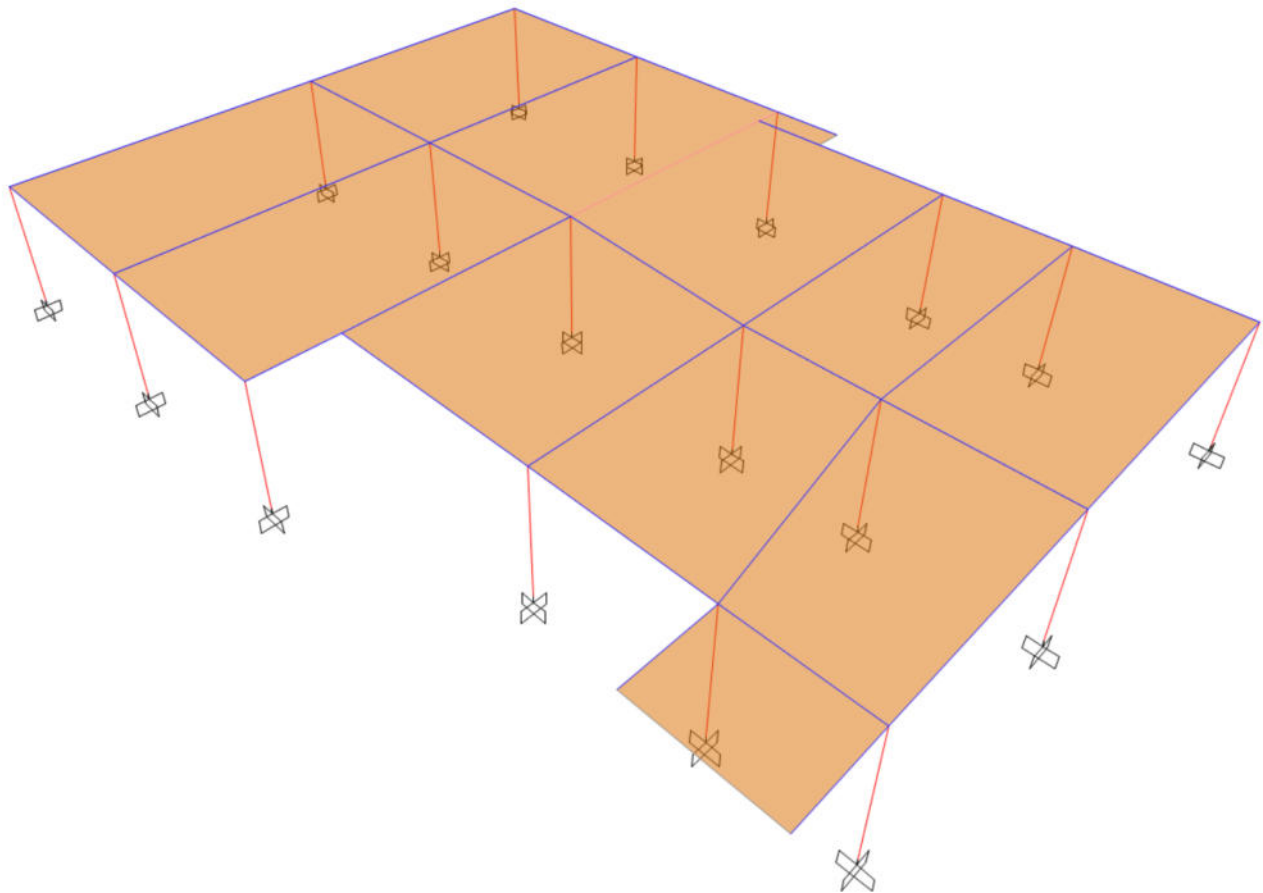


PROYECTO LAS AMERICAS



DISEÑO ESTRUCTURAL MEMORIAS DE CÁLCULO

MANIZALES – CALDAS
MARZO 2026



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INTRODUCCIÓN

A continuación, se presenta el diseño estructural de “Proyecto las Américas”, que estará ubicado en la Carrera 16 #16-60 en la ciudad de Manizales - Caldas.

Para el desarrollo del proyecto se calcula una estructura en Concreto reforzado, que consta de 1 nivel, el cual tiene una altura total de 3.30 m. La estructura se conforma por pórticos de concreto resistentes a momento. La estructura cuenta con una estructura de cubierta compuesta por correas metálicas.

METODOLOGÍA DE DISEÑO

Es de notar que el diseño estructural fue realizado con la ayuda del programa ETABS Version-17.0.1, que realiza un análisis dinámico de la estructura, basado en los elementos y cargas que se le asignen al modelo adoptado. Así mismo, vale aclarar que el presente diseño, cumple con los requisitos impuestos por el código de construcciones NSR-10, con combinaciones de sismo y factores de amplificación.

El procedimiento de diseño está compuesto por etapas, que siguen el orden que se presenta a continuación:

1. Inicialmente se hizo una evaluación de las cargas muertas y vivas a las que estaría sometida la estructura durante su vida útil.
2. Una vez definidas los elementos estructurales, se hizo la asignación de cargas a los elementos, en este caso se optó por simular en el modelo matemático una losa maciza tipo membrana, con un espesor equivalente. A estas losas, se asignaron cargas de **0.5 kN/m², 1.0 kN/m², 0.4 kN/m²**, por concepto de carga viva de cubierta, granizo y viento respectivamente.

3. Luego se procedió a realizar la sumatoria de cargas de cada elemento para determinar la masa de cada piso de la estructura, para ser utilizada en el análisis de la fuerza horizontal equivalente que describe la NSR-10.
4. Se hizo el análisis sísmico, por el método de la fuerza horizontal equivalente, teniendo en cuenta para este caso los siguientes parámetros.

Al ser una edificación ubicada en la ciudad de Manizales, se tuvo en cuenta una amenaza sísmica alta con un factor (**Aa**) de **0.25** y (**Av**) de **0.25**.

Para el tipo de suelo se usaron los datos del estudio de suelos, donde para la ubicación del predio se tiene un coeficiente de amplificación (**Fa**) de **1.45** y (**Fv**) de **3**.

Para el uso de la edificación se determinó que correspondía al **grupo de uso (II)**, con un coeficiente de importancia (**I**) de **1.10**.

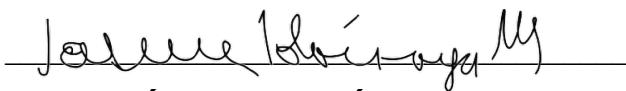
El sistema estructural adoptado en este caso está constituido de pórticos resistentes a momento de concreto reforzado.

Teniendo en cuenta una capacidad de disipación de energía especial (**DES**) con irregularidad torsional y falta de redundancia, se determinó que la estructura poseía un coeficiente de disipación de energía **R** de **4.73**.

Luego de hacer el análisis sísmico se obtuvo la fuerza horizontal equivalente.

5. Hasta esta estancia del diseño, no se había hecho intervención al programa de cálculo ETABS.
6. Haciendo uso del programa de cálculo se definieron inicialmente las propiedades de los materiales que iban a ser utilizados en la construcción, se determinaron las supuestas secciones de vigas, columnas; y se ingresaron las combinaciones de carga consideradas en el diseño.

7. Se graficó el modelo tridimensional y se definieron los casos de sismo que se emplearían en el cálculo, estos sismos incluyeron los efectos de **torsión accidental** del **5.0%** señalados en el código.
8. Al hacer un prediseño, se comparó la fuerza dinámica de los sismos inelásticos empleada en el modelo con la FHE, que presenta el código, determinando el factor de amplificación (Ajuste dinámico) del sismo dinámico para hacerla coincidir con el porcentaje de FHE considerado en el numeral **A.5.4.5** en la fórmula **A.5.4-5** de la **NSR-10**, que para nuestro caso es de **90%**.
9. Luego de este chequeo, se procedió a verificar si las derivas presentes en la estructura cumplían con las permitidas por el código (1.0%), viendo si era necesario incrementar el tamaño de los elementos estructurales:
La deriva máxima fue de **$0.45 \% \leq 1.0\%$** **ok**.
10. Después de los pasos descritos, se presentaron en la memoria las plantas y los perfiles de la estructura con la numeración de elementos que fueron asignados por el programa y los resultados de diseño que arrojó en pantalla en cuanto a aceros de refuerzo por flexión, corte y torsión en vigas, columnas y muros estructurales.
11. De igual manera se presentó la numeración de nodos en la planta de cimentación, el diseño y el chequeo de dicha cimentación que consta de zapatas vaciadas in situ, cuya geometría fue determinada con la ayuda y la recomendación realizada en el estudio de suelos, siguiendo los parámetros propuestos por el Ingeniero Geotecnista.



JAIME IDÁRRAGA MARÍN

M.P. 25294 CALDAS

Ingeniero civil

Especialista en estructuras

EVALUACIÓN DE CARGAS

CARGAS NIVEL TIPO

CM:	Acabados	1.10	kN/m ²
	Muros	3	kN/m ²
		4.10	kN/m ²

Espesor equivalente para modelar membrana equivalente 0.00 cm

CARGAS EN CUBIERTA

CM:	Teja Acesco	0.04	kN/m ²
	Correas Metalicas	0.05	kN/m ²
	Cielo raso	0.20	kN/m ²
	Lamparas	0.04	kN/m ²
		0.33	kN/m ²

Espesor equivalente para modelar membrana equivalente 1.39 cm

CUCHILLA			
Muro	Peso [kN/m ²]	Altura [m]	Peso [kN/m]
Mampostería 12 cm	2.08	1.2	2.50

Las cargas de los muros fueron asignadas a las vigas sobre las que iran apoyados

CV:	Cubierta <15°	0.50	kN/m ²
CW:	Succión/Compresión	±0.40	kN/m ²
CS:	Granizo <15°	1.00	kN/m ²

CARGA MUERTA ADICIONAL EN VOLADIZO

L voladizo=	2 m
Carga Muerta	0.13 kN/m ²
Total peso =	0.26 kN/m
Carga adicional (30%)=	0.08 kN/m

A.3.6.13 — EFECTO DE LAS ACCELERACIONES VERTICALES — En las zonas de amenaza sísmica alta e intermedia, deben tenerse en cuenta los efectos de los movimientos sísmicos verticales en los siguientes elementos estructurales:
(a) En los voladizos, considerando una fuerza vertical, ascendente o descendente, en la punta del elemento con un valor igual al 30 por ciento de la carga muerta del voladizo en las zonas de amenaza sísmica alta, y del 15 por ciento en las zonas de amenaza sísmica intermedia; y
(b) En los elementos contruados con concreto preesforzado, deben utilizarse combinaciones de carga adicionales a todas aquellas que incluyan carga muerta, utilizando el 50 por ciento de la carga muerta.

Se adiciona a carga de muro de cubierta, la carga total
corresponde a 2.58 kN/m²

IRREGULARIDAD TORSIONAL 1aP IRREGULARIDAD TORSIONAL EXTREMA 1bP

1aP	Irregularidad torsional — La irregularidad torsional existe cuando en una edificación con diafragma rígido, la máxima deriva de piso de un extremo de la estructura, calculada incluyendo la torsión accidental evaluada con $A_x = 1.0$ y medida perpendicularmente a un eje determinado, es más de 1.2 y menor o igual a 1.4 veces la deriva promedio de los dos extremos de la estructura, con respecto al mismo eje de referencia.
1bP	Irregularidad torsional extrema — La irregularidad torsional extrema existe cuando en una edificación con diafragma rígido, la máxima deriva de piso de un extremo de la estructura, calculada incluyendo la torsión accidental evaluada con $A_x = 1.0$ y medida perpendicularmente a un eje determinado, es más de 1.4 veces la deriva promedio de los dos extremos de la estructura, con respecto al mismo eje de referencia.

Tipo 1aP — Irregularidad torsional

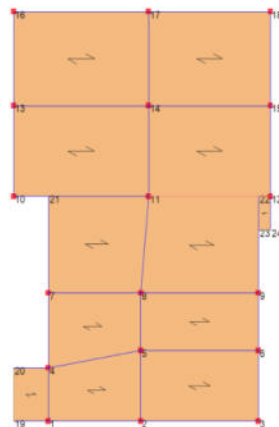
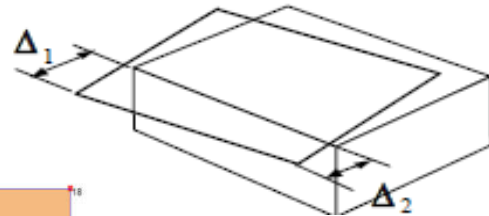
$$\phi_p = 0.9$$

$$1.4 \left(\frac{\Delta_1 + \Delta_2}{2} \right) \geq \Delta_1 > 1.2 \left(\frac{\Delta_1 + \Delta_2}{2} \right)$$

Tipo 1bP — Irregularidad torsional extrema

$$\phi_p = 0.8$$

$$\Delta_1 > 1.4 \left(\frac{\Delta_1 + \Delta_2}{2} \right)$$



Story	Label	Load Case/Combo	Step Type	Drift	$\left(\frac{\Delta_1 + \Delta_2}{2} \right)$	Chequeo	Tipo de irregularidad	ϕ_p
Story1	1	(DER2) 1.2D+L+Ey	Max	0.002936	0.002845	Sin Irregularidad torsional	-	1
Story1	3	(DER2) 1.2D+L+Ey	Max	0.002753				
Story1	1	(DER2) 1.2D+L+Ey	Min	0.002773	0.002826	Sin Irregularidad torsional	-	1
Story1	3	(DER2) 1.2D+L+Ey	Min	0.002879				
Story1	1	(DER4) 0.9D+Ey	Max	0.003181	0.003113	Sin Irregularidad torsional	-	1
Story1	3	(DER4) 0.9D+Ey	Max	0.003044				
Story1	1	(DER4) 0.9D+Ey	Min	0.003072	0.003101	Sin Irregularidad torsional	-	1
Story1	3	(DER4) 0.9D+Ey	Min	0.003129				
Story1	3	(DER1) 1.2D+L+Ex	Max	0.002724	0.003605	Irregularidad torsional	1aP	0.9
Story1	18	(DER1) 1.2D+L+Ex	Max	0.004486				
Story1	3	(DER1) 1.2D+L+Ex	Min	0.003064	0.003728	Sin Irregularidad torsional	-	1
Story1	18	(DER1) 1.2D+L+Ex	Min	0.004392				
Story1	3	(DER3) 0.9D+Ex	Max	0.002766	0.003620	Irregularidad torsional	1aP	0.9
Story1	18	(DER3) 0.9D+Ex	Max	0.004474				
Story1	3	(DER3) 0.9D+Ex	Min	0.003022	0.003713	Sin Irregularidad torsional	-	1
Story1	18	(DER3) 0.9D+Ex	Min	0.004404				

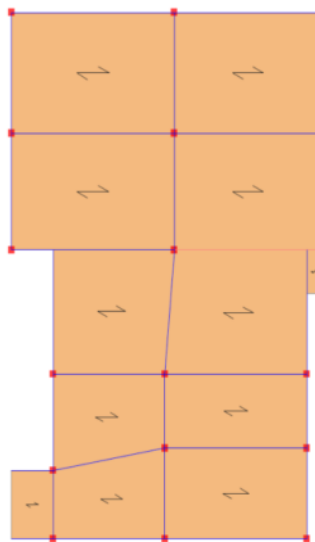
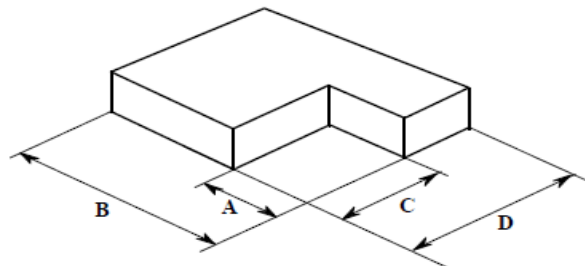
APLICA IRREGULARIDAD TORSIONAL $\phi_p=0.9$

RETROCESOS EXCESIVOS EN LAS ESQUINAS 2P

Retrocesos excesivos en las esquinas — La configuración de una estructura se considera irregular cuando ésta tiene retrocesos excesivos en sus esquinas. Un retroceso en una esquina se considera excesivo cuando las proyecciones de la estructura, a ambos lados del retroceso, son mayores que el 15 por ciento de la dimensión de la planta de la estructura en la dirección del retroceso.

Tipo 2P — Retrocesos en las esquinas — $\phi_p = 0.9$

$$A > 0.15B \quad \text{y} \quad C > 0.15D$$



A=	0.00 m
B=	21.50 m
A > 0.15B	
NO APLICA	

C=	0.00 m
D=	14.40 m
C > 0.15D	
NO APLICA	

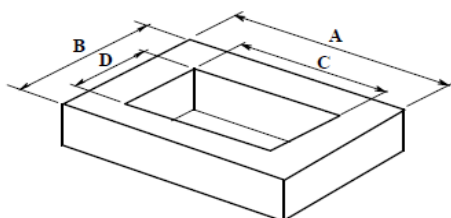
NO APLICA
IRREGULARIDAD TIPO
2P
 $\phi_p = 1$

DISCONTINUIDADES EN EL DIAFRAGMA 3P

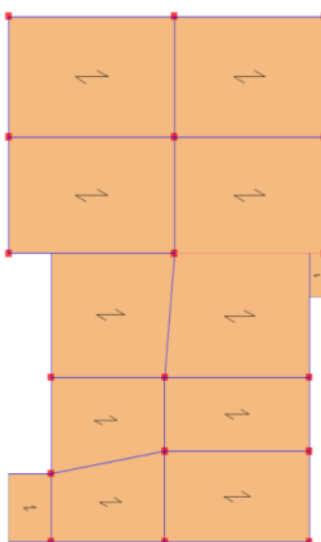
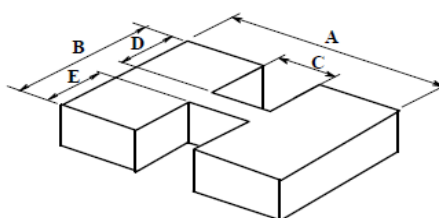
Discontinuidades en el diafragma — Cuando el diafragma tiene discontinuidades apreciables o variaciones en su rigidez, incluyendo las causadas por aberturas, entradas, retrocesos o huecos con áreas mayores al 50 por ciento del área bruta del diafragma o existen cambios en la rigidez efectiva del diafragma de más del 50 por ciento, entre niveles consecutivos, la estructura se considera irregular.

Tipo 3P — Irregularidad del diafragma — $\phi_p = 0.9$

1) $C \times D > 0.5 A \times B$



2) $(C \times D + C \times E) > 0.5 A \times B$



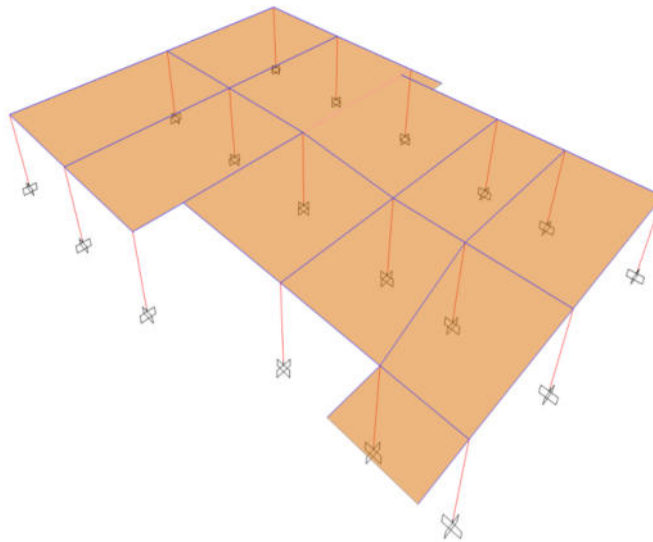
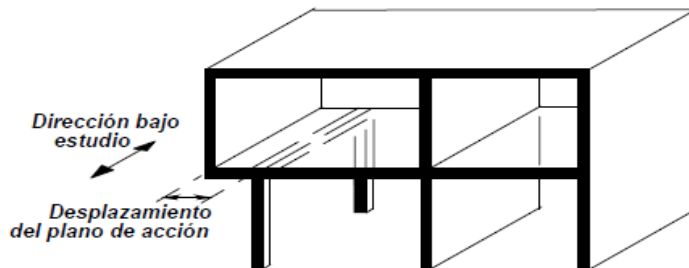
CASO 1	
A=	21.50 m
B=	14.40 m
C=	0.00 m
D=	0.00 m
CxD>0.5AxB	
NO APLICA	

CASO 2	
A=	21.50 m
B=	14.40 m
C=	8.57 m
D=	2.00 m
E=	0.00 m
(CxD+CxE)>0.5AxB	
NO APLICA	

NO APLICA
IRREGULARIDAD TIPO
3P
 $\phi_p = 1$

DESPLAZAMIENTOS DEL PLANO DE ACCIÓN DE ELEMENTOS VERTICALES 4P

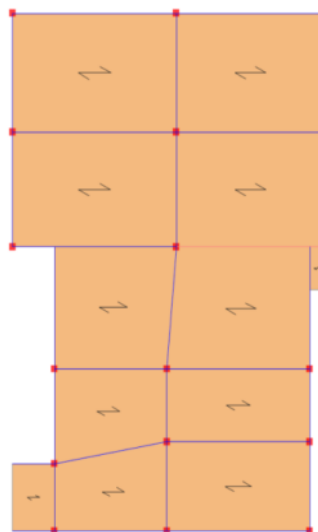
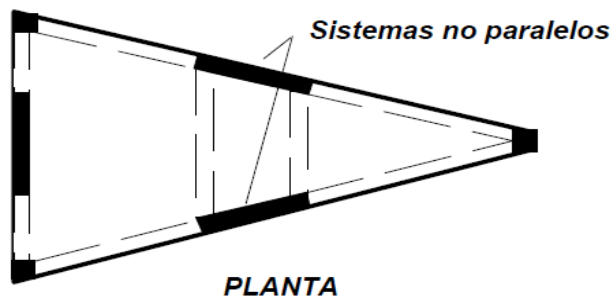
Desplazamientos del plano de acción de elementos verticales — La estructura se considera irregular cuando existen discontinuidades en las trayectorias de las fuerzas inducidas por los efectos sísmicos, tales como cuando se traslada el plano que contiene a un grupo de elementos verticales del sistema de resistencia sísmica, en una dirección perpendicular a él, generando un nuevo plano. Los altillos o manzardas de un solo piso se eximen de este requisito en la consideración de irregularidad.



NO APLICA
IRREGULARIDAD TIPO
4P
 $\phi_p = 1$

SISTEMAS NO PARALELOS 5P

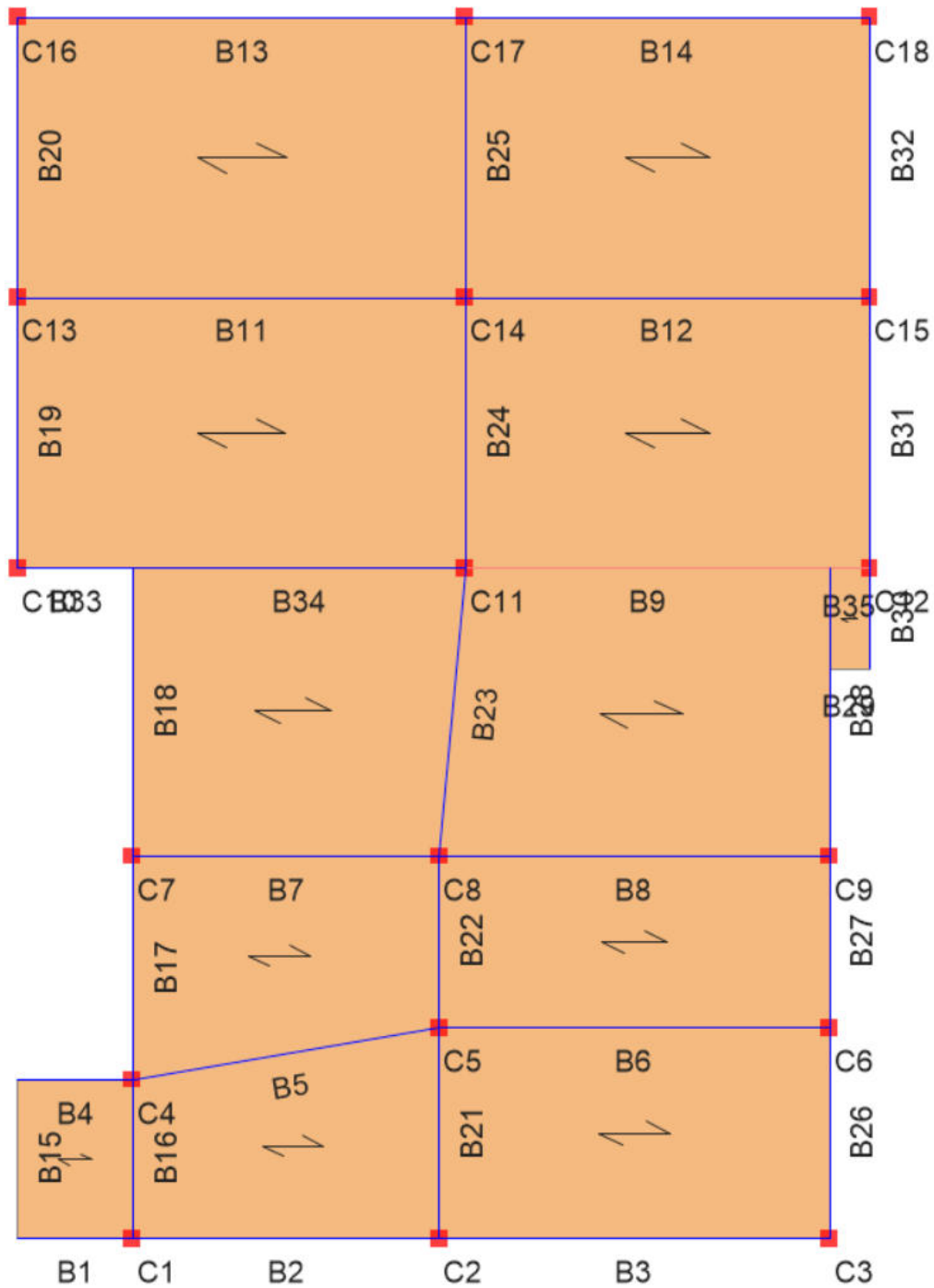
Sistemas no paralelos — Cuando las direcciones de acción horizontal de los elementos verticales del sistema de resistencia sísmica no son paralelas o simétricas con respecto a los ejes ortogonales horizontales principales del sistema de resistencia sísmica, la estructura se considera irregular.



APLICA
IRREGULARIDAD TIPO
5P
 $\phi_p = 0.9$

NUMERACIÓN DE ELEMENTOS

N+3.30



ASIGNACIÓN DE CARGAS CARGAS DISTRIBUIDAS

Shell Uniform Load Set Data ✕

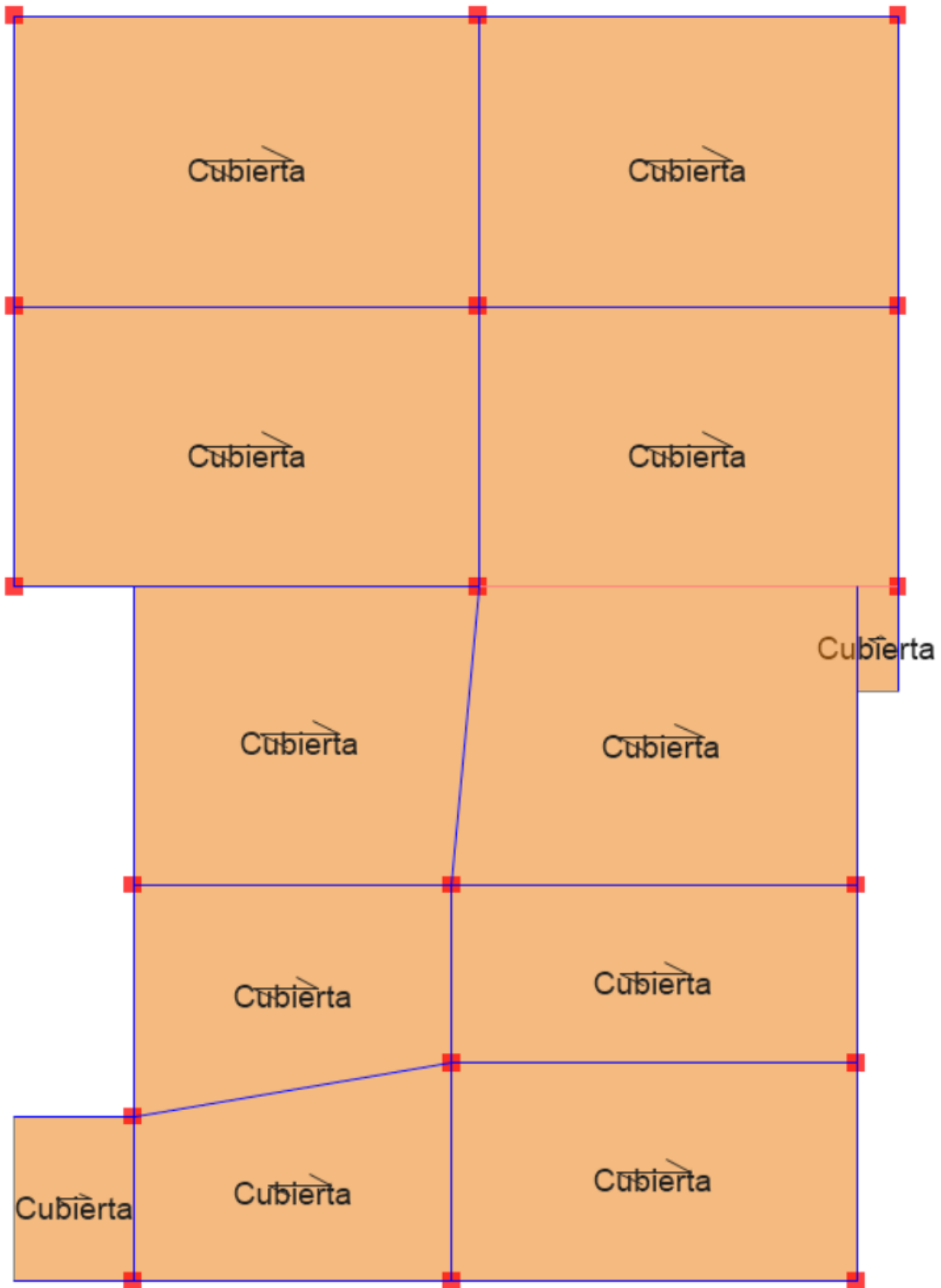
Uniform Load Set Name

Load Set Loads

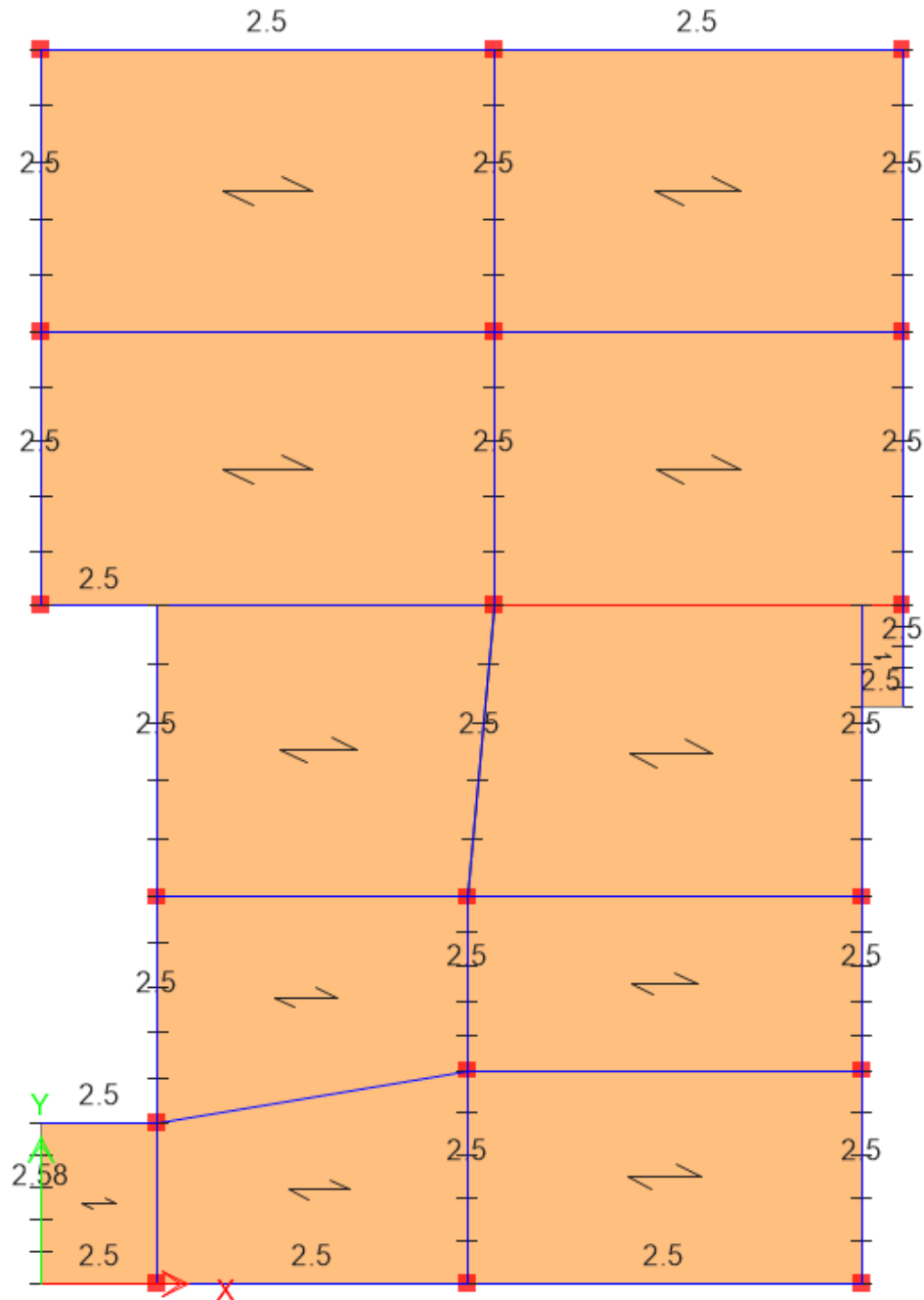
Load Pattern	Load Value (kN/m ²)
Roof Live	0.5
Wind	0.4
Snow	1

Note: Loads are in the gravity direction.

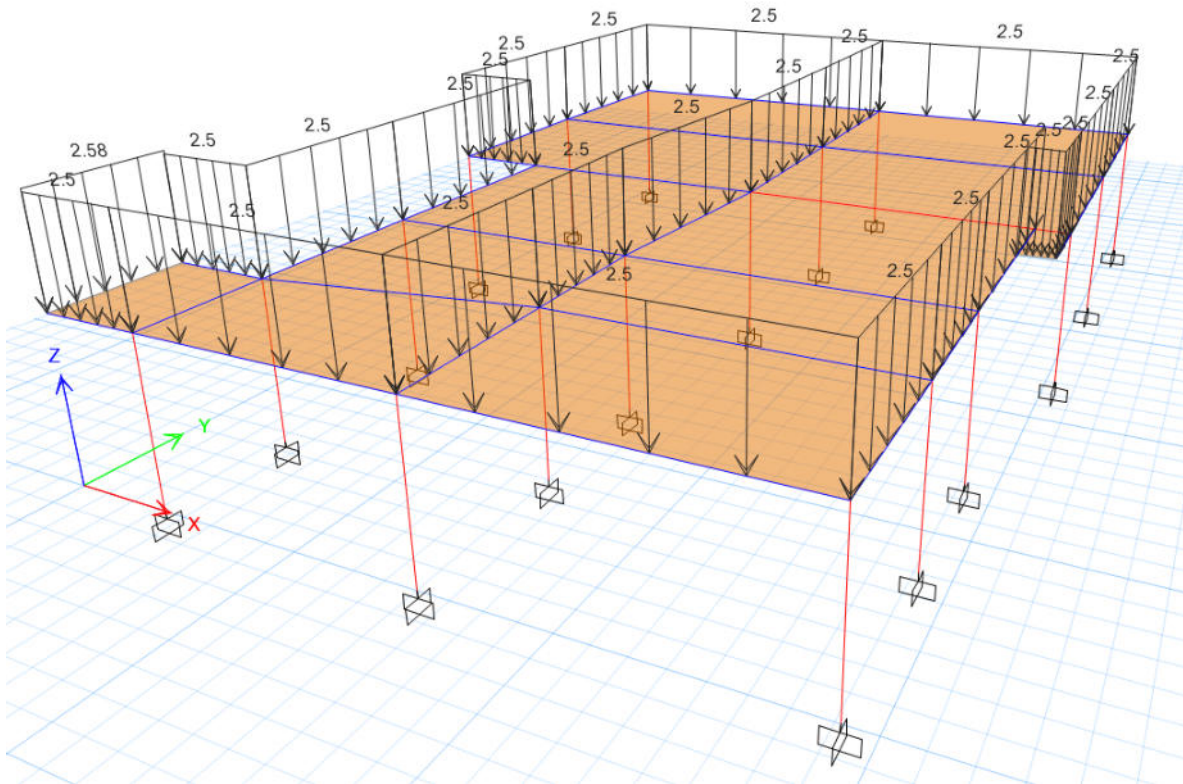
N+3.30

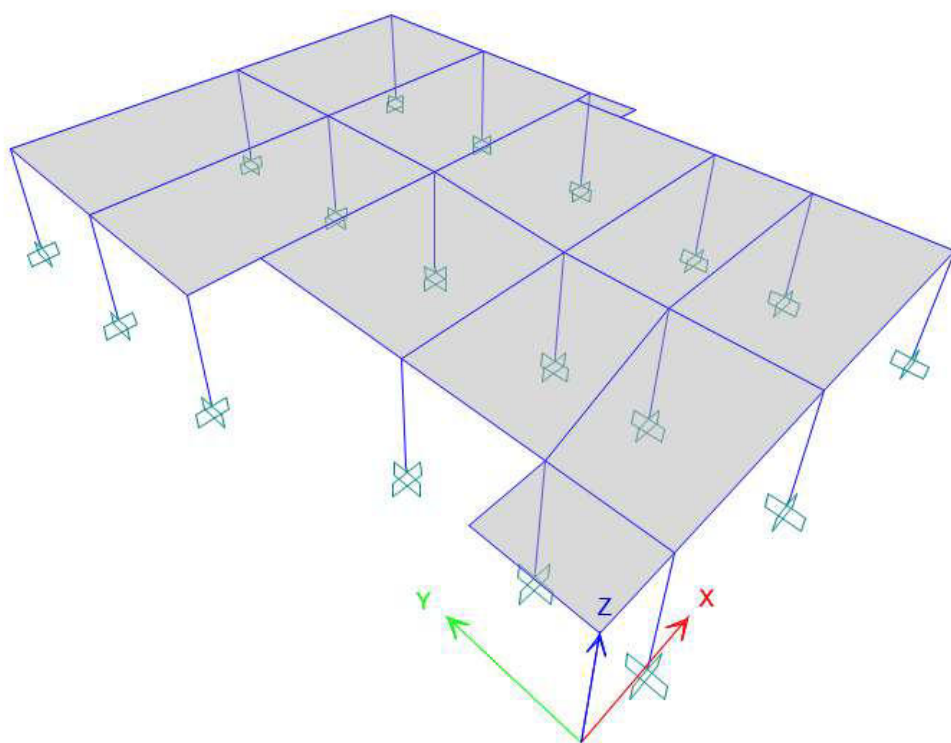


ASIGNACIÓN DE CARGAS CARGAS LINEALES kN/m



Carga en voladizo = $2.50 \text{ kN/m} + 0.08 \text{ kN/m}$





MASAS DE PISO

Model File: Las Americas, Revision 0
19/03/2026

1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

1.1 Story Data

Table 1.1 - Story Definitions

Tower	Name	Height m	Master Story	Similar To	Splice Story	Splice Height m	Color
T1	Story1	3.3	Yes	None	No		Green

1.2 Mass

Table 1.2 - Mass Source Definition

Name	Is Default	Include Lateral Mass?	Include Vertical Mass?	Lump Mass?	Source Self Mass?	Source Added Mass?	Source Load Patterns?	Move Mass Centroid?	Move Ratio X	Move Ratio Y	Load Pattern	Multiplier
MsSrc1	Yes	Yes	No	Yes	No	No	Yes	No			Dead	1
MsSrc1											Super Dead	1

Table 1.3 - Mass Summary by Story

Story	UX kg	UY kg	UZ kg
Story1	72701.78	72701.78	0
Base	6415.2	6415.2	0

Table 1.4 - Mass Summary by Group

Group	Self Mass kg	Self Weight kN	Mass X kg	Mass Y kg	Mass Z kg
All	0	528.224	79116.98	79116.98	0

ANÁLISIS SÍSMICO

Parámetros del Análisis

I. Localización y zona de amenaza sísmica

Ciudad	Manizales	
Amenaza sísmica	Alta	
Aa	0.25	Parámetro con base en la aceleración pico efectiva
Av	0.25	Parámetro con base en la velocidad pico efectiva

II. Parámetros del perfil del suelo

Tipo de Perfil	E	Clasificación del perfil de suelo
Fa	1.45	Coefficiente de amplificación Fa
Fv	3	Coefficiente de amplificación Fv

III. Características de la estructura

Grupo de Uso	II	
I	1.10	Coefficiente de importancia
Sistema estructural	Porticos de Hormigon Resistentes a momentos	
Disipación de energía	DES	Capacidad de Disipación de Energía Especial

