

**TEMA:**

**“DISEÑO E IMPLEMENTACIÓN DE UN SISTEMA ACUMULADOR Y DE TRANSFERENCIA DE BOBINAS DE ALAMBRÓN, PARA SU INCORPORACIÓN EN LA PRODUCCIÓN DE UNA NUEVA LÍNEA DE PRODUCTOS DERIVADOS DEL ACERO, EN LA EMPRESA NOVACERO S.A. PLANTA LASSO”.**

# PROBLEMA



**DISEÑAR UN SISTEMA QUE  
PERMITA ACUMULAR Y  
TRANSFERIR ROLLOS DE  
ALAMBRÓN**

# OBJETIVOS

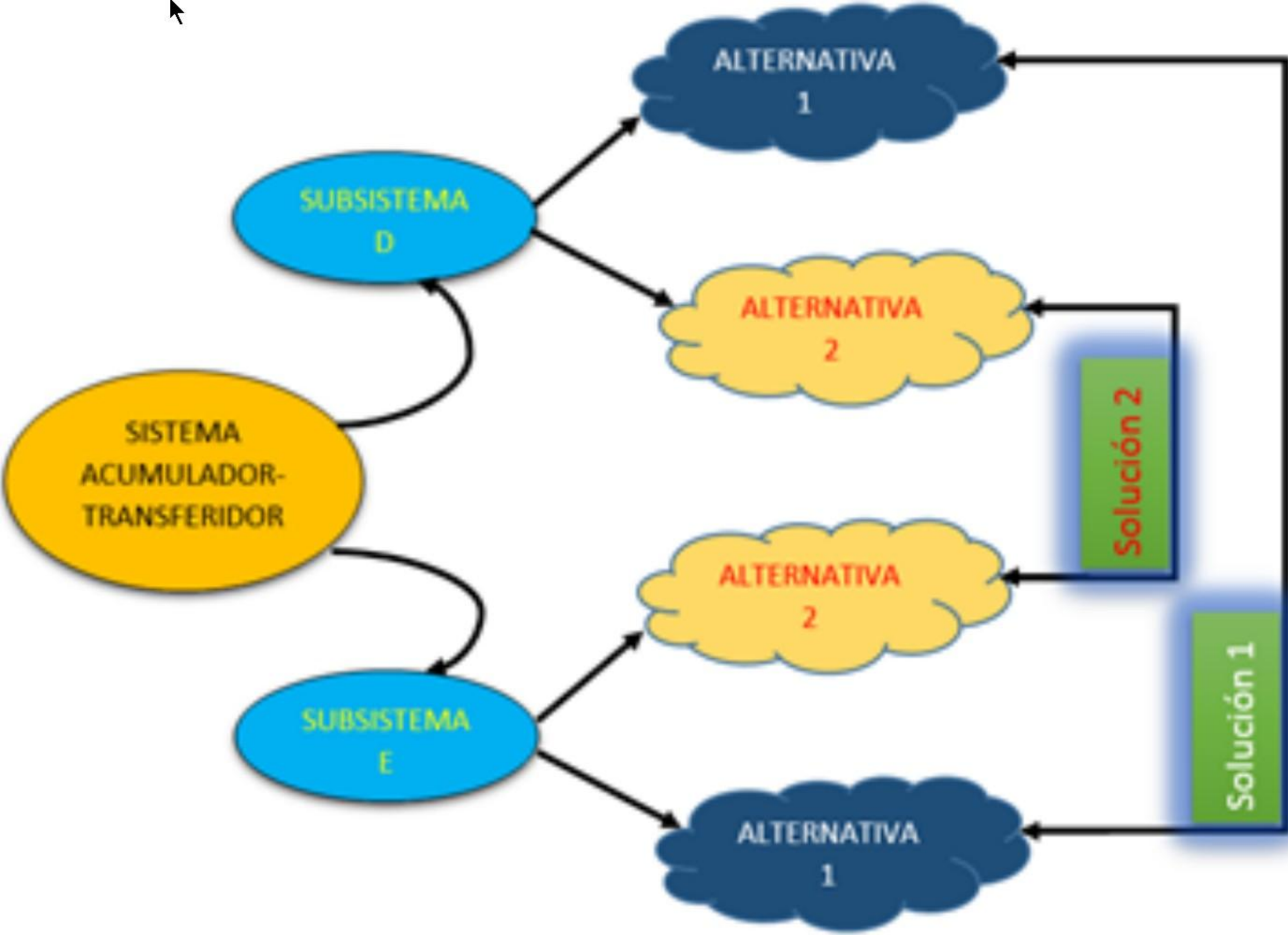


**DISEÑAR UN SISTEMA QUE  
PERMITA ACUMULAR LOS  
ROLLOS DE ALAMBRÓN**

**DISEÑAR UN SISTEMA QUE  
PERMITA TRANSFERIR LOS  
ROLLOS DE ALAMBRÓN**

# SELECCIÓN DE ALTERNATIVAS





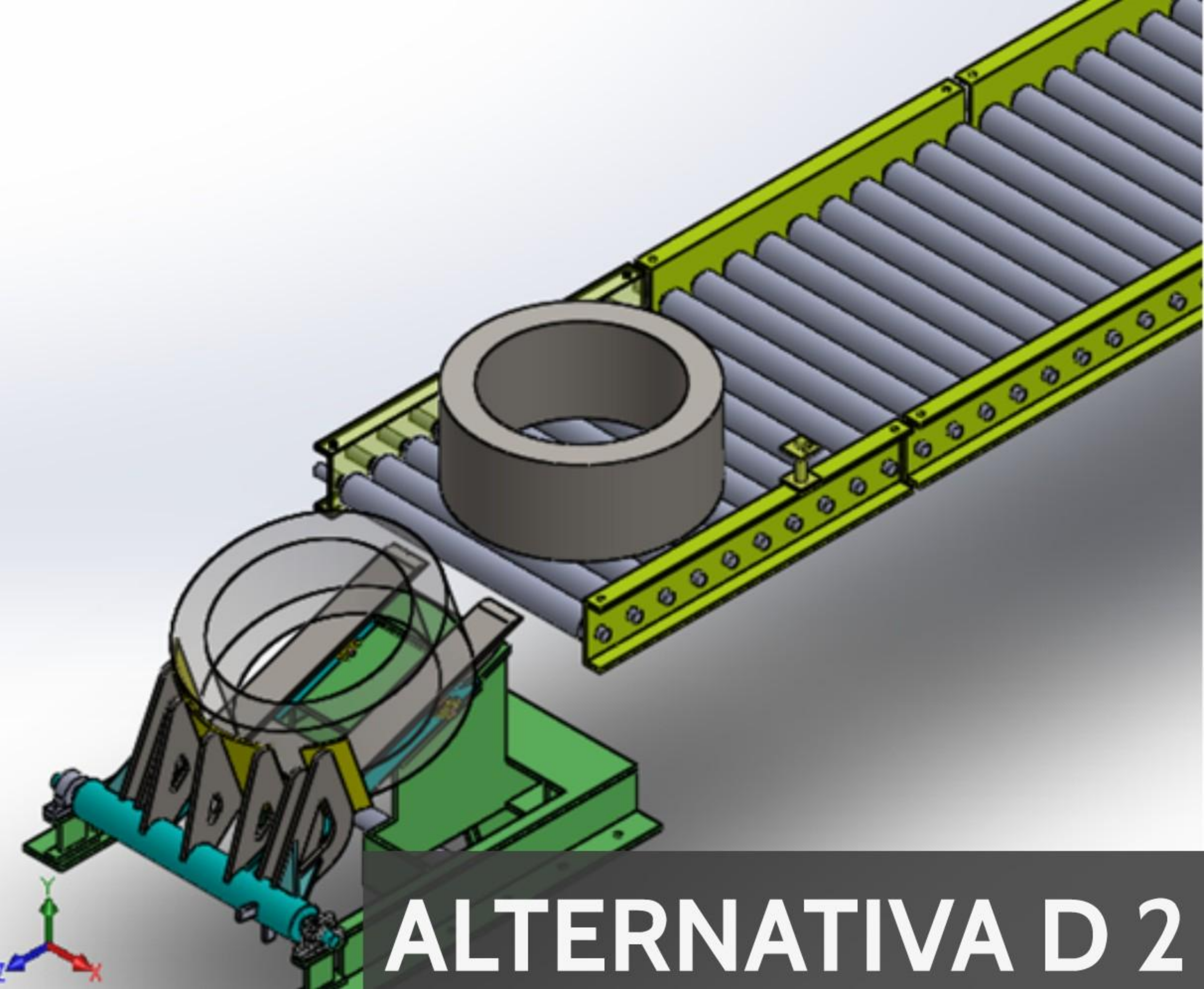


MECANISMO  
ELEVADOR DE ROLLOS  
DE ALAMBRÓN.

MECANISMO  
GIRATORIO  
DE ROLLOS DE  
ALAMBRÓN.

MECANISMO  
TRASLACIONAL PARA  
RECOGER ROLLOS DE  
ALAMBRÓN.

