

0	12/05/2016	A. B.	M. I. A.	BTESA	PRIMERA EMISIÓN	PE
Rev.	Fecha	Elaborado por nombre/firma	Revisado por nombre/firma	Aprobado por nombre/firma	Descripción	Estado
<div style="text-align: center;">  <p><b>TORRE 100 m + EXTENSION 8 m</b> <b>JURISDICCIONES – NORTE DE SANTANDER</b></p> </div>						
<div style="text-align: center;"> <p>EVALUACION ESTRUCTURAL</p>  </div>						
ESCALA SIN	FORMATO A4	REFERENCIA BTESA TAC100-E8-JR-NS	REFERENCIA RTVC TORRE 100-JURISDICCIONES	HOJA 1/31	REV 0	

## TABLA DE CONTENIDO

1.	DESCRIPCION.....	3
2.	ESPECIFICACIONES.....	3
3.	CARGAS.....	4
4.	MATERIALES.....	4
5.	ANALISIS Y DISEÑO.....	5
6.	ANEXOS – EVALUACION ESTRUCTURAL.....	5

### EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
**2 / 31**

REV.  
**0**

## TORRE 100 m + EXTENSION 8 m

### EVALUACION ESTRUCTURAL

#### 1. DESCRIPCIÓN:

A continuación presentamos la verificación estructural de la torre auto-soportada de 100 metros, instalada en la estación Jurisdicciones (Abrego-Norte de Santander), es tipo celosía de sección cuadrada, diseñada con perfiles angulares; El chequeo se hace con las cargas de antenas instaladas actualmente: Ochenta y ocho (88) antenas TV dipolo y cuatro (4) antenas de radio; Se proyecta la instalación de veintiseis (26) antenas panel TV, en una extensión de 8m, según cuadro y luego se verifican los elementos que requieren refuerzo.

#### 2. ESPECIFICACIONES:

Carga de diseño:

TIPO / DIAMETRO	ALTURA EN TORRE	CANTIDAD
ANTENAS EXISTENTES		
ANTENA TV	99,0 m	28 und
ANTENA TV	85,0 m	8 und
ANTENA TV	76,0 m	4 und
ANTENA TV	71,5 m	4 und
ANTENA TV	67,0 m	4 und
ANTENA TV	62,5 m	4 und
ANTENA TV	56,0 m	4 und
ANTENA TV	52,0 m	4 und
ANTENA TV	48,0 m	4 und
ANTENA TV	42,3 m	8 und
ANTENA TV	35,2 m	4 und
ANTENA TV	30,0 m	12 und
ANTENA RADIO	20,1 m	4 und
ANTENAS NUEVAS		
ANTENA PANEL	105,0 m	12 und
ANTENA PANEL	97,0 m	14 und

Carga viva: 3 Operarios de 80 kg. c/u.

Velocidad del viento: 120. Km / h

### EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
3 / 31

REV.  
0

Materiales :- Ángulos, canales y platinas: ASTM A36 y ASTM A572

- Tornillos : ASTM A325 –G5

Galvanizado: Según norma ASTM A153 y ASTM A123

**NOTA:**

A CONTINUACION SE MUESTRAN LOS AZIMUT DE LAS CARAS DE LA TORRE:

AZIMUT DE LA CARA A: 99°

AZIMUT DE LA CARA B: 189°

AZIMUT DE LA CARA C: 279°

AZIMUT DE LA CARA D: 9°

**3. CARGAS:**

Las cargas de diseño corresponden a acciones de gravedad y viento sobre la torre, antenas y demás accesorios, afectadas por un factor de seguridad.

**3.1. Cargas de gravedad.**

El peso propio de la estructura es evaluado por el programa de análisis estructural y es afectado por un factor de 1.2 para tener en cuenta los elementos redundantes, platinas, tornillos, uniones y galvanizado. El peso de las antenas y sus soportes se obtienen directamente del catálogo del fabricante.

**3.2. Carga de viento:**

V = Velocidad del viento: 120 Km. / hora.

Para el cálculo de las cargas viento se utiliza el NSR-10, con la siguiente expresión:

Fuerza debida al viento  $F = q_z * C_f * A_f$

En donde:

$q_z$  = Presion de viento en daN/m<sup>2</sup>

$C_f$  = Coeficiente de fuerza según capitulo H

$A_f$  = Area expuesta en m<sup>2</sup>

La presión del viento  $q_z$ , está dada por:

$$q_z = Q \times (Z_V \times V)^2 \times G$$

En donde,

Q Factor de densidad del aire = 0.0048

ZV Factor de terreno.

V Velocidad de viento básica = 120 km/h

G Factor de ráfaga de viento.

Presión de viento básica 76.2 kg/m<sup>2</sup>

EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
4 / 31

REV.  
0

### 3.3. Viento sobre la estructura.

Se aplican en los nudos que comprenden cada panel analizado.

Para  $P(0) = 76.2 \text{ kg / m}^2$

$P(10) = 76.2$

$P(100) = 120.2$

A = área del panel analizado. S / silueta.

Se plantean tres (3) hipótesis de carga de acuerdo con las especificaciones:

#### 3.3.1. Viento Transversal: (Hipótesis C1)

Esta dada por la siguiente expresión:  $F_t = C_f * P * A$

#### 3.3.2. Viento a 45° : (Hipótesis C2)

Esta dada por la expresión:  $F_{45^\circ} = 1.15 * F_t$

Se debe aplicar en cada dirección principal simultáneamente.

Adicionalmente para verificar deformaciones se tiene una hipótesis (C3) con viento de 60.Km/h

### 4. MATERIALES:

Acero: ASTM A36, A572

Tornillos: ASTM A394 To

Galvanización: ASTM A153 y ASTM A123

### 5. ANÁLISIS Y DISEÑO.

Se llevó a cabo según lo especificado en las normas EIA-222F, NSR-10 y se ejecutó mediante el programa tower.

### 6. ANEXOS-EVALUACION ESTRUCTURAL

TORRE 100m+EXT.8m – JURISDICCIONES – ABREGO – NORTE DE SANTANDER

#### EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
5 / 31

REV.  
0

SILUETA TAC100-ANTENAS



EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
6 / 31

REV.  
0

## LISTADO TOWER

```
*****
*
* TOWER - Analysis and Design - Copyright Power Line Systems, Inc. 1986-2006 *
*
*****
```

Project Name : TORRE 100.m+EXT.8m -JURISDICCIONES -ACT.  
 Project Notes: BTESA - RTVC  
 Project File : f:\arch 2016\eval btesa\tac100 jurisdicciones\tor100e8jur.tow  
 Date run : 01:51:27 p.m. miercoles, 11 de mayo de 2016  
 by : Tower Version 10.20

Successfully performed linear analysis

The model has 0 warnings.



Member check option: TIA/EIA 222-F  
 Connection rupture check: Not Checked  
 Crossing diagonal check: Fixed

### Joints Geometry:

Joint Label	Symmetry Code	X Coord. (m)	Y Coord. (m)	Z Coord. (m)	X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.
1F	XY-Symmetry	0.3	0.3	108	Free	Free	Free	Free	Free	Free
17F	XY-Symmetry	0.3	0.3	100	Free	Free	Free	Free	Free	Free
33F	XY-Symmetry	0.3	0.3	92	Free	Free	Free	Free	Free	Free
34F	XY-Symmetry	0.93	0.93	90.7	Free	Free	Free	Free	Free	Free
35F	XY-Symmetry	0.93	0.93	89.7	Free	Free	Free	Free	Free	Free
43F	XY-Symmetry	0.93	0.93	69.7	Free	Free	Free	Free	Free	Free
59F	XY-Symmetry	0.93	0.93	37	Free	Free	Free	Free	Free	Free
60F	XY-Symmetry	1.048	1.048	35.4	Free	Free	Free	Free	Free	Free
64F	XY-Symmetry	1.673	1.673	27	Free	Free	Free	Free	Free	Free
69F	XY-Symmetry	3.235	3.235	5.8	Free	Free	Free	Free	Free	Free
70F	XY-Symmetry	3.579	3.579	1.1	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
1X	X-GenXY	0.3	-0.3	108	Free	Free	Free	Free	Free	Free
1XY	XY-GenXY	-0.3	-0.3	108	Free	Free	Free	Free	Free	Free
1Y	Y-GenXY	-0.3	0.3	108	Free	Free	Free	Free	Free	Free
17X	X-GenXY	0.3	-0.3	100	Free	Free	Free	Free	Free	Free
17XY	XY-GenXY	-0.3	-0.3	100	Free	Free	Free	Free	Free	Free
17Y	Y-GenXY	-0.3	0.3	100	Free	Free	Free	Free	Free	Free
33X	X-GenXY	0.3	-0.3	92	Free	Free	Free	Free	Free	Free
33XY	XY-GenXY	-0.3	-0.3	92	Free	Free	Free	Free	Free	Free
33Y	Y-GenXY	-0.3	0.3	92	Free	Free	Free	Free	Free	Free
34X	X-GenXY	0.93	-0.93	90.7	Free	Free	Free	Free	Free	Free
34XY	XY-GenXY	-0.93	-0.93	90.7	Free	Free	Free	Free	Free	Free
34Y	Y-GenXY	-0.93	0.93	90.7	Free	Free	Free	Free	Free	Free
35X	X-GenXY	0.93	-0.93	89.7	Free	Free	Free	Free	Free	Free
35XY	XY-GenXY	-0.93	-0.93	89.7	Free	Free	Free	Free	Free	Free
35Y	Y-GenXY	-0.93	0.93	89.7	Free	Free	Free	Free	Free	Free
43X	X-GenXY	0.93	-0.93	69.7	Free	Free	Free	Free	Free	Free
43XY	XY-GenXY	-0.93	-0.93	69.7	Free	Free	Free	Free	Free	Free
43Y	Y-GenXY	-0.93	0.93	69.7	Free	Free	Free	Free	Free	Free
59X	X-GenXY	0.93	-0.93	37	Free	Free	Free	Free	Free	Free

## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
7 / 31



REV.  
0

59XY	XY-GenXY	-0.93	-0.93	37	Free	Free	Free	Free	Free	Free
59Y	Y-GenXY	-0.93	0.93	37	Free	Free	Free	Free	Free	Free
60X	X-GenXY	1.048	-1.048	35.4	Free	Free	Free	Free	Free	Free
60XY	XY-GenXY	-1.048	-1.048	35.4	Free	Free	Free	Free	Free	Free
60Y	Y-GenXY	-1.048	1.048	35.4	Free	Free	Free	Free	Free	Free
64X	X-GenXY	1.673	-1.673	27	Free	Free	Free	Free	Free	Free
64XY	XY-GenXY	-1.673	-1.673	27	Free	Free	Free	Free	Free	Free
64Y	Y-GenXY	-1.673	1.673	27	Free	Free	Free	Free	Free	Free
69X	X-GenXY	3.235	-3.235	5.8	Free	Free	Free	Free	Free	Free
69XY	XY-GenXY	-3.235	-3.235	5.8	Free	Free	Free	Free	Free	Free
69Y	Y-GenXY	-3.235	3.235	5.8	Free	Free	Free	Free	Free	Free
70X	X-GenXY	3.579	-3.579	1.1	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
70XY	XY-GenXY	-3.579	-3.579	1.1	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
70Y	Y-GenXY	-3.579	3.579	1.1	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Secondary Joints:

Joint Label	Symmetry Code	Origin Joint	End Fraction Joint	Elevation	X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.
(m)										
2S	XY-Symmetry	1P	17P	0.063	0	Free	Free	Free	Free	Free
3S	XY-Symmetry	1P	17P	0.125	0	Free	Free	Free	Free	Free
4S	XY-Symmetry	1P	17P	0.188	0	Free	Free	Free	Free	Free
5S	XY-Symmetry	1P	17P	0.25	0	Free	Free	Free	Free	Free
6S	XY-Symmetry	1P	17P	0.313	0	Free	Free	Free	Free	Free
7S	XY-Symmetry	1P	17P	0.375	0	Free	Free	Free	Free	Free
8S	XY-Symmetry	1P	17P	0.438	0	Free	Free	Free	Free	Free
9S	XY-Symmetry	1P	17P	0.5	0	Free	Free	Free	Free	Free
10S	XY-Symmetry	1P	17P	0.563	0	Free	Free	Free	Free	Free
11S	XY-Symmetry	1P	17P	0.625	0	Free	Free	Free	Free	Free
12S	XY-Symmetry	1P	17P	0.688	0	Free	Free	Free	Free	Free
13S	XY-Symmetry	1P	17P	0.75	0	Free	Free	Free	Free	Free
14S	XY-Symmetry	1P	17P	0.813	0	Free	Free	Free	Free	Free
15S	XY-Symmetry	1P	17P	0.875	0	Free	Free	Free	Free	Free
16S	XY-Symmetry	1P	17P	0.938	0	Free	Free	Free	Free	Free
18S	XY-Symmetry	17P	33P	0.063	0	Free	Free	Free	Free	Free
19S	XY-Symmetry	17P	33P	0.125	0	Free	Free	Free	Free	Free
20S	XY-Symmetry	17P	33P	0.188	0	Free	Free	Free	Free	Free
21S	XY-Symmetry	17P	33P	0.25	0	Free	Free	Free	Free	Free
22S	XY-Symmetry	17P	33P	0.313	0	Free	Free	Free	Free	Free
23S	XY-Symmetry	17P	33P	0.375	0	Free	Free	Free	Free	Free
24S	XY-Symmetry	17P	33P	0.438	0	Free	Free	Free	Free	Free
25S	XY-Symmetry	17P	33P	0.5	0	Free	Free	Free	Free	Free
26S	XY-Symmetry	17P	33P	0.563	0	Free	Free	Free	Free	Free
27S	XY-Symmetry	17P	33P	0.625	0	Free	Free	Free	Free	Free
28S	XY-Symmetry	17P	33P	0.688	0	Free	Free	Free	Free	Free
29S	XY-Symmetry	17P	33P	0.75	0	Free	Free	Free	Free	Free
30S	XY-Symmetry	17P	33P	0.813	0	Free	Free	Free	Free	Free
31S	XY-Symmetry	17P	33P	0.875	0	Free	Free	Free	Free	Free
32S	XY-Symmetry	17P	33P	0.938	0	Free	Free	Free	Free	Free
36S	XY-Symmetry	35P	43P	0.125	0	Free	Free	Free	Free	Free
37S	XY-Symmetry	35P	43P	0.25	0	Free	Free	Free	Free	Free
38S	XY-Symmetry	35P	43P	0.375	0	Free	Free	Free	Free	Free
39S	XY-Symmetry	35P	43P	0.5	0	Free	Free	Free	Free	Free
40S	XY-Symmetry	35P	43P	0.625	0	Free	Free	Free	Free	Free
41S	XY-Symmetry	35P	43P	0.75	0	Free	Free	Free	Free	Free
42S	XY-Symmetry	35P	43P	0.875	0	Free	Free	Free	Free	Free
44S	XY-Symmetry	43P	59P	0.063	0	Free	Free	Free	Free	Free
45S	XY-Symmetry	43P	59P	0.125	0	Free	Free	Free	Free	Free
46S	XY-Symmetry	43P	59P	0.188	0	Free	Free	Free	Free	Free
47S	XY-Symmetry	43P	59P	0.25	0	Free	Free	Free	Free	Free
48S	XY-Symmetry	43P	59P	0.313	0	Free	Free	Free	Free	Free
49S	XY-Symmetry	43P	59P	0.375	0	Free	Free	Free	Free	Free
50S	XY-Symmetry	43P	59P	0.438	0	Free	Free	Free	Free	Free
51S	XY-Symmetry	43P	59P	0.5	0	Free	Free	Free	Free	Free
52S	XY-Symmetry	43P	59P	0.563	0	Free	Free	Free	Free	Free
53S	XY-Symmetry	43P	59P	0.625	0	Free	Free	Free	Free	Free
54S	XY-Symmetry	43P	59P	0.688	0	Free	Free	Free	Free	Free
55S	XY-Symmetry	43P	59P	0.75	0	Free	Free	Free	Free	Free
56S	XY-Symmetry	43P	59P	0.813	0	Free	Free	Free	Free	Free
57S	XY-Symmetry	43P	59P	0.875	0	Free	Free	Free	Free	Free
58S	XY-Symmetry	43P	59P	0.938	0	Free	Free	Free	Free	Free
61S	XY-Symmetry	60P	64P	0.25	0	Free	Free	Free	Free	Free
62S	XY-Symmetry	60P	64P	0.5	0	Free	Free	Free	Free	Free
63S	XY-Symmetry	60P	64P	0.75	0	Free	Free	Free	Free	Free
65S	XY-Symmetry	64P	69P	0.2	0	Free	Free	Free	Free	Free
66S	XY-Symmetry	64P	69P	0.4	0	Free	Free	Free	Free	Free
67S	XY-Symmetry	64P	69P	0.6	0	Free	Free	Free	Free	Free
68S	XY-Symmetry	64P	69P	0.8	0	Free	Free	Free	Free	Free
2X	X-GenXY	1P	17P	0.063	0	Free	Free	Free	Free	Free
2XY	XY-GenXY	1P	17P	0.063	0	Free	Free	Free	Free	Free
2Y	Y-GenXY	1P	17P	0.063	0	Free	Free	Free	Free	Free
3X	X-GenXY	1P	17P	0.125	0	Free	Free	Free	Free	Free

