

ANEXO 1 TABLAS

Tabla 1. Presupuesto general del proyecto.

Presupuesto			
Rubro	Efectivo	Especie	Sub-total
Talento humano			
Tutores (\$70.000/h)	-	\$ 2.800.000	\$ 2.800.000
Estudiantes (\$ 7.480/h)	-	\$ 2.019.600	
Servicios			
Laboratorio Robótica (\$40.000/h)	-	\$ 1.440.000	\$ 1.440.000
Movilidad y Transporte	\$ 500.000	-	\$ 500.000
Material Bibliográfico (Suscripciones y membresías)	\$ 120.000	-	\$ 120.000
Licencias Software	\$ 120.000	\$ 4.200.000	\$ 4.320.000
Transporte equipo (prototipo e insumos)	\$ 400.000	-	\$ 400.000
Insumos			
Insumos de seguridad (Cascos y botas)	\$ 150.000	-	\$ 150.000
Materiales prototipo	\$ 1.800.000	-	\$ 1.800.000
Ácido Naftalenacético (Presentación líquida)	\$ 260.000	-	\$ 260.000
Embalaje para el transporte del prototipo	\$ 80.000	-	\$ 80.000
Imprevistos (15%)	\$ 514.500	-	\$ 514.500
TOTAL	\$ 3.944.500	\$ 10.459.600	\$ 14.404.100

Tabla 2. Cotización de materiales y componentes para la construcción del prototipo telescópico.

Lista de materiales y componentes prototipo telescópico	
Concepto	Costo
Carro Transportador y Brazo Telescópico	
Tubo alumino 5/8 in * 3m	\$15.600
Tubo alumino 3/4 in * 3m	\$20.900
Tubo alumino 7/8 in * 6m	\$41.811
Tubo alumino 1 in * 3m	\$23.500
Tubo alumino 1 in * 6m	\$46.011
Acoples	\$510.000
Envio tubos	\$30.000
Gasolina para el cacorro	\$11.140
Aceite 2 tiempos	\$12.300
Manguera 20 metros	\$80.000
Tubo EMT 1/2 in - 2 IMC (3/4in - 1 in)	\$125.000
TUBO IMC 1 - 1/4 in 6 m	\$201.000
Acople 3/4 in a 1 in	\$200.000
Acople 1 in a 1 1/4 in	\$240.000
Material de carrito (angulos etc)	\$400.000
Malla 2x1 m 30 cal 12	\$125.000
Llantas	\$375.000
Componentes eléctricos	
Motobomba	\$93.000
Switch	\$8.600
Adaptador AC/DC	\$28.000
Pulsador	\$15.000
Bateria x2	\$190.000
Otros	
ANA líquido	\$129.200

Tabla 3. Medidas de longitud y área de racimos del híbrido OxG

Medida de racimos del híbrido OxG			
Ejemplar	Ancho (cm)	Largo (cm)	Área aproximada (cm ²)
1	27.8	29.1	808.98
2	32.2	27.8	895.16
3	29.6	28.7	849.52
4	31.3	22.8	713.64
5	31.2	28.9	901.68
6	28.8	27.4	789.12
7	25.3	24.4	617.32
8	25.5	28.7	731.85
9	33.7	31.4	1058.18
10	29.8	25.9	771.82
11	35.5	29.2	1036.6
12	35.1	25.5	895.05
13	26.5	24.8	657.2
14	25.5	27.6	703.8
15	31.4	31.2	979.68
16	35.3	28.9	1020.17
17	31.5	29.0	913.5
18	34.0	30.4	1033.6
19	36.2	25.6	926.72
20	25.4	28.1	713.74
21	37.5	33.4	1252.5
22	29.6	30.2	893.92
23	29.8	29.6	882.08
24	26.7	26.8	715.56
25	35.2	26.7	939.84
26	35.4	23.7	838.98
27	27.3	33.3	909.09
28	33.5	29.1	974.85
29	30.4	25.5	775.2
30	24.6	22.1	543.66
31	33.1	26.6	880.46
32	27.2	23.5	639.2
33	30.4	26.8	814.72
34	36.4	23.2	844.48
35	24.4	31.7	773.48
36	28.2	26.2	738.84

37	29.9	31.6	944.84
38	24.7	25.2	622.44
39	25.9	22.6	585.34
40	27.3	33.3	909.09
MAX	37.5	33.4	1252.5
MEDIA	30.2	27.7	837.4

Tabla 4. Tiempos de polinización método actual y prototipo.

Método Actual de polinización					
Dato	Tiempo de Aspersión	Tiempo de ascenso y descenso	Tiempo polinización (Tiempo de aspersión + tiempo de ascenso y descenso).	Tiempo de movilización	TOTAL
1	1.6	3.3	8.8	6.1	14.9
2	2.8				
3	1.1				
4	2.1	3.6	7.1	6.4	13.5
5	1.4				
6	2.4	2.8	6.4	4.2	10.6
7	1.2				
8	2.3	3.4	7.4	3.7	11.1
9	1.7				
10	2.1				
11	1.9	2.2	10.1	6.4	16.5
12	2.6				
13	1.3				
14	2.5				
15	2.7	3.5	8.7	6.6	15.3
16	1.8				
17	2	3.1	6.9	5.9	12.8
18	1.5				
19	2.2	3.8	10	5.3	15.3
20	2.5				
21	1.2				
22	2.8	3.4	11.4	6.2	17.6
23	1.3				
24	2.7				
25	1.1	3.3	7	6.4	13.4
26	2.6				

27	1.8	3.5	9.6	6.6	16.2
28	2.3				
29	2				
30	1.6	3.3	7.8	6.4	14.2
31	2.9				
32	1.4	3.3	8.6	6.3	14.9
33	2.2				
34	1.7				
35	2.4	3.9	10	5.7	15.7
36	1.2				
37	2.5				
38	2.2	2.9	7	4.9	11.9
39	1.9				
40	2.3	3.4	10.9	4.6	15.5
41	1.6				
42	2.1				
43	1.5				
44	2.8	2.6	7.8	3.6	11.4
45	2.4				
46	1.1	2.6	7.6	4.5	12.1
47	2.6				
48	1.3				
49	2.7	2.5	8.9	5.3	14.2
50	1.7				
51	2				
52	2.8	3.1	10	6.6	16.6
53	1.2				
54	2.9				
55	1.1	3.8	7.4	4.2	11.6
56	2.5				
57	2.3	2.9	10.6	5.8	16.4
58	1.4				
59	2.1				
60	1.9				
TOTAL	119.80	70.20	190.00	121.70	311.70
MEDIA	2.00	3.19	8.64	5.53	14.17
Prototipo					
Dato	Tiempo de Aspersión	Tiempo de ascenso y descenso	Tiempo polinización (Tiempo de aspersión + tiempo de ascenso y descenso).	Tiempo de movilización	TOTAL
1	4.06	5.9	38.75	6.30	45.05

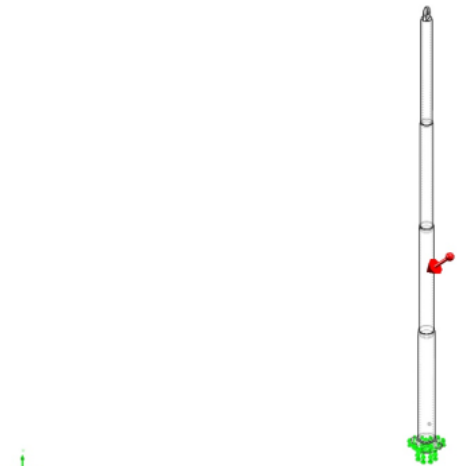
2	3.54				
3	3.80				
4	2.25				
5	2.82				
6	2.87				
7	4.90				
8	3.84				
9	4.76				
10	3.10	6.3	45.56	6.20	51.76
11	2.27				
12	2.38				
13	2.39				
14	4.15				
15	4.19				
16	3.57				
17	3.59				
18	4.47				
19	4.40				
20	4.75				
21	2.23	6.7	45.62	7.90	53.52
22	3.60				
23	4.49				
24	4.33				
25	4.26				
26	2.59				
27	3.37				
28	3.10				
29	3.36				
30	4.00				
31	3.59				
32	2.21	5.1	48.45	5.30	53.75
33	4.32				
34	3.87				
35	3.35				
36	4.67				
37	2.38				
38	4.23				
39	4.23				
40	3.45				
41	2.68				
42	3.35				