**ALTERNATIVA D 1**



**ALTERNATIVA D 2**

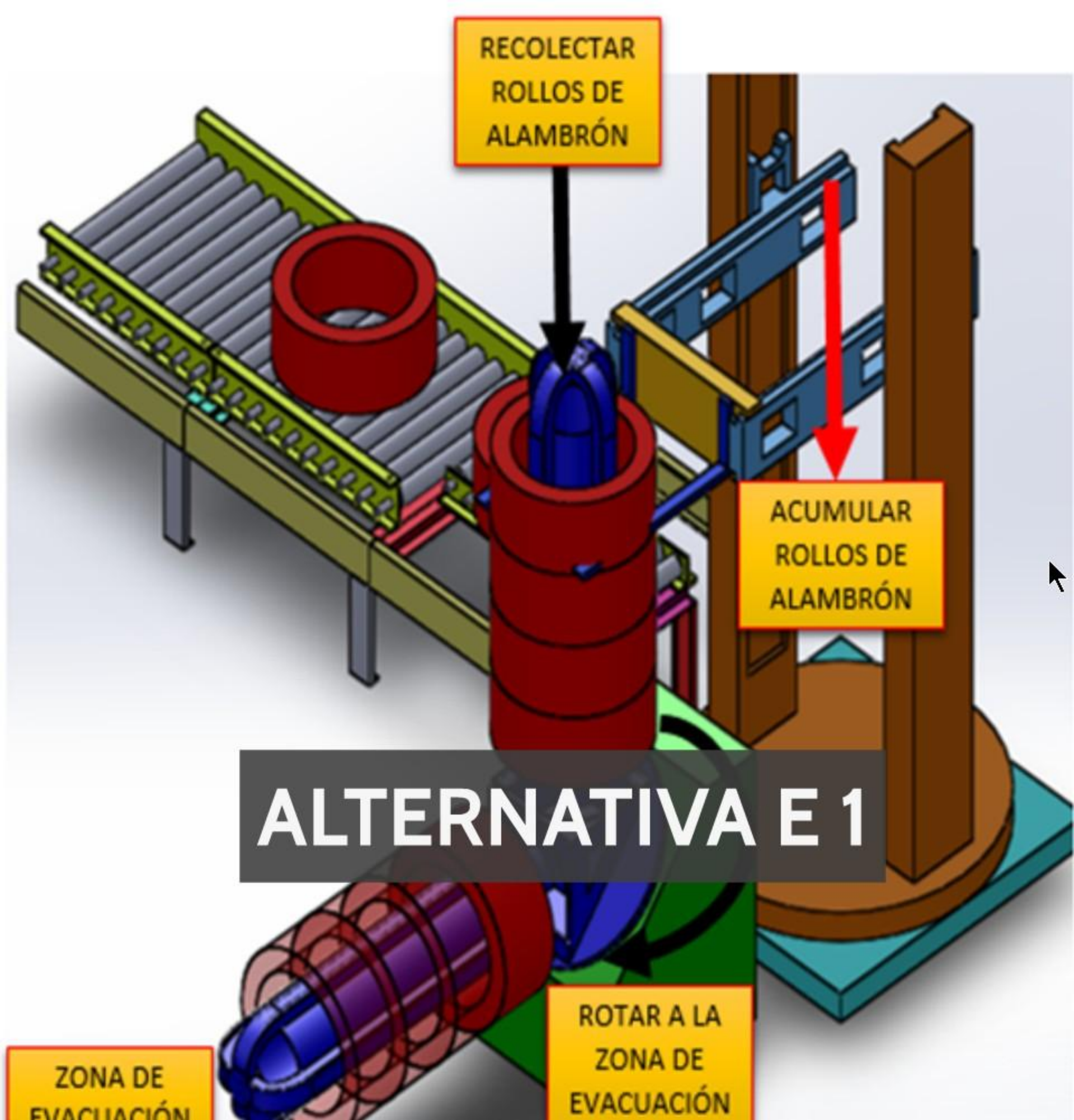
RECOLECTAR  
ROLLOS DE  
ALAMBRÓN

ACUMULAR  
ROLLOS DE  
ALAMBRÓN

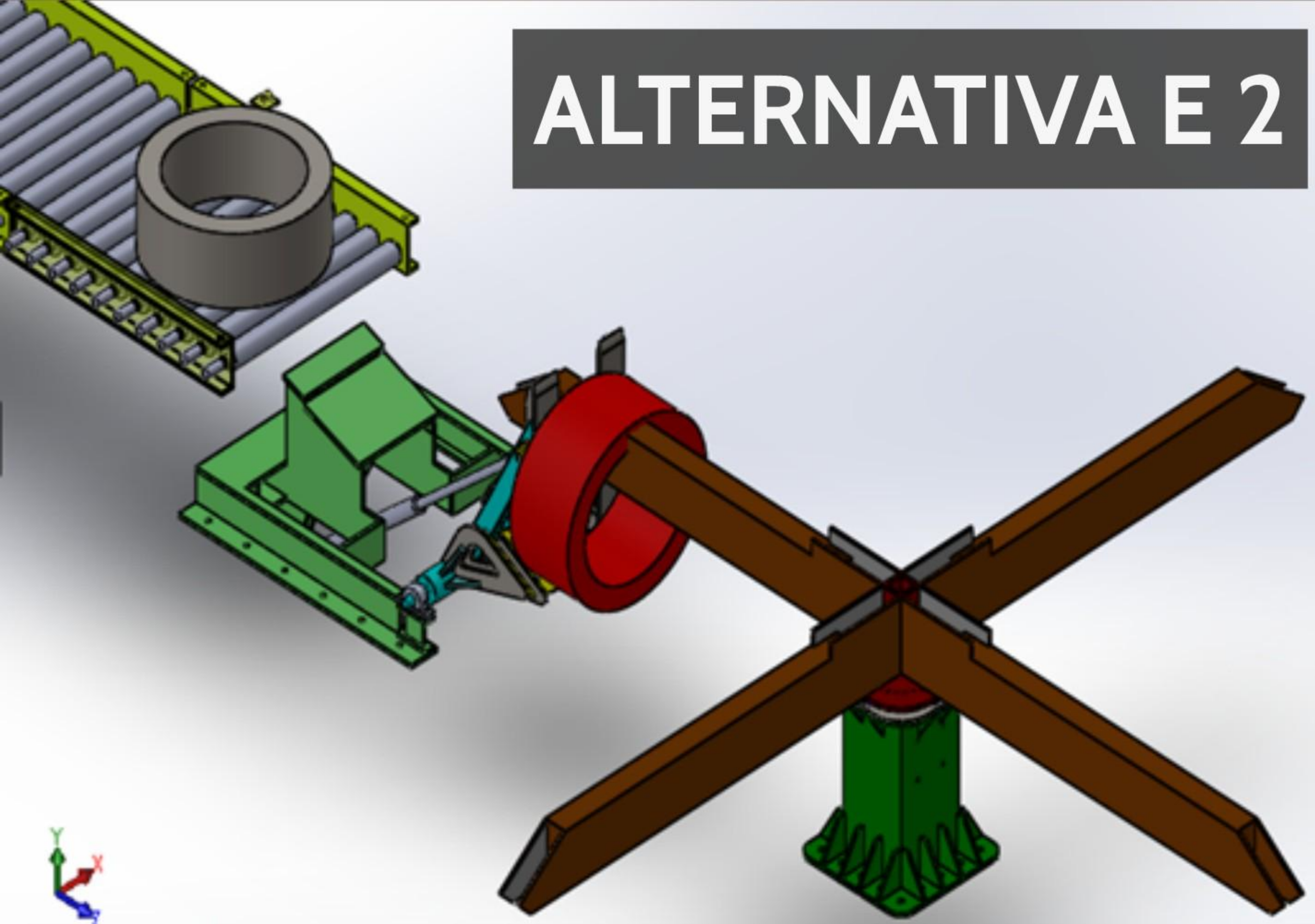
# ALTERNATIVA E 1

ZONA DE  
EVACUACIÓN

ROTAR A LA  
ZONA DE  
EVACUACIÓN



# ALTERNATIVA E 2



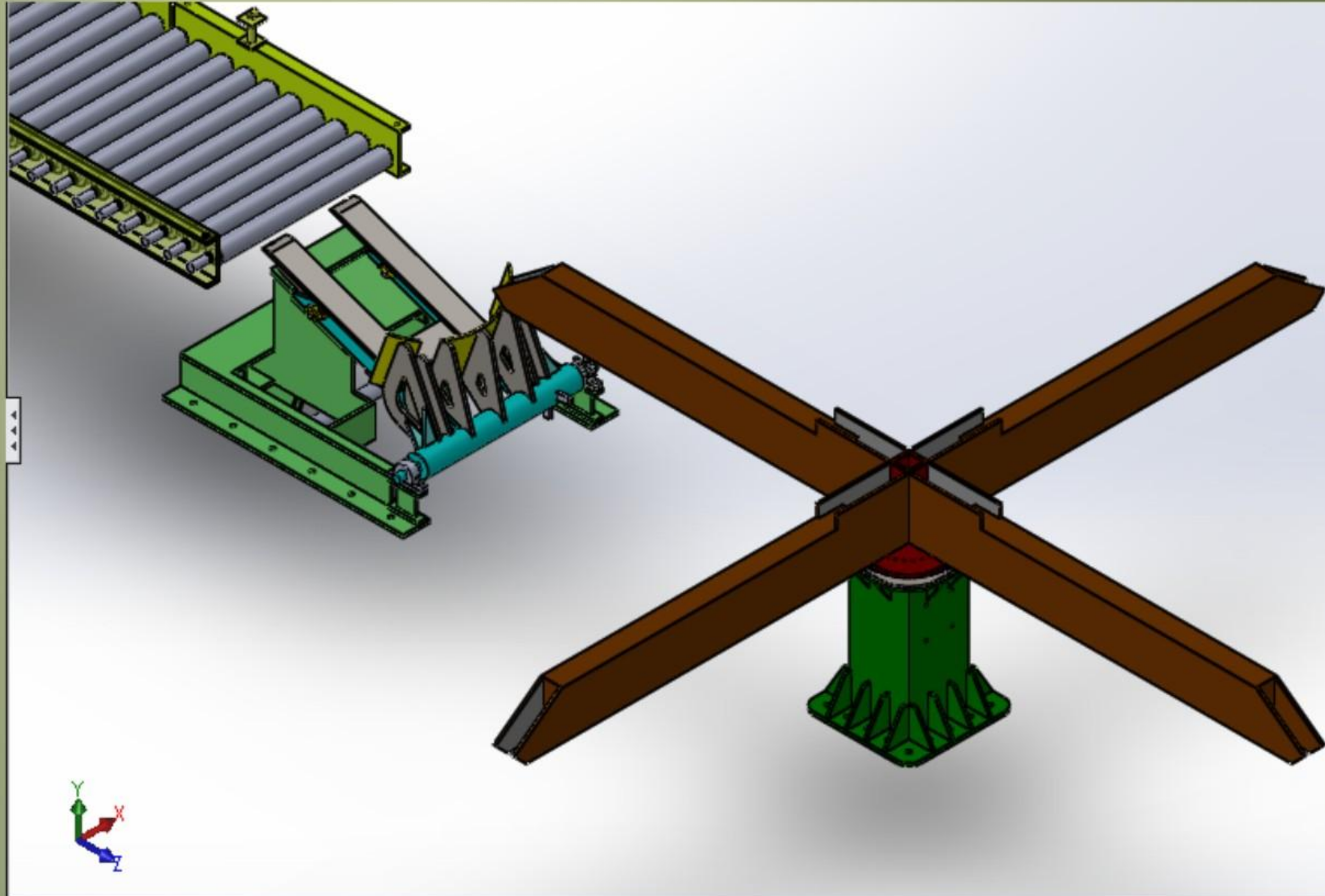
## **VENTAJA:**

**EL ÁREA DE IMPLEMENTACIÓN ES  
REDUCIDA**

## **DESVENTAJAS:**

- **CARGA SUSPENDIDA**
- **COMPLEJIDAD MECÁNICA**
- **VARIOS MOVIMIENTOS POR PARTE DEL MECANISMO**

# SOLUCIÓN 2



## **VENTAJAS:**

- **BAJO COSTO.**
- **ELEMENTOS MECÁNICOS ESTANDARIZADOS.**
- **FÁCIL IMPLEMENTACIÓN.**

## **DESVENTAJA:**

**MAYOR ÁREA DE  
IMPLEMENTACIÓN REQUERIDA**

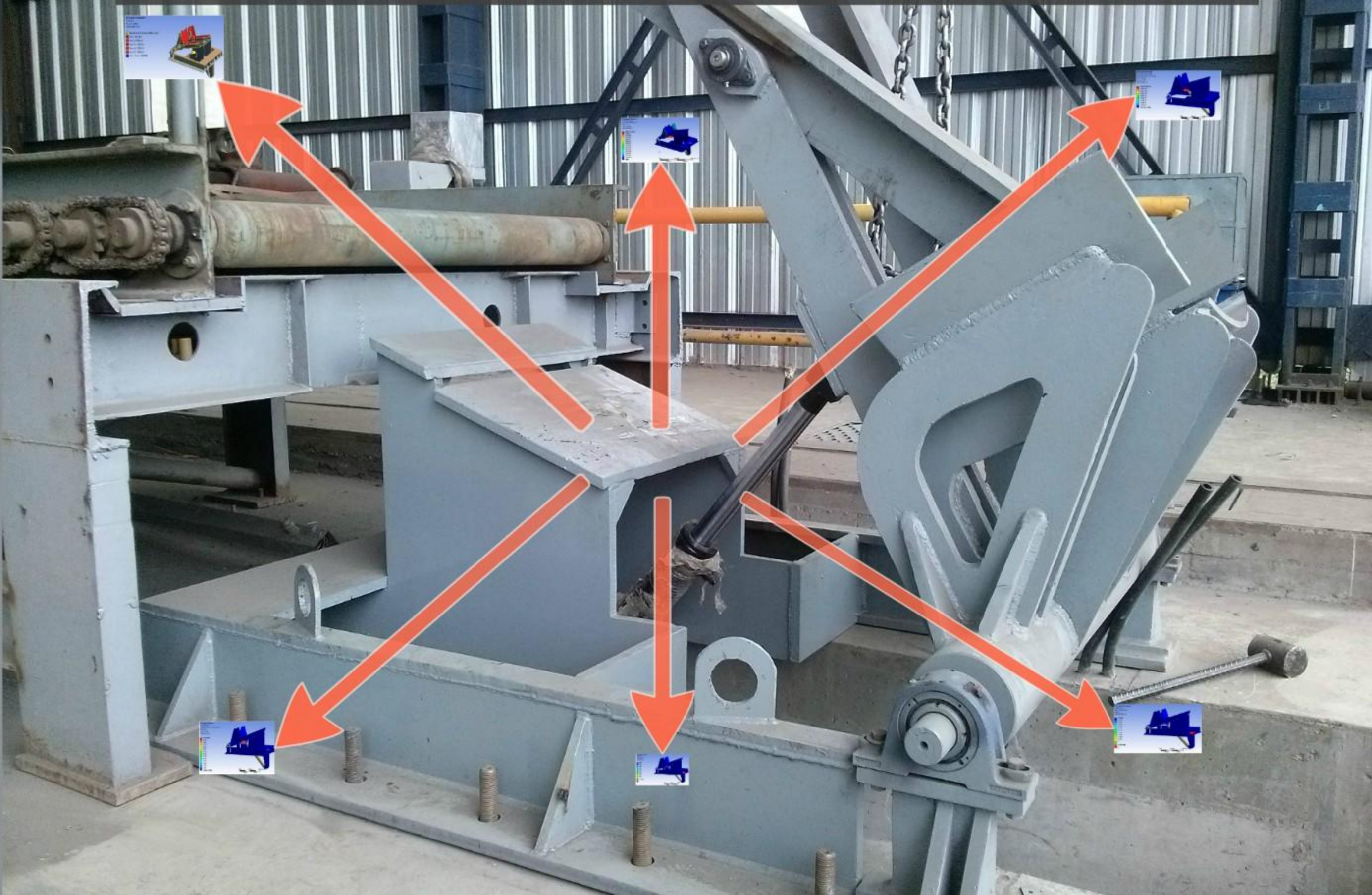
*DISEÑO ASISTIDO POR COMPUTADOR*



**ANSYS**<sup>®</sup>



# MECANISMO VOLTEADOR-ACUMULADOR



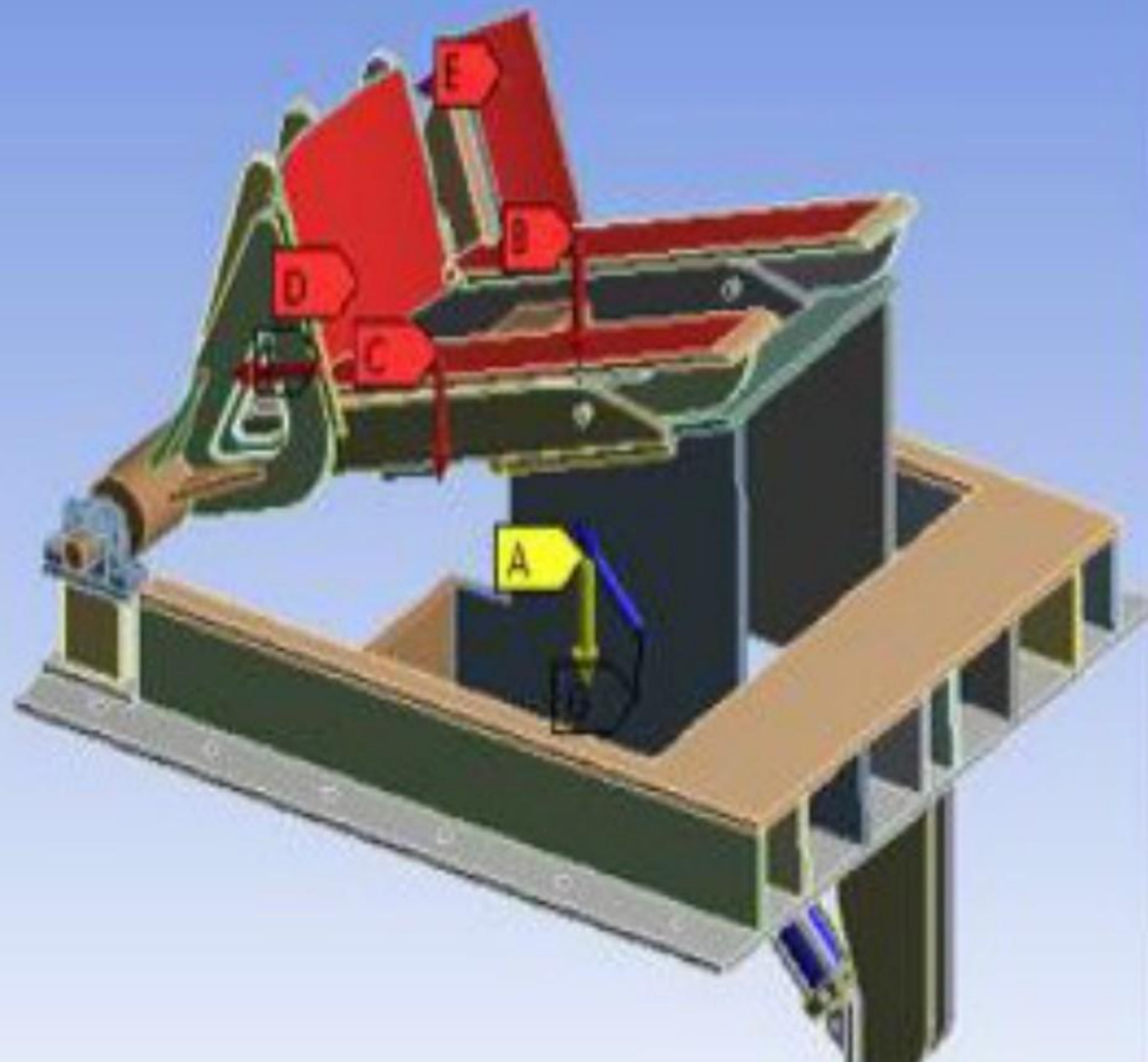
## B: Transient Structural

Transient

Time: 1,e-004 s

28/07/2014 21:32

- A** Standard Earth Gravity:  $9806,6 \text{ mm/s}^2$
- B** Force:  $5502,6 \text{ N}$
- C** Force 2:  $5502,6 \text{ N}$
- D** Force 3:  $-5502,6 \text{ N}$
- E** Force 4:  $-5502,6 \text{ N}$
- F** Force 5:  $-5502,6 \text{ N}$
- G** Joint - Force:  $-80420 \text{ N}$



