PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DATOS GENERALES

HOJA: DG-1
FECHA: 27/10/14
CALCULO: M.P.
REVISO:

* Determinar Características del Puente

+ Datos Generales

- L puente = 185.00 m
- Claros = 5
- Longitud Claros = 37.00 m

+ Características del puente

- De acuerdo a las recomendaciones del Texas-DOT no se recomienda utilizar más de 4 claros continuos; por lo tanto tratar los tres claros interiores como continuos y los dos claros exteriores como claros simplemente apoyados

+ Estimar peralte de las vigas

- De acuerdo al AASHTO-LFD para vigas compuestas, el peralte total de la sección compuesta (viga + losa)

$$h_{min} = \frac{L}{25} = \frac{37.00}{25} = 1.48\,m$$

- Y el peralte de la viga

$$d_{min} = \frac{L}{30} = \frac{37.00}{30} = 1.23\,m$$

- Tratar $d_{max} = 4' = 1.22\,m$ para no tener desperdicio (con los patines y la losa se exceden los peraltes mínimos recomendados por el AASHTO)

PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DATOS GENERALES

HOJA: DG - 2
FECHA: 27/12/14
CALCULO: M.P.
REVISO:

+ Estimar espesor del alma

- $D/t_w \geq 150 \Rightarrow$

$t_{w\,min} = \frac{D}{150} = \frac{122}{150} = 0.81\ cm \approx 3/16"$

- De acuerdo al Texas-DOT $t_{w\,min} = 1/2"$

- Tratar $t_w = 1/2"$

+ Estimar dimensiones de los patines

- Para puentes curvos $b_f \geq d/3 \Rightarrow$

$b_{f\,min} = \frac{122}{3} = 41\ cms \approx 16"$

- De acuerdo al Texas-DOT

$b_{f\,min} = 15"$

- Tratar $b_f = 16" = 40\ cm$

+ Estimar espesor de los patines

- De acuerdo al Texas-DOT para puentes curvos

$t_{f\,min} = 1"$

- Para puentes rectos

$t_{f\,min} = 3/4"$

- De acuerdo al AASHTO, $b/t \leq 24 \Rightarrow$

$t_{f\,min} = \frac{b_f}{24} = \frac{16}{24} = 0.67 \approx 5/8"$

- Tratar $t_f = 1"$

PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

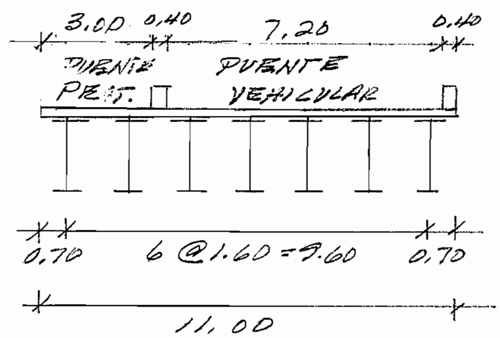
CONCEPTO: DATOS GENERALES

HOJA: DG-3
FECHA: 27/10/14
CALCULO: M.P.
REVISO:

+ Definir Sección Transversal del puente

- Ancho Total = 11.00 m
- De acuerdo a las recomendaciones del Texas-DOT se deben utilizar un mínimo de 4 vigas y una separación máxima de 10' ⇒

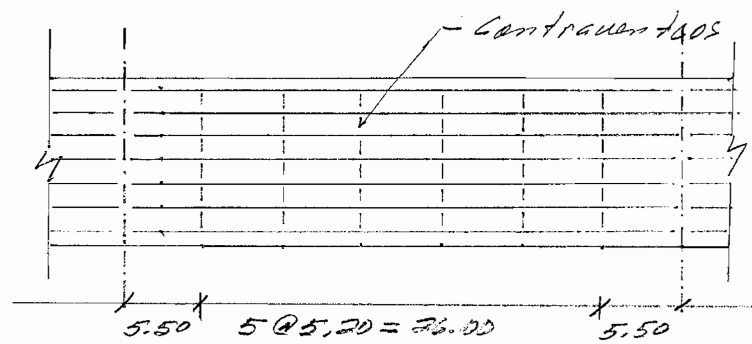
Tratar 7 vigas @ 1.60 m como se muestra



+ Contraventeos

- De acuerdo al AASHTO, los contraventeos en las vigas deben estar separados un máximo de 25' = 7.62 m ⇒

Tratar 6 líneas de contraventeo como se muestra



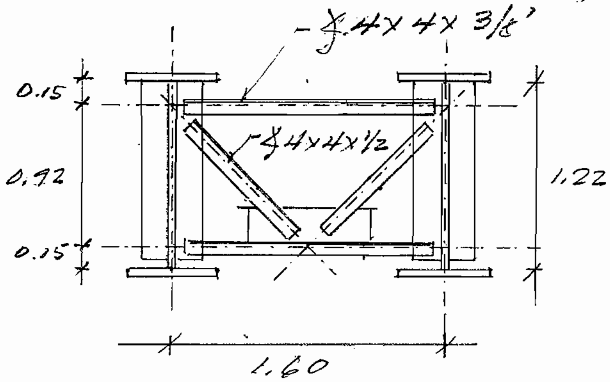
PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DATOS GENERALES

HOJA: 36-1
FECHA: 27/10/11
CALCULO: M.P.
REVISO:

- Detalle de Contraventeos



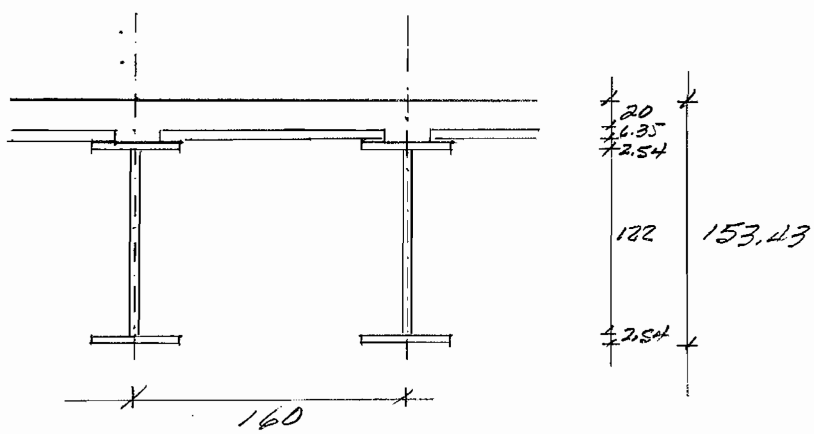
+ Predimensionar Losa

- Estimar espesor de la losa

$$h_{min} = \frac{S+10}{32} = \frac{1.80/0.305+10}{32} = 0.50' = 15 \text{ cm}$$

Tratar $h = 20$ cm

- Tratar cimbra Secc. 4 ($h_{lam} = 2\tfrac{1}{2}" = 6.35$ cms)



PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DATOS GENERALES

HOJA: DG-5
FECHA: 28/10/14
CALCULO: M.P.
REVISO:

+ Predimensionar Juntas de Dilatación

- $L_{max} = 37.00 \times 2 = 74.00$ mts
- Estimar desplazamientos de los apoyos

Considerar clima moderado

$T_{min} = 0°F$

$T_{max} = 120°F$

Considerar $T = 60°F$ al montaje del puente

$\Delta_T(-) = 60°F$

$\Delta_T(+) = 60°F$

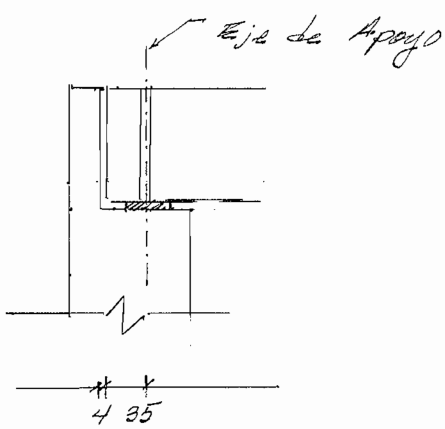
Tomar $\alpha = 6.5 \times 10^{-6} / °F$

$\Delta_L = 6.5 \times 10^{-6} \times 60 \times 7400 = 2.89$ cm

- Juntas en Estribos

$\Delta_{max} \approx 1.50 \times 2.89 = 4.34$ cm

Tratar $\Delta = 5.00$ cm

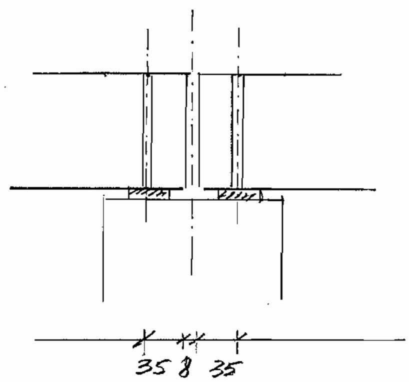


PORTILLO Y YOUNG S.C.	PROYECTO: P.S. CALLE MARISCAL	HOJA: 84 - 6
		FECHA: 29/10/14
	CONCEPTO: DATOS GENERALES	CALCULO: M.P.
		REVISO:

- Juntas en Apoyos Interiores

$\Delta max \approx 1.5 (2.87 + 2.87/2) = 6.50\ mm$

Tomar $\Delta = 8\ mm$



PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DISEÑO VIGAS

HOJA: VI-1
FECHA: 28/10/14
CALCULO: M.P.
REVISO:

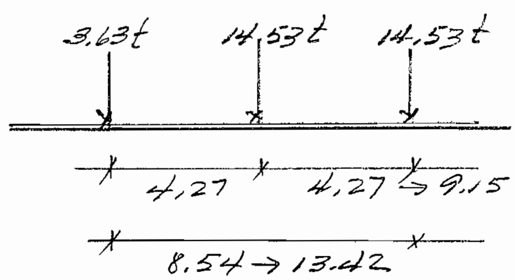
* Análisis de Cargas

+ Carga Muerta

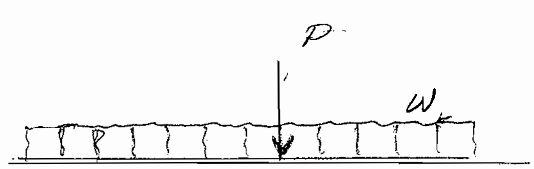
- Parapeto y Guarnición =	500 kg/m
- Toldo =	500 ✓
- Pavimento = 0.12 × 2,200 =	264 kg/m²
- Peso Propio Losa = 0.20 × 2,400	480 ✓
- Peso Cimbra Metálica =	10 ✓
- Peso Concreto en Cimbra = 0.0635/2 × 2,400	76 ✓

+ Carga Viva

- Tratar Camión HS20



- Carga de Carril



$W = 952$ kg/m

$P = 18,000$ # $= 8.17$ ton (momento)

$P = 26,000$ # $= 11.80$ ton (cortante)

- Carga Peatonal

$W_p = 60$ psf $= 300$ kg/m² $\times 2.80 = 840$ kg/m

	CLARO 1	CLARO 2	CLARO 3	CLARO 4	CLARO 5
LONG. DE VIGA 1	36.46m	34.57m	35.83m	36.61m	34.19m
LONG. DE VIGA 2	36.46m	35.08m	36.12m	36.61m	34.76m
LONG. DE VIGA 3	36.46m	35.59m	36.41m	36.61m	35.33m
LONG. DE VIGA 4	36.46m	36.10m	36.71m	36.61m	35.89m
LONG. DE VIGA 5	36.46m	36.61m	37.00m	36.61m	36.46m
LONG. DE VIGA 6	36.46m	37.12m	37.29m	36.61m	37.03m
LONG. DE VIGA 7	36.46m	37.63m	37.59m	36.61m	37.59m

PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

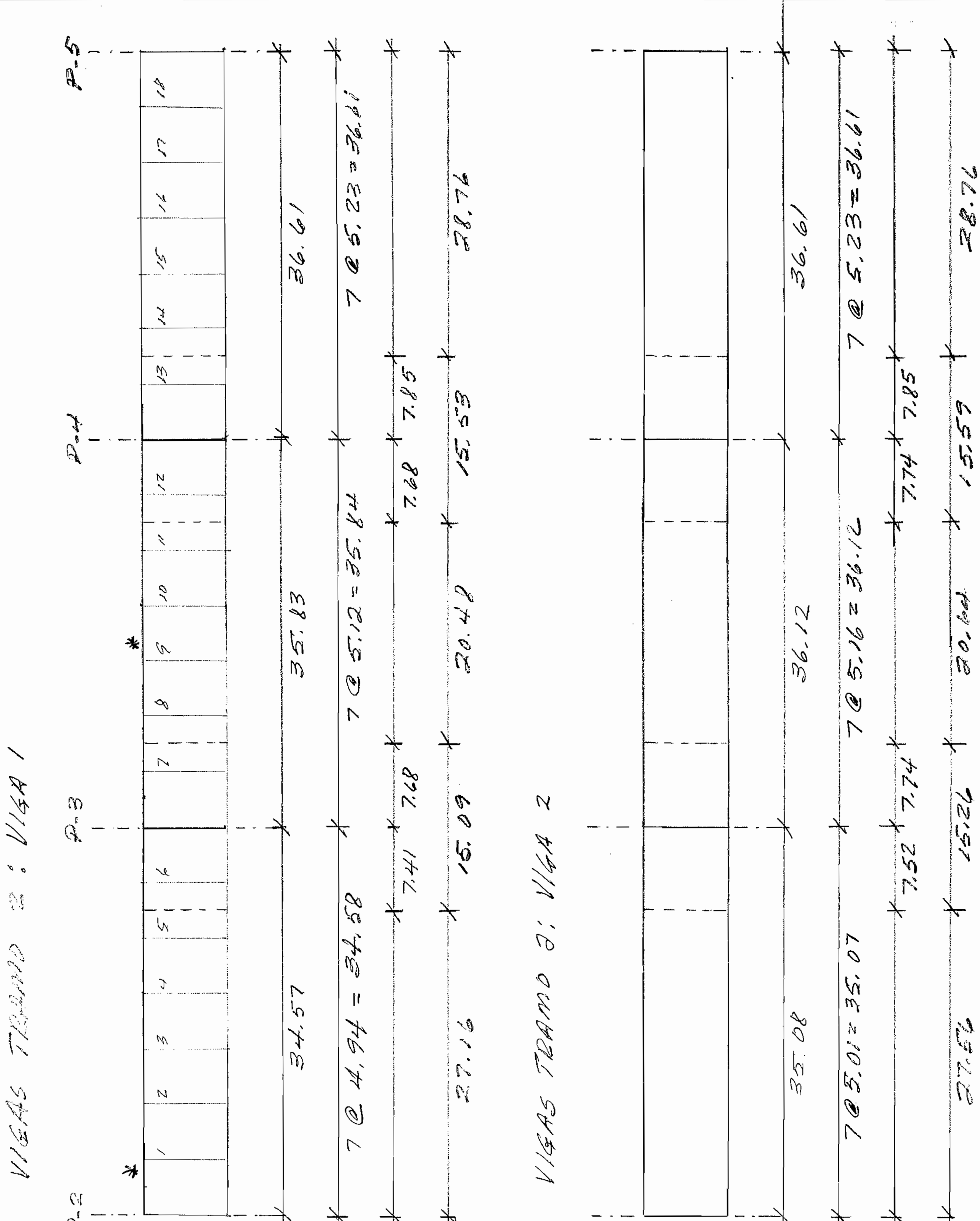
CONCEPTO: DISEÑO VIGAS

HOJA: VI-

FECHA: 03/11/14

CALCULO: M.P.

REVISO:

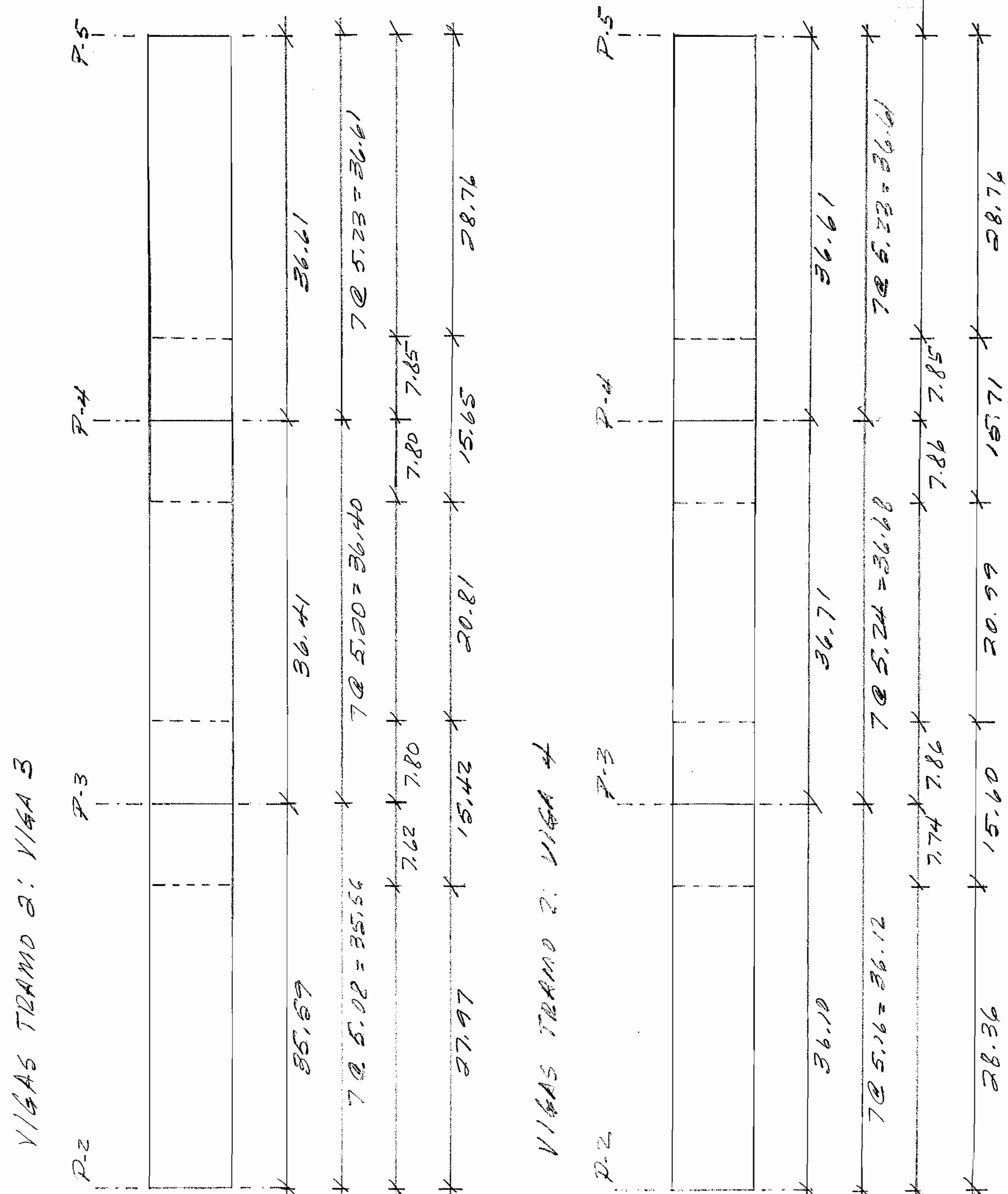


PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

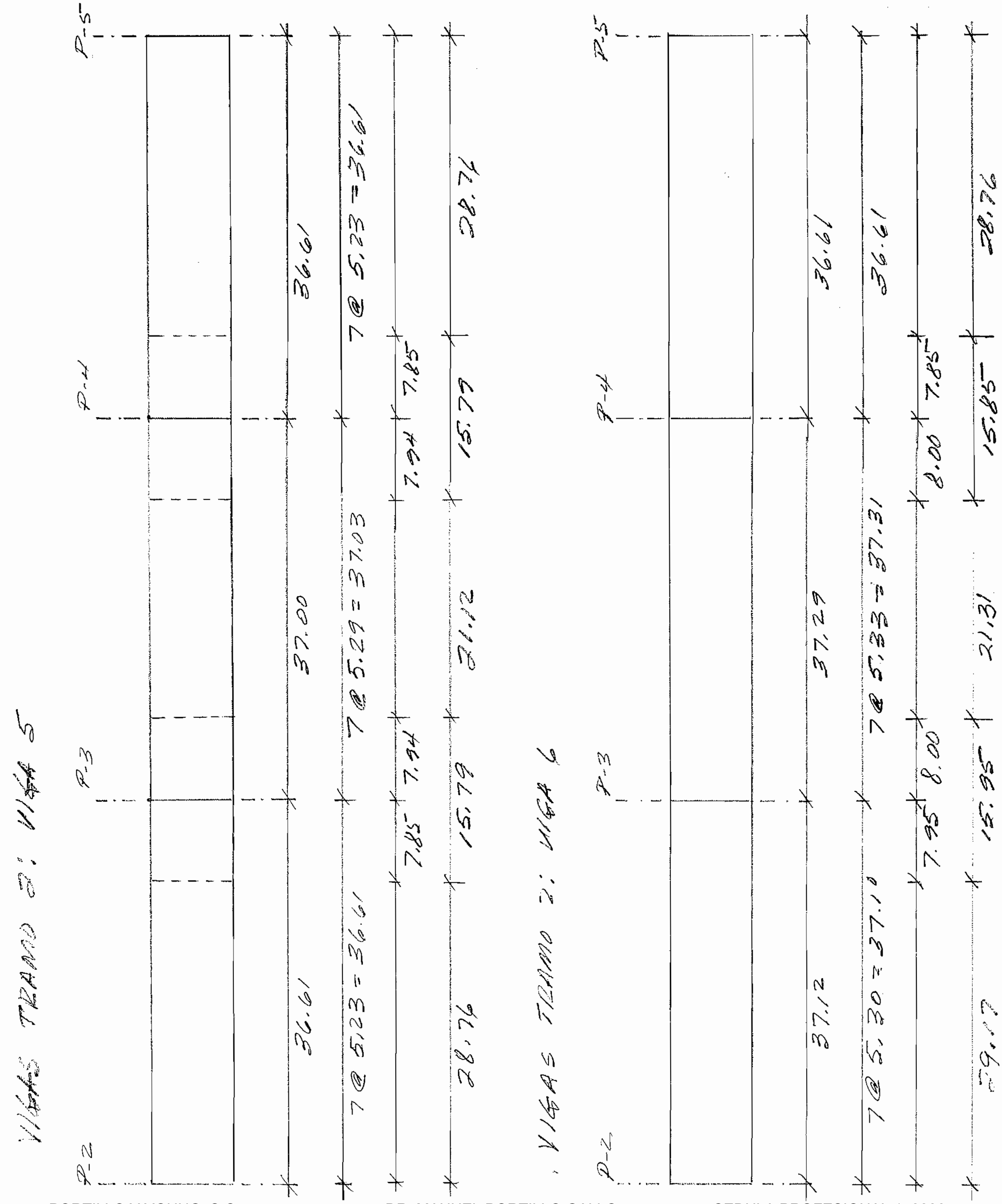
CONCEPTO: DISEÑO VIGAS

HOJA: VI-3
FECHA: 2/11/14
CALCULO: M.P
REVISO:



PORTILLO Y YOUNG S.C.

PROYECTO: P. S. CALLE MARISCAL	HOJA: VI-4
	FECHA: 2/11/14
CONCEPTO: DISEÑO VIGAS	CALCULO: M.P
	REVISO:



PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

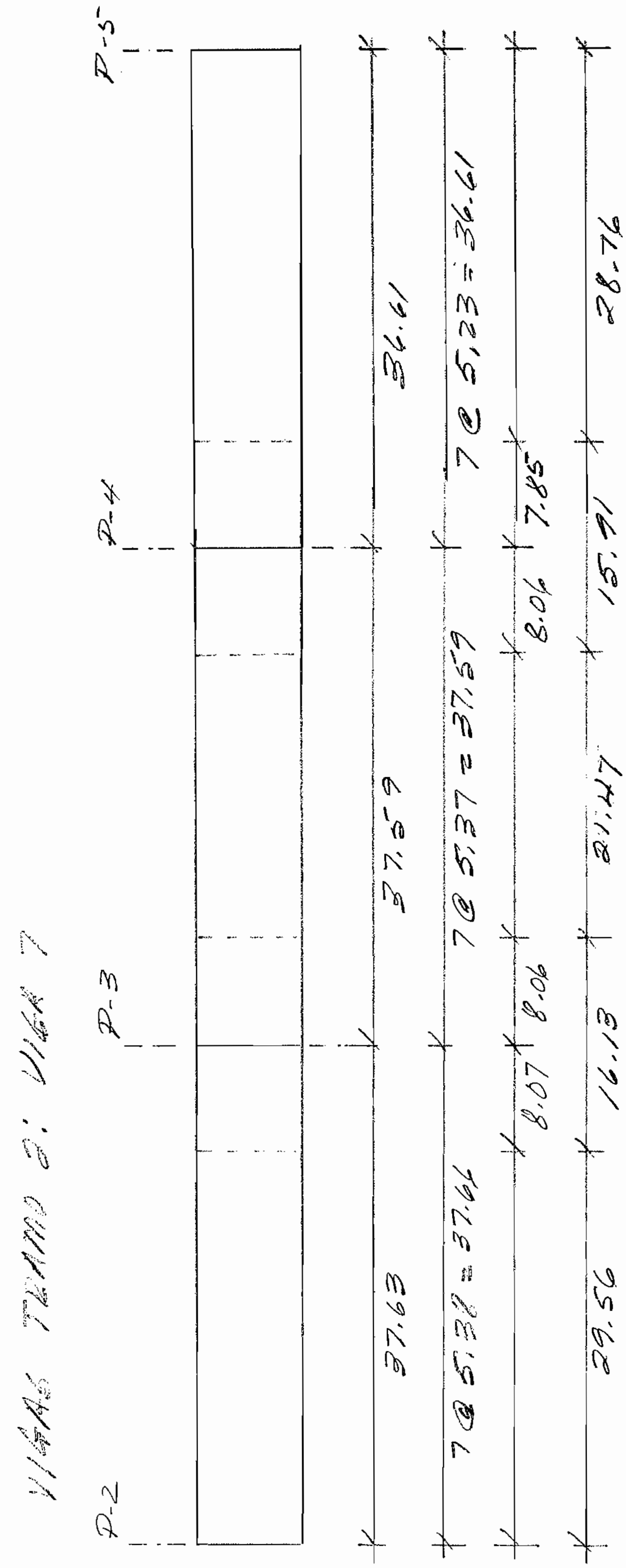
CONCEPTO: DISEÑO VIGAS

HOJA: VI-5

FECHA: 2/11/14

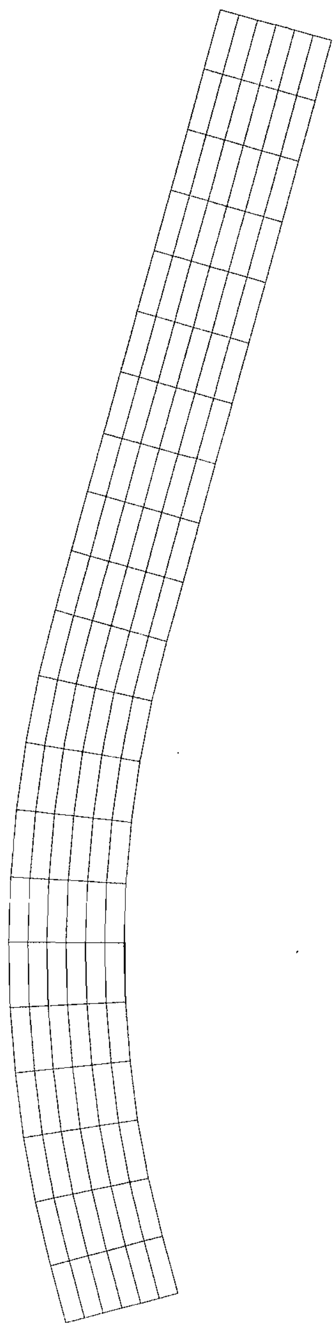
CALCULO: M.P.

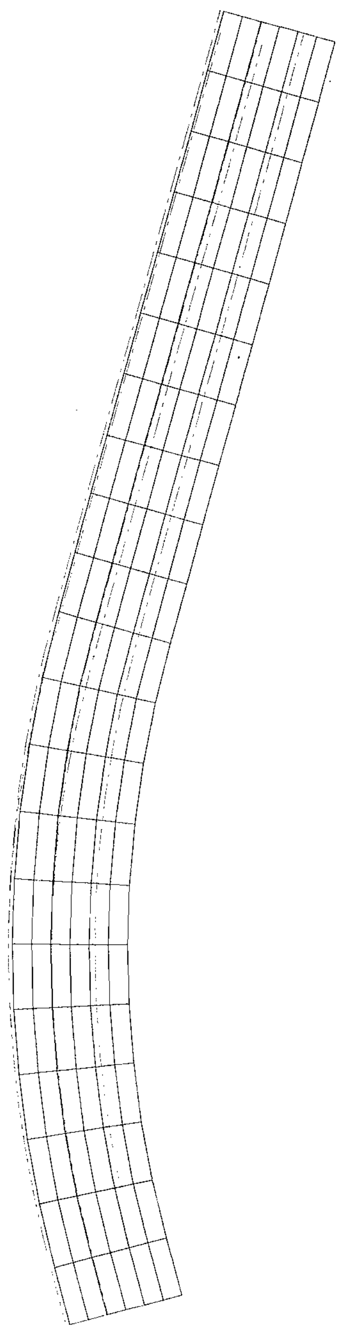
REVISO:



```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder System : Input File : Layout/Slab/Loading Definition
Tue Jan 13 13:11:17 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
CONDITIONS
  FLOAT LANES
  HS20 LOADING
  LFD METHOD
  METRIC INPUT
  METRIC OUTPUT
  RATE MODE
  RATING PROJECT
  SELF WEIGHT FOR DEAD LOAD 1
DATA
  BR-1 4.94 4.94 4.94 4.94 4.94 4.94 10.06 5.12 5.12 5.12 5.12 5.12
  10.35 5.23 5.23 5.23 5.23 5.23
  CHGCURVE 4.74 51.7
  CURB 2.7
  FPC 27.5
  GDSPC 1.6 1.6 1.6 1.6 1.6 1.6
  LANES 3.6 3.6
  RAD-1  0.  0. 93.6 93.6 93.6 93.6 93.6 93.6 93.6 93.6 93.6 93.6 93.6
  93.6 93.6 93.6  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.
  ROADWP 7.2
  SIDEWALK 3.  0.
  SKEW-1 90. 90. 90. 90.
  SLABEXT  0.7  0.7
  SLABT 200.
  SLABWEAR  0.
  SPN-1 34.58 35.84 36.61
  STP-1 2 1 2 2
  STP-2 2 1 2 2
  STP-3 2 1 2 2
  STP-4 2 1 2 2
  STP-5 2 1 2 2
  STP-6 2 1 2 2
  STP-7 2 1 2 2
  WAC-1 1.12
  WAC-2 1.2
  WAC-3 1.2
  WAC-4 1.2
  WAC-5 1.2
  WAC-6 1.2
  WAC-7 1.12
  WAS-1  0.2
  WAS-2  0.2
  WAS-3  0.2
  WAS-4  0.2
  WAS-5  0.2
  WAS-6  0.2
  WAS-7  0.2
  WCONC 23563.
  WS-1 8.79
  WS-2 6.6
  WS-3 6.6
  WS-4 4.14
  WS-5 4.14
  WS-6 4.14
  WS-7 8.79
GO
```





DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder System : Analysis Output : Case Data
Tue Jan 13 13:13:14 2015

Girder System Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2

Geometry

Span Lengths, Girder 1

Span 1	34.580 m
Span 2	35.840 m
Span 3	36.610 m

Brace Angles at Supports, Girder 1

Support 1	90.000 deg
Support 2	90.000 deg
Support 3	90.000 deg
Support 4	90.000 deg

Girder spacing

Girder 1 to 2	1.60 m
Girder 2 to 3	1.60 m
Girder 3 to 4	1.60 m
Girder 4 to 5	1.60 m
Girder 5 to 6	1.60 m
Girder 6 to 7	1.60 m

Slab extension from center of girder 1 0.70 m

Slab extension from center of girder 7 0.70 m

Intermediate brace spacing

Girder 1

Brace 1	4.94 m
Brace 2	4.94 m
Brace 3	4.94 m
Brace 4	4.94 m
Brace 5	4.94 m
Brace 6	4.94 m
Brace 7	10.06 m
Brace 8	5.12 m
Brace 9	5.12 m
Brace 10	5.12 m
Brace 11	5.12 m
Brace 12	5.12 m
Brace 13	10.35 m
Brace 14	5.23 m
Brace 15	5.23 m
Brace 16	5.23 m
Brace 17	5.23 m
Brace 18	5.23 m

Radius of curvature - Girder 1

0.00 m	0.00 m	93.60 m	93.60 m	93.60 m
93.60 m	93.60 m	93.60 m	93.60 m	93.60 m
93.60 m	93.60 m	93.60 m	93.60 m	93.60 m
93.60 m	0.00 m	0.00 m	0.00 m	0.00 m
0.00 m	0.00 m	0.00 m	0.00 m	0.00 m
0.00 m	0.00 m	0.00 m	0.00 m	0.00 m
0.00 m				

Lane Geometry

Curb from girder 1, m

2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
2.70								

Lane Spacing

Lane 1	3.60 m
Lane 2	3.60 m

Since superelevation and/or speed not given,
Centrifugal forces not included in live load

Loading

Superimposed dead load, kN/m

Girder 1

8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79
8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79
8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79
8.79									

Girder 2

6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60
6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60
6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60
6.60									

Girder 3

6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60
6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60
6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60	6.60
6.60									

Girder 4

4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14
4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14
4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14
4.14									

Girder 5

4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14
4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14
4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14
4.14									

Girder 6

4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14
4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14
4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14	4.14
4.14									

Girder 7

8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79
8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79
8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79	8.79
8.79									

HS20 Loading

Influence surface values not displayed

Multiple Presence Factors

1.00
1.00
0.90
0.75

Units

Input: metric

Output: metric

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder System : Analysis Output : Girder Span Lengths
Tue Jan 13 13:14:32 2015

Span Lengths

Girder 1		
	Span 1	34.580
	Span 2	35.840
	Span 3	36.610
Girder 2		
	Span 1	35.090
	Span 2	36.177
	Span 3	36.610
Girder 3		
	Span 1	35.600
	Span 2	36.514
	Span 3	36.610
Girder 4		
	Span 1	36.110
	Span 2	36.851
	Span 3	36.610
Girder 5		
	Span 1	36.620
	Span 2	37.188
	Span 3	36.610
Girder 6		
	Span 1	37.130
	Span 2	37.525
	Span 3	36.610
Girder 7		
	Span 1	37.641
	Span 2	37.862
	Span 3	36.610

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 1 : Input File : Definition
Tue Jan 13 13:32:15 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BFISPB 250. 250. 250. 250.
  BFISPT 19. 19. 19. 19.
  BFOSPB 550. 550. 550. 550.
  BFOSPT 19. 19. 19. 19.
  BR 4.94 4.94 4.94 4.94 4.94 4.94 4.94 5.12 5.12 5.12 5.12 5.12 5.12
  5.12 5.23 5.23 5.23 5.23 5.23 5.23 5.23
  BSPL 27.16 15.09 20.48 15.53
  EDGEH 50. 50. 50. 50.
  EDGEV 50. 50. 50. 50.
  EDGEW 60. 60. 60. 60.
  ESLABW 1500.
  FBLTDIAM 22.
  FILLET 63.5
  FNHOLES 6 6 6 6
  FPC 27.5
  FPEDGE 50. 50. 50. 50.
  FPEND 50. 50. 50. 50.
  FSPBSP 75. 75. 75. 75.
  GAGEBF 75. 75. 75. 75.
  GAGEH 75. 75. 75. 75.
  GAGETF 75. 75. 75. 75.
  GAGEV 75. 75. 75. 75.
  HAUNCW 450.
  IGIRD 1
  NBLTB 30 30 30 30
  NBLTT 30 30 30 30
  NLINEH 13 13 13 13
  NLINEV 3 3 3 3
  NSTUDL 3
  PITCH 300.
  PITSP 107.0301
  RAD  0. 15240. 93.6 93.6 93.6 93.6 93.6 93.6 93.6 93.6 93.6 93.6 93.6
  93.6 93.6 93.6  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.
  RCEN  0.  0. 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4
  98.4 98.4 98.4  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.
  SLABT 200.
  SLABWEAR  0.
  SPL 27.16 15.09 20.48 15.53
  SPLBFT 32.
  SPLBFW 600.
  SPLT 13. 13. 13. 13.
  SPLTFT 32.
  SPLTFW 600.
  SPLTYP 1 1 1 1
  SPLWD 1220.
  SPLWT 13.
  SPN 34.5801 35.84 36.61
  SS 25.
  STD 22.
  STH 114.
  SUPBST 19.
  SUPBSW 150.
  TFISPB 250. 250. 250. 250.
  TFISPT 19. 19. 19. 19.
  TFOSPB 550. 550. 550. 550.
```

```
  TFOSPT 19. 19. 19. 19.
  TSLABW 1500.
  TSPL 27.16 15.09 20.48 15.53
  WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 1 : Rating Output : Case Data
Tue Jan 13 13:35:41 2015

Girder 1 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220 mm	1220 mm	1220 mm	1220 mm	1220 mm
Web Thickness	13 mm	13 mm	13 mm	13 mm	13 mm
Bearing Stiff. Width	150 mm	150 mm	150 mm	150 mm	
Bearing Stiff. Thickness	19 mm	19 mm	19 mm	19 mm	

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	4.94 m	9.88 m	14.82 m
19.76 m	24.70 m	29.64 m	34.58 m
39.70 m	44.82 m	49.94 m	55.06 m
60.18 m	65.30 m	70.42 m	75.65 m
80.88 m	86.11 m	91.34 m	96.57 m
101.80 m	107.03 m		

Unbraced length of comp. flange at support 2 is 5.12 m .
Unbraced length of comp. flange at support 3 is 5.23 m .

Cover plates

No cover plates

Curvature

Radius of curvature	0.00 m	15240.00 m	93.60 m	93.60 m
	93.60 m	93.60 m	93.60 m	93.60 m
	93.60 m	93.60 m	93.60 m	93.60 m
	93.60 m	93.60 m	93.60 m	93.60 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	

2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Top flange splice locations

27.16 m 42.25 m 62.73 m 78.26 m

Bottom flange splice locations

27.16 m 42.25 m 62.73 m 78.26 m

Flange bolts staggered

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 107.03 m

Span lengths

34.58 m	35.84 m	36.61 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web Splices

Web splice locations	27.16 m	42.25 m	62.73 m	78.26 m

Web haunches

No web haunches

Fatigue

Allowable weld stress 124.11 MPa
AWS minimum welds
Fatigue stress category B flange splices

Impact

Impact factors assigned in GSA program

Loading

Load Factors gamma, beta	1.300	1.670
Constructibility	1.400	
Forms weight factor	1.000	

Unshored construction

Material

Concrete

Unit wt of concrete	23563. N/cu m		
Slab t for strength	200 mm	200 mm	200 mm
Concrete strength	27.50 MPa		
Effective slab width	1500 mm		
Neg mom rebar area		2999 mm2	2999 mm2
Rebar placement from bottom of slab		112 mm	112 mm
Negative mom. slab used in dead load 2 analysis			
Fillet	63 mm		
Slab haunch width	450 mm	450 mm	450 mm
Self weight slab width	1500 mm		

Steel

Web splice section 1		
	Steel grade	M270M-345
Web splice section 2		
	Steel grade	M270M-345
Web splice section 3		
	Steel grade	M270M-345
Web splice section 4		
	Steel grade	M270M-345
Web splice section 5		
	Steel grade	M270M-345
Rebar yield		413.69 MPa

Summary tables

Standard resolution summary tables

Units

Input Units: Metric
Output Units: Metric

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 2 : Input File : Definition
Tue Jan 13 13:32:19 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BFISPB 250. 250. 250. 250.
  BFISPT 19. 19. 19. 19.
  BFOSPB 550. 550. 550. 550.
  BFOSPT 19. 19. 19. 19.
  BR 4.9403 5.0279 5.0244 5.0244 5.0244 5.0245 5.0241 5.2078 5.2075
  5.2075 5.2119 5.12 5.12 5.1022 5.2478 5.23 5.23 5.23 5.23 5.23 5.2122
  BSPL 27.56 15.26 20.64 15.59
  EDGEH 50. 50. 50. 50.
  EDGEV 50. 50. 50. 50.
  EDGEW 60. 60. 60. 60.
  ESLABW 1600.
  FBLTDIAM 22.
  FILLET 63.5
  FNHOLES 6 6 6 6
  FPC 27.5
  FPEDGE 50. 50. 50. 50.
  FPEND 50. 50. 50. 50.
  FSPBSP 75. 75. 75. 75.
  GAGEBF 75. 75. 75. 75.
  GAGEH 75. 75. 75. 75.
  GAGETF 75. 75. 75. 75.
  GAGEV 75. 75. 75. 75.
  HAUNCW 450.
  IGIRD 2
  NBLTB 30 30 30 30
  NBLTT 30 30 30 30
  NLINEH 13 13 13 13
  NLINEV 3 3 3 3
  NSTUDL 3
  PITCH 300.
  PITSP 107.8771
  RAD  0. 15241.6006 95.2 95.2 95.2 95.2 95.2 95.2 95.2 95.2 95.2 95.2
  95.2 95.2 95.2 95.2  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.  0.  0.
  RCEN  0.   0. 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4
  98.4 98.4 98.4  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.
  SLABT 200.
  SLABWEAR  0.
  SPL 27.56 15.26 20.64 15.59
  SPLBFT 32.
  SPLBFW 600.
  SPLT 13. 13. 13. 13.
  SPLTFT 32.
  SPLTFW 600.
  SPLTYP 1 1 1 1
  SPLWD 1220.
  SPLWT 13.
  SPN 35.0901 36.177 36.61
  SS 25.
  STD 22.
  STH 114.
  SUPBST 19.
  SUPBSW 150.
  TFISPB 250. 250. 250. 250.
  TFISPT 19. 19. 19. 19.
  TFOSPB 550. 550. 550. 550.
```

```
  TFOSPT 19. 19. 19. 19.
  TSLABW 1600.
  TSPL 27.56 15.26 20.64 15.59
  WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 2 : Rating Output : Case Data
Tue Jan 13 13:36:30 2015

Girder 2 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220 mm	1220 mm	1220 mm	1220 mm	
	1220 mm				
Web Thickness	13 mm	13 mm	13 mm	13 mm	
	13 mm				
Bearing Stiff. Width	150 mm	150 mm	150 mm	150 mm	
Bearing Stiff. Thickness	19 mm	19 mm	19 mm	19 mm	

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	4.94 m	9.97 m	14.99 m
20.02 m	25.04 m	30.07 m	35.09 m
40.30 m	45.51 m	50.71 m	55.92 m
61.04 m	66.16 m	71.27 m	76.51 m
81.74 m	86.97 m	92.20 m	97.43 m
102.66 m	107.88 m		

Unbraced length of comp. flange at support 2 is 5.21 m .
Unbraced length of comp. flange at support 3 is 5.25 m .

Cover plates

No cover plates

Curvature

Radius of curvature	0.00 m	15241.60 m	95.20 m	95.20 m
	95.20 m	95.20 m	95.20 m	95.20 m
	95.20 m	95.20 m	95.20 m	95.20 m
	95.20 m	95.20 m	95.20 m	95.20 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	

2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Top flange splice locations

27.56 m 42.82 m 63.46 m 79.05 m

Bottom flange splice locations

27.56 m 42.82 m 63.46 m 79.05 m

Flange bolts staggered

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 107.88 m

Span lengths

	35.09 m	36.18 m	36.61 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web Splices

Web splice locations	27.56 m	42.82 m	63.46 m	79.05 m

Web haunches

No web haunches

Fatigue

Allowable weld stress 124.11 MPa
AWS minimum welds
Fatigue stress category B flange splices

Impact

Impact factors assigned in GSA program

Loading

Load Factors gamma, beta	1.300	1.670
Constructibility	1.400	
Forms weight factor	1.000	

Unshored construction

Material

Concrete

Unit wt of concrete	23563. N/cu m		
Slab t for strength	200 mm	200 mm	200 mm
Concrete strength	27.50 MPa		
Effective slab width	1600 mm		
Neg mom rebar area		3199 mm2	3199 mm2
Rebar placement from bottom of slab		112 mm	112 mm
Negative mom. slab used in dead load 2 analysis			
Fillet	63 mm		
Slab haunch width	450 mm	450 mm	450 mm
Self weight slab width	1600 mm		

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 3 : Input File : Definition
Tue Jan 13 13:32:44 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BFISPB 250. 250. 250. 250.
  BFISPT 19. 19. 19. 19.
  BFOSPB 550. 550. 550. 550.
  BFOSPT 19. 19. 19. 19.
  BR 4.9407 5.1157 5.1089 5.1089 5.1089 5.1089 5.1083 5.2957 5.295 5.295
  5.3038 5.12 5.12 5.0844 5.2656 5.23 5.23 5.23 5.23 5.23 5.1944
  BSPL 27.97 15.42 20.81 15.65
  EDGEH 50. 50. 50. 50.
  EDGEV 50. 50. 50. 50.
  EDGEW 60. 60. 60. 60.
  ESLABW 1600.
  FBLTDIAM 22.
  FILLET 63.5
  FNHOLES 6 6 6 6
  FPC 27.5
  FPEDGE 50. 50. 50. 50.
  FPEND 50. 50. 50. 50.
  FSPBSP 75. 75. 75. 75.
  GAGEBF 75. 75. 75. 75.
  GAGEH 75. 75. 75. 75.
  GAGETF 75. 75. 75. 75.
  GAGEV 75. 75. 75. 75.
  HAUNCW 450.
  IGIRD 3
  NBLTB 30 30 30 30
  NBLTT 30 30 30 30
  NLINEH 13 13 13 13
  NLINEV 3 3 3 3
  NSTUDL 3
  PITCH 300.
  PITSP 108.7241
  RAD  0. 15243.2002 96.8 96.8 96.8 96.8 96.8 96.8 96.8 96.8 96.8 96.8
  96.8 96.8 96.8 96.8  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.  0.  0.
  RCEN  0.  0. 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4
  98.4 98.4 98.4  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.
  SLABT 200.
  SLABWEAR  0.
  SPL 27.97 15.42 20.81 15.65
  SPLBFT 32.
  SPLBFW 600.
  SPLT 13. 13. 13. 13.
  SPLTFT 32.
  SPLTFW 600.
  SPLTYP 1 1 1 1
  SPLWD 1220.
  SPLWT 13.
  SPN 35.6002 36.5139 36.61
  SS 25.
  STD 22.
  STH 114.
  SUPBST 19.
  SUPBSW 150.
  TFISPB 250. 250. 250. 250.
  TFISPT 19. 19. 19. 19.
  TFOSPB 550. 550. 550. 550.
```

```
TFOSPT 19. 19. 19. 19.
TSLABW 1600.
TSPL 27.97 15.42 20.81 15.65
WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 3 : Rating Output : Case Data
Tue Jan 13 13:36:53 2015

Girder 3 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220 mm	1220 mm	1220 mm	1220 mm
	1220 mm			
Web Thickness	13 mm	13 mm	13 mm	13 mm
	13 mm			
Bearing Stiff. Width	150 mm	150 mm	150 mm	150 mm
Bearing Stiff. Thickness	19 mm	19 mm	19 mm	19 mm

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	4.94 m	10.06 m	15.17 m
20.27 m	25.38 m	30.49 m	35.60 m
40.90 m	46.19 m	51.49 m	56.79 m
61.91 m	67.03 m	72.11 m	77.38 m
82.61 m	87.84 m	93.07 m	98.30 m
103.53 m	108.72 m		

Unbraced length of comp. flange at support 2 is 5.30 m .
Unbraced length of comp. flange at support 3 is 5.27 m .

Cover plates

No cover plates

Curvature

Radius of curvature	0.00 m	15243.20 m	96.80 m	96.80 m
	96.80 m	96.80 m	96.80 m	96.80 m
	96.80 m	96.80 m	96.80 m	96.80 m
	96.80 m	96.80 m	96.80 m	96.80 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	

2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Top flange splice locations

27.97 m   43.39 m   64.20 m   79.85 m

Bottom flange splice locations

27.97 m   43.39 m   64.20 m   79.85 m

Flange bolts staggered

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 108.72 m

Span lengths

35.60 m	36.51 m	36.61 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web Splices

Web splice locations	27.97 m	43.39 m	64.20 m	79.85 m

Web haunches

No web haunches

Fatigue

Allowable weld stress 124.11 MPa
AWS minimum welds
Fatigue stress category B flange splices

Impact

Impact factors assigned in GSA program

Loading

Load Factors gamma, beta	1.300	1.670
Constructibility	1.400	
Forms weight factor	1.000	

Unshored construction

Material

Concrete

Unit wt of concrete	23563. N/cu m		
Slab t for strength	200 mm	200 mm	200 mm
Concrete strength	27.50 MPa		
Effective slab width	1600 mm		
Neg mom rebar area		3199 mm2	3199 mm2
Rebar placement from bottom of slab		112 mm	112 mm
Negative mom. slab used in dead load 2 analysis			
Fillet	63 mm		
Slab haunch width	450 mm	450 mm	450 mm
Self weight slab width	1600 mm		

Steel

Web splice section 1	
Steel grade	M270M-345
Web splice section 2	
Steel grade	M270M-345
Web splice section 3	
Steel grade	M270M-345
Web splice section 4	
Steel grade	M270M-345
Web splice section 5	
Steel grade	M270M-345
Rebar yield	413.69 MPa

Summary tables

Standard resolution summary tables

Units

Input Units: Metric
Output Units: Metric

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 4 : Input File : Definition
Tue Jan 13 13:32:59 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BFISPB 250. 250. 250. 250.
  BFISPT 19. 19. 19. 19.
  BFOSPB 550. 550. 550. 550.
  BFOSPT 19. 19. 19. 19.
  BR 4.941 5.2035 5.1933 5.1933 5.1933 5.1933 5.1924 5.3835 5.3826
  5.3826 5.3957 5.12 5.12 5.0665 5.2835 5.23 5.23 5.23 5.23 5.23 5.1766
  BSPL 28.36 15.6 20.99 15.71
  EDGEH 50. 50. 50. 50.
  EDGEV 50. 50. 50. 50.
  EDGEW 60. 60. 60. 60.
  ESLABW 1600.
  FBLTDIAM 22.
  FILLET 63.5
  FNHOLES 6 6 6 6
  FPC 27.5
  FPEDGE 50. 50. 50. 50.
  FPEND 50. 50. 50. 50.
  FSPBSP 75. 75. 75. 75.
  GAGEBF 75. 75. 75. 75.
  GAGEH 75. 75. 75. 75.
  GAGETF 75. 75. 75. 75.
  GAGEV 75. 75. 75. 75.
  HAUNCW 450.
  IGIRD 4
  NBLTB 30 30 30 30
  NBLTT 30 30 30 30
  NLINEH 13 13 13 13
  NLINEV 3 3 3 3
  NSTUDL 3
  PITCH 300.
  PITSP 109.5711
  RAD  0. 15244.7998 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4
  98.4 98.4 98.4 98.4  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.  0.  0.
  RCEN  0.  0. 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4
  98.4 98.4 98.4  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.
  SLABT 200.
  SLABWEAR  0.
  SPL 28.36 15.6 20.99 15.71
  SPLBFT 32.
  SPLBFW 600.
  SPLT 13. 13. 13. 13.
  SPLTFT 32.
  SPLTFW 600.
  SPLTYP 1 1 1 1
  SPLWD 1220.
  SPLWT 13.
  SPN 36.1102 36.8509 36.61
  SS 25.
  STD 22.
  STH 114.
  SUPBST 19.
  SUPBSW 150.
  TFISPB 250. 250. 250. 250.
  TFISPT 19. 19. 19. 19.
  TFOSPB 550. 550. 550. 550.
```

```
TFOSPT 19. 19. 19. 19.
TSLABW 1600.
TSPL 28.36 15.6 20.99 15.71
WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 4 : Rating Output : Case Data
Tue Jan 13 13:37:10 2015

Girder 4 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220 mm	1220 mm	1220 mm	1220 mm
	1220 mm			
Web Thickness	13 mm	13 mm	13 mm	13 mm
	13 mm			
Bearing Stiff. Width	150 mm	150 mm	150 mm	150 mm
Bearing Stiff. Thickness	19 mm	19 mm	19 mm	19 mm

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	4.94 m	10.14 m	15.34 m
20.53 m	25.72 m	30.92 m	36.11 m
41.49 m	46.88 m	52.26 m	57.65 m
62.77 m	67.89 m	72.96 m	78.24 m
83.47 m	88.70 m	93.93 m	99.16 m
104.39 m	109.57 m		

Unbraced length of comp. flange at support 2 is 5.38 m .
Unbraced length of comp. flange at support 3 is 5.28 m .

Cover plates

No cover plates

Curvature

Radius of curvature	0.00 m	15244.80 m	98.40 m	98.40 m
	98.40 m	98.40 m	98.40 m	98.40 m
	98.40 m	98.40 m	98.40 m	98.40 m
	98.40 m	98.40 m	98.40 m	98.40 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	

2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Top flange splice locations

28.36 m   43.96 m   64.95 m   80.66 m

Bottom flange splice locations

28.36 m   43.96 m   64.95 m   80.66 m

Flange bolts staggered

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 109.57 m

Span lengths

36.11 m	36.85 m	36.61 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web Splices

Web splice locations	28.36 m	43.96 m	64.95 m	80.66 m

Web haunches

No web haunches

Fatigue

Allowable weld stress 124.11 MPa
AWS minimum welds
Fatigue stress category B flange splices

Impact

Impact factors assigned in GSA program

Loading

Load Factors gamma, beta	1.300	1.670
Constructibility	1.400	
Forms weight factor	1.000	

Unshored construction

Material

Concrete

Unit wt of concrete	23563. N/cu m		
Slab t for strength	200 mm	200 mm	200 mm
Concrete strength	27.50 MPa		
Effective slab width	1600 mm		
Neg mom rebar area		3199 mm2	3199 mm2
Rebar placement from bottom of slab		112 mm	112 mm
Negative mom. slab used in dead load 2 analysis			
Fillet	63 mm		
Slab haunch width	450 mm	450 mm	450 mm
Self weight slab width	1600 mm		

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 5 : Input File : Definition
Tue Jan 13 13:33:28 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BFISPB 250. 250. 250. 250.
  BFISPT 19. 19. 19. 19.
  BFOSPB 550. 550. 550. 550.
  BFOSPT 19. 19. 19. 19.
  BR 4.9413 5.2914 5.2778 5.2778 5.2778 5.2778 5.2765 5.4713 5.4701
  5.4701 5.4876 5.12 5.12 5.0487 5.3013 5.23 5.23 5.23 5.23 5.23 5.1587
  BSPL 28.76 15.79 21.12 15.79
  EDGEH 50. 50. 50. 50.
  EDGEV 50. 50. 50. 50.
  EDGEW 60. 60. 60. 60.
  ESLABW 1600.
  FBLTDIAM 22.
  FILLET 63.5
  FNHOLES 6 6 6 6
  FPC 27.5
  FPEDGE 50. 50. 50. 50.
  FPEND 50. 50. 50. 50.
  FSPBSP 75. 75. 75. 75.
  GAGEBF 75. 75. 75. 75.
  GAGEH 75. 75. 75. 75.
  GAGETF 75. 75. 75. 75.
  GAGEV 75. 75. 75. 75.
  HAUNCW 450.
  IGIRD 5
  NBLTB 30 30 30 30
  NBLTT 30 30 30 30
  NLINEH 13 13 13 13
  NLINEV 3 3 3 3
  NSTUDL 3
  PITCH 300.
  PITSP 110.4181
  RAD  0. 15246.3994 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
  100. 100. 100. 100.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.  0.  0.
  RCEN  0.  0. 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4
  98.4 98.4 98.4  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.
  SLABT 200.
  SLABWEAR  0.
  SPL 28.76 15.79 21.12 15.79
  SPLBFT 32.
  SPLBFW 600.
  SPLT 13. 13. 13. 13.
  SPLTFT 32.
  SPLTFW 600.
  SPLTYP 1 1 1 1
  SPLWD 1220.
  SPLWT 13.
  SPN 36.6203 37.1878 36.61
  SS 25.
  STD 22.
  STH 114.
  SUPBST 19.
  SUPBSW 150.
  TFISPB 250. 250. 250. 250.
  TFISPT 19. 19. 19. 19.
  TFOSPB 550. 550. 550. 550.
```

```
TFOSPT 19. 19. 19. 19.
TSLABW 1600.
TSPL 28.76 15.79 21.12 15.79
WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 5 : Rating Output : Case Data
Tue Jan 13 13:37:42 2015

Girder 5 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220 mm	1220 mm	1220 mm	1220 mm
	1220 mm			
Web Thickness	13 mm	13 mm	13 mm	13 mm
	13 mm			
Bearing Stiff. Width	150 mm	150 mm	150 mm	150 mm
Bearing Stiff. Thickness	19 mm	19 mm	19 mm	19 mm

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	4.94 m	10.23 m	15.51 m
20.79 m	26.07 m	31.34 m	36.62 m
42.09 m	47.56 m	53.03 m	58.52 m
63.64 m	68.76 m	73.81 m	79.11 m
84.34 m	89.57 m	94.80 m	100.03 m
105.26 m	110.42 m		

Unbraced length of comp. flange at support 2 is 5.47 m .
Unbraced length of comp. flange at support 3 is 5.30 m .

Cover plates

No cover plates

Curvature

Radius of curvature	0.00 m	15246.40 m	100.00 m	100.00 m
	100.00 m	100.00 m	100.00 m	100.00 m
	100.00 m	100.00 m	100.00 m	100.00 m
	100.00 m	100.00 m	100.00 m	100.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	

2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Top flange splice locations

28.76 m	44.55 m	65.67 m	81.46 m

Bottom flange splice locations

28.76 m	44.55 m	65.67 m	81.46 m

Flange bolts staggered

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 110.42 m

Span lengths

36.62 m	37.19 m	36.61 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web Splices

Web splice locations	28.76 m	44.55 m	65.67 m	81.46 m

Web haunches

No web haunches

Fatigue

Allowable weld stress 124.11 MPa
AWS minimum welds
Fatigue stress category B flange splices

Impact

Impact factors assigned in GSA program

Loading

Load Factors gamma, beta	1.300	1.670
Constructibility	1.400	
Forms weight factor	1.000	

Unshored construction

Material

Concrete

Unit wt of concrete	23563. N/cu m		
Slab t for strength	200 mm	200 mm	200 mm
Concrete strength	27.50 MPa		
Effective slab width	1600 mm		
Neg mom rebar area		3199 mm2	3199 mm2
Rebar placement from bottom of slab		112 mm	112 mm
Negative mom. slab used in dead load 2 analysis			
Fillet	63 mm		
Slab haunch width	450 mm	450 mm	450 mm
Self weight slab width	1600 mm		

Steel

Web splice section 1	
Steel grade	M270M-345
Web splice section 2	
Steel grade	M270M-345
Web splice section 3	
Steel grade	M270M-345
Web splice section 4	
Steel grade	M270M-345
Web splice section 5	
Steel grade	M270M-345
Rebar yield	413.69 MPa

Summary tables

Standard resolution summary tables

Units

Input Units: Metric
Output Units: Metric

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 6 : Input File : Definition
Tue Jan 13 13:33:35 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BFISPB 250. 250. 250. 250.
  BFISPT 19. 19. 19. 19.
  BFOSPB 550. 550. 550. 550.
  BFOSPT 19. 19. 19. 19.
  BR 4.9417 5.3792 5.3622 5.3622 5.3622 5.3622 5.3606 5.5592 5.5576
  5.5576 5.5795 5.12 5.12 5.0309 5.3191 5.23 5.23 5.23 5.23 5.23 5.1409
  BSPL 29.17 15.95 21.31 15.85
  EDGEH 50. 50. 50. 50.
  EDGEV 50. 50. 50. 50.
  EDGEW 60. 60. 60. 60.
  ESLABW 1600.
  FBLTDIAM 22.
  FILLET 63.5
  FNHOLES 6 6 6 6
  FPC 27.5
  FPEDGE 50. 50. 50. 50.
  FPEND 50. 50. 50. 50.
  FSPBSP 75. 75. 75. 75.
  GAGEBF 75. 75. 75. 75.
  GAGEH 75. 75. 75. 75.
  GAGETF 75. 75. 75. 75.
  GAGEV 75. 75. 75. 75.
  HAUNCW 450.
  IGIRD 6
  NBLTB 30 30 30 30
  NBLTT 30 30 30 30
  NLINEH 13 13 13 13
  NLINEV 3 3 3 3
  NSTUDL 3
  PITCH 300.
  PITSP 111.2652
  RAD  0. 15248. 101.6 101.6 101.6 101.6 101.6 101.6 101.6 101.6 101.6
  101.6 101.6 101.6 101.6 101.6  0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
   0.   0.   0.   0.   0.
  RCEN  0.   0. 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4
  98.4 98.4 98.4  0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.   0.
   0.
  SLABT 200.
  SLABWEAR  0.
  SPL 29.17 15.95 21.31 15.85
  SPLBFT 32.
  SPLBFW 600.
  SPLT 13. 13. 13. 13.
  SPLTFT 32.
  SPLTFW 600.
  SPLTYP 1 1 1 1
  SPLWD 1220.
  SPLWT 13.
  SPN 37.1304 37.5248 36.61
  SS 25.
  STD 22.
  STH 114.
  SUPBST 19.
  SUPBSW 150.
  TFISPB 250. 250. 250. 250.
  TFISPT 19. 19. 19. 19.
  TFOSPB 550. 550. 550. 550.
```

```
  TFOSPT 19. 19. 19. 19.
  TSLABW 1600.
  TSPL 29.17 15.95 21.31 15.85
  WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 6 : Rating Output : Case Data
Tue Jan 13 13:38:18 2015

Girder 6 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220 mm	1220 mm	1220 mm	1220 mm
	1220 mm			
Web Thickness	13 mm	13 mm	13 mm	13 mm
	13 mm			
Bearing Stiff. Width	150 mm	150 mm	150 mm	150 mm
Bearing Stiff. Thickness	19 mm	19 mm	19 mm	19 mm

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	4.94 m	10.32 m	15.68 m
21.05 m	26.41 m	31.77 m	37.13 m
42.69 m	48.25 m	53.80 m	59.38 m
64.50 m	69.62 m	74.66 m	79.97 m
85.20 m	90.43 m	95.66 m	100.89 m
106.12 m	111.27 m		

Unbraced length of comp. flange at support 2 is 5.56 m .
Unbraced length of comp. flange at support 3 is 5.32 m .

Cover plates

No cover plates

Curvature

Radius of curvature	0.00 m	15248.00 m	101.60 m	101.60 m
	101.60 m	101.60 m	101.60 m	101.60 m
	101.60 m	101.60 m	101.60 m	101.60 m
	101.60 m	101.60 m	101.60 m	101.60 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	

2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Top flange splice locations

29.17 m 45.12 m 66.43 m 82.28 m

Bottom flange splice locations

29.17 m 45.12 m 66.43 m 82.28 m

Flange bolts staggered

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 111.27 m

Span lengths

	37.13 m	37.52 m	36.61 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web Splices

Web splice locations	29.17 m	45.12 m	66.43 m	82.28 m

Web haunches

No web haunches

Fatigue

Allowable weld stress 124.11 MPa
AWS minimum welds
Fatigue stress category B flange splices

Impact

Impact factors assigned in GSA program

Loading

Load Factors gamma, beta	1.300	1.670
Constructibility	1.400	
Forms weight factor	1.000	

Unshored construction

Material

Concrete

Unit wt of concrete	23563. N/cu m		
Slab t for strength	200 mm	200 mm	200 mm
Concrete strength	27.50 MPa		
Effective slab width	1600 mm		
Neg mom rebar area		3199 mm2	3199 mm2
Rebar placement from bottom of slab		112 mm	112 mm
Negative mom. slab used in dead load 2 analysis			
Fillet	63 mm		
Slab haunch width	450 mm	450 mm	450 mm
Self weight slab width	1600 mm		

Steel

Web splice section	1	
Steel grade		M270M-345
Web splice section	2	
Steel grade		M270M-345
Web splice section	3	
Steel grade		M270M-345
Web splice section	4	
Steel grade		M270M-345
Web splice section	5	
Steel grade		M270M-345
Rebar yield		413.69 MPa

Summary tables

Standard resolution summary tables

Units

Input Units: Metric
Output Units: Metric

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Input File : Definition
Tue Jan 13 13:33:40 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BFISPB 250. 250. 250. 250.
  BFISPT 19. 19. 19. 19.
  BFOSPB 550. 550. 550. 550.
  BFOSPT 19. 19. 19. 19.
  BR 4.942 5.4671 5.4467 5.4467 5.4467 5.4467 5.4448 5.647 5.6451 5.6451
  5.6714 5.12 5.12 5.0131 5.3369 5.23 5.23 5.23 5.23 5.23 5.1231
  BSPL 29.56 16.13 21.47 15.91
  EDGEH 50. 50. 50. 50.
  EDGEV 50. 50. 50. 50.
  EDGEW 60. 60. 60. 60.
  ESLABW 1500.
  FBLTDIAM 22.
  FILLET 63.5
  FNHOLES 6 6 6 6
  FPC 27.5
  FPEDGE 50. 50. 50. 50.
  FPEND 50. 50. 50. 50.
  FSPBSP 75. 75. 75. 75.
  GAGEBF 75. 75. 75. 75.
  GAGEH 75. 75. 75. 75.
  GAGETF 75. 75. 75. 75.
  GAGEV 75. 75. 75. 75.
  HAUNCW 450.
  IGIRD 7
  NBLTB 30 30 30 30
  NBLTT 30 30 30 30
  NLINEH 13 13 13 13
  NLINEV 3 3 3 3
  NSTUDL 3
  PITCH 300.
  PITSP 112.1123
  RAD  0. 15249.6006 103.2 103.2 103.2 103.2 103.2 103.2 103.2 103.2
  103.2 103.2 103.2 103.2 103.2 103.2  0.  0.  0.  0.  0.  0.  0.  0.
   0.  0.  0.  0.  0.  0.  0.
  RCEN  0.  0. 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4 98.4
  98.4 98.4 98.4  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.  0.
   0.
  SLABT 200.
  SLABWEAR  0.
  SPL 29.56 16.13 21.47 15.91
  SPLBFT 32.
  SPLBFW 600.
  SPLT 13. 13. 13. 13.
  SPLTFT 32.
  SPLTFW 600.
  SPLTYP 1 1 1 1
  SPLWD 1220.
  SPLWT 13.
  SPN 37.6405 37.8618 36.61
  SS 25.
  STD 22.
  STH 114.
  SUPBST 19.
  SUPBSW 150.
  TFISPB 250. 250. 250. 250.
  TFISPT 19. 19. 19. 19.
  TFOSPB 550. 550. 550. 550.
```

```
  TFOSPT 19. 19. 19. 19.
  TSLABW 1500.
  TSPL 29.56 16.13 21.47 15.91
  WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Case Data
Tue Jan 13 13:38:34 2015

Girder 7 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220 mm	1220 mm	1220 mm	1220 mm
	1220 mm			
Web Thickness	13 mm	13 mm	13 mm	13 mm
	13 mm			
Bearing Stiff. Width	150 mm	150 mm	150 mm	150 mm
Bearing Stiff. Thickness	19 mm	19 mm	19 mm	19 mm

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	4.94 m	10.41 m	15.86 m
21.30 m	26.75 m	32.20 m	37.64 m
43.29 m	48.93 m	54.58 m	60.25 m
65.37 m	70.49 m	75.50 m	80.84 m
86.07 m	91.30 m	96.53 m	101.76 m
106.99 m	112.11 m		

Unbraced length of comp. flange at support 2 is 5.65 m .
Unbraced length of comp. flange at support 3 is 5.34 m .

