	falso bastidor.asm:1,cogida_chasis.par:4	falso bastidor.asm:1,cogida_chasis.par:3	fa bastidor.asm:1,c
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Symmetric			
Suppressed	No			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Program Controlled			

Mesh

TABLE 76
E.L.Servicio > Mesh

Object Name	Mesh
State	Solved
Defaults	
Physics Preference	Mechanical
Relevance	0
Advanced	
Relevance Center	Coarse
Element Size	Default
Shape Checking	Standard Mechanical
Solid Element Midside Nodes	Program Controlled
Straight Sided Elements	No
Initial Size Seed	Active Assembly
Smoothing	Low
Transition	Fast
Statistics	
Nodes	122661
Elements	53134

Named Selections

TABLE 77
E.L.Servicio > Named Selections > Named Selections

Object Name	Apoyo	Apoyo Falso bastidor	Frenada	Curva	Hidrostatica
State	Fully Defined				
Scope					
Geometry	3 Faces	8 Faces	3 Faces	8 Faces	
Statistics					
Type	Manual				
Total Selection	3 Faces	8 Faces	3 Faces	8 Faces	
Suppressed	0				
Hidden	0				

TABLE 78
E.L.Servicio > Named Selections > Named Selections

Object Name	Fondo
State	Fully Defined
Scope	
Geometry	1 Face
Statistics	
Type	Manual
Total Selection	1 Face
Suppressed	0
Hidden	0

PP + Hidrostatica

TABLE 79
E.L.Servicio > Analysis

Object Name	PP + Hidrostatica
State	Fully Defined
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Options	
Reference Temp	22, °C

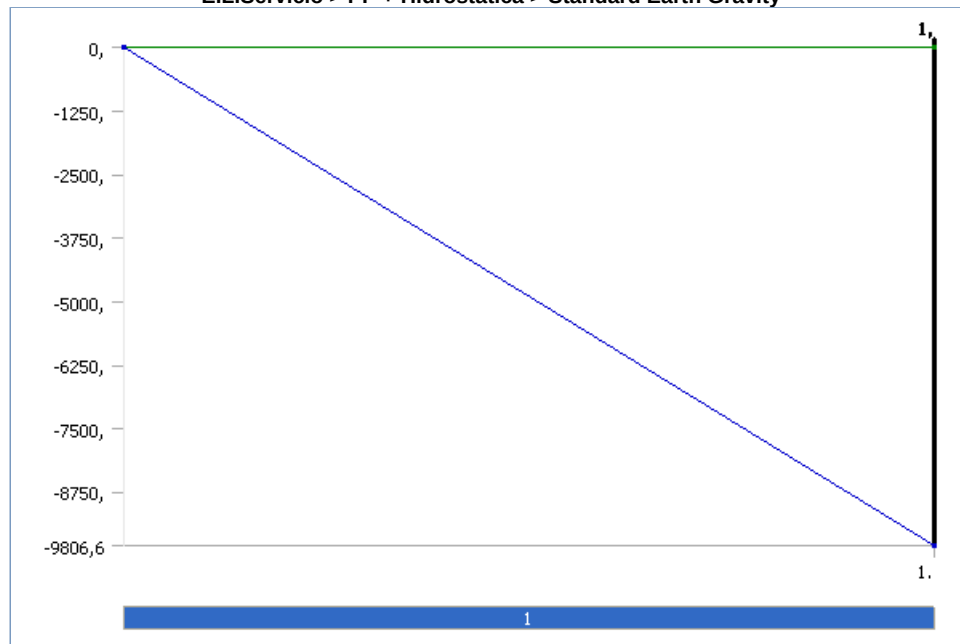
TABLE 80
E.L.Servicio > PP + Hidrostatica > Analysis Settings

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	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Nonlinear Controls	
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Output Controls	
Calculate Stress	Yes
Calculate Strain	Yes
Calculate Results At	All Time Points
Analysis Data Management	
Solver Files Directory	C:\Antonio\PFC APEREA\CRB ACERO\DATOS\Análisis Workbench 4\CRB8000I Simulation Files\PP + Hidrostatica (2)\
Future Analysis	None
Save ANSYS db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No

TABLE 81

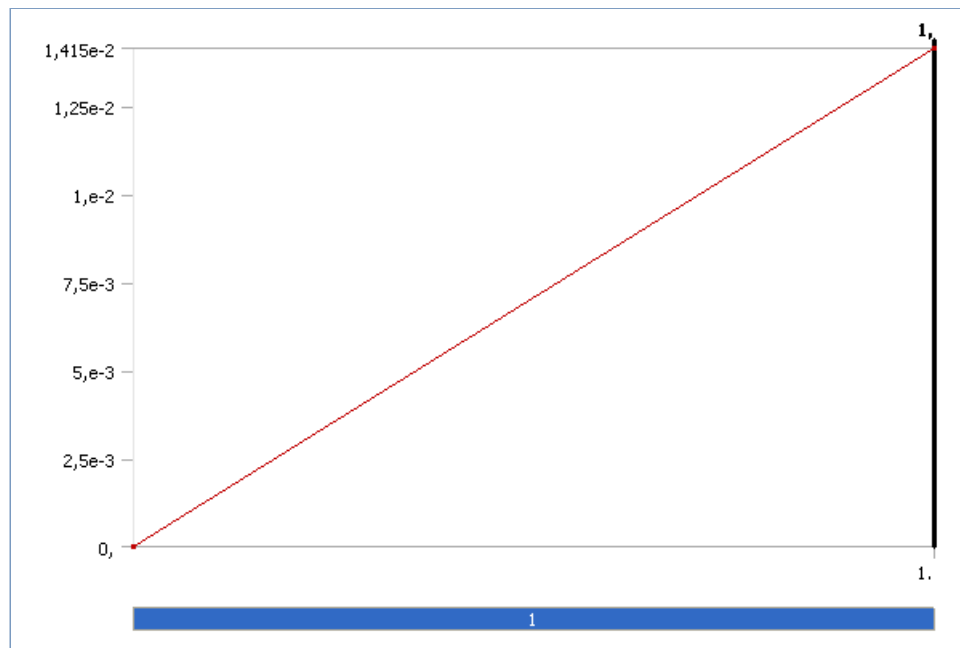
E.L.Servicio > PP + Hidrostatica > Accelerations

Object Name	<i>Standard Earth Gravity</i>
State	Fully Defined
Scope	
Geometry	All Bodies
Definition	
X Component	0, mm/s ² (ramped)
Y Component	0, mm/s ² (ramped)
Z Component	-9806,6 mm/s ² (ramped)
Suppressed	No
Direction	-Z Direction

FIGURE 39**E.L.Servicio > PP + Hidrostatica > Standard Earth Gravity****TABLE 82****E.L.Servicio > PP + Hidrostatica > Loads**

Object Name	Fixed Support	PP Agua	Hidrostatica
State	Fully Defined		
Scope			
Scoping Method	Named Selection		
Named Selection	Apoyo Falso bastidor	Fondo	Hidrostatica
Definition			
Type	Fixed Support	Pressure	Hydrostatic Pressure
Suppressed	No		
Define By		Normal To	
Magnitude		1,415e-002 MPa (ramped)	
Fluid Density			1,e-009 kg/mm³
Hydrostatic Acceleration			
Define By			Vector
Magnitude			9810, mm/s²
Direction			Defined
Free Surface Location			
X Coordinate			-0,62317 mm
Y Coordinate			2976, mm
Z Coordinate			1609, mm
Location			Defined

FIGURE 40**E.L.Servicio > PP + Hidrostatica > PP Agua**



Solution

TABLE 83
E.L.Servicio > PP + Hidrostatica > Solution

Object Name	<i>Solution</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1,
Refinement Depth	2,

TABLE 84
E.L.Servicio > PP + Hidrostatica > Solution > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Update Interval	2,5 s
Display Points	All

TABLE 85
E.L.Servicio > PP + Hidrostatica > Solution > Results

E.E.Servicio > PP + Hidrostatica > Solution > Results					
Object Name	Equivalent (von-Mises) Elastic Strain - Tanque	Total Deformation - Tanque	Equivalent (von-Mises) Elastic Strain - falso bastidor	Total Deformation - falso bastidor	Equivalent (von-Mises) Elastic Strain - Durmientes
State	Solved				
Scope					
Geometry	3 Bodies		8 Bodies		9 Bodies
Definition					
Type	Equivalent (von-Mises) Elastic Strain	Total Deformation	Equivalent (von-Mises) Elastic Strain	Total Deformation	Equivalent (von-Mises) Elastic Strain
Display Time	End Time				
Results					
Minimum	4,4244e-008 mm/mm	1,7668e-004 mm	3,2061e-008 mm/mm	0, mm	1,0453e-007 mm/mm
Maximum	1,4278e-004 mm/mm	0,7175 mm	5,8432e-005 mm/mm	1,7457e-002 mm	7,8271e-005 mm/mm
Minimum	Tanque.asm:1,Superficie		falso	falso	Tanque.asm:1,CONJ.

Occurs On	lateral.par:1	bastidor.asm:2,largueros.par:6	bastidor.asm:1,largueros.par:1	DURMIENTE.asm:2,Durmientes.p.
Maximum Occurs On	Tanque.asm:1,Superficie lateral.par:1	falso bastidor.asm:1,largueros.par:1	falso bastidor.asm:2,largueros.par:7	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.
Information				
Time	1, s			
Load Step	1			
Substep	1			
Iteration Number	1			

FIGURE 41

E.L.Servicio > PP + Hidrostatica > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Figure

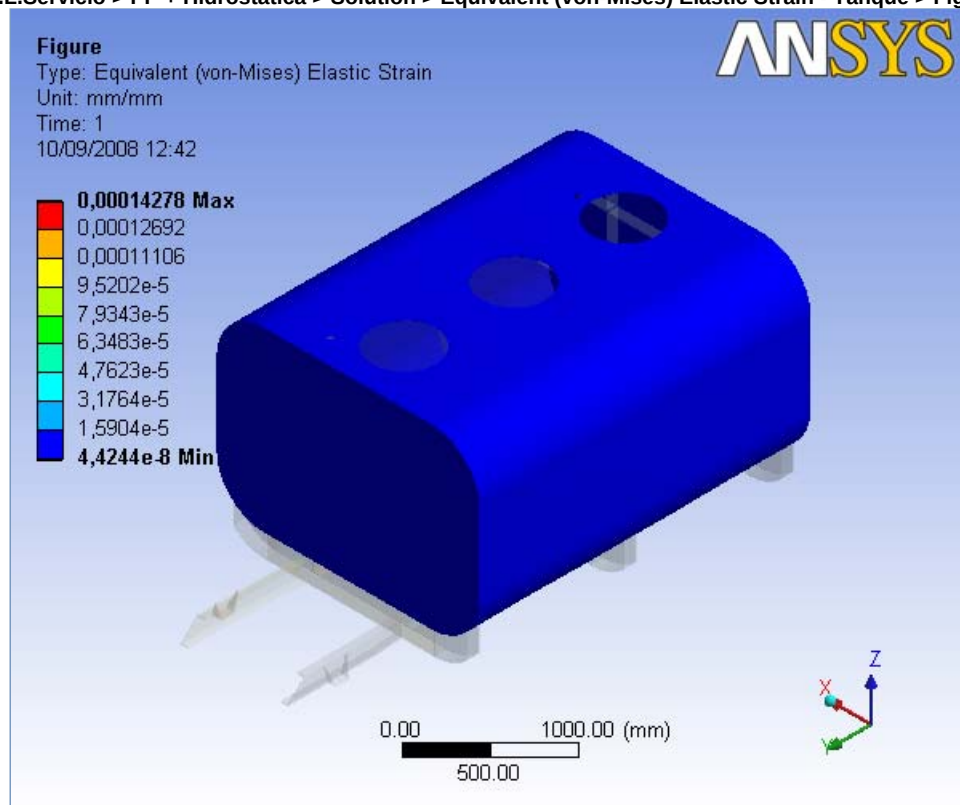


FIGURE 42

E.L.Servicio > PP + Hidrostatica > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Image

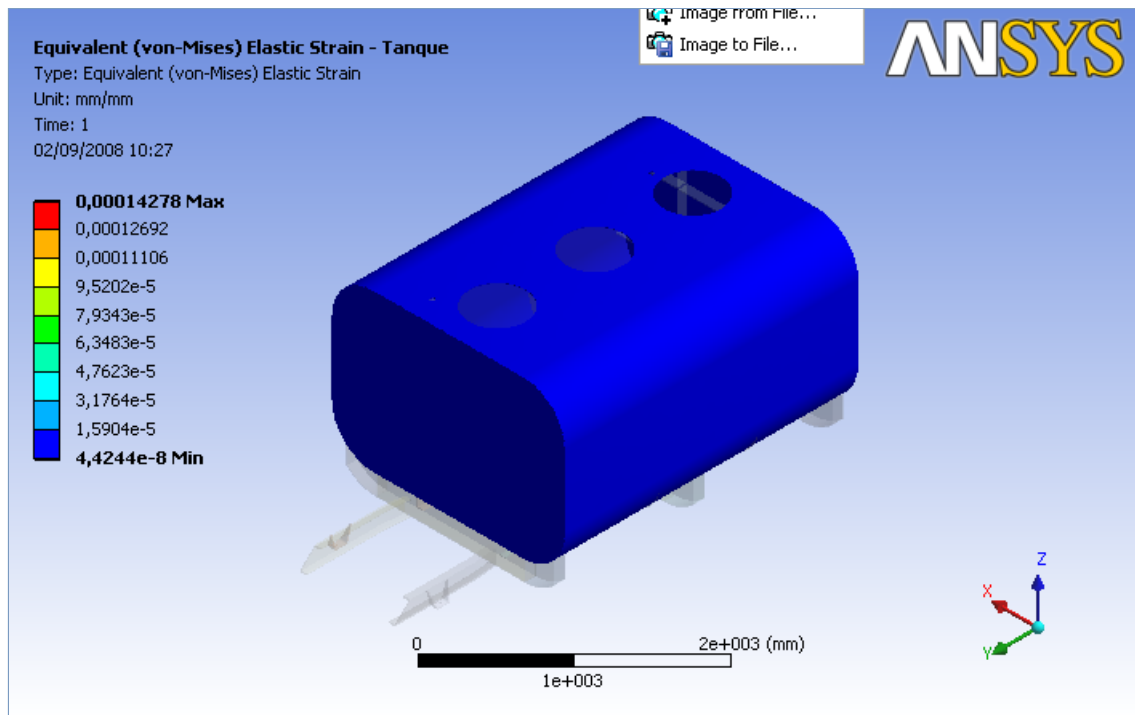


FIGURE 43

E.L.Servicio > PP + Hidrostatica > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Figure 2

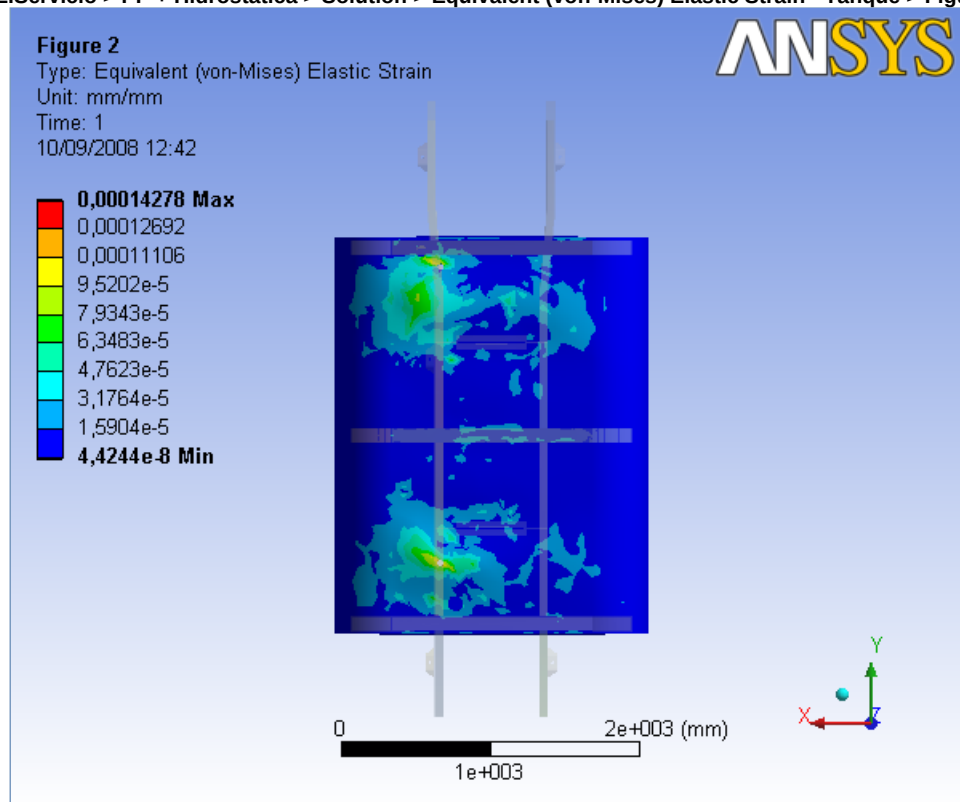


FIGURE 44

E.L.Servicio > PP + Hidrostatica > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Image

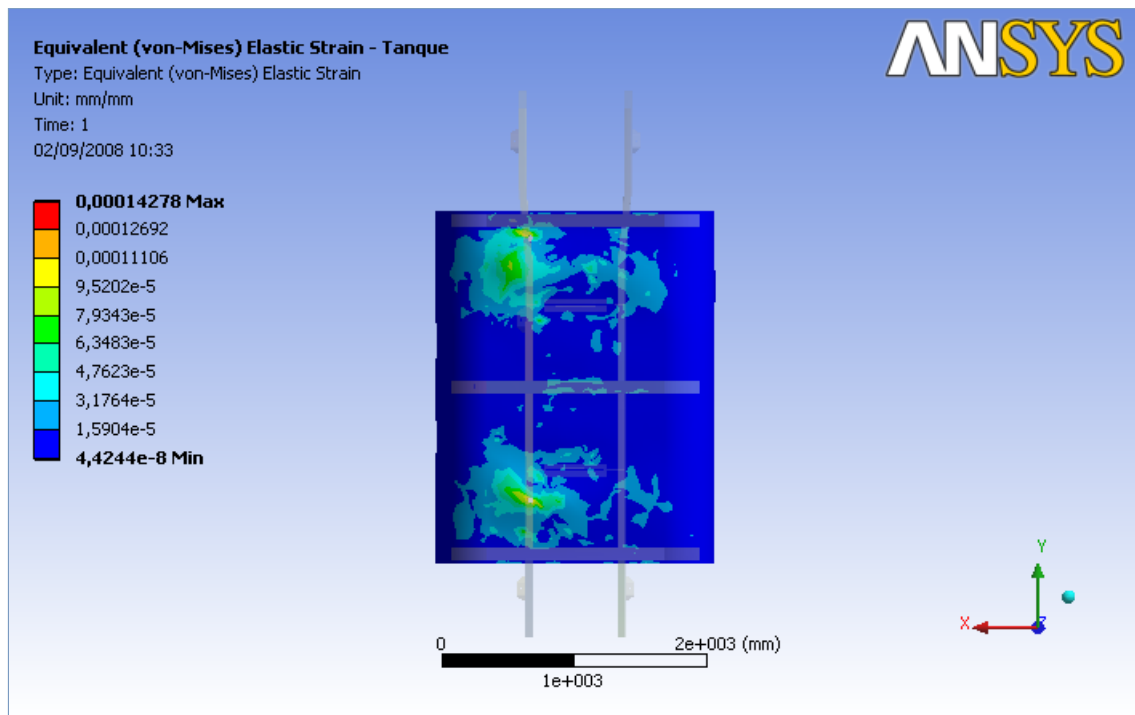


FIGURE 45

E.L.Servicio > PP + Hidrostatica > Solution > Total Deformation - Tanque > Figure

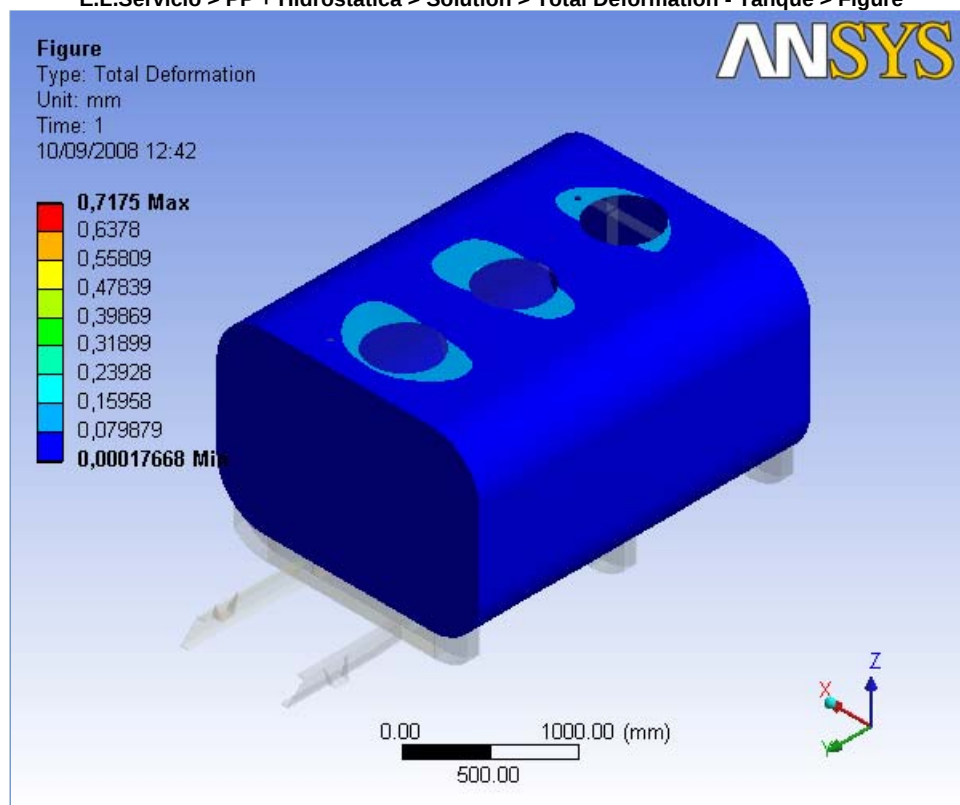


FIGURE 46

E.L.Servicio > PP + Hidrostatica > Solution > Total Deformation - Tanque > Image

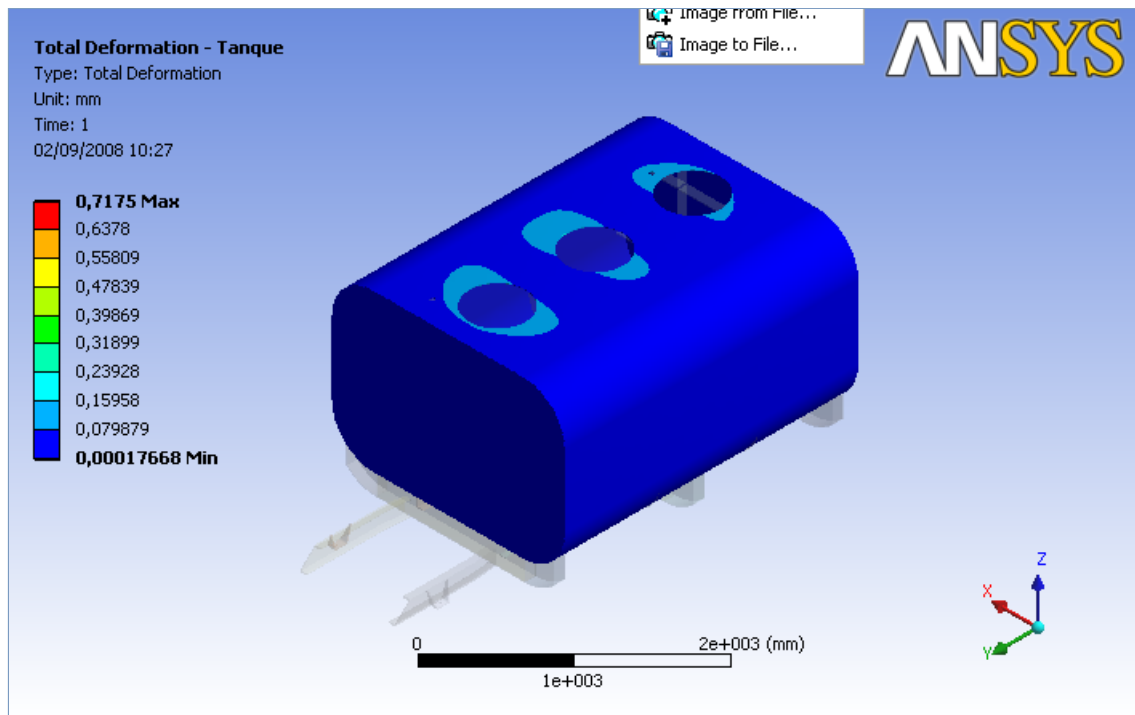


FIGURE 47

E.L.Servicio > PP + Hidrostatica > Solution > Total Deformation - Tanque > Figure 2