EVALUACION ESTRUCTURAL TAC100

		TORRE 100m+EXT.8m		
		TAC100-E8-JR-NS	HOJA 8 / 31	REV. 0



3XY	XY-GenXY	1P	17P	0.125	0	Free	Free	Free	Free	Free	Free
3Y	Y-GenXY	1P	17P	0.125	0	Free	Free	Free	Free	Free	Free
4X	X-GenXY	1P	17P	0.188	0	Free	Free	Free	Free	Free	Free
4XY	XY-GenXY	1P	17P	0.188	0	Free	Free	Free	Free	Free	Free
4Y	Y-GenXY	1P	17P	0.188	0	Free	Free	Free	Free	Free	Free
5X	X-GenXY	1P	17P	0.25	0	Free	Free	Free	Free	Free	Free
5XY	XY-GenXY	1P	17P	0.25	0	Free	Free	Free	Free	Free	Free
5Y	Y-GenXY	1P	17P	0.25	0	Free	Free	Free	Free	Free	Free
6X	X-GenXY	1P	17P	0.313	0	Free	Free	Free	Free	Free	Free
6XY	XY-GenXY	1P	17P	0.313	0	Free	Free	Free	Free	Free	Free
6Y	Y-GenXY	1P	17P	0.313	0	Free	Free	Free	Free	Free	Free
7X	X-GenXY	1P	17P	0.375	0	Free	Free	Free	Free	Free	Free
7XY	XY-GenXY	1P	17P	0.375	0	Free	Free	Free	Free	Free	Free
7Y	Y-GenXY	1P	17P	0.375	0	Free	Free	Free	Free	Free	Free
8X	X-GenXY	1P	17P	0.438	0	Free	Free	Free	Free	Free	Free
8XY	XY-GenXY	1P	17P	0.438	0	Free	Free	Free	Free	Free	Free
8Y	Y-GenXY	1P	17P	0.438	0	Free	Free	Free	Free	Free	Free
9X	X-GenXY	1P	17P	0.5	0	Free	Free	Free	Free	Free	Free
9XY	XY-GenXY	1P	17P	0.5	0	Free	Free	Free	Free	Free	Free
9Y	Y-GenXY	1P	17P	0.5	0	Free	Free	Free	Free	Free	Free
10X	X-GenXY	1P	17P	0.563	0	Free	Free	Free	Free	Free	Free
10XY	XY-GenXY	1P	17P	0.563	0	Free	Free	Free	Free	Free	Free
10Y	Y-GenXY	1P	17P	0.563	0	Free	Free	Free	Free	Free	Free
11X	X-GenXY	1P	17P	0.625	0	Free	Free	Free	Free	Free	Free
11XY	XY-GenXY	1P	17P	0.625	0	Free	Free	Free	Free	Free	Free
11Y	Y-GenXY	1P	17P	0.625	0	Free	Free	Free	Free	Free	Free
12X	X-GenXY	1P	17P	0.688	0	Free	Free	Free	Free	Free	Free
12XY	XY-GenXY	1P	17P	0.688	0	Free	Free	Free	Free	Free	Free
12Y	Y-GenXY	1P	17P	0.688	0	Free	Free	Free	Free	Free	Free
13X	X-GenXY	1P	17P	0.75	0	Free	Free	Free	Free	Free	Free
13XY	XY-GenXY	1P	17P	0.75	0	Free	Free	Free	Free	Free	Free
13Y	Y-GenXY	1P	17P	0.75	0	Free	Free	Free	Free	Free	Free
14X	X-GenXY	1P	17P	0.813	0	Free	Free	Free	Free	Free	Free
14XY	XY-GenXY	1P	17P	0.813	0	Free	Free	Free	Free	Free	Free
14Y	Y-GenXY	1P	17P	0.813	0	Free	Free	Free	Free	Free	Free
15X	X-GenXY	1P	17P	0.875	0	Free	Free	Free	Free	Free	Free
15XY	XY-GenXY	1P	17P	0.875	0	Free	Free	Free	Free	Free	Free
15Y	Y-GenXY	1P	17P	0.875	0	Free	Free	Free	Free	Free	Free
16X	X-GenXY	1P	17P	0.938	0	Free	Free	Free	Free	Free	Free
16XY	XY-GenXY	1P	17P	0.938	0	Free	Free	Free	Free	Free	Free
16Y	Y-GenXY	1P	17P	0.938	0	Free	Free	Free	Free	Free	Free
18X	X-GenXY	17P	33P	0.063	0	Free	Free	Free	Free	Free	Free
18XY	XY-GenXY	17P	33P	0.063	0	Free	Free	Free	Free	Free	Free
18Y	Y-GenXY	17P	33P	0.063	0	Free	Free	Free	Free	Free	Free
19X	X-GenXY	17P	33P	0.125	0	Free	Free	Free	Free	Free	Free
19XY	XY-GenXY	17P	33P	0.125	0	Free	Free	Free	Free	Free	Free
19Y	Y-GenXY	17P	33P	0.125	0	Free	Free	Free	Free	Free	Free
20X	X-GenXY	17P	33P	0.188	0	Free	Free	Free	Free	Free	Free
20XY	XY-GenXY	17P	33P	0.188	0	Free	Free	Free	Free	Free	Free
20Y	Y-GenXY	17P	33P	0.188	0	Free	Free	Free	Free	Free	Free
21X	X-GenXY	17P	33P	0.25	0	Free	Free	Free	Free	Free	Free
21XY	XY-GenXY	17P	33P	0.25	0	Free	Free	Free	Free	Free	Free
21Y	Y-GenXY	17P	33P	0.25	0	Free	Free	Free	Free	Free	Free
22X	X-GenXY	17P	33P	0.313	0	Free	Free	Free	Free	Free	Free
22XY	XY-GenXY	17P	33P	0.313	0	Free	Free	Free	Free	Free	Free
22Y	Y-GenXY	17P	33P	0.313	0	Free	Free	Free	Free	Free	Free
23X	X-GenXY	17P	33P	0.375	0	Free	Free	Free	Free	Free	Free
23XY	XY-GenXY	17P	33P	0.375	0	Free	Free	Free	Free	Free	Free
23Y	Y-GenXY	17P	33P	0.375	0	Free	Free	Free	Free	Free	Free
24X	X-GenXY	17P	33P	0.438	0	Free	Free	Free	Free	Free	Free
24XY	XY-GenXY	17P	33P	0.438	0	Free	Free	Free	Free	Free	Free
24Y	Y-GenXY	17P	33P	0.438	0	Free	Free	Free	Free	Free	Free
25X	X-GenXY	17P	33P	0.5	0	Free	Free	Free	Free	Free	Free
25XY	XY-GenXY	17P	33P	0.5	0	Free	Free	Free	Free	Free	Free
25Y	Y-GenXY	17P	33P	0.5	0	Free	Free	Free	Free	Free	Free
26X	X-GenXY	17P	33P	0.563	0	Free	Free	Free	Free	Free	Free
26XY	XY-GenXY	17P	33P	0.563	0	Free	Free	Free	Free	Free	Free
26Y	Y-GenXY	17P	33P	0.563	0	Free	Free	Free	Free	Free	Free
27X	X-GenXY	17P	33P	0.625	0	Free	Free	Free	Free	Free	Free
27XY	XY-GenXY	17P	33P	0.625	0	Free	Free	Free	Free	Free	Free
27Y	Y-GenXY	17P	33P	0.625	0	Free	Free	Free	Free	Free	Free
28X	X-GenXY	17P	33P	0.688	0	Free	Free	Free	Free	Free	Free
28XY	XY-GenXY	17P	33P	0.688	0	Free	Free	Free	Free	Free	Free
28Y	Y-GenXY	17P	33P	0.688	0	Free	Free	Free	Free	Free	Free
29X	X-GenXY	17P	33P	0.75	0	Free	Free	Free	Free	Free	Free
29XY	XY-GenXY	17P	33P	0.75	0	Free	Free	Free	Free	Free	Free
29Y	Y-GenXY	17P	33P	0.75	0	Free	Free	Free	Free	Free	Free
30X	X-GenXY	17P	33P	0.813	0	Free	Free	Free	Free	Free	Free
30XY	XY-GenXY	17P	33P	0.813	0	Free	Free	Free	Free	Free	Free
30Y	Y-GenXY	17P	33P	0.813	0	Free	Free	Free	Free	Free	Free
31X	X-GenXY	17P	33P	0.875	0	Free	Free	Free	Free	Free	Free
31XY	XY-GenXY	17P	33P	0.875	0	Free	Free	Free	Free	Free	Free
31Y	Y-GenXY	17P	33P	0.875	0	Free	Free	Free	Free	Free	Free
32X	X-GenXY	17P	33P	0.938	0	Free	Free	Free	Free	Free	Free

## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
9 / 31

REV.  
0

32XY	XY-GenXY	17P	33P	0.938	0	Free	Free	Free	Free	Free	Free
32Y	Y-GenXY	17P	33P	0.938	0	Free	Free	Free	Free	Free	Free
36X	X-GenXY	35P	43P	0.125	0	Free	Free	Free	Free	Free	Free
36XY	XY-GenXY	35P	43P	0.125	0	Free	Free	Free	Free	Free	Free
36Y	Y-GenXY	35P	43P	0.125	0	Free	Free	Free	Free	Free	Free
37X	X-GenXY	35P	43P	0.25	0	Free	Free	Free	Free	Free	Free
37XY	XY-GenXY	35P	43P	0.25	0	Free	Free	Free	Free	Free	Free
37Y	Y-GenXY	35P	43P	0.25	0	Free	Free	Free	Free	Free	Free
38X	X-GenXY	35P	43P	0.375	0	Free	Free	Free	Free	Free	Free
38XY	XY-GenXY	35P	43P	0.375	0	Free	Free	Free	Free	Free	Free
38Y	Y-GenXY	35P	43P	0.375	0	Free	Free	Free	Free	Free	Free
39X	X-GenXY	35P	43P	0.5	0	Free	Free	Free	Free	Free	Free
39XY	XY-GenXY	35P	43P	0.5	0	Free	Free	Free	Free	Free	Free
39Y	Y-GenXY	35P	43P	0.5	0	Free	Free	Free	Free	Free	Free
40X	X-GenXY	35P	43P	0.625	0	Free	Free	Free	Free	Free	Free
40XY	XY-GenXY	35P	43P	0.625	0	Free	Free	Free	Free	Free	Free
40Y	Y-GenXY	35P	43P	0.625	0	Free	Free	Free	Free	Free	Free
41X	X-GenXY	35P	43P	0.75	0	Free	Free	Free	Free	Free	Free
41XY	XY-GenXY	35P	43P	0.75	0	Free	Free	Free	Free	Free	Free
41Y	Y-GenXY	35P	43P	0.75	0	Free	Free	Free	Free	Free	Free
42X	X-GenXY	35P	43P	0.875	0	Free	Free	Free	Free	Free	Free
42XY	XY-GenXY	35P	43P	0.875	0	Free	Free	Free	Free	Free	Free
42Y	Y-GenXY	35P	43P	0.875	0	Free	Free	Free	Free	Free	Free
44X	X-GenXY	43P	59P	0.063	0	Free	Free	Free	Free	Free	Free
44XY	XY-GenXY	43P	59P	0.063	0	Free	Free	Free	Free	Free	Free
44Y	Y-GenXY	43P	59P	0.063	0	Free	Free	Free	Free	Free	Free
45X	X-GenXY	43P	59P	0.125	0	Free	Free	Free	Free	Free	Free
45XY	XY-GenXY	43P	59P	0.125	0	Free	Free	Free	Free	Free	Free
45Y	Y-GenXY	43P	59P	0.125	0	Free	Free	Free	Free	Free	Free
46X	X-GenXY	43P	59P	0.188	0	Free	Free	Free	Free	Free	Free
46XY	XY-GenXY	43P	59P	0.188	0	Free	Free	Free	Free	Free	Free
46Y	Y-GenXY	43P	59P	0.188	0	Free	Free	Free	Free	Free	Free
47X	X-GenXY	43P	59P	0.25	0	Free	Free	Free	Free	Free	Free
47XY	XY-GenXY	43P	59P	0.25	0	Free	Free	Free	Free	Free	Free
47Y	Y-GenXY	43P	59P	0.25	0	Free	Free	Free	Free	Free	Free
48X	X-GenXY	43P	59P	0.313	0	Free	Free	Free	Free	Free	Free
48XY	XY-GenXY	43P	59P	0.313	0	Free	Free	Free	Free	Free	Free
48Y	Y-GenXY	43P	59P	0.313	0	Free	Free	Free	Free	Free	Free
49X	X-GenXY	43P	59P	0.375	0	Free	Free	Free	Free	Free	Free
49XY	XY-GenXY	43P	59P	0.375	0	Free	Free	Free	Free	Free	Free
49Y	Y-GenXY	43P	59P	0.375	0	Free	Free	Free	Free	Free	Free
50X	X-GenXY	43P	59P	0.438	0	Free	Free	Free	Free	Free	Free
50XY	XY-GenXY	43P	59P	0.438	0	Free	Free	Free	Free	Free	Free
50Y	Y-GenXY	43P	59P	0.438	0	Free	Free	Free	Free	Free	Free
51X	X-GenXY	43P	59P	0.5	0	Free	Free	Free	Free	Free	Free
51XY	XY-GenXY	43P	59P	0.5	0	Free	Free	Free	Free	Free	Free
51Y	Y-GenXY	43P	59P	0.5	0	Free	Free	Free	Free	Free	Free
52X	X-GenXY	43P	59P	0.563	0	Free	Free	Free	Free	Free	Free
52XY	XY-GenXY	43P	59P	0.563	0	Free	Free	Free	Free	Free	Free
52Y	Y-GenXY	43P	59P	0.563	0	Free	Free	Free	Free	Free	Free
53X	X-GenXY	43P	59P	0.625	0	Free	Free	Free	Free	Free	Free
53XY	XY-GenXY	43P	59P	0.625	0	Free	Free	Free	Free	Free	Free
53Y	Y-GenXY	43P	59P	0.625	0	Free	Free	Free	Free	Free	Free
54X	X-GenXY	43P	59P	0.688	0	Free	Free	Free	Free	Free	Free
54XY	XY-GenXY	43P	59P	0.688	0	Free	Free	Free	Free	Free	Free
54Y	Y-GenXY	43P	59P	0.688	0	Free	Free	Free	Free	Free	Free
55X	X-GenXY	43P	59P	0.75	0	Free	Free	Free	Free	Free	Free
55XY	XY-GenXY	43P	59P	0.75	0	Free	Free	Free	Free	Free	Free
55Y	Y-GenXY	43P	59P	0.75	0	Free	Free	Free	Free	Free	Free
56X	X-GenXY	43P	59P	0.813	0	Free	Free	Free	Free	Free	Free
56XY	XY-GenXY	43P	59P	0.813	0	Free	Free	Free	Free	Free	Free
56Y	Y-GenXY	43P	59P	0.813	0	Free	Free	Free	Free	Free	Free
57X	X-GenXY	43P	59P	0.875	0	Free	Free	Free	Free	Free	Free
57XY	XY-GenXY	43P	59P	0.875	0	Free	Free	Free	Free	Free	Free
57Y	Y-GenXY	43P	59P	0.875	0	Free	Free	Free	Free	Free	Free
58X	X-GenXY	43P	59P	0.938	0	Free	Free	Free	Free	Free	Free
58XY	XY-GenXY	43P	59P	0.938	0	Free	Free	Free	Free	Free	Free
58Y	Y-GenXY	43P	59P	0.938	0	Free	Free	Free	Free	Free	Free
61X	X-GenXY	60P	64P	0.25	0	Free	Free	Free	Free	Free	Free
61XY	XY-GenXY	60P	64P	0.25	0	Free	Free	Free	Free	Free	Free
61Y	Y-GenXY	60P	64P	0.25	0	Free	Free	Free	Free	Free	Free
62X	X-GenXY	60P	64P	0.5	0	Free	Free	Free	Free	Free	Free
62XY	XY-GenXY	60P	64P	0.5	0	Free	Free	Free	Free	Free	Free
62Y	Y-GenXY	60P	64P	0.5	0	Free	Free	Free	Free	Free	Free
63X	X-GenXY	60P	64P	0.75	0	Free	Free	Free	Free	Free	Free
63XY	XY-GenXY	60P	64P	0.75	0	Free	Free	Free	Free	Free	Free
63Y	Y-GenXY	60P	64P	0.75	0	Free	Free	Free	Free	Free	Free
65X	X-GenXY	64P	69P	0.2	0	Free	Free	Free	Free	Free	Free
65XY	XY-GenXY	64P	69P	0.2	0	Free	Free	Free	Free	Free	Free
65Y	Y-GenXY	64P	69P	0.2	0	Free	Free	Free	Free	Free	Free
66X	X-GenXY	64P	69P	0.4	0	Free	Free	Free	Free	Free	Free
66XY	XY-GenXY	64P	69P	0.4	0	Free	Free	Free	Free	Free	Free
66Y	Y-GenXY	64P	69P	0.4	0	Free	Free	Free	Free	Free	Free
67X	X-GenXY	64P	69P	0.6	0	Free	Free	Free	Free	Free	Free

## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
10 / 31

REV.  
0

67XY	XY-GenXY	64P	69P	0.6	0	Free	Free	Free	Free	Free	Free
67Y	Y-GenXY	64P	69P	0.6	0	Free	Free	Free	Free	Free	Free
68X	X-GenXY	64P	69P	0.8	0	Free	Free	Free	Free	Free	Free
68XY	XY-GenXY	64P	69P	0.8	0	Free	Free	Free	Free	Free	Free
68Y	Y-GenXY	64P	69P	0.8	0	Free	Free	Free	Free	Free	Free

#### Steel Material Properties:

Steel Material Label	Modulus of Elasticity (MPa)	Yield Stress Fy (MPa)	Ultimate Stress Fu (MPa)	Member Stress All. Hyp. 1 (MPa)	Member Stress All. Hyp. 2 (MPa)	Member Rupture Hyp. 1 (MPa)	Member Rupture Hyp. 2 (MPa)	Member Bearing Hyp. 1 (MPa)	Member Bearing Hyp. 2 (MPa)
A-36	2e+005	248.1	399.9	0	0	0	0	0	0

#### Bolt Properties:

Bolt Label	Bolt Diameter (cm)	Hole Diameter (cm)	Ultimate Shear Capacity (kN)	Default End Distance (cm)	Default Bolt Spacing (cm)	Shear Hyp. 1 (kN)	Shear Hyp. 2 (kN)
5/8"	1.59	1.749	62.53	2.5	0	0	0
5/8" DC	1.59	1.749	125	2.5	0	0	0
3/4" DC	1.905	2.064	150.3	3	0	0	0

#### Number Bolts Used By Type:

Bolt Type	Number Bolts
3/4" DC	720
5/8" DC	1408
5/8"	1196

#### Angle Properties:

Angle Type	Angle Size (cm)	Long Leg (cm)	Short Leg (cm)	Thick. (cm)	Unit Weight (N/m)	Gross Area (cm^2)	w/t Ratio	Radius of Gyration Rx (cm)	Radius of Gyration Ry (cm)	Radius of Gyration Rz (cm)	Number of Angles	Wind Width (cm)	Short Edge Dist. (cm)	Long Edge Dist. (cm)	Optimize Factor	Section Cost Modulus (cm^3)
SAE	4X4X0.375	10.16	10.16	0.9525	143	18.52	8.67	3.132	3.132	2.004	1	10.16	0	0	1.0000	0
SAE	3X3X0.25	7.62	7.62	0.635	71.79	9.355	9.75	2.375	2.375	1.514	1	7.62	0	0	1.0000	0
SAE	2.5X2.5X0.25	6.35	6.35	0.635	59.83	7.677	7.75	1.953	1.953	1.247	1	6.35	0	0	1.0000	0
SAE	2.5X2.5X0.1875	6.35	6.35	0.4763	44.8	5.935	10.67	1.976	1.976	1.257	1	6.35	0	0	1.0000	0
SAE	2X2X0.1875	5.08	5.08	0.4763	35.61	4.581	7	1.567	1.567	1.001	1	5.08	0	0	1.0000	0
SAE	5X5X0.375	12.7	12.7	0.9525	179.5	23.29	11	3.962	3.962	2.515	1	12.7	0	0	1.0000	0
SAE	3X3X0.375	7.62	7.62	0.9525	105.1	13.61	6.17	2.319	2.319	1.491	1	7.62	0	0	1.0000	0

#### Angle Groups:

Group Label	Group Description	Angle Type	Angle Size	Material Type	Element Type	Group Type	Optimize Group	Allow. Angle Width For Optimize (cm)	Add. Width (cm)
1	M01	SAE	5X5X0.375	A-36	Beam		Size + Type	30.480	
2	M02	SAE	5X5X0.375	A-36	Beam		Size + Type	30.480	
3	M03	SAE	5X5X0.375	A-36	Beam		Size + Type	30.480	
4	M04	SAE	5X5X0.375	A-36	Beam		Size + Type	30.480	
5	M05	SAE	5X5X0.375	A-36	Beam		Size + Type	30.480	
6	M06	SAE	4X4X0.375	A-36	Beam		Size + Type	30.480	
7	M07	SAE	3X3X0.375	A-36	Beam		Size + Type	30.480	
8	M08	SAE	3X3X0.375	A-36	Beam		Size + Type	30.480	
9	M09	SAE	3X3X0.375	A-36	Beam		Size + Type	30.480	
10	M10	SAE	3X3X0.25	A-36	Beam		Size + Type	30.480	
11	M11	SAE	3X3X0.25	A-36	Beam		Size + Type	30.480	
12	M12	SAE	2.5X2.5X0.25	A-36	Beam		Size + Type	30.480	
13	D01	SAE	2.5X2.5X0.1875	A-36	Truss		Size + Type	30.480	
14	D02	SAE	2.5X2.5X0.1875	A-36	Truss		Size + Type	30.480	
15	D03	SAE	2.5X2.5X0.1875	A-36	Truss		Size + Type	30.480	
16	D04	SAE	2.5X2.5X0.1875	A-36	Truss		Size + Type	30.480	
17	D05	SAE	2.5X2.5X0.1875	A-36	Truss		Size + Type	30.480	
18	D06	SAE	2.5X2.5X0.1875	A-36	Truss		Size + Type	30.480	
19	D07	SAE	2.5X2.5X0.1875	A-36	Truss		Size + Type	30.480	
20	D08	SAE	2X2X0.1875	A-36	Truss		Size + Type	30.480	
21	D09	SAE	2X2X0.1875	A-36	Truss		Size + Type	30.480	
22	D10	SAE	2X2X0.1875	A-36	Truss		Size + Type	30.480	
23	D11	SAE	2X2X0.1875	A-36	Truss		Size + Type	30.480	
24	D12	SAE	2X2X0.1875	A-36	Truss		Size + Type	30.480	
25	H01	SAE	2.5X2.5X0.1875	A-36	Beam		Size + Type	30.480	
26	H02	SAE	2.5X2.5X0.1875	A-36	Beam		Size + Type	30.480	
27	H03	SAE	2.5X2.5X0.1875	A-36	Beam		Size + Type	30.480	
28	H04	SAE	2.5X2.5X0.1875	A-36	Beam		Size + Type	30.480	

## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
11 / 31

REV.  
0

29	H05	SAE	2.5X2.5X0.1875	A-36	Beam	Size + Type	30.480
30	H06	SAE	2X2X0.1875	A-36	Beam	Size + Type	30.480
31	H07	SAE	2X2X0.1875	A-36	Beam	Size + Type	30.480
32	H08	SAE	2X2X0.1875	A-36	Beam	Size + Type	30.480
33	C01	SAE	2X2X0.1875	A-36	Truss	Size + Type	30.480
34	C02	SAE	2X2X0.1875	A-36	Truss	Size + Type	30.480
35	C03	SAE	2X2X0.1875	A-36	Truss	Size + Type	30.480
36	C04	SAE	2X2X0.1875	A-36	Truss	Size + Type	30.480

#### Aggregate Angle Information:

Note: Estimate of surface area reported for painting purposes, not wind loading.

Angle Type	Angle Size	Material Type	Total Length (m)	Total Surface Area (m^2)	Total Weight (N)
SAE	5X5X0.375	A-36	177.08	89.96	31783.16
SAE	4X4X0.375	A-36	32.70	13.29	4676.23
SAE	3X3X0.375	A-36	105.40	32.13	11073.85
SAE	3X3X0.25	A-36	82.30	25.09	5908.94
SAE	2.5X2.5X0.25	A-36	32.00	8.13	1914.51
SAE	2.5X2.5X0.1875	A-36	1073.94	272.78	48110.58
SAE	2X2X0.1875	A-36	189.70	38.55	6754.32

#### Sections:

The adjustment factors below only apply to dead load and wind areas that are calculated for members in the model. They do not apply to equipment or to manually input dead load and drag areas.

Section Label	Joint Defining Section Bottom	Dead Load Adjust. Factor	Transverse Drag x Area For Face	Longitudinal Drag x Area For Face	Transverse Area Factor (CD From Code)	Longitudinal Area Factor (CD From Code)	Af Flat For EIA Only	Ar Round For Face For EIA Only	Transverse Drag x Area Factor For All	Longitudinal Drag x Area Factor For All	SAPS Angle Factor	SAPS Round Factor	Force Solid Face
EXT8	17P	1.200	0.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	None
SECC1	33P	1.200	0.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	None
SECC2	34P	1.200	0.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	None
SECC3	41S	1.200	0.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	None
SECC4	49S	1.200	0.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	None
SECC5	55S	1.200	0.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	None
SECC6	59P	1.200	0.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	None
SECC7	64P	1.200	0.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	None
SECC8	67S	1.200	0.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	None
SECC9	70P	1.200	0.000	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	None

## CARGAS APLICADAS

\*\*\* Loads Data

Loads from file: f:\arch\_2016\eval\_btessa\tac100\_jurisdicciones\tor100e8jur.eia

Structure Height Summary (used for calculating wind/ice adjust with height):

Structure height above ground 108.00 (m)  
Elevation of structure bottom for wind height adjustment: 0.00 (m)  
Structure height for structure gust response factor: 106.90 (m)  
Structure gust response factor, Gh: 1.0781  
Guy installation temperature: 15.56 (deg C)  
Tower Type: Rectangular Latticed

#### EIA Rev. F Load Cases:

Load Case Description	Dead Load Factor	Wind Load Factor	Ice Load Factor	Strength Allowable Factor	Basic Wind Speed (m/s) (Deg)	Ice Thick. (cm)	Ice Temperature Density (N/m^3) (deg C)	Point Loads	Joint Displ.
WIN 0 -120	1.2500	0.8500	1.0000	1.0000	1.3300	33.333	0 0.0000	0.0000	20.0 33 loads
WIN 45-120	1.2500	0.8500	1.0000	1.0000	1.3300	33.333	45 0.0000	0.0000	20.0 33 loads
WIN 45-60	1.2500	0.8500	1.0000	1.0000	1.3300	16.666	45 0.0000	0.0000	20.0 33 loads

Concentrated Loads for Load Case "WIN 0 -120":

Joint Label	Force X-Dir (N)	Force Y-Dir (N)	Force Vertical (N)	Moment X-Axis (N-m)	Moment Y-Axis (N-m)	Moment Z-Axis (N-m)	Load Comment
4S	920	230	480	0	0	0	
9S	920	230	480	0	0	0	
13S	920	230	480	0	0	0	
17P	805	200	840	0	0	0	
21S	805	200	840	0	0	0	

## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
12 / 31

REV.  
0

25S	805	200	840	0	0	0
29S	805	200	840	0	0	0
35P	865	215	530	0	0	0
37S	865	215	530	0	0	0
39S	865	215	530	0	0	0
40S	850	250	900	0	0	0
41S	850	250	900	0	0	0
42S	850	250	900	0	0	0
43P	850	250	900	0	0	0
44S	850	250	900	0	0	0
45S	850	250	900	0	0	0
46S	850	250	900	0	0	0
47S	850	250	900	0	0	0
49S	850	250	900	0	0	0
50S	850	250	900	0	0	0
51S	850	250	900	0	0	0
52S	850	250	900	0	0	0
53S	850	250	900	0	0	0
54S	850	250	900	0	0	0
56S	1130	285	1000	0	0	0
57S	1130	285	1000	0	0	0
58S	1130	285	1000	0	0	0
60P	640	160	700	0	0	0
61S	640	160	700	0	0	0
63S	690	175	720	0	0	0
64P	690	175	720	0	0	0
65S	500	125	500	0	0	0
66S	500	125	500	0	0	0

EIA Section Load Case Information for "WIN 0 -120":