43	4.61				
44	3.82	6	43.31	6.70	50.01
45	2.68				
46	4.67				
47	2.17				
48	2.92				
49	4.91				
50	2.59				
51	4.86				
52	2.77				
53	3.10				
54	2.83	4.9	25.96	7.10	33.06
55	4.40				
56	3.08				
57	2.91				
58	2.52				
59	4.02				
60	4.14				
TOTAL	212.76	34.90	247.66	39.50	287.16
MEDIA	3.55	5.82	41.28	6.58	47.86

ANEXO 2 INFORMES

Informe 1. Estudio de análisis estático del brazo telescópico compuesto de Aluminio

Model Information

 Model name: hrydraulic assy Current Configuration: Default			
Solid Bodies			
Document Name and Reference	Treated As	Volumetric Properties	Document Path/Date Modified
Fillet2 	Solid Body	Mass: 32.1744 kg Volume: 0.0119164 m ³ Density: 2,700 kg/m ³ Weight: 315.309 N	C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2\cassinga.SLDPRT May 9 21:16:12 2023
Cut-Extrude1 	Solid Body	Mass: 18.3435 kg Volume: 0.00679389 m ³ Density: 2,700 kg/m ³ Weight: 179.766 N	C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2\cyl1.SLDPRT May 9 21:16:12 2023
Cut-Extrude1 	Solid Body	Mass: 15.5486 kg Volume: 0.00575874 m ³ Density: 2,700 kg/m ³ Weight: 152.376 N	C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2\cyl2.SLDPRT May 9 21:16:12 2023
Cut-Extrude1 	Solid Body	Mass: 14.436 kg Volume: 0.00534667 m ³ Density: 2,700 kg/m ³ Weight: 141.473 N	C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2\cyl3.SLDPRT May 9 21:16:12 2023

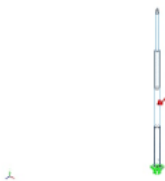
Study Properties

Study name	Análisis Aluminio
Analysis type	Static
Mesh type	Solid Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	298 Kelvin
Include fluid pressure effects from SOLIDWORKS Flow Simulation	Off
Solver type	Automatic
Inplane Effect:	Off
Soft Spring:	Off
Inertial Relief:	Off
Incompatible bonding options	Automatic
Large displacement	Off
Compute free body forces	On
Friction	Off
Use Adaptive Method:	Off
Result folder	SOLIDWORKS document (C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2)

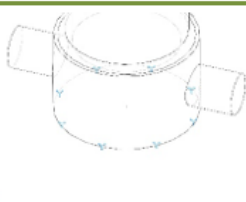
Units

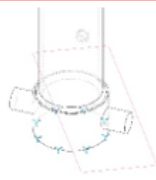
Unit system:	SI (MKS)
Length/Displacement	mm
Temperature	Kelvin
Angular velocity	Rad/sec
Pressure/Stress	N/m ²

Material Properties

Model Reference	Properties	Components
	Name: 6063-T6 Model type: Linear Elastic Isotropic Default failure criterion: Max von Mises Stress Yield strength: 2.15e+08 N/m ² Tensile strength: 2.4e+08 N/m ² Elastic modulus: 6.9e+10 N/m ² Poisson's ratio: 0.33 Mass density: 2,700 kg/m ³ Shear modulus: 2.58e+10 N/m ² Thermal expansion coefficient: 2.34e-05 /Kelvin	SolidBody 1(Fillet2)(cassing a-1), SolidBody 1(Cut-Extrude1)(cyl 1-1), SolidBody 1(Cut-Extrude1)(cyl 2-1), SolidBody 1(Cut-Extrude1)(cyl 3-1)
Curve Data:N/A		

Loads and Fixtures

Fixture name	Fixture Image	Fixture Details		
Fixed-1		Entities: 1 face(s) Type: Fixed Geometry		
Resultant Forces				
Components	X	Y	Z	Resultant
Reaction force(N)	513.57	565.597	-236.952	799.876
Reaction <u>Moment</u> (N.m)	0	0	0	0

Load name	Load Image	Load Details
Gravity-1		Reference: PLANE1 Values: 0 0 9.81 Units: m/s^2

Contact Information

Contact	Contact Image	Contact Properties
Global Interaction		Type: Bonded Components: 1 component(s) Options: Independent mesh

Resultant Forces

Reaction forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	513.57	565.597	-236.952	799.876

Reaction Moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	0

Free body forces

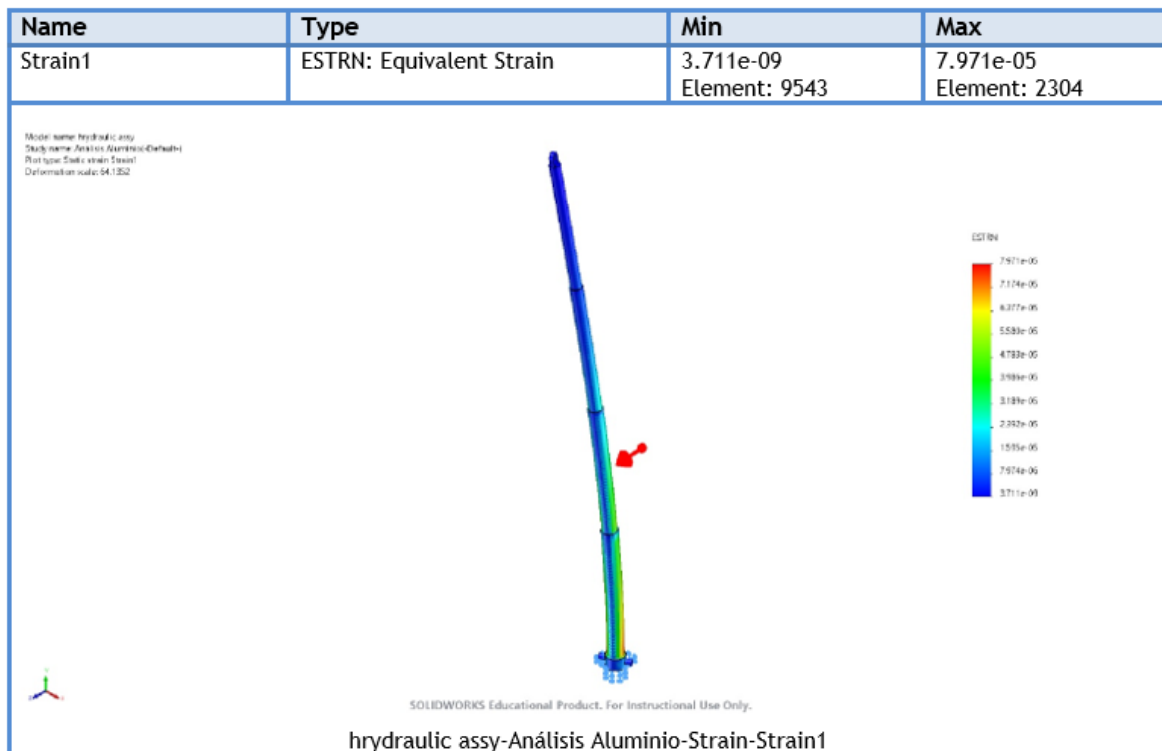
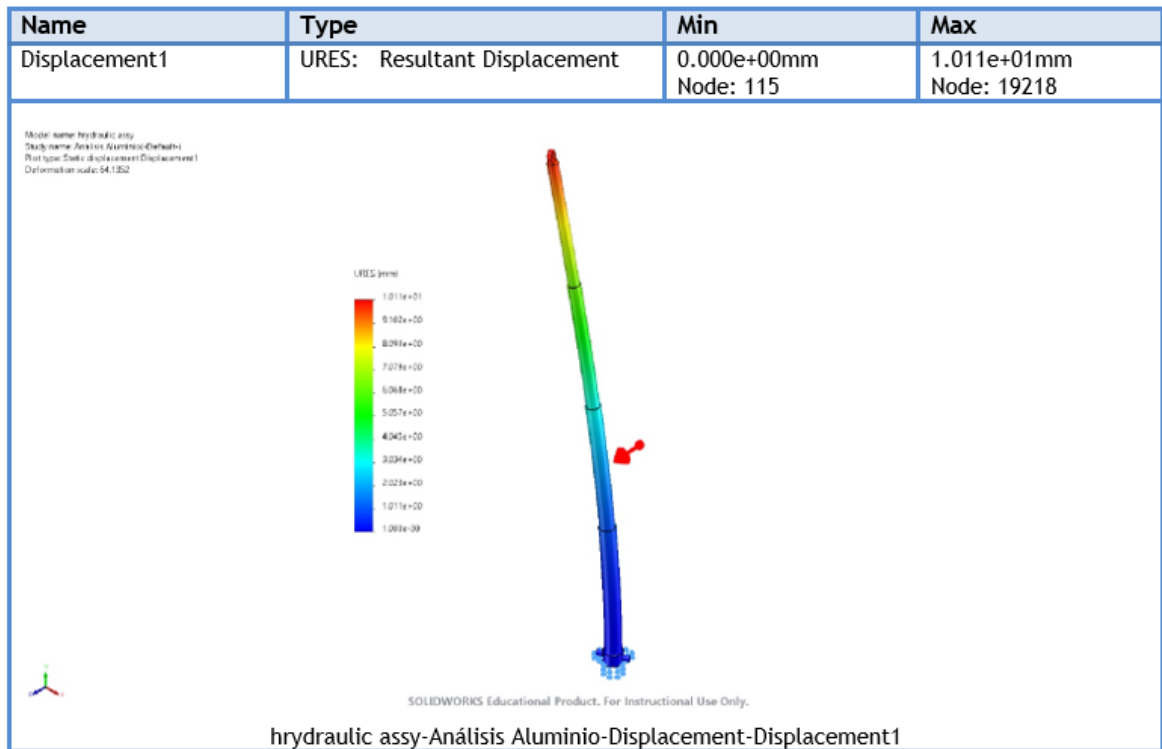
Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	354.438	390.504	-163.534	552.144