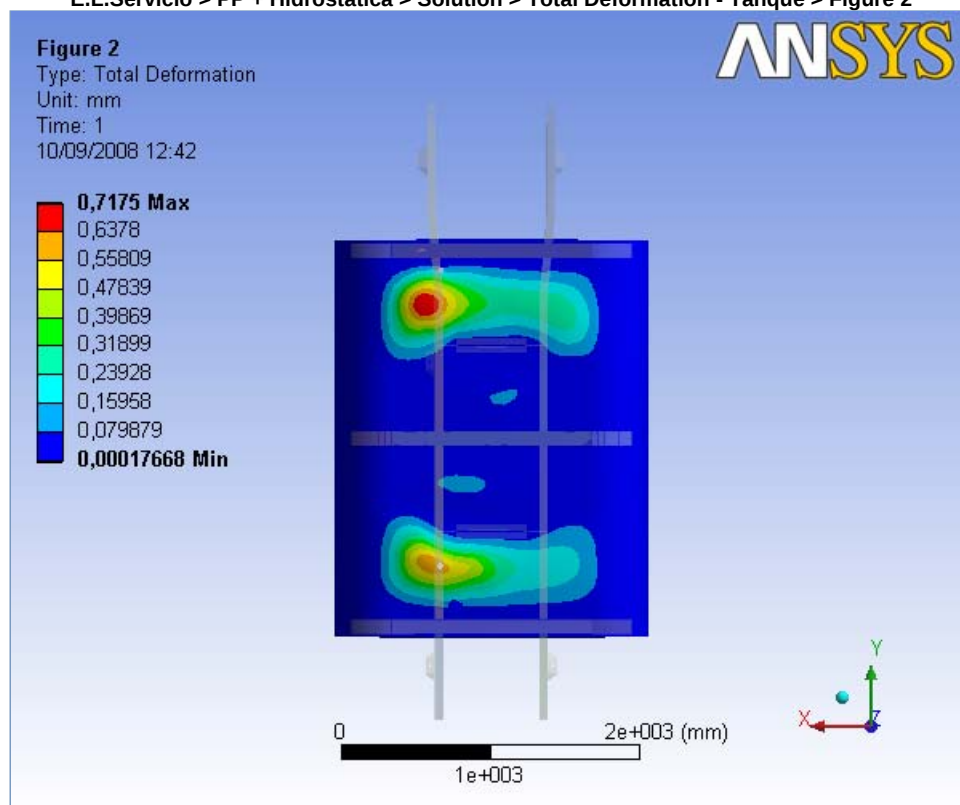


FIGURE 48

E.L.Servicio > PP + Hidrostatica > Solution > Total Deformation - Tanque > Image

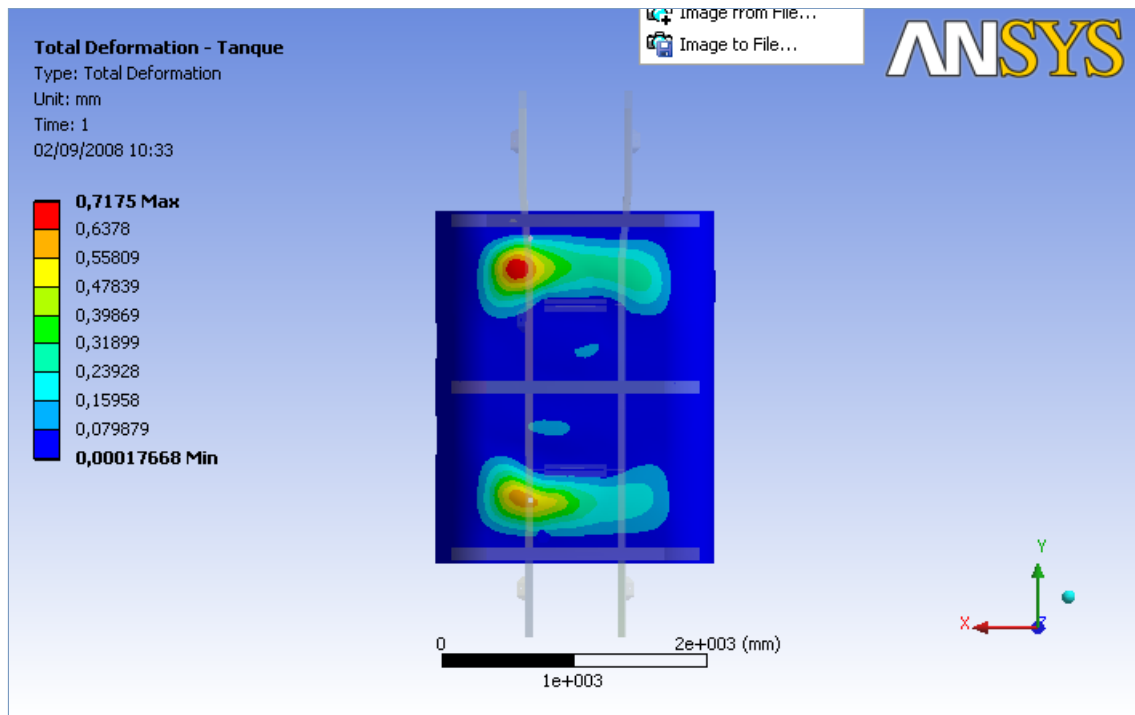


FIGURE 49

E.L.Servicio > PP + Hidrostatica > Solution > Equivalent (von-Mises) Elastic Strain - falso bastidor > Figure

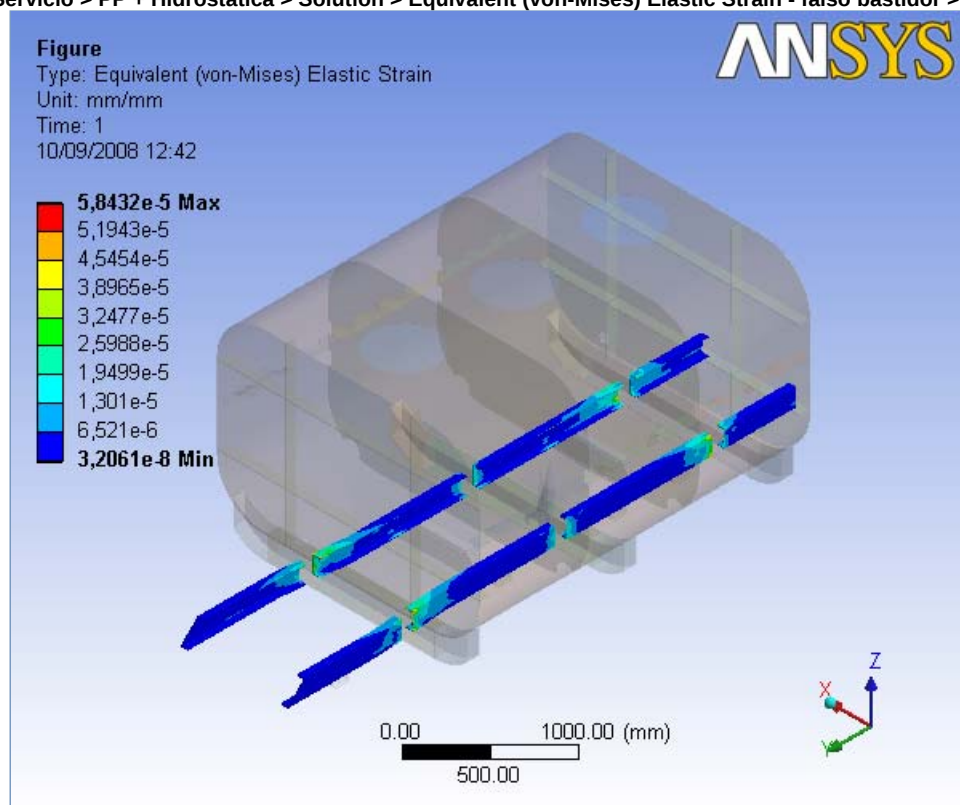


FIGURE 50

E.L.Servicio > PP + Hidrostatica > Solution > Equivalent (von-Mises) Elastic Strain - falso bastidor > Image

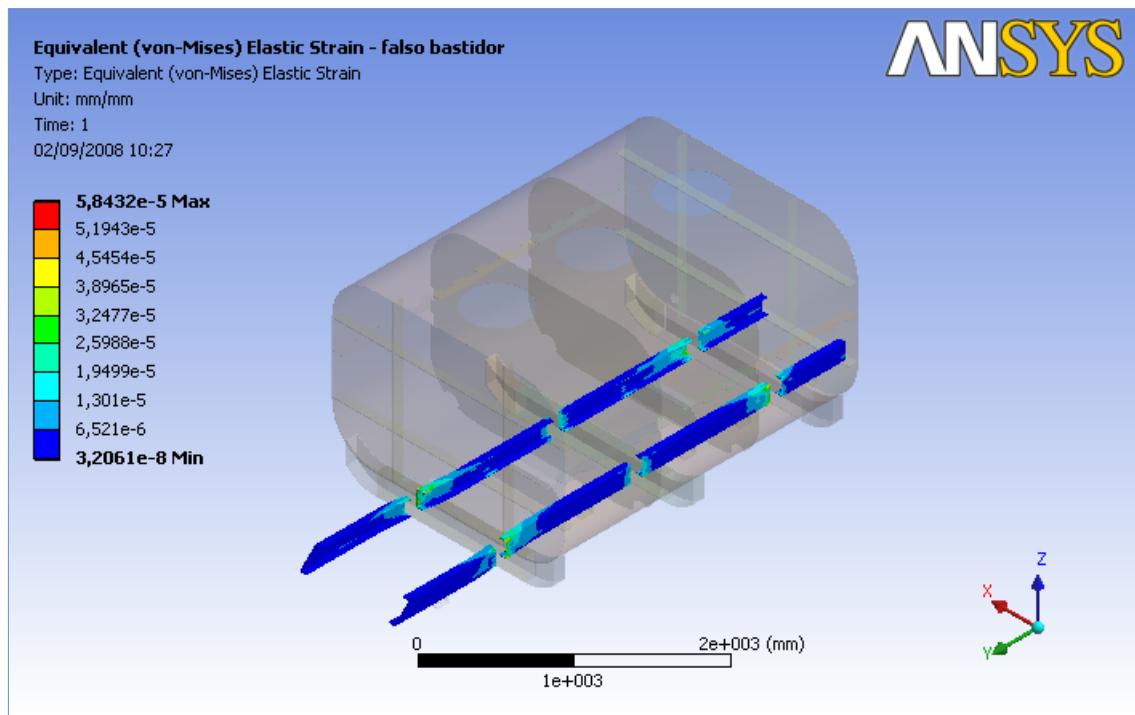


FIGURE 51

E.L.Servicio > PP + Hidrostatica > Solution > Total Deformation - falso bastidor > Figure

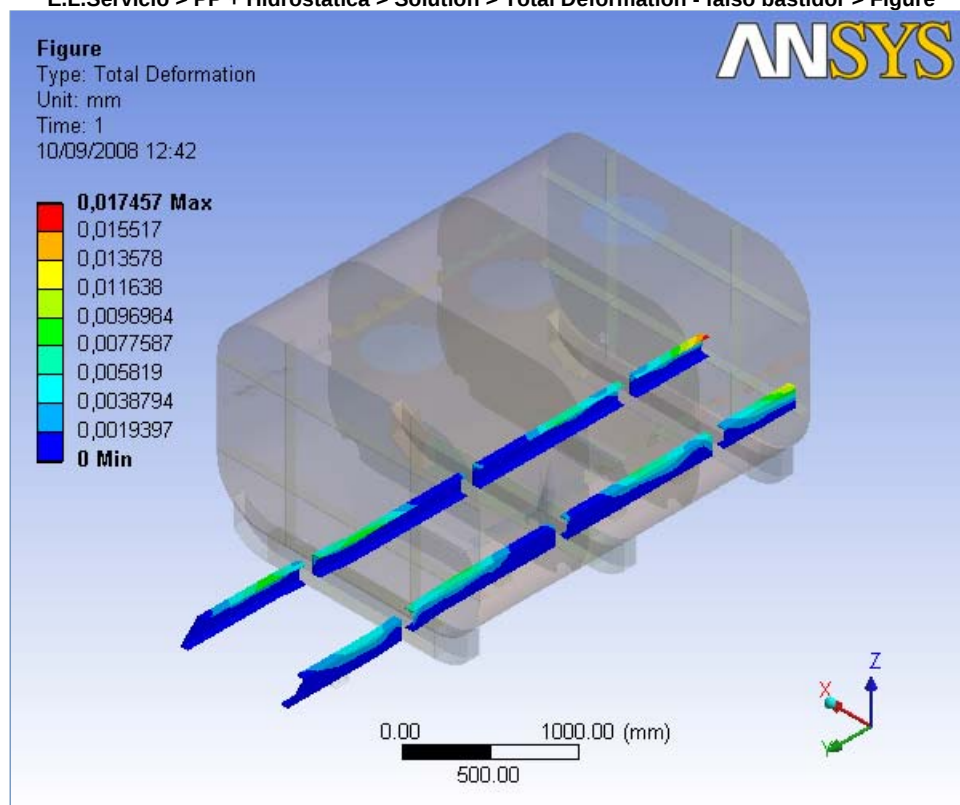


FIGURE 52

E.L.Servicio > PP + Hidrostatica > Solution > Total Deformation - falso bastidor > Image

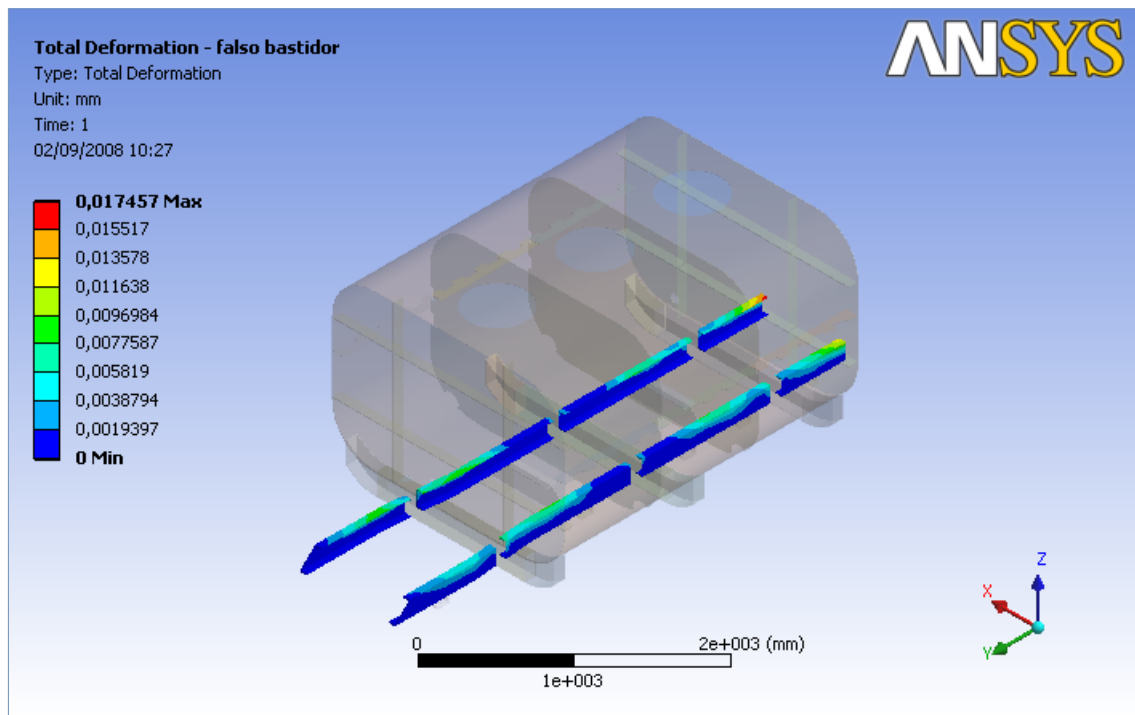


FIGURE 53

E.L.Servicio > PP + Hidrostatica > Solution > Equivalent (von-Mises) Elastic Strain - Durmientes > Figure

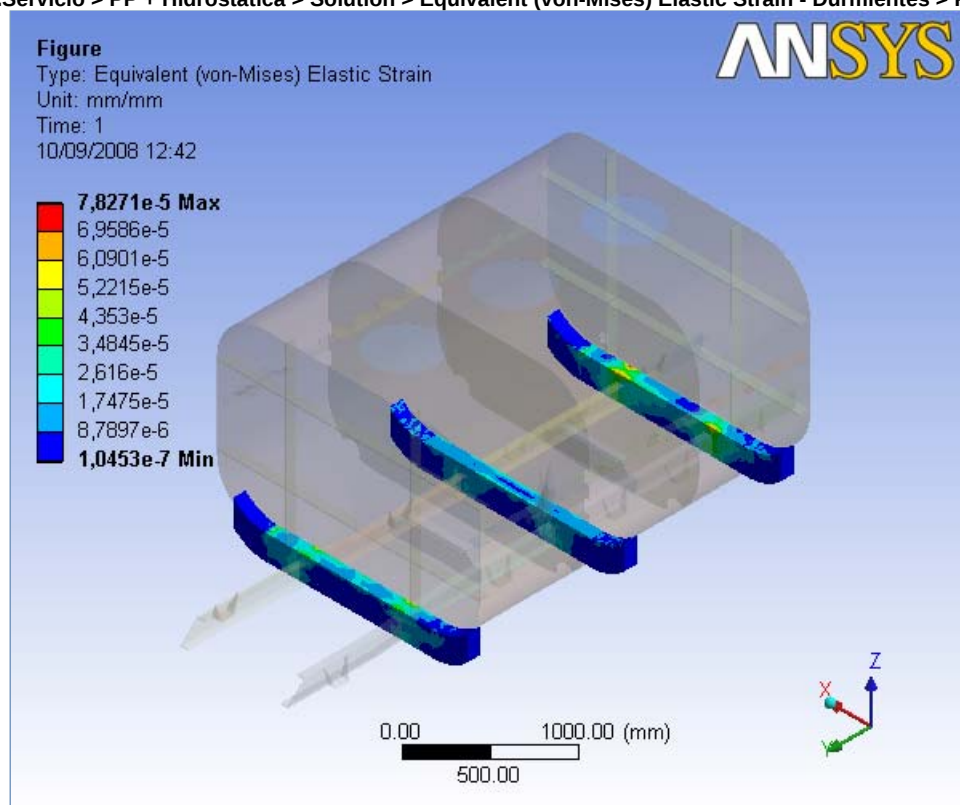


FIGURE 54

E.L.Servicio > PP + Hidrostatica > Solution > Equivalent (von-Mises) Elastic Strain - Durmientes > Image

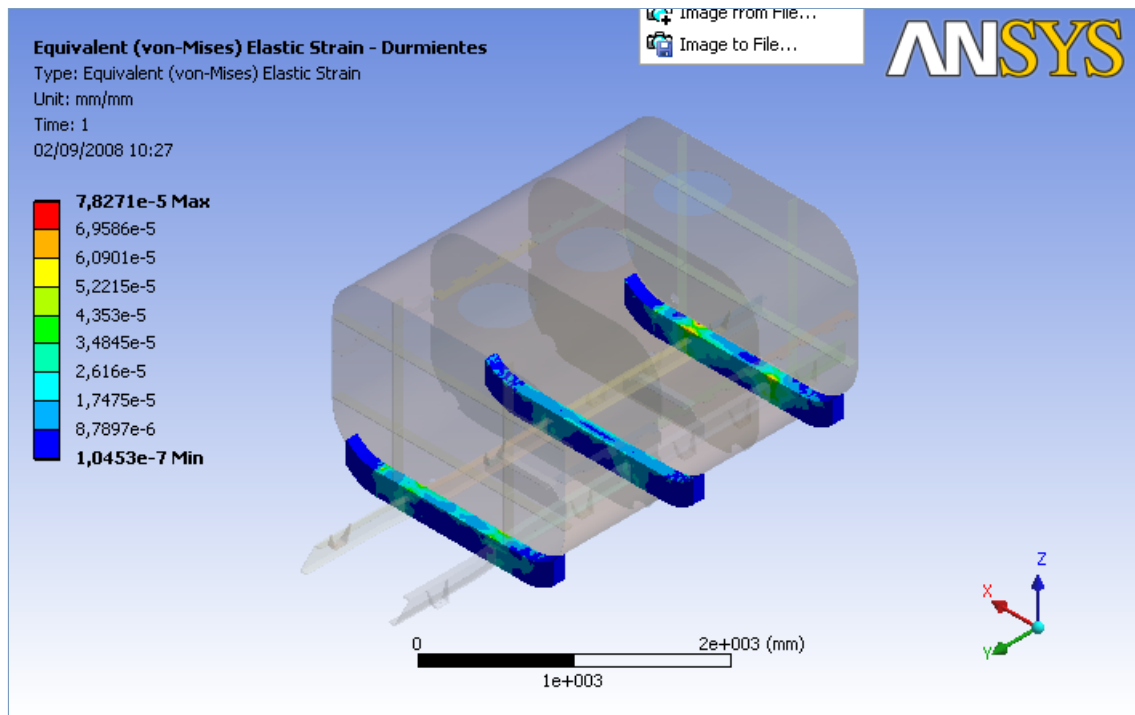


TABLE 86
E.L.Servicio > PP + Hidrostatica > Solution > Results

E.L.Servicio > PP > Hidrostatica > Solution > Results			
Object Name	Total Deformation - Durmientes	Equivalent (von-Mises) Elastic Strain - Rompeolas	Total Deformation - Rompeolas
State	Solved		
Scope			
Geometry	9 Bodies	2 Bodies	
Definition			
Type	Total Deformation	Equivalent (von-Mises) Elastic Strain	Total Deformation
Display Time	End Time		
Results			
Minimum	6,1177e-005 mm	3,121e-007 mm/mm	1,9565e-002 mm
Maximum	2,2202e-002 mm	4,9541e-005 mm/mm	0,10347 mm
Minimum Occurs On	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1	Tanque.asm:1,Rompeolas transversal.par:2	Tanque.asm:1,Rompeolas transversal.par:1
Maximum Occurs On	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes_2.par:1	Tanque.asm:1,Rompeolas transversal.par:1	Tanque.asm:1,Rompeolas transversal.par:2
Information			
Time	1, s		
Load Step	1		
Substep	1		
Iteration Number	1		

FIGURE 55
E.L.Servicio > PP + Hidrostatica > Solution > Total Deformation - Durmientes > Figure

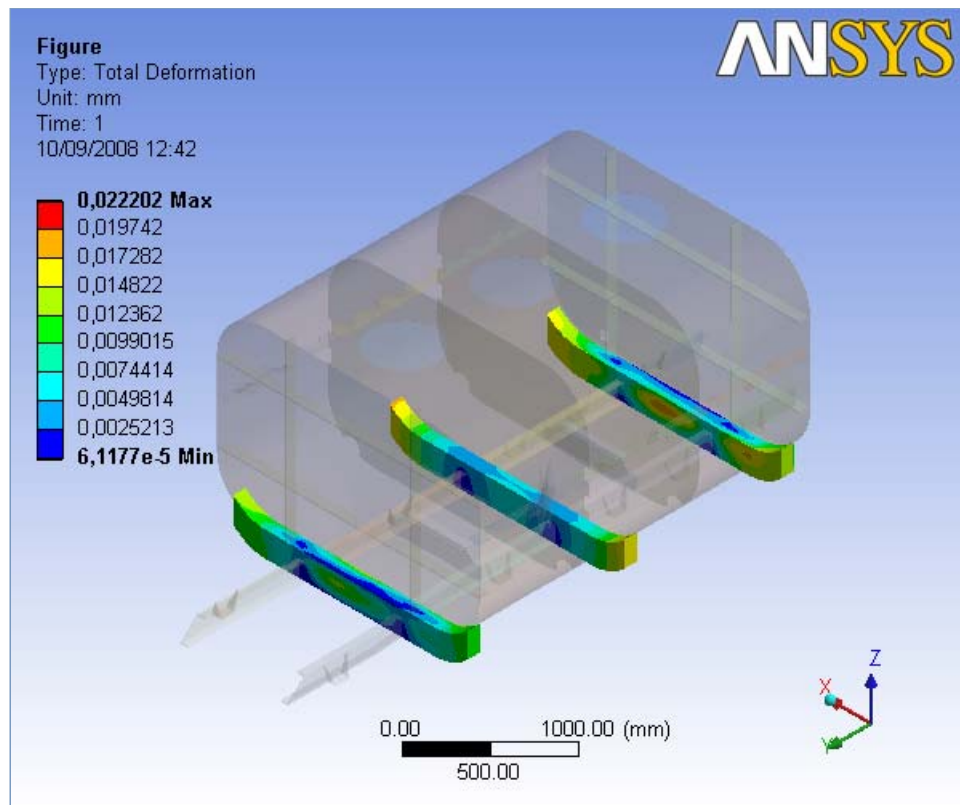


FIGURE 56

E.L.Servicio > PP + Hidrostatica > Solution > Total Deformation - Durmientes > Image