IV. Espectro elástico de aceleraciones de diseño

Ta portico resistente a momentos

h (m)	3.3	Altura total de la estructura
Ct	0.047	
a	0.9	
T=Ta (s)	0.138	$T_a = C_t \cdot h^a$ Periodo fundamental aproximado

Ta promedio

Ta (s)	0.138	
T1 modal (s)	0.231	(UX)
T2 modal (s)	0.208	(RZ)
T3 modal (s)	0.204	(UY)
T0 (s)	0.21	
Tc (s)	0.99	
TL (s)	7.2	
Sa x (g)	0.99688	Aceleración horizontal de diseño para Tx
Sa y (g)	0.99688	Aceleración horizontal de diseño para Ty

$$S_a = \begin{cases} \frac{2.5 A_a F_a I}{T} & \text{si } 0 < T_a \leq T_c \\ \frac{1.2 A_v F_v I}{T} & \text{si } T_c < T_a \leq T_L \\ \frac{1.2 A_v F_v T_L I}{T^2} & \text{si } T_a > T_L \end{cases}$$

Nota: Sa esta definido para un coeficiente de amortiguamiento del 5% del crítico

VI. Fuerza horizontal equivalente

W (ton)	72.7
Vsx (ton)	72.47
Vsy (ton)	72.47

Peso total de la estructura

Cortante basal X

Cortante basal Y

A.4.3.1 NSR-10

kx	1.0000
ky	1.0000

Exponente relacionado con T

A.4.3.2 NSR-10

$$k = \begin{cases} 1.0 & \text{si } T \leq 0.5 \\ 0.75 + 0.5T & \text{si } 0.5 < T \leq 2.5 \\ 2.0 & \text{si } T > 2.5 \end{cases} \quad C_{vx} = \frac{m_x h_x^k}{\sum_{i=1}^n (m_i h_i^k)} \quad F_x = C_{vx} V_s \quad V_s = S_a W \rightarrow W = g \cdot M$$

Nivel	h_x [m]	W_x (ton)	$W_x h_x^k$	C_{vx}	F_x (ton)	F_y (ton)
N+3.30	3.3	72.701	240	1.00	72.47	72.47
N+0.00	0	0	0	0.00	0.00	0.00
Suma		72.701	239.9	1.0	72.47	72.47

VII. Capacidad de disipación de energía

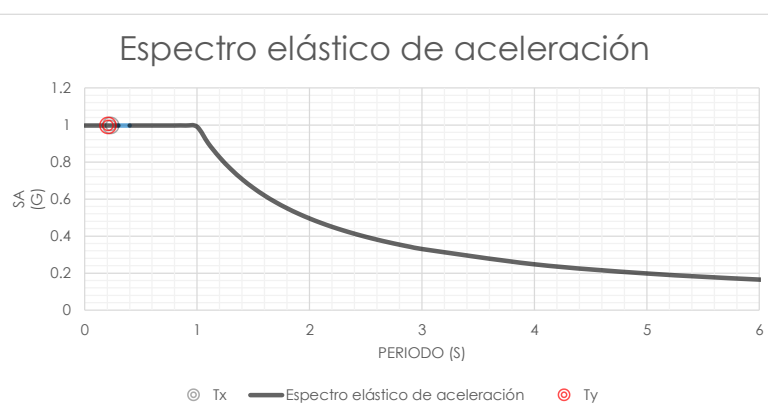
Disipación de energía	DES	Capacidad de Disipación de Energía Especial
R0	7	
φP	0.9	Reducción por irregularidad en planta
φa	1	Reducción por irregularidad en altura
φr	0.75	Reducción por ausencia de redundancia
R	4.73	Coefficiente de capacidad de disipación de energía
Ω0	3	Coefficiente de sobrerresistencia

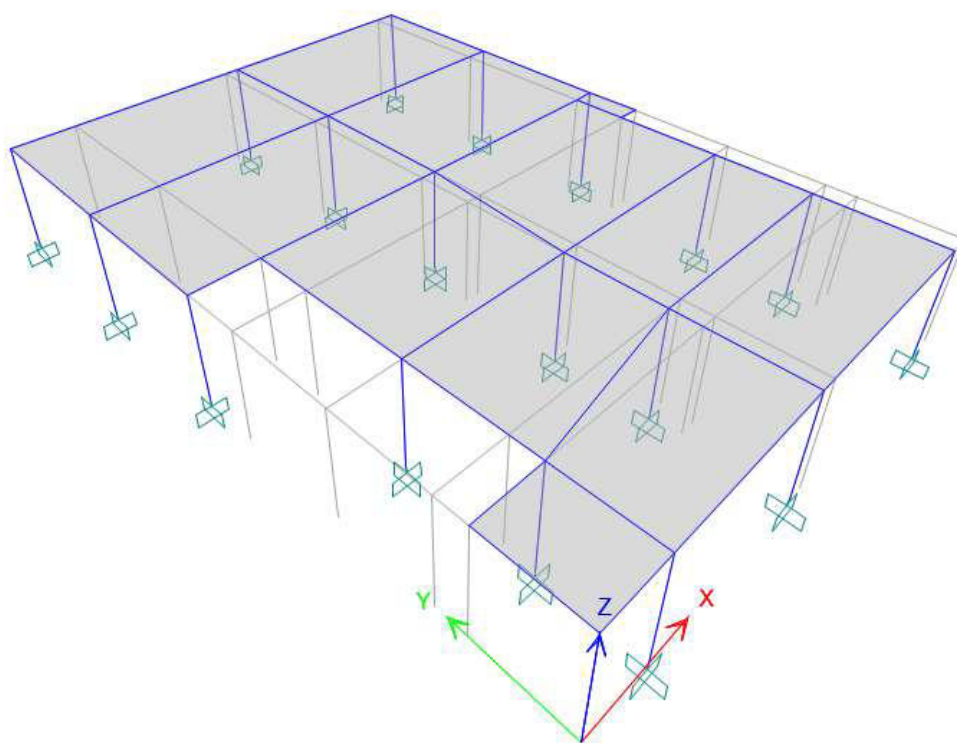
VIII. Ajuste de Resultados

Cu	1.20	$C_u = 1.75 - 1.2A_v F_p$
Tmax	0.17	$T_{max} = C_u T_a$
T₁	0.231	Periodo calculado del Análisis Modal
T₂	0.208	Periodo calculado del Análisis Modal
T₃	0.204	Periodo calculado del Análisis Modal
Sa x (g)	0.996875	Nota: Los periodos modales son mayores que el Tmax, sin embargo el valor de Sa se mantiene en la meseta del espectro.
Sa y (g)	0.996875	

IX. Espectro elástico de aceleraciones de diseño

T (s)	Sa (g)
0	0.9969
0.1	0.9969
0.2	0.9969
0.3	0.9969
0.4	0.9969
0.5	0.9969
0.6	0.9969
0.7	0.9969
0.8	0.9969
0.9	0.9969
1	0.9900
1.1	0.9000
1.2	0.8250
1.3	0.7615
1.4	0.7071
1.5	0.6600
1.6	0.6188
1.7	0.5824





ANALISIS MODAL

Model File: Las Americas, Revision 0
20/03/2026

1 Analysis Results

This chapter provides analysis results.

1.1 Modal Results

Table 1.1 - Modal Periods And Frequencies

Case	Mode	Period sec	Frequency cyc/sec	CircFreq rad/sec	Eigenvalue rad2/sec2
Modal	1	0.231	4.333	27.2221	741.0411
Modal	2	0.208	4.8	30.16	909.6234
Modal	3	0.204	4.912	30.8601	952.3488
Modal	4	0.07	14.202	89.2323	7962.4051
Modal	5	0.041	24.576	154.4158	23844.253

Table 1.2 - Modal Participating Mass Ratios (Part 1 of 2)

Case	Mode	Period sec	UX	UY	UZ	SumUX	SumUY	SumUZ	RX	RY	RZ
Modal	1	0.231	0.818	0.0012	0	0.818	0.0012	0	0.0012	0.818	0.1846
Modal	2	0.208	0.1436	0.2747	0	0.9615	0.2759	0	0.2747	0.1436	0.5799
Modal	3	0.204	0.0384	0.724	0	1	1	0	0.724	0.0384	0.2355
Modal	4	0.07	2.886E-05	3.134E-05	0	1	1	0	3.134E-05	2.886E-05	2.35E-05
Modal	5	0.041	6.075E-06	2.544E-06	0	1	1	0	2.544E-06	6.075E-06	1.302E-05

Table 1.2 - Modal Participating Mass Ratios (Part 2 of 2)

Case	Mode	SumRX	SumRY	SumRZ
Modal	1	0.0012	0.818	0.1846
Modal	2	0.2759	0.9615	0.7645
Modal	3	1	1	1
Modal	4	1	1	1
Modal	5	1	1	1

Table 1.3 - Modal Participation Factors

Case	Mode	Period sec	UX kN-m	UY kN-m	UZ kN-m	RX kN-m	RY kN-m	RZ kN-m	ModalMass kN-m-s2	ModalStiff kN-m
Modal	1	0.231	-0.002082	-8.1E-05	0	0.000852	-0.021934	0.348793	0.0001	0.08373
Modal	2	0.208	-0.000872	0.001207	0	-0.01271	-0.009189	-0.618291	0.0001	0.10277
Modal	3	0.204	0.000451	0.001959	0	-0.020636	0.004753	0.393989	0.0001	0.1076
Modal	4	0.07	-1.2E-05	-1.3E-05	0	0.000136	-0.00013	0.003935	0.0001	0.89963
Modal	5	0.041	-6E-06	4E-06	0	-3.9E-05	-6E-05	0.002929	0.0001	2.69404

Table 1.4 - Modal Load Participation Ratios

Case	ItemType	Item	Static %	Dynamic %
Modal	Acceleration	UX	100	100
Modal	Acceleration	UY	100	100
Modal	Acceleration	UZ	0	0

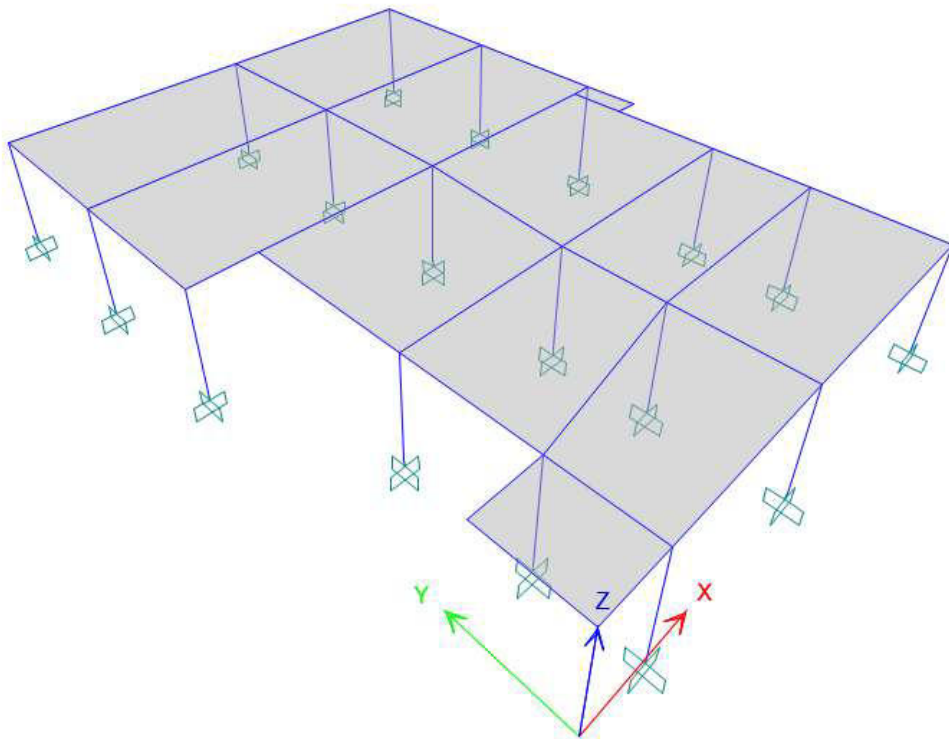
Table 1.5 - Modal Direction Factors

Case	Mode	Period sec	UX	UY	UZ	RZ
Modal	1	0.231	0.824	0.001	0	0.175
Modal	2	0.208	0.144	0.276	0	0.58
Modal	3	0.204	0.039	0.728	0	0.233
Modal	4	0.07	0	0	0	1
Modal	5	0.041	0	0	0	1

CORRECCIÓN DINÁMICA

Tipo Estructura (Regular/Irregular)	Irregular	Corrección	90%
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Método	Periodo		Valor cortante basal ETABS	
	Tx (sec)	Ty (sec)	VX (ton)	VY (ton)
Analisis estático. Metodo fuerza horizontal equivalente (MFHE)	0.138	0.138	72.47	72.47
Analisis Dinámico (Ex-Ey Espectro)	0.231	0.178	66.44	71.69
Factor correccion			0.982	0.910
Nota: A partir de este factor de corrección se ingresa en ETABS el Ex_C y Ey_C, en este caso se toma un factor de corrección de 1 para ambos casos				
Dado que los factores de corrección son menores a 1.00, <u>se mantiene como 1.00.</u>				



COMBINACIONES DE CARGA

Model File: Las Americas, Revision 0
19/03/2026

1 Loads

This chapter provides loading information as applied to the model.

1.1 Load Patterns

Table 1.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
~LLRF	Yes	Other	0	
Dead	No	Dead	1	
FHE-X	No	Seismic	0	User Coefficient
FHE-Y	No	Seismic	0	User Coefficient
H	No	Other	0	
Live	No	Live	0	
Roof Live	No	Roof Live	0	
Snow	No	Snow	0	
Super Dead	No	Super Dead	0	
Wind	No	Other	0	

1.2 Load Sets

Table 1.2 - Shell Uniform Load Sets

Name	Load Pattern	Load Value kN/m2
Cubierta	Roof Live	0.5
Cubierta	Snow	1
Cubierta	Wind	0.4

1.3 Auto Seismic Loading

Table 1.3 - Load Pattern Definitions - Auto Seismic - User Coefficient (Part 1 of 2)

Name	Weight Used kN	Base Shear kN	Is Auto Load	X Dir?	X Dir Plus Ecc?	X Dir Minus Ecc?	Y Dir?	Y Dir Plus Ecc?	Y Dir Minus Ecc?	Ecc Ratio	Top Story	Bottom Story
FHE-X	712.961	710.733	No	No	Yes	No	No	No	No	0.05	Story1	Base
FHE-Y	712.961	710.733	No	No	No	No	No	Yes	No	0.05	Story1	Base

Table 1.3 - Load Pattern Definitions - Auto Seismic - User Coefficient (Part 2 of 2)

Name	Weight Used kN	Base Shear kN	Ecc Overwrite Story	Ecc Overwrite Diaphragm	Ecc Overwrite Length m	C	K
FHE-X	712.961	710.733				0.996875	1
FHE-Y	712.961	710.733				0.996875	1

User Coefficient Auto Seismic Load Calculation

This calculation presents the automatically generated lateral seismic loads for load pattern FHE-X using the user input coefficients, as calculated by ETABS.

Direction and Eccentricity

Direction = X + Eccentricity Y

Eccentricity Ratio = 5% for all diaphragms

Factors and Coefficients

Equivalent Lateral Forces

Base Shear Coefficient, C

$$C = 0.996875$$

Base Shear, V

$$V = CW$$

Calculated Base Shear

Direction	Period Used (sec)	C	W (kN)	V (kN)
X + Ecc. Y	0	0	712.961	710.733

Applied Story Forces

Lateral Load to Stories - X



Story	Elevation	X-Dir	Y-Dir
	m	kN	kN
Story1	3.3	710.733	0
Base	0	0	0

User Coefficient Auto Seismic Load Calculation

This calculation presents the automatically generated lateral seismic loads for load pattern FHE-Y using the user input coefficients, as calculated by ETABS.

Direction and Eccentricity

Direction = Y + Eccentricity X

Eccentricity Ratio = 5% for all diaphragms

Factors and Coefficients

Equivalent Lateral Forces

Base Shear Coefficient, C C = 0.996875

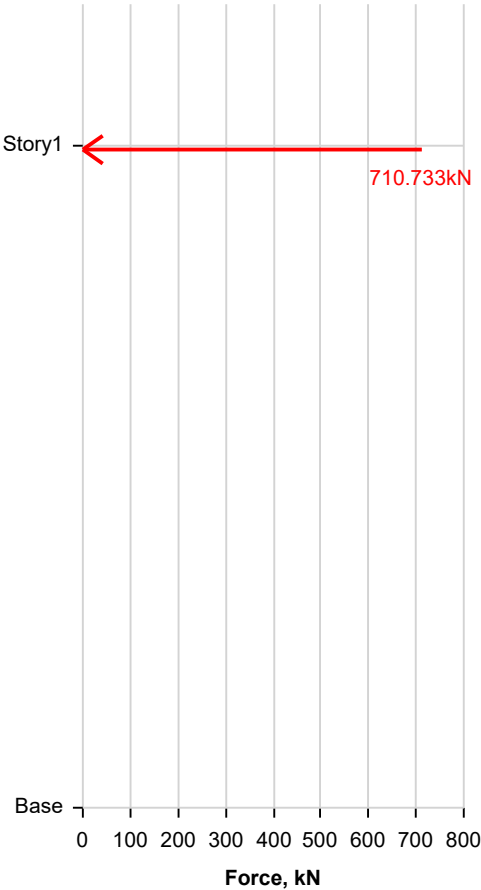
Base Shear, V V = CW

Calculated Base Shear

Direction	Period Used (sec)	C	W (kN)	V (kN)
Y + Ecc. X	0	0	712.961	710.733

Applied Story Forces

Lateral Load to Stories - Y



Story	Elevation m	X-Dir kN	Y-Dir kN
Story1	3.3	0	710.733
Base	0	0	0

1.4 Functions

1.4.1 Response Spectrum Functions

Table 1.6 - Functions - Response Spectrum - Columbia NSR-10

Name	Period sec	Value	Aa	Av	Ae	Ad	Group of Use	Fa	Fv	Damping Ratio
Manizales Suelo E	0	0.996875	0.25	0.25	0.18	0.09	2	1.45	3	0.05
Manizales Suelo E	0.1	0.996875								
Manizales Suelo E	0.2	0.996875								
Manizales Suelo E	0.3	0.996875								
Manizales Suelo E	0.4	0.996875								
Manizales Suelo E	0.5	0.996875								
Manizales Suelo E	0.6	0.996875								
Manizales Suelo E	0.7	0.996875								
Manizales Suelo E	0.8	0.996875								
Manizales Suelo E	0.9	0.996875								
Manizales Suelo E	1	0.99								
Manizales Suelo E	1.2	0.825								
Manizales Suelo E	1.5	0.66								
Manizales Suelo E	1.7	0.582353								
Manizales Suelo E	2	0.495								
Manizales Suelo E	2.5	0.396								
Manizales Suelo E	3	0.33								
Manizales Suelo E	3.5	0.282857								
Manizales Suelo E	4	0.2475								
Manizales Suelo E	5	0.198								
Manizales Suelo E	8	0.111375								
Manizales Suelo E	11	0.058909								
Manizales Suelo E	15	0.03168								

1.5 Load Cases

Table 1.7 - Load Case Definitions - Summary

Name	Type	Notes
Modal	Modal - Eigen	
Dead	Linear Static	
Live	Linear Static	
Super Dead	Linear Static	
Roof Live	Linear Static	
H	Linear Static	
Snow	Linear Static	
FHE-X	Linear Static	
FHE-Y	Linear Static	
Ex Espectro	Response Spectrum	
Ey Espectro	Response Spectrum	
Wind	Linear Static	

Table 1.8 - Load Case Definitions - Linear Static (Part 1 of 2)

Name	Design Type	User Design Type	Exclude Group	Mass Source	Stiffness Type	Nonlinear Case	Load Type	Load Name	Load SF
Dead	Program Determined		None	MsSrc1	P-Delta		Load	Dead	1
FHE-X	Program Determined		None	MsSrc1	P-Delta		Load	FHE-X	1
FHE-Y	Program Determined		None	MsSrc1	P-Delta		Load	FHE-Y	1
H	Program Determined		None	MsSrc1	P-Delta		Load	H	1
Live	Program Determined		None	MsSrc1	P-Delta		Load	Live	1
Roof Live	Program Determined		None	MsSrc1	P-Delta		Load	Roof Live	1
Snow	Program Determined		None	MsSrc1	P-Delta		Load	Snow	1
Super Dead	Program Determined		None	MsSrc1	P-Delta		Load	Super Dead	1
Wind	Program Determined		None	MsSrc1	P-Delta		Load	Wind	1

Table 1.8 - Load Case Definitions - Linear Static (Part 2 of 2)

Name	Design Type	User Design Type	Trans Accel SF mm/sec2	Rot Accel SF rad/sec2	Notes
Dead	Program Determined				
FHE-X	Program Determined				
FHE-Y	Program Determined				
H	Program Determined				
Live	Program Determined				
Roof Live	Program Determined				
Snow	Program Determined				
Super Dead	Program Determined				
Wind	Program Determined				

Table 1.9 - Modal Case Definitions - Eigen (Part 1 of 2)

Name	Design Type	User Design Type	Exclude Group	Mass Source	Stiffness Type	Nonlinear Case	Load Type	Load Name	Target Ratio %
Modal	Program Determined		None	MsSrc1	P-Delta				

Table 1.9 - Modal Case Definitions - Eigen (Part 2 of 2)

Name	Design Type	User Design Type	Static Correction?	Max Modes	Min Modes	Freq Shift cyc/sec	Cutoff Freq cyc/sec	Convergence Tol	Auto Shift?
Modal	Program Determined			5	5	0	0	0	Yes

Table 1.10 - Load Case Definitions - Response Spectrum (Part 1 of 4)

Name	Design Type	User Design Type	Mass Source	Load Name	Function	Trans Accel SF mm/sec2	Rot Accel SF rad/sec2
Ex Espectro	Program Determined		Previous (MsSrc1)	U1	Manizales Suelo E	9806.65	
Ey Espectro	Program Determined		Previous (MsSrc1)	U2	Manizales Suelo E	9806.65	

Table 1.10 - Load Case Definitions - Response Spectrum (Part 2 of 4)

Name	Design Type	User Design Type	Coordinate System	Angle deg	Modal Case	Modal Combo Method	Rigid Response?	f1 cyc/sec	f2 cyc/sec
Ex Espectro	Program Determined		Global	0	Modal	CQC	No		
Ey Espectro	Program Determined		Global	0	Modal	CQC	No		

Table 1.10 - Load Case Definitions - Response Spectrum (Part 3 of 4)

Name	Design Type	User Design Type	td sec	Directional Combo Type	Absolute SF sec	Eccentricity Ratio	Story Overwrite	Diaphragm Overwrite
Ex Espectro	Program Determined			SRSS		0		
Ey Espectro	Program Determined			SRSS		0		

Table 1.10 - Load Case Definitions - Response Spectrum (Part 4 of 4)

Name	Design Type	User Design Type	Notes
Ex Espectro	Program Determined		
Ey Espectro	Program Determined		

Table 1.11 - P-Delta Option Definition

Load Pattern	ScaleFactor	Convergence Tolerance	Automation Method
Dead	1.2	0.0001	Iterative Based on Loads
Live	1.6		
Super Dead	1.2		

1.6 Load Combinations

Table 1.12 - Load Combination Definitions

Name	Type	Is Auto	Load Name	Mode	SF	Notes
(B.2.3-2) D+H+L	Linear Add	No	Dead		1	
(B.2.3-2) D+H+L			Super Dead		1	
(B.2.3-2) D+H+L			Live		1	
(B.2.3-2) D+H+L			H		1	
(B.2.3-4A) D+H+0.5L+0.75G	Linear Add	No	Dead		1	
(B.2.3-4A) D+H+0.5L+0.75G			Super Dead		1	
(B.2.3-4A) D+H+0.5L+0.75G			Live		0.5	
(B.2.3-4A) D+H+0.5L+0.75G			H		1	
(B.2.3-4A) D+H+0.5L+0.75G			Snow		0.75	
(B.2.3-4A) D+H+0.5L+0.75Lr	Linear Add	No	Dead		1	
(B.2.3-4A) D+H+0.5L+0.75Lr			Super Dead		1	
(B.2.3-4A) D+H+0.5L+0.75Lr			Live		0.5	
(B.2.3-4A) D+H+0.5L+0.75Lr			H		1	
(B.2.3-4A) D+H+0.5L+0.75Lr			Roof Live		0.75	
(B.2.3-6A) D+H+L+0.7Ex	Linear Add	No	Dead		1	
(B.2.3-6A) D+H+L+0.7Ex			Super Dead		1	
(B.2.3-6A) D+H+L+0.7Ex			Live		1	
(B.2.3-6A) D+H+L+0.7Ex			H		1	
(B.2.3-6A) D+H+L+0.7Ex			Ex/R (R=4.73)		0.7	
(B.2.3-6A) D+H+L+0.7Ex			Ey/R (R=4.73)		0.21	
(B.2.3-6A) D+H+L+0.7Ey	Linear Add	No	Dead		1	

Table 1.12 - Load Combination Definitions (continued)

Name	Type	Is Auto	Load Name	Mode	SF	Notes
(B.2.3-6A) D+H+L+0.7Ey			Super Dead		1	
(B.2.3-6A) D+H+L+0.7Ey			Live		1	
(B.2.3-6A) D+H+L+0.7Ey			H		1	
(B.2.3-6A) D+H+L+0.7Ey			Ex/R (R=4.73)		0.21	
(B.2.3-6A) D+H+L+0.7Ey			Ey/R (R=4.73)		0.7	
(B.2.4-1) 1.4D	Linear Add	No	Dead		1.4	
(B.2.4-1) 1.4D			Super Dead		1.4	
(B.2.4-1) 1.4D+1.6H	Linear Add	No	Dead		1.4	
(B.2.4-1) 1.4D+1.6H			Super Dead		1.4	
(B.2.4-1) 1.4D+1.6H			H		1.6	
(B.2.4-2A) 1.2D+1.6L+0.5Lr	Linear Add	No	Dead		1.2	
(B.2.4-2A) 1.2D+1.6L+0.5Lr			Super Dead		1.2	
(B.2.4-2A) 1.2D+1.6L+0.5Lr			Live		1.6	
(B.2.4-2A) 1.2D+1.6L+0.5Lr			Roof Live		0.5	
(B.2.4-2A) 1.2D+1.6L+0.5Lr+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-2A) 1.2D+1.6L+0.5Lr+1.6H			Super Dead		1.2	
(B.2.4-2A) 1.2D+1.6L+0.5Lr+1.6H			Live		1.6	
(B.2.4-2A) 1.2D+1.6L+0.5Lr+1.6H			Roof Live		0.5	
(B.2.4-2A) 1.2D+1.6L+0.5Lr+1.6H			H		1.6	
(B.2.4-2B) 1.2D+1.6L+0.5G	Linear Add	No	Dead		1.2	
(B.2.4-2B) 1.2D+1.6L+0.5G			Super Dead		1.2	
(B.2.4-2B) 1.2D+1.6L+0.5G			Live		1.6	
(B.2.4-2B) 1.2D+1.6L+0.5G			Snow		0.5	
(B.2.4-2B) 1.2D+1.6L+0.5G+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-2B) 1.2D+1.6L+0.5G+1.6H			Super Dead		1.2	
(B.2.4-2B) 1.2D+1.6L+0.5G+1.6H			Live		1.6	
(B.2.4-2B) 1.2D+1.6L+0.5G+1.6H			Snow		0.5	
(B.2.4-2B) 1.2D+1.6L+0.5G+1.6H			H		1.6	
(B.2.4-3A) 1.2D+1.6Lr+L	Linear Add	No	Dead		1.2	
(B.2.4-3A) 1.2D+1.6Lr+L			Super Dead		1.2	
(B.2.4-3A) 1.2D+1.6Lr+L			Live		1	
(B.2.4-3A) 1.2D+1.6Lr+L			Roof Live		1.6	
(B.2.4-3A) 1.2D+1.6Lr+L+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-3A) 1.2D+1.6Lr+L+1.6H			Super Dead		1.2	
(B.2.4-3A) 1.2D+1.6Lr+L+1.6H			Live		1	
(B.2.4-3A) 1.2D+1.6Lr+L+1.6H			Roof Live		1.6	
(B.2.4-3A) 1.2D+1.6Lr+L+1.6H			H		1.6	
(B.2.4-3B) 1.2D+1.6G+L	Linear Add	No	Dead		1.2	
(B.2.4-3B) 1.2D+1.6G+L			Super Dead		1.2	
(B.2.4-3B) 1.2D+1.6G+L			Live		1	
(B.2.4-3B) 1.2D+1.6G+L			Snow		1.6	
(B.2.4-3B) 1.2D+1.6G+L+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-3B) 1.2D+1.6G+L+1.6H			Super Dead		1.2	
(B.2.4-3B) 1.2D+1.6G+L+1.6H			Live		1	
(B.2.4-3B) 1.2D+1.6G+L+1.6H			Snow		1.6	
(B.2.4-3B) 1.2D+1.6G+L+1.6H			H		1.6	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	Linear Add	No	Dead		1.2	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc			Super Dead		1.2	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc			Wind		0.5	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc			Roof Live		1.6	

Table 1.12 - Load Combination Definitions (continued)

Name	Type	Is Auto	Load Name	Mode	SF	Notes
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc+1.6H			Super Dead		1.2	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc+1.6H			Wind		0.5	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc+1.6H			Roof Live		1.6	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc+1.6H			H		1.6	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	Linear Add	No	Dead		1.2	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws			Super Dead		1.2	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws			Wind		-0.5	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws			Roof Live		1.6	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws+1.6H			Super Dead		1.2	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws+1.6H			Wind		-0.5	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws+1.6H			Roof Live		1.6	
(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws+1.6H			H		1.6	
(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	Linear Add	No	Dead		1.2	
(B.2.4-3D) 1.2D+1.6G+L+0.5Wc			Super Dead		1.2	
(B.2.4-3D) 1.2D+1.6G+L+0.5Wc			Wind		0.5	
(B.2.4-3D) 1.2D+1.6G+L+0.5Wc			Roof Live		1.6	
(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H			Super Dead		1.2	
(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H			Wind		0.5	
(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H			Roof Live		1.6	
(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H			H		1.6	
(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	Linear Add	No	Dead		1.2	
(B.2.4-3D) 1.2D+1.6G+L+0.5Ws			Super Dead		1.2	
(B.2.4-3D) 1.2D+1.6G+L+0.5Ws			Wind		-0.5	
(B.2.4-3D) 1.2D+1.6G+L+0.5Ws			Roof Live		1.6	
(B.2.4-3D) 1.2D+1.6G+L+0.5Ws+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-3D) 1.2D+1.6G+L+0.5Ws+1.6H			Super Dead		1.2	
(B.2.4-3D) 1.2D+1.6G+L+0.5Ws+1.6H			Wind		-0.5	
(B.2.4-3D) 1.2D+1.6G+L+0.5Ws+1.6H			Roof Live		1.6	
(B.2.4-3D) 1.2D+1.6G+L+0.5Ws+1.6H			H		1.6	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr	Linear Add	No	Dead		1.2	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr			Super Dead		1.2	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr			Wind		1	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr			Roof Live		0.5	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr			Live		1	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr+1.6H			Super Dead		1.2	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr+1.6H			Wind		1	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr+1.6H			Roof Live		0.5	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr+1.6H			Live		1	
(B.2.4-4A) 1.2D+Wc+L+0.5Lr+1.6H			H		1.6	
(B.2.4-4A) 1.2D+Ws+L+0.5Lr	Linear Add	No	Dead		1.2	
(B.2.4-4A) 1.2D+Ws+L+0.5Lr			Super Dead		1.2	
(B.2.4-4A) 1.2D+Ws+L+0.5Lr			Wind		-1	
(B.2.4-4A) 1.2D+Ws+L+0.5Lr			Roof Live		0.5	
(B.2.4-4A) 1.2D+Ws+L+0.5Lr			Live		1	
(B.2.4-4A) 1.2D+Ws+L+0.5Lr+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-4A) 1.2D+Ws+L+0.5Lr+1.6H			Super Dead		1.2	

Table 1.12 - Load Combination Definitions (continued)

Name	Type	Is Auto	Load Name	Mode	SF	Notes
(B.2.4-4A) 1.2D+Ws+L+0.5Lr+1.6H			Wind		-1	
(B.2.4-4A) 1.2D+Ws+L+0.5Lr+1.6H			Roof Live		0.5	
(B.2.4-4A) 1.2D+Ws+L+0.5Lr+1.6H			Live		1	
(B.2.4-4A) 1.2D+Ws+L+0.5Lr+1.6H			H		1.6	
(B.2.4-4B) 1.2D+Wc+L+0.5G	Linear Add	No	Dead		1.2	
(B.2.4-4B) 1.2D+Wc+L+0.5G			Super Dead		1.2	
(B.2.4-4B) 1.2D+Wc+L+0.5G			Wind		1	
(B.2.4-4B) 1.2D+Wc+L+0.5G			Snow		0.5	
(B.2.4-4B) 1.2D+Wc+L+0.5G			Live		1	
(B.2.4-4B) 1.2D+Wc+L+0.5G+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-4B) 1.2D+Wc+L+0.5G+1.6H			Super Dead		1.2	
(B.2.4-4B) 1.2D+Wc+L+0.5G+1.6H			Wind		1	
(B.2.4-4B) 1.2D+Wc+L+0.5G+1.6H			Snow		0.5	
(B.2.4-4B) 1.2D+Wc+L+0.5G+1.6H			Live		1	
(B.2.4-4B) 1.2D+Wc+L+0.5G+1.6H			H		1.6	
(B.2.4-4B) 1.2D+Ws+L+0.5G	Linear Add	No	Dead		1.2	
(B.2.4-4B) 1.2D+Ws+L+0.5G			Super Dead		1.2	
(B.2.4-4B) 1.2D+Ws+L+0.5G			Wind		-1	
(B.2.4-4B) 1.2D+Ws+L+0.5G			Snow		0.5	
(B.2.4-4B) 1.2D+Ws+L+0.5G			Live		1	
(B.2.4-4B) 1.2D+Ws+L+0.5G+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-4B) 1.2D+Ws+L+0.5G+1.6H			Super Dead		1.2	
(B.2.4-4B) 1.2D+Ws+L+0.5G+1.6H			Wind		-1	
(B.2.4-4B) 1.2D+Ws+L+0.5G+1.6H			Snow		0.5	
(B.2.4-4B) 1.2D+Ws+L+0.5G+1.6H			Live		1	
(B.2.4-4B) 1.2D+Ws+L+0.5G+1.6H			H		1.6	
(B.2.4-5A) 1.2D+L+Ex	Linear Add	No	Dead		1.2	
(B.2.4-5A) 1.2D+L+Ex			Super Dead		1.2	
(B.2.4-5A) 1.2D+L+Ex			Live		1	
(B.2.4-5A) 1.2D+L+Ex			Ex/R (R=4.73)		1	
(B.2.4-5A) 1.2D+L+Ex			Ey/R (R=4.73)		0.3	
(B.2.4-5A) 1.2D+L+Ex+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-5A) 1.2D+L+Ex+1.6H			Super Dead		1.2	
(B.2.4-5A) 1.2D+L+Ex+1.6H			Live		1	
(B.2.4-5A) 1.2D+L+Ex+1.6H			Ex/R (R=4.73)		1	
(B.2.4-5A) 1.2D+L+Ex+1.6H			Ey/R (R=4.73)		0.3	
(B.2.4-5A) 1.2D+L+Ex+1.6H			H		1.6	
(B.2.4-5B) 1.2D+L+Ey	Linear Add	No	Dead		1.2	
(B.2.4-5B) 1.2D+L+Ey			Super Dead		1.2	
(B.2.4-5B) 1.2D+L+Ey			Live		1	
(B.2.4-5B) 1.2D+L+Ey			Ey/R (R=4.73)		1	
(B.2.4-5B) 1.2D+L+Ey			Ex/R (R=4.73)		0.3	
(B.2.4-5B) 1.2D+L+Ey+1.6H	Linear Add	No	Dead		1.2	
(B.2.4-5B) 1.2D+L+Ey+1.6H			Super Dead		1.2	
(B.2.4-5B) 1.2D+L+Ey+1.6H			Live		1	
(B.2.4-5B) 1.2D+L+Ey+1.6H			Ey/R (R=4.73)		1	
(B.2.4-5B) 1.2D+L+Ey+1.6H			Ex/R (R=4.73)		0.3	
(B.2.4-5B) 1.2D+L+Ey+1.6H			H		1.6	
(B.2.4-6) 0.9D+Wc	Linear Add	No	Dead		0.9	
(B.2.4-6) 0.9D+Wc			Super Dead		0.9	

Table 1.12 - Load Combination Definitions (continued)

Name	Type	Is Auto	Load Name	Mode	SF	Notes
(B.2.4-6) 0.9D+Wc			Wind		1	
(B.2.4-6) 0.9D+Wc+1.6H	Linear Add	No	Dead		0.9	
(B.2.4-6) 0.9D+Wc+1.6H			Super Dead		0.9	
(B.2.4-6) 0.9D+Wc+1.6H			Wind		1	
(B.2.4-6) 0.9D+Wc+1.6H			H		1.6	
(B.2.4-6) 0.9D+Ws	Linear Add	No	Dead		0.9	
(B.2.4-6) 0.9D+Ws			Super Dead		0.9	
(B.2.4-6) 0.9D+Ws			Wind		-1	
(B.2.4-6) 0.9D+Ws+1.6H	Linear Add	No	Dead		0.9	
(B.2.4-6) 0.9D+Ws+1.6H			Super Dead		0.9	
(B.2.4-6) 0.9D+Ws+1.6H			Wind		-1	
(B.2.4-6) 0.9D+Ws+1.6H			H		1.6	
(B.2.4-7A) 0.9D+Ex	Linear Add	No	Dead		0.9	
(B.2.4-7A) 0.9D+Ex			Super Dead		0.9	
(B.2.4-7A) 0.9D+Ex			Ex/R (R=4.73)		1	
(B.2.4-7A) 0.9D+Ex			Ey/R (R=4.73)		0.3	
(B.2.4-7A) 0.9D+Ex+1.6H	Linear Add	No	Dead		0.9	
(B.2.4-7A) 0.9D+Ex+1.6H			Super Dead		0.9	
(B.2.4-7A) 0.9D+Ex+1.6H			Ex/R (R=4.73)		1	
(B.2.4-7A) 0.9D+Ex+1.6H			Ey/R (R=4.73)		0.3	
(B.2.4-7A) 0.9D+Ex+1.6H			H		1.6	
(B.2.4-7B) 0.9D+Ey	Linear Add	No	Dead		0.9	
(B.2.4-7B) 0.9D+Ey			Super Dead		0.9	
(B.2.4-7B) 0.9D+Ey			Ex/R (R=4.73)		0.3	
(B.2.4-7B) 0.9D+Ey			Ey/R (R=4.73)		1	
(B.2.4-7B) 0.9D+Ey+1.6H	Linear Add	No	Dead		0.9	
(B.2.4-7B) 0.9D+Ey+1.6H			Super Dead		0.9	
(B.2.4-7B) 0.9D+Ey+1.6H			Ex/R (R=4.73)		0.3	
(B.2.4-7B) 0.9D+Ey+1.6H			Ey/R (R=4.73)		1	
(B.2.4-7B) 0.9D+Ey+1.6H			H		1.6	
(C.15-6) D+Ex	Linear Add	No	Dead		1	
(C.15-6) D+Ex			Super Dead		1	
(C.15-6) D+Ex			Ex/R (R=4.73)		1	
(C.15-6) D+Ex			Ey/R (R=4.73)		0.3	
(C.15-6) D+Ey	Linear Add	No	Dead		1	
(C.15-6) D+Ey			Super Dead		1	
(C.15-6) D+Ey			Ex/R (R=4.73)		0.3	
(C.15-6) D+Ey			Ey/R (R=4.73)		1	
(DER1) 1.2D+L+Ex	Linear Add	No	Dead		1.2	
(DER1) 1.2D+L+Ex			Super Dead		1.2	
(DER1) 1.2D+L+Ex			Live		1	
(DER1) 1.2D+L+Ex			Ex _c		1	
(DER1) 1.2D+L+Ex			Ey _c		0.3	
(DER2) 1.2D+L+Ey	Linear Add	No	Dead		1.2	
(DER2) 1.2D+L+Ey			Super Dead		1.2	
(DER2) 1.2D+L+Ey			Live		1	
(DER2) 1.2D+L+Ey			Ey _c		1	
(DER2) 1.2D+L+Ey			Dead		0.3	
(DER3) 0.9D+Ex	Linear Add	No	Dead		0.9	
(DER3) 0.9D+Ex			Super Dead		0.9	

Table 1.12 - Load Combination Definitions (continued)

Name	Type	Is Auto	Load Name	Mode	SF	Notes
(DER3) 0.9D+Ex			Ex _c		1	
(DER3) 0.9D+Ex			Ey _c		0.3	
(DER4) 0.9D+Ey	Linear Add	No	Dead		0.9	
(DER4) 0.9D+Ey			Super Dead		0.9	
(DER4) 0.9D+Ey			Ey _c		1	
(DER4) 0.9D+Ey			Ex _c		0.3	
EnvLosa	Envelope	No	(B.2.4-1) 1.4D		1	
EnvLosa			(B.2.4-2A) 1.2D+1.6L+0.5Lr		1	
EnvLosa			(B.2.4-2B) 1.2D+1.6L+0.5G		1	
EnvLosa			(B.2.4-3A) 1.2D+1.6Lr+L		1	
EnvLosa			(B.2.4-3B) 1.2D+1.6G+L		1	
EnvLosa			(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws		1	
EnvLosa			(B.2.4-3D) 1.2D+1.6G+L+0.5Ws		1	
EnvLosa			(B.2.4-6) 0.9D+Wc		1	
EnvLosa			(B.2.4-6) 0.9D+Wc		1	
EnvLosa			(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc		1	
EnvLosa			(B.2.4-3D) 1.2D+1.6G+L+0.5Wc		1	
EnvLosa			Dead		1	
Envolvente	Envelope	No	(B.2.4-1) 1.4D		1	
Envolvente			(B.2.4-2A) 1.2D+1.6L+0.5Lr		1	
Envolvente			(B.2.4-2B) 1.2D+1.6L+0.5G		1	
Envolvente			(B.2.4-3A) 1.2D+1.6Lr+L		1	
Envolvente			(B.2.4-3B) 1.2D+1.6G+L		1	
Envolvente			(B.2.4-5A) 1.2D+L+Ex		1	
Envolvente			(B.2.4-5B) 1.2D+L+Ey		1	
Envolvente			(B.2.4-7A) 0.9D+Ex		1	
Envolvente			(B.2.4-7B) 0.9D+Ey		1	
Envolvente-H	Envelope	No	(B.2.4-1) 1.4D		1	
Envolvente-H			(B.2.4-2A) 1.2D+1.6L+0.5Lr		1	
Envolvente-H			(B.2.4-2B) 1.2D+1.6L+0.5G		1	
Envolvente-H			(B.2.4-3A) 1.2D+1.6Lr+L		1	
Envolvente-H			(B.2.4-3B) 1.2D+1.6G+L		1	
Envolvente-H			(B.2.4-5A) 1.2D+L+Ex		1	
Envolvente-H			(B.2.4-5B) 1.2D+L+Ey		1	
Envolvente-H			(B.2.4-7A) 0.9D+Ex		1	
Envolvente-H			(B.2.4-7B) 0.9D+Ey		1	
Envolvente-H			(B.2.4-2A) 1.2D+1.6L+0.5Lr+1.6H		1	
Envolvente-H			(B.2.4-2B) 1.2D+1.6L+0.5G+1.6H		1	
Envolvente-H			(B.2.4-1) 1.4D+1.6H		1	
Envolvente-H			(B.2.4-3A) 1.2D+1.6Lr+L+1.6H		1	
Envolvente-H			(B.2.4-3B) 1.2D+1.6G+L+1.6H		1	
Envolvente-H			(B.2.4-5A) 1.2D+L+Ex+1.6H		1	
Envolvente-H			(B.2.4-5B) 1.2D+L+Ey+1.6H		1	
Envolvente-H			(B.2.4-7A) 0.9D+Ex+1.6H		1	
Envolvente-H			(B.2.4-7B) 0.9D+Ey+1.6H		1	
Ex _c	Linear Add	No	Ex Espectro		1	
Ex/R (R=4.73)	Linear Add	No	Ex _c		0.2114	
Ey _c	Linear Add	No	Ey Espectro		1	
Ey/R (R=4.73)	Linear Add	No	Ey _c		0.2114	
VPlastico	Linear Add	No	Super Dead		1.2	

Table 1.12 - Load Combination Definitions (continued)

Name	Type	Is Auto	Load Name	Mode	SF	Notes
VPlastico			Dead		1.2	
VPlastico			Live		1	
VPlastico			Snow		0.2	

DERIVAS-GRUPO DE USO I

Story	Load Case/Combo	Direction	Drift	Label	X	Y	Z
					m	m	m
Story1	(DER1) 1.2D+L+Ex	X	0.45%	16	0	21.2	3.3
Story1	(DER1) 1.2D+L+Ex	Y	0.21%	10	0	11.64	3.3
Story1	(DER1) 1.2D+L+Ex	X	0.44%	18	14.8	21.2	3.3
Story1	(DER1) 1.2D+L+Ex	Y	0.19%	16	0	21.2	3.3
Story1	(DER2) 1.2D+L+Ey	Y	0.29%	7	2	6.64	3.3
Story1	(DER2) 1.2D+L+Ey	X	0.08%	1	2	0	3.3
Story1	(DER2) 1.2D+L+Ey	Y	0.29%	18	14.8	21.2	3.3
Story1	(DER3) 0.9D+Ex	X	0.45%	16	0	21.2	3.3
Story1	(DER3) 0.9D+Ex	Y	0.21%	10	0	11.64	3.3
Story1	(DER3) 0.9D+Ex	X	0.44%	18	14.8	21.2	3.3
Story1	(DER3) 0.9D+Ex	Y	0.20%	16	0	21.2	3.3
Story1	(DER4) 0.9D+Ey	X	0.17%	16	0	21.2	3.3
Story1	(DER4) 0.9D+Ey	Y	0.32%	16	0	21.2	3.3
Story1	(DER4) 0.9D+Ey	X	0.16%	18	14.8	21.2	3.3
Story1	(DER4) 0.9D+Ey	Y	0.32%	18	14.8	21.2	3.3

Deriva máxima	0.450%	CUMPLE
Deriva máxima permitida para concreto reforzado	1.0%	

CALCULO DE ÍNDICE DE ESTABILIDAD

Los efectos P-Delta deben tenerse en cuenta cuando el índice de estabilidad Q_i es mayor que 0.10.