# B: Transient Structural

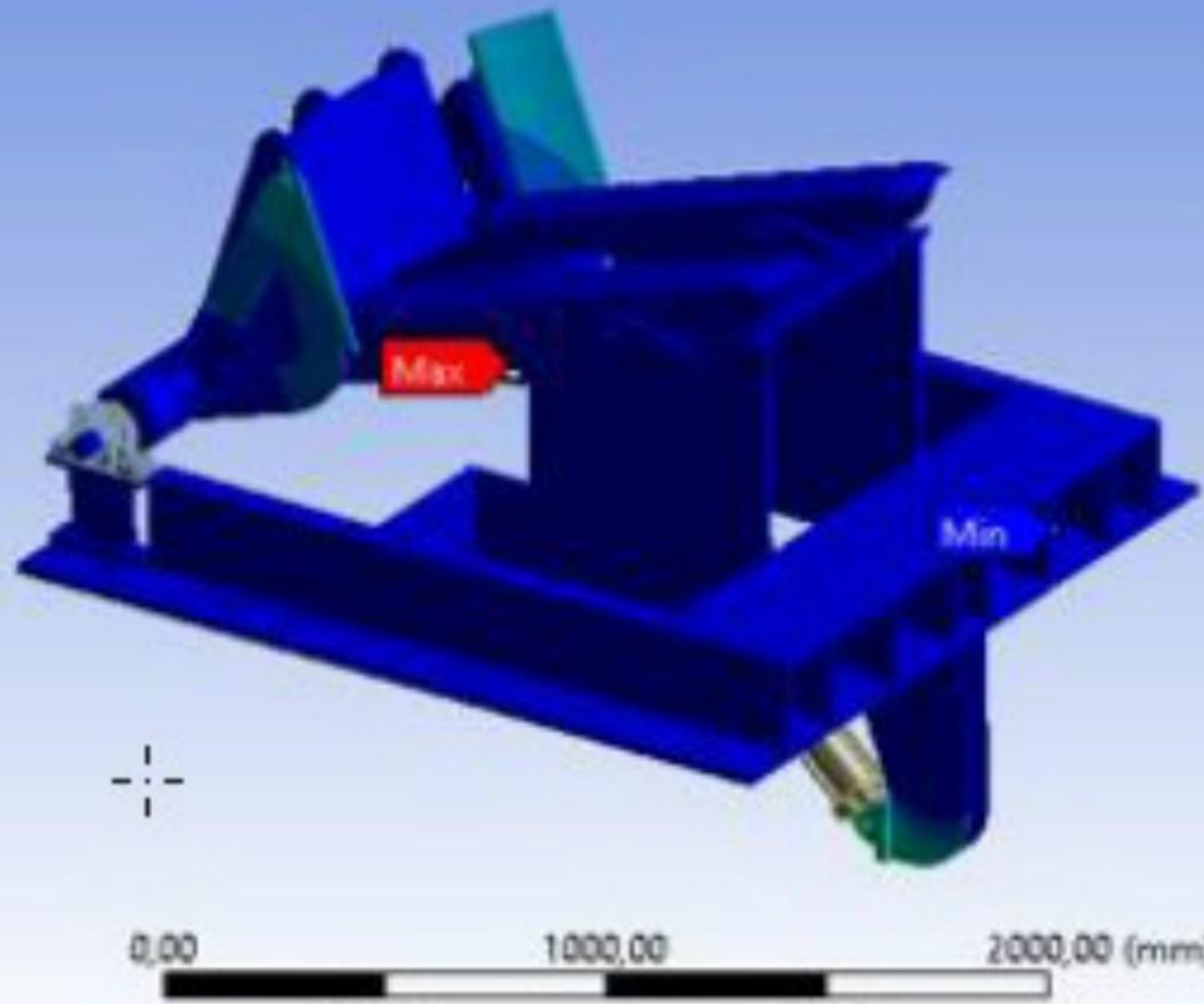
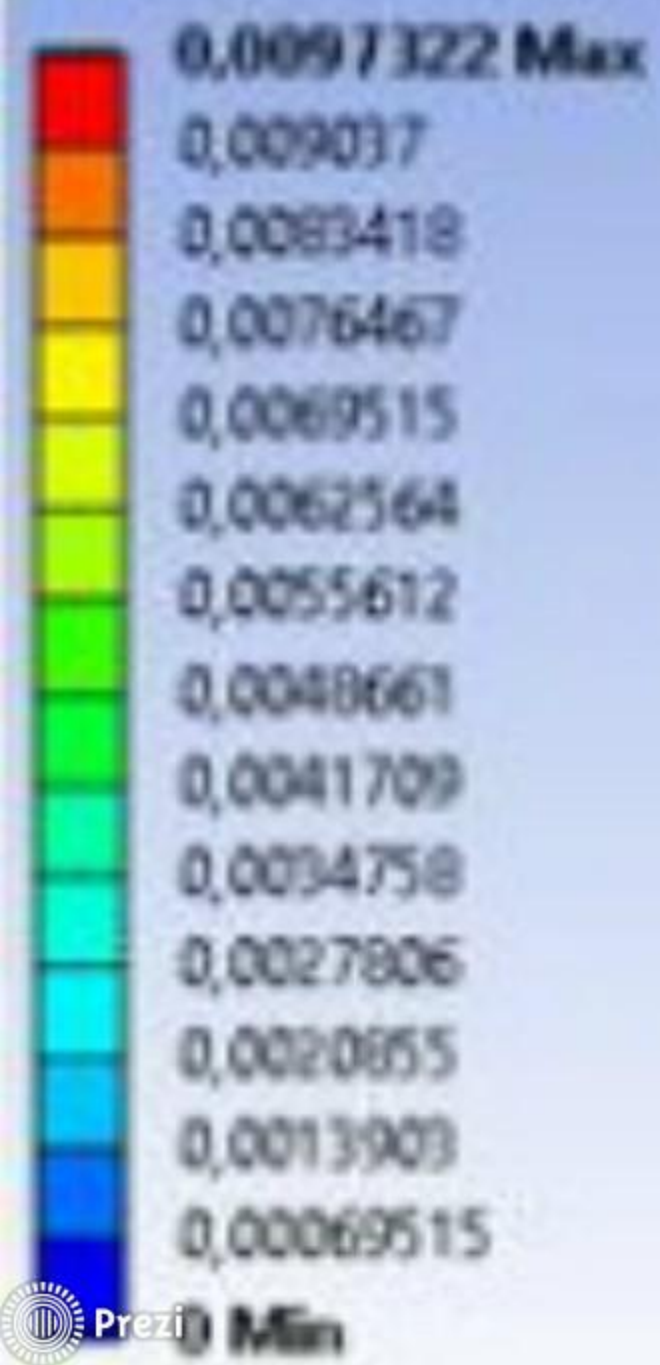
Total Deformation

Type: Total Deformation

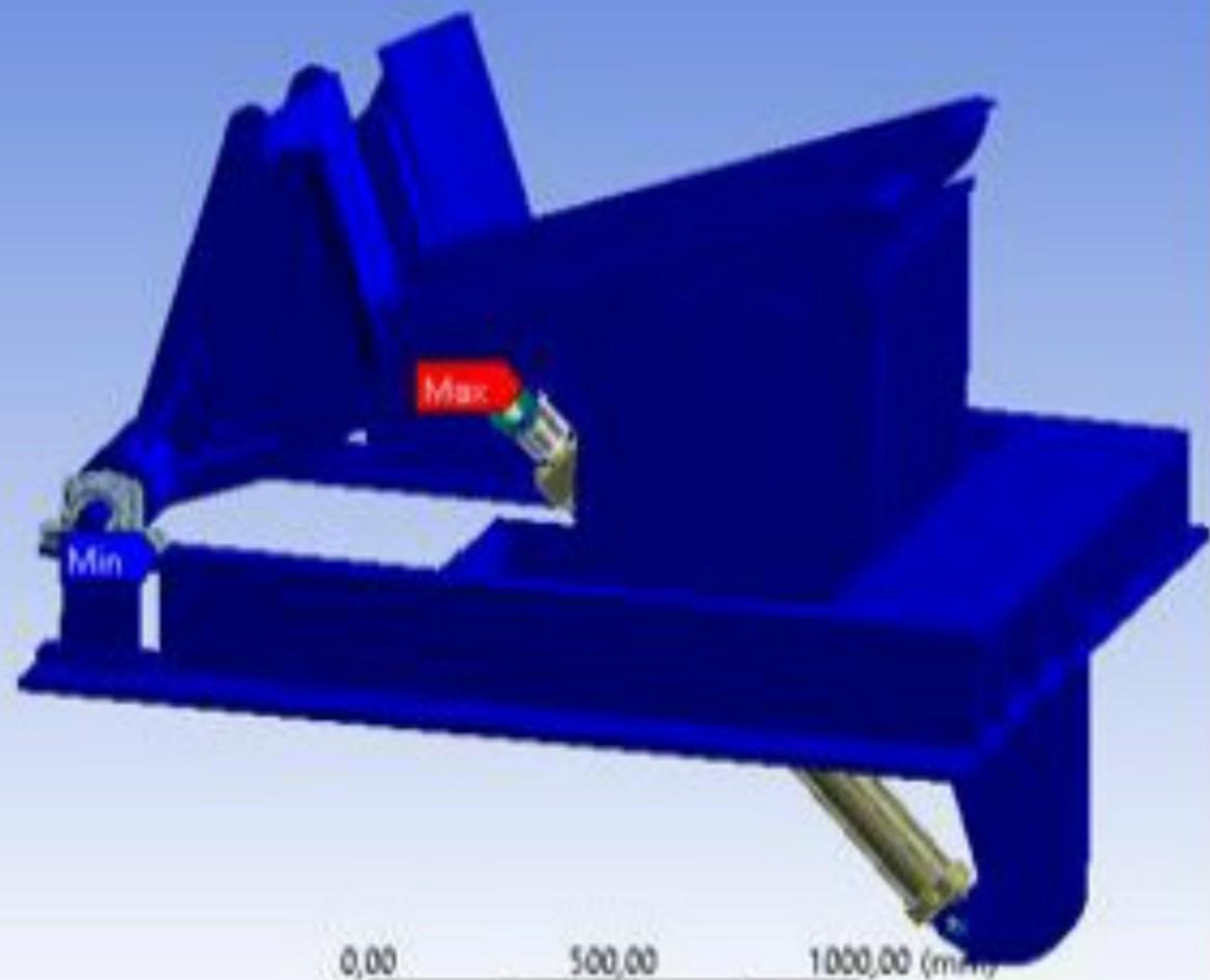
Unit: mm

Time: 1,e-004

28/07/2014 22:12



B: Transient Structural  
Equivalent Elastic Strain  
Type: Equivalent Elastic Strain  
Unit: mm/mm  
Time: 1,e-004  
28/07/2014 22:42