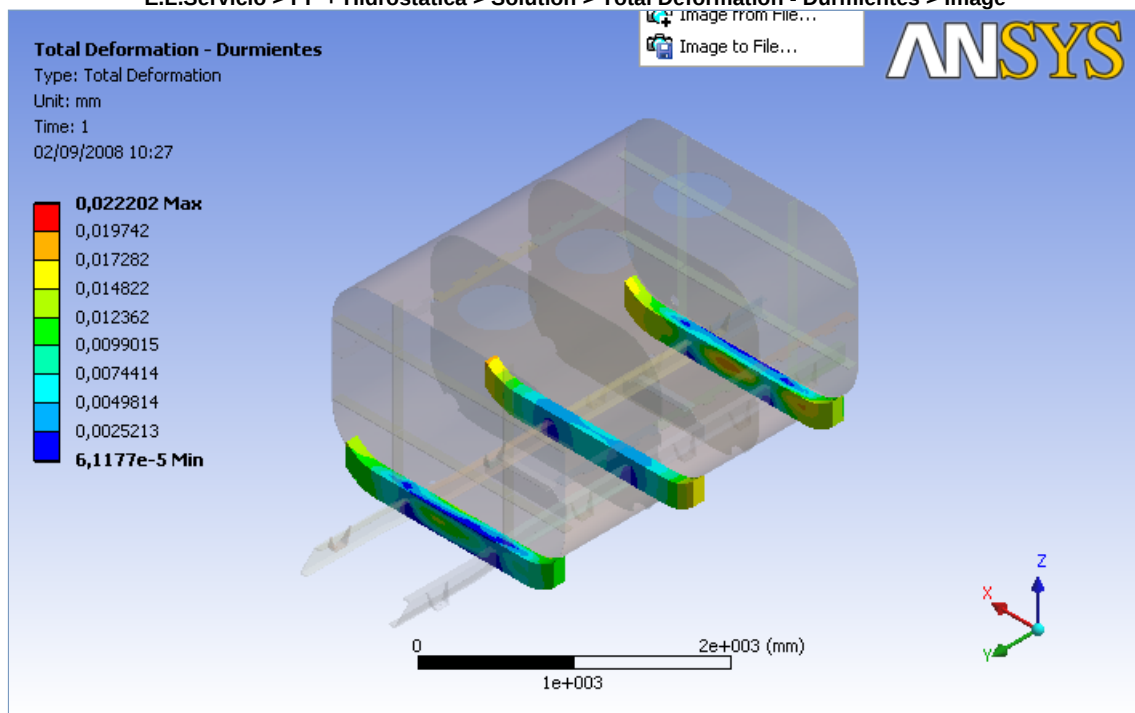


FIGURE 57

E.L.Servicio > PP + Hidrostatica > Solution > Equivalent (von-Mises) Elastic Strain - Rompeolas > Figure

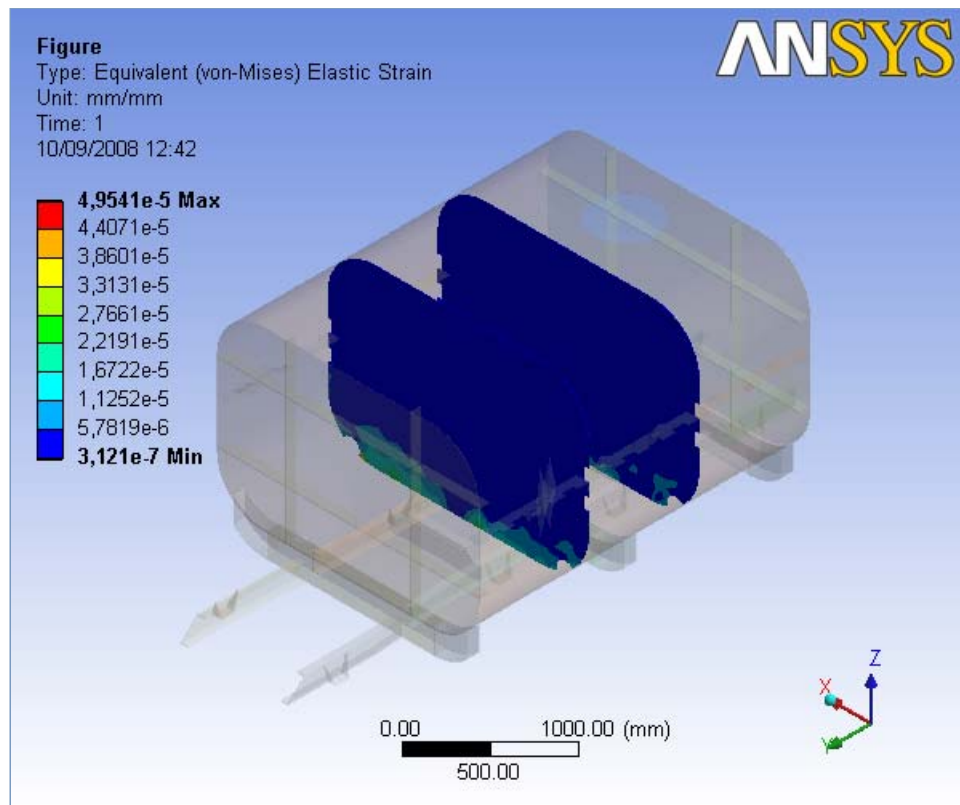


FIGURE 58

E.L.Servicio > PP + Hidrostatica > Solution > Equivalent (von-Mises) Elastic Strain - Rompeolas > Image

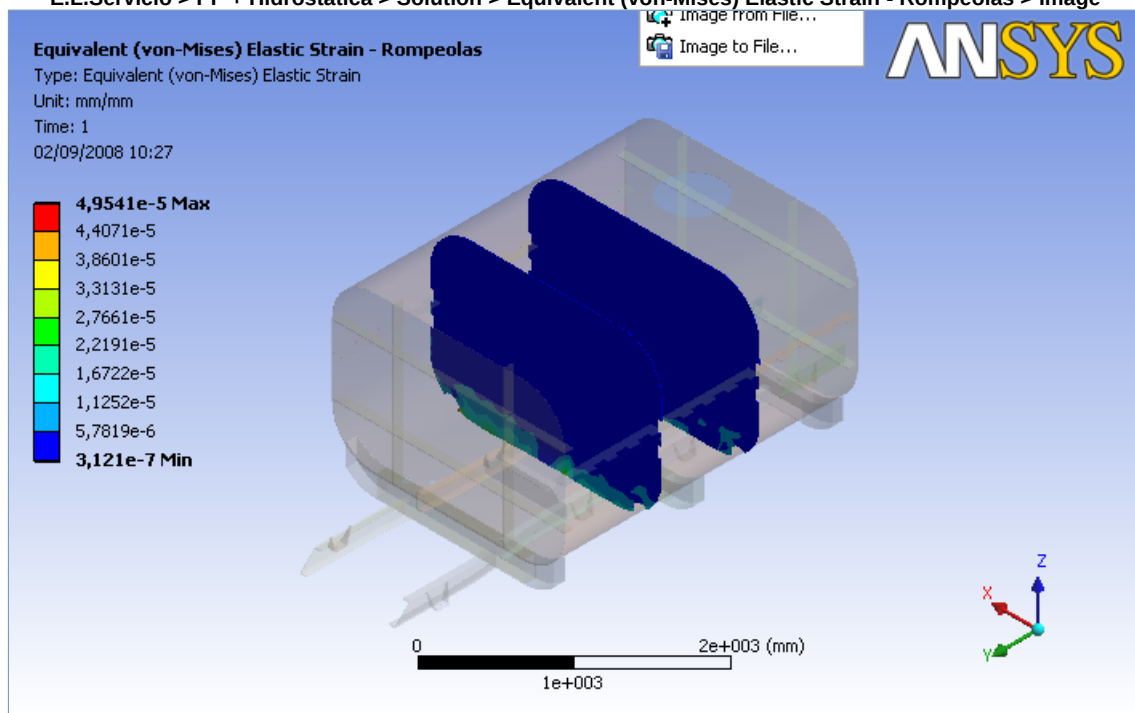


FIGURE 59

E.L.Servicio > PP + Hidrostatica > Solution > Total Deformation - Rompeolas > Figure

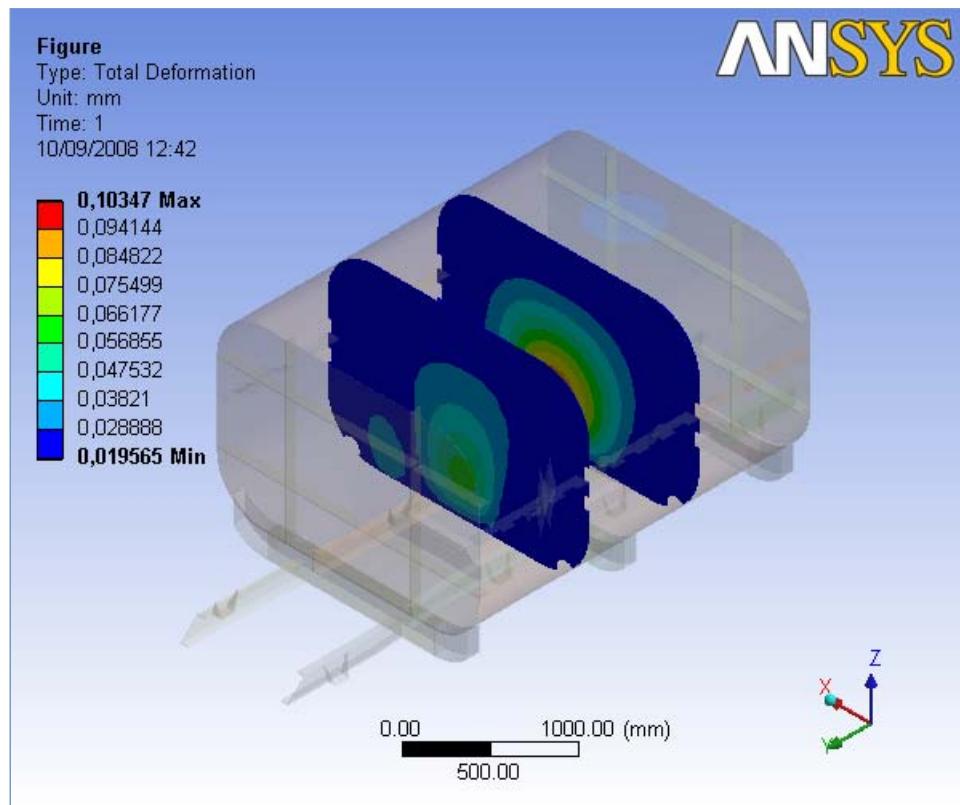
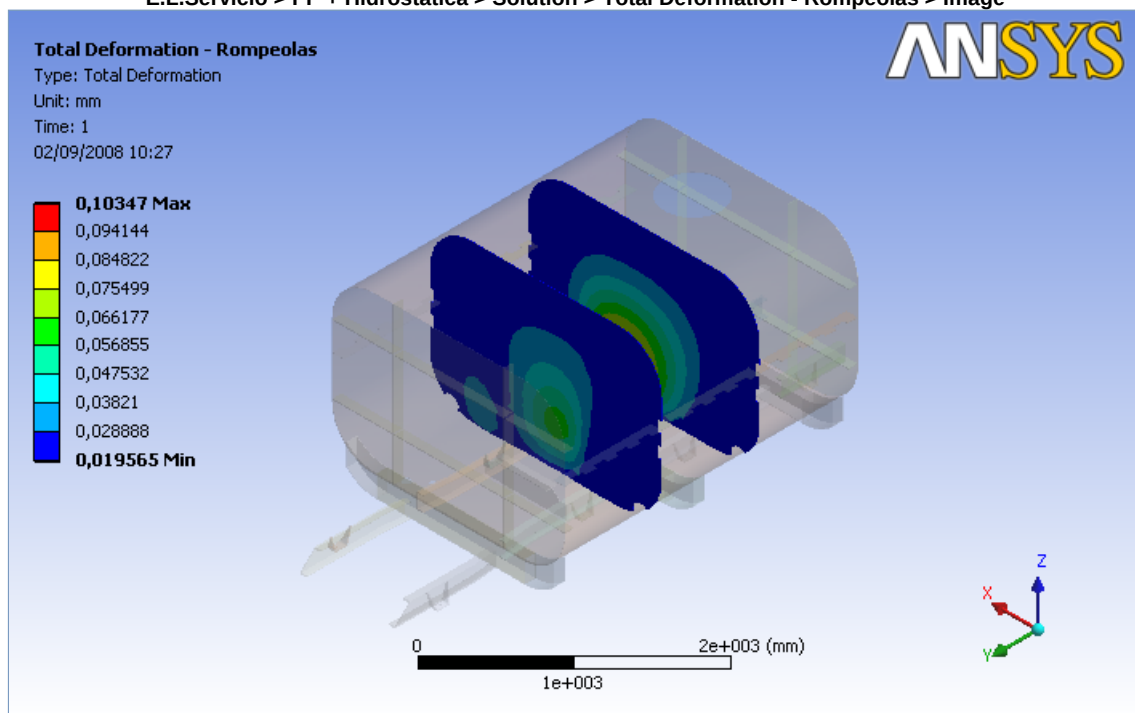


FIGURE 60

E.L.Servicio > PP + Hidrostatica > Solution > Total Deformation - Rompeolas > Image



PP + Hidrostatica + Frenada

TABLE 87
E.L.Servicio > Analysis

Object Name	PP + Hidrostatica + Frenada
State	Fully Defined
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Options	
Reference Temp	22, °C

TABLE 88
E.L.Servicio > PP + Hidrostatica + Frenada > Analysis Settings

Object Name	<i>Analysis Settings</i>
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	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Nonlinear Controls	
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Output Controls	
Calculate Stress	Yes
Calculate Strain	Yes
Calculate Results At	All Time Points
Analysis Data Management	
Solver Files Directory	C:\Antonio\PFC APEREA\CRB ACERO\DATOS\Análisis Workbench 4\CRB8000I Simulation Files\PP + Hidrostatica + Frenada (2)\
Future Analysis	None
Save ANSYS db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No

TABLE 89
E.L.Servicio > PP + Hidrostatica + Frenada > Accelerations

Object Name	<i>Standard Earth Gravity</i>
State	Fully Defined
Scope	
Geometry	All Bodies
Definition	
X Component	0, mm/s ² (ramped)
Y Component	0, mm/s ² (ramped)
Z Component	-9806,6 mm/s ² (ramped)
Suppressed	No
Direction	-Z Direction

FIGURE 61
E.L.Servicio > PP + Hidrostatica + Frenada > Standard Earth Gravity

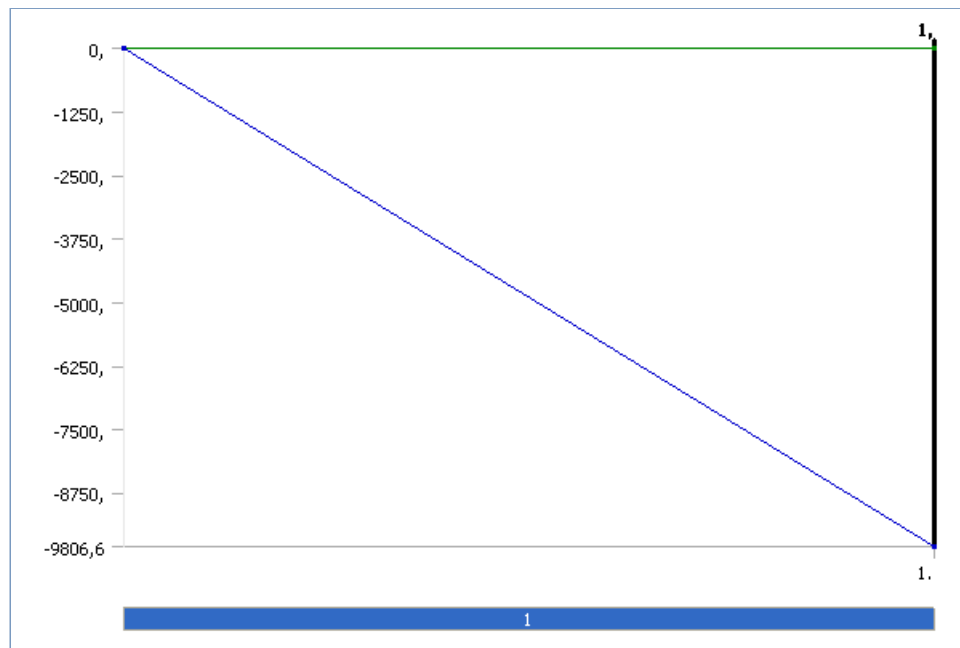


TABLE 90
E.L.Servicio > PP + Hidrostatica + Frenada > Loads

Object Name	Fixed Support	PP Agua	Hidrostatica	Frenada
State	Fully Defined			
Scope				
Scoping Method	Named Selection			
Named Selection	Apoyo Falso bastidor	Fondo	Hidrostatica	Frenada
Definition				
Type	Fixed Support	Pressure	Hydrostatic Pressure	Pressure
Suppressed	No			
Define By		Normal To		Normal To
Magnitude		1,415e-002 MPa (ramped)		7,7971e-004 MPa (ramped)
Fluid Density			1,e-009 kg/mm³	
Hydrostatic Acceleration				
Define By			Vector	
Magnitude			9810, mm/s²	
Direction			Defined	
Free Surface Location				
X Coordinate			-0,62317 mm	
Y Coordinate			2976, mm	
Z Coordinate			1609, mm	
Location			Defined	

FIGURE 62
E.L.Servicio > PP + Hidrostatica + Frenada > PP Agua

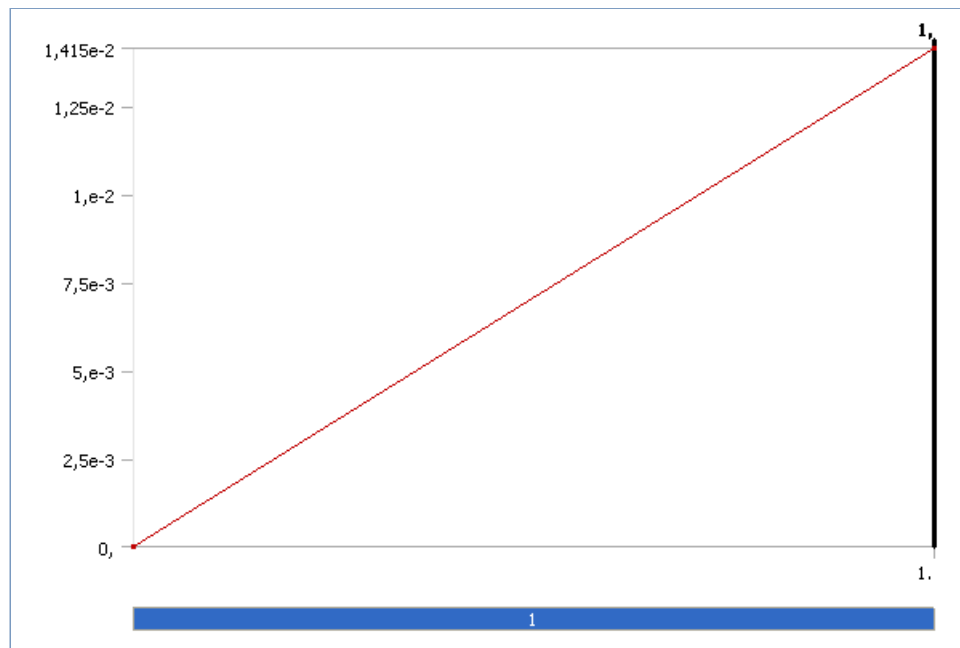
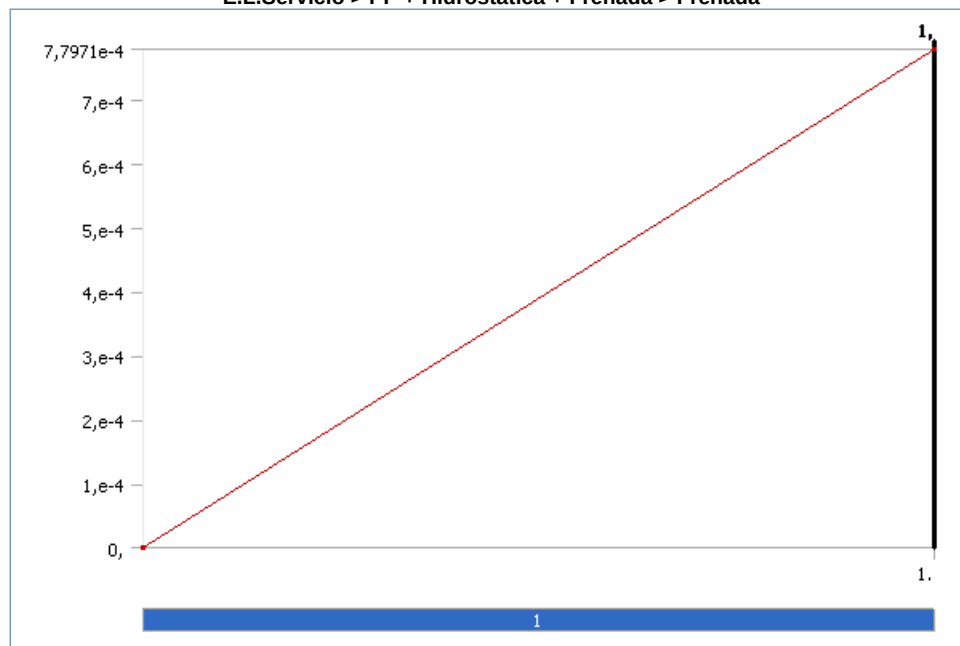


FIGURE 63
E.L.Servicio > PP + Hidrostatica + Frenada > Frenada



Solution

TABLE 91
E.L.Servicio > PP + Hidrostatica + Frenada > Solution

Object Name	<i>Solution</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1,
Refinement Depth	2,

TABLE 92
E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Update Interval	2,5 s
Display Points	All

TABLE 93
E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Results

Object Name	Equivalent (von-Mises) Elastic Strain - Tanque	Total Deformation - Tanque	Equivalent (von-Mises) Elastic Strain - falso bastidor	Total Deformation - falso bastidor	Equivalent (von-Mises) Elastic Strain - Durmientes
State	Solved				
Scope					
Geometry	3 Bodies		8 Bodies		9 Bodies
Definition					
Type	Equivalent (von-Mises) Elastic Strain	Total Deformation	Equivalent (von-Mises) Elastic Strain	Total Deformation	Equivalent (von-Mises) Elastic Strain
Display Time	End Time				
Results					
Minimum	1,1567e-007 mm/mm	1,8945e-003 mm	3,3761e-008 mm/mm	0, mm	1,203e-007 mm/mm
Maximum	1,4442e-004 mm/mm	0,72127 mm	6,9982e-005 mm/mm	1,994e-002 mm	8,9834e-005 mm/mm
Minimum Occurs On	Tanque.asm:1,Superficie lateral.par:1		falso bastidor.asm:2,largueros.par:6	falso bastidor.asm:1,largueros.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:1
Maximum Occurs On	Tanque.asm:1,Superficie lateral.par:1		falso bastidor.asm:1,largueros.par:1	falso bastidor.asm:2,largueros.par:7	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1
Information					
Time	1, s				
Load Step	1				
Substep	1				
Iteration Number	1				