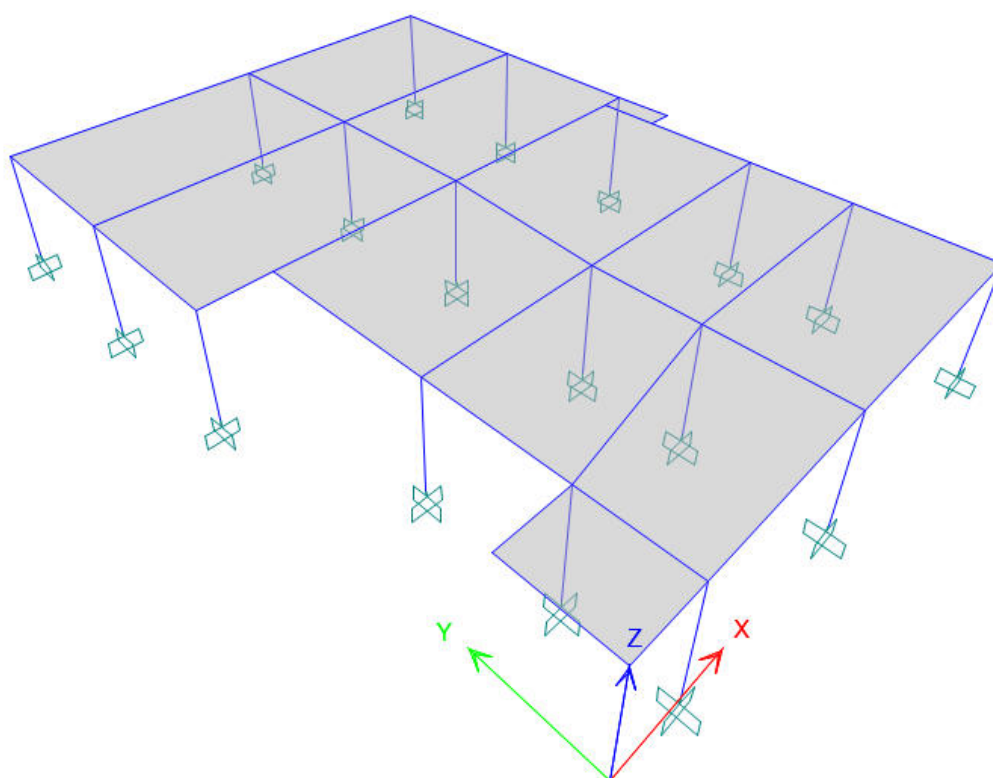
A.6.2.3 — DESPLAZAMIENTOS HORIZONTALES CAUSADOS POR EFECTOS P-DELTA, $\delta_{pd,j}$ — Corresponden a los efectos adicionales, en las dos direcciones principales en planta, causados por los efectos de segundo orden (efectos P-Delta) de la estructura. Los efectos P-Delta producen un aumento en las deflexiones horizontales y en las fuerzas internas de la estructura. Estos efectos deben tenerse en cuenta cuando el índice de estabilidad, Q_i , es mayor de 0.10. El índice de estabilidad, para el piso i y en la dirección bajo estudio, se calcula por medio de la siguiente ecuación:

$$Q_i = \frac{P_i \Delta_{cm}}{V_i h_{pi}} \quad (\text{A.6.2-2})$$

El índice de estabilidad de cualquier piso, Q_i , no debe exceder el valor de 0.30. Cuando el valor de Q_i es mayor que 0.30, la estructura es potencialmente inestable y debe rigidizarse, a menos que se cumplan, en estructuras de concreto reforzado, una verificación con un análisis elástico de segundo orden considerando la totalidad de los requisitos enumerados en C.10.10.4 o alternativamente con la consideración en C.10.10.7.4.

Análisis en sentido X, para E_{x_c} , y D+Sd+L					
PISO	P_i kN	Δ_{cm}	V_i kN	Q_i	Chequeo
Story1	775.87	0.00476	651.54	0.006	No P-Delta

Análisis en sentido Y, para E_{y_c} , y D+Sd+L					
PISO	P_i kN	Δ_{cm}	V_i kN	Q_i	Chequeo
Story1	775.87	0.00314	703.06	0.003	No P-Delta



DISEÑO DE VIGAS Y COLUMNAS

Model File: Las Americas, Revision 0
19/03/2026

1 Design Data

This chapter provides design data and results.

1.1 Concrete Frame Design

Table 1.1 - Concrete Frame Design Preferences - ACI 318-08

Item	Value
Multi-Response Design	Step-by-Step - All
# Interaction Curves	24
# Interaction Points	31
Minimum Eccentricity?	Yes
Design for BCCR?	No
Ignore Beneficial Pu for Beam Design?	No
Seismic Design Category	D
Design System Rho	1
Design System Sds	0.5
Phi (Tension)	0.9
Phi (Compression Tied)	0.65
Phi (Compression Spiral)	0.75
Phi (Shear and Torsion)	0.75
Phi (Shear Seismic)	0.6
Phi (Shear Joint)	0.85
Pattern Live Load Factor	0.75
Utilization Factor Limit	1

Table 1.2 - Concrete Column Overwrites - ACI 318-08 (Part 1 of 2)

Story	Label	Unique Name	Design Type	Design Section	Frame Type	LLRF	Unbraced Length Ratio (Major)	Unbraced Length Ratio (Minor)
Story1	C1	1	Column	Program Determined	Program Determined	0	0	0
Story1	C2	2	Column	Program Determined	Program Determined	0	0	0
Story1	C3	3	Column	Program Determined	Program Determined	0	0	0
Story1	C4	4	Column	Program Determined	Program Determined	0	0	0
Story1	C5	5	Column	Program Determined	Program Determined	0	0	0
Story1	C6	6	Column	Program Determined	Program Determined	0	0	0
Story1	C7	7	Column	Program Determined	Program Determined	0	0	0
Story1	C8	8	Column	Program Determined	Program Determined	0	0	0
Story1	C9	9	Column	Program Determined	Program Determined	0	0	0
Story1	C10	10	Column	Program Determined	Program Determined	0	0	0
Story1	C11	11	Column	Program Determined	Program Determined	0	0	0
Story1	C12	12	Column	Program Determined	Program Determined	0	0	0
Story1	C13	13	Column	Program Determined	Program Determined	0	0	0
Story1	C14	14	Column	Program Determined	Program Determined	0	0	0
Story1	C15	15	Column	Program Determined	Program Determined	0	0	0
Story1	C16	16	Column	Program Determined	Program Determined	0	0	0
Story1	C17	17	Column	Program Determined	Program Determined	0	0	0
Story1	C18	18	Column	Program Determined	Program Determined	0	0	0

Table 1.2 - Concrete Column Overwrites - ACI 318-08 (Part 2 of 2)

Effective Length Factor (K Major)	Effective Length Factor (K Minor)	Moment Coefficient (Cm Major)	Moment Coefficient (Cm Minor)	Non Sway Moment Factor (Dns Major)	Non Sway Moment Factor (Dns Minor)	Sway Moment Factor (Ds Major)	Sway Moment Factor (Ds Minor)	Consider Minimum Eccentricity?
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined

Effective Length Factor (K Major)	Effective Length Factor (K Minor)	Moment Coefficient (Cm Major)	Moment Coefficient (Cm Minor)	Non Sway Moment Factor (Dns Major)	Non Sway Moment Factor (Dns Minor)	Sway Moment Factor (Ds Major)	Sway Moment Factor (Ds Minor)	Consider Minimum Eccentricity?
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined
0	0	0	0	0	0	0	0	Program Determined

Table 1.3 - Concrete Beam Overwrites - ACI 318-08 (Part 1 of 2)

Story	Label	Unique Name	Design Type	Design Section	Frame Type	LLRF	Unbraced Length Ratio (Major)	Unbraced Length Ratio (Minor)
Story1	B1	19	Beam	Program Determined	Program Determined	0	0	0
Story1	B2	20	Beam	Program Determined	Program Determined	0	0	0
Story1	B3	21	Beam	Program Determined	Program Determined	0	0	0
Story1	B4	22	Beam	Program Determined	Program Determined	0	0	0
Story1	B5	23	Beam	Program Determined	Program Determined	0	0	0
Story1	B6	24	Beam	Program Determined	Program Determined	0	0	0
Story1	B7	25	Beam	Program Determined	Program Determined	0	0	0
Story1	B8	26	Beam	Program Determined	Program Determined	0	0	0
Story1	B11	27	Beam	Program Determined	Program Determined	0	0	0
Story1	B12	28	Beam	Program Determined	Program Determined	0	0	0
Story1	B13	29	Beam	Program Determined	Program Determined	0	0	0
Story1	B14	30	Beam	Program Determined	Program Determined	0	0	0
Story1	B15	31	Beam	Program Determined	Program Determined	0	0	0
Story1	B16	32	Beam	Program Determined	Program Determined	0	0	0
Story1	B17	33	Beam	Program Determined	Program Determined	0	0	0
Story1	B18	34	Beam	Program Determined	Program Determined	0	0	0
Story1	B19	35	Beam	Program Determined	Program Determined	0	0	0
Story1	B20	36	Beam	Program Determined	Program Determined	0	0	0
Story1	B21	37	Beam	Program Determined	Program Determined	0	0	0
Story1	B22	38	Beam	Program Determined	Program Determined	0	0	0
Story1	B23	39	Beam	Program Determined	Program Determined	0	0	0
Story1	B24	40	Beam	Program Determined	Program Determined	0	0	0
Story1	B25	41	Beam	Program Determined	Program Determined	0	0	0
Story1	B26	42	Beam	Program Determined	Program Determined	0	0	0
Story1	B27	43	Beam	Program Determined	Program Determined	0	0	0
Story1	B28	44	Beam	Program Determined	Program Determined	0	0	0
Story1	B29	45	Beam	Program Determined	Program Determined	0	0	0
Story1	B30	46	Beam	Program Determined	Program Determined	0	0	0
Story1	B31	47	Beam	Program Determined	Program Determined	0	0	0
Story1	B32	48	Beam	Program Determined	Program Determined	0	0	0
Story1	B33	49	Beam	Program Determined	Program Determined	0	0	0
Story1	B34	50	Beam	Program Determined	Program Determined	0	0	0
Story1	B9	51	Beam	Program Determined	Program Determined	0	0	0
Story1	B35	52	Beam	Program Determined	Program Determined	0	0	0

Table 1.3 - Concrete Beam Overwrites - ACI 318-08 (Part 2 of 2)

[illegible]

Table 1.4 - Concrete Column PMM Envelope - ACI 318-08 (Part 1 of 2)

Story	Label	UniqueName	Location	Section	P kN	M Major kN-m	M Minor kN-m	PMM Combo
Story1	C1	1	Top	C. 30x30 (21)	28.1012	-9.5566	-10.5544	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C1	1	Bottom	C. 30x30 (21)	35.7269	7.614	16.9934	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C2	2	Top	C. 30x30 (21)	44.0334	19.8114	7.5208	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C2	2	Bottom	C. 30x30 (21)	48.9941	-14.8668	-16.3601	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C3	3	Top	C. 30x30 (21)	23.9575	-14.7715	13.9786	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C3	3	Bottom	C. 30x30 (21)	31.5832	10.5309	-18.5988	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C4	4	Top	C. 30x30 (21)	38.3938	-11.5092	-14.9569	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C4	4	Bottom	C. 30x30 (21)	46.0194	8.8001	19.4824	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C5	5	Top	C. 30x30 (21)	39.0252	10.5732	-16.0087	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C5	5	Bottom	C. 30x30 (21)	46.6508	-11.8402	18.493	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C6	6	Top	C. 30x30 (21)	27.707	-8.6019	-15.6218	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C6	6	Bottom	C. 30x30 (21)	35.3326	7.2262	-18.0002	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C7	7	Top	C. 30x30 (21)	38.9033	7.1664	16.4203	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C7	7	Bottom	C. 30x30 (21)	46.5403	-17.8944	-11.0897	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C8	8	Top	C. 30x30 (21)	44.975	8.4351	16.114	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C8	8	Bottom	C. 30x30 (21)	52.6007	-9.9042	-18.2292	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C9	9	Top	C. 30x30 (21)	34.63	-8.63	19.18	(B.2.4-5B) 1.2D+L+Ey+1.6H
Story1	C9	9	Bottom	C. 30x30 (21)	43.8335	15.6684	-14.142	(B.2.4-5A) 1.2D+L+Ex+1.6H

Story	Label	UniqueName	Location	Section	P kN	M Major kN-m	M Minor kN-m	PMM Combo
Story1	C10	10	Top	C. 30x30 (21)	36.3501	25.9233	10.4261	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C10	10	Bottom	C. 30x30 (21)	43.9757	-25.9907	-11.3141	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C11	11	Top	C. 30x30 (21)	65.4756	-14.8752	-5.6428	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C11	11	Bottom	C. 30x30 (21)	73.1012	18.8828	6.4971	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C12	12	Top	C. 30x30 (21)	48.7988	-18.4173	-8.4602	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C12	12	Bottom	C. 30x30 (21)	56.4244	20.8118	9.827	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C13	13	Top	C. 30x30 (21)	44.9443	12.0777	-13.7858	(B.2.4-5B) 1.2D+L+Ex+1.6H
Story1	C13	13	Bottom	C. 30x30 (21)	51.1839	-21.6478	12.5491	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C14	14	Top	C. 30x30 (21)	61.0718	-14.8899	5.9825	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C14	14	Bottom	C. 30x30 (21)	68.6974	20.9589	-6.6045	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C15	15	Top	C. 30x30 (21)	40.6221	-9.7246	15.8783	(B.2.4-5B) 1.2D+L+Ex+1.6H
Story1	C15	15	Bottom	C. 30x30 (21)	46.7017	20.8197	-12.8103	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C16	16	Top	C. 30x30 (21)	33.3732	25.3032	-13.7464	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C16	16	Bottom	C. 30x30 (21)	40.9989	-27.7384	15.2102	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C17	17	Top	C. 30x30 (21)	60.8312	-18.7378	-11.9486	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C17	17	Bottom	C. 30x30 (21)	68.4568	25.5537	10.0381	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C18	18	Top	C. 30x30 (21)	29.9445	-22.569	-11.9337	(B.2.4-5A) 1.2D+L+Ex+1.6H
Story1	C18	18	Bottom	C. 30x30 (21)	37.5701	27.6514	11.7822	(B.2.4-5A) 1.2D+L+Ex+1.6H

Table 1.4 - Concrete Column PMM Envelope - ACI 318-08 (Part 2 of 2)

Story	Label	UniqueName	Location	PMM Ratio or Rebar %	Status
Story1	C1	1	Top	0.281	
Story1	C1	1	Bottom	0.346	
Story1	C2	2	Top	0.384	
Story1	C2	2	Bottom	0.434	
Story1	C3	3	Top	0.407	
Story1	C3	3	Bottom	0.409	
Story1	C4	4	Top	0.369	
Story1	C4	4	Bottom	0.397	
Story1	C5	5	Top	0.371	
Story1	C5	5	Bottom	0.423	
Story1	C6	6	Top	0.34	
Story1	C6	6	Bottom	0.355	
Story1	C7	7	Top	0.331	
Story1	C7	7	Bottom	0.404	
Story1	C8	8	Top	0.342	
Story1	C8	8	Bottom	0.392	
Story1	C9	9	Top	0.392	
Story1	C9	9	Bottom	0.415	
Story1	C10	10	Top	0.517	
Story1	C10	10	Bottom	0.527	
Story1	C11	11	Top	0.288	
Story1	C11	11	Bottom	0.357	
Story1	C12	12	Top	0.376	
Story1	C12	12	Bottom	0.429	
Story1	C13	13	Top	0.359	
Story1	C13	13	Bottom	0.477	
Story1	C14	14	Top	0.292	
Story1	C14	14	Bottom	0.388	
Story1	C15	15	Top	0.357	
Story1	C15	15	Bottom	0.47	
Story1	C16	16	Top	0.552	
Story1	C16	16	Bottom	0.605	
Story1	C17	17	Top	0.426	
Story1	C17	17	Bottom	0.5	

Story	Label	UniqueName	Location	PMM Ratio or Rebar %	Status
Story1	C18	18	Top	0.488	
Story1	C18	18	Bottom	0.56	

Table 1.5 - Concrete Column Shear Envelope - ACI 318-08 (Part 1 of 2)

Story	Label	UniqueName	Location	Section	V Major kN	V Major Combo	At Major mm2/m	V Minor kN
Story1	C1	1	Top	C. 30x30 (21)	36.5447	(B.2.4-7B) 0.9D+Ey+1.6H	485.73	14.2808
Story1	C1	1	Bottom	C. 30x30 (21)	36.5447	(B.2.4-7B) 0.9D+Ey+1.6H	485.73	14.2808
Story1	C2	2	Top	C. 30x30 (21)	34.7834	(B.2.4-7B) 0.9D+Ey+1.6H	462.32	14.8193
Story1	C2	2	Bottom	C. 30x30 (21)	34.7834	(B.2.4-7B) 0.9D+Ey+1.6H	462.32	14.8193
Story1	C3	3	Top	C. 30x30 (21)	20.1628	(B.2.4-7B) 0.9D+Ey+1.6H	267.99	16.0268
Story1	C3	3	Bottom	C. 30x30 (21)	20.1628	(B.2.4-7B) 0.9D+Ey+1.6H	267.99	16.0268
Story1	C4	4	Top	C. 30x30 (21)	34.7074	(B.2.4-7B) 0.9D+Ey+1.6H	461.31	23.0334
Story1	C4	4	Bottom	C. 30x30 (21)	34.7074	(B.2.4-7B) 0.9D+Ey+1.6H	461.31	23.0334
Story1	C5	5	Top	C. 30x30 (21)	23.5872	(B.2.4-7B) 0.9D+Ey+1.6H	313.51	25.9818
Story1	C5	5	Bottom	C. 30x30 (21)	23.5872	(B.2.4-7B) 0.9D+Ey+1.6H	313.51	25.9818
Story1	C6	6	Top	C. 30x30 (21)	13.3877	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	21.8326
Story1	C6	6	Bottom	C. 30x30 (21)	13.3877	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	21.8326
Story1	C7	7	Top	C. 30x30 (21)	13.4656	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	36.9581
Story1	C7	7	Bottom	C. 30x30 (21)	13.4656	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	36.9581
Story1	C8	8	Top	C. 30x30 (21)	27.579	(B.2.4-7B) 0.9D+Ey+1.6H	366.56	33.9161
Story1	C8	8	Bottom	C. 30x30 (21)	27.579	(B.2.4-7B) 0.9D+Ey+1.6H	366.56	33.9161
Story1	C9	9	Top	C. 30x30 (21)	13.7282	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	33.0896
Story1	C9	9	Bottom	C. 30x30 (21)	13.7282	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	33.0896
Story1	C10	10	Top	C. 30x30 (21)	22.861	(B.2.4-7B) 0.9D+Ey+1.6H	303.86	16.3278
Story1	C10	10	Bottom	C. 30x30 (21)	22.861	(B.2.4-7B) 0.9D+Ey+1.6H	303.86	16.3278
Story1	C11	11	Top	C. 30x30 (21)	39.2205	(B.2.4-7B) 0.9D+Ey+1.6H	521.3	44.0117
Story1	C11	11	Bottom	C. 30x30 (21)	39.2205	(B.2.4-7B) 0.9D+Ey+1.6H	521.3	44.0117
Story1	C12	12	Top	C. 30x30 (21)	21.1165	(B.2.4-7B) 0.9D+Ey+1.6H	280.67	26.6957
Story1	C12	12	Bottom	C. 30x30 (21)	21.1165	(B.2.4-7B) 0.9D+Ey+1.6H	280.67	26.6957
Story1	C13	13	Top	C. 30x30 (21)	18.3201	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	35.1929
Story1	C13	13	Bottom	C. 30x30 (21)	18.3201	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	35.1929
Story1	C14	14	Top	C. 30x30 (21)	31.5979	(B.2.4-7B) 0.9D+Ey+1.6H	419.98	49.8362
Story1	C14	14	Bottom	C. 30x30 (21)	31.5979	(B.2.4-7B) 0.9D+Ey+1.6H	419.98	49.8362
Story1	C15	15	Top	C. 30x30 (21)	16.9308	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	33.7101
Story1	C15	15	Bottom	C. 30x30 (21)	16.9308	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	33.7101
Story1	C16	16	Top	C. 30x30 (21)	22.7296	(B.2.4-7B) 0.9D+Ey+1.6H	302.11	18.8479
Story1	C16	16	Bottom	C. 30x30 (21)	22.7296	(B.2.4-7B) 0.9D+Ey+1.6H	302.11	18.8479
Story1	C17	17	Top	C. 30x30 (21)	48.5159	(B.2.4-7B) 0.9D+Ey+1.6H	644.85	20.1628
Story1	C17	17	Bottom	C. 30x30 (21)	48.5159	(B.2.4-7B) 0.9D+Ey+1.6H	644.85	20.1628
Story1	C18	18	Top	C. 30x30 (21)	16.698	(B.2.4-5A) 1.2D+L+Ex+1.6H	277.42	17.066
Story1	C18	18	Bottom	C. 30x30 (21)	16.698	(B.2.4-5A) 1.2D+L+Ex+1.6H	277.42	17.066

Table 1.5 - Concrete Column Shear Envelope - ACI 318-08 (Part 2 of 2)

Story	Label	UniqueName	Location	V Minor Combo	At Minor mm2/m	Status
Story1	C1	1	Top	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	
Story1	C1	1	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	
Story1	C2	2	Top	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	
Story1	C2	2	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	
Story1	C3	3	Top	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	
Story1	C3	3	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	
Story1	C4	4	Top	(B.2.4-7B) 0.9D+Ey+1.6H	306.15	
Story1	C4	4	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	306.15	

Story	Label	UniqueName	Location	V Minor Combo	At Minor mm2/m	Status
Story1	C5	5	Top	(B.2.4-7B) 0.9D+Ey+1.6H	345.34	
Story1	C5	5	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	345.34	
Story1	C6	6	Top	(B.2.4-7B) 0.9D+Ey+1.6H	290.19	
Story1	C6	6	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	290.19	
Story1	C7	7	Top	(B.2.4-7B) 0.9D+Ey+1.6H	491.23	
Story1	C7	7	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	491.23	
Story1	C8	8	Top	(B.2.4-7B) 0.9D+Ey+1.6H	450.79	
Story1	C8	8	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	450.79	
Story1	C9	9	Top	(B.2.4-7B) 0.9D+Ey+1.6H	439.81	
Story1	C9	9	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	439.81	
Story1	C10	10	Top	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	
Story1	C10	10	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	
Story1	C11	11	Top	(B.2.4-7B) 0.9D+Ey+1.6H	584.98	
Story1	C11	11	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	584.98	
Story1	C12	12	Top	(B.2.4-7B) 0.9D+Ey+1.6H	354.82	
Story1	C12	12	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	354.82	
Story1	C13	13	Top	(B.2.4-7B) 0.9D+Ey+1.6H	467.76	
Story1	C13	13	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	467.76	
Story1	C14	14	Top	(B.2.4-7B) 0.9D+Ey+1.6H	662.4	
Story1	C14	14	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	662.4	
Story1	C15	15	Top	(B.2.4-7B) 0.9D+Ey+1.6H	448.06	
Story1	C15	15	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	448.06	
Story1	C16	16	Top	(B.2.4-7B) 0.9D+Ey+1.6H	250.52	
Story1	C16	16	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	250.52	
Story1	C17	17	Top	(B.2.4-7B) 0.9D+Ey+1.6H	267.99	
Story1	C17	17	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	267.99	
Story1	C18	18	Top	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	
Story1	C18	18	Bottom	(B.2.4-7B) 0.9D+Ey+1.6H	250.02	

Table 1.6 - Concrete Beam Flexure Envelope - ACI 318-08 (Part 1 of 2)

Story	Label	UniqueName	Location	Section	-ve Moment Combo	-ve Moment kN-m	As Top mm2
Story1	B1	19	End-I	V. 30x30 (21)	(B.2.4-7A) 0.9D+Ex+1.6H	0	4
Story1	B1	19	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-11.0296	155
Story1	B1	19	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-26.801	289
Story1	B2	20	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-24.8284	272
Story1	B2	20	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-6.2071	93
Story1	B2	20	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-17.8884	260
Story1	B3	21	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-26.4397	281
Story1	B3	21	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-6.6099	92
Story1	B3	21	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-19.2964	260
Story1	B4	22	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	0	4
Story1	B4	22	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-11.0296	155
Story1	B4	22	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-26.8009	289
Story1	B5	23	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-20.4566	260
Story1	B5	23	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-5.1141	77
Story1	B5	23	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-10.5199	154
Story1	B6	24	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-15.688	222
Story1	B6	24	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-3.922	54
Story1	B6	24	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-12.0837	170
Story1	B7	25	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-12.155	171
Story1	B7	25	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-3.5129	49
Story1	B7	25	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-14.0516	198
Story1	B8	26	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-16.1418	228
Story1	B8	26	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-4.0354	56
Story1	B8	26	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-12.3953	174
Story1	B11	27	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-16.6212	235
Story1	B11	27	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-5.1504	72

Story	Label	UniqueName	Location	Section	-ve Moment Combo	-ve Moment kN-m	As Top mm2
Story1	B11	27	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-20.6016	260
Story1	B12	28	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-19.7902	260
Story1	B12	28	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-4.9476	69
Story1	B12	28	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-15.3381	217
Story1	B13	29	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-28.0407	295
Story1	B13	29	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-9.2152	129
Story1	B13	29	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-36.8608	397
Story1	B14	30	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-33.6454	362
Story1	B14	30	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-8.4113	117
Story1	B14	30	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-24.924	262
Story1	B15	31	End-I	VT 20x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	0	0.05871
Story1	B15	31	Middle	VT 20x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	0	0.05871
Story1	B15	31	End-J	VT 20x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	0	0.05871
Story1	B16	32	End-I	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	-11.1359	157
Story1	B16	32	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-3.4704	49
Story1	B16	32	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-13.8815	197
Story1	B17	33	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-8.9306	127
Story1	B17	33	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-5.4318	78
Story1	B17	33	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-21.7271	260
Story1	B18	34	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-30.1437	323
Story1	B18	34	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-7.5359	105
Story1	B18	34	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-7.5359	105
Story1	B19	35	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-14.7824	208
Story1	B19	35	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-6.4894	90
Story1	B19	35	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-25.9578	273
Story1	B20	36	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-25.4484	267
Story1	B20	36	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-6.3621	89
Story1	B20	36	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-17.1099	242
Story1	B21	37	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-13.3956	188
Story1	B21	37	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-3.9068	54
Story1	B21	37	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-15.6272	221
Story1	B22	38	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-12.0343	169
Story1	B22	38	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-4.4236	61
Story1	B22	38	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-17.6943	251
Story1	B23	39	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-26.2027	275
Story1	B23	39	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-8.1738	114
Story1	B23	39	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-32.6951	350
Story1	B24	40	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-31.7042	338
Story1	B24	40	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-8.4629	118
Story1	B24	40	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-33.8515	363
Story1	B25	41	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-38.352	415
Story1	B25	41	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-9.588	134
Story1	B25	41	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-20.4253	260
Story1	B26	42	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-14.5053	204
Story1	B26	42	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-3.6263	50
Story1	B26	42	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-13.1125	184
Story1	B27	43	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-12.0954	177
Story1	B27	43	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-4.2743	67
Story1	B27	43	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-17.0974	249
Story1	B28	44	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-24.7909	263
Story1	B28	44	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-6.1977	86
Story1	B28	44	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-15.9036	225
Story1	B29	45	End-I	VT 20x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	0	3
Story1	B29	45	Middle	VT 20x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	0	3
Story1	B29	45	End-J	VT 20x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	0	3
Story1	B30	46	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	0	4
Story1	B30	46	Middle	V. 30x30 (21)	(B.2.4-1) 1.4D+1.6H	-5.8142	82
Story1	B30	46	End-J	V. 30x30 (21)	(B.2.4-1) 1.4D+1.6H	-11.5484	163
Story1	B31	47	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-21.1225	260

Story	Label	UniqueName	Location	Section	-ve Moment Combo	-ve Moment kN-m	As Top mm2
Story1	B31	47	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-5.2806	78
Story1	B31	47	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-20.1839	260
Story1	B32	48	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-24.4593	260
Story1	B32	48	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	-6.1148	85
Story1	B32	48	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	-15.4627	218
Story1	B33	49	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-28.3004	297
Story1	B33	49	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-16.3822	232
Story1	B33	49	End-J	V. 30x30 (21)	(B.2.4-6) 0.9D+Ws+1.6H	0	0
Story1	B34	50	End-I	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-6.3432	88
Story1	B34	50	Middle	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-6.3432	88
Story1	B34	50	End-J	V. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-25.3727	266
Story1	B9	51	End-I	V. 35x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-24.9231	303
Story1	B9	51	Middle	V. 35x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-6.2308	87
Story1	B9	51	End-J	V. 35x30 (21)	(B.2.4-7A) 0.9D+Ex+1.6H	-6.7397	94
Story1	B35	52	End-I	V. 35x30 (21)	(B.2.4-7A) 0.9D+Ex+1.6H	-5.7518	80
Story1	B35	52	Middle	V. 35x30 (21)			
Story1	B35	52	End-J	V. 35x30 (21)	(B.2.4-5A) 1.2D+L+Ex+1.6H	-19.1539	271

Table 1.6 - Concrete Beam Flexure Envelope - ACI 318-08 (Part 2 of 2)

Story	Label	UniqueName	Location	+ve Moment Combo	+ve Moment kN-m	As Bot mm2	Status
Story1	B1	19	End-I	(B.2.4-7A) 0.9D+Ex+1.6H	0	4	
Story1	B1	19	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	6.7003	93	
Story1	B1	19	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	13.4005	189	
Story1	B2	20	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	12.4142	181	
Story1	B2	20	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	6.2071	93	
Story1	B2	20	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	8.9442	131	
Story1	B3	21	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	13.2198	186	
Story1	B3	21	Middle	(B.2.4-1) 1.4D+1.6H	14.9847	211	
Story1	B3	21	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	9.6482	135	
Story1	B4	22	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0	4	
Story1	B4	22	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	6.7002	93	
Story1	B4	22	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	13.4005	189	
Story1	B5	23	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	10.2283	149	
Story1	B5	23	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	5.1141	77	
Story1	B5	23	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	5.26	79	
Story1	B6	24	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	7.844	109	
Story1	B6	24	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	8.232	115	
Story1	B6	24	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	7.1262	99	
Story1	B7	25	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	6.2231	87	
Story1	B7	25	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	5.7	79	
Story1	B7	25	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	7.0258	98	
Story1	B8	26	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	8.0709	113	
Story1	B8	26	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	8.0718	113	
Story1	B8	26	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	7.0496	98	
Story1	B11	27	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	8.75	122	
Story1	B11	27	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	9.6125	134	
Story1	B11	27	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	10.3008	144	
Story1	B12	28	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	9.8951	138	
Story1	B12	28	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	8.6464	121	
Story1	B12	28	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	7.7835	109	
Story1	B13	29	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	14.0204	197	
Story1	B13	29	Middle	(B.2.4-1) 1.4D+1.6H	18.4773	260	
Story1	B13	29	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	18.4304	260	
Story1	B14	30	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	16.8227	238	
Story1	B14	30	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	14.5403	205	
Story1	B14	30	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	12.462	175	
Story1	B15	31	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	4.1337	57	

Story	Label	UniqueName	Location	+ve Moment Combo	+ve Moment kN-m	As Bot mm ²	Status
Story1	B15	31	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	6.2006	87	
Story1	B15	31	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	4.1337	57	
Story1	B16	32	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	12.8256	181	
Story1	B16	32	Middle	(B.2.4-5B) 1.2D+L+Ey+1.6H	5.0407	71	
Story1	B16	32	End-J	(B.2.4-5B) 1.2D+L+Ey+1.6H	6.9407	98	
Story1	B17	33	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	5.7482	82	
Story1	B17	33	Middle	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H	5.6354	78	
Story1	B17	33	End-J	(B.2.4-5B) 1.2D+L+Ey+1.6H	10.8635	155	
Story1	B18	34	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	15.0719	213	
Story1	B18	34	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	15.5266	219	
Story1	B18	34	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	7.5359	105	
Story1	B19	35	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	7.3912	103	
Story1	B19	35	Middle	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H	13.4725	190	
Story1	B19	35	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	12.9789	182	
Story1	B20	36	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	12.7242	179	
Story1	B20	36	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	15.0166	212	
Story1	B20	36	End-J	(B.2.4-5B) 1.2D+L+Ey+1.6H	8.5549	119	
Story1	B21	37	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	8.7626	122	
Story1	B21	37	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	12.6003	177	
Story1	B21	37	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	7.8136	109	
Story1	B22	38	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	6.0172	84	
Story1	B22	38	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	4.4236	61	
Story1	B22	38	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	8.8471	124	
Story1	B23	39	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	13.1013	184	
Story1	B23	39	Middle	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H	20.3098	260	
Story1	B23	39	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	16.3476	231	
Story1	B24	40	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	15.8521	224	
Story1	B24	40	Middle	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H	18.5966	260	
Story1	B24	40	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	16.9257	240	
Story1	B25	41	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	19.176	260	
Story1	B25	41	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	23.3433	260	
Story1	B25	41	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	10.2126	143	
Story1	B26	42	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	8.3926	117	
Story1	B26	42	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	9.0405	126	
Story1	B26	42	End-J	(B.2.4-5B) 1.2D+L+Ey+1.6H	6.5562	91	
Story1	B27	43	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	6.0477	91	
Story1	B27	43	Middle	(B.2.4-5B) 1.2D+L+Ey+1.6H	4.2743	67	
Story1	B27	43	End-J	(B.2.4-5B) 1.2D+L+Ey+1.6H	8.5487	127	
Story1	B28	44	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	12.3954	174	
Story1	B28	44	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	17.3441	246	
Story1	B28	44	End-J	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H	11.1741	157	
Story1	B29	45	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0	3	
Story1	B29	45	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.2875	8	
Story1	B29	45	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	0	3	
Story1	B30	46	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0	4	
Story1	B30	46	Middle	(B.2.4-1) 1.4D+1.6H	2.8871	41	
Story1	B30	46	End-J	(B.2.4-1) 1.4D+1.6H	5.7742	81	
Story1	B31	47	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	10.5613	152	
Story1	B31	47	Middle	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc+1.6H	10.6723	150	
Story1	B31	47	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	10.0919	141	
Story1	B32	48	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	12.2297	172	
Story1	B32	48	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	14.6981	207	
Story1	B32	48	End-J	(B.2.4-5B) 1.2D+L+Ey+1.6H	8.112	113	
Story1	B33	49	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	14.1502	199	
Story1	B33	49	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	7.0751	99	
Story1	B33	49	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	22.6419	260	
Story1	B34	50	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	19.4506	260	
Story1	B34	50	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	15.457	218	
Story1	B34	50	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	12.6864	178	

Story	Label	UniqueName	Location	+ve Moment Combo	+ve Moment kN-m	As Bot mm2	Status
Story1	B9	51	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	12.4616	175	
Story1	B9	51	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	11.8585	166	
Story1	B9	51	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	12.2567	172	
Story1	B35	52	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	10.5924	148	
Story1	B35	52	Middle				
Story1	B35	52	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	9.5769	134	

Table 1.7 - Concrete Beam Shear Envelope - ACI 318-08 (Part 1 of 3)