Cover plates

No cover plates

Curvature

Radius of curvature	0.00 m	15249.60 m	103.20 m	103.20 m
	103.20 m	103.20 m	103.20 m	103.20 m
	103.20 m	103.20 m	103.20 m	103.20 m
	103.20 m	103.20 m	103.20 m	103.20 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	0.00 m
	0.00 m	0.00 m	0.00 m	

2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Top flange splice locations

29.56 m   45.69 m   67.16 m   83.07 m

Bottom flange splice locations

29.56 m   45.69 m   67.16 m   83.07 m

Flange bolts staggered

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 112.11 m

Span lengths

	37.64 m	37.86 m	36.61 m	

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web Splices

Web splice locations	29.56 m	45.69 m	67.16 m	83.07 m

Web haunches

No web haunches

Fatigue

Allowable weld stress 124.11 MPa
AWS minimum welds
Fatigue stress category B flange splices

Impact

Impact factors assigned in GSA program

Loading

Load Factors gamma, beta	1.300	1.670
Constructibility	1.400	
Forms weight factor	1.000	

Unshored construction

Material

Concrete

Unit wt of concrete	23563. N/cu m		
Slab t for strength	200 mm	200 mm	200 mm
Concrete strength	27.50 MPa		
Effective slab width	1500 mm		
Neg mom rebar area		2999 mm2	2999 mm2
Rebar placement from bottom of slab		112 mm	112 mm
Negative mom. slab used in dead load 2 analysis			
Fillet	63 mm		
Slab haunch width	450 mm	450 mm	450 mm
Self weight slab width	1500 mm		

```
Steel

   Web splice section  1
         Steel grade           M270M-345
   Web splice section  2
         Steel grade           M270M-345
   Web splice section  3
         Steel grade           M270M-345
   Web splice section  4
         Steel grade           M270M-345
   Web splice section  5
         Steel grade           M270M-345
   Rebar yield                413.69 MPa

Summary tables

   Standard resolution summary tables

Units

   Input Units:  Metric
   Output Units: Metric
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Bearing Stiffener Stress
Tue Jan 13 13:38:59 2015

Girder 7 Bearing Stiffeners

Location from Left End of Web Sect.	Service Reaction	Allowable Column Stress	Actual Column Stress	Ratio	Allowable Bearing Stress	Actual Bearing Stress	Ratio
0.00	964.57	342.73	110.34	0.322	465.75	203.07	0.436
37.64	1436.72	342.73	164.35	0.480	465.75	302.47	0.649
75.50	1748.77	342.73	200.04	0.584	465.75	368.16	0.790
112.11	755.04	342.73	86.37	0.252	465.75	158.96	0.341

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Bottom Flange Factored Bending Stress - Group I Loa
Tue Jan 13 13:40:40 2015

Girder 7 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Noncomp Dead	Comp Dead	Max LM+I	Min LL+I	LL+I Rng	Wind	Tot	Allow	Ratio
		Bottom Flange								
0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	327.8	0.000
1	3.76	44.3	18.4	42.9	-7.7	50.5	0.0	105.5	345.0	0.306
2	7.53	78.6	32.0	76.0	-15.4	91.3	0.0	186.6	335.9	0.556
3	11.29	101.4	40.3	98.6	-22.9	121.4	0.0	240.3	341.4	0.704
4	15.06	108.4	42.5	106.4	-29.6	135.9	0.0	257.3	338.8	0.759
5	18.82	99.4	38.8	102.1	-35.2	137.3	0.0	240.2	334.3	0.718
6	22.58	76.9	29.4	90.0	-40.1	130.1	0.0	196.3	332.4	0.591
7	26.35	40.9	14.6	69.6	-44.0	113.6	0.0	125.0	339.2	0.369
Bot.Flg.Spl.		1.0	-1.8	45.8	-44.7	90.5	0.0	-45.5	305.0	0.149
Bot.Flg.Spl.		1.0	-1.8	45.8	-44.7	90.5	0.0	-45.5	305.3	0.149
8	30.11	-6.2	-5.1	41.9	-46.1	88.0	0.0	-57.4	331.5	0.173
9	33.88	-59.3	-29.8	17.2	-65.3	82.5	0.0	-154.4	338.0	0.457
10	37.64	-117.0	-57.8	12.1	-102.8	115.0	0.0	-277.6	283.1	0.981
11	41.43	-76.7	-36.3	20.9	-75.4	96.3	0.0	-188.4	336.8	0.559
12	45.21	-41.0	-18.4	48.1	-67.9	116.0	0.0	-127.3	335.2	0.380
Bot.Flg.Spl.		-36.9	-16.3	51.2	-67.2	118.4	0.0	-120.4	338.6	0.356
Bot.Flg.Spl.		-36.9	-16.3	51.2	-67.2	118.4	0.0	-120.4	337.5	0.357
13	49.00	-10.2	-3.9	70.7	-63.4	134.0	0.0	-77.4	328.5	0.236
14	52.79	11.0	5.9	80.4	-57.9	138.3	0.0	97.3	342.7	0.284
15	56.57	20.8	10.2	80.7	-50.3	131.0	0.0	111.7	340.6	0.328
16	60.36	19.4	9.2	72.3	-43.0	115.2	0.0	100.8	345.0	0.259
17	64.14	7.3	4.2	56.2	-37.7	94.0	0.0	67.7	345.0	0.177
Bot.Flg.Spl.		-9.1	-3.3	39.6	-36.9	76.5	0.0	-49.3	331.8	0.148
Bot.Flg.Spl.		-9.1	-3.3	39.6	-36.9	76.5	0.0	-49.3	331.8	0.148
18	67.93	-14.2	-5.8	35.7	-38.5	74.3	0.0	-58.5	331.8	0.176
19	71.72	-45.1	-21.4	19.4	-57.4	76.8	0.0	-123.9	332.4	0.373
20	75.50	-85.4	-42.7	26.3	-94.6	120.9	0.0	-222.7	332.4	0.670
21	79.16	-36.9	-18.4	24.8	-59.2	84.0	0.0	-114.4	330.7	0.346
22	82.82	2.9	0.7	38.4	-43.8	82.2	0.0	41.9	345.0	0.111
Bot.Flg.Spl.		5.2	1.7	39.5	-43.2	82.6	0.0	46.4	345.0	0.112
Bot.Flg.Spl.		5.2	1.7	39.5	-43.2	82.6	0.0	46.4	345.0	0.112
23	86.49	33.8	13.7	57.4	-38.9	96.3	0.0	104.9	345.0	0.261
24	90.15	55.8	22.9	70.9	-34.1	105.0	0.0	149.6	345.0	0.369
25	93.81	68.9	28.4	77.9	-29.1	107.0	0.0	175.2	345.0	0.430
26	97.47	73.1	30.1	79.1	-23.9	103.0	0.0	182.2	345.0	0.446
27	101.13	68.2	28.3	73.1	-18.3	91.4	0.0	169.6	345.0	0.415
28	104.79	54.4	23.2	57.6	-12.4	70.0	0.0	135.1	345.0	0.335
29	108.45	31.6	13.8	34.1	-6.3	40.4	0.0	79.5	345.0	0.204
30	112.11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	327.8	0.000

Lateral bending stress not included in the above factored stresses.

Allowable tension stress does not consider the effect of net section from bolted flange splice holes.

Governing expression for allowable compression stress

Tenth Pt	Expression
8	(5-8)
9	(5-8)
10	(5-8)
11	(5-8)
12	(5-8)
13	(5-8)
18	(5-8)
19	(5-8)
20	(5-8)

21 (5-8)

Perf. ratio for compact section is (factored mom/mom strength)
if this is less than (total stress/allowable stress).

Grp I Bottom Flange Factored Lateral Bending Stress

Tenth Pt	Noncomp Dead Lat Mom kN-m	Noncomp Dead fw MPa	Comp Dead Lat Mom kN-m	Comp Dead fw MPa	Max LL+I Lat Mom kN-m	Max LL+I fw MPa	Min LL+I Lat Mom kN-m	Min LL+I fw MPa
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.03	0.02	0.01	0.01	0.04	0.02	0.01	0.00
2	-19.90	10.37	-9.05	4.72	-23.62	12.31	-4.21	2.19
3	7.95	4.14	3.64	1.90	9.30	4.84	1.24	0.64
4	13.45	7.01	5.87	3.06	16.40	8.54	4.48	2.33
5	-22.73	11.84	-9.96	5.19	-28.78	14.99	-8.31	4.33
6	1.68	0.88	0.88	0.46	-0.99	0.52	-2.12	1.10
7	8.50	4.43	3.22	1.68	21.84	11.38	13.18	6.87
Bot.Flg.Spl	-9.04	0.00	-3.95	2.06	-13.65	7.11	-12.16	6.33
Bot.Flg.Spl	-9.04	0.00	-3.95	2.06	-13.65	7.11	-12.16	6.33
8	-7.12	3.71	-3.18	1.66	-12.75	6.64	-9.90	5.16
9	-13.74	7.16	-7.09	3.69	-2.13	1.11	-12.94	6.74
10	57.65	30.03	29.66	15.45	7.32	3.81	52.80	27.51
11	-18.15	9.46	-9.27	4.83	-3.41	1.77	-17.27	9.00
12	-4.01	2.09	-1.81	0.94	-13.24	6.90	-12.02	6.26
Bot.Flg.Spl	-7.87	4.10	-3.40	1.77	-15.84	8.25	-16.35	8.52
Bot.Flg.Spl	-7.87	4.10	-3.40	1.77	-15.84	8.25	-16.35	8.52
13	5.02	2.62	1.98	0.00	40.86	21.28	31.46	16.39
14	-1.76	0.92	-0.76	0.40	-13.38	6.97	-9.82	5.12
15	-3.94	2.05	-2.14	1.11	-19.12	9.96	-10.01	5.22
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bot.Flg.Spl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bot.Flg.Spl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bot.Flg.Spl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bot.Flg.Spl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Dabrowski sign convention: +fw/fb ratio used for allowable stress.
(See 2003 Guide spec. commentary C5.1)

First of two splice entries is to left of splice,
second is to right of splice.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Bottom Flange Overload Stress
Tue Jan 13 13:40:49 2015

Girder 7 Bottom Flange Permanent Defl Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.00	0.00	0.00	327.75	0.000
1	3.76	34.08	14.14	32.99	-5.91	327.75	0.248
2	7.53	68.46	28.25	67.90	-13.51	327.75	0.502
3	11.29	81.18	32.46	79.55	-18.08	327.75	0.589
4	15.06	88.79	35.05	88.38	-24.54	327.75	0.648
5	18.82	85.53	33.81	90.06	-30.42	327.75	0.639
6	22.58	59.87	22.98	69.59	-31.71	327.75	0.465
7	26.35	34.86	12.50	62.25	-39.15	327.75	0.334
Bot.flg.spl.		0.80	-1.31	43.98	-39.65	327.75	0.133
Bot.flg.spl.		0.80	-1.42	43.98	-39.65	327.75	0.132
8	30.11	-7.66	-3.96	37.36	-39.39	327.75	0.156
9	33.88	-51.09	-25.75	14.11	-55.43	327.75	0.404
10	37.64	-113.10	-56.33	12.26	-100.27	283.09	0.953
11	41.43	-66.25	-31.67	17.43	-64.90	327.75	0.497
12	45.21	-33.16	-14.84	42.32	-57.06	327.75	0.321
Bot.flg.spl.		-29.97	-13.29	44.70	-56.50	327.75	0.304
Bot.flg.spl.		-29.97	-13.29	44.70	-56.50	327.75	0.304
13	49.00	-9.85	-2.97	70.72	-61.35	327.75	0.226
14	52.79	9.20	4.86	67.18	-48.47	327.75	0.248
15	56.57	17.60	8.69	69.72	-42.74	327.75	0.293
16	60.36	14.89	7.10	55.58	-33.05	327.75	0.237
17	64.14	5.59	3.23	43.25	-29.02	327.75	0.159
Bot.flg.spl.		-6.99	-2.32	30.44	-28.38	327.75	0.115
Bot.flg.spl.		-6.99	-2.51	30.44	-28.38	327.75	0.116
18	67.93	-10.94	-4.46	27.49	-29.64	327.75	0.137
19	71.72	-34.69	-16.48	14.90	-44.15	327.75	0.291
20	75.50	-65.68	-32.83	20.23	-72.78	327.75	0.523
21	79.16	-28.37	-14.12	19.10	-45.54	327.75	0.269
22	82.82	2.20	0.53	29.51	-33.70	327.75	0.098
Bot.flg.spl.		4.01	1.31	30.36	-33.20	327.75	0.109
Bot.flg.spl.		4.01	1.31	30.36	-33.20	327.75	0.109
23	86.49	26.00	10.52	44.14	-29.94	327.75	0.246
24	90.15	42.94	17.61	54.54	-26.26	327.75	0.351
25	93.81	53.00	21.86	59.93	-22.41	327.75	0.411
26	97.47	56.19	23.13	60.84	-18.38	327.75	0.428
27	101.13	52.48	21.79	56.22	-14.08	327.75	0.398
28	104.79	41.82	17.82	44.28	-9.53	327.75	0.317
29	108.45	24.33	10.58	26.24	-4.83	327.75	0.187
30	112.11	0.00	0.00	0.00	0.00	327.75	0.000

Lateral bending stresses not included if compact.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Constructibility of Web in Bending
Tue Jan 13 13:41:30 2015

Girder 7 Web Compression Bending Stress for Constructibility - MPa

Tenth Point	Noncomp. Dead Factored Mom	Noncomp. Dead Web Bending Stress	Allowable (6-3),(6-8)	Ratio
0	-0.03	0.00	345.00	0.000
1	1264.11	45.32	345.00	0.131
2	2244.20	80.45	345.00	0.233
3	2893.83	103.74	345.00	0.301
4	3094.52	110.94	345.00	0.322
5	2835.78	101.66	345.00	0.295
6	2196.34	78.74	345.00	0.228
7	1167.21	41.84	345.00	0.121
8	-178.16	6.39	345.00	0.019
9	-1691.48	60.64	345.00	0.176
10	-3339.48	119.72	345.00	0.347
11	-2188.20	78.45	345.00	0.227
12	-1170.81	41.97	345.00	0.122
13	-290.97	10.43	345.00	0.030
14	315.08	11.30	345.00	0.033
15	594.57	21.32	345.00	0.062
16	552.58	19.81	345.00	0.057
17	207.31	7.43	345.00	0.022
18	-405.85	14.55	345.00	0.042
19	-1287.04	46.14	345.00	0.134
20	-2437.15	87.37	345.00	0.253
21	-1052.52	37.73	345.00	0.109
22	81.51	2.92	345.00	0.008
23	964.66	34.58	345.00	0.100
24	1593.32	57.12	345.00	0.166
25	1966.45	70.50	345.00	0.204
26	2085.14	74.75	345.00	0.217
27	1947.23	69.81	345.00	0.202
28	1551.80	55.63	345.00	0.161
29	902.68	32.36	345.00	0.094
30	0.00	0.00	345.00	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Deflections
Tue Jan 13 13:41:58 2015

Girder 7 Service Deflections - mm

Tenth Pt	Total Noncomp Dead	Steel	Wet Con-crete	Super-Imposed Dead	Max LL+I Down	Max LL+I Up
Support	0	0	0	0	0	0
1	32	11	22	11	12	3
2	59	20	40	20	23	5
3	81	27	54	28	32	7
4	91	30	61	31	37	9
5	91	30	61	31	38	10
6	81	27	54	28	35	10
7	63	21	42	21	29	9
8	41	14	28	14	20	7
9	18	6	12	6	10	4
Support	0	0	0	0	0	0
11	-9	-3	-6	-2	7	4
12	-11	-3	-7	-2	15	7
13	-9	-3	-6	-1	21	9
14	-6	-2	-4	0	24	10
15	-3	-1	-2	1	25	9
16	-2	0	-1	1	22	8
17	-3	-1	-2	0	18	6
18	-4	-1	-2	0	12	4
19	-3	-1	-2	0	6	2
Support	0	0	0	0	0	0
21	9	3	6	3	6	3
22	22	7	15	7	12	4
23	35	12	23	12	17	5
24	45	15	30	15	20	6
25	50	17	34	17	21	6
26	50	17	34	17	21	5
27	45	15	30	15	18	4
28	34	11	23	11	13	3
29	18	6	12	6	7	2
Support	0	0	0	0	0	0

Influence surfaces for defl developed assuming unequal participation of girders in resisting deflection.

	Loc						
Brace	4.94	40	14	28	14	15	3
Brace	10.41	76	25	51	26	30	6
Brace	15.86	91	30	61	31	37	9
Brace	21.30	85	28	56	29	36	10
Brace	26.75	60	20	40	20	28	8
Web Spl	29.56	44	15	30	15	21	7
Brace	32.20	27	9	18	9	14	5
Brace	37.64	0	0	0	0	0	0
Brace	43.29	-10	-3	-7	-2	10	5
Web Spl	45.69	-10	-3	-6	-1	15	7
Brace	48.93	-9	-3	-6	-1	20	8
Brace	54.58	-4	-1	-3	0	24	9
Brace	60.25	-2	0	-1	1	22	8
Brace	65.37	-3	-1	-2	0	16	5
Web Spl	67.16	-3	-1	-2	0	13	4
Brace	70.49	-3	-1	-2	0	7	2
Brace	75.50	0	0	0	0	0	0
Brace	80.84	14	4	9	4	8	3
Web Spl	83.07	22	7	15	7	12	4
Brace	86.07	33	11	22	11	16	4
Brace	91.30	47	15	31	15	20	6
Brace	96.53	50	17	34	17	21	5
Brace	101.76	43	14	29	14	17	3
Brace	106.99	24	8	16	8	9	2

Positive dead load deflection is downward.
Live load deflection as indicated in column heading.

Live load includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Dimensions
Tue Jan 13 13:42:18 2015

Girder 7 Dimensions

Tenth Point	Loc	-Top Flange- tfw	tft	weld	----Web---- wd	wt	weld	-Bot Flange- bfw	bft	Area
0	0.00	600	32	8	1220	13	8	600	32	54260
1	3.76	600	32	8	1220	13	8	600	32	54260
2	7.53	600	32	8	1220	13	8	600	32	54260
3	11.29	600	32	8	1220	13	8	600	32	54260
4	15.06	600	32	8	1220	13	8	600	32	54260
5	18.82	600	32	8	1220	13	8	600	32	54260
6	22.58	600	32	8	1220	13	8	600	32	54260
7	26.35	600	32	8	1220	13	8	600	32	54260
SpL	29.56	600	32	8	1220	13	8	600	32	54260
SpR	29.56	600	32	8	1220	13	8	600	32	54260
8	30.11	600	32	8	1220	13	8	600	32	54260
9	33.88	600	32	8	1220	13	8	600	32	54260
10	37.64	600	32	8	1220	13	8	600	32	54260
11	41.43	600	32	8	1220	13	8	600	32	54260
12	45.21	600	32	8	1220	13	8	600	32	54260
SpL	45.69	600	32	8	1220	13	8	600	32	54260
SpR	45.69	600	32	8	1220	13	8	600	32	54260
13	49.00	600	32	8	1220	13	8	600	32	54260
14	52.79	600	32	8	1220	13	8	600	32	54260
15	56.57	600	32	8	1220	13	8	600	32	54260
16	60.36	600	32	8	1220	13	8	600	32	54260
17	64.14	600	32	8	1220	13	8	600	32	54260
SpL	67.16	600	32	8	1220	13	8	600	32	54260
SpR	67.16	600	32	8	1220	13	8	600	32	54260
18	67.93	600	32	8	1220	13	8	600	32	54260
19	71.72	600	32	8	1220	13	8	600	32	54260
20	75.50	600	32	8	1220	13	8	600	32	54260
21	79.16	600	32	8	1220	13	8	600	32	54260
22	82.82	600	32	8	1220	13	8	600	32	54260
SpL	83.07	600	32	8	1220	13	8	600	32	54260
SpR	83.07	600	32	8	1220	13	8	600	32	54260
23	86.49	600	32	8	1220	13	8	600	32	54260
24	90.15	600	32	8	1220	13	8	600	32	54260
25	93.81	600	32	8	1220	13	8	600	32	54260
26	97.47	600	32	8	1220	13	8	600	32	54260
27	101.13	600	32	8	1220	13	8	600	32	54260
28	104.79	600	32	8	1220	13	8	600	32	54260
29	108.45	600	32	8	1220	13	8	600	32	54260
30	112.11	600	32	8	1220	13	8	600	32	54260

Bearing Stiffeners

Location	Width	Thickness
0.00	150	19
37.64	150	19
75.50	150	19
112.11	150	19

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Elastic Noncomposite Section Properties at Web Splice
Tue Jan 13 13:43:08 2015

Girder 7 Elastic Noncomposite Section Properties at Web Splices

Splice Location	Web wd	Web wt	Top Flg tfw	Top Flg tft	Bott Flg bfw	Bott Flg bft	Area (mm2) x10**3	I (mm4) x10**5	na from Bott	na from Top
29.56L	1220	13	600	32	600	32	54	170184	642	642
29.56R	1220	13	600	32	600	32	54	170184	642	642
45.69L	1220	13	600	32	600	32	54	170184	642	642
45.69R	1220	13	600	32	600	32	54	170184	642	642
67.16L	1220	13	600	32	600	32	54	170184	642	642
67.16R	1220	13	600	32	600	32	54	170184	642	642
83.07L	1220	13	600	32	600	32	54	170184	642	642
83.07R	1220	13	600	32	600	32	54	170184	642	642

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Elastic Section Properties for Neg Mom Stress
Tue Jan 13 13:43:15 2015

Girder 7 Elastic Section Properties for Neg Mom Stress

	----- Noncomp -----			------ Comp ------ (n = 8)			------ Comp ------ (3n = 24)		
Tenth Point	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg
	x10**6			x10**6			x10**6		
0	17018	642	642	18919	685	599	18919	685	599
1	17018	642	642	18919	685	599	18919	685	599
2	17018	642	642	18919	685	599	18919	685	599
3	17018	642	642	18919	685	599	18919	685	599
4	17018	642	642	18919	685	599	18919	685	599
5	17018	642	642	18919	685	599	18919	685	599
6	17018	642	642	18919	685	599	18919	685	599
7	17018	642	642	18919	685	599	18919	685	599
8	17018	642	642	18919	685	599	18919	685	599
9	17018	642	642	18919	685	599	18919	685	599
10	17018	642	642	18919	685	599	18919	685	599
11	17018	642	642	18919	685	599	18919	685	599
12	17018	642	642	18919	685	599	18919	685	599
13	17018	642	642	18919	685	599	18919	685	599
14	17018	642	642	18919	685	599	18919	685	599
15	17018	642	642	18919	685	599	18919	685	599
16	17018	642	642	18919	685	599	18919	685	599
17	17018	642	642	18919	685	599	18919	685	599
18	17018	642	642	18919	685	599	18919	685	599
19	17018	642	642	18919	685	599	18919	685	599
20	17018	642	642	18919	685	599	18919	685	599
21	17018	642	642	18919	685	599	18919	685	599
22	17018	642	642	18919	685	599	18919	685	599
23	17018	642	642	18919	685	599	18919	685	599
24	17018	642	642	18919	685	599	18919	685	599
25	17018	642	642	18919	685	599	18919	685	599
26	17018	642	642	18919	685	599	18919	685	599
27	17018	642	642	18919	685	599	18919	685	599
28	17018	642	642	18919	685	599	18919	685	599
29	17018	642	642	18919	685	599	18919	685	599
30	17018	642	642	18919	685	599	18919	685	599

Composite properties assume reinforcment is present
in negative moment regions if COMSPC is not used.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Elastic Section Properties for Pos Mom Stress
Tue Jan 13 13:43:24 2015

Girder 7 Elastic Section Properties for Pos Mom Stress

	----- Noncomp -----			------ Comp ------ (n = 8)			------ Comp ------ (3n = 24)		
Tenth Point	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg
	x10**6			x10**6			x10**6		
0	17018	642	642	31531	971	313	23651	793	491
1	17018	642	642	31531	971	313	23651	793	491
2	17018	642	642	31531	971	313	23651	793	491
3	17018	642	642	31531	971	313	23651	793	491
4	17018	642	642	31531	971	313	23651	793	491
5	17018	642	642	31531	971	313	23651	793	491
6	17018	642	642	31531	971	313	23651	793	491
7	17018	642	642	31531	971	313	23651	793	491
8	17018	642	642	31531	971	313	23651	793	491
9	17018	642	642	31531	971	313	23651	793	491
10	17018	642	642	31531	971	313	23651	793	491
11	17018	642	642	31531	971	313	23651	793	491
12	17018	642	642	31531	971	313	23651	793	491
13	17018	642	642	31531	971	313	23651	793	491
14	17018	642	642	31531	971	313	23651	793	491
15	17018	642	642	31531	971	313	23651	793	491
16	17018	642	642	31531	971	313	23651	793	491
17	17018	642	642	31531	971	313	23651	793	491
18	17018	642	642	31531	971	313	23651	793	491
19	17018	642	642	31531	971	313	23651	793	491
20	17018	642	642	31531	971	313	23651	793	491
21	17018	642	642	31531	971	313	23651	793	491
22	17018	642	642	31531	971	313	23651	793	491
23	17018	642	642	31531	971	313	23651	793	491
24	17018	642	642	31531	971	313	23651	793	491
25	17018	642	642	31531	971	313	23651	793	491
26	17018	642	642	31531	971	313	23651	793	491
27	17018	642	642	31531	971	313	23651	793	491
28	17018	642	642	31531	971	313	23651	793	491
29	17018	642	642	31531	971	313	23651	793	491
30	17018	642	642	31531	971	313	23651	793	491

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Elastic Section Properties for Stiffness Analysis
Tue Jan 13 13:43:34 2015

Girder 7 Elastic Section Properties for Stiffness Analysis

	----- Noncomp -----			------ Comp ------ (n = 8)			------ Comp ------ (3n = 24)		
Tenth Point	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg
	x10**6			x10**6			x10**6		
0	17018	642	642	31531	971	313	23651	793	491
1	17018	642	642	31531	971	313	23651	793	491
2	17018	642	642	31531	971	313	23651	793	491
3	17018	642	642	31531	971	313	23651	793	491
4	17018	642	642	31531	971	313	23651	793	491
5	17018	642	642	31531	971	313	23651	793	491
6	17018	642	642	31531	971	313	23651	793	491
7	17018	642	642	31531	971	313	23651	793	491
8	17018	642	642	31531	971	313	23651	793	491
9	17018	642	642	31531	971	313	23651	793	491
10	17018	642	642	31531	971	313	23651	793	491
11	17018	642	642	31531	971	313	23651	793	491
12	17018	642	642	31531	971	313	23651	793	491
13	17018	642	642	31531	971	313	23651	793	491
14	17018	642	642	31531	971	313	23651	793	491
15	17018	642	642	31531	971	313	23651	793	491
16	17018	642	642	31531	971	313	23651	793	491
17	17018	642	642	31531	971	313	23651	793	491
18	17018	642	642	31531	971	313	23651	793	491
19	17018	642	642	31531	971	313	23651	793	491
20	17018	642	642	31531	971	313	23651	793	491
21	17018	642	642	31531	971	313	23651	793	491
22	17018	642	642	31531	971	313	23651	793	491
23	17018	642	642	31531	971	313	23651	793	491
24	17018	642	642	31531	971	313	23651	793	491
25	17018	642	642	31531	971	313	23651	793	491
26	17018	642	642	31531	971	313	23651	793	491
27	17018	642	642	31531	971	313	23651	793	491
28	17018	642	642	31531	971	313	23651	793	491
29	17018	642	642	31531	971	313	23651	793	491
30	17018	642	642	31531	971	313	23651	793	491

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Factored Strengths
Tue Jan 13 13:43:58 2015

Girder 7 Factored Strengths

Tenth Point	Loc	Factored Shear (kN)	Shear Strength (kN)		Ratio	Factored Moment (kN-m)	Bending Strength (kN-m)		Ratio
0	0.00	904.5	1588.9	(5)	0.569	0.1	9669.4	(10)	0.000
1	3.76	796.4	1588.9	(5)	0.501	3113.2	10177.9	(10)	0.306
2	7.53	630.8	1588.9	(5)	0.397	5504.2	9907.9	(10)	0.556
3	11.29	345.6	1588.9	(5)	0.218	7089.1	10033.1	(10)	0.707
4	15.06	213.7	1588.9	(5)	0.134	7594.0	9999.8	(10)	0.759
5	18.82	408.2	1588.9	(5)	0.257	7103.3	9886.7	(10)	0.718
6	22.58	645.3	1588.9	(5)	0.406	5836.9	9882.5	(10)	0.591
7	26.35	769.1	1588.9	(5)	0.484	3776.2	10244.8	(10)	0.369
8	30.11	959.3	1588.9	(5)	0.604	1579.6	9115.5	(10)	0.173
9	33.88	987.4	1588.9	(5)	0.621	4197.3	9191.6	(10)	0.457
10L	37.64	1102.3	1588.9	(5)	0.694	7537.1	7686.0	(10)	0.981
10R	37.64	903.0	1588.8	(5)	0.568	7537.1	7686.0	(10)	0.981
11	41.43	775.2	1588.8	(5)	0.488	5117.4	9149.1	(10)	0.559
12	45.21	723.1	1588.8	(5)	0.455	3470.2	9138.6	(10)	0.380
13	49.00	530.7	1588.8	(5)	0.334	2126.9	9026.0	(10)	0.236
14	52.79	400.6	1588.8	(5)	0.252	3077.8	10527.2	(10)	0.292
15	56.57	188.7	1588.8	(5)	0.119	3474.7	10438.3	(10)	0.333
16	60.36	335.9	1588.8	(5)	0.211	3134.0	12109.9	(20)	0.259
17	64.14	477.0	1588.8	(5)	0.300	2143.0	12109.9	(20)	0.177
18	67.93	607.2	1588.8	(5)	0.382	1601.0	9075.2	(10)	0.176
19	71.72	753.9	1588.8	(5)	0.474	3372.0	9045.2	(10)	0.373
20L	75.50	919.5	1588.8	(5)	0.579	6055.0	9038.0	(10)	0.670
20R	75.50	1010.6	1589.0	(5)	0.636	6055.0	9038.0	(10)	0.670
21	79.16	854.2	1589.0	(5)	0.538	3119.6	9014.8	(10)	0.346
22	82.82	713.9	1589.0	(5)	0.449	1341.6	12109.9	(20)	0.111
23	86.49	572.3	1589.0	(5)	0.360	3166.5	12109.9	(20)	0.261
24	90.15	437.9	1589.0	(5)	0.276	4464.0	12109.9	(20)	0.369
25	93.81	303.0	1589.0	(5)	0.191	5202.9	12109.9	(20)	0.430
26	97.47	182.7	1589.0	(5)	0.115	5400.8	12109.9	(20)	0.446
27	101.13	311.5	1589.0	(5)	0.196	5025.6	12109.9	(20)	0.415
28	104.79	457.8	1589.0	(5)	0.288	4000.6	11937.3	(20)	0.335
29	108.45	613.8	1589.0	(5)	0.386	2356.0	11527.1	(20)	0.204
30	112.11	751.0	1589.0	(5)	0.473	0.0	9713.0	(10)	0.000

(5) C 0.58 Fyw D t
(20) compact section
(10) Fby=Fbs*Pb*Pw (noncompact section)
Maximum moment in factored strength expression

Concurrent Factored Moment with Max Shear at Piers

Reaction	Concurrent Moment Left	Concurrent Moment Right

Max Web Slenderness for Unstiffened Web - 6.2

Tenth Pt.	Max D/tw	Actual D/tw
0	150.00	93.85
1	150.00	93.85
2	100.00	93.85
3	100.00	93.85
4	100.00	93.85
5	100.00	93.85
6	100.00	93.85
7	100.00	93.85
8	100.00	93.85

9	100.00	93.85
10	100.00	93.85
11	100.00	93.85
12	100.00	93.85
13	100.00	93.85
14	100.00	93.85
15	100.00	93.85
16	150.00	93.85
17	150.00	93.85
18	150.00	93.85
19	150.00	93.85
20	150.00	93.85
21	150.00	93.85
22	150.00	93.85
23	150.00	93.85
24	150.00	93.85
25	150.00	93.85
26	150.00	93.85
27	150.00	93.85
28	150.00	93.85
29	150.00	93.85
30	150.00	93.85

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Fatigue Stress
Tue Jan 13 13:44:14 2015

Girder 7 Fatigue Summary

Condition	Location from Left End of Girder	Category (Table 6.6.1.2.3-1)	Force Range (kN-m)	Actual Stress Range	Allowable Stress Range	Ratio
Base metal	3.76	B	374.12	11.53	55.16	0.209
Base metal	7.53	B	652.23	22.54	55.16	0.409
Base metal	11.29	B	852.59	27.20	55.16	0.493
Base metal	15.06	B	929.85	30.43	55.16	0.552
Base metal	18.82	B	926.25	31.72	55.16	0.575
Base metal	22.58	B	882.31	27.46	55.16	0.498
Base metal	26.35	B	761.97	26.52	55.16	0.481
Near flg-web weld	3.76	B	374.12	11.15	55.16	0.202
Near flg-web weld	7.53	B	652.23	19.43	55.16	0.352
Near flg-web weld	11.29	B	852.59	25.40	55.16	0.460
Near flg-web weld	15.06	B	929.85	27.70	55.16	0.502
Near flg-web weld	18.82	B	926.25	27.59	55.16	0.500
Near flg-web weld	22.58	B	882.31	26.28	55.16	0.477
Near flg-web weld	26.35	B	761.97	22.70	55.16	0.412
Cat. B at top flange	29.56	B	595.51	13.33	55.16	0.242
Cat. B at bot flange	29.56	B	595.51	23.41	55.16	0.425
Base metal	30.11	C	570.19	5.66	34.47	0.164
Base metal	33.88	C	423.53	4.20	34.47	0.122
Base metal	37.64	C	586.57	5.82	34.47	0.169
Base metal	41.43	C	614.77	6.10	34.47	0.177
Base metal	45.21	C	782.56	7.76	34.47	0.225
Near flg-web weld	30.11	B	570.19	5.36	55.16	0.097
Near flg-web weld	33.88	B	423.53	3.98	55.16	0.072
Near flg-web weld	37.64	B	586.57	5.51	55.16	0.100
Near flg-web weld	41.43	B	614.77	5.77	55.16	0.105
Near flg-web weld	45.21	B	782.56	7.35	55.16	0.133
Cat. B at top flange	45.69	B	800.18	18.53	55.16	0.336
Cat. B at bot flange	45.69	B	800.18	35.38	55.16	0.641
Rebars	37.64		1032.58	42.30	137.90	0.307
Base metal	49.00	C	900.71	8.94	34.47	0.259
Base metal	52.79	B	890.59	29.44	55.16	0.534
Base metal	56.57	B	801.24	27.04	55.16	0.490
Base metal	60.36	B	717.21	23.06	55.16	0.418
Base metal	64.14	B	634.21	20.71	55.16	0.376
Near flg-web weld	49.00	B	900.71	26.83	55.16	0.486
Near flg-web weld	52.79	B	890.59	26.53	55.16	0.481
Near flg-web weld	56.57	B	801.24	23.87	55.16	0.433
Near flg-web weld	60.36	B	717.21	22.30	55.16	0.404
Near flg-web weld	64.14	B	634.21	20.03	55.16	0.363
Cat. B at top flange	67.16	B	533.79	11.39	55.16	0.207
Cat. B at bot flange	67.16	B	533.79	19.15	55.16	0.347
Base metal	67.93	C	511.41	10.77	34.47	0.312
Base metal	71.72	C	420.66	10.91	34.47	0.317
Base metal	75.50	C	594.61	14.82	34.47	0.430
Base metal	79.16	C	507.82	12.66	34.47	0.367
Base metal	82.82	B	560.73	18.87	55.16	0.342
Near flg-web weld	67.93	B	511.41	10.19	55.16	0.185
Near flg-web weld	71.72	B	420.66	10.33	55.16	0.187
Near flg-web weld	75.50	B	594.61	14.03	55.16	0.254
Near flg-web weld	79.16	B	507.82	11.98	55.16	0.217
Near flg-web weld	82.82	B	560.73	18.25	55.16	0.331
Cat. B at top flange	83.07	B	566.58	12.67	55.16	0.230
Cat. B at bot flange	83.07	B	566.58	20.48	55.16	0.371
Rebars	75.50		1065.72	43.65	137.90	0.317
Base metal	86.49	B	677.65	22.20	55.16	0.402
Base metal	90.15	B	747.59	24.12	55.16	0.437
Base metal	93.81	B	759.50	24.28	55.16	0.440
Base metal	97.47	B	741.42	23.52	55.16	0.426
Base metal	101.13	B	676.28	21.33	55.16	0.387

Base metal	104.79	B	530.98	16.69	55.16	0.303
Base metal	108.45	B	315.88	9.89	55.16	0.179
Near flg-web weld	86.49	B	677.65	21.47	55.16	0.389
Near flg-web weld	90.15	B	747.59	23.33	55.16	0.423
Near flg-web weld	93.81	B	759.50	23.48	55.16	0.426
Near flg-web weld	97.47	B	741.42	22.75	55.16	0.412
Near flg-web weld	101.13	B	676.28	20.63	55.16	0.374
Near flg-web weld	104.79	B	530.98	16.14	55.16	0.293
Near flg-web weld	108.45	B	315.88	9.57	55.16	0.173
Cat. B at top flange	112.11	B	0.02	0.00	55.16	0.000
Cat. B at bot flange	112.11	B	0.02	0.00	55.16	0.000

Allowable range determined by:

Life 75 yrs

Avg daily trk traffic 4000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Governing Service Moment
Tue Jan 13 13:52:13 2015

Girder 7 Service Moment - kN-m

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I		Min LL+I		Range
0	0.00	0.00	-0.01	0.02	T	-0.03	T	0.04
1	3.76	902.93	421.53	640.92	T	-97.64	T	738.56
2	7.53	1603.00	734.30	1135.73	T	-195.61	T	1331.34
3	11.29	2067.02	924.75	1473.89	T	-290.79	T	1764.68
4	15.06	2210.37	975.42	1590.27	T	-376.21	T	1966.48
5	18.82	2025.56	889.51	1526.34	T	-448.05	T	1974.39
6	22.58	1568.82	674.95	1345.01	T	-510.43	T	1855.44
7	26.35	833.72	334.30	1039.95	T	-560.11	T	1600.05
Top flg.spl	29.56	21.28	-39.22	684.75		-568.39		1253.15
Bot.flg.spl	29.56	21.28	-39.22	684.75		-568.39		1253.15
8	30.11	-127.26	-109.32	626.87	T	-585.91	T	1212.78
9	33.88	-1208.20	-632.74	257.56	L	-831.00	L	1088.56
10	37.64	-2385.34	-1227.45	181.34	T	-1308.37	L	1489.71
11	41.43	-1563.00	-772.03	312.23	T	-958.92	L	1271.15
12	45.21	-836.29	-389.95	719.38	T	-864.14	T	1583.52
Top flg.spl	45.69	-751.68	-347.06	765.72		-854.80		1620.52
Bot.flg.spl	45.69	-751.68	-347.06	765.72		-854.80		1620.52
13	49.00	-207.84	-81.96	1056.42	T	-806.17	L	1862.58
14	52.79	225.06	135.76	1201.64	T	-736.54	L	1938.18
15	56.57	424.69	233.57	1206.32	T	-640.50	L	1846.82
16	60.36	394.70	211.76	1080.44	T	-546.66	L	1627.10
17	64.14	148.08	96.48	840.68	T	-480.01	L	1320.69
Top flg.spl	67.16	-185.32	-69.34	591.61		-469.47		1061.08
Bot.flg.spl	67.16	-185.32	-69.34	591.61		-469.47		1061.08
18	67.93	-289.89	-123.10	534.31	T	-490.15	T	1024.46
19	71.72	-919.32	-455.13	289.67	L	-730.18	L	1019.86
20	75.50	-1740.82	-906.74	393.21	T	-1203.66	L	1596.86
21	79.16	-751.80	-390.02	371.32	L	-753.20	L	1124.52
22	82.82	58.22	15.84	573.61	L	-557.42	T	1131.03
Top flg.spl	83.07	106.17	39.21	590.13		-549.06		1139.19
Bot.flg.spl	83.07	106.17	39.21	590.13		-549.06		1139.19
23	86.49	689.04	313.82	858.02	T	-495.19	T	1353.22
24	90.15	1138.08	525.20	1060.21	T	-434.31	T	1494.52
25	93.81	1404.61	652.05	1164.99	T	-370.63	T	1535.62
26	97.47	1489.38	690.06	1182.66	T	-303.99	T	1486.65
27	101.13	1390.88	649.87	1092.88	T	-232.96	T	1325.84
28	104.79	1108.43	531.53	860.73	T	-157.59	T	1018.33
29	108.45	644.77	315.64	510.13	T	-79.88	T	590.01
30	112.11	0.00	-0.01	0.02	T	-0.02	T	0.04

T - governed by truck loading
L - governed by lane loading

Range shown in this table not used for fatigue.

At Bracing

Brace No.

2	4.94	1143.83	531.10	811.48	-128.26
3	10.41	1986.95	892.62	1414.47	-269.34
4	15.86	2198.57	968.60	1591.78	-392.61
5	21.30	1755.61	762.17	1420.65	-490.61
6	26.75	742.13	291.95	1001.10	-563.99
7	32.20	-713.70	-390.24	386.23	-692.87
8	37.64	-2385.34	-1227.45	181.34	-1308.37
9	43.29	-1193.85	-575.06	477.84	-880.51
10	48.93	-217.15	-86.57	1052.17	-807.28

11	54.58	348.66	197.02	1221.38	-694.36
12	60.25	398.57	213.68	1085.62	-548.96
13	65.37	27.25	36.82	748.80	-474.89
14	70.49	-694.33	-334.45	330.81	-626.84
15	75.50	-1740.82	-906.74	393.21	-1203.66
16	80.84	-358.75	-190.46	436.11	-631.96
17	86.07	626.52	284.32	829.85	-502.20
18	91.30	1241.71	574.27	1103.72	-414.56
19	96.53	1485.12	687.76	1188.37	-321.50
20	101.76	1355.38	635.08	1063.07	-220.30
21	106.99	851.65	413.81	669.28	-111.17

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Governing Service Shear
Tue Jan 13 13:52:20 2015

Girder 7 Service Shear -kN

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I		Range
0	0.00	264.85	128.55	181.06	T	206.60
1	3.76	215.01	95.47	180.90	T	199.06
2	7.53	159.06	68.32	154.41	T	172.80
3	11.29	63.01	30.01	103.49	T	166.77
4	15.06	13.18	-3.08	92.38	T	171.11
5	18.82	-84.10	-40.24	-113.57	T	167.53
6	22.58	-170.41	-73.97	-150.91	T	182.14
7	26.35	-220.24	-107.06	-158.25	T	183.25
Top flg.spl.	29.56	-276.01	-130.97	-189.99		203.01
Bot flg.spl.	29.56	-276.01	-130.97	-189.99		203.01
8	30.11	-281.57	-133.70	-193.21	T	205.28
9	33.88	-287.98	-141.50	-197.63	T	211.85
10	37.64L	-337.81	-174.59	-200.92	L	215.25
10	37.64R	242.30	136.94	188.83	L	220.35
11	41.43	192.17	103.66	179.91	T	211.66
12	45.21	191.11	97.81	160.06	T	187.79
Top flg.spl.	45.69	187.38	95.81	155.88		184.68
Bot flg.spl.	45.69	187.38	95.81	155.88		184.68
13	49.00	139.42	74.15	116.56	L	162.57
14	52.79	89.29	40.87	106.56	T	169.11
15	56.57	17.39	10.64	-103.72	T	169.94
16	60.36	-40.09	-13.81	-122.46	T	172.58
17	64.14	-90.21	-47.09	-137.49	T	175.82
Top flg.spl.	67.16	-130.66	-66.40	-148.87		185.27
Bot flg.spl.	67.16	-130.66	-66.40	-148.87		185.27
18	67.93	-140.99	-71.92	-152.19	T	188.96
19	71.72	-191.83	-102.59	-170.94	T	214.58
20	75.50L	-241.95	-135.87	-197.28	L	243.11
20	75.50R	294.43	157.26	195.01	L	212.56
21	79.16	245.96	125.08	171.26	T	182.90
22	82.82	196.69	96.39	153.33	T	161.85
Top flg.spl.	83.07	193.37	94.68	151.98		161.21
Bot flg.spl.	83.07	193.37	94.68	151.98		161.21
23	86.49	146.91	73.84	131.45	T	162.17
24	90.15	98.44	41.66	117.81	T	161.55
25	93.81	47.95	22.74	97.25	T	157.02
26	97.47	-2.68	5.11	82.71	T	159.07
27	101.13	-51.14	-27.07	-96.67	T	158.08
28	104.79	-101.77	-46.18	-122.27	T	161.34
29	108.45	-151.91	-70.14	-149.77	T	166.67
30	112.11	-200.38	-102.32	-164.68	T	177.23

Ranges shown in this table not used for fatigue.

T - governed by truck loading
L - governed by lane loading

Live shear in Governing Shear table includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Lateral Bending in Flanges
Tue Jan 13 13:52:28 2015

Factored Lateral Bending in Bottom Flange
From Curvature

Brace Location (m)	Primary Bending Stress (MPa)	Lateral Bending Stress (MPa)	Lateral ------- Primary	Perf Ratio	Lateral ------- .5 Fy	Perf Ratio
0.00	0.00	0.00	0.000	0.000	0.000	0.000
4.94	133.53	0.23	0.002	0.003	0.001	0.001
10.41	230.96	65.51	0.284	0.567	0.380	0.380
15.86	256.48	72.53	0.283	0.566	0.420	0.420
21.30	214.27	60.81	0.284	0.568	0.353	0.353
26.75	114.20	33.46	0.293	0.586	0.194	0.194
32.20	107.81	28.03	0.260	0.520	0.162	0.162
37.64	277.61	75.00	0.270	0.540	0.435	0.435
43.29	154.80	43.31	0.280	0.560	0.251	0.251
48.93	78.18	21.74	0.278	0.556	0.126	0.126
54.58	107.16	34.19	0.319	0.638	0.198	0.198
60.25	101.45	0.00	0.000	0.000	0.000	0.000
65.37	44.30	0.00	0.000	0.000	0.000	0.000
70.49	99.06	0.00	0.000	0.000	0.000	0.000
75.50	222.67	0.00	0.000	0.000	0.000	0.000
80.84	72.79	0.00	0.000	0.000	0.000	0.000
86.07	98.58	0.00	0.000	0.000	0.000	0.000
91.30	159.71	0.00	0.000	0.000	0.000	0.000
96.53	182.27	0.00	0.000	0.000	0.000	0.000
101.76	165.26	0.00	0.000	0.000	0.000	0.000
106.99	104.58	0.00	0.000	0.000	0.000	0.000
112.11	0.00	0.00	0.000	0.000	0.000	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Max Performance Ratios
Tue Jan 13 13:53:19 2015

Girder 7 Maximum Performance Ratios

Criterion	Location m	Max Performance Ratio
Shear	37.64	0.694
Bending	37.64	0.981
Bolted web spl.	354.72	0.860
Fatigue	45.69	0.641
Bearing Stf.	75.50	0.790

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Reactions
Tue Jan 13 13:54:13 2015

Girder 7 Factored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	351.63	177.81	435.13	-83.27	964.57	185.09
	Steel 116.44					
	Conc 235.18					
37.64	585.79	325.88	525.06	-39.99	1436.72	505.81
	Steel 194.20					
	Conc 391.59					
75.50	698.65	383.52	666.60	-154.91	1748.77	388.83
	Steel 231.75					
	Conc 466.90					
112.11	265.85	136.04	353.15	-61.93	755.04	142.00
	Steel 88.34					
	Conc 177.51					

Unfactored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	270.48	136.78	200.43	-38.35	607.69	368.91
	Steel 89.57					
	Conc 180.91					
37.64	450.61	250.68	241.85	-18.42	943.13	682.86
	Steel 149.39					
	Conc 301.22					
75.50	537.42	295.02	307.05	-71.35	1139.49	761.08
	Steel 178.27					
	Conc 359.15					
112.11	204.50	104.64	162.67	-28.52	471.81	280.62
	Steel 67.96					
	Conc 136.54					

Reactions in girder output include weight in girder extensions
at abutments, which is not included in girder system output.

Live reaction includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Shear Connectors - 2003 Guide Spec Fatigue Truck
Tue Jan 13 13:54:55 2015

Given Pitch for 22 x 114 Stud Connectors for Fatigue

Tenth Point	Loc (m)	Given Pitch (mm)	Studs in a Line	Actual Shear Range (kN)	Shear Range Capacity (kN)	Ratio
0	0.00	300.00	3	97.43 T	162.00	0.601
1	3.76	300.00	3	97.54 T	162.00	0.602
2	7.53	300.00	3	83.13 T	152.26	0.546
3	11.29	300.00	3	74.04 T	142.95	0.518
4	15.06	300.00	3	79.76 T	142.56	0.559
5	18.82	300.00	3	84.48 T	144.45	0.585
6	22.58	300.00	3	86.81 T	146.58	0.592
7	26.35	300.00	3	92.23 T	151.31	0.610
8	30.11	300.00	3	100.42 T	156.68	0.641
9	33.88	300.00	3	106.10 T	159.30	0.666
10	37.64	300.00	3	111.43 T	157.24	0.709
11	41.43	300.00	3	109.18 T	156.59	0.697
12	45.21	300.00	3	98.07 T	151.66	0.647
13	49.00	300.00	3	76.75 T	141.81	0.541
14	52.79	300.00	3	81.72 T	144.14	0.567
15	56.57	300.00	3	78.75 T	146.11	0.539
16	60.36	300.00	3	78.55 T	162.00	0.485
17	64.14	300.00	3	82.79 T	162.00	0.511
18	67.93	300.00	3	89.79 T	162.00	0.554
19	71.72	300.00	3	102.35 T	162.00	0.632
20	75.50	300.00	3	110.66 T	162.00	0.683
21	79.16	300.00	3	105.15 T	162.00	0.649
22	82.82	300.00	3	93.40 T	162.00	0.577
23	86.49	300.00	3	91.39 T	162.00	0.564
24	90.15	300.00	3	88.54 T	162.00	0.547
25	93.81	300.00	3	86.97 T	162.00	0.537
26	97.47	300.00	3	84.32 T	162.00	0.521
27	101.13	300.00	3	82.56 T	162.00	0.510
28	104.79	300.00	3	80.03 T	162.00	0.494
29	108.45	300.00	3	83.69 T	162.00	0.517
30	112.11	300.00	3	96.40 T	162.00	0.595

* Use 610 mm as per AASHTO 10.38.5.1.

Minimum Total Number of Connectors for Ultimate Strength

Beg TP	End TP	Beg Loc	End Loc	Number
0	4	0.00	15.06	53
	(153 provided)			
4	10	15.06	37.64	82
	(228 provided)			
10	15	37.64	56.57	81
	(192 provided)			
15	20	56.57	75.50	81
	(192 provided)			
20	26	75.50	97.47	80
	(222 provided)			

26	30	97.47	112.11	52

(147 provided)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Shear Strength at Web Splices
Tue Jan 13 13:55:07 2015

Girder 7 Shear Strength at Web Splice

Splice Location	Web Depth	Web t Left of Spl	Web t Right of Spl	Factored Shear at Spl	Shear Strngth Left of Splice	Perf Ratio	Shear Strngth Right of Splice	Perf Ratio
m	mm	mm	mm	kN	kN		kN	
29.56	1220	13	13	946.61	1587.19	0.596	1587.19	0.596
45.69	1220	13	13	712.79	1587.19	0.449	1587.19	0.449
67.16	1220	13	13	584.84	1587.19	0.368	1587.19	0.368
83.07	1220	13	13	712.92	1587.19	0.449	1587.19	0.449

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Slab and Rebar Factored Stress - Group I Loading
Tue Jan 13 13:55:17 2015

Girder 7 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Slab Comp Dead	Slab Max LL+I	Slab Tot	Rebars Comp Dead	Rebars Min LL+I	Rebars Tot
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	3.76	-0.73	-3.18	-3.91	0.00	8.68	8.68
2	7.53	-1.27	-5.63	-6.90	0.00	17.40	17.40
3	11.29	-1.60	-7.31	-8.91	0.00	25.86	25.86
4	15.06	-1.69	-7.89	-9.58	0.00	33.46	33.46
5	18.82	-1.54	-7.57	-9.11	0.00	39.84	39.84
6	22.58	-1.17	-6.67	-7.84	0.00	45.39	45.39
7	26.35	-0.58	-5.16	-5.74	0.00	49.81	49.81
8	30.11	0.00	-3.11	-3.11	5.82	52.10	57.93
9	33.88	0.00	-1.28	-1.28	33.69	73.90	107.59
10	37.64	0.00	-0.90	-0.90	65.36	116.35	181.71
11	41.43	0.00	-1.55	-1.55	41.11	85.27	126.39
12	45.21	0.00	-3.57	-3.57	20.77	76.85	97.61
13	49.00	0.00	-5.24	-5.24	4.36	71.69	76.06
14	52.79	-0.23	-5.96	-6.20	0.00	65.50	65.50
15	56.57	-0.40	-5.98	-6.39	0.00	56.96	56.96
16	60.36	-0.37	-5.36	-5.73	0.00	48.61	48.61
17	64.14	-0.17	-4.17	-4.34	0.00	42.69	42.69
18	67.93	0.00	-2.65	-2.65	6.56	43.59	50.14
19	71.72	0.00	-1.44	-1.44	24.24	64.93	89.17
20	75.50	0.00	-1.95	-1.95	48.28	107.04	155.32
21	79.16	0.00	-1.84	-1.84	20.77	66.98	87.75
22	82.82	-0.03	-2.85	-2.87	0.00	49.57	49.57
23	86.49	-0.54	-4.26	-4.80	0.00	44.04	44.04
24	90.15	-0.91	-5.26	-6.17	0.00	38.62	38.62
25	93.81	-1.13	-5.78	-6.91	0.00	32.96	32.96
26	97.47	-1.19	-5.87	-7.06	0.00	27.03	27.03
27	101.13	-1.12	-5.42	-6.55	0.00	20.72	20.72
28	104.79	-0.92	-4.27	-5.19	0.00	14.01	14.01
29	108.45	-0.55	-2.53	-3.08	0.00	7.10	7.10
30	112.11	0.00	0.00	0.00	0.00	0.00	0.00

Only slab compression stresses tabulated.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Top Flange Factored Bending Stress - Group I Loadin
Tue Jan 13 13:55:27 2015

Girder 7 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Top Flange: Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	LL+I Rng	Tot	Allow	Ratio
0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000
1	3.76	-44.3	-11.4	-13.8	6.7	20.5	-69.5	345.0	0.201
2	7.53	-78.6	-19.8	-24.5	13.5	37.9	-122.9	345.0	0.356
3	11.29	-101.4	-25.0	-31.8	20.0	51.7	-158.1	345.0	0.458
4	15.06	-108.4	-26.3	-34.3	25.9	60.1	-169.0	345.0	0.490
5	18.82	-99.4	-24.0	-32.9	30.8	63.7	-156.3	345.0	0.453
6	22.58	-76.9	-18.2	-29.0	35.1	64.1	-124.1	333.1	0.373
7	26.35	-40.9	-9.0	-22.4	38.5	60.9	-72.3	343.4	0.211
Top Flg.Spl.		-1.0	1.6	-14.8	39.1	53.8	39.7	345.0	0.115
Top Flg.Spl.		-1.0	1.6	-14.8	39.1	53.8	39.7	345.0	0.115
8	30.11	6.2	4.5	-13.5	40.3	53.8	51.0	345.0	0.148
9	33.88	59.3	26.1	-5.5	57.1	62.7	142.5	345.0	0.413
10	37.64	117.0	50.5	-3.9	90.0	93.9	257.5	345.0	0.746
11	41.43	76.7	31.8	-6.7	65.9	72.7	174.4	345.0	0.505
12	45.21	41.0	16.1	-15.5	59.4	74.9	116.5	345.0	0.338
Top Flg.Spl.		36.9	14.3	-16.5	58.8	75.3	109.9	345.0	0.319
Top Flg.Spl.		36.9	14.3	-16.5	58.8	75.3	109.9	345.0	0.319
13	49.00	10.2	3.4	-22.8	55.4	78.2	69.0	345.0	0.200
14	52.79	-11.0	-3.7	-25.9	50.6	76.5	-40.6	344.1	0.118
15	56.57	-20.8	-6.3	-26.0	44.0	70.0	-53.1	345.0	0.154
16	60.36	-19.4	-5.7	-23.3	37.6	60.9	-48.4	345.0	0.140
17	64.14	-7.3	-2.6	-18.1	33.0	51.1	-28.0	345.0	0.081
Top Flg.Spl.		9.1	2.9	-12.7	32.3	45.0	44.2	345.0	0.128
Top Flg.Spl.		9.1	2.9	-12.7	32.3	45.0	44.2	345.0	0.128
18	67.93	14.2	5.1	-11.5	33.7	45.2	53.0	345.0	0.154
19	71.72	45.1	18.7	-6.2	50.2	56.5	114.0	345.0	0.331
20	75.50	85.4	37.3	-8.5	82.8	91.2	205.5	345.0	0.596
21	79.16	36.9	16.1	-8.0	51.8	59.8	104.7	345.0	0.304
22	82.82	-2.9	-0.4	-12.4	38.3	50.7	35.0	345.0	0.102
Top Flg.Spl.		-5.2	-1.1	-12.7	37.8	50.5	31.5	345.0	0.091
Top Flg.Spl.		-5.2	-1.1	-12.7	37.8	50.5	31.5	345.0	0.091
23	86.49	-33.8	-8.5	-18.5	34.1	52.5	-60.8	345.0	0.176
24	90.15	-55.8	-14.2	-22.8	29.9	52.7	-92.8	345.0	0.269
25	93.81	-68.9	-17.6	-25.1	25.5	50.6	-111.6	345.0	0.323
26	97.47	-73.1	-18.6	-25.5	20.9	46.4	-117.2	345.0	0.340
27	101.13	-68.2	-17.5	-23.5	16.0	39.6	-109.3	345.0	0.317
28	104.79	-54.4	-14.4	-18.5	10.8	29.4	-87.3	345.0	0.253
29	108.45	-31.6	-8.5	-11.0	5.5	16.5	-51.1	345.0	0.148
30	112.11	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000

Lateral bending stress not included in the above factored stresses.

Allowable tension stress does not consider the effect of
net section from bolted flange splice holes.

Governing expression for allowable compression stress

Tenth Pt	Expression
1	(5-8)
2	(5-8)
3	(5-8)
4	(5-8)
5	(5-8)
6	(5-8)
7	(5-8)
14	(5-8)
15	(5-8)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Top Flange Overload Stress
Tue Jan 13 13:55:38 2015

Girder 7 Top Flange 10.57 Overload Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.00	0.00	0.00	327.75	0.000
1	3.76	-34.08	-8.76	-10.62	5.16	327.75	0.163
2	7.53	-68.46	-15.25	-18.82	10.35	327.75	0.313
3	11.29	-81.18	-19.21	-24.42	15.38	327.75	0.381
4	15.06	-88.79	-20.26	-26.35	19.90	327.75	0.413
5	18.82	-85.53	-18.48	-25.29	23.70	327.75	0.395
6	22.58	-59.87	-14.02	-22.29	27.00	327.75	0.293
7	26.35	-34.86	-6.94	-17.23	29.63	327.75	0.180
Top flg.spl.		-0.80	0.81	-11.35	30.07	327.75	0.092
Top flg.spl.		-0.80	1.24	-11.35	30.07	327.75	0.093
8	30.11	7.66	3.46	-10.39	30.99	327.75	0.128
9	33.88	51.09	20.04	-4.27	43.96	327.75	0.351
10	37.64	113.10	38.88	-3.00	69.21	327.75	0.675
11	41.43	66.25	24.45	-5.17	50.72	327.75	0.432
12	45.21	33.16	12.35	-11.92	45.71	327.75	0.278
Top flg.spl.		29.97	10.99	-12.69	45.22	327.75	0.263
Top flg.spl.		29.97	10.99	-12.69	45.22	327.75	0.263
13	49.00	9.85	2.60	-17.51	42.64	327.75	0.168
14	52.79	-9.20	-2.82	-19.91	38.96	327.75	0.097
15	56.57	-17.60	-4.85	-19.99	33.88	327.75	0.129
16	60.36	-14.89	-4.40	-17.90	28.92	327.75	0.113
17	64.14	-5.59	-2.00	-13.93	25.39	327.75	0.066
Top flg.spl.		6.99	1.44	-9.80	24.83	327.75	0.101
Top flg.spl.		6.99	2.20	-9.80	24.83	327.75	0.104
18	67.93	10.94	3.90	-8.85	25.93	327.75	0.124
19	71.72	34.69	14.42	-4.80	38.62	327.75	0.268
20	75.50	65.68	28.72	-6.52	63.67	327.75	0.482
21	79.16	28.37	12.35	-6.15	39.84	327.75	0.246
22	82.82	-2.20	-0.33	-9.51	29.49	327.75	0.082
Top flg.spl.		-4.01	-0.81	-9.78	29.04	327.75	0.074
Top flg.spl.		-4.01	-0.81	-9.78	29.04	327.75	0.074
23	86.49	-26.00	-6.52	-14.22	26.19	327.75	0.143
24	90.15	-42.94	-10.91	-17.57	22.97	327.75	0.218
25	93.81	-53.00	-13.54	-19.30	19.61	327.75	0.262
26	97.47	-56.19	-14.33	-19.60	16.08	327.75	0.275
27	101.13	-52.48	-13.50	-18.11	12.32	327.75	0.257
28	104.79	-41.82	-11.04	-14.26	8.34	327.75	0.205
29	108.45	-24.33	-6.56	-8.45	4.23	327.75	0.120
30	112.11	0.00	0.00	0.00	0.00	327.75	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Weight
Tue Jan 13 13:55:49 2015

	Volume	Weight	
	cu m	kN	
Top Flange	2.15	165.69	
Web	1.78	136.87	
Bottom Flange	2.15	165.69	
Flange-Web Weld		1.09	
Bearing Stiffeners	0.03	2.14	
Steel in extensions		2.55	
Additional Steel		20.28	
Total Steel			494.30
Slab	33.63	792.51	
Flange Haunch	3.20	75.49	
Concrete in extensions		4.31	
Additional Concrete		125.57	
Total Concrete			997.87
Total Steel and Concrete			1494.31

Does not include weight of bracing, which can be found in bracing output stiffness tables.

(Noncomposite weight data used in girder input is used for analysis loading.)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Top Flange Factored Bending Stress - Group I Loadin
Tue Jan 13 13:55:27 2015

Girder 7 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	LL+I Rng	Tot	Allow	Ratio
0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000
1	3.76	-44.3	-11.4	-13.8	6.7	20.5	-69.5	345.0	0.201
2	7.53	-78.6	-19.8	-24.5	13.5	37.9	-122.9	345.0	0.356
3	11.29	-101.4	-25.0	-31.8	20.0	51.7	-158.1	345.0	0.458
4	15.06	-108.4	-26.3	-34.3	25.9	60.1	-169.0	345.0	0.490
5	18.82	-99.4	-24.0	-32.9	30.8	63.7	-156.3	345.0	0.453
6	22.58	-76.9	-18.2	-29.0	35.1	64.1	-124.1	333.1	0.373
7	26.35	-40.9	-9.0	-22.4	38.5	60.9	-72.3	343.4	0.211
Top Flg.Spl.		-1.0	1.6	-14.8	39.1	53.8	39.7	345.0	0.115
Top Flg.Spl.		-1.0	1.6	-14.8	39.1	53.8	39.7	345.0	0.115
8	30.11	6.2	4.5	-13.5	40.3	53.8	51.0	345.0	0.148
9	33.88	59.3	26.1	-5.5	57.1	62.7	142.5	345.0	0.413
10	37.64	117.0	50.5	-3.9	90.0	93.9	257.5	345.0	0.746
11	41.43	76.7	31.8	-6.7	65.9	72.7	174.4	345.0	0.505
12	45.21	41.0	16.1	-15.5	59.4	74.9	116.5	345.0	0.338
Top Flg.Spl.		36.9	14.3	-16.5	58.8	75.3	109.9	345.0	0.319
Top Flg.Spl.		36.9	14.3	-16.5	58.8	75.3	109.9	345.0	0.319
13	49.00	10.2	3.4	-22.8	55.4	78.2	69.0	345.0	0.200
14	52.79	-11.0	-3.7	-25.9	50.6	76.5	-40.6	344.1	0.118
15	56.57	-20.8	-6.3	-26.0	44.0	70.0	-53.1	345.0	0.154
16	60.36	-19.4	-5.7	-23.3	37.6	60.9	-48.4	345.0	0.140
17	64.14	-7.3	-2.6	-18.1	33.0	51.1	-28.0	345.0	0.081
Top Flg.Spl.		9.1	2.9	-12.7	32.3	45.0	44.2	345.0	0.128
Top Flg.Spl.		9.1	2.9	-12.7	32.3	45.0	44.2	345.0	0.128
18	67.93	14.2	5.1	-11.5	33.7	45.2	53.0	345.0	0.154
19	71.72	45.1	18.7	-6.2	50.2	56.5	114.0	345.0	0.331
20	75.50	85.4	37.3	-8.5	82.8	91.2	205.5	345.0	0.596
21	79.16	36.9	16.1	-8.0	51.8	59.8	104.7	345.0	0.304
22	82.82	-2.9	-0.4	-12.4	38.3	50.7	35.0	345.0	0.102
Top Flg.Spl.		-5.2	-1.1	-12.7	37.8	50.5	31.5	345.0	0.091
Top Flg.Spl.		-5.2	-1.1	-12.7	37.8	50.5	31.5	345.0	0.091
23	86.49	-33.8	-8.5	-18.5	34.1	52.5	-60.8	345.0	0.176
24	90.15	-55.8	-14.2	-22.8	29.9	52.7	-92.8	345.0	0.269
25	93.81	-68.9	-17.6	-25.1	25.5	50.6	-111.6	345.0	0.323
26	97.47	-73.1	-18.6	-25.5	20.9	46.4	-117.2	345.0	0.340
27	101.13	-68.2	-17.5	-23.5	16.0	39.6	-109.3	345.0	0.317
28	104.79	-54.4	-14.4	-18.5	10.8	29.4	-87.3	345.0	0.253
29	108.45	-31.6	-8.5	-11.0	5.5	16.5	-51.1	345.0	0.148
30	112.11	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000

Lateral bending stress not included in the above factored stresses.

Allowable tension stress does not consider the effect of net section from bolted flange splice holes.

Governing expression for allowable compression stress

Tenth Pt	Expression
1	(5-8)
2	(5-8)
3	(5-8)
4	(5-8)
5	(5-8)
6	(5-8)
7	(5-8)
14	(5-8)
15	(5-8)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Top Flange Overload Stress
Tue Jan 13 13:55:38 2015

Girder 7 Top Flange 10.57 Overload Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.00	0.00	0.00	327.75	0.000
1	3.76	-34.08	-8.76	-10.62	5.16	327.75	0.163
2	7.53	-68.46	-15.25	-18.82	10.35	327.75	0.313
3	11.29	-81.18	-19.21	-24.42	15.38	327.75	0.381
4	15.06	-88.79	-20.26	-26.35	19.90	327.75	0.413
5	18.82	-85.53	-18.48	-25.29	23.70	327.75	0.395
6	22.58	-59.87	-14.02	-22.29	27.00	327.75	0.293
7	26.35	-34.86	-6.94	-17.23	29.63	327.75	0.180
Top flg.spl.		-0.80	0.81	-11.35	30.07	327.75	0.092
Top flg.spl.		-0.80	1.24	-11.35	30.07	327.75	0.093
8	30.11	7.66	3.46	-10.39	30.99	327.75	0.128
9	33.88	51.09	20.04	-4.27	43.96	327.75	0.351
10	37.64	113.10	38.88	-3.00	69.21	327.75	0.675
11	41.43	66.25	24.45	-5.17	50.72	327.75	0.432
12	45.21	33.16	12.35	-11.92	45.71	327.75	0.278
Top flg.spl.		29.97	10.99	-12.69	45.22	327.75	0.263
Top flg.spl.		29.97	10.99	-12.69	45.22	327.75	0.263
13	49.00	9.85	2.60	-17.51	42.64	327.75	0.168
14	52.79	-9.20	-2.82	-19.91	38.96	327.75	0.097
15	56.57	-17.60	-4.85	-19.99	33.88	327.75	0.129
16	60.36	-14.89	-4.40	-17.90	28.92	327.75	0.113
17	64.14	-5.59	-2.00	-13.93	25.39	327.75	0.066
Top flg.spl.		6.99	1.44	-9.80	24.83	327.75	0.101
Top flg.spl.		6.99	2.20	-9.80	24.83	327.75	0.104
18	67.93	10.94	3.90	-8.85	25.93	327.75	0.124
19	71.72	34.69	14.42	-4.80	38.62	327.75	0.268
20	75.50	65.68	28.72	-6.52	63.67	327.75	0.482
21	79.16	28.37	12.35	-6.15	39.84	327.75	0.246
22	82.82	-2.20	-0.33	-9.51	29.49	327.75	0.082
Top flg.spl.		-4.01	-0.81	-9.78	29.04	327.75	0.074
Top flg.spl.		-4.01	-0.81	-9.78	29.04	327.75	0.074
23	86.49	-26.00	-6.52	-14.22	26.19	327.75	0.143
24	90.15	-42.94	-10.91	-17.57	22.97	327.75	0.218
25	93.81	-53.00	-13.54	-19.30	19.61	327.75	0.262
26	97.47	-56.19	-14.33	-19.60	16.08	327.75	0.275
27	101.13	-52.48	-13.50	-18.11	12.32	327.75	0.257
28	104.79	-41.82	-11.04	-14.26	8.34	327.75	0.205
29	108.45	-24.33	-6.56	-8.45	4.23	327.75	0.120
30	112.11	0.00	0.00	0.00	0.00	327.75	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Weight
Tue Jan 13 13:55:49 2015

	Volume	Weight	
	cu m	kN	
Top Flange	2.15	165.69	
Web	1.78	136.87	
Bottom Flange	2.15	165.69	
Flange-Web Weld		1.09	
Bearing Stiffeners	0.03	2.14	
Steel in extensions		2.55	
Additional Steel		20.28	
Total Steel			494.30
Slab	33.63	792.51	
Flange Haunch	3.20	75.49	
Concrete in extensions		4.31	
Additional Concrete		125.57	
Total Concrete			997.87
Total Steel and Concrete			1494.31

Does not include weight of bracing, which can be found in bracing output stiffness tables.

(Noncomposite weight data used in girder input is used for analysis loading.)

PORTILLO Y YOUNG S.C.

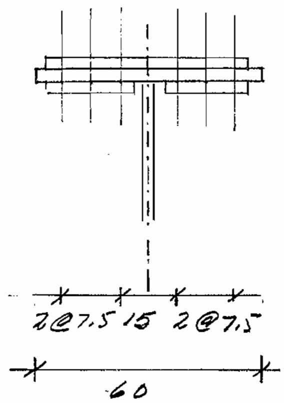
PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DISEÑO VIGAS

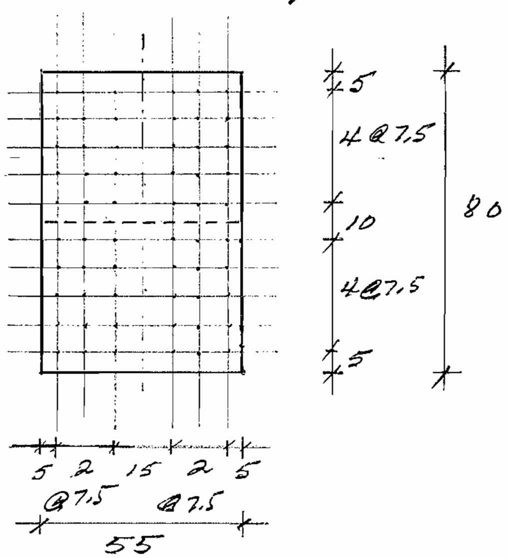
HOJA: VI -
FECHA: 10/11/14
CALCULO: M.P.
REVISO:

+ Diseño Conexión de Campo

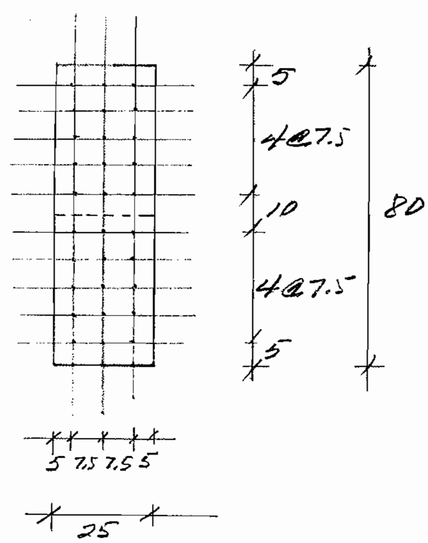
+ b_f = 60. cm



+ Placa Superior
(PL 55×80×3/4")



+ Placa Inferior
(PL 25×80×3/4")



PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DISEÑO VIGAS

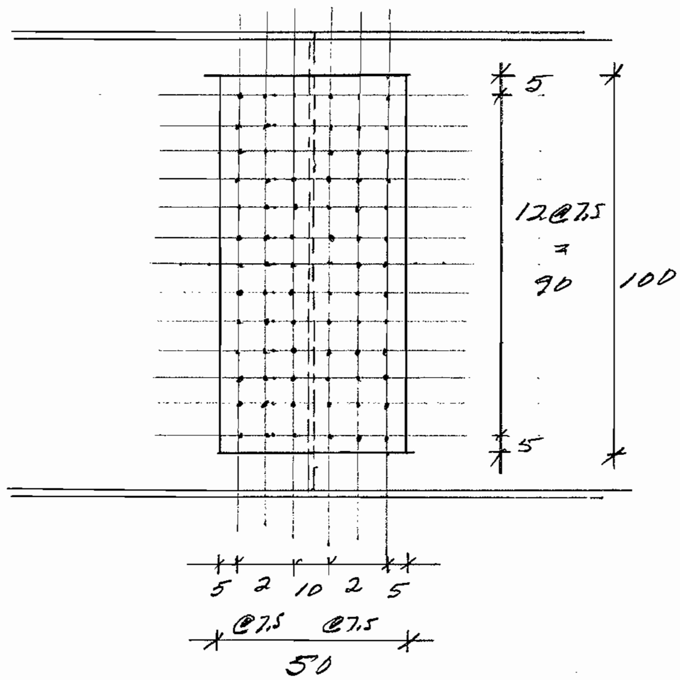
HOJA: VI-

FECHA: 7/11/14

CALCULO: M.P.

REVISO:

+ Alma (⅌ 50x100x½")



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DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder 7 : Rating Output : Bolted Web Splices - Maximum Dead Factors
Tue Jan 13 13:39:21 2015


Girder 7 Web Splice Analysis


 Using method of LRFD spec. 6.13.6.1.4b.
 Splice resists moment given by (C6.13.6.1.4b-1)
  and horizontal force given by (C6.13.6.1.4b-2)
  using LFD load factors.


   22 ASTM A325 H.S. Bolts - Class A Surface


 ***************************
 Web splice location:  29.56
 ***************************

   Web t left                 13.000 mm
   Web t right                13.000 mm
   Factored shear             946.61 kN
   Shear strength left       1587.19 kN
   Shear strength right      1587.19 kN
   Design shear              1266.90 kN

    Strength
     Factored Bndg Stresses Top Flg      Bottom Flg
       at ctr of flg
      Noncomp dead         -1.02 MPa       1.02 MPa
      Comp dead             1.57          -1.80
      Max live            -14.00          45.04
      Min live             38.04         -43.63
      Total                38.60         -44.42
      Resistance          343.40        -339.17

     Bottom flange controls
      Fcf                     -258.75 MPa
      fcf                      -44.42 MPa
      Rcf                      40.165
      fncf                      38.60 MPa
      Muw                      779.63 kN-m
      Huw                     -268.87 kN

     Top flange stress reversal
      Fcf                     -258.75 MPa
      fcf                      -44.42 MPa
      Rcf                       5.825
      fncf                      38.60 MPa
      Muw                      779.63 kN-m
      Huw                     -268.87 kN

     Bottom flange stress reversal
      Fcf                      258.75 MPa
      fcf                       44.26 MPa
      Rcf                       5.847
      fncf                     -13.44 MPa
      Muw                      543.84 kN-m
      Huw                     1428.67 kN

    Overload
     Factored Bndg Stresses Top Flg      Bottom Flg
       at ctr of flg
      Noncomp dead         -0.78 MPa       0.78 MPa
      Comp dead             1.21          -1.39
      Max live            -10.77          34.65
      Min live             29.26         -33.56
      Total                29.69         -34.17
      Resistance          327.75        -327.75
```

```
Bottom flange controls
 fcf                    -34.17 MPa
 Rcf                      6.895
 fncf                    29.69 MPa
 Muw                    102.95 kN-m
 Huw                    -35.50 kN

Bottom flange stress reversal
 fcf                     34.04 MPa
 Rcf                     1.000
 fncf                   -10.34 MPa
 Muw                     71.55 kN-m
 Huw                    187.97 kN

    Bolt pattern each side of splice
      Number of vertical lines          3 spaced at    75 mm
      Number of horizontal lines       13 spaced at    75 mm
      Vertical edge on plate        50.000 mm
      Horizontal edge on web        60.000 mm
                                                  Perf. Ratio
    Plate depth                   1000.00 mm
    Plate thickness                 13.000 mm
    Plate gross sect. shr strngth 5202.61 kN       0.244
    Plate net sect. fracture strng 4666.14 kN      0.272
    Plate block shear strength    4962.16 kN       0.255

    Plate flexure for strength      229.76 MPa
    Allowable stress                345.00 MPa     0.666

    Plate flexure for overload       58.97 MPa
    Allowable stress                327.75 MPa     0.180

    Shear on extreme bolt - strength150.17 kN
    Shear on extreme bolt - overload 49.17 kN
    Bolt shear strength             195.15 kN      0.769
    Bolt slip strength              114.50 kN      0.429
    Threads in shear plane

    Clear edge to splice line       48.000 mm
    Horiz brng on web               150.17 kN
    Horiz brng capacity on web      248.61 kN      0.604

    Clear vertical distance         51.000 mm
    Vert brng on web                150.17 kN
    Vert brng capacity              248.61 kN      0.604

  Fatigue
    Max fatigue moment              288.04 kN-m
    Min fatigue moment              307.46

    Comp. stress at top of web       -2.87 MPa
    Tens. stress at top of web      -11.18
    Comp. stress at bot of web        9.71
    Tens. stress at bot of web        8.88

    Max fatge mom resisted by web    18.93 kN-m
    Max fatge mom horiz resultant    47.66 kN
    Min fatge mom resisted by web   171.29 kN-m
    Min fatge mom horiz resultant   -18.03 kN

    Max shear at splice             163.87 kN
    Min shear at splice              11.23 kN
    Mom from max shr eccentricity    22.12 kN-m
    Mom from min shr eccentricity     1.52 kN-m

    Total max + eccentric mom        41.05 kN-m
    Total min + eccentric mom        35.19 kN-m

    Tot Bndg and axial stress
     at bot of plate from max mo     12.13 MPa
    Tot Bndg and axial stress
     at bot of plate from min mo      7.47 MPa
    Allowable range                 124.11 MPa     0.038
```