Free body moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	1e-33

Study Results

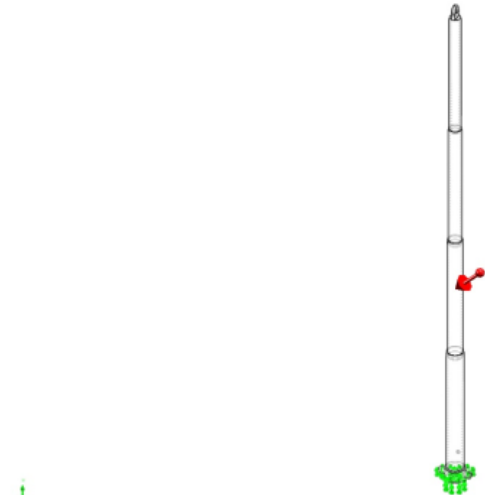




Name	Type
Displacement1{1}	Deformed shape
Model name: hydraulic.assy Study name: Analisis Aluminio (Default) Plot type: Deformed shape (Displacement1) Deformation scale: 64.132   SOLIDWORKS Educational Product. For Instructional Use Only. hydraulic.assy-Análisis Aluminio-Displacement-Displacement1{1}	

Informe 2. Estudio de análisis estático del brazo telescópico compuesto de Polietileno

Model Information

 Model name: hrydraulic assy Current Configuration: Default			
Solid Bodies			
Document Name and Reference	Treated As	Volumetric Properties	Document Path/Date Modified
Fillet2 	Solid Body	Mass: 11.3206 kg Volume: 0.0119164 m ³ Density: 950 kg/m ³ Weight: 110.942 N	C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2\cassinga.SLDPRT May 9 21:16:12 2023
Cut-Extrude1 	Solid Body	Mass: 6.4542 kg Volume: 0.00679389 m ³ Density: 950 kg/m ³ Weight: 63.2511 N	C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2\cyl1.SLDPRT May 9 21:16:12 2023
Cut-Extrude1 	Solid Body	Mass: 5.4708 kg Volume: 0.00575874 m ³ Density: 950 kg/m ³ Weight: 53.6138 N	C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2\cyl2.SLDPRT May 9 21:16:12 2023
Cut-Extrude1 	Solid Body	Mass: 5.07934 kg Volume: 0.00534667 m ³ Density: 950 kg/m ³ Weight: 49.7775 N	C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2\cyl3.SLDPRT May 9 21:16:12 2023

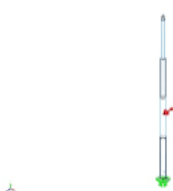
Study Properties

Study name	Análisis Polietileno
Analysis type	Static
Mesh type	Solid Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	298 Kelvin
Include fluid pressure effects from SOLIDWORKS Flow Simulation	Off
Solver type	Automatic
Inplane Effect:	Off
Soft Spring:	Off
Inertial Relief:	Off
Incompatible bonding options	Automatic
Large displacement	Off
Compute free body forces	On
Friction	Off
Use Adaptive Method:	Off
Result folder	SOLIDWORKS document (C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2)

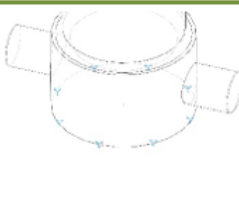
Units

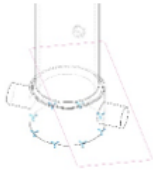
Unit system:	SI (MKS)
Length/Displacement	mm
Temperature	Kelvin
Angular velocity	Rad/sec
Pressure/Stress	N/m ²

Material Properties

Model Reference	Properties	Components
	Name: Polyethylene Cross-Linked Model type: Linear Elastic Isotropic Default failure criterion: Unknown Tensile strength: 1.8e+07 N/m ² Compressive strength: 1.4e+07 N/m ² Elastic modulus: 6e+08 N/m ² Mass density: 950 kg/m ³	SolidBody 1(Fillet2)(cassing a-1), SolidBody 1(Cut-Extrude1)(cyl 1-1), SolidBody 1(Cut-Extrude1)(cyl 2-1), SolidBody 1(Cut-Extrude1)(cyl 3-1)
Curve Data :N/A		

Loads and Fixtures

Fixture name	Fixture Image	Fixture Details		
Fixed-1		Entities: 1 face(s) Type: Fixed Geometry		
Resultant Forces				
Components	X	Y	Z	Resultant
Reaction force(N)	180.701	199.007	-83.3719	281.438
Reaction <u>Moment</u> (N.m)	0	0	0	0

Load name	Load Image	Load Details
Gravity-1		Reference: PLANE1 Values: <u>0</u> <u>0</u> 9.81 Units: m/s^2

Contact Information

Contact	Contact Image	Contact Properties
Global Interaction		Type: Bonded Components: 1 component(s) Options: Independent mesh

Resultant Forces

Reaction forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	180.701	199.007	-83.3719	281.438