FIGURE 64

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Figure

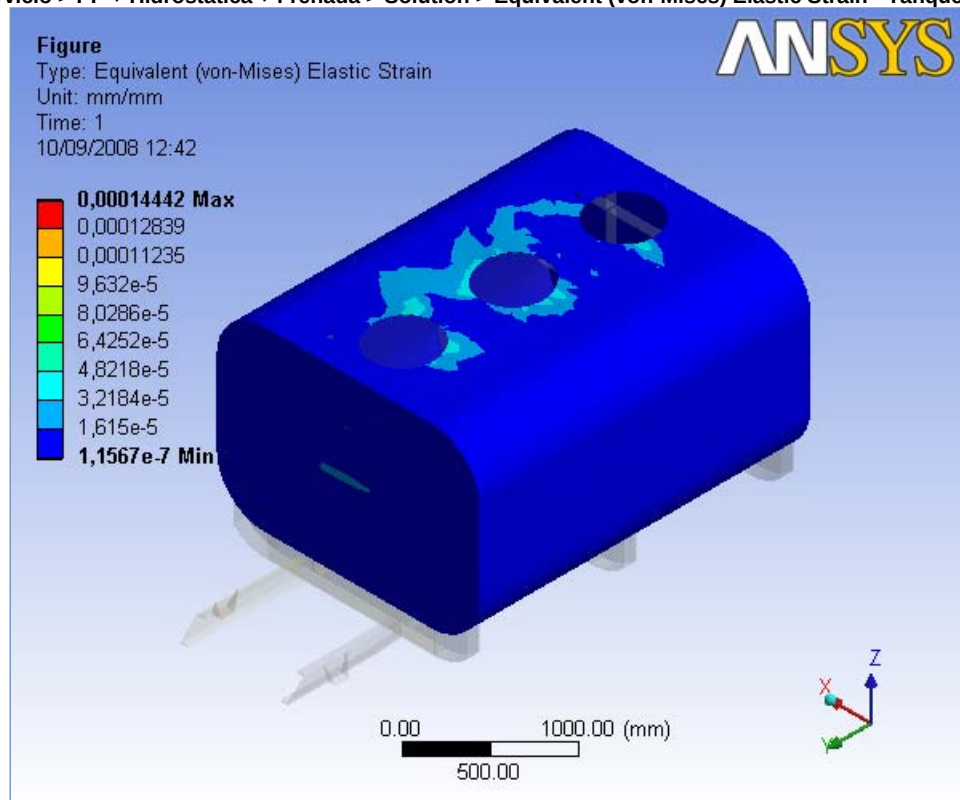


FIGURE 65

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Image

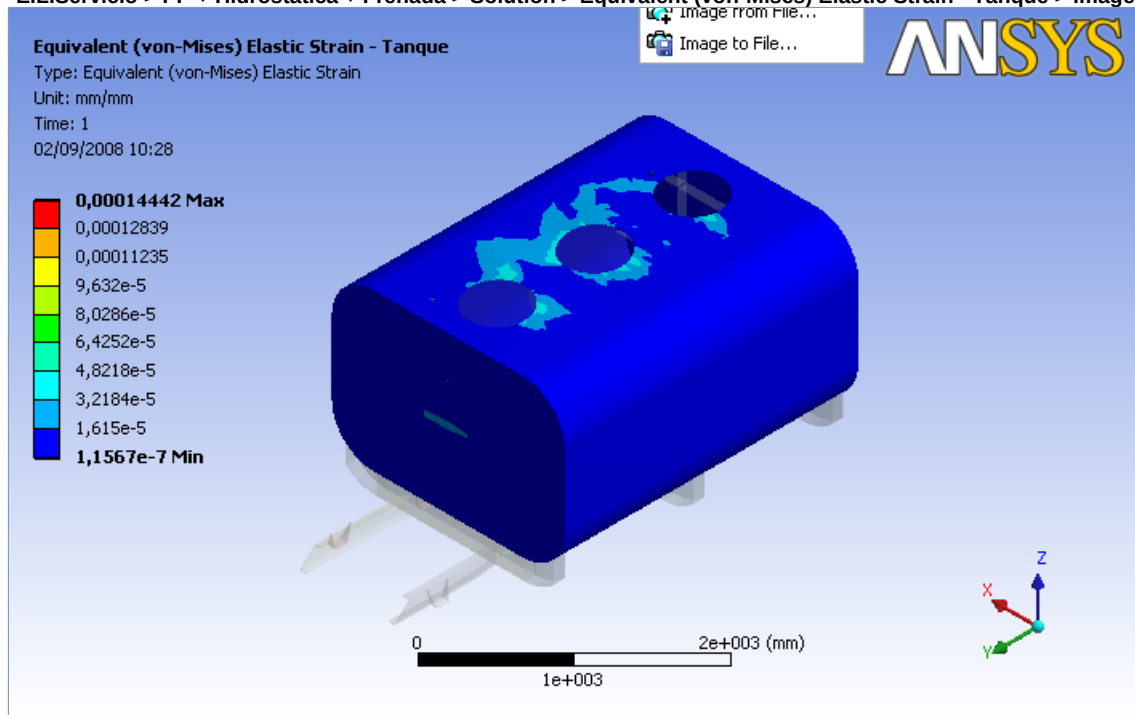


FIGURE 66

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Figure 2

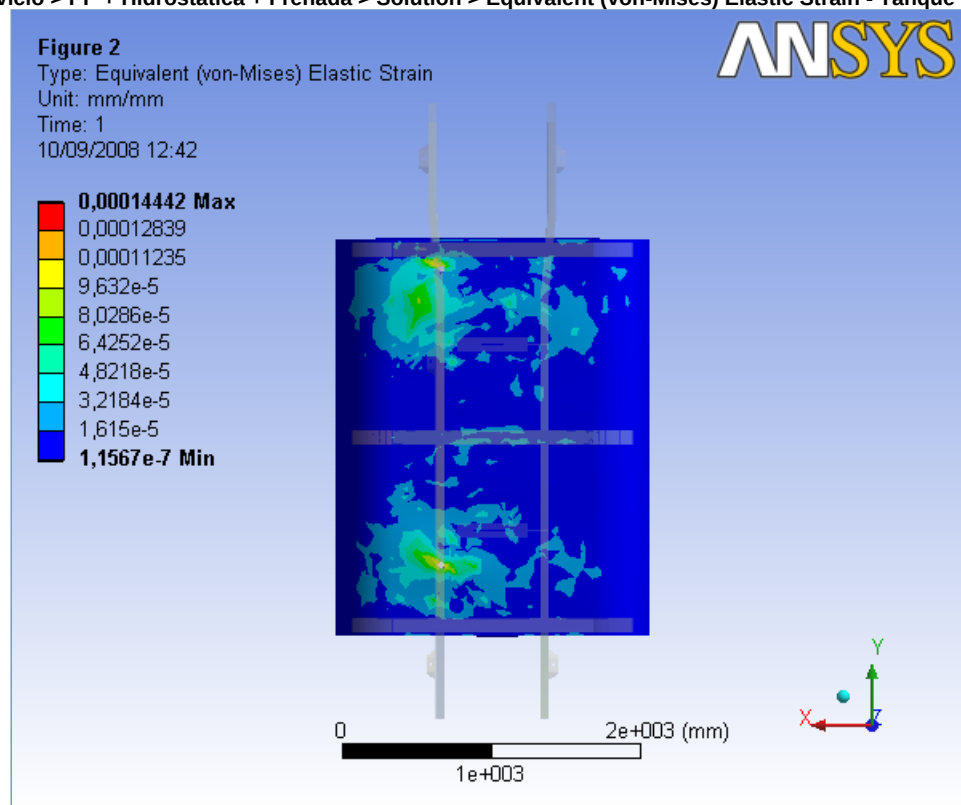


FIGURE 67

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Image

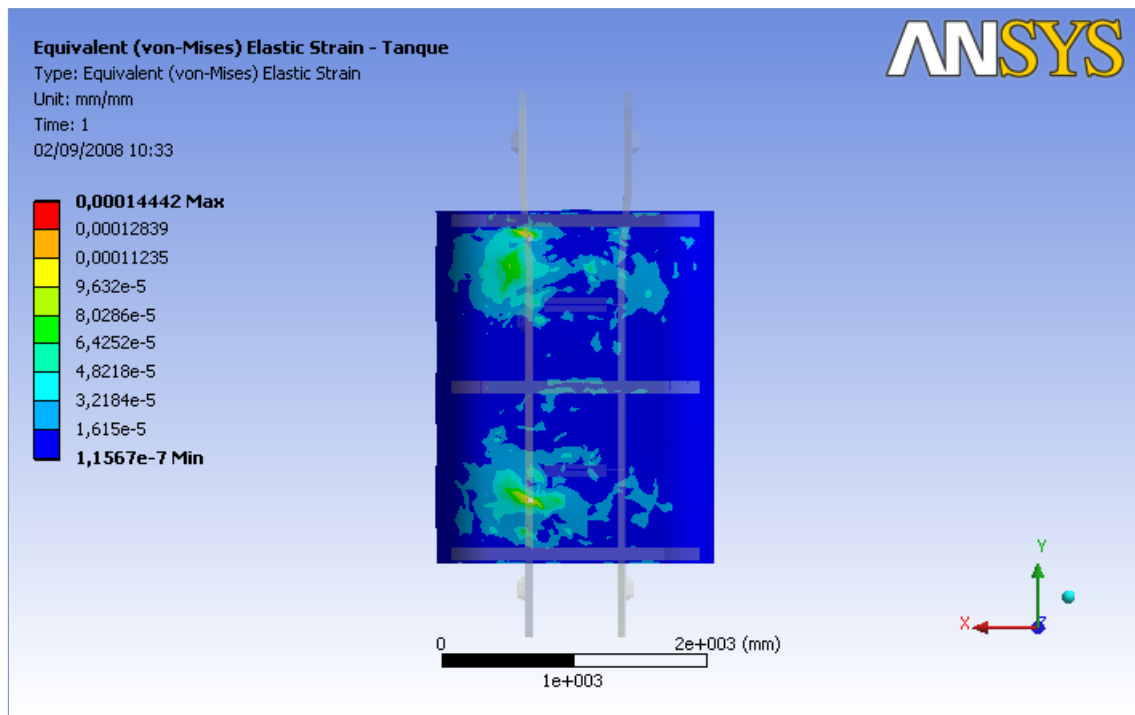


FIGURE 68

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Total Deformation - Tanque > Figure

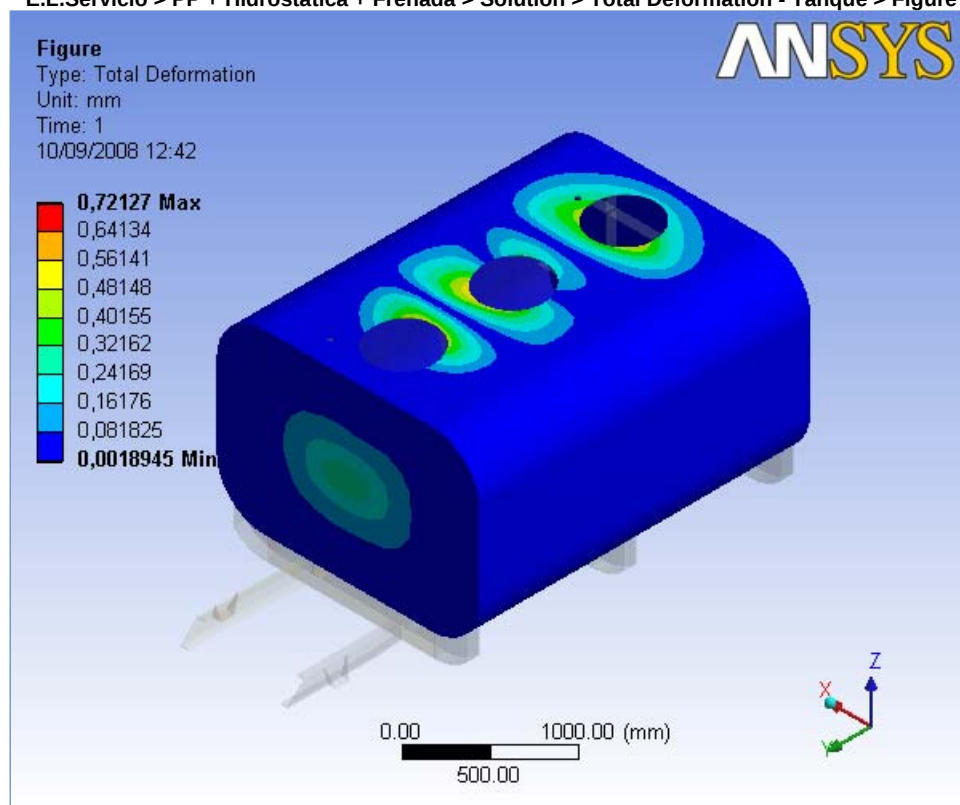


FIGURE 69

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Total Deformation - Tanque > Image

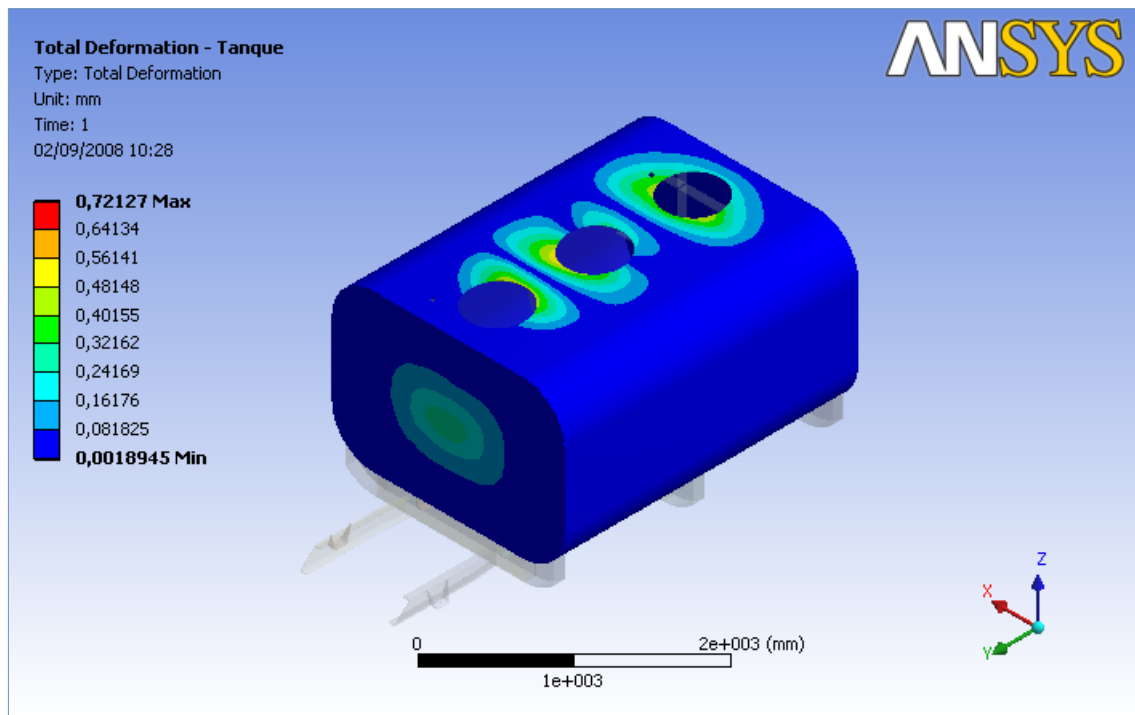


FIGURE 70

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Total Deformation - Tanque > Figure 2

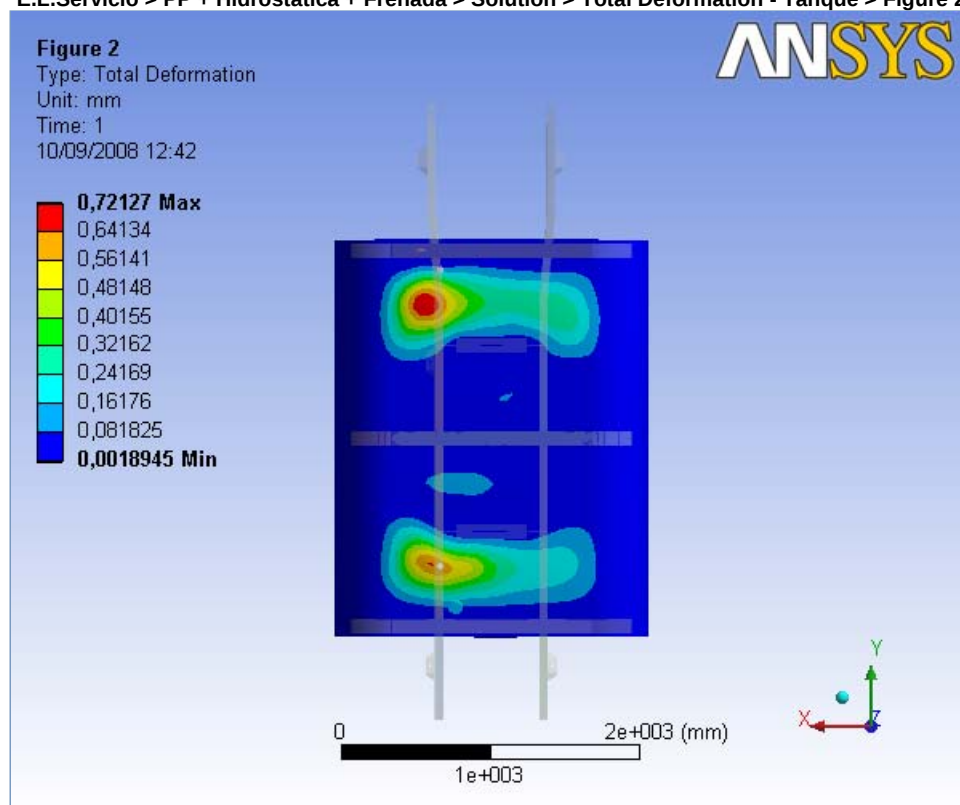


FIGURE 71

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Total Deformation - Tanque > Image

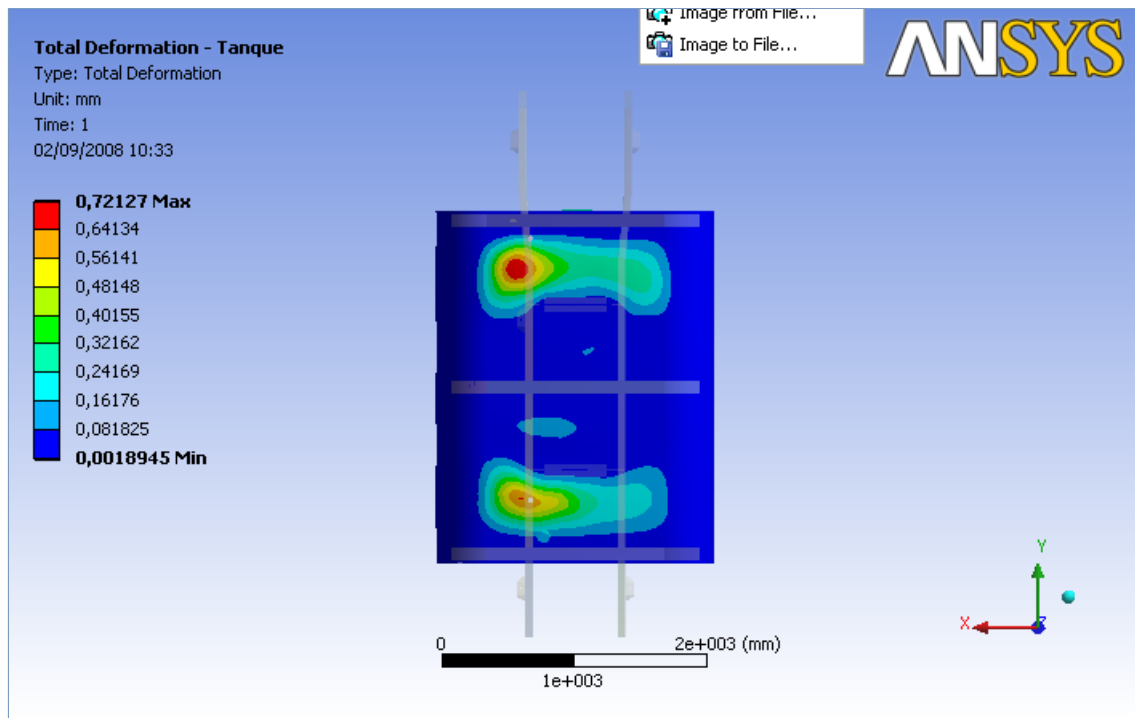


FIGURE 72

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Elastic Strain - falso bastidor > Figure

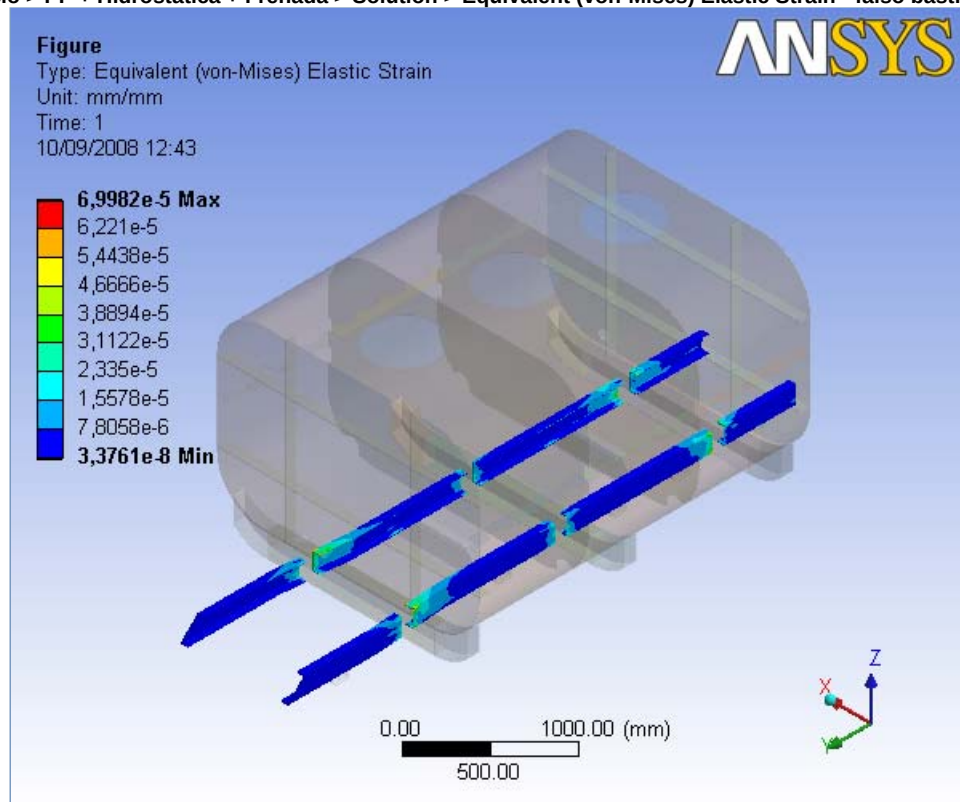


FIGURE 73

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Elastic Strain - falso bastidor > Image