Story	Label	UniqueName	Location	Section	Shear Design Combo	Shear Force kN	Torsion for Av/s kN-m
Story1	B1	19	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	27.3252	0
Story1	B1	19	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	32.4515	0
Story1	B1	19	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	37.5777	0
Story1	B2	20	End-I	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	22.579	0.4568
Story1	B2	20	Middle	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	15.6239	0.4568
Story1	B2	20	End-J	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	20.8964	0.4568
Story1	B3	21	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	28.1181	0.046
Story1	B3	21	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	18.3241	0.046
Story1	B3	21	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	25.5108	0.046
Story1	B4	22	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	27.3085	0
Story1	B4	22	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	32.4348	0
Story1	B4	22	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	37.561	0
Story1	B5	23	End-I	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	15.0581	0.4126
Story1	B5	23	Middle	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	11.5981	0.4126
Story1	B5	23	End-J	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	12.5026	0.4126
Story1	B6	24	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	15.1125	0.0312
Story1	B6	24	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	10.6203	0.0312
Story1	B6	24	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	13.6058	0.0312
Story1	B7	25	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	13.1101	0.0295
Story1	B7	25	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	10.0635	0.0295
Story1	B7	25	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	14.3169	0.0295
Story1	B8	26	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	15.3016	0.1682
Story1	B8	26	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	10.8094	0.1682
Story1	B8	26	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	13.7548	0.1682
Story1	B11	27	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	15.3584	0.1518
Story1	B11	27	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	10.932	0.1518
Story1	B11	27	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	16.7822	0.1518
Story1	B12	28	End-I	V. 30x30 (21)	(B.2.4-7A) 0.9D+Ex+1.6H	4.4127	0.1324
Story1	B12	28	Middle	V. 30x30 (21)	(B.2.4-7A) 0.9D+Ex+1.6H	3.2847	0.1324
Story1	B12	28	End-J	V. 30x30 (21)	(B.2.4-7A) 0.9D+Ex+1.6H	3.1208	0.1324
Story1	B13	29	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	29.3782	0.0204
Story1	B13	29	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	19.3838	0.0204
Story1	B13	29	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	32.1387	0.0204
Story1	B14	30	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	30.2882	0.2071
Story1	B14	30	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	17.9358	0.2071
Story1	B14	30	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	27.2461	0.2071
Story1	B15	31	End-I	VT 20x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	9.3608	0
Story1	B15	31	Middle	VT 20x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.8722	0
Story1	B15	31	End-J	VT 20x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	9.3608	0
Story1	B16	32	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	22.5632	0.4754
Story1	B16	32	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	23.1661	0.4754
Story1	B16	32	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	27.0811	0.4754
Story1	B17	33	End-I	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	18.1499	1.3247
Story1	B17	33	Middle	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	17.1694	1.3247
Story1	B17	33	End-J	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	23.064	1.3247
Story1	B18	34	End-I	V. 30x30 (21)	(B.2.4-6) 0.9D+Wc+1.6H	17.6359	1.9917
Story1	B18	34	Middle	V. 30x30 (21)	(B.2.4-6) 0.9D+Wc+1.6H	10.3272	1.9917

Story	Label	UniqueName	Location	Section	Shear Design Combo	Shear Force kN	Torsion for Av/s kN-m
Story1	B18	34	End-J	V. 30x30 (21)	(B.2.4-6) 0.9D+Wc+1.6H	11.8806	1.9917
Story1	B19	35	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	26.0877	1.8208
Story1	B19	35	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	21.1496	1.3336
Story1	B19	35	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	32.4016	1.8208
Story1	B20	36	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	32.9013	0.9883
Story1	B20	36	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	21.2058	0.8357
Story1	B20	36	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	27.7149	0.9883
Story1	B21	37	End-I	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	21.4472	0.3519
Story1	B21	37	Middle	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	16.3607	0.3519
Story1	B21	37	End-J	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	22.7662	0.3519
Story1	B22	38	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	25.4696	0.2957
Story1	B22	38	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	19.5089	0.2957
Story1	B22	38	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	27.996	0.2957
Story1	B23	39	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	40.0439	0.7254
Story1	B23	39	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	24.2467	0.6189
Story1	B23	39	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	42.7942	0.7254
Story1	B24	40	End-I	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	30.7578	0.0166
Story1	B24	40	Middle	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	23.9289	0.0166
Story1	B24	40	End-J	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	30.8977	0.0166
Story1	B25	41	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	50.1856	0.0715
Story1	B25	41	Middle	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	27.0584	0.0715
Story1	B25	41	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	42.3231	0.0715
Story1	B26	42	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	22.6845	0.9021
Story1	B26	42	Middle	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	14.5861	0.6302
Story1	B26	42	End-J	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	20.3592	0.6302
Story1	B27	43	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	24.1947	0.0394
Story1	B27	43	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	19.7127	0.0394
Story1	B27	43	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	27.0803	0.0394
Story1	B28	44	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	32.0728	1.1432
Story1	B28	44	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	18.6949	1.0449
Story1	B28	44	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	29.2864	1.1432
Story1	B29	45	End-I	VT 20x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	2.5657	0
Story1	B29	45	Middle	VT 20x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	1.3339	0
Story1	B29	45	End-J	VT 20x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	2.5662	0
Story1	B30	46	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	15.239	0
Story1	B30	46	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	21.2969	0
Story1	B30	46	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	24.3259	0
Story1	B31	47	End-I	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	23.9639	0.2746
Story1	B31	47	Middle	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	17.3196	0.2746
Story1	B31	47	End-J	V. 30x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	23.0285	0.2746
Story1	B32	48	End-I	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	31.4648	0.6193
Story1	B32	48	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	20.6056	0.8432
Story1	B32	48	End-J	V. 30x30 (21)	(B.2.4-3B) 1.2D+1.6G+L+1.6H	25.6987	0.6193
Story1	B33	49	End-I	V. 30x30 (21)	(B.2.4-4A) 1.2D+Ws+L+0.5Lr+1.6H	23.774	2.4194
Story1	B33	49	Middle	V. 30x30 (21)	(B.2.4-4A) 1.2D+Ws+L+0.5Lr+1.6H	21.2109	2.4194
Story1	B33	49	End-J	V. 30x30 (21)	(B.2.4-4A) 1.2D+Ws+L+0.5Lr+1.6H	13.5215	2.4194
Story1	B34	50	End-I	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	10.5968	0.6757
Story1	B34	50	Middle	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	17.6202	0.6757
Story1	B34	50	End-J	V. 30x30 (21)	(B.2.4-5B) 1.2D+L+Ey+1.6H	21.9134	0.6757
Story1	B9	51	End-I	V. 35x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	20.6969	0.4667
Story1	B9	51	Middle	V. 35x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	16.9543	0.4667
Story1	B9	51	End-J	V. 35x30 (21)	(B.2.4-7B) 0.9D+Ey+1.6H	16.1293	0.4667
Story1	B35	52	End-I	V. 35x30 (21)	(B.2.4-6) 0.9D+Ws+1.6H	13.8094	3.3335
Story1	B35	52	Middle	V. 35x30 (21)			
Story1	B35	52	End-J	V. 35x30 (21)	(B.2.4-6) 0.9D+Ws+1.6H	15.0326	3.3335

Table 1.7 - Concrete Beam Shear Envelope - ACI 318-08 (Part 2 of 3)

Story	Label	UniqueName	Location	VRebar (Av/s) mm2/m	TTrnCombo	Torsion for TTrnRebar kN-m	TTrnRebar (At/s) mm2/m
Story1	B1	19	End-I	338.77	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0
Story1	B1	19	Middle	402.32	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0
Story1	B1	19	End-J	465.87	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0
Story1	B2	20	End-I	279.93	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.7248	0
Story1	B2	20	Middle	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.7248	0
Story1	B2	20	End-J	259.07	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.7248	0
Story1	B3	21	End-I	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.2955	0
Story1	B3	21	Middle	0	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.2955	0
Story1	B3	21	End-J	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.2955	0
Story1	B4	22	End-I	338.56	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0
Story1	B4	22	Middle	402.11	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0
Story1	B4	22	End-J	465.67	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0
Story1	B5	23	End-I	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.9171	0
Story1	B5	23	Middle	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.9171	0
Story1	B5	23	End-J	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.9171	0
Story1	B6	24	End-I	0	(B.2.4-7A) 0.9D+Ex+1.6H	0.0878	0
Story1	B6	24	Middle	0	(B.2.4-7A) 0.9D+Ex+1.6H	0.0878	0
Story1	B6	24	End-J	0	(B.2.4-7A) 0.9D+Ex+1.6H	0.0878	0
Story1	B7	25	End-I	250.02	(B.2.4-1) 1.4D+1.6H	0.3276	0
Story1	B7	25	Middle	250.02	(B.2.4-1) 1.4D+1.6H	0.3276	0
Story1	B7	25	End-J	250.02	(B.2.4-1) 1.4D+1.6H	0.3276	0
Story1	B8	26	End-I	0	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.2562	0
Story1	B8	26	Middle	0	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.2562	0
Story1	B8	26	End-J	0	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.2562	0
Story1	B11	27	End-I	0	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.214	0
Story1	B11	27	Middle	0	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.214	0
Story1	B11	27	End-J	0	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.214	0
Story1	B12	28	End-I	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.1553	0
Story1	B12	28	Middle	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.1553	0
Story1	B12	28	End-J	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.1553	0
Story1	B13	29	End-I	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.6183	0
Story1	B13	29	Middle	0	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.6183	0
Story1	B13	29	End-J	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.6183	0
Story1	B14	30	End-I	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.5442	0
Story1	B14	30	Middle	0	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.5442	0
Story1	B14	30	End-J	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.5442	0
Story1	B15	31	End-I	0	(B.2.4-6) 0.9D+Ws+1.6H	0	0
Story1	B15	31	Middle	0	(B.2.4-6) 0.9D+Ws+1.6H	0	0
Story1	B15	31	End-J	0	(B.2.4-6) 0.9D+Ws+1.6H	0	0
Story1	B16	32	End-I	279.73	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.6044	0
Story1	B16	32	Middle	287.2	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.6044	0
Story1	B16	32	End-J	335.74	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.6044	0
Story1	B17	33	End-I	250.02	(B.2.4-1) 1.4D+1.6H	2.367	100.71
Story1	B17	33	Middle	250.02	(B.2.4-1) 1.4D+1.6H	2.367	100.71
Story1	B17	33	End-J	285.94	(B.2.4-1) 1.4D+1.6H	2.367	100.71
Story1	B18	34	End-I	80.54	(B.2.4-5A) 1.2D+L+Ex+1.6H	3.5203	149.78
Story1	B18	34	Middle	80.54	(B.2.4-5A) 1.2D+L+Ex+1.6H	3.5203	149.78
Story1	B18	34	End-J	80.54	(B.2.4-5A) 1.2D+L+Ex+1.6H	3.5203	149.78
Story1	B19	35	End-I	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.8208	0
Story1	B19	35	Middle	0	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.8208	0
Story1	B19	35	End-J	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.8208	0
Story1	B20	36	End-I	250.02	(B.2.4-1) 1.4D+1.6H	1.2002	0
Story1	B20	36	Middle	0	(B.2.4-1) 1.4D+1.6H	1.2002	0
Story1	B20	36	End-J	250.02	(B.2.4-1) 1.4D+1.6H	1.2002	0
Story1	B21	37	End-I	265.89	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.5215	0
Story1	B21	37	Middle	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.5215	0
Story1	B21	37	End-J	282.25	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.5215	0
Story1	B22	38	End-I	315.76	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3844	0
Story1	B22	38	Middle	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3844	0

Story	Label	UniqueName	Location	VRebar (Av/s) mm2/m	TTrnCombo	Torsion for TTrnRebar kN-m	TTrnRebar (At/s) mm2/m
Story1	B22	38	End-J	347.08	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3844	0
Story1	B23	39	End-I	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.7314	0
Story1	B23	39	Middle	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.7314	0
Story1	B23	39	End-J	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.7314	0
Story1	B24	40	End-I	381.32	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.482	0
Story1	B24	40	Middle	296.66	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.482	0
Story1	B24	40	End-J	383.06	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.482	0
Story1	B25	41	End-I	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3171	0
Story1	B25	41	Middle	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3171	0
Story1	B25	41	End-J	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3171	0
Story1	B26	42	End-I	250.02	(B.2.4-1) 1.4D+1.6H	1.2689	0
Story1	B26	42	Middle	250.02	(B.2.4-1) 1.4D+1.6H	1.2689	0
Story1	B26	42	End-J	252.41	(B.2.4-1) 1.4D+1.6H	1.2689	0
Story1	B27	43	End-I	299.96	(B.2.4-7A) 0.9D+Ex+1.6H	0.223	0
Story1	B27	43	Middle	250.02	(B.2.4-7A) 0.9D+Ex+1.6H	0.223	0
Story1	B27	43	End-J	335.73	(B.2.4-7A) 0.9D+Ex+1.6H	0.223	0
Story1	B28	44	End-I	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	1.315	0
Story1	B28	44	Middle	0	(B.2.4-5A) 1.2D+L+Ex+1.6H	1.315	0
Story1	B28	44	End-J	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	1.315	0
Story1	B29	45	End-I	166.68	(B.2.4-6) 0.9D+Ws+1.6H	0	0
Story1	B29	45	Middle	166.68	(B.2.4-6) 0.9D+Ws+1.6H	0	0
Story1	B29	45	End-J	166.68	(B.2.4-6) 0.9D+Ws+1.6H	0	0
Story1	B30	46	End-I	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0	0
Story1	B30	46	Middle	264.03	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0	0
Story1	B30	46	End-J	301.58	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0	0
Story1	B31	47	End-I	297.09	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.0789	0
Story1	B31	47	Middle	250.02	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.0789	0
Story1	B31	47	End-J	285.5	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.0789	0
Story1	B32	48	End-I	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.9941	0
Story1	B32	48	Middle	0	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.9941	0
Story1	B32	48	End-J	250.02	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.9941	0
Story1	B33	49	End-I	44.14	(B.2.4-3B) 1.2D+1.6G+L+1.6H	5.4774	233.06
Story1	B33	49	Middle	44.14	(B.2.4-3B) 1.2D+1.6G+L+1.6H	5.4774	233.06
Story1	B33	49	End-J	44.14	(B.2.4-3B) 1.2D+1.6G+L+1.6H	5.4774	233.06
Story1	B34	50	End-I	0	(B.2.4-5B) 1.2D+L+Ey+1.6H	0.6757	0
Story1	B34	50	Middle	0	(B.2.4-5B) 1.2D+L+Ey+1.6H	0.6757	0
Story1	B34	50	End-J	0	(B.2.4-5B) 1.2D+L+Ey+1.6H	0.6757	0
Story1	B9	51	End-I	291.7	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.6825	0
Story1	B9	51	Middle	291.7	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.6825	0
Story1	B9	51	End-J	291.7	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.6825	0
Story1	B35	52	End-I	62.34	(B.2.4-3B) 1.2D+1.6G+L+1.6H	14.2203	489.19
Story1	B35	52	Middle				
Story1	B35	52	End-J	62.34	(B.2.4-3B) 1.2D+1.6G+L+1.6H	14.2203	489.19

Table 1.7 - Concrete Beam Shear Envelope - ACI 318-08 (Part 3 of 3)

Story	Label	UniqueName	Location	TLngCombo	Torsion for TLngRebar kN-m	TLngRebar (Al) mm2	Status
Story1	B1	19	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0	
Story1	B1	19	Middle	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0	
Story1	B1	19	End-J	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0	
Story1	B2	20	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.7248	0	
Story1	B2	20	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.7248	0	
Story1	B2	20	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.7248	0	
Story1	B3	21	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.2955	0	
Story1	B3	21	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.2955	0	
Story1	B3	21	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.2955	0	
Story1	B4	22	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0	
Story1	B4	22	Middle	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0	

Story	Label	UniqueName	Location	TLngCombo	Torsion for TLngRebar kN-m	TLngRebar (AI) mm2	Status
Story1	B4	22	End-J	(B.2.4-5B) 1.2D+L+Ey+1.6H	0	0	
Story1	B5	23	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.9171	0	
Story1	B5	23	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.9171	0	
Story1	B5	23	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.9171	0	
Story1	B6	24	End-I	(B.2.4-7A) 0.9D+Ex+1.6H	0.0878	0	
Story1	B6	24	Middle	(B.2.4-7A) 0.9D+Ex+1.6H	0.0878	0	
Story1	B6	24	End-J	(B.2.4-7A) 0.9D+Ex+1.6H	0.0878	0	
Story1	B7	25	End-I	(B.2.4-1) 1.4D+1.6H	0.3276	0	
Story1	B7	25	Middle	(B.2.4-1) 1.4D+1.6H	0.3276	0	
Story1	B7	25	End-J	(B.2.4-1) 1.4D+1.6H	0.3276	0	
Story1	B8	26	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.2562	0	
Story1	B8	26	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.2562	0	
Story1	B8	26	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.2562	0	
Story1	B11	27	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.214	0	
Story1	B11	27	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.214	0	
Story1	B11	27	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.214	0	
Story1	B12	28	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.1553	0	
Story1	B12	28	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.1553	0	
Story1	B12	28	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.1553	0	
Story1	B13	29	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.6183	0	
Story1	B13	29	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.6183	0	
Story1	B13	29	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.6183	0	
Story1	B14	30	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.5442	0	
Story1	B14	30	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.5442	0	
Story1	B14	30	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.5442	0	
Story1	B15	31	End-I	(B.2.4-6) 0.9D+Ws+1.6H	0	0	
Story1	B15	31	Middle	(B.2.4-6) 0.9D+Ws+1.6H	0	0	
Story1	B15	31	End-J	(B.2.4-6) 0.9D+Ws+1.6H	0	0	
Story1	B16	32	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.6044	0	
Story1	B16	32	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.6044	0	
Story1	B16	32	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.6044	0	
Story1	B17	33	End-I	(B.2.4-1) 1.4D+1.6H	2.367	308	
Story1	B17	33	Middle	(B.2.4-1) 1.4D+1.6H	2.367	308	
Story1	B17	33	End-J	(B.2.4-1) 1.4D+1.6H	2.367	308	
Story1	B18	34	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	2.9243	308	
Story1	B18	34	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	2.9243	308	
Story1	B18	34	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	2.9243	308	
Story1	B19	35	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.8208	0	
Story1	B19	35	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.8208	0	
Story1	B19	35	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.8208	0	
Story1	B20	36	End-I	(B.2.4-1) 1.4D+1.6H	1.2002	0	
Story1	B20	36	Middle	(B.2.4-1) 1.4D+1.6H	1.2002	0	
Story1	B20	36	End-J	(B.2.4-1) 1.4D+1.6H	1.2002	0	
Story1	B21	37	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.5215	0	
Story1	B21	37	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.5215	0	
Story1	B21	37	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.5215	0	
Story1	B22	38	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3844	0	
Story1	B22	38	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3844	0	
Story1	B22	38	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3844	0	
Story1	B23	39	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.7314	0	
Story1	B23	39	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.7314	0	
Story1	B23	39	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.7314	0	
Story1	B24	40	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.482	0	
Story1	B24	40	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.482	0	
Story1	B24	40	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0.482	0	
Story1	B25	41	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3171	0	
Story1	B25	41	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3171	0	
Story1	B25	41	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.3171	0	
Story1	B26	42	End-I	(B.2.4-1) 1.4D+1.6H	1.2689	0	

Story	Label	UniqueName	Location	TLngCombo	Torsion for TLngRebar kN-m	TLngRebar (AI) mm2	Status
Story1	B26	42	Middle	(B.2.4-1) 1.4D+1.6H	1.2689	0	
Story1	B26	42	End-J	(B.2.4-1) 1.4D+1.6H	1.2689	0	
Story1	B27	43	End-I	(B.2.4-7A) 0.9D+Ex+1.6H	0.223	0	
Story1	B27	43	Middle	(B.2.4-7A) 0.9D+Ex+1.6H	0.223	0	
Story1	B27	43	End-J	(B.2.4-7A) 0.9D+Ex+1.6H	0.223	0	
Story1	B28	44	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	1.315	0	
Story1	B28	44	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	1.315	0	
Story1	B28	44	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	1.315	0	
Story1	B29	45	End-I	(B.2.4-6) 0.9D+Ws+1.6H	0	0	
Story1	B29	45	Middle	(B.2.4-6) 0.9D+Ws+1.6H	0	0	
Story1	B29	45	End-J	(B.2.4-6) 0.9D+Ws+1.6H	0	0	
Story1	B30	46	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0	0	
Story1	B30	46	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0	0	
Story1	B30	46	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	0	0	
Story1	B31	47	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.0789	0	
Story1	B31	47	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.0789	0	
Story1	B31	47	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.0789	0	
Story1	B32	48	End-I	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.9941	0	
Story1	B32	48	Middle	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.9941	0	
Story1	B32	48	End-J	(B.2.4-5A) 1.2D+L+Ex+1.6H	0.9941	0	
Story1	B33	49	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	2.8562	308	
Story1	B33	49	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	2.8562	308	
Story1	B33	49	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	2.8562	308	
Story1	B34	50	End-I	(B.2.4-5B) 1.2D+L+Ey+1.6H	0.6757	0	
Story1	B34	50	Middle	(B.2.4-5B) 1.2D+L+Ey+1.6H	0.6757	0	
Story1	B34	50	End-J	(B.2.4-5B) 1.2D+L+Ey+1.6H	0.6757	0	
Story1	B9	51	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.6825	0	
Story1	B9	51	Middle	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.6825	0	
Story1	B9	51	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	1.6825	0	
Story1	B35	52	End-I	(B.2.4-3B) 1.2D+1.6G+L+1.6H	14.2203	462	
Story1	B35	52	Middle				
Story1	B35	52	End-J	(B.2.4-3B) 1.2D+1.6G+L+1.6H	14.2203	462	

Table 1.8 - Concrete Joint Envelope - ACI 318-08 (Part 1 of 2)

Story	Label	UniqueName	Section	B/C Major Combo	B/C Major Ratio	B/C Minor Combo	B/C Minor Ratio
Story1	C1	1	C. 30x30 (21)	(B.2.4-7B) 0.9D+Ey	0.957	(B.2.4-7B) 0.9D+Ey	0.373
Story1	C2	2	C. 30x30 (21)	(B.2.4-7B) 0.9D+Ey	0.896	(B.2.4-7B) 0.9D+Ey	0.381
Story1	C3	3	C. 30x30 (21)	(B.2.4-7B) 0.9D+Ey	0.53	(B.2.4-7B) 0.9D+Ey	0.421
Story1	C4	4	C. 30x30 (21)	(B.2.4-7B) 0.9D+Ey	0.897	(B.2.4-7B) 0.9D+Ey	0.593
Story1	C5	5	C. 30x30 (21)	(B.2.4-7A) 0.9D+Ex	0.607	(B.2.4-7A) 0.9D+Ex	0.669
Story1	C6	6	C. 30x30 (21)	(B.2.4-7A) 0.9D+Ex	0.349	(B.2.4-7A) 0.9D+Ex	0.569
Story1	C7	7	C. 30x30 (21)	(B.2.4-7B) 0.9D+Ey	0.347	(B.2.4-7B) 0.9D+Ey	0.955
Story1	C8	8	C. 30x30 (21)	(B.2.4-7B) 0.9D+Ey	0.706	(B.2.4-7B) 0.9D+Ey	0.869
Story1	C9	9	C. 30x30 (21)	(B.2.4-7B) 0.9D+Ey	0.355	(B.2.4-7B) 0.9D+Ey	0.858
Story1	C10	10	C. 30x30 (21)	(B.2.4-7A) 0.9D+Ex	0.593	(B.2.4-7A) 0.9D+Ex	0.422
Story1	C11	11	C. 30x30 (21)	(B.2.4-7A) 0.9D+Ex	0.983	(B.2.4-5A) 1.2D+L+Ex	0.991
Story1	C12	12	C. 30x30 (21)	(B.2.4-7A) 0.9D+Ex	0.539	(B.2.4-7A) 0.9D+Ex	0.681
Story1	C13	13	C. 30x30 (21)	(B.2.4-7A) 0.9D+Ex	0.47	(B.2.4-7A) 0.9D+Ex	0.903
Story1	C14	14	C. 30x30 (21)	(B.2.4-7B) 0.9D+Ey	0.795	(B.2.4-5A) 1.2D+L+Ex	0.876
Story1	C15	15	C. 30x30 (21)	(B.2.4-7A) 0.9D+Ex	0.436	(B.2.4-7A) 0.9D+Ex	0.869
Story1	C16	16	C. 30x30 (21)	(B.2.4-7B) 0.9D+Ey	0.593	(B.2.4-7B) 0.9D+Ey	0.49
Story1	C17	17	C. 30x30 (21)	(B.2.4-5A) 1.2D+L+Ex	0.983	(B.2.4-7B) 0.9D+Ey	0.51
Story1	C18	18	C. 30x30 (21)	(B.2.4-7B) 0.9D+Ey	0.532	(B.2.4-7B) 0.9D+Ey	0.445

Table 1.8 - Concrete Joint Envelope - ACI 318-08 (Part 2 of 2)

Story	Label	UniqueName	JS Major Combo	JS Major Ratio	JS Minor Combo	JS Minor Ratio
Story1	C1	1	(B.2.4-5A) 1.2D+L+Ex	0.557	(B.2.4-5A) 1.2D+L+Ex	0.215
Story1	C2	2	(B.2.4-5A) 1.2D+L+Ex	0.528	(B.2.4-5A) 1.2D+L+Ex	0.223
Story1	C3	3	(B.2.4-5A) 1.2D+L+Ex	0.385	(B.2.4-5A) 1.2D+L+Ex	0.303
Story1	C4	4	(B.2.4-5A) 1.2D+L+Ex	0.395	(B.2.4-5A) 1.2D+L+Ex	0.259
Story1	C5	5	(B.2.4-5A) 1.2D+L+Ex	0.266	(B.2.4-5A) 1.2D+L+Ex	0.293
Story1	C6	6	(B.2.4-5A) 1.2D+L+Ex	0.201	(B.2.4-5A) 1.2D+L+Ex	0.327
Story1	C7	7	(B.2.4-5A) 1.2D+L+Ex	0.202	(B.2.4-5A) 1.2D+L+Ex	0.565
Story1	C8	8	(B.2.4-5A) 1.2D+L+Ex	0.312	(B.2.4-5A) 1.2D+L+Ex	0.386
Story1	C9	9	(B.2.4-5A) 1.2D+L+Ex	0.206	(B.2.4-5A) 1.2D+L+Ex	0.501
Story1	C10	10	(B.2.4-5A) 1.2D+L+Ex	0.44	(B.2.4-5A) 1.2D+L+Ex	0.309
Story1	C11	11	(B.2.4-5A) 1.2D+L+Ex	0.447	(B.2.4-5A) 1.2D+L+Ex	0.508
Story1	C12	12	(B.2.4-5A) 1.2D+L+Ex	0.321	(B.2.4-5A) 1.2D+L+Ex	0.404
Story1	C13	13	(B.2.4-5A) 1.2D+L+Ex	0.278	(B.2.4-5A) 1.2D+L+Ex	0.535
Story1	C14	14	(B.2.4-5A) 1.2D+L+Ex	0.359	(B.2.4-5A) 1.2D+L+Ex	0.581
Story1	C15	15	(B.2.4-5A) 1.2D+L+Ex	0.256	(B.2.4-5A) 1.2D+L+Ex	0.511
Story1	C16	16	(B.2.4-5A) 1.2D+L+Ex	0.437	(B.2.4-5A) 1.2D+L+Ex	0.359
Story1	C17	17	(B.2.4-5A) 1.2D+L+Ex	0.752	(B.2.4-5A) 1.2D+L+Ex	0.308
Story1	C18	18	(B.2.4-5A) 1.2D+L+Ex	0.389	(B.2.4-5A) 1.2D+L+Ex	0.323

REFUERZO DE COLUMNAS

E Frame Section Property Data

General Data

Property Name: C. 30x30 (21)

Material: 3000PSI

Notional Size Data: Modify/Show Notional Size...

Display Color: Change...

Notes: Modify/Show Notes...

Shape

Section Shape: Concrete Rectangular

Section Property Source

Source: User Defined

Section Dimensions

Depth: 300 mm

Width: 300 mm

Property Modifiers

Modify/Show Modifiers...
Currently Default

Reinforcement

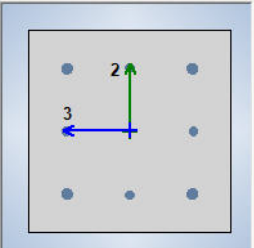
Modify/Show Rebar...

OK

Cancel

Show Section Properties...

☐ Include Automatic Rigid Zone Area Over Column



E Frame Section Property Reinforcement Data

Design Type

☒ P-M2-M3 Design (Column)

☐ M3 Design Only (Beam)

Rebar Material

Longitudinal Bars: ASTM 706M-Gr60

Confinement Bars (Ties): ASTM 706M-Gr60

Reinforcement Configuration

☒ Rectangular

☐ Circular

Confinement Bars

☒ Ties

☐ Spirals

Check/Design

☒ Reinforcement to be Checked

☐ Reinforcement to be Designed

Longitudinal Bars

Clear Cover for Confinement Bars: 40 mm

Number of Longitudinal Bars Along 3-dir Face: 3

Number of Longitudinal Bars Along 2-dir Face: 3

Longitudinal Bar Size and Area: #4 129 mm²

Corner Bar Size and Area: #5 200 mm²

Confinement Bars

Confinement Bar Size and Area: #3 71 mm²

Longitudinal Spacing of Confinement Bars (Along 1-Axis): 70 mm

Number of Confinement Bars in 3-dir: 3

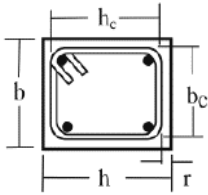
Number of Confinement Bars in 2-dir: 3

OK

Cancel

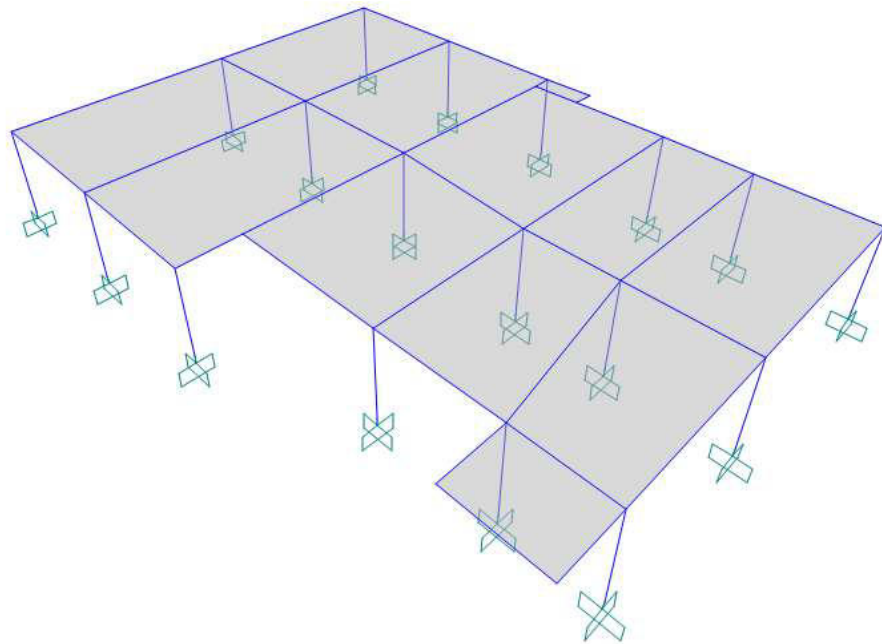
FLEJES DE CONFINAMIENTO EN COLUMNAS

f_y=	4200 kgf/cm ²
r=	4 cm



$A_{sh} = 0.3 \frac{s b_c f'_c}{f_{yt}} \left[\left(\frac{A_g}{A_{ch}} \right) - 1 \right]$	$A_{sh} = 0.09 \frac{s b_c f'_c}{f_{yt}}$	$A_g = b * h$
		$A_{ch} = b_c * h_c$

Sección		f' _c	Separación	Sentido b			Sentido h		
b (cm)	h (cm)	kgf/cm ²	s (cm)	A _{sh} (cm ²)	Fleje	Ramas	A _{sh} (cm ²)	Fleje	Ramas
30	30	210	7.0	1.99	#3	2.8	1.99	#3	2.8



Reacciones en la Base

Model File: Las Americas, Revision 0
20/12/2025

1 Analysis Results

This chapter provides analysis results.

1.1 Point Results

Table 1.1 - Joint Reactions

Story	Label	Unique Name	Output Case	Case Type	Step Type	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m
Base	1	1	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-2.1165	-0.4751	35.6278	1.0446	-0.755	0.0968
Base	1	1	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		-2.3784	-0.2663	37.8822	0.8822	-0.956	0.1023
Base	1	1	D+H+0.5L+0.75G (B.2.3-4A)	Combination		-2.6403	-0.0575	40.1367	0.7198	-1.1569	0.1078
Base	1	1	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	2.294	2.8319	39.1718	6.5305	7.286	0.3248
Base	1	1	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-6.5269	-3.7822	32.0838	-4.4413	-8.7961	-0.1312
Base	1	1	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	0.0736	5.3048	40.9139	10.6584	3.227	0.2273
Base	1	1	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-4.3066	-6.2551	30.3417	-8.5692	-4.737	-0.0337
Base	2	3	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		5.0271	1.9127	43.5064	-1.7651	6.2479	0.0732
Base	2	3	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		5.1545	2.6871	47.278	-2.5065	6.4273	0.0762
Base	2	3	D+H+0.5L+0.75G (B.2.3-4A)	Combination		5.2819	3.4615	51.0496	-3.2479	6.6067	0.0792
Base	2	3	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	10.8953	3.6884	45.1498	1.3005	15.7206	0.2774
Base	2	3	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-0.8411	0.1369	41.8629	-4.8308	-3.2249	-0.131
Base	2	3	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	7.9257	6.7965	46.7158	6.6827	10.9239	0.1886
Base	2	3	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	2.1284	-2.9712	40.2969	-10.2129	1.5719	-0.0422
Base	3	5	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-5.1313	2.5738	29.8575	-2.9432	-3.6948	0.1041
Base	3	5	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		-5.0798	3.0762	32.0419	-3.443	-3.5912	0.1093
Base	3	5	D+H+0.5L+0.75G (B.2.3-4A)	Combination		-5.0283	3.5787	34.2263	-3.9427	-3.4876	0.1145
Base	3	5	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	-1.1365	5.5347	32.2677	2.1562	3.9317	0.3245
Base	3	5	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-9.1262	-0.3871	27.4472	-8.0426	-11.3212	-0.1163
Base	3	5	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	-3.1454	7.7658	33.2705	6.0393	0.0807	0.2261
Base	3	5	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-7.1173	-2.6182	26.4444	-11.9256	-7.4703	-0.0179
Base	4	7	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-3.4979	-0.4484	40.4513	1.0207	-2.3506	0.0814
Base	4	7	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		-3.6266	-0.5809	44.8993	1.193	-2.4332	0.0848
Base	4	7	D+H+0.5L+0.75G (B.2.3-4A)	Combination		-3.7553	-0.7135	49.3472	1.3654	-2.5158	0.0881
Base	4	7	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	0.8951	3.7327	43.0699	7.3647	5.7003	0.2914
Base	4	7	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-7.8908	-4.6295	37.8328	-5.3234	-10.4015	-0.1286
Base	4	7	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	-1.5186	6.8263	43.4418	12.1044	1.2825	0.1997
Base	4	7	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-5.4772	-7.7232	37.4609	-10.0631	-5.9837	-0.037
Base	5	9	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		3.349	-1.2882	36.5662	1.3692	4.2724	0.111
Base	5	9	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		3.3572	-1.6846	43.958	1.7747	4.3187	0.1173
Base	5	9	D+H+0.5L+0.75G (B.2.3-4A)	Combination		3.3654	-2.0809	51.3498	2.1803	4.3651	0.1237
Base	5	9	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	9.2452	1.1233	37.3126	5.051	13.8212	0.3391
Base	5	9	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-2.5473	-3.6997	35.8198	-2.3126	-5.2764	-0.1172
Base	5	9	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	5.9445	5.3687	37.0903	11.5517	8.4726	0.2364
Base	5	9	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	0.7534	-7.9451	36.0421	-8.8133	0.0722	-0.0144
Base	6	11	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-2.4017	-0.3778	28.7753	-0.0519	-1.3607	0.0762
Base	6	11	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		-2.3623	-0.618	32.8609	0.1757	-1.2846	0.0792
Base	6	11	D+H+0.5L+0.75G (B.2.3-4A)	Combination		-2.3229	-0.8583	36.9464	0.4033	-1.2084	0.0822
Base	6	11	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	1.6606	3.6567	30.2664	6.1041	6.3833	0.2784
Base	6	11	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-6.4641	-4.4124	27.2843	-6.208	-9.1048	-0.126
Base	6	11	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	-0.6141	6.7431	29.6967	10.8284	2.0463	0.1908

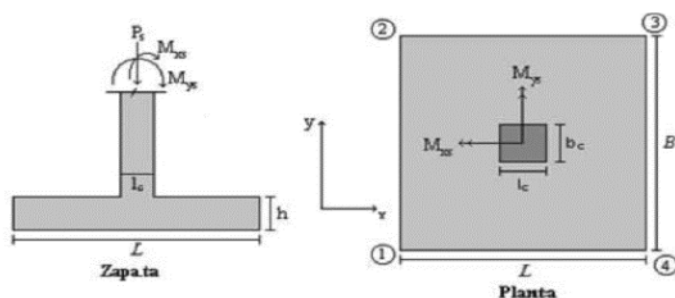
Table 1.1 - Joint Reactions (continued)

Story	Label	Unique Name	Output Case	Case Type	Step Type	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m
Base	6	11	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-4.1893	-7.4987	27.8539	-10.9323	-4.7677	-0.0384
Base	7	13	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		2.4148	2.1957	39.0942	-1.576	3.0533	0.1397
Base	7	13	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		2.4808	2.6619	44.3098	-1.9922	3.1423	0.1495
Base	7	13	D+H+0.5L+0.75G (B.2.3-4A)	Combination		2.5467	3.128	49.5254	-2.4083	3.2312	0.1593
Base	7	13	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	7.2926	5.5246	41.0101	3.9307	11.7541	0.3768
Base	7	13	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-2.4629	-1.1332	37.1783	-7.0827	-5.6475	-0.0974
Base	7	13	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	4.3337	8.1798	41.0121	8.2431	6.4857	0.2687
Base	7	13	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	0.496	-3.7883	37.1763	-11.3951	-0.379	0.0107
Base	8	15	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		2.267	1.8751	42.9976	-1.7441	2.9207	0.064
Base	8	15	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		2.3839	2.5616	52.1982	-2.404	3.06	0.0656
Base	8	15	D+H+0.5L+0.75G (B.2.3-4A)	Combination		2.5008	3.248	61.3989	-3.0639	3.1992	0.0671
Base	8	15	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	8.4152	4.094	43.954	1.7572	12.8725	0.2649
Base	8	15	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-3.8813	-0.3438	42.0411	-5.2455	-7.0311	-0.1369
Base	8	15	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	4.703	8.0032	45.067	7.9271	6.8607	0.179
Base	8	15	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-0.1691	-4.253	40.9281	-11.4154	-1.0192	-0.051
Base	9	17	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-2.6212	3.4719	36.3209	-3.8338	-1.8602	0.1103
Base	9	17	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		-2.6384	4.0254	41.8006	-4.3864	-1.8529	0.1155
Base	9	17	D+H+0.5L+0.75G (B.2.3-4A)	Combination		-2.6557	4.5789	47.2804	-4.9391	-1.8456	0.1208
Base	9	17	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	1.7222	7.0502	37.932	1.8815	6.3229	0.3545
Base	9	17	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-6.9646	-0.1063	34.7098	-9.549	-10.0434	-0.1339
Base	9	17	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	-0.9093	9.9089	38.9044	6.3902	1.3718	0.2415
Base	9	17	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-4.333	-2.965	33.7374	-14.0578	-5.0923	-0.0209
Base	10	19	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		9.4749	1.9084	37.6999	-1.3454	9.4593	-0.0612
Base	10	19	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		10.3672	2.5428	42.6361	-1.9491	10.3298	-0.0778
Base	10	19	D+H+0.5L+0.75G (B.2.3-4A)	Combination		11.2595	3.1773	47.5722	-2.5528	11.2003	-0.0944
Base	10	19	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	13.9938	5.2384	39.865	4.4426	18.2488	0.1095
Base	10	19	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	4.9559	-1.4216	35.5349	-7.1333	0.6697	-0.232
Base	10	19	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	11.2185	7.2147	39.4654	7.828	12.5924	0.0677
Base	10	19	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	7.7313	-3.3979	35.9344	-10.5187	6.3261	-0.1902
Base	11	21	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-1.0496	-0.8575	55.697	0.8788	-0.7902	0.1288
Base	11	21	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		-1.3417	-0.9571	68.609	0.9823	-1.0747	0.1378
Base	11	21	D+H+0.5L+0.75G (B.2.3-4A)	Combination		-1.6339	-1.0567	81.5211	1.0859	-1.3593	0.1468
Base	11	21	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	5.6248	1.1983	55.8936	4.184	10.1297	0.374
Base	11	21	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-7.7241	-2.9133	55.5004	-2.4264	-11.7101	-0.1165
Base	11	21	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	1.2075	4.962	55.782	10.2492	2.8823	0.2632
Base	11	21	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-3.3068	-6.677	55.612	-8.4917	-4.4627	-0.0057
Base	12	23	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-5.2858	-1.085	47.6505	0.5935	-4.905	0.0579
Base	12	23	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		-5.8034	-0.907	53.6893	0.404	-5.4069	0.0619
Base	12	23	D+H+0.5L+0.75G (B.2.3-4A)	Combination		-6.3211	-0.729	59.7282	0.2145	-5.9088	0.0658
Base	12	23	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	-0.4329	2.2254	49.8419	6.1717	4.2184	0.2425
Base	12	23	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-10.1387	-4.3954	45.459	-4.9848	-14.0284	-0.1268
Base	12	23	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	-3.6013	4.6506	49.0745	10.206	-1.8107	0.1688
Base	12	23	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-6.9703	-6.8206	46.2264	-9.0191	-7.9992	-0.053
Base	13	25	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		4.6252	-0.5665	41.2517	1.0638	4.4373	0.1337
Base	13	25	D+H+0.5L+0.75Lr (B.2.3-4A)	Combination		4.6816	-0.5	48.804	1.0128	4.4861	0.144

Table 1.1 - Joint Reactions (continued)