Flange Plates

Top flange plates

600 x 32 flange

Splice plate Fy	50.04	
Design stress - Fncf	258.75	MPa
Gross gov flg area - Ag	19200.00	
An	16914.00	
Effective gov flg area	19200.00	
Strength resistance - Fncf x Ag	4968.01	kN
Overload resistance - .8 Fcf x Ag	570.04	kN

Outside plate		550 x	19 Pl
Inside plates	2 -	250 x	19 Pls

Staggered bolt pattern

Total number of bolts given on 6 gage lines on each side of splice	30
Min spacing	67
Max spacing outside line for sealing	178
Actual spacing	75

Lateral bending effect from curvature

Radius 103.20

Polar I of bolt group 725805056.00 x Area of bolt

Lateral bndg moment on bolt group 9.04 kN-m

Force components on critical bolt from lat bndg

Longitudinal 1.808 kN

Transverse 1.205 kN

		Perf. Ratio
Resultant shr on critical bolt	167.77	
Shr strngth of crit. bolt	195.15	0.860

Vertical Bending Only

Connected length of pattern 337.00

		Perf. Ratio
Single bolt shear strength	195.15	
Total bolt shear strength	5854.62	0.849
Overload flange force	570.04	
Single bolt slip strength	114.50	
Total bolt slip strength	3434.92	0.166
Single bolt bearing strength	611.96	
Total bolt bearing strength	18358.90	0.271
Comp resistance flange	1116.85	
Comp resistance plates	1392.58	0.802

Bottom flange plates

600 x 32 flange

Splice plate Fy	50.04	
Design stress - Fcf	258.75	MPa
Gross gov flg area - Ag	19200.00	
An	15228.00	

```
 Effective gov flg area                16657.96
 Strength resistance - Fcf  x Ag        4310.25 kN
 Overload resistance - .8 Fcf  x Ag      656.00 kN
 Fracture strength of flange    5459.66

 Outside plate                  550 x      19 Pl


                                          Perf. Ratio

 Tens. capacity of gross section  6538.62        0.659  (6.8.2.1-1)

 Tens. capacity of net section    5429.61        0.794  (6.8.2.1-2)


 Staggered bolt pattern


 Total number of bolts given on  6 gage lines
 on each side of splice                          30

 Min spacing                                     67
 Max spacing outside line for sealing           178
 Actual spacing                                  75

Lateral bending effect from curvature
 Radius                            103.20
 Polar I of bolt group       725805056.00 x Area of bolt
 Lateral bndg moment on bolt group
                                     9.04 kN-m
 Force components on critical bolt from lat bndg
   Longitudinal                     1.808 kN
   Transverse                       1.205 kN

   Resultant shr on critical bolt  145.85     Perf. Ratio
   Shr strngth of crit. bolt       195.15         0.747

Vertical Bending Only

 Connected length of pattern                337.00

                                          Perf. Ratio
 Single bolt shear strength        195.15
 Total bolt shear strength        5854.62        0.736

 Overload flange force             656.00
 Single bolt slip strength         114.50
 Total bolt slip strength         3434.92        0.191

 Single bolt bearing strength      611.96
 Total bolt bearing strength     18358.90        0.235

 Comp resistance flange           1116.85
 Comp resistance plates           1392.58        0.802


 Block rupture on staggered pattern- outside plates
   Net tension area - Atn         7856.25
   Gross tension area - Atg       9500.00
   Net shear area - Avn           3121.34
   Resistance to rupture - Rr     3424.99

 Block rupture on staggered pattern- inside plates
   Net tension area - Atn         6182.47
   Gross tension area - Atg       7600.00
   Net shear area - Avn           9228.06
   Resistance to rupture - Rr     2824.89

   Tot block rupture resistance   6249.88        0.690

**************************
Web splice location:  45.69
**************************
```

```
Web t left                  13.000 mm
Web t right                 13.000 mm
Factored shear              712.79 kN
Shear strength left        1587.19 kN
Shear strength right       1587.19 kN
Design shear               1069.18 kN

 Strength
  Factored Bndg Stresses Top Flg      Bottom Flg
    at ctr of flg
   Noncomp dead         35.95 MPa     -35.95 MPa
   Comp dead            13.91         -15.95
   Max live            -15.65          50.37
   Min live             57.21         -65.62
   Total               107.07        -117.52
   Resistance          345.00        -335.23

  Bottom flange controls
   Fcf                      -258.75 MPa
   fcf                      -117.52 MPa
   Rcf                       15.180
   fncf                      107.07 MPa
   Muw                       797.20 kN-m
   Huw                      -182.44 kN

     (A top flange reversal does not occur.)


     (A bottom flange reversal does not occur.)


 Overload
  Factored Bndg Stresses Top Flg      Bottom Flg
    at ctr of flg
   Noncomp dead         27.65 MPa     -27.65 MPa
   Comp dead            10.70         -12.27
   Max live            -12.04          38.74
   Min live             44.01         -50.48
   Total                82.36         -90.40
   Resistance          327.75        -327.75

  Bottom flange controls
   fcf                       -90.40 MPa
   Rcf                        6.895
   fncf                       82.36 MPa
   Muw                       278.52 kN-m
   Huw                       -63.74 kN

     (A top flange reversal does not occur.)


     (A bottom flange reversal does not occur.)


      Bolt pattern each side of splice
        Number of vertical lines           3 spaced at    75 mm
        Number of horizontal lines        13 spaced at    75 mm
        Vertical edge on plate        50.000 mm
        Horizontal edge on web        60.000 mm
                                                Perf. Ratio
      Plate depth                    1000.00 mm
      Plate thickness                 13.000 mm
      Plate gross sect. shr strngth  5202.61 kN       0.206
      Plate net sect. fracture strng 4666.14 kN       0.229
      Plate block shear strength     4962.16 kN       0.215

      Plate flexure for strength      224.33 MPa
      Allowable stress                345.00 MPa      0.650

      Plate flexure for overload      205.87 MPa
      Allowable stress                327.75 MPa      0.628

      Shear on extreme bolt - strength145.04 kN
```

Shear on extreme bolt - overload	63.50 kN	
Bolt shear strength	195.15 kN	0.743
Bolt slip strength	114.50 kN	0.555
Threads in shear plane		
Clear edge to splice line	48.000 mm	
Horiz brng on web	145.04 kN	
Horiz brng capacity on web	248.61 kN	0.583
Clear vertical distance	51.000 mm	
Vert brng on web	145.04 kN	
Vert brng capacity	248.61 kN	0.583

Fatigue

Max fatigue moment	360.99 kN-m	
Min fatigue moment	439.19	
Comp. stress at top of web	-3.59 MPa	
Tens. stress at top of web	-15.97	
Comp. stress at bot of web	13.87	
Tens. stress at bot of web	11.12	
Max fatge mom resisted by web	23.72 kN-m	
Max fatge mom horiz resultant	59.72 kN	
Min fatge mom resisted by web	244.67 kN-m	
Min fatge mom horiz resultant	-25.76 kN	
Max shear at splice	134.44 kN	
Min shear at splice	24.85 kN	
Mom from max shr eccentricity	18.15 kN-m	
Mom from min shr eccentricity	3.35 kN-m	
Total max + eccentric mom	41.87 kN-m	
Total min + eccentric mom	51.46 kN-m	
Tot Bndg and axial stress at bot of plate from max mo	12.99 MPa	
Tot Bndg and axial stress at bot of plate from min mo	10.95 MPa	
Allowable range	124.11 MPa	0.016

Flange Plates

Top flange plates

600 x 32 flange

Splice plate Fy	50.04
Design stress - Fncf	258.75 MPa
Gross gov flg area - Ag	19200.00
An	16914.00
Effective gov flg area	18502.28
Strength resistance - Fncf x Ae	4787.47 kN
Overload resistance - .8 Fcf x Ag	1581.37 kN
Fracture strength of flange	6064.13

Outside plate		550 x	19 Pl
Inside plates	2 -	250 x	19 Pls

		Perf. Ratio	
Tens. capacity of gross section	6538.62	0.732	(6.8.2.1-1)
Tens. capacity of net section	5429.61	0.882	(6.8.2.1-2)

Staggered bolt pattern

Total number of bolts given on 6 gage lines
on each side of splice 30

Min spacing	67
Max spacing outside line for sealing	178
Actual spacing	75

Lateral bending effect from curvature

Radius	103.20	
Polar I of bolt group	725805056.00	x Area of bolt
Lateral bndg moment on bolt group	7.87	kN-m
Force components on critical bolt from lat bndg		
Longitudinal	1.575	kN
Transverse	1.050	kN

		Perf. Ratio
Resultant shr on critical bolt	161.48	
Shr strngth of crit. bolt	195.15	0.827

Vertical Bending Only

Connected length of pattern 337.00

		Perf. Ratio
Single bolt shear strength	195.15	
Total bolt shear strength	5854.62	0.818
Overload flange force	1581.37	
Single bolt slip strength	114.50	
Total bolt slip strength	3434.92	0.460
Single bolt bearing strength	611.96	
Total bolt bearing strength	18358.90	0.261
Comp resistance flange	1116.85	
Comp resistance plates	1392.58	0.802

Block rupture on staggered pattern- outside plates

Net tension area - Atn	7856.25
Gross tension area - Atg	9500.00
Net shear area - Avn	3121.34
Resistance to rupture - Rr	3424.99

Block rupture on staggered pattern- inside plates

Net tension area - Atn	6182.47	
Gross tension area - Atg	7600.00	
Net shear area - Avn	9228.06	
Resistance to rupture - Rr	2824.89	
Tot block rupture resistance	6249.88	0.766

Bottom flange plates

600 x 32 flange

Splice plate Fy	50.04	
Design stress - Fcf	258.75	MPa
Gross gov flg area - Ag	19200.00	
An	15228.00	
Effective gov flg area	19200.00	
Strength resistance - Fcf x Ag	4968.01	kN
Overload resistance - .8 Fcf x Ag	1735.70	kN

Outside plate 550 x 19 Pl

Staggered bolt pattern

Total number of bolts given on 6 gage lines

```
    on each side of splice                          30

    Min spacing                                     67
    Max spacing outside line for sealing           178
    Actual spacing                                  75

   Lateral bending effect from curvature
    Radius                          103.20
    Polar I of bolt group     725805056.00 x Area of bolt
    Lateral bndg moment on bolt group
                                      7.87 kN-m
    Force components on critical bolt from lat bndg
      Longitudinal                   1.575 kN
      Transverse                     1.050 kN

      Resultant shr on critical bolt  167.49     Perf. Ratio
      Shr strngth of crit. bolt       195.15        0.858

   Vertical Bending Only

    Connected length of pattern              337.00

                                               Perf. Ratio
    Single bolt shear strength       195.15
    Total bolt shear strength       5854.62         0.849

    Overload flange force           1735.70
    Single bolt slip strength        114.50
    Total bolt slip strength        3434.92         0.505

    Single bolt bearing strength     611.96
    Total bolt bearing strength    18358.90         0.271

    Comp resistance flange          1116.85
    Comp resistance plates          1392.58         0.802


***************************
Web splice location:  67.16
***************************

  Web t left                 13.000 mm
  Web t right                13.000 mm
  Factored shear             584.84 kN
  Shear strength left       1587.19 kN
  Shear strength right      1587.19 kN
  Design shear               877.25 kN

   Strength
    Factored Bndg Stresses Top Flg      Bottom Flg
      at ctr of flg
     Noncomp dead           8.86 MPa     -8.86 MPa
     Comp dead            2.78          -3.19
     Max live           -12.09          38.92
     Min live            31.42         -36.04
     Total               43.06         -48.09
     Resistance         345.00        -345.00

    Bottom flange controls
     Fcf                    -258.75 MPa
     fcf                     -48.09 MPa
     Rcf                     37.098
     fncf                     43.06 MPa
     Muw                     790.70 kN-m
     Huw                    -214.40 kN

    Top flange stress reversal
     Fcf                    -258.75 MPa
     fcf                     -48.09 MPa
     Rcf                      5.381
     fncf                     43.06 MPa
     Muw                     790.70 kN-m
     Huw                    -214.40 kN
```

```
 Bottom flange stress reversal
  Fcf                      258.75 MPa
  fcf                       26.86 MPa
  Rcf                       9.632
  fncf                      -0.45 MPa
  Muw                      424.13 kN-m
  Huw                     2017.52 kN

Overload
 Factored Bndg Stresses Top Flg      Bottom Flg
   at ctr of flg
  Noncomp dead         6.82 MPa      -6.82 MPa
  Comp dead            2.14          -2.45
  Max live            -9.30          29.93
  Min live            24.17         -27.72
  Total               33.13         -36.99
  Resistance         327.75        -327.75

 Bottom flange controls
  fcf                      -36.99 MPa
  Rcf                       6.895
  fncf                      33.13 MPa
  Muw                      113.04 kN-m
  Huw                      -30.65 kN

 Bottom flange stress reversal
  fcf                       20.67 MPa
  Rcf                       1.000
  fncf                      -0.35 MPa
  Muw                       33.87 kN-m
  Huw                      161.13 kN

     Bolt pattern each side of splice
       Number of vertical lines          3 spaced at    75 mm
       Number of horizontal lines       13 spaced at    75 mm
       Vertical edge on plate       50.000 mm
       Horizontal edge on web       60.000 mm
                                                  Perf. Ratio
     Plate depth                   1000.00 mm
     Plate thickness                13.000 mm
     Plate gross sect. shr strngth 5202.61 kN        0.169
     Plate net sect. fracture strng 4666.14 kN       0.188
     Plate block shear strength    4962.16 kN        0.177

     Plate flexure for strength     218.08 MPa
     Allowable stress               345.00 MPa       0.632

     Plate flexure for overload      48.10 MPa
     Allowable stress               327.75 MPa       0.147

     Shear on extreme bolt - strength139.68 kN
     Shear on extreme bolt - overload 36.51 kN
     Bolt shear strength            195.15 kN        0.716
     Bolt slip strength             114.50 kN        0.319
     Threads in shear plane

     Clear edge to splice line      48.000 mm
     Horiz brng on web              139.68 kN
     Horiz brng capacity on web     248.61 kN        0.562

     Clear vertical distance        51.000 mm
     Vert brng on web               139.68 kN
     Vert brng capacity             248.61 kN        0.562

   Fatigue
     Max fatigue moment             281.42 kN-m
     Min fatigue moment             252.37

     Comp. stress at top of web      -2.80 MPa
     Tens. stress at top of web      -9.18
     Comp. stress at bot of web       7.97
     Tens. stress at bot of web       8.67
```

```
Max fatge mom resisted by web    18.50 kN-m
Max fatge mom horiz resultant    46.56 kN
Min fatge mom resisted by web   140.59 kN-m
Min fatge mom horiz resultant   -14.80 kN

Max shear at splice             128.40 kN
Min shear at splice              31.40 kN
Mom from max shr eccentricity    17.33 kN-m
Mom from min shr eccentricity     4.24 kN-m

Total max + eccentric mom        35.83 kN-m
Total min + eccentric mom        31.88 kN-m

Tot Bndg and axial stress
 at bot of plate from max mo     10.86 MPa
Tot Bndg and axial stress
 at bot of plate from min mo      6.83 MPa
Allowable range                 124.11 MPa      0.033
```

Flange Plates

Top flange plates

```
     600 x   32 flange

Splice plate Fy                              50.04
Design stress - Fncf                        258.75 MPa
Gross gov flg area - Ag                   19200.00
An                                        16914.00
Effective gov flg area                    18502.28
Strength resistance - Fncf x Ag            4787.47 kN
Overload resistance - .8 Fcf  x Ag          636.02 kN
Fracture strength of flange    6064.13

Outside plate                   550 x      19 Pl
Inside plates          2 -      250 x      19 Pls


                                              Perf. Ratio

Tens. capacity of gross section  6538.62         0.732  (6.8.2.1-1)

Tens. capacity of net section    5429.61         0.882  (6.8.2.1-2)


Staggered bolt pattern


Total number of bolts given on  6 gage lines
on each side of splice                           30

Min spacing                                      67
Max spacing outside line for sealing            178
Actual spacing                                   75

Vertical Bending Only

Connected length of pattern              337.00

                                              Perf. Ratio
Single bolt shear strength        195.15
Total bolt shear strength        5854.62         0.818

Overload flange force             636.02
Single bolt slip strength         114.50
Total bolt slip strength         3434.92         0.185

Single bolt bearing strength      611.96
Total bolt bearing strength     18358.90         0.261
```

```
Comp resistance flange          1116.85
Comp resistance plates          1392.58         0.802


Block rupture on staggered pattern- outside plates
  Net tension area - Atn        7856.25
  Gross tension area - Atg      9500.00
  Net shear area - Avn          3121.34
  Resistance to rupture - Rr    3424.99

Block rupture on staggered pattern- inside plates
  Net tension area - Atn        6182.47
  Gross tension area - Atg      7600.00
  Net shear area - Avn          9228.06
  Resistance to rupture - Rr    2824.89

  Tot block rupture resistance  6249.88         0.766


Bottom flange plates

     600 x   32 flange

Splice plate Fy                             50.04
Design stress - Fcf                        258.75 MPa
Gross gov flg area - Ag                  19200.00
An                                       15228.00
Effective gov flg area                   19200.00
Strength resistance - Fcf  x Ag           4968.01 kN
Overload resistance - .8 Fcf  x Ag         710.24 kN

Outside plate                     550 x      19 Pl


Staggered bolt pattern


Total number of bolts given on  6 gage lines
on each side of splice                          30

Min spacing                                     67
Max spacing outside line for sealing           178
Actual spacing                                  75

Vertical Bending Only

Connected length of pattern             337.00

                                          Perf. Ratio
Single bolt shear strength       195.15
Total bolt shear strength       5854.62         0.849

Overload flange force            710.24
Single bolt slip strength        114.50
Total bolt slip strength        3434.92         0.207

Single bolt bearing strength     611.96
Total bolt bearing strength    18358.90         0.271

Comp resistance flange          1116.85
Comp resistance plates          1392.58         0.802


**************************
Web splice location:  83.07
**************************

  Web t left              13.000 mm
  Web t right             13.000 mm
  Factored shear          712.92 kN
  Shear strength left    1587.19 kN
```

Shear strength right	1587.19 kN
Design shear	1069.38 kN

Strength

Factored Bndg Stresses at ctr of flg	Top Flg	Bottom Flg
Noncomp dead	-5.08 MPa	5.08 MPa
Comp dead	-1.02	1.67
Max live	-12.06	38.82
Min live	36.75	-42.15
Total	30.65	45.57
Resistance	345.00	345.00

Bottom flange controls

Fcf	258.75 MPa
fcf	45.57 MPa
Rcf	39.149
fncf	-18.16 MPa
Muw	583.42 kN-m
Huw	1234.01 kN

Top flange stress reversal

Fcf	-258.75 MPa
fcf	-35.40 MPa
Rcf	7.310
fncf	30.65 MPa
Muw	778.32 kN-m
Huw	-275.30 kN

Bottom flange stress reversal

Fcf	-258.75 MPa
fcf	-35.40 MPa
Rcf	7.310
fncf	30.65 MPa
Muw	778.32 kN-m
Huw	-275.30 kN

Overload

Factored Bndg Stresses at ctr of flg	Top Flg	Bottom Flg
Noncomp dead	-3.91 MPa	3.91 MPa
Comp dead	-0.79	1.29
Max live	-9.28	29.86
Min live	28.27	-32.42
Total	23.57	35.05
Resistance	327.75	327.75

Bottom flange controls

fcf	35.05 MPa
Rcf	6.895
fncf	-13.97 MPa
Muw	79.04 kN-m
Huw	167.18 kN

Bottom flange stress reversal

fcf	-27.23 MPa
Rcf	1.000
fncf	23.57 MPa
Muw	81.90 kN-m
Huw	-28.97 kN

Bolt pattern each side of splice

Number of vertical lines	3	spaced at	75 mm
Number of horizontal lines	13	spaced at	75 mm
Vertical edge on plate	50.000 mm		
Horizontal edge on web	60.000 mm		

		Perf. Ratio
Plate depth	1000.00 mm	
Plate thickness	13.000 mm	
Plate gross sect. shr strngth	5202.61 kN	0.206
Plate net sect. fracture strng	4666.14 kN	0.229
Plate block shear strength	4962.16 kN	0.216

Plate flexure for strength 223.55 MPa

Allowable stress	345.00 MPa	0.648
Plate flexure for overload	49.99 MPa	
Allowable stress	327.75 MPa	0.153
Shear on extreme bolt - strength	144.65 kN	
Shear on extreme bolt - overload	39.74 kN	
Bolt shear strength	195.15 kN	0.741
Bolt slip strength	114.50 kN	0.347
Threads in shear plane		
Clear edge to splice line	48.000 mm	
Horiz brng on web	144.65 kN	
Horiz brng capacity on web	248.61 kN	0.582
Clear vertical distance	51.000 mm	
Vert brng on web	144.65 kN	
Vert brng capacity	248.61 kN	0.582

Fatigue

Max fatigue moment	274.73 kN-m	
Min fatigue moment	291.85	
Comp. stress at top of web	-2.73 MPa	
Tens. stress at top of web	-10.61	
Comp. stress at bot of web	9.22	
Tens. stress at bot of web	8.47	
Max fatge mom resisted by web	18.06 kN-m	
Max fatge mom horiz resultant	45.45 kN	
Min fatge mom resisted by web	162.59 kN-m	
Min fatge mom horiz resultant	-17.12 kN	
Max shear at splice	131.09 kN	
Min shear at splice	7.95 kN	
Mom from max shr eccentricity	17.69 kN-m	
Mom from min shr eccentricity	1.07 kN-m	
Total max + eccentric mom	35.75 kN-m	
Total min + eccentric mom	33.04 kN-m	
Tot Bndg and axial stress at bot of plate from max mo	10.78 MPa	
Tot Bndg and axial stress at bot of plate from min mo	7.01 MPa	
Allowable range	124.11 MPa	0.030

Flange Plates

Top flange plates

600 x 32 flange

Splice plate Fy	50.04
Design stress - Fncf	258.75 MPa
Gross gov flg area - Ag	19200.00
An	16914.00
Effective gov flg area	19200.00
Strength resistance - Fncf x Ag	4968.01 kN
Overload resistance - .8 Fcf x Ag	452.63 kN

Outside plate		550 x	19 Pl
Inside plates	2 -	250 x	19 Pls

Staggered bolt pattern

Total number of bolts given on 6 gage lines
on each side of splice 30

Min spacing	67
Max spacing outside line for sealing	178
Actual spacing	75

Vertical Bending Only

Connected length of pattern 337.00

		Perf. Ratio
Single bolt shear strength	195.15	
Total bolt shear strength	5854.62	0.849
Overload flange force	452.63	
Single bolt slip strength	114.50	
Total bolt slip strength	3434.92	0.132
Single bolt bearing strength	611.96	
Total bolt bearing strength	18358.90	0.271
Comp resistance flange	1116.85	
Comp resistance plates	1392.58	0.802

Bottom flange plates

600 x 32 flange

Splice plate Fy	50.04	
Design stress - Fcf	258.75	MPa
Gross gov flg area - Ag	19200.00	
An	15228.00	
Effective gov flg area	16657.96	
Strength resistance - Fcf x Ag	4310.25	kN
Overload resistance - .8 Fcf x Ag	673.04	kN
Fracture strength of flange	5459.66	

Outside plate 550 x 19 Pl

		Perf. Ratio	
Tens. capacity of gross section	6538.62	0.659	(6.8.2.1-1)
Tens. capacity of net section	5429.61	0.794	(6.8.2.1-2)

Staggered bolt pattern

Total number of bolts given on 6 gage lines
on each side of splice 30

Min spacing	67
Max spacing outside line for sealing	178
Actual spacing	75

Vertical Bending Only

Connected length of pattern 337.00

		Perf. Ratio
Single bolt shear strength	195.15	
Total bolt shear strength	5854.62	0.736
Overload flange force	673.04	
Single bolt slip strength	114.50	
Total bolt slip strength	3434.92	0.196
Single bolt bearing strength	611.96	
Total bolt bearing strength	18358.90	0.235

Comp resistance flange	1116.85	
Comp resistance plates	1392.58	0.802

Block rupture on staggered pattern- outside plates

Net tension area - Atn	7856.25	
Gross tension area - Atg	9500.00	
Net shear area - Avn	3121.34	
Resistance to rupture - Rr	3424.99	

Block rupture on staggered pattern- inside plates

Net tension area - Atn	6182.47	
Gross tension area - Atg	7600.00	
Net shear area - Avn	9228.06	
Resistance to rupture - Rr	2824.89	
Tot block rupture resistance	6249.88	0.690

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Input File : Definition
Tue Jan 13 13:56:39 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
CONDITIONS
  BOTTOM CHORD L102X102X9.52 LONG LEG CONNECTED FOR GROUP 1
  DIAGONALS L102X102X12.7 LONG LEG CONNECTED FOR GROUP 1
  LFD METHOD
  M270M-345 STEEL
  METRIC INPUT
  METRIC OUTPUT
  RATE MODE
  TOP CHORD L102X102X9.52 LONG LEG CONNECTED FOR GROUP 1
  TYPE C BRACING FOR GROUP 1
DATA
  BRL-1 1.6 1.6 1.6 1.6 1.6 1.6 1.5993 1.6 1.6 1.6 1.6 1.6001 1.6001
  1.6001 1.6 1.6001 1.6001 1.6001 1.6001 1.6001 1.6001 1.6
  BRL-2 1.6 1.6 1.6 1.6 1.6 1.6 1.6008 1.6 1.6 1.6 1.6 1.6001 1.6001
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  BRL-3 1.6 1.6 1.6 1.6 1.6 1.6 1.5993 1.6 1.6 1.6 1.6 1.6001 1.6001
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  BRL-4 1.6 1.6 1.6 1.6 1.6 1.6 1.6008 1.6 1.6 1.6 1.6 1.6001 1.6001
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  BRL-5 1.6 1.6 1.6 1.6 1.6 1.6 1.5993 1.6 1.6 1.6 1.6 1.6001 1.6001
  1.6001 1.6 1.6001 1.6001 1.6001 1.6001 1.6001 1.6001 1.6
  BRL-6 1.6 1.6 1.6 1.6 1.6 1.6 1.6008 1.6 1.6 1.6 1.6 1.6001 1.6001
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  GCONNDST 75.
  GRP-1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
  GRP-2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
  GRP-3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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  GRP-5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
  GRP-6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
  GRPHT 920.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Factored Combined Forces Summary - Girder 1
Tue Jan 13 14:17:56 2015

Girder 1 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	9.63	-7.22	40.48	-40.48	29.60	-23.61
2	C	5.83	-43.71	54.76	-54.76	53.63	-36.95
3	C	0.00	-92.89	110.15	-110.15	156.33	-63.88
4	C	1.68	-102.51	115.75	-115.75	152.04	-70.02
5	C	9.48	-93.60	106.57	-106.57	153.08	-70.20
6	C	22.84	-60.80	70.01	-70.01	94.02	-57.06
7	C	32.11	-2.85	94.98	-94.98	55.73	-84.53
8	C	41.22	0.00	293.71	-293.71	145.89	-218.60
9	C	24.51	-10.97	106.14	-106.14	70.59	-85.73
10	C	10.66	-69.73	49.04	-49.04	74.34	-33.05
11	C	2.58	-92.22	76.20	-76.20	113.79	-40.86
12	C	7.89	-55.17	45.16	-45.16	71.16	-34.16
13	C	11.19	-40.65	50.50	-50.50	58.24	-30.05
14	C	14.04	-21.54	35.78	-35.78	30.16	-24.37
15	C	7.58	-1.93	20.87	-20.87	13.90	-11.94
16	C	14.37	-21.56	32.44	-32.44	26.99	-25.10
17	C	26.54	-26.16	46.92	-46.92	48.74	-52.32
18	C	26.29	-28.40	55.56	-55.56	50.89	-53.88
19	C	27.00	-25.37	53.71	-53.71	49.58	-51.35
20	C	25.24	-26.28	52.14	-52.14	49.43	-48.47
21	C	24.61	-18.66	36.53	-36.53	35.25	-43.08
22	C	12.71	-3.94	53.64	-53.64	35.56	-30.84

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Factored Combined Forces Summary - Girder 2
Tue Jan 13 14:18:05 2015

Girder 2 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	6.37	-2.35	29.13	-29.13	16.80	-24.39
2	C	26.97	-93.04	135.23	-135.23	139.16	-72.01
3	C	62.53	-134.56	240.40	-240.40	243.03	-187.31
4	C	78.47	-156.46	264.17	-264.17	271.88	-209.82
5	C	85.70	-145.28	236.61	-236.61	240.46	-192.84
6	C	76.92	-113.12	159.36	-159.36	164.60	-131.85
7	C	43.31	-63.38	102.61	-102.61	90.33	-70.71
8	C	0.00	-23.67	208.04	-208.04	149.42	-108.11
9	C	8.79	-83.97	126.96	-126.96	125.40	-64.10
10	C	32.72	-139.37	115.86	-115.86	165.99	-69.28
11	C	31.36	-163.63	164.35	-164.35	222.00	-107.04
12	C	29.43	-161.11	138.77	-138.77	180.89	-58.36
13	C	33.40	-124.19	115.40	-115.40	137.26	-43.56
14	C	25.76	-66.62	73.75	-73.75	77.46	-35.19
15	C	5.42	-1.81	17.38	-17.38	8.13	-16.18
16	C	33.66	-58.69	72.47	-72.47	76.17	-45.79
17	C	47.38	-94.81	118.24	-118.24	135.96	-65.26
18	C	51.34	-106.37	139.61	-139.61	164.51	-73.19
19	C	49.88	-105.68	144.40	-144.40	167.95	-72.28
20	C	40.62	-98.52	134.56	-134.56	137.67	-61.00
21	C	23.03	-66.73	96.80	-96.80	91.90	-47.96
22	C	6.05	-3.09	34.44	-34.44	17.46	-27.37

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Factored Combined Forces Summary - Girder 3
Tue Jan 13 14:18:12 2015

Girder 3 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	7.88	-3.29	29.94	-29.94	20.92	-17.26
2	C	73.51	-43.81	118.68	-118.68	108.64	-124.99
3	C	147.45	-62.55	260.70	-260.70	212.80	-262.76
4	C	181.93	-66.80	285.79	-285.79	232.51	-311.05
5	C	180.80	-64.18	251.45	-251.45	208.79	-290.29
6	C	145.26	-57.20	160.54	-160.54	146.77	-201.65
7	C	83.42	-37.67	68.08	-68.08	54.04	-116.24
8	C	5.76	-1.35	241.21	-241.21	147.89	-152.17
9	C	41.08	-79.52	104.21	-104.21	119.82	-92.23
10	C	77.54	-145.27	99.25	-99.25	184.16	-99.74
11	C	95.08	-168.75	148.58	-148.58	230.40	-143.22
12	C	87.64	-155.19	77.97	-77.97	183.77	-116.59
13	C	71.68	-116.16	35.80	-35.80	130.38	-85.44
14	C	44.06	-60.54	28.02	-28.02	74.28	-50.44
15	C	3.98	-0.80	12.48	-12.48	7.34	-8.42
16	C	58.52	-55.75	25.49	-25.49	65.86	-64.82
17	C	90.22	-94.82	37.62	-37.62	110.31	-98.19
18	C	100.26	-115.15	48.97	-48.97	131.84	-111.84
19	C	98.66	-118.83	53.37	-53.37	137.13	-111.55
20	C	86.63	-103.43	46.22	-46.22	117.69	-93.76
21	C	54.27	-63.84	33.71	-33.71	75.62	-62.50
22	C	8.02	-3.06	26.76	-26.76	17.98	-16.36

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Factored Combined Forces Summary - Girder 4
Tue Jan 13 14:18:18 2015

Girder 4 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	3.91	-1.28	40.02	-40.02	22.36	-28.05
2	C	104.26	-15.09	121.78	-121.78	67.00	-125.06
3	C	201.57	0.00	300.17	-300.17	122.09	-302.50
4	C	247.91	0.00	329.01	-329.01	123.31	-337.50
5	C	234.69	0.00	285.64	-285.64	116.45	-299.88
6	C	175.22	-12.69	180.73	-180.73	75.96	-189.95
7	C	84.94	-2.21	97.96	-97.96	38.81	-140.60
8	C	0.00	-24.14	289.78	-289.78	202.44	-176.42
9	C	24.73	-62.74	134.87	-134.87	121.79	-101.31
10	C	51.35	-133.28	122.67	-122.67	176.22	-84.50
11	C	68.47	-145.92	181.04	-181.04	209.68	-78.00
12	C	77.59	-166.06	93.60	-93.60	200.67	-105.32
13	C	69.78	-140.11	78.12	-78.12	148.40	-94.56
14	C	47.48	-74.91	48.85	-48.85	75.50	-58.19
15	C	0.79	-1.31	11.62	-11.62	6.40	-7.98
16	C	60.51	-77.22	48.66	-48.66	79.32	-72.65
17	C	96.25	-146.62	71.61	-71.61	151.72	-117.34
18	C	111.52	-186.60	79.67	-79.67	194.62	-138.87
19	C	108.12	-197.67	80.70	-80.70	208.48	-138.98
20	C	86.68	-168.14	75.52	-75.52	175.30	-120.60
21	C	48.24	-99.33	53.32	-53.32	99.81	-76.56
22	C	2.27	-3.31	25.99	-25.99	15.02	-18.10

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Factored Combined Forces Summary - Girder 5
Tue Jan 13 14:18:24 2015

Girder 5 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
			HS				
1	C	1.46	-2.59	24.27	-24.27	16.22	-13.86
2	C	108.64	0.00	133.09	-133.09	38.20	-169.16
3	C	197.56	0.00	315.54	-315.54	86.20	-345.87
4	C	229.83	0.00	347.67	-347.67	63.96	-384.03
5	C	211.34	0.00	296.94	-296.94	59.97	-328.39
6	C	136.99	0.00	176.86	-176.86	53.17	-199.73
7	C	57.35	0.00	124.14	-124.14	62.28	-127.64
8	C	13.83	0.00	247.26	-247.26	141.68	-166.72
9	C	0.00	-54.42	161.85	-161.85	152.80	-81.89
10	C	0.00	-78.63	162.69	-162.69	176.44	-40.79
11	C	27.37	-76.66	219.06	-219.06	208.53	-92.39
12	C	50.79	-76.83	133.03	-133.03	156.02	-75.65
13	C	52.87	-72.79	66.23	-66.23	110.24	-63.36
14	C	35.80	-47.30	39.96	-39.96	65.09	-45.65
15	C	2.25	-0.84	9.95	-9.95	6.08	-7.61
16	C	40.37	-52.81	42.04	-42.04	69.36	-49.37
17	C	65.78	-87.14	73.27	-73.27	122.62	-75.16
18	C	77.48	-107.24	92.04	-92.04	159.55	-87.19
19	C	76.02	-111.73	97.79	-97.79	168.26	-85.13
20	C	60.89	-99.63	86.48	-86.48	146.91	-67.11
21	C	34.49	-62.81	59.36	-59.36	89.18	-47.21
22	C	1.83	-2.76	19.46	-19.46	14.40	-13.72

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Factored Combined Forces Summary - Girder 6
Tue Jan 13 14:18:30 2015

Girder 6 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	37.66	-5.58	106.16	-106.16	54.05	-79.00
2	C	106.19	0.00	43.19	-43.19	0.00	-115.18
3	C	247.78	0.00	203.08	-203.08	0.00	-354.64
4	C	285.27	0.00	203.54	-203.54	0.00	-403.34
5	C	234.93	0.00	165.79	-165.79	0.00	-332.78
6	C	132.33	0.00	87.24	-87.24	0.00	-182.38
7	C	15.26	-24.95	209.96	-209.96	153.77	-128.92
8	C	0.00	-77.61	529.31	-529.31	404.26	-255.73
9	C	0.00	-98.72	233.91	-233.91	233.61	-85.33
10	C	48.10	-68.20	108.68	-108.68	107.72	-97.78
11	C	88.36	-26.53	146.86	-146.86	48.51	-174.47
12	C	47.59	0.00	49.11	-49.11	23.83	-64.29
13	C	33.73	-5.11	44.12	-44.12	29.58	-56.07
14	C	17.58	-7.56	21.45	-21.45	17.47	-25.39
15	C	5.34	-1.63	23.45	-23.45	11.28	-19.85
16	C	13.82	-9.99	26.93	-26.93	21.42	-25.54
17	C	19.31	-12.71	46.28	-46.28	33.85	-39.11
18	C	24.95	-9.26	52.53	-52.53	32.67	-46.11
19	C	26.04	-6.58	53.41	-53.41	29.09	-48.04
20	C	22.40	-11.25	51.19	-51.19	34.16	-41.79
21	C	21.32	-8.60	37.74	-37.74	29.74	-35.31
22	C	5.71	-6.27	47.01	-47.01	25.80	-33.64

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Summary of Performance Ratios - Girder 1 - HS
Tue Jan 13 14:01:06 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

	Combined Stresses			Fatigue Stresses		
Brace	Top Chord	Diag	Bott Chord	Top Chord	Diag	Bott Chord
1	0.020	0.065	0.061	0.008	0.062	0.057
2	0.100	0.088	0.111	0.030	0.025	0.062
3	0.212	0.178	0.322	0.047	0.021	0.084
4	0.234	0.187	0.314	0.052	0.025	0.092
5	0.214	0.172	0.316	0.055	0.025	0.098
6	0.139	0.113	0.194	0.058	0.024	0.090
7	0.066	0.153	0.169	0.041	0.028	0.048
8	0.085	0.473	0.438	0.007	0.030	0.022
9	0.051	0.171	0.172	0.042	0.029	0.048
10	0.159	0.079	0.153	0.047	0.023	0.084
11	0.211	0.123	0.235	0.046	0.019	0.080
12	0.126	0.073	0.147	0.038	0.035	0.079
13	0.093	0.081	0.120	0.032	0.045	0.063
14	0.049	0.058	0.062	0.021	0.030	0.037
15	0.016	0.034	0.029	0.003	0.021	0.019
16	0.049	0.052	0.056	0.025	0.026	0.042
17	0.060	0.076	0.105	0.037	0.041	0.069
18	0.065	0.090	0.108	0.043	0.052	0.075
19	0.058	0.087	0.103	0.039	0.054	0.073
20	0.060	0.084	0.102	0.037	0.049	0.066
21	0.051	0.059	0.086	0.031	0.029	0.048
22	0.026	0.086	0.073	0.010	0.068	0.065

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Summary of Performance Ratios - Girder 2 - HS
Tue Jan 13 14:02:18 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

	Combined Stresses			Fatigue Stresses		
Brace	Top Chord	Diag	Bott Chord	Top Chord	Diag	Bott Chord
1	0.013	0.047	0.049	0.005	0.039	0.032
2	0.212	0.218	0.287	0.110	0.039	0.147
3	0.307	0.388	0.501	0.190	0.053	0.263
4	0.357	0.426	0.561	0.231	0.085	0.311
5	0.332	0.381	0.496	0.233	0.054	0.304
6	0.258	0.257	0.339	0.195	0.030	0.222
7	0.145	0.165	0.186	0.113	0.041	0.112
8	0.054	0.335	0.308	0.006	0.076	0.047
9	0.192	0.205	0.259	0.096	0.042	0.100
10	0.318	0.187	0.342	0.162	0.043	0.234
11	0.374	0.265	0.458	0.182	0.076	0.268
12	0.368	0.224	0.373	0.172	0.064	0.244
13	0.284	0.186	0.283	0.155	0.083	0.186
14	0.152	0.119	0.160	0.094	0.054	0.110
15	0.011	0.028	0.032	0.001	0.013	0.008
16	0.134	0.117	0.157	0.093	0.032	0.111
17	0.216	0.191	0.280	0.145	0.067	0.173
18	0.243	0.225	0.339	0.166	0.090	0.201
19	0.241	0.233	0.346	0.164	0.086	0.198
20	0.225	0.217	0.284	0.141	0.104	0.172
21	0.152	0.156	0.190	0.088	0.080	0.117
22	0.012	0.056	0.055	0.005	0.037	0.030

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Summary of Performance Ratios - Girder 3 - HS
Tue Jan 13 14:02:35 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

Brace	Combined Stresses			Fatigue Stresses		
	Top Chord	Diag	Bott Chord	Top Chord	Diag	Bott Chord
1	0.016	0.048	0.043	0.005	0.037	0.035
2	0.152	0.191	0.250	0.159	0.032	0.165
3	0.304	0.420	0.526	0.286	0.071	0.329
4	0.375	0.461	0.623	0.350	0.069	0.388
5	0.373	0.405	0.581	0.346	0.064	0.346
6	0.300	0.259	0.404	0.282	0.050	0.286
7	0.172	0.110	0.233	0.165	0.046	0.147
8	0.012	0.389	0.305	0.010	0.091	0.064
9	0.182	0.168	0.247	0.127	0.041	0.169
10	0.332	0.160	0.380	0.230	0.065	0.305
11	0.385	0.240	0.475	0.263	0.060	0.347
12	0.354	0.126	0.379	0.250	0.025	0.312
13	0.265	0.058	0.269	0.202	0.015	0.223
14	0.138	0.045	0.153	0.119	0.020	0.134
15	0.008	0.020	0.017	0.002	0.009	0.007
16	0.127	0.041	0.136	0.123	0.020	0.139
17	0.217	0.061	0.227	0.193	0.018	0.222
18	0.263	0.079	0.272	0.225	0.020	0.265
19	0.271	0.086	0.283	0.226	0.025	0.269
20	0.236	0.074	0.243	0.193	0.019	0.232
21	0.146	0.054	0.156	0.119	0.011	0.142
22	0.017	0.043	0.037	0.006	0.030	0.030

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Summary of Performance Ratios - Girder 4 - HS
Tue Jan 13 14:02:44 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

Brace	Combined Stresses Top Chord	Combined Stresses Diag	Combined Stresses Bott Chord	Fatigue Stresses Top Chord	Fatigue Stresses Diag	Fatigue Stresses Bott Chord
1	0.008	0.065	0.056	0.002	0.051	0.041
2	0.215	0.196	0.250	0.168	0.082	0.209
3	0.416	0.484	0.606	0.282	0.178	0.367
4	0.511	0.530	0.676	0.347	0.203	0.445
5	0.484	0.460	0.600	0.342	0.186	0.433
6	0.361	0.291	0.380	0.260	0.115	0.265
7	0.175	0.158	0.282	0.145	0.109	0.147
8	0.055	0.467	0.417	0.009	0.149	0.093
9	0.143	0.217	0.251	0.117	0.109	0.164
10	0.304	0.198	0.363	0.214	0.142	0.341
11	0.333	0.292	0.432	0.256	0.174	0.439
12	0.379	0.151	0.414	0.267	0.098	0.385
13	0.320	0.126	0.306	0.224	0.089	0.302
14	0.171	0.079	0.156	0.138	0.060	0.166
15	0.003	0.019	0.016	0.002	0.010	0.008
16	0.176	0.078	0.164	0.148	0.062	0.178
17	0.335	0.115	0.313	0.247	0.101	0.325
18	0.426	0.128	0.401	0.295	0.110	0.406
19	0.451	0.130	0.430	0.295	0.108	0.419
20	0.384	0.122	0.362	0.248	0.105	0.365
21	0.227	0.086	0.206	0.145	0.073	0.219
22	0.008	0.042	0.036	0.005	0.033	0.027

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Summary of Performance Ratios - Girder 5 - HS
Tue Jan 13 14:02:53 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

	Combined Stresses			Fatigue Stresses		
Brace	Top Chord	Diag	Bott Chord	Top Chord	Diag	Bott Chord
1	0.006	0.039	0.033	0.005	0.031	0.030
2	0.224	0.215	0.339	0.073	0.153	0.130
3	0.407	0.509	0.692	0.117	0.285	0.235
4	0.474	0.560	0.769	0.098	0.329	0.238
5	0.436	0.479	0.657	0.095	0.305	0.219
6	0.282	0.285	0.400	0.110	0.219	0.185
7	0.118	0.200	0.256	0.074	0.087	0.109
8	0.029	0.399	0.334	0.014	0.131	0.092
9	0.124	0.261	0.315	0.042	0.135	0.124
10	0.180	0.262	0.364	0.079	0.228	0.247
11	0.175	0.353	0.430	0.104	0.289	0.304
12	0.175	0.214	0.322	0.129	0.159	0.244
13	0.166	0.107	0.227	0.126	0.082	0.193
14	0.108	0.064	0.134	0.087	0.049	0.124
15	0.005	0.016	0.015	0.001	0.011	0.010
16	0.121	0.068	0.143	0.094	0.055	0.133
17	0.199	0.118	0.253	0.150	0.100	0.228
18	0.245	0.148	0.329	0.176	0.122	0.276
19	0.255	0.158	0.347	0.178	0.122	0.282
20	0.228	0.139	0.303	0.151	0.114	0.248
21	0.143	0.096	0.184	0.093	0.077	0.161
22	0.006	0.031	0.030	0.005	0.027	0.025

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Bracing : Rating Output : Summary of Performance Ratios - Girder 6 - HS
Tue Jan 13 14:03:03 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

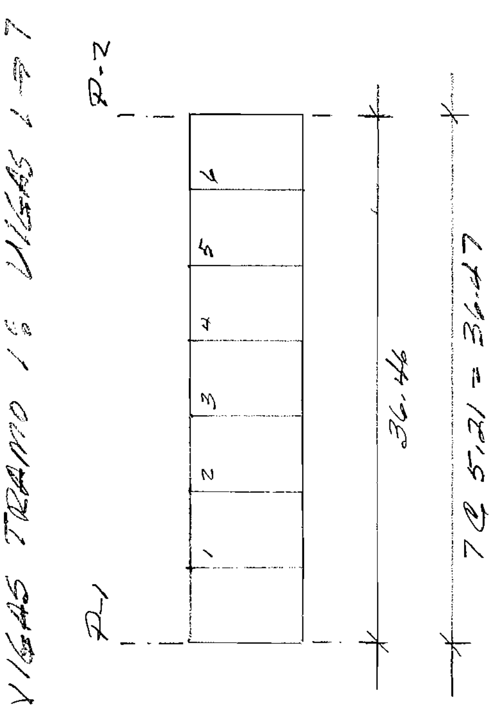
Brace	Combined Stresses Top Chord	Combined Stresses Diag	Combined Stresses Bott Chord	Fatigue Stresses Top Chord	Fatigue Stresses Diag	Fatigue Stresses Bott Chord
1	0.078	0.171	0.158	0.031	0.141	0.125
2	0.219	0.070	0.231	0.060	0.048	0.065
3	0.511	0.327	0.710	0.154	0.133	0.182
4	0.588	0.328	0.808	0.204	0.134	0.217
5	0.484	0.267	0.666	0.197	0.114	0.207
6	0.273	0.141	0.365	0.153	0.088	0.166
7	0.057	0.338	0.317	0.054	0.123	0.121
8	0.177	0.853	0.834	0.036	0.258	0.181
9	0.225	0.377	0.482	0.084	0.162	0.150
10	0.156	0.175	0.222	0.155	0.117	0.229
11	0.182	0.237	0.349	0.163	0.136	0.213
12	0.098	0.079	0.129	0.066	0.051	0.080
13	0.070	0.071	0.112	0.043	0.036	0.055
14	0.036	0.035	0.051	0.027	0.019	0.030
15	0.011	0.038	0.040	0.008	0.028	0.027
16	0.028	0.043	0.051	0.024	0.027	0.033
17	0.040	0.075	0.078	0.033	0.036	0.045
18	0.051	0.085	0.092	0.032	0.042	0.045
19	0.054	0.086	0.096	0.031	0.044	0.041
20	0.046	0.083	0.084	0.035	0.039	0.047
21	0.044	0.061	0.071	0.032	0.030	0.039
22	0.014	0.076	0.067	0.017	0.062	0.066

PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DISEÑO VIGAS

HOJA: VI - 6
FECHA: 13/01/15
CALCULO: M.P.
REVISO:



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DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder System : Input File : Layout/Slab/Loading Definition
Tue Jan 13 15:20:39 2015


ID: DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
CONDITIONS
  FLOAT LANES
  HS20 LOADING
  LFD METHOD
  METRIC INPUT
  METRIC OUTPUT
  RATE MODE
  RATING PROJECT
  SELF WEIGHT FOR DEAD LOAD 1
DATA
  BR-1 5.21 5.21 5.21 5.21 5.21 5.21
  CURB 2.7
  FPC 27.5
  GDSPC 1.6 1.6 1.6 1.6 1.6 1.6
  LANES 3.6 3.6
  ROADWP 7.2
  SIDEWALK 3.  0.
  SKEW-1 90. 90.
  SLABEXT  0.7  0.7
  SLABT 200.
  SLABWEAR  0.
  SPN-1 36.46
  WAC-1 1.12
  WAC-2 1.2
  WAC-3 1.2
  WAC-4 1.2
  WAC-5 1.2
  WAC-6 1.2
  WAC-7 1.12
  WAS-1  0.2
  WAS-2  0.2
  WAS-3  0.2
  WAS-4  0.2
  WAS-5  0.2
  WAS-6  0.2
  WAS-7  0.2
  WCONC 23563.
  WS-1 8.79
  WS-2 6.6
  WS-3 6.6
  WS-4 4.14
  WS-5 4.14
  WS-6 4.14
  WS-7 8.79
GO
```
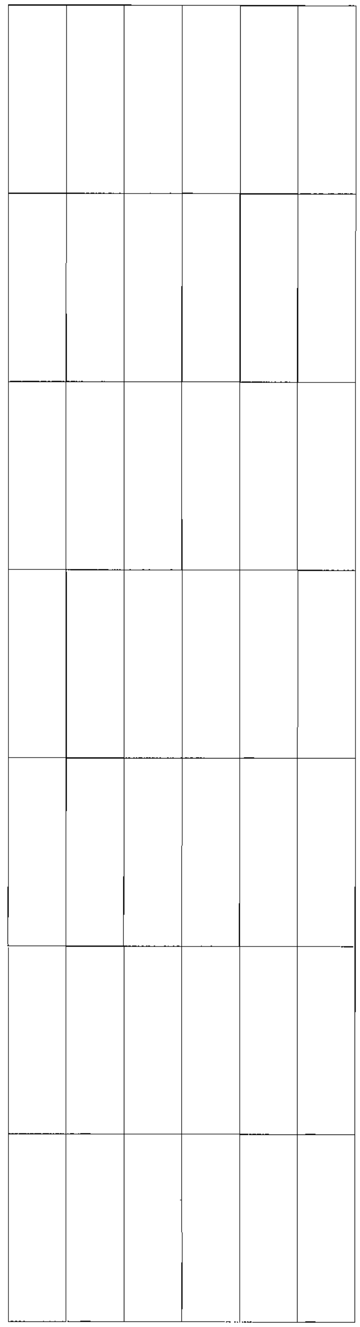
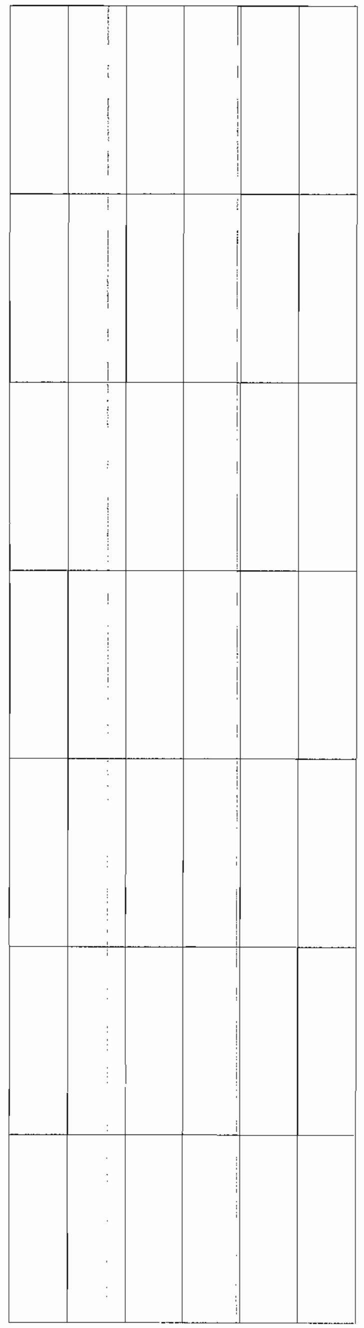





DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder System : Analysis Output : Case Data
Tue Jan 13 15:22:06 2015

Girder System Case Data - DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1

Geometry

Span Lengths, Girder 1

Span 1	36.460 m

Brace Angles at Supports, Girder 1

Support 1	90.000 deg
Support 2	90.000 deg

Girder spacing

Girder 1 to 2	1.60 m
Girder 2 to 3	1.60 m
Girder 3 to 4	1.60 m
Girder 4 to 5	1.60 m
Girder 5 to 6	1.60 m
Girder 6 to 7	1.60 m

Slab extension from center of girder 1 0.70 m

Slab extension from center of girder 7 0.70 m

Intermediate brace spacing

Girder 1

Brace 1	5.21 m
Brace 2	5.21 m
Brace 3	5.21 m
Brace 4	5.21 m
Brace 5	5.21 m
Brace 6	5.21 m

No curvature

Lane Geometry

Curb from girder 1, m

2.70 2.70 2.70 2.70 2.70 2.70 2.70 2.70 2.70
2.70

Lane Spacing

Lane 1 3.60 m
Lane 2 3.60 m

Loading

Superimposed dead load, kN/m

Girder 1

8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79
8.79

Girder 2

6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60
6.60

Girder 3

6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60
6.60

Girder 4

4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14
4.14

Girder 5

4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14
4.14

Girder 6

4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14
4.14

Girder 7

8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79
8.79

HS20 Loading

Influence surface values not displayed

Multiple Presence Factors

1.00
1.00
0.90
0.75

Units

Input: metric

Output: metric

```
DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Input File : Definition
Tue Jan 13 15:27:35 2015


ID: DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BR 5.21 5.21 5.21 5.21 5.21 5.21 5.2
  BSPACE 150.
  ESLABW 1500.
  FPC 27.5
  HAUNCH 63.5
  HAUNCW 260.
  IGIRD 7
  NSTUDL 2
  PITCH 350.
  PITSP 36.46
  SLABT 200.
  SLABWEAR  0.
  SPLBFT 32.
  SPLBFW 400.
  SPLTFT 25.
  SPLTFW 400.
  SPLWD 1220.
  SPLWT 13.
  SPN 36.46
  SS 25.
  STD 22.
  STH 114.
  SUPBST 16.
  SUPBSW 150.
  TSLABW 1500.
  WCONC 23563.
GO
```

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Case Data
Tue Jan 13 15:27:44 2015

Girder 7 Case Data - DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220	mm		
Web Thickness	13	mm		
Bearing Stiff. Width	150	mm	150	mm
Bearing Stiff. Thickness	16	mm	16	mm

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	5.21 m	10.42 m	15.63 m
20.84 m	26.05 m	31.26 m	36.46 m

Cover plates

No cover plates

Curvature

No curvature

Flange splices

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 36.46 m

Span lengths

36.46 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web haunches

Fatigue

Allowable weld stress 124.11 MPa
AWS minimum welds
Case I road for fatigue
Redundant load path structure

Impact

Impact factors assigned in GSA program

Loading

Load Factors gamma, beta	1.300	1.670
Constructibility	1.300	
Forms weight factor	1.000	

Unshored construction

Material

Concrete

Unit wt of concrete	23563. N/cu m
Slab t for strength	200 mm
Concrete strength	27.50 MPa
Effective slab width	1500 mm
Slab haunch	63 mm
Slab haunch width	260 mm
Self weight slab width	1500 mm

Steel

Web splice section 1
Steel grade M270M-345
Rebar yield 413.69 MPa

Summary tables

Standard resolution summary tables

Units

Input Units: Metric
Output Units: Metric

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Bearing Stiffener Stress
Tue Jan 13 15:34:58 2015

Girder 7 Bearing Stiffeners

Location from Left End of Web Sect.	Service Reaction	Allowable Column Stress	Actual Column Stress	Ratio	Allowable Bearing Stress	Actual Bearing Stress	Ratio
0.00	500.11	160.71	63.77	0.397	276.00	125.03	0.453
36.46	500.12	160.71	63.77	0.397	276.00	125.03	0.453

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Bottom Flange Factored Bending Stress - Group I Loa
Tue Jan 13 15:35:06 2015

Girder 7 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Bottom Flange Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	LL+I Rng	Wind	Tot	Allow	Ratio
0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000
1	3.65	51.6	22.6	48.2	-1.8	50.0	0.0	122.3	345.0	0.274
2	7.29	91.8	39.3	83.6	-3.4	87.0	0.0	214.7	345.0	0.481
3	10.94	120.7	50.3	109.3	-4.7	114.0	0.0	280.3	345.0	0.627
4	14.58	138.0	57.1	123.1	-5.5	128.6	0.0	318.2	345.0	0.711
5	18.23	143.7	59.6	126.2	-5.8	132.0	0.0	329.5	345.0	0.736
6	21.88	138.0	57.1	123.1	-5.5	128.6	0.0	318.2	345.0	0.711
7	25.52	120.7	50.3	109.2	-4.7	114.0	0.0	280.3	345.0	0.627
8	29.17	91.8	39.3	83.6	-3.4	87.0	0.0	214.7	345.0	0.481
9	32.81	51.6	22.6	48.2	-1.8	50.0	0.0	122.3	345.0	0.274
10	36.46	0.0	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000

Governing expression for allowable compression stress

Tenth Pt Expression

Perf. ratio for compact section is (factored mom/mom strength)
if this is less than (total stress/allowable stress).

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Bottom Flange Overload Stress
Tue Jan 13 15:35:22 2015

Girder 7 Bottom Flange 10.57 Overload Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.00	0.00	0.00	327.75	0.000
1	3.65	39.66	17.38	37.05	-1.40	327.75	0.287
2	7.29	70.60	30.24	64.33	-2.62	327.75	0.504
3	10.94	92.85	38.73	84.05	-3.65	327.75	0.658
4	14.58	106.16	43.95	94.66	-4.26	327.75	0.747
5	18.23	110.56	45.83	97.08	-4.43	327.75	0.773
6	21.88	106.15	43.95	94.66	-4.26	327.75	0.747
7	25.52	92.84	38.73	84.03	-3.64	327.75	0.658
8	29.17	70.61	30.24	64.34	-2.62	327.75	0.504
9	32.81	39.66	17.37	37.05	-1.40	327.75	0.287
10	36.46	0.00	0.00	0.00	0.00	327.75	0.000

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Constructibility of Web in Bending
Tue Jan 13 15:35:33 2015

Girder 7 Web Compression Bending Stress for Constructibility - MPa

Tenth Point	Noncomp. Dead Factored Mom	Noncomp. Dead Web Bending Stress	Allowable (10-173)	Ratio
0	0.00	0.00	345.00	0.000
1	932.52	56.79	345.00	0.165
2	1660.11	101.11	345.00	0.293
3	2183.10	132.96	345.00	0.385
4	2496.02	152.01	345.00	0.441
5	2599.67	158.33	345.00	0.459
6	2495.95	152.01	345.00	0.441
7	2183.00	132.95	345.00	0.385
8	1660.18	101.11	345.00	0.293
9	932.50	56.79	345.00	0.165
10	0.00	0.00	345.00	0.000

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Deflections
Tue Jan 13 15:35:42 2015

Girder 7 Service Deflections - mm

Tenth Pt	Total Noncomp Dead	Steel	Wet Con-crete	Super-Imposed Dead	Max LL+I Down	Max LL+I Up
Support	0	0	0	0	0	0
1	41	11	30	13	11	0
2	76	21	55	24	21	1
3	104	28	76	33	29	1
4	122	33	89	38	34	1
5	128	35	93	40	36	1
6	122	33	89	38	34	1
7	105	28	76	33	29	1
8	77	21	56	24	21	1
9	41	11	30	13	11	0
Support	0	0	0	0	0	0

Influence surfaces for defl developed assuming unequal participation of girders in resisting deflection.

	Loc						
Brace	5.21	56	15	41	17	15	0
Brace	10.42	100	27	73	31	28	1
Brace	15.63	124	33	91	38	34	1
Brace	20.84	124	33	91	38	34	1
Brace	26.05	101	27	73	31	28	1
Brace	31.26	56	15	41	17	15	0

Positive dead load deflection is downward.
Live load deflection as indicated in column heading.

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Dimensions
Tue Jan 13 15:35:50 2015

Girder 7 Dimensions

Tenth Point	Loc	-Top Flange- tfw	tft	weld	----Web---- wd	wt	weld	-Bot Flange- bfw	bft	Area
0	0.00	400	25	8	1220	13	8	400	32	38660
1	3.65	400	25	8	1220	13	8	400	32	38660
2	7.29	400	25	8	1220	13	8	400	32	38660
3	10.94	400	25	8	1220	13	8	400	32	38660
4	14.58	400	25	8	1220	13	8	400	32	38660
5	18.23	400	25	8	1220	13	8	400	32	38660
6	21.88	400	25	8	1220	13	8	400	32	38660
7	25.52	400	25	8	1220	13	8	400	32	38660
8	29.17	400	25	8	1220	13	8	400	32	38660
9	32.81	400	25	8	1220	13	8	400	32	38660
10	36.46	400	25	8	1220	13	8	400	32	38660

Bearing Stiffeners

Location	Width	Thickness
0.00	150	16
36.46	150	16

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Elastic Section Properties for Pos Mom Stress
Tue Jan 13 15:36:08 2015

Girder 7 Elastic Section Properties for Pos Mom Stress

	----- Noncomp -----			------ Comp ------ (n = 8)			------ Comp ------ (3n = 24)		
Tenth Point	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg
	x10**6			x10**6			x10**6		
0	10777	596	681	23693	999	278	17166	796	481
1	10777	596	681	23693	999	278	17166	796	481
2	10777	596	681	23693	999	278	17166	796	481
3	10777	596	681	23693	999	278	17166	796	481
4	10777	596	681	23693	999	278	17166	796	481
5	10777	596	681	23693	999	278	17166	796	481
6	10777	596	681	23693	999	278	17166	796	481
7	10777	596	681	23693	999	278	17166	796	481
8	10777	596	681	23693	999	278	17166	796	481
9	10777	596	681	23693	999	278	17166	796	481
10	10777	596	681	23693	999	278	17166	796	481

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Elastic Section Properties for Stiffness Analysis
Tue Jan 13 15:36:16 2015

Girder 7 Elastic Section Properties for Stiffness Analysis

	----- Noncomp -----			------ Comp ------ (n = 8)			------ Comp ------ (3n = 24)		
Tenth Point	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg
	x10**6			x10**6			x10**6		
0	10777	596	681	23693	999	278	17166	796	481
1	10777	596	681	23693	999	278	17166	796	481
2	10777	596	681	23693	999	278	17166	796	481
3	10777	596	681	23693	999	278	17166	796	481
4	10777	596	681	23693	999	278	17166	796	481
5	10777	596	681	23693	999	278	17166	796	481
6	10777	596	681	23693	999	278	17166	796	481
7	10777	596	681	23693	999	278	17166	796	481
8	10777	596	681	23693	999	278	17166	796	481
9	10777	596	681	23693	999	278	17166	796	481
10	10777	596	681	23693	999	278	17166	796	481

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Factored Strengths
Tue Jan 13 15:36:27 2015

Girder 7 Factored Strengths

Tenth Point	Loc	Factored Shear (kN)	Shear Strength (kN)	Ratio	Factored Moment (kN-m)	Bending Strength (kN-m)	Ratio
0	0.00	773.6	1620.3 (5)	0.477	0.0	9340.3 (20)	0.000
1	3.65	669.8	1620.3 (5)	0.413	2561.1	9340.3 (20)	0.274
2	7.29	532.5	1620.3 (5)	0.329	4490.1	9340.3 (20)	0.481
3	10.94	403.7	1620.3 (5)	0.249	5858.5	9340.3 (20)	0.627
4	14.58	277.2	1620.3 (5)	0.171	6645.0	9340.3 (20)	0.711
5	18.23	156.8	1620.3 (5)	0.097	6875.8	9340.3 (20)	0.736
6	21.88	277.9	1620.3 (5)	0.172	6644.7	9340.3 (20)	0.711
7	25.52	404.0	1620.3 (5)	0.249	5858.1	9340.3 (20)	0.627
8	29.17	531.8	1620.3 (5)	0.328	4490.3	9340.3 (20)	0.481
9	32.81	669.2	1620.3 (5)	0.413	2561.1	9340.3 (20)	0.274
10	36.46	788.1	1620.3 (5)	0.486	0.0	9340.3 (20)	0.000

(5) C 0.58 Fyw D t
(20) compact section

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Fatigue Stress
Tue Jan 13 15:36:33 2015

Girder 7 Fatigue Summary

Condition	Location from Left End of Girder	Category (Table 10.3.1A)	Force Range (kN-m)	Actual Stress Range	Allowable Stress Range	Ratio
Base metal	3.65	B	525.83 T	22183.	124106.	0.179
Base metal *	3.65	B	455.83 T	19230.	110316.	0.174
Base metal	7.29	B	913.17 T	38523.	124106.	0.310
Base metal *	7.29	B	782.34 T	33004.	110316.	0.299
Base metal	10.94	B	1192.95 T	50327.	124106.	0.406
Base metal *	10.94	B	1012.14 T	42699.	110316.	0.387
Base metal	14.58	B	1343.68 T	56685.	124106.	0.457
Base metal *	14.58	B	1137.17 T	47974.	110316.	0.435
Base metal	18.23	B	1378.02 T	58134.	124106.	0.468
Base metal *	18.23	B	1165.68 T	49176.	110316.	0.446
Base metal	21.88	B	1343.61 T	56682.	124106.	0.457
Base metal *	21.88	B	1137.08 T	47970.	110316.	0.435
Base metal	25.52	B	1192.80 T	50320.	124106.	0.405
Base metal *	25.52	B	1012.03 T	42694.	110316.	0.387
Base metal	29.17	B	913.22 T	38526.	124106.	0.310
Base metal *	29.17	B	782.39 T	33006.	110316.	0.299
Base metal	32.81	B	525.87 T	22185.	124106.	0.179
Base metal *	32.81	B	455.86 T	19231.	110316.	0.174
Near flg-web weld	3.65	B	525.83 T	21473.	124106.	0.173
Near flg-web weld *	3.65	B	455.83 T	18614.	110316.	0.169
Near flg-web weld	7.29	B	913.17 T	37290.	124106.	0.300
Near flg-web weld *	7.29	B	782.34 T	31948.	110316.	0.290
Near flg-web weld	10.94	B	1192.95 T	48715.	124106.	0.393
Near flg-web weld *	10.94	B	1012.14 T	41332.	110316.	0.375
Near flg-web weld	14.58	B	1343.68 T	54870.	124106.	0.442
Near flg-web weld *	14.58	B	1137.17 T	46438.	110316.	0.421
Near flg-web weld	18.23	B	1378.02 T	56273.	124106.	0.453
Near flg-web weld *	18.23	B	1165.68 T	47601.	110316.	0.432
Near flg-web weld	21.88	B	1343.61 T	54867.	124106.	0.442
Near flg-web weld *	21.88	B	1137.08 T	46434.	110316.	0.421
Near flg-web weld	25.52	B	1192.80 T	48709.	124106.	0.392
Near flg-web weld *	25.52	B	1012.03 T	41327.	110316.	0.375
Near flg-web weld	29.17	B	913.22 T	37292.	124106.	0.300
Near flg-web weld *	29.17	B	782.39 T	31950.	110316.	0.290
Near flg-web weld	32.81	B	525.87 T	21474.	124106.	0.173
Near flg-web weld *	32.81	B	455.86 T	18616.	110316.	0.169
Base metal	3.65	B	525.83 T	22183.	124106.	0.179
Base metal *	3.65	B	455.83 T	19230.	110316.	0.174
Base metal	7.29	B	913.17 T	38523.	124106.	0.310
Base metal *	7.29	B	782.34 T	33004.	110316.	0.299
Base metal	10.94	B	1192.95 T	50327.	124106.	0.406
Base metal *	10.94	B	1012.14 T	42699.	110316.	0.387
Base metal	14.58	B	1343.68 T	56685.	124106.	0.457
Base metal *	14.58	B	1137.17 T	47974.	110316.	0.435
Base metal	18.23	B	1378.02 T	58134.	124106.	0.468
Base metal *	18.23	B	1165.68 T	49176.	110316.	0.446
Base metal	21.88	B	1343.61 T	56682.	124106.	0.457
Base metal *	21.88	B	1137.08 T	47970.	110316.	0.435
Base metal	25.52	B	1192.80 T	50320.	124106.	0.405
Base metal *	25.52	B	1012.03 T	42694.	110316.	0.387
Base metal	29.17	B	913.22 T	38526.	124106.	0.310
Base metal *	29.17	B	782.39 T	33006.	110316.	0.299
Base metal	32.81	B	525.87 T	22185.	124106.	0.179
Base metal *	32.81	B	455.86 T	19231.	110316.	0.174
Base metal	3.65	B	450.22 L	18993.	199948.	0.095
Base metal	7.29	B	801.60 L	33817.	199948.	0.169
Base metal	10.94	B	1053.01 L	44423.	199948.	0.222
Base metal	14.58	B	1199.41 L	50599.	199948.	0.253
Base metal	18.23	B	1246.83 L	52600.	199948.	0.263

Base metal	21.88	B	1199.37	L	50597.	199948.	0.253
Base metal	25.52	B	1052.91	L	44419.	199948.	0.222
Base metal	29.17	B	801.65	L	33819.	199948.	0.169
Base metal	32.81	B	450.24	L	18994.	199948.	0.095
Near flg-web weld	3.65	B	450.22	L	18385.	199948.	0.092
Near flg-web weld	7.29	B	801.60	L	32734.	199948.	0.164
Near flg-web weld	10.94	B	1053.01	L	43001.	199948.	0.215
Near flg-web weld	14.58	B	1199.41	L	48979.	199948.	0.245
Near flg-web weld	18.23	B	1246.83	L	50916.	199948.	0.255
Near flg-web weld	21.88	B	1199.37	L	48977.	199948.	0.245
Near flg-web weld	25.52	B	1052.91	L	42997.	199948.	0.215
Near flg-web weld	29.17	B	801.65	L	32736.	199948.	0.164
Near flg-web weld	32.81	B	450.24	L	18386.	199948.	0.092
Base metal	3.65	B	450.22	L	18993.	199948.	0.095
Base metal	7.29	B	801.60	L	33817.	199948.	0.169
Base metal	10.94	B	1053.01	L	44423.	199948.	0.222
Base metal	14.58	B	1199.41	L	50599.	199948.	0.253
Base metal	18.23	B	1246.83	L	52600.	199948.	0.263
Base metal	21.88	B	1199.37	L	50597.	199948.	0.253
Base metal	25.52	B	1052.91	L	44419.	199948.	0.222
Base metal	29.17	B	801.65	L	33819.	199948.	0.169
Base metal	32.81	B	450.24	L	18994.	199948.	0.095

* Single truck, one traffic lane, >2,000,000 cycles

T - truck loading
L - lane loading

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Governing Service Moment
Tue Jan 13 15:36:42 2015

Girder 7 Service Moment - kN-m

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	Range
0	0.00	0.00	0.00	0.00 T	0.00 T	0.01
1	3.65	717.32	374.64	525.83	-16.20 T	542.03
2	7.29	1277.01	651.91	913.17	-30.39 T	943.56
3	10.94	1679.31	834.96	1192.95	-42.29 T	1235.24
4	14.58	1920.02	947.60	1343.68	-49.38 T	1393.06
5	18.23	1999.74	988.06	1378.02	-51.40 T	1429.42
6	21.88	1919.96	947.51	1343.61	-49.38 T	1392.98
7	25.52	1679.23	834.99	1192.80	-42.28 T	1235.08
8	29.17	1277.06	651.94	913.22	-30.39 T	943.61
9	32.81	717.31	374.60	525.87	-16.20 T	542.08
10	36.46	0.00	0.00	0.00 T	0.00 T	0.01

T - governed by truck loading
L - governed by lane loading

At Bracing

Brace No.

2	5.21	976.71	505.50	708.94	-22.53
3	10.42	1632.00	813.25	1161.07	-40.89
4	15.63	1959.36	966.59	1365.44	-50.47
5	20.84	1959.00	966.36	1365.22	-50.47
6	26.05	1630.99	812.85	1160.29	-40.85
7	31.26	975.15	504.70	707.90	-22.50

Live moment includes sidewalk.

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Governing Service Shear
Tue Jan 13 15:36:48 2015

Girder 7 Service Shear -kN

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I		Range
0	0.00	217.92	118.80	154.69	T	154.69
1	3.65	175.63	86.75	151.43	T	151.43
2	7.29	131.76	64.09	127.98	T	134.81
3	10.94	87.18	46.92	105.65	T	146.23
4	14.58	44.88	14.87	91.92	T	147.93
5	18.23	0.00	0.02	-72.24	T	143.61
6	21.88	-44.89	-14.84	-92.24	T	147.56
7	25.52	-87.18	-46.89	-105.80	T	145.89
8	29.17	-131.77	-64.07	-127.70	T	149.88
9	32.81	-175.63	-86.74	-151.11	T	154.29
10	36.46	-217.93	-118.79	-161.38	T	161.38

T - governed by truck loading
L - governed by lane loading

Live shear in Governing Shear table includes sidewalk.

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Max Performance Ratios
Tue Jan 13 15:37:04 2015

Girder 7 Maximum Performance Ratios

Criterion	Location m	Max Performance Ratio
Shear	36.46	0.486
Bending	18.23	0.773
Fatigue	18.23	0.468
Bearing Stf.	36.46	0.453

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Reactions
Tue Jan 13 15:37:15 2015

Girder 7 Factored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	287.67	157.67	340.03	-17.89	785.37	0.00
Steel	78.84					
Conc	208.83					
36.46	287.68	157.66	340.05	-17.90	785.38	0.00
Steel	78.84					
Conc	208.84					

Unfactored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	221.29	121.28	156.63	-8.24	499.19	334.33
Steel	60.65					
Conc	160.64					
36.46	221.29	121.27	156.63	-8.25	499.20	334.32
Steel	60.65					
Conc	160.64					

Reactions in girder output include weight in girder extensions
at abutments, which is not included in girder system output.

Live reaction includes sidewalk.

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Shear Connectors - Lane Loading
Tue Jan 13 15:37:46 2015

Girder 7 Lane loading - 500000 cycles

Given Pitch for 22 x 114 Stud Connectors for Fatigue

Tenth Point	Loc (m)	Given Pitch (mm)	Studs in a Line	Actual Shear Range (kN)	Shear Range Capacity (kN)	Ratio
0	0.00	350.00	2	154.67 L	306.92	0.504
1	3.65	350.00	2	132.73 L	306.92	0.432
2	7.29	350.00	2	116.65 L	306.92	0.380
3	10.94	350.00	2	110.58 L	306.92	0.360
4	14.58	350.00	2	106.16 L	306.92	0.346
5	18.23	350.00	2	100.18 L	306.92	0.326
6	21.88	350.00	2	107.31 L	306.92	0.350
7	25.52	350.00	2	111.08 L	306.92	0.362
8	29.17	350.00	2	123.77 L	306.92	0.403
9	32.81	350.00	2	138.44 L	306.92	0.451
10	36.46	350.00	2	153.85 L	306.92	0.501

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Shear Connectors - Truck Loading
Tue Jan 13 15:38:02 2015

Girder 7 Truck loading - 2000000 cycles

Given Pitch for 22 x 114 Stud Connectors for Fatigue

Tenth Point	Loc (m)	Given Pitch (mm)	Studs in a Line	Actual Shear Range (kN)	Shear Range Capacity (kN)	Ratio
0	0.00	350.00	2	170.18 T	227.29	0.749
1	3.65	350.00	2	151.43 T	227.29	0.666
2	7.29	350.00	2	134.81 T	227.29	0.593
3	10.94	350.00	2	146.23 T	227.29	0.643
4	14.58	350.00	2	147.93 T	227.29	0.651
5	18.23	350.00	2	143.61 T	227.29	0.632
6	21.88	350.00	2	147.03 T	227.29	0.647
7	25.52	350.00	2	145.45 T	227.29	0.640
8	29.17	350.00	2	149.85 T	227.29	0.659
9	32.81	350.00	2	154.29 T	227.29	0.679
10	36.46	350.00	2	161.38 T	227.29	0.710

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Shear Connectors - Truck Loading >2,000,000 Cycles
Tue Jan 13 15:38:08 2015

Girder 7 Truck loading - >2000000 cycles

(Single truck in single lane)

Given Pitch for 22 x 114 Stud Connectors for Fatigue

Tenth Point	Loc (m)	Given Pitch (mm)	Studs in a Line	Actual Shear Range (kN)	Shear Range Capacity (kN)	Ratio
0	0.00	350.00	2	131.52	159.25	0.826
1	3.65	350.00	2	131.51	159.25	0.826
2	7.29	350.00	2	119.42	159.25	0.750
3	10.94	350.00	2	137.72	159.25	0.865
4	14.58	350.00	2	139.36	159.25	0.875
5	18.23	350.00	2	140.40	159.25	0.882
6	21.88	350.00	2	138.74	159.25	0.871
7	25.52	350.00	2	137.07	159.25	0.861
8	29.17	350.00	2	134.37	159.25	0.844
9	32.81	350.00	2	134.24	159.25	0.843
10	36.46	350.00	2	141.32	159.25	0.887

Minimum Total Number of Connectors for Ultimate Strength

Beg TP	End TP	Beg Loc	End Loc	Number
0	5 (106 provided)	0.00	18.23	53
5	10 (106 provided)	18.23	36.46	53

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Slab and Rebar Factored Stress - Group I Loading
Tue Jan 13 15:38:22 2015

Girder 7 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	----- Slab -----			---- Rebars ----		
		Comp Dead	Max LL+I	Tot	Comp Dead	Min LL+I	Tot
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	3.65	-0.85	-3.11	-3.96	0.00	2.14	2.14
2	7.29	-1.48	-5.40	-6.88	0.00	4.01	4.01
3	10.94	-1.90	-7.05	-8.95	0.00	5.58	5.58
4	14.58	-2.15	-7.94	-10.10	0.00	6.52	6.52
5	18.23	-2.24	-8.15	-10.39	0.00	6.78	6.78
6	21.88	-2.15	-7.94	-10.10	0.00	6.52	6.52
7	25.52	-1.90	-7.05	-8.95	0.00	5.58	5.58
8	29.17	-1.48	-5.40	-6.88	0.00	4.01	4.01
9	32.81	-0.85	-3.11	-3.96	0.00	2.14	2.14
10	36.46	0.00	0.00	0.00	0.00	0.00	0.00

Only slab compression stresses tabulated.

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Top Flange Factored Bending Stress - Group I Loadin
Tue Jan 13 15:38:31 2015

Girder 7 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Top Flange Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	LL+I Rng	Tot	Allow	Ratio
0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000
1	3.65	-59.0	-13.6	-13.4	1.7	15.1	-86.0	345.0	0.249
2	7.29	-105.0	-23.7	-23.2	3.2	26.5	-151.9	345.0	0.440
3	10.94	-138.0	-30.4	-30.4	4.5	34.8	-198.8	345.0	0.576
4	14.58	-157.8	-34.5	-34.2	5.2	39.4	-226.5	345.0	0.657
5	18.23	-164.4	-36.0	-35.1	5.5	40.5	-235.4	345.0	0.682
6	21.88	-157.8	-34.5	-34.2	5.2	39.4	-226.5	345.0	0.657
7	25.52	-138.0	-30.4	-30.3	4.5	34.8	-198.8	345.0	0.576
8	29.17	-105.0	-23.7	-23.2	3.2	26.5	-151.9	345.0	0.440
9	32.81	-59.0	-13.6	-13.4	1.7	15.1	-86.0	345.0	0.249
10	36.46	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000

Governing expression for allowable compression stress

Tenth Pt	Expression
1	compact
2	compact
3	compact
4	compact
5	compact
6	compact
7	compact
8	compact
9	compact

Perf. ratio for compact section is (factored mom/mom strength)
if this is less than (total stress/allowable stress).

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Top Flange Overload Stress
Tue Jan 13 15:38:36 2015

Girder 7 Top Flange 10.57 Overload Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.00	0.00	0.00	327.75	0.000
1	3.65	-45.35	-10.50	-10.29	1.32	327.75	0.202
2	7.29	-80.74	-18.27	-17.87	2.48	327.75	0.357
3	10.94	-106.17	-23.40	-23.35	3.45	327.75	0.467
4	14.58	-121.39	-26.55	-26.30	4.03	327.75	0.532
5	18.23	-126.43	-27.69	-26.97	4.20	327.75	0.553
6	21.88	-121.38	-26.55	-26.30	4.03	327.75	0.532
7	25.52	-106.17	-23.40	-23.34	3.45	327.75	0.467
8	29.17	-80.74	-18.27	-17.87	2.48	327.75	0.357
9	32.81	-45.35	-10.50	-10.29	1.32	327.75	0.202
10	36.46	0.00	0.00	0.00	0.00	327.75	0.000

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder 7 : Rating Output : Weight
Tue Jan 13 15:38:44 2015

	Volume	Weight	
	cu m	kN	
Top Flange	0.36	28.06	
Web	0.58	44.51	
Bottom Flange	0.36	28.06	
Flange-Web Weld		0.35	
Bearing Stiffeners	0.01	0.90	
Steel in extensions		1.81	
Additional Steel		6.39	
Total Steel			110.10
Slab	10.94	257.73	
Flange Haunch	0.36	8.60	
Concrete in extensions		4.31	
Additional Concrete		40.84	
Total Concrete			311.48
Total Steel and Concrete			422.48

Does not include weight of bracing, which can be found in bracing output stiffness tables.

(Noncomposite weight data used in girder input is used for analysis loading.)