# B: Transient Structural

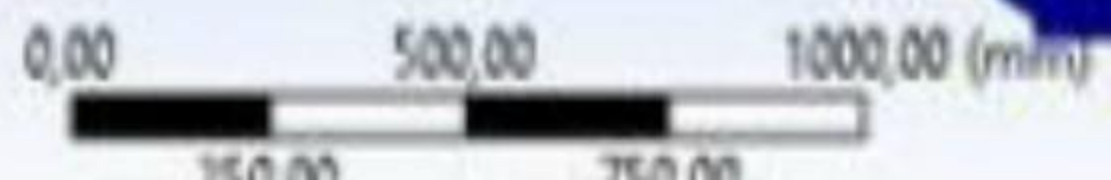
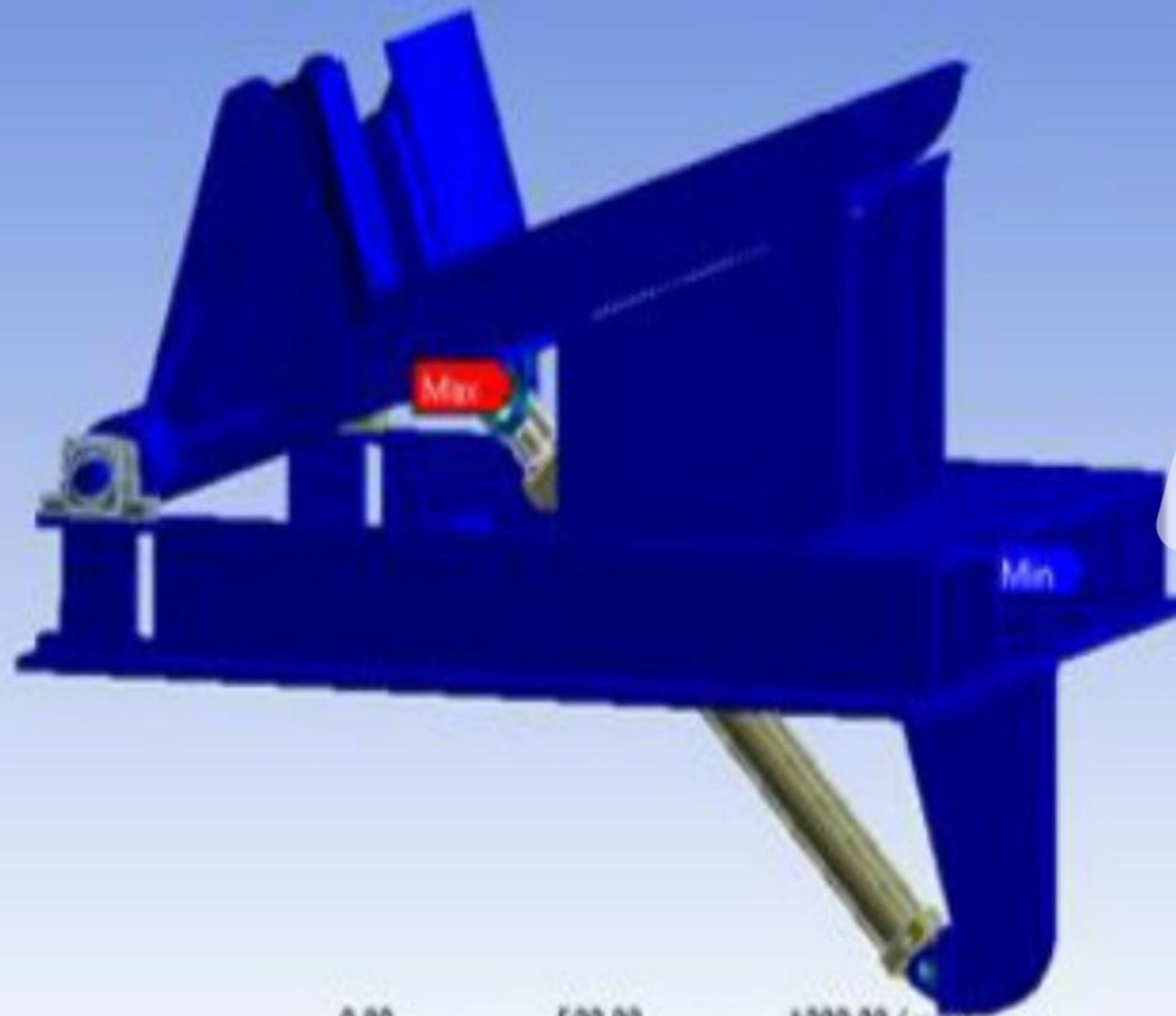
Equivalent Stress

Type: Equivalent (von-Mises) Stress

Unit: MPa

Time: 1,e-004

20/07/2014 22:52



# E: Transient Structural

Safety Factor

Type: Safety Factor

Time: 1, e-004

28/01/2014 23:00

15 Max

14,545

14,091

13,636

13,182

12,727

12,273

11,818

11,364

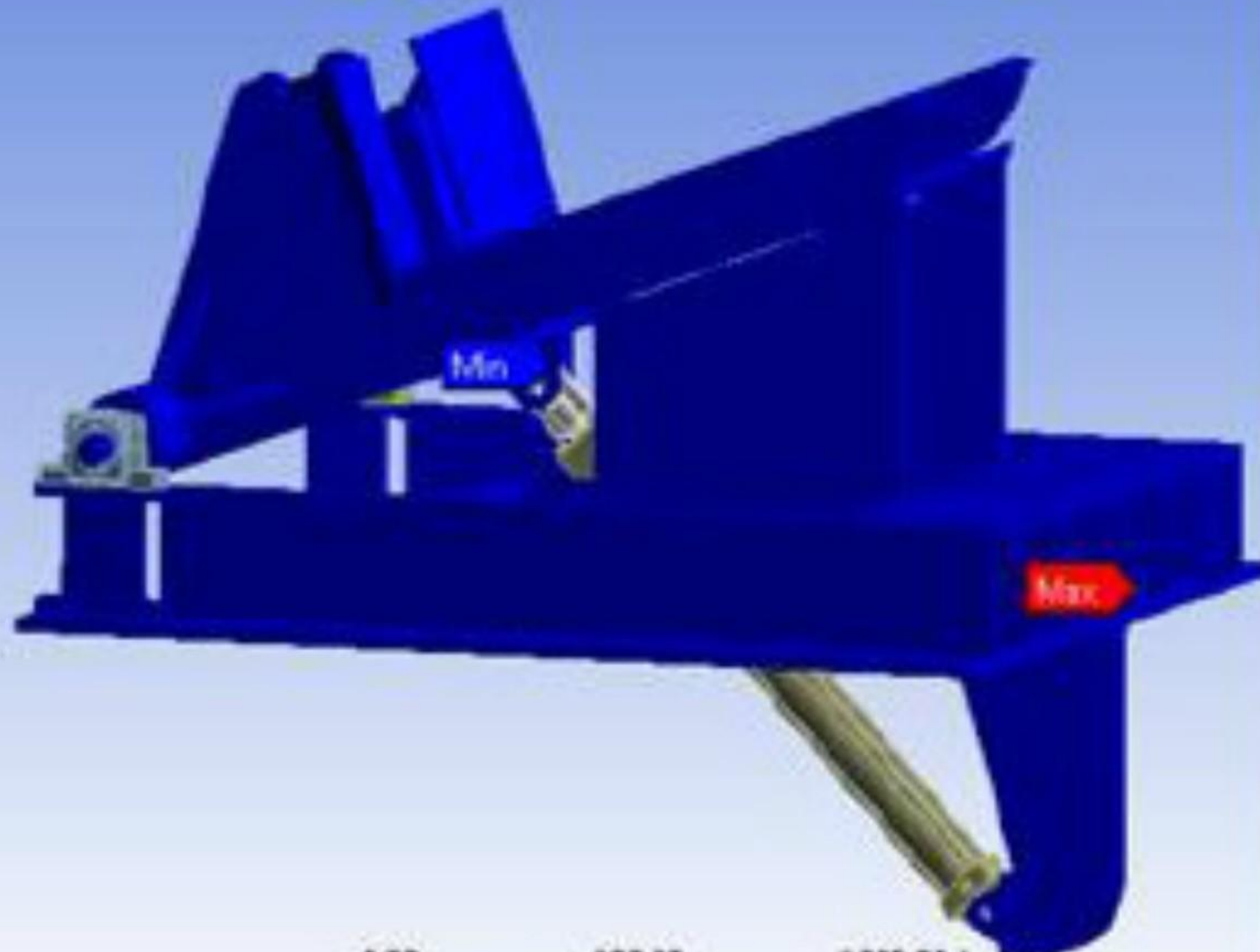
10,909

10,455

6,1917 Min

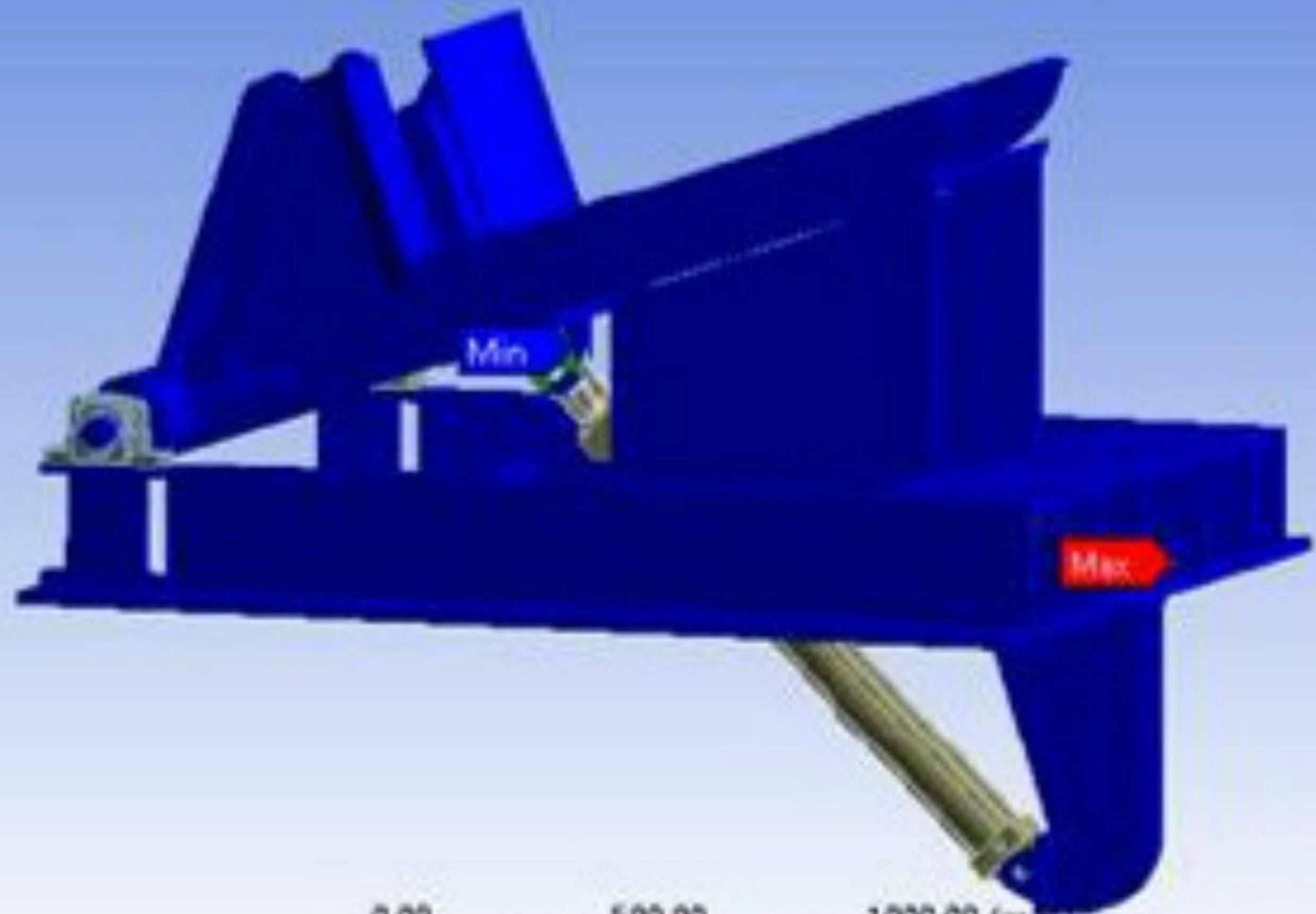
1

0

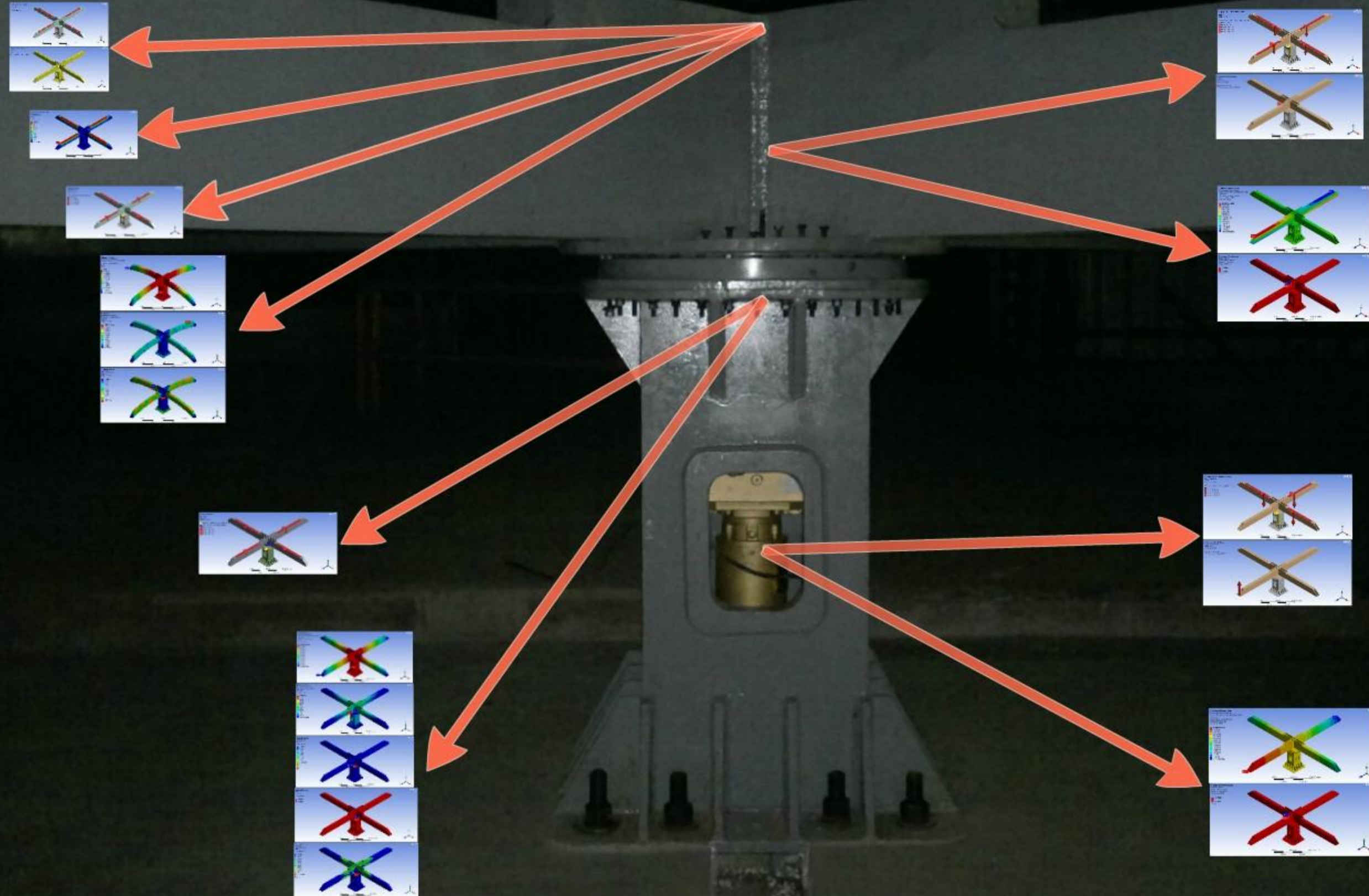


0,00 500,00 1000,00 (mm)