Story	Label	Unique Name	Output Case	Case Type	Step Type	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m
Base	13	25	(B.2.3-4A) D+H+0.5L+0.75G	Combination		4.7381	-0.4336	56.3562	0.9617	4.5348	0.1544
Base	13	25	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	9.6935	3.6903	42.4957	7.7644	14.3349	0.3764
Base	13	25	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-0.4432	-4.8232	40.0078	-5.6367	-5.4603	-0.1091
Base	13	25	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	6.3798	6.1044	41.6795	11.5819	7.8576	0.268
Base	13	25	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	2.8705	-7.2373	40.824	-9.4542	1.0169	-0.0006
Base	14	27	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-0.8535	0.8122	52.54	-0.7835	-0.9134	0.0203
Base	14	27	(B.2.3-4A) D+H+0.5L+0.75Lr	Combination		-0.8836	1.1338	66.396	-1.1006	-0.9509	0.017
Base	14	27	(B.2.3-4A) D+H+0.5L+0.75G	Combination		-0.9136	1.4554	80.252	-1.4177	-0.9883	0.0136
Base	14	27	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	6.3935	2.9392	52.9323	2.5984	11.1294	0.2052
Base	14	27	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-8.1005	-1.3148	52.1476	-4.1653	-12.9562	-0.1645
Base	14	27	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	1.6444	6.8359	52.9734	8.7968	3.239	0.1351
Base	14	27	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-3.3515	-5.2116	52.1065	-10.3638	-5.0658	-0.0944
Base	15	29	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-3.5154	1.6685	38.3909	-2.1088	-3.4998	0.1031
Base	15	29	(B.2.3-4A) D+H+0.5L+0.75Lr	Combination		-3.5612	1.8424	45.0582	-2.2979	-3.5533	0.109
Base	15	29	(B.2.3-4A) D+H+0.5L+0.75G	Combination		-3.6071	2.0164	51.7255	-2.487	-3.6069	0.1148
Base	15	29	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	1.784	5.5658	39.97	4.043	6.6224	0.3395
Base	15	29	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-8.8147	-2.2289	36.8117	-8.2606	-13.6219	-0.1332
Base	15	29	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	-1.6899	8.3119	39.0528	8.3976	-0.0101	0.2334
Base	15	29	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-5.3408	-4.9749	37.7289	-12.6152	-6.9895	-0.0271
Base	16	31	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		8.2215	-4.1995	34.9285	4.6116	7.6133	0.0229
Base	16	31	(B.2.3-4A) D+H+0.5L+0.75Lr	Combination		8.2096	-5.21	38.1696	5.6128	7.5843	0.0189
Base	16	31	(B.2.3-4A) D+H+0.5L+0.75G	Combination		8.1977	-6.2205	41.4106	6.6141	7.5553	0.0149
Base	16	31	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	14.0784	-1.0852	36.5593	10.1898	18.988	0.2048
Base	16	31	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	2.3647	-7.3138	33.2978	-0.9665	-3.7615	-0.159
Base	16	31	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	10.4622	0.6447	37.2115	13.3367	11.9514	0.1391
Base	16	31	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	5.9809	-9.0437	32.6456	-4.1134	3.2751	-0.0933
Base	17	33	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-1.9422	-4.0821	55.6284	4.0064	-2.2881	0.1096
Base	17	33	(B.2.3-4A) D+H+0.5L+0.75Lr	Combination		-1.9699	-5.8759	61.8651	5.7595	-2.3327	0.1168
Base	17	33	(B.2.3-4A) D+H+0.5L+0.75G	Combination		-1.9975	-7.6697	68.1018	7.5126	-2.3774	0.1241
Base	17	33	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	6.3482	-2.5013	56.558	6.856	11.4891	0.345
Base	17	33	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-10.2326	-5.6629	54.6989	1.1568	-16.0653	-0.1258
Base	17	33	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	1.2125	0.3992	57.7537	12.084	2.9514	0.2394
Base	17	33	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-5.0969	-8.5635	53.5032	-4.0712	-7.5276	-0.0201
Base	18	35	(B.2.3-2) D+H+L (B.2.3-4A)	Combination		-6.9643	-3.0381	32.5303	2.5021	-7.1603	0.0261
Base	18	35	(B.2.3-4A) D+H+0.5L+0.75Lr	Combination		-6.9894	-3.9313	35.462	3.3563	-7.2026	0.0241
Base	18	35	(B.2.3-4A) D+H+0.5L+0.75G	Combination		-7.0144	-4.8246	38.3938	4.2106	-7.245	0.0221
Base	18	35	(B.2.3-6A) D+H+L+0.7Ex	Combination	Max	-0.861	-0.1553	34.3943	7.656	4.451	0.2099
Base	18	35	(B.2.3-6A) D+H+L+0.7Ex	Combination	Min	-13.0677	-5.9209	30.6663	-2.6518	-18.7716	-0.1578
Base	18	35	(B.2.3-6A) D+H+L+0.7Ey	Combination	Max	-4.6336	1.8405	34.8813	11.2766	-2.7379	0.1358
Base	18	35	(B.2.3-6A) D+H+L+0.7Ey	Combination	Min	-9.295	-7.9167	30.1793	-6.2724	-11.5826	-0.0836

PREDIMENSIONAMIENTO ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL (B=L)



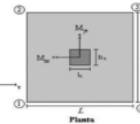
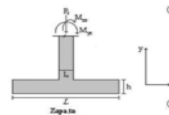
$$q_{msx} = \frac{P_s}{BL} \left(1 + \frac{6|e_B|}{B} + \frac{6|e_L|}{L} \right)$$

$$q_{min} = \frac{P_s}{BL} \left(1 - \frac{6|e_B|}{B} - \frac{6|e_L|}{L} \right)$$

q (ton/m²)=	10
(B.2.3-2) D+H+L	

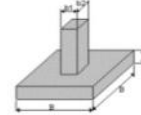
LABEL	Ps (ton)	Msx (ton-m)	Msy (ton-m)	B (m)	L (m)	ey (m)	ex (m)	qmax s (ton/m²)	qmin s (ton/m²)
1	3.7879	0.0896	-0.1001	1.20	1.20	0.024	0.026	3.29	1.97
2	4.6227	-0.2	0.6205	1.20	1.20	0.043	0.134	6.06	0.36
3	3.1752	-0.3121	-0.3758	1.20	1.20	0.098	0.118	4.59	-0.18
4	4.3401	0.1005	-0.2466	1.20	1.20	0.023	0.057	4.22	1.81
5	4.0322	0.1444	0.4253	1.20	1.20	0.036	0.105	4.78	0.82
6	3.1274	-0.0023	-0.1424	1.20	1.20	0.001	0.046	2.67	1.67
7	4.2253	-0.1736	0.3027	1.20	1.20	0.041	0.072	4.59	1.28
8	4.7578	-0.1927	0.295	1.20	1.20	0.041	0.062	5.00	1.61
9	3.95	-0.3974	-0.1865	1.20	1.20	0.101	0.047	4.77	0.72
10	4.0521	-0.1399	0.9809	1.20	1.20	0.035	0.242	6.71	-1.08
11	6.1842	0.0902	-0.0778	1.20	1.20	0.015	0.013	4.88	3.71
12	5.1102	0.0479	-0.4956	1.20	1.20	0.009	0.097	5.44	1.66
13	4.5296	0.1162	0.4528	1.20	1.20	0.026	0.100	5.12	1.17
14	5.8951	-0.0887	-0.0897	1.20	1.20	0.015	0.015	4.71	3.47
15	4.1977	-0.2211	-0.3503	1.20	1.20	0.053	0.083	4.90	0.93
16	3.7178	0.5	0.7589	1.20	1.20	0.134	0.204	6.95	-1.79
17	5.9504	0.4544	-0.2319	1.20	1.20	0.076	0.039	6.52	1.75
18	3.4613	0.2728	-0.7173	1.20	1.20	0.079	0.207	5.84	-1.03

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL



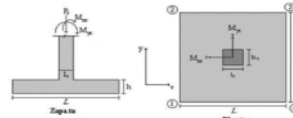
$$q_{max u} = \frac{P_u}{BL} \left(1 + \frac{6I_{ex}}{B} + \frac{6I_{ey}}{L} \right)$$

$$q_{min u} = \frac{P_u}{BL} \left(1 - \frac{6I_{ex}}{B} - \frac{6I_{ey}}{L} \right)$$



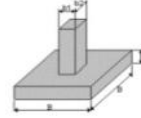
LABEL	COMBO	Pu (kN)	Mux (kN-m)	Muy (kN-m)	B (m)	L (m)	ey (m)	ex (m)	qmax u (kN/m²)	qmin u (kN/m²)	h (mm)	d (mm)	lc (mm)	bc (mm)	b0 (mm)	αs	αs	β	Tipo de concreto	λ
																αs	αs	β	λ	λ
1	(B.2.4-1) 1.4D	52.01	1.23	-1.37	1.20	1.20	0.024	0.026	45.16	27.07	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-2A) 1.2D+1.6L+0.5Lr	46.08	0.94	-1.31	1.20	1.20	0.020	0.028	39.82	24.19	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-2B) 1.2D+1.6L+0.5G	47.59	0.82	-1.45	1.20	1.20	0.017	0.030	40.93	25.17	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-3A) 1.2D+1.6Lr+L	49.40	0.68	-1.61	1.20	1.20	0.014	0.033	42.26	26.35	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-3B) 1.2D+1.6G+L	54.22	0.31	-2.04	1.20	1.20	0.006	0.038	45.81	29.49	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-5A) 1.2D+L+Ex	50.53	10.08	11.96	1.20	1.20	0.199	0.237	111.61	-41.43	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-5A) 1.2D+L+Ex	38.62	-7.97	-14.32	1.20	1.20	0.206	0.371	104.20	-50.55	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-5B) 1.2D+L+Ev	53.42	16.99	5.26	1.20	1.20	0.318	0.098	114.36	-40.16	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-5B) 1.2D+L+Ev	35.73	-14.88	-7.61	1.20	1.20	0.417	0.213	102.93	-53.31	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-7A) 0.9D+Ex	39.38	9.81	12.26	1.20	1.20	0.249	0.311	103.98	-49.28	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-7A) 0.9D+Ex	27.48	-8.23	-14.02	1.20	1.20	0.300	0.510	96.35	-58.18	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-7B) 0.9D+Ev	42.28	16.73	5.55	1.20	1.20	0.396	0.131	106.73	-48.01	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-7B) 0.9D+Ev	24.58	-15.15	-7.32	1.20	1.20	0.616	0.298	95.08	-60.94	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	48.19	0.77	-1.50	1.20	1.20	0.016	0.031	41.37	25.56	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	50.60	0.59	-1.72	1.20	1.20	0.012	0.034	43.15	27.13	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	48.19	0.77	-1.50	1.20	1.20	0.016	0.031	41.37	25.56	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	50.60	0.59	-1.72	1.20	1.20	0.012	0.034	43.15	27.13	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	48.49	0.75	-1.53	1.20	1.20	0.015	0.032	41.59	25.76	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	43.67	1.12	-1.10	1.20	1.20	0.026	0.025	38.04	22.61	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-4B) 1.2D+Ws+L+0.5G	45.18	1.01	-1.23	1.20	1.20	0.022	0.027	39.15	23.60	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-4B) 1.2D+Wc+L+0.5G	50.00	0.63	-1.66	1.20	1.20	0.013	0.033	42.70	26.74	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-6) 0.9D+Wc	35.84	0.60	-1.10	1.20	1.20	0.017	0.031	30.81	18.98	300	217	300	300	2068	Central	40	1.00	Normal	1
1	(B.2.4-6) 0.9D+Ws	31.02	0.98	-0.67	1.20	1.20	0.032	0.021	27.25	15.83	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-1) 1.4D	63.47	-2.75	8.52	1.20	1.20	0.043	0.134	83.19	4.96	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-2A) 1.2D+1.6L+0.5Lr	56.90	-2.84	7.41	1.20	1.20	0.050	0.130	75.11	3.92	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-2B) 1.2D+1.6L+0.5G	59.41	-3.32	7.52	1.20	1.20	0.056	0.127	78.91	3.60	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-3A) 1.2D+1.6Lr+L	62.41	-3.90	7.66	1.20	1.20	0.063	0.123	83.48	3.20	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-3B) 1.2D+1.6G+L	70.42	-5.45	8.01	1.20	1.20	0.077	0.114	95.65	2.16	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-5A) 1.2D+L+Ex	57.14	2.70	22.79	1.20	1.20	0.047	0.399	128.19	-48.83	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-5A) 1.2D+L+Ex	51.66	-7.40	-8.19	1.20	1.20	0.143	0.159	90.02	-18.27	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-5B) 1.2D+L+Ev	59.81	11.65	14.87	1.20	1.20	0.195	0.249	133.61	-50.55	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-5B) 1.2D+L+Ev	48.99	-16.36	-0.26	1.20	1.20	0.334	0.005	91.74	-23.70	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-7A) 0.9D+Ex	43.54	3.29	20.97	1.20	1.20	0.075	0.482	114.45	-53.97	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-7A) 0.9D+Ex	38.06	-6.82	-10.01	1.20	1.20	0.179	0.263	84.87	-32.01	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-7B) 0.9D+Ev	46.21	12.24	13.04	1.20	1.20	0.265	0.282	119.87	-55.70	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-7B) 0.9D+Ev	35.39	-15.77	-2.09	1.20	1.20	0.446	0.059	86.59	-37.44	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	60.41	-3.51	7.57	1.20	1.20	0.058	0.125	80.43	3.47	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	64.41	-4.29	7.75	1.20	1.20	0.067	0.120	86.52	2.94	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	60.41	-3.51	7.57	1.20	1.20	0.058	0.125	80.43	3.47	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	64.41	-4.29	7.75	1.20	1.20	0.067	0.120	86.52	2.94	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	60.91	-3.61	7.59	1.20	1.20	0.059	0.125	81.20	3.40	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	52.90	-2.06	7.24	1.20	1.20	0.039	0.137	69.02	4.45	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-4B) 1.2D+Ws+L+0.5G	55.40	-2.55	7.35	1.20	1.20	0.046	0.133	72.83	4.12	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-4B) 1.2D+Wc+L+0.5G	63.41	-4.10	7.70	1.20	1.20	0.065	0.121	85.00	3.07	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-6) 0.9D+Wc	44.81	-2.54	5.65	1.20	1.20	0.057	0.126	59.57	2.66	300	217	300	300	2068	Central	40	1.00	Normal	1
2	(B.2.4-6) 0.9D+Ws	36.79	-0.99	5.30	1.20	1.20	0.027	0.144	47.39	3.71	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-1) 1.4D	43.59	-4.28	-5.16	1.20	1.20	0.098	0.118	63.07	-2.52	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-2A) 1.2D+1.6L+0.5Lr	38.82	-4.00	-4.36	1.20	1.20	0.103	0.112	56.00	-2.08	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-2B) 1.2D+1.6L+0.5G	40.27	-4.33	-4.30	1.20	1.20	0.108	0.107	57.93	-2.00	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-3A) 1.2D+1.6Lr+L	42.02	-4.73	-4.23	1.20	1.20	0.112	0.101	60.26	-1.90	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-3B) 1.2D+1.6G+L	46.67	-5.78	-4.03	1.20	1.20	0.124	0.086	66.46	-1.64	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-5A) 1.2D+L+Ex	41.46	4.82	8.04	1.20	1.20	0.116	0.194	73.45	-15.86	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-5A) 1.2D+L+Ex	33.27	-12.16	-16.89	1.20	1.20	0.366	0.508	123.98	-77.77	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-5B) 1.2D+L+Ev	43.15	11.25	1.69	1.20	1.20	0.261	0.039	74.89	-14.96	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-5B) 1.2D+L+Ev	31.58	-18.60	-10.53	1.20	1.20	0.589	0.333	123.08	-79.21	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-7A) 0.9D+Ex	32.12	5.74	9.15	1.20	1.20	0.179	0.285	73.99	-29.38	300	217	300	300	2068	Central	40	1.00	Normal	1

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL



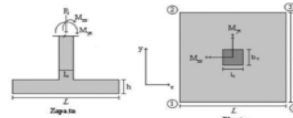
$$q_{max\ u} = \frac{P_u}{BL} \left(1 + \frac{6I_{ep}I}{B} + \frac{6I_{ey}I}{L} \right)$$

$$q_{min\ u} = \frac{P_u}{BL} \left(1 - \frac{6I_{ep}I}{B} - \frac{6I_{ey}I}{L} \right)$$



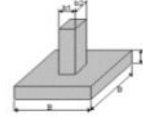
LABEL	COMBO	Pu (kN)	Mux (kN-m)	Muy (kN-m)	B (m)	L (m)	ey (m)	ex (m)	qmax u (kN/m²)	qmin u (kN/m²)	h (mm)	d (mm)	lc (mm)	bc (mm)	b0 (mm)	αs	αs	β	Tipo de concreto	λ
3	(B.2.4-7A) 0.9D+Ex	23.93	-11.24	-15.78	1.20	1.20	0.470	0.660	110.47	-77.23	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-7B) 0.9D+Ey	33.81	12.17	2.79	1.20	1.20	0.360	0.083	75.43	-28.48	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-7B) 0.9D+Ey	22.24	-17.68	-9.43	1.20	1.20	0.795	0.424	109.56	-78.67	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	40.85	-4.46	-4.28	1.20	1.20	0.109	0.105	58.71	-1.97	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	43.18	-4.99	-4.18	1.20	1.20	0.116	0.097	61.81	-1.84	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	40.85	-4.46	-4.28	1.20	1.20	0.109	0.105	58.71	-1.97	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	43.18	-4.99	-4.18	1.20	1.20	0.116	0.097	61.81	-1.84	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	41.14	-4.53	-4.26	1.20	1.20	0.110	0.104	59.10	-1.95	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	36.49	-3.48	-4.46	1.20	1.20	0.095	0.122	52.90	-2.21	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-4B) 1.2D+Ws+L+0.5G	37.95	-3.80	-4.40	1.20	1.20	0.100	0.116	54.83	-2.13	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-4B) 1.2D+Wc+L+0.5G	42.60	-4.86	-4.20	1.20	1.20	0.114	0.099	61.03	-1.87	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-6) 0.9D+Wc	30.35	-3.28	-3.22	1.20	1.20	0.108	0.106	43.64	-1.49	300	217	300	300	2068	Central	40	1.00	Normal	1
3	(B.2.4-6) 0.9D+Ws	25.70	-2.23	-3.42	1.20	1.20	0.087	0.133	37.44	-1.75	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-1) 1.4D	59.59	1.38	-3.39	1.20	1.20	0.023	0.057	57.92	24.84	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-2A) 1.2D+1.6L+0.5Lr	54.04	1.28	-2.96	1.20	1.20	0.024	0.055	52.25	22.80	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-2B) 1.2D+1.6L+0.5G	57.00	1.38	-3.01	1.20	1.20	0.024	0.053	54.85	24.31	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-3A) 1.2D+1.6Lr+L	60.55	1.51	-3.08	1.20	1.20	0.025	0.051	57.98	26.12	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-3B) 1.2D+1.6G+L	70.03	1.83	-3.26	1.20	1.20	0.026	0.047	66.30	30.96	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-5A) 1.2D+L+Ex	55.46	11.58	10.32	1.20	1.20	0.209	0.186	114.55	-37.52	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-5A) 1.2D+L+Ex	46.69	-9.22	-16.12	1.20	1.20	0.197	0.345	120.39	-55.55	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-5B) 1.2D+L+Ey	56.13	19.48	3.00	1.20	1.20	0.347	0.053	117.03	-39.07	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-5B) 1.2D+L+Ey	46.02	-17.12	-8.80	1.20	1.20	0.372	0.191	121.95	-58.04	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-7A) 0.9D+Ex	42.70	11.29	11.04	1.20	1.20	0.264	0.259	107.18	-47.88	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-7A) 0.9D+Ex	33.92	-9.51	-15.39	1.20	1.20	0.280	0.454	110.03	-62.93	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-7B) 0.9D+Ey	43.36	19.19	3.72	1.20	1.20	0.442	0.086	109.66	-49.43	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-7B) 0.9D+Ey	33.25	-17.41	-8.07	1.20	1.20	0.524	0.243	111.59	-65.41	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	58.18	1.42	-3.04	1.20	1.20	0.024	0.052	55.89	24.92	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	62.92	1.59	-3.13	1.20	1.20	0.025	0.050	60.06	27.33	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	58.18	1.42	-3.04	1.20	1.20	0.024	0.052	55.89	24.92	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	62.92	1.59	-3.13	1.20	1.20	0.025	0.050	60.06	27.33	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	58.78	1.44	-3.05	1.20	1.20	0.025	0.052	56.41	25.22	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	49.30	1.12	-2.87	1.20	1.20	0.023	0.058	48.09	20.38	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-4B) 1.2D+Ws+L+0.5G	52.26	1.22	-2.92	1.20	1.20	0.023	0.056	50.69	21.89	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-4B) 1.2D+Wc+L+0.5G	61.74	1.55	-3.10	1.20	1.20	0.025	0.050	59.02	26.73	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-6) 0.9D+Wc	43.04	1.05	-2.27	1.20	1.20	0.024	0.053	41.40	18.38	300	217	300	300	2068	Central	40	1.00	Normal	1
4	(B.2.4-6) 0.9D+Ws	33.57	0.73	-2.09	1.20	1.20	0.022	0.062	33.07	13.55	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-1) 1.4D	55.36	1.98	5.84	1.20	1.20	0.036	0.105	65.60	11.29	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-2A) 1.2D+1.6L+0.5Lr	52.38	1.95	5.03	1.20	1.20	0.037	0.096	60.64	12.11	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-2B) 1.2D+1.6L+0.5G	57.31	2.21	5.06	1.20	1.20	0.039	0.088	65.05	14.55	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-3A) 1.2D+1.6Lr+L	63.22	2.52	5.10	1.20	1.20	0.040	0.081	70.34	17.47	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-3B) 1.2D+1.6G+L	78.99	3.33	5.19	1.20	1.20	0.042	0.066	84.45	25.26	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-5A) 1.2D+L+Ex	48.67	7.74	20.71	1.20	1.20	0.159	0.426	132.60	-65.00	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-5A) 1.2D+L+Ex	46.23	-4.34	-10.70	1.20	1.20	0.094	0.232	84.34	-20.13	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-5B) 1.2D+L+Ey	48.25	18.49	11.84	1.20	1.20	0.383	0.245	138.83	-71.82	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-5B) 1.2D+L+Ey	46.65	-15.09	-1.83	1.20	1.20	0.324	0.039	91.16	-26.37	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-7A) 0.9D+Ex	36.81	7.32	19.46	1.20	1.20	0.199	0.529	118.54	-67.42	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-7A) 0.9D+Ex	34.37	-4.77	-11.95	1.20	1.20	0.139	0.348	81.92	-34.19	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-7B) 0.9D+Ey	36.39	18.07	10.59	1.20	1.20	0.497	0.291	124.77	-74.23	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-7B) 0.9D+Ey	34.79	-15.52	-3.08	1.20	1.20	0.446	0.089	88.74	-40.43	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	59.28	2.31	5.07	1.20	1.20	0.039	0.086	66.81	15.52	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	67.17	2.72	5.12	1.20	1.20	0.040	0.076	73.87	19.42	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	59.28	2.31	5.07	1.20	1.20	0.039	0.086	66.81	15.52	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	67.17	2.72	5.12	1.20	1.20	0.040	0.076	73.87	19.42	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	60.27	2.36	5.08	1.20	1.20	0.039	0.084	67.69	16.41	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	44.49	1.55	4.99	1.20	1.20	0.035	0.112	53.59	8.21	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-4B) 1.2D+Ws+L+0.5G	49.42	1.80	5.02	1.20	1.20	0.036	0.101	57.99	10.65	300	217	300	300	2068	Central	40	1.00	Normal	1

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL



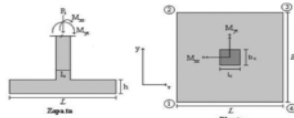
$$q_{max\ u} = \frac{P_u}{BL} \left(1 + \frac{6I_{ex}}{B} + \frac{6I_{ey}}{L} \right)$$

$$q_{min\ u} = \frac{P_u}{BL} \left(1 - \frac{6I_{ex}}{B} - \frac{6I_{ey}}{L} \right)$$



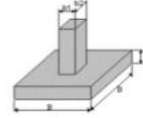
LABEL	COMBO	Pu (kN)	Mux (kN-m)	Muy (kN-m)	B (m)	L (m)	ey (m)	ex (m)	qmax u (kN/m²)	qmin u (kN/m²)	h (mm)	d (mm)	lc (mm)	bc (mm)	b0 (mm)	αs	αs	β	Tipo de concreto	λ
																αs	αs	β	λ	λ
5	(B.2.4-4B) 1.2D+Wc+L+0.5G	65.19	2.62	5.11	1.20	1.20	0.040	0.078	72.10	18.44	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-6) 0.9D+Wc	43.47	1.68	3.80	1.20	1.20	0.039	0.087	49.23	11.15	300	217	300	300	2068	Central	40	1.00	Normal	1
5	(B.2.4-6) 0.9D+Ws	27.70	0.87	3.71	1.20	1.20	0.031	0.134	35.12	3.36	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-1) 1.4D	42.94	-0.03	-1.96	1.20	1.20	0.001	0.046	36.71	22.92	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-2A) 1.2D+1.6L+0.5Lr	39.53	0.12	-1.63	1.20	1.20	0.003	0.041	33.51	21.39	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-2B) 1.2D+1.6L+0.5G	42.25	0.26	-1.58	1.20	1.20	0.006	0.037	35.74	22.95	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-3A) 1.2D+1.6Lr+L	45.52	0.43	-1.53	1.20	1.20	0.009	0.034	38.41	24.82	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-3B) 1.2D+1.6G+L	54.25	0.88	-1.38	1.20	1.20	0.016	0.025	45.53	29.81	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-5A) 1.2D+L+Ex	39.30	10.16	11.06	1.20	1.20	0.259	0.281	100.99	-46.41	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-5A) 1.2D+L+Ex	34.31	-10.22	-14.41	1.20	1.20	0.298	0.420	109.34	-61.70	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-5B) 1.2D+L+Ex	38.27	17.95	3.87	1.20	1.20	0.469	0.101	102.35	-49.19	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-5B) 1.2D+L+Ex	35.33	-18.00	-7.23	1.20	1.20	0.509	0.205	112.13	-63.06	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-7A) 0.9D+Ex	30.10	10.17	11.48	1.20	1.20	0.338	0.381	96.08	-54.27	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-7A) 0.9D+Ex	25.10	-10.21	-14.00	1.20	1.20	0.407	0.557	101.48	-66.61	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-7B) 0.9D+Ex	29.07	17.95	4.29	1.20	1.20	0.618	0.148	97.44	-57.06	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-7B) 0.9D+Ex	26.13	-17.99	-6.81	1.20	1.20	0.689	0.260	104.26	-67.97	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	43.34	0.31	-1.57	1.20	1.20	0.007	0.036	36.63	23.57	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	47.70	0.54	-1.49	1.20	1.20	0.011	0.031	40.19	26.07	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	43.34	0.31	-1.57	1.20	1.20	0.007	0.036	36.63	23.57	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	47.70	0.54	-1.49	1.20	1.20	0.011	0.031	40.19	26.07	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	43.89	0.34	-1.56	1.20	1.20	0.008	0.035	37.07	23.89	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	35.17	-0.11	-1.70	1.20	1.20	0.003	0.048	30.72	18.12	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-4B) 1.2D+Ws+L+0.5G	37.89	0.03	-1.66	1.20	1.20	0.001	0.044	32.17	20.46	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-4B) 1.2D+Wc+L+0.5G	46.61	0.48	-1.51	1.20	1.20	0.010	0.032	39.30	25.45	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-6) 0.9D+Wc	31.96	0.21	-1.18	1.20	1.20	0.006	0.037	27.02	17.37	300	217	300	300	2068	Central	40	1.00	Normal	1
6	(B.2.4-6) 0.9D+Ws	23.24	-0.25	-1.33	1.20	1.20	0.011	0.057	21.62	10.66	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-1) 1.4D	58.01	-2.38	4.16	1.20	1.20	0.041	0.072	62.99	17.58	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-2A) 1.2D+1.6L+0.5Lr	53.20	-2.32	3.62	1.20	1.20	0.044	0.068	57.57	16.32	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-2B) 1.2D+1.6L+0.5G	56.68	-2.60	3.68	1.20	1.20	0.046	0.065	61.14	17.58	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-3A) 1.2D+1.6Lr+L	60.85	-2.93	3.75	1.20	1.20	0.048	0.062	65.43	19.09	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-3B) 1.2D+1.6G+L	71.99	-3.81	3.93	1.20	1.20	0.053	0.055	76.87	23.12	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-5A) 1.2D+L+Ex	52.91	7.00	17.89	1.20	1.20	0.132	0.338	123.19	-49.71	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-5A) 1.2D+L+Ex	46.54	-11.09	-10.77	1.20	1.20	0.238	0.231	108.22	-43.58	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-5B) 1.2D+L+Ex	52.92	14.23	9.18	1.20	1.20	0.269	0.173	118.05	-44.55	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-5B) 1.2D+L+Ex	46.53	-18.32	-2.05	1.20	1.20	0.394	0.044	103.06	-38.43	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-7A) 0.9D+Ex	40.48	7.51	17.00	1.20	1.20	0.186	0.420	113.24	-57.03	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-7A) 0.9D+Ex	34.11	-10.58	-11.66	1.20	1.20	0.310	0.342	100.91	-53.53	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-7B) 0.9D+Ex	40.49	14.75	8.29	1.20	1.20	0.364	0.205	108.09	-51.86	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-7B) 0.9D+Ex	34.10	-17.81	-2.94	1.20	1.20	0.522	0.086	95.74	-48.38	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	58.07	-2.71	3.70	1.20	1.20	0.047	0.064	62.57	18.09	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	63.64	-3.15	3.79	1.20	1.20	0.049	0.060	68.29	20.10	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	58.07	-2.71	3.70	1.20	1.20	0.047	0.064	62.57	18.09	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	63.64	-3.15	3.79	1.20	1.20	0.049	0.060	68.29	20.10	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	58.77	-2.76	3.71	1.20	1.20	0.047	0.063	63.29	18.34	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	47.44	-1.88	3.53	1.20	1.20	0.039	0.074	51.85	14.31	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-4B) 1.2D+Ws+L+0.5G	51.11	-2.15	3.59	1.20	1.20	0.042	0.070	55.42	15.57	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-4B) 1.2D+Wc+L+0.5G	62.25	-3.04	3.77	1.20	1.20	0.049	0.061	66.86	19.59	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-6) 0.9D+Wc	42.86	-1.97	2.76	1.20	1.20	0.046	0.064	46.21	13.31	300	217	300	300	2068	Central	40	1.00	Normal	1
7	(B.2.4-6) 0.9D+Ws	31.73	-1.09	2.58	1.20	1.20	0.034	0.081	34.78	9.29	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-1) 1.4D	65.32	-2.65	4.05	1.20	1.20	0.040	0.062	68.61	22.11	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-2A) 1.2D+1.6L+0.5Lr	62.12	-2.69	3.56	1.20	1.20	0.043	0.057	64.84	21.44	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-2B) 1.2D+1.6L+0.5G	68.26	-3.11	3.65	1.20	1.20	0.046	0.053	70.88	23.93	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-3A) 1.2D+1.6Lr+L	75.62	-3.62	3.75	1.20	1.20	0.048	0.050	78.12	26.91	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-3B) 1.2D+1.6G+L	95.24	-4.98	4.03	1.20	1.20	0.052	0.042	97.42	34.86	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-5A) 1.2D+L+Ex	57.56	3.48	19.86	1.20	1.20	0.060	0.345	121.02	-41.07	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-5A) 1.2D+L+Ex	54.42	-8.01	-12.92	1.20	1.20	0.147	0.237	110.47	-34.89	300	217	300	300	2068	Central	40	1.00	Normal	1

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL



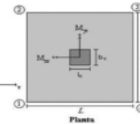
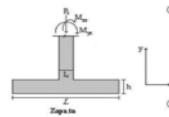
$$q_{max u} = \frac{P_u}{BL} \left(1 + \frac{6e_y L}{B} + \frac{6e_x B}{L} \right)$$

$$q_{min u} = \frac{P_u}{BL} \left(1 - \frac{6e_y L}{B} - \frac{6e_x B}{L} \right)$$



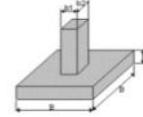
LABEL	COMBO	Pu (kN)	Mux (kN-m)	Muy (kN-m)	B (m)	L (m)	ey (m)	ex (m)	qmax u (kN/m²)	qmin u (kN/m²)	h (mm)	d (mm)	lc (mm)	bc (mm)	b0 (mm)	αs	αs	β	Tipo de concreto	λ
8	(B.2.4-5B) 1.2D+L+Ey	59.38	13.69	9.90	1.20	1.20	0.231	0.167	123.18	-40.71	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-5B) 1.2D+L+Ey	52.60	-18.23	-2.96	1.20	1.20	0.347	0.056	110.10	-37.05	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-7A) 0.9D+Ex	43.56	4.04	19.00	1.20	1.20	0.093	0.436	110.25	-49.75	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-7A) 0.9D+Ex	40.42	-7.45	-13.79	1.20	1.20	0.184	0.341	101.80	-45.66	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-7B) 0.9D+Ey	45.38	14.26	9.04	1.20	1.20	0.314	0.199	112.41	-49.38	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-7B) 0.9D+Ey	38.60	-17.66	-3.83	1.20	1.20	0.458	0.099	101.43	-47.81	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	70.71	-3.28	3.68	1.20	1.20	0.046	0.052	73.29	24.92	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	80.52	-3.96	3.82	1.20	1.20	0.049	0.047	82.94	28.89	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	70.71	-3.28	3.68	1.20	1.20	0.046	0.052	73.29	24.92	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	80.52	-3.96	3.82	1.20	1.20	0.049	0.047	82.94	28.89	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	71.94	-3.37	3.70	1.20	1.20	0.047	0.051	74.50	25.42	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	52.31	-2.01	3.42	1.20	1.20	0.038	0.065	55.19	17.46	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-4B) 1.2D+Ws+L+0.5G	58.44	-2.44	3.51	1.20	1.20	0.042	0.060	61.22	19.95	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-4B) 1.2D+Wc+L+0.5G	78.07	-3.79	3.79	1.20	1.20	0.049	0.049	80.53	27.90	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-6) 0.9D+Wc	51.81	-2.38	2.74	1.20	1.20	0.046	0.053	53.76	18.19	300	217	300	300	2068	Central	40	1.00	Normal	1
8	(B.2.4-6) 0.9D+Ws	32.18	-1.02	2.46	1.20	1.20	0.032	0.077	34.45	10.24	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-1) 1.4D	54.23	-5.46	-2.56	1.20	1.20	0.101	0.047	65.50	9.83	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-2A) 1.2D+1.6L+0.5Lr	50.14	-5.03	-2.19	1.20	1.20	0.100	0.044	59.90	9.73	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-2B) 1.2D+1.6L+0.5G	53.79	-5.39	-2.19	1.20	1.20	0.100	0.041	63.66	11.04	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-3A) 1.2D+1.6Lr+L	58.17	-5.82	-2.19	1.20	1.20	0.100	0.038	68.18	12.62	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-3B) 1.2D+1.6G+L	69.86	-6.96	-2.18	1.20	1.20	0.100	0.031	80.22	16.81	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-5A) 1.2D+L+Ex	49.13	4.79	11.28	1.20	1.20	0.097	0.230	89.91	-21.67	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-5A) 1.2D+L+Ex	43.83	-14.14	-15.67	1.20	1.20	0.323	0.357	133.95	-73.07	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-5B) 1.2D+L+Ey	50.71	12.22	3.09	1.20	1.20	0.241	0.061	88.38	-17.94	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-5B) 1.2D+L+Ey	42.26	-21.57	-7.48	1.20	1.20	0.511	0.177	130.22	-71.53	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-7A) 0.9D+Ex	37.51	5.96	11.83	1.20	1.20	0.159	0.315	87.81	-35.71	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-7A) 0.9D+Ex	32.21	-12.97	-15.12	1.20	1.20	0.403	0.469	119.91	-75.17	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-7B) 0.9D+Ey	39.09	13.39	3.64	1.20	1.20	0.343	0.093	86.27	-31.98	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-7B) 0.9D+Ey	30.63	-20.41	-6.93	1.20	1.20	0.666	0.226	116.19	-73.64	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	55.25	-5.53	-2.19	1.20	1.20	0.100	0.040	65.17	11.57	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	61.09	-6.10	-2.18	1.20	1.20	0.100	0.036	71.19	13.66	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	55.25	-5.53	-2.19	1.20	1.20	0.100	0.040	65.17	11.57	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	61.09	-6.10	-2.18	1.20	1.20	0.100	0.036	71.19	13.66	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	55.98	-5.60	-2.19	1.20	1.20	0.100	0.039	65.92	11.83	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	44.29	-4.46	-2.20	1.20	1.20	0.101	0.050	53.88	7.64	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-4B) 1.2D+Ws+L+0.5G	47.95	-4.82	-2.19	1.20	1.20	0.101	0.046	57.64	8.95	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-4B) 1.2D+Wc+L+0.5G	59.63	-5.96	-2.18	1.20	1.20	0.100	0.037	67.68	13.14	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-6) 0.9D+Wc	40.71	-4.08	-1.64	1.20	1.20	0.100	0.040	48.12	8.41	300	217	300	300	2068	Central	40	1.00	Normal	1
9	(B.2.4-6) 0.9D+Ws	29.02	-2.94	-1.65	1.20	1.20	0.101	0.057	36.08	4.22	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-1) 1.4D	55.63	-1.92	13.47	1.20	1.20	0.035	0.242	92.06	-14.80	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-2A) 1.2D+1.6L+0.5Lr	50.96	-2.03	12.12	1.20	1.20	0.040	0.238	84.50	-13.72	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-2B) 1.2D+1.6L+0.5G	54.24	-2.41	12.69	1.20	1.20	0.044	0.234	90.09	-14.76	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-3A) 1.2D+1.6Lr+L	58.17	-2.87	13.38	1.20	1.20	0.049	0.230	96.79	-16.00	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-3B) 1.2D+1.6G+L	68.65	-4.09	15.21	1.20	1.20	0.060	0.222	114.67	-19.32	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-5A) 1.2D+L+Ex	51.39	8.02	25.99	1.20	1.20	0.156	0.506	153.79	-82.41	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-5A) 1.2D+L+Ex	43.98	-11.31	-2.90	1.20	1.20	0.257	0.066	79.91	-18.83	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-5B) 1.2D+L+Ey	50.70	13.76	16.73	1.20	1.20	0.271	0.330	141.08	-70.65	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-5B) 1.2D+L+Ey	44.67	-17.06	6.36	1.20	1.20	0.382	0.142	112.33	-50.29	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-7A) 0.9D+Ex	39.47	8.43	23.10	1.20	1.20	0.214	0.585	136.92	-82.10	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-7A) 0.9D+Ex	32.05	-10.90	-5.79	1.20	1.20	0.340	0.181	80.22	-35.70	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-7B) 0.9D+Ey	38.78	14.17	13.84	1.20	1.20	0.366	0.357	124.21	-70.34	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-7B) 0.9D+Ey	32.75	-16.64	3.48	1.20	1.20	0.508	0.106	92.60	-47.12	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	55.55	-2.56	12.92	1.20	1.20	0.046	0.233	92.32	-15.17	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	60.79	-3.17	13.83	1.20	1.20	0.052	0.228	101.26	-16.83	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	55.55	-2.56	12.92	1.20	1.20	0.046	0.233	92.32	-15.17	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	60.79	-3.17	13.83	1.20	1.20	0.052	0.228	101.26	-16.83	300	217	300	300	2068	Central	40	1.00	Normal	1

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL



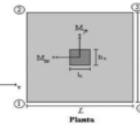
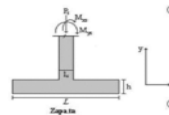
$$q_{max\ u} = \frac{P_u}{BL} \left(1 + \frac{6e_y l}{B} + \frac{6e_x l}{L} \right)$$

$$q_{min\ u} = \frac{P_u}{BL} \left(1 - \frac{6e_y l}{B} - \frac{6e_x l}{L} \right)$$