```
DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Bracing : Input File : Definition
Tue Jan 13 15:44:41 2015


ID: DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
CONDITIONS
  ALL SHAPES L89X89X9.52 FOR GROUP 1
  LFD METHOD
  M270M-345 STEEL
  METRIC INPUT
  METRIC OUTPUT
  RATE MODE
  TYPE C BRACING FOR GROUP 1
DATA
  BRL-1 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  BRL-2 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  BRL-3 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  BRL-4 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  BRL-5 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  BRL-6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  GCONNDST 75.
  GRP-1 1 1 1 1 1 1 1 1
  GRP-2 1 1 1 1 1 1 1 1
  GRP-3 1 1 1 1 1 1 1 1
  GRP-4 1 1 1 1 1 1 1 1
  GRP-5 1 1 1 1 1 1 1 1
  GRP-6 1 1 1 1 1 1 1 1
  GRPHT 920.
GO
```

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Bracing : Rating Output : Case Data
Tue Jan 13 15:45:19 2015

Case Data - DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1

Execution Mode

Rate Mode

Fatigue

* Category B
* Case I Road

Geometry

Brace Lengths from Girder 1 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Brace Lengths from Girder 2 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Brace Lengths from Girder 3 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Brace Lengths from Girder 4 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Brace Lengths from Girder 5 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Brace Lengths from Girder 6 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Connection to center of girder distance by group

75.00

Brace height by group - mm

920.00

Loading

Load Factor Method

Material

Steel grade: M270M-345

Units

Input - Metric
Output - Metric

* Default

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Bracing : Rating Output : Factored Combined Forces Summary - Girder 1
Tue Jan 13 15:45:05 2015

Girder 1 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	25.54	-7.39	78.32	-78.32	51.76	-45.19
2	C	24.80	-18.70	38.07	-38.07	35.00	-42.71
3	C	23.38	-26.30	55.76	-55.76	48.45	-44.18
4	C	22.64	-26.20	61.16	-61.16	49.18	-43.85
5	C	22.64	-26.21	61.16	-61.16	49.17	-43.85
6	C	23.37	-26.29	55.74	-55.74	48.44	-44.17
7	C	24.77	-18.67	38.00	-38.00	34.95	-42.66
8	C	25.54	-7.40	78.32	-78.32	51.76	-45.19

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Bracing : Rating Output : Factored Combined Forces Summary - Girder 2
Tue Jan 13 15:45:46 2015

Girder 2 Max Combined Member Forces - kN

Brace	Type	Top Chord		Diagonal		Bottom Chord	
		Tens	Comp	Tens	Comp	Tens	Comp
				HS			
1	C	9.58	-3.79	46.65	-46.65	26.09	-38.45
2	C	24.79	-62.55	100.83	-100.83	92.32	-52.86
3	C	42.66	-89.61	142.91	-142.91	149.57	-65.48
4	C	50.43	-95.51	158.24	-158.24	171.34	-75.38
5	C	50.43	-95.51	158.23	-158.23	171.33	-75.37
6	C	42.63	-89.57	142.81	-142.81	149.46	-65.44
7	C	24.75	-62.46	100.69	-100.69	92.20	-52.79
8	C	9.58	-3.79	46.66	-46.66	26.10	-38.46

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Bracing : Rating Output : Factored Combined Forces Summary - Girder 4
Tue Jan 13 15:45:56 2015

Girder 4 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	1.57	-5.11	37.01	-37.01	22.43	-24.48
2	C	47.59	-101.43	53.12	-53.12	102.79	-77.96
3	C	80.42	-169.25	74.02	-74.02	174.97	-122.45
4	C	98.01	-204.10	80.42	-80.42	214.39	-143.87
5	C	97.99	-204.06	80.42	-80.42	214.35	-143.85
6	C	80.36	-169.12	73.97	-73.97	174.84	-122.40
7	C	47.51	-101.27	52.77	-52.77	102.61	-77.85
8	C	1.57	-5.11	37.02	-37.02	22.43	-24.48

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Bracing : Rating Output : Factored Combined Forces Summary - Girder 5
Tue Jan 13 15:46:02 2015

Girder 5 Max Combined Member Forces - kN

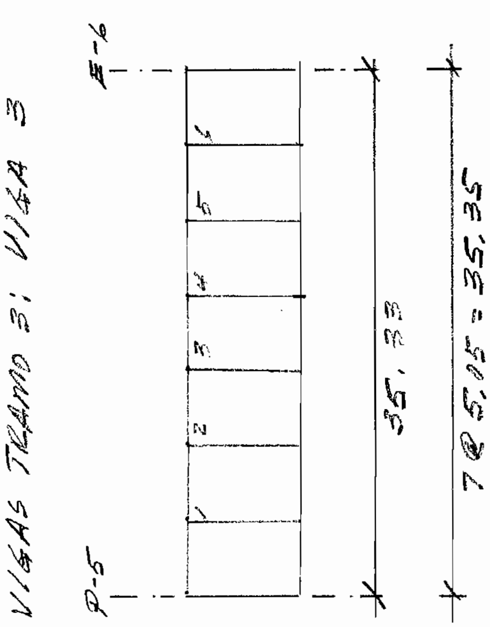
Brace	Type	Top Chord		Diagonal		Bottom Chord	
		Tens	Comp	Tens	Comp	Tens	Comp
				HS			
1	C	2.21	-3.71	22.75	-22.75	17.68	-15.14
2	C	35.84	-62.86	60.48	-60.48	88.84	-51.54
3	C	62.65	-99.30	90.33	-90.33	148.68	-68.74
4	C	76.69	-113.44	104.69	-104.69	174.44	-84.63
5	C	76.67	-113.43	104.68	-104.68	174.42	-84.61
6	C	62.60	-99.24	90.27	-90.27	148.63	-68.73
7	C	35.78	-62.77	60.38	-60.38	88.70	-51.47
8	C	2.33	-3.27	22.66	-22.66	17.18	-15.12

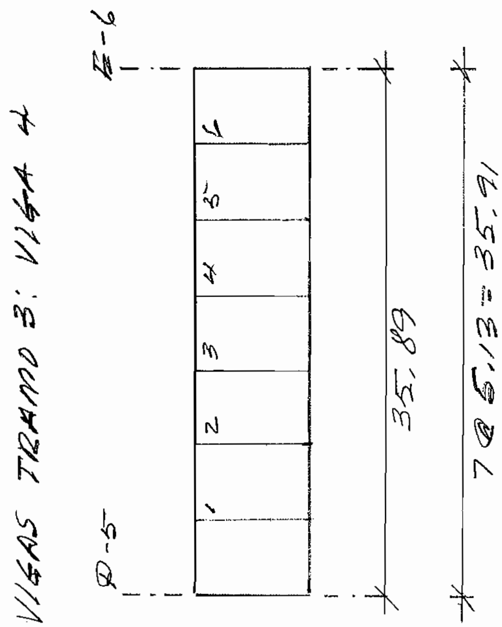
DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Bracing : Rating Output : Factored Combined Forces Summary - Girder 6
Tue Jan 13 15:46:07 2015

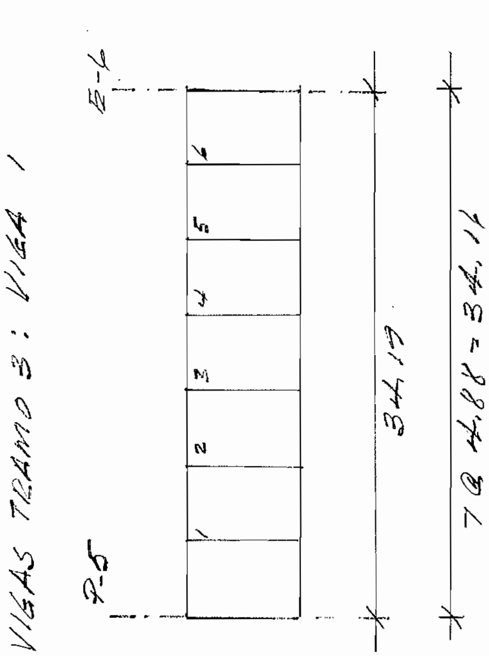
Girder 6 Max Combined Member Forces - kN

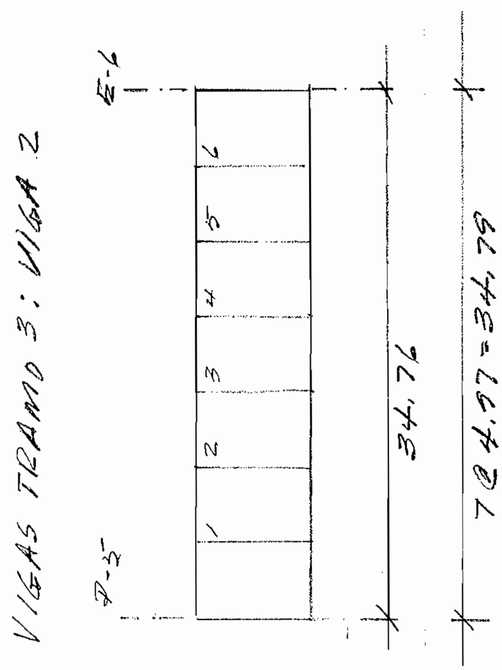
Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	16.60	-6.26	61.22	-61.22	34.34	-43.73
2	C	22.11	-10.43	39.82	-39.82	32.25	-37.08
3	C	25.73	-11.87	53.79	-53.79	41.41	-45.66
4	C	33.11	-7.09	58.15	-58.15	23.33	-56.66
5	C	33.08	-7.10	58.15	-58.15	23.33	-56.65
6	C	25.72	-11.87	53.78	-53.78	41.42	-45.65
7	C	22.08	-10.42	39.75	-39.75	31.28	-37.03
8	C	16.60	-6.34	61.22	-61.22	34.38	-43.73

PORTILLO Y YOUNG S.C.	PROYECTO: P.S. CALLE MARISCAL	HOJA: VI - 7
		FECHA: 14/01/15
		CALCULO: M.P.
	CONCEPTO: DISEÑO VIGAS	REVISO:







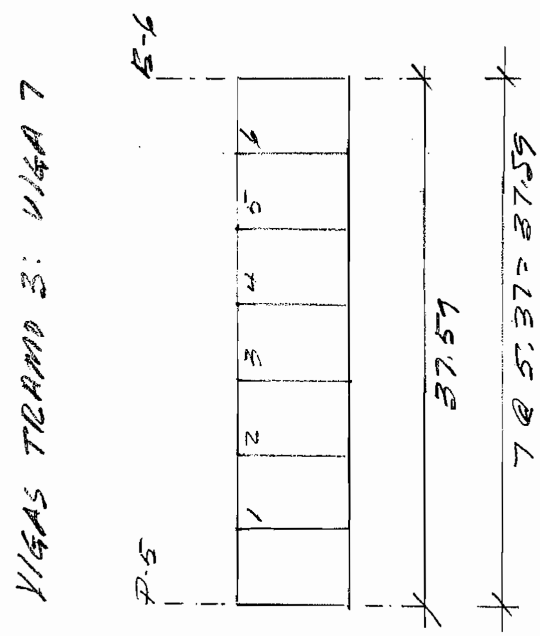


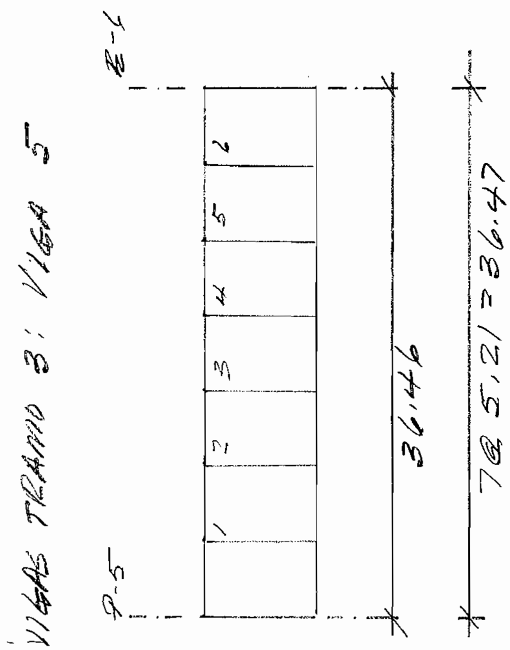
PORTILLO Y YOUNG S.C.

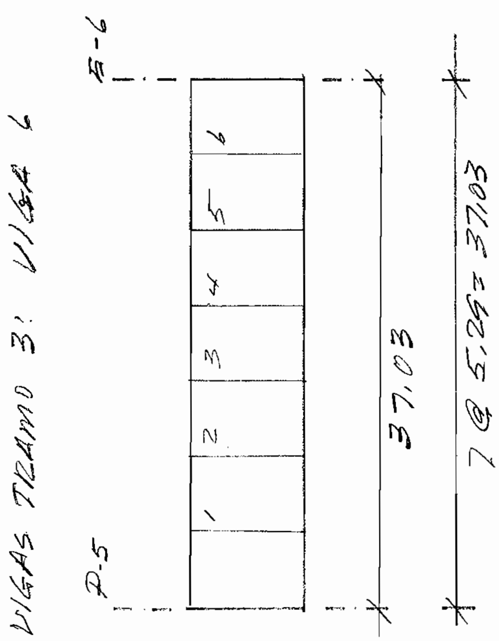
PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DISEÑO VIGAS

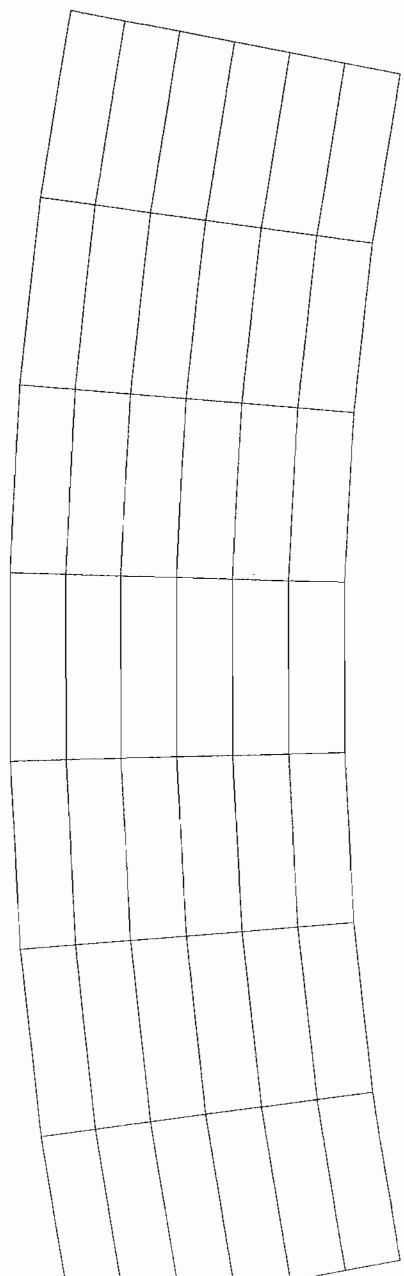
HOJA: VI-8
FECHA: 14/01/15
CALCULO: M.D.
REVISO:

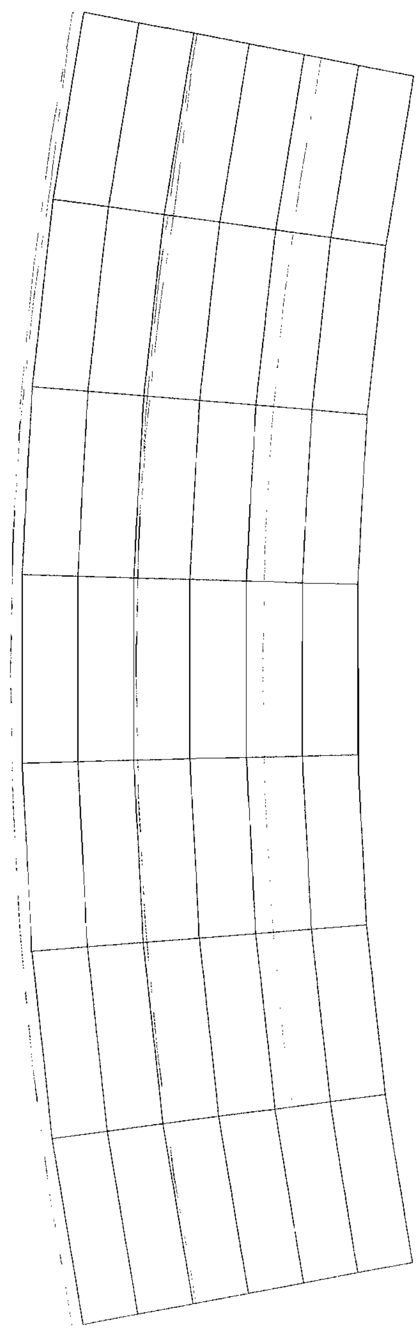






```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder System : Input File : Layout/Slab/Loading Definition
Thu Jan 15 10:36:49 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
CONDITIONS
  FLOAT LANES
  HS20 LOADING
  LFD METHOD
  METRIC INPUT
  METRIC OUTPUT
  RATE MODE
  RATING PROJECT
  SELF WEIGHT FOR DEAD LOAD 1
DATA
  BR-1 4.88 4.88 4.88 4.88 4.88 4.88
  CURB 2.7
  FPC 27.5
  GDSPC 1.6 1.6 1.6 1.6 1.6 1.6
  LANES 3.6 3.6
  RAD-1 90.1
  ROADWP 7.2
  SIDEWALK 3.  0.
  SKEW-1 90. 90.
  SLABEXT  0.7  0.7
  SLABT 200.
  SLABWEAR  0.
  SPEED 60
  SPN-1 34.19
  STP-1 1 2
  STP-2 1 2
  STP-3 1 2
  STP-4 1 2
  STP-5 1 2
  STP-6 1 2
  STP-7 1 2
  SUPER  0.02
  WAC-1 1.12
  WAC-2 1.2
  WAC-3 1.2
  WAC-4 1.2
  WAC-5 1.2
  WAC-6 1.2
  WAC-7 1.12
  WAS-1  0.2
  WAS-2  0.2
  WAS-3  0.2
  WAS-4  0.2
  WAS-5  0.2
  WAS-6  0.2
  WAS-7  0.2
  WCONC 23563.
  WS-1 8.79
  WS-2 6.6
  WS-3 6.6
  WS-4 4.14
  WS-5 4.14
  WS-6 4.14
  WS-7 8.79
GO
```





DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder System : Analysis Output : Case Data
Thu Jan 15 10:37:40 2015

Girder System Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3

Geometry

Span Lengths, Girder 1

Span 1 34.190 m

Brace Angles at Supports, Girder 1

Support 1 90.000 deg
Support 2 90.000 deg

Girder spacing

Girder 1 to 2 1.60 m
Girder 2 to 3 1.60 m
Girder 3 to 4 1.60 m
Girder 4 to 5 1.60 m
Girder 5 to 6 1.60 m
Girder 6 to 7 1.60 m

Slab extension from center of girder 1 0.70 m

Slab extension from center of girder 7 0.70 m

Intermediate brace spacing

Girder 1

Brace 1 4.88 m
Brace 2 4.88 m
Brace 3 4.88 m
Brace 4 4.88 m
Brace 5 4.88 m
Brace 6 4.88 m

Radius of curvature - Girder 1
90.10 m

Lane Geometry

Curb from girder 1, m

2.70 2.70 2.70 2.70 2.70 2.70 2.70 2.70 2.70
2.70

Lane Spacing

Lane 1 3.60 m
Lane 2 3.60 m

Centrifugal Force

Design speed 60.00 km/H for centrifugal force loading

Given superelevation

0.0200 0.0200 0.0200 0.0200 0.0200 0.0200 0.0200 0.0200
0.0200 0.0200 0.0200

Loading

Superimposed dead load, kN/m

Girder 1

8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79
8.79

Girder 2

6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60
6.60

Girder 3

6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60 6.60
6.60

Girder 4

4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14
4.14

Girder 5

4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14
4.14

Girder 6

4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14 4.14
4.14

Girder 7

8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79 8.79
8.79

HS20 Loading

Influence surface values not displayed

Multiple Presence Factors

1.00
1.00
0.90
0.75

Units

Input: metric

Output: metric

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder System : Analysis Output : Girder Span Lengths
Thu Jan 15 10:51:12 2015

Span Lengths

Girder 1			
	Span	1	34.190
Girder 2			
	Span	1	34.797
Girder 3			
	Span	1	35.404
Girder 4			
	Span	1	36.011
Girder 5			
	Span	1	36.619
Girder 6			
	Span	1	37.226
Girder 7			
	Span	1	37.833

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3 VIGAS 1 - 4
Girder 4 : Input File : Definition
Thu Jan 15 10:50:20 2015

```
ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BR 5.14 5.14 5.14 5.14 5.14 5.14 5.1716
  ESLABW 1600.
  FILLET 63.5
  FPC 27.5
  HAUNCW 250.
  IGIRD 4
  NSTUDL 2
  PITCH 300.
  PITSP 36.0114
  RAD 94.9
  RCEN 94.9
  SLABT 200.
  SLABWEAR  0.
  SPLBFT 25.
  SPLBFW 400.
  SPLTFT 25.
  SPLTFW 400.
  SPLWD 1220.
  SPLWT 13.
  SPN 36.0114
  SS 25.
  STD 22.
  STH 114.
  SUPBST 16.
  SUPBSW 150.
  TSLABW 1600.
  WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Case Data
Thu Jan 15 11:51:04 2015

Girder 4 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220	mm		
Web Thickness	13	mm		
Bearing Stiff. Width	150	mm	150	mm
Bearing Stiff. Thickness	16	mm	16	mm

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	5.14 m	10.28 m	15.42 m
20.56 m	25.70 m	30.84 m	36.01 m

Cover plates

No cover plates

Curvature

Radius of curvature 94.90 m
2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 36.01 m

Span lengths

36.01 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

```
 Web haunches


Fatigue

   Allowable weld stress      124.11 MPa
   AWS minimum welds

Impact

   Impact factors assigned in GSA program

Loading

   Load Factors gamma, beta     1.300        1.670
       Constructibility         1.400

       Forms weight factor      1.000

   Unshored construction

Material


 Concrete

   Unit wt of concrete         23563. N/cu m
   Slab t for strength           200 mm
   Concrete strength           27.50 MPa
   Effective slab width         1600 mm
   Fillet                         63 mm
   Slab haunch width             250 mm
   Self weight slab width       1600 mm

 Steel

   Web splice section  1
         Steel grade           M270M-345
   Rebar yield                413.69 MPa

Summary tables

   Standard resolution summary tables

Units

   Input Units:  Metric
   Output Units: Metric
```

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 1 : Input File : Definition
Thu Jan 15 10:52:03 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BR 4.88 4.88 4.88 4.88 4.88 4.88 4.91
  ESLABW 1500.
  FILLET 63.5
  FPC 27.5
  HAUNCW 250.
  IGIRD 1
  NSTUDL 2
  PITCH 300.
  PITSP 34.19
  RAD 90.1
  RCEN 94.9
  SLABT 200.
  SLABWEAR  0.
  SPLBFT 25.
  SPLBFW 400.
  SPLTFT 25.
  SPLTFW 400.
  SPLWD 1220.
  SPLWT 13.
  SPN 34.19
  SS 25.
  STD 22.
  STH 114.
  SUPBST 16.
  SUPBSW 150.
  TSLABW 1500.
  WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Bearing Stiffener Stress
Thu Jan 15 11:51:22 2015

Girder 4 Bearing Stiffeners

Location from Left End of Web Sect.	Service Reaction	Allowable Column Stress	Actual Column Stress	Ratio	Allowable Bearing Stress	Actual Bearing Stress	Ratio
0.00	660.04	342.58	84.17	0.246	465.75	165.01	0.354
36.01	660.52	342.58	84.23	0.246	465.75	165.13	0.355

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Bottom Flange Factored Bending Stress - Group I Loa
Thu Jan 15 11:51:36 2015

Girder 4 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Noncomp Dead	Comp Dead	Max LM+I	Min LL+I	LL+I Rng	Wind	Tot	Allow	Ratio
		Bottom Flange								
0	0.00	0.0	0.0	0.1	0.0	0.1	0.0	0.1	345.0	0.000
1	3.60	42.9	17.1	42.2	0.0	42.2	0.0	102.3	344.7	0.297
2	7.20	74.9	30.6	66.7	0.0	66.7	0.0	172.2	331.6	0.519
3	10.80	96.2	40.3	79.1	0.0	79.1	0.0	215.6	329.8	0.654
4	14.40	109.7	46.1	86.7	0.0	86.7	0.0	242.5	341.9	0.709
5	18.01	114.5	48.0	89.1	0.0	89.1	0.0	251.6	324.5	0.775
6	21.61	109.6	46.0	86.6	0.0	86.6	0.0	242.3	342.8	0.707
7	25.21	96.2	40.3	79.1	0.0	79.1	0.0	215.5	328.7	0.656
8	28.81	74.9	30.6	66.7	0.0	66.7	0.0	172.2	331.9	0.519
9	32.41	42.9	17.2	42.3	0.0	42.3	0.0	102.3	344.4	0.297
10	36.01	0.0	0.0	0.1	0.0	0.1	0.0	0.1	345.0	0.000

Lateral bending stress not included in the above factored stresses.

Governing expression for allowable compression stress

Tenth Pt Expression

Perf. ratio for compact section is (factored mom/mom strength)
if this is less than (total stress/allowable stress).

Grp I Bottom Flange Factored Lateral Bending Stress

Tenth Pt	Noncomp Dead Lat Mom kN-m	Noncomp Dead fw MPa	Comp Dead Lat Mom kN-m	Comp Dead fw MPa	Max LL+I Lat Mom kN-m	Max LL+I fw MPa	Min LL+I Lat Mom kN-m	Min LL+I fw MPa
0	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00
1	-0.20	0.30	-0.10	0.15	-0.26	0.39	0.00	0.00
2	-9.40	14.10	-4.76	7.14	-10.98	16.47	0.00	0.00
3	10.77	16.15	5.50	8.25	12.28	18.42	0.00	0.00
4	2.35	3.52	1.22	1.83	2.23	3.34	0.00	0.00
5	-14.91	22.37	-7.67	11.51	-15.87	23.81	0.00	0.00
6	1.71	2.56	0.89	1.34	1.54	2.32	0.00	0.00
7	11.55	17.33	5.90	8.86	13.13	19.70	0.00	0.00
8	-9.25	13.87	-4.69	7.03	-10.78	16.17	0.00	0.00
9	-0.40	0.59	-0.20	0.29	-0.51	0.77	0.00	0.00
10	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00

Dabrowski sign convention: +fw/fb ratio used for allowable stress.
(See 2003 Guide spec. commentary C5.1)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Bottom Flange Overload Stress
Thu Jan 15 11:51:45 2015

Girder 4 Bottom Flange Permanent Defl Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.00	0.04	-0.01	327.75	0.000
1	3.60	33.00	13.19	32.48	0.00	327.75	0.240
2	7.20	57.59	23.52	51.31	0.00	327.75	0.404
3	10.80	74.03	30.97	60.86	0.00	327.75	0.506
4	14.40	84.40	35.45	66.68	0.00	327.75	0.569
5	18.01	88.05	36.91	68.57	0.00	327.75	0.590
6	21.61	84.34	35.42	66.65	0.00	327.75	0.569
7	25.21	74.01	30.97	60.82	0.00	327.75	0.506
8	28.81	57.60	23.53	51.32	0.00	327.75	0.404
9	32.41	33.02	13.20	32.52	0.00	327.75	0.240
10	36.01	0.00	0.00	0.04	-0.01	327.75	0.000

Lateral bending stresses not included if compact.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Constructibility of Web in Bending
Thu Jan 15 11:51:56 2015

Girder 4 Web Compression Bending Stress for Constructibility - MPa

Tenth Point	Noncomp. Dead Factored Mom	Noncomp. Dead Web Bending Stress	Allowable (6-3),(6-8)	Ratio
0	0.01	0.00	345.00	0.000
1	706.86	44.38	345.00	0.129
2	1233.76	77.45	345.00	0.225
3	1585.89	99.56	345.00	0.289
4	1808.06	113.51	345.00	0.329
5	1886.19	118.41	345.00	0.343
6	1806.77	113.43	345.00	0.329
7	1585.50	99.54	345.00	0.289
8	1233.92	77.46	345.00	0.225
9	707.33	44.41	345.00	0.129
10	0.01	0.00	345.00	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Deflections
Thu Jan 15 11:52:16 2015

Girder 4 Service Deflections - mm

Tenth Pt	Total Noncomp Dead	Steel	Wet Con-crete	Super-Imposed Dead	Max LL+I Down	Max LL+I Up
Support	0	0	0	0	0	0
1	35	11	24	10	8	0
2	64	20	44	19	15	0
3	88	28	61	26	21	0
4	103	32	71	31	25	0
5	109	34	75	32	26	0
6	104	33	71	31	25	0
7	88	28	61	26	21	0
8	65	20	45	19	15	0
9	35	11	24	10	8	0
Support	0	0	0	0	0	0

Influence surfaces for defl developed assuming unequal participation of girders in resisting deflection.

	Loc						
Brace	5.14	48	15	33	13	11	0
Brace	10.28	85	27	58	25	20	0
Brace	15.42	105	32	72	31	25	0
Brace	20.56	106	33	72	31	25	0
Brace	25.70	85	27	59	25	20	0
Brace	30.84	48	15	33	14	11	0

Positive dead load deflection is downward.
Live load deflection as indicated in column heading.

Live load includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Dimensions
Thu Jan 15 11:52:33 2015

Girder 4 Dimensions

Tenth Point	Loc	-Top Flange- tfw	tft	weld	----Web---- wd	wt	weld	-Bot Flange- bfw	bft	Area
0	0.00	400	25	8	1220	13	8	400	25	35860
1	3.60	400	25	8	1220	13	8	400	25	35860
2	7.20	400	25	8	1220	13	8	400	25	35860
3	10.80	400	25	8	1220	13	8	400	25	35860
4	14.40	400	25	8	1220	13	8	400	25	35860
5	18.01	400	25	8	1220	13	8	400	25	35860
6	21.61	400	25	8	1220	13	8	400	25	35860
7	25.21	400	25	8	1220	13	8	400	25	35860
8	28.81	400	25	8	1220	13	8	400	25	35860
9	32.41	400	25	8	1220	13	8	400	25	35860
10	36.01	400	25	8	1220	13	8	400	25	35860

Bearing Stiffeners

Location	Width	Thickness
0.00	150	16
36.01	150	16

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Elastic Section Properties for Pos Mom Stress
Thu Jan 15 11:52:50 2015

Girder 4 Elastic Section Properties for Pos Mom Stress

	----- Noncomp -----			------ Comp ------ (n = 8)			------ Comp ------ (3n = 24)		
Tenth Point	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg
	x10**6			x10**6			x10**6		
0	9718	635	635	21907	1056	214	15959	851	419
1	9718	635	635	21907	1056	214	15959	851	419
2	9718	635	635	21907	1056	214	15959	851	419
3	9718	635	635	21907	1056	214	15959	851	419
4	9718	635	635	21907	1056	214	15959	851	419
5	9718	635	635	21907	1056	214	15959	851	419
6	9718	635	635	21907	1056	214	15959	851	419
7	9718	635	635	21907	1056	214	15959	851	419
8	9718	635	635	21907	1056	214	15959	851	419
9	9718	635	635	21907	1056	214	15959	851	419
10	9718	635	635	21907	1056	214	15959	851	419

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Elastic Section Properties for Stiffness Analysis
Thu Jan 15 11:53:06 2015

Girder 4 Elastic Section Properties for Stiffness Analysis

	----- Noncomp -----			------ Comp ------ (n = 8)			------ Comp ------ (3n = 24)		
Tenth Point	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg	I	na from Bott	na from Top Flg
	x10**6			x10**6			x10**6		
0	9718	635	635	21907	1056	214	15959	851	419
1	9718	635	635	21907	1056	214	15959	851	419
2	9718	635	635	21907	1056	214	15959	851	419
3	9718	635	635	21907	1056	214	15959	851	419
4	9718	635	635	21907	1056	214	15959	851	419
5	9718	635	635	21907	1056	214	15959	851	419
6	9718	635	635	21907	1056	214	15959	851	419
7	9718	635	635	21907	1056	214	15959	851	419
8	9718	635	635	21907	1056	214	15959	851	419
9	9718	635	635	21907	1056	214	15959	851	419
10	9718	635	635	21907	1056	214	15959	851	419

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Factored Strengths
Thu Jan 15 11:53:15 2015

Girder 4 Factored Strengths

Tenth Point	Loc	Factored Shear (kN)	Shear Strength (kN)	Ratio	Factored Moment (kN-m)	Bending Strength (kN-m)	Ratio
0	0.00	654.9	1589.0 (5)	0.412	1.2	5279.1 (6)	0.000
1	3.60	496.7	1589.0 (5)	0.313	1853.6	6247.7 (6)	0.297
2	7.20	401.0	1589.0 (5)	0.252	3102.3	5976.1 (6)	0.519
3	10.80	361.6	1589.0 (5)	0.228	3868.2	5916.8 (6)	0.654
4	14.40	179.9	1589.0 (5)	0.113	4340.6	6120.1 (6)	0.709
5	18.01	163.3	1589.0 (5)	0.103	4499.8	5803.8 (6)	0.775
6	21.61	171.0	1589.0 (5)	0.108	4337.9	6136.0 (6)	0.707
7	25.21	352.5	1589.0 (5)	0.222	3866.8	5897.1 (6)	0.656
8	28.81	392.0	1589.0 (5)	0.247	3102.8	5980.2 (6)	0.519
9	32.41	486.1	1589.0 (5)	0.306	1855.1	6242.5 (6)	0.297
10	36.01	659.4	1589.0 (5)	0.415	1.2	5279.1 (6)	0.000

(5) C 0.58 Fyw D t
(6) Fy S(equiv)
Maximum moment in factored strength expression

Max Web Slenderness for Unstiffened Web - 6.2

Tenth Pt.	Max D/tw	Actual D/tw
0	100.00	93.85
1	100.00	93.85
2	100.00	93.85
3	100.00	93.85
4	100.00	93.85
5	100.00	93.85
6	100.00	93.85
7	100.00	93.85
8	100.00	93.85
9	100.00	93.85
10	100.00	93.85

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Fatigue Stress
Thu Jan 15 11:53:24 2015

Girder 4 Fatigue Summary

Condition	Location from Left End of Girder	Category (Table 6.6.1.2.3-1)	Force Range (kN-m)	Actual Stress Range	Allowable Stress Range	Ratio
Base metal	3.60	B	169.54	8.23	55.16	0.149
Base metal	7.20	B	249.28	14.26	55.16	0.259
Base metal	10.80	B	270.41	15.46	55.16	0.280
Base metal	14.40	B	287.37	14.24	55.16	0.258
Base metal	18.01	B	293.13	17.13	55.16	0.311
Base metal	21.61	B	287.44	14.11	55.16	0.256
Base metal	25.21	B	270.00	15.60	55.16	0.283
Base metal	28.81	B	249.42	14.22	55.16	0.258
Base metal	32.41	B	169.79	8.30	55.16	0.150
Near flg-web weld	3.60	B	169.54	7.98	55.16	0.145
Near flg-web weld	7.20	B	249.28	11.73	55.16	0.213
Near flg-web weld	10.80	B	270.41	12.73	55.16	0.231
Near flg-web weld	14.40	B	287.37	13.53	55.16	0.245
Near flg-web weld	18.01	B	293.13	13.80	55.16	0.250
Near flg-web weld	21.61	B	287.44	13.53	55.16	0.245
Near flg-web weld	25.21	B	270.00	12.71	55.16	0.230
Near flg-web weld	28.81	B	249.42	11.74	55.16	0.213
Near flg-web weld	32.41	B	169.79	7.99	55.16	0.145

Allowable range determined by:
Life 75 yrs
Avg daily trk traffic 4000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Governing Service Moment
Thu Jan 15 11:54:55 2015

Girder 4 Service Moment - kN-m

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	Range
0	0.00	0.00	0.07	0.51 T	-0.13 T	0.64
1	3.60	504.90	247.20	403.44	0.00 T	403.44
2	7.20	881.26	440.84	637.28	0.00 T	637.28
3	10.80	1132.78	580.46	755.88	0.00 T	755.88
4	14.40	1291.47	664.40	828.19	0.00 T	828.19
5	18.01	1347.28	691.82	851.66	0.00 T	851.66
6	21.61	1290.55	663.84	827.82	0.00 T	827.82
7	25.21	1132.50	580.46	755.40	0.00 T	755.40
8	28.81	881.37	440.90	637.44	0.00 T	637.44
9	32.41	505.24	247.33	403.84	0.00 T	403.84
10	36.01	0.00	0.07	0.52 T	-0.14 T	0.65

T - governed by truck loading
L - governed by lane loading

Range shown in this table not used for fatigue.

At Bracing

Brace No.					
2	5.14	681.45	336.49	524.06	0.02
3	10.28	1101.98	563.63	741.52	0.00
4	15.42	1317.63	677.86	839.75	0.00
5	20.56	1317.49	677.68	839.76	0.00
6	25.70	1103.68	564.71	741.96	0.00
7	30.84	685.12	338.34	526.57	0.02

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Governing Service Shear
Thu Jan 15 11:55:01 2015

Girder 4 Service Shear -kN

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I		Range
0	0.00	161.97	76.09	159.11	T	145.86
1	3.60	118.49	61.18	121.20	T	108.42
2	7.20	88.61	46.31	103.92	T	104.90
3	10.80	65.82	30.77	108.71	T	148.51
4	14.40	22.34	15.86	-86.11	T	145.98
5	18.01	-0.31	-0.11	75.45	T	142.38
6	21.61	-22.16	-15.70	90.35	T	146.31
7	25.21	-65.64	-30.61	-104.72	T	147.57
8	28.81	-88.63	-46.25	-99.78	T	135.08
9	32.41	-118.63	-61.24	-116.20	T	124.87
10	36.01	-162.11	-76.15	-161.04	T	147.77

Ranges shown in this table not used for fatigue.

T - governed by truck loading
L - governed by lane loading

Live shear in Governing Shear table includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Lateral Bending in Flanges
Thu Jan 15 11:53:47 2015

Factored Lateral Bending in Bottom Flange
From Curvature

Brace Location (m)	Primary Bending Stress (MPa)	Lateral Bending Stress (MPa)	Lateral ------- Primary	Perf Ratio	Lateral ------- .5 Fy	Perf Ratio
0.00	0.00	0.00	0.000	0.000	compact	
5.14	136.22	65.91	0.484	0.968	compact	
10.28	210.32	101.24	0.481	0.963	compact	
15.42	246.83	118.52	0.480	0.960	compact	
20.56	246.81	118.51	0.480	0.960	compact	
25.70	210.58	101.36	0.481	0.963	compact	
30.84	136.92	66.65	0.487	0.974	compact	
36.01	0.00	0.00	0.000	0.000	compact	

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Max Performance Ratios
Thu Jan 15 11:53:57 2015

Girder 4 Maximum Performance Ratios

Criterion	Location m	Max Performance Ratio
Shear	36.01	0.415
Bending	30.84	0.974
Fatigue	18.01	0.311
Bearing Stf.	36.01	0.355

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Reactions
Thu Jan 15 11:54:24 2015

Girder 4 Factored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	216.01	97.23	346.80	0.00	660.04	216.01
Steel	60.17					
Conc	155.84					
36.01	216.20	97.32	347.00	0.00	660.52	216.20
Steel	60.21					
Conc	155.99					

Unfactored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	166.16	74.79	159.74	0.00	400.70	240.96
Steel	46.28					
Conc	119.88					
36.01	166.31	74.86	159.83	0.00	401.00	241.17
Steel	46.31					
Conc	120.00					

Reactions in girder output include weight in girder extensions at abutments, which is not included in girder system output.

Live reaction includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Service Torque
Thu Jan 15 11:56:15 2015

Girder 4 Service Torque - kN-m

Tenth Point	Location	DL1	DL2	Max LL+I	Min LL+I	Range
0	0.00	-0.30	-2.60	4.74	-11.12	15.86
1	3.60	-0.30	-2.60	4.74 T	-11.13 T	15.86
2	7.20	-0.25	-2.22	3.77 T	-8.95 T	12.72
3	10.80	-0.15	-1.39	2.04 T	-5.52 T	7.56
4	14.40	-0.15	-1.39	2.04 T	-5.52 T	7.56
5	18.01	0.00	0.00	2.05 T	-1.56 T	3.61
6	21.61	0.15	1.37	5.48 T	-0.08 T	5.56
7	25.21	0.15	1.37	5.48 T	-0.08 T	5.56
8	28.81	0.25	2.22	8.95 T	-0.05 T	9.00
9	32.41	0.30	2.60	11.13 T	-0.23 T	11.36
10	36.01	0.30	2.60	11.12	-0.23	11.35

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Shear Connectors - 2003 Guide Spec Fatigue Truck
Thu Jan 15 11:56:28 2015

Given Pitch for 22 x 114 Stud Connectors for Fatigue

Tenth Point	Loc (m)	Given Pitch (mm)	Studs in a Line	Actual Shear Range (kN)	Shear Range Capacity (kN)	Ratio
0	0.00	300.00	2	70.22 T	88.77	0.791
1	3.60	300.00	2	47.09 T	88.22	0.534
2	7.20	300.00	2	50.18 T	87.73	0.572
3	10.80	300.00	2	62.02 T	87.97	0.705
4	14.40	300.00	2	62.53 T	87.88	0.712
5	18.01	300.00	2	61.10 T	87.80	0.696
6	21.61	300.00	2	61.62 T	87.85	0.701
7	25.21	300.00	2	62.86 T	87.99	0.714
8	28.81	300.00	2	55.11 T	87.91	0.627
9	32.41	300.00	2	59.26 T	88.42	0.670
10	36.01	300.00	2	70.26 T	88.77	0.791

Minimum Total Number of Connectors for Ultimate Strength

Beg TP	End TP	Beg Loc	End Loc	Number
0	5	0.00	18.01	56
(122 provided)				
5	10	18.01	36.01	56
(122 provided)				

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Top Flange Factored Bending Stress - Group I Loadin
Thu Jan 15 11:56:50 2015

Girder 4 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Top Flange: Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	LL+I Rng	Tot	Allow	Ratio
0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000
1	3.60	-42.9	-8.4	-8.6	0.0	8.6	-59.9	345.0	0.174
2	7.20	-74.9	-15.0	-13.5	0.0	13.5	-103.4	345.0	0.300
3	10.80	-96.2	-19.8	-16.0	0.0	16.0	-132.1	345.0	0.383
4	14.40	-109.7	-22.7	-17.6	0.0	17.6	-149.9	345.0	0.435
5	18.01	-114.5	-23.6	-18.1	0.0	18.1	-156.1	345.0	0.453
6	21.61	-109.6	-22.6	-17.6	0.0	17.6	-149.8	345.0	0.434
7	25.21	-96.2	-19.8	-16.0	0.0	16.0	-132.0	345.0	0.383
8	28.81	-74.9	-15.0	-13.5	0.0	13.5	-103.4	345.0	0.300
9	32.41	-42.9	-8.4	-8.6	0.0	8.6	-59.9	345.0	0.174
10	36.01	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000

Lateral bending stress not included in the above factored stresses.

Governing expression for allowable compression stress

Tenth Pt	Expression
1	compact
2	compact
3	compact
4	compact
5	compact
6	compact
7	compact
8	compact
9	compact

Perf. ratio for compact section is (factored mom/mom strength)
if this is less than (total stress/allowable stress).

Grp I Top Flange Factored Lateral Bending Stress

Tenth Pt	Noncomp Dead Lat Mom kN-m	Noncomp Dead fw MPa	Comp Dead Lat Mom kN-m	Comp Dead fw MPa	Max LL+I Lat Mom kN-m	Max LL+I fw MPa	Min LL+I Lat Mom kN-m	Min LL+I fw MPa
0	0.00	0.00			composite			
1	-0.20	0.30			composite			
2	-9.40	14.10			composite			
3	10.77	16.15			composite			
4	2.35	3.52			composite			
5	-14.91	22.37			composite			
6	1.71	2.56			composite			
7	11.55	17.33			composite			
8	-9.25	13.87			composite			
9	-0.40	0.59			composite			
10	0.00	0.00			composite			

Dabrowski sign convention: +fw/fb ratio used for allowable stress.
(See 2003 Guide spec. commentary C5.1)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Top Flange Overload Stress
Thu Jan 15 11:56:56 2015

Girder 4 Top Flange Permanent Defl Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.00	-0.01	0.00	327.75	0.000
1	3.60	-33.00	-6.48	-6.58	0.00	321.34	0.143
2	7.20	-57.59	-11.56	-10.40	0.00	327.75	0.243
3	10.80	-74.03	-15.23	-12.33	0.00	327.75	0.310
4	14.40	-84.40	-17.43	-13.51	0.00	327.26	0.352
5	18.01	-88.05	-18.15	-13.89	0.00	327.75	0.366
6	21.61	-84.34	-17.41	-13.50	0.00	325.21	0.354
7	25.21	-74.01	-15.23	-12.32	0.00	327.75	0.310
8	28.81	-57.60	-11.57	-10.40	0.00	327.75	0.243
9	32.41	-33.02	-6.49	-6.59	0.00	322.27	0.143
10	36.01	0.00	0.00	-0.01	0.00	327.75	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 4 : Rating Output : Weight
Thu Jan 15 11:57:04 2015

	Volume	Weight	
	cu m	kN	
Top Flange	0.36	27.72	
Web	0.57	43.96	
Bottom Flange	0.36	27.72	
Flange-Web Weld		0.35	
Bearing Stiffeners	0.01	0.90	
Steel in extensions		1.68	
Additional Steel		6.30	
Total Steel			108.63
Slab	11.52	271.53	
Flange Haunch	0.57	13.47	
Concrete in extensions		4.60	
Additional Concrete		43.21	
Total Concrete			332.81
Total Steel and Concrete			442.35

Does not include weight of bracing, which can be found in bracing output stiffness tables.

(Noncomposite weight data used in girder input is used for analysis loading.)

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Input File : Definition
Thu Jan 15 11:57:37 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BR 5.2266 5.2266 5.2266 5.2266 5.2266 5.2266 5.2588
  ESLABW 1600.
  FILLET 63.5
  FPC 27.5
  HAUNCW 250.
  IGIRD 5
  NSTUDL 3
  PITCH 300.
  PITSP 36.6186
  RAD 96.5
  RCEN 94.9
  SLABT 200.
  SLABWEAR  0.
  SPLBFT 32.
  SPLBFW 600.
  SPLTFT 32.
  SPLTFW 600.
  SPLWD 1220.
  SPLWT 13.
  SPN 36.6186
  SS 25.
  STD 22.
  STH 114.
  SUPBST 16.
  SUPBSW 150.
  TSLABW 1600.
  WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Case Data
Thu Jan 15 12:01:17 2015

Girder 5 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220	mm		
Web Thickness	13	mm		
Bearing Stiff. Width	150	mm	150	mm
Bearing Stiff. Thickness	16	mm	16	mm

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	5.23 m	10.45 m	15.68 m
20.91 m	26.13 m	31.36 m	36.62 m

Cover plates

No cover plates

Curvature

Radius of curvature 96.50 m
2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 36.62 m

Span lengths

36.62 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web haunches

Fatigue

Allowable weld stress 124.11 MPa
AWS minimum welds

Impact

Impact factors assigned in GSA program

Loading

Load Factors gamma, beta	1.300	1.670
Constructibility	1.400	
Forms weight factor	1.000	

Unshored construction

Material

Concrete

Unit wt of concrete	23563. N/cu m
Slab t for strength	200 mm
Concrete strength	27.50 MPa
Effective slab width	1600 mm
Fillet	63 mm
Slab haunch width	250 mm
Self weight slab width	1600 mm

Steel

Web splice section 1	
Steel grade	M270M-345
Rebar yield	413.69 MPa

Summary tables

Standard resolution summary tables

Units

Input Units: Metric
Output Units: Metric

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Bearing Stiffener Stress
Thu Jan 15 12:01:27 2015

Girder 5 Bearing Stiffeners

Location from Left End of Web Sect.	Service Reaction	Allowable Column Stress	Actual Column Stress	Ratio	Allowable Bearing Stress	Actual Bearing Stress	Ratio
0.00	1060.62	342.58	135.25	0.395	465.75	265.15	0.569
36.62	1060.44	342.58	135.23	0.395	465.75	265.11	0.569

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Bottom Flange Factored Bending Stress - Group I Loa
Thu Jan 15 12:01:34 2015

Girder 5 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Bottom Flange Noncomp Dead	Comp Dead	Max LM+I	Min LL+I	LL+I Rng	Wind	Tot	Allow	Ratio
0	0.00	0.0	0.0	0.0	0.0	0.1	0.0	0.0	327.8	0.000
1	3.66	44.8	15.7	44.5	0.0	44.5	0.0	105.0	332.6	0.316
2	7.32	81.1	28.9	70.1	0.0	70.1	0.0	180.1	337.3	0.534
3	10.99	108.3	39.4	84.2	0.0	84.2	0.0	231.9	336.2	0.690
4	14.65	124.8	45.8	94.0	0.0	94.0	0.0	264.6	337.6	0.784
5	18.31	130.1	47.8	97.3	0.0	97.3	0.0	275.2	332.9	0.827
6	21.97	124.7	45.8	94.0	0.0	94.0	0.0	264.5	335.8	0.788
7	25.63	108.3	39.4	84.2	0.0	84.2	0.0	231.9	335.6	0.691
8	29.29	81.1	28.9	70.1	0.0	70.1	0.0	180.0	337.5	0.534
9	32.96	44.8	15.7	44.5	0.0	44.5	0.0	104.9	333.7	0.314
10	36.62	0.0	0.0	0.0	0.0	0.1	0.0	0.0	327.8	0.000

Lateral bending stress not included in the above factored stresses.

Governing expression for allowable compression stress

Tenth Pt Expression

Grp I Bottom Flange Factored Lateral Bending Stress

Tenth Pt	Noncomp Dead Lat Mom kN-m	Noncomp Dead fw MPa	Comp Dead Lat Mom kN-m	Comp Dead fw MPa	Max LL+I Lat Mom kN-m	Max LL+I fw MPa	Min LL+I Lat Mom kN-m	Min LL+I fw MPa
0	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00
1	-0.37	0.19	-0.15	0.08	-0.43	0.22	0.00	0.00
2	-18.24	9.50	-7.43	3.87	-18.54	9.66	0.00	0.00
3	21.13	11.01	8.64	4.50	20.65	10.76	0.00	0.00
4	4.83	2.51	2.05	1.07	4.08	2.13	0.00	0.00
5	-29.81	15.53	-12.39	6.45	-27.53	14.34	0.00	0.00
6	3.53	1.84	1.51	0.79	2.89	1.50	0.00	0.00
7	22.71	11.83	9.30	4.84	22.13	11.53	0.00	0.00
8	-17.96	9.35	-7.32	3.81	-18.19	9.48	0.00	0.00
9	-0.74	0.39	-0.30	0.15	-0.86	0.45	0.00	0.00
10	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00

Dabrowski sign convention: +fw/fb ratio used for allowable stress.
(See 2003 Guide spec. commentary C5.1)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Bottom Flange Overload Stress
Thu Jan 15 12:01:39 2015

Girder 5 Bottom Flange Permanent Defl Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.00	0.03	-0.01	327.75	0.000
1	3.66	34.65	12.12	34.37	0.00	327.75	0.248
2	7.32	69.68	25.21	61.34	0.00	327.75	0.477
3	10.99	91.79	33.76	73.03	0.00	327.75	0.606
4	14.65	97.93	36.07	73.96	0.00	327.75	0.634
5	18.31	112.03	41.75	85.86	0.00	327.75	0.731
6	21.97	97.37	35.83	73.47	0.00	327.75	0.631
7	25.63	92.43	34.03	73.60	0.00	327.75	0.610
8	29.29	69.55	25.16	61.20	0.00	327.75	0.476
9	32.96	34.76	12.17	34.55	0.00	327.75	0.249
10	36.62	0.00	0.00	0.03	-0.01	327.75	0.000

Lateral bending stresses not included if compact.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Constructibility of Web in Bending
Thu Jan 15 12:02:05 2015

Girder 5 Web Compression Bending Stress for Constructibility - MPa

Tenth Point	Noncomp. Dead Factored Mom	Noncomp. Dead Web Bending Stress	Allowable (6-3),(6-8)	Ratio
0	0.05	0.00	345.00	0.000
1	1280.13	45.89	345.00	0.133
2	2314.44	82.97	345.00	0.240
3	3091.83	110.84	345.00	0.321
4	3561.84	127.69	345.00	0.370
5	3713.55	133.13	345.00	0.386
6	3560.36	127.64	345.00	0.370
7	3092.01	110.85	345.00	0.321
8	2313.72	82.95	345.00	0.240
9	1278.81	45.84	345.00	0.133
10	0.05	0.00	345.00	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Deflections
Thu Jan 15 12:02:19 2015

Girder 5 Service Deflections - mm

Tenth Pt	Total Noncomp Dead	Steel	Wet Con-crete	Super-Imposed Dead	Max LL+I Down	Max LL+I Up
Support	0	0	0	0	0	0
1	40	14	27	12	10	0
2	75	25	50	22	19	0
3	103	35	68	30	26	0
4	121	41	80	36	30	0
5	128	43	84	37	32	0
6	122	41	80	36	31	0
7	104	35	69	30	26	0
8	76	26	50	22	19	0
9	40	14	27	12	10	0
Support	0	0	0	0	0	0

Influence surfaces for defl developed assuming unequal
participation of girders in resisting deflection.

	Loc						
Brace	5.23	55	19	37	16	13	0
Brace	10.45	99	33	65	28	25	0
Brace	15.68	124	41	81	36	30	0
Brace	20.91	124	41	81	36	31	0
Brace	26.13	100	33	66	29	25	0
Brace	31.36	56	19	37	16	14	0

Positive dead load deflection is downward.
Live load deflection as indicated in column heading.

Live load includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Dimensions
Thu Jan 15 12:02:51 2015

Girder 5 Dimensions

Tenth Point	Loc	-Top Flange- tfw	tft	weld	----Web---- wd	wt	weld	-Bot Flange- bfw	bft	Area
0	0.00	600	32	8	1220	13	8	600	32	54260
1	3.66	600	32	8	1220	13	8	600	32	54260
2	7.32	600	32	8	1220	13	8	600	32	54260
3	10.99	600	32	8	1220	13	8	600	32	54260
4	14.65	600	32	8	1220	13	8	600	32	54260
5	18.31	600	32	8	1220	13	8	600	32	54260
6	21.97	600	32	8	1220	13	8	600	32	54260
7	25.63	600	32	8	1220	13	8	600	32	54260
8	29.29	600	32	8	1220	13	8	600	32	54260
9	32.96	600	32	8	1220	13	8	600	32	54260
10	36.62	600	32	8	1220	13	8	600	32	54260

Bearing Stiffeners

Location	Width	Thickness
0.00	150	16
36.62	150	16

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Factored Strengths
Thu Jan 15 12:04:11 2015

Girder 5 Factored Strengths

Tenth Point	Loc	Factored Shear (kN)	Shear Strength (kN)		Ratio	Factored Moment (kN-m)	Bending Strength (kN-m)		Ratio
0	0.00	1057.4	1589.0	(5)	0.665	1.5	9704.3	(10)	0.000
1	3.66	883.6	1589.0	(5)	0.556	3108.5	9847.4	(10)	0.316
2	7.32	741.6	1589.0	(5)	0.467	5301.2	9930.3	(10)	0.534
3	10.99	644.3	1589.0	(5)	0.405	6797.2	9855.7	(10)	0.690
4	14.65	426.2	1589.0	(5)	0.268	7747.0	9884.5	(10)	0.784
5	18.31	296.9	1589.0	(5)	0.187	8054.2	9742.4	(10)	0.827
6	21.97	375.6	1589.0	(5)	0.236	7744.4	9831.8	(10)	0.788
7	25.63	593.8	1589.0	(5)	0.374	6796.4	9836.5	(10)	0.691
8	29.29	692.2	1589.0	(5)	0.436	5300.1	9934.2	(10)	0.534
9	32.96	825.0	1589.0	(5)	0.519	3106.9	********	(10)	0.000
10	36.62	1055.5	1589.0	(5)	0.664	1.6	9704.8	(10)	0.000

(5) C 0.58 Fyw D t
(10) Fby=Fbs*Pb*Pw (noncompact section)
Maximum moment in factored strength expression

Max Web Slenderness for Unstiffened Web - 6.2

Tenth Pt.	Max D/tw	Actual D/tw
0	100.00	93.85
1	100.00	93.85
2	100.00	93.85
3	100.00	93.85
4	100.00	93.85
5	100.00	93.85
6	100.00	93.85
7	100.00	93.85
8	100.00	93.85
9	100.00	93.85
10	100.00	93.85

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Fatigue Stress
Thu Jan 15 12:04:43 2015

Girder 5 Fatigue Summary

Condition	Location from Left End of Girder	Category (Table 6.6.1.2.3-1)	Force Range (kN-m)	Actual Stress Range	Allowable Stress Range	Ratio
Base metal	3.66	B	219.44	6.75	55.16	0.122
Base metal	7.32	B	334.08	11.32	55.16	0.205
Base metal	10.99	B	387.93	13.08	55.16	0.237
Base metal	14.65	B	417.96	13.02	55.16	0.236
Base metal	18.31	B	422.15	14.46	55.16	0.262
Base metal	21.97	B	417.91	12.95	55.16	0.235
Base metal	25.63	B	387.92	13.17	55.16	0.239
Base metal	29.29	B	334.12	11.30	55.16	0.205
Base metal	32.96	B	219.49	6.78	55.16	0.123
Near flg-web weld	3.66	B	219.44	6.51	55.16	0.118
Near flg-web weld	7.32	B	334.08	9.91	55.16	0.180
Near flg-web weld	10.99	B	387.93	11.51	55.16	0.209
Near flg-web weld	14.65	B	417.96	12.40	55.16	0.225
Near flg-web weld	18.31	B	422.15	12.52	55.16	0.227
Near flg-web weld	21.97	B	417.91	12.40	55.16	0.225
Near flg-web weld	25.63	B	387.92	11.51	55.16	0.209
Near flg-web weld	29.29	B	334.12	9.91	55.16	0.180
Near flg-web weld	32.96	B	219.49	6.51	55.16	0.118

Allowable range determined by:
Life 75 yrs
Avg daily trk traffic 4000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Governing Service Moment
Thu Jan 15 12:04:55 2015

Girder 5 Service Moment - kN-m

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	Range
0	0.00	0.00	0.14	0.60 T	-0.22 T	0.82
1	3.66	914.38	361.57	667.77	0.00 T	667.77
2	7.32	1653.17	666.38	1052.89	0.00 T	1052.89
3	10.99	2208.45	908.18	1264.66	0.00 T	1264.66
4	14.65	2544.17	1056.33	1412.40	0.00 T	1412.40
5	18.31	2652.54	1102.40	1461.42	0.00 T	1461.42
6	21.97	2543.11	1055.68	1412.22	0.00 T	1412.22
7	25.63	2208.58	908.28	1264.17	0.00 T	1264.17
8	29.29	1652.66	666.12	1052.81	0.00 T	1052.81
9	32.96	913.44	361.11	667.91	0.00 T	667.91
10	36.62	0.00	0.14	0.61 T	-0.23 T	0.84

T - governed by truck loading
L - governed by lane loading

Range shown in this table not used for fatigue.