Section Label	Z of Top (m)	Z of Bottom (m)	Elev. Above Gnd. (m)	qzGh (Pa)	Ice Thick. (cm)	Face AF (m^2)	Face AR (m^2)	Face RR*AR (m^2)	Face AG (m^2)	e	DF	DR	RR	CF	Face AE (m^2)	Face WF (N)	NotF AAF (m^2)	NotF CAF (m^2)	NotF AAR (m^2)	NotF CAR (m^2)	NotF AAR*CAR (m^2)	NotF WA (N)	Total Wind (N)	Total Weight (N)
EXT8	108.00	100.00	104.00	1216.56	0.00	2.17	0.00	0.00	4.8	0.45	1.00	1.00	0.67	2.15	2.2	5675	0.00	2.00	0.00	1.20	0.00	0	5675	7811
SECC1	100.00	92.00	96.00	1189.05	0.00	2.37	0.00	0.00	4.8	0.49	1.00	1.00	0.69	2.06	2.4	5810	0.00	2.00	0.00	1.20	0.00	0	5810	8377
SECC2	92.00	90.70	91.35	1172.31	0.00	0.60	0.43	0.33	1.6	0.64	1.00	1.00	0.78	1.86	0.9	2036	0.00	2.00	0.00	1.20	0.00	0	2036	2831
SECC3	90.70	74.70	82.70	1139.46	0.00	5.08	5.27	3.33	29.8	0.35	1.00	1.00	0.63	2.43	8.4	23307	0.00	2.00	0.00	1.20	0.00	0	23307	23396
SECC4	74.70	57.44	66.07	1068.66	0.00	5.65	5.69	3.60	32.1	0.35	1.00	1.00	0.63	2.42	9.3	23881	0.00	2.00	0.00	1.20	0.00	0	23881	28588
SECC5	57.44	45.17	51.31	994.17	0.00	4.39	4.04	2.59	22.8	0.37	1.00	1.00	0.64	2.37	7.0	16404	0.00	2.00	0.00	1.20	0.00	0	16404	21815
SECC6	45.17	37.00	41.08	933.04	0.00	3.60	2.69	1.77	15.2	0.41	1.00	1.00	0.66	2.24	5.4	11239	0.00	2.00	0.00	1.20	0.00	0	11239	17734
SECC7	37.00	27.00	32.00	868.72	0.00	4.63	3.30	2.03	26.0	0.30	1.00	1.00	0.62	2.57	6.7	14903	0.00	2.00	0.00	1.20	0.00	0	14903	22310
SECC8	27.00	14.28	20.64	766.43	0.00	5.55	4.19	2.46	54.5	0.18	1.00	1.00	0.59	3.07	8.0	18863	0.00	2.00	0.00	1.20	0.00	0	18863	26957
SECC9	14.28	1.10	7.69	624.13	0.00	6.25	4.34	2.51	81.6	0.13	1.00	1.00	0.58	3.30	8.8	18064	0.00	2.00	0.00	1.20	0.00	0	18064	30056

Concentrated Loads for Load Case "WIN 45-120":

Joint Label	Force X-Dir (N)	Force Y-Dir (N)	Force Vertical (N)	Moment X-Axis (N-m)	Moment Y-Axis (N-m)	Moment Z-Axis (N-m)	Load Comment
4S	813	813	480	0	0	0	
9S	813	813	480	0	0	0	
13S	813	813	480	0	0	0	
17P	710	710	840	0	0	0	
21S	710	710	840	0	0	0	
25S	710	710	840	0	0	0	
29S	710	710	840	0	0	0	
35P	764	764	530	0	0	0	
37S	764	764	530	0	0	0	
39S	764	764	530	0	0	0	
40S	780	780	900	0	0	0	
41S	780	780	900	0	0	0	
42S	780	780	900	0	0	0	
43P	780	780	900	0	0	0	
44S	780	780	900	0	0	0	
45S	780	780	900	0	0	0	
46S	780	780	900	0	0	0	
47S	780	780	900	0	0	0	
49S	780	780	900	0	0	0	
50S	780	780	900	0	0	0	
51S	780	780	900	0	0	0	
52S	780	780	900	0	0	0	
53S	780	780	900	0	0	0	
54S	780	780	900	0	0	0	
56S	985	985	1200	0	0	0	
57S	985	985	1200	0	0	0	
58S	985	985	1200	0	0	0	
60P	565	565	700	0	0	0	
61S	565	565	700	0	0	0	
63S	610	610	720	0	0	0	
64P	610	610	720	0	0	0	
65S	442	442	500	0	0	0	
66S	442	442	500	0	0	0	

EIA Section Load Case Information for "WIN 45-120":

## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
13 / 31

REV.  
0

Section Label	Z of Top (m)	Z of Bottom (m)	Elev. Above Gnd. (m)	qsGh (Pa)	Ice Thick. (cm)	Face AF (m²)	Face AR (m²)	Face RR*AR (m²)	Face AG (m²)	Face e	Face DF	Face DR	Face RF	Face CF	Face AE (m²)	Face WF (N)	NotF AAF (m²)	NotF CAF	NotF AAR (m²)	NotF CAR	NotF AAR*CAR (m²)	NotF WA (N)	Total Wind (N)	Total Weight (N)
EXT8	108.00	100.00	104.00	1216.56	0.00	2.17	0.00	0.00	4.8	0.45	1.20	1.20	0.67	2.15	2.6	6810	0.00	2.00	0.00	1.20	0.00	0	6810	7811
SECC1	100.00	92.00	96.00	1189.05	0.00	2.37	0.00	0.00	4.8	0.49	1.20	1.20	0.69	2.06	2.8	6972	0.00	2.00	0.00	1.20	0.00	0	6972	8377
SECC2	92.00	90.70	91.35	1172.31	0.00	0.60	0.43	0.33	1.6	0.64	1.20	1.20	0.78	1.86	1.1	2444	0.00	2.00	0.00	1.20	0.00	0	2444	2831
SECC3	90.70	74.70	82.70	1139.46	0.00	5.08	5.27	3.33	29.8	0.35	1.20	1.20	0.63	2.43	10.1	27968	0.00	2.00	0.00	1.20	0.00	0	27968	23396
SECC4	74.70	57.44	66.07	1068.66	0.00	5.65	5.69	3.60	32.1	0.35	1.20	1.20	0.63	2.42	11.1	28657	0.00	2.00	0.00	1.20	0.00	0	28657	28588
SECC5	57.44	45.17	51.31	994.17	0.00	4.39	4.04	2.59	22.8	0.37	1.20	1.20	0.64	2.37	8.4	19685	0.00	2.00	0.00	1.20	0.00	0	19685	21815
SECC6	45.17	37.00	41.09	933.04	0.00	3.60	2.69	1.77	15.2	0.41	1.20	1.20	0.66	2.24	6.4	13487	0.00	2.00	0.00	1.20	0.00	0	13487	17734
SECC7	37.00	27.00	32.00	868.72	0.00	4.63	3.30	2.03	26.0	0.30	1.20	1.20	0.62	2.57	8.0	17883	0.00	2.00	0.00	1.20	0.00	0	17883	22310
SECC8	27.00	14.28	20.64	766.43	0.00	5.55	4.19	2.46	54.5	0.18	1.13	1.13	0.59	3.07	9.1	21394	0.00	2.00	0.00	1.20	0.00	0	21394	26957
SECC9	14.28	1.10	7.69	624.13	0.00	6.25	4.34	2.51	81.6	0.13	1.10	1.10	0.58	3.30	9.6	19824	0.00	2.00	0.00	1.20	0.00	0	19824	30056

Concentrated Loads for Load Case "WIN 45-60":

Joint Label	Force X-Dir (N)	Force Y-Dir (N)	Force Vertical (N)	Moment X-Axis (N-m)	Moment Y-Axis (N-m)	Moment Z-Axis (N-m)	Load Comment
4S	230	230	480	0	0	0	
9S	230	230	480	0	0	0	
13S	230	230	480	0	0	0	
17P	178	178	840	0	0	0	
21S	178	178	840	0	0	0	
25S	178	178	840	0	0	0	
29S	178	178	840	0	0	0	
35P	191	191	530	0	0	0	
37S	191	191	530	0	0	0	
39S	191	191	530	0	0	0	
40S	195	195	900	0	0	0	
41S	195	195	900	0	0	0	
42S	195	195	900	0	0	0	
43P	195	195	900	0	0	0	
44S	195	195	900	0	0	0	
45S	195	195	900	0	0	0	
46S	195	195	900	0	0	0	
47S	195	195	900	0	0	0	
49S	195	195	900	0	0	0	
50S	195	195	900	0	0	0	
51S	195	195	900	0	0	0	
52S	195	195	900	0	0	0	
53S	195	195	900	0	0	0	
54S	195	195	900	0	0	0	
56S	250	250	1200	0	0	0	
57S	250	250	1200	0	0	0	
58S	250	250	1200	0	0	0	
60P	142	142	700	0	0	0	
61S	142	142	700	0	0	0	
63S	155	155	720	0	0	0	
64P	155	155	720	0	0	0	
65S	110	110	500	0	0	0	
66S	110	110	500	0	0	0	

EIA Section Load Case Information for "WIN 45-60":

Section Label	Z of Top (m)	Z of Bottom (m)	Elev. Above Gnd. (m)	qsGh (Pa)	Ice Thick. (cm)	Face AF (m²)	Face AR (m²)	Face RR*AR (m²)	Face AG (m²)	Face e	Face DF	Face DR	Face RF	Face CF	Face AE (m²)	Face WF (N)	NotF AAF (m²)	NotF CAF	NotF AAR (m²)	NotF CAR	NotF AAR*CAR (m²)	NotF WA (N)	Total Wind (N)	Total Weight (N)
EXT8	108.00	100.00	104.00	304.12	0.00	2.17	0.00	0.00	4.8	0.45	1.20	1.20	0.67	2.15	2.6	1702	0.00	2.00	0.00	1.20	0.00	0	1702	7811
SECC1	100.00	92.00	96.00	297.25	0.00	2.37	0.00	0.00	4.8	0.49	1.20	1.20	0.65	2.06	2.8	1743	0.00	2.00	0.00	1.20	0.00	0	1743	8377
SECC2	92.00	90.70	91.35	293.06	0.00	0.60	0.43	0.33	1.6	0.64	1.20	1.20	0.78	1.86	1.1	611	0.00	2.00	0.00	1.20	0.00	0	611	2831
SECC3	90.70	74.70	82.70	284.85	0.00	5.08	5.27	3.33	29.8	0.35	1.20	1.20	0.63	2.43	10.1	6992	0.00	2.00	0.00	1.20	0.00	0	6992	23396
SECC4	74.70	57.44	66.07	267.15	0.00	5.65	5.69	3.60	32.1	0.35	1.20	1.20	0.63	2.42	11.1	7164	0.00	2.00	0.00	1.20	0.00	0	7164	28588
SECC5	57.44	45.17	51.31	248.53	0.00	4.39	4.04	2.55	22.8	0.37	1.20	1.20	0.64	2.37	8.4	4921	0.00	2.00	0.00	1.20	0.00	0	4921	21815
SECC6	45.17	37.00	41.09	233.25	0.00	3.60	2.69	1.77	15.2	0.41	1.20	1.20	0.66	2.24	6.4	3372	0.00	2.00	0.00	1.20	0.00	0	3372	17734
SECC7	37.00	27.00	32.00	217.17	0.00	4.63	3.30	2.03	26.0	0.30	1.20	1.20	0.62	2.57	8.0	4471	0.00	2.00	0.00	1.20	0.00	0	4471	22310
SECC8	27.00	14.28	20.64	191.59	0.00	5.55	4.19	2.46	54.5	0.18	1.13	1.13	0.55	3.07	9.1	5348	0.00	2.00	0.00	1.20	0.00	0	5348	26957
SECC9	14.28	1.10	7.69	156.02	0.00	6.25	4.34	2.51	81.6	0.13	1.10	1.10	0.58	3.30	9.6	4956	0.00	2.00	0.00	1.20	0.00	0	4956	30056

## EVALUACION ESTRUCTURAL TAC100



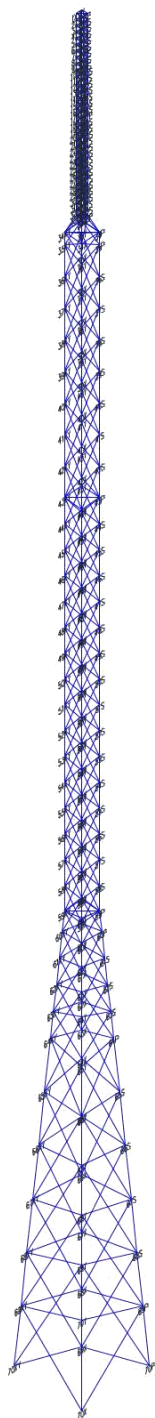
TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
14 / 31

REV.  
0

# SILUETA TAC100-NUDOS



## EVALUACION ESTRUCTURAL TAC100



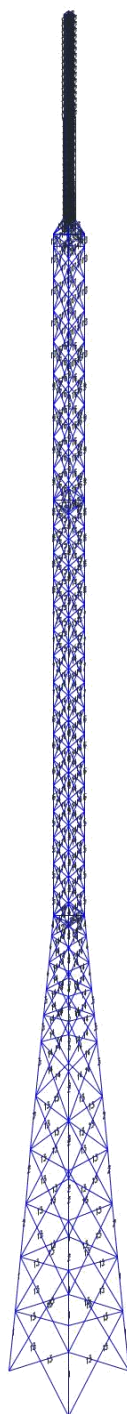
TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
15 / 31

REV.  
0

# SILUETA TAC100-ELEMENTOS



## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
16 / 31

REV.  
0



## RESUMEN

Project Name : TORRE 100.m+EXT.8m -JURISDICCIONES -ACT.  
 Project Notes: BTESA - RTVC  
 Project File : f:\arch\_2016\eval\_btesa\tac100\_jurisdicciones\tor100e8jur.tow  
 Date run : 01:51:27 p.m. miercoles, 11 de mayo de 2016  
 by : Tower Version 10.20

Successfully performed linear analysis

The model has 0 warnings.

Member check option: TIA/EIA 222-F  
 Connection rupture check: Not Checked  
 Crossing diagonal check: Fixed  
 Loads from file: f:\arch\_2016\eval\_btesa\tac100\_jurisdicciones\tor100e8jur.eia

\*\*\* Analysis Results:

Maximum element usage is 447.43% for Angle "21P" in load case "WIN 45-120" NG

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kN)	Tran. Force (kN)	Vert. Force (kN)	Shear Force (kN)	Tran. Moment (kN-m)	Long. Moment (kN-m)	Vert. Moment (kN-m)	Bending Moment (kN-m)	Found. Usage %
WIN 0 -120	70P	-49.16	-50.91	695.86	70.77	0.93	-0.37	0.08	1.00	0.00
WIN 0 -120	70X	-42.98	48.65	628.63	64.91	-0.94	-0.27	-0.07	0.98	0.00
WIN 0 -120	70XY	-39.37	-43.61	-589.45	58.75	0.64	-0.05	-0.06	0.64	0.00
WIN 0 -120	70Y	-35.27	38.52	-519.34	52.23	-0.61	0.03	0.08	0.61	0.00
WIN 45-120	70P	-78.30	-78.30	1094.12	110.73	0.96	-0.96	-0.00	1.35	0.00
WIN 45-120	70X	-0.79	8.20	55.00	8.24	-0.69	0.38	-0.13	0.78	0.00
WIN 45-120	70XY	-69.76	-69.76	-987.82	98.65	0.65	-0.65	0.00	0.92	0.00
WIN 45-120	70Y	8.20	-0.79	55.00	8.24	-0.38	0.69	0.13	0.78	0.00
WIN 45-60	70P	-22.97	-22.97	317.59	32.48	0.36	-0.36	-0.00	0.51	0.00
WIN 45-60	70X	-3.40	5.47	54.51	6.44	-0.29	-0.02	-0.03	0.29	0.00
WIN 45-60	70XY	-14.36	-14.36	-210.30	20.31	0.05	-0.05	0.00	0.07	0.00
WIN 45-60	70Y	5.47	-3.40	54.51	6.44	0.02	0.29	0.03	0.29	0.00

Note: Summary of Joint Support Reactions For All Load Cases in Direction of Leg not printed because none of the angle members attached to foundation joints have a group type of 'Leg'.