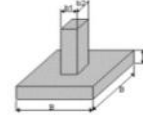
LABEL	COMBO	Pu (kN)	Mux (kN-m)	Muy (kN-m)	B (m)	L (m)	ey (m)	ex (m)	qmax u (kN/m²)	qmin u (kN/m²)	h (mm)	d (mm)	lc (mm)	bc (mm)	b0 (mm)	αs	αs	β	Tipo de concreto	λ
																αs	αs	β	λ	λ
10	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	56.20	-2.64	13.03	1.20	1.20	0.047	0.232	93.44	-15.38	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	45.72	-1.42	11.20	1.20	1.20	0.031	0.245	75.56	-12.06	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-4B) 1.2D+Ws+L+0.5G	49.00	-1.80	11.77	1.20	1.20	0.037	0.240	81.15	-13.10	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-4B) 1.2D+Wc+L+0.5G	59.48	-3.02	13.61	1.20	1.20	0.051	0.229	99.02	-16.42	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-6) 0.9D+Wc	41.00	-1.84	9.57	1.20	1.20	0.045	0.233	68.12	-11.17	300	217	300	300	2068	Central	40	1.00	Normal	1
10	(B.2.4-6) 0.9D+Ws	30.52	-0.62	7.74	1.20	1.20	0.020	0.254	50.25	-7.85	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-1) 1.4D	84.90	1.24	-1.07	1.20	1.20	0.015	0.013	66.97	50.95	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-2A) 1.2D+1.6L+0.5Lr	81.39	1.13	-1.09	1.20	1.20	0.014	0.013	64.25	48.80	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-2B) 1.2D+1.6L+0.5G	90.01	1.20	-1.27	1.20	1.20	0.013	0.014	71.10	53.92	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-3A) 1.2D+1.6Lr+L	100.35	1.28	-1.49	1.20	1.20	0.013	0.015	79.31	60.07	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-3B) 1.2D+1.6G+L	127.93	1.50	-2.06	1.20	1.20	0.012	0.016	101.22	76.46	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-5A) 1.2D+L+Ex	73.10	6.50	17.05	1.20	1.20	0.089	0.233	132.53	-31.00	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-5A) 1.2D+L+Ex	72.45	-4.37	-18.88	1.20	1.20	0.060	0.261	131.07	-30.44	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-5B) 1.2D+L+Ey	72.90	16.54	5.10	1.20	1.20	0.227	0.070	125.75	-24.51	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-5B) 1.2D+L+Ey	72.65	-14.41	-6.93	1.20	1.20	0.198	0.095	124.57	-23.66	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-7A) 0.9D+Ex	54.91	6.23	17.28	1.20	1.20	0.113	0.315	119.77	-43.51	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-7A) 0.9D+Ex	54.26	-4.64	-18.65	1.20	1.20	0.086	0.344	118.56	-43.20	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-7B) 0.9D+Ey	54.70	16.27	5.33	1.20	1.20	0.297	0.097	112.99	-37.01	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-7B) 0.9D+Ey	54.46	-14.68	-6.70	1.20	1.20	0.270	0.123	112.06	-36.42	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	93.46	1.23	-1.35	1.20	1.20	0.013	0.014	73.83	55.97	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	107.25	1.34	-1.63	1.20	1.20	0.012	0.015	84.79	64.17	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	93.46	1.23	-1.35	1.20	1.20	0.013	0.014	73.83	55.97	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	107.25	1.34	-1.63	1.20	1.20	0.012	0.015	84.79	64.17	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	95.18	1.24	-1.38	1.20	1.20	0.013	0.015	75.20	56.99	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	67.60	1.02	-0.81	1.20	1.20	0.015	0.012	53.30	40.60	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-4B) 1.2D+Ws+L+0.5G	76.22	1.09	-0.99	1.20	1.20	0.014	0.013	60.14	45.72	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-4B) 1.2D+Wc+L+0.5G	103.80	1.31	-1.56	1.20	1.20	0.013	0.015	82.05	62.12	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-6) 0.9D+Wc	68.37	0.91	-0.97	1.20	1.20	0.013	0.014	54.01	40.95	300	217	300	300	2068	Central	40	1.00	Normal	1
11	(B.2.4-6) 0.9D+Ws	40.79	0.69	-0.40	1.20	1.20	0.017	0.010	32.10	24.56	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-1) 1.4D	70.16	0.66	-6.80	1.20	1.20	0.009	0.097	74.63	22.81	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-2A) 1.2D+1.6L+0.5Lr	64.15	0.44	-6.15	1.20	1.20	0.007	0.096	67.46	21.64	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-2B) 1.2D+1.6L+0.5G	68.17	0.32	-6.48	1.20	1.20	0.005	0.095	70.95	23.73	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-3A) 1.2D+1.6Lr+L	72.99	0.18	-6.86	1.20	1.20	0.002	0.094	75.14	26.24	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-3B) 1.2D+1.6G+L	85.85	-0.20	-7.89	1.20	1.20	0.002	0.092	87.73	31.51	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-5A) 1.2D+L+Ex	63.85	9.83	9.15	1.20	1.20	0.154	0.143	110.22	-21.54	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-5A) 1.2D+L+Ex	56.42	-8.70	-20.81	1.20	1.20	0.154	0.369	141.66	-63.29	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-5B) 1.2D+L+Ey	62.53	16.45	-0.78	1.20	1.20	0.263	0.012	103.27	-16.41	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-5B) 1.2D+L+Ey	57.74	-15.33	-10.88	1.20	1.20	0.265	0.189	131.10	-50.91	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-7A) 0.9D+Ex	48.81	9.69	10.60	1.20	1.20	0.198	0.217	104.35	-36.56	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-7A) 0.9D+Ex	41.39	-8.84	-19.35	1.20	1.20	0.214	0.468	126.64	-69.16	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-7B) 0.9D+Ey	47.50	16.31	0.68	1.20	1.20	0.343	0.014	91.98	-26.00	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-7B) 0.9D+Ey	42.70	-15.47	-9.43	1.20	1.20	0.362	0.221	116.09	-56.78	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	69.78	0.28	-6.60	1.20	1.20	0.004	0.095	72.35	24.57	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	76.21	0.08	-7.12	1.20	1.20	0.001	0.093	77.93	27.91	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	69.78	0.28	-6.60	1.20	1.20	0.004	0.095	72.35	24.57	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	76.21	0.08	-7.12	1.20	1.20	0.001	0.093	77.93	27.91	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	70.58	0.25	-6.67	1.20	1.20	0.004	0.094	73.05	24.99	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	57.73	0.64	-5.64	1.20	1.20	0.011	0.098	61.87	18.30	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-4B) 1.2D+Ws+L+0.5G	61.74	0.52	-5.96	1.20	1.20	0.008	0.097	65.36	20.39	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-4B) 1.2D+Wc+L+0.5G	74.60	0.13	-6.99	1.20	1.20	0.002	0.094	76.54	27.08	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-6) 0.9D+Wc	51.53	0.23	-4.89	1.20	1.20	0.004	0.095	53.56	18.01	300	217	300	300	2068	Central	40	1.00	Normal	1
12	(B.2.4-6) 0.9D+Ws	38.67	0.61	-3.86	1.20	1.20	0.016	0.100	42.39	11.32	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-1) 1.4D	62.19	1.60	6.22	1.20	1.20	0.026	0.100	70.31	16.06	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-2A) 1.2D+1.6L+0.5Lr	58.36	1.34	5.36	1.20	1.20	0.023	0.092	63.81	17.25	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-2B) 1.2D+1.6L+0.5G	63.43	1.31	5.40	1.20	1.20	0.021	0.085	67.35	20.74	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-3A) 1.2D+1.6Lr+L	69.50	1.28	5.44	1.20	1.20	0.018	0.078	71.60	24.92	300	217	300	300	2068	Central	40	1.00	Normal	1

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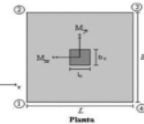
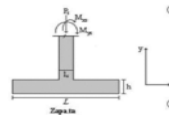
$$q_{max\ u} = \frac{P_u}{BL} \left(1 + \frac{6I_{ex}l}{B} + \frac{6I_{ey}l}{L} \right)$$

$$q_{min\ u} = \frac{P_u}{BL} \left(1 - \frac{6I_{ex}l}{B} - \frac{6I_{ey}l}{L} \right)$$



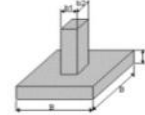
LABEL	COMBO	Pu (kN)	Mux (kN-m)	Muy (kN-m)	B (m)	L (m)	ey (m)	ex (m)	qmax u (kN/m²)	qmin u (kN/m²)	h (mm)	d (mm)	lc (mm)	bc (mm)	b0 (mm)	αs	αs	β	Tipo de concreto	λ
																αs	αs	β	λ	λ
13	(B.2.4-3B) 1.2D+1.6G+L	85.69	1.19	5.55	1.20	1.20	0.014	0.065	82.93	36.08	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-5A) 1.2D+L+Ex	55.42	12.55	21.65	1.20	1.20	0.226	0.391	157.23	-80.25	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-5A) 1.2D+L+Ex	51.18	-9.81	-10.99	1.20	1.20	0.192	0.215	107.78	-36.69	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-5B) 1.2D+L+Ey	54.04	19.01	10.94	1.20	1.20	0.352	0.203	141.53	-66.48	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-5B) 1.2D+L+Ey	52.57	-16.27	-0.29	1.20	1.20	0.310	0.005	94.00	-20.99	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-7A) 0.9D+Ex	42.10	12.21	20.32	1.20	1.20	0.290	0.483	142.16	-83.69	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-7A) 0.9D+Ex	37.86	-10.16	-12.32	1.20	1.20	0.268	0.325	104.34	-51.76	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-7B) 0.9D+Ey	40.71	18.67	9.61	1.20	1.20	0.459	0.236	126.46	-69.92	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-7B) 0.9D+Ey	39.24	-16.62	-1.62	1.20	1.20	0.423	0.041	90.56	-36.06	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	65.45	1.30	5.41	1.20	1.20	0.020	0.083	68.77	22.13	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	73.55	1.26	5.47	1.20	1.20	0.017	0.074	74.43	27.71	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	65.45	1.30	5.41	1.20	1.20	0.020	0.083	68.77	22.13	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	73.55	1.26	5.47	1.20	1.20	0.017	0.074	74.43	27.71	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	66.46	1.30	5.42	1.20	1.20	0.020	0.082	69.48	22.83	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	50.27	1.38	5.31	1.20	1.20	0.028	0.106	58.14	11.67	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-4B) 1.2D+Ws+L+0.5G	55.33	1.36	5.34	1.20	1.20	0.025	0.097	61.69	15.16	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-4B) 1.2D+Wc+L+0.5G	71.52	1.27	5.45	1.20	1.20	0.018	0.076	73.02	26.32	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-6) 0.9D+Wc	48.07	0.98	4.05	1.20	1.20	0.020	0.084	50.87	15.90	300	217	300	300	2068	Central	40	1.00	Normal	1
13	(B.2.4-6) 0.9D+Ws	31.88	1.07	3.94	1.20	1.20	0.034	0.124	39.54	4.74	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-1) 1.4D	80.94	-1.22	-1.23	1.20	1.20	0.015	0.015	64.71	47.70	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-2A) 1.2D+1.6L+0.5Lr	78.64	-1.25	-1.08	1.20	1.20	0.016	0.014	62.70	46.52	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-2B) 1.2D+1.6L+0.5G	87.90	-1.46	-1.10	1.20	1.20	0.017	0.013	69.94	52.14	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-3A) 1.2D+1.6Lr+L	99.02	-1.71	-1.13	1.20	1.20	0.017	0.011	78.63	58.89	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-3B) 1.2D+1.6G+L	128.66	-2.37	-1.21	1.20	1.20	0.018	0.009	101.80	76.90	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-5A) 1.2D+L+Ex	70.05	4.52	18.85	1.20	1.20	0.064	0.269	129.78	-32.49	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-5A) 1.2D+L+Ex	68.70	-6.60	-20.96	1.20	1.20	0.096	0.305	143.41	-48.00	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-5B) 1.2D+L+Ey	70.15	14.78	5.78	1.20	1.20	0.211	0.082	120.11	-22.67	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-5B) 1.2D+L+Ey	68.60	-16.87	-7.89	1.20	1.20	0.246	0.115	133.60	-38.33	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-7A) 0.9D+Ex	52.71	4.78	19.11	1.20	1.20	0.091	0.363	119.55	-46.35	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-7A) 0.9D+Ex	51.35	-6.34	-20.70	1.20	1.20	0.124	0.403	129.55	-58.22	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-7B) 0.9D+Ey	52.81	15.04	6.04	1.20	1.20	0.285	0.114	109.89	-36.54	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-7B) 0.9D+Ey	51.25	-16.61	-7.63	1.20	1.20	0.324	0.149	119.74	-48.55	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	91.61	-1.54	-1.11	1.20	1.20	0.017	0.012	72.84	54.39	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	106.43	-1.87	-1.15	1.20	1.20	0.018	0.011	84.42	63.39	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	91.61	-1.54	-1.11	1.20	1.20	0.017	0.012	72.84	54.39	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	106.43	-1.87	-1.15	1.20	1.20	0.018	0.011	84.42	63.39	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	93.46	-1.58	-1.12	1.20	1.20	0.017	0.012	74.29	55.52	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	63.82	-0.92	-1.04	1.20	1.20	0.014	0.016	51.12	37.51	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-4B) 1.2D+Ws+L+0.5G	73.08	-1.13	-1.07	1.20	1.20	0.015	0.015	58.36	43.14	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-4B) 1.2D+Wc+L+0.5G	102.72	-1.79	-1.14	1.20	1.20	0.017	0.011	81.53	61.14	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-6) 0.9D+Wc	66.85	-1.11	-0.83	1.20	1.20	0.017	0.012	53.18	39.67	300	217	300	300	2068	Central	40	1.00	Normal	1
14	(B.2.4-6) 0.9D+Ws	37.21	-0.45	-0.75	1.20	1.20	0.012	0.020	30.01	21.66	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-1) 1.4D	57.63	-3.04	-4.81	1.20	1.20	0.053	0.083	67.26	12.78	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-2A) 1.2D+1.6L+0.5Lr	53.86	-2.73	-4.16	1.20	1.20	0.051	0.077	61.31	13.50	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-2B) 1.2D+1.6L+0.5G	58.32	-2.85	-4.19	1.20	1.20	0.049	0.072	64.97	16.04	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-3A) 1.2D+1.6Lr+L	63.67	-3.00	-4.24	1.20	1.20	0.047	0.067	69.35	19.08	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-3B) 1.2D+1.6G+L	77.95	-3.41	-4.35	1.20	1.20	0.044	0.056	81.06	27.21	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-5A) 1.2D+L+Ex	52.09	7.61	12.58	1.20	1.20	0.146	0.241	106.26	-33.90	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-5A) 1.2D+L+Ex	46.70	-12.81	-20.82	1.20	1.20	0.274	0.446	149.20	-84.34	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-5B) 1.2D+L+Ey	50.55	14.74	1.61	1.20	1.20	0.292	0.032	91.88	-21.68	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-5B) 1.2D+L+Ey	48.25	-19.95	-9.85	1.20	1.20	0.413	0.204	136.98	-69.97	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-7A) 0.9D+Ex	39.75	8.26	13.61	1.20	1.20	0.208	0.342	103.52	-48.31	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-7A) 0.9D+Ex	34.35	-12.16	-19.79	1.20	1.20	0.354	0.576	134.79	-87.08	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-7B) 0.9D+Ey	38.20	15.39	2.64	1.20	1.20	0.403	0.069	89.14	-36.09	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-7B) 0.9D+Ey	35.90	-19.30	-8.82	1.20	1.20	0.538	0.246	122.57	-72.71	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	60.11	-2.90	-4.21	1.20	1.20	0.048	0.070	66.43	17.05	300	217	300	300	2068	Central	40	1.00	Normal	1

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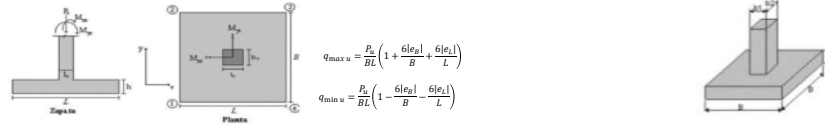
$$q_{max\ u} = \frac{P_u}{BL} \left(1 + \frac{6e_y l}{B} + \frac{6e_x l}{L} \right)$$

$$q_{min\ u} = \frac{P_u}{BL} \left(1 - \frac{6e_y l}{B} - \frac{6e_x l}{L} \right)$$



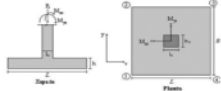
LABEL	COMBO	Pu (kN)	Mux (kN-m)	Muy (kN-m)	B (m)	L (m)	ey (m)	ex (m)	qmax u (kN/m²)	qmin u (kN/m²)	h (mm)	d (mm)	lc (mm)	bc (mm)	b0 (mm)	αs	αs	β	Tipo de concreto	λ
																αs	αs	β	λ	λ
15	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	67.24	-3.10	-4.26	1.20	1.20	0.046	0.063	72.28	21.11	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	60.11	-2.90	-4.21	1.20	1.20	0.048	0.070	66.43	17.05	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	67.24	-3.10	-4.26	1.20	1.20	0.046	0.063	72.28	21.11	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	61.00	-2.93	-4.21	1.20	1.20	0.048	0.069	67.16	17.56	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	46.72	-2.53	-4.10	1.20	1.20	0.054	0.088	55.46	9.43	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-4B) 1.2D+Ws+L+0.5G	51.18	-2.65	-4.14	1.20	1.20	0.052	0.081	59.11	11.97	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-4B) 1.2D+Wc+L+0.5G	65.46	-3.05	-4.25	1.20	1.20	0.047	0.065	70.82	20.10	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-6) 0.9D+Wc	44.19	-2.15	-3.15	1.20	1.20	0.049	0.071	49.09	12.28	300	217	300	300	2068	Central	40	1.00	Normal	1
15	(B.2.4-6) 0.9D+Ws	29.91	-1.75	-3.03	1.20	1.20	0.059	0.101	37.39	4.16	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-1) 1.4D	51.04	6.86	10.42	1.20	1.20	0.134	0.204	95.46	-24.56	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-2A) 1.2D+1.6L+0.5Lr	45.90	6.54	8.91	1.20	1.20	0.142	0.194	85.52	-21.77	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-2B) 1.2D+1.6L+0.5G	48.05	7.20	8.89	1.20	1.20	0.150	0.185	89.22	-22.49	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-3A) 1.2D+1.6Lr+L	50.62	7.98	8.87	1.20	1.20	0.158	0.175	93.66	-23.35	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-3B) 1.2D+1.6G+L	57.50	10.08	8.80	1.20	1.20	0.175	0.153	105.50	-25.65	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-5A) 1.2D+L+Ex	46.50	15.21	27.74	1.20	1.20	0.327	0.596	181.42	-116.83	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-5A) 1.2D+L+Ex	41.00	-3.44	-9.88	1.20	1.20	0.084	0.241	74.72	-17.78	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-5B) 1.2D+L+Ey	47.64	20.54	16.04	1.20	1.20	0.431	0.337	160.11	-93.94	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-5B) 1.2D+L+Ey	39.86	-8.78	1.82	1.20	1.20	0.220	0.046	64.48	-9.12	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-7A) 0.9D+Ex	35.57	13.74	25.51	1.20	1.20	0.386	0.717	160.97	-111.57	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-7A) 0.9D+Ex	30.06	-4.91	-12.11	1.20	1.20	0.163	0.403	79.99	-38.23	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-7B) 0.9D+Ey	36.71	19.07	13.80	1.20	1.20	0.520	0.376	139.65	-88.67	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-7B) 0.9D+Ey	28.92	-10.25	-0.41	1.20	1.20	0.354	0.014	57.09	-16.92	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	48.91	7.46	8.88	1.20	1.20	0.153	0.182	90.70	-22.78	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	52.34	8.51	8.85	1.20	1.20	0.163	0.169	96.62	-23.93	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	48.91	7.46	8.88	1.20	1.20	0.153	0.182	90.70	-22.78	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	52.34	8.51	8.85	1.20	1.20	0.163	0.169	96.62	-23.93	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	49.34	7.59	8.88	1.20	1.20	0.154	0.180	91.44	-22.92	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	42.46	5.49	8.94	1.20	1.20	0.129	0.211	79.60	-20.63	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-4B) 1.2D+Ws+L+0.5G	44.61	6.15	8.92	1.20	1.20	0.138	0.200	83.30	-21.34	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-4B) 1.2D+Wc+L+0.5G	51.48	8.25	8.86	1.20	1.20	0.160	0.172	95.14	-23.64	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-6) 0.9D+Wc	36.25	5.46	6.67	1.20	1.20	0.151	0.184	67.29	-16.94	300	217	300	300	2068	Central	40	1.00	Normal	1
16	(B.2.4-6) 0.9D+Ws	29.38	3.36	6.73	1.20	1.20	0.114	0.229	55.45	-14.64	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-1) 1.4D	81.69	6.24	-3.18	1.20	1.20	0.076	0.039	89.45	24.02	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-2A) 1.2D+1.6L+0.5Lr	74.16	6.48	-2.76	1.20	1.20	0.087	0.037	83.60	19.40	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-2B) 1.2D+1.6L+0.5G	78.30	7.62	-2.79	1.20	1.20	0.097	0.036	90.54	18.21	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-3A) 1.2D+1.6Lr+L	83.26	8.99	-2.83	1.20	1.20	0.108	0.034	98.86	16.79	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-3B) 1.2D+1.6G+L	96.50	12.43	-2.93	1.20	1.20	0.131	0.030	121.04	12.99	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-5A) 1.2D+L+Ex	71.59	10.04	20.10	1.20	1.20	0.140	0.281	154.35	-54.91	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-5A) 1.2D+L+Ex	68.46	0.66	-25.55	1.20	1.20	0.010	0.373	138.54	-43.46	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-5B) 1.2D+L+Ey	73.62	18.70	5.87	1.20	1.20	0.254	0.080	136.46	-34.21	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-5B) 1.2D+L+Ey	66.43	-8.01	-11.33	1.20	1.20	0.121	0.171	113.29	-21.03	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-7A) 0.9D+Ex	54.09	8.70	20.78	1.20	1.20	0.161	0.384	139.92	-64.80	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-7A) 0.9D+Ex	50.95	-0.68	-24.87	1.20	1.20	0.013	0.488	124.11	-53.34	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-7B) 0.9D+Ey	56.11	17.37	6.56	1.20	1.20	0.310	0.117	122.03	-44.10	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-7B) 0.9D+Ey	48.92	-9.35	-10.65	1.20	1.20	0.191	0.218	103.41	-35.46	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	79.95	8.08	-2.81	1.20	1.20	0.101	0.035	93.31	17.74	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	86.57	9.90	-2.86	1.20	1.20	0.114	0.033	104.40	15.84	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	79.95	8.08	-2.81	1.20	1.20	0.101	0.035	93.31	17.74	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	86.57	9.90	-2.86	1.20	1.20	0.114	0.033	104.40	15.84	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	80.78	8.30	-2.81	1.20	1.20	0.103	0.035	94.70	17.50	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	67.54	4.66	-2.71	1.20	1.20	0.069	0.040	72.51	21.30	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-4B) 1.2D+Ws+L+0.5G	71.68	5.80	-2.74	1.20	1.20	0.081	0.038	79.44	20.11	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-4B) 1.2D+Wc+L+0.5G	84.92	9.44	-2.84	1.20	1.20	0.111	0.033	101.63	16.32	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-6) 0.9D+Wc	59.14	5.83	-2.10	1.20	1.20	0.099	0.035	68.59	13.54	300	217	300	300	2068	Central	40	1.00	Normal	1
17	(B.2.4-6) 0.9D+Ws	45.90	2.19	-2.00	1.20	1.20	0.048	0.043	46.41	17.34	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-1) 1.4D	47.52	3.75	-9.85	1.20	1.20	0.079	0.207	80.20	-14.20	300	217	300	300	2068	Central	40	1.00	Normal	1

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL



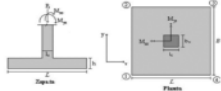
LABEL	COMBO	Pu (kN)	Mux (kN-m)	Muy (kN-m)	B (m)	L (m)	ey (m)	ex (m)	qmax u (kN/m²)	qmin u (kN/m²)	h (mm)	d (mm)	lc (mm)	bc (mm)	b0 (mm)	αs	αs	β	Tipo de concreto	λ
18	(B.2.4-2A) 1.2D+1.6L+0.5Lr	42.68	3.77	-8.47	1.20	1.20	0.088	0.199	72.13	-12.86	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-2B) 1.2D+1.6L+0.5G	44.62	4.32	-8.50	1.20	1.20	0.097	0.191	75.51	-13.54	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-3A) 1.2D+1.6Lr+L	46.95	4.99	-8.54	1.20	1.20	0.106	0.182	79.58	-14.37	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-3B) 1.2D+1.6G+L	53.17	6.77	-8.63	1.20	1.20	0.127	0.162	90.41	-16.56	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-5A) 1.2D+L+Ex	43.89	11.78	10.77	1.20	1.20	0.268	0.245	108.78	-47.82	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-5A) 1.2D+L+Ex	37.57	-5.36	-27.65	1.20	1.20	0.143	0.736	140.72	-88.54	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-5B) 1.2D+L+Ey	44.72	17.72	-1.19	1.20	1.20	0.396	0.027	96.73	-34.61	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-5B) 1.2D+L+Ey	36.74	-11.30	-15.69	1.20	1.20	0.308	0.427	119.25	-68.22	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-7A) 0.9D+Ex	33.71	10.98	12.88	1.20	1.20	0.326	0.382	106.25	-59.43	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-7A) 0.9D+Ex	27.39	-6.16	-25.54	1.20	1.20	0.225	0.933	129.10	-91.07	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-7B) 0.9D+Ey	34.54	16.92	0.92	1.20	1.20	0.490	0.027	85.94	-37.97	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-7B) 0.9D+Ey	26.56	-12.11	-13.58	1.20	1.20	0.456	0.511	107.64	-70.75	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Ws	45.40	4.55	-8.51	1.20	1.20	0.100	0.188	76.87	-13.82	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-3C) 1.2D+1.6Lr+L+0.5Wc	48.50	5.43	-8.56	1.20	1.20	0.112	0.177	82.28	-14.92	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-3D) 1.2D+1.6G+L+0.5Ws	45.40	4.55	-8.51	1.20	1.20	0.100	0.188	76.87	-13.82	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-3D) 1.2D+1.6G+L+0.5Wc	48.50	5.43	-8.56	1.20	1.20	0.112	0.177	82.28	-14.92	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-4A) 1.2D+Wc+L+0.5Lr	45.78	4.66	-8.52	1.20	1.20	0.102	0.186	77.55	-13.96	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-4A) 1.2D+Ws+L+0.5Lr	39.57	2.88	-8.42	1.20	1.20	0.073	0.213	66.71	-11.76	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-4B) 1.2D+Ws+L+0.5G	41.51	3.43	-8.45	1.20	1.20	0.083	0.204	70.10	-12.45	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-4B) 1.2D+Wc+L+0.5G	47.73	5.21	-8.55	1.20	1.20	0.109	0.179	80.93	-14.64	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-6) 0.9D+Wc	33.66	3.30	-6.38	1.20	1.20	0.098	0.190	56.97	-10.23	300	217	300	300	2068	Central	40	1.00	Normal	1
18	(B.2.4-6) 0.9D+Ws	27.44	1.52	-6.28	1.20	1.20	0.055	0.229	46.14	-8.03	300	217	300	300	2068	Central	40	1.00	Normal	1

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL (B=L)



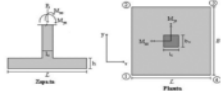
			$0.170\phi_s \left(1 + \frac{2}{\beta}\right) \lambda \sqrt{f'_c}$		$0.083\phi_s \left(\frac{a_{ud}}{h_u}\right) \lambda \sqrt{f'_c}$		$0.330\phi_s \lambda \sqrt{f'_c}$		$V_{uid} = q_{max} \left[\frac{(B - b_u)}{2} - d \right] L$ $V_c = 0.17 \lambda \sqrt{f'_c} L d$		$M_u = \left(\left(\frac{q_{max} L}{2} \right) L \right)$		$L_p = \frac{L - L_c}{2}$ $\phi M_{ux} = \phi_s L^2 f_y \rho \left(1 - 0.59 f_y \rho \right)$		
LABEL	fy (MPa)	f'c (MPa)	Cortante bidireccional (Punzonamiento)					Cortante unidireccional			Flexión				
			ϕv	Vubd=Pu (kN)	ϕV_{ubd} (kN)	ϕV_{ubd} (kN)	ϕV_{ubd} (kN)	CHEQUEO	Vuud (kN)	ϕV_c (kN)	ϕf	Lv (m)	ρ	Mu (kN-m)	ϕM_n (kN-m)
1	420	21	0.75	42.35	786.85	537.56	509.14	Ok	12.62	152.18	0.90	0.45	0.0018	5.487	37.648
1	420	21	0.75	37.53	786.85	537.56	509.14	Ok	11.13	152.18	0.90	0.45	0.0018	4.838	37.648
1	420	21	0.75	38.75	786.85	537.56	509.14	Ok	11.44	152.18	0.90	0.45	0.0018	4.973	37.648
1	420	21	0.75	40.23	786.85	537.56	509.14	Ok	11.81	152.18	0.90	0.45	0.0018	5.135	37.648
1	420	21	0.75	44.15	786.85	537.56	509.14	Ok	12.81	152.18	0.90	0.45	0.0018	5.566	37.648
1	420	21	0.75	41.15	786.85	537.56	509.14	Ok	31.20	152.18	0.90	0.45	0.0018	13.560	37.648
1	420	21	0.75	31.45	786.85	537.56	509.14	Ok	29.13	152.18	0.90	0.45	0.0018	12.660	37.648
1	420	21	0.75	43.51	786.85	537.56	509.14	Ok	31.97	152.18	0.90	0.45	0.0018	13.895	37.648
1	420	21	0.75	29.09	786.85	537.56	509.14	Ok	28.77	152.18	0.90	0.45	0.0018	12.506	37.648
1	420	21	0.75	32.07	786.85	537.56	509.14	Ok	29.07	152.18	0.90	0.45	0.0018	12.633	37.648
1	420	21	0.75	22.38	786.85	537.56	509.14	Ok	26.93	152.18	0.90	0.45	0.0018	11.707	37.648
1	420	21	0.75	34.43	786.85	537.56	509.14	Ok	29.84	152.18	0.90	0.45	0.0018	12.968	37.648
1	420	21	0.75	20.02	786.85	537.56	509.14	Ok	26.58	152.18	0.90	0.45	0.0018	11.553	37.648
1	420	21	0.75	39.24	786.85	537.56	509.14	Ok	11.56	152.18	0.90	0.45	0.0018	5.027	37.648
1	420	21	0.75	41.21	786.85	537.56	509.14	Ok	12.06	152.18	0.90	0.45	0.0018	5.242	37.648
1	420	21	0.75	39.24	786.85	537.56	509.14	Ok	11.56	152.18	0.90	0.45	0.0018	5.027	37.648
1	420	21	0.75	41.21	786.85	537.56	509.14	Ok	12.06	152.18	0.90	0.45	0.0018	5.242	37.648
1	420	21	0.75	39.49	786.85	537.56	509.14	Ok	11.63	152.18	0.90	0.45	0.0018	5.054	37.648
1	420	21	0.75	35.56	786.85	537.56	509.14	Ok	10.63	152.18	0.90	0.45	0.0018	4.622	37.648
1	420	21	0.75	36.79	786.85	537.56	509.14	Ok	10.94	152.18	0.90	0.45	0.0018	4.757	37.648
1	420	21	0.75	40.72	786.85	537.56	509.14	Ok	11.94	152.18	0.90	0.45	0.0018	5.188	37.648
1	420	21	0.75	29.19	786.85	537.56	509.14	Ok	8.61	152.18	0.90	0.45	0.0018	3.743	37.648
1	420	21	0.75	25.26	786.85	537.56	509.14	Ok	7.62	152.18	0.90	0.45	0.0018	3.311	37.648
2	420	21	0.75	51.68	786.85	537.56	509.14	Ok	23.25	152.18	0.90	0.45	0.0018	10.107	37.648
2	420	21	0.75	46.34	786.85	537.56	509.14	Ok	21.00	152.18	0.90	0.45	0.0018	9.126	37.648
2	420	21	0.75	48.38	786.85	537.56	509.14	Ok	22.06	152.18	0.90	0.45	0.0018	9.588	37.648
2	420	21	0.75	50.82	786.85	537.56	509.14	Ok	23.34	152.18	0.90	0.45	0.0018	10.143	37.648
2	420	21	0.75	57.35	786.85	537.56	509.14	Ok	26.74	152.18	0.90	0.45	0.0018	11.622	37.648
2	420	21	0.75	46.53	786.85	537.56	509.14	Ok	35.83	152.18	0.90	0.45	0.0018	15.575	37.648
2	420	21	0.75	42.07	786.85	537.56	509.14	Ok	25.16	152.18	0.90	0.45	0.0018	10.938	37.648
2	420	21	0.75	48.70	786.85	537.56	509.14	Ok	37.35	152.18	0.90	0.45	0.0018	16.234	37.648
2	420	21	0.75	39.90	786.85	537.56	509.14	Ok	25.65	152.18	0.90	0.45	0.0018	11.147	37.648
2	420	21	0.75	35.46	786.85	537.56	509.14	Ok	31.99	152.18	0.90	0.45	0.0018	13.906	37.648
2	420	21	0.75	30.99	786.85	537.56	509.14	Ok	23.72	152.18	0.90	0.45	0.0018	10.312	37.648
2	420	21	0.75	37.63	786.85	537.56	509.14	Ok	33.51	152.18	0.90	0.45	0.0018	14.565	37.648
2	420	21	0.75	28.82	786.85	537.56	509.14	Ok	24.21	152.18	0.90	0.45	0.0018	10.521	37.648
2	420	21	0.75	49.19	786.85	537.56	509.14	Ok	22.48	152.18	0.90	0.45	0.0018	9.773	37.648
2	420	21	0.75	52.46	786.85	537.56	509.14	Ok	24.19	152.18	0.90	0.45	0.0018	10.512	37.648
2	420	21	0.75	49.19	786.85	537.56	509.14	Ok	22.48	152.18	0.90	0.45	0.0018	9.773	37.648
2	420	21	0.75	52.46	786.85	537.56	509.14	Ok	24.19	152.18	0.90	0.45	0.0018	10.512	37.648
2	420	21	0.75	49.60	786.85	537.56	509.14	Ok	22.70	152.18	0.90	0.45	0.0018	9.865	37.648
2	420	21	0.75	43.08	786.85	537.56	509.14	Ok	19.29	152.18	0.90	0.45	0.0018	8.386	37.648
2	420	21	0.75	45.12	786.85	537.56	509.14	Ok	20.36	152.18	0.90	0.45	0.0018	8.848	37.648
2	420	21	0.75	51.64	786.85	537.56	509.14	Ok	23.76	152.18	0.90	0.45	0.0018	10.328	37.648
2	420	21	0.75	36.49	786.85	537.56	509.14	Ok	16.65	152.18	0.90	0.45	0.0018	7.237	37.648
2	420	21	0.75	29.96	786.85	537.56	509.14	Ok	13.25	152.18	0.90	0.45	0.0018	5.758	37.648
3	420	21	0.75	35.50	786.85	537.56	509.14	Ok	17.63	152.18	0.90	0.45	0.0018	7.663	37.648
3	420	21	0.75	31.61	786.85	537.56	509.14	Ok	15.65	152.18	0.90	0.45	0.0018	6.803	37.648
3	420	21	0.75	32.80	786.85	537.56	509.14	Ok	16.19	152.18	0.90	0.45	0.0018	7.039	37.648
3	420	21	0.75	34.22	786.85	537.56	509.14	Ok	16.84	152.18	0.90	0.45	0.0018	7.321	37.648
3	420	21	0.75	38.00	786.85	537.56	509.14	Ok	18.58	152.18	0.90	0.45	0.0018	8.075	37.648
3	420	21	0.75	33.76	786.85	537.56	509.14	Ok	20.53	152.18	0.90	0.45	0.0018	8.924	37.648
3	420	21	0.75	27.09	786.85	537.56	509.14	Ok	34.66	152.18	0.90	0.45	0.0018	15.063	37.648
3	420	21	0.75	35.14	786.85	537.56	509.14	Ok	20.93	152.18	0.90	0.45	0.0018	9.099	37.648
3	420	21	0.75	25.72	786.85	537.56	509.14	Ok	34.41	152.18	0.90	0.45	0.0018	14.954	37.648
3	420	21	0.75	26.16	786.85	537.56	509.14	Ok	20.68	152.18	0.90	0.45	0.0018	8.990	37.648

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL (B=L)



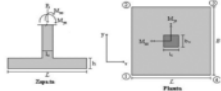
$0.170\phi_s \left(1 + \frac{2}{\beta}\right) \lambda \sqrt{f'_c}$ $0.083\phi_s \left(\frac{h_w d}{h_o}\right) \lambda \sqrt{f'_c}$ $0.330\phi_s \lambda \sqrt{f'_c}$ $V_{uud} = q_{max} \left[\frac{(B - b_o)}{2} - d \right] L$ $V_c = 0.17 \lambda \sqrt{f'_c} L d$ $M_u = \left[\left(\frac{q_{max} L^2}{2} \right) \right] L$ $L_p = \frac{L - L_c}{2}$ $\phi M_{ux} = \phi_s L^2 f_p \rho \left(1 - 0.59 f_p \rho \right) / f'_c$															
LABEL	fy (MPa)	f'c (MPa)	Cortante bidireccional (Punzonamiento)						Cortante unidireccional			Flexión			
			ϕ_v	Vubd=Pu (kN)	ϕV_{ubd} (kN)	ϕV_{ubd} (kN)	ϕV_{ubd} (kN)	CHEQUEO	Vuud (kN)	ϕV_c (kN)	ϕf	Lv (m)	ρ	Mu (kN-m)	ϕM_n (kN-m)
3	420	21	0.75	19.49	786.85	537.56	509.14	Ok	30.88	152.18	0.90	0.45	0.0018	13.422	37.648
3	420	21	0.75	27.53	786.85	537.56	509.14	Ok	21.09	152.18	0.90	0.45	0.0018	9.165	37.648
3	420	21	0.75	18.11	786.85	537.56	509.14	Ok	30.63	152.18	0.90	0.45	0.0018	13.312	37.648
3	420	21	0.75	33.27	786.85	537.56	509.14	Ok	16.41	152.18	0.90	0.45	0.0018	7.133	37.648
3	420	21	0.75	35.16	786.85	537.56	509.14	Ok	17.28	152.18	0.90	0.45	0.0018	7.510	37.648
3	420	21	0.75	33.27	786.85	537.56	509.14	Ok	16.41	152.18	0.90	0.45	0.0018	7.133	37.648
3	420	21	0.75	35.16	786.85	537.56	509.14	Ok	17.28	152.18	0.90	0.45	0.0018	7.510	37.648
3	420	21	0.75	33.51	786.85	537.56	509.14	Ok	16.52	152.18	0.90	0.45	0.0018	7.180	37.648
3	420	21	0.75	29.72	786.85	537.56	509.14	Ok	14.79	152.18	0.90	0.45	0.0018	6.427	37.648
3	420	21	0.75	30.90	786.85	537.56	509.14	Ok	15.33	152.18	0.90	0.45	0.0018	6.662	37.648
3	420	21	0.75	34.69	786.85	537.56	509.14	Ok	17.06	152.18	0.90	0.45	0.0018	7.415	37.648
3	420	21	0.75	24.72	786.85	537.56	509.14	Ok	12.20	152.18	0.90	0.45	0.0018	5.303	37.648
3	420	21	0.75	20.93	786.85	537.56	509.14	Ok	10.47	152.18	0.90	0.45	0.0018	4.549	37.648
4	420	21	0.75	48.52	786.85	537.56	509.14	Ok	16.19	152.18	0.90	0.45	0.0018	7.038	37.648
4	420	21	0.75	44.00	786.85	537.56	509.14	Ok	14.61	152.18	0.90	0.45	0.0018	6.348	37.648
4	420	21	0.75	46.42	786.85	537.56	509.14	Ok	15.33	152.18	0.90	0.45	0.0018	6.665	37.648
4	420	21	0.75	49.31	786.85	537.56	509.14	Ok	16.21	152.18	0.90	0.45	0.0018	7.044	37.648
4	420	21	0.75	57.03	786.85	537.56	509.14	Ok	18.53	152.18	0.90	0.45	0.0018	8.056	37.648
4	420	21	0.75	45.17	786.85	537.56	509.14	Ok	32.02	152.18	0.90	0.45	0.0018	13.918	37.648
4	420	21	0.75	38.02	786.85	537.56	509.14	Ok	33.65	152.18	0.90	0.45	0.0018	14.628	37.648
4	420	21	0.75	45.71	786.85	537.56	509.14	Ok	32.72	152.18	0.90	0.45	0.0018	14.219	37.648
4	420	21	0.75	37.48	786.85	537.56	509.14	Ok	34.09	152.18	0.90	0.45	0.0018	14.817	37.648
4	420	21	0.75	34.77	786.85	537.56	509.14	Ok	29.96	152.18	0.90	0.45	0.0018	13.022	37.648
4	420	21	0.75	27.62	786.85	537.56	509.14	Ok	30.76	152.18	0.90	0.45	0.0018	13.369	37.648
4	420	21	0.75	35.31	786.85	537.56	509.14	Ok	30.65	152.18	0.90	0.45	0.0018	13.323	37.648
4	420	21	0.75	27.08	786.85	537.56	509.14	Ok	31.19	152.18	0.90	0.45	0.0018	13.558	37.648
4	420	21	0.75	47.38	786.85	537.56	509.14	Ok	15.62	152.18	0.90	0.45	0.0018	6.791	37.648
4	420	21	0.75	51.24	786.85	537.56	509.14	Ok	16.79	152.18	0.90	0.45	0.0018	7.297	37.648
4	420	21	0.75	47.38	786.85	537.56	509.14	Ok	15.62	152.18	0.90	0.45	0.0018	6.791	37.648
4	420	21	0.75	51.24	786.85	537.56	509.14	Ok	16.79	152.18	0.90	0.45	0.0018	7.297	37.648
4	420	21	0.75	47.86	786.85	537.56	509.14	Ok	15.77	152.18	0.90	0.45	0.0018	6.854	37.648
4	420	21	0.75	40.15	786.85	537.56	509.14	Ok	13.44	152.18	0.90	0.45	0.0018	5.843	37.648
4	420	21	0.75	42.56	786.85	537.56	509.14	Ok	14.17	152.18	0.90	0.45	0.0018	6.159	37.648
4	420	21	0.75	50.28	786.85	537.56	509.14	Ok	16.50	152.18	0.90	0.45	0.0018	7.171	37.648
4	420	21	0.75	35.05	786.85	537.56	509.14	Ok	11.57	152.18	0.90	0.45	0.0018	5.030	37.648
4	420	21	0.75	27.34	786.85	537.56	509.14	Ok	9.24	152.18	0.90	0.45	0.0018	4.018	37.648
5	420	21	0.75	45.08	786.85	537.56	509.14	Ok	18.34	152.18	0.90	0.45	0.0018	7.971	37.648
5	420	21	0.75	42.66	786.85	537.56	509.14	Ok	16.95	152.18	0.90	0.45	0.0018	7.368	37.648
5	420	21	0.75	46.67	786.85	537.56	509.14	Ok	18.18	152.18	0.90	0.45	0.0018	7.904	37.648
5	420	21	0.75	51.49	786.85	537.56	509.14	Ok	19.66	152.18	0.90	0.45	0.0018	8.546	37.648
5	420	21	0.75	64.33	786.85	537.56	509.14	Ok	23.61	152.18	0.90	0.45	0.0018	10.261	37.648
5	420	21	0.75	39.64	786.85	537.56	509.14	Ok	37.07	152.18	0.90	0.45	0.0018	16.110	37.648
5	420	21	0.75	37.65	786.85	537.56	509.14	Ok	23.58	152.18	0.90	0.45	0.0018	10.248	37.648
5	420	21	0.75	39.29	786.85	537.56	509.14	Ok	38.81	152.18	0.90	0.45	0.0018	16.868	37.648
5	420	21	0.75	37.99	786.85	537.56	509.14	Ok	25.48	152.18	0.90	0.45	0.0018	11.076	37.648
5	420	21	0.75	29.98	786.85	537.56	509.14	Ok	33.14	152.18	0.90	0.45	0.0018	14.403	37.648
5	420	21	0.75	27.99	786.85	537.56	509.14	Ok	22.90	152.18	0.90	0.45	0.0018	9.954	37.648
5	420	21	0.75	29.63	786.85	537.56	509.14	Ok	34.88	152.18	0.90	0.45	0.0018	15.160	37.648
5	420	21	0.75	28.33	786.85	537.56	509.14	Ok	24.81	152.18	0.90	0.45	0.0018	10.782	37.648
5	420	21	0.75	48.27	786.85	537.56	509.14	Ok	18.68	152.18	0.90	0.45	0.0018	8.118	37.648
5	420	21	0.75	54.70	786.85	537.56	509.14	Ok	20.65	152.18	0.90	0.45	0.0018	8.975	37.648
5	420	21	0.75	48.27	786.85	537.56	509.14	Ok	18.68	152.18	0.90	0.45	0.0018	8.118	37.648
5	420	21	0.75	54.70	786.85	537.56	509.14	Ok	20.65	152.18	0.90	0.45	0.0018	8.975	37.648
5	420	21	0.75	49.08	786.85	537.56	509.14	Ok	18.92	152.18	0.90	0.45	0.0018	8.225	37.648
5	420	21	0.75	36.23	786.85	537.56	509.14	Ok	14.98	152.18	0.90	0.45	0.0018	6.511	37.648
5	420	21	0.75	40.25	786.85	537.56	509.14	Ok	16.21	152.18	0.90	0.45	0.0018	7.046	37.648