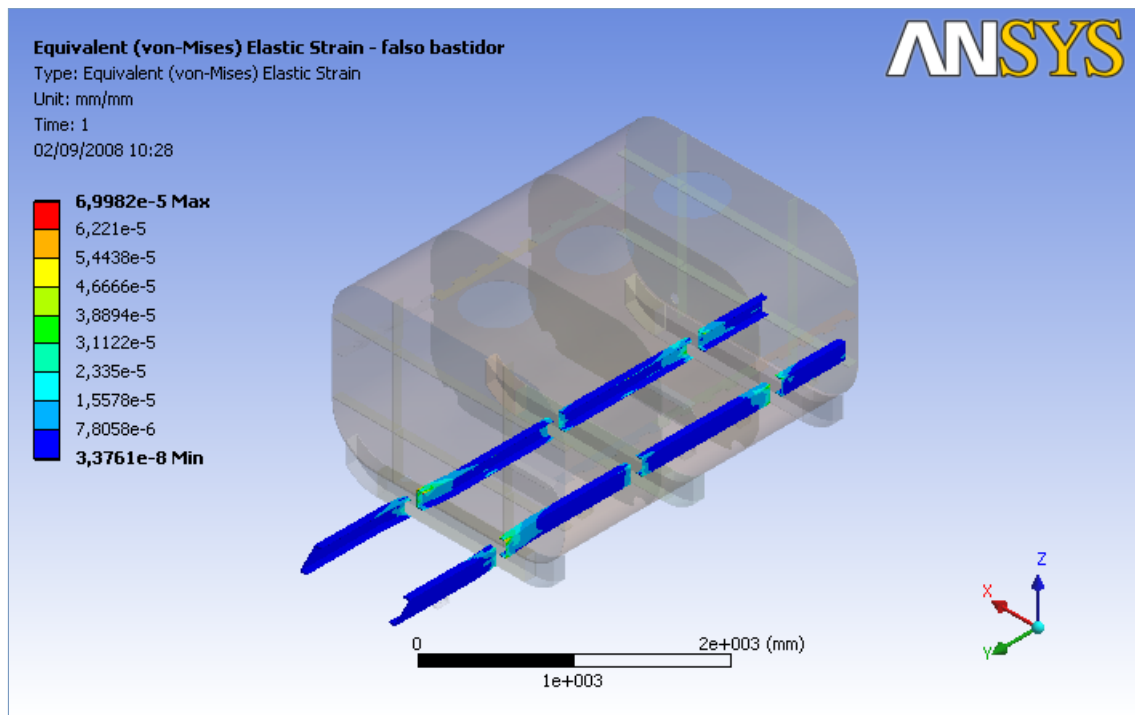


FIGURE 74

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Total Deformation - falso bastidor > Figure

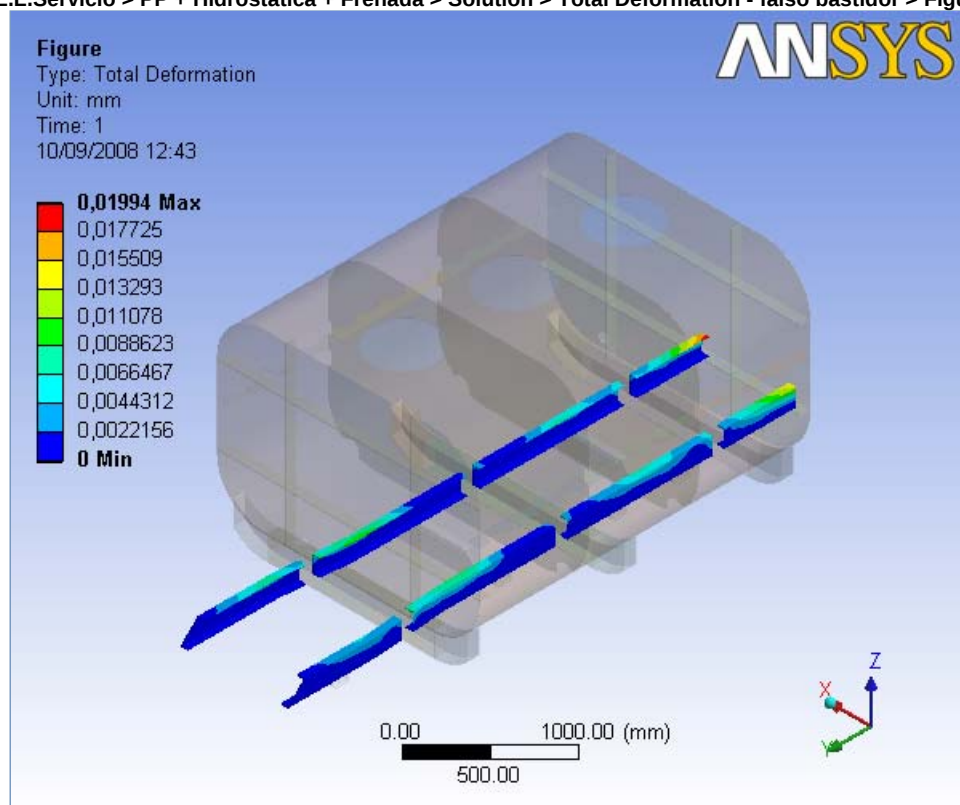


FIGURE 75

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Total Deformation - falso bastidor > Image

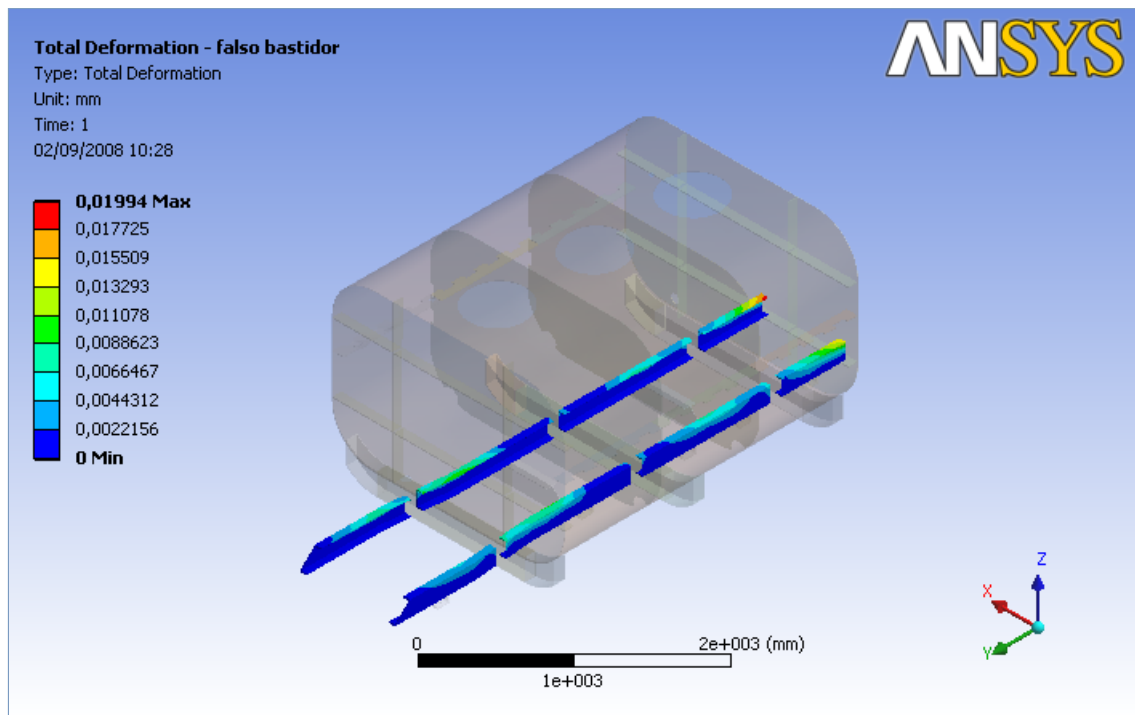


FIGURE 76

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Elastic Strain - Durmientes > Figure

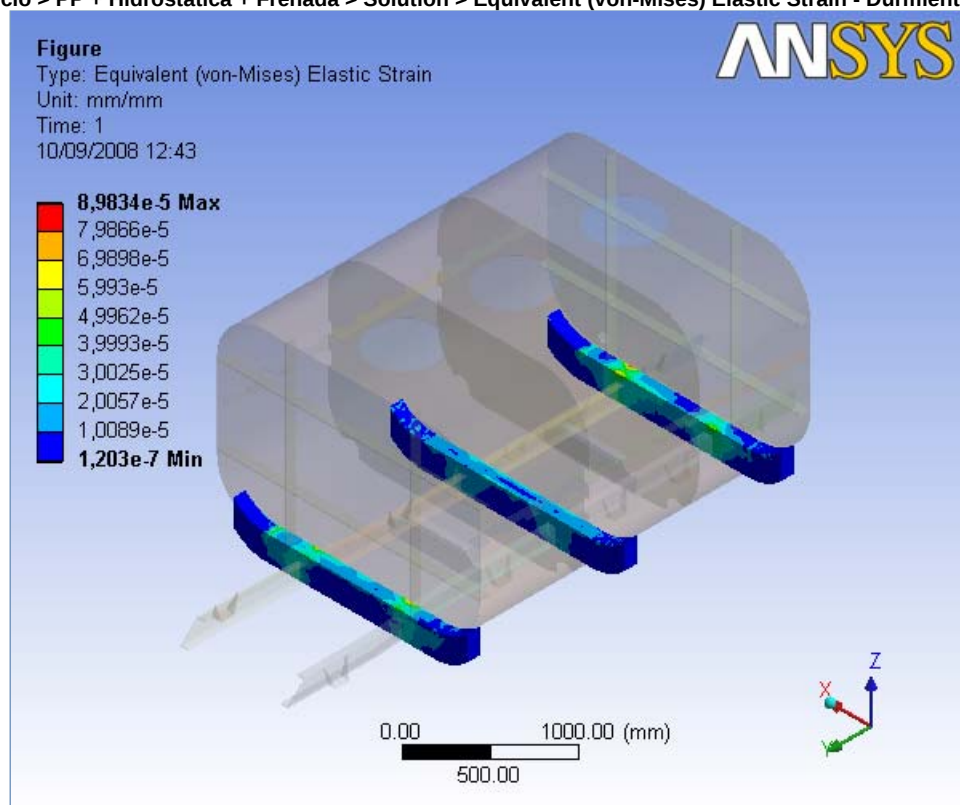


FIGURE 77

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Elastic Strain - Durmientes > Image

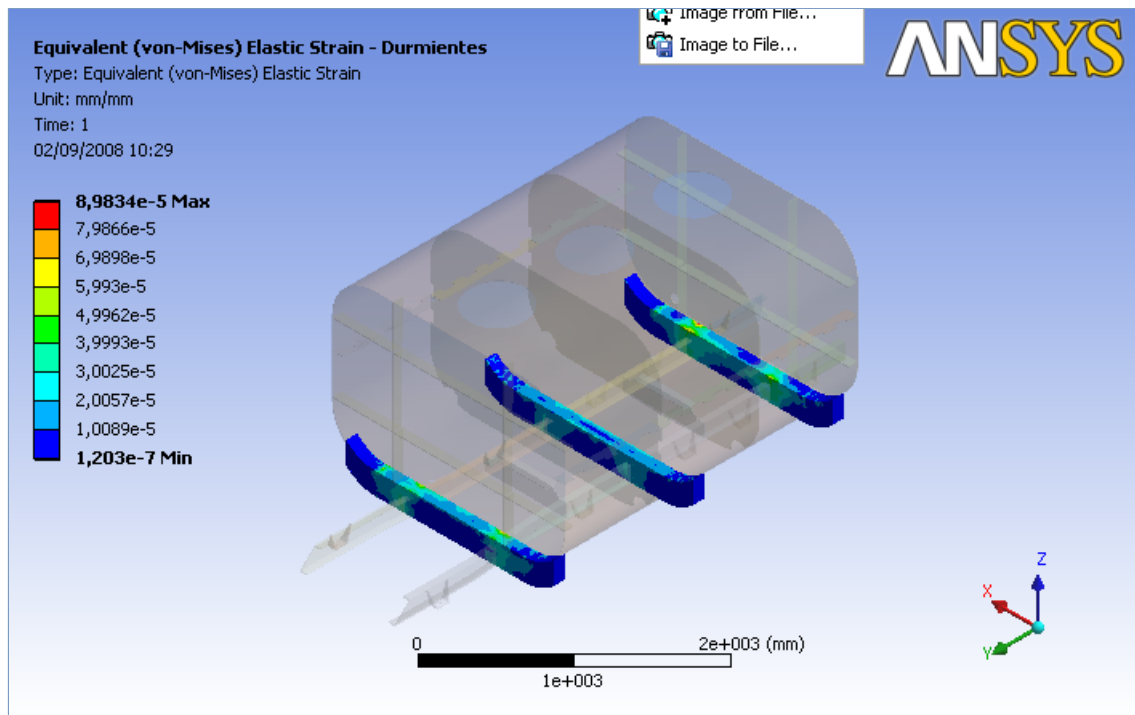


TABLE 94
E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Results

E.L.Servicio > PP > Hidrostatica > Frenada > Solution > Results			
Object Name	Total Deformation - Durmientes	Equivalent (von-Mises) Elastic Strain - Rompeolas	Total Deformation - Rompeolas
State	Solved		
Scope			
Geometry	9 Bodies	2 Bodies	
Definition			
Type	Total Deformation	Equivalent (von-Mises) Elastic Strain	Total Deformation
Display Time	End Time		
Results			
Minimum	5,1611e-005 mm	6,2479e-007 mm/mm	1,8978e-002 mm
Maximum	2,4471e-002 mm	2,2995e-004 mm/mm	5,588 mm
Minimum Occurs On	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes_2.par:1	Tanque.asm:1,Rompeolas transversal.par:1	Tanque.asm:1,Rompeolas transversal.par:2
Maximum Occurs On	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes_2.par:1	Tanque.asm:1,Rompeolas transversal.par:1	
Information			
Time	1, s		
Load Step	1		
Substep	1		
Iteration Number	1		

FIGURE 78
E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Total Deformation - Durmientes > Figure

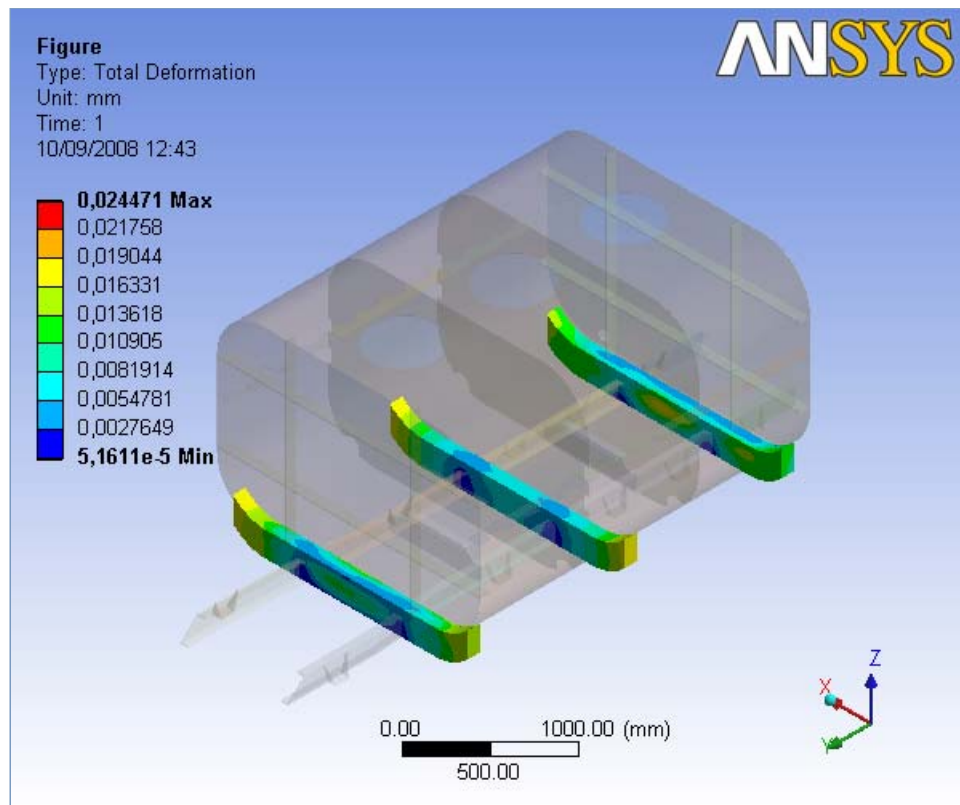


FIGURE 79

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Total Deformation - Durmientes > Image

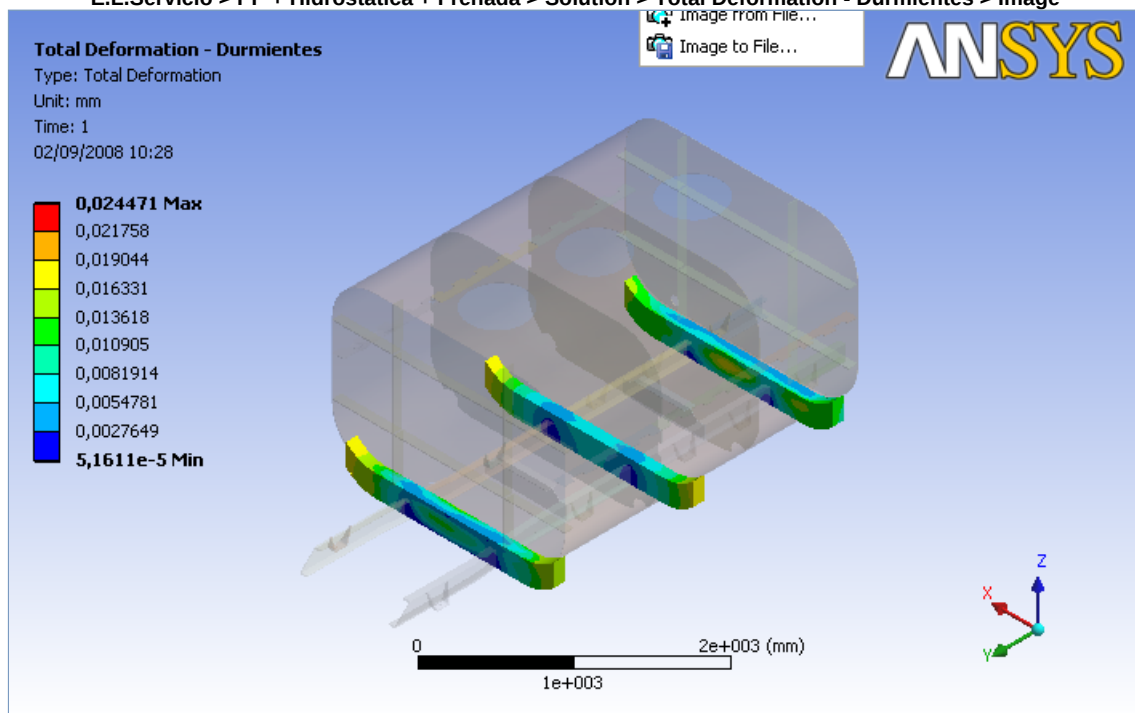


FIGURE 80

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Elastic Strain - Rompeolas > Figure

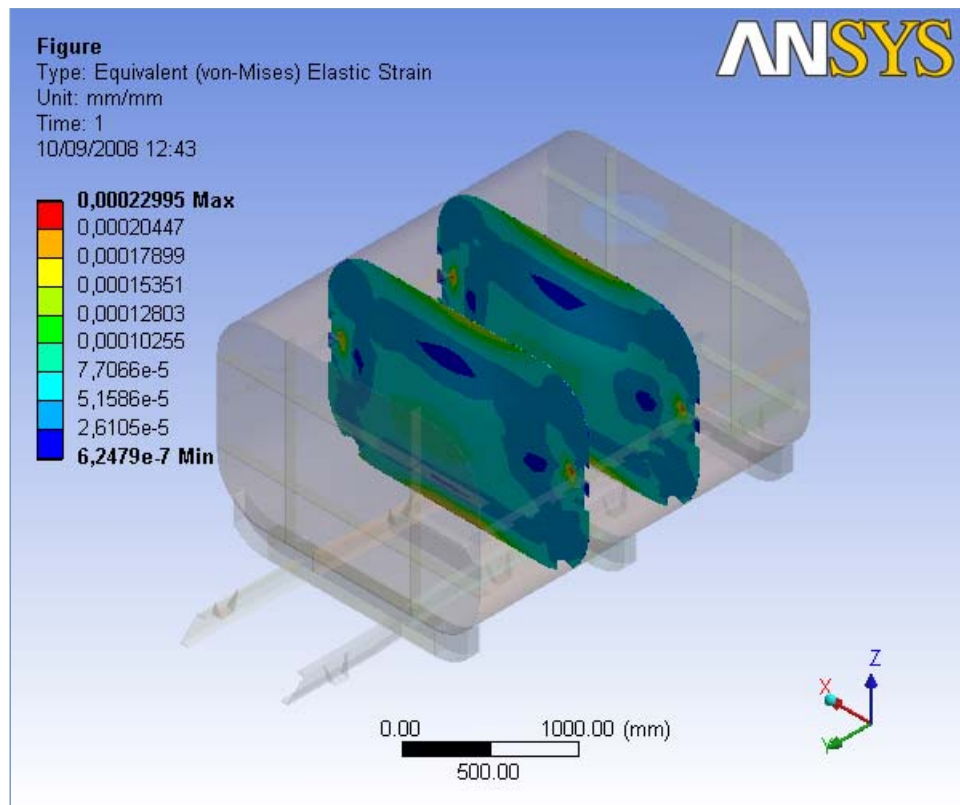


FIGURE 81

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Equivalent (von-Mises) Elastic Strain - Rompeolas > Image

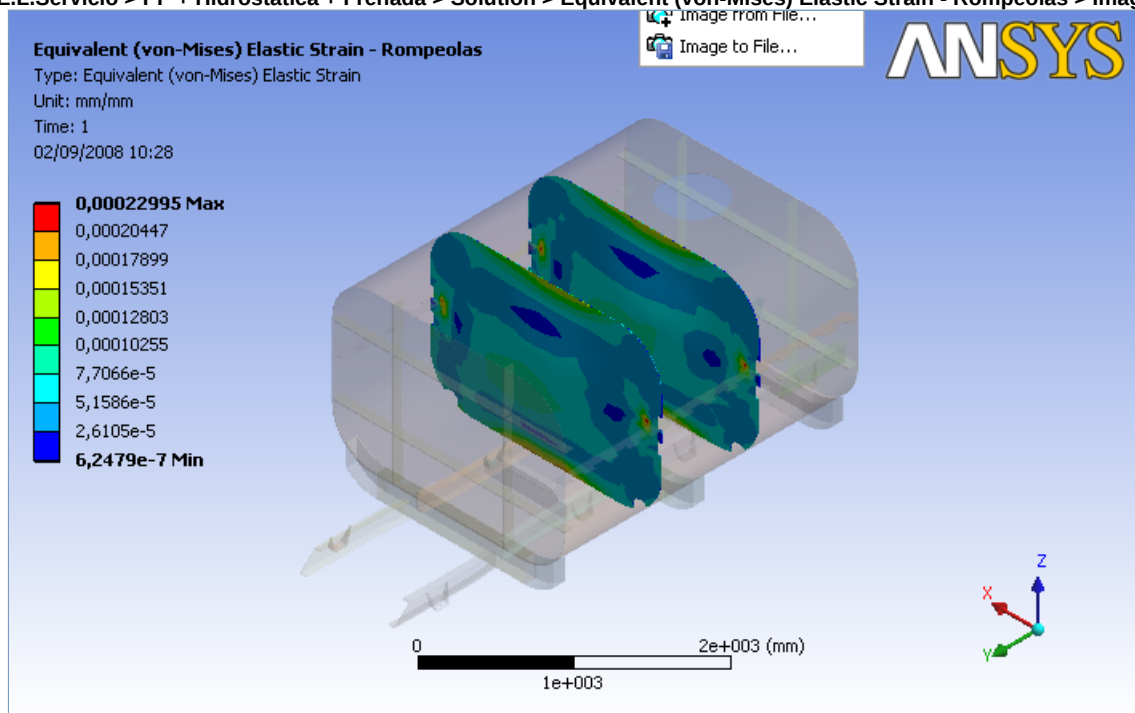


FIGURE 82

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Total Deformation - Rompeolas > Figure