At Bracing

Brace No.					
2	5.23	1251.55	498.75	866.85	0.03
3	10.45	2141.36	878.85	1237.85	0.00
4	15.68	2597.73	1079.65	1436.22	0.00
5	20.91	2598.14	1079.64	1436.72	0.00
6	26.13	2145.72	880.80	1239.05	0.00
7	31.36	1257.27	501.02	870.51	0.03

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Governing Service Shear
Thu Jan 15 12:05:03 2015

Girder 5 Service Shear -kN

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I		Range
0	0.00	274.44	106.30	259.09	T	247.80
1	3.66	225.04	91.14	217.66	T	206.66
2	7.32	178.17	75.33	189.80	T	203.87
3	10.99	116.40	48.04	198.29	T	261.92
4	14.65	67.00	32.88	136.53	T	253.73
5	18.31	-0.24	-0.10	136.96	T	253.03
6	21.97	-66.67	-32.68	145.30	T	258.81
7	25.63	-116.07	-47.84	-175.37	T	255.30
8	29.29	-178.41	-75.43	-166.86	T	250.53
9	32.96	-224.90	-91.06	-190.81	T	238.96
10	36.62	-274.30	-106.22	-258.33	T	247.04

Ranges shown in this table not used for fatigue.

T - governed by truck loading
L - governed by lane loading

Live shear in Governing Shear table includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Lateral Bending in Flanges
Thu Jan 15 12:05:10 2015

Factored Lateral Bending in Bottom Flange
From Curvature

Brace Location (m)	Primary Bending Stress (MPa)	Lateral Bending Stress (MPa)	Lateral ------- Primary	Perf Ratio	Lateral ------- .5 Fy	Perf Ratio
0.00	0.00	0.00	0.000	0.000	0.000	0.000
5.23	140.86	39.24	0.279	0.557	0.227	0.227
10.45	225.52	62.55	0.277	0.555	0.363	0.363
15.68	269.83	74.74	0.277	0.554	0.433	0.433
20.91	269.89	74.75	0.277	0.554	0.433	0.433
26.13	225.90	62.65	0.277	0.555	0.363	0.363
31.36	141.49	39.66	0.280	0.561	0.230	0.230
36.62	0.00	0.00	0.000	0.000	0.000	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Max Performance Ratios
Thu Jan 15 12:05:19 2015

Girder 5 Maximum Performance Ratios

Criterion	Location m	Max Performance Ratio
Shear	0.00	0.665
Bending	1.53	0.827
Fatigue	18.31	0.262
Bearing Stf.	0.00	0.569

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Reactions
Thu Jan 15 12:05:27 2015

Girder 5 Factored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	361.69	137.44	561.49	0.00	1060.62	361.69
Steel	114.39					
Conc	247.30					
36.62	361.51	137.33	561.60	0.00	1060.44	361.51
Steel	114.31					
Conc	247.20					

Unfactored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	278.22	105.72	258.63	0.00	642.58	383.95
Steel	87.99					
Conc	190.23					
36.62	278.08	105.64	258.68	0.00	642.40	383.72
Steel	87.93					
Conc	190.16					

Reactions in girder output include weight in girder extensions at abutments, which is not included in girder system output.

Live reaction includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Service Torque
Thu Jan 15 12:05:36 2015

Girder 5 Service Torque - kN-m

Tenth Point	Location	DL1	DL2	Max LL+I	Min LL+I	Range
0	0.00	-1.11	-5.16	6.60	-12.71	19.30
1	3.66	-1.11	-5.16	6.60 T	-12.71 T	19.30
2	7.32	-0.89	-4.12	5.00 T	-10.35 T	15.36
3	10.99	-0.51	-2.41	3.22 T	-7.59 T	10.82
4	14.65	-0.51	-2.41	3.22 T	-7.59 T	10.82
5	18.31	0.00	-0.03	3.08 T	-2.96 T	6.03
6	21.97	0.51	2.42	7.60 T	-1.37 T	8.97
7	25.63	0.51	2.42	7.60 T	-1.37 T	8.97
8	29.29	0.88	4.12	10.34 T	-1.66 T	11.99
9	32.96	1.11	5.16	12.69 T	-2.67 T	15.37
10	36.62	1.11	5.16	12.69	-2.67	15.37

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Shear Connectors - 2003 Guide Spec Fatigue Truck
Thu Jan 15 12:05:51 2015

Given Pitch for 22 x 114 Stud Connectors for Fatigue

Tenth Point	Loc (m)	Given Pitch (mm)	Studs in a Line	Actual Shear Range (kN)	Shear Range Capacity (kN)	Ratio
0	0.00	300.00	3	82.52 T	158.79	0.520
1	3.66	300.00	3	72.56 T	157.32	0.461
2	7.32	300.00	3	68.58 T	155.06	0.442
3	10.99	300.00	3	84.32 T	155.45	0.542
4	14.65	300.00	3	80.44 T	154.57	0.520
5	18.31	300.00	3	82.93 T	154.73	0.536
6	21.97	300.00	3	84.46 T	154.95	0.545
7	25.63	300.00	3	80.93 T	155.18	0.522
8	29.29	300.00	3	77.46 T	155.84	0.497
9	32.96	300.00	3	68.02 T	157.12	0.433
10	36.62	300.00	3	81.55 T	158.79	0.514

* Use 610 mm as per AASHTO 10.38.5.1.

Minimum Total Number of Connectors for Ultimate Strength

Beg TP	End TP	Beg Loc	End Loc	Number
0	5	0.00	18.31	56
(186 provided)				
5	10	18.31	36.62	56
(186 provided)				

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Top Flange Factored Bending Stress - Group I Loadin
Thu Jan 15 12:06:04 2015

Girder 5 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Top Flange Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	LL+I Rng	Tot	Allow	Ratio
0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	327.8	0.000
1	3.66	-44.8	-9.5	-13.6	0.0	13.6	-67.9	333.3	0.204
2	7.32	-81.1	-17.4	-21.4	0.0	21.4	-119.9	337.4	0.355
3	10.99	-108.3	-23.8	-25.7	0.0	25.7	-157.8	342.1	0.461
4	14.65	-124.8	-27.6	-28.7	0.0	28.7	-181.1	340.7	0.532
5	18.31	-130.1	-28.8	-29.7	0.0	29.7	-188.6	337.3	0.559
6	21.97	-124.7	-27.6	-28.7	0.0	28.7	-181.0	338.0	0.536
7	25.63	-108.3	-23.8	-25.7	0.0	25.7	-157.8	339.8	0.464
8	29.29	-81.1	-17.4	-21.4	0.0	21.4	-119.9	338.0	0.355
9	32.96	-44.8	-9.4	-13.6	0.0	13.6	-67.8	335.2	0.202
10	36.62	0.0	0.0	0.0	0.0	0.0	0.0	327.8	0.000

Lateral bending stress not included in the above factored stresses.

Governing expression for allowable compression stress

Tenth Pt	Expression
1	(5-8)
2	(5-8)
3	(5-8)
4	(5-8)
5	(5-8)
6	(5-8)
7	(5-8)
8	(5-8)
9	(5-8)

Grp I Top Flange Factored Lateral Bending Stress

Tenth Pt	Noncomp Dead Lat Mom kN-m	Noncomp Dead fw MPa	Comp Dead Lat Mom kN-m	Comp Dead fw MPa	Max LL+I Lat Mom kN-m	Max LL+I fw MPa	Min LL+I Lat Mom kN-m	Min LL+I fw MPa
0	0.00	0.00			composite			
1	-0.37	0.19			composite			
2	-18.24	9.50			composite			
3	21.13	11.01			composite			
4	4.83	2.51			composite			
5	-29.81	15.53			composite			
6	3.53	1.84			composite			
7	22.71	11.83			composite			
8	-17.96	9.35			composite			
9	-0.74	0.39			composite			
10	0.00	0.00			composite			

Dabrowski sign convention: +fw/fb ratio used for allowable stress.
(See 2003 Guide spec. commentary C5.1)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Top Flange Overload Stress
Thu Jan 15 12:06:11 2015

Girder 5 Top Flange Permanent Defl Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.00	-0.01	0.00	327.75	0.000
1	3.66	-34.65	-7.28	-10.43	0.00	327.75	0.160
2	7.32	-69.68	-13.41	-16.45	0.00	327.75	0.304
3	10.99	-91.79	-18.28	-19.76	0.00	327.75	0.396
4	14.65	-97.93	-21.26	-22.07	0.00	327.75	0.431
5	18.31	-112.03	-22.19	-22.83	0.00	327.75	0.479
6	21.97	-97.37	-21.25	-22.06	0.00	327.75	0.429
7	25.63	-92.43	-18.28	-19.75	0.00	327.75	0.398
8	29.29	-69.55	-13.41	-16.45	0.00	327.75	0.303
9	32.96	-34.76	-7.27	-10.44	0.00	327.75	0.160
10	36.62	0.00	0.00	-0.01	0.00	327.75	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 5 : Rating Output : Weight
Thu Jan 15 12:06:40 2015

	Volume	Weight	
	cu m	kN	
Top Flange	0.70	54.12	
Web	0.58	44.70	
Bottom Flange	0.70	54.12	
Flange-Web Weld		0.36	
Bearing Stiffeners	0.01	0.90	
Steel in extensions		2.55	
Additional Steel		6.42	
Total Steel			163.16
Slab	11.72	276.11	
Flange Haunch	0.58	13.70	
Concrete in extensions		4.60	
Additional Concrete		43.94	
Total Concrete			338.35
Total Steel and Concrete			502.41

Does not include weight of bracing, which can be found in bracing output stiffness tables.

(Noncomposite weight data used in girder input is used for analysis loading.)

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DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Input File : Definition
Thu Jan 15 12:08:58 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BR 5.3133 5.3133 5.3133 5.3133 5.3133 5.3133 5.346
  ESLABW 1600.
  FILLET 63.5
  FPC 27.5
  HAUNCW 250.
  IGIRD 6
  NSTUDL 3
  PITCH 300.
  PITSP 37.2257
  RAD 98.1
  RCEN 94.9
  SLABT 200.
  SLABWEAR  0.
  SPLBFT 44.
  SPLBFW 600.
  SPLTFT 32.
  SPLTFW 600.
  SPLWD 1220.
  SPLWT 13.
  SPN 37.2257
  SS 25.
  STD 22.
  STH 114.
  SUPBST 16.
  SUPBSW 150.
  TSLABW 1600.
  WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Case Data
Thu Jan 15 12:09:11 2015

Girder 6 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220	mm		
Web Thickness	13	mm		
Bearing Stiff. Width	150	mm	150	mm
Bearing Stiff. Thickness	16	mm	16	mm

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	5.31 m	10.63 m	15.94 m
21.25 m	26.57 m	31.88 m	37.23 m

Cover plates

No cover plates

Curvature

Radius of curvature 98.10 m
2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 37.23 m

Span lengths

37.23 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web haunches

Fatigue

```
   Allowable weld stress      124.11 MPa
   AWS minimum welds
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Impact

```
   Impact factors assigned in GSA program
```

Loading

```
   Load Factors gamma, beta     1.300        1.670
       Constructibility         1.400

       Forms weight factor      1.000

   Unshored construction
```

Material

Concrete

```
   Unit wt of concrete        23563. N/cu m
   Slab t for strength          200 mm
   Concrete strength          27.50 MPa
   Effective slab width        1600 mm
   Fillet                        63 mm
   Slab haunch width            250 mm
   Self weight slab width      1600 mm
```

Steel

```
   Web splice section  1
         Steel grade          M270M-345
   Rebar yield               413.69 MPa
```

Summary tables

```
   Standard resolution summary tables
```

Units

```
   Input Units:  Metric
   Output Units: Metric
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Bearing Stiffener Stress
Thu Jan 15 12:09:23 2015

Girder 6 Bearing Stiffeners

Location from Left End of Web Sect.	Service Reaction	Allowable Column Stress	Actual Column Stress	Ratio	Allowable Bearing Stress	Actual Bearing Stress	Ratio
0.00	1061.74	342.58	135.39	0.395	465.75	265.43	0.570
37.23	1062.40	342.58	135.48	0.395	465.75	265.60	0.570

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Bottom Flange Factored Bending Stress - Group I Loa
Thu Jan 15 12:09:32 2015

Girder 6 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Noncomp Dead	Comp Dead	Max LM+I	Min LL+I	LL+I Rng	Wind	Tot	Allow	Ratio
		Bottom Flange								
0	0.00	0.0	0.0	0.0	0.0	0.1	0.0	0.1	327.8	0.000
1	3.72	44.1	15.7	34.8	0.0	34.8	0.0	94.7	332.2	0.285
2	7.45	81.6	29.5	61.5	0.0	61.5	0.0	172.5	337.9	0.510
3	11.17	111.1	40.8	83.3	0.0	83.3	0.0	235.2	336.7	0.698
4	14.89	127.9	47.1	95.8	0.0	95.8	0.0	270.8	337.1	0.803
5	18.61	133.2	49.1	98.7	0.0	98.7	0.0	281.0	333.3	0.843
6	22.34	128.0	47.2	95.9	0.0	95.9	0.0	271.0	335.4	0.808
7	26.06	111.1	40.8	83.3	0.0	83.3	0.0	235.2	336.1	0.700
8	29.78	81.5	29.5	61.4	0.0	61.4	0.0	172.4	338.0	0.510
9	33.50	44.2	15.7	34.9	0.0	34.9	0.0	94.8	333.2	0.284
10	37.23	0.0	0.0	0.0	0.0	0.1	0.0	0.1	327.8	0.000

Lateral bending stress not included in the above factored stresses.

Governing expression for allowable compression stress

Tenth Pt Expression

Grp I Bottom Flange Factored Lateral Bending Stress

Tenth Pt	Noncomp Dead Lat Mom kN-m	Noncomp Dead fw MPa	Comp Dead Lat Mom kN-m	Comp Dead fw MPa	Max LL+I Lat Mom kN-m	Max LL+I fw MPa	Min LL+I Lat Mom kN-m	Min LL+I fw MPa
0	0.00	0.00	0.01	0.00	0.03	0.00	0.01	0.00
1	-0.48	0.18	-0.19	0.07	-0.46	0.17	0.00	0.00
2	-24.10	9.13	-9.91	3.75	-22.34	8.46	0.00	0.00
3	28.15	10.67	11.63	4.40	25.90	9.81	0.00	0.00
4	6.42	2.43	2.70	1.02	5.85	2.22	0.00	0.00
5	-39.73	15.05	-16.52	6.26	-36.41	13.79	0.00	0.00
6	4.73	1.79	1.99	0.76	4.30	1.63	0.00	0.00
7	30.23	11.45	12.49	4.73	27.81	10.54	0.00	0.00
8	-23.74	9.00	-9.76	3.70	-22.00	8.33	0.00	0.00
9	-0.96	0.36	-0.39	0.15	-0.91	0.35	0.00	0.00
10	0.00	0.00	0.01	0.00	0.03	0.00	0.01	0.00

Dabrowski sign convention: +fw/fb ratio used for allowable stress.
(See 2003 Guide spec. commentary C5.1)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Bottom Flange Overload Stress
Thu Jan 15 12:09:58 2015

Girder 6 Bottom Flange Permanent Defl Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.01	0.03	-0.01	327.75	0.000
1	3.72	34.10	12.14	26.94	0.00	327.75	0.223
2	7.45	69.76	25.56	53.78	0.00	327.75	0.455
3	11.17	93.68	34.77	71.60	0.00	327.75	0.610
4	14.89	100.23	37.03	75.37	0.00	327.75	0.649
5	18.61	114.08	42.58	86.50	0.00	327.75	0.742
6	22.34	99.82	36.86	74.98	0.00	327.75	0.646
7	26.06	94.28	35.02	72.17	0.00	327.75	0.615
8	29.78	69.63	25.52	53.67	0.00	327.75	0.454
9	33.50	34.28	12.21	27.08	0.00	327.75	0.224
10	37.23	0.00	0.01	0.03	-0.01	327.75	0.000

Lateral bending stresses not included if compact.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Constructibility of Web in Bending
Thu Jan 15 12:10:09 2015

Girder 6 Web Compression Bending Stress for Constructibility - MPa

Tenth Point	Noncomp. Dead Factored Mom	Noncomp. Dead Web Bending Stress	Allowable (6-3),(6-8)	Ratio
0	0.10	0.00	345.00	0.000
1	1618.96	56.41	345.00	0.164
2	2990.60	104.21	345.00	0.302
3	4074.71	141.99	345.00	0.412
4	4688.81	163.39	345.00	0.474
5	4886.26	170.27	345.00	0.494
6	4692.76	163.52	345.00	0.474
7	4074.53	141.98	345.00	0.412
8	2989.69	104.18	345.00	0.302
9	1620.69	56.47	345.00	0.164
10	0.11	0.00	345.00	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Deflections
Thu Jan 15 12:10:15 2015

Girder 6 Service Deflections - mm

Tenth Pt	Total Noncomp Dead	Steel	Wet Con-crete	Super-Imposed Dead	Max LL+I Down	Max LL+I Up
Support	0	0	0	0	0	0
1	48	17	31	14	13	0
2	89	32	57	27	24	0
3	124	44	79	37	33	0
4	145	52	93	43	39	0
5	152	55	98	46	41	0
6	145	52	93	44	39	0
7	124	44	79	37	33	0
8	91	33	58	27	24	0
9	48	17	31	14	13	0
Support	0	0	0	0	0	0

Influence surfaces for defl developed assuming unequal participation of girders in resisting deflection.

	Loc						
Brace	5.31	66	23	42	19	17	0
Brace	10.63	119	42	76	35	31	0
Brace	15.94	148	53	95	44	39	0
Brace	21.25	148	53	95	45	39	0
Brace	26.57	120	42	76	35	31	0
Brace	31.88	67	24	43	19	18	0

Positive dead load deflection is downward.
Live load deflection as indicated in column heading.

Live load includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Dimensions
Thu Jan 15 12:10:20 2015

Girder 6 Dimensions

Tenth Point	Loc	-Top Flange- tfw	tft	weld	----Web---- wd	wt	weld	-Bot Flange- bfw	bft	Area
0	0.00	600	32	8	1220	13	8	600	44	61460
1	3.72	600	32	8	1220	13	8	600	44	61460
2	7.45	600	32	8	1220	13	8	600	44	61460
3	11.17	600	32	8	1220	13	8	600	44	61460
4	14.89	600	32	8	1220	13	8	600	44	61460
5	18.61	600	32	8	1220	13	8	600	44	61460
6	22.34	600	32	8	1220	13	8	600	44	61460
7	26.06	600	32	8	1220	13	8	600	44	61460
8	29.78	600	32	8	1220	13	8	600	44	61460
9	33.50	600	32	8	1220	13	8	600	44	61460
10	37.23	600	32	8	1220	13	8	600	44	61460

Bearing Stiffeners

Location	Width	Thickness
0.00	150	16
37.23	150	16

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Factored Strengths
Thu Jan 15 12:11:01 2015

Girder 6 Factored Strengths

Tenth Point	Loc	Factored Shear (kN)	Shear Strength (kN)		Ratio	Factored Moment (kN-m)	Bending Strength (kN-m)		Ratio
0	0.00	1045.9	1588.9	(5)	0.658	2.2	12325.0	(10)	0.000
1	3.72	936.8	1588.9	(5)	0.590	3561.2	12491.3	(10)	0.285
2	7.45	828.5	1588.9	(5)	0.521	6474.6	12651.9	(10)	0.512
3	11.17	590.1	1588.9	(5)	0.371	8826.7	12572.1	(10)	0.702
4	14.89	440.5	1588.9	(5)	0.277	10161.6	12650.9	(10)	0.803
5	18.61	208.7	1588.9	(5)	0.131	10541.2	12338.0	(10)	0.854
6	22.34	440.0	1588.9	(5)	0.277	10170.2	12588.4	(10)	0.808
7	26.06	585.1	1588.9	(5)	0.368	8826.9	12531.0	(10)	0.704
8	29.78	815.1	1588.9	(5)	0.513	6473.0	12659.0	(10)	0.511
9	33.50	930.5	1588.9	(5)	0.586	3564.1	********	(10)	0.000
10	37.23	1080.8	1588.9	(5)	0.680	2.3	12324.7	(10)	0.000

(5) C 0.58 Fyw D t
(10) Fby=Fbs*Pb*Pw (noncompact section)
Maximum moment in factored strength expression

Max Web Slenderness for Unstiffened Web - 6.2

Tenth Pt.	Max D/tw	Actual D/tw
0	100.00	93.85
1	100.00	93.85
2	100.00	93.85
3	100.00	93.85
4	100.00	93.85
5	100.00	93.85
6	100.00	93.85
7	100.00	93.85
8	100.00	93.85
9	100.00	93.85
10	100.00	93.85

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Fatigue Stress
Thu Jan 15 12:11:08 2015

Girder 6 Fatigue Summary

Condition	Location from Left End of Girder	Category (Table 6.6.1.2.3-1)	Force Range (kN-m)	Actual Stress Range	Allowable Stress Range	Ratio
Base metal	3.72	B	260.14	6.25	55.16	0.113
Base metal	7.45	B	444.20	11.69	55.16	0.212
Base metal	11.17	B	582.13	15.14	55.16	0.275
Base metal	14.89	B	661.39	16.12	55.16	0.292
Base metal	18.61	B	666.18	17.66	55.16	0.320
Base metal	22.34	B	662.00	16.06	55.16	0.291
Base metal	26.06	B	581.88	15.23	55.16	0.276
Base metal	29.78	B	444.31	11.68	55.16	0.212
Base metal	33.50	B	260.56	6.29	55.16	0.114
Near flg-web weld	3.72	B	260.14	5.94	55.16	0.108
Near flg-web weld	7.45	B	444.20	10.13	55.16	0.184
Near flg-web weld	11.17	B	582.13	13.28	55.16	0.241
Near flg-web weld	14.89	B	661.39	15.09	55.16	0.274
Near flg-web weld	18.61	B	666.18	15.20	55.16	0.276
Near flg-web weld	22.34	B	662.00	15.10	55.16	0.274
Near flg-web weld	26.06	B	581.88	13.28	55.16	0.241
Near flg-web weld	29.78	B	444.31	10.14	55.16	0.184
Near flg-web weld	33.50	B	260.56	5.95	55.16	0.108

Allowable range determined by:
Life 75 yrs
Avg daily trk traffic 4000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Governing Service Moment
Thu Jan 15 12:11:27 2015

Girder 6 Service Moment - kN-m

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	Range
0	0.00	0.07	0.24	0.84 T	-0.22 T	1.05
1	3.72	1156.40	464.10	669.99	0.00 T	669.99
2	7.45	2136.14	871.04	1181.62	0.00 T	1181.62
3	11.17	2910.51	1205.17	1601.23	0.00 T	1601.23
4	14.89	3349.15	1392.09	1841.54	0.00 T	1841.54
5	18.61	3490.19	1450.43	1897.01	0.00 T	1897.01
6	22.34	3351.97	1393.30	1843.08	0.00 T	1843.08
7	26.06	2910.38	1205.37	1601.32	0.00 T	1601.32
8	29.78	2135.49	870.78	1181.41	0.00 T	1181.41
9	33.50	1157.64	464.62	670.29	0.00 T	670.29
10	37.23	0.08	0.24	0.85 T	-0.22 T	1.07

T - governed by truck loading
L - governed by lane loading

Range shown in this table not used for fatigue.

At Bracing

Brace No.					
2	5.31	1596.67	644.96	907.89	0.03
3	10.63	2818.80	1165.75	1551.38	0.00
4	15.94	3419.05	1421.55	1875.89	0.00
5	21.25	3423.43	1423.39	1878.12	0.00
6	26.57	2824.18	1168.31	1554.47	0.00
7	31.88	1606.16	648.90	912.65	0.03

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Governing Service Shear
Thu Jan 15 12:11:32 2015

Girder 6 Service Shear -kN

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I		Range
0	0.00	336.82	132.34	200.83	T	194.75
1	3.72	284.54	116.92	191.09	T	185.12
2	7.45	240.74	101.56	176.67	T	179.98
3	11.17	144.00	57.93	150.92	T	194.56
4	14.89	91.71	42.51	122.55	T	188.70
5	18.61	0.98	0.47	95.28	T	186.18
6	22.34	-92.50	-42.79	-121.67	T	190.30
7	26.06	-144.79	-58.20	-147.95	T	191.82
8	29.78	-240.05	-101.23	-171.10	T	195.99
9	33.50	-284.86	-117.06	-187.94	T	191.51
10	37.23	-337.14	-132.47	-216.62	T	210.56

Ranges shown in this table not used for fatigue.

T - governed by truck loading
L - governed by lane loading

Live shear in Governing Shear table includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Lateral Bending in Flanges
Thu Jan 15 12:11:46 2015

Factored Lateral Bending in Bottom Flange
From Curvature

Brace Location (m)	Primary Bending Stress (MPa)	Lateral Bending Stress (MPa)	Lateral ------- Primary	Perf Ratio	Lateral ------- .5 Fy	Perf Ratio
0.00	0.00	0.00	0.000	0.000	0.000	0.000
5.31	130.04	34.01	0.262	0.523	0.197	0.197
10.63	227.75	59.53	0.261	0.523	0.345	0.345
15.94	276.22	72.18	0.261	0.523	0.418	0.418
21.25	276.56	72.27	0.261	0.523	0.419	0.419
26.57	228.21	59.65	0.261	0.523	0.346	0.346
31.88	130.79	34.42	0.263	0.526	0.200	0.200
37.23	0.00	0.00	0.000	0.000	0.000	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Max Performance Ratios
Thu Jan 15 12:11:59 2015

Girder 6 Maximum Performance Ratios

Criterion	Location m	Max Performance Ratio
Shear	37.23	0.680
Bending	1.55	0.854
Fatigue	18.61	0.320
Bearing Stf.	37.23	0.570

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Reactions
Thu Jan 15 12:12:07 2015

Girder 6 Factored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	438.02	161.37	462.35	0.00	1061.74	438.02
	Steel 149.77					
	Conc 288.25					
37.23	438.44	161.56	462.40	0.00	1062.40	438.44
	Steel 149.96					
	Conc 288.48					

Unfactored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	336.94	124.13	212.97	0.00	674.03	461.07
	Steel 115.21					
	Conc 221.73					
37.23	337.26	124.28	212.99	0.00	674.53	461.54
	Steel 115.35					
	Conc 221.91					

Reactions in girder output include weight in girder extensions at abutments, which is not included in girder system output.

Live reaction includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Service Torque
Thu Jan 15 12:12:22 2015

Girder 6 Service Torque - kN-m

Tenth Point	Location	DL1	DL2	Max LL+I	Min LL+I	Range
0	0.00	-2.55	-8.59	6.18	-17.44	23.62
1	3.72	-2.55	-8.59	6.18 T	-17.44 T	23.62
2	7.45	-1.97	-6.55	4.63 T	-13.61 T	18.24
3	11.17	-1.07	-3.47	3.10 T	-9.36 T	12.46
4	14.89	-1.07	-3.47	3.10 T	-9.36 T	12.46
5	18.61	0.00	-0.01	3.74 T	-3.74 T	7.48
6	22.34	1.07	3.46	9.35 T	-1.42 T	10.77
7	26.06	1.07	3.46	9.35 T	-1.42 T	10.77
8	29.78	1.97	6.52	13.56 T	-1.63 T	15.19
9	33.50	2.55	8.59	17.42 T	-2.58 T	20.00
10	37.23	2.55	8.59	17.42	-2.58	20.00

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Shear Connectors - 2003 Guide Spec Fatigue Truck
Thu Jan 15 12:12:36 2015

Given Pitch for 22 x 114 Stud Connectors for Fatigue

Tenth Point	Loc (m)	Given Pitch (mm)	Studs in a Line	Actual Shear Range (kN)	Shear Range Capacity (kN)	Ratio
0	0.00	300.00	3	82.07 T	166.06	0.494
1	3.72	300.00	3	71.96 T	163.32	0.441
2	7.45	300.00	3	74.75 T	158.96	0.470
3	11.17	300.00	3	71.99 T	153.59	0.469
4	14.89	300.00	3	74.33 T	151.30	0.491
5	18.61	300.00	3	72.81 T	150.57	0.484
6	22.34	300.00	3	74.25 T	151.24	0.491
7	26.06	300.00	3	76.83 T	154.97	0.496
8	29.78	300.00	3	74.79 T	158.97	0.470
9	33.50	300.00	3	75.26 T	163.54	0.460
10	37.23	300.00	3	87.24 T	166.06	0.525

* Use 610 mm as per AASHTO 10.38.5.1.

Minimum Total Number of Connectors for Ultimate Strength

Beg TP	End TP	Beg Loc	End Loc	Number
0	5	0.00	18.61	56
(189 provided)				
5	10	18.61	37.23	56
(189 provided)				

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Top Flange Factored Bending Stress - Group I Loadin
Thu Jan 15 12:12:51 2015

Girder 6 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Top Flange Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	LL+I Rng	Tot	Allow	Ratio
0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000
1	3.72	-54.8	-12.0	-13.9	0.0	13.9	-80.8	345.0	0.234
2	7.45	-101.3	-22.5	-24.6	0.0	24.6	-148.4	345.0	0.430
3	11.17	-138.0	-31.1	-33.3	0.0	33.3	-202.4	345.0	0.587
4	14.89	-158.8	-35.9	-38.3	0.0	38.3	-233.1	345.0	0.676
5	18.61	-165.5	-37.4	-39.5	0.0	39.5	-242.4	345.0	0.703
6	22.34	-158.9	-36.0	-38.4	0.0	38.4	-233.3	345.0	0.676
7	26.06	-138.0	-31.1	-33.3	0.0	33.3	-202.4	345.0	0.587
8	29.78	-101.2	-22.5	-24.6	0.0	24.6	-148.3	345.0	0.430
9	33.50	-54.9	-12.0	-14.0	0.0	14.0	-80.8	345.0	0.234
10	37.23	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000

Lateral bending stress not included in the above factored stresses.

Governing expression for allowable compression stress

Tenth Pt	Expression
1	(5-8)
2	(5-8)
3	(5-8)
4	(5-8)
5	(5-8)
6	(5-8)
7	(5-8)
8	(5-8)
9	(5-8)

Grp I Top Flange Factored Lateral Bending Stress

Tenth Pt	Noncomp Dead Lat Mom kN-m	Noncomp Dead fw MPa	Comp Dead Lat Mom kN-m	Comp Dead fw MPa	Max LL+I Lat Mom kN-m	Max LL+I fw MPa	Min LL+I Lat Mom kN-m	Min LL+I fw MPa
0	0.00	0.00			composite			
1	-0.48	0.25			composite			
2	-24.10	12.55			composite			
3	28.15	14.67			composite			
4	6.42	3.35			composite			
5	-39.73	20.70			composite			
6	4.73	2.47			composite			
7	30.23	15.75			composite			
8	-23.74	12.37			composite			
9	-0.96	0.50			composite			
10	0.00	0.00			composite			

Dabrowski sign convention: +fw/fb ratio used for allowable stress.
(See 2003 Guide spec. commentary C5.1)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Top Flange Overload Stress
Thu Jan 15 12:12:56 2015

Girder 6 Top Flange Permanent Defl Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.00	-0.01	0.00	327.75	0.000
1	3.72	-42.37	-9.22	-10.73	0.00	327.75	0.190
2	7.45	-87.56	-17.30	-18.92	0.00	327.75	0.378
3	11.17	-117.43	-23.93	-25.64	0.00	327.75	0.510
4	14.89	-124.72	-27.64	-29.48	0.00	327.75	0.555
5	18.61	-143.21	-28.80	-30.37	0.00	327.75	0.618
6	22.34	-124.15	-27.67	-29.51	0.00	327.75	0.553
7	26.06	-118.26	-23.94	-25.64	0.00	327.75	0.512
8	29.78	-87.40	-17.29	-18.91	0.00	327.75	0.377
9	33.50	-42.60	-9.23	-10.73	0.00	327.75	0.191
10	37.23	0.00	0.00	-0.01	0.00	327.75	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 6 : Rating Output : Weight
Thu Jan 15 12:13:04 2015

	Volume	Weight	
	cu m	kN	
Top Flange	0.71	55.02	
Web	0.59	45.44	
Bottom Flange	0.71	55.02	
Flange-Web Weld		0.36	
Bearing Stiffeners	0.01	0.90	
Steel in extensions		2.88	
Additional Steel		6.54	
Total Steel			166.16
Slab	11.91	280.69	
Flange Haunch	0.59	13.92	
Concrete in extensions		4.60	
Additional Concrete		44.67	
Total Concrete			343.88
Total Steel and Concrete			510.95

Does not include weight of bracing, which can be found in bracing output stiffness tables.

(Noncomposite weight data used in girder input is used for analysis loading.)

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Input File : Definition
Thu Jan 15 12:13:32 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
CONDITIONS
  LFD METHOD
  M270M-345 STEEL
  M270M-345 STIFFENER STEEL
  METRIC INPUT
  METRIC OUTPUT
  NO INTERMEDIATE TRANSVERSE STIFFENERS
  RATE MODE
  SINGLE BEARING STIFFENERS EACH SIDE
  SYSTEM FORCES
DATA
  BR 5.4 5.4 5.4 5.4 5.4 5.4 5.4332
  ESLABW 1500.
  FILLET 63.5
  FPC 27.5
  HAUNCW 250.
  IGIRD 7
  NSTUDL 3
  PITCH 300.
  PITSP 37.8329
  RAD 99.7
  RCEN 94.9
  SLABT 200.
  SLABWEAR  0.
  SPLBFT 57.
  SPLBFW 600.
  SPLTFT 32.
  SPLTFW 600.
  SPLWD 1220.
  SPLWT 13.
  SPN 37.8329
  SS 25.
  STD 22.
  STH 114.
  SUPBST 16.
  SUPBSW 150.
  TSLABW 1500.
  WCONC 23563.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Case Data
Thu Jan 15 12:13:43 2015

Girder 7 Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3

AASHTO Specification

Load Factor Method
17th Edition Standard Specifications for Highway Bridges
2003 Horizontally Curved Steel Girder Guide Specification

Dimensions (additional information available in Dimensions table)

Given dimensions-

Web Depth	1220	mm		
Web Thickness	13	mm		
Bearing Stiff. Width	150	mm	150	mm
Bearing Stiff. Thickness	16	mm	16	mm

Execution Mode

Rate Mode

Geometry

Brace locations

0.00 m	5.40 m	10.80 m	16.20 m
21.60 m	27.00 m	32.40 m	37.83 m

Cover plates

No cover plates

Curvature

Radius of curvature 99.70 m
2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Flange splices

Girder Type

Plate Girder

Composite Behavior

Composite region for composite loading - 0. - 37.83 m

Span lengths

37.83 m

Stiffeners

Bearing Stiffeners

Single bearing stiffeners each side

Longitudinal Stiffeners

No longitudinal stiffener

Transverse Stiffeners

No transverse stiffeners

Web haunches

Fatigue

```
Allowable weld stress      124.11 MPa
AWS minimum welds
```

Impact

Impact factors assigned in GSA program

Loading

```
Load Factors gamma, beta     1.300        1.670
    Constructibility         1.400

    Forms weight factor      1.000
```

Unshored construction

Material

Concrete

```
Unit wt of concrete         23563. N/cu m
Slab t for strength           200 mm
Concrete strength           27.50 MPa
Effective slab width         1500 mm
Fillet                         63 mm
Slab haunch width             250 mm
Self weight slab width       1500 mm
```

Steel

```
Web splice section  1
      Steel grade           M270M-345
Rebar yield                413.69 MPa
```

Summary tables

Standard resolution summary tables

Units

```
Input Units:  Metric
Output Units: Metric
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Bearing Stiffener Stress
Thu Jan 15 12:13:57 2015

Girder 7 Bearing Stiffeners

Location from Left End of Web Sect.	Service Reaction	Allowable Column Stress	Actual Column Stress	Ratio	Allowable Bearing Stress	Actual Bearing Stress	Ratio
0.00	1568.96	342.58	200.07	0.584	465.75	392.24	0.842
37.83	1567.66	342.58	199.91	0.584	465.75	391.91	0.841

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Bottom Flange Factored Bending Stress - Group I Loa
Thu Jan 15 12:14:06 2015

Girder 7 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Bottom Flange Noncomp Dead	Comp Dead	Max LM+I	Min LL+I	LL+I Rng	Wind	Tot	Allow	Ratio
0	0.00	0.0	0.0	0.0	0.0	0.1	0.0	0.1	327.8	0.000
1	3.78	49.2	19.4	44.0	-0.1	44.1	0.0	112.6	331.8	0.339
2	7.57	88.1	34.1	77.6	-0.2	77.8	0.0	199.8	337.2	0.592
3	11.35	116.6	44.3	101.6	-0.3	101.9	0.0	262.6	336.0	0.782
4	15.13	133.9	50.6	115.1	-0.3	115.4	0.0	299.6	336.3	0.891
5	18.92	139.3	52.6	118.2	-0.3	118.6	0.0	310.1	332.5	0.933
6	22.70	133.9	50.6	115.0	-0.3	115.4	0.0	299.5	334.7	0.895
7	26.48	116.7	44.3	101.7	-0.3	101.9	0.0	262.7	335.3	0.783
8	30.27	88.1	34.1	77.6	-0.2	77.8	0.0	199.8	337.3	0.592
9	34.05	49.2	19.3	43.9	-0.1	44.0	0.0	112.5	332.7	0.338
10	37.83	0.0	0.0	0.0	0.0	0.1	0.0	0.1	327.8	0.000

Lateral bending stress not included in the above factored stresses.

Governing expression for allowable compression stress

Tenth Pt Expression

Grp I Bottom Flange Factored Lateral Bending Stress

Tenth Pt	Noncomp Dead Lat Mom kN-m	Noncomp Dead fw MPa	Comp Dead Lat Mom kN-m	Comp Dead fw MPa	Max LL+I Lat Mom kN-m	Max LL+I fw MPa	Min LL+I Lat Mom kN-m	Min LL+I fw MPa
0	0.00	0.00	0.01	0.00	0.04	0.00	0.01	0.00
1	-0.65	0.19	-0.29	0.08	-0.72	0.21	0.00	0.00
2	-31.99	9.36	-13.77	4.03	-34.27	10.02	-0.08	0.00
3	36.98	10.81	15.84	4.63	39.63	11.59	0.10	0.00
4	8.30	2.43	3.47	1.01	8.38	2.45	0.02	0.00
5	-51.84	15.16	-21.97	6.43	-54.23	15.86	-0.13	0.00
6	6.08	1.78	2.52	0.74	6.04	1.77	0.01	0.00
7	39.72	11.61	17.00	4.97	42.53	12.44	0.10	0.00
8	-31.50	9.21	-13.55	3.96	-33.74	9.87	-0.08	0.00
9	-1.31	0.38	-0.57	0.17	-1.43	0.42	0.00	0.00
10	0.00	0.00	0.01	0.00	0.04	0.00	0.01	0.00

Dabrowski sign convention: +fw/fb ratio used for allowable stress.
(See 2003 Guide spec. commentary C5.1)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Bottom Flange Overload Stress
Thu Jan 15 12:14:14 2015

Girder 7 Bottom Flange Permanent Defl Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	0.01	0.04	-0.01	327.75	0.000
1	3.78	38.03	14.96	33.99	-0.08	327.75	0.265
2	7.57	74.93	29.30	67.43	-0.16	327.75	0.524
3	11.35	98.05	37.65	87.09	-0.22	327.75	0.680
4	15.13	104.90	39.69	90.43	-0.24	327.75	0.717
5	18.92	118.80	45.41	103.16	-0.26	327.75	0.816
6	22.70	104.34	39.46	89.85	-0.24	327.75	0.713
7	26.48	98.70	37.92	87.76	-0.22	327.75	0.685
8	30.27	74.83	29.25	67.31	-0.16	327.75	0.523
9	34.05	38.13	15.01	34.12	-0.08	327.75	0.266
10	37.83	0.00	0.01	0.04	-0.01	327.75	0.000

Lateral bending stresses not included if compact.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Constructibility of Web in Bending
Thu Jan 15 12:14:26 2015

Girder 7 Web Compression Bending Stress for Constructibility - MPa

Tenth Point	Noncomp. Dead Factored Mom	Noncomp. Dead Web Bending Stress	Allowable (6-3),(6-8)	Ratio
0	0.19	0.01	345.00	0.000
1	2226.29	75.90	345.00	0.220
2	3980.91	135.72	345.00	0.393
3	5273.42	179.79	345.00	0.521
4	6055.19	206.44	345.00	0.598
5	6296.33	214.67	345.00	0.622
6	6051.67	206.32	345.00	0.598
7	5275.34	179.86	345.00	0.521
8	3981.03	135.73	345.00	0.393
9	2223.92	75.82	345.00	0.220
10	0.19	0.01	345.00	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Deflections
Thu Jan 15 12:14:34 2015

Girder 7 Service Deflections - mm

Tenth Pt	Total Noncomp Dead	Steel	Wet Con-crete	Super-Imposed Dead	Max LL+I Down	Max LL+I Up
Support	0	0	0	0	0	0
1	58	22	36	18	18	0
2	108	40	67	34	34	1
3	148	56	93	46	47	1
4	174	65	109	54	55	1
5	183	68	114	57	58	1
6	174	65	109	54	56	1
7	149	56	93	46	47	1
8	109	41	68	34	35	1
9	58	22	36	18	18	0
Support	0	0	0	0	0	0

Influence surfaces for defl developed assuming unequal participation of girders in resisting deflection.

	Loc						
Brace	5.40	80	30	49	25	25	0
Brace	10.80	143	54	89	44	45	1
Brace	16.20	178	66	111	55	56	1
Brace	21.60	178	66	111	55	57	1
Brace	27.00	144	54	90	44	45	1
Brace	32.40	81	30	50	25	25	0

Positive dead load deflection is downward.
Live load deflection as indicated in column heading.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Dimensions
Thu Jan 15 12:14:42 2015

Girder 7 Dimensions

Tenth Point	Loc	-Top Flange- tfw	tft	weld	----Web---- wd	wt	weld	-Bot Flange- bfw	bft	Area
0	0.00	600	32	8	1220	13	8	600	57	69260
1	3.78	600	32	8	1220	13	8	600	57	69260
2	7.57	600	32	8	1220	13	8	600	57	69260
3	11.35	600	32	8	1220	13	8	600	57	69260
4	15.13	600	32	8	1220	13	8	600	57	69260
5	18.92	600	32	8	1220	13	8	600	57	69260
6	22.70	600	32	8	1220	13	8	600	57	69260
7	26.48	600	32	8	1220	13	8	600	57	69260
8	30.27	600	32	8	1220	13	8	600	57	69260
9	34.05	600	32	8	1220	13	8	600	57	69260
10	37.83	600	32	8	1220	13	8	600	57	69260

Bearing Stiffeners

Location	Width	Thickness
0.00	150	16
37.83	150	16

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Factored Strengths
Thu Jan 15 12:15:02 2015

Girder 7 Factored Strengths

Tenth Point	Loc	Factored Shear (kN)	Shear Strength (kN)		Ratio	Factored Moment (kN-m)	Bending Strength (kN-m)		Ratio
0	0.00	1563.1	1588.8	(5)	0.984	2.9	15240.9	(10)	0.000
1	3.78	1358.2	1588.8	(5)	0.855	5235.2	15427.2	(10)	0.339
2	7.57	1022.7	1588.8	(5)	0.644	9283.7	15472.5	(10)	0.600
3	11.35	727.8	1588.8	(5)	0.458	12197.4	15339.8	(10)	0.795
4	15.13	568.2	1588.8	(5)	0.358	13910.1	15613.5	(10)	0.891
5	18.92	258.9	1588.8	(5)	0.163	14390.6	14960.7	(10)	0.962
6	22.70	566.7	1588.8	(5)	0.357	13902.5	15538.9	(10)	0.895
7	26.48	728.4	1588.8	(5)	0.458	12201.5	15272.6	(10)	0.799
8	30.27	1026.6	1588.8	(5)	0.646	9284.1	15484.5	(10)	0.600
9	34.05	1363.4	1588.8	(5)	0.858	5230.3	********	(10)	0.000
10	37.83	1504.1	1588.8	(5)	0.947	3.0	15241.0	(10)	0.000

(5) C 0.58 Fyw D t
(10) Fby=Fbs*Pb*Pw (noncompact section)
Maximum moment in factored strength expression

Max Web Slenderness for Unstiffened Web - 6.2

Tenth Pt.	Max D/tw	Actual D/tw
0	100.00	93.85
1	100.00	93.85
2	100.00	93.85
3	100.00	93.85
4	100.00	93.85
5	100.00	93.85
6	100.00	93.85
7	100.00	93.85
8	100.00	93.85
9	100.00	93.85
10	100.00	93.85

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Fatigue Stress
Thu Jan 15 12:15:10 2015

Girder 7 Fatigue Summary

Condition	Location from Left End of Girder	Category (Table 6.6.1.2.3-1)	Force Range (kN-m)	Actual Stress Range	Allowable Stress Range	Ratio
Base metal	3.78	B	511.32	10.01	55.16	0.181
Base metal	7.57	B	868.23	18.54	55.16	0.336
Base metal	11.35	B	1120.97	23.71	55.16	0.430
Base metal	15.13	B	1241.78	24.59	55.16	0.446
Base metal	18.92	B	1240.13	26.69	55.16	0.484
Base metal	22.70	B	1241.29	24.48	55.16	0.444
Base metal	26.48	B	1121.34	23.85	55.16	0.432
Base metal	30.27	B	868.24	18.51	55.16	0.336
Base metal	34.05	B	510.88	10.03	55.16	0.182
Near flg-web weld	3.78	B	511.32	9.31	55.16	0.169
Near flg-web weld	7.57	B	868.23	15.81	55.16	0.287
Near flg-web weld	11.35	B	1120.97	20.41	55.16	0.370
Near flg-web weld	15.13	B	1241.78	22.61	55.16	0.410
Near flg-web weld	18.92	B	1240.13	22.58	55.16	0.409
Near flg-web weld	22.70	B	1241.29	22.60	55.16	0.410
Near flg-web weld	26.48	B	1121.34	20.41	55.16	0.370
Near flg-web weld	30.27	B	868.24	15.81	55.16	0.287
Near flg-web weld	34.05	B	510.88	9.30	55.16	0.169

Allowable range determined by:
Life 75 yrs
Avg daily trk traffic 4000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Governing Service Moment
Thu Jan 15 12:15:21 2015

Girder 7 Service Moment - kN-m

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	Range
0	0.00	0.14	0.31	1.08 T	-0.15 T	1.24
1	3.78	1590.21	702.04	1038.83	-2.08 T	1040.91
2	7.57	2843.51	1235.22	1833.87	-4.12 T	1837.98
3	11.35	3766.73	1607.14	2400.46	-5.86 T	2406.31
4	15.13	4325.13	1834.31	2718.94	-6.34 T	2725.29
5	18.92	4497.38	1907.68	2793.21	-6.79 T	2800.00
6	22.70	4322.62	1833.44	2717.46	-6.37 T	2723.82
7	26.48	3768.10	1607.52	2401.27	-5.86 T	2407.13
8	30.27	2843.59	1235.33	1833.97	-4.08 T	1838.05
9	34.05	1588.51	701.44	1037.94	-2.05 T	1039.99
10	37.83	0.14	0.31	1.10 T	-0.16 T	1.26

T - governed by truck loading
L - governed by lane loading

Range shown in this table not used for fatigue.

At Bracing

Brace No.

2	5.40	2166.98	950.51	1408.27	-2.94
3	10.80	3655.20	1562.07	2333.52	-5.68
4	16.20	4412.80	1870.57	2764.61	-6.47
5	21.60	4412.57	1870.65	2764.26	-6.50
6	27.00	3663.60	1565.29	2338.57	-5.69
7	32.40	2176.74	954.79	1414.64	-2.92

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Governing Service Shear
Thu Jan 15 12:15:26 2015

Girder 7 Service Shear -kN

Tenth Point	Location	Noncomp Dead	Comp Dead	Max LL+I		Range
0	0.00	447.02	202.14	331.26	T	331.00
1	3.78	393.70	168.89	288.73	T	288.47
2	7.57	278.04	115.72	235.31	T	247.88
3	11.35	174.28	76.69	184.95	T	251.72
4	15.13	120.96	43.43	163.30	T	255.97
5	18.92	-0.24	-0.16	-119.00	T	234.85
6	22.70	-119.93	-43.10	-163.39	T	254.24
7	26.48	-173.26	-76.35	-186.04	T	251.53
8	30.27	-278.16	-115.82	-236.96	T	273.27
9	34.05	-393.29	-168.74	-291.44	T	294.27
10	37.83	-446.61	-202.00	-304.45	T	304.18

Ranges shown in this table not used for fatigue.

T - governed by truck loading
L - governed by lane loading

Live shear in Governing Shear table includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Lateral Bending in Flanges
Thu Jan 15 12:15:52 2015

Factored Lateral Bending in Bottom Flange
From Curvature

Brace Location (m)	Primary Bending Stress (MPa)	Lateral Bending Stress (MPa)	Lateral ------- Primary	Perf Ratio	Lateral ------- .5 Fy	Perf Ratio
0.00	0.00	0.00	0.000	0.000	0.000	0.000
5.40	152.95	38.57	0.252	0.504	0.224	0.224
10.80	255.06	64.30	0.252	0.504	0.373	0.373
16.20	305.27	76.92	0.252	0.504	0.446	0.446
21.60	305.25	76.91	0.252	0.504	0.446	0.446
27.00	255.62	64.44	0.252	0.504	0.374	0.374
32.40	153.64	38.98	0.254	0.507	0.226	0.226
37.83	0.00	0.00	0.000	0.000	0.000	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Max Performance Ratios
Thu Jan 15 12:16:33 2015

Girder 7 Maximum Performance Ratios

Criterion	Location m	Max Performance Ratio
Shear	0.00	0.984
Bending	1.58	0.962
Fatigue	18.92	0.484
Bearing Stf.	0.00	0.842

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Reactions
Thu Jan 15 12:16:38 2015

Girder 7 Factored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	593.09	277.46	698.42	-7.92	1568.96	577.24
	Steel 217.66					
	Conc 375.42					
37.83	592.54	277.25	697.87	-7.90	1567.66	576.74
	Steel 217.46					
	Conc 375.09					

Unfactored Reactions - kN

Loc	Noncomp Dead	Comp Dead	LL+I Max	LL+I Min	Max Total	Min Total
0.00	456.22	213.43	321.70	-3.65	991.35	666.00
	Steel 167.43					
	Conc 288.79					
37.83	455.80	213.27	321.45	-3.64	990.52	665.43
	Steel 167.27					
	Conc 288.53					

Reactions in girder output include weight in girder extensions
at abutments, which is not included in girder system output.

Live reaction includes sidewalk.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Service Torque
Thu Jan 15 12:16:45 2015

Girder 7 Service Torque - kN-m

Tenth Point	Location	DL1	DL2	Max LL+I	Min LL+I	Range
0	0.00	-5.78	-11.59	4.72	-22.94	27.66
1	3.78	-5.78	-11.59	4.72 T	-22.94 T	27.66
2	7.57	-3.78	-7.44	3.89 T	-16.88 T	20.77
3	11.35	-2.16	-4.12	2.63 T	-11.78 T	14.41
4	15.13	-2.16	-4.12	2.63 T	-11.78 T	14.41
5	18.92	0.00	0.02	5.50 T	-5.46 T	10.96
6	22.70	2.13	4.05	11.69 T	-1.11 T	12.81
7	26.48	2.13	4.05	11.69 T	-1.11 T	12.81
8	30.27	3.78	7.45	16.85 T	-1.14 T	17.99
9	34.05	5.77	11.58	22.92 T	-1.50 T	24.42
10	37.83	5.77	11.58	22.92	-1.50	24.42

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Shear Connectors - 2003 Guide Spec Fatigue Truck
Thu Jan 15 12:16:56 2015

Given Pitch for 22 x 114 Stud Connectors for Fatigue

Tenth Point	Loc (m)	Given Pitch (mm)	Studs in a Line	Actual Shear Range (kN)	Shear Range Capacity (kN)	Ratio
0	0.00	300.00	3	138.09 T	175.25	0.788
1	3.78	300.00	3	138.02 T	171.52	0.805
2	7.57	300.00	3	118.86 T	161.96	0.734
3	11.35	300.00	3	113.90 T	153.11	0.744
4	15.13	300.00	3	122.71 T	152.08	0.807
5	18.92	300.00	3	123.29 T	152.31	0.809
6	22.70	300.00	3	121.26 T	151.65	0.800
7	26.48	300.00	3	122.67 T	155.66	0.788
8	30.27	300.00	3	120.95 T	162.37	0.745
9	34.05	300.00	3	137.39 T	171.49	0.801
10	37.83	300.00	3	149.96 T	175.25	0.856

Minimum Total Number of Connectors for Ultimate Strength

Beg TP	End TP	Beg Loc	End Loc	Number
0	5	0.00	18.92	53
(192 provided)				
5	10	18.92	37.83	53
(192 provided)				

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Top Flange Factored Bending Stress - Group I Loadin
Thu Jan 15 12:17:15 2015

Girder 7 Grp I Factored Bending Stresses - MPa

Tenth Point	Loc	Top Flange: Noncomp Dead	Comp Dead	Max LL+I	Min LL+I	LL+I Rng	Tot	Allow	Ratio
0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000
1	3.78	-73.5	-18.5	-23.1	0.1	23.3	-115.1	345.0	0.334
2	7.57	-131.4	-32.5	-40.8	0.3	41.1	-204.7	345.0	0.593
3	11.35	-174.1	-42.3	-53.4	0.4	53.8	-269.7	345.0	0.782
4	15.13	-199.9	-48.2	-60.5	0.4	60.9	-308.6	345.0	0.894
5	18.92	-207.8	-50.2	-62.2	0.4	62.6	-320.1	345.0	0.928
6	22.70	-199.7	-48.2	-60.5	0.4	60.9	-308.4	345.0	0.894
7	26.48	-174.1	-42.3	-53.4	0.4	53.8	-269.8	345.0	0.782
8	30.27	-131.4	-32.5	-40.8	0.3	41.1	-204.7	345.0	0.593
9	34.05	-73.4	-18.4	-23.1	0.1	23.2	-114.9	345.0	0.333
10	37.83	0.0	0.0	0.0	0.0	0.0	0.0	345.0	0.000

Lateral bending stress not included in the above factored stresses.

Governing expression for allowable compression stress

Tenth Pt	Expression
1	(5-8)
2	(5-8)
3	(5-8)
4	(5-8)
5	(5-8)
6	(5-8)
7	(5-8)
8	(5-8)
9	(5-8)

Grp I Top Flange Factored Lateral Bending Stress

Tenth Pt	Noncomp Dead Lat Mom kN-m	Noncomp Dead fw MPa	Comp Dead Lat Mom kN-m	Comp Dead fw MPa	Max LL+I Lat Mom kN-m	Max LL+I fw MPa	Min LL+I Lat Mom kN-m	Min LL+I fw MPa
0	0.00	0.00			composite			
1	-0.65	0.34			composite			
2	-31.99	16.66			composite			
3	36.98	19.26			composite			
4	8.30	4.33			composite			
5	-51.84	27.00			composite			
6	6.08	3.17			composite			
7	39.72	20.69			composite			
8	-31.50	16.41			composite			
9	-1.31	0.68			composite			
10	0.00	0.00			composite			

Dabrowski sign convention: +fw/fb ratio used for allowable stress.
(See 2003 Guide spec. commentary C5.1)

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Top Flange Overload Stress
Thu Jan 15 12:17:20 2015

Girder 7 Top Flange Permanent Defl Stress - MPa

Tenth	Loc	Noncomp Dead	Comp Dead	1.67 Max LL+I	1.67 Min LL+I	Allowable	Ratio
0	0.00	0.00	-0.01	-0.02	0.00	327.75	0.000
1	3.78	-56.79	-14.20	-17.78	0.10	327.75	0.271
2	7.57	-113.89	-24.98	-31.39	0.21	327.75	0.520
3	11.35	-148.71	-32.50	-41.09	0.29	327.75	0.678
4	15.13	-157.06	-37.10	-46.54	0.32	327.75	0.734
5	18.92	-180.63	-38.58	-47.82	0.34	327.75	0.815
6	22.70	-156.08	-37.08	-46.52	0.32	327.75	0.731
7	26.48	-149.85	-32.51	-41.11	0.29	327.75	0.682
8	30.27	-113.70	-24.98	-31.39	0.21	327.75	0.519
9	34.05	-56.99	-14.19	-17.77	0.10	327.75	0.271
10	37.83	0.00	-0.01	-0.02	0.00	327.75	0.000

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Girder 7 : Rating Output : Weight
Thu Jan 15 12:17:29 2015

	Volume	Weight	
	cu m	kN	
Top Flange	0.73	55.91	
Web	0.60	46.19	
Bottom Flange	0.73	55.91	
Flange-Web Weld		0.37	
Bearing Stiffeners	0.01	0.90	
Steel in extensions		3.25	
Additional Steel		6.67	
Total Steel			169.19
Slab	11.35	267.44	
Flange Haunch	0.60	14.15	
Concrete in extensions		4.31	
Additional Concrete		42.37	
Total Concrete			328.27
Total Steel and Concrete			498.37

Does not include weight of bracing, which can be found in bracing output stiffness tables.

(Noncomposite weight data used in girder input is used for analysis loading.)

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Input File : Definition
Thu Jan 15 12:17:57 2015


ID: DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
CONDITIONS
  ALL SHAPES L102X102X9.52 FOR GROUP 1
  BOTTOM CHORD L127X127X15.9 LONG LEG CONNECTED FOR GROUP 2
  DIAGONALS L102X102X12.7 LONG LEG CONNECTED FOR GROUP 2
  LFD METHOD
  M270M-345 STEEL
  METRIC INPUT
  METRIC OUTPUT
  RATE MODE
  TOP CHORD L127X127X15.9 LONG LEG CONNECTED FOR GROUP 2
  TYPE C BRACING FOR GROUP 1
  TYPE C BRACING FOR GROUP 2
DATA
  BRL-1 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  BRL-2 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  BRL-3 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  BRL-4 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  BRL-5 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  BRL-6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
  GCONNDST 75. 75.
  GRP-1 1 1 2 2 2 2 1 1
  GRP-2 1 1 2 2 2 2 1 1
  GRP-3 1 1 2 2 2 2 1 1
  GRP-4 1 1 2 2 2 2 1 1
  GRP-5 1 1 2 2 2 2 1 1
  GRP-6 1 1 2 2 2 2 1 1
  GRPHT 920. 920.
GO
```

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Case Data
Thu Jan 15 12:18:11 2015

Case Data - DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3

Execution Mode

Rate Mode

Fatigue

* Category B

Geometry

Brace Lengths from Girder 1 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Brace Lengths from Girder 2 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Brace Lengths from Girder 3 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Brace Lengths from Girder 4 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Brace Lengths from Girder 5 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Brace Lengths from Girder 6 (m) -
1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60, 1.60

Connection to center of girder distance by group

75.00 75.00

Brace height by group - mm

920.00 920.00

Loading

Load Factor Method
2003 Guide Spec. for Horizontally Curved Steel Girder Bridges

Material

Steel grade: M270M-345

Units

Input - Metric
Output - Metric

* Default

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Factored Combined Forces Summary - Girder 1
Thu Jan 15 12:19:27 2015

Girder 1 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	13.38	-7.44	53.54	-53.54	40.58	-29.02
2	C	4.14	-52.01	79.51	-79.51	88.93	-49.71
3	C	10.35	-125.51	124.09	-124.09	194.80	-80.90
4	C	13.29	-140.73	141.79	-141.79	207.21	-96.94
5	C	14.09	-139.56	142.72	-142.72	206.74	-98.61
6	C	10.74	-124.01	122.76	-122.76	192.24	-80.06
7	C	3.89	-53.16	81.97	-81.97	91.59	-50.74
8	C	13.32	-7.50	53.73	-53.73	40.76	-29.10

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Factored Combined Forces Summary - Girder 2
Thu Jan 15 12:19:34 2015

Girder 2 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	1.17	-2.10	36.58	-36.58	22.66	-22.65
2	C	29.24	-81.49	156.36	-156.36	136.12	-90.05
3	C	109.86	-221.67	311.87	-311.87	298.85	-231.65
4	C	148.20	-232.71	338.72	-338.72	332.14	-310.00
5	C	147.91	-234.15	339.52	-339.52	333.73	-310.41
6	C	110.47	-221.34	311.62	-311.62	298.34	-232.24
7	C	29.63	-81.51	157.70	-157.70	136.62	-92.00
8	C	1.33	-2.08	36.63	-36.63	22.69	-22.68

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Factored Combined Forces Summary - Girder 3
Thu Jan 15 12:19:46 2015

Girder 3 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	8.79	-3.02	41.43	-41.43	28.66	-24.06
2	C	80.65	-24.70	166.67	-166.67	121.98	-154.35
3	C	289.37	-27.95	362.93	-362.93	230.65	-467.92
4	C	371.39	-5.64	431.20	-431.20	241.95	-586.96
5	C	371.45	-5.72	429.29	-429.29	240.76	-586.26
6	C	290.62	-27.14	364.76	-364.76	231.38	-470.05
7	C	80.81	-25.21	167.85	-167.85	123.20	-155.00
8	C	8.99	-3.07	41.44	-41.44	28.71	-24.13

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Factored Combined Forces Summary - Girder 4
Thu Jan 15 12:19:53 2015

Girder 4 Max Combined Member Forces - kN

Brace	Type	Top Chord		Diagonal		Bottom Chord	
		Tens	Comp	Tens	Comp	Tens	Comp
				HS			
1	C	1.71	-1.76	50.34	-50.34	30.41	-31.91
2	C	155.20	0.00	250.40	-250.40	55.83	-269.63
3	C	517.14	0.00	488.52	-488.52	37.54	-701.80
4	C	646.20	0.00	562.35	-562.35	3.68	-850.75
5	C	648.29	0.00	563.71	-563.71	1.86	-853.58
6	C	517.90	0.00	490.21	-490.21	38.22	-702.98
7	C	155.73	0.00	250.69	-250.69	55.90	-270.03
8	C	1.66	-1.88	50.30	-50.30	30.42	-31.84

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Factored Combined Forces Summary - Girder 5
Thu Jan 15 12:19:59 2015

Girder 5 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	2.82	-4.12	40.67	-40.67	29.25	-21.26
2	C	164.75	0.00	284.04	-284.04	77.08	-310.54
3	C	533.06	0.00	502.65	-502.65	0.00	-775.20
4	C	609.39	0.00	550.28	-550.28	0.00	-869.17
5	C	607.85	0.00	555.92	-555.92	0.00	-871.26
6	C	533.03	0.00	501.58	-501.58	0.00	-774.43
7	C	166.45	0.00	285.83	-285.83	76.82	-313.49
8	C	2.83	-4.13	40.65	-40.65	29.24	-21.28

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Factored Combined Forces Summary - Girder 6
Thu Jan 15 12:20:04 2015

Girder 6 Max Combined Member Forces - kN

Brace	Type	Top Chord Tens	Top Chord Comp	Diagonal Tens	Diagonal Comp	Bottom Chord Tens	Bottom Chord Comp
				HS			
1	C	54.78	0.00	155.12	-155.12	77.35	-123.61
2	C	229.09	0.00	265.63	-265.63	0.00	-376.70
3	C	548.87	0.00	244.35	-244.35	0.00	-660.10
4	C	650.40	0.00	289.55	-289.55	0.00	-788.90
5	C	646.59	0.00	283.31	-283.31	0.00	-781.19
6	C	554.10	0.00	248.68	-248.68	0.00	-667.91
7	C	229.18	0.00	263.82	-263.82	0.00	-375.42
8	C	53.97	0.00	155.40	-155.40	77.63	-123.60

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Shapes - Girder 1 To Adjacent Girder - Brace 1
Thu Jan 15 12:39:03 2015

Girder 1 Shapes

Brace 1

Type C bracing - top and bottom chords
K diagonals to mid of bottom chord

	Shape	Comp KL/r	Tens L/r
Top chord:	L 102 x 102 x 9.53	65.95	73.28
Diagonals:	L 102 x 102 x 9.53	53.27	59.18
Bot chord:	L 102 x 102 x 9.53	41.77	36.64

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Shapes - Girder 1 To Adjacent Girder - Brace 3
Thu Jan 15 12:39:22 2015

Girder 1 Shapes

Brace 3

Type C bracing - top and bottom chords
K diagonals to mid of bottom chord

	Shape	Comp KL/r	Tens L/r
Top chord:	L 127 x 127 x 15.90	52.70	58.55
Diagonals:	L 102 x 102 x 12.70	53.47	59.41
Bot chord:	L 127 x 127 x 15.90	33.80	29.28

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Summary of Performance Ratios - Girder 1 - HS
Thu Jan 15 12:40:10 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

	Combined Stresses			Fatigue Stresses		
Brace	Top Chord	Diag	Bott Chord	Top Chord	Diag	Bott Chord
1	0.028	0.113	0.084	0.009	0.104	0.073
2	0.119	0.168	0.183	0.030	0.021	0.051
3	0.128	0.200	0.193	0.039	0.033	0.068
4	0.144	0.229	0.206	0.045	0.038	0.078
5	0.142	0.230	0.205	0.044	0.040	0.078
6	0.127	0.198	0.191	0.040	0.035	0.069
7	0.121	0.173	0.189	0.034	0.016	0.053
8	0.027	0.113	0.084	0.009	0.103	0.074

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Summary of Performance Ratios - Girder 2 - HS
Thu Jan 15 12:40:17 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

	Combined Stresses			Fatigue Stresses		
Brace	Top Chord	Diag	Bott Chord	Top Chord	Diag	Bott Chord
1	0.005	0.077	0.047	0.004	0.067	0.045
2	0.186	0.330	0.281	0.101	0.057	0.149
3	0.226	0.503	0.296	0.153	0.071	0.209
4	0.237	0.546	0.329	0.179	0.091	0.235
5	0.239	0.547	0.331	0.181	0.090	0.237
6	0.226	0.502	0.296	0.157	0.054	0.210
7	0.186	0.333	0.282	0.109	0.110	0.154
8	0.005	0.077	0.047	0.003	0.065	0.041

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Summary of Performance Ratios - Girder 3 - HS
Thu Jan 15 12:40:25 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

	Combined Stresses			Fatigue Stresses		
Brace	Top Chord	Diag	Bott Chord	Top Chord	Diag	Bott Chord
1	0.018	0.087	0.059	0.005	0.070	0.048
2	0.166	0.352	0.309	0.141	0.073	0.177
3	0.287	0.585	0.442	0.211	0.083	0.217
4	0.368	0.695	0.554	0.250	0.086	0.251
5	0.368	0.692	0.553	0.253	0.087	0.252
6	0.288	0.588	0.444	0.217	0.085	0.218
7	0.167	0.354	0.310	0.153	0.074	0.185
8	0.019	0.087	0.059	0.005	0.071	0.049

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Summary of Performance Ratios - Girder 4 - HS
Thu Jan 15 12:40:31 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

	Combined Stresses			Fatigue Stresses		
Brace	Top Chord	Diag	Bott Chord	Top Chord	Diag	Bott Chord
1	0.004	0.106	0.064	0.005	0.091	0.057
2	0.320	0.529	0.540	0.177	0.116	0.193
3	0.513	0.787	0.662	0.249	0.165	0.211
4	0.641	0.906	0.803	0.280	0.172	0.245
5	0.643	0.909	0.805	0.281	0.172	0.246
6	0.514	0.790	0.663	0.255	0.162	0.217
7	0.321	0.529	0.541	0.176	0.124	0.156
8	0.004	0.106	0.064	0.010	0.091	0.057

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Summary of Performance Ratios - Girder 5 - HS
Thu Jan 15 12:40:37 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

	Combined Stresses			Fatigue Stresses		
Brace	Top Chord	Diag	Bott Chord	Top Chord	Diag	Bott Chord
1	0.009	0.086	0.060	0.006	0.068	0.051
2	0.340	0.600	0.622	0.089	0.323	0.196
3	0.529	0.810	0.732	0.106	0.438	0.189
4	0.604	0.887	0.820	0.081	0.470	0.173
5	0.603	0.896	0.822	0.072	0.528	0.173
6	0.529	0.809	0.731	0.100	0.449	0.189
7	0.343	0.603	0.628	0.086	0.333	0.202
8	0.009	0.086	0.060	0.006	0.068	0.051

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 3
Bracing : Rating Output : Summary of Performance Ratios - Girder 6 - HS
Thu Jan 15 12:40:45 2015

(Performance ratios do not include the effect of connection eccentricity.)

Bracing forces from loading in lane locations used
for forces in associated girder.

	Combined Stresses			Fatigue Stresses		
Brace	Top Chord	Diag	Bott Chord	Top Chord	Diag	Bott Chord
1	0.113	0.327	0.247	0.040	0.282	0.188
2	0.472	0.561	0.754	0.130	0.232	0.175
3	0.544	0.394	0.623	0.148	0.128	0.136
4	0.645	0.467	0.744	0.177	0.155	0.163
5	0.641	0.457	0.737	0.176	0.157	0.164
6	0.550	0.401	0.630	0.152	0.123	0.140
7	0.473	0.557	0.752	0.131	0.340	0.179
8	0.111	0.328	0.247	0.041	0.280	0.188

PORTILLO Y YOUNG S.C.