B: Transient Structural  
Safety Factor  
Type: Safety Factor  
Time: 0  
28/07/2014 23:16



# MECANISMO RECOLECTOR-TRANSFERIDOR

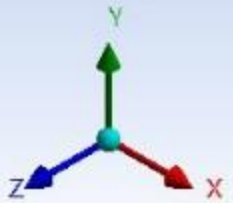
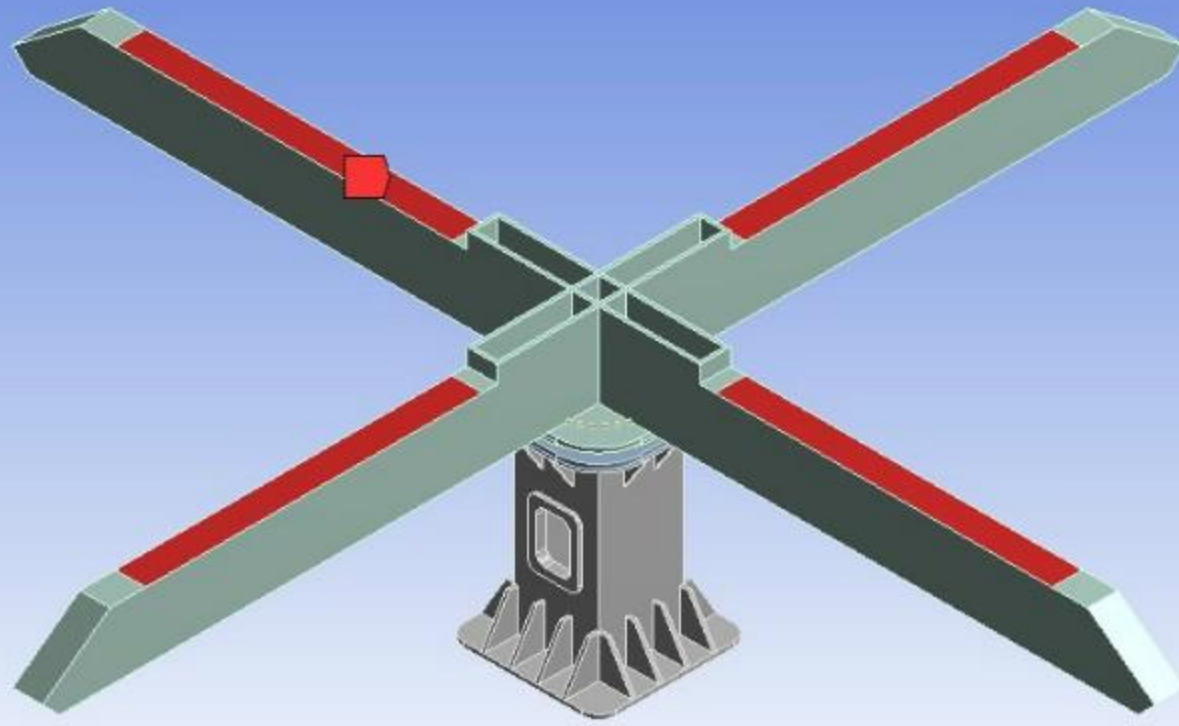




**B: Carga termina a 250 grados**

Temperature  
Time: 1. s  
29-jul-14 19:02

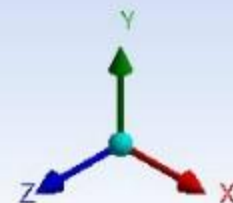
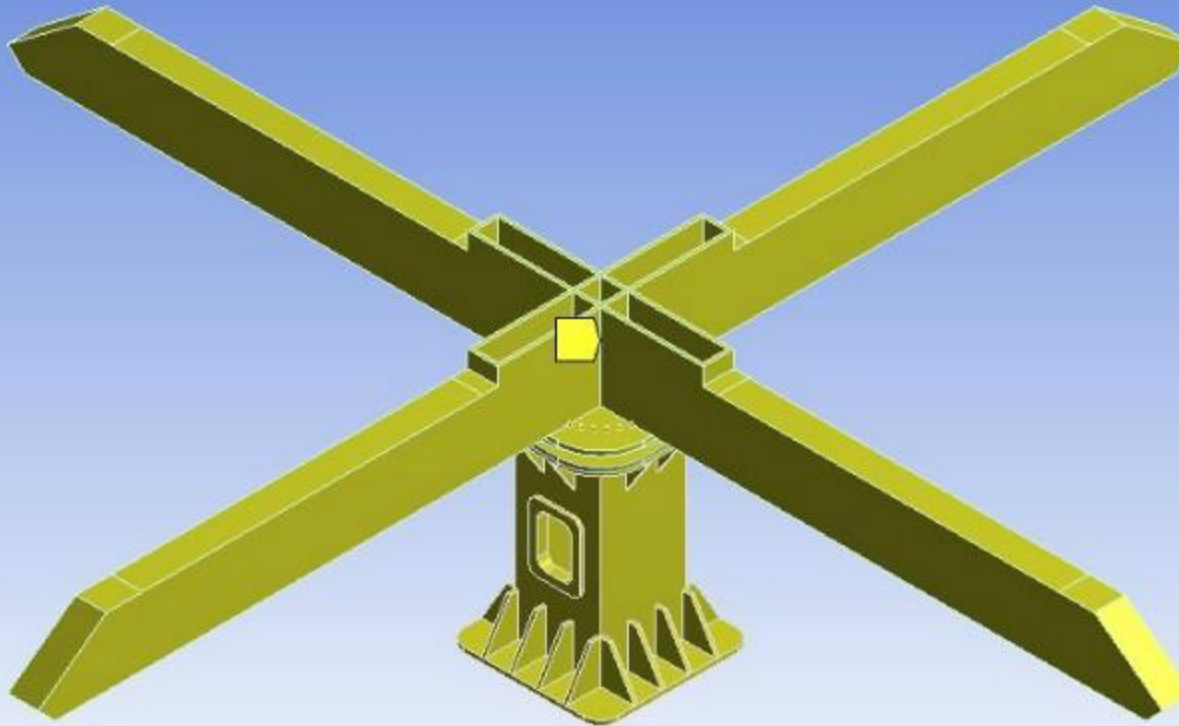
Temperature: 250. °C



**B: Carga termina a 250 grados**

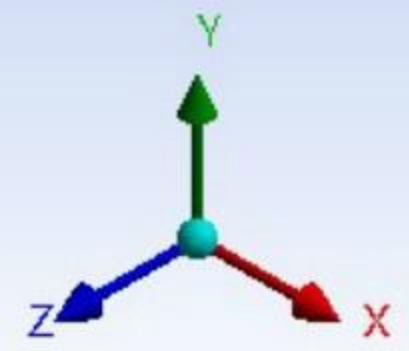
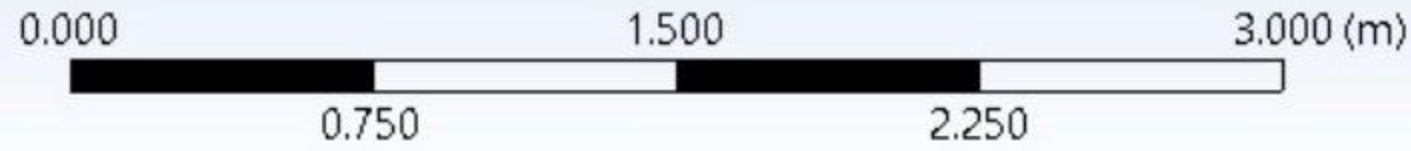
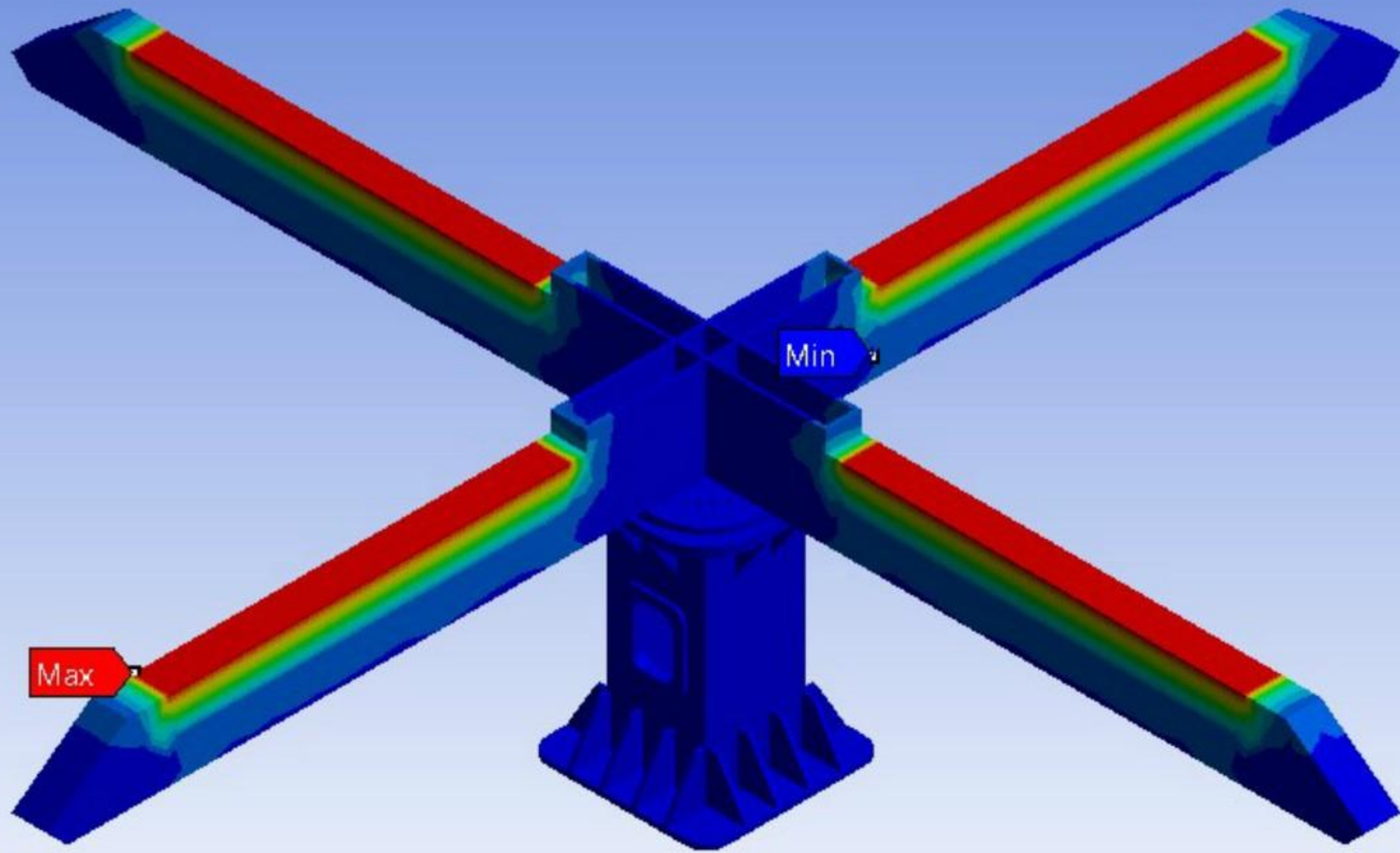
Convection  
Time: 1. s  
29-jul-14 19:05