Overturning Moment Summary For All Load Cases:

Load Case	Transverse Moment (kN-m)	Longitudinal Moment (kN-m)	Resultant Moment (kN-m)
WIN 0 -120	491.530	8708.679	8722.540
WIN 45-120	7451.280	7451.279	10537.700
WIN 45-60	1889.341	1889.342	2671.932

EIA Sections Information:

Section Label	Top Z (m)	Bottom Z (m)	Joint Count	Member Count	Top Width (m)	Bottom Width (m)	Gross Area (m^2)	Face Adjust Factor	Face Ar Adjust Factor	Dead Load Factor
EXT8	108.000	100.000	68	198	0.60	0.60	4.80	1.0000	1.0000	1.200
SECC1	100.000	92.000	68	194	0.60	0.60	4.80	1.0000	1.0000	1.200
SECC2	92.000	90.700	8	18	0.60	1.86	1.60	1.0000	1.0000	1.200
SECC3	90.700	74.700	32	84	1.86	1.86	29.76	1.0000	1.0000	1.200
SECC4	74.700	57.438	36	102	1.86	1.86	32.11	1.0000	1.0000	1.200
SECC5	57.438	45.175	28	72	1.86	1.86	22.81	1.0000	1.0000	1.200
SECC6	45.175	37.000	20	54	1.86	1.86	15.21	1.0000	1.0000	1.200
SECC7	37.000	27.000	24	60	1.86	3.35	26.03	1.0000	1.0000	1.200
SECC8	27.000	14.280	16	36	3.35	5.22	54.48	1.0000	1.0000	1.200
SECC9	14.280	1.100	16	36	5.22	7.16	81.57	1.0000	1.0000	1.200

\*\*\* Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress  
 Printed capacities do not include EIA allowable stress increase for wind load cases.  
 Printed capacities do not include the strength factor entered for each loadcase.

Group Summary (Compression Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (MPa)	Max Usage %	Max Use In Control %	Comp. Member	Comp. Force (kN)	Comp. Control Load Case	L/R Comp. Capacity (kN)	Conn. Shear Capacity (kN)	Conn. Bearing Capacity (kN)	RIX	RLY	RLZ	L/R Length (m)	Curve No.	No. Bolts	Of Comp.
1	M01	SAE	5X5X0.375	248.1	376.02	376.02	1P	-1102.29	WIN 45-120	220.411	1052.352	870.781	0.500	0.500	0.500	93.95	4.725	1	10 NG

## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
17 / 31

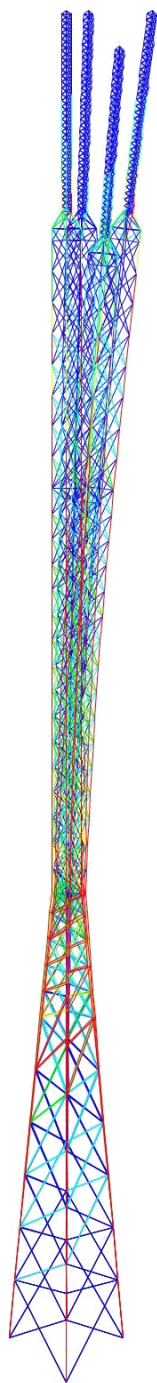
REV.  
0

2	M02	SAE	5X5X0.375	248.1	380.49	380.49	5P	-1203.717WIN	45-120	237.863	1052.352	870.781	0.500	0.500	0.500	84.76	4.263	1	10	NG
3	M03	SAE	5X5X0.375	248.1	395.69	395.69	6P	-1251.785WIN	45-120	237.863	1052.352	870.781	0.500	0.500	0.500	84.76	4.263	1	10	NG
4	M04	SAE	5X5X0.375	248.1	394.40	394.40	11P	-1667.105WIN	45-120	317.815	1052.352	870.781	0.500	0.500	0.500	31.99	1.609	1	10	NG
5	M05	SAE	5X5X0.375	248.1	402.25	402.25	12P	-1645.818WIN	45-120	307.632	1052.352	870.781	0.500	0.500	0.500	40.31	2.027	1	10	NG
6	M06	SAE	4X4X0.375	248.1	407.81	407.81	16P	-1266.641WIN	45-120	233.531	1052.352	870.781	0.500	0.500	0.500	50.58	2.027	1	10	NG
7	M07	SAE	3X3X0.375	248.1	447.43	447.43	21P	-928.966WIN	45-120	156.107	875.035	726.794	0.500	0.500	0.500	67.99	2.027	1	10	NG
8	M08	SAE	3X3X0.375	248.1	316.20	316.20	25P	-656.496WIN	45-120	156.107	875.035	726.794	0.500	0.500	0.500	67.99	2.027	1	10	NG
9	M09	SAE	3X3X0.375	248.1	226.17	226.17	29P	-421.204WIN	45-120	140.023	875.035	726.794	0.500	0.500	0.500	83.84	2.500	1	10	NG
10	M10	SAE	3X3X0.25	248.1	161.47	161.47	33P	-208.641WIN	45-120	97.152	875.035	484.529	0.500	0.500	0.500	82.57	2.500	1	10	NG
11	M11	SAE	3X3X0.25	248.1	113.70	113.70	39P	-192.485WIN	45-120	127.289	700.028	387.623	1.000	1.000	1.000	32.76	0.496	1	8	NG
12	M12	SAE	2.5X2.5X0.25	248.1	34.27	34.27	55P	-46.325WIN	45-120	101.636	350.014	193.812	1.000	1.000	1.000	39.77	0.496	1	4	
13	D01	SAE	2.5X2.5X0.1875	248.1	52.89	52.89	80X	-21.900WIN	0-120	31.133	131.307	109.019	0.500	0.250	0.250	152.70	6.035	6	3	
14	D02	SAE	2.5X2.5X0.1875	248.1	181.55	181.55	81P	-30.280WIN	45-120	12.541	87.538	72.679	1.000	0.500	0.500	283.83	5.609	6	2	NG
15	D03	SAE	2.5X2.5X0.1875	248.1	59.33	59.33	116Y	-27.435WIN	0-120	34.769	87.538	72.679	1.000	0.500	0.500	140.45	2.776	6	2	
16	D04	SAE	2.5X2.5X0.1875	248.1	63.74	63.74	126Y	-25.275WIN	45-120	29.813	87.538	72.679	1.000	0.500	0.500	157.68	3.116	6	2	
17	D05	SAE	2.5X2.5X0.1875	248.1	101.01	101.01	143P	-72.907WIN	45-120	54.269	87.538	72.679	0.750	0.500	0.500	75.45	1.897	3	2	NG
18	D06	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000	0	0	
19	D07	SAE	2.5X2.5X0.1875	248.1	14.25	14.25	146YR	-12.284WIN	0-120	64.803	87.538	72.679	0.750	0.500	0.500	31.16	0.784	3	2	
20	D08	SAE	2X2X0.1875	248.1	17.73	17.73	148YR	-11.471WIN	0-120	48.631	87.538	72.679	0.750	0.500	0.500	39.15	0.784	3	2	
21	D09	SAE	2X2X0.1875	248.1	15.43	15.43	151YR	-9.992WIN	0-120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2	
22	D10	SAE	2X2X0.1875	248.1	13.12	13.12	153YR	-8.494WIN	0-120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2	
23	D11	SAE	2X2X0.1875	248.1	10.83	10.83	159YR	-7.013WIN	0-120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2	
24	D12	SAE	2X2X0.1875	248.1	8.20	8.20	163YR	-5.306WIN	0-120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2	
25	H01	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000	0	0	
26	H02	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000	0	0	
27	H03	SAE	2.5X2.5X0.1875	248.1	45.80	45.80	177P	-33.287WIN	0-120	54.646	87.538	72.679	0.500	0.500	0.500	73.97	1.860	3	2	
28	H04	SAE	2.5X2.5X0.1875	248.1	37.60	37.60	181Y	-24.688WIN	0-120	49.363	87.538	72.679	1.000	0.500	0.500	94.12	1.860	3	2	
29	H05	SAE	2.5X2.5X0.1875	248.1	28.68	28.68	183P	-20.353WIN	0-120	64.979	87.538	72.679	1.000	0.500	0.500	30.36	0.600	3	2	
30	H06	SAE	2X2X0.1875	248.1	12.19	12.19	186YR	-6.801WIN	45-120	44.860	87.538	72.679	1.000	1.000	1.000	59.95	0.600	3	2	
31	H07	SAE	2X2X0.1875	248.1	10.53	10.53	189YR	-5.973WIN	45-120	44.860	87.538	72.679	1.000	1.000	1.000	59.95	0.600	3	2	
32	H08	SAE	2X2X0.1875	248.1	2.81	0.00	216YR	0.000		44.860	87.538	72.679	1.000	1.000	1.000	59.95	0.600	3	2	
33	C01	SAE	2X2X0.1875	248.1	19.83	19.83	217P	-5.571WIN	45-120	21.124	87.538	72.679	1.000	0.500	0.500	167.85	2.630	6	2	
34	C02	SAE	2X2X0.1875	248.1	20.79	20.79	218P	-5.841WIN	45-120	21.124	87.538	72.679	1.000	0.500	0.500	167.85	2.630	6	2	
35	C03	SAE	2X2X0.1875	248.1	7.07	7.07	219P	-1.986WIN	45-120	21.124	87.538	72.679	1.000	0.500	0.500	167.85	2.630	6	2	
36	C04	SAE	2X2X0.1875	248.1	4.57	4.57	221P	-2.794WIN	45-120	45.939	87.538	72.679	1.000	0.500	0.500	54.14	0.849	3	2	

Group Summary (Tension Portion):

Group	Label	Group Desc.	Angle Type	Angle Size	Steel Strength (MPa)	Max Tens. %	Max Tens. In Control Member	Tension Force (kN)	Control Load Case	Net Tens. Section Capacity (kN)	Conn. Shear Capacity (kN)	Tens. Bearing Capacity (kN)	Conn. Rupture Capacity (kN)	Length (m)	No. Of Bolts	No. Of Holes	Of Diameter (cm)
1	M01	SAE	5X5X0.375	248.1	376.02	220.18	2XY	1015.293WIN	45-120	346.711	1052.352	870.781	0.000	4.263	10	2.000	2.064 NG
2	M02	SAE	5X5X0.375	248.1	380.49	242.16	5XY	1116.645WIN	45-120	346.711	1052.352	870.781	0.000	4.263	10	2.000	2.064 NG
3	M03	SAE	5X5X0.375	248.1	395.69	281.42	8XY	1297.710WIN	45-120	346.711	1052.352	870.781	0.000	2.112	10	2.000	2.064 NG
4	M04	SAE	5X5X0.375	248.1	394.40	341.42	11XY	1574.392WIN	45-120	346.711	1052.352	870.781	0.000	1.609	10	2.000	2.064 NG
5	M05	SAE	5X5X0.375	248.1	402.25	338.35	12XY	1560.222WIN	45-120	346.711	1052.352	870.781	0.000	2.027	10	2.000	2.064 NG
6	M06	SAE	4X4X0.375	248.1	407.81	333.39	16XY	1222.226WIN	45-120	275.640	1052.352	870.781	0.000	2.027	10	2.000	2.064 NG
7	M07	SAE	3X3X0.375	248.1	447.43	334.94	21XY	902.741WIN	45-120	202.648	875.035	726.794	0.000	2.027	10	2.000	1.749 NG
8	M08	SAE	3X3X0.375	248.1	316.20	231.47	25XY	623.862WIN	45-120	202.648	875.035	726.794	0.000	2.027	10	2.000	1.749 NG
9	M09	SAE	3X3X0.375	248.1	226.17	138.96	29XY	374.525WIN	45-120	202.648	875.035	726.794	0.000	2.500	10	2.000	1.749 NG
10	M10	SAE	3X3X0.25	248.1	161.47	103.15	33XY	191.050WIN	45-120	139.260	875.035	484.529	0.000	2.500	10	2.000	1.749 NG
11	M11	SAE	3X3X0.25	248.1	113.70	98.31	39XY	182.081WIN	45-120	139.260	700.028	387.623	0.000	0.496	8	2.000	1.749 NG
12	M12	SAE	2.5X2.5X0.25	248.1	34.27	29.26	55XY	42.452WIN	45-120	109.100	350.014	193.812	0.000	0.496	4	2.000	1.749
13	D01	SAE	2.5X2.5X0.1875	248.1	52.89	21.35	79X	21.731WIN	45-120	76.521	131.307	109.019	0.000	6.035	3	1.000	1.749
14	D02	SAE	2.5X2.5X0.1875	248.1	181.55	56.22	92XY	54.341WIN	45-120	76.521	87.538	72.679	0.000	2.547	2	1.000	1.749 NG
15	D03	SAE	2.5X2.5X0.1875	248.1	59.33	29.07	114P	28.103WIN	0-120	76.521	87.538	72.679	0.000	2.751	2	1.000	1.749
16	D04	SAE	2.5X2.5X0.1875	248.1	63.74	24.44	128P	23.621WIN	0-120	76.521	87.538	72.679	0.000	3.116	2	1.000	1.749
17	D05	SAE	2.5X2.5X0.1875	248.1	101.01	66.11	143XY	63.905WIN	45-120	76.521	87.538	72.679	0.000	1.897	2	1.000	1.749 NG
18	D06	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
19	D07	SAE	2.5X2.5X0.1875	248.1	14.25	9.16	146YR	8.854WIN	0-120	76.521	87.538	72.679	0.000	0.784	2	1.000	1.749
20	D08	SAE	2X2X0.1875	248.1	17.73	11.15	147YR	8.337WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749
21	D09	SAE	2X2X0.1875	248.1	15.43	9.79	151YR	7.317WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749
22	D10	SAE	2X2X0.1875	248.1	13.12	8.19	155YR	6.123WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749
23	D11	SAE	2X2X0.1875	248.1	10.83	6.63	159YR	4.956WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749
24	D12	SAE	2X2X0.1875	248.1	8.20	4.91	163YR	3.668WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749
25	H01	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
26	H02	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
27	H03	SAE	2.5X2.5X0.1875	248.1	45.80	38.78	177Y	37.486WIN	0-120	76.521	87.538	72.679	0.000	1.860	2	1.000	1.749
28	H04	SAE	2.5X2.5X0.1875	248.1	37.60	35.60	181P	34.412WIN	0-120	76.521	87.538	72.679	0.000	1.860	2	1.000	1.749
29	H05	SAE	2.5X2.5X0.1875	248.1	28.68	28.68	183Y	27.721WIN	0-120	76.521	87.538	72.679	0.000	0.600	2	1.000	1.749
30	H06	SAE	2.5X2.5X0.1875	248.1	12.19	12.19	186YR	9.112WIN	0-120	56.203	87.538	72.679	0.000	0.600	2	1.000	1.749
31	H07	SAE	2X2X0.1875	248.1	10.53	10.53	189YR	7.871WIN	0-120	56.203	87.538	72.679	0.000	0.600	2	1.000	1.749
32	H08	SAE	2X2X0.1875	248.1	2.81	2.81	216R	2.101WIN	45-120	56.203	87.538	72.679	0.000	0.600	2	1.000	1.749
33	C03	SAE	2X2X0.1875	248.1	20.79	9.89	217Y	9.741WIN	45-120	56.203	87.538	72.679	0.000	0.630	2	1.000	1.749
34	C02	SAE	2X2X0.1875	248.1	20.79	9.89	218X	0.741WIN	45-120	56.203	87.538	72.679	0.000	0.630	2	1.000	1.749
35	C03	SAE	2X2X0.1875	248.1	7.07	0.00	220X	0.000		56.203	87.538	72.679	0.000	0.849	2	1.000	1.749
36	C04	SAE	2X2X0.1875	248.1	4.57	0.00	221X	0.000		56.203	87.538	72.679	0.000	0.849	2	1.000	1.749

SILUETA ESFUERZOS-DEF.



## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
19 / 31

REV.  
0

TORRE 100 m – JURISDICCIONES-ABREGO  
REFORZAMIENTO

EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
20 / 31

REV.  
0

## RESUMEN DE DISEÑO

Project Name : TORRE 100.m+EXT.8m -JURISDICCIONES -ACT.  
 Project Notes: BTESA - RTVC  
 Project File : f:\arch\_2016\eval\_btesa\tac100\_jurisdicciones\tor100e8jur.tow  
 Date run : 01:51:27 p.m. miercoles, 11 de mayo de 2016  
 by : Tower Version 10.20

Successfully performed linear analysis

The model has 0 warnings.

Member check option: TIA/EIA 222-F  
 Connection rupture check: Not Checked  
 Crossing diagonal check: Fixed  
 Loads from file: f:\arch\_2016\eval\_btesa\tac100\_jurisdicciones\tor100e8jur.eia

\*\*\* Analysis Results:

**Maximum element usage is 447.43% for Angle "21P" in load case "WIN 45-120" NG**

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kN)	Tran. Force (kN)	Vert. Force (kN)	Shear Force (kN)	Tran. Moment (kN-m)	Long. Moment (kN-m)	Vert. Moment (kN-m)	Bending Moment (kN-m)	Found. Usage %
WIN 0 -120	70P	-49.16	-50.91	695.86	70.77	0.93	-0.37	0.08	1.00	0.00
WIN 0 -120	70X	-42.98	48.65	628.63	64.91	-0.94	-0.27	-0.07	0.98	0.00
WIN 0 -120	70XY	-39.37	-43.61	-589.45	58.75	0.64	-0.05	-0.06	0.64	0.00
WIN 0 -120	70Y	-35.27	38.52	-519.34	52.23	-0.61	0.03	0.08	0.61	0.00
WIN 45-120	70P	-78.30	-78.30	1094.12	110.73	0.96	-0.96	-0.00	1.35	0.00
WIN 45-120	70X	-0.79	8.20	55.00	8.24	-0.69	0.38	-0.13	0.78	0.00
WIN 45-120	70XY	-69.76	-69.76	-987.82	98.65	0.65	-0.65	0.00	0.92	0.00
WIN 45-120	70Y	8.20	-0.79	55.00	8.24	-0.38	0.69	0.13	0.78	0.00
WIN 45-60	70P	-22.97	-22.97	317.59	32.48	0.36	-0.36	-0.00	0.51	0.00
WIN 45-60	70X	-3.40	5.47	54.51	6.44	-0.29	-0.02	-0.03	0.29	0.00
WIN 45-60	70XY	-14.36	-14.36	-210.30	20.31	0.05	-0.05	0.00	0.07	0.00
WIN 45-60	70Y	5.47	-3.40	54.51	6.44	0.02	0.29	0.03	0.29	0.00

Note: Summary of Joint Support Reactions For All Load Cases in Direction of Leg not printed because none of the angle members attached to foundation joints have a group type of 'Leg'.

Overturning Moment Summary For All Load Cases:

Load Case	Transverse Moment (kN-m)	Longitudinal Moment (kN-m)	Resultant Moment (kN-m)
WIN 0 -120	491.530	8708.679	8722.540
WIN 45-120	7451.280	7451.279	10537.700
WIN 45-60	1889.341	1889.342	2671.932

EIA Sections Information:

Section Label	Top Z (m)	Bottom Z (m)	Joint Count	Member Count	Top Width (m)	Bottom Width (m)	Gross Area (m^2)	Face Adjust Factor	Face Ar Adjust Factor	Dead Load
EXT8	108.000	100.000	68	198	0.60	0.60	4.80	1.0000	1.0000	1.200
SECC1	100.000	92.000	68	194	0.60	0.60	4.80	1.0000	1.0000	1.200
SECC2	92.000	90.700	8	18	0.60	1.86	1.60	1.0000	1.0000	1.200
SECC3	90.700	74.700	32	84	1.86	1.86	29.76	1.0000	1.0000	1.200
SECC4	74.700	57.438	36	102	1.86	1.86	32.11	1.0000	1.0000	1.200
SECC5	57.438	45.175	28	72	1.86	1.86	22.81	1.0000	1.0000	1.200
SECC6	45.175	37.000	20	54	1.86	1.86	15.21	1.0000	1.0000	1.200
SECC7	37.000	27.000	24	60	1.86	3.35	26.03	1.0000	1.0000	1.200
SECC8	27.000	14.280	16	36	3.35	5.22	54.48	1.0000	1.0000	1.200
SECC9	14.280	1.100	16	36	5.22	7.16	81.57	1.0000	1.0000	1.200

\*\*\* Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress  
 Printed capacities do not include EIA allowable stress increase for wind load cases.  
 Printed capacities do not include the strength factor entered for each loadcase.

Group Summary (Compression Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (MPa)	Max Usage %	Max Use In Comp. %	Comp. Member	Comp. Force (kN)	Comp. Control Load Case	Comp. Capacity (kN)	L/R Comp. Shear Capacity (kN)	Conn. Comp. Capacity (kN)	Conn. Bearing Capacity (kN)	R1X	R1Y	R1Z	L/R Length (m)	Curve No.	No. Comp.	Of Bolts Comp.
-------------	-------------	------------	------------	----------------------	-------------	--------------------	--------------	------------------	-------------------------	---------------------	-------------------------------	---------------------------	-----------------------------	-----	-----	-----	----------------	-----------	-----------	----------------

## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
21 / 31

REV.  
0

1	M01	SAE	5X5X0.375	248.1	376.02	376.02	1P	-1102.296WIN	45-120	220.411	1052.352	870.781	0.500	0.500	0.500	93.95	4.725	1	10	NG
2	M02	SAE	5X5X0.375	248.1	380.49	380.49	5P	-1203.717WIN	45-120	237.863	1052.352	870.781	0.500	0.500	0.500	84.76	4.263	1	10	NG
3	M03	SAE	5X5X0.375	248.1	395.69	395.69	6P	-1251.785WIN	45-120	237.863	1052.352	870.781	0.500	0.500	0.500	84.76	4.263	1	10	NG
4	M04	SAE	5X5X0.375	248.1	394.40	394.40	11P	-1667.105WIN	45-120	317.815	1052.352	870.781	0.500	0.500	0.500	31.99	1.609	1	10	NG
5	M05	SAE	5X5X0.375	248.1	402.25	402.25	12P	-1645.818WIN	45-120	307.632	1052.352	870.781	0.500	0.500	0.500	40.31	2.027	1	10	NG
6	M06	SAE	4X4X0.375	248.1	407.81	407.81	16P	-1266.641WIN	45-120	233.531	1052.352	870.781	0.500	0.500	0.500	50.58	2.027	1	10	NG
7	M07	SAE	3X3X0.375	248.1	447.43	447.43	21P	-928.966WIN	45-120	156.107	875.035	726.794	0.500	0.500	0.500	67.99	2.027	1	10	NG
8	M08	SAE	3X3X0.375	248.1	316.20	316.20	25P	-656.496WIN	45-120	156.107	875.035	726.794	0.500	0.500	0.500	67.99	2.027	1	10	NG
9	M09	SAE	3X3X0.375	248.1	226.17	226.17	29P	-421.204WIN	45-120	140.023	875.035	726.794	0.500	0.500	0.500	83.84	2.500	1	10	NG
10	M10	SAE	3X3X0.25	248.1	161.47	161.47	33P	-208.641WIN	45-120	97.152	875.035	484.529	0.500	0.500	0.500	82.57	2.500	1	10	NG
11	M11	SAE	3X3X0.25	248.1	113.70	113.70	39P	-192.485WIN	45-120	127.289	700.028	387.623	1.000	1.000	1.000	32.76	0.496	1	8	NG
12	M12	SAE	2.5X2.5X0.25	248.1	34.27	34.27	55P	-46.325WIN	45-120	101.636	350.014	193.812	1.000	1.000	1.000	39.77	0.496	1	4	
13	D01	SAE	2.5X2.5X0.1875	248.1	52.89	52.89	80X	-21.900WIN	0 -120	31.133	131.307	109.019	0.500	0.250	0.250	152.70	6.035	6	2	NG
14	D02	SAE	2.5X2.5X0.1875	248.1	181.55	181.55	81P	-30.280WIN	45-120	12.541	87.538	72.679	1.000	0.500	0.500	283.83	5.609	6	2	NG
15	D03	SAE	2.5X2.5X0.1875	248.1	59.33	59.33	116Y	-27.435WIN	0 -120	34.769	87.538	72.679	1.000	0.500	0.500	140.45	2.776	6	2	
16	D04	SAE	2.5X2.5X0.1875	248.1	63.74	63.74	126Y	-25.275WIN	45-120	29.813	87.538	72.679	1.000	0.500	0.500	157.68	3.116	6	2	
17	D05	SAE	2.5X2.5X0.1875	248.1	101.01	101.01	143P	-72.907WIN	45-120	54.269	87.538	72.679	0.750	0.500	0.500	75.45	1.897	3	2	NG
18	D06	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000	0	0	
19	D07	SAE	2.5X2.5X0.1875	248.1	14.25	14.25	146YR	-12.284WIN	0 -120	64.803	87.538	72.679	0.750	0.500	0.500	31.16	0.784	3	2	
20	D08	SAE	2X2X0.1875	248.1	17.73	17.73	148YR	-11.471WIN	0 -120	48.631	87.538	72.679	0.750	0.500	0.500	39.15	0.784	3	2	
21	D09	SAE	2X2X0.1875	248.1	15.43	15.43	151YR	-9.992WIN	0 -120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2	
22	D10	SAE	2X2X0.1875	248.1	13.12	13.12	155YR	-8.494WIN	0 -120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2	
23	D11	SAE	2X2X0.1875	248.1	10.83	10.83	159YR	-7.013WIN	0 -120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2	
24	D12	SAE	2X2X0.1875	248.1	8.20	8.20	163YR	-5.306WIN	0 -120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2	
25	H01	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000	0	0	
26	H02	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000	0	0	
27	H03	SAE	3X3X0.1875	248.1	45.80	45.80	177P	-33.287WIN	0 -120	54.646	87.538	72.679	0.500	0.500	0.500	73.97	1.860	3	2	
28	H04	SAE	2.5X2.5X0.1875	248.1	37.60	37.60	181Y	-24.688WIN	0 -120	49.363	87.538	72.679	1.000	0.500	0.500	94.12	1.860	3	2	
29	H05	SAE	2.5X2.5X0.1875	248.1	28.68	23.55	183P	-20.353WIN	0 -120	46.979	87.538	72.679	1.000	0.500	0.500	30.36	0.600	3	2	
30	H06	SAE	2X2X0.1875	248.1	12.19	11.40	186XR	-6.801WIN	45-120	44.860	87.538	72.679	1.000	1.000	1.000	59.95	0.600	3	2	
31	H07	SAE	2X2X0.1875	248.1	10.53	10.01	189XR	-5.973WIN	45-120	44.860	87.538	72.679	1.000	1.000	1.000	59.95	0.600	3	2	
32	H08	SAE	2X2X0.1875	248.1	2.81	0.00	216YR	0.000		44.860	87.538	72.679	1.000	1.000	1.000	59.95	0.600	3	2	
33	C01	SAE	2X2X0.1875	248.1	19.83	19.83	217P	-5.571WIN	45-120	21.124	87.538	72.679	1.000	0.500	0.500	167.85	2.630	6	2	
34	C02	SAE	2X2X0.1875	248.1	20.79	20.79	218P	-5.841WIN	45-120	21.124	87.538	72.679	1.000	0.500	0.500	167.85	2.630	6	2	
35	C03	SAE	2X2X0.1875	248.1	7.07	7.07	219P	-1.986WIN	45-120	21.124	87.538	72.679	1.000	0.500	0.500	167.85	2.630	6	2	
36	C04	SAE	2X2X0.1875	248.1	4.57	4.57	221P	-2.794WIN	45-120	45.939	87.538	72.679	1.000	0.500	0.500	54.14	0.849	3	2	

Group Summary (Tension Portion):