Reaction Moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	0

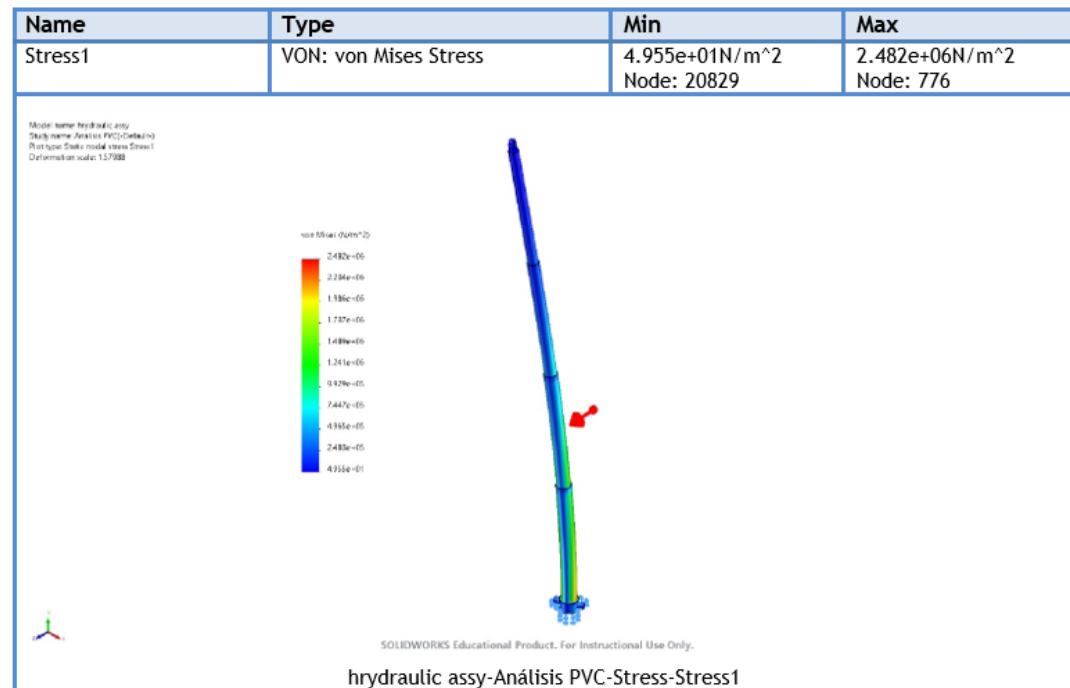
Free body forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	124.714	137.334	-57.5412	194.23

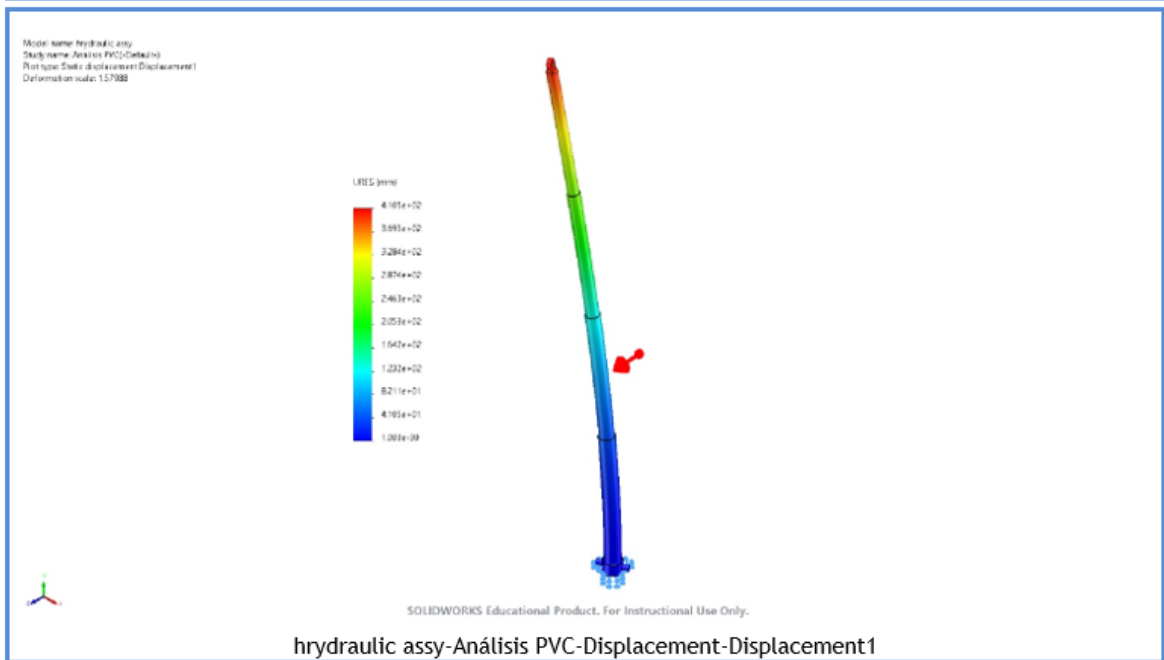
Free body moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	1e-33

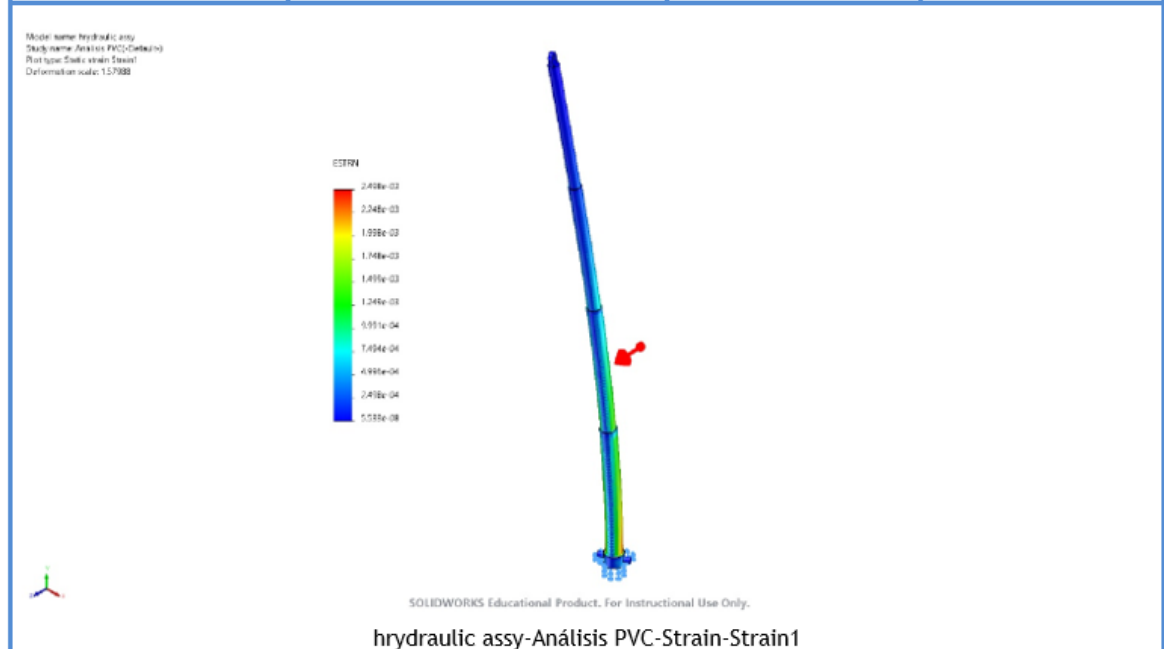
Study Results



Name	Type	Min	Max
Displacement1	URES: Resultant Displacement	0.000e+00mm Node: 115	4.105e+02mm Node: 19218



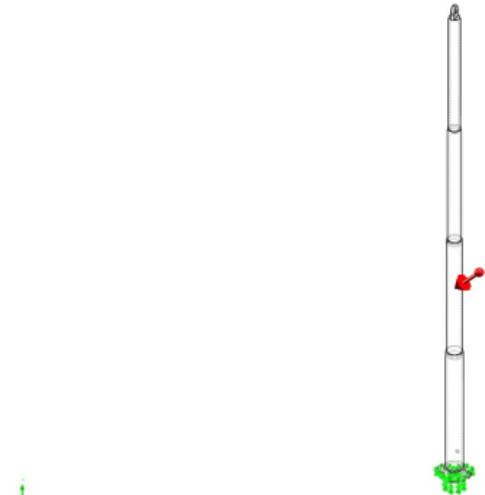
Name	Type	Min	Max
Strain1	ESTRN: Equivalent Strain	5.533e-08 Element: 9464	2.498e-03 Element: 2304