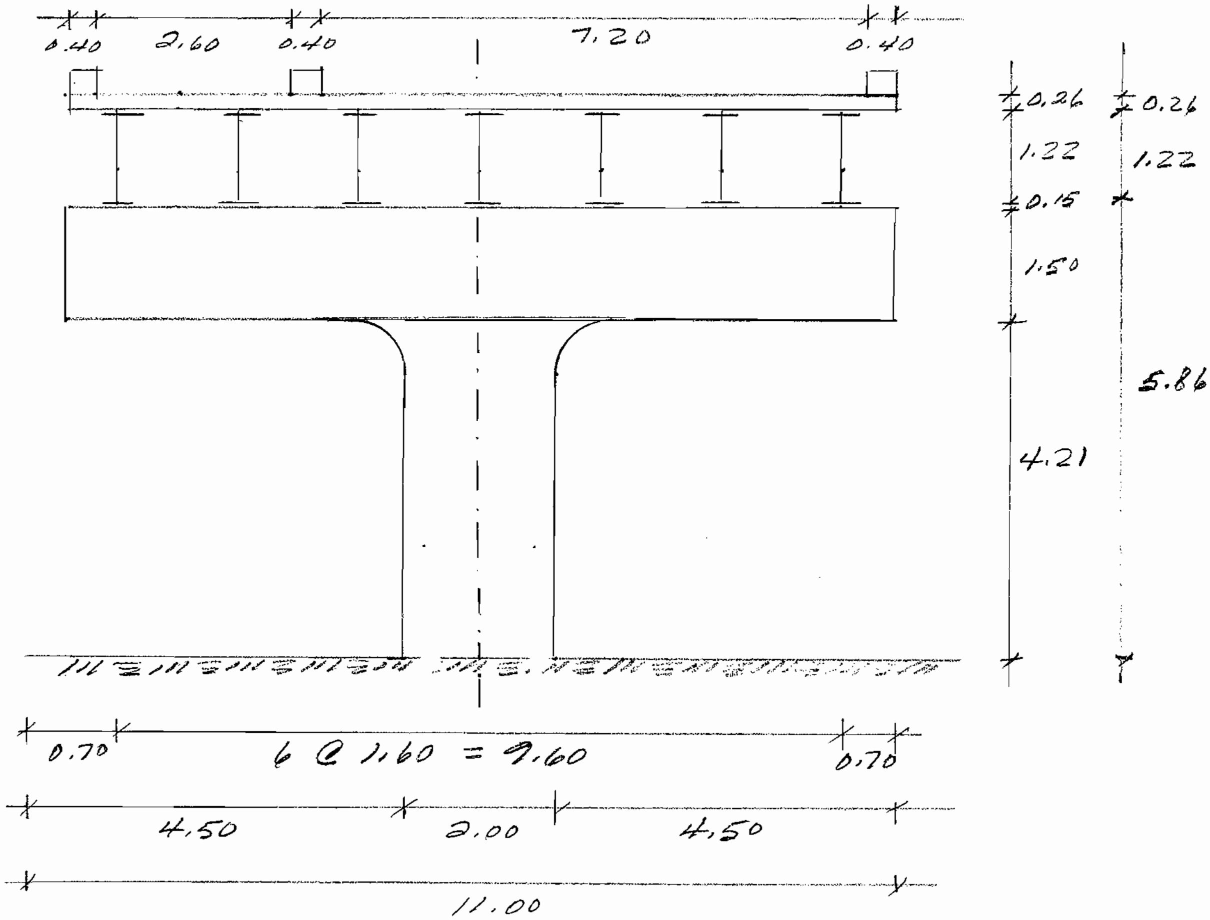
PROYECTO: P.S. CALLE MARISCAL

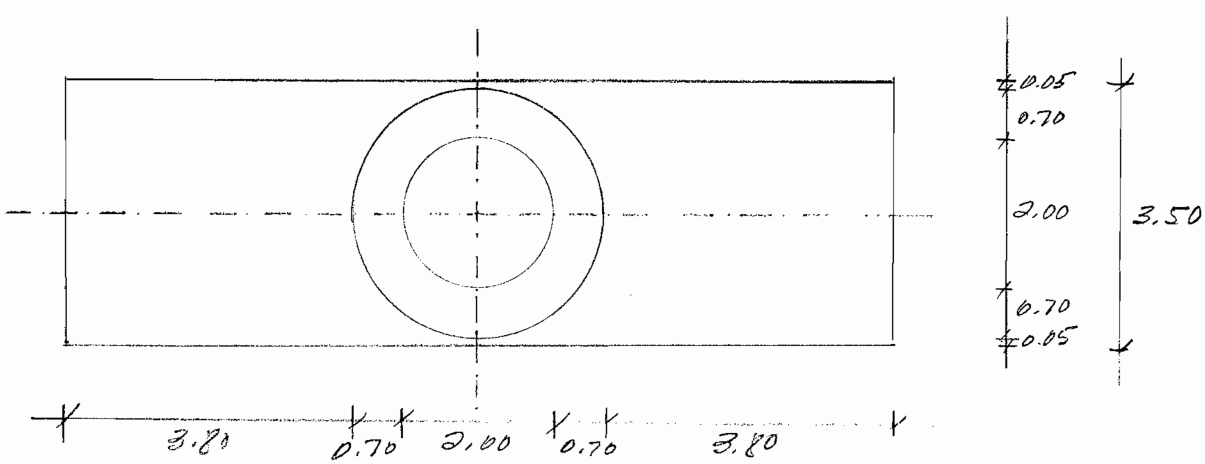
CONCEPTO: DISEÑO PILAS

HOJA: PI-1
FECHA: 16/01/15
CALCULO: M.P.
REVISO:

* Diseño Pila 3 (Apoyo Fijo)

+ Datos Generales





11.00

PORTILLO Y YOUNG S.C.	PROYECTO: P.S. CALLE MARISCAL CONCEPTO: DISEÑO PILAS	HOJA: PI-2 FECHA: 16/01/15 CALCULO: M.P. REVISO:

+ Análisis de Cargas

- Carga Muerta

$P_{D1} = 555.15 + 342.93 = 898.08\ kN = 91.55\ ton$

$P_{D2} = 463.54 + 218.88 = 682.42\ kN = 69.56\ ton$

$P_{D3} = 542.98 + 229.01 = 771.99\ kN = 78.69\ ton$

$P_{D4} = 569.56 + 195.95 = 765.51\ kN = 78.03\ ton$

$P_{D5} = 593.02 + 202.94 = 795.96\ kN = 81.14\ ton$

$P_{D6} = 722.54 + 301.81 = 1{,}024.35\ kN = 104.42\ ton$

$P_{D7} = 450.61 + 250.68 = 701.29\ kN = 71.49\ ton$

- Carga Viva: Carril 1 cargado

$P_{L1} = 28.19\ kN = 2.87\ ton$

$P_{L2} = 90.12\ kN = 9.19\ ton$

$P_{L3} = 221.36\ kN = 22.56\ ton$

$P_{L4} = 215.15\ kN = 21.93\ ton$

$P_{L5} = 155.62\ kN = 15.86\ ton$

$P_{L6} = 67.24\ kN = 6.85\ ton$

$P_{L7} = 11.34\ kN = 1.16\ ton$

- Carga Viva: Carril 2 cargado

$P_{L1} = 3.92\ kN = 0.40\ ton$

$P_{L2} = 6.41\ kN = 0.65\ ton$

$P_{L3} = 24.90\ kN = 2.54\ ton$

$P_{L4} = 73.64\ kN = 7.51\ ton$

PORTILLO Y YOUNG S.C.	PROYECTO: P.S. CALLE MARISCAL	HOJA: PI-3
	CONCEPTO: DISEÑO PILAS	FECHA: 11/01/15
		CALCULO: M.P.
		REVISO:

$P_{L5} = 186.24$ kN $= 18.98$ ton

$P_{L6} = 280.89$ kN $= 28.63$ ton

$P_{L7} = 229.52$ kN $= 23.40$ ton

- Carga Viva: Carril 1 + Carril 2 cargados

$P_{L1} = 32.11$ kN $= 3.27$ ton

$P_{L2} = 96.53$ kN $= 9.84$ ton

$P_{L3} = 246.26$ kN $= 25.10$ ton

$P_{L4} = 288.79$ kN $= 29.44$ ton

$P_{L5} = 341.86$ kN $= 34.85$ ton

$P_{L6} = 348.13$ kN $= 35.49$ ton

$P_{L7} = 240.87$ kN $= 24.55$ ton

- Frenaje (Considerar que sólo 5 vigas toman el frenaje)

$F_{LF} = 0.05(0.953 \times 111.00 + 8.17) = 5.70$ ton/carril $=$

$F_{LF} = 5.70 \times 2/5 = 2.28$ ton/viga

$M_{LF} = 2.28(1.83 + 0.26 + 1.22 + 0.15 + 0.75) = 9.60$ ton-m/viga

- Sismo

Masas Transversales: Tomar la mitad de la masa de las vigas que se apoyan en la pila

$M_1 = 91.55 + 1.50 \times 3.50 \times 1.50 \times 2.4 = 91.55 + 18.90 = 110.45$ ton

$M_2 = 69.56 + 1.50 \times 3.50 \times 1.60 \times 2.4 = 69.56 + 20.16 = 89.72$

$M_3 = 78.69 + 20.16 = 98.85$ ton

$M_4 = 78.03 + 20.16 + \pi \times 2.00^2/4 \times 2.10 \times 2.4 = 78.03 + 20.16 + 15.83 = 114.02$ ton

$M_5 = 81.14 + 20.16 = 101.30$ ton

$M_6 = 104.42 + 20.16 = 124.58$ ton

$M_7 = 71.49 + 18.90 = 90.39$ ton

Masas Longitudinales: Por ser el único apoyo móvil en el tramo, tomar la masa total de las vigas del tramo

$M_1 = (131.68 + 84.96 + 555.15 + 342.93 + 547.31 + 338.06 + 197.26 + 119.16)/9.81 + 18.90 = 255.04$ ton

$M_2 = (158.96 + 83.27 + 463.54 + 218.88 + 560.02 + 218.31 + 203.06 + 98.86)/9.81 + 20.16 = 230.55$ ton

$M_3 = (175.91 + 78.99 + 542.98 + 229.01 + 561.47 + 240.89 + 202.28 + 87.85)/9.81 + 20.16 = 236.20$ ton

$M_4 = (192.71 + 70.17 + 5$ [illegible] $+ 195.95 + 562.60 + 193.50 + 204.88 + 73.68)/9.81 + 20.16 + 15.83 = 246.29$ ton

$M_5 = (213.86 + 75 +$ [illegible] $+$ [illegible] $+ 558.66 + 184.79 + 205.32 + 72.27)/9.81 + 20.16 = 234.82$ ton

$M_6 = (235.47 + 85.60 + 722.54 +$ [illegible] $+$ [illegible] $+$ [illegible] $+$ [illegible] $+ 77.$[illegible]$)/9.81 + 20.16 = 263.07$ ton

$M_7 = ($[illegible] $+ 136.74 + 450.61 + 250.66 + 537.42 + 295.02 + 201.07 + 104.64)/9.81 + 18.90 = 24$[illegible]$.57$ ton

Paso Superior Calle Mariscal

Análisis de Cargas Pila 3

A).- DATOS GENERALES

- Superestructura

Claro Mayor	37.00	mts
Claro Menor	37.00	mts
H(parapeto)	2.10	mts
H(guarnición)	0.40	mts
H(losa)	0.26	mts
H(vigas: Claro Mayor)	1.22	mts
H(Apoyos Claro Mayor)	0.20	mts
H(vigas: Claro Menor)	1.22	mts
H(Apoyos Claro Menor)	0.20	mts
# Vigas (Claro Mayor)	7	
# Vigas (Claro Menor)	7	
Número de carriles	2	

- Subestructura

L(cabezal)	11.00	mts
H(cabezal)	1.50	mts
B(Cabezal)	3.50	mts
Excent. (C. Mayor)	0.00	mts
Excent. (C. Menor)	0.00	mts
Esviaje	0.00	°
# Columnas Cabezal	1	
D(columnas)	2.00	mts
H(columnas)	4.21	mts

G).- VIENTO EN LA ESTRUCTURA (Ww = 250 kg/m2)

- Parapeto (Considerar como área expuesta un tercio del área bruta)

Fwpn	6,475	kg
Mwpl	-25,123	kg-m

- Guarnición y Losa

Fwvn	6,105	kg
Mwvl	-15,263	kg-m

- Cabezal

Fwvv	1,313	kg
Mwvv	0	kg-m

- Vigas

Fwvv	11,285	kg
Mwvv	-17,605	kg-m

- Columnas

Fwcoln	2,105	kg
Mwcoll	6,010	kg-m

- Viento total en la estructura

Fwn	27,283	kg =	27,283	kg / columna
Mwl	-51,980	kg-m =	-51,980	kg - m / columna
Fwx			27,283	kg / columna
Mwz			-51,980	kg - m / columna
Fwz			0	kg / columna
Mwx			0	kg - m / columna

H).- VIENTO EN LA CARGA VIVA (Ww = 150 kg/m)

Fwln	5,550	kg	5,550	kg / columna
Mwll	-23,643	kg-m	-23,643	kg - m / columna
Fwlx			5,550	kg / columna
Mwlz			-23,643	kg - m / columna
Fwlz			0	kg / columna
Mwlx			0	kg - m / columna

I).- CARGA DE SISMO

- Consideraciones Generales
  - \+ El análisis sísmico se realizará con base en el espectro de respuestas definido por la CFE para el sitio
  - \+ Para el análisis de las pilas en el sentido transversal, se supondrá que la masa que actúa sobre cada pila se puede calcular con base en la mitad del peso de la superestructura localizada a cada lado de la pila, ya que las vigas se encuentran simplemente apoyadas en la subestructura.
  - \+ Para el análisis de las pilas en el sentido longitudinal, se supondrá que la masa que actúa sobre cada pila con apoyos fijos se puede calcular con base en el peso total de la superestructura localizada a cada lado de la pila

- Cálculo del Espectro de Respuestas

Zona	A	
Terreno Tipo	II	
Parametros del Espectro		
a_o =	0.04	
c =	0.16	(Para puentes semi - importantes)
T_a =	0.30	
T_b =	1.50	
r =	2/3	

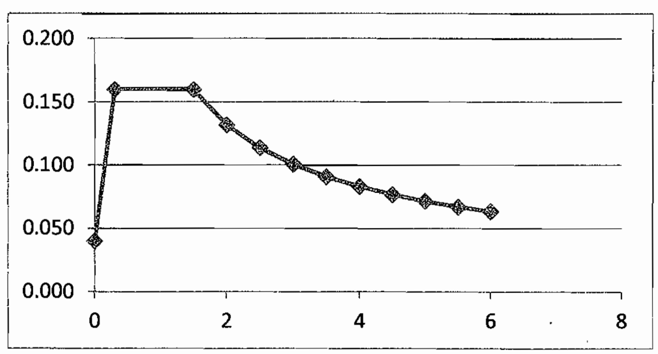
Definir Espectro

Para $T < T_a$ $\quad a = a_o + (c - a_o)\,T / T_a$

Para $T_a < T < T_b$ $\quad a = c$

Para $T > T_b$ $\quad a = c\,(T_b / T)^r$

T (seg)	a (% g)
0	0.040
0.30	0.160
1.50	0.160
2.00	0.132
2.50	0.114
3.00	0.101
3.50	0.091
4.00	0.083
4.50	0.077
5.00	0.072
5.50	0.067
6.00	0.063



Definir Q

Tomar Q = 2 para estructuras en las que la fuerza de sismo es resistida por una sola columna

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder System : Analysis Output : Reactions - Girder 1
Fri Jan 16 11:09:15 2015

Girder 1 Service Vertical Reactions - kN

Supp/Node		Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min
Governing							
1	1	131.68	84.96	6.09	-21.25	31.68	-2.70
	Steel	43.94					
	Concrete	87.74					

	Max	Min	
Global x concurrent LL+I rot.	0.0023	0.0033	deg
Global y concurrent LL+I rot.	0.0067	0.0047	deg

Max LL+I Contribution by Lane

1	2
1.82	4.95

Concurrent reactions using same governing loaded lanes
as for Max LL+I and Min LL+I

Concurrent at gdr 2 - 30.80

Concurrent at gdr 3 - 101.20

Concurrent at gdr 4 - 100.31

Concurrent at gdr 5 - 47.21

Concurrent at gdr 6 - 28.88

Concurrent at gdr 7 - 3.61

Supp/Node		Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min
2	20	555.15	342.93	32.11	-36.36	127.38	-15.99
	Steel	184.20					
	Concrete	370.95					

	Max	Min	
Global x concurrent LL+I rot.	0.0008	-0.0005	deg
Global y concurrent LL+I rot.	0.0052	-0.0054	deg

Max LL+I Contribution by Lane

1	2
28.19	3.92

Concurrent reactions using same governing loaded lanes
as for Max LL+I and Min LL+I

Concurrent at gdr 2 - 95.66

Concurrent at gdr 3 - 242.18

Concurrent at gdr 4 - 279.71

Concurrent at gdr 5 - 282.00

```
      Concurrent at gdr  6 -     304.80

      Concurrent at gdr  7 -     152.22


   3   69    547.31    338.06     23.21    -27.42  113.60    -5.28
      Steel    181.59
      Concrete 365.72


 Global x concurrent LL+I rot.  -0.0010   -0.0014 deg
 Global y concurrent LL+I rot.   0.0146   -0.0051 deg


     Max LL+I Contribution by Lane
         1          2
       18.83      4.39


     Concurrent reactions using same governing loaded lanes
     as for Max LL+I and Min LL+I


      Concurrent at gdr  2 -      45.69

      Concurrent at gdr  3 -      69.81

      Concurrent at gdr  4 -     114.31

      Concurrent at gdr  5 -     219.92

      Concurrent at gdr  6 -     259.18

      Concurrent at gdr  7 -     203.59


   4  118    197.26    119.16     16.54    -18.15   45.61    -4.59
      Steel     65.43
      Concrete 131.84


 Global x concurrent LL+I rot.   0.0078   -0.0011 deg
 Global y concurrent LL+I rot.  -0.0071   -0.0081 deg


     Max LL+I Contribution by Lane
         1          2
       12.84      3.70


     Concurrent reactions using same governing loaded lanes
     as for Max LL+I and Min LL+I


      Concurrent at gdr  2 -      38.09

      Concurrent at gdr  3 -      47.56

      Concurrent at gdr  4 -      70.51

      Concurrent at gdr  5 -     128.94

      Concurrent at gdr  6 -     146.18

      Concurrent at gdr  7 -     100.33


Truck Loading

   1    1                           6.73     -20.76
   2   20                          26.00     -29.29
   3   69                          23.19     -21.18
   4  118                          16.45     -17.10
```

Lane Loading

1	1	6.71	-21.01
2	20	32.11	-36.36
3	69	22.06	-27.42
4	118	15.95	-18.15

Fatigue Truck

1	1	3.73	-14.97
2	20	16.54	-19.31
3	69	14.00	-14.58
4	118	9.38	-12.46

Support Rotations - Degrees

About global axes used in Girder Geometry table

Supp/Node		Noncomp Dead x-axis	Noncomp Dead y-axis	Superimp Dead x-axis	Superimp Dead y-axis	LL+I+SDWK Range x-axis		LL+I+SDWK Range y-axis	
1	1	-0.04	0.16	-0.02	0.07	(0.00 to	0.01)	(-0.01 to	0.02)
		Concurrent live vertical reaction				-9.38	-1.54	-9.10	5.31
2	20	0.03	-0.04	0.02	-0.02	(0.00 to	0.00)	(-0.01 to	0.01)
		Concurrent live vertical reaction				20.35	-14.20	13.77	4.82
3	69	0.02	0.08	0.01	0.03	(0.00 to	0.01)	(-0.01 to	0.02)
		Concurrent live vertical reaction				12.46	-8.58	-8.77	12.46
4	118	-0.07	-0.27	-0.03	-0.11	(0.00 to	0.01)	(-0.02 to	0.02)
		Concurrent live vertical reaction				-9.69	14.47	15.59	-9.34

Noncomp dead end reactions do not include weight of girder extensions.

Torsional and flexural rotations - member local axes

Supp/Node		Noncomp Dead tors	Noncomp Dead flex	Superimp Dead tors	Superimp Dead flex	LL+I+SDWK Range tors	LL+I+SDWK Range flex
1	1	0.00	0.17	0.00	0.07	(-0.01 to 0.01)	(-0.01 to 0.01)
2	20	0.03	-0.04	0.02	-0.02	(0.00 to 0.00)	(-0.01 to 0.01)
3	69	0.00	0.09	0.00	0.03	(0.00 to 0.00)	(-0.01 to 0.02)
4	118	0.00	-0.28	0.00	-0.11	(0.00 to 0.00)	(-0.02 to 0.02)

Noncomp dead end reactions do not include weight of girder extensions.

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder System : Analysis Output : Reactions - Girder  2
Fri Jan 16 11:09:47 2015


Girder 2 Service Vertical Reactions - kN


    Supp/Node    Noncomp    Super-    Max       Min          Sidewalk
                 Dead       Imposed   Live+     Live+      Max     Min
                            Dead      Impact    Impact


  Governing

      1    2    158.96     82.27      37.73      -7.67    42.72    -2.39
         Steel     52.41
         Concrete 106.55


    Global x concurrent LL+I rot.   0.0084   -0.0003 deg
    Global y concurrent LL+I rot.   0.0277   -0.0019 deg


        Max LL+I Contribution by Lane
             1         2
           36.89      0.84


        Concurrent reactions using same governing loaded lanes
        as for Max LL+I and Min LL+I


         Concurrent at gdr  1 -       2.26

         Concurrent at gdr  3 -     102.86

         Concurrent at gdr  4 -     105.55

         Concurrent at gdr  5 -      54.83

         Concurrent at gdr  6 -      29.19

         Concurrent at gdr  7 -      -4.74


      2   27    463.54    218.88      96.53     -14.75   109.97    -3.99
         Steel    151.33
         Concrete 312.21


    Global x concurrent LL+I rot.   0.0003   -0.0010 deg
    Global y concurrent LL+I rot.   0.0080   -0.0086 deg


        Max LL+I Contribution by Lane
             1         2
           90.12      6.41


        Concurrent reactions using same governing loaded lanes
        as for Max LL+I and Min LL+I


         Concurrent at gdr  1 -      32.11

         Concurrent at gdr  3 -     244.22

         Concurrent at gdr  4 -     282.15

         Concurrent at gdr  5 -     284.58
```

```
     Concurrent at gdr  6 -     307.69

     Concurrent at gdr  7 -     153.64


  3   76    560.02    278.31     92.22    -11.57  130.41    -4.69
     Steel    183.35
     Concrete 376.67


 Global x concurrent LL+I rot.   0.0018   -0.0019 deg
 Global y concurrent LL+I rot.   0.0099   -0.0078 deg


    Max LL+I Contribution by Lane
        1         2
      88.51      3.71


    Concurrent reactions using same governing loaded lanes
    as for Max LL+I and Min LL+I


     Concurrent at gdr  1 -      11.72

     Concurrent at gdr  3 -     238.70

     Concurrent at gdr  4 -     254.11

     Concurrent at gdr  5 -     165.32

     Concurrent at gdr  6 -     115.21

     Concurrent at gdr  7 -      83.92


  4  125    203.06     98.86     53.32     -7.23   44.92    -2.79
     Steel     66.79
     Concrete 136.27


 Global x concurrent LL+I rot.   0.0110   -0.0032 deg
 Global y concurrent LL+I rot.  -0.0217    0.0060 deg


    Max LL+I Contribution by Lane
        1         2
      48.99      4.33


    Concurrent reactions using same governing loaded lanes
    as for Max LL+I and Min LL+I


     Concurrent at gdr  1 -      -1.22

     Concurrent at gdr  3 -     117.40

     Concurrent at gdr  4 -     128.79

     Concurrent at gdr  5 -      87.09

     Concurrent at gdr  6 -      69.19

     Concurrent at gdr  7 -      60.31


Truck Loading

  1    2                         37.73     -7.59
  2   27                         65.38    -13.77
  3   76                         67.04    -11.47
  4  125                         53.32     -7.23
```

Lane Loading

1	2	34.44	-7.37
2	27	96.53	-14.75
3	76	91.96	-11.25
4	125	50.72	-7.21

Fatigue Truck

1	2	26.95	-5.63
2	27	44.37	-10.38
3	76	47.30	-8.46
4	125	36.48	-5.43

Support Rotations - Degrees

About global axes used in Girder Geometry table

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range			
		x-axis	y-axis	x-axis	y-axis	x-axis		y-axis	
1	2	-0.06	0.20	-0.02	0.07	(0.00 to	0.01)	(-0.01 to	0.04)
	Concurrent live vertical reaction					-1.24	32.48	-1.24	30.17
2	27	0.00	-0.06	0.00	-0.02	(0.00 to	0.00)	(-0.02 to	0.02)
	Concurrent live vertical reaction					57.51	-7.79	61.23	57.45
3	76	0.02	0.09	0.01	0.03	(-0.01 to	0.01)	(-0.02 to	0.02)
	Concurrent live vertical reaction					63.71	46.08	45.78	63.71
4	125	-0.07	-0.27	-0.03	-0.10	(0.00 to	0.01)	(-0.04 to	0.01)
	Concurrent live vertical reaction					-4.03	50.29	50.29	-4.05

Noncomp dead end reactions do not include weight of girder extensions.

Torsional and flexural rotations - member local axes

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range			
		tors	flex	tors	flex	tors		flex	
1	2	0.00	0.21	0.00	0.07	(-0.01 to	0.02)	(-0.01 to	0.03)
2	27	0.01	-0.06	0.00	-0.02	(0.00 to	0.00)	(-0.02 to	0.02)
3	76	0.00	0.09	0.00	0.03	(0.00 to	0.00)	(-0.02 to	0.03)
4	125	0.00	-0.28	0.00	-0.10	(0.01 to	0.01)	(-0.04 to	0.01)

Noncomp dead end reactions do not include weight of girder extensions.

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder System : Analysis Output : Reactions - Girder  3
Fri Jan 16 11:10:08 2015


Girder 3 Service Vertical Reactions - kN

    Supp/Node    Noncomp    Super-    Max      Min        Sidewalk
                 Dead       Imposed   Live+    Live+     Max     Min
                            Dead      Impact   Impact

  Governing

      1    3    175.91      78.99    143.39     -3.88   21.57    -2.47
         Steel     57.73
         Concrete 118.18

    Global x concurrent LL+I rot.   0.0114   -0.0017 deg
    Global y concurrent LL+I rot.   0.0357   -0.0057 deg

        Max LL+I Contribution by Lane
             1         2
          140.28      3.11

        Concurrent reactions using same governing loaded lanes
        as for Max LL+I and Min LL+I

         Concurrent at gdr  1 -      -8.16

         Concurrent at gdr  2 -      16.21

         Concurrent at gdr  4 -     152.31

         Concurrent at gdr  5 -      88.59

         Concurrent at gdr  6 -      72.57

         Concurrent at gdr  7 -     109.89

      2   34    542.98     229.01    246.26    -18.94   47.26    -4.77
         Steel    176.87
         Concrete 366.11

    Global x concurrent LL+I rot.   0.0005   -0.0016 deg
    Global y concurrent LL+I rot.   0.0131   -0.0143 deg

        Max LL+I Contribution by Lane
             1         2
          221.36     24.90

        Concurrent reactions using same governing loaded lanes
        as for Max LL+I and Min LL+I

         Concurrent at gdr  1 -      32.11

         Concurrent at gdr  2 -      96.53

         Concurrent at gdr  4 -     284.59

         Concurrent at gdr  5 -     287.15
```

```
     Concurrent at gdr  6 -     310.57

     Concurrent at gdr  7 -     155.05


  3   83     561.47    240.89    243.72    -11.88   51.79    -4.32
     Steel    182.95
     Concrete 378.52


Global x concurrent LL+I rot.   0.0035   -0.0036 deg
Global y concurrent LL+I rot.   0.0140   -0.0123 deg


    Max LL+I Contribution by Lane
         1          2
      222.05      21.68


    Concurrent reactions using same governing loaded lanes
    as for Max LL+I and Min LL+I


     Concurrent at gdr  1 -      22.16

     Concurrent at gdr  2 -      92.21

     Concurrent at gdr  4 -     284.49

     Concurrent at gdr  5 -     292.95

     Concurrent at gdr  6 -     284.14

     Concurrent at gdr  7 -     211.41


  4  132     202.28     87.85    157.91     -7.72   19.57    -2.45
     Steel      66.30
     Concrete 135.98


Global x concurrent LL+I rot.   0.0098   -0.0017 deg
Global y concurrent LL+I rot.  -0.0207   -0.0233 deg


    Max LL+I Contribution by Lane
         1          2
      144.27      13.65


    Concurrent reactions using same governing loaded lanes
    as for Max LL+I and Min LL+I


     Concurrent at gdr  1 -       4.25

     Concurrent at gdr  2 -      33.69

     Concurrent at gdr  4 -     172.78

     Concurrent at gdr  5 -     148.89

     Concurrent at gdr  6 -     135.22

     Concurrent at gdr  7 -      96.93


Truck Loading

  1    3                        143.39     -3.75
  2   34                        197.06    -18.06
  3   83                        197.82    -11.33
  4  132                        157.67     -7.58
```

Lane Loading

1	3	116.41	-3.88
2	34	246.26	-18.94
3	83	243.72	-11.88
4	132	133.53	-7.72

Fatigue Truck

1	3	100.23	-2.79
2	34	132.93	-13.69
3	83	131.75	-8.56
4	132	103.87	-5.54

Support Rotations - Degrees

About global axes used in Girder Geometry table

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		x-axis	y-axis	x-axis	y-axis	x-axis	y-axis
1	3	-0.07	0.24	-0.02	0.07	(0.00 to 0.02)	(-0.02 to 0.06)
Concurrent live vertical reaction						-1.93 52.35	-1.93 70.72
2	34	0.01	-0.08	0.00	-0.03	(0.00 to 0.00)	(-0.04 to 0.04)
Concurrent live vertical reaction						108.60 -10.19	131.93 122.70
3	83	0.02	0.09	0.01	0.03	(-0.01 to 0.01)	(-0.03 to 0.04)
Concurrent live vertical reaction						133.38 97.17	112.20 133.38
4	132	-0.07	-0.28	-0.02	-0.08	(0.00 to 0.02)	(-0.07 to 0.02)
Concurrent live vertical reaction						-4.29 70.20	85.99 -4.29

Noncomp dead end reactions do not include weight of girder extensions.

Torsional and flexural rotations - member local axes

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		tors	flex	tors	flex	tors	flex
1	3	0.00	0.25	0.00	0.08	(-0.01 to 0.03)	(-0.01 to 0.05)
2	34	0.02	-0.08	0.01	-0.02	(0.00 to 0.00)	(-0.04 to 0.04)
3	83	0.00	0.09	0.00	0.03	(0.00 to 0.00)	(-0.04 to 0.04)
4	132	0.00	-0.29	0.00	-0.09	(0.01 to 0.01)	(-0.06 to 0.02)

Noncomp dead end reactions do not include weight of girder extensions.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder System : Analysis Output : Reactions - Girder 4
Fri Jan 16 11:10:24 2015

Girder 4 Service Vertical Reactions - kN

Supp/Node		Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min

Governing

Supp	Node	Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min
1	4	192.71	70.17	157.70	-6.45	12.66	-2.37
	Steel	63.13					
	Concrete	129.58					

Global x concurrent LL+I rot. 0.0170 -0.0024 deg
Global y concurrent LL+I rot. 0.0565 -0.0083 deg

Max LL+I Contribution by Lane

1	2
136.39	21.30

Concurrent reactions using same governing loaded lanes as for Max LL+I and Min LL+I

Concurrent at gdr 1 - -11.92

Concurrent at gdr 2 - 13.26

Concurrent at gdr 3 - 95.44

Concurrent at gdr 5 - 177.27

Concurrent at gdr 6 - 132.02

Concurrent at gdr 7 - 130.17

Supp	Node	Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min
2	41	569.56	195.95	288.79	-21.45	16.45	-2.46
	Steel	185.42					
	Concrete	384.14					

Global x concurrent LL+I rot. 0.0006 -0.0022 deg
Global y concurrent LL+I rot. 0.0177 -0.0197 deg

Max LL+I Contribution by Lane

1	2
215.15	73.64

Concurrent reactions using same governing loaded lanes as for Max LL+I and Min LL+I

Concurrent at gdr 1 - 20.03

Concurrent at gdr 2 - 79.43

Concurrent at gdr 3 - 191.54

Concurrent at gdr 5 - 338.90

```
      Concurrent at gdr  6 -     335.80

      Concurrent at gdr  7 -     162.34


   3   90     562.60    193.50    284.61    -17.56   19.65    -3.69
      Steel     183.07
      Concrete 379.53


 Global x concurrent LL+I rot.  0.0045   -0.0047 deg
 Global y concurrent LL+I rot.  0.0177   -0.0162 deg


     Max LL+I Contribution by Lane
          1         2
       219.56     65.06


     Concurrent reactions using same governing loaded lanes
     as for Max LL+I and Min LL+I


      Concurrent at gdr  1 -      13.16

      Concurrent at gdr  2 -      71.89

      Concurrent at gdr  3 -     186.23

      Concurrent at gdr  5 -     341.77

      Concurrent at gdr  6 -     305.10

      Concurrent at gdr  7 -     221.17


   4  139     204.88     73.68    172.99    -10.48    8.64    -1.71
      Steel      67.08
      Concrete 137.81


 Global x concurrent LL+I rot.  0.0162   -0.0021 deg
 Global y concurrent LL+I rot. -0.0402   -0.0298 deg


     Max LL+I Contribution by Lane
          1         2
       138.84     34.14


     Concurrent reactions using same governing loaded lanes
     as for Max LL+I and Min LL+I


      Concurrent at gdr  1 -      -7.63

      Concurrent at gdr  2 -      22.76

      Concurrent at gdr  3 -     108.87

      Concurrent at gdr  5 -     181.26

      Concurrent at gdr  6 -     130.01

      Concurrent at gdr  7 -      91.76


Truck Loading

   1    4                       157.70     -6.26
   2   41                       217.28    -20.61
   3   90                       215.76    -17.03
   4  139                       172.99    -10.17
```

Lane Loading

1	4	132.41	-6.45
2	41	288.79	-21.45
3	90	284.61	-17.56
4	139	149.69	-10.48

Fatigue Truck

1	4	98.49	-4.74
2	41	126.44	-15.61
3	90	126.97	-12.87
4	139	99.91	-7.72

Support Rotations - Degrees

About global axes used in Girder Geometry table

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		x-axis	y-axis	x-axis	y-axis	x-axis	y-axis
1	4	-0.08	0.28	-0.02	0.08	(-0.01 to 0.02)	(-0.02 to 0.08)
	Concurrent live vertical reaction					-3.55 88.24	-3.55 88.24
2	41	0.01	-0.10	0.00	-0.03	(-0.01 to 0.00)	(-0.06 to 0.05)
	Concurrent live vertical reaction					132.05 -11.62	161.48 144.71
3	90	0.03	0.09	0.01	0.03	(-0.01 to 0.01)	(-0.05 to 0.05)
	Concurrent live vertical reaction					161.72 139.99	136.82 162.37
4	139	-0.07	-0.28	-0.02	-0.08	(-0.01 to 0.02)	(-0.08 to 0.02)
	Concurrent live vertical reaction					-5.77 107.96	103.97 -5.77

Noncomp dead end reactions do not include weight of girder extensions.

Torsional and flexural rotations - member local axes

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		tors	flex	tors	flex	tors	flex
1	4	0.00	0.29	0.00	0.08	(-0.01 to 0.05)	(-0.02 to 0.08)
2	41	0.02	-0.10	0.01	-0.03	(0.00 to 0.00)	(-0.06 to 0.05)
3	90	0.00	0.10	0.00	0.03	(0.00 to 0.00)	(-0.05 to 0.05)
4	139	0.00	-0.29	0.00	-0.08	(0.02 to 0.02)	(-0.08 to 0.03)

Noncomp dead end reactions do not include weight of girder extensions.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder System : Analysis Output : Reactions - Girder 5
Fri Jan 16 11:10:34 2015

Girder 5 Service Vertical Reactions - kN

Supp/Node		Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min

Governing

Supp	Node	Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min
1	5	213.86	75.00	204.92	-12.61	6.44	-1.83

Steel 70.10
Concrete 143.76

Global x concurrent LL+I rot. 0.0152 -0.0035 deg
Global y concurrent LL+I rot. 0.0533 -0.0117 deg

Max LL+I Contribution by Lane

1	2
97.68	107.25

Concurrent reactions using same governing loaded lanes
as for Max LL+I and Min LL+I

Concurrent at gdr 1 - -9.05

Concurrent at gdr 2 - 13.97

Concurrent at gdr 3 - 95.00

Concurrent at gdr 4 - 151.46

Concurrent at gdr 6 - 165.17

Concurrent at gdr 7 - 120.03

Supp	Node	Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min
2	48	593.02	202.94	341.86	-22.26	4.68	-1.18

Steel 193.38
Concrete 399.64

Global x concurrent LL+I rot. 0.0007 -0.0027 deg
Global y concurrent LL+I rot. 0.0223 -0.0257 deg

Max LL+I Contribution by Lane

1	2
155.62	186.24

Concurrent reactions using same governing loaded lanes
as for Max LL+I and Min LL+I

Concurrent at gdr 1 - 20.17

Concurrent at gdr 2 - 80.14

Concurrent at gdr 3 - 193.21

Concurrent at gdr 4 - 288.79

Concurrent at gdr 6 - 338.89

Concurrent at gdr 7 - 163.81

```
  3   97     558.66     184.79     342.85     -28.02     5.32     -2.71
      Steel     182.01
      Concrete 376.65
```

```
Global x concurrent LL+I rot.   0.0053   -0.0056 deg
Global y concurrent LL+I rot.   0.0207   -0.0196 deg
```

```
    Max LL+I Contribution by Lane
         1         2
      163.06    179.79
```

Concurrent reactions using same governing loaded lanes as for Max LL+I and Min LL+I

Concurrent at gdr 1 - 13.20

Concurrent at gdr 2 - 72.08

Concurrent at gdr 3 - 186.78

Concurrent at gdr 4 - 284.61

Concurrent at gdr 6 - 306.12

Concurrent at gdr 7 - 222.00

```
  4  146    205.32     72.27     206.59    -13.33     2.66     -0.94
     Steel      67.30
     Concrete 138.03
```

```
Global x concurrent LL+I rot.   0.0133   -0.0026 deg
Global y concurrent LL+I rot.  -0.0406   -0.0340 deg
```

```
    Max LL+I Contribution by Lane
         1         2
       95.14    111.45
```

Concurrent reactions using same governing loaded lanes as for Max LL+I and Min LL+I

Concurrent at gdr 1 - -5.23

Concurrent at gdr 2 - 21.72

Concurrent at gdr 3 - 102.91

Concurrent at gdr 4 - 159.07

Concurrent at gdr 6 - 162.52

Concurrent at gdr 7 - 96.24

Truck Loading

1	5	204.92	-12.26
2	48	245.58	-21.43
3	97	245.62	-27.04
4	146	206.59	-12.86

Lane Loading

1	5	177.21	-12.61
2	48	341.86	-22.26
3	97	342.85	-28.02
4	146	180.32	-13.33

Fatigue Truck

1	5	81.35	-9.30
2	48	100.72	-16.17
3	97	99.54	-20.39
4	146	80.94	-9.71

Support Rotations - Degrees

About global axes used in Girder Geometry table

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		x-axis	y-axis	x-axis	y-axis	x-axis	y-axis
1	5	-0.09	0.33	-0.03	0.09	(-0.01 to 0.03)	(-0.03 to 0.11)
	Concurrent live vertical reaction					-6.98 120.25	-6.98 120.25
2	48	0.01	-0.13	0.00	-0.04	(-0.01 to 0.00)	(-0.07 to 0.06)
	Concurrent live vertical reaction					159.96 -12.02	149.99 159.96
3	97	0.03	0.10	0.01	0.03	(-0.02 to 0.01)	(-0.05 to 0.06)
	Concurrent live vertical reaction					160.51 166.97	166.97 154.51
4	146	-0.08	-0.28	-0.02	-0.07	(-0.01 to 0.03)	(-0.10 to 0.03)
	Concurrent live vertical reaction					-7.26 123.45	123.45 -7.26

Noncomp dead end reactions do not include weight of girder extensions.

Torsional and flexural rotations - member local axes

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		tors	flex	tors	flex	tors	flex
1	5	0.00	0.34	0.00	0.10	(-0.02 to 0.06)	(-0.03 to 0.10)
2	48	0.02	-0.13	0.01	-0.04	(0.00 to 0.00)	(-0.07 to 0.06)
3	97	0.00	0.10	0.00	0.03	(0.00 to 0.00)	(-0.06 to 0.06)
4	146	0.00	-0.29	0.00	-0.08	(0.02 to 0.02)	(-0.09 to 0.03)

Noncomp dead end reactions do not include weight of girder extensions.

```
DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder System : Analysis Output : Reactions - Girder  6
Fri Jan 16 11:10:47 2015


Girder 6 Service Vertical Reactions - kN

    Supp/Node    Noncomp    Super-    Max       Min          Sidewalk
                 Dead       Imposed   Live+     Live+       Max     Min
                            Dead      Impact    Impact


  Governing

    1    6    235.47     85.60    184.54    -14.42    3.14    -1.46
       Steel     77.40
       Concrete 158.07


    Global x concurrent LL+I rot.   0.0166   -0.0047 deg
    Global y concurrent LL+I rot.   0.0593   -0.0165 deg


        Max LL+I Contribution by Lane
             1         2
           46.44    138.10


        Concurrent reactions using same governing loaded lanes
        as for Max LL+I and Min LL+I


         Concurrent at gdr  1 -      -4.34

         Concurrent at gdr  2 -      23.94

         Concurrent at gdr  3 -      78.85

         Concurrent at gdr  4 -     125.40

         Concurrent at gdr  5 -     178.36

         Concurrent at gdr  7 -     159.21


    2   55    722.54    301.81    348.13    -31.26    0.99    -3.60
       Steel    237.12
       Concrete 485.42


    Global x concurrent LL+I rot.   0.0009   -0.0025 deg
    Global y concurrent LL+I rot.   0.0278   -0.0331 deg


        Max LL+I Contribution by Lane
             1         2
           67.24    280.89


        Concurrent reactions using same governing loaded lanes
        as for Max LL+I and Min LL+I


         Concurrent at gdr  1 -      20.94

         Concurrent at gdr  2 -      78.74

         Concurrent at gdr  3 -     190.56

         Concurrent at gdr  4 -     286.92
```

```
 Concurrent at gdr  5 -     326.82

 Concurrent at gdr  7 -     188.01


3  104     550.61     207.13     307.99     -39.75     0.29     -3.58
   Steel     180.22
   Concrete 370.39


Global x concurrent LL+I rot.   0.0060    -0.0060 deg
Global y concurrent LL+I rot.   0.0221    -0.0221 deg


  Max LL+I Contribution by Lane
       1          2
     71.13     236.86


  Concurrent reactions using same governing loaded lanes
  as for Max LL+I and Min LL+I


   Concurrent at gdr  1 -      13.60

   Concurrent at gdr  2 -      71.29

   Concurrent at gdr  3 -     183.25

   Concurrent at gdr  4 -     278.89

   Concurrent at gdr  5 -     325.05

   Concurrent at gdr  7 -     248.13


4  153     202.72      77.10     178.79     -15.10     0.37     -1.07
   Steel      66.69
   Concrete 136.04


Global x concurrent LL+I rot.   0.0122    -0.0030 deg
Global y concurrent LL+I rot.  -0.0247    -0.0350 deg


  Max LL+I Contribution by Lane
       1          2
     37.51     141.28


  Concurrent reactions using same governing loaded lanes
  as for Max LL+I and Min LL+I


   Concurrent at gdr  1 -       2.20

   Concurrent at gdr  2 -      37.52

   Concurrent at gdr  3 -      88.07

   Concurrent at gdr  4 -     133.36

   Concurrent at gdr  5 -     179.41

   Concurrent at gdr  7 -     122.55


Truck Loading

    1    6                         184.23     -14.01
    2   55                         224.41     -30.13
    3  104                         213.28     -38.10
    4  153                         178.56     -14.48
```

Lane Loading

1	6	165.03	-14.42
2	55	348.13	-31.26
3	104	307.99	-39.75
4	153	160.15	-15.10

Fatigue Truck

1	6	104.56	-10.58
2	55	133.69	-22.72
3	104	127.36	-28.65
4	153	102.35	-10.96

Support Rotations - Degrees

About global axes used in Girder Geometry table

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		x-axis	y-axis	x-axis	y-axis	x-axis	y-axis
1	6	-0.11	0.39	-0.03	0.12	(-0.01 to 0.04)	(-0.05 to 0.14)
		Concurrent live vertical reaction				-7.91 87.17	-7.91 87.17
2	55	0.00	-0.16	0.00	-0.05	(-0.01 to 0.00)	(-0.09 to 0.08)
		Concurrent live vertical reaction				156.31 143.07	193.48 157.71
3	104	0.03	0.10	0.01	0.03	(-0.02 to 0.02)	(-0.06 to 0.06)
		Concurrent live vertical reaction				136.88 129.67	130.18 136.49
4	153	-0.08	-0.28	-0.02	-0.08	(-0.01 to 0.03)	(-0.10 to 0.03)
		Concurrent live vertical reaction				-8.18 115.11	115.11 -8.18

Noncomp dead end reactions do not include weight of girder extensions.

Torsional and flexural rotations - member local axes

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		tors	flex	tors	flex	tors	flex
1	6	0.00	0.41	0.00	0.13	(-0.02 to 0.07)	(-0.04 to 0.12)
2	55	0.02	-0.16	0.00	-0.05	(0.00 to 0.00)	(-0.09 to 0.08)
3	104	0.00	0.10	0.00	0.03	(0.00 to 0.00)	(-0.06 to 0.06)
4	153	0.00	-0.29	0.00	-0.08	(0.02 to 0.02)	(-0.10 to 0.04)

Noncomp dead end reactions do not include weight of girder extensions.

DISEñO VIGAS PUENTE AVE. MARISCAL - TRAMO 2
Girder System : Analysis Output : Reactions - Girder 7
Fri Jan 16 11:10:53 2015

Girder 7 Service Vertical Reactions - kN

Supp/Node		Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min

Governing

1	7	267.05	136.78	200.07	-35.50	0.36	-2.86
	Steel	88.30					
	Concrete	178.76					

Global x concurrent LL+I rot. 0.0215 -0.0075 deg
Global y concurrent LL+I rot. 0.0671 -0.0234 deg

Max LL+I Contribution by Lane

1	2
27.09	172.98

Concurrent reactions using same governing loaded lanes
as for Max LL+I and Min LL+I

Concurrent at gdr 1 - 6.09

Concurrent at gdr 2 - 27.95

Concurrent at gdr 3 - 80.39

Concurrent at gdr 4 - 124.64

Concurrent at gdr 5 - 143.87

Concurrent at gdr 6 - 164.42

2	56	450.61	250.68	240.87	-14.53	0.98	-3.89
	Steel	149.39					
	Concrete	301.22					

Global x concurrent LL+I rot. 0.0007 -0.0056 deg
Global y concurrent LL+I rot. 0.0200 -0.0470 deg

Max LL+I Contribution by Lane

1	2
11.34	229.52

Concurrent reactions using same governing loaded lanes
as for Max LL+I and Min LL+I

Concurrent at gdr 1 - 19.40

Concurrent at gdr 2 - 35.36

Concurrent at gdr 3 - 55.94

Concurrent at gdr 4 - 100.37

```
 Concurrent at gdr  5 -     179.32

 Concurrent at gdr  6 -     335.79


3  105     537.42    295.02    305.99    -63.58    1.06    -7.78
   Steel    178.27
   Concrete 359.15


Global x concurrent LL+I rot.   0.0077   -0.0070 deg
Global y concurrent LL+I rot.   0.0254   -0.0269 deg


    Max LL+I Contribution by Lane
        1         2
      13.74    292.26


    Concurrent reactions using same governing loaded lanes
    as for Max LL+I and Min LL+I


     Concurrent at gdr  1 -      14.43

     Concurrent at gdr  2 -      71.22

     Concurrent at gdr  3 -     175.58

     Concurrent at gdr  4 -     263.79

     Concurrent at gdr  5 -     287.86

     Concurrent at gdr  6 -     307.99


4  154     201.07    104.64    161.34    -23.22    1.33    -5.31
   Steel     66.68
   Concrete 134.39


Global x concurrent LL+I rot.   0.0143   -0.0039 deg
Global y concurrent LL+I rot.  -0.0348   -0.0387 deg


    Max LL+I Contribution by Lane
        1         2
       7.57    153.77


    Concurrent reactions using same governing loaded lanes
    as for Max LL+I and Min LL+I


     Concurrent at gdr  1 -       2.28

     Concurrent at gdr  2 -      36.78

     Concurrent at gdr  3 -      86.41

     Concurrent at gdr  4 -     127.74

     Concurrent at gdr  5 -     148.31

     Concurrent at gdr  6 -     177.96


Truck Loading

  1    7                      195.79    -34.48
  2   56                      174.05    -13.20
  3  105                      183.15    -58.37
  4  154                      160.61    -21.68
```

Lane Loading

1	7	200.07	-35.50
2	56	240.66	-14.53
3	105	305.99	-63.58
4	154	153.42	-23.22

Fatigue Truck

1	7	130.31	-26.08
2	56	122.48	-9.49
3	105	130.50	-43.90
4	154	114.03	-16.33

Support Rotations - Degrees

About global axes used in Girder Geometry table

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		x-axis	y-axis	x-axis	y-axis	x-axis	y-axis
1	7	-0.13	0.48	-0.05	0.16	(-0.02 to 0.06)	(-0.07 to 0.19)
	Concurrent live vertical reaction					-19.58 149.01	-19.51 148.69
2	56	0.04	-0.21	0.02	-0.07	(-0.02 to 0.00)	(-0.13 to 0.11)
	Concurrent live vertical reaction					118.37 -6.45	106.84 116.86
3	105	0.03	0.11	0.01	0.03	(-0.02 to 0.02)	(-0.08 to 0.07)
	Concurrent live vertical reaction					139.70 153.40	152.72 139.70
4	154	-0.08	-0.28	-0.03	-0.09	(-0.01 to 0.03)	(-0.11 to 0.04)
	Concurrent live vertical reaction					-12.19 123.65	122.06 -12.15

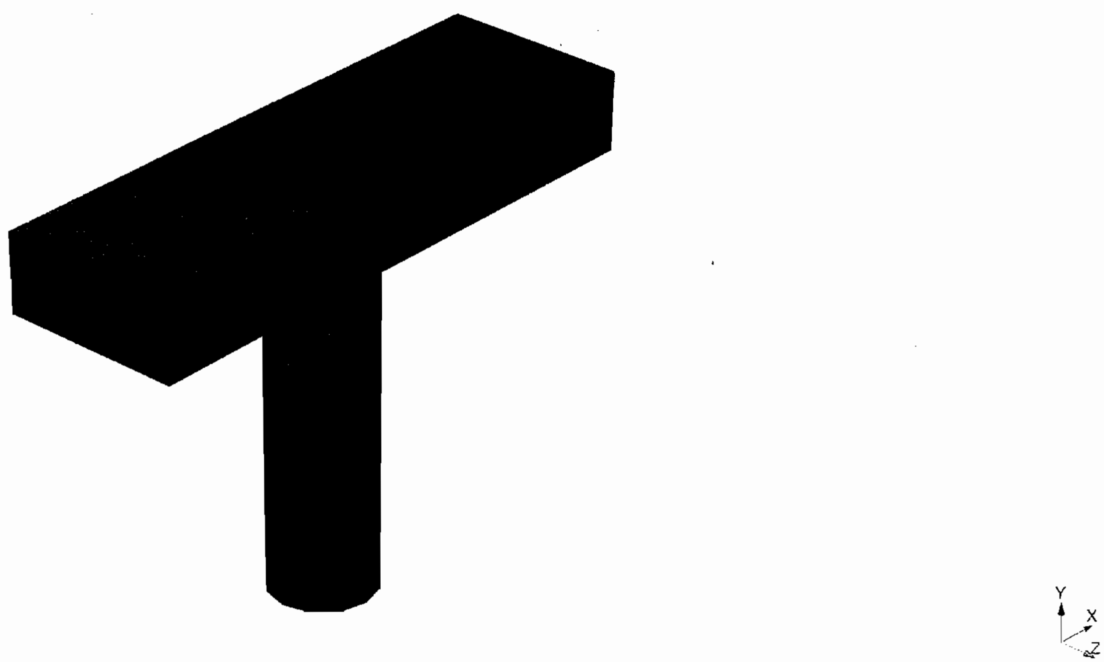
Noncomp dead end reactions do not include weight of girder extensions.

Torsional and flexural rotations - member local axes

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		tors	flex	tors	flex	tors	flex
1	7	0.00	0.50	0.00	0.17	(-0.04 to 0.11)	(-0.06 to 0.16)
2	56	0.06	-0.20	0.03	-0.06	(0.00 to -0.01)	(-0.13 to 0.11)
3	105	0.00	0.11	0.00	0.03	(0.00 to 0.00)	(-0.08 to 0.07)
4	154	0.00	-0.29	0.00	-0.10	(0.02 to 0.02)	(-0.11 to 0.04)

Noncomp dead end reactions do not include weight of girder extensions.

Current Date: 17/01/2015 01:55 p.m.
Units system: Metric
File name: Z:\proyectos\Puente Ave. Mariscal - Cd. Juarez\Calculo\Diseño Pila 3 - 2.etz\



Current Date: 17/01/2015 01:57 p.m.
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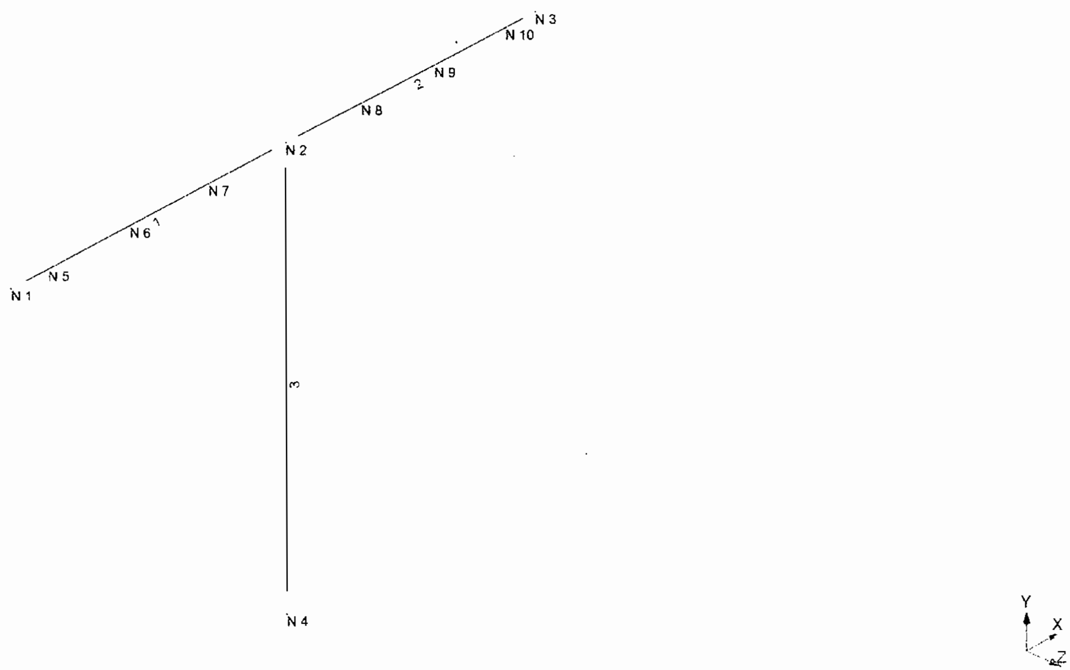


Bentley

Current Date: 17/01/2015 01:59 p.m.
Units system: Metric
File name: Z:\proyectos\Puente Ave. Mariscal - Cd. Juarez\Calculo\Diseño Pila 3 - 2.etz\

Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [m]	Y [m]	Z [m]	Rigid Floor
1	-5.50	5.71	0.00	0
2	0.00	5.71	0.00	0
3	5.50	5.71	0.00	0
4	0.00	-1.00	0.00	0
5	-4.80	5.71	0.00	0
6	-3.20	5.71	0.00	0
7	-1.60	5.71	0.00	0
8	1.60	5.71	0.00	0
9	3.20	5.71	0.00	0
10	4.80	5.71	0.00	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
4	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [cm]	dL [cm]	Ig factor
1	1	2	Cabezal	VigaConR 350X150	C 250-4200	0.00	0.00	0.35
2	2	3	Cabezal	VigaConR 350X150	C 250-4200	0.00	0.00	0.35
3	4	2	Columna	ColConC 200	C 250-4200	0.00	0.00	0.70

Bentley

Current Date: 17/01/2015 02:00 p.m.
Units system: Metric
File name: Z:\proyectos\Puente Ave. Mariscal - Cd. Juarez\Calculo\Diseño Pila 3 - 2.etz\

Load data

GLOSSARY

Comb : Indicates if load condition is a load combination

Load conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
L1	Carga Viva Carril 1	No	LL
L2	Carga Viva Carril 2	No	LL
L3	Carga Viva Carriles 1 - 2	No	LL
LF1	Frenaje Carril 1	No	LF
LF2	Frenaje Carril 2	No	LF
LF3	Frenaje Carriles 1 - 2	No	LF
RST	Contraccion y Temperatura	No	RST
WE	Viento en la Estructura	No	WE
WL	Viento en la Carga Viva	No	WL
EQx	Seismic in X	No	EQX
EQz	Seismic in Z	No	EQZ

Masses

Node	TX [Ton]	TY [Ton]	TZ [Ton]	RX [Ton*m2]	RY [Ton*m2]	RZ [Ton*m2]
2	114.02	0.00	246.29	0.00	0.00	0.00
5	110.45	0.00	255.04	0.00	0.00	0.00
6	89.72	0.00	230.55	0.00	0.00	0.00
7	98.85	0.00	236.20	0.00	0.00	0.00
8	101.30	0.00	234.82	0.00	0.00	0.00
9	124.58	0.00	263.07	0.00	0.00	0.00
10	90.39	0.00	247.57	0.00	0.00	0.00

Load on nodes

Condition	Node	FX [Ton]	FY [Ton]	FZ [Ton]	MX [Ton*m]	MY [Ton*m]	MZ [Ton*m]
DL	2	0.00	-78.03	0.00	0.00	0.00	0.00
	5	0.00	-91.55	0.00	0.00	0.00	0.00
	6	0.00	-69.56	0.00	0.00	0.00	0.00
	7	0.00	-78.69	0.00	0.00	0.00	0.00
	8	0.00	-81.14	0.00	0.00	0.00	0.00
	9	0.00	-104.42	0.00	0.00	0.00	0.00
	10	0.00	-71.49	0.00	0.00	0.00	0.00
L1	2	0.00	-21.93	0.00	0.00	0.00	0.00

	5	0.00	-2.87	0.00	0.00	0.00	0.00
	6	0.00	-9.19	0.00	0.00	0.00	0.00
	7	0.00	-22.56	0.00	0.00	0.00	0.00
	8	0.00	-15.86	0.00	0.00	0.00	0.00
	9	0.00	-6.85	0.00	0.00	0.00	0.00
	10	0.00	-1.16	0.00	0.00	0.00	0.00
L2	2	0.00	-7.51	0.00	0.00	0.00	0.00
	5	0.00	-0.40	0.00	0.00	0.00	0.00
	6	0.00	-0.65	0.00	0.00	0.00	0.00
	7	0.00	-2.59	0.00	0.00	0.00	0.00
	8	0.00	-18.98	0.00	0.00	0.00	0.00
	9	0.00	-28.63	0.00	0.00	0.00	0.00
	10	0.00	-23.40	0.00	0.00	0.00	0.00
L3	2	0.00	-29.44	0.00	0.00	0.00	0.00
	5	0.00	-3.27	0.00	0.00	0.00	0.00
	6	0.00	-9.84	0.00	0.00	0.00	0.00
	7	0.00	-25.10	0.00	0.00	0.00	0.00
	8	0.00	-34.85	0.00	0.00	0.00	0.00
	9	0.00	-35.49	0.00	0.00	0.00	0.00
	10	0.00	-24.55	0.00	0.00	0.00	0.00
LF1	2	0.00	0.00	2.28	9.60	0.00	0.00
	7	0.00	0.00	2.28	9.60	0.00	0.00
	8	0.00	0.00	2.28	9.60	0.00	0.00
LF2	8	0.00	0.00	2.28	9.60	0.00	0.00
	9	0.00	0.00	2.28	9.60	0.00	0.00
	10	0.00	0.00	2.28	9.60	0.00	0.00
LF3	2	0.00	0.00	2.28	9.60	0.00	0.00
	7	0.00	0.00	2.28	9.60	0.00	0.00
	8	0.00	0.00	2.28	9.60	0.00	0.00
	9	0.00	0.00	2.28	9.60	0.00	0.00
	10	0.00	0.00	2.28	9.60	0.00	0.00
WE	2	27.283	0.00	0.00	0.00	0.00	-51.98
WL	2	5.55	0.00	0.00	0.00	0.00	-23.643

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
L1	Carga Viva Carril 1	No	0.00	0.00	0.00
L2	Carga Viva Carril 2	No	0.00	0.00	0.00
L3	Carga Viva Carriles 1 - 2	No	0.00	0.00	0.00
LF1	Frenaje Carril 1	No	0.00	0.00	0.00
LF2	Frenaje Carril 2	No	0.00	0.00	0.00
LF3	Frenaje Carriles 1 - 2	No	0.00	0.00	0.00
RST	Contraccion y Temperatura	No	0.00	0.00	0.00
WE	Viento en la Estructura	No	0.00	0.00	0.00
WL	Viento en la Carga Viva	No	0.00	0.00	0.00
EQx	Seismic in X	No	0.00	0.00	0.00
EQz	Seismic in Z	No	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
L1	0.00	0.00	0.00
L2	0.00	0.00	0.00
L3	0.00	0.00	0.00
LF1	0.00	0.00	0.00
LF2	0.00	0.00	0.00
LF3	0.00	0.00	0.00
RST	0.00	0.00	0.00
WE	0.00	0.00	0.00
WL	0.00	0.00	0.00
EQx	0.50	0.00	5.00
EQz	0.50	-90.00	5.00

Response spectrum

T [Sec]	a/g
0.00	0.04
0.30	0.16
1.50	0.16
2.00	0.132
2.50	0.114
3.00	0.101
3.50	0.091
4.00	0.083
4.50	0.077
5.00	0.072
5.50	0.067
6.00	0.063

Unable to read file "<spectrum>"

Current Date: 17/01/2015 02:03 p.m.
Units system: Metric
File name: Z:\proyectos\Puente Ave. Mariscal - Cd. Juarez\Calculo\Diseño Pila 3 - 2.etz\

Seismic analysis

Modal analysis

MASSES:

Node	Mass X [Ton]	Mass Y [Ton]	Mass Z [Ton]	MMI.xx [Ton*m2]	MMI.yy [Ton*m2]	MMI.zz [Ton*m2]
2	114.02	0.00	246.29	0.00	0.00	0.00
5	110.45	0.00	255.04	0.00	0.00	0.00
6	89.72	0.00	230.55	0.00	0.00	0.00
7	98.85	0.00	236.20	0.00	0.00	0.00
8	101.30	0.00	234.82	0.00	0.00	0.00
9	124.58	0.00	263.07	0.00	0.00	0.00
10	90.39	0.00	247.57	0.00	0.00	0.00

MODE FREQUENCIES

MODE	W [RAD/SEC]	T [SEC]
1	2.47	2.54300
2	8.42	0.74656
3	12.99	0.48360
4	93.28	0.06736
5	226.13	0.02779

MASS PARTICIPATION PERCENTAGE

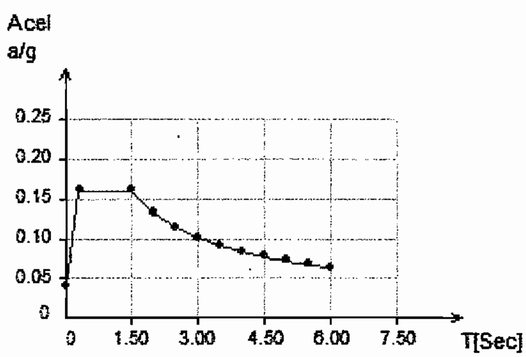
	Modal participation					
MODE	Part.X	Part.Y	Part.Z	Rot.X	Rot.Y	Rot.Z
1	0.00	0.00	0.02	0.00	0.00	0.00
2	0.00	0.00	99.97	0.00	0.00	0.00
3	100.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.01	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL:	100.00	0.00	100.00	0.00	0.00	0.00

TOTAL MASS

DOF	Total mass [Ton/m*Sec2]
TX	74.42
TY	0.00
TZ	174.85
RX	0.00
RY	0.00
RZ	0.00

SEISMIC RESPONSE SPECTRUM

T[Sec]	a/g
0.00000	0.04
0.30000	0.16
1.50000	0.16
2.00000	0.13
2.50000	0.11
3.00000	0.10
3.50000	0.09
4.00000	0.08
4.50000	0.08
5.00000	0.07
5.50000	0.07
6.00000	0.06



Condition	= **EQx=Seismic in X**
Scale Factor	= 0.50
Damping factor	= 5.00

COMPUTED SPECTRAL VALUES

MODE	W [RAD/SEC]	T [SEC]	a [m/Sec2]
1	2.47	2.54300	0.55
2	8.42	0.74656	0.78
3	12.99	0.48360	0.78
4	93.28	0.06736	0.33
5	226.13	0.02779	0.25

Condition	= **EQz=Seismic in Z**
Scale Factor	= 0.50
Damping factor	= 5.00

COMPUTED SPECTRAL VALUES

MODE	W [RAD/SEC]	T [SEC]	a [m/Sec2]
1	2.47	2.54300	0.55
2	8.42	0.74656	0.78
3	12.99	0.48360	0.78
4	93.28	0.06736	0.33
5	226.13	0.02779	0.25

MODAL SHAPES

Normalized displacements to Phi*M*Phi=1

Modal shapes : 1

W = 2.47 [RAD/SEC] **PERIOD** = 2.54300 [SEC]

DISPLACEMENTS

Node	Trans.X [phi]	Trans.Y [phi]	Trans.Z [phi]	Rot.X [phiRot]	Rot.Y [phiRot]	Rot.Z [phiRot]
2	0.00E+00	0.00E+00	8.38E-05	1.81E-05	-2.34E-02	0.00E+00
5	0.00E+00	0.00E+00	-1.12E-01	1.81E-05	-2.35E-02	0.00E+00
6	0.00E+00	0.00E+00	-7.49E-02	1.81E-05	-2.34E-02	0.00E+00
7	0.00E+00	0.00E+00	-3.74E-02	1.81E-05	-2.34E-02	0.00E+00
8	0.00E+00	0.00E+00	3.76E-02	1.81E-05	-2.34E-02	0.00E+00
9	0.00E+00	0.00E+00	7.51E-02	1.81E-05	-2.34E-02	0.00E+00
10	0.00E+00	0.00E+00	1.13E-01	1.81E-05	-2.35E-02	0.00E+00

Modal shapes : 2

W = 8.42 [RAD/SEC] **PERIOD** = 0.74656 [SEC]

DISPLACEMENTS

Node	Trans.X [phi]	Trans.Y [phi]	Trans.Z [phi]	Rot.X [phiRot]	Rot.Y [phiRot]	Rot.Z [phiRot]
2	0.00E+00	0.00E+00	7.45E-02	1.61E-02	3.03E-04	0.00E+00
5	0.00E+00	0.00E+00	7.81E-02	1.61E-02	8.56E-04	0.00E+00
6	0.00E+00	0.00E+00	7.67E-02	1.61E-02	8.15E-04	0.00E+00
7	0.00E+00	0.00E+00	7.54E-02	1.61E-02	6.55E-04	0.00E+00
8	0.00E+00	0.00E+00	7.45E-02	1.61E-02	-4.69E-05	0.00E+00
9	0.00E+00	0.00E+00	7.48E-02	1.61E-02	-2.03E-04	0.00E+00
10	0.00E+00	0.00E+00	7.52E-02	1.61E-02	-2.41E-04	0.00E+00

Modal shapes : 3

W = 12.99 [RAD/SEC] **PERIOD** = 0.48360 [SEC]

DISPLACEMENTS

Node	Trans.X [phi]	Trans.Y [phi]	Trans.Z [phi]	Rot.X [phiRot]	Rot.Y [phiRot]	Rot.Z [phiRot]
2	1.16E-01	3.26E-17	1.55E-24	3.33E-25	4.26E-24	-2.50E-02
5	1.16E-01	1.20E-01	4.26E-24	3.33E-25	6.83E-24	-2.50E-02
6	1.16E-01	7.99E-02	-1.31E-23	3.33E-25	-6.13E-25	-2.50E-02
7	1.16E-01	4.00E-02	1.11E-23	3.33E-25	-2.33E-24	-2.50E-02
8	1.16E-01	-4.00E-02	-1.31E-23	3.33E-25	-1.44E-24	-2.50E-02
9	1.16E-01	-7.99E-02	1.14E-23	3.33E-25	-1.03E-24	-2.50E-02
10	1.16E-01	-1.20E-01	-4.12E-24	3.33E-25	5.96E-24	-2.50E-02

Modal shapes : 4

W = 93.28 [RAD/SEC] **PERIOD =** 0.06736 [SEC]

DISPLACEMENTS

Node	Trans.X [phi]	Trans.Y [phi]	Trans.Z [phi]	Rot.X [phiRot]	Rot.Y [phiRot]	Rot.Z [phiRot]
2	1.63E-22	2.39E-35	9.70E-02	2.09E-02	2.30E-04	-3.51E-23
5	8.50E-21	1.68E-22	-1.02E-01	2.09E-02	-5.62E-02	-3.51E-23
6	6.71E-21	1.12E-22	-6.06E-03	2.09E-02	-4.96E-02	-3.51E-23
7	3.79E-21	5.61E-23	6.88E-02	2.09E-02	-2.96E-02	-3.51E-23
8	-3.47E-21	-5.61E-23	6.80E-02	2.09E-02	2.99E-02	-3.51E-23
9	-6.41E-21	-1.12E-22	-7.33E-03	2.09E-02	4.98E-02	-3.51E-23
10	-7.79E-21	-1.68E-22	-1.03E-01	2.09E-02	5.63E-02	-3.51E-23

Modal shapes : 5

W = 226.13 [RAD/SEC] **PERIOD** = 0.02779 [SEC]

DISPLACEMENTS

Node	Trans.X [phi]	Trans.Y [phi]	Trans.Z [phi]	Rot.X [phiRot]	Rot.Y [phiRot]	Rot.Z [phiRot]
2	9.17E-20	-1.53E-35	-1.66E-03	-3.58E-04	-4.51E-02	-1.98E-20
5	-4.86E-19	9.50E-20	7.22E-02	-3.58E-04	7.29E-02	-1.98E-20
6	2.21E-19	6.33E-20	-6.81E-02	-3.58E-04	4.55E-02	-1.98E-20
7	5.66E-19	3.17E-20	-1.00E-01	-3.58E-04	-1.34E-02	-1.98E-20
8	-5.36E-19	-3.17E-20	9.84E-02	-3.58E-04	-1.38E-02	-1.98E-20
9	-2.12E-19	-6.33E-20	6.77E-02	-3.58E-04	4.69E-02	-1.98E-20
10	4.68E-19	-9.50E-20	-7.88E-02	-3.58E-04	7.60E-02	-1.98E-20

BASE REACTIONS

Condition : EQx=Seismic in X

	Shear [Ton]		Moment [Ton*m]		
Mode	**In X**	**In Z**	**Mxx**	**Mzz**	**Myy**
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	-58.34	0.00	0.00	333.15	0.00
4	0.00	0.00	0.00	0.00	0.00

5	0.00	0.00	0.00	0.00	0.00
Modal comb.	58.34	0.00	0.00	333.15	0.00

Condition : EQz=Seismic in Z

	Shear [Ton]		Moment [Ton*m]		
Mode	**In X**	**In Z**	**Mxx**	**Mzz**	**Myy**
1	0.00	-0.02	-0.09	0.00	4.07
2	0.00	-137.04	-782.52	0.00	-0.49
3	0.00	0.00	0.00	0.00	0.00
4	0.00	-0.01	-0.04	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
Modal comb.	0.00	137.04	782.52	0.00	4.10

Bentley

Current Date: 17/01/2015 11:07 a.m.
Units system: Metric
File name: Z:\proyectos\Puente Ave. Mariscal - Cd. Juarez\Calculo\Diseño Pila 3 - 2.etz\

Analysis result

Forces envelope

Note.- lc is the controlling load condition
Forces envelope for :

DC1=1.3DL+2.17L1
DC2=1.3DL+2.17L2
DC3=1.3DL+2.17L3
DC4=1.3DL+1.3WE
DC5=1.3DL-1.3WE
DC6=1.3DL+1.3L1+0.39WE+1.3WL+1.3LF1
DC8=1.3DL+1.3L2+0.39WE+1.3WL+1.3LF2
DC12=1.3DL+1.3L3+0.39WE+1.3WL+1.3LF3
DC15=1.3DL+1.3L1-0.39WE-1.3WL+1.3LF1
DC17=1.3DL+1.3L2-0.39WE-1.3WL+1.3LF2
DC21=1.3DL+1.3L3-0.39WE-1.3WL+1.3LF3
DC24=1.3DL+1.3L1+1.3RST
DC25=1.3DL+1.3L2+1.3RST
DC26=1.3DL+1.3L3+1.3RST
DC27=1.25DL+1.25WE+1.25RST
DC28=1.25DL-1.25WE+1.25RST
DC29=1.25DL+1.25L1+0.375WE+1.25WL+1.25LF1+1.25RST
DC31=1.25DL+1.25L2+0.375WE+1.25WL+1.25LF2+1.25RST
DC35=1.25DL+1.25L3+0.375WE+1.25WL+1.25LF3+1.25RST
DC38=1.25DL+1.25L1-0.375WE-1.25WL+1.25LF1+1.25RST
DC40=1.25DL+1.25L2-0.375WE-1.25WL+1.25LF2+1.25RST
DC44=1.25DL+1.25L3-0.375WE-1.25WL+1.25LF3+1.25RST
DC47=1.3DL+1.3EQx+0.39EQz
DC48=1.3DL+1.3EQx-0.39EQz
DC49=1.3DL-1.3EQx+0.39EQz
DC50=1.3DL-1.3EQx-0.39EQz
DC51=1.3DL+1.3EQz+0.39EQx
DC52=1.3DL+1.3EQz-0.39EQx
DC53=1.3DL-1.3EQz+0.39EQx
DC54=1.3DL-1.3EQz-0.39EQx