Convection: 10. °C, 153.51 W/m<sup>2</sup>·°C



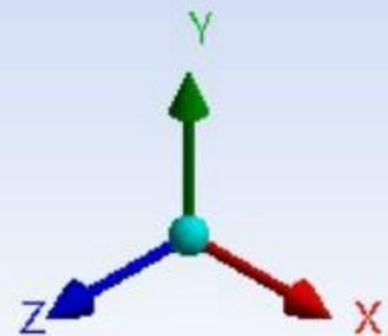
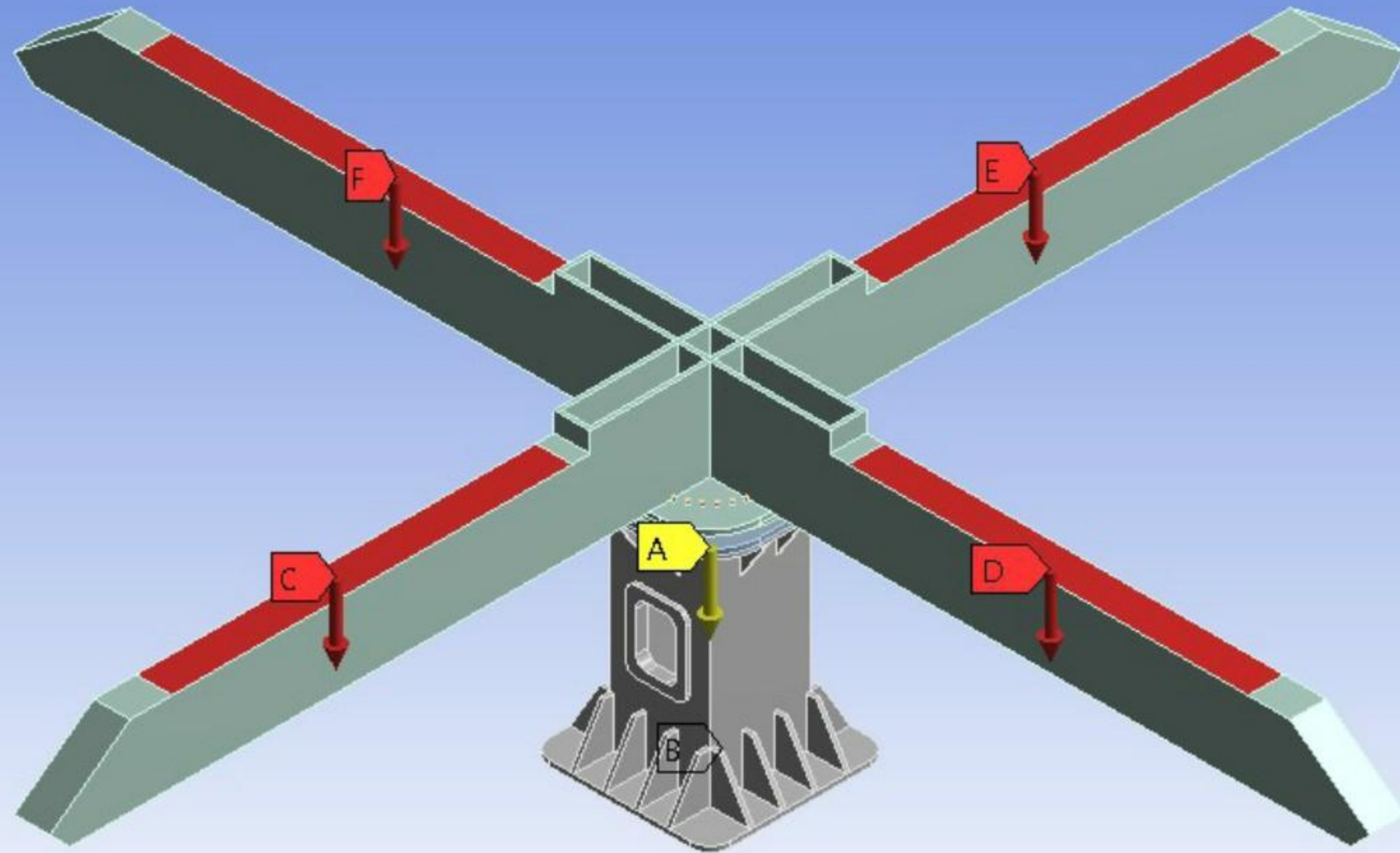
**B: Carga termina a 250 grados**

Temperature  
Type: Temperature  
Unit: °C  
Time: 1  
29-jul-14 19:08



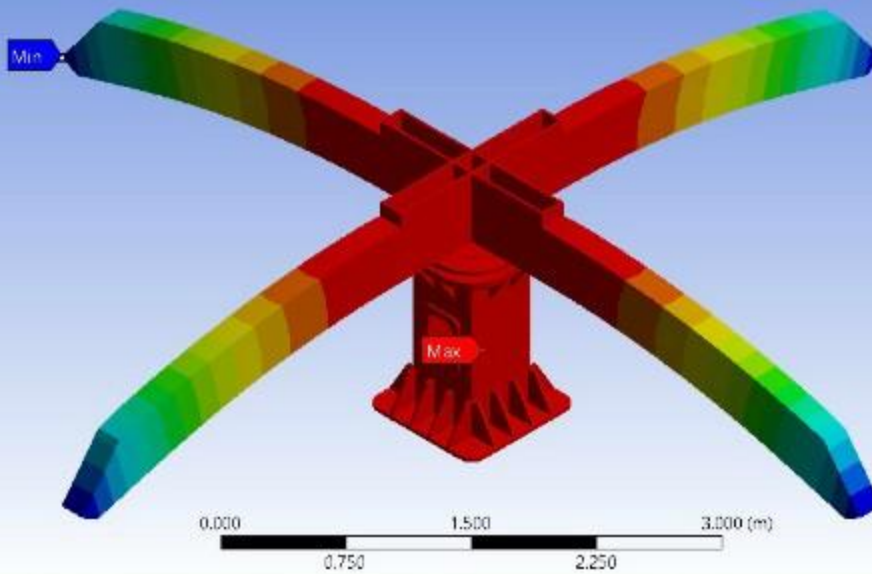
C: Estudio Termico  
Static Structural  
Time: 1. s  
29-jul-14 19:10

- A** Standard Earth Gravity: 9.8066 m/s<sup>2</sup>
- B** Fixed Support
- C** Force: 20000 N
- D** Force 2: 20000 N
- E** Force 3: 20000 N
- F** Force 4: 20000 N



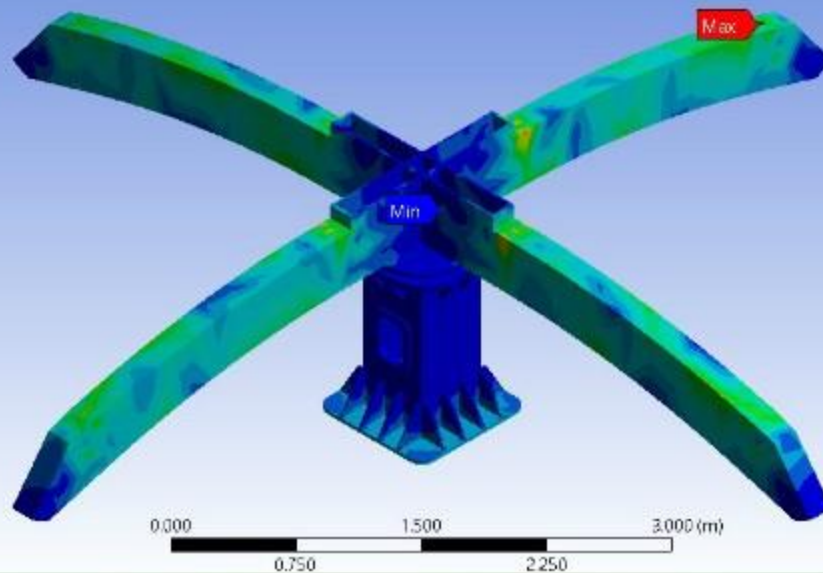
C: Estudio Termico  
 Directional Deformation  
 Type: Directional Deformation(Y Axis)  
 Unit: m  
 Global Coordinate System  
 Time: 1  
 29-jul-14 19:12

0 Max  
 -0.0018715  
 -0.0037429  
 -0.0056144  
 -0.0074858  
 -0.0093573  
 -0.011229  
 -0.0131  
 -0.014972  
 -0.016843  
 -0.018715  
 -0.020586  
 -0.022457  
 -0.024329  
 -0.0262 Min



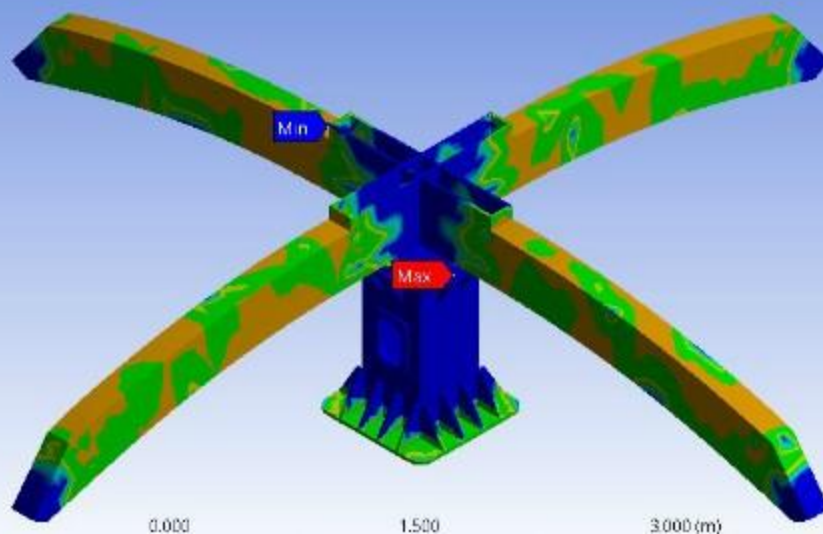
C: Estudio Termico  
 Maximum Shear Stress  
 Type: Maximum Shear Stress  
 Unit: Pa  
 Time: 1  
 29-jul-14 19:14

1.0256e8 Max  
 9.5232e7  
 8.7908e7  
 8.0584e7  
 7.326e7  
 6.5936e7  
 5.8613e7  
 5.1289e7  
 4.3965e7  
 3.6641e7  
 2.9317e7  
 2.1993e7  
 1.4669e7  
 7.3455e6  
 21627 Min



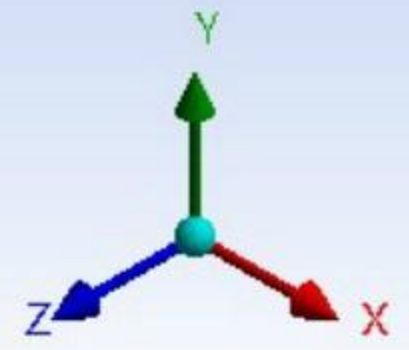
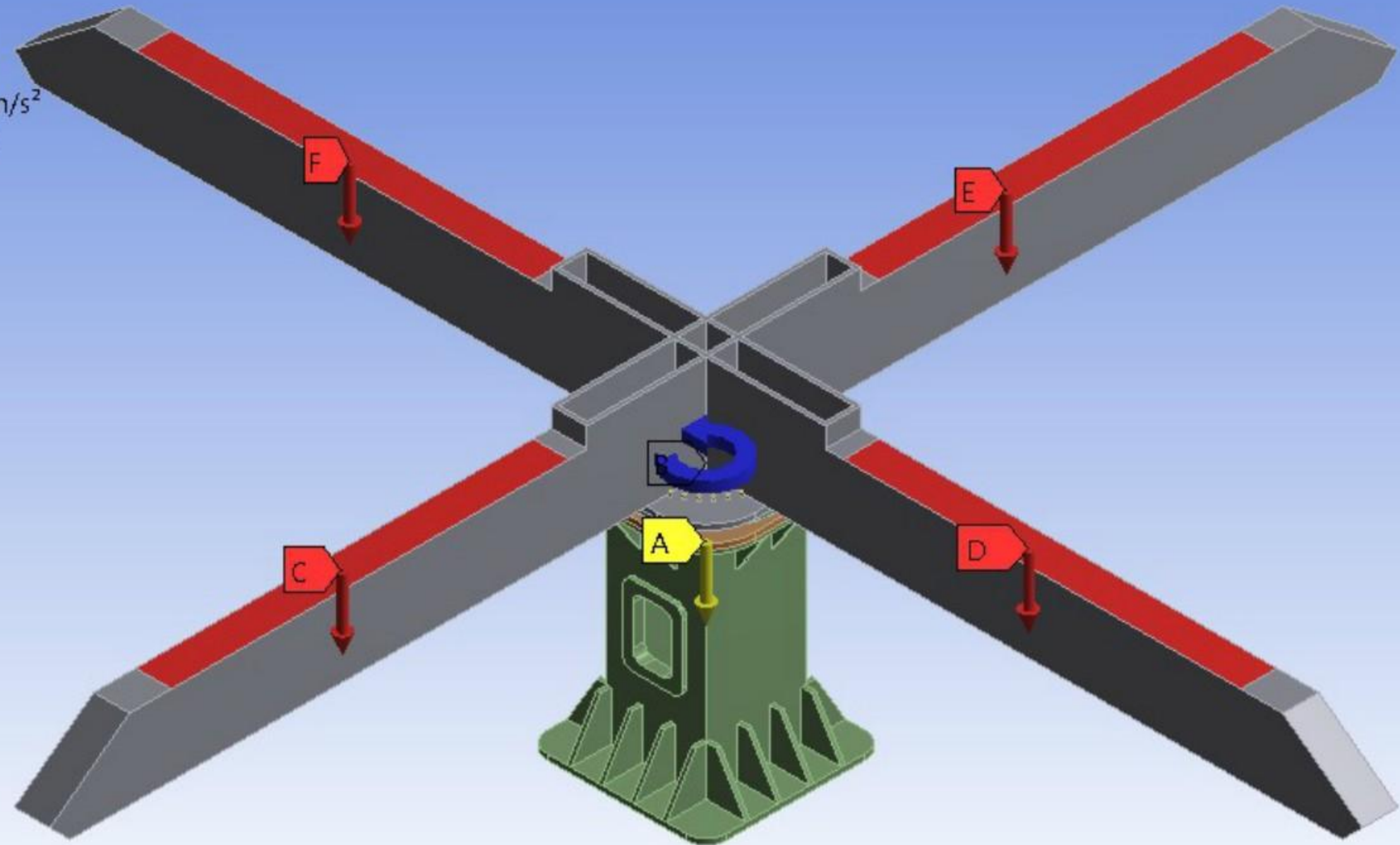
C: Estudio Termico  
 Safety Factor  
 Type: Safety Factor  
 Time: 1  
 29-jul-14 19:15

15 Max  
 14.545  
 14.091  
 13.636  
 13.182  
 12.727  
 12.273  
 11.818  
 11.364  
 10.909  
 10.455  
 10  
 1.2854 Min  
 0