Name	Type
Displacement2	Deformed shape
Model name: hrydraulic.assy Study name: Analysis PVC-Displacement2 Plot type: Deformed shape Displacement2 Deformation scale: 1.57988   SOLIDWORKS Educational Product. For Instructional Use Only. hrydraulic assy-Análisis PVC-Displacement-Displacement2	

Informe 3. Estudio de análisis estático del brazo telescópico compuesto de PVC

Model Information

 Model name: hrydraulic assy Current Configuration: Default			
Solid Bodies			
Document Name and Reference	Treated As	Volumetric Properties	Document Path/Date Modified
Fillet2 	Solid Body	Mass: 15.3722 kg Volume: 0.0119164 m ³ Density: 1,290 kg/m ³ Weight: 150.648 N	C:\Users\PC\Downloads\telescopico-hydraulic-cylinder-fe-1.snapshot.2\cassinga.SLDPRT May 9 21:16:12 2023
Cut-Extrude1 	Solid Body	Mass: 8.76412 kg Volume: 0.00679389 m ³ Density: 1,290 kg/m ³ Weight: 85.8884 N	C:\Users\PC\Downloads\telescopico-hydraulic-cylinder-fe-1.snapshot.2\cyl1.SLDPRT May 9 21:16:12 2023
Cut-Extrude1 	Solid Body	Mass: 7.42877 kg Volume: 0.00575874 m ³ Density: 1,290 kg/m ³ Weight: 72.8019 N	C:\Users\PC\Downloads\telescopico-hydraulic-cylinder-fe-1.snapshot.2\cyl2.SLDPRT May 9 21:16:12 2023
Cut-Extrude1	Solid Body	Mass: 6.8972 kg Volume: 0.00534667 m ³ Density: 1,290 kg/m ³	C:\Users\PC\Downloads\telescopico-hydraulic-cylinder-fe-

Study Properties

Study name	Análisis PVC
Analysis type	Static
Mesh type	Solid Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	298 Kelvin
Include fluid pressure effects from SOLIDWORKS Flow Simulation	Off
Solver type	Automatic
Inplane Effect:	Off
Soft Spring:	Off
Inertial Relief:	Off
Incompatible bonding options	Automatic
Large displacement	On
Compute free body forces	On
Friction	Off
Use Adaptive Method:	Off
Result folder	SOLIDWORKS document (C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2)

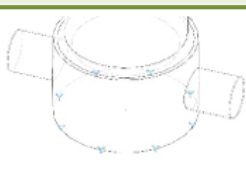
Units

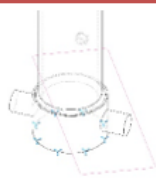
Unit system:	SI (MKS)
Length/Displacement	mm
Temperature	Kelvin
Angular velocity	Rad/sec
Pressure/Stress	N/m ²

Material Properties

Model Reference	Properties	Components
	Name: PVC 0.007 Plasticized Model type: Linear Elastic Isotropic Default failure criterion: Unknown Tensile strength: 1.3e+07 N/m ² Elastic modulus: 6e+06 N/m ² Poisson's ratio: 0.47 Mass density: 1,290 kg/m ³ Shear modulus: 2e+06 N/m ²	SolidBody 1(Fillet2)(cassing a-1), SolidBody 1(Cut-Extrude1)(cyl 1-1), SolidBody 1(Cut-Extrude1)(cyl 2-1), SolidBody 1(Cut-Extrude1)(cyl 3-1)
Curve Data :N/A		

Loads and Fixtures

Fixture name	Fixture Image	Fixture Details		
Fixed-1		Entities: 1 face(s) Type: Fixed Geometry		
Resultant Forces				
Components	X	Y	Z	Resultant
Reaction force(N)	13.8227	15.2232	-6.37718	21.5286
Reaction Moment(N.m)	0	0	0	0

Load name	Load Image	Load Details		
Gravity-1		Reference: PLANE1 Values: 0 0 9.81 Units: m/s^2		

Contact Information

Contact	Contact Image	Contact Properties
Global Interaction		Type: Bonded Components: 1 component(s) Options: Independent mesh

Resultant Forces

Reaction forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	13.8227	15.2232	-6.37718	21.5286

Reaction Moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	0

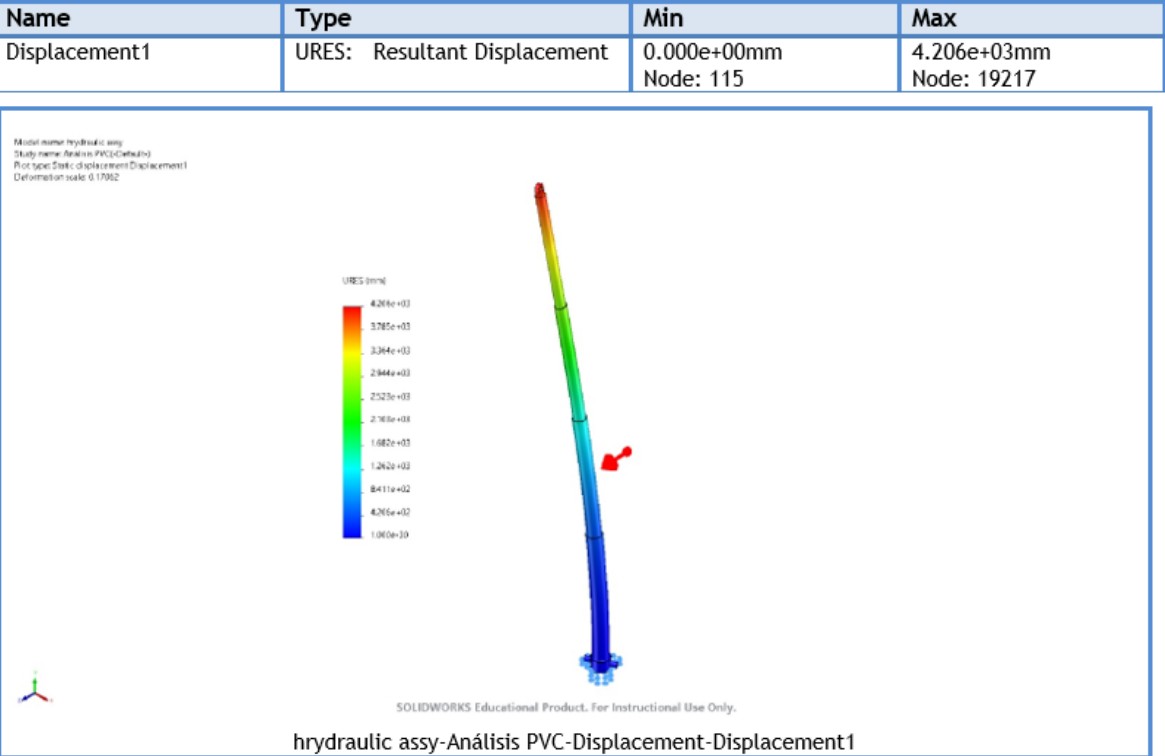
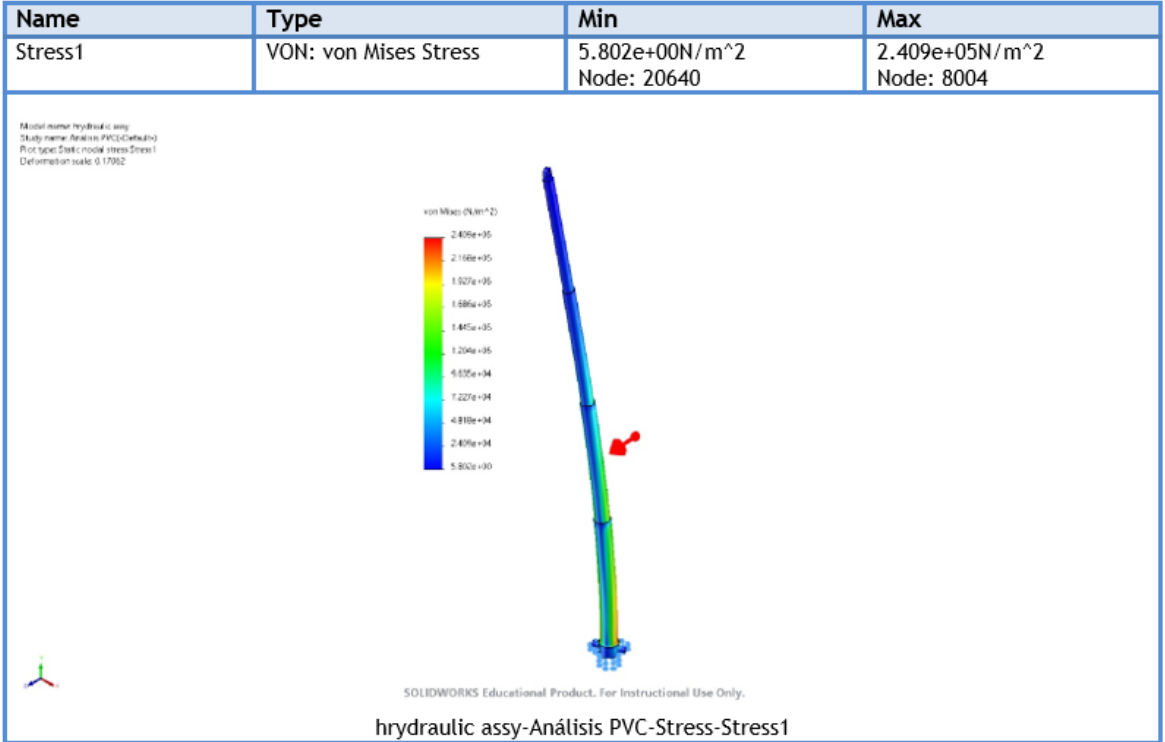
Free body forces