MEMBER 1

Station		Axial [Ton]	lc	Shear V2 [Ton]	lc	Shear V3 [Ton]	lc	Torsion [Ton*m]	lc	M22 [Ton*m]	lc	M33 [Ton*m]	lc
0%	Max	0.00	DC1	0.00	DC3	0.00	DC1	0.00	DC1	0.00	DC1	0.00	DC2
	Min	0.00	DC1	0.00	DC40	0.00	DC1	0.00	DC1	0.00	DC1	0.00	DC3
10%	Max	0.00	DC1	-8.66	DC35	0.00	DC1	0.00	DC1	0.00	DC1	-2.38	DC27
	Min	0.00	DC1	-9.01	DC17	0.00	DC1	0.00	DC1	0.00	DC1	-2.48	DC5
20%	Max	11.49	DC49	-131.76	DC27	27.30	DC51	0.00	DC1	10.92	DC53	-55.30	DC28
	Min	-11.49	DC47	-144.13	DC3	-27.30	DC53	0.00	DC1	-10.92	DC51	-60.35	DC3
30%	Max	11.49	DC49	-140.42	DC27	27.30	DC51	0.00	DC1	25.93	DC53	-130.16	DC28
	Min	-11.49	DC47	-153.14	DC3	-27.30	DC53	0.00	DC1	-25.93	DC51	-142.10	DC3
40%	Max	11.49	DC49	-149.09	DC27	27.30	DC51	0.00	DC1	40.95	DC53	-209.77	DC27
	Min	-11.49	DC47	-162.15	DC3	-27.30	DC53	0.00	DC1	-40.95	DC51	-228.81	DC3
50%	Max	20.82	DC49	-244.70	DC27	51.62	DC51	0.00	DC1	66.91	DC53	-333.28	DC27
	Min	-20.82	DC47	-282.94	DC3	-51.62	DC53	0.00	DC1	-66.91	DC51	-370.77	DC3
60%	Max	20.82	DC49	-253.36	DC27	51.62	DC51	0.00	DC1	95.30	DC53	-470.25	DC27
	Min	-20.82	DC47	-291.95	DC3	-51.62	DC53	0.00	DC1	-95.30	DC51	-528.86	DC3
70%	Max	20.82	DC49	-262.02	DC27	51.62	DC51	0.00	DC1	123.69	DC53	-611.98	DC27
	Min	-20.82	DC47	-300.95	DC3	-51.62	DC53	0.00	DC1	-123.69	DC51	-691.91	DC3
80%	Max	31.10	DC49	-369.05	DC27	76.20	DC51	0.00	DC1	164.37	DC53	-807.65	DC27

	Min	-31.10	DC47	-466.73	DC3	-76.23	DC53	-12.48	DC12	-164.74	DC51	-938.29	DC3
90%	Max	31.10	DC49	-377.71	DC27	76.23	DC51	0.00	DC8	206.66	DC53	-1013.01	DC27
	Min	-31.10	DC47	-475.74	DC3	-76.23	DC53	-12.48	DC12	-206.66	DC51	-1197.47	DC3
100%	Max	31.10	DC49	-386.37	DC27	76.23	DC51	0.00	DC8	248.59	DC53	-1223.14	DC27
	Min	-31.10	DC47	-484.75	DC3	-76.23	DC53	-12.48	DC12	-248.59	DC51	-1461.60	DC3

MEMBER **2**

Station		Axial [Ton]	Ic	Shear V2 [Ton]	Ic	Shear V3 [Ton]	Ic	Torsion [Ton*m]	Ic	M22 [Ton*m]	Ic	M33 [Ton*m]	Ic
0%	Max	32.90	DC49	630.17	DC3	76.71	DC51	37.44	DC12	247.98	DC53	-1247.12	DC28
	Min	-32.90	DC47	407.94	DC28	-76.71	DC53	0.00	DC1	-247.98	DC51	-1920.16	DC3
10%	Max	32.90	DC49	621.16	DC3	76.71	DC51	37.44	DC12	205.78	DC53	-1025.14	DC28
	Min	-32.90	DC47	399.28	DC28	-76.71	DC53	0.00	DC1	-205.78	DC51	-1576.04	DC3
20%	Max	32.90	DC49	612.15	DC3	76.71	DC51	37.44	DC12	163.59	DC53	-807.92	DC28
	Min	-32.90	DC47	390.61	DC28	-76.71	DC53	0.00	DC1	-163.59	DC51	-1236.89	DC3
30%	Max	22.36	DC49	422.03	DC3	52.67	DC51	24.96	DC12	122.61	DC53	-600.53	DC28
	Min	-22.36	DC47	280.53	DC27	-52.67	DC53	0.00	DC1	-122.61	DC51	-911.74	DC3
40%	Max	22.36	DC49	413.02	DC3	52.67	DC51	24.96	DC12	93.64	DC53	-448.63	DC28
	Min	-22.36	DC47	271.86	DC27	-52.67	DC53	0.00	DC1	-93.64	DC51	-682.10	DC3
50%	Max	22.36	DC49	404.01	DC3	52.67	DC51	24.96	DC12	64.67	DC53	-301.48	DC28
	Min	-22.36	DC47	263.20	DC27	-52.67	DC53	0.00	DC1	-64.67	DC51	-457.41	DC3
60%	Max	9.41	DC49	182.25	DC3	25.61	DC51	12.48	DC12	38.41	DC53	-172.16	DC28
	Min	-9.41	DC47	124.01	DC28	-25.61	DC53	0.00	DC1	-38.41	DC51	-258.96	DC3
70%	Max	9.41	DC49	173.24	DC3	25.61	DC51	12.48	DC12	24.33	DC53	-106.33	DC28
	Min	-9.41	DC47	115.35	DC28	-25.61	DC53	0.00	DC1	-24.33	DC51	-161.20	DC3
80%	Max	9.41	DC49	164.23	DC3	25.61	DC51	12.48	DC12	10.24	DC53	-45.27	DC28
	Min	-9.41	DC47	106.69	DC28	-25.61	DC53	0.00	DC1	-10.24	DC51	-68.39	DC3
90%	Max	0.00	DC1	9.01	DC3	0.00	DC1	0.00	DC1	0.00	DC1	-2.38	DC40
	Min	0.00	DC1	8.66	DC40	0.00	DC8	0.00	DC1	0.00	DC8	-2.48	DC3
100%	Max	0.00	DC1	0.00	DC3	0.00	DC1	0.00	DC1	0.00	DC8	0.00	DC17
	Min	0.00	DC1	0.00	DC40	0.00	DC8	0.00	DC1	0.00	DC1	0.00	DC27

MEMBER **3**

Station		Axial [Ton]	Ic	Shear V2 [Ton]	Ic	Shear V3 [Ton]	Ic	Torsion [Ton*m]	Ic	M22 [Ton*m]	Ic	M33 [Ton*m]	Ic
0%	Max	-955.04	DC27	75.85	DC47	178.16	DC51	5.33	DC53	1195.44	DC53	484.00	DC49
	Min	-1345.95	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-1195.44	DC51	-533.88	DC47
10%	Max	-948.72	DC27	75.85	DC47	178.16	DC51	5.33	DC53	1075.89	DC53	433.11	DC49
	Min	-1339.38	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-1075.89	DC51	-515.71	DC2
20%	Max	-942.40	DC27	75.85	DC47	178.16	DC51	5.33	DC53	956.35	DC53	382.21	DC49
	Min	-1332.81	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-956.35	DC51	-515.71	DC2
30%	Max	-936.08	DC27	75.85	DC47	178.16	DC51	5.33	DC53	836.81	DC53	331.32	DC49
	Min	-1326.23	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-836.81	DC51	-515.71	DC2
40%	Max	-929.76	DC27	75.85	DC47	178.16	DC51	5.33	DC53	717.26	DC53	280.43	DC49
	Min	-1319.66	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-717.26	DC51	-515.71	DC2
50%	Max	-923.44	DC27	75.85	DC47	178.16	DC51	5.33	DC53	597.72	DC53	229.53	DC49
	Min	-1313.09	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-597.72	DC51	-515.71	DC2
60%	Max	-917.12	DC27	75.85	DC47	178.16	DC51	5.33	DC53	478.18	DC53	178.64	DC49
	Min	-1306.52	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-478.18	DC51	-515.71	DC2
70%	Max	-910.81	DC27	75.85	DC47	178.16	DC51	5.33	DC53	358.63	DC53	127.74	DC49
	Min	-1299.95	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-358.63	DC51	-515.71	DC2
80%	Max	-904.49	DC27	75.85	DC47	178.16	DC51	5.33	DC53	239.09	DC53	90.23	DC5
	Min	-1293.38	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-239.09	DC51	-515.71	DC2
90%	Max	-898.17	DC27	75.85	DC47	178.16	DC51	5.33	DC53	119.54	DC53	72.39	DC15
	Min	-1286.81	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-119.54	DC51	-515.71	DC2

100%	Max	-891.85	DC27	75.85	DC47	178.16	DC51	5.33	DC53	0.00	DC51	60.41	DC15
	Min	-1280.24	DC3	-75.85	DC49	-178.16	DC53	-28.45	DC8	-62.40	DC12	-515.71	DC2

PORTILLO Y YOUNG S.C.		
	PROYECTO: P.S. CALLE MARISCAL	HOJA: PI - 5
		FECHA: 17/01/15
	CONCEPTO: DISEÑO PILAS	CALCULO: M.P.
		REVISO:

+ Diseño Cabezal

- Análisis de Cargas

Cara de la Columna

$X = 0.89 \times 200/2 = 0.89\ m$

$M_u = 1{,}371.95$ ton-m

$V_u = 615.75$ ton

$T_u = 87.44$ ton-m

DISEÑO VIGAS RECTANGULARES (AASHTO 2002)

A).- DATOS GENERALES

PROYECTO:	Paso Superior Calle Mariscal
DENOMINACION	Diseño Cabezal Pila 3

B).- CARGAS ULTIMAS

Localización	Cara de la Columna	
Mu =	1,371,950	kg - m
Vu =	615,750	kg
Tu =	37,440	kg - m

C).- DATOS DE LA VIGA

f'c =	250	kg/cm2
fy =	4,200	kg/cm2
bw =	350	cm
h =	150	cm

D).- DISEÑO A FLEXION

Rec =	5	cms	
Calcular d para condición	2	2 lechos de armado	
d = h - rec - db(est) - db(flex) - 1.5 =	138.74	cms	
Ro (max) para $\varepsilon c = 0.005$ =	0.0161		
Ro (min) = 14 / fy =	0.0033		
Ro (req) para que Mn =1.3 Mu =	0.0074		
Ro (req) =	0.0057		
As = Ro (req) x bw x d =	277.31	cm2	
Tratar varillas No.	10		
Refuerzo Requerido =	35.03	Varillas No.	10
Refuerzo Propuesto =	36	Varillas No.	10

E).- DISEÑO A CORTANTE

ϕVc = 0.85 x 0.53 sqrt (f´c) bw d =	345,881	kg		
Vs = Vu / ϕ - Vc	317,493	kg	= 0.41	$\sqrt{f'c} \times bw \times d$
Av / s = Vs / fy d	0.5449	cm2 / cm		
Tratar Varillas No	5	de	6	ramas
s = Av fy d / Vs	21.80	cm	< smax	o. k.
smax = d / 2 =	69.37	cm		
smax = 30 cms =	30.00	cm	*** domina ***	

DC15	Top	-1032.07	60.41	-37.44	-8.89	-17.86	No	No
	Bottom	-1097.78	180.22	-97.11	-8.89	-17.86	No	No
DC17	Top	-1034.33	-267.94	-37.44	-8.89	-17.86	No	No
	Bottom	-1100.04	-148.13	-97.11	-8.89	-17.86	No	No
DC21	Top	-1138.83	-233.70	-62.40	-14.82	-17.86	No	No
	Bottom	-1204.54	-113.89	-161.84	-14.82	-17.86	No	No
DC24	Top	-1032.07	9.40	0.00	0.00	0.00	No	No
	Bottom	-1097.78	9.40	0.00	0.00	0.00	No	No
DC25	Top	-1034.33	-318.95	0.00	0.00	0.00	No	No
	Bottom	-1100.04	-318.95	0.00	0.00	0.00	No	No
DC26	Top	-1138.83	-284.71	0.00	0.00	0.00	No	No
	Bottom	-1204.54	-284.71	0.00	0.00	0.00	No	No
DC27	Top	-891.85	-88.96	0.00	0.00	34.10	No	No
	Bottom	-955.04	-317.79	0.00	0.00	34.10	No	No
DC28	Top	-891.85	41.00	0.00	0.00	-34.10	No	No
	Bottom	-955.04	269.83	0.00	0.00	-34.10	No	No
DC29	Top	-992.38	-40.01	-36.00	-8.55	17.17	No	No
	Bottom	-1055.56	-155.21	-93.37	-8.55	17.17	No	No
DC31	Top	-994.55	-355.73	-36.00	-8.55	17.17	No	No
	Bottom	-1057.74	-470.93	-93.37	-8.55	17.17	No	No
DC35	Top	-1095.03	-322.81	-60.00	-14.25	17.17	No	No
	Bottom	-1158.21	-438.01	-155.62	-14.25	17.17	No	No
DC38	Top	-992.38	58.09	-36.00	-8.55	-17.17	No	No
	Bottom	-1055.56	173.29	-93.37	-8.55	-17.17	No	No
DC40	Top	-994.55	-257.63	-36.00	-8.55	-17.17	No	No
	Bottom	-1057.74	-142.43	-93.37	-8.55	-17.17	No	No
DC44	Top	-1095.03	-224.71	-60.00	-14.25	-17.17	No	No
	Bottom	-1158.21	-109.51	-155.62	-14.25	-17.17	No	No
DC47	Top	-927.52	-24.94	0.00	53.45	75.85	No	No
	Bottom	-993.24	-533.88	-358.63	53.45	75.85	No	No
DC48	Top	-927.52	-24.94	0.00	-53.45	75.85	No	No
	Bottom	-993.24	-533.88	358.63	-53.45	75.85	No	No
DC49	Top	-927.52	-24.94	0.00	53.45	-75.85	No	No
	Bottom	-993.24	484.00	-358.63	53.45	-75.85	No	No
DC50	Top	-927.52	-24.94	0.00	-53.45	-75.85	No	No
	Bottom	-993.24	484.00	358.63	-53.45	-75.85	No	No
DC51	Top	-927.52	-24.94	0.00	178.16	22.75	No	No
	Bottom	-993.24	-177.62	-1195.44	178.16	22.75	No	No
DC52	Top	-927.52	-24.94	0.00	178.16	-22.75	No	No
	Bottom	-993.24	127.74	-1195.44	178.16	-22.75	No	No
DC53	Top	-927.52	-24.94	0.00	-178.16	22.75	No	No
	Bottom	-993.24	-177.62	1195.44	-178.16	22.75	No	No
DC54	Top	-927.52	-24.94	0.00	-178.16	-22.75	No	No
	Bottom	-993.24	127.74	1195.44	-178.16	-22.75	No	No

RESULTS OF COLUMN: 1

Column status : OK

Biaxial compression

Controlling condition	:	DC51
Stress in bars	:	fs>0.5fy
Dowel splice length	:	211.00 [cm]
Bar clear spacing at splices	:	8.01 [cm]

Condition	Pos.	Pu [Ton]	Mcxx [Ton*m]	Mcyy [Ton*m]	δnsxx	δnsyy	Cmxx	Cmyy
DC1	Top	-1102.04	32.38	0.00	1.00	1.00	1.000	1.000
	Bot.	-1167.75	32.38	0.00	1.00	1.00	1.000	1.000
DC2	Top	-1105.81	-515.71	0.00	1.00	1.00	1.000	1.000
	Bot.	-1171.52	-515.71	0.00	1.00	1.00	1.000	1.000
DC3	Top	-1280.24	-458.56	0.00	1.00	1.00	1.000	1.000
	Bot.	-1345.95	-458.56	0.00	1.00	1.00	1.000	1.000
DC4	Top	-927.52	-92.51	0.00	1.00	1.00	0.712	1.000
	Bot.	-993.24	-330.50	0.00	1.00	1.00	0.712	1.000
DC5	Top	-927.52	42.63	0.00	1.00	1.00	0.661	1.000
	Bot.	-993.24	280.62	0.00	1.00	1.00	0.661	1.000
DC6	Top	-1032.07	-41.61	-37.44	1.00	1.00	0.703	0.754
	Bot.	-1097.78	-161.42	-97.11	1.00	1.00	0.703	0.754
DC8	Top	-1034.33	-369.96	-37.44	1.00	1.00	0.902	0.754
	Bot.	-1100.04	-489.76	-97.11	1.00	1.00	0.902	0.754
DC12	Top	-1138.83	-335.72	-62.40	1.00	1.00	0.895	0.754
	Bot.	-1204.54	-455.53	-161.84	1.00	1.00	0.895	0.754
DC15	Top	-1032.07	60.41	-37.44	1.00	1.00	0.734	0.754
	Bot.	-1097.78	180.22	-97.11	1.00	1.00	0.734	0.754
DC17	Top	-1034.33	-267.94	-37.44	1.00	1.00	0.821	0.754
	Bot.	-1100.04	-148.13	-97.11	1.00	1.00	0.821	0.754
DC21	Top	-1138.83	-233.70	-62.40	1.00	1.00	0.795	0.754
	Bot.	-1204.54	-113.89	-161.84	1.00	1.00	0.795	0.754
DC24	Top	-1032.07	9.40	0.00	1.00	1.00	1.000	1.000
	Bot.	-1097.78	9.40	0.00	1.00	1.00	1.000	1.000
DC25	Top	-1034.33	-318.95	0.00	1.00	1.00	1.000	1.000
	Bot.	-1100.04	-318.95	0.00	1.00	1.00	1.000	1.000
DC26	Top	-1138.83	-284.71	0.00	1.00	1.00	1.000	1.000
	Bot.	-1204.54	-284.71	0.00	1.00	1.00	1.000	1.000
DC27	Top	-891.85	-88.96	0.00	1.00	1.00	0.712	1.000
	Bot.	-955.04	-317.79	0.00	1.00	1.00	0.712	1.000
DC28	Top	-891.85	41.00	0.00	1.00	1.00	0.661	1.000
	Bot.	-955.04	269.83	0.00	1.00	1.00	0.661	1.000
DC29	Top	-992.38	-40.01	-36.00	1.00	1.00	0.703	0.754
	Bot.	-1055.56	-155.21	-93.37	1.00	1.00	0.703	0.754
DC31	Top	-994.55	-355.73	-36.00	1.00	1.00	0.902	0.754
	Bot.	-1057.74	-470.93	-93.37	1.00	1.00	0.902	0.754
DC35	Top	-1095.03	-322.81	-60.00	1.00	1.00	0.895	0.754
	Bot.	-1158.21	-438.01	-155.62	1.00	1.00	0.895	0.754
DC38	Top	-992.38	58.09	-36.00	1.00	1.00	0.734	0.754
	Bot.	-1055.56	173.29	-93.37	1.00	1.00	0.734	0.754
DC40	Top	-994.55	-257.63	-36.00	1.00	1.00	0.821	0.754
	Bot.	-1057.74	-142.43	-93.37	1.00	1.00	0.821	0.754
DC44	Top	-1095.03	-224.71	-60.00	1.00	1.00	0.795	0.754
	Bot.	-1158.21	-109.51	-155.62	1.00	1.00	0.795	0.754
DC47	Top	-927.52	-24.94	0.00	1.00	1.00	0.619	0.600
	Bot.	-993.24	-533.88	-358.63	1.00	1.00	0.619	0.600
DC48	Top	-927.52	-24.94	0.00	1.00	1.00	0.619	0.600
	Bot.	-993.24	-533.88	358.63	1.00	1.00	0.619	0.600
DC49	Top	-927.52	-24.94	0.00	1.00	1.00	0.579	0.600
	Bot.	-993.24	484.00	-358.63	1.00	1.00	0.579	0.600
DC50	Top	-927.52	-24.94	0.00	1.00	1.00	0.579	0.600
	Bot.	-993.24	484.00	358.63	1.00	1.00	0.579	0.600
DC51	Top	-927.52	-24.94	0.00	1.00	1.00	0.656	0.600
	Bot.	-993.24	-177.62	-1195.44	1.00	1.00	0.656	0.600
DC52	Top	-927.52	-24.94	0.00	1.00	1.00	0.522	0.600
	Bot.	-993.24	127.74	-1195.44	1.00	1.00	0.522	0.600
DC53	Top	-927.52	-24.94	0.00	1.00	1.00	0.656	0.600
	Bot.	-993.24	-177.62	1195.44	1.00	1.00	0.656	0.600

DC54	Top	-927.52	-24.94	0.00	1.00	1.00	0.522	0.600
	Bot.	-993.24	127.74	1195.44	1.00	1.00	0.522	0.600

Condition	Pos.	ϕ*Mnxx [Ton*m]	ϕ*Mnyy [Ton*m]	Mc/(ϕ*Mn)	Pu/(ϕ*Pn)	Asreq/Asprov	Demand: Capacity Ratio
DC1	Top	1560.16	0.00	0.02	0.27	0.96	0.27
	Bot.	1586.75	0.00	0.02	0.28	0.96	0.28
DC2	Top	-1561.69	0.00	0.33	0.27	0.96	0.33
	Bot.	-1588.28	0.00	0.32	0.28	0.96	0.32
DC3	Top	-1600.06	0.00	0.29	0.31	0.96	0.31
	Bot.	-1595.73	0.00	0.29	0.33	0.96	0.33
DC4	Top	-1489.54	0.00	0.06	0.22	0.96	0.22
	Bot.	-1516.13	0.00	0.22	0.24	0.96	0.24
DC5	Top	1489.54	0.00	0.03	0.22	0.96	0.22
	Bot.	1516.13	0.00	0.19	0.24	0.96	0.24
DC6	Top	-1135.73	-1021.99	0.04	0.25	0.96	0.25
	Bot.	-1333.52	-802.23	0.12	0.27	0.96	0.27
DC8	Top	-1519.29	-153.75	0.24	0.25	0.96	0.25
	Bot.	-1527.19	-302.79	0.32	0.27	0.96	0.32
DC12	Top	-1547.47	-287.63	0.22	0.28	0.96	0.28
	Bot.	-1508.58	-535.98	0.30	0.29	0.96	0.30
DC15	Top	1299.00	-805.08	0.05	0.25	0.96	0.25
	Bot.	1369.01	-737.65	0.13	0.27	0.96	0.27
DC17	Top	-1514.22	-211.59	0.18	0.25	0.96	0.25
	Bot.	-1299.73	-852.03	0.11	0.27	0.96	0.27
DC21	Top	-1516.12	-404.81	0.15	0.28	0.96	0.28
	Bot.	-918.33	-1304.96	0.12	0.29	0.96	0.29
DC24	Top	1531.85	0.00	0.01	0.25	0.96	0.25
	Bot.	1558.44	0.00	0.01	0.27	0.96	0.27
DC25	Top	-1532.76	0.00	0.21	0.25	0.96	0.25
	Bot.	-1559.35	0.00	0.20	0.27	0.96	0.27
DC26	Top	-1575.05	0.00	0.18	0.28	0.96	0.28
	Bot.	-1601.64	0.00	0.18	0.29	0.96	0.29
DC27	Top	-1475.10	0.00	0.06	0.22	0.96	0.22
	Bot.	-1500.67	0.00	0.21	0.23	0.96	0.23
DC28	Top	1475.10	0.00	0.03	0.22	0.96	0.22
	Bot.	1500.67	0.00	0.18	0.23	0.96	0.23
DC29	Top	-1123.75	-1011.22	0.04	0.24	0.96	0.24
	Bot.	-1318.82	-793.38	0.12	0.26	0.96	0.26
DC31	Top	-1503.32	-152.14	0.24	0.24	0.96	0.24
	Bot.	-1510.38	-299.46	0.31	0.26	0.96	0.31
DC35	Top	-1530.02	-284.38	0.21	0.26	0.96	0.26
	Bot.	-1490.84	-529.67	0.29	0.28	0.96	0.29
DC38	Top	1285.31	-796.59	0.05	0.24	0.96	0.24
	Bot.	1353.92	-729.52	0.13	0.26	0.96	0.26
DC40	Top	-1498.30	-209.36	0.17	0.24	0.96	0.24
	Bot.	-1285.38	-842.62	0.11	0.26	0.96	0.26
DC44	Top	-1499.00	-400.24	0.15	0.26	0.96	0.26
	Bot.	-907.53	-1289.61	0.12	0.28	0.96	0.28
DC47	Top	-1489.54	0.00	0.02	0.22	0.96	0.22
	Bot.	-1253.76	-842.21	0.43	0.24	0.96	0.43
DC48	Top	-1489.54	0.00	0.02	0.22	0.96	0.22
	Bot.	-1253.76	842.21	0.43	0.24	0.96	0.43

DC49	Top	-1489.54	0.00	0.02	0.22	0.96	0.22
	Bot.	1213.72	-899.33	0.40	0.24	0.96	0.40
DC50	Top	-1489.54	0.00	0.02	0.22	0.96	0.22
	Bot.	1213.72	899.33	0.40	0.24	0.96	0.40
DC51	Top	-1489.54	0.00	0.02	0.22	0.96	0.22
	Bot.	-222.37	-1496.63	0.80	0.24	0.96	0.80
DC52	Top	-1489.54	0.00	0.02	0.22	0.96	0.22
	Bot.	160.51	-1502.05	0.80	0.24	0.96	0.80
DC53	Top	-1489.54	0.00	0.02	0.22	0.96	0.22
	Bot.	-222.37	1496.63	0.80	0.24	0.96	0.80
DC54	Top	-1489.54	0.00	0.02	0.22	0.96	0.22
	Bot.	160.51	1502.05	0.80	0.24	0.96	0.80

Shear

S provided	:	15.00 [cm]	S required	:	17.24 [cm]
Sini provided	:	0.00 [cm]	Sini required	:	8.62 [cm]

Condition Gob.	Pos.	Vu [Ton]	Vc [Ton]	Vs [Ton]	ϕ*Vn [Ton]	Vu/(ϕ*Vn)
DC49	Top	92.79	324.65	115.61	330.20	0.59
	Bot.	92.79	328.65	115.61	333.19	0.59

Notes

* Torsion is not considered for design.

* Only columns with rectangular or circular sections are designed.

* Each column is verified considering only the forces at the ends of the member.

* The transverse reinforcement is ordered from bottom to top of the column.

* Lu = Unsupported length.

* K = Effective length factor.

* Cm = A factor relating actual moment diagram to an equivalent uniform moment diagram.

* Sway = True if column is considered unbraced in its local axis.

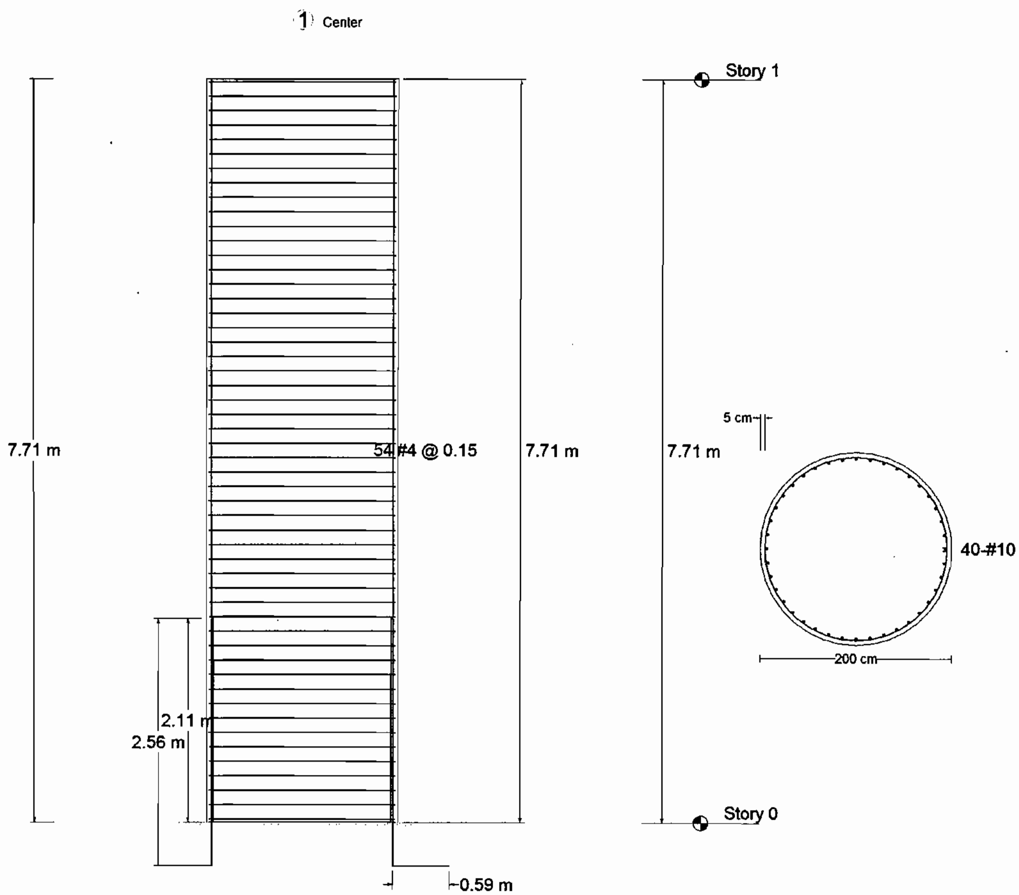
* Mc = Factored moment to be used for design. Considers the slenderness effects of the column. Mc = Mu*δns.

* δn2 = Amplification factor to account for small P-delta effects (P-δ).

* Mn = Nominal moment strength.

* Mc/(ϕ*Mn) = Strength ratio. The bar graphs indicate the relative ratio of Mc/(ϕ*Mn) for each load condition. If a bar is shown in red the ratio is greater than one.

Current Date: 17/01/2015 10:45 a.m.
Units system: Metric



PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

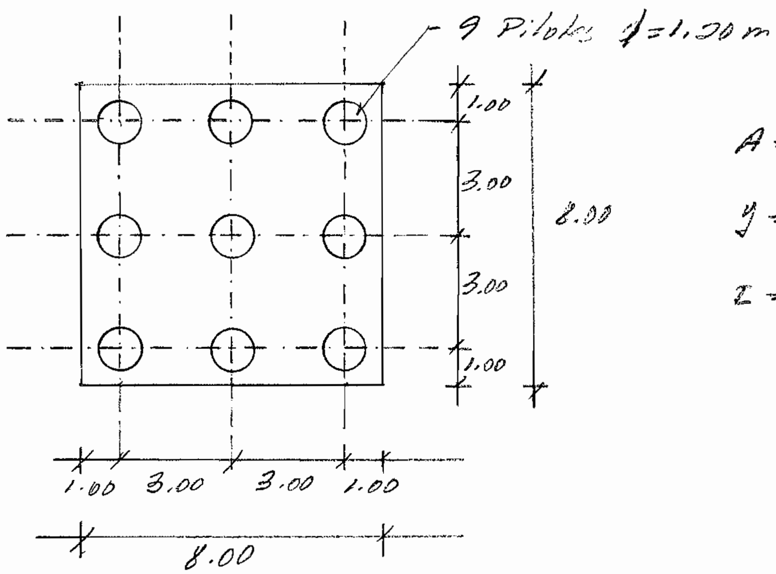
CONCEPTO: DISEÑO PILAS

HOJA: PI - 7
FECHA: 17/01/15
CALCULO: M.P
REVISO:

+ Diseño Zapatas

- Mecánica de Suelos: Se recomienda el uso de pilotes colados en el lugar a una profundidad mínima de 8.00 m con respecto al nivel del terreno natural
- Capacidad de carga = 168 ton para pilotes de 1.20 m de diámetro
- Predimensionar Zapatas

Tratar Zapata de 8.00 x 8.00 x 1.75 con 9 pilotes



$A = 9$

$y = 3.00$

$I = 2(3 \times 3.00^2) = 54.00$

- Revisar capacidad de los pilotes

$P_{max} = 146.28$ ton $< P_{adm} = 168$ ton o.k

$P_{min} = 35.45$ ton > 0 o.k

- Carga Ultima en pilotes

$Pu_{max} = 253.65$ ton

$Pu_{min} = 61.69$ ton

PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DISEÑO PILAS

HOJA: PI-8
FECHA: 17/01/15
CALCULO: M.D
REVISO:

- Diseño a Flexión

$Mu = 3 \times 253.65 \times (8.00 - 0.89 \times 2.00)/2 = 2,366.55$ ton-m

Tratar $b = 800$ cm, $d = 175 - 15 - 5 - 3.175 = 151.83$ cm

$\rho_{req} = 0.0035 \Rightarrow A_s = 427.25 \Rightarrow 54 \phi 10$

- Diseño a cortante

$Vu \approx 3 \times 253.65 = 760.95$ ton

$\phi Vc = 0.85 \times 0.53 \sqrt{250} \times 800 \times 151.83 / 1000 = 865.19$ ton $> Vu$

- Diseño a penetración

$vu_{max} = 6.73$ kg/cm²

$\phi v_c = 0.85 \times 1.10 \sqrt{250} = 14.78$ kg/cm² $> v_u$

PASU SUPERIOR AVE. MARISCAL

ANALISIS DE CARGAS DE SERVICIO EN PILOTES

Datos de la Zapata

Ancho =	8.00	mts.
Largo =	8.00	mts.
Peralte =	1.75	mts.
Relleno =	0.50	mts.
# Pilotes =	9	
A =	9	
Y =	3.00	
I =	54.00	

Node	FX	FY	FZ	MX	MY	MZ	Fp max	Fp min
		REACCIONES (ton - m)					CARGAS EN PILOTES	
Condition SC1=DL+L1								
4.00	0.00	844.45	0.00	0.00	0.00	-7.23	130.50	129.69
Condition SC2=DL+L2								
4.00	0.00	846.19	0.00	0.00	0.00	245.34	143.92	116.66
Condition SC3=DL+L3								
4.00	0.00	926.57	0.00	0.00	0.00	219.01	151.39	127.05
Condition SC4=0.8DL+0.8WE								
4.00	-21.83	611.22	0.00	0.00	0.00	203.39	110.35	83.51
Condition SC5=0.8DL-0.8WE								
4.00	21.83	611.22	0.00	0.00	0.00	-172.69	108.64	85.21
Condition SC6=0.8DL+0.8L1+0.24WE+0.8WL+0.8LF1								
4.00	-10.99	675.56	-5.47	-59.76	0.00	99.33	114.51	93.64
Condition SC8=0.8DL+0.8L2+0.24WE+0.8WL+0.8LF2								
4.00	-10.99	676.95	-5.47	-59.76	17.51	301.39	125.89	82.57
Condition SC12=0.8DL+0.8L3+0.24WE+0.8WL+0.8LF3								
4.00	-10.99	741.25	-9.12	-99.60	14.59	280.32	134.44	88.31
Condition SC15=0.8DL+0.8L1-0.24WE-0.8WL+0.8LF1								
4.00	10.99	675.56	-5.47	-59.76	0.00	-110.90	115.16	92.99

Condition SC17=0.8DL+0.8L2-0.24WE-0.8WL+0.8LF2

4.00	10.99	676.95	-5.47	-59.76	17.51	91.16	114.21	94.25

Condition SC21=0.8DL+0.8L3-0.24WE-0.8WL+0.8LF3

4.00	10.99	741.25	-9.12	-99.60	14.59	70.09	122.76	99.99

Condition SC24=0.8DL+0.8L1+0.8RST

4.00	0.00	675.56	0.00	0.00	0.00	-5.79	104.40	103.75

Condition SC25=0.8DL+0.8L2+0.8RST

4.00	0.00	676.95	0.00	0.00	0.00	196.28	115.13	93.33

Condition SC26=0.8DL+0.8L3+0.8RST

4.00	0.00	741.25	0.00	0.00	0.00	175.21	121.11	101.64

Condition SC27=0.71DL+0.71WE+0.71RST

4.00	-19.37	542.46	0.00	0.00	0.00	180.51	97.93	74.11

Condition SC28=0.71DL-0.71WE+0.71RST

4.00	19.37	542.46	0.00	0.00	0.00	-153.26	96.42	75.62

Condition SC29=0.71DL+0.71L1+0.21WE+0.71WL+0.71LF1+0.71RST

4.00	-9.67	599.56	-4.86	-53.03	0.00	87.45	101.58	83.15

Condition SC31=0.71DL+0.71L2+0.21WE+0.71WL+0.71LF2+0.71RST

4.00	-9.67	600.79	-4.86	-53.03	15.54	266.78	111.68	73.32

Condition SC35=0.71DL+0.71L3+0.21WE+0.71WL+0.71LF3+0.71RST

4.00	-9.67	657.86	-8.09	-88.39	12.95	248.08	119.27	78.43

Condition SC38=0.71DL+0.71L1-0.21WE-0.71WL+0.71LF1+0.71RST

4.00	9.67	599.56	-4.86	-53.03	0.00	-97.72	102.15	82.58

Condition SC40=0.71DL+0.71L2-0.21WE-0.71WL+0.71LF2+0.71RST

4.00	9.67	600.79	-4.86	-53.03	15.54	81.61	101.40	83.61

Condition SC44=0.71DL+0.71L3-0.21WE-0.71WL+0.71LF3+0.71RST

4.00	9.67	657.86	-8.09	-88.39	12.95	62.91	108.98	88.71

Condition SC47=0.75DL+0.75EQx+0.23EQz

4.00	43.76	573.02	31.52	211.50	0.94	308.01	127.05	54.69

Condition SC48=0.75DL+0.75EQx-0.23EQz

4.00	43.76	573.02	-31.52	-211.50	-0.94	308.01	127.05	54.69

PASO SUPERIOR AVE. MARISCAL

ANALISIS DE CARGAS ULTIMAS EN PILOTES

Datos de la Zapata

Ancho =	8.00	mts.
Largo =	8.00	mts.
Peralte =	1.75	mts.
Relleno =	0.50	mts.
# Pilotes =	9	
Area =	9	
Y =	3.00	
I =	54.00	

REACCIONES (ton - m) CARGAS EN PILOTES

Node	FX	FY	FZ	MX	MY	MZ	Fp max	Fp min
Condition DC1=1.3DL+2.17L1								
4.00	0.00	1167.75	0.00	0.00	0.00	-32.38	178.70	175.10
Condition DC2=1.3DL+2.17L2								
4.00	0.00	1171.52	0.00	0.00	0.00	515.71	205.97	148.67
Condition DC3=1.3DL+2.17L3								
4.00	0.00	1345.95	0.00	0.00	0.00	458.56	222.17	171.22
Condition DC4=1.3DL+1.3WE								
4.00	-35.47	993.24	0.00	0.00	0.00	330.50	179.32	135.70
Condition DC5=1.3DL-1.3WE								
4.00	35.47	993.24	0.00	0.00	0.00	-280.62	176.54	138.47
Condition DC6=1.3DL+1.3L1+0.39WE+1.3WL+1.3LF1								
4.00	-17.86	1097.78	-8.89	-97.11	0.00	161.42	186.09	152.16
Condition DC8=1.3DL+1.3L2+0.39WE+1.3WL+1.3LF2								
4.00	-17.86	1100.04	-8.89	-97.11	28.45	489.76	204.58	134.17
Condition DC12=1.3DL+1.3L3+0.39WE+1.3WL+1.3LF3								
4.00	-17.86	1204.54	-14.82	-161.84	23.71	455.53	218.46	143.51
Condition DC15=1.3DL+1.3L1-0.39WE-1.3WL+1.3LF1								
4.00	17.86	1097.78	-8.89	-97.11	0.00	-180.22	187.13	151.12

Condition DC17=1.3DL+1.3L2-0.39WE-1.3WL+1.3LF2

4.00	17.86	1100.04	-8.89	-97.11	28.45	148.13	185.60	153.15

Condition DC21=1.3DL+1.3L3-0.39WE-1.3WL+1.3LF3

4.00	17.86	1204.54	-14.82	-161.84	23.71	113.89	199.48	162.49

Condition DC24=1.3DL+1.3L1+1.3RST

4.00	0.00	1097.78	0.00	0.00	0.00	-9.40	169.64	168.60

Condition DC25=1.3DL+1.3L2+1.3RST

4.00	0.00	1100.04	0.00	0.00	0.00	318.95	187.09	151.65

Condition DC26=1.3DL+1.3L3+1.3RST

4.00	0.00	1204.54	0.00	0.00	0.00	284.71	196.80	165.17

Condition DC27=1.25DL+1.25WE+1.25RST

4.00	-34.10	955.04	0.00	0.00	0.00	317.79	172.42	130.48

Condition DC28=1.25DL-1.25WE+1.25RST

4.00	34.10	955.04	0.00	0.00	0.00	-269.83	169.75	133.14

Condition DC29=1.25DL+1.25L1+0.375WE+1.25WL+1.25LF1+1.25RST

4.00	-17.17	1055.56	-8.55	-93.37	0.00	155.21	178.93	146.31

Condition DC31=1.25DL+1.25L2+0.375WE+1.25WL+1.25LF2+1.25RST

4.00	-17.17	1057.74	-8.55	-93.37	27.36	470.93	196.71	129.01

Condition DC35=1.25DL+1.25L3+0.375WE+1.25WL+1.25LF3+1.25RST

4.00	-17.17	1158.21	-14.25	-155.62	22.80	438.01	210.06	137.99

Condition DC38=1.25DL+1.25L1-0.375WE-1.25WL+1.25LF1+1.25RST

4.00	17.17	1055.56	-8.55	-93.37	0.00	-173.29	179.93	145.30

Condition DC40=1.25DL+1.25L2-0.375WE-1.25WL+1.25LF2+1.25RST

4.00	17.17	1057.74	-8.55	-93.37	27.36	142.43	178.46	147.26

Condition DC44=1.25DL+1.25L3-0.375WE-1.25WL+1.25LF3+1.25RST

4.00	17.17	1158.21	-14.25	-155.62	22.80	109.51	191.81	156.24

Condition DC47=1.3DL+1.3EQx+0.39EQz

4.00	75.85	993.24	53.45	358.63	1.60	533.88	219.66	95.35

Condition DC48=1.3DL+1.3EQx-0.39EQz

4.00	75.85	993.24	-53.45	-358.63	-1.60	533.88	219.66	95.35

Condition DC49=1.3DL-1.3EQx+0.39EQz

4.00	-75.85	993.24	53.45	358.63	1.60	-484.00	216.89	98.12

Condition DC50=1.3DL-1.3EQx-0.39EQz

4.00	-75.85	993.24	-53.45	-358.63	-1.60	-484.00	216.89	98.12

Condition DC51=1.3DL+1.3EQz+0.39EQx

4.00	22.75	993.24	178.16	1195.44	5.33	177.62	253.32	61.69

Condition DC52=1.3DL+1.3EQz-0.39EQx

4.00	-22.75	993.24	178.16	1195.44	5.33	-127.74	250.55	64.46

Condition DC53=1.3DL-1.3EQz+0.39EQx

4.00	22.75	993.24	-178.16	-1195.44	-5.33	177.62	253.32	61.69

Condition DC54=1.3DL-1.3EQz-0.39EQx

4.00	-22.75	993.24	-178.16	-1195.44	-5.33	-127.74	250.55	64.46

PASO SUPERIOR AVE. MARISCAL

ANALISIS DE ESFUERZOS DE PENETRACION EN LA ZAPATA

Datos de la Columna / Zapata

ca =	178.00	cms
cb =	178.00	cms
d =	151.83	cms
bo =	1319.32	cms
Ac =	200312	cm2
Jx =	3.82E+09	cm3
Jz =	3.82E+09	cm3

	REACCIONES (ton - m)						ESF. PENETRACION kg/cm2
Node	FX	FY	FZ	MX	MY	MZ	
Condition DC1=1.3DL+2.17L1							
4.00	0.00	1167.75	0.00	0.00	0.00	-32.38	5.83
Condition DC2=1.3DL+2.17L2							
4.00	0.00	1171.52	0.00	0.00	0.00	515.71	5.86
Condition DC3=1.3DL+2.17L3							
4.00	0.00	1345.95	0.00	0.00	0.00	458.56	6.73
Condition DC4=1.3DL+1.3WE							
4.00	-35.47	993.24	0.00	0.00	0.00	330.50	4.96
Condition DC5=1.3DL-1.3WE							
4.00	35.47	993.24	0.00	0.00	0.00	-280.62	4.96
Condition DC6=1.3DL+1.3L1+0.39WE+1.3WL+1.3LF1							
4.00	-17.86	1097.78	-8.89	-97.11	0.00	161.42	5.48
Condition DC8=1.3DL+1.3L2+0.39WE+1.3WL+1.3LF2							
4.00	-17.86	1100.04	-8.89	-97.11	28.45	489.76	5.50
Condition DC12=1.3DL+1.3L3+0.39WE+1.3WL+1.3LF3							
4.00	-17.86	1204.54	-14.82	-161.84	23.71	455.53	6.02
Condition DC15=1.3DL+1.3L1-0.39WE-1.3WL+1.3LF1							
4.00	17.86	1097.78	-8.89	-97.11	0.00	-180.22	5.49
Condition DC17=1.3DL+1.3L2-0.39WE-1.3WL+1.3LF2							
4.00	17.86	1100.04	-8.89	-97.11	28.45	148.13	5.50
Condition DC21=1.3DL+1.3L3-0.39WE-1.3WL+1.3LF3							
4.00	17.86	1204.54	-14.82	-161.84	23.71	113.89	6.02

Condition DC24=1.3DL+1.3L1+1.3RST

4.00	0.00	1097.78	0.00	0.00	0.00	-9.40	5.48

Condition DC25=1.3DL+1.3L2+1.3RST

4.00	0.00	1100.04	0.00	0.00	0.00	318.95	5.50

Condition DC26=1.3DL+1.3L3+1.3RST

4.00	0.00	1204.54	0.00	0.00	0.00	284.71	6.02

Condition DC27=1.25DL+1.25WE+1.25RST

4.00	-34.10	955.04	0.00	0.00	0.00	317.79	4.77

Condition DC28=1.25DL-1.25WE+1.25RST

4.00	34.10	955.04	0.00	0.00	0.00	-269.83	4.77

Condition DC29=1.25DL+1.25L1+0.375WE+1.25WL+1.25LF1+1.25RST

4.00	-17.17	1055.56	-8.55	-93.37	0.00	155.21	5.27

Condition DC31=1.25DL+1.25L2+0.375WE+1.25WL+1.25LF2+1.25RST

4.00	-17.17	1057.74	-8.55	-93.37	27.36	470.93	5.29

Condition DC35=1.25DL+1.25L3+0.375WE+1.25WL+1.25LF3+1.25RST

4.00	-17.17	1158.21	-14.25	-155.62	22.80	438.01	5.79

Condition DC38=1.25DL+1.25L1-0.375WE-1.25WL+1.25LF1+1.25RST

4.00	17.17	1055.56	-8.55	-93.37	0.00	-173.29	5.27

Condition DC40=1.25DL+1.25L2-0.375WE-1.25WL+1.25LF2+1.25RST

4.00	17.17	1057.74	-8.55	-93.37	27.36	142.43	5.28

Condition DC44=1.25DL+1.25L3-0.375WE-1.25WL+1.25LF3+1.25RST

4.00	17.17	1158.21	-14.25	-155.62	22.80	109.51	5.79

Condition DC47=1.3DL+1.3EQx+0.39EQz

4.00	75.85	993.24	53.45	358.63	1.60	533.88	4.97

Condition DC48=1.3DL+1.3EQx-0.39EQz

4.00	75.85	993.24	-53.45	-358.63	-1.60	533.88	4.97

Condition DC49=1.3DL-1.3EQx+0.39EQz

4.00	-75.85	993.24	53.45	358.63	1.60	-484.00	4.97

Condition DC50=1.3DL-1.3EQx-0.39EQz

4.00	-75.85	993.24	-53.45	-358.63	-1.60	-484.00	4.97

Condition DC51=1.3DL+1.3EQz+0.39EQx

4.00	22.75	993.24	178.16	1195.44	5.33	177.62	4.98

Condition DC52=1.3DL+1.3EQz-0.39EQx

4.00	-22.75	993.24	178.16	1195.44	5.33	-127.74	4.98

Condition DC53=1.3DL-1.3EQz+0.39EQx

4.00	22.75	993.24	-178.16	-1195.44	-5.33	177.62	4.98

Condition DC54=1.3DL-1.3EQz-0.39EQx

4.00	-22.75	993.24	-178.16	-1195.44	-5.33	-127.74	4.98

PORTILLO Y YOUNG S.C.

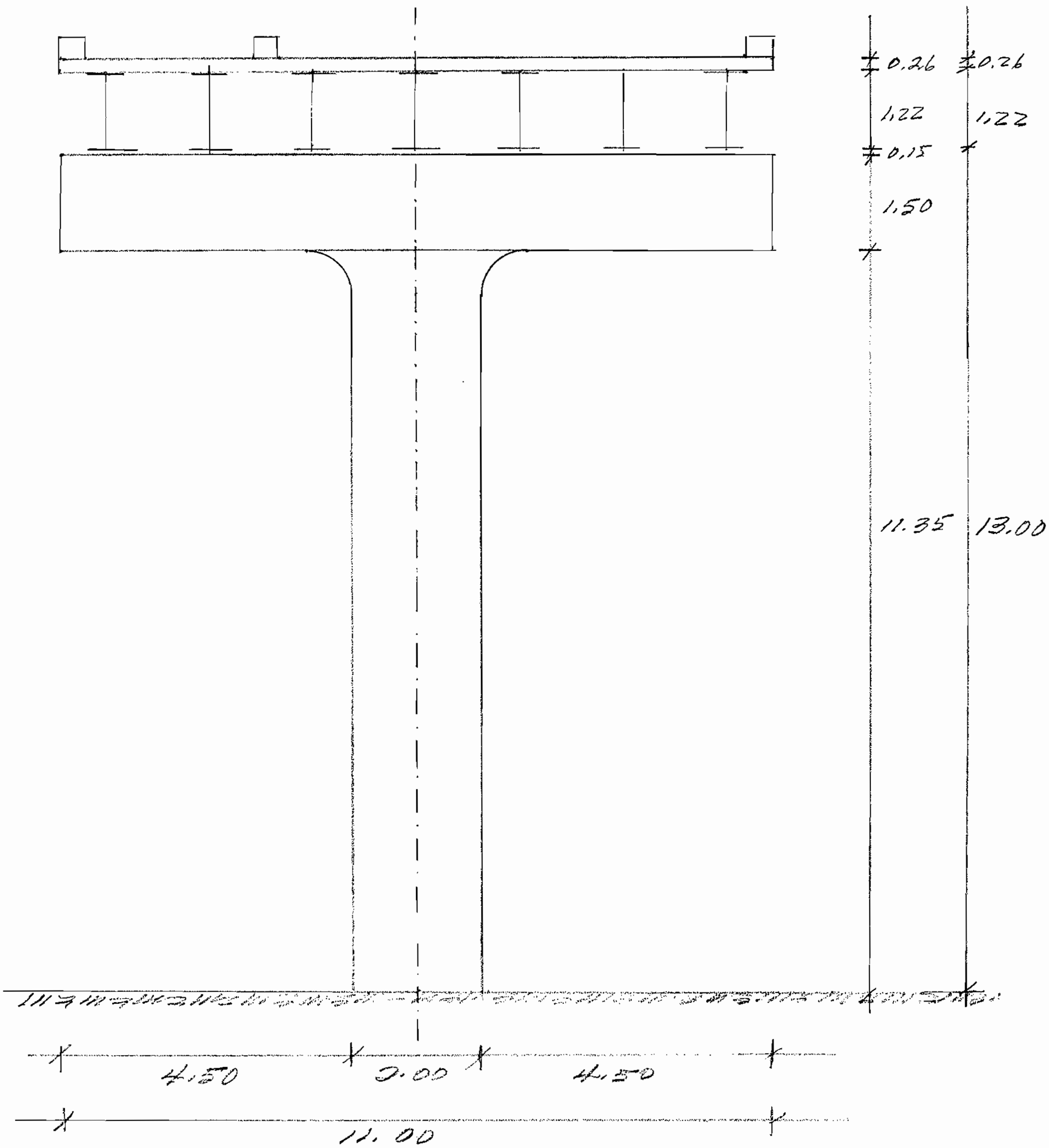
PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DISEÑO PILAS

HOJA: PI - 7
FECHA: 19/01/15
CALCULO: M.P.
REVISO:

* Diseño Pila 4 (Apoyo Móvil)

+ Datos Generales



PORTILLO Y YOUNG S.C.	PROYECTO: P.S. CALLE MARISCAL	HOJA: PE-8
	CONCEPTO: DISEÑO PILAS	FECHA: 19/01/15
		CALCULO: M.P.
		REVISO:

+ Análisis de Cargas

- Carga Muerta

$P_{D1} = 547.31 + 338.06 = 885.37\ kN = 90.25\ ton$

$P_{D2} = 560.02 + 278.31 = 838.33\ kN = 85.46\ ton$

$P_{D3} = 561.47 + 240.89 = 802.36\ kN = 81.79\ ton$

$P_{D4} = 562.60 + 193.50 = 756.10\ kN = 77.07\ ton$

$P_{D5} = 558.66 + 184.79 = 743.45\ kN = 75.78\ ton$

$P_{D6} = 550.61 + 207.13 = 757.74\ kN = 77.24\ ton$

$P_{D7} = 537.42 + 295.02 = 832.44\ kN = 84.86\ ton$

- Carga Viva: Carril 1 cargado

$P_{L1} = 18.83\ kN = 1.92\ ton$

$P_{L2} = 88.51\ kN = 9.02\ ton$

$P_{L3} = 222.05\ kN = 22.64\ ton$

$P_{L4} = 219.56\ kN = 22.38\ ton$

$P_{L5} = 163.06\ kN = 16.62\ ton$

$P_{L6} = 71.13\ kN = 7.25\ ton$

$P_{L7} = 13.74\ kN = 1.40\ ton$

- Carga Viva: Carril 2 cargado

$P_{L1} = 4.39\ kN = 0.45\ ton$

$P_{L2} = 3.71\ kN = 0.38\ ton$

$P_{L3} = 21.68\ kN = 2.21\ ton$

$P_{L4} = 65.06\ kN = 6.63\ ton$

PORTILLO Y YOUNG S.C.	PROYECTO: P.S. CALLE MARISCAL	HOJA: PP-9
	CONCEPTO: DISEÑO PILAS	FECHA: 19/01/15
		CALCULO: M.P.
		REVISO:

$P_{L5} = 179.79\ kN = 18.33\ ton$

$P_{L6} = 234.86\ kN = 23.94\ ton$

$P_{L7} = 292.26\ kN = 29.79\ ton$

- Carga Viva: Carril 1+ Carril 2 cargados:

$P_{L1} = 23.21\ kN = 2.37\ ton$

$P_{L2} = 92.22\ kN = 9.40\ ton$

$P_{L3} = 243.72\ kN = 24.84\ ton$

$P_{L4} = 284.61\ kN = 29.01\ ton$

$P_{L5} = 342.85\ kN = 34.95\ ton$

$P_{L6} = 307.99\ kN = 31.40\ ton$

$P_{L7} = 305.99\ kN = 31.19\ ton$

- Frenaje

$F_{LR} = 0$ (por ser apoyo móvil)

- Sismo:

Masas Transversales: Tomar la mitad de la masa de las vigas que se apoyan en la pila

$M_1 = 90.25 + 18.90 = 109.15\ ton$

$M_2 = 85.46 + 20.16 = 105.56\ ton$

$M_3 = 81.79 + 20.16 = 101.95\ ton$

$M_4 = 77.07 + 20.16 + \pi \times 2.00^2/4 \times 11.35/2 = 77.07 + 20.16 + 17.83 =$

$= 115.06\ ton$

$M_5 = 75.78 + 20.16 = 95.94\ ton$

PORTILLO Y YOUNG S.C.

PROYECTO: P. S. CALLE MARISCAL

CONCEPTO: DISEÑO PILAS

HOJA: PI-10
FECHA: 17/01/15
CALCULO: M.P.
REVISO:

$M_6 = 77.24 + 20.16 = 97.40$ ton

$M_7 = 84.86 + 18.90 = 103.76$ ton

- Masas longitudinales: Como se tiene apoyo móvil, tomar únicamente la masa de la pila

$M_1 = 18.90$ ton

$M_2 = 20.16$ ton

$M_3 = 20.16$ ton

$M_4 = 20.16 + 17.83 = 37.99$ ton

$M_5 = 20.16$ ton

$M_6 = 20.16$ ton

$M_7 = 18.90$ ton

Paso Superior Calle Mariscal

Análisis de Cargas Pila 4

A).- DATOS GENERALES

- Superestructura

Claro Mayor	37.00	mts
Claro Menor	37.00	mts
H(parapeto)	2.10	mts
H(guarnición)	0.40	mts
H(losa)	0.26	mts
H(vigas: Claro Mayor)	1.22	mts
H(Apoyos Claro Mayor)	0.20	mts
H(vigas: Claro Menor)	1.22	mts
H(Apoyos Claro Menor)	0.20	mts
# Vigas (Claro Mayor)	7	
# Vigas (Claro Menor)	7	
Número de carriles	2	

- Subestructura

L(cabezal)	11.00	mts
H(cabezal)	1.50	mts
B(Cabezal)	3.50	mts
Excent. (C. Mayor)	0.00	mts
Excent. (C. Menor)	0.00	mts
Esviaje	0.00	°
# Columnas Cabezal	1	
D(columnas)	2.00	mts
H(columnas)	11.35	mts

G).- VIENTO EN LA ESTRUCTURA (Ww = 250 kg/m2)

- Parapeto (Considerar como área expuesta un tercio del área bruta)

Fwpn	6,475	kg
Mwpl	-25,123	kg-m

- Guarnición y Losa

Fwvn	6,105	kg
Mwvl	-15,263	kg-m

- Cabezal

Fwvv	1,313	kg
Mwvv	0	kg-m

- Vigas

Fwvv	11,285	kg
Mwvv	-17,605	kg-m

- Columnas

Fwcoln	5,675	kg
Mwcoll	36,462	kg-m

- Viento total en la estructura

Fwn	30,853	kg =	30,853	kg / columna
Mwl	-21,528	kg-m =	-21,528	kg - m / columna
Fwx			30,853	kg / columna
Mwz			-21,528	kg - m / columna
Fwz			0	kg / columna
Mwx			0	kg - m / columna

H).- VIENTO EN LA CARGA VIVA (Ww = 150 kg/m)

Fwln	5,550	kg	5,550	kg / columna
Mwll	-23,643	kg-m	-23,643	kg - m / columna
Fwlx			5,550	kg / columna
Mwlz			-23,643	kg - m / columna
Fwlz			0	kg / columna
Mwlx			0	kg - m / columna

I).- CARGA DE SISMO

- Consideraciones Generales

+ El análisis sísmico se realizará con base en el espectro de respuestas definido por la CFE para el sitio
+ Para el análisis de las pilas en el sentido transversal, se supondrá que la masa que actúa sobre cada pila se puede calcular con base en la mitad del peso de la superestructura localizada a cada lado de la pila, ya que las vigas se encuentran simplemente apoyadas en la subestructura.
+ Para el análisis de las pilas en el sentido longitudinal, se supondrá que la masa que actúa sobre cada pila con apoyos fijos se puede calcular con base en el peso total de la superestructura localizada a cada lado de la pila

- Cálculo del Espectro de Respuestas

Zona	A	
Terreno Tipo	II	
Parametros del Espectro		
a_o =	0.04	
c =	0.16	(Para puentes semi - importantes)
T_a =	0.30	
T_b =	1.50	
r =	2/3	

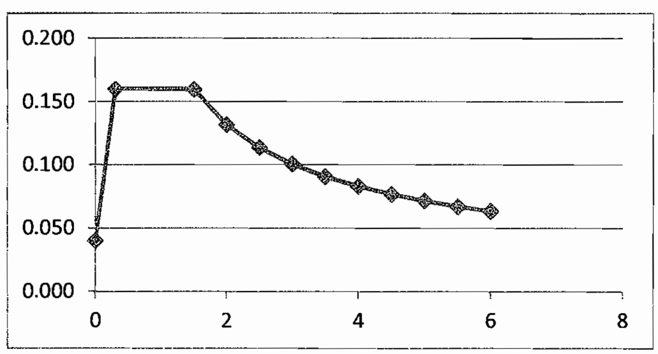
Definir Espectro

Para $T < T_a$ $\quad a = a_o + (c - a_o)\, T / T_a$

Para $T_a < T < T_b$ $\quad a = c$

Para $T > T_b$ $\quad a = c\, (T_b / T)^r$

T (seg)	a (% g)
0	0.040
0.30	0.160
1.50	0.160
2.00	0.132
2.50	0.114
3.00	0.101
3.50	0.091
4.00	0.083
4.50	0.077
5.00	0.072
5.50	0.067
6.00	0.063



Definir Q

Tomar Q = 2 para estructuras en las que la fuerza de sismo es resistida por una sola columna

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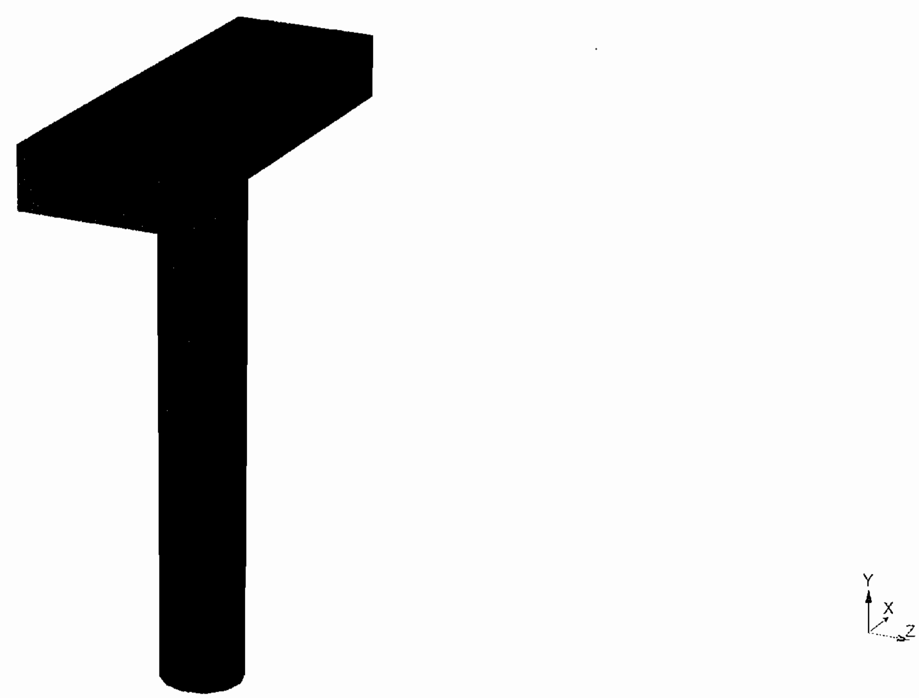

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Units system: Metric
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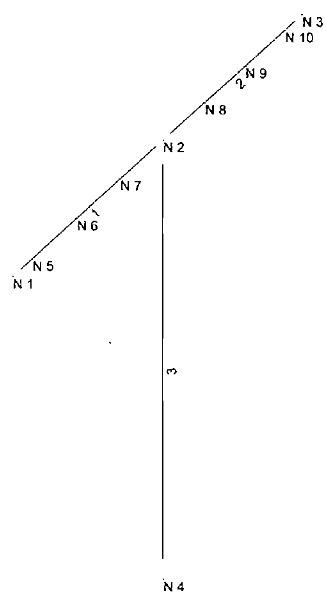

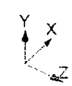

Bentley

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Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [m]	Y [m]	Z [m]	Rigid Floor
1	-5.50	12.87	0.00	0
2	0.00	12.87	0.00	0
3	5.50	12.87	0.00	0
4	0.00	-1.00	0.00	0
5	-4.80	12.87	0.00	0
6	-3.20	12.87	0.00	0
7	-1.60	12.87	0.00	0
8	1.60	12.87	0.00	0
9	3.20	12.87	0.00	0
10	4.80	12.87	0.00	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
4	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [cm]	dL [cm]	Ig factor
1	1	2	Cabezal	VigaConR 350X150	C 250-4200	0.00	0.00	0.35
2	2	3	Cabezal	VigaConR 350X150	C 250-4200	0.00	0.00	0.35
3	4	2	Columna	ColConC 200	C 250-4200	0.00	0.00	0.70

Bentley

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Load data

GLOSSARY

Comb : Indicates if load condition is a load combination

Load conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
L1	Carga Viva Carril 1	No	LL
L2	Carga Viva Carril 2	No	LL
L3	Carga Viva Carriles 1 - 2	No	LL
LF1	Frenaje Carril 1	No	LF
LF2	Frenaje Carril 2	No	LF
LF3	Frenaje Carriles 1 - 2	No	LF
RST	Contraccion y Temperatura	No	RST
WE	Viento en la Estructura	No	WE
WL	Viento en la Carga Viva	No	WL
EQx	Seismic in X	No	EQX
EQz	Seismic in Z	No	EQZ

Masses

Node	TX [Ton]	TY [Ton]	TZ [Ton]	RX [Ton*m2]	RY [Ton*m2]	RZ [Ton*m2]
2	115.06	0.00	37.99	0.00	0.00	0.00
5	109.15	0.00	18.90	0.00	0.00	0.00
6	105.56	0.00	20.16	0.00	0.00	0.00
7	101.95	0.00	20.16	0.00	0.00	0.00
8	95.94	0.00	20.16	0.00	0.00	0.00
9	97.40	0.00	20.16	0.00	0.00	0.00
10	103.76	0.00	18.90	0.00	0.00	0.00

Load on nodes

Condition	Node	FX [Ton]	FY [Ton]	FZ [Ton]	MX [Ton*m]	MY [Ton*m]	MZ [Ton*m]
DL	2	0.00	-77.07	0.00	0.00	0.00	0.00
	5	0.00	-90.25	0.00	0.00	0.00	0.00
	6	0.00	-85.46	0.00	0.00	0.00	0.00
	7	0.00	-81.79	0.00	0.00	0.00	0.00
	8	0.00	-75.78	0.00	0.00	0.00	0.00
	9	0.00	-77.24	0.00	0.00	0.00	0.00
	10	0.00	-84.86	0.00	0.00	0.00	0.00
L1	2	0.00	-22.38	0.00	0.00	0.00	0.00

	5	0.00	-1.92	0.00	0.00	0.00	0.00
	6	0.00	-9.02	0.00	0.00	0.00	0.00
	7	0.00	-22.64	0.00	0.00	0.00	0.00
	8	0.00	-16.62	0.00	0.00	0.00	0.00
	9	0.00	-7.25	0.00	0.00	0.00	0.00
	10	0.00	-1.40	0.00	0.00	0.00	0.00
L2	2	0.00	-6.63	0.00	0.00	0.00	0.00
	5	0.00	-0.45	0.00	0.00	0.00	0.00
	6	0.00	-0.39	0.00	0.00	0.00	0.00
	7	0.00	-2.21	0.00	0.00	0.00	0.00
	8	0.00	-18.33	0.00	0.00	0.00	0.00
	9	0.00	-23.94	0.00	0.00	0.00	0.00
	10	0.00	-29.79	0.00	0.00	0.00	0.00
L3	2	0.00	-29.01	0.00	0.00	0.00	0.00
	5	0.00	-2.37	0.00	0.00	0.00	0.00
	6	0.00	-9.40	0.00	0.00	0.00	0.00
	7	0.00	-24.84	0.00	0.00	0.00	0.00
	8	0.00	-34.95	0.00	0.00	0.00	0.00
	9	0.00	-31.40	0.00	0.00	0.00	0.00
	10	0.00	-31.19	0.00	0.00	0.00	0.00
WE	2	30.853	0.00	0.00	0.00	0.00	-21.528
WL	2	5.55	0.00	0.00	0.00	0.00	-23.643

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
L1	Carga Viva Carril 1	No	0.00	0.00	0.00
L2	Carga Viva Carril 2	No	0.00	0.00	0.00
L3	Carga Viva Carriles 1 - 2	No	0.00	0.00	0.00
LF1	Frenaje Carril 1	No	0.00	0.00	0.00
LF2	Frenaje Carril 2	No	0.00	0.00	0.00
LF3	Frenaje Carriles 1 - 2	No	0.00	0.00	0.00
RST	Contraccion y Temperatura	No	0.00	0.00	0.00
WE	Viento en la Estructura	No	0.00	0.00	0.00
WL	Viento en la Carga Viva	No	0.00	0.00	0.00
EQx	Seismic in X	No	0.00	0.00	0.00
EQz	Seismic in Z	No	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
L1	0.00	0.00	0.00
L2	0.00	0.00	0.00
L3	0.00	0.00	0.00
LF1	0.00	0.00	0.00
LF2	0.00	0.00	0.00
LF3	0.00	0.00	0.00

RST	0.00	0.00	0.00
WE	0.00	0.00	0.00
WL	0.00	0.00	0.00
EQx	0.50	0.00	5.00
EQz	0.50	-90.00	5.00

Response spectrum

T [Sec]	a/g
0.00	0.04
0.30	0.16
1.50	0.16
2.00	0.132
2.50	0.114
3.00	0.101
3.50	0.091
4.00	0.083
4.50	0.077
5.00	0.072
5.50	0.067
6.00	0.063

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Bentley

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Seismic analysis

Modal analysis

MASSES:

Node	Mass X [Ton]	Mass Y [Ton]	Mass Z [Ton]	MMI.xx [Ton*m2]	MMI.yy [Ton*m2]	MMI.zz [Ton*m2]
2	115.06	0.00	37.99	0.00	0.00	0.00
5	109.15	0.00	18.90	0.00	0.00	0.00
6	105.56	0.00	20.16	0.00	0.00	0.00
7	101.95	0.00	20.16	0.00	0.00	0.00
8	95.94	0.00	20.16	0.00	0.00	0.00
9	97.40	0.00	20.16	0.00	0.00	0.00
10	103.76	0.00	18.90	0.00	0.00	0.00

MODE FREQUENCIES

MODE	W [RAD/SEC]	T [SEC]
1	4.44	1.41672
2	6.17	1.01891
3	9.57	0.65674
4	303.71	0.02069
5	382.85	0.01641

MASS PARTICIPATION PERCENTAGE

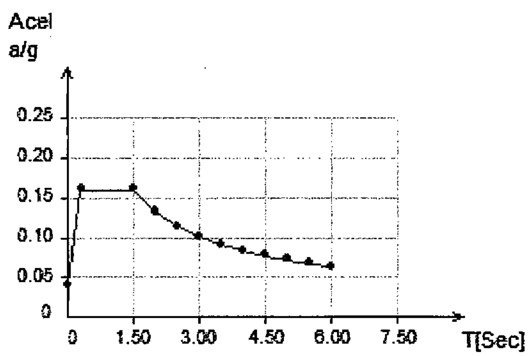
	Modal participation					
MODE	Part.X	Part.Y	Part.Z	Rot.X	Rot.Y	Rot.Z
1	100.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	100.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL:	100.00	0.00	100.00	0.00	0.00	0.00

TOTAL MASS

DOF	Total mass [Ton/m*Sec2]
TX	74.37
TY	0.00
TZ	15.96
RX	0.00
RY	0.00
RZ	0.00

SEISMIC RESPONSE SPECTRUM

T[Sec]	a/g
0.00000	0.04
0.30000	0.16
1.50000	0.16
2.00000	0.13
2.50000	0.11
3.00000	0.10
3.50000	0.09
4.00000	0.08
4.50000	0.08
5.00000	0.07
5.50000	0.07
6.00000	0.06