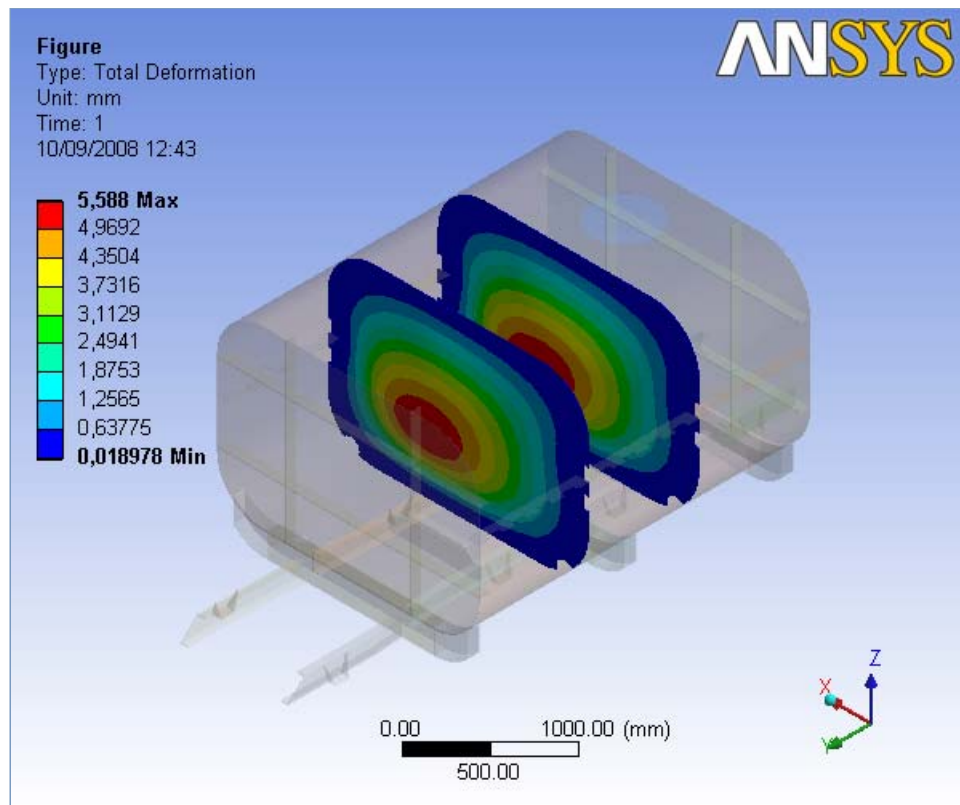
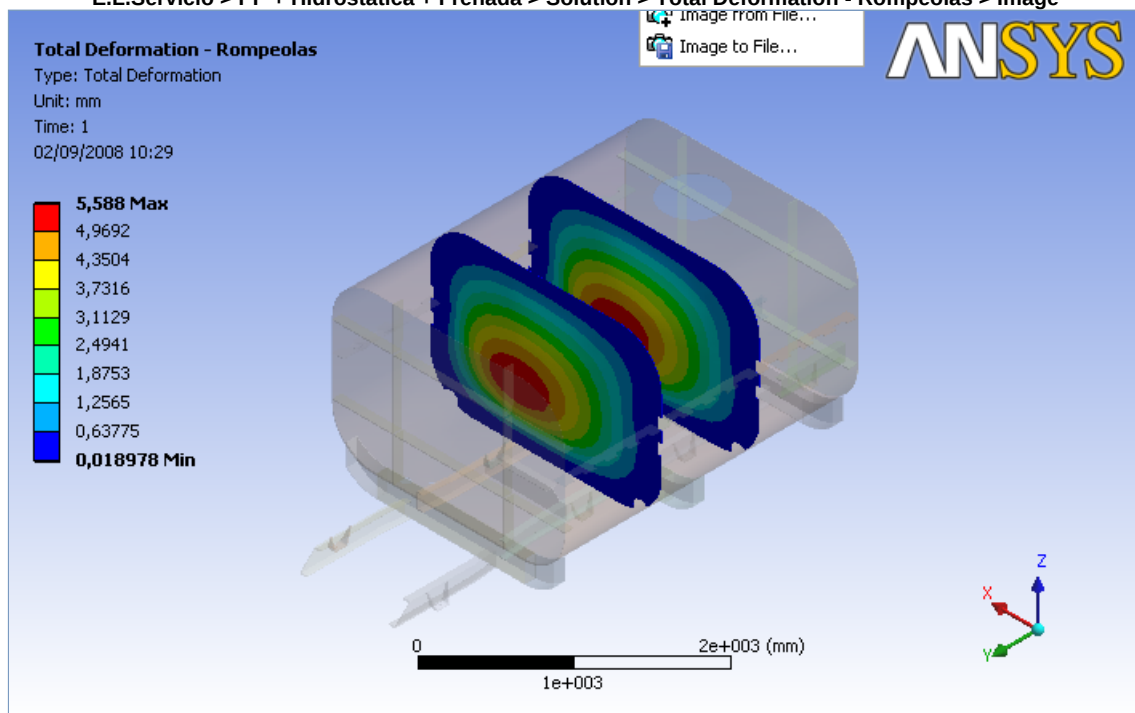


FIGURE 83

E.L.Servicio > PP + Hidrostatica + Frenada > Solution > Total Deformation - Rompeolas > Image



PP + Hidrostatica + Curva

TABLE 95
E.L.Servicio > Analysis

Object Name	PP + Hidrostatica + Curva
State	Fully Defined
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Options	
Reference Temp	22, °C

TABLE 96
E.L.Servicio > PP + Hidrostatica + Curva > Analysis Settings

Object Name	<i>Analysis Settings</i>
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	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Nonlinear Controls	
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Output Controls	
Calculate Stress	Yes
Calculate Strain	Yes
Calculate Results At	All Time Points
Analysis Data Management	
Solver Files Directory	C:\Antonio\PFC APEREA\CRB ACERO\DATOS\Analisis Workbench 4\CRB8000I Simulation Files\PP + Hidrostatica + Curva (2)\
Future Analysis	None
Save ANSYS db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No

TABLE 97
E.L.Servicio > PP + Hidrostatica + Curva > Accelerations

Object Name	<i>Standard Earth Gravity</i>
State	Fully Defined
Scope	
Geometry	All Bodies
Definition	
X Component	0, mm/s ² (ramped)
Y Component	0, mm/s ² (ramped)
Z Component	-9806,6 mm/s ² (ramped)
Suppressed	No
Direction	-Z Direction

FIGURE 84
E.L.Servicio > PP + Hidrostatica + Curva > Standard Earth Gravity

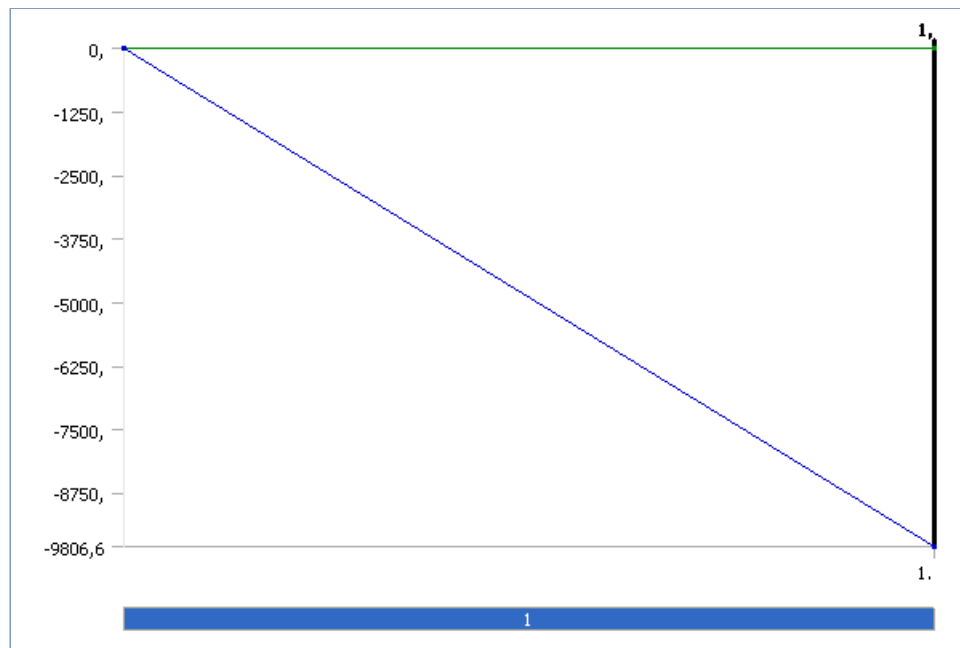


TABLE 98
E.L.Servicio > PP + Hidrostatica + Curva > Loads

Object Name	Fixed Support	PP Agua	Hidrostatica	Curva
State	Fully Defined			
Scope				
Scoping Method	Named Selection			
Named Selection	Apoyo Falso bastidor	Fondo	Hidrostatica	Curva
Definition				
Type	Fixed Support	Pressure	Hydrostatic Pressure	Pressure
Suppressed	No			
Define By		Normal To		Normal To
Magnitude		1,415e-002 MPa (ramped)		3,5842e-003 MPa (ramped)
Fluid Density			1,e-009 kg/mm³	
Hydrostatic Acceleration				
Define By			Vector	
Magnitude			9810, mm/s²	
Direction			Defined	
Free Surface Location				
X Coordinate			-0,62317 mm	
Y Coordinate			2976, mm	
Z Coordinate			1609, mm	
Location			Defined	

FIGURE 85
E.L.Servicio > PP + Hidrostatica + Curva > PP Agua

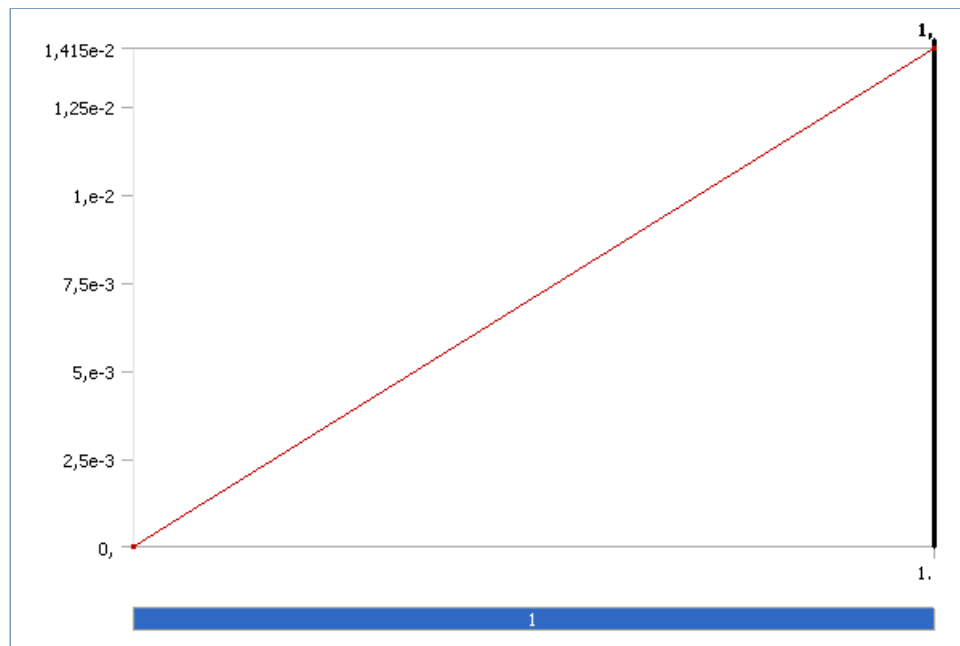
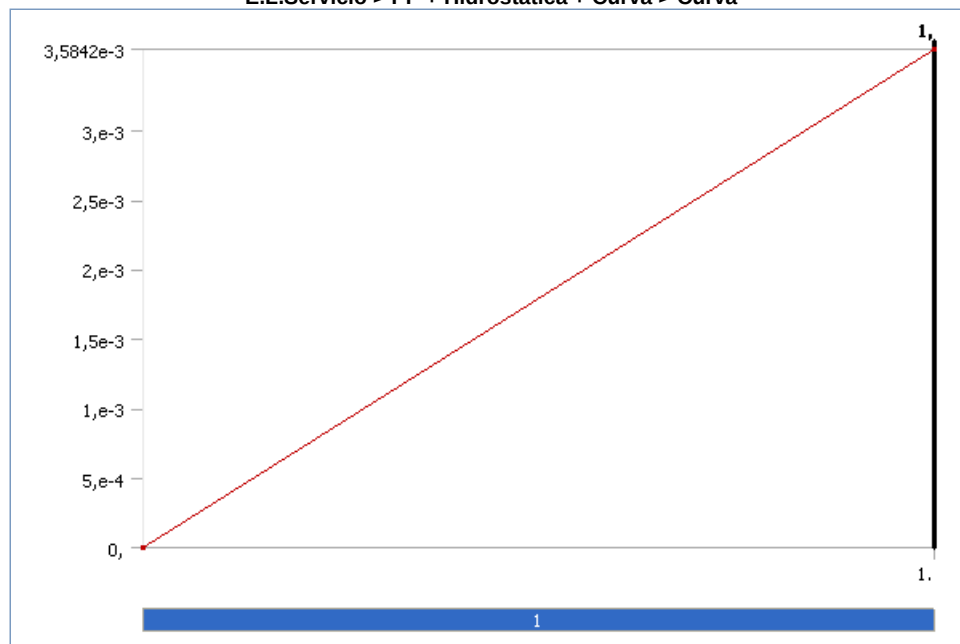


FIGURE 86
E.L.Servicio > PP + Hidrostatica + Curva > Curva



Solution

TABLE 99
E.L.Servicio > PP + Hidrostatica + Curva > Solution

Object Name	<i>Solution</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1,
Refinement Depth	2,

TABLE 100
E.L.Servicio > PP + Hidrostatica + Curva > Solution > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Update Interval	2,5 s
Display Points	All

TABLE 101
E.L.Servicio > PP + Hidrostatica + Curva > Solution > Results

Object Name	Equivalent (von-Mises) Elastic Strain - Tanque	Total Deformation - Tanque	Equivalent (von-Mises) Elastic Strain - falso bastidor	Total Deformation - falso bastidor	Equivalent (von-Mises) Elastic Strain - Durmientes
State	Solved				
Scope					
Geometry	3 Bodies		8 Bodies		9 Bodies
Definition					
Type	Equivalent (von-Mises) Elastic Strain	Total Deformation	Equivalent (von-Mises) Elastic Strain	Total Deformation	Equivalent (von-Mises) Elastic Strain
Display Time	End Time				
Results					
Minimum	7,5546e-008 mm/mm	3,1827e-003 mm	3,2121e-008 mm/mm	0, mm	1,8559e-008 mm/mm
Maximum	1,4071e-004 mm/mm	0,72172 mm	7,0696e-005 mm/mm	2,3384e-002 mm	8,6597e-005 mm/mm
Minimum Occurs On	Tanque.asm:1,Superficie lateral.par:1		falso bastidor.asm:2,largueros.par:6	falso bastidor.asm:1,largueros.par:1	Tanque.asm:1,CONJ. DURMIENTE.asm:2,Durmientes.par:1
Maximum Occurs On	Tanque.asm:1,Superficie lateral.par:1		falso bastidor.asm:1,largueros.par:1	falso bastidor.asm:2,largueros.par:7	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes.par:2
Information					
Time	1, s				
Load Step	1				
Substep	1				
Iteration Number	1				

FIGURE 87
E.L.Servicio > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Figure

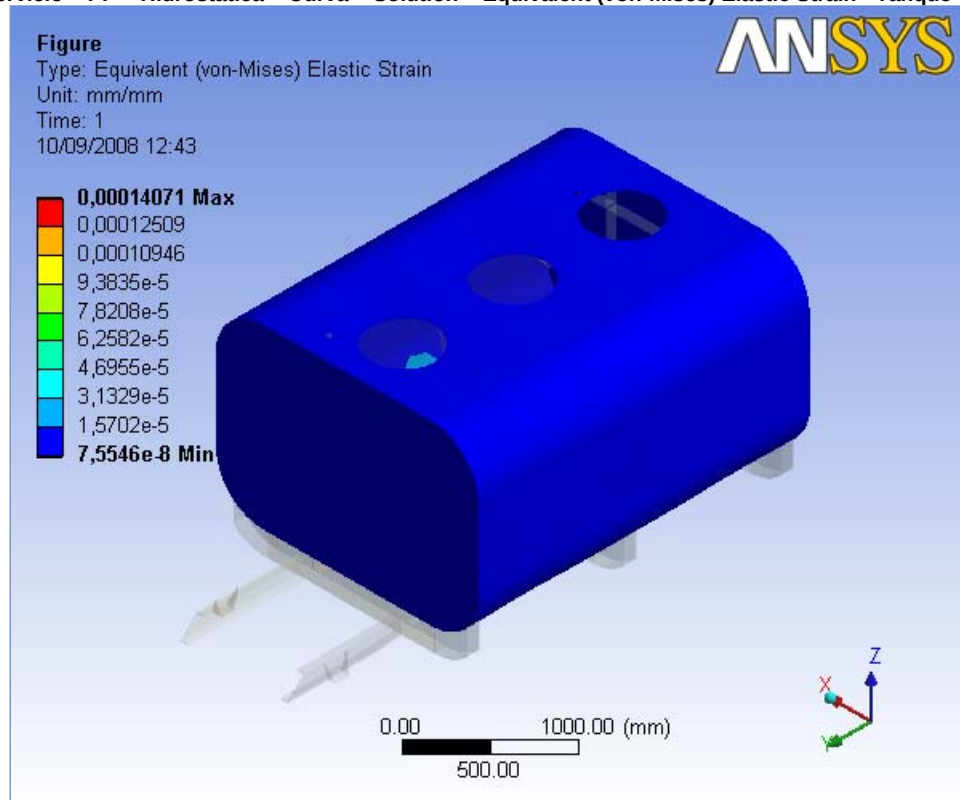


FIGURE 88

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Image

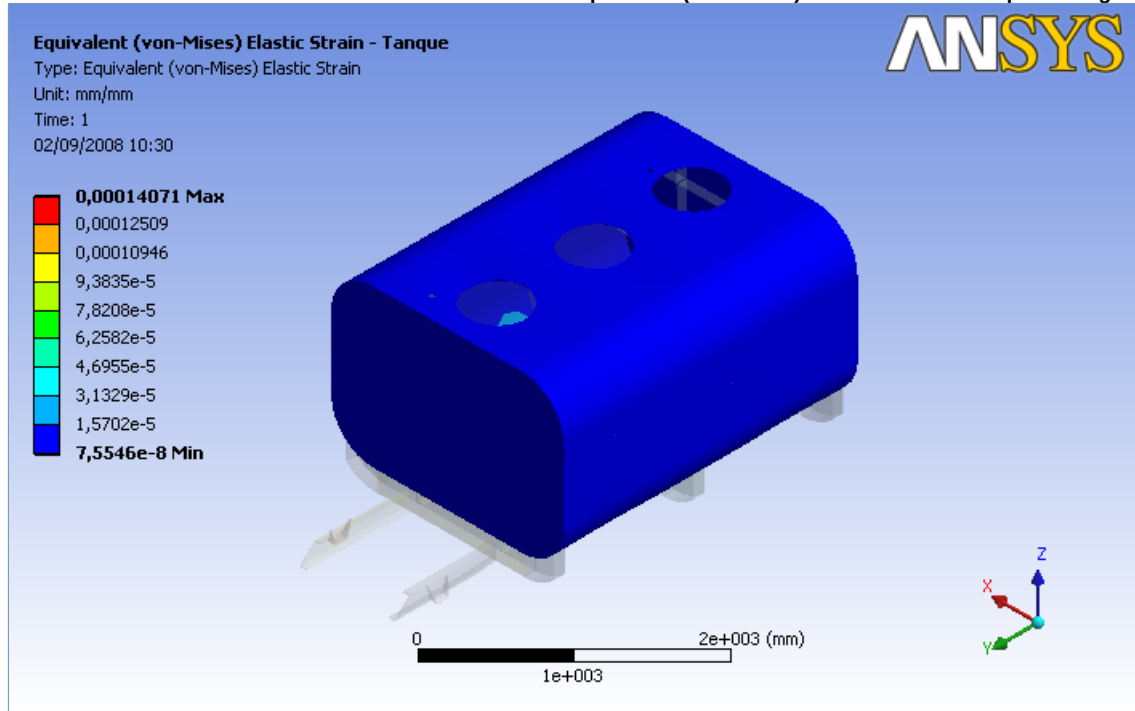


FIGURE 89

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Figure 2

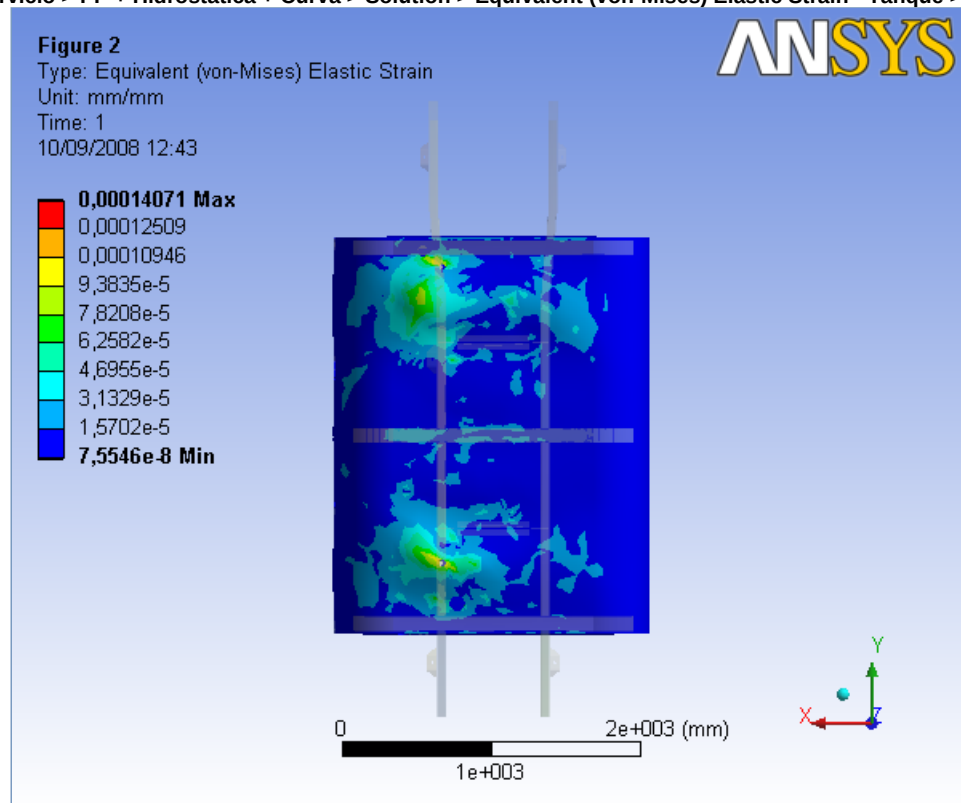


FIGURE 90

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Elastic Strain - Tanque > Image

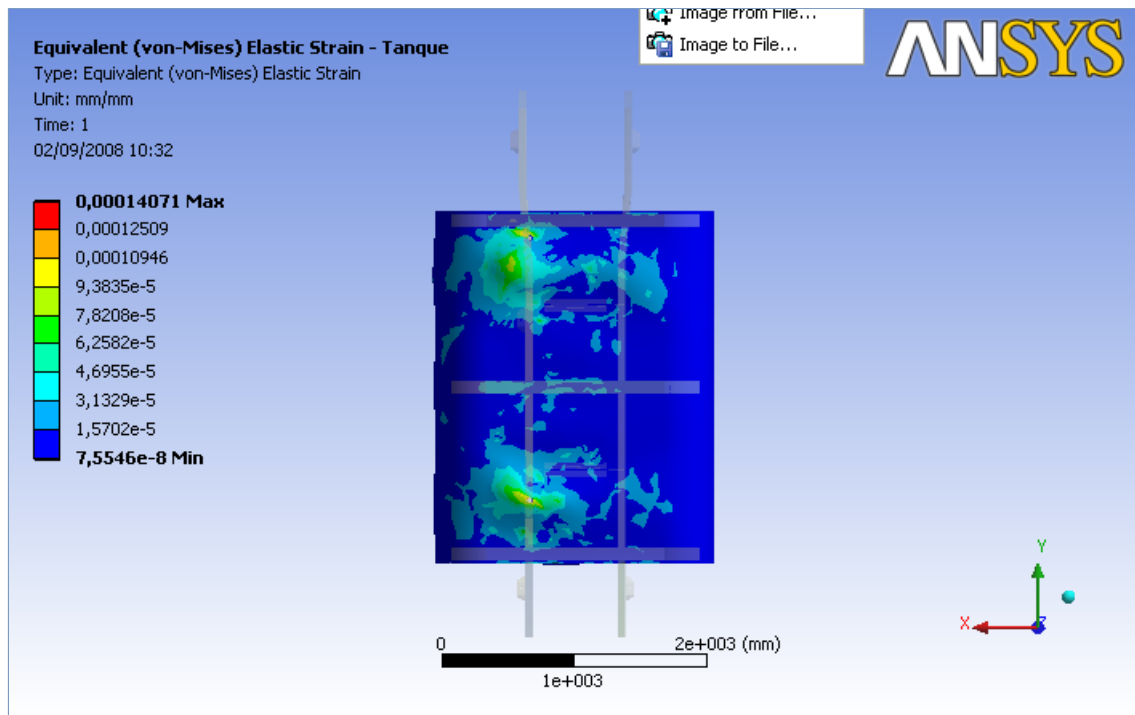


FIGURE 91

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Total Deformation - Tanque > Figure