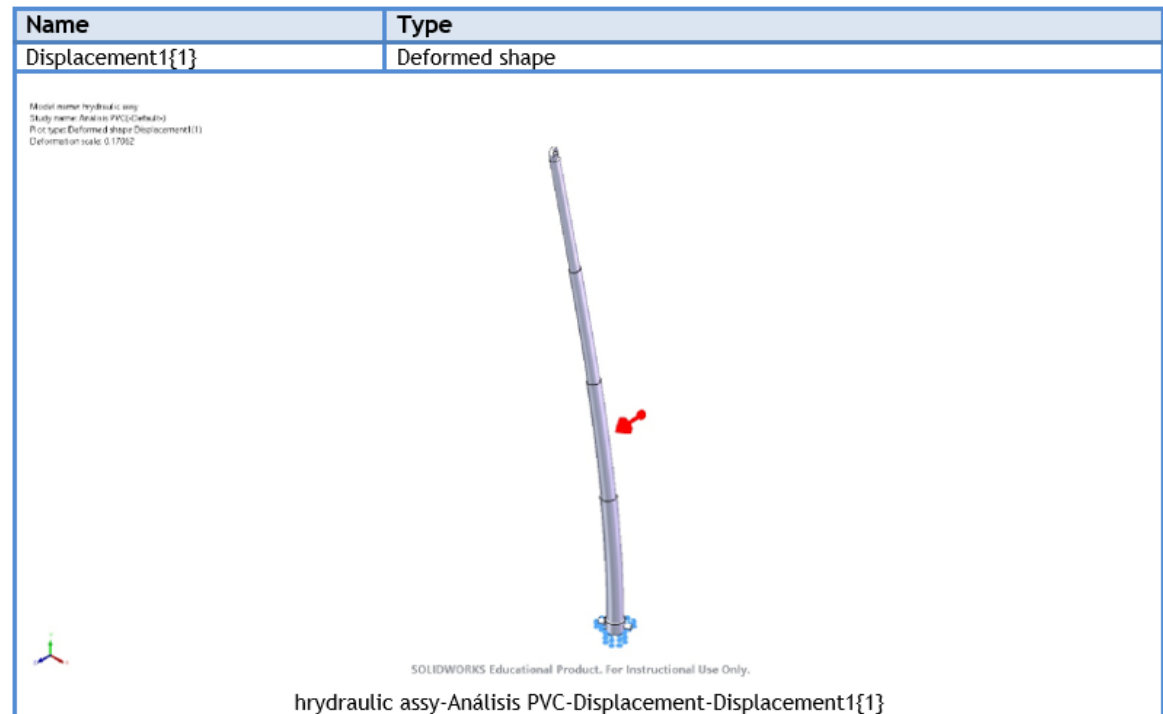
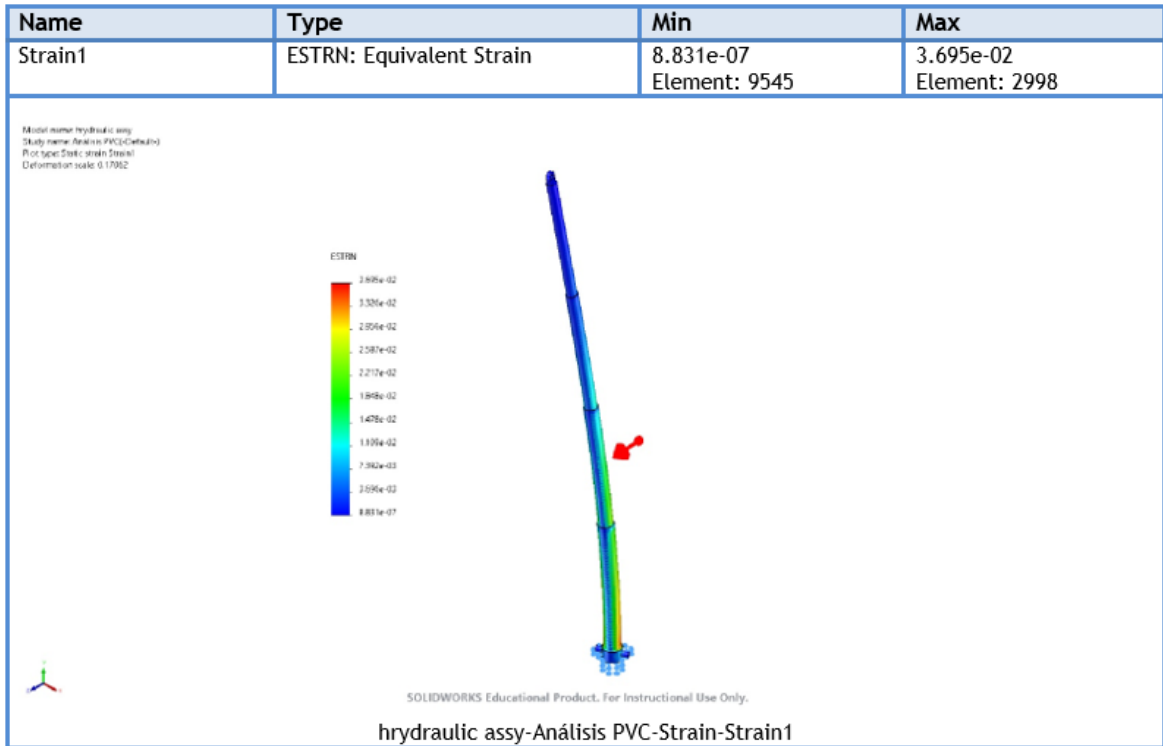
Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	0	0	0	0