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL (B=L)



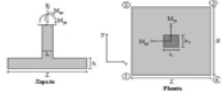
			$0.170\phi_s \left(1 + \frac{2}{\beta}\right) \lambda \sqrt{f'_c}$	$0.083\phi_s \left(\frac{a_w d}{h_w}\right) \lambda \sqrt{f'_c}$	$0.330\phi_s \lambda \sqrt{f'_c}$	$V_{uud} = q_{max} \left[\frac{(B - b_w)}{2} - d \right] L$ $V_c = 0.17 \lambda \sqrt{f'_c} L d$	$M_u = \left(\left(\frac{q_{max} L}{2} \right) L \right)$	$L_p = \frac{L - L_c}{2}$ $\phi M_{ux} = \phi_s L^2 f_y \rho \left(1 - 0.59 f_y \rho\right)$							
LABEL	f _y (MPa)	f _c (MPa)	Cortante bidireccional (Punzonamiento)					Cortante unidireccional		Flexión					
			φ _v	Vubd=Pu (kN)	φVubd (kN)	φVubd (kN)	φVubd (kN)	CHEQUEO	Vuud (kN)	φVc (kN)	φ _f	L _v (m)	ρ	Mu (kN-m)	φMn (kN-m)
5	420	21	0.75	53.09	786.85	537.56	509.14	Ok	20.16	152.18	0.90	0.45	0.0018	8.761	37.648
5	420	21	0.75	35.40	786.85	537.56	509.14	Ok	13.76	152.18	0.90	0.45	0.0018	5.981	37.648
5	420	21	0.75	22.56	786.85	537.56	509.14	Ok	9.82	152.18	0.90	0.45	0.0018	4.267	37.648
6	420	21	0.75	34.97	786.85	537.56	509.14	Ok	10.26	152.18	0.90	0.45	0.0018	4.461	37.648
6	420	21	0.75	32.19	786.85	537.56	509.14	Ok	9.37	152.18	0.90	0.45	0.0018	4.071	37.648
6	420	21	0.75	34.41	786.85	537.56	509.14	Ok	9.99	152.18	0.90	0.45	0.0018	4.342	37.648
6	420	21	0.75	37.07	786.85	537.56	509.14	Ok	10.74	152.18	0.90	0.45	0.0018	4.666	37.648
6	420	21	0.75	44.17	786.85	537.56	509.14	Ok	12.73	152.18	0.90	0.45	0.0018	5.532	37.648
6	420	21	0.75	32.01	786.85	537.56	509.14	Ok	28.23	152.18	0.90	0.45	0.0018	12.270	37.648
6	420	21	0.75	27.94	786.85	537.56	509.14	Ok	30.57	152.18	0.90	0.45	0.0018	13.285	37.648
6	420	21	0.75	31.17	786.85	537.56	509.14	Ok	28.61	152.18	0.90	0.45	0.0018	12.435	37.648
6	420	21	0.75	28.77	786.85	537.56	509.14	Ok	31.34	152.18	0.90	0.45	0.0018	13.624	37.648
6	420	21	0.75	24.51	786.85	537.56	509.14	Ok	26.86	152.18	0.90	0.45	0.0018	11.674	37.648
6	420	21	0.75	20.44	786.85	537.56	509.14	Ok	28.37	152.18	0.90	0.45	0.0018	12.329	37.648
6	420	21	0.75	23.68	786.85	537.56	509.14	Ok	27.24	152.18	0.90	0.45	0.0018	11.839	37.648
6	420	21	0.75	21.28	786.85	537.56	509.14	Ok	29.15	152.18	0.90	0.45	0.0018	12.668	37.648
6	420	21	0.75	35.30	786.85	537.56	509.14	Ok	10.24	152.18	0.90	0.45	0.0018	4.450	37.648
6	420	21	0.75	38.85	786.85	537.56	509.14	Ok	11.23	152.18	0.90	0.45	0.0018	4.883	37.648
6	420	21	0.75	35.30	786.85	537.56	509.14	Ok	10.24	152.18	0.90	0.45	0.0018	4.450	37.648
6	420	21	0.75	38.85	786.85	537.56	509.14	Ok	11.23	152.18	0.90	0.45	0.0018	4.883	37.648
6	420	21	0.75	35.74	786.85	537.56	509.14	Ok	10.36	152.18	0.90	0.45	0.0018	4.504	37.648
6	420	21	0.75	28.64	786.85	537.56	509.14	Ok	8.59	152.18	0.90	0.45	0.0018	3.733	37.648
6	420	21	0.75	30.86	786.85	537.56	509.14	Ok	8.99	152.18	0.90	0.45	0.0018	3.909	37.648
6	420	21	0.75	37.96	786.85	537.56	509.14	Ok	10.98	152.18	0.90	0.45	0.0018	4.774	37.648
6	420	21	0.75	26.03	786.85	537.56	509.14	Ok	7.55	152.18	0.90	0.45	0.0018	3.283	37.648
6	420	21	0.75	18.93	786.85	537.56	509.14	Ok	6.04	152.18	0.90	0.45	0.0018	2.627	37.648
7	420	21	0.75	47.24	786.85	537.56	509.14	Ok	17.61	152.18	0.90	0.45	0.0018	7.653	37.648
7	420	21	0.75	43.32	786.85	537.56	509.14	Ok	16.09	152.18	0.90	0.45	0.0018	6.994	37.648
7	420	21	0.75	46.16	786.85	537.56	509.14	Ok	17.09	152.18	0.90	0.45	0.0018	7.429	37.648
7	420	21	0.75	49.56	786.85	537.56	509.14	Ok	18.29	152.18	0.90	0.45	0.0018	7.950	37.648
7	420	21	0.75	58.62	786.85	537.56	509.14	Ok	21.49	152.18	0.90	0.45	0.0018	9.339	37.648
7	420	21	0.75	43.08	786.85	537.56	509.14	Ok	34.44	152.18	0.90	0.45	0.0018	14.968	37.648
7	420	21	0.75	37.90	786.85	537.56	509.14	Ok	30.25	152.18	0.90	0.45	0.0018	13.149	37.648
7	420	21	0.75	43.09	786.85	537.56	509.14	Ok	33.00	152.18	0.90	0.45	0.0018	14.343	37.648
7	420	21	0.75	37.89	786.85	537.56	509.14	Ok	28.81	152.18	0.90	0.45	0.0018	12.521	37.648
7	420	21	0.75	32.96	786.85	537.56	509.14	Ok	31.66	152.18	0.90	0.45	0.0018	13.759	37.648
7	420	21	0.75	27.78	786.85	537.56	509.14	Ok	28.21	152.18	0.90	0.45	0.0018	12.260	37.648
7	420	21	0.75	32.97	786.85	537.56	509.14	Ok	30.22	152.18	0.90	0.45	0.0018	13.133	37.648
7	420	21	0.75	27.77	786.85	537.56	509.14	Ok	26.76	152.18	0.90	0.45	0.0018	11.633	37.648
7	420	21	0.75	47.29	786.85	537.56	509.14	Ok	17.49	152.18	0.90	0.45	0.0018	7.602	37.648
7	420	21	0.75	51.82	786.85	537.56	509.14	Ok	19.09	152.18	0.90	0.45	0.0018	8.297	37.648
7	420	21	0.75	47.29	786.85	537.56	509.14	Ok	17.49	152.18	0.90	0.45	0.0018	7.602	37.648
7	420	21	0.75	51.82	786.85	537.56	509.14	Ok	19.09	152.18	0.90	0.45	0.0018	8.297	37.648
7	420	21	0.75	47.86	786.85	537.56	509.14	Ok	17.69	152.18	0.90	0.45	0.0018	7.689	37.648
7	420	21	0.75	38.79	786.85	537.56	509.14	Ok	14.49	152.18	0.90	0.45	0.0018	6.300	37.648
7	420	21	0.75	41.63	786.85	537.56	509.14	Ok	15.49	152.18	0.90	0.45	0.0018	6.734	37.648
7	420	21	0.75	50.69	786.85	537.56	509.14	Ok	18.69	152.18	0.90	0.45	0.0018	8.123	37.648
7	420	21	0.75	34.90	786.85	537.56	509.14	Ok	12.92	152.18	0.90	0.45	0.0018	5.615	37.648
7	420	21	0.75	25.84	786.85	537.56	509.14	Ok	9.72	152.18	0.90	0.45	0.0018	4.225	37.648
8	420	21	0.75	53.19	786.85	537.56	509.14	Ok	19.18	152.18	0.90	0.45	0.0018	8.336	37.648
8	420	21	0.75	50.59	786.85	537.56	509.14	Ok	18.13	152.18	0.90	0.45	0.0018	7.878	37.648
8	420	21	0.75	55.58	786.85	537.56	509.14	Ok	19.81	152.18	0.90	0.45	0.0018	8.611	37.648
8	420	21	0.75	61.58	786.85	537.56	509.14	Ok	21.84	152.18	0.90	0.45	0.0018	9.491	37.648
8	420	21	0.75	77.56	786.85	537.56	509.14	Ok	27.23	152.18	0.90	0.45	0.0018	11.837	37.648
8	420	21	0.75	46.87	786.85	537.56	509.14	Ok	33.83	152.18	0.90	0.45	0.0018	14.704	37.648
8	420	21	0.75	44.32	786.85	537.56	509.14	Ok	30.88	152.18	0.90	0.45	0.0018	13.422	37.648

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL (B=L)



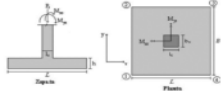
			$0.170\phi_s \left(1 + \frac{2}{\beta}\right) \lambda \sqrt{f'_c}$	$0.083\phi_s \left(\frac{a_w d}{h_w}\right) \lambda \sqrt{f'_c}$	$0.330\phi_s \lambda \sqrt{f'_c}$		$V_{uud} = q_{max} \left[\frac{(B - b_u)}{2} - d \right] L$ $V_c = 0.17 \lambda \sqrt{f'_c} L d$	$M_u = \left[\left(\frac{q_{max} L}{2} \right) L \right]$	$L_p = \frac{L - L_c}{2}$ $\phi M_{ux} = \phi_s L d^2 f_y \rho \left(1 - 0.59 f_y \rho\right)$						
LABEL	f _y (MPa)	f _c (MPa)	Cortante bidireccional (Punzonamiento)					Cortante unidireccional		Flexión					
			φ _v	Vubd=Pu (kN)	φVubd (kN)	φVubd (kN)	φVubd (kN)	CHEQUEO	Vuud (kN)	φVc (kN)	φ _f	L _v (m)	ρ	Mu (kN-m)	φMn (kN-m)
8	420	21	0.75	48.36	786.85	537.56	509.14	Ok	34.43	152.18	0.90	0.45	0.0018	14.966	37.648
8	420	21	0.75	42.84	786.85	537.56	509.14	Ok	30.78	152.18	0.90	0.45	0.0018	13.378	37.648
8	420	21	0.75	35.48	786.85	537.56	509.14	Ok	30.82	152.18	0.90	0.45	0.0018	13.396	37.648
8	420	21	0.75	32.92	786.85	537.56	509.14	Ok	28.46	152.18	0.90	0.45	0.0018	12.368	37.648
8	420	21	0.75	36.96	786.85	537.56	509.14	Ok	31.42	152.18	0.90	0.45	0.0018	13.658	37.648
8	420	21	0.75	31.44	786.85	537.56	509.14	Ok	28.35	152.18	0.90	0.45	0.0018	12.324	37.648
8	420	21	0.75	57.58	786.85	537.56	509.14	Ok	20.49	152.18	0.90	0.45	0.0018	8.905	37.648
8	420	21	0.75	65.57	786.85	537.56	509.14	Ok	23.19	152.18	0.90	0.45	0.0018	10.078	37.648
8	420	21	0.75	57.58	786.85	537.56	509.14	Ok	20.49	152.18	0.90	0.45	0.0018	8.905	37.648
8	420	21	0.75	65.57	786.85	537.56	509.14	Ok	23.19	152.18	0.90	0.45	0.0018	10.078	37.648
8	420	21	0.75	58.58	786.85	537.56	509.14	Ok	20.82	152.18	0.90	0.45	0.0018	9.051	37.648
8	420	21	0.75	42.60	786.85	537.56	509.14	Ok	15.43	152.18	0.90	0.45	0.0018	6.705	37.648
8	420	21	0.75	47.59	786.85	537.56	509.14	Ok	17.11	152.18	0.90	0.45	0.0018	7.439	37.648
8	420	21	0.75	63.58	786.85	537.56	509.14	Ok	22.51	152.18	0.90	0.45	0.0018	9.784	37.648
8	420	21	0.75	42.19	786.85	537.56	509.14	Ok	15.03	152.18	0.90	0.45	0.0018	6.532	37.648
8	420	21	0.75	26.20	786.85	537.56	509.14	Ok	9.63	152.18	0.90	0.45	0.0018	4.186	37.648
9	420	21	0.75	44.16	786.85	537.56	509.14	Ok	18.31	152.18	0.90	0.45	0.0018	7.958	37.648
9	420	21	0.75	40.83	786.85	537.56	509.14	Ok	16.74	152.18	0.90	0.45	0.0018	7.278	37.648
9	420	21	0.75	43.80	786.85	537.56	509.14	Ok	17.80	152.18	0.90	0.45	0.0018	7.735	37.648
9	420	21	0.75	47.37	786.85	537.56	509.14	Ok	19.06	152.18	0.90	0.45	0.0018	8.284	37.648
9	420	21	0.75	56.89	786.85	537.56	509.14	Ok	22.42	152.18	0.90	0.45	0.0018	9.747	37.648
9	420	21	0.75	40.01	786.85	537.56	509.14	Ok	25.13	152.18	0.90	0.45	0.0018	10.924	37.648
9	420	21	0.75	35.70	786.85	537.56	509.14	Ok	37.44	152.18	0.90	0.45	0.0018	16.275	37.648
9	420	21	0.75	41.30	786.85	537.56	509.14	Ok	24.71	152.18	0.90	0.45	0.0018	10.738	37.648
9	420	21	0.75	34.41	786.85	537.56	509.14	Ok	36.40	152.18	0.90	0.45	0.0018	15.822	37.648
9	420	21	0.75	30.55	786.85	537.56	509.14	Ok	24.55	152.18	0.90	0.45	0.0018	10.669	37.648
9	420	21	0.75	26.23	786.85	537.56	509.14	Ok	33.52	152.18	0.90	0.45	0.0018	14.570	37.648
9	420	21	0.75	31.83	786.85	537.56	509.14	Ok	24.12	152.18	0.90	0.45	0.0018	10.482	37.648
9	420	21	0.75	24.95	786.85	537.56	509.14	Ok	32.48	152.18	0.90	0.45	0.0018	14.117	37.648
9	420	21	0.75	44.99	786.85	537.56	509.14	Ok	18.22	152.18	0.90	0.45	0.0018	7.918	37.648
9	420	21	0.75	49.75	786.85	537.56	509.14	Ok	19.90	152.18	0.90	0.45	0.0018	8.649	37.648
9	420	21	0.75	44.99	786.85	537.56	509.14	Ok	18.22	152.18	0.90	0.45	0.0018	7.918	37.648
9	420	21	0.75	49.75	786.85	537.56	509.14	Ok	19.90	152.18	0.90	0.45	0.0018	8.649	37.648
9	420	21	0.75	45.59	786.85	537.56	509.14	Ok	18.43	152.18	0.90	0.45	0.0018	8.009	37.648
9	420	21	0.75	36.07	786.85	537.56	509.14	Ok	15.06	152.18	0.90	0.45	0.0018	6.547	37.648
9	420	21	0.75	39.04	786.85	537.56	509.14	Ok	16.11	152.18	0.90	0.45	0.0018	7.004	37.648
9	420	21	0.75	48.56	786.85	537.56	509.14	Ok	19.48	152.18	0.90	0.45	0.0018	8.467	37.648
9	420	21	0.75	33.15	786.85	537.56	509.14	Ok	13.45	152.18	0.90	0.45	0.0018	5.847	37.648
9	420	21	0.75	23.63	786.85	537.56	509.14	Ok	10.09	152.18	0.90	0.45	0.0018	4.384	37.648
10	420	21	0.75	45.30	786.85	537.56	509.14	Ok	25.74	152.18	0.90	0.45	0.0018	11.186	37.648
10	420	21	0.75	41.50	786.85	537.56	509.14	Ok	23.62	152.18	0.90	0.45	0.0018	10.267	37.648
10	420	21	0.75	44.17	786.85	537.56	509.14	Ok	25.18	152.18	0.90	0.45	0.0018	10.945	37.648
10	420	21	0.75	47.37	786.85	537.56	509.14	Ok	27.06	152.18	0.90	0.45	0.0018	11.760	37.648
10	420	21	0.75	55.90	786.85	537.56	509.14	Ok	32.05	152.18	0.90	0.45	0.0018	13.932	37.648
10	420	21	0.75	41.85	786.85	537.56	509.14	Ok	42.99	152.18	0.90	0.45	0.0018	18.685	37.648
10	420	21	0.75	35.81	786.85	537.56	509.14	Ok	22.34	152.18	0.90	0.45	0.0018	9.709	37.648
10	420	21	0.75	41.29	786.85	537.56	509.14	Ok	39.44	152.18	0.90	0.45	0.0018	17.141	37.648
10	420	21	0.75	36.37	786.85	537.56	509.14	Ok	31.40	152.18	0.90	0.45	0.0018	13.648	37.648
10	420	21	0.75	32.14	786.85	537.56	509.14	Ok	38.27	152.18	0.90	0.45	0.0018	16.636	37.648
10	420	21	0.75	26.10	786.85	537.56	509.14	Ok	22.42	152.18	0.90	0.45	0.0018	9.747	37.648
10	420	21	0.75	31.58	786.85	537.56	509.14	Ok	34.72	152.18	0.90	0.45	0.0018	15.091	37.648
10	420	21	0.75	26.67	786.85	537.56	509.14	Ok	25.88	152.18	0.90	0.45	0.0018	11.251	37.648
10	420	21	0.75	45.23	786.85	537.56	509.14	Ok	25.81	152.18	0.90	0.45	0.0018	11.217	37.648
10	420	21	0.75	49.50	786.85	537.56	509.14	Ok	28.31	152.18	0.90	0.45	0.0018	12.303	37.648
10	420	21	0.75	45.23	786.85	537.56	509.14	Ok	25.81	152.18	0.90	0.45	0.0018	11.217	37.648
10	420	21	0.75	49.50	786.85	537.56	509.14	Ok	28.31	152.18	0.90	0.45	0.0018	12.303	37.648

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL (B=L)



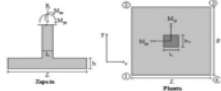
			$0.170\phi_s \left(1 + \frac{2}{\beta}\right) \lambda \sqrt{f'_c}$		$0.083\phi_s \left(\frac{a_w d}{b_w}\right) \lambda \sqrt{f'_c}$		$0.330\phi_s \lambda \sqrt{f'_c}$		$V_{\text{máx}} = q_{\text{máx}} \left[\frac{(B - b_w)}{2} - d \right] L$ $V_c = 0.17 \lambda \sqrt{f'_c} L d$		$M_u = \left[\left(\frac{q_{\text{máx}} L}{2} \right) L \right]$		$L_p = \frac{L - L_c}{2}$ $\phi M_{ux} = \phi_s L^2 f_y \rho \left(1 - 0.59 f_y \rho \right)$		
LABEL	f _y (MPa)	f _c (MPa)	Cortante bidireccional (Punzonamiento)					Cortante unidireccional			Flexión				
			φ _v	V _u bd=Pu (kN)	φV _u bd (kN)	φV _u bd (kN)	φV _u bd (kN)	CHEQUEO	V _u ud (kN)	φV _c (kN)	φ _f	L _v (m)	ρ	M _u (kN-m)	φM _n (kN-m)
10	420	21	0.75	45.77	786.85	537.56	509.14	Ok	26.12	152.18	0.90	0.45	0.0018	11.353	37.648
10	420	21	0.75	37.23	786.85	537.56	509.14	Ok	21.12	152.18	0.90	0.45	0.0018	9.181	37.648
10	420	21	0.75	39.90	786.85	537.56	509.14	Ok	22.68	152.18	0.90	0.45	0.0018	9.859	37.648
10	420	21	0.75	48.43	786.85	537.56	509.14	Ok	27.68	152.18	0.90	0.45	0.0018	12.031	37.648
10	420	21	0.75	33.39	786.85	537.56	509.14	Ok	19.04	152.18	0.90	0.45	0.0018	8.277	37.648
10	420	21	0.75	24.86	786.85	537.56	509.14	Ok	14.05	152.18	0.90	0.45	0.0018	6.105	37.648
11	420	21	0.75	69.14	786.85	537.56	509.14	Ok	18.72	152.18	0.90	0.45	0.0018	8.137	37.648
11	420	21	0.75	66.28	786.85	537.56	509.14	Ok	17.96	152.18	0.90	0.45	0.0018	7.806	37.648
11	420	21	0.75	73.30	786.85	537.56	509.14	Ok	19.87	152.18	0.90	0.45	0.0018	8.638	37.648
11	420	21	0.75	81.72	786.85	537.56	509.14	Ok	22.17	152.18	0.90	0.45	0.0018	9.636	37.648
11	420	21	0.75	104.18	786.85	537.56	509.14	Ok	28.29	152.18	0.90	0.45	0.0018	12.298	37.648
11	420	21	0.75	59.53	786.85	537.56	509.14	Ok	37.05	152.18	0.90	0.45	0.0018	16.103	37.648
11	420	21	0.75	59.00	786.85	537.56	509.14	Ok	36.64	152.18	0.90	0.45	0.0018	15.924	37.648
11	420	21	0.75	59.36	786.85	537.56	509.14	Ok	35.15	152.18	0.90	0.45	0.0018	15.279	37.648
11	420	21	0.75	59.17	786.85	537.56	509.14	Ok	34.82	152.18	0.90	0.45	0.0018	15.135	37.648
11	420	21	0.75	44.71	786.85	537.56	509.14	Ok	33.48	152.18	0.90	0.45	0.0018	14.552	37.648
11	420	21	0.75	44.18	786.85	537.56	509.14	Ok	33.14	152.18	0.90	0.45	0.0018	14.405	37.648
11	420	21	0.75	44.55	786.85	537.56	509.14	Ok	31.59	152.18	0.90	0.45	0.0018	13.728	37.648
11	420	21	0.75	44.35	786.85	537.56	509.14	Ok	31.33	152.18	0.90	0.45	0.0018	13.615	37.648
11	420	21	0.75	76.11	786.85	537.56	509.14	Ok	20.64	152.18	0.90	0.45	0.0018	8.971	37.648
11	420	21	0.75	87.34	786.85	537.56	509.14	Ok	23.70	152.18	0.90	0.45	0.0018	10.302	37.648
11	420	21	0.75	76.11	786.85	537.56	509.14	Ok	20.64	152.18	0.90	0.45	0.0018	8.971	37.648
11	420	21	0.75	87.34	786.85	537.56	509.14	Ok	23.70	152.18	0.90	0.45	0.0018	10.302	37.648
11	420	21	0.75	77.51	786.85	537.56	509.14	Ok	21.02	152.18	0.90	0.45	0.0018	9.137	37.648
11	420	21	0.75	55.05	786.85	537.56	509.14	Ok	14.90	152.18	0.90	0.45	0.0018	6.475	37.648
11	420	21	0.75	62.07	786.85	537.56	509.14	Ok	16.81	152.18	0.90	0.45	0.0018	7.307	37.648
11	420	21	0.75	84.53	786.85	537.56	509.14	Ok	22.94	152.18	0.90	0.45	0.0018	9.969	37.648
11	420	21	0.75	55.68	786.85	537.56	509.14	Ok	15.10	152.18	0.90	0.45	0.0018	6.562	37.648
11	420	21	0.75	33.22	786.85	537.56	509.14	Ok	8.97	152.18	0.90	0.45	0.0018	3.900	37.648
12	420	21	0.75	57.13	786.85	537.56	509.14	Ok	20.86	152.18	0.90	0.45	0.0018	9.068	37.648
12	420	21	0.75	52.24	786.85	537.56	509.14	Ok	18.86	152.18	0.90	0.45	0.0018	8.196	37.648
12	420	21	0.75	55.52	786.85	537.56	509.14	Ok	19.83	152.18	0.90	0.45	0.0018	8.621	37.648
12	420	21	0.75	59.44	786.85	537.56	509.14	Ok	21.00	152.18	0.90	0.45	0.0018	9.129	37.648
12	420	21	0.75	69.91	786.85	537.56	509.14	Ok	24.52	152.18	0.90	0.45	0.0018	10.659	37.648
12	420	21	0.75	51.99	786.85	537.56	509.14	Ok	30.81	152.18	0.90	0.45	0.0018	13.392	37.648
12	420	21	0.75	45.95	786.85	537.56	509.14	Ok	39.60	152.18	0.90	0.45	0.0018	17.211	37.648
12	420	21	0.75	50.93	786.85	537.56	509.14	Ok	28.87	152.18	0.90	0.45	0.0018	12.547	37.648
12	420	21	0.75	47.02	786.85	537.56	509.14	Ok	36.65	152.18	0.90	0.45	0.0018	15.929	37.648
12	420	21	0.75	39.75	786.85	537.56	509.14	Ok	29.17	152.18	0.90	0.45	0.0018	12.679	37.648
12	420	21	0.75	33.71	786.85	537.56	509.14	Ok	35.40	152.18	0.90	0.45	0.0018	15.387	37.648
12	420	21	0.75	38.68	786.85	537.56	509.14	Ok	25.71	152.18	0.90	0.45	0.0018	11.175	37.648
12	420	21	0.75	34.78	786.85	537.56	509.14	Ok	32.45	152.18	0.90	0.45	0.0018	14.105	37.648
12	420	21	0.75	56.82	786.85	537.56	509.14	Ok	20.22	152.18	0.90	0.45	0.0018	8.790	37.648
12	420	21	0.75	62.06	786.85	537.56	509.14	Ok	21.79	152.18	0.90	0.45	0.0018	9.469	37.648
12	420	21	0.75	56.82	786.85	537.56	509.14	Ok	20.22	152.18	0.90	0.45	0.0018	8.790	37.648
12	420	21	0.75	62.06	786.85	537.56	509.14	Ok	21.79	152.18	0.90	0.45	0.0018	9.469	37.648
12	420	21	0.75	57.48	786.85	537.56	509.14	Ok	20.42	152.18	0.90	0.45	0.0018	8.875	37.648
12	420	21	0.75	47.01	786.85	537.56	509.14	Ok	17.30	152.18	0.90	0.45	0.0018	7.518	37.648
12	420	21	0.75	50.28	786.85	537.56	509.14	Ok	18.27	152.18	0.90	0.45	0.0018	7.942	37.648
12	420	21	0.75	60.75	786.85	537.56	509.14	Ok	21.39	152.18	0.90	0.45	0.0018	9.299	37.648
12	420	21	0.75	41.96	786.85	537.56	509.14	Ok	14.97	152.18	0.90	0.45	0.0018	6.508	37.648
12	420	21	0.75	31.49	786.85	537.56	509.14	Ok	11.85	152.18	0.90	0.45	0.0018	5.150	37.648
13	420	21	0.75	50.64	786.85	537.56	509.14	Ok	19.66	152.18	0.90	0.45	0.0018	8.543	37.648
13	420	21	0.75	47.53	786.85	537.56	509.14	Ok	17.84	152.18	0.90	0.45	0.0018	7.753	37.648
13	420	21	0.75	51.65	786.85	537.56	509.14	Ok	18.83	152.18	0.90	0.45	0.0018	8.183	37.648
13	420	21	0.75	56.60	786.85	537.56	509.14	Ok	20.02	152.18	0.90	0.45	0.0018	8.699	37.648

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL (B=L)



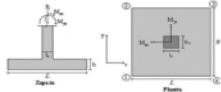
			$0.170\phi_s \left(1 + \frac{2}{\beta}\right) \lambda \sqrt{f'_c}$	$0.083\phi_s \left(\frac{a_w d}{h_o}\right) \lambda \sqrt{f'_c}$	$0.330\phi_s \lambda \sqrt{f'_c}$		$V_{\text{adm}} = q_{\text{max}} u \left[\frac{(B - b_o)}{2} - d \right] L$ $V_c = 0.17 \lambda \sqrt{f'_c} L d$	$M_u = \left(\left(\frac{q_{\text{max}} L}{2} \right) L \right)$	$L_p = \frac{L - L_c}{2}$ $\phi M_n = \phi_s L^2 f_p \rho \left(1 - \frac{0.59 f_p \rho}{f'_c} \right)$						
LABEL	fy (MPa)	f'c (MPa)	Cortante bidireccional (Punzonamiento)					Cortante unidireccional		Flexión					
			ϕv	Vubd=Pu (kN)	ϕV_{ubd} (kN)	ϕV_{ubd} (kN)	ϕV_{ubd} (kN)	CHEQUEO	Vuud (kN)	ϕV_c (kN)	ϕf	Lv (m)	ρ	Mu (kN-m)	ϕM_n (kN-m)
13	420	21	0.75	69.78	786.85	537.56	509.14	Ok	23.18	152.18	0.90	0.45	0.0018	10.076	37.648
13	420	21	0.75	45.13	786.85	537.56	509.14	Ok	43.95	152.18	0.90	0.45	0.0018	19.103	37.648
13	420	21	0.75	41.68	786.85	537.56	509.14	Ok	30.13	152.18	0.90	0.45	0.0018	13.095	37.648
13	420	21	0.75	44.01	786.85	537.56	509.14	Ok	39.56	152.18	0.90	0.45	0.0018	17.196	37.648
13	420	21	0.75	42.81	786.85	537.56	509.14	Ok	26.28	152.18	0.90	0.45	0.0018	11.421	37.648
13	420	21	0.75	34.28	786.85	537.56	509.14	Ok	39.74	152.18	0.90	0.45	0.0018	17.273	37.648
13	420	21	0.75	30.83	786.85	537.56	509.14	Ok	29.17	152.18	0.90	0.45	0.0018	12.677	37.648
13	420	21	0.75	33.15	786.85	537.56	509.14	Ok	35.35	152.18	0.90	0.45	0.0018	15.365	37.648
13	420	21	0.75	31.96	786.85	537.56	509.14	Ok	25.32	152.18	0.90	0.45	0.0018	11.003	37.648
13	420	21	0.75	53.30	786.85	537.56	509.14	Ok	19.22	152.18	0.90	0.45	0.0018	8.355	37.648
13	420	21	0.75	59.89	786.85	537.56	509.14	Ok	20.81	152.18	0.90	0.45	0.0018	9.044	37.648
13	420	21	0.75	53.30	786.85	537.56	509.14	Ok	19.22	152.18	0.90	0.45	0.0018	8.355	37.648
13	420	21	0.75	59.89	786.85	537.56	509.14	Ok	20.81	152.18	0.90	0.45	0.0018	9.044	37.648
13	420	21	0.75	54.12	786.85	537.56	509.14	Ok	19.42	152.18	0.90	0.45	0.0018	8.441	37.648
13	420	21	0.75	40.94	786.85	537.56	509.14	Ok	16.25	152.18	0.90	0.45	0.0018	7.065	37.648
13	420	21	0.75	45.06	786.85	537.56	509.14	Ok	17.24	152.18	0.90	0.45	0.0018	7.495	37.648
13	420	21	0.75	58.24	786.85	537.56	509.14	Ok	20.41	152.18	0.90	0.45	0.0018	8.872	37.648
13	420	21	0.75	39.15	786.85	537.56	509.14	Ok	14.22	152.18	0.90	0.45	0.0018	6.180	37.648
13	420	21	0.75	25.96	786.85	537.56	509.14	Ok	11.05	152.18	0.90	0.45	0.0018	4.804	37.648
14	420	21	0.75	65.91	786.85	537.56	509.14	Ok	18.09	152.18	0.90	0.45	0.0018	7.862	37.648
14	420	21	0.75	64.04	786.85	537.56	509.14	Ok	17.53	152.18	0.90	0.45	0.0018	7.619	37.648
14	420	21	0.75	71.58	786.85	537.56	509.14	Ok	19.55	152.18	0.90	0.45	0.0018	8.498	37.648
14	420	21	0.75	80.63	786.85	537.56	509.14	Ok	21.98	152.18	0.90	0.45	0.0018	9.554	37.648
14	420	21	0.75	104.78	786.85	537.56	509.14	Ok	28.46	152.18	0.90	0.45	0.0018	12.369	37.648
14	420	21	0.75	57.04	786.85	537.56	509.14	Ok	36.28	152.18	0.90	0.45	0.0018	15.768	37.648
14	420	21	0.75	55.94	786.85	537.56	509.14	Ok	40.09	152.18	0.90	0.45	0.0018	17.425	37.648
14	420	21	0.75	57.13	786.85	537.56	509.14	Ok	33.57	152.18	0.90	0.45	0.0018	14.593	37.648
14	420	21	0.75	55.86	786.85	537.56	509.14	Ok	37.35	152.18	0.90	0.45	0.0018	16.233	37.648
14	420	21	0.75	42.92	786.85	537.56	509.14	Ok	33.42	152.18	0.90	0.45	0.0018	14.526	37.648
14	420	21	0.75	41.82	786.85	537.56	509.14	Ok	36.21	152.18	0.90	0.45	0.0018	15.740	37.648
14	420	21	0.75	43.00	786.85	537.56	509.14	Ok	30.72	152.18	0.90	0.45	0.0018	13.351	37.648
14	420	21	0.75	41.74	786.85	537.56	509.14	Ok	33.47	152.18	0.90	0.45	0.0018	14.548	37.648
14	420	21	0.75	74.60	786.85	537.56	509.14	Ok	20.36	152.18	0.90	0.45	0.0018	8.850	37.648
14	420	21	0.75	86.67	786.85	537.56	509.14	Ok	23.60	152.18	0.90	0.45	0.0018	10.257	37.648
14	420	21	0.75	74.60	786.85	537.56	509.14	Ok	20.36	152.18	0.90	0.45	0.0018	8.850	37.648
14	420	21	0.75	86.67	786.85	537.56	509.14	Ok	23.60	152.18	0.90	0.45	0.0018	10.257	37.648
14	420	21	0.75	76.11	786.85	537.56	509.14	Ok	20.77	152.18	0.90	0.45	0.0018	9.026	37.648
14	420	21	0.75	51.97	786.85	537.56	509.14	Ok	14.29	152.18	0.90	0.45	0.0018	6.211	37.648
14	420	21	0.75	59.51	786.85	537.56	509.14	Ok	16.31	152.18	0.90	0.45	0.0018	7.091	37.648
14	420	21	0.75	83.65	786.85	537.56	509.14	Ok	22.79	152.18	0.90	0.45	0.0018	9.906	37.648
14	420	21	0.75	54.44	786.85	537.56	509.14	Ok	14.87	152.18	0.90	0.45	0.0018	6.462	37.648
14	420	21	0.75	30.30	786.85	537.56	509.14	Ok	8.39	152.18	0.90	0.45	0.0018	3.647	37.648
15	420	21	0.75	46.93	786.85	537.56	509.14	Ok	18.80	152.18	0.90	0.45	0.0018	8.172	37.648
15	420	21	0.75	43.86	786.85	537.56	509.14	Ok	17.14	152.18	0.90	0.45	0.0018	7.449	37.648
15	420	21	0.75	47.49	786.85	537.56	509.14	Ok	18.16	152.18	0.90	0.45	0.0018	7.893	37.648
15	420	21	0.75	51.85	786.85	537.56	509.14	Ok	19.39	152.18	0.90	0.45	0.0018	8.426	37.648
15	420	21	0.75	63.48	786.85	537.56	509.14	Ok	22.66	152.18	0.90	0.45	0.0018	9.848	37.648
15	420	21	0.75	42.42	786.85	537.56	509.14	Ok	29.70	152.18	0.90	0.45	0.0018	12.910	37.648
15	420	21	0.75	38.03	786.85	537.56	509.14	Ok	41.71	152.18	0.90	0.45	0.0018	18.128	37.648
15	420	21	0.75	41.16	786.85	537.56	509.14	Ok	25.69	152.18	0.90	0.45	0.0018	11.164	37.648
15	420	21	0.75	39.29	786.85	537.56	509.14	Ok	38.29	152.18	0.90	0.45	0.0018	16.643	37.648
15	420	21	0.75	32.37	786.85	537.56	509.14	Ok	28.94	152.18	0.90	0.45	0.0018	12.577	37.648
15	420	21	0.75	27.97	786.85	537.56	509.14	Ok	37.68	152.18	0.90	0.45	0.0018	16.377	37.648
15	420	21	0.75	31.11	786.85	537.56	509.14	Ok	24.92	152.18	0.90	0.45	0.0018	10.831	37.648
15	420	21	0.75	29.23	786.85	537.56	509.14	Ok	34.26	152.18	0.90	0.45	0.0018	14.892	37.648
15	420	21	0.75	48.95	786.85	537.56	509.14	Ok	18.57	152.18	0.90	0.45	0.0018	8.071	37.648

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAXIAL (B=L)