**E: Analiis Dinamico**  
Transient  
Time: 5. s  
29-jul-14 19:16

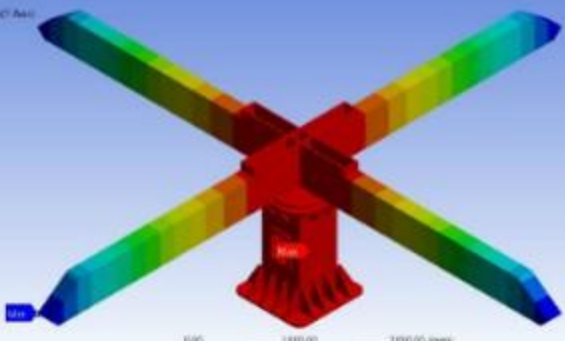
- A** Standard Earth Gravity: 9806.6 mm/s<sup>2</sup>
- B** Joint - Rotational Velocity: 3. RPM
- C** Force: 20000 N
- D** Force 2: 20000 N
- E** Force 3: 20000 N
- F** Force 4: 20000 N



## D. Ansys Dynamic

Worked Model (Static) - Static  
Type: Static Structural (Deformation) - Ansys  
User: user  
Global Coordinate System:  
Time: 5  
29-jan-14 14:25

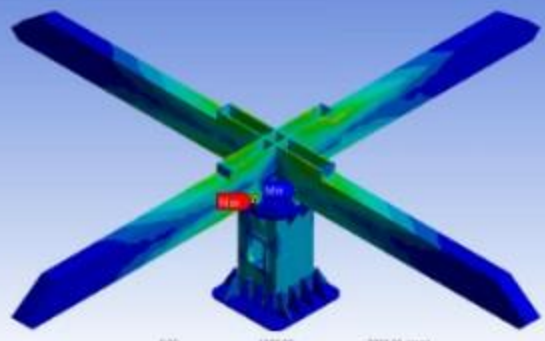
0.0007341 Max  
-0.000487  
-0.13771  
-0.20003  
-0.27675  
-0.34557  
-0.4145  
-0.48355  
-0.55304  
-0.62255  
-0.69199  
-0.7617  
-0.83152  
-0.90135  
-0.96857 Min



## E. Ansys Dynamic

Worked Model (Static) - Static  
Type: Maximum Shear Stress  
User: user  
Global Coordinate System:  
Time: 5  
29-jan-14 14:27

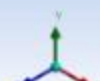
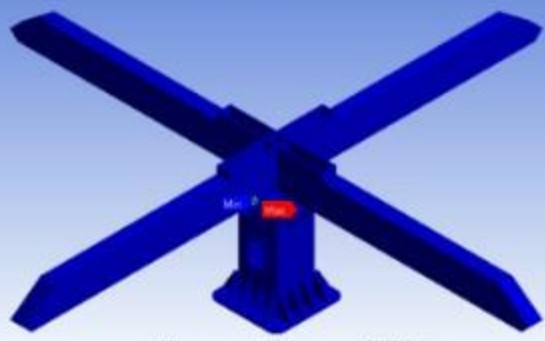
12.815 Max  
11.714  
10.813  
9.912  
9.011  
8.1094  
7.2084  
6.3073  
5.4063  
4.5052  
3.6042  
2.7031  
1.8021  
0.90105  
-1.6722e-6 Min



## F. Ansys Dynamic

Worked Model (Static) - Static  
Type: Safety Factor  
User: user  
Global Coordinate System:  
Time: 5  
29-jan-14 14:32

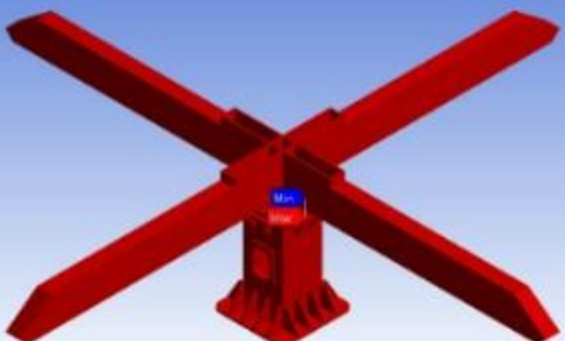
10 Max  
14.545  
14.001  
13.626  
13.182  
12.737  
12.293  
11.848  
11.404  
10.238 Min  
10  
1  
1  
1



## G. Ansys Dynamic

Worked Model (Static) - Static  
Type: Safety Factor  
User: user  
Global Coordinate System:  
Time: 6  
29-jan-14 14:37

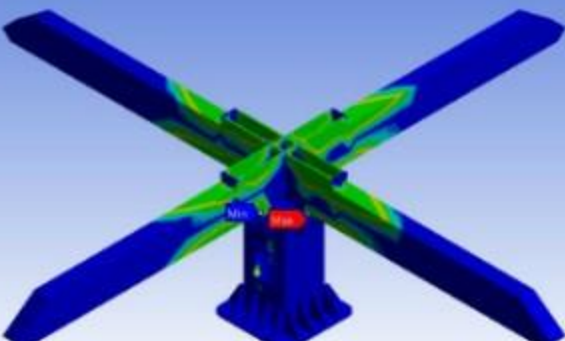
1e6 Max  
1e6 Min



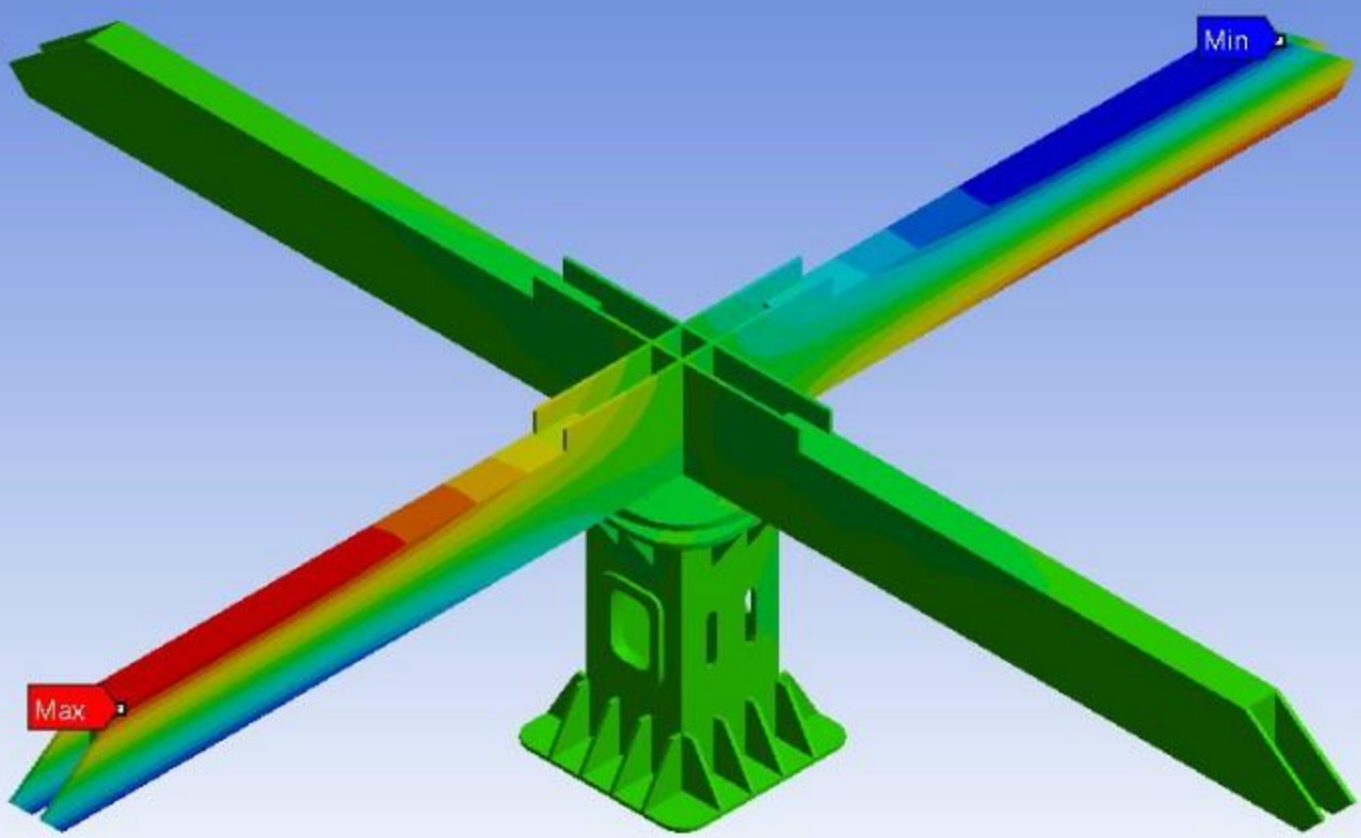
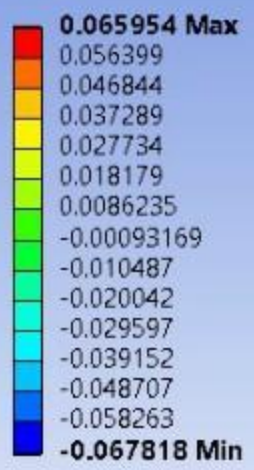
## H. Ansys Dynamic

Worked Model (Static) - Static  
Type: Safety Factor  
User: user  
Global Coordinate System:  
Time: 6  
29-jan-14 14:38

10 Max  
14.545  
14.001  
13.626  
13.182  
12.737  
12.293  
11.848  
11.404  
10.906  
10.415  
10  
8.6212 Min  
8

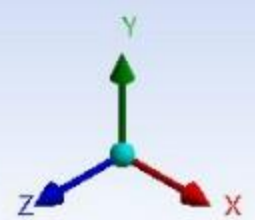


C: Impacto Montacargas  
Directional Deformation  
Type: Directional Deformation(Z Axis)  
Unit: mm  
Global Coordinate System  
Time: 2.7991e-008  
29-jul-14 19:51

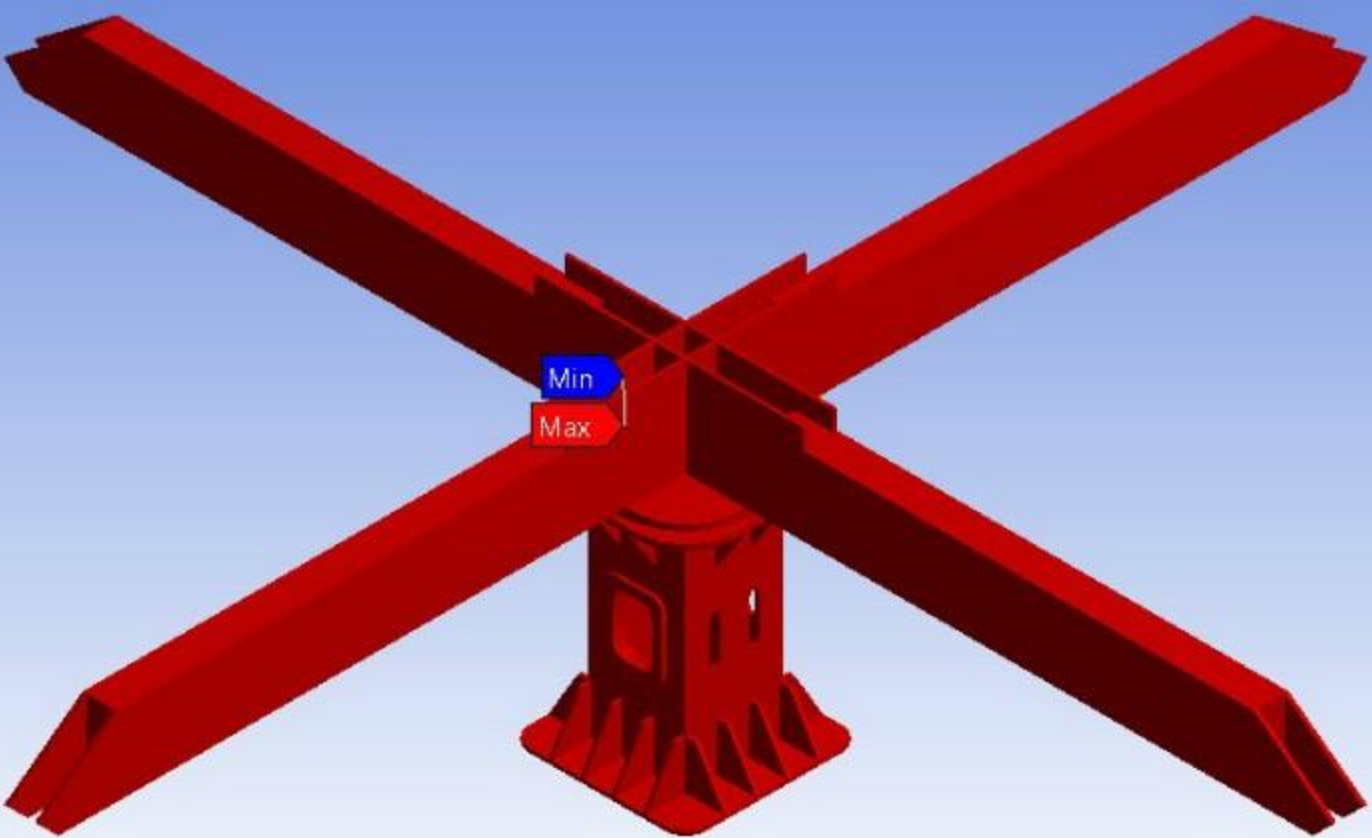


Max

Min

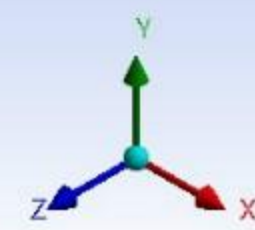


C: Impacto Montacargas  
Safety Factor  
Type: Safety Factor  
Time: 2.7991e-008  
29-jul-14 19:52