Group Label	Group Desc.	Angle Type	Steel Size	Max Strength (MPa)	Max Usage %	Max Tension Use In Tens. Member %	Tension Force (kN)	Tension Control Load Case	Net Tens. Section Capacity (kN)	Conn. Shear Capacity (kN)	Tens. Bearing Capacity (kN)	Conn. Rupture Capacity (kN)	Tens. Member Length (m)	No. Of Bolts Tens.	No. Of Holes	Hole Diameter (cm)
1	M01	SAE	5X5X0.375	248.1	376.02	220.18	2XY 1015.293WIN	45-120	346.711	1052.352	870.781	0.000	4.263	10	2.000	2.064 NG
2	M02	SAE	5X5X0.375	248.1	380.49	242.16	5XY 1116.645WIN	45-120	346.711	1052.352	870.781	0.000	4.263	10	2.000	2.064 NG
3	M03	SAE	5X5X0.375	248.1	395.69	281.42	8XY 1297.710WIN	45-120	346.711	1052.352	870.781	0.000	2.112	10	2.000	2.064 NG
4	M04	SAE	5X5X0.375	248.1	394.40	341.42	11XY 1574.392WIN	45-120	346.711	1052.352	870.781	0.000	1.609	10	2.000	2.064 NG
5	M05	SAE	5X5X0.375	248.1	402.25	338.35	12XY 1560.222WIN	45-120	346.711	1052.352	870.781	0.000	2.027	10	2.000	2.064 NG
6	M06	SAE	4X4X0.375	248.1	407.81	333.39	16XY 1222.226WIN	45-120	275.640	1052.352	870.781	0.000	2.027	10	2.000	2.064 NG
7	M07	SAE	3X3X0.375	248.1	447.43	334.94	21XY 902.741WIN	45-120	202.648	875.035	726.794	0.000	2.027	10	2.000	1.749 NG
8	M08	SAE	3X3X0.375	248.1	316.20	231.47	25XY 623.862WIN	45-120	202.648	875.035	726.794	0.000	2.027	10	2.000	1.749 NG
9	M09	SAE	3X3X0.375	248.1	226.17	138.96	29XY 374.525WIN	45-120	202.648	875.035	726.794	0.000	2.500	10	2.000	1.749 NG
10	M10	SAE	3X3X0.25	248.1	161.47	103.15	33XY 191.050WIN	45-120	139.260	875.035	484.529	0.000	2.500	10	2.000	1.749 NG
11	M11	SAE	3X3X0.25	248.1	113.70	98.31	39XY 182.081WIN	45-120	139.260	700.028	387.623	0.000	0.496	8	2.000	1.749 NG
12	M12	SAE	2.5X2.5X0.25	248.1	34.27	29.26	55XY 42.452WIN	45-120	109.100	350.014	193.812	0.000	0.496	4	2.000	1.749
13	D01	SAE	2.5X2.5X0.1875	248.1	52.89	21.35	79X 21.731WIN	45-120	76.521	131.307	109.019	0.000	6.035	3	1.000	1.749
14	D02	SAE	2.5X2.5X0.1875	248.1	181.55	56.22	92XY 54.341WIN	45-120	76.521	87.538	72.679	0.000	2.547	2	1.000	1.749 NG
15	D03	SAE	2.5X2.5X0.1875	248.1	59.33	29.07	114P 28.103WIN	0 -120	76.521	87.538	72.679	0.000	2.751	2	1.000	1.749 NG
16	D04	SAE	2.5X2.5X0.1875	248.1	63.74	24.44	128P 23.621WIN	0 -120	76.521	87.538	72.679	0.000	3.116	2	1.000	1.749
17	D05	SAE	2.5X2.5X0.1875	248.1	101.01	66.11	143XY 63.905WIN	45-120	76.521	87.538	72.679	0.000	1.897	2	1.000	1.749 NG
18	D06	SAE	2.5X2.5X0.1875	248.1	0.00	0.00			0.000	0.000	0.000	0.000	0.000	0	0.000	
19	D07	SAE	2.5X2.5X0.1875	248.1	14.25	9.16	146XR 8.854WIN	0 -120	76.521	87.538	72.679	0.000	0.784	2	1.000	1.749
20	D08	SAE	2X2X0.1875	248.1	17.73	11.15	147XR 8.337WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749
21	D09	SAE	2X2X0.1875	248.1	15.43	9.79	151XR 7.317WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749
22	D10	SAE	2X2X0.1875	248.1	13.12	8.19	155XR 6.123WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749
23	D11	SAE	2X2X0.1875	248.1	10.83	6.63	159XR 4.956WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749
24	D12	SAE	2X2X0.1875	248.1	8.20	4.91	163XR 3.668WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749
25	H01	SAE	2.5X2.5X0.1875	248.1	0.00	0.00			0.000	0.000	0.000	0.000	0.000	0	0.000	
26	H02	SAE	2.5X2.5X0.1875	248.1	0.00	0.00			0.000	0.000	0.000	0.000	0.000	0	0.000	
27	H03	SAE	2.5X2.5X0.1875	248.1	45.80	38.78	177Y 37.486WIN	0 -120	76.521	87.538	72.679	0.000	1.860	2	1.000	1.749
28	H04	SAE	2.5X2.5X0.1875	248.1	37.60	35.60	181P 34.412WIN	0 -120	76.521	87.538	72.679	0.000	1.860	2	1.000	1.749
29	H05	SAE	2.5X2.5X0.1875	248.1	28.68	28.68	183Y 27.721WIN	0 -120	76.521	87.538	72.679	0.000	0.600	2	1.000	1.749
30	H06	SAE	2X2X0.1875	248.1	12.19	12.19	186YR 9.112WIN	0 -120	56.203	87.538	72.679	0.000	0.600	2	1.000	1.749
31	H07	SAE	2X2X0.1875	248.1	10.53	10.53	189YR 7.871WIN	0 -120	56.203	87.538	72.679	0.000	0.600	2	1.000	1.749
32	H08	SAE	2X2X0.1875	248.1	2.81	2.81	216R 2.101WIN	45-120	56.203	87.538	72.679	0.000	0.600	2	1.000	1.749
33	C01	SAE	2X2X0.1875	248.1	21.78	21.78	217X 10.000WIN	0 -120	56.203	87.538	72.679	0.000	2.630	2	1.000	1.749
34	C02	SAE	2X2X0.1875	248.1	20.79	9.99	218X 0.741WIN	45-120	56.203	87.538	72.679	0.000	2.630	2	1.000	1.749
35	C03	SAE	2X2X0.1875	248.1	7.07	0.00	220X 0.000		56.203	87.538	72.679	0.000	0.849	2	1.000	1.749
36	C04	SAE	2X2X0.1875	248.1	4.57	0.00	221X 0.000		56.203	87.538	72.679	0.000	0.849	2	1.000	1.749

TORRE 100 m – JURISDICCIONES - ABREGO  
CIMENTACION

EVALUACION ESTRUCTURAL TAC100



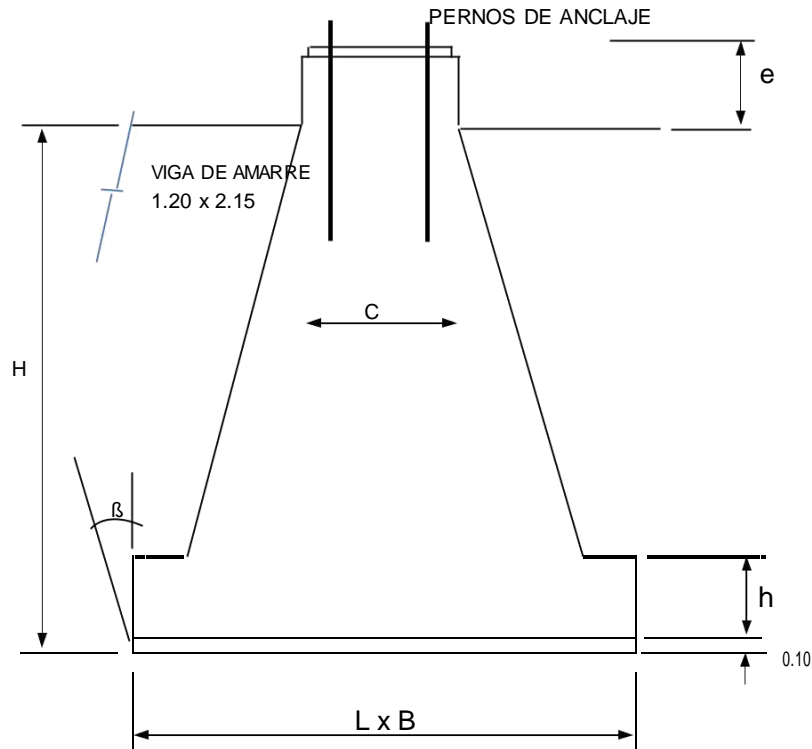
TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
23 / 31

REV.  
0

**TORRE 100,m - JURISDICCIONES  
CIMENTACION EN CONCRETO**





MATERIALES: Acero  $f_y = 4,200$  Kg / cm<sup>2</sup>  
 Concr.  $f'_c = 210$  Kg / cm<sup>2</sup>  
 Angulo  $\beta = 20$  grados.  $T_g = 0.364$   
 Suelo  $q_u = 1.00$  Kg / cm<sup>2</sup>  
 Suelo  $C = 0.10$  Kg / cm<sup>2</sup>

PREDIMENSIONAMIENT. CHEQUEO ESTABLD.

Dimensiones ( m.)	H = 3.27	h = 0.60	C = 1.20	L = 4.90	e = 0.25
Volumen de Concreto (m3)	V1 = 4.133	V2 = 14.406	V3 = 1.201	Vc = <b>19.74</b>	Cortante Vu =
Volumen de Suelo ( m3)	V4 = 78.513	V5 = 36.983	V6 = 4.632	Vs = <b>100.388</b>	11,954
Peso Específico ( Ton / m3 )	Suelo 1.70	Concreto 2.40	R. Cohesión 32.046	P. Suelo 170.660	P. Concreto 47.374
Peso total Fundación ( Ton.)	250,080	Arrancamiento	Fu = 111,398	Factor de seguridad al arranque K =	1.91
Compresión C =	132,773	Area m2 24.01	0.42	Kg / cm2	Presión sobre el terreno

**EVALUACION ESTRUCTURAL TAC100**

		TORRE 100m+EXT.8m		
		TAC100-E8-JR-NS	HOJA <b>24 / 31</b>	REV. <b>0</b>





## CONCLUSIONES:

La torre de 100 metros instalada en sitio Jurisdicciones-Abrego, en el estado actual y después del análisis con las antenas instaladas:

1. La estructura metálica en las condiciones de trabajo con las cargas actuales mas las antenas nuevas, no cumple por esfuerzos y deformaciones; El elemento más esforzado está trabajando al 447.43 %, referido al límite fluencia, fallan los elementos M01, M02, M03, M04, M05 de L5"x3/8", M06 de L4"x3/8", M07, M08, M09 de L3"x3/8" y M10. M11 de L3"x1/4", marcados en rojo en la silueta.
2. El análisis estructural se hace considerando que los elementos que conforman la estructura están en buen estado.
3. La deflexión máxima en el extremo superior de las torre, para cargas de trabajo, con viento de 60.km/h es 1.95 m, es decir 1.03 ° mayor a 0.5°, lo que supone inestabilidad estructural por deformación.
4. Se propone un refuerzo para los elementos M01, M02, M03, M04, M05, M06 con dos (2) perfiles adicionales de L5"x1/2", M07, M08, M09 con dos (2) perfiles adicionales de L4"x3/8", además de hacer cierre interno entre estas diagonales para mejorar la esbeltez; El peso aprox. de la extensión de 8 metros mas el reforzamiento es 18.500 kg.
5. La cimentación, según el informe de campo, está compuesta por zapatas cuadradas de 4.9m, con pedestales de 1.20x1.20 ( piramidales) a una profundidad de 3.27 metros, unidos mediante vigas de amarre de 1.20x2.15m, con suelo  $q_a=1.0 \text{ kg/cm}^2$  y según la verificación, la cimentación cumple por esfuerzos para las cargas de la torre con las antenas nuevas.

### EVALUACION ESTRUCTURAL TAC100

		TORRE 100m+EXT.8m		
		TAC100-E8-JR-NS	HOJA 25 / 31	REV. 0

EVALUACION ESTRUCTURAL TAC100

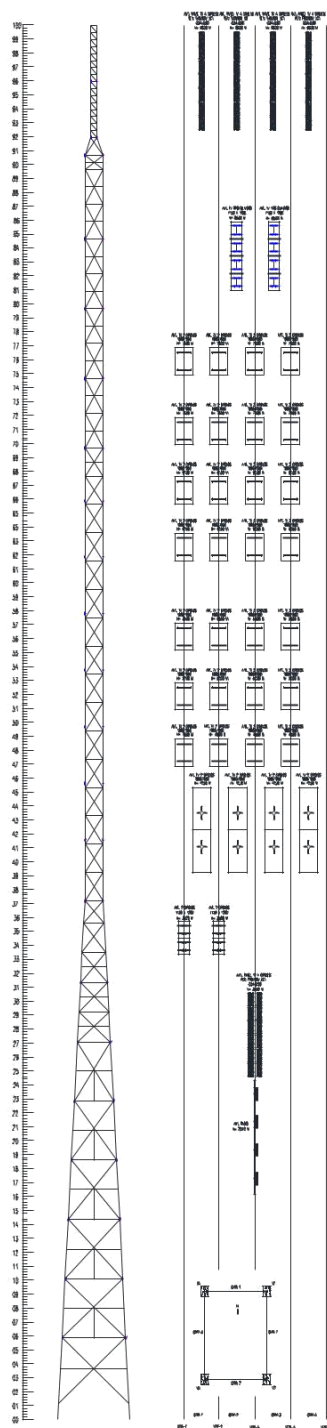


TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
**26 / 31**

REV.  
**0**



# EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
27 / 31

REV.  
0

TORRE 100 m – JURISDICCIONES - ABREGO  
REFORZAMIENTO

EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
**28 / 31**

REV.  
**0**

Project Name : TORRE 100.m+EXT.8m -JURISDICCIONES -REF.  
Project Notes: BTESA - RTVC  
Project File : f:\arch\_2016\eval\_btesa\tac100\_jurisdicciones\tor100e8jur\_r.tow  
Date run : 03:41:59 p.m. jueves, 12 de mayo de 2016  
by : Tower Version 10.20

Successfully performed linear analysis

The model has 0 warnings.

Member check option: TIA/EIA 222-F  
Connection rupture check: Not Checked  
Crossing diagonal check: Fixed  
Loads from file: f:\arch\_2016\eval\_btesa\tac100\_jurisdicciones\tor100e8jur.eia

\*\*\* Analysis Results:

Maximum element usage is 94.54% for Angle "13P" in load case "WIN 45-120"

**Summary of Joint Support Reactions For All Load Cases:**

Load Case	Joint Label	Long. Force (kN)	Tran. Force (kN)	Vert. Force (kN)	Shear Force (kN)	Tran. Moment (kN-m)	Long. Moment (kN-m)	Vert. Moment (kN-m)	Bending Moment (kN-m)	Found. Usage %
WIN 0 -120	70P	-62.34	-64.90	854.80	89.99	1.88	-0.95	0.15	2.10	0.00
WIN 0 -120	70X	-55.94	62.57	786.38	83.93	-2.04	-0.74	-0.13	2.17	0.00
WIN 0 -120	70XY	-43.00	-48.03	-641.15	64.47	0.68	0.43	-0.11	0.81	0.00
WIN 0 -120	70Y	-38.78	42.97	-571.13	57.88	-0.64	0.47	0.17	0.79	0.00
WIN 45-120	70P	-98.18	-98.18	1327.73	138.84	1.90	-1.90	-0.00	2.69	0.00
WIN 45-120	70X	-4.85	13.58	107.87	14.42	-1.63	0.33	-0.24	1.66	0.00
WIN 45-120	70XY	-80.07	-80.07	-1113.98	113.24	0.62	-0.62	0.00	0.87	0.00
WIN 45-120	70Y	13.58	-4.85	107.87	14.42	-0.33	1.63	0.24	1.66	0.00
WIN 45-60	70P	-31.52	-31.52	416.05	44.58	0.96	-0.96	-0.00	1.35	0.00
WIN 45-60	70X	-7.97	10.39	107.65	13.10	-0.91	-0.40	-0.06	0.99	0.00
WIN 45-60	70XY	-13.37	-13.37	-201.88	18.91	-0.33	0.33	0.00	0.47	0.00
WIN 45-60	70Y	10.39	-7.97	107.65	13.10	0.40	0.91	0.06	0.99	0.00

Note: Summary of Joint Support Reactions For All Load Cases in Direction of Leg not printed because none of the angle members attached to foundation joints have a group type of 'Leg'.