Free body moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	0

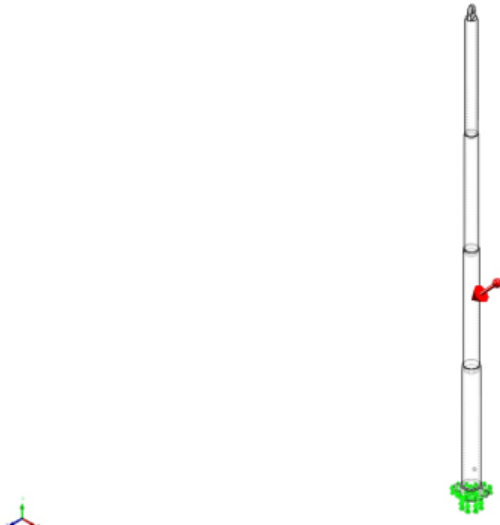
Study Results





Informe 4. Estudio de análisis estático del brazo telescópico compuesto de IMC

Model Information

 Model name: hrydraulic assy Current Configuration: Default			
Solid Bodies			
Document Name and Reference	Treated As	Volumetric Properties	Document Path/Date Modified
Fillet2 	Solid Body	Mass:93.7824 kg Volume:0.0119164 m ³ Density:7,870 kg/m ³ Weight:919.068 N	C:\Users\PC\Downloads\telescopico-hydraulic-cylinder-fe-1.snapshot.2\cassing a.SLDPRT May 9 21:16:12 2023
Cut-Extrude1 	Solid Body	Mass:53.4679 kg Volume:0.00679389 m ³ Density:7,870 kg/m ³ Weight:523.986 N	C:\Users\PC\Downloads\telescopico-hydraulic-cylinder-fe-1.snapshot.2\cyl 1.SLDPRT May 9 21:16:12 2023
Cut-Extrude1 	Solid Body	Mass:45.3212 kg Volume:0.00575874 m ³ Density:7,870 kg/m ³ Weight:444.148 N	C:\Users\PC\Downloads\telescopico-hydraulic-cylinder-fe-1.snapshot.2\cyl 2.SLDPRT May 9 21:16:12 2023
Cut-Extrude1	Solid Body	Mass:42.0783 kg Volume:0.00534667 m ³ Density:7,870 kg/m ³	C:\Users\PC\Downloads\telescopico-hydraulic-cylinder-fe-

Study Properties

Study name	Análisis IMC
Analysis type	Static
Mesh type	Solid Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	298 Kelvin
Include fluid pressure effects from SOLIDWORKS Flow Simulation	Off
Solver type	Automatic
Inplane Effect:	Off
Soft Spring:	Off
Inertial Relief:	Off
Incompatible bonding options	Automatic
Large displacement	On
Compute free body forces	On
Friction	Off
Use Adaptive Method:	Off
Result folder	SOLIDWORKS document (C:\Users\PC\Downloads\telescopic-hydraulic-cylinder-fe-1.snapshot.2)

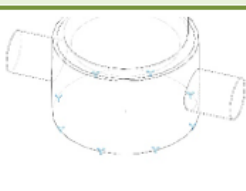
Units

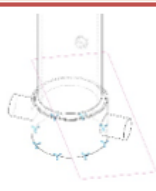
Unit system:	SI (MKS)
Length/Displacement	mm
Temperature	Kelvin
Angular velocity	Rad/sec
Pressure/Stress	N/m ²

Material Properties

Model Reference	Properties	Components
	Name: Galvanized Steel Model type: Linear Elastic Isotropic Default failure criterion: Max von Mises Stress Yield strength: 2.03943e+08 N/m ² Tensile strength: 3.56901e+08 N/m ² Elastic modulus: 2e+11 N/m ² Poisson's ratio: 0.29 Mass density: 7,870 kg/m ³	SolidBody 1(Fillet2)(cassing a-1), SolidBody 1(Cut-Extrude1)(cyl 1-1), SolidBody 1(Cut-Extrude1)(cyl 2-1), SolidBody 1(Cut-Extrude1)(cyl 3-1)
Curve Data :N/A		

Loads and Fixtures

Fixture name	Fixture Image	Fixture Details		
Fixed-1		Entities: 1 face(s) Type: Fixed Geometry		
Resultant Forces				
Components	X	Y	Z	Resultant
Reaction force(N)	1,496.96	1,648.61	-690.67	2,331.49
Reaction <u>Moment</u> (N.m)	0	0	0	0

Load name	Load Image	Load Details
Gravity-1		Reference: PLANE1 Values: 0 0 9.81 Units: m/s^2

Contact Information

Contact	Contact Image	Contact Properties
Global Interaction		Type: Bonded Components: 1 component(s) Options: Independent mesh

Resultant Forces

Reaction forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	1,496.96	1,648.61	-690.67	2,331.49

Reaction Moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	0

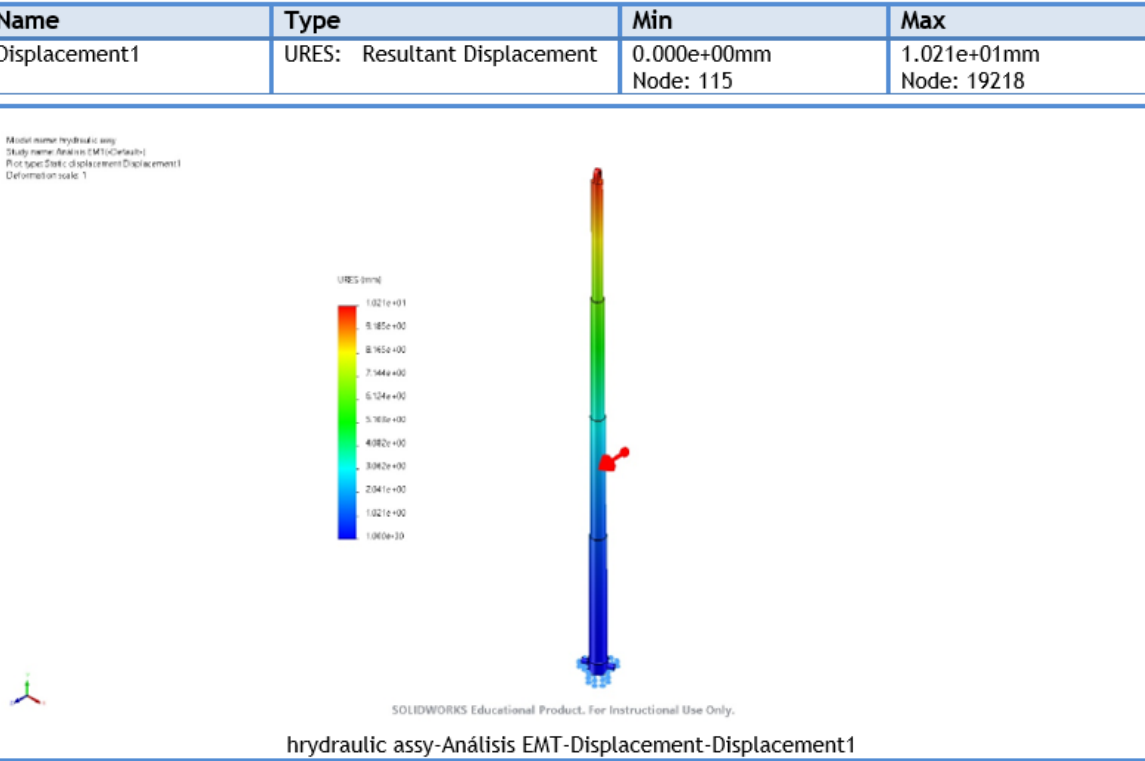
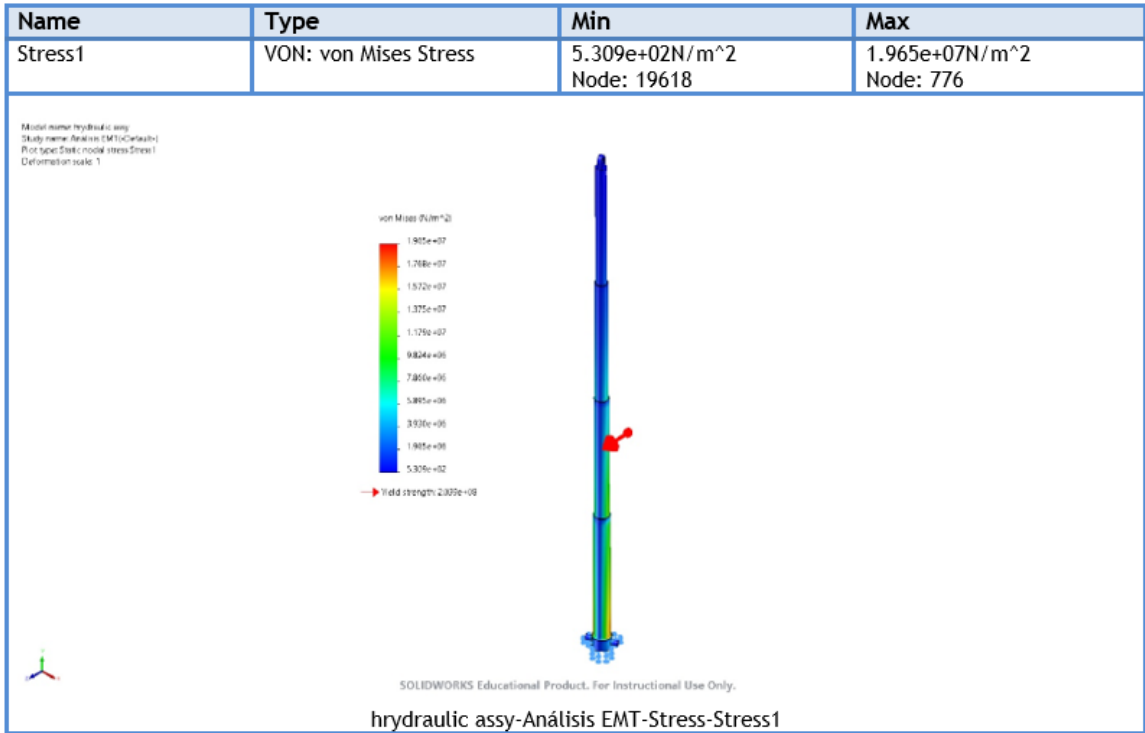
Free body forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	0	0	0	0