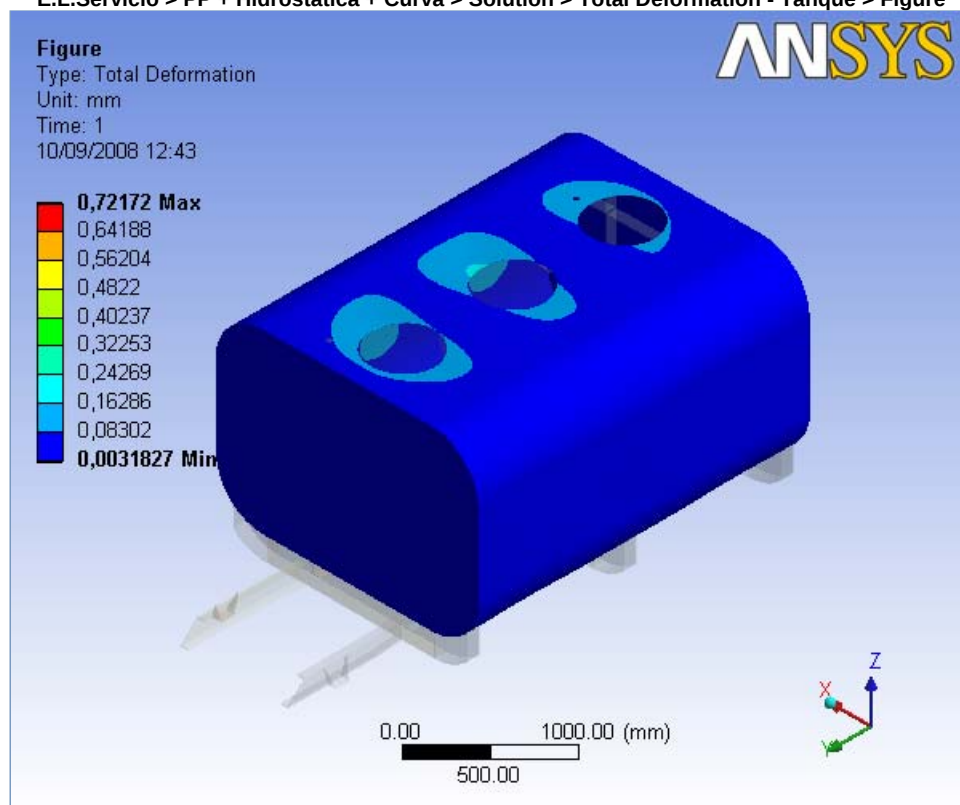


FIGURE 92

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Total Deformation - Tanque > Image

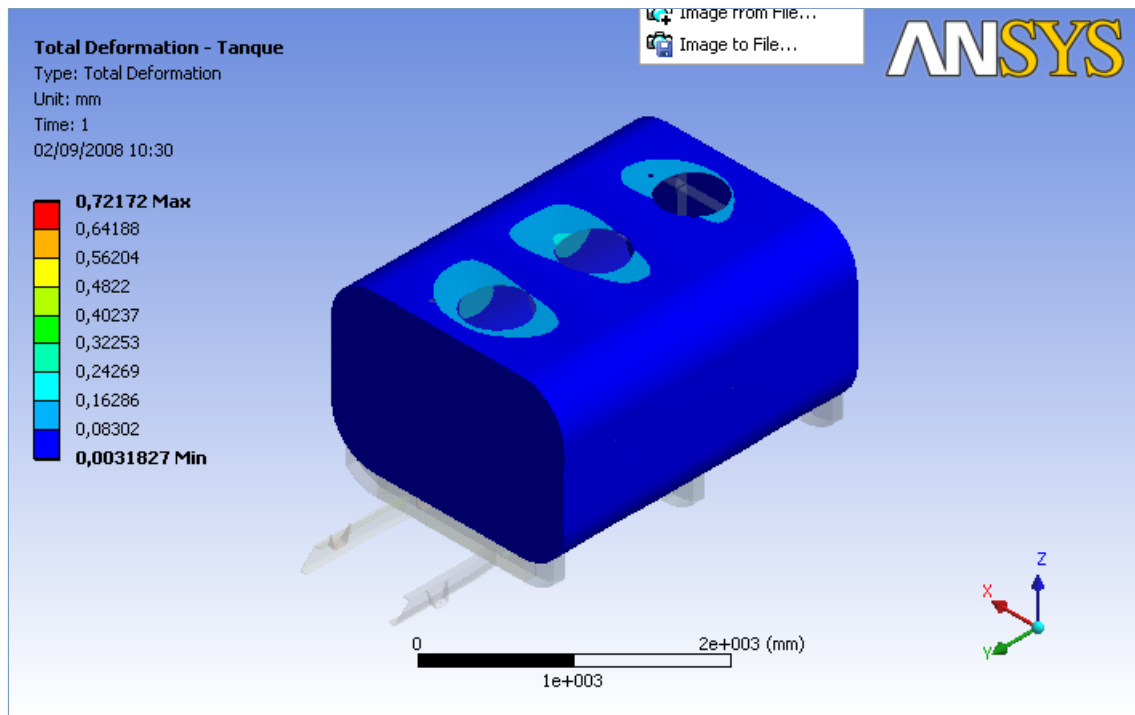


FIGURE 93

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Total Deformation - Tanque > Figure 2

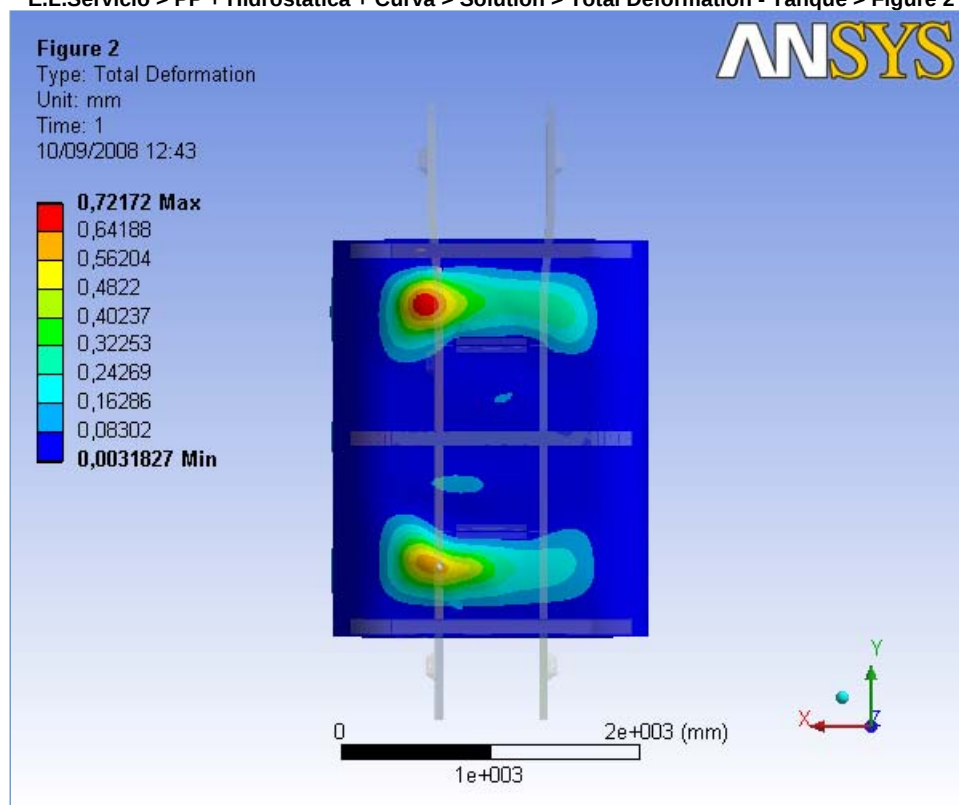


FIGURE 94

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Total Deformation - Tanque > Image

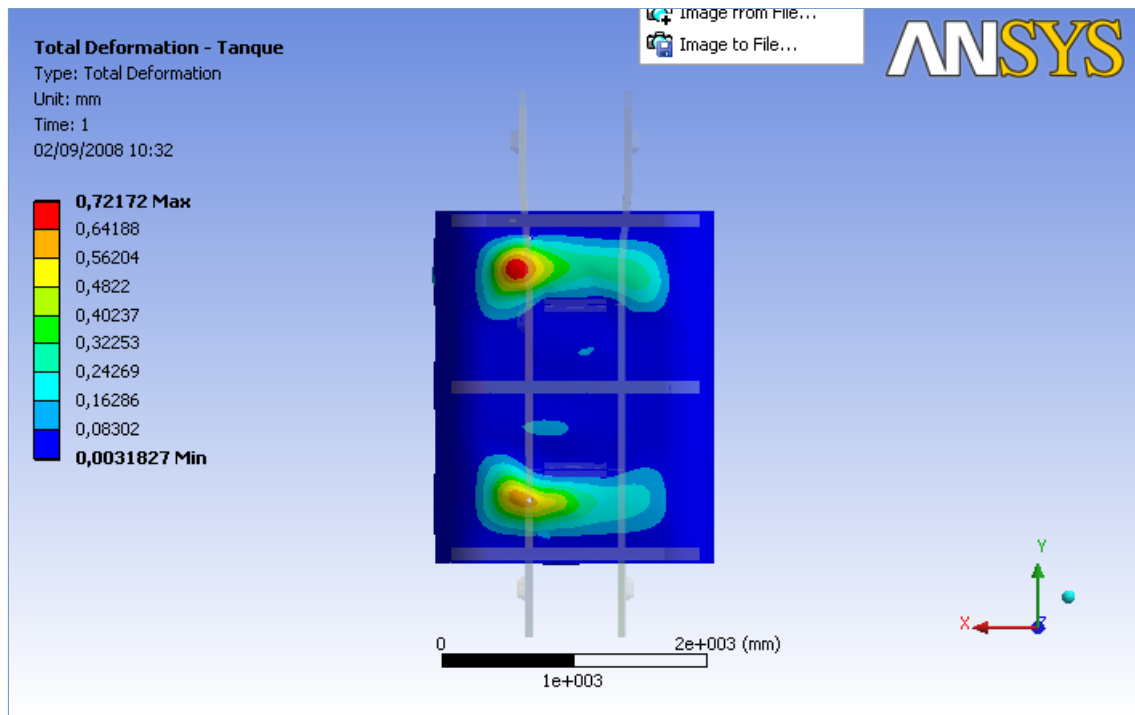


FIGURE 95

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Elastic Strain - falso bastidor > Figure

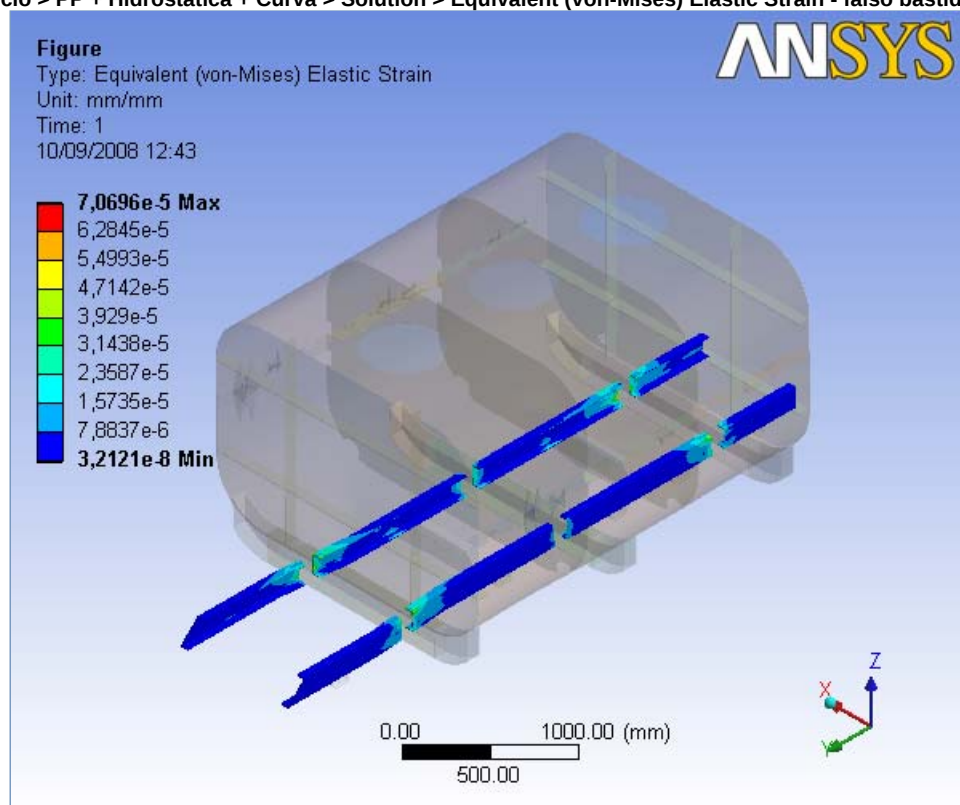


FIGURE 96

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Elastic Strain - falso bastidor > Image

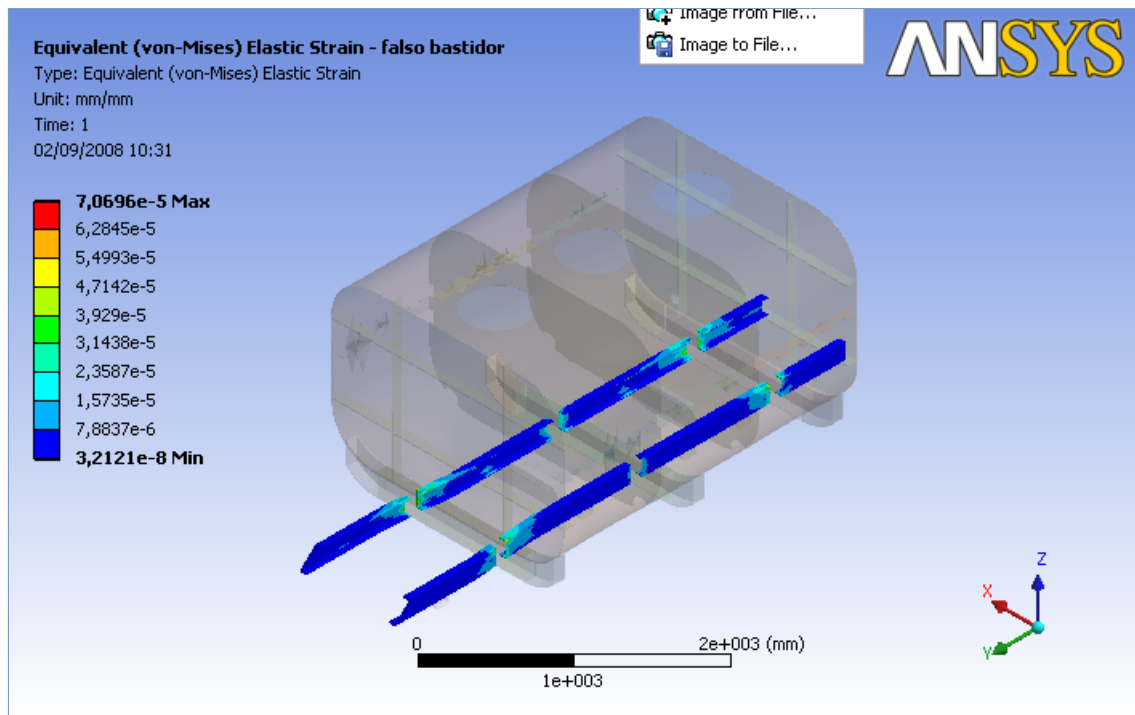


FIGURE 97

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Total Deformation - falso bastidor > Figure

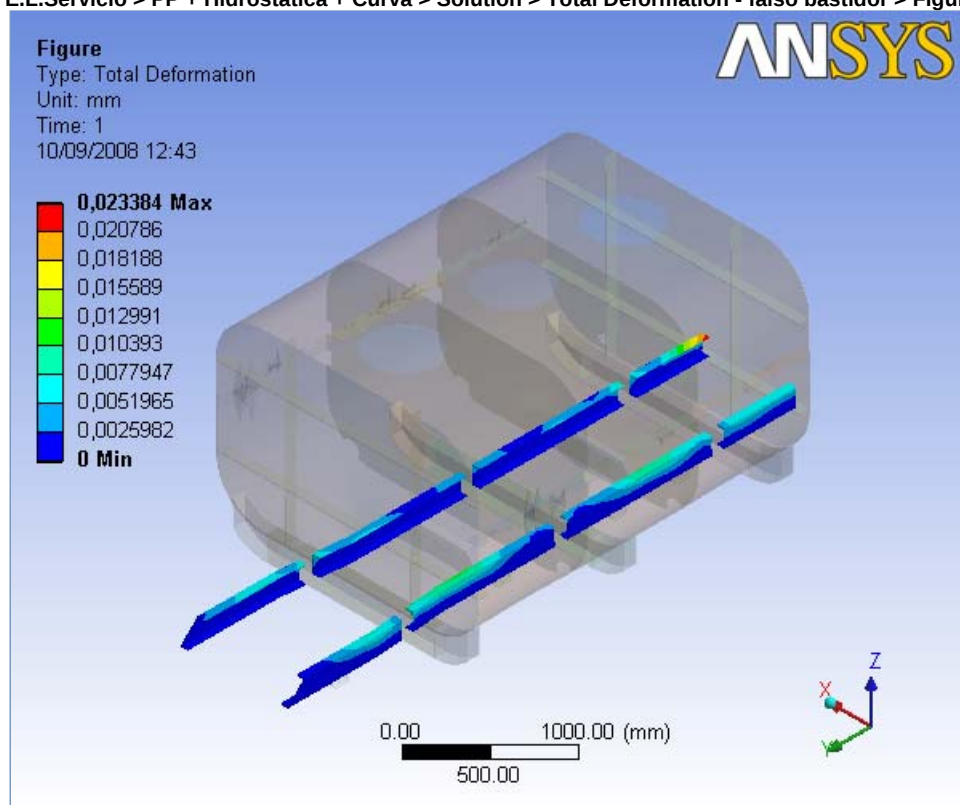


FIGURE 98

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Total Deformation - falso bastidor > Image

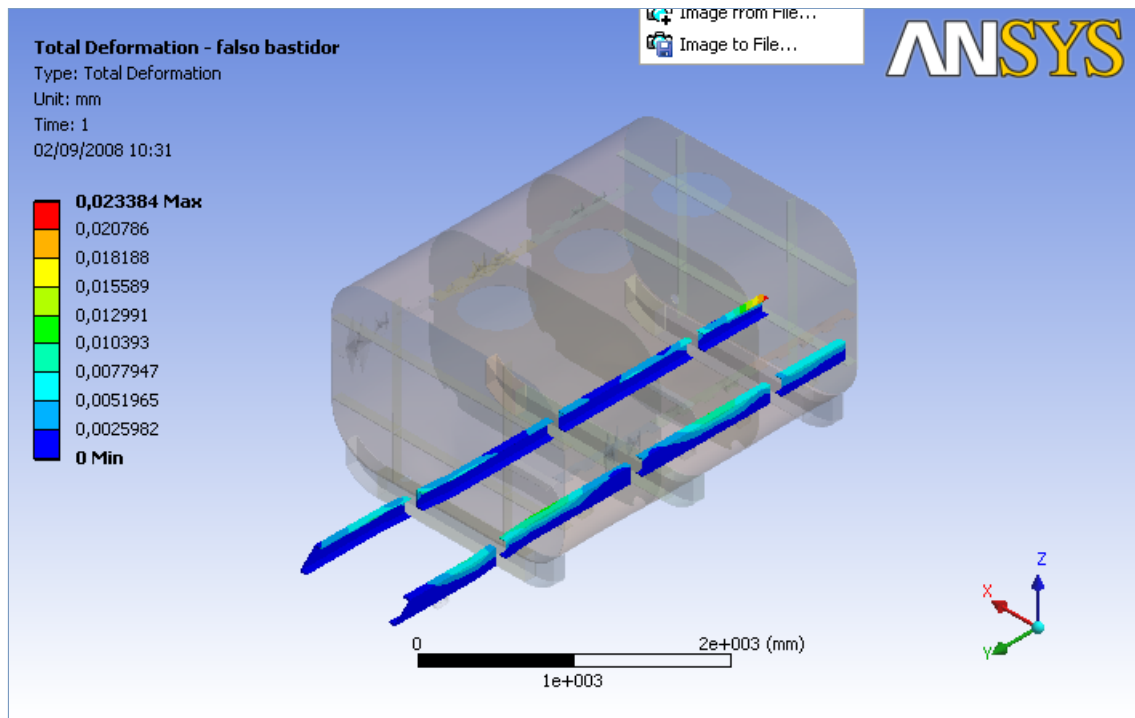


FIGURE 99

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Elastic Strain - Durmientes > Figure

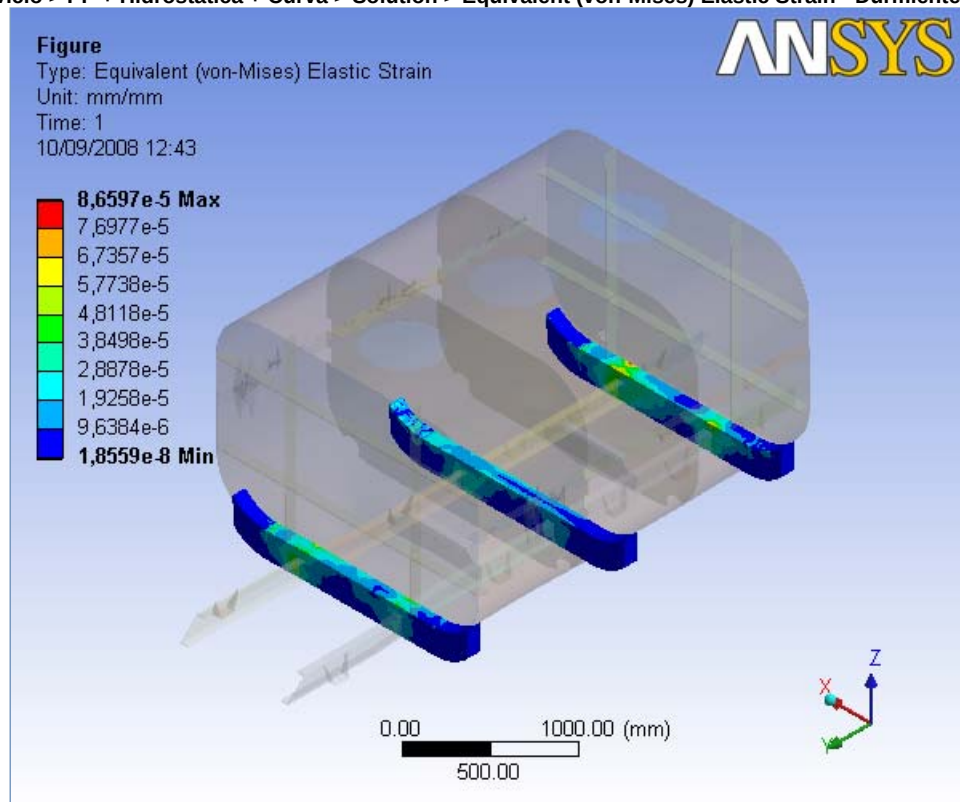


FIGURE 100

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Elastic Strain - Durmientes > Image