Condition = **EQx=Seismic in X**
Scale Factor = 0.50
Damping factor = 5.00

COMPUTED SPECTRAL VALUES

MODE	W [RAD/SEC]	T [SEC]	a [m/Sec2]
1	4.44	1.41672	0.78
2	6.17	1.01891	0.78
3	9.57	0.65674	0.78
4	303.71	0.02069	0.24
5	382.85	0.01641	0.23

Condition = **EQz=Seismic in Z**
Scale Factor = 0.50
Damping factor = 5.00

COMPUTED SPECTRAL VALUES

MODE	W [RAD/SEC]	T [SEC]	a [m/Sec2]
1	4.44	1.41672	0.78
2	6.17	1.01891	0.78
3	9.57	0.65674	0.78
4	303.71	0.02069	0.24
5	382.85	0.01641	0.23

MODAL SHAPES

Normalized displacements to Phi*M*Phi=1

Modal shapes : 1

W = 4.44 [RAD/SEC] **PERIOD =** 1.41672 [SEC]

DISPLACEMENTS

Node	Trans.X [phi]	Trans.Y [phi]	Trans.Z [phi]	Rot.X [phiRot]	Rot.Y [phiRot]	Rot.Z [phiRot]
2	1.16E-01	1.10E-16	0.00E+00	0.00E+00	0.00E+00	-1.24E-02
5	1.16E-01	5.97E-02	0.00E+00	0.00E+00	0.00E+00	-1.24E-02
6	1.16E-01	3.98E-02	0.00E+00	0.00E+00	0.00E+00	-1.24E-02
7	1.16E-01	1.99E-02	0.00E+00	0.00E+00	0.00E+00	-1.24E-02
8	1.16E-01	-1.99E-02	0.00E+00	0.00E+00	0.00E+00	-1.24E-02
9	1.16E-01	-3.98E-02	0.00E+00	0.00E+00	0.00E+00	-1.24E-02
10	1.16E-01	-5.97E-02	0.00E+00	0.00E+00	0.00E+00	-1.24E-02

Modal shapes : 2

W = 6.17 [RAD/SEC] **PERIOD =** 1.01891 [SEC]

DISPLACEMENTS

Node	Trans.X [phi]	Trans.Y [phi]	Trans.Z [phi]	Rot.X [phiRot]	Rot.Y [phiRot]	Rot.Z [phiRot]
2	-3.93E-16	-2.96E-30	-3.39E-13	0.00E+00	-8.40E-02	4.21E-17
5	1.26E-15	-2.02E-16	-4.04E-01	0.00E+00	-8.41E-02	4.21E-17
6	-2.98E-15	-1.35E-16	-2.69E-01	0.00E+00	-8.41E-02	4.21E-17
7	5.11E-16	-6.74E-17	-1.34E-01	0.00E+00	-8.40E-02	4.21E-17
8	5.99E-16	6.74E-17	1.34E-01	0.00E+00	-8.40E-02	4.21E-17
9	-3.26E-15	1.35E-16	2.69E-01	0.00E+00	-8.41E-02	4.21E-17
10	1.37E-15	2.02E-16	4.04E-01	0.00E+00	-8.41E-02	4.21E-17

Modal shapes : 3

W = 9.57 [RAD/SEC] **PERIOD =** 0.65674 [SEC]

DISPLACEMENTS

Node	Trans.X [phi]	Trans.Y [phi]	Trans.Z [phi]	Rot.X [phiRot]	Rot.Y [phiRot]	Rot.Z [phiRot]
2	-5.79E-15	-2.92E-29	2.50E-01	2.68E-02	-1.16E-13	6.21E-16
5	1.09E-14	-2.98E-15	2.51E-01	2.68E-02	1.81E-04	6.21E-16
6	-3.18E-14	-1.99E-15	2.50E-01	2.68E-02	1.68E-04	6.21E-16
7	3.31E-15	-9.93E-16	2.50E-01	2.68E-02	1.17E-04	6.21E-16
8	4.16E-15	9.93E-16	2.50E-01	2.68E-02	-1.17E-04	6.21E-16
9	-3.46E-14	1.99E-15	2.50E-01	2.68E-02	-1.68E-04	6.21E-16
10	1.21E-14	2.98E-15	2.51E-01	2.68E-02	-1.81E-04	6.21E-16

Modal shapes : 4

W = 303.71 [RAD/SEC] **PERIOD =** 0.02069 [SEC]

DISPLACEMENTS

Node	Trans.X [phi]	Trans.Y [phi]	Trans.Z [phi]	Rot.X [phiRot]	Rot.Y [phiRot]	Rot.Z [phiRot]
2	-2.69E-10	-1.73E-26	-2.76E-01	-2.96E-02	-6.57E-10	2.88E-11
5	1.92E-10	-1.38E-10	3.81E-01	-2.96E-02	1.81E-01	2.88E-11
6	-4.15E-10	-9.22E-11	7.47E-02	-2.96E-02	1.62E-01	2.88E-11
7	3.32E-10	-4.61E-11	-1.73E-01	-2.96E-02	9.95E-02	2.88E-11
8	6.30E-10	4.61E-11	-1.73E-01	-2.96E-02	-9.95E-02	2.88E-11
9	-8.30E-10	9.22E-11	7.47E-02	-2.96E-02	-1.62E-01	2.88E-11
10	3.89E-10	1.38E-10	3.81E-01	-2.96E-02	-1.81E-01	2.88E-11

Modal shapes : 5

W = 382.85 [RAD/SEC] **PERIOD =** 0.01641 [SEC]

DISPLACEMENTS

Node	Trans.X [phi]	Trans.Y [phi]	Trans.Z [phi]	Rot.X [phiRot]	Rot.Y [phiRot]	Rot.Z [phiRot]
2	4.08E-03	-1.63E-18	-5.08E-09	-5.45E-10	6.49E-10	-4.38E-04
5	-1.58E-01	2.10E-03	3.83E-09	-5.45E-10	5.48E-09	-4.38E-04
6	-1.25E-01	1.40E-03	-1.05E-08	-5.45E-10	-9.49E-10	-4.38E-04
7	-6.70E-02	7.01E-04	1.22E-08	-5.45E-10	-1.15E-09	-4.38E-04
8	7.43E-02	-7.01E-04	8.48E-09	-5.45E-10	5.13E-10	-4.38E-04
9	1.31E-01	-1.40E-03	-6.36E-09	-5.45E-10	7.96E-10	-4.38E-04
10	1.63E-01	-2.10E-03	2.24E-09	-5.45E-10	-3.22E-09	-4.38E-04

BASE REACTIONS

Condition : EQx=Seismic in X

	Shear [Ton]		Moment [Ton*m]		
Mode	**In X**	**In Z**	**Mxx**	**Mzz**	**Myy**
1	-58.31	0.00	0.00	750.39	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00

5	0.00	0.00	0.00	0.00	0.00
Modal comb.	58.31	0.00	0.00	750.39	0.00

Condition : EQz=Seismic in Z

	Shear [Ton]		Moment [Ton*m]		
Mode	**In X**	**In Z**	**Mxx**	**Mzz**	**Myy**
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	-12.51	-161.06	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
Modal comb.	0.00	12.51	161.06	0.00	0.00

Bentley

Current Date: 20/01/2015 09:05 a.m.
Units system: Metric
File name: Z:\proyectos\Puente Ave. Mariscal - Cd. Juarez\Calculo\Diseño Pila 4.etz\

Analysis result

Forces envelope

Note.- Ic is the controlling load condition
Forces envelope for :

DC1=1.3DL+2.17L1
DC2=1.3DL+2.17L2
DC3=1.3DL+2.17L3
DC4=1.3DL+1.3WE
DC5=1.3DL-1.3WE
DC6=1.3DL+1.3L1+0.39WE+1.3WL+1.3LF1
DC8=1.3DL+1.3L2+0.39WE+1.3WL+1.3LF2
DC12=1.3DL+1.3L3+0.39WE+1.3WL+1.3LF3
DC15=1.3DL+1.3L1-0.39WE-1.3WL+1.3LF1
DC17=1.3DL+1.3L2-0.39WE-1.3WL+1.3LF2
DC21=1.3DL+1.3L3-0.39WE-1.3WL+1.3LF3
DC24=1.3DL+1.3L1+1.3RST
DC25=1.3DL+1.3L2+1.3RST
DC26=1.3DL+1.3L3+1.3RST
DC27=1.25DL+1.25WE+1.25RST
DC28=1.25DL-1.25WE+1.25RST
DC29=1.25DL+1.25L1+0.375WE+1.25WL+1.25LF1+1.25RST
DC31=1.25DL+1.25L2+0.375WE+1.25WL+1.25LF2+1.25RST
DC35=1.25DL+1.25L3+0.375WE+1.25WL+1.25LF3+1.25RST
DC38=1.25DL+1.25L1-0.375WE-1.25WL+1.25LF1+1.25RST
DC40=1.25DL+1.25L2-0.375WE-1.25WL+1.25LF2+1.25RST
DC44=1.25DL+1.25L3-0.375WE-1.25WL+1.25LF3+1.25RST
DC47=1.3DL+1.3EQx+0.39EQz
DC48=1.3DL+1.3EQx-0.39EQz
DC49=1.3DL-1.3EQx+0.39EQz
DC50=1.3DL-1.3EQx-0.39EQz
DC51=1.3DL+1.3EQz+0.39EQx
DC52=1.3DL+1.3EQz-0.39EQx
DC53=1.3DL-1.3EQz+0.39EQx
DC54=1.3DL-1.3EQz-0.39EQx

MEMBER 1

Station		Axial [Ton]	Ic	Shear V2 [Ton]	Ic	Shear V3 [Ton]	Ic	Torsion [Ton*m]	Ic	M22 [Ton*m]	Ic	M33 [Ton*m]	Ic
0%	Max	0.00	DC1	0.00	DC21	0.00	DC1	0.00	DC1	0.00	DC1	0.00	DC28
	Min	0.00	DC1	0.00	DC27	0.00	DC1	0.00	DC1	0.00	DC1	0.00	DC2
10%	Max	0.00	DC1	-8.66	DC44	0.00	DC1	0.00	DC1	0.00	DC1	-2.38	DC28
	Min	0.00	DC1	-9.01	DC4	0.00	DC1	0.00	DC1	0.00	DC1	-2.48	DC4
20%	Max	11.35	DC49	-130.14	DC27	1.97	DC51	0.00	DC1	0.79	DC53	-54.65	DC28
	Min	-11.35	DC47	-140.49	DC3	-1.97	DC53	0.00	DC1	-0.79	DC51	-58.90	DC3
30%	Max	11.35	DC49	-138.80	DC27	1.97	DC51	0.00	DC1	1.87	DC53	-128.61	DC28
	Min	-11.35	DC47	-149.49	DC3	-1.97	DC53	0.00	DC1	-1.87	DC51	-138.64	DC3
40%	Max	11.35	DC49	-147.46	DC27	1.97	DC51	0.00	DC1	2.95	DC53	-207.33	DC28
	Min	-11.35	DC47	-158.50	DC3	-1.97	DC53	0.00	DC1	-2.95	DC51	-223.34	DC3
50%	Max	22.33	DC49	-262.95	DC27	4.07	DC51	0.00	DC1	4.98	DC53	-338.89	DC28
	Min	-22.33	DC47	-299.01	DC3	-4.07	DC53	0.00	DC1	-4.98	DC51	-372.17	DC3
60%	Max	22.33	DC49	-271.61	DC27	4.07	DC51	0.00	DC1	7.22	DC53	-485.90	DC28
	Min	-22.33	DC47	-308.02	DC3	-4.07	DC53	0.00	DC1	-7.22	DC51	-539.10	DC3
70%	Max	22.33	DC49	-280.27	DC27	4.07	DC51	0.00	DC1	9.45	DC53	-637.67	DC28
	Min	-22.33	DC47	-317.03	DC3	-4.07	DC53	0.00	DC1	-9.45	DC51	-710.99	DC3
80%	Max	32.93	DC49	-391.17	DC27	6.16	DC51	0.00	DC1	12.74	DC53	-845.32	DC28

	Min	-32.93	DC47	-486.27	DC3	-6.16	DC53	0.00	DC1	-12.74	DC51	-967.95	DC3
90%	Max	32.93	DC49	-399.84	DC27	6.16	DC51	0.00	DC1	16.13	DC53	-1062.85	DC28
	Min	-32.93	DC47	-495.27	DC3	-6.16	DC53	0.00	DC1	-16.13	DC51	-1237.87	DC3
100%	Max	32.93	DC49	-408.50	DC27	6.16	DC51	0.00	DC1	19.51	DC53	-1285.14	DC27
	Min	-32.93	DC47	-504.28	DC3	-6.16	DC53	0.00	DC1	-19.51	DC51	-1512.75	DC3

MEMBER 2

Station		Axial [Ton]	Ic	Shear V2 [Ton]	Ic	Shear V3 [Ton]	Ic	Torsion [Ton*m]	Ic	M22 [Ton*m]	Ic	M33 [Ton*m]	Ic
0%	Max	30.90	DC49	611.00	DC3	6.16	DC51	0.00	DC1	19.51	DC53	-1207.90	DC28
	Min	-30.90	DC47	383.97	DC28	-6.16	DC53	0.00	DC1	-19.51	DC51	-1920.48	DC3
10%	Max	30.90	DC49	601.99	DC3	6.16	DC51	0.00	DC1	16.13	DC53	-999.09	DC28
	Min	-30.90	DC47	375.31	DC28	-6.16	DC53	0.00	DC1	-16.13	DC51	-1586.91	DC3
20%	Max	30.90	DC49	592.98	DC3	6.16	DC51	0.00	DC1	12.74	DC53	-795.05	DC28
	Min	-30.90	DC47	366.65	DC28	-6.16	DC53	0.00	DC1	-12.74	DC51	-1258.29	DC3
30%	Max	20.92	DC49	409.61	DC3	4.07	DC51	0.00	DC1	9.45	DC53	-600.52	DC28
	Min	-20.92	DC47	263.26	DC28	-4.07	DC53	0.00	DC1	-9.45	DC51	-943.35	DC3
40%	Max	20.92	DC49	400.60	DC3	4.07	DC51	0.00	DC1	7.22	DC53	-458.10	DC28
	Min	-20.92	DC47	254.60	DC28	-4.07	DC53	0.00	DC1	-7.22	DC51	-720.54	DC3
50%	Max	20.92	DC49	391.60	DC3	4.07	DC51	0.00	DC1	4.98	DC53	-320.46	DC28
	Min	-20.92	DC47	245.94	DC28	-4.07	DC53	0.00	DC1	-4.98	DC51	-502.68	DC3
60%	Max	10.79	DC49	214.04	DC3	1.97	DC51	0.00	DC1	2.95	DC53	-197.23	DC28
	Min	-10.79	DC47	140.72	DC28	-1.97	DC53	0.00	DC1	-2.95	DC51	-306.64	DC3
70%	Max	10.79	DC49	205.03	DC3	1.97	DC51	0.00	DC1	1.87	DC53	-122.21	DC28
	Min	-10.79	DC47	132.06	DC28	-1.97	DC53	0.00	DC1	-1.87	DC51	-191.40	DC3
80%	Max	10.79	DC49	196.02	DC3	1.97	DC51	0.00	DC1	0.79	DC53	-51.96	DC28
	Min	-10.79	DC47	123.40	DC28	-1.97	DC53	0.00	DC1	-0.79	DC51	-81.11	DC3
90%	Max	0.00	DC1	9.01	DC3	0.00	DC1	0.00	DC1	0.00	DC1	-2.38	DC28
	Min	0.00	DC1	8.66	DC31	0.00	DC1	0.00	DC1	0.00	DC1	-2.48	DC3
100%	Max	0.00	DC1	0.00	DC3	0.00	DC1	0.00	DC1	0.00	DC1	0.00	DC3
	Min	0.00	DC1	0.00	DC2	0.00	DC1	0.00	DC1	0.00	DC1	0.00	DC2

MEMBER 3

Station		Axial [Ton]	Ic	Shear V2 [Ton]	Ic	Shear V3 [Ton]	Ic	Torsion [Ton*m]	Ic	M22 [Ton*m]	Ic	M33 [Ton*m]	Ic
0%	Max	-1019.42	DC28	75.80	DC47	16.27	DC51	0.00	DC1	225.65	DC53	1131.64	DC49
	Min	-1414.26	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	-225.65	DC51	-970.98	DC47
10%	Max	-1006.36	DC28	75.80	DC47	16.27	DC51	0.00	DC1	203.08	DC53	1026.51	DC49
	Min	-1400.67	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	-203.08	DC51	-865.85	DC47
20%	Max	-993.30	DC28	75.80	DC47	16.27	DC51	0.00	DC1	180.52	DC53	921.38	DC49
	Min	-1387.09	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	-180.52	DC51	-760.72	DC47
30%	Max	-980.24	DC28	75.80	DC47	16.27	DC51	0.00	DC1	157.95	DC53	816.25	DC49
	Min	-1373.51	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	-157.95	DC51	-655.59	DC47
40%	Max	-967.18	DC28	75.80	DC47	16.27	DC51	0.00	DC1	135.39	DC53	711.11	DC49
	Min	-1359.92	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	-135.39	DC51	-550.46	DC47
50%	Max	-954.12	DC28	75.80	DC47	16.27	DC51	0.00	DC1	112.82	DC53	605.98	DC49
	Min	-1346.34	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	-112.82	DC51	-445.32	DC47
60%	Max	-941.06	DC28	75.80	DC47	16.27	DC51	0.00	DC1	90.26	DC53	500.85	DC49
	Min	-1332.76	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	-90.26	DC51	-444.78	DC2
70%	Max	-928.00	DC28	75.80	DC47	16.27	DC51	0.00	DC1	67.69	DC53	395.72	DC49
	Min	-1319.17	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	-67.69	DC51	-444.78	DC2
80%	Max	-914.93	DC28	75.80	DC47	16.27	DC51	0.00	DC1	45.13	DC53	290.59	DC49
	Min	-1305.59	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	-45.13	DC51	-444.78	DC2
90%	Max	-901.87	DC28	75.80	DC47	16.27	DC51	0.00	DC1	22.56	DC53	185.46	DC49
	Min	-1292.01	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	-22.56	DC51	-444.78	DC2

100%	Max	-888.81	DC28	75.80	DC47	16.27	DC51	0.00	DC1	0.00	DC51	142.59	DC15
	Min	-1278.42	DC3	-75.80	DC49	-16.27	DC53	0.00	DC1	0.00	DC53	-444.78	DC2

PORTILLO Y YOUNG S.C.	PROYECTO: P.S. CALLE MARISCAL	HOJA: PI-11
	CONCEPTO: DISEÑO PILAS	FECHA: 20/01/15
		CALCULO: M.P.
		REVISO:

+ Diseño Cabezal

- Análisis de Cargas

$X = 0.89 \times 2.00/2 = 0.89 m$

$M_u = 1,398.14$ ton-m

$V_u = 556.58$ ton-m

$T_u = 0$

DISEÑO VIGAS RECTANGULARES (AASHTO 2002)

A).- DATOS GENERALES

PROYECTO:	Paso Superior Calle Mariscal
DENOMINACION	Diseño Cabezal Pila 4

B).- CARGAS ULTIMAS

Localización	Cara de la Columna	
Mu =	1,398,140	kg - m
Vu =	596,580	kg
Tu =	0	kg - m

C).- DATOS DE LA VIGA

f'c =	250	kg/cm2
fy =	4,200	kg/cm2
bw =	350	cm
h =	150	cm

D).- DISEÑO A FLEXION

Rec =	5	cms	
Calcular d para condición	2	2 lechos de armado	
d = h - rec - db(est) - db(flex) - 1.5 =	138.74	cms	
Ro (max) para $\varepsilon c = 0.005$ =	0.0161		
Ro (min) = 14 / fy =	0.0033		
Ro (req) para que Mn =1.3 Mu =	0.0076		
Ro (req) =	0.0058		
As = Ro (req) x bw x d =	282.94	cm2	
Tratar varillas No.	10		
Refuerzo Requerido =	35.74	Varillas No.	10
Refuerzo Propuesto =	36	Varillas No.	10

E).- DISEÑO A CORTANTE

ϕVc = 0.85 x 0.53 sqrt (f'c) bw d =	345,881	kg		
Vs = Vu / ϕ - Vc	294,940	kg	= 0.38	$\sqrt{f'c} \times bw \times d$
Av / s = Vs / fy d	0.5062	cm2 / cm		
Tratar Varillas No	5	de	6	ramas
s = Av fy d / Vs	23.46	cm	< smax o. k.	
smax = d / 2 =	69.37	cm		
smax = 30 cms =	30.00	cm	*** domina ***	

Bentley

Current Date: 20/01/2015 09:14 a.m.
Units system: Metric

Design Results

Reinforced Concrete Columns

GENERAL INFORMATION:

Design Code : ACI 318-2005

Load Conditions included in design:

DC1	:	1.3DL+2.17L1
DC2	:	1.3DL+2.17L2
DC3	:	1.3DL+2.17L3
DC4	:	1.3DL+1.3WE
DC5	:	1.3DL-1.3WE
DC6	:	1.3DL+1.3L1+0.39WE+1.3WL+1.3LF1
DC8	:	1.3DL+1.3L2+0.39WE+1.3WL+1.3LF2
DC12	:	1.3DL+1.3L3+0.39WE+1.3WL+1.3LF3
DC15	:	1.3DL+1.3L1-0.39WE-1.3WL+1.3LF1
DC17	:	1.3DL+1.3L2-0.39WE-1.3WL+1.3LF2
DC21	:	1.3DL+1.3L3-0.39WE-1.3WL+1.3LF3
DC24	:	1.3DL+1.3L1+1.3RST
DC25	:	1.3DL+1.3L2+1.3RST
DC26	:	1.3DL+1.3L3+1.3RST
DC27	:	1.25DL+1.25WE+1.25RST
DC28	:	1.25DL-1.25WE+1.25RST
DC29	:	1.25DL+1.25L1+0.375WE+1.25WL+1.25LF1+1.25RST
DC31	:	1.25DL+1.25L2+0.375WE+1.25WL+1.25LF2+1.25RST
DC35	:	1.25DL+1.25L3+0.375WE+1.25WL+1.25LF3+1.25RST
DC38	:	1.25DL+1.25L1-0.375WE-1.25WL+1.25LF1+1.25RST
DC40	:	1.25DL+1.25L2-0.375WE-1.25WL+1.25LF2+1.25RST
DC44	:	1.25DL+1.25L3-0.375WE-1.25WL+1.25LF3+1.25RST
DC47	:	1.3DL+1.3EQx+0.39EQz
DC48	:	1.3DL+1.3EQx-0.39EQz
DC49	:	1.3DL-1.3EQx+0.39EQz
DC50	:	1.3DL-1.3EQx-0.39EQz
DC51	:	1.3DL+1.3EQz+0.39EQx
DC52	:	1.3DL+1.3EQz-0.39EQx
DC53	:	1.3DL-1.3EQz+0.39EQx
DC54	:	1.3DL-1.3EQz-0.39EQx

Moment frame : Ordinary

Materials

Concrete, f'c	:	0.25 [Ton/cm2]	Steel, fy	:	4.20 [Ton/cm2]
Concrete type	:	Normal	Steel, fyt	:	4.20 [Ton/cm2]
Modulus of elasticity	:	239.00 [Ton/cm2]	Type of splices	:	Tangential
Unit weight	:	2.40 [Ton/m3]	Minimum provided Rho	:	0.010
Epoxy coated	:	No	Maximum provided Rho	:	0.080

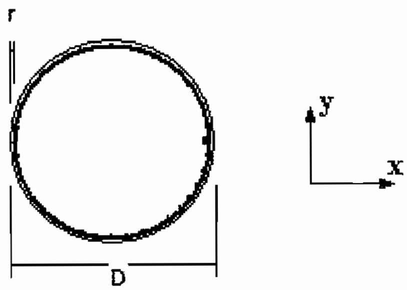
General status : OK

COLUMN DATA : 1

Geometry

Section type	:	Circular
Column location	:	Center
Distance between levels	:	13.87 [m]
Diameter	:	200.00 [cm]

Rebar



Longitudinal	:	40-#10
Free cover	:	5.00 [cm]
As provided	:	327.74 [cm2]
Provided Rho	:	0.010
Number of bars	:	40
Transverse	:	92 #4 @ 15.00cm
Initial spacing (Sini)	:	0.00 [cm]

Design parameters

Slenderness	Axis yy	Axis xx
Lu[cm]	1387.00	1387.00
K	1.90	1.90
Klu/r	52.79	52.79
Cm	0.00	0.00
Pc[Ton]	6648.31	6648.31
Sway	Yes	Yes

Forces

Condition	Position	Pu [Ton]	Muxx [Ton*m]	Muyy [Ton*m]	Vx [Ton]	Vy [Ton]	Transverse load xx	yy
DC1	Top	-1100.63	118.94	0.00	0.00	0.00	No	No
	Bottom	-1236.47	118.94	0.00	0.00	0.00	No	No
DC2	Top	-1101.74	-444.78	0.00	0.00	0.00	No	No
	Bottom	-1237.57	-444.78	0.00	0.00	0.00	No	No
DC3	Top	-1278.42	-407.73	0.00	0.00	0.00	No	No
	Bottom	-1414.26	-407.73	0.00	0.00	0.00	No	No
DC4	Top	-924.37	52.34	0.00	0.00	40.11	No	No
	Bottom	-1060.20	-503.97	0.00	0.00	40.11	No	No
DC5	Top	-924.37	108.32	0.00	0.00	-40.11	No	No
	Bottom	-1060.20	664.63	0.00	0.00	-40.11	No	No
DC6	Top	-1029.96	64.33	0.00	0.00	19.25	No	No
	Bottom	-1165.80	-202.64	0.00	0.00	19.25	No	No
DC8	Top	-1030.63	-273.38	0.00	0.00	19.25	No	No
	Bottom	-1166.46	-540.35	0.00	0.00	19.25	No	No
DC12	Top	-1136.47	-251.19	0.00	0.00	19.25	No	No
	Bottom	-1272.31	-518.15	0.00	0.00	19.25	No	No

DC15	Top	-1029.96	142.59	0.00	0.00	-19.25	No	No
	Bottom	-1165.80	409.56	0.00	0.00	-19.25	No	No
DC17	Top	-1030.63	-195.12	0.00	0.00	-19.25	No	No
	Bottom	-1166.46	71.85	0.00	0.00	-19.25	No	No
DC21	Top	-1136.47	-172.92	0.00	0.00	-19.25	No	No
	Bottom	-1272.31	94.04	0.00	0.00	-19.25	No	No
DC24	Top	-1029.96	103.46	0.00	0.00	0.00	No	No
	Bottom	-1165.80	103.46	0.00	0.00	0.00	No	No
DC25	Top	-1030.63	-234.25	0.00	0.00	0.00	No	No
	Bottom	-1166.46	-234.25	0.00	0.00	0.00	No	No
DC26	Top	-1136.47	-212.06	0.00	0.00	0.00	No	No
	Bottom	-1272.31	-212.06	0.00	0.00	0.00	No	No
DC27	Top	-888.81	50.33	0.00	0.00	38.57	No	No
	Bottom	-1019.42	-484.58	0.00	0.00	38.57	No	No
DC28	Top	-888.81	104.15	0.00	0.00	-38.57	No	No
	Bottom	-1019.42	639.06	0.00	0.00	-38.57	No	No
DC29	Top	-990.35	61.85	0.00	0.00	18.51	No	No
	Bottom	-1120.96	-194.84	0.00	0.00	18.51	No	No
DC31	Top	-990.99	-262.87	0.00	0.00	18.51	No	No
	Bottom	-1121.60	-519.56	0.00	0.00	18.51	No	No
DC35	Top	-1092.76	-241.53	0.00	0.00	18.51	No	No
	Bottom	-1223.37	-498.22	0.00	0.00	18.51	No	No
DC38	Top	-990.35	137.11	0.00	0.00	-18.51	No	No
	Bottom	-1120.96	393.80	0.00	0.00	-18.51	No	No
DC40	Top	-990.99	-187.61	0.00	0.00	-18.51	No	No
	Bottom	-1121.60	69.08	0.00	0.00	-18.51	No	No
DC44	Top	-1092.76	-166.27	0.00	0.00	-18.51	No	No
	Bottom	-1223.37	90.42	0.00	0.00	-18.51	No	No
DC47	Top	-924.37	80.33	0.00	4.88	75.80	No	No
	Bottom	-1060.20	-970.98	-67.69	4.88	75.80	No	No
DC48	Top	-924.37	80.33	0.00	-4.88	75.80	No	No
	Bottom	-1060.20	-970.98	67.69	-4.88	75.80	No	No
DC49	Top	-924.37	80.33	0.00	4.88	-75.80	No	No
	Bottom	-1060.20	1131.64	-67.69	4.88	-75.80	No	No
DC50	Top	-924.37	80.33	0.00	-4.88	-75.80	No	No
	Bottom	-1060.20	1131.64	67.69	-4.88	-75.80	No	No
DC51	Top	-924.37	80.33	0.00	16.27	22.74	No	No
	Bottom	-1060.20	-235.06	-225.65	16.27	22.74	No	No
DC52	Top	-924.37	80.33	0.00	16.27	-22.74	No	No
	Bottom	-1060.20	395.72	-225.65	16.27	-22.74	No	No
DC53	Top	-924.37	80.33	0.00	-16.27	22.74	No	No
	Bottom	-1060.20	-235.06	225.65	-16.27	22.74	No	No
DC54	Top	-924.37	80.33	0.00	-16.27	-22.74	No	No
	Bottom	-1060.20	395.72	225.65	-16.27	-22.74	No	No

RESULTS OF COLUMN: 1

Column status : OK

Biaxial compression

Controlling condition : DC49
Stress in bars : fs>0.5fy
Dowel splice length : 211.00 [cm]
Bar clear spacing at splices : 8.01 [cm]

Condition	Pos.	Pu [Ton]	Mcxx [Ton*m]	Mcyy [Ton*m]	δnsxx	δnsyy	Cmxx	Cmyy
DC1	Top	-1100.63	118.94	0.00	1.00	1.00	1.000	1.000
	Bot.	-1236.47	118.94	0.00	1.00	1.00	1.000	1.000
DC2	Top	-1101.74	-444.78	0.00	1.00	1.00	1.000	1.000
	Bot.	-1237.57	-444.78	0.00	1.00	1.00	1.000	1.000
DC3	Top	-1278.42	-407.73	0.00	1.00	1.00	1.000	1.000
	Bot.	-1414.26	-407.73	0.00	1.00	1.00	1.000	1.000
DC4	Top	-924.37	52.34	0.00	1.00	1.00	0.558	1.000
	Bot.	-1060.20	-503.97	0.00	1.00	1.00	0.558	1.000
DC5	Top	-924.37	108.32	0.00	1.00	1.00	0.665	1.000
	Bot.	-1060.20	664.63	0.00	1.00	1.00	0.665	1.000
DC6	Top	-1029.96	64.33	0.00	1.00	1.00	0.473	1.000
	Bot.	-1165.80	-202.64	0.00	1.00	1.00	0.473	1.000
DC8	Top	-1030.63	-273.38	0.00	1.00	1.00	0.802	1.000
	Bot.	-1166.46	-540.35	0.00	1.00	1.00	0.802	1.000
DC12	Top	-1136.47	-251.19	0.00	1.00	1.00	0.794	1.000
	Bot.	-1272.31	-518.15	0.00	1.00	1.00	0.794	1.000
DC15	Top	-1029.96	142.59	0.00	1.00	1.00	0.739	1.000
	Bot.	-1165.80	409.56	0.00	1.00	1.00	0.739	1.000
DC17	Top	-1030.63	-195.12	0.00	1.00	1.00	0.453	1.000
	Bot.	-1166.46	71.85	0.00	1.00	1.00	0.453	1.000
DC21	Top	-1136.47	-172.92	0.00	1.00	1.00	0.400	1.000
	Bot.	-1272.31	94.04	0.00	1.00	1.00	0.400	1.000
DC24	Top	-1029.96	103.46	0.00	1.00	1.00	1.000	1.000
	Bot.	-1165.80	103.46	0.00	1.00	1.00	1.000	1.000
DC25	Top	-1030.63	-234.25	0.00	1.00	1.00	1.000	1.000
	Bot.	-1166.46	-234.25	0.00	1.00	1.00	1.000	1.000
DC26	Top	-1136.47	-212.06	0.00	1.00	1.00	1.000	1.000
	Bot.	-1272.31	-212.06	0.00	1.00	1.00	1.000	1.000
DC27	Top	-888.81	50.33	0.00	1.00	1.00	0.558	1.000
	Bot.	-1019.42	-484.58	0.00	1.00	1.00	0.558	1.000
DC28	Top	-888.81	104.15	0.00	1.00	1.00	0.665	1.000
	Bot.	-1019.42	639.06	0.00	1.00	1.00	0.665	1.000
DC29	Top	-990.35	61.85	0.00	1.00	1.00	0.473	1.000
	Bot.	-1120.96	-194.84	0.00	1.00	1.00	0.473	1.000
DC31	Top	-990.99	-262.87	0.00	1.00	1.00	0.802	1.000
	Bot.	-1121.60	-519.56	0.00	1.00	1.00	0.802	1.000
DC35	Top	-1092.76	-241.53	0.00	1.00	1.00	0.794	1.000
	Bot.	-1223.37	-498.22	0.00	1.00	1.00	0.794	1.000
DC38	Top	-990.35	137.11	0.00	1.00	1.00	0.739	1.000
	Bot.	-1120.96	393.80	0.00	1.00	1.00	0.739	1.000
DC40	Top	-990.99	-187.61	0.00	1.00	1.00	0.453	1.000
	Bot.	-1121.60	69.08	0.00	1.00	1.00	0.453	1.000
DC44	Top	-1092.76	-166.27	0.00	1.00	1.00	0.400	1.000
	Bot.	-1223.37	90.42	0.00	1.00	1.00	0.400	1.000
DC47	Top	-924.37	80.33	0.00	1.00	1.00	0.567	0.600
	Bot.	-1060.20	-970.98	-67.69	1.00	1.00	0.567	0.600
DC48	Top	-924.37	80.33	0.00	1.00	1.00	0.567	0.600
	Bot.	-1060.20	-970.98	67.69	1.00	1.00	0.567	0.600
DC49	Top	-924.37	80.33	0.00	1.00	1.00	0.628	0.600
	Bot.	-1060.20	1131.64	-67.69	1.00	1.00	0.628	0.600
DC50	Top	-924.37	80.33	0.00	1.00	1.00	0.628	0.600
	Bot.	-1060.20	1131.64	67.69	1.00	1.00	0.628	0.600
DC51	Top	-924.37	80.33	0.00	1.00	1.00	0.463	0.600
	Bot.	-1060.20	-235.06	-225.65	1.00	1.00	0.463	0.600
DC52	Top	-924.37	80.33	0.00	1.00	1.00	0.681	0.600
	Bot.	-1060.20	395.72	-225.65	1.00	1.00	0.681	0.600
DC53	Top	-924.37	80.33	0.00	1.00	1.00	0.463	0.600
	Bot.	-1060.20	-235.06	225.65	1.00	1.00	0.463	0.600

DC54	Top	-924.37	80.33	0.00	1.00	1.00	0.681	0.600
	Bot.	-1060.20	395.72	225.65	1.00	1.00	0.681	0.600

Condition	Pos.	ϕ*Mnxx [Ton*m]	ϕ*Mnyy [Ton*m]	Mc/(ϕ*Mn)	Pu/(ϕ*Pn)	Asreq/Asprov	Demand: Capacity Ratio
DC1	Top	1559.59	0.00	0.08	0.27	0.96	0.27
	Bot.	1602.94	0.00	0.07	0.30	0.96	0.30
DC2	Top	-1560.04	0.00	0.29	0.27	0.96	0.29
	Bot.	-1602.86	0.00	0.28	0.30	0.96	0.30
DC3	Top	-1600.18	0.00	0.25	0.31	0.96	0.31
	Bot.	-1591.23	0.00	0.26	0.34	0.96	0.34
DC4	Top	1488.26	0.00	0.04	0.22	0.96	0.22
	Bot.	-1543.23	0.00	0.33	0.26	0.96	0.33
DC5	Top	1488.26	0.00	0.07	0.22	0.96	0.22
	Bot.	1543.23	0.00	0.43	0.26	0.96	0.43
DC6	Top	1530.99	0.00	0.04	0.25	0.96	0.25
	Bot.	-1585.96	0.00	0.13	0.28	0.96	0.28
DC8	Top	-1531.26	0.00	0.18	0.25	0.96	0.25
	Bot.	-1586.23	0.00	0.34	0.28	0.96	0.34
DC12	Top	-1574.09	0.00	0.16	0.27	0.96	0.27
	Bot.	-1600.58	0.00	0.32	0.31	0.96	0.32
DC15	Top	1530.99	0.00	0.09	0.25	0.96	0.25
	Bot.	1585.96	0.00	0.26	0.28	0.96	0.28
DC17	Top	-1531.26	0.00	0.13	0.25	0.96	0.25
	Bot.	1586.23	0.00	0.05	0.28	0.96	0.28
DC21	Top	-1574.09	0.00	0.11	0.27	0.96	0.27
	Bot.	1600.58	0.00	0.06	0.31	0.96	0.31
DC24	Top	1530.99	0.00	0.07	0.25	0.96	0.25
	Bot.	1585.96	0.00	0.07	0.28	0.96	0.28
DC25	Top	-1531.26	0.00	0.15	0.25	0.96	0.25
	Bot.	-1586.23	0.00	0.15	0.28	0.96	0.28
DC26	Top	-1574.09	0.00	0.13	0.27	0.96	0.27
	Bot.	-1600.58	0.00	0.13	0.31	0.96	0.31
DC27	Top	1473.87	0.00	0.03	0.22	0.96	0.22
	Bot.	-1526.73	0.00	0.32	0.25	0.96	0.32
DC28	Top	1473.87	0.00	0.07	0.22	0.96	0.22
	Bot.	1526.73	0.00	0.42	0.25	0.96	0.42
DC29	Top	1514.96	0.00	0.04	0.24	0.96	0.24
	Bot.	-1567.82	0.00	0.12	0.27	0.96	0.27
DC31	Top	-1515.22	0.00	0.17	0.24	0.96	0.24
	Bot.	-1568.07	0.00	0.33	0.27	0.96	0.33
DC35	Top	-1556.41	0.00	0.16	0.26	0.96	0.26
	Bot.	-1603.80	0.00	0.31	0.30	0.96	0.31
DC38	Top	1514.96	0.00	0.09	0.24	0.96	0.24
	Bot.	1567.82	0.00	0.25	0.27	0.96	0.27
DC40	Top	-1515.22	0.00	0.12	0.24	0.96	0.24
	Bot.	1568.07	0.00	0.04	0.27	0.96	0.27
DC44	Top	-1556.41	0.00	0.11	0.26	0.96	0.26
	Bot.	1603.80	0.00	0.06	0.30	0.96	0.30
DC47	Top	1488.26	0.00	0.05	0.22	0.96	0.22
	Bot.	-1533.86	-106.94	0.63	0.26	0.96	0.63
DC48	Top	1488.26	0.00	0.05	0.22	0.96	0.22
	Bot.	-1533.86	106.94	0.63	0.26	0.96	0.63

DC49	Top	1488.26	0.00	0.05	0.22	0.96	0.22
	Bot.	1535.18	-91.83	0.74	0.26	0.96	0.74
DC50	Top	1488.26	0.00	0.05	0.22	0.96	0.22
	Bot.	1535.18	91.83	0.74	0.26	0.96	0.74
DC51	Top	1488.26	0.00	0.05	0.22	0.96	0.22
	Bot.	-1109.14	-1064.71	0.21	0.26	0.96	0.26
DC52	Top	1488.26	0.00	0.05	0.22	0.96	0.22
	Bot.	1339.86	-764.01	0.30	0.26	0.96	0.30
DC53	Top	1488.26	0.00	0.05	0.22	0.96	0.22
	Bot.	-1109.14	1064.71	0.21	0.26	0.96	0.26
DC54	Top	1488.26	0.00	0.05	0.22	0.96	0.22
	Bot.	1339.86	764.01	0.30	0.26	0.96	0.30

Shear

S provided	:	15.00 [cm]	S required	:	51.61 [cm]
Sini provided	:	0.00 [cm]	Sini required	:	25.81 [cm]

Condition Gob.	Pos.	Vu [Ton]	Vc [Ton]	Vs [Ton]	ϕ*Vn [Ton]	Vu/(ϕ*Vn)
DC49	Top	75.95	324.46	115.61	330.06	0.23
	Bot.	75.95	332.71	115.61	336.24	0.23

Notes

* Torsion is not considered for design.

* Only columns with rectangular or circular sections are designed.

* Each column is verified considering only the forces at the ends of the member.

* The transverse reinforcement is ordered from bottom to top of the column.

* Lu = Unsupported length.

* K = Effective length factor.

* Cm = A factor relating actual moment diagram to an equivalent uniform moment diagram.

* Sway = True if column is considered unbraced in its local axis.

* Mc = Factored moment to be used for design. Considers the slenderness effects of the column. Mc = Mu*δns.

* δn2 = Amplification factor to account for small P-delta effects (P-δ).

* Mn = Nominal moment strength.

* Mc/(ϕ*Mn) = Strength ratio. The bar graphs indicate the relative ratio of Mc/(ϕ*Mn) for each load condition. If a bar is shown in red the ratio is greater than one.

Bentley

Current Date: 20/01/2015 09:21 a.m.
Units system: Metric

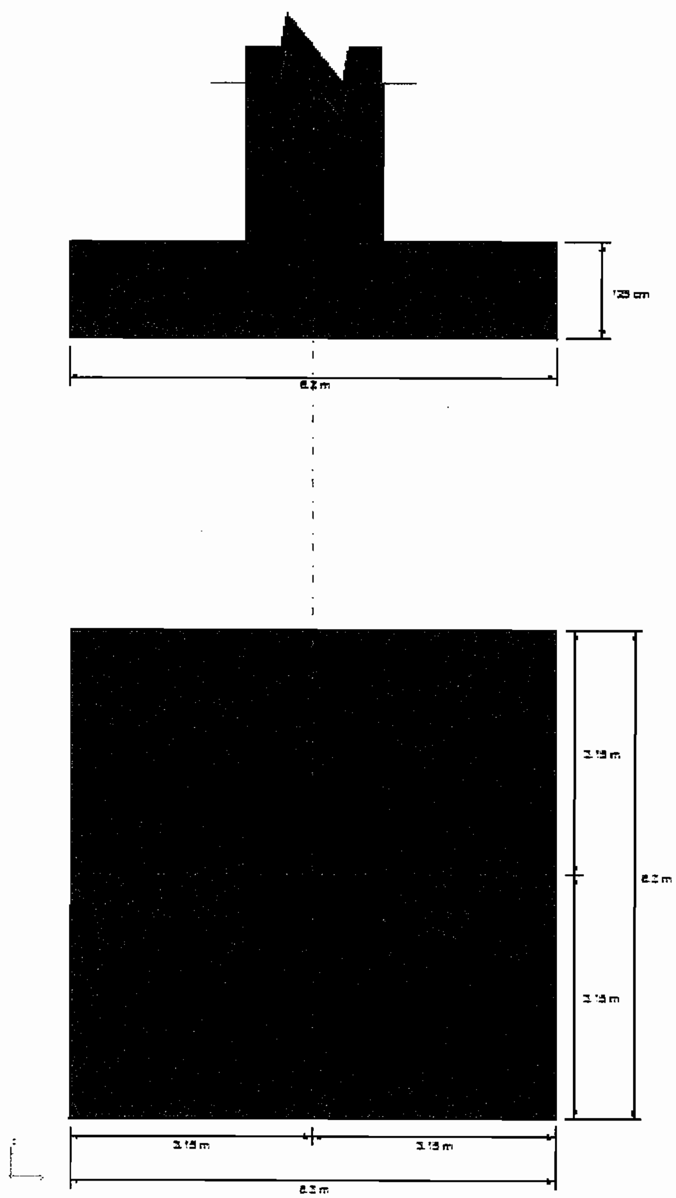
Design Results

Reinforced Concrete Footings

GENERAL INFORMATION:

Global status	:	OK
Design Code	:	ACI 318-2011
Footing type	:	Spread
Column type	:	Concrete

Geometry



Length	:	6.30 [m]
Width	:	6.30 [m]
Thickness	:	1.25 [m]
Base depth	:	2.00 [m]
Base area	:	39.69 [m2]
Footing volume	:	49.61 [m3]
Column length	:	178.00 [cm]
Column width	:	178.00 [cm]

Column location relative to footing g.c. : Centered

Materials

Concrete, f'c	:	0.25 [Ton/cm2]	Steel, fy	:	4.20 [Ton/cm2]
Concrete type	:	Normal	Epoxy coated	:	No
Concrete elasticity modulus	:	239.00 [Ton/cm2]	Steel elasticity modulus	:	2100.00 [Ton/cm2]
Unit weight	:	2.40 [Ton/m3]			

Soil

Modulus of subgrade reaction	:	3150.00 [Ton/m3]
Unit weight (wet)	:	1.75 [Ton/m3]

Footing reinforcement

Free cover	:	8.00 [cm]
Maximum Rho/Rho balanced ratio	:	0.75
Bottom reinforcement // to L (xx)	:	22-#10 @ 29.00cm
Top reinforcement // to L (xx)	:	22-#5 @ 29.00cm
Bottom reinforcement // to B (zz)	:	22-#10 @ 29.00cm (Zone 1)
Top reinforcement // to B (zz)	:	22-#5 @ 29.00cm

Dowel bar size

Rebar 1	:	8-#10
Free cover	:	2.50 [cm]
Development length calculated	:	in tension
Bars number // to x axis	:	3
Bars number // to z axis	:	3
Stirrups	:	#3 @ 20.00cm
Legs number // to x axis	:	2
Legs number // to z axis	:	2

Load conditions to be included in design

Service loads:

SC1	:	DL+L1
SC2	:	DL+L2
SC3	:	DL+L3
SC4	:	0.8DL+0.8WE
SC5	:	0.8DL-0.8WE
SC6	:	0.8DL+0.8L1+0.24WE+0.8WL+0.8LF1
SC8	:	0.8DL+0.8L2+0.24WE+0.8WL+0.8LF2
SC12	:	0.8DL+0.8L3+0.24WE+0.8WL+0.8LF3
SC15	:	0.8DL+0.8L1-0.24WE-0.8WL+0.8LF1
SC17	:	0.8DL+0.8L2-0.24WE-0.8WL+0.8LF2
SC21	:	0.8DL+0.8L3-0.24WE-0.8WL+0.8LF3
SC24	:	0.8DL+0.8L1+0.8RST
SC25	:	0.8DL+0.8L2+0.8RST
SC26	:	0.8DL+0.8L3+0.8RST
SC27	:	0.71DL+0.71WE+0.71RST
SC28	:	0.71DL-0.71WE+0.71RST
SC29	:	0.71DL+0.71L1+0.21WE+0.71WL+0.71LF1+0.71RST
SC31	:	0.71DL+0.71L2+0.21WE+0.71WL+0.71LF2+0.71RST
SC35	:	0.71DL+0.71L3+0.21WE+0.71WL+0.71LF3+0.71RST

SC38	:	0.71DL+0.71L1-0.21WE-0.71WL+0.71LF1+0.71RST
SC40	:	0.71DL+0.71L2-0.21WE-0.71WL+0.71LF2+0.71RST
SC44	:	0.71DL+0.71L3-0.21WE-0.71WL+0.71LF3+0.71RST
SC47	:	0.75DL+0.75EQx+0.23EQz
SC48	:	0.75DL+0.75EQx-0.23EQz
SC49	:	0.75DL-0.75EQx+0.23EQz
SC50	:	0.75DL-0.75EQx-0.23EQz
SC51	:	0.75DL+0.75EQz+0.23EQx
SC52	:	0.75DL+0.75EQz-0.23EQx
SC53	:	0.75DL-0.75EQz+0.23EQx
SC54	:	0.75DL-0.75EQz-0.23EQx
Design strength loads:		
DC1	:	1.3DL+2.17L1
DC2	:	1.3DL+2.17L2
DC3	:	1.3DL+2.17L3
DC4	:	1.3DL+1.3WE
DC5	:	1.3DL-1.3WE
DC6	:	1.3DL+1.3L1+0.39WE+1.3WL+1.3LF1
DC8	:	1.3DL+1.3L2+0.39WE+1.3WL+1.3LF2
DC12	:	1.3DL+1.3L3+0.39WE+1.3WL+1.3LF3
DC15	:	1.3DL+1.3L1-0.39WE-1.3WL+1.3LF1
DC17	:	1.3DL+1.3L2-0.39WE-1.3WL+1.3LF2
DC21	:	1.3DL+1.3L3-0.39WE-1.3WL+1.3LF3
DC24	:	1.3DL+1.3L1+1.3RST
DC25	:	1.3DL+1.3L2+1.3RST
DC26	:	1.3DL+1.3L3+1.3RST
DC27	:	1.25DL+1.25WE+1.25RST
DC28	:	1.25DL-1.25WE+1.25RST
DC29	:	1.25DL+1.25L1+0.375WE+1.25WL+1.25LF1+1.25RST
DC31	:	1.25DL+1.25L2+0.375WE+1.25WL+1.25LF2+1.25RST
DC35	:	1.25DL+1.25L3+0.375WE+1.25WL+1.25LF3+1.25RST
DC38	:	1.25DL+1.25L1-0.375WE-1.25WL+1.25LF1+1.25RST
DC40	:	1.25DL+1.25L2-0.375WE-1.25WL+1.25LF2+1.25RST
DC44	:	1.25DL+1.25L3-0.375WE-1.25WL+1.25LF3+1.25RST
DC47	:	1.3DL+1.3EQx+0.39EQz
DC48	:	1.3DL+1.3EQx-0.39EQz
DC49	:	1.3DL-1.3EQx+0.39EQz
DC50	:	1.3DL-1.3EQx-0.39EQz
DC51	:	1.3DL+1.3EQz+0.39EQx
DC52	:	1.3DL+1.3EQz-0.39EQx
DC53	:	1.3DL-1.3EQz+0.39EQx
DC54	:	1.3DL-1.3EQz-0.39EQx

Loads

Condition	Footing	Node	Axial [Ton]	Mxx [Ton*m]	Mzz [Ton*m]	Vx [Ton]	Vz [Ton]
DL	1	4	815.54	0.00	61.79	0.00	0.00
L1	1	4	81.23	0.00	17.79	0.00	0.00
L2	1	4	81.74	0.00	-241.98	0.00	0.00
L3	1	4	163.16	0.00	-224.91	0.00	0.00
WE	1	4	0.00	0.00	-449.46	-30.85	0.00
WL	1	4	0.00	0.00	-100.62	-5.55	0.00
LF1	1	4	0.00	0.00	0.00	0.00	0.00
LF2	1	4	0.00	0.00	0.00	0.00	0.00
LF3	1	4	0.00	0.00	0.00	0.00	0.00
RST	1	4	0.00	0.00	0.00	0.00	0.00
EQx	1	4	0.00	0.00	-808.70	58.31	0.00
EQz	1	4	0.00	173.57	0.00	0.00	-12.51

RESULTS:

Status : OK

Soil.Foundation interaction

Allowable stress	:	3.5E04 [kg/m2]
Min. safety factor for sliding	:	1.25
Min. safety factor for overturning	:	1.25

Controlling condition : SC49 - 1

Condition Footing	qmean [kg/m2]	qmax [kg/m2]	Δmax [cm]	Area in compression [m2]	(%)	Overturning FSx	FSz	FS slip
SC49 - 1	1.86E04	3.4E04	1.08	39.69	100	53.56	3.90	7.78

Bending

Factor ϕ	:	0.90
Min rebar ratio	:	0.00200

Development length

Axis	Pos.	ld [cm]	lhd [cm]	Dist1 [cm]	Dist2 [cm]
zz	Bot.	141.18	39.53	218.00	218.00
xx	Bot.	154.54	43.27	218.00	218.00
zz	Top	30.48	15.24	218.00	218.00
xx	Top	30.48	15.24	218.00	218.00

Axis	Pos.	Condition Footing	Mu [Ton*m]	ϕ*Mn [Ton*m]	Asreq [cm2]	Asprov [cm2]	Asreq/Asprov	Mu/(ϕ*Mn)
zz	Top	DC1 - 1	0.00	0.00	0.00	44.00	0.000	0.000
zz	Bot.	DC50 - 1	734.34	766.95	172.40	180.26	0.956	0.957
xx	Top	DC1 - 1	0.00	0.00	0.00	44.00	0.000	0.000
xx	Bot.	DC3 - 1	573.29	744.97	157.50	180.26	0.874	0.770

Shear

Factor ϕ	:	0.75
Shear area (plane zz)	:	7.27 [m2]
Shear area (plane xx)	:	7.07 [m2]

Plane	Condition Footing	Vu [Ton]	Vc [Ton]	Vu/(ϕ*Vn)
xy	DC3 - 1	255.55	592.49	0.575
yz	DC49 - 1	329.09	609.53	0.720

Punching shear

Factor ϕ	:	0.75
Perimeter of critical section (b...	:	11.67 [m]
Punching shear area	:	13.28 [m2]

Column	Condition Footing	Vu [Ton]	Vc [Ton]	Vu/(ϕ*Vn)
column 1	DC3 - 1	1110.91	2226.79	0.665

Notes

* Soil under the footing is considered elastic and homogeneous. A linear soil pressure variation is assumed.

* The required flexural reinforcement considers at least the minimum reinforcement

* The design bending moment is calculated at the critical sections located at the support faces

* Only rectangular footings with uniform sections and rectangular columns are considered.

* The nominal shear strength is calculated in critical sections located at a distance d from the support face

* The punching shear strength is calculated in a perimetral section located at a distance d/2 from the support faces

* Transverse reinforcement is not considered in footings

* Values shown in red are not in compliance with a provision of the code

*qprom = Mean compression pressure on soil.

*qmax = Maximum compression pressure on soil.

*Δmax = maximum total settlement (considering an elastic soil modeled by the subgrade reaction modulus).

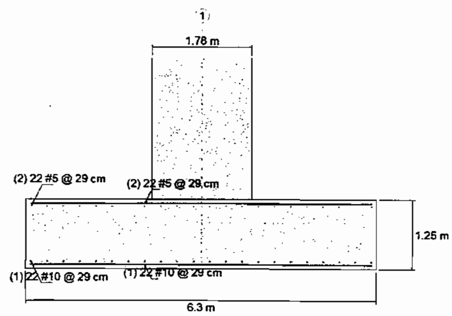
* Mn = Nominal moment strength.

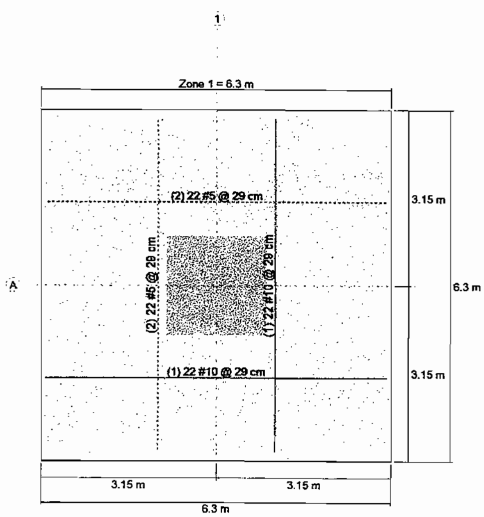
* Mu/(ϕ*Mn) = Strength ratio.

* Vn = Nominal shear or punchure force (for footings Vn=Vc).

* Vu/(ϕ*Vn) = Shear or punching shear strength ratio.

Current Date: 20/01/2015 09:24 a.m.
Units system: Metric





PORTILLO Y YOUNG S.C.

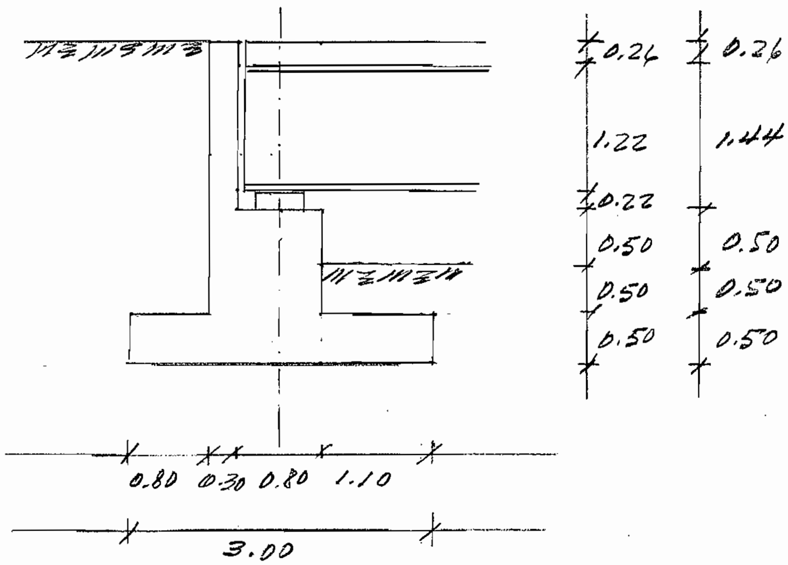
PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DISEÑO ESTRIBOS

HOJA: ES-1
FECHA: 01/01/15
CALCULO: M.D
REVISO:

* Diseño Estribo 1

+ Datos Generales



PORTILLO Y YOUNG S.C.	PROYECTO: P.S. CALLE MARISCAL	HOJA: ES-2
	CONCEPTO: DISEÑO ESTRIBOS	FECHA: 21/01/15
		CALCULO: M.P.
		REVISO:

+ Análisis de Cargas:

- Carga Muerta

$P_D = 222.25 + 94.25 = 316.5\ kN/viga = 32.26\ ton/viga =$

$= 20.16\ ton/m$

- Carga Viva

$P_{L+I} = 192.26\ kN/viga = 19.60\ ton/viga = 12.25\ ton/m$

- Carga Viva en Accesos

Tomar $W_{LL} = 1.08\ ton/m^2$

- Frenaje (Considerar 5 vigas para el puente vehicular)

$H_{LF} = 0.05(0.952 \times 37.00 + 18 \times 0.454) = 2.17\ ton/carril \times 2/5$

$= 0.87\ ton/viga / 1.60 = 0.54\ ton/m$

- Contracción y Temperatura

$$H_{RST} = \frac{G(W \times L)\Delta L}{T} = \frac{0.11(14 \times 10)0.78}{5} = 2.40\ kips = 1.09\ ton/viga/1.60 =$$

$= 0.68\ ton/viga$

- Sismo

utilizar ecuaciones Mononobe-Okabe y el espectro de respuesta

DISEñO VIGAS PASO SUPERIOR AVE. MARISCAL - TRAMO 1
Girder System : Analysis Output : Reactions - Girder 5
Wed Jan 21 12:45:19 2015

Girder 5 Service Vertical Reactions - kN

Supp/Node		Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min
Governing							
1	5	222.25	94.25	192.26	0.00	3.76	0.00
	Steel	60.31					
	Concrete	161.94					

Global x concurrent LL+I rot. 0.0005 -0.0006 deg
Global y concurrent LL+I rot. 0.0703 0.0000 deg

Max LL+I Contribution by Lane

1	2
88.46	103.80

Concurrent reactions using same governing loaded lanes
as for Max LL+I and Min LL+I

Concurrent at gdr 1 - -4.76

Concurrent at gdr 2 - 23.47

Concurrent at gdr 3 - 96.78

Concurrent at gdr 4 - 148.62

Concurrent at gdr 6 - 153.25

Concurrent at gdr 7 - 94.20

Supp/Node		Noncomp Dead	Super-Imposed Dead	Max Live+ Impact	Min Live+ Impact	Sidewalk Max	Sidewalk Min
2	48	222.26	94.26	192.25	0.00	3.76	0.00
	Steel	60.31					
	Concrete	161.95					

Global x concurrent LL+I rot. 0.0005 -0.0006 deg
Global y concurrent LL+I rot. -0.0593 -0.0555 deg

Max LL+I Contribution by Lane

1	2
88.46	103.80

Concurrent reactions using same governing loaded lanes
as for Max LL+I and Min LL+I

Concurrent at gdr 1 - -4.76

Concurrent at gdr 2 - 23.48

Concurrent at gdr 3 - 96.78

Concurrent at gdr 4 - 148.62

Concurrent at gdr 6 - 153.25

Concurrent at gdr 7 - 94.20

Truck Loading

1	5	192.26	0.00
2	48	192.25	0.00

Lane Loading

1	5	178.23	0.00
2	48	178.23	0.00

Fatigue Truck

Support Rotations - Degrees

About global axes used in Girder Geometry table

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		x-axis	y-axis	x-axis	y-axis	x-axis	y-axis
1	5	0.00	0.65	0.00	0.18	(0.00 to 0.00)	(0.00 to 0.15)
	Concurrent live vertical reaction					72.50 64.75	0.00 95.86
2	48	0.00	-0.65	0.00	-0.18	(0.00 to 0.00)	(-0.15 to 0.00)
	Concurrent live vertical reaction					72.50 64.74	95.85 0.00

Noncomp dead end reactions do not include weight of girder extensions.

Torsional and flexural rotations - member local axes

Supp/Node		Noncomp Dead		Superimp Dead		LL+I+SDWK Range	
		tors	flex	tors	flex	tors	flex
1	5	0.00	0.65	0.00	0.18	(0.00 to 0.00)	(0.00 to 0.15)
2	48	0.00	-0.65	0.00	-0.18	(0.00 to 0.00)	(-0.15 to 0.00)

Noncomp dead end reactions do not include weight of girder extensions.

Paso Superior Calle Mariscal

A).- DATOS GENERALES

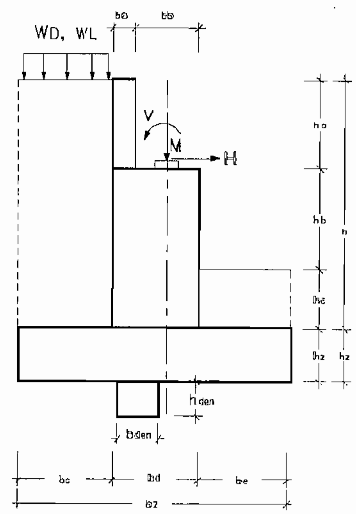
Denominación	Diseño Estribo 1

B).- ANALISIS DE CARGAS

Fvd = carga muerta	20,160	kg/m
Fvl = carga viva	12,250	kg/m
Fhlf = frenaje	540	kg/m
Fhrst = contr. y temp.	680	kg/m
Md = mom. c. muerta	0	kg - m/m
Ml = mom. c. viva	0	kg - m/m
wd =sobrecarga muerta	0	kg / m2
wl =sobrecarga viva	1,080	kg / m2

C).- DATOS DEL MURO

γm = peso vol. muro	2,400	kg/m3
ha =altura del respaldo	1.70	mts
hb = altura libre muro	0.50	mts
hf = prof. de desplante	1.00	mts
ht = altura total estribo	3.20	mts
bma = ancho respaldo	0.30	mts
bap = ancho del apoyo	0.80	mts
bmb = ancho min. muro	1.10	mts
bmc = ancho max.muro	1.10	mts
hz = espesor zapata	0.50	mts
lzn = long nariz zapata	1.10	mts
lzt = long talón zapata	0.80	mts
lz = longitud zapata	3.00	mts



D).- DATOS DEL DENTELLON

hden(mts)	0.00	mts
bden(mts)	0.00	mts

D).- DATOS DEL SUELO

γs = peso vol. suelo	1,800	kg/m3
ϕ = angulo de friccion	33	grados
Ka	0.29	
Kp	3.39	
μ = coeficiente de fricc	0.40	
qa = esfuerzo admisible	20,000	kg/m2

E).- DATOS PARA ANALISIS SISMICO (Mononobo - Okabe)

Coef. Sísmico = C =	0.04
Fh =	0.50
kh = Fh x C =	0.02
θ = ATAN (kh) =	1.15 °
ψ =	2.36
Kae =	0.31

E).- CALCULAR ACCIONES DE DISEÑO EN LA BASE

- Empuje Lateral

Debido al Suelo			
Es (Estatico)	=	2,717	kg/m
Es (Sísmico)	=	102	kg/m
Debido al muro			
Emuro (Sísmico)	=	149	kg/m
Debido a la Superestructura			
Tomar Sismo?		SI	
Esup (Sísmico)	=	403	kg/m
Debido a las cargas horizontales			
Flf (Estático)	=	540	kg/m
Frst (Estático)	=	680	kg/m
Debido a las sobrecargas			
Ewd (Estático)	=	-	kg/m
Ewd (Sísmico)	=	-	kg/m
Ewl (Estático)	=	1,019	kg/m

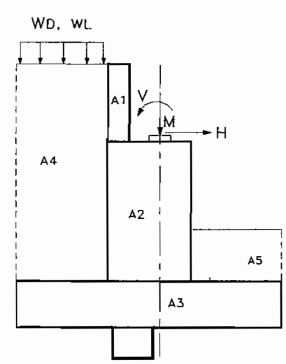
- Momento de Volteo

Debido al Suelo			
Ms (Estático)	=	2,898	kg-m/m
Ms (Sísmico)	=	195	kg-m/m
Debido al muro			
Mmuro (Sísmico)	=	128	kg-m/m
Debido a la Superestructura			
Msup (Sismico)	=	605	kg-m/m
Debido a las cargas horizontales			
Mlf	=	810	kg-m/m
Mrst	=	1,020	kg-m/m
Debido a las sobrecargas			
Mwd (Estatico)	=	-	kg-m/m
Mwd (Sísmico)	=	-	kg-m/m
Mwl (Estático)	=	1,630	kg-m/m
Debido a los momentos aplicados			
Md (Estático)	=	-	kg-m/m
Ml (Estático)	=	-	kg-m/m

F).- REVISAR ESTABILIDAD AL VOLTEO

- Calcular Momento Reistente

Sección	Area (m2/m)	Peso (kg/m)	Brazo (m)	Momento (kg-m/m)
Debido al peso del muro				
A1	0.51	1,224	2.05	2,509
A2	1.10	2,640	1.65	4,356
A3	-	-	2.20	-
A4	1.50	3,600	1.50	5,400
Debido al peso del relleno				
A5	-	-	2.20	-
A6	-	-	2.20	-
A7	2.16	3,888	2.60	10,109
A8	0.55	990	0.55	545
Debido a las cargas verticales				
Fvd		20,160	1.50	30,240
Fvl		12,250	1.50	18,375
wd		-	2.60	-
wl		864	2.60	2,246
Totales		**45,616**		**73,780**



1.6

- Calcular Factor de Seguridad al Volteo
  F. S. = Mresistente / Mactuante = **11.60** > 2 o.k.

G).- REVISAR RESISTENCIA AL DESLIZAMIENTO

- Calcular fuerza de deslizamiento resistente (empuje pasivo en zapata y dentellon)

Frd = fricción cargas muertas	13,131	kg/m
Frl = fricción cargas vivas	5,298	kg/m
Fd = empuje pasivo en zapata	-	kg/m
Fd = empuje pasivo en dent.	-	kg/m
Totales	**18,429**	kg/m

- Calcular Factor de Seguridad al Deslizamiento
  F. S. = E resistente / E actuante = 3.72 **> 1.5 o.k.**

H).- REVISAR ESFUERZOS DE TRABAJO EN EL TERRENO

- Analizar combinaciones de cargas

Combinacion	M(kg-m/m)	P(kg/m)	x(m)	e(m)	qn(kg/m2)	qt(kg/m2)
Grupo I	69,251	45,616	1.52	-0.02	14,654	15,757
Grupo II	50,260	32,502	1.55	-0.05	9,829	11,839
Grupo III	68,441	45,616	1.50	0.00	15,194	15,217
Grupo IV	68,231	45,616	1.50	0.00	15,334	15,077
Grupo V	49,240	32,502	1.51	-0.01	10,509	11,159
Grupo VI	67,421	45,616	1.48	0.02	15,874	14,537
Grupo VII	49,332	32,502	1.52	-0.02	10,448	11,220

- Revisar esfuerzos en el terreno

e max =	0.02	mts	< lz / 6 o.k.
e min =	-0.05	mts	< lz / 6 o.k.
qn max =	15,874	kg/m2	0 < qf < qa o. k.
qn min =	9,829	kg/m2	0 < qf < qa o. k.
qt max =	15,757	kg/m2	0 < qt < qa o. k.
qt min =	11,159	kg/m2	0 < qt < qa o. k.

I).- DISEÑO DEL MURO

- Datos Generales

f'c =	250	kg/cm2
fy =	4200	kg/cm2
ρb =	0.0255	
0.75 ρb =	0.0191	
Varillas No.	5	

- Diseño a Flexión

Punto	Mu(kg-m/m)	Mu min(kg-m/m)	d(cm)	ρ	As(cm2/m)	Var/m	Sep(cm)
1	1,512	2,011	24.21	0.0009	2.22	1.12	89
2	6,240	8,299	104.21	0.0002	2.11	1.07	94

Diseño a Cortante

Punto	Vu (kg-m)	d(cm)	Vc(kg/m)	
1	2,211	24.21	17,223	o. k.
2	6,065	104.21	74,144	o. k.

I).- DISEÑO DE LA ZAPATA

- Datos Generales

f'c =	250	kg/cm2
fy =	4200	kg/cm2
ρb =	0.0255	
0.75 ρb =	0.0191	
Varillas No.	5	

- Calcular esfuerzos últimos

Combinacion	Mu(kg-m/m)	Pu(kg/m)	xu(m)	eu(m)	qnu(kg/m2)	qtu(kg/m2)
Grupo I	106,201	70,710	1.50	0.00	23,479	23,661
Grupo II	64,208	42,253	1.52	-0.02	13,532	14,637
Grupo III	87,208	59,301	1.47	0.03	20,929	18,604
Grupo IV	86,935	59,301	1.47	0.03	21,111	18,422
Grupo V	60,463	42,253	1.43	0.07	16,028	12,141
Grupo VI	82,578	57,020	1.45	0.05	20,974	17,039
Grupo VII	63,001	42,253	1.49	0.01	14,336	13,832

- Diseño Nariz

Diseño a Flexión

Mu =	14,205	kg-m/m	
Mu min =	15,811	kg-m/m	* domina
d =	44.21	cm	
ρ =	0.0022		
As =	9.67	cm2/m	
Var/m =	4.89		
Sep Var =	20	cm	

Diseño a Cortante

Vu =	15,448	kg/m	
ΦVc =	31,488	kg/m	> Vu o. k.

- Diseño Talón

Diseño a Flexión

Mu =	915	kg-m/m	
Mu min =	1,217	kg-m/m	* domina
d =	44.21	cm	
ρ =	0.0002		
As =	0.73	cm2/m	
Var/m =	0.37		
Sep Var =	271	cm	refuerzo inferior

Diseño a Cortante

Vu =	3,080	kg/m	
ΦVc =	31,488	kg/m	> Vu o. k.

J).- Refuerzo por Contracción y Temperatura (AASHTO / ACI)

- Muro

Tratar varillas No. 4

Refuerzo Vertical

As min	=	2.64	cm2 / m / cara = Var. @	48 cms
As min = 1/2 (0.0015) Ag	=	8.25	cm2 / m / cara = Var. @	15 cms
s max	=			45 cms

Refuerzo Horizontal

As min	=	2.64	cm2 / m / cara = Var. @	48 cms
As min = 1/2 (0.0020) Ag	=	11.00	cm2 / m / cara = Var. @	12 cms
s max	=			45 cms

- Zapata

Tratar varillas No. 4

As min	=	2.64	cm2 / m / cara = Var. @	48 cms
As min = 1/2 (0.0018) Ag	=	4.50	cm2 / m / cara = Var. @	28 cms
s max	=			45 cms

PORTILLO Y YOUNG S.C.

PROYECTO: P.S. CALLE MARISCAL

CONCEPTO: DISEÑO ESTRIBOS

HOJA: ES-3
FECHA: 22/05/15
CALCULO: M.P.
REVISO:

+ Armado Estribo