**Overturning Moment Summary For All Load Cases:**

Load Case	Transverse Moment (kN-m)	Longitudinal Moment (kN-m)	Resultant Moment (kN-m)
WIN 0 -120	495.474	10212.544	10224.557
WIN 45-120	8738.880	8738.878	12358.642
WIN 45-60	2211.573	2211.573	3127.637

**EIA Sections Information:**

Section Label	Top Z (m)	Bottom Z (m)	Joint Count	Member Count	Top Width (m)	Bottom Width (m)	Gross Area (m^2)	Face Adjust Factor	Face Ar Adjust Factor	Dead Load Factor
EXT8	108.000	100.000	68	198	0.60	0.60	4.80	1.0000	1.0000	1.200
SECC1	100.000	92.000	68	194	0.60	0.60	4.80	1.0000	1.0000	1.200
SECC2	92.000	90.700	8	18	0.60	1.86	1.60	1.0000	1.0000	1.200
SECC3	90.700	74.700	32	84	1.86	1.86	29.76	1.0000	1.0000	1.200
SECC4	74.700	57.438	36	102	1.86	1.86	32.11	1.0000	1.0000	1.200
SECC5	57.438	45.175	28	72	1.86	1.86	22.81	1.0000	1.0000	1.200
SECC6	45.175	37.000	20	54	1.86	1.86	15.21	1.0000	1.0000	1.200
SECC7	37.000	27.000	24	60	1.86	3.35	26.03	1.0000	1.0000	1.200
SECC8	27.000	14.280	16	36	3.35	5.22	54.48	1.0000	1.0000	1.200
SECC9	14.280	1.100	16	36	5.22	7.16	81.57	1.0000	1.0000	1.200

\*\*\* Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Printed capacities do not include EIA allowable stress increase for wind load cases.  
Printed capacities do not include the strength factor entered for each loadcase.

**Group Summary (Compression Portion):**

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (MPa)	Max Usage %	Max Use In Comp. %	Comp. Member	Comp. Force (kN)	Comp. Control Load Case	L/R Comp. Capacity (kN)	Conn. Shear Capacity (kN)	Conn. Bearing Capacity (kN)	R1X	R1Y	R1Z	L/R Length (m)	Curve No.	No. Member	Of Bolts Comp.
1	M01	DAI	5X3/8+215X1/2	344.7	70.05	70.05	1P	-1331.477	WIN 45-120	1429.101	2104.704	4202.298	0.500	0.500	0.500	49.01	4.725	1	20
2	M02	DAI	5X3/8+215X1/2	344.7	73.05	73.09	5P	-1430.216	WIN 45-120	1471.211	1894.234	3782.068	0.500	0.500	0.500	44.21	4.263	1	18
3	M03	DAI	5X3/8+215X1/2	344.7	75.72	75.72	6P	-1481.577	WIN 45-120	1471.211	1894.234	3782.068	0.500	0.500	0.500	44.21	4.263	1	18
4	M04	DAI	5X3/8+215X1/2	344.7	87.04	87.04	11P	-1933.400	WIN 45-120	1670.150	1683.763	3361.838	0.500	0.500	0.500	16.68	1.609	1	16
5	M05	DAI	5X3/8+215X1/2	344.7	94.54	94.54	13P	-1852.462	WIN 45-120	1641.875	1473.293	2941.608	0.500	0.500	0.500	21.37	2.060	1	14

## EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
29 / 31

REV.  
0

6	M06	DAI	5X3/8+214X3/8	344.7	94.11	94.11	16P	-1476.781WIN	45-120	1179.875	1473.293	2941.608	0.500	0.500	0.500	23.30	2.027	1	14
7	M07	DAI	3X3/8+214X3/8	344.7	87.84	87.84	21P	-1079.920WIN	45-120	924.334	1050.042	2104.458	0.500	0.500	0.500	35.01	2.027	1	12
8	M08	DAI	3X3/8+213X3/8	344.7	76.30	76.30	25P	-757.305WIN	45-120	746.307	875.035	1753.715	0.500	0.500	0.500	35.01	2.027	1	10
9	M09	DAI	3X3/8+213X3/8	344.7	51.17	51.17	29P	-486.167WIN	45-120	714.427	875.035	1753.715	0.500	0.500	0.500	43.17	2.500	1	10
10	M10	DAI	3X3X0.25	344.7	55.80	55.80	33P	-241.277WIN	45-120	325.117	875.035	1169.327	0.500	0.500	0.500	43.17	2.500	1	10
11	M11	DAI	3X3X0.25	344.7	42.12	42.12	39P	-205.219WIN	45-120	366.295	700.028	935.462	1.000	1.000	1.000	17.13	0.496	1	8
12	M12	SAE	2.5X2.5X0.25	344.7	26.20	26.20	55P	-47.696WIN	45-120	136.898	350.014	233.829	1.000	1.000	1.000	39.77	0.496	1	4
13	D01	SAE	2.5X2.5X0.1875	248.1	57.44	57.44	80X	-23.786WIN	0 -120	31.133	131.307	109.019	0.500	0.250	0.250	152.70	6.035	6	3
14	D02	DAE	2.5X2.5X0.1875	248.1	68.62	68.62	81P	-34.789WIN	45-120	38.116	87.538	145.359	0.750	0.500	0.500	132.87	5.609	6	2
15	D03	SAE	2.5X2.5X0.1875	248.1	67.60	67.60	114Y	-31.620WIN	0 -120	35.167	87.538	72.679	1.000	0.500	0.500	139.23	2.751	6	2
16	D04	SAE	2.5X2.5X0.1875	248.1	72.18	72.18	126Y	-28.612WIN	0 -120	29.813	87.538	72.679	1.000	0.500	0.500	157.68	3.116	6	2
17	D05	SAE	2.5X2.5X0.1875	248.1	90.86	90.86	144P	-65.578WIN	45-120	54.269	87.538	72.679	0.750	0.500	0.500	75.45	1.897	3	2
18	D06	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0
19	D07	SAE	2.5X2.5X0.1875	248.1	16.48	16.48	146YR	-14.202WIN	0 -120	64.803	87.538	72.679	0.750	0.500	0.500	31.16	0.784	3	2
20	D08	SAE	2X2X0.1875	248.1	19.66	19.66	148YR	-12.714WIN	0 -120	48.631	87.538	72.679	0.750	0.500	0.500	39.15	0.784	3	2
21	D09	SAE	2X2X0.1875	248.1	17.07	17.07	151YR	-11.051WIN	0 -120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2
22	D10	SAE	2X2X0.1875	248.1	14.28	14.28	155YR	-9.246WIN	0 -120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2
23	D11	SAE	2X2X0.1875	248.1	11.49	11.49	159YR	-7.435WIN	0 -120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2
24	D12	SAE	2X2X0.1875	248.1	8.41	8.41	163YR	-5.444WIN	0 -120	48.676	87.538	72.679	0.750	0.500	0.500	38.89	0.778	3	2
25	H01	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0
26	H02	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0
27	H03	SAE	2.5X2.5X0.1875	248.1	34.61	34.61	177P	-25.155WIN	0 -120	54.646	87.538	72.679	0.500	0.500	0.500	73.97	1.860	3	2
28	H04	SAE	2.5X2.5X0.1875	248.1	34.25	30.36	181Y	-19.932WIN	0 -120	49.363	87.538	72.679	1.000	0.500	0.500	94.12	1.860	3	2
29	H05	SAE	2.5X2.5X0.1875	248.1	38.51	34.79	183P	-30.068WIN	0 -120	64.979	87.538	72.679	1.000	0.500	0.500	30.36	0.600	3	2
30	H06	SAE	2X2X0.1875	248.1	13.67	12.64	186YR	-7.544WIN	45-120	44.860	87.538	72.679	1.000	1.000	1.000	59.95	0.600	3	2
31	H07	SAE	2X2X0.1875	248.1	11.81	10.76	189YR	-6.422WIN	0 -120	44.860	87.538	72.679	1.000	1.000	1.000	59.95	0.600	3	2
32	H08	SAE	2X2X0.1875	248.1	2.81	0.00	216YR	0.000		44.860	87.538	72.679	1.000	1.000	1.000	59.95	0.600	3	2
33	C01	SAE	2X2X0.1875	248.1	16.10	16.10	217P	-4.524WIN	45-120	21.124	87.538	72.679	1.000	0.500	0.500	167.85	2.630	6	2
34	C02	SAE	2X2X0.1875	248.1	19.18	19.18	218P	-5.390WIN	45-120	21.124	87.538	72.679	1.000	0.500	0.500	167.85	2.630	6	2
35	C03	SAE	2X2X0.1875	248.1	6.86	6.86	219P	-1.928WIN	45-120	21.124	87.538	72.679	1.000	0.500	0.500	167.85	2.630	6	2
36	C04	SAE	2X2X0.1875	248.1	4.57	4.57	221P	-2.794WIN	45-120	45.939	87.538	72.679	1.000	0.500	0.500	54.14	0.849	3	2

Group Summary (Tension Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (MPa)	Max Usage %	Max Tension Use In Tens. Member	Tension Force (kN)	Tension Control Load Case	Section Capacity (kN)	Net Tens. Shear Capacity (kN)	Conn. Tens. Capacity (kN)	Bearing Tens. Capacity (kN)	Rupture Tens. Capacity (kN)	Length (m)	No. Of Bolts	Of Holes	Hole Diameter (cm)
1	M01	DAI	5X3/8+215X1/2	344.7	70.05	49.26	2XY 1146.335WIN	45-120	1749.531	2104.704	4202.298	0.000	4.263	20	2.000	2.064	
2	M02	DAI	5X3/8+215X1/2	344.7	73.09	54.25	5XY 1262.305WIN	45-120	1749.531	1894.234	3782.068	0.000	4.263	18	2.000	2.064	
3	M03	DAI	5X3/8+215X1/2	344.7	75.72	63.45	8XY 1477.318WIN	45-120	1749.531	1894.234	3782.068	0.000	2.112	18	2.000	2.064	
4	M04	DAI	5X3/8+215X1/2	344.7	87.04	79.96	11XY 1790.553WIN	45-120	1749.531	1683.763	3361.838	0.000	1.609	16	2.000	2.064	
5	M05	DAI	5X3/8+215X1/2	344.7	94.54	88.10	13XY 1726.398WIN	45-120	1749.531	1473.293	2941.608	0.000	2.060	14	2.000	2.064	
6	M06	DAI	5X3/8+214X3/8	344.7	94.11	82.98	16XY 1398.011WIN	45-120	1266.787	1473.293	2941.608	0.000	2.027	14	2.000	2.064	
7	M07	DAI	3X3/8+214X3/8	344.7	87.84	74.18	23XY 863.331WIN	45-120	1045.922	875.035	1753.715	0.000	2.027	10	2.000	1.749	
8	M08	DAI	3X3/8+213X3/8	344.7	76.30	63.26	25XY 710.520WIN	45-120	844.477	875.035	1753.715	0.000	2.027	10	2.000	1.749	
9	M09	DAI	3X3/8+213X3/8	344.7	51.17	38.45	29XY 432.342WIN	45-120	844.477	875.035	1753.715	0.000	2.500	10	2.000	1.749	
10	M10	DAI	3X3X0.25	344.7	55.80	42.71	33XY 218.312WIN	45-120	384.299	875.035	1169.327	0.000	2.500	10	2.000	1.749	
11	M11	DAI	3X3X0.25	344.7	42.12	37.74	39XY 192.887WIN	45-120	384.299	700.028	935.462	0.000	0.496	8	2.000	1.749	
12	M12	SAE	2.5X2.5X0.25	248.1	26.20	25.04	55XY 43.838WIN	45-120	131.627	350.014	233.829	0.000	0.496	4	2.000	1.749	
13	D01	SAE	2.5X2.5X0.1875	248.1	57.44	23.88	80XY 24.307WIN	0 -120	76.521	131.307	109.019	0.000	0.603	3	1.000	1.749	
14	D02	DAE	2.5X2.5X0.1875	248.1	68.62	55.43	91XY 64.533WIN	45-120	161.665	87.538	145.359	0.000	2.547	2	1.000	1.749	
15	D03	SAE	2.5X2.5X0.1875	248.1	67.60	33.00	114P 31.900WIN	0 -120	76.521	87.538	72.679	0.000	2.751	2	1.000	1.749	
16	D04	SAE	2.5X2.5X0.1875	248.1	72.18	27.87	128P 26.937WIN	0 -120	76.521	87.538	72.679	0.000	3.116	2	1.000	1.749	
17	D05	SAE	2.5X2.5X0.1875	248.1	90.86	57.84	144XY 55.914WIN	45-120	76.521	87.538	72.679	0.000	1.897	2	1.000	1.749	
18	D06	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000	0.000	0.000	0.000	0.000	0.000	0	0.000	0	
19	D07	SAE	2.5X2.5X0.1875	248.1	16.48	11.04	146P 10.676WIN	45-120	76.521	87.538	72.679	0.000	0.784	2	1.000	1.749	
20	D08	SAE	2X2X0.1875	248.1	19.66	12.01	148YR 8.974WIN	0 -120	56.203	87.538	72.679	0.000	0.784	2	1.000	1.749	
21	D09	SAE	2X2X0.1875	248.1	17.07	10.47	151YR 7.824WIN	0 -120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749	
22	D10	SAE	2X2X0.1875	248.1	14.28	8.55	155YR 6.392WIN	0 -120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749	
23	D11	SAE	2X2X0.1875	248.1	11.49	6.69	159YR 5.004WIN	0 -120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749	
24	D12	SAE	2X2X0.1875	248.1	8.41	5.07	163YR 3.789WIN	45-120	56.203	87.538	72.679	0.000	0.778	2	1.000	1.749	
25	H01	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000	0.000	0.000	0.000	0.000	0.000	0	0.000	0	
26	H02	SAE	2.5X2.5X0.1875	248.1	0.00	0.00		0.000	0.000	0.000	0.000	0.000	0.000	0	0.000	0	
27	H03	SAE	2.5X2.5X0.1875	248.1	34.61	33.05	177Y 31.985WIN	0 -120	76.521	87.538	72.679	0.000	1.860	2	1.000	1.749	
28	H04	SAE	2.5X2.5X0.1875	248.1	31.25	31.25	181P 30.208WIN	0 -120	76.521	87.538	72.679	0.000	1.860	2	1.000	1.749	
29	H05	SAE	2.5X2.5X0.1875	248.1	38.51	38.51	183Y 37.227WIN	0 -120	76.521	87.538	72.679	0.000	0.600	2	1.000	1.749	
30	H06	SAE	2X2X0.1875	248.1	13.67	13.67	186YR 10.216WIN	45-120	56.203	87.538	72.679	0.000	0.600	2	1.000	1.749	
31	H07	SAE	2X2X0.1875	248.1	11.81	11.81	189YR 8.831WIN	0 -120	56.203	87.538	72.679	0.000	0.600	2	1.000	1.749	
32	H08	SAE	2X2X0.1875	248.1	2.81	2.81	216R 2.104WIN	45-120	56.203	87.538	72.679	0.000	0.600	2	1.000	1.749	
33	C01	SAE	2X2X0.1875	248.1	16.10	0.26	217X 0.192WIN	45-120	56.203	87.538	72.679	0.000	2.630	2	1.000	1.749	
34	C02	SAE	2X2X0.1875	248.1	19.18	0.42	218R 1.058WIN	45-120	56.203	87.538	72.679	0.000	2.630	2	1.000	1.749	
35	C03	SAE	2X2X0.1875	248.1	6.86	0.17	219X 0.124WIN	45-120	56.203	87.538	72.679	0.000	2.630	2	1.000	1.749	
36	C04	SAE	2X2X0.1875	248.1	4.57	0.00	221X 0.000	45-120	56.203	87.538	72.679	0.000	0.849	2	1.000	1.749	

EVALUACION ESTRUCTURAL TAC100



TORRE 100m+EXT.8m

TAC100-E8-JR-NS

HOJA  
31 / 31

REV.  
0