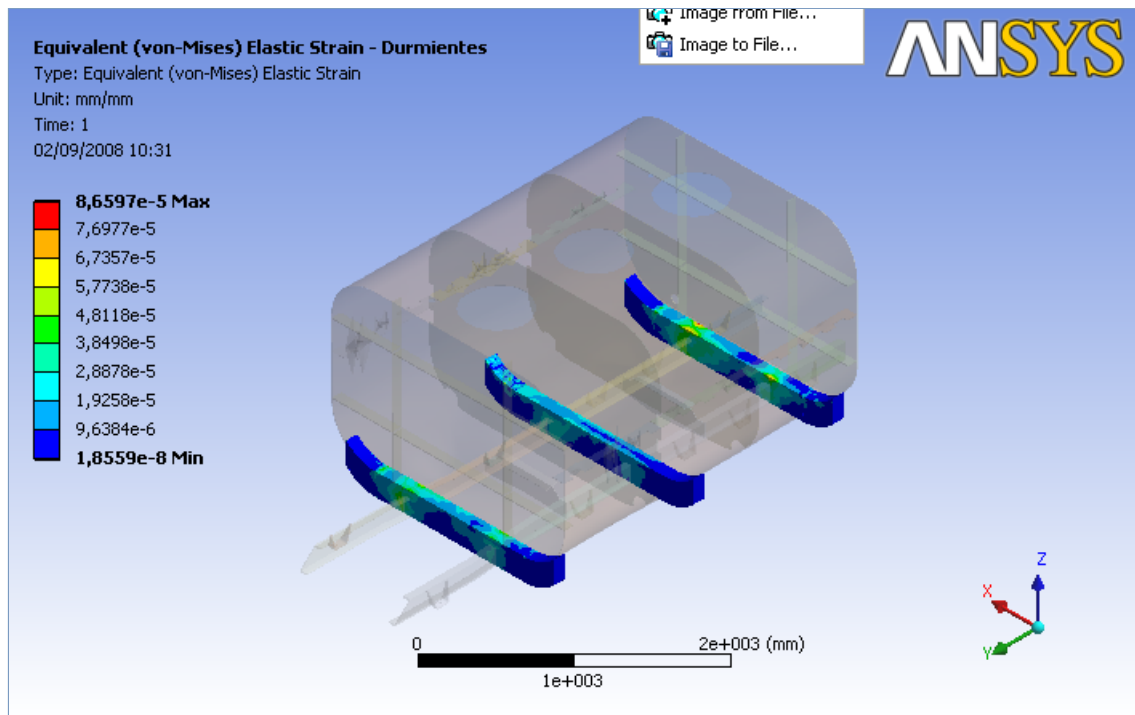


TABLE 102
E.L.Servicio > PP + Hidrostatica + Curva > Solution > Results

Object Name	Total Deformation - Durmientes	Equivalent (von-Mises) Elastic Strain - Rompeolas	Total Deformation - Rompeolas
State	Solved		
Scope			
Geometry	9 Bodies	2 Bodies	
Definition			
Type	Total Deformation	Equivalent (von-Mises) Elastic Strain	Total Deformation
Display Time	End Time		
Results			
Minimum	2,7488e-005 mm	9,5392e-008 mm/mm	6,807e-003 mm
Maximum	3,9541e-002 mm	5,2724e-005 mm/mm	0,1049 mm
Minimum Occurs On	Tanque.asm:1,CONJ. DURMIENTE.asm:1,Durmientes_2.par:1	Tanque.asm:1,Rompeolas transversal.par:2	
Maximum Occurs On	Tanque.asm:1,CONJ. DURMIENTE.asm:3,Durmientes.par:1	Tanque.asm:1,Rompeolas transversal.par:1	Tanque.asm:1,Rompeolas transversal.par:2
Information			
Time	1, s		
Load Step	1		
Substep	1		
Iteration Number	1		

FIGURE 101
E.L.Servicio > PP + Hidrostatica + Curva > Solution > Total Deformation - Durmientes > Figure

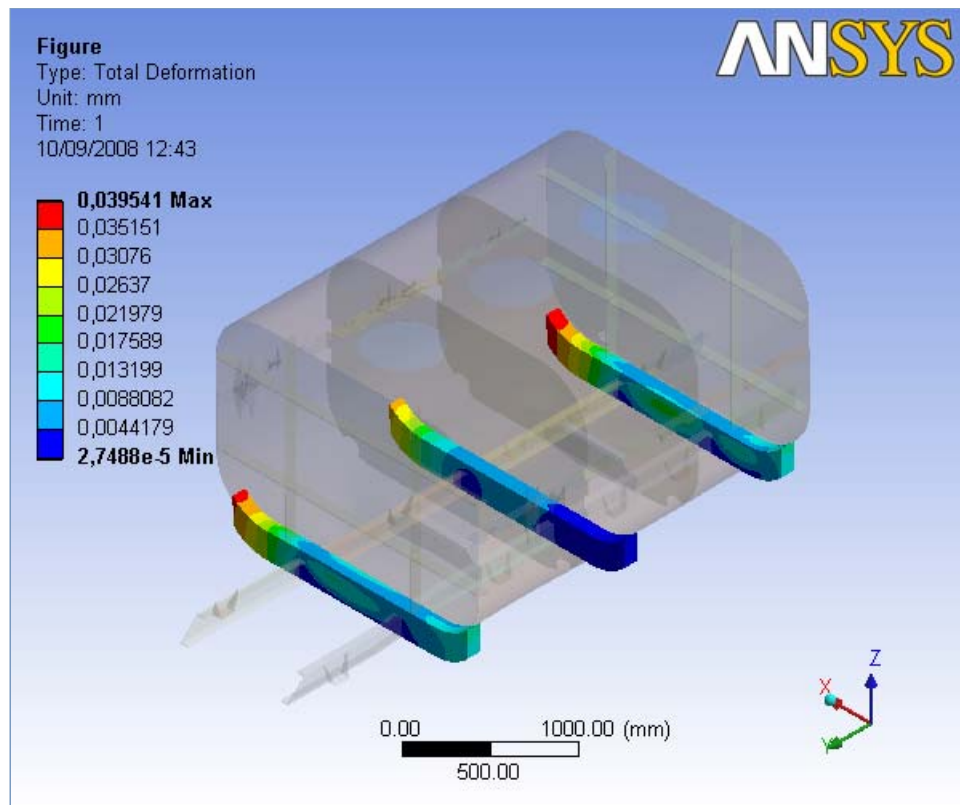


FIGURE 102

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Total Deformation - Durmientes > Image

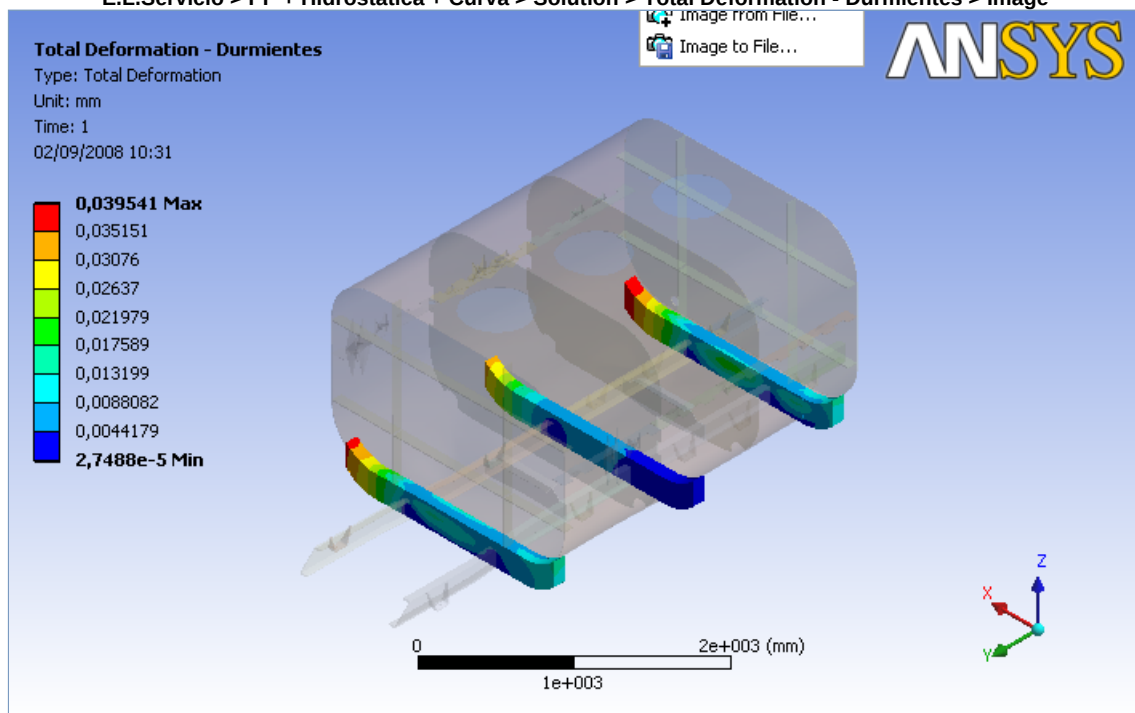


FIGURE 103

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Elastic Strain - Rompeolas > Figure

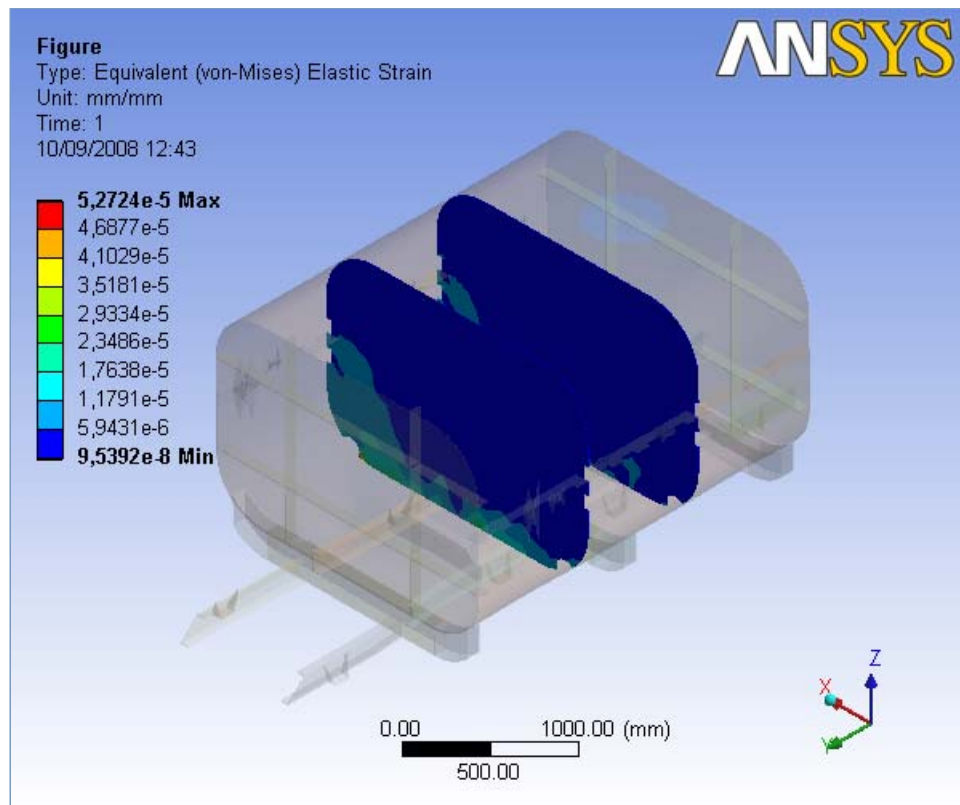


FIGURE 104

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Equivalent (von-Mises) Elastic Strain - Rompeolas > Image

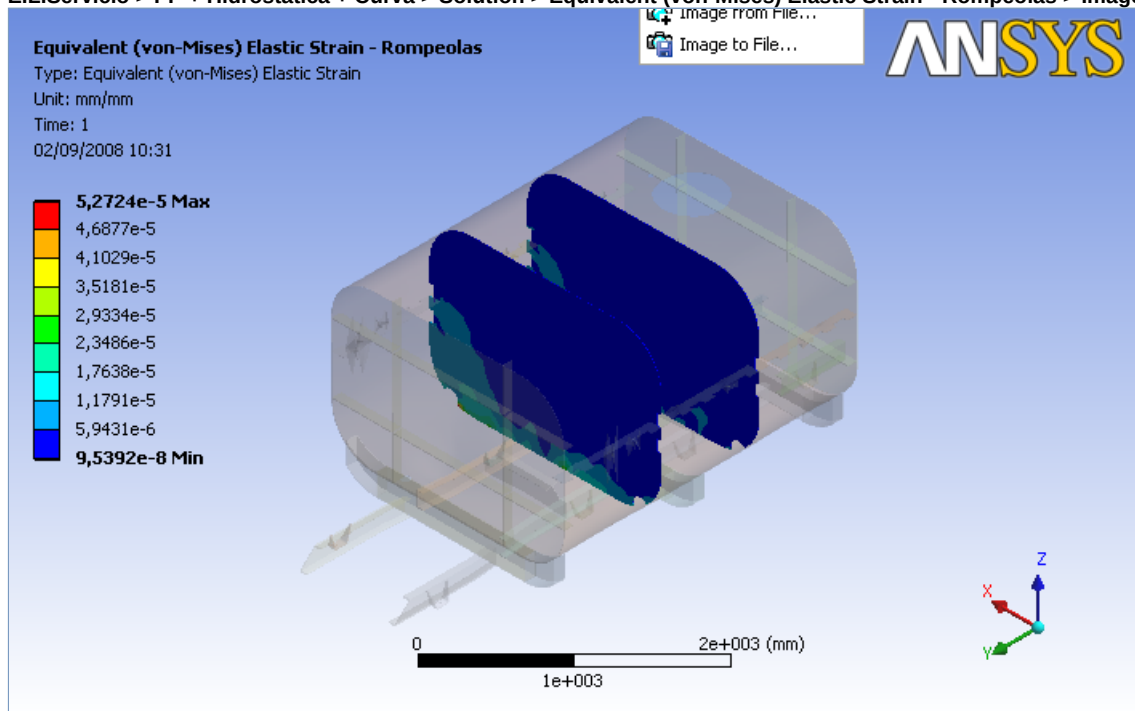


FIGURE 105

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Total Deformation - Rompeolas > Figure

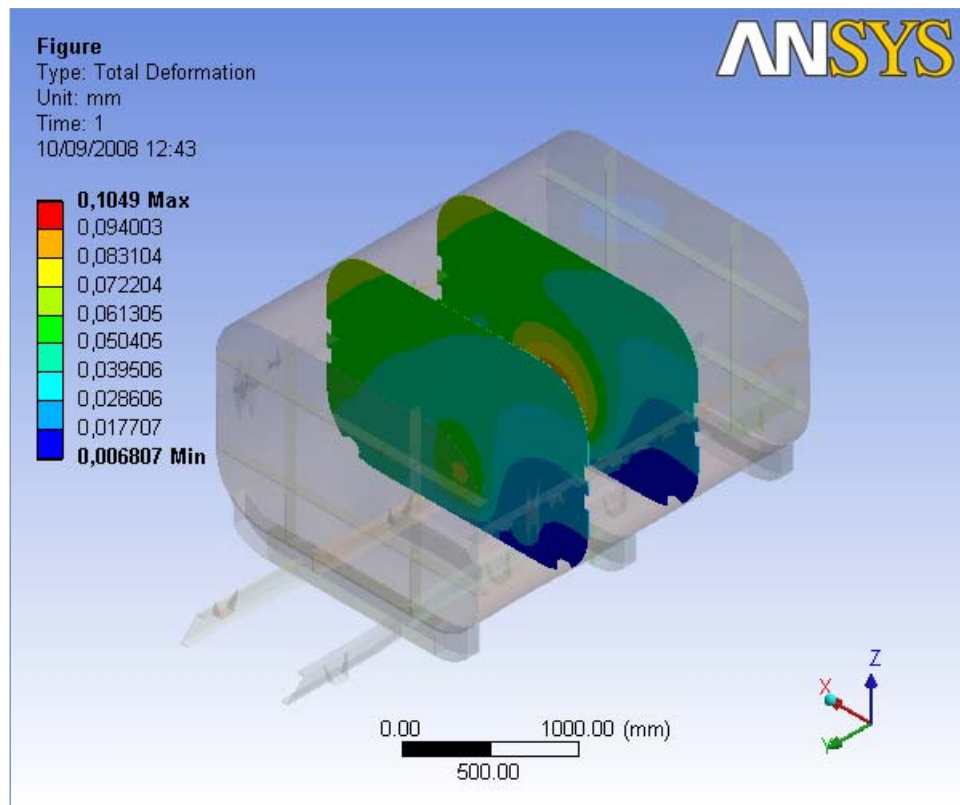
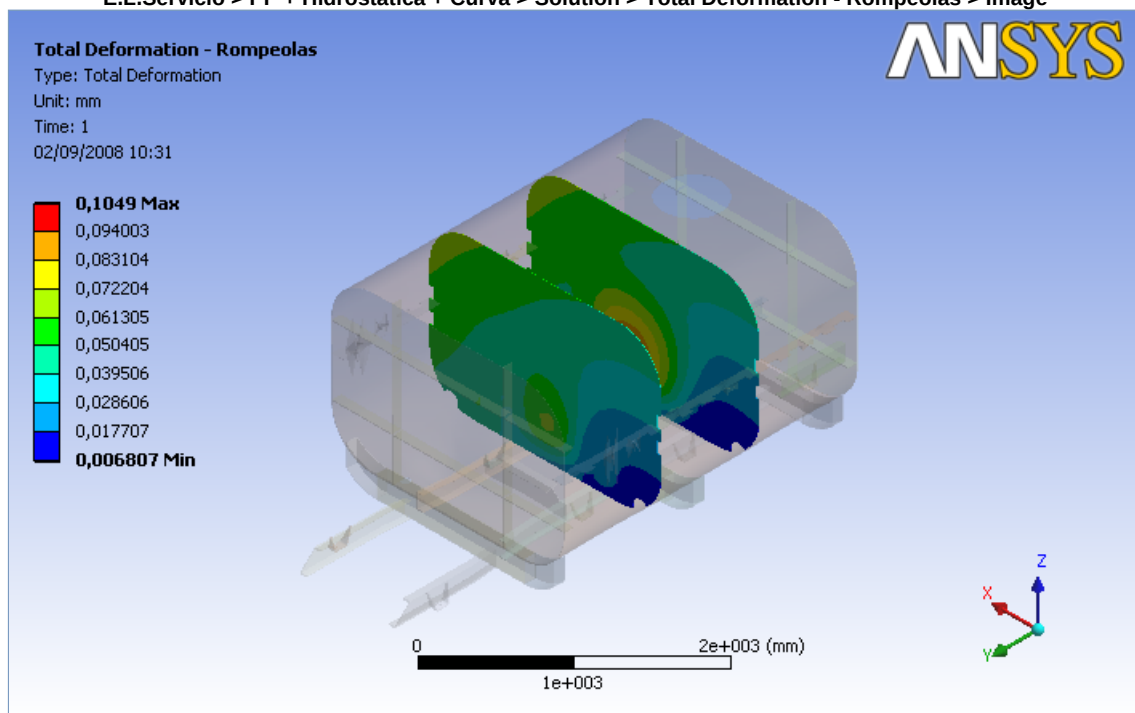


FIGURE 106

E.L.Servicio > PP + Hidrostatica + Curva > Solution > Total Deformation - Rompeolas > Image



Material Data

Structural Steel

TABLE 103
Structural Steel > Constants

Structural	
Young's Modulus	2,e+005 MPa
Poisson's Ratio	0,3
Density	7,85e-006 kg/mm ³
Thermal Expansion	1,2e-005 1/°C

Tensile Yield Strength	250, MPa
Compressive Yield Strength	250, MPa
Tensile Ultimate Strength	460, MPa
Compressive Ultimate Strength	0, MPa
Thermal	
Thermal Conductivity	6,05e-002 W/mm·°C
Specific Heat	434, J/kg·°C
Electromagnetics	
Relative Permeability	10000
Resistivity	1,7e-004 Ohm·mm

FIGURE 107
Structural Steel > Alternating Stress

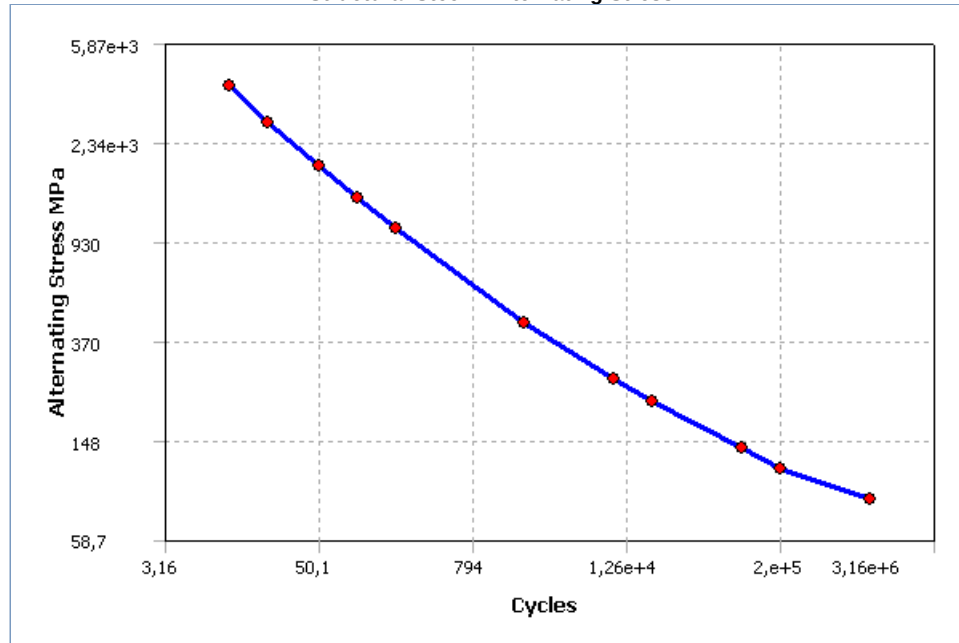


TABLE 104
Structural Steel > Alternating Stress > Property Attributes

Interpolation	Log-Log
Mean Curve Type	Mean Stress

TABLE 105
Structural Steel > Alternating Stress > Alternating Stress Curve Data

Mean Value MPa
0,

TABLE 106
Structural Steel > Alternating Stress > Alternating Stress vs. Cycles

Cycles	Alternating Stress MPa
10,	3999,
20,	2827,
50,	1896,
100,	1413,
200,	1069,
2000,	441,
10000	262,
20000	214,
1,e+005	138,
2,e+005	114,
1,e+006	86,2

FIGURE 108
Structural Steel > Strain-Life Parameters

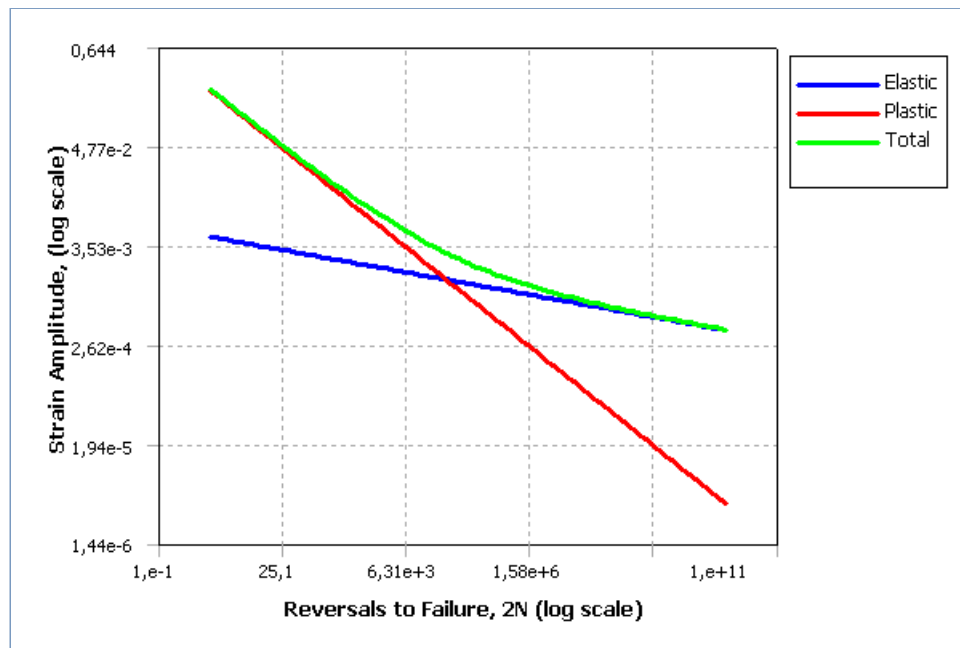


TABLE 107
Structural Steel > Strain-Life Parameters > Property Attributes
 Display Curve Type Strain-Life

TABLE 108
Structural Steel > Strain-Life Parameters > Strain-Life Parameters

Strength Coefficient MPa	920,
Strength Exponent	-0,106
Ductility Coefficient	0,213
Ductility Exponent	-0,47
Cyclic Strength Coefficient MPa	1000,
Cyclic Strain Hardening Exponent	0,2