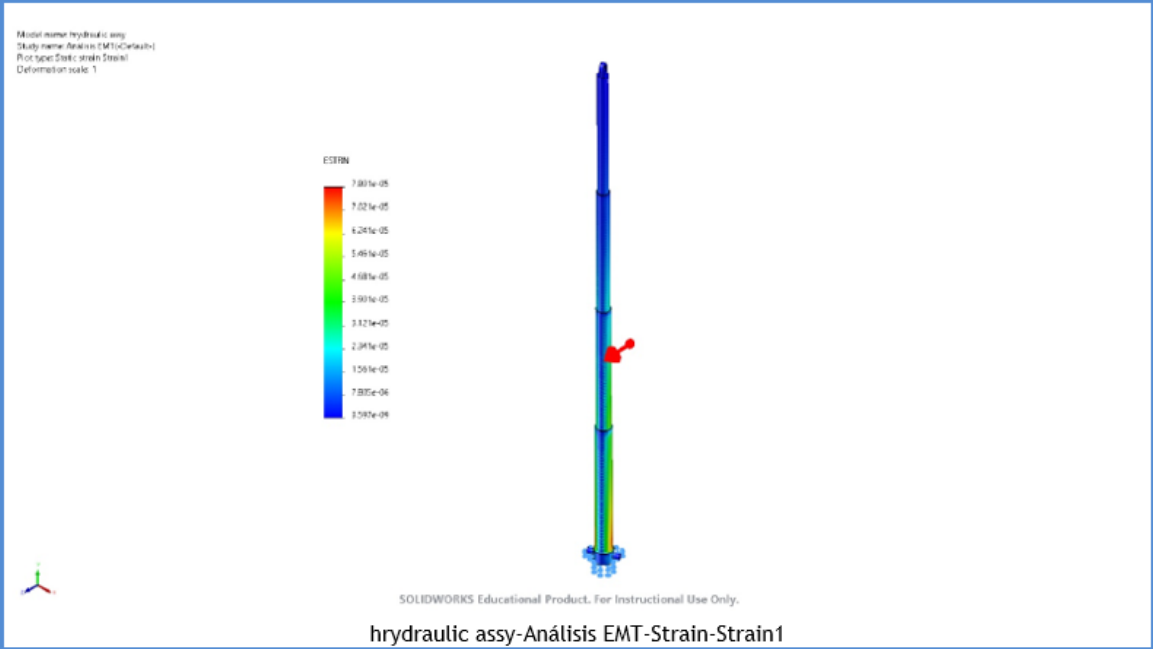
Free body moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	0

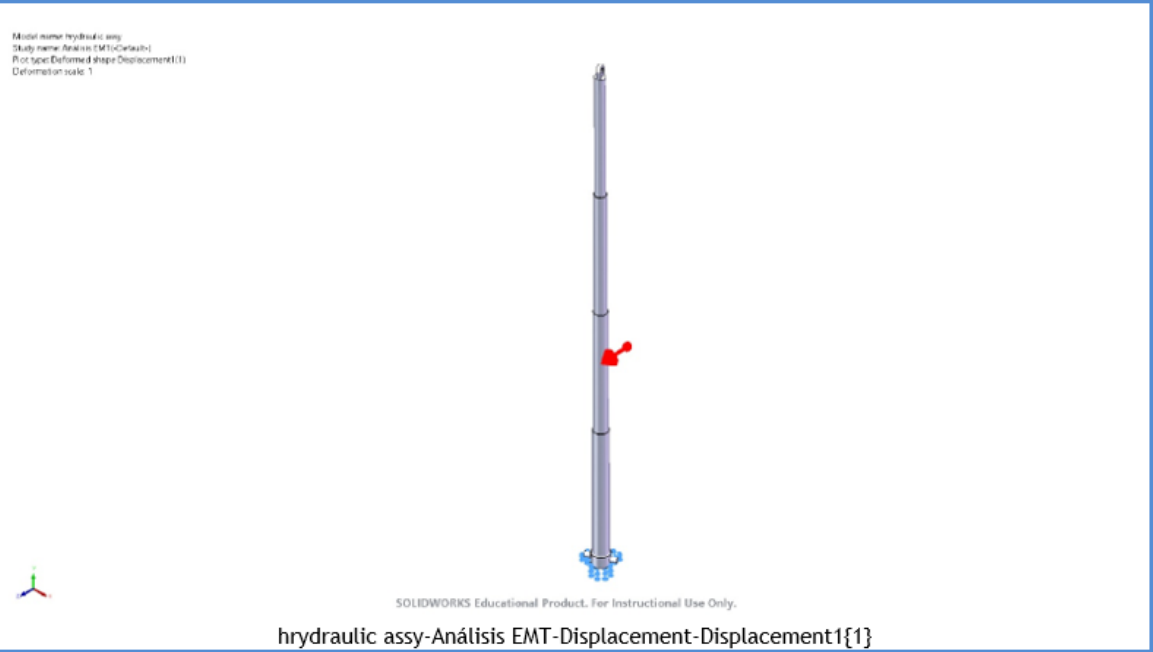
Study Results



Name	Type	Min	Max
Strain1	ESTRN: Equivalent Strain	3.597e-09 Element: 9543	7.801e-05 Element: 2304



Name	Type
Displacement1{1}	Deformed shape



ANEXO 3 VIDEO

Video 1. https://youtu.be/_vP7LnMzPAg