Min

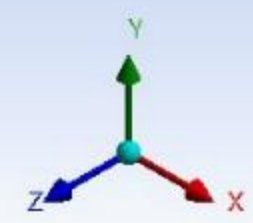
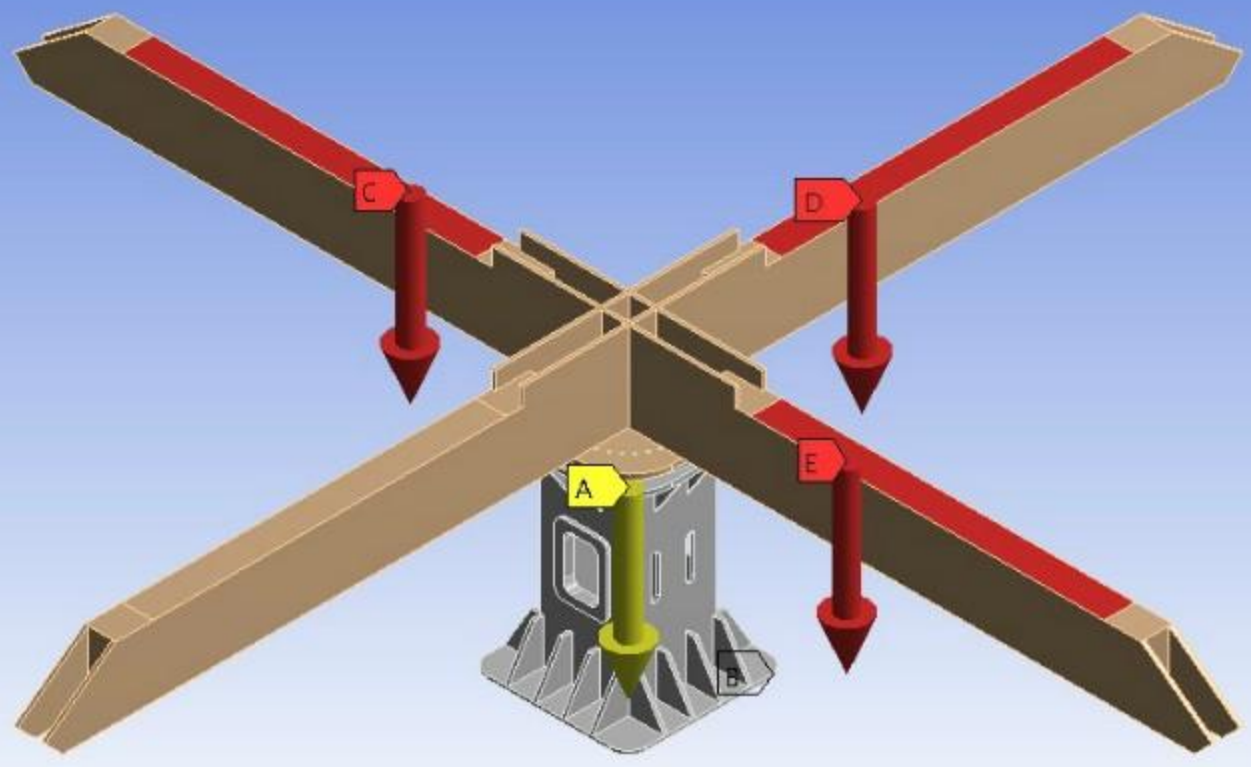
Max



### E: Acumulador 3 Brazos Cargados

Static Structural  
Time: 1. s  
29-jul-14 19:45

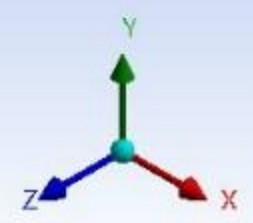
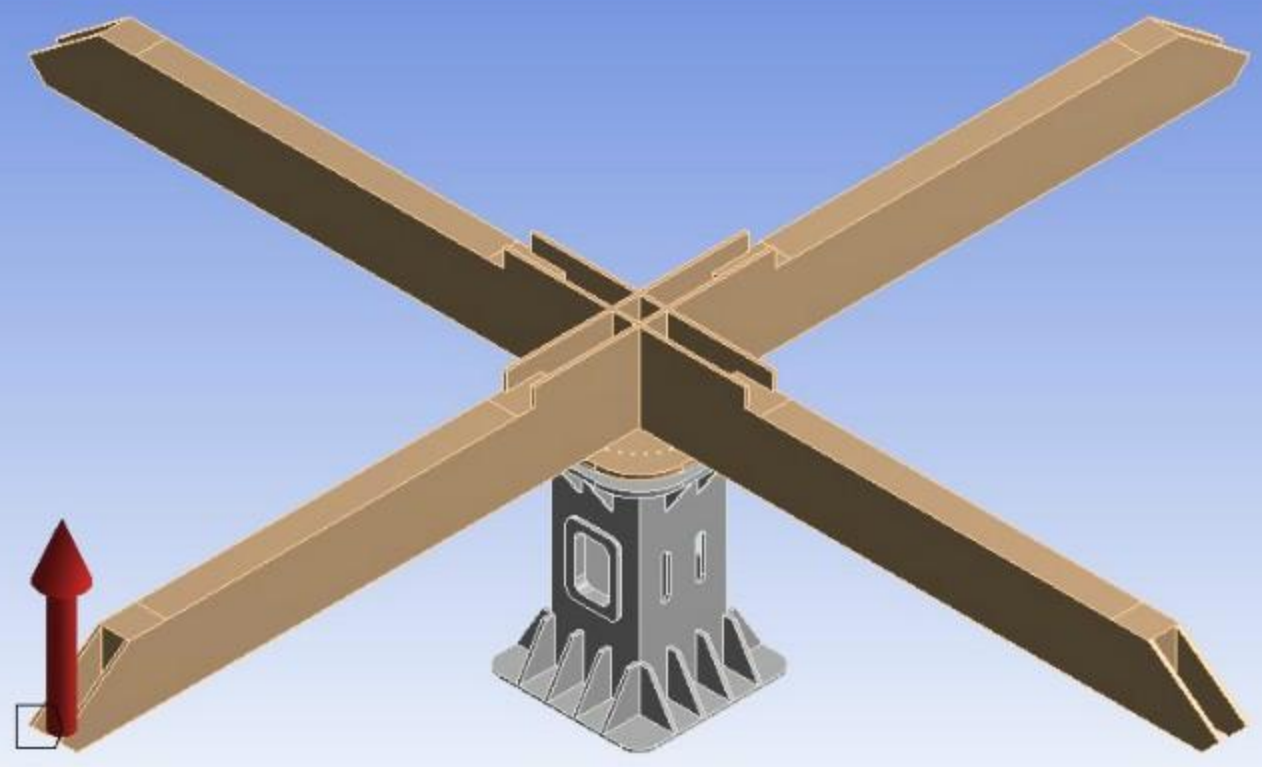
- A** Standard Earth Gravity: 9806.6 mm/s<sup>2</sup>
- B** Fixed Support
- C** Force: 20000 N
- D** Force 2: 20000 N
- E** Force 3: 20000 N



### F: Impacto Puente Grúa

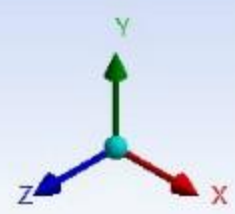
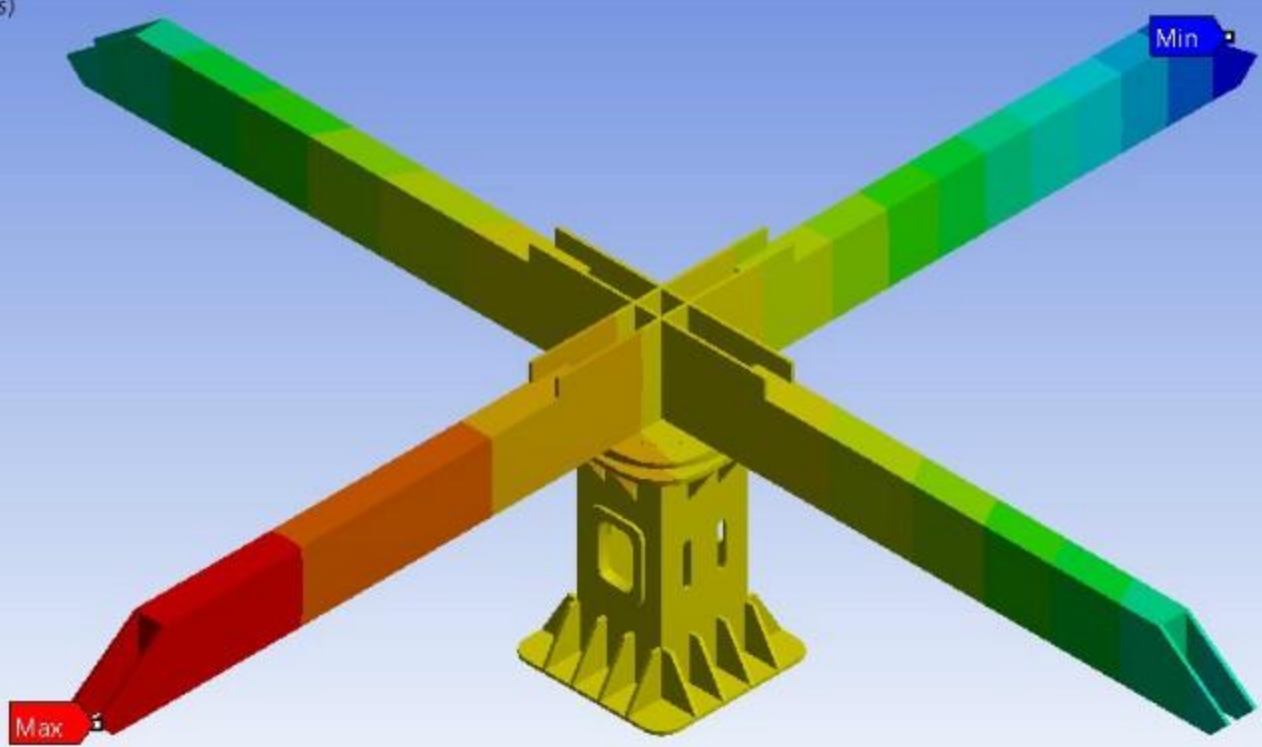
Explicit Dynamics  
Time: 3. s  
29-jul-14 19:47

- Force: 30000 N**  
Components: 0,30000,0. N

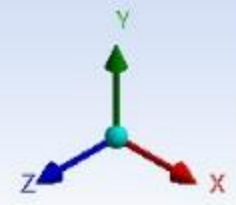
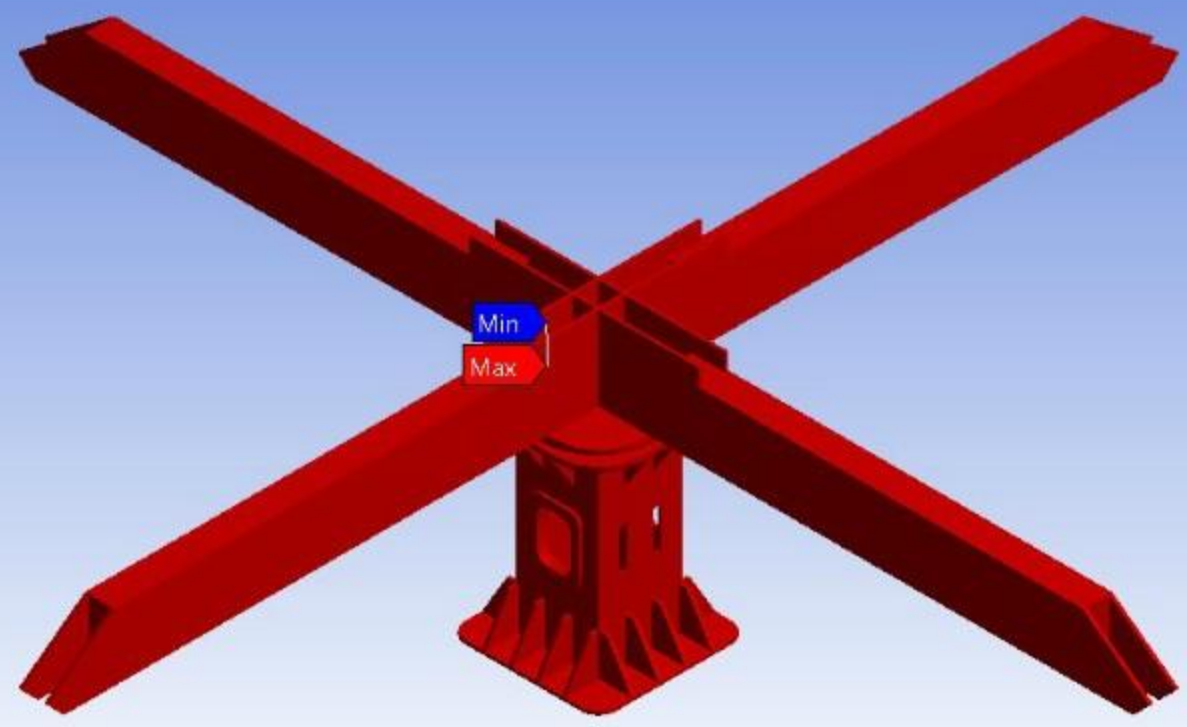




**F: Impacto Puente Grua**  
 Directional Deformation  
 Type: Directional Deformation(Y Axis)  
 Unit: mm  
 Global Coordinate System  
 Time: 2.7991e-008  
 29-jul-14 19:47



**F: Impacto Puente Grua**  
 Safety Factor  
 Type: Safety Factor  
 Time: 2.7991e-008  
 29-jul-14 19:49





# ESPE

UNIVERSIDAD DE LAS FUERZAS ARMADAS  
INNOVACIÓN PARA LA EXCELENCIA

EL ACERO DEL FUTURO  
**NOVACERO**

*gracias*  
POR SU ATENCIÓN