			$0.170\phi_s \left(1 + \frac{2}{\beta}\right) \lambda \sqrt{f'_c}$	$0.083\phi_s \left(\frac{a_w d}{b_w}\right) \lambda \sqrt{f'_c}$	$0.330\phi_s \lambda \sqrt{f'_c}$		$V_{uud} = q_{max} u \left[\frac{(B - b_w)}{2} - d \right] L$ $V_c = 0.17 \lambda \sqrt{f'_c} L d$	$M_u = \left[\left(\frac{q_{max} u L_p^2}{2} \right) \right] L$	$L_p = \frac{L - L_c}{2}$ $\phi M_u = \phi_s L d^2 f_y \rho \left(1 - 0.59 f_y \rho \right)$						
LABEL	f _y (MPa)	f _c (MPa)	Cortante bidireccional (Punzonamiento)					Cortante unidireccional		Flexión					
			φ _v	V _{uud} =P _u (kN)	φV _{uud} (kN)	φV _{uud} (kN)	CHEQUEO	V _{uud} (kN)	φV _c (kN)	φ _f	L _v (m)	ρ	M _u (kN-m)	φM _n (kN-m)	
15	420	21	0.75	54.76	786.85	537.56	509.14	Ok	20.20	152.18	0.90	0.45	0.0018	8.782	37.648
15	420	21	0.75	48.95	786.85	537.56	509.14	Ok	18.57	152.18	0.90	0.45	0.0018	8.071	37.648
15	420	21	0.75	54.76	786.85	537.56	509.14	Ok	20.20	152.18	0.90	0.45	0.0018	8.782	37.648
15	420	21	0.75	49.67	786.85	537.56	509.14	Ok	18.77	152.18	0.90	0.45	0.0018	8.160	37.648
15	420	21	0.75	38.05	786.85	537.56	509.14	Ok	15.50	152.18	0.90	0.45	0.0018	6.738	37.648
15	420	21	0.75	41.68	786.85	537.56	509.14	Ok	16.52	152.18	0.90	0.45	0.0018	7.182	37.648
15	420	21	0.75	53.31	786.85	537.56	509.14	Ok	19.80	152.18	0.90	0.45	0.0018	8.604	37.648
15	420	21	0.75	35.98	786.85	537.56	509.14	Ok	13.72	152.18	0.90	0.45	0.0018	5.964	37.648
15	420	21	0.75	24.36	786.85	537.56	509.14	Ok	10.45	152.18	0.90	0.45	0.0018	4.542	37.648
16	420	21	0.75	41.57	786.85	537.56	509.14	Ok	26.68	152.18	0.90	0.45	0.0018	11.598	37.648
16	420	21	0.75	37.38	786.85	537.56	509.14	Ok	23.91	152.18	0.90	0.45	0.0018	10.391	37.648
16	420	21	0.75	39.13	786.85	537.56	509.14	Ok	24.94	152.18	0.90	0.45	0.0018	10.840	37.648
16	420	21	0.75	41.23	786.85	537.56	509.14	Ok	26.18	152.18	0.90	0.45	0.0018	11.380	37.648
16	420	21	0.75	46.82	786.85	537.56	509.14	Ok	29.49	152.18	0.90	0.45	0.0018	12.819	37.648
16	420	21	0.75	37.87	786.85	537.56	509.14	Ok	50.71	152.18	0.90	0.45	0.0018	22.043	37.648
16	420	21	0.75	33.39	786.85	537.56	509.14	Ok	20.89	152.18	0.90	0.45	0.0018	9.079	37.648
16	420	21	0.75	38.80	786.85	537.56	509.14	Ok	44.76	152.18	0.90	0.45	0.0018	19.453	37.648
16	420	21	0.75	32.46	786.85	537.56	509.14	Ok	18.03	152.18	0.90	0.45	0.0018	7.835	37.648
16	420	21	0.75	28.96	786.85	537.56	509.14	Ok	45.00	152.18	0.90	0.45	0.0018	19.557	37.648
16	420	21	0.75	24.48	786.85	537.56	509.14	Ok	22.36	152.18	0.90	0.45	0.0018	9.718	37.648
16	420	21	0.75	29.89	786.85	537.56	509.14	Ok	39.04	152.18	0.90	0.45	0.0018	16.968	37.648
16	420	21	0.75	23.55	786.85	537.56	509.14	Ok	15.96	152.18	0.90	0.45	0.0018	6.936	37.648
16	420	21	0.75	39.83	786.85	537.56	509.14	Ok	25.35	152.18	0.90	0.45	0.0018	11.020	37.648
16	420	21	0.75	42.62	786.85	537.56	509.14	Ok	27.01	152.18	0.90	0.45	0.0018	11.740	37.648
16	420	21	0.75	39.83	786.85	537.56	509.14	Ok	25.35	152.18	0.90	0.45	0.0018	11.020	37.648
16	420	21	0.75	42.62	786.85	537.56	509.14	Ok	27.01	152.18	0.90	0.45	0.0018	11.740	37.648
16	420	21	0.75	40.18	786.85	537.56	509.14	Ok	25.56	152.18	0.90	0.45	0.0018	11.110	37.648
16	420	21	0.75	34.58	786.85	537.56	509.14	Ok	22.25	152.18	0.90	0.45	0.0018	9.672	37.648
16	420	21	0.75	36.33	786.85	537.56	509.14	Ok	23.29	152.18	0.90	0.45	0.0018	10.121	37.648
16	420	21	0.75	41.93	786.85	537.56	509.14	Ok	26.60	152.18	0.90	0.45	0.0018	11.560	37.648
16	420	21	0.75	29.52	786.85	537.56	509.14	Ok	18.81	152.18	0.90	0.45	0.0018	8.175	37.648
16	420	21	0.75	23.92	786.85	537.56	509.14	Ok	15.50	152.18	0.90	0.45	0.0018	6.737	37.648
17	420	21	0.75	66.53	786.85	537.56	509.14	Ok	25.00	152.18	0.90	0.45	0.0018	10.868	37.648
17	420	21	0.75	60.39	786.85	537.56	509.14	Ok	23.37	152.18	0.90	0.45	0.0018	10.158	37.648
17	420	21	0.75	63.76	786.85	537.56	509.14	Ok	25.31	152.18	0.90	0.45	0.0018	11.000	37.648
17	420	21	0.75	67.81	786.85	537.56	509.14	Ok	27.63	152.18	0.90	0.45	0.0018	12.011	37.648
17	420	21	0.75	78.59	786.85	537.56	509.14	Ok	33.84	152.18	0.90	0.45	0.0018	14.706	37.648
17	420	21	0.75	58.30	786.85	537.56	509.14	Ok	43.15	152.18	0.90	0.45	0.0018	18.753	37.648
17	420	21	0.75	55.75	786.85	537.56	509.14	Ok	38.73	152.18	0.90	0.45	0.0018	16.833	37.648
17	420	21	0.75	59.95	786.85	537.56	509.14	Ok	38.15	152.18	0.90	0.45	0.0018	16.580	37.648
17	420	21	0.75	54.10	786.85	537.56	509.14	Ok	31.67	152.18	0.90	0.45	0.0018	13.765	37.648
17	420	21	0.75	44.04	786.85	537.56	509.14	Ok	39.11	152.18	0.90	0.45	0.0018	17.000	37.648
17	420	21	0.75	41.49	786.85	537.56	509.14	Ok	34.69	152.18	0.90	0.45	0.0018	15.079	37.648
17	420	21	0.75	45.70	786.85	537.56	509.14	Ok	34.11	152.18	0.90	0.45	0.0018	14.827	37.648
17	420	21	0.75	39.84	786.85	537.56	509.14	Ok	28.91	152.18	0.90	0.45	0.0018	12.564	37.648
17	420	21	0.75	65.11	786.85	537.56	509.14	Ok	26.08	152.18	0.90	0.45	0.0018	11.337	37.648
17	420	21	0.75	70.50	786.85	537.56	509.14	Ok	29.18	152.18	0.90	0.45	0.0018	12.685	37.648
17	420	21	0.75	65.11	786.85	537.56	509.14	Ok	26.08	152.18	0.90	0.45	0.0018	11.337	37.648
17	420	21	0.75	70.50	786.85	537.56	509.14	Ok	29.18	152.18	0.90	0.45	0.0018	12.685	37.648
17	420	21	0.75	65.78	786.85	537.56	509.14	Ok	26.47	152.18	0.90	0.45	0.0018	11.505	37.648
17	420	21	0.75	55.00	786.85	537.56	509.14	Ok	20.27	152.18	0.90	0.45	0.0018	8.810	37.648
17	420	21	0.75	58.37	786.85	537.56	509.14	Ok	22.21	152.18	0.90	0.45	0.0018	9.652	37.648
17	420	21	0.75	69.15	786.85	537.56	509.14	Ok	28.41	152.18	0.90	0.45	0.0018	12.348	37.648
17	420	21	0.75	48.16	786.85	537.56	509.14	Ok	19.18	152.18	0.90	0.45	0.0018	8.334	37.648
17	420	21	0.75	37.38	786.85	537.56	509.14	Ok	12.97	152.18	0.90	0.45	0.0018	5.639	37.648
18	420	21	0.75	38.70	786.85	537.56	509.14	Ok	22.42	152.18	0.90	0.45	0.0018	9.745	37.648

DISEÑO DE ZAPATA AISLADA CONCENTRICA CON FLEXIÓN BIAIXIAL (B=L)



			$0.17\phi_s \left(1 + \frac{2}{\beta}\right) \lambda \sqrt{f'_c}$		$0.083\phi_s \left(\frac{A_{sc}}{b_o}\right) \lambda \sqrt{f'_c}$		$0.33\phi_s \lambda \sqrt{f'_c}$		$V_{uid} = q_{max} \left[\frac{(B - b_c)}{2} - d \right] L$ $V_c = 0.17 \lambda \sqrt{f'_c} L d$		$M_u = \left(\left(\frac{q_{max} L^2}{2} \right) \right) L$		$L_p = \frac{L - L_c}{2}$ $\phi M_{ux} = \phi_s L^2 f_y \rho \left(1 - \frac{0.59 f_y \rho}{f'_c}\right)$				
LABEL	f _y (MPa)	f _c (MPa)	Cortante bidireccional (Punzonamiento)						Cortante unidireccional				Flexión				
			φ _v	V _{ubd} =Pu (kN)	φV _{ubd} (kN)	φV _{ubd} (kN)	φV _{ubd} (kN)	CHEQUEO	V _{uud} (kN)	φV _c (kN)	φ _f	L _v (m)	ρ	μ _u (kN-m)	φM _n (kN-m)		
18	420	21	0.75	34.75	786.85	537.56	509.14	Ok	20.16	152.18	0.90	0.45	0.0018	8.764	37.648		
18	420	21	0.75	36.33	786.85	537.56	509.14	Ok	21.11	152.18	0.90	0.45	0.0018	9.175	37.648		
18	420	21	0.75	38.23	786.85	537.56	509.14	Ok	22.24	152.18	0.90	0.45	0.0018	9.668	37.648		
18	420	21	0.75	43.30	786.85	537.56	509.14	Ok	25.27	152.18	0.90	0.45	0.0018	10.984	37.648		
18	420	21	0.75	35.74	786.85	537.56	509.14	Ok	30.41	152.18	0.90	0.45	0.0018	13.217	37.648		
18	420	21	0.75	30.60	786.85	537.56	509.14	Ok	39.34	152.18	0.90	0.45	0.0018	17.097	37.648		
18	420	21	0.75	36.42	786.85	537.56	509.14	Ok	27.04	152.18	0.90	0.45	0.0018	11.752	37.648		
18	420	21	0.75	29.92	786.85	537.56	509.14	Ok	33.34	152.18	0.90	0.45	0.0018	14.489	37.648		
18	420	21	0.75	27.45	786.85	537.56	509.14	Ok	29.70	152.18	0.90	0.45	0.0018	12.910	37.648		
18	420	21	0.75	22.30	786.85	537.56	509.14	Ok	36.09	152.18	0.90	0.45	0.0018	15.686	37.648		
18	420	21	0.75	28.13	786.85	537.56	509.14	Ok	24.02	152.18	0.90	0.45	0.0018	10.441	37.648		
18	420	21	0.75	21.63	786.85	537.56	509.14	Ok	30.09	152.18	0.90	0.45	0.0018	13.078	37.648		
18	420	21	0.75	36.97	786.85	537.56	509.14	Ok	21.49	152.18	0.90	0.45	0.0018	9.340	37.648		
18	420	21	0.75	39.50	786.85	537.56	509.14	Ok	23.00	152.18	0.90	0.45	0.0018	9.997	37.648		
18	420	21	0.75	36.97	786.85	537.56	509.14	Ok	21.49	152.18	0.90	0.45	0.0018	9.340	37.648		
18	420	21	0.75	39.50	786.85	537.56	509.14	Ok	23.00	152.18	0.90	0.45	0.0018	9.997	37.648		
18	420	21	0.75	37.28	786.85	537.56	509.14	Ok	21.68	152.18	0.90	0.45	0.0018	9.422	37.648		
18	420	21	0.75	32.22	786.85	537.56	509.14	Ok	18.65	152.18	0.90	0.45	0.0018	8.106	37.648		
18	420	21	0.75	33.80	786.85	537.56	509.14	Ok	19.60	152.18	0.90	0.45	0.0018	8.517	37.648		
18	420	21	0.75	38.87	786.85	537.56	509.14	Ok	22.62	152.18	0.90	0.45	0.0018	9.833	37.648		
18	420	21	0.75	27.41	786.85	537.56	509.14	Ok	15.93	152.18	0.90	0.45	0.0018	6.922	37.648		
18	420	21	0.75	22.35	786.85	537.56	509.14	Ok	12.90	152.18	0.90	0.45	0.0018	5.606	37.648		

DISEÑO VIGA DE FUNDACION 30x30

Cargas de diseño	
Carga axial última=	128.662 kN
T en viga =	0.00 kN

Materiales	
f'c=	21 MPa
fy=	420 MPa

Predimensionamiento	
Luz máxima =	4.1 m
Disipación de energía =	DES
Aa=	0.2
L/30 =	0.14 m

Cargas de diseño	
C o T= 0.25*Aa*Pu =	6.433 kN
Tensión en viga de fundación =	0.00 kN

b=	30 cm
h=	30 cm

El área de refuerzo longitudinal **As** para elementos no compuestos a compresión no debe ser mayor que **0.04Ag**

As min=	1.8 cm²
---------	---------

Varilla a utilizar	No. 5
Area de la barra	2 cm²

As superior	2	VARILLAS	No. 5
As inferior	2	VARILLAS	No. 5

As total=	4.000 cm²
As total=	4.000 cm²

De acuerdo con el artículo C.10.3.5.2 de la NSR-10, la resistencia de diseño a fuerza axial de un elemento no preesforzado, reforzado con estribos cerrados, sometido a compresión esta dada por

Ø=	0.65
C =	858.11 kN
T =	302.40 kN

$$C = 0.75 \phi [0.85 f'_c (A_g - A_{st}) + f_y A_{st}]$$

$$T = 0.90 f_y A_{st}$$

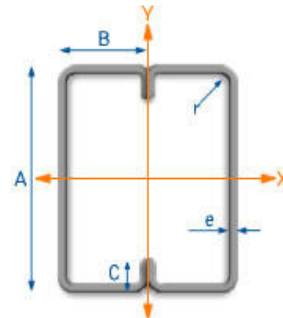
Chequeo de la sección				
C=	6.43 kN	<	858.11 kN	OK
T=	6.43 kN	<	302.40 kN	OK

Tipo de sección: Cajón

Materiales

Módulo de elasticidad del acero E (kg/cm ²) :	2040000
Esfuerzo de fluencia del Perlín Fy (kg/cm ²) :	2800
Esfuerzo último del perlín Fu (kg/cm ²) :	3650

Número de luces: 2 Luces



Separación correas S(m): 1.2

Pendiente de la cubierta M (%): 11

Tensores a: L/2

Cargas Sobreimpuestas

Tipo de teja: Arquitectónica (4.32Kg/m²)

Elementos varios: Lámparas (4Kg/m²)

Carga viva (kg/m²): 50

Granizo (kg/m²): 100

Otro adicional a los anteriores (kg/m²): 0.00

Viento en succión (kg/m²): 40

Viento en presión (kg/m²): 40

Notas:

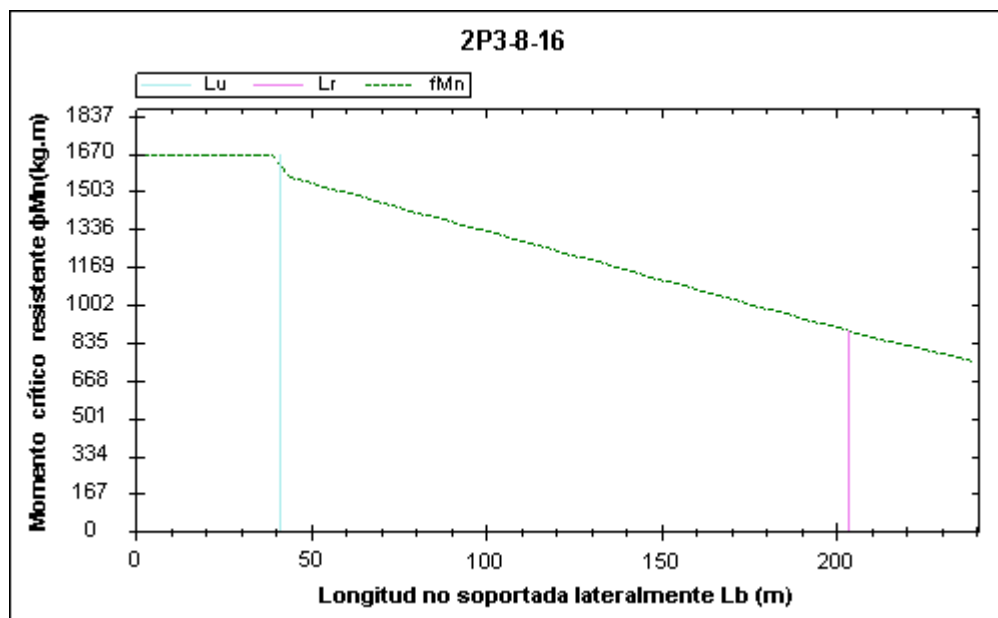
- Viento en succión con signo negativo (-).
- La carga de granizo que aparece por defecto es sugerida por el programa de acuerdo a la pendiente de la cubierta. Recuerde que las regiones ubicadas a menos de 2000m sobre el nivel del mar no se debe tener en cuenta la carga de granizo.

Selección: 2P3-8-16

Designación	Peso negro Kg/m	Momento último Mu (kg-m)	Cortante último Vu (kg)	$(M_{ux}/\phi M_{nx}) + (M_{uy}/\phi M_{ny})$	$(M_{ux}/\phi M_{nx})^2 + (V_{ux}/\phi V_{nx})^2$
2P-9-16	8.74	1528.79	1221.01	0.88	0.86
2P3-8-16	8.82	1529.47	1221.47	0.97	1
2P-6-14	9.26	1533.24	1224.02	0.89	0.74
2P-10-16	9.34	1533.92	1224.49	0.8	0.78
2P3-9-16	9.42	1534.6	1224.95	0.85	0.83
2P3-10-16	10.02	1539.74	1228.43	0.78	0.77
2P3-6-14	10.16	1540.93	1229.24	0.87	0.71
2P-150-12	10.4	1542.99	1230.63	0.83	0.63
2P-12-16	10.52	1544.01	1231.32	0.69	0.75
2P-8-14	10.84	1546.75	1233.18	0.62	0.36
2P3-12-16	11.22	1550	1235.38	0.67	0.74
2P-6-12	11.56	1552.91	1237.35	0.71	0.47
2P-9-14	11.64	1553.59	1237.81	0.53	0.28
2P-14-16	11.72	1554.28	1238.28	0.61	0.79
2P3-8-14	11.76	1554.62	1238.51	0.6	0.35
2P-10-14	12.44	1560.44	1242.45	0.47	0.23
2P-150-11	12.48	1560.78	1242.68	0.72	0.48
2P3-9-14	12.56	1561.46	1243.14	0.52	0.27
2P3-6-12	12.72	1562.83	1244.07	0.67	0.43
2P3-10-14	13.36	1568.31	1247.78	0.45	0.22
2P-8-12	13.56	1570.02	1248.94	0.49	0.22
2P-6-11	13.88	1572.76	1250.79	0.61	0.34
2P-12-14	14.04	1574.12	1251.72	0.38	0.18
2P-9-12	14.56	1578.57	1254.73	0.42	0.17
2P3-8-12	14.7	1579.77	1255.54	0.47	0.21
2P3-12-14	14.96	1581.99	1257.05	0.38	0.19
2P3-6-11	15.26	1584.56	1258.79	0.55	0.29
2P-10-12	15.56	1587.13	1260.53	0.37	0.13
2P-14-14	15.64	1587.81	1260.99	0.34	0.18
2P3-9-12	15.7	1588.32	1261.34	0.4	0.15
2P-8-11	16.28	1593.28	1264.7	0.42	0.16
2P3-10-12	16.7	1596.88	1267.13	0.35	0.12
2P-9-11	17.46	1603.38	1271.54	0.36	0.12
2P-12-12	17.54	1604.06	1272	0.29	0.09
2P3-8-11	17.64	1604.92	1272.58	0.39	0.14
2P-10-11	18.66	1613.64	1278.49	0.32	0.09
2P3-12-12	18.7	1613.98	1278.72	0.28	0.08
2P3-9-11	18.84	1615.18	1279.53	0.33	0.1
2P-14-12	19.54	1621.17	1283.59	0.24	0.07
2P3-10-11	20.04	1625.45	1286.49	0.29	0.08
2P-12-11	21.06	1634.17	1292.4	0.25	0.06
2P3-12-11	22.44	1645.98	1300.39	0.23	0.05

Propiedades Físicas y Geométricas

A (cm):	20.32
B (cm):	7.62
C (cm):	1.91
CALIBRE:	16
ESPESOR, e (cm):	0.15
PESO NEGRO (kg/m):	8.82
PESO GALV (kg/m):	8.91
AREA BRUTA (cm²):	11.44
AREA EFECTIVA (cm²):	6.45
Ix (cm4):	733.8
Iex (cm4):	671.52
Sx (cm³):	72.23
Sxe (cm³):	62.61
Iy (cm4):	424.8
Iey (cm4):	292.24
Sy (cm³):	55.75
Sye (cm³):	31.48
rx (cm):	8.01
ry (cm):	6.09
Xcg (cm):	0
Ycg (cm):	0
J (cm4):	788.19
Cw (cm6):	424



Cargas Gravitacionales

Carga muerta - D (kg/m²):	15.67
Carga viva de cubierta - Lr (kg/m²):	50
Carga de granizo - G (kg/m²):	100
Viento en presión (kg/m²):	40
Viento en succión (kg/m²):	40

Combinaciones Hipótesis de Cargas	Carga Última En Dirección Horizontal Wh(Kg/m)			Carga Última En Dirección Vertical Wv(Kg/m)				
	Wucm = γcd	W G = $\gamma (g)$	Wu	Wcm = γcd	W G = $\gamma (g)$	WCWp = γCW	WCWs = γCW	Wu
1.4CM+0CV+0W	2.88	0	2.88	26.17	0	0	0	26.17
1.2CM+1.6CV+0W	2.47	20.99	23.46	22.43	190.85	0	0	213.28
1.2CM+1.6CV+0.8W	2.47	20.99	23.46	22.43	190.85	38.4	38.4	251.68
1.2CM+0.5CV+1.6W	2.47	6.56	9.03	22.43	59.64	76.8	76.8	158.87
1.2CM+1CV+0W	2.47	13.12	15.59	22.43	119.28	0	0	141.71
0.9CM+0CV+1.6W	1.85	0	1.85	16.82	0	76.8	76.8	93.62
0.9CM+0CV+0W	1.85	0	1.85	16.82	0	0	0	16.82

Combinaciones Hipótesis de Cargas	Momento Último Mu(kg.m)		Cortante Último Vu(kg)	
	Muy	Mux	Vuy	Vux
1.4CM+0CV+0W	5.61	187.66	2.49	127.12
1.2CM+1.6CV+0W	45.76	1529.47	20.29	1036.05
1.2CM+1.6CV+0.8W	45.76	1255.75	20.29	1221.47
1.2CM+0.5CV+1.6W	17.61	41.09	7.81	769.51
1.2CM+1CV+0W	30.4	1016.24	13.48	688.39
0.9CM+0CV+1.6W	3.61	-426.81	1.6	452.56
0.9CM+0CV+0W	3.61	120.64	1.6	81.72

Mux = 1529 kg.m

Muy = 46 kg.m

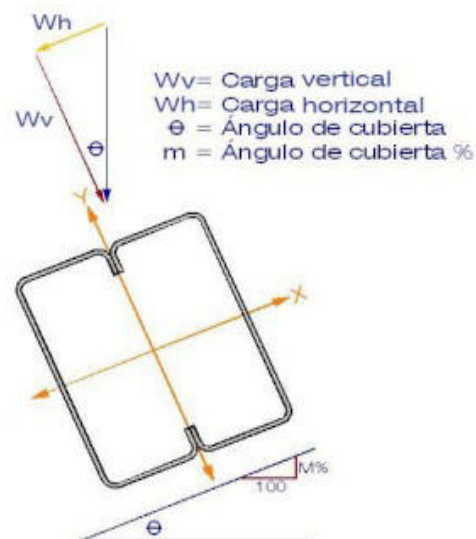
Vux = 1221 kg

Capacidades de la sección

Mnx (kg-m):	1753
Mny (kg-m):	881
Mnrx (kg-m):	884
Vnx (kg):	3131
Condición de soporte lateral:	2
Lb (m) (Longitud no arriostrada):	3.95
Lu (m):	41.11
Lr (m):	203.89
Cb:	1.3
Fe (kg/cm²):	105217.88
Fc (kg/cm²):	2800
ϕMnx (kg-m):	1665.43
ϕMny (kg-m):	836.95

Análisis De Deflexiones

Inercia de la sección Ixe (cm4):	672	
Δy (cm) CV:	2.064	
Δadm (cm) CV: L/240=	3.292	OK
Δy (cm) CM+(CV ó G):	2.387	
Δadm (cm) CM+(CV ó G): L/180=	4.389	OK
Δy (cm) CV en voladizo:	0	
Δadm (cm) CV en voladizo: L/180=	0	NA
Δy (cm) CM+(CV ó G) en voladizo:	0	
Δadm (cm) CM+(CV ó G) en voladizo: L/120=	0	NA

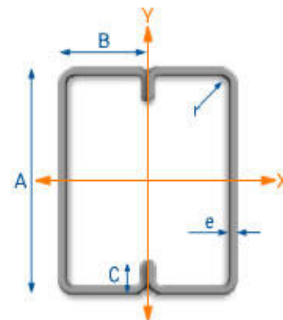


Tipo de sección: Cajón

Materiales

Módulo de elasticidad del acero E (kg/cm ²):	2040000
Esfuerzo de fluencia del Perlín Fy (kg/cm ²):	2800
Esfuerzo último del perlín Fu (kg/cm ²):	3650

Número de luces: 2 Luces



Separación correas S(m): 1.2

Pendiente de la cubierta M (%): 11

Tensores a: L/2

Cargas Sobreimpuestas

Tipo de teja: Arquitectónica (4.32Kg/m²)

Elementos varios: Lámparas (4Kg/m²)

Carga viva (kg/m²): 50

Granizo (kg/m²): 100

Otro adicional a los anteriores (kg/m²): 0.00

Viento en succión (kg/m²): 40

Viento en presión (kg/m²): 40

Notas:

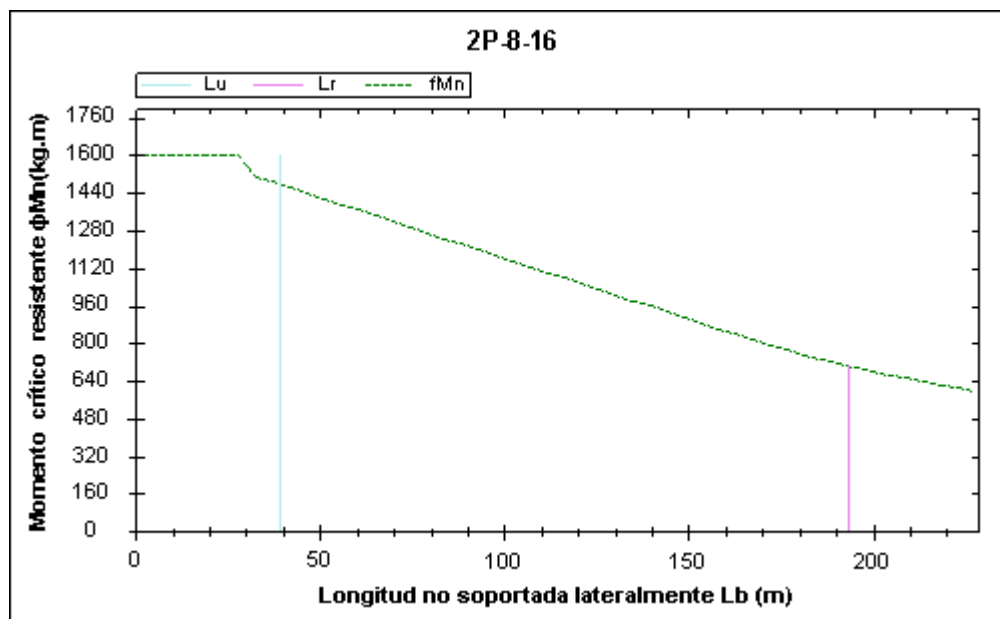
- Viento en succión con signo negativo (-).
- La carga de granizo que aparece por defecto es sugerida por el programa de acuerdo a la pendiente de la cubierta. Recuerde que las regiones ubicadas a menos de 2000m sobre el nivel del mar no se debe tener en cuenta la carga de granizo.

Selección: 2P-8-16

Designación	Peso negro Kg/m	Momento último Mu (kg-m)	Cortante último Vu (kg)	$(M_{ux}/\phi M_{nx}) + (M_{uy}/\phi M_{ny})$	$(M_{ux}/\phi M_{nx})^2 + (V_{ux}/\phi V_{nx})^2$
2P-6-16	6.94	1020.56	1019.61	1	0.95
2P-125-14	7.54	1024.02	1022.54	0.86	0.68
2P3-6-16	7.62	1024.48	1022.93	0.95	0.88
2P-8-16	8.14	1027.48	1025.46	0.69	0.52
2P-150-14	8.32	1028.52	1026.34	0.68	0.42
2P-100-12	8.4	1028.98	1026.73	0.96	0.86
2P-9-16	8.74	1030.94	1028.39	0.6	0.44
2P3-8-16	8.82	1031.4	1028.78	0.66	0.49
2P-6-14	9.26	1033.94	1030.93	0.6	0.34
2P-10-16	9.34	1034.4	1031.32	0.54	0.42
2P3-9-16	9.42	1034.86	1031.71	0.58	0.43
2P-125-12	9.42	1034.86	1031.71	0.71	0.47
2P3-10-16	10.02	1038.32	1034.64	0.53	0.41
2P-100-11	10.08	1038.67	1034.93	0.83	0.66
2P3-6-14	10.16	1039.13	1035.32	0.59	0.33
2P-150-12	10.4	1040.51	1036.49	0.56	0.29
2P-12-16	10.52	1041.21	1037.08	0.47	0.43
2P-8-14	10.84	1043.05	1038.64	0.42	0.17
2P3-12-16	11.22	1045.24	1040.5	0.45	0.43
2P-125-11	11.3	1045.71	1040.89	0.62	0.36
2P-6-12	11.56	1047.21	1042.16	0.48	0.21
2P-9-14	11.64	1047.67	1042.55	0.36	0.14
2P-14-16	11.72	1048.13	1042.94	0.41	0.49
2P3-8-14	11.76	1048.36	1043.13	0.41	0.17
2P-10-14	12.44	1052.28	1046.45	0.32	0.11
2P-150-11	12.48	1052.51	1046.65	0.49	0.22
2P3-9-14	12.56	1052.97	1047.04	0.35	0.13
2P3-6-12	12.72	1053.9	1047.82	0.45	0.2
2P3-10-14	13.36	1057.59	1050.94	0.31	0.11
2P-8-12	13.56	1058.74	1051.92	0.33	0.1
2P-6-11	13.88	1060.59	1053.48	0.41	0.16
2P-12-14	14.04	1061.51	1054.26	0.26	0.1
2P-9-12	14.56	1064.51	1056.8	0.29	0.08
2P3-8-12	14.7	1065.32	1057.48	0.32	0.1
2P3-12-14	14.96	1066.82	1058.75	0.26	0.1
2P3-6-11	15.26	1068.55	1060.21	0.38	0.13
2P-10-12	15.56	1070.28	1061.68	0.25	0.06
2P-14-14	15.64	1070.74	1062.07	0.23	0.11
2P3-9-12	15.7	1071.09	1062.36	0.27	0.07
2P-8-11	16.28	1074.43	1065.19	0.28	0.07
2P3-10-12	16.7	1076.86	1067.24	0.24	0.06
2P-9-11	17.46	1081.24	1070.95	0.24	0.05

Propiedades Físicas y Geométricas

A (cm):	20.32
B (cm):	6.35
C (cm):	1.91
CALIBRE:	16
ESPESOR, e (cm):	0.15
PESO NEGRO (kg/m):	8.14
PESO GALV (kg/m):	8.22
AREA BRUTA (cm²):	10.68
AREA EFECTIVA (cm²):	6.30
Ix (cm4):	656.3
Iex (cm4):	626.79
Sx (cm³):	64.60
Sxe (cm³):	59.95
Iy (cm4):	283.84
Iey (cm4):	193.77
Sy (cm³):	44.70
Sye (cm³):	25.02
rx (cm):	7.84
ry (cm):	5.16
Xcg (cm):	0
Ycg (cm):	0
J (cm4):	587.5
Cw (cm6):	711



Cargas Gravitacionales

Carga muerta - D (kg/m²):	15.1033
Carga viva de cubierta - Lr (kg/m²):	50
Carga de granizo - G (kg/m²):	100
Viento en presión (kg/m²):	40
Viento en succión (kg/m²):	40

Combinaciones Hipótesis de Cargas	Carga Última En Dirección Horizontal Wh(Kg/m)			Carga Última En Dirección Vertical Wv(Kg/m)				
	Wucm = γcd	W G = $\gamma (g)$	Wu	Wcm = γcd	W G = $\gamma (g)$	WCWp = γCW	WCWs = γCW	Wu
1.4CM+0CV+0W	2.77	0	2.77	25.22	0	0	0	25.22
1.2CM+1.6CV+0W	2.38	20.99	23.37	21.62	190.85	0	0	212.47
1.2CM+1.6CV+0.8W	2.38	20.99	23.37	21.62	190.85	38.4	38.4	250.87
1.2CM+0.5CV+1.6W	2.38	6.56	8.94	21.62	59.64	76.8	76.8	158.06
1.2CM+1CV+0W	2.38	13.12	15.5	21.62	119.28	0	0	140.9
0.9CM+0CV+1.6W	1.78	0	1.78	16.21	0	76.8	76.8	93.01
0.9CM+0CV+0W	1.78	0	1.78	16.21	0	0	0	16.21

Combinaciones Hipótesis de Cargas	Momento Último Mu(kg.m)		Cortante Último Vu(kg)	
	Muy	Mux	Vuy	Vux
1.4CM+0CV+0W	3.95	121.97	2.05	103.19
1.2CM+1.6CV+0W	33.28	1027.48	17.27	869.3
1.2CM+1.6CV+0.8W	33.28	842.89	17.27	1025.46
1.2CM+0.5CV+1.6W	12.73	23.79	6.61	644.8
1.2CM+1CV+0W	22.07	681.38	11.46	576.48
0.9CM+0CV+1.6W	2.54	-290.76	1.32	378.68
0.9CM+0CV+0W	2.54	78.41	1.32	66.34

Mux = 1027 kg.m

Muy = 33 kg.m

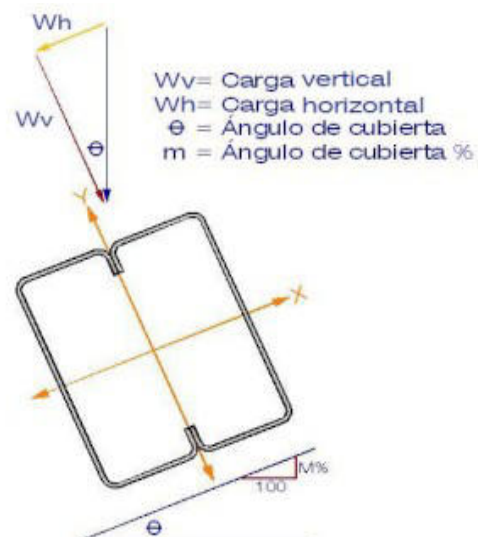
Vux = 1025 kg

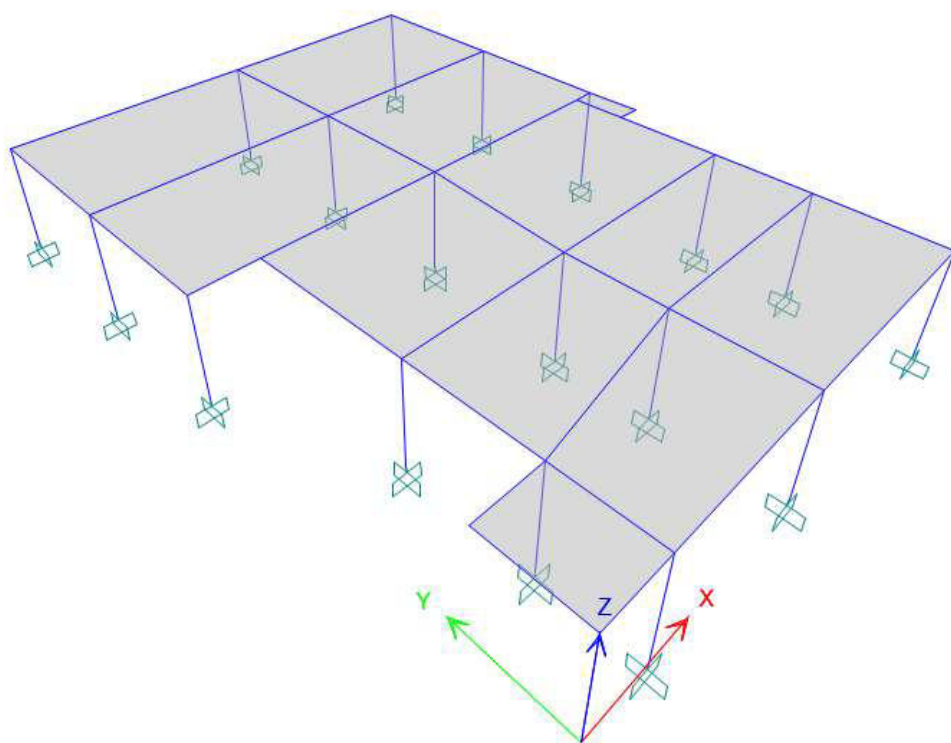
Capacidades de la sección

Mnx (kg-m):	1679
Mny (kg-m):	700
Mnrx (kg-m):	703
Vnx (kg):	3131
Condición de soporte lateral:	2
Lb (m) (Longitud no arriostrada):	3.38
Lu (m):	39.04
Lr (m):	193.63
Cb:	1.3
Fe (kg/cm ²):	97175.74
Fc (kg/cm ²):	2800
ϕMnx (kg-m):	1594.59
ϕMny (kg-m):	665

Análisis De Deflexiones

Inercia de la sección Ixe (cm ⁴):	627	
Δy (cm) CV:	0.478	
Δadm (cm) CV: L/240=	2.812	OK
Δy (cm) CM+(CV ó G):	0.55	
Δadm (cm) CM+(CV ó G): L/180=	3.75	OK
Δy (cm) CV en voladizo:	0	
Δadm (cm) CV en voladizo: L/180=	0	NA
Δy (cm) CM+(CV ó G) en voladizo:	0	
Δadm (cm) CM+(CV ó G) en voladizo: L/120=	0	NA





PROPIEDADES, MATERIALES Y SECCIONES

Model File: Las Americas, Revision 0
19/03/2026

1 Properties

This chapter provides property information for materials, frame sections, shell sections, and links.

1.1 Materials

Table 1.1 - Material Properties - General

Material	Type	SymType	Grade	Color	Notes
3000PSI	Concrete	Isotropic	Unknown	Green	
A416Gr270	Tendon	Uniaxial	Unknown	Yellow	
ASTM 706M-Gr60	Rebar	Uniaxial	Unknown	Red	

Table 1.2 - Material Properties - Concrete Data (Part 1 of 3)

Material	Fc MPa	LtWtConc	LtWtFact	IsUserFr	UserFr MPa	SSCurveOpt	SSHysType	SFc mm/mm	SCap mm/mm
3000PSI	21	No		No		Mander	Concrete	0.002219	0.005

Table 1.2 - Material Properties - Concrete Data (Part 2 of 3)

Material	FinalSlope	FAngle deg	DAngle deg	TimeType	TimeE	Modulus Factor	TimeCreep	Creep Factor	TimeShrink
3000PSI	-0.1	0	0						

Table 1.2 - Material Properties - Concrete Data (Part 3 of 3)

Material	CreepType	CreepTerms
3000PSI		

Table 1.3 - Material Properties - Rebar Data

Material	Fy MPa	Fu MPa	Fye MPa	Fue MPa	SSCurveOpt	SSHysType	SHard mm/mm	SCap mm/mm	FinalSlope
ASTM 706M-Gr60	413.64	620.53	455.05	682.58	Simple	Kinematic	0.01	0.09	-0.1

Table 1.4 - Material Properties - Tendon Data

Material	Fy MPa	Fu MPa	SSCurveOpt	SSHysType	FinalSlope
A416Gr270	1689.91	1861.58	270 ksi	Kinematic	-0.1

1.2 Frame Sections

Table 1.5 - Frame Section Property Definitions - Summary (Part 1 of 4)

Name	Material	Shape	Color	Area cm2	J cm4	I33 cm4	I22 cm4	I23 cm4	IMajor cm4	IMinor cm4
C. 30x30 (21)	3000PSI	Concrete Rectangular	Red	900	114117.2	67500	67500	0		
V. 30x30 (21)	3000PSI	Concrete Rectangular	Blue	900	114105.5	67500	67499.9	0		
V. 35x30 (21)	3000PSI	Concrete Rectangular	Red	1050	153608.7	78750	107187.5	0		
VT 20x30 (21)	3000PSI	Concrete Rectangular	Gray8Dark	600	47074.6	45000	20000	0		

Table 1.5 - Frame Section Property Definitions - Summary (Part 2 of 4)

Name	MajorAngle deg	As2 cm2	As3 cm2	S33Pos cm3	S33Neg cm3	S22Pos cm3	S22Neg cm3	Z33 cm3	Z22 cm3	R33 mm	R22 mm
C. 30x30 (21)		750	750	4500	4500	4500	4500	6750	6750	86.6	86.6
V. 30x30 (21)		750	750	4500	4500	4500	4500	6750	6750	86.6	86.6
V. 35x30 (21)		875	875	5250	5250	6125	6125	7875	9187.5	86.6	101
VT 20x30 (21)		500	500	3000	3000	2000	2000	4500	3000	86.6	57.7

Table 1.5 - Frame Section Property Definitions - Summary (Part 3 of 4)

Name	Fillet Radius mm	CG Offset 3 mm	CG Offset 2 mm	PNA Offset 3 mm	PNA Offset 2 mm	SC Offset 3 mm	SC Offset 2 mm	Area Modifier	As2 Modifier	As3 Modifier	J Modifier
C. 30x30 (21)		0	0	0	0			1	1	1	1
V. 30x30 (21)		0	0	0	0			1	1	1	1
V. 35x30 (21)		0	0	0	0			1	1	1	1
VT 20x30 (21)		0	0	0	0			1	1	1	1

Table 1.5 - Frame Section Property Definitions - Summary (Part 4 of 4)

Name	I22 Modifier	Mass Modifier	Weight Modifier
C. 30x30 (21)	1	1	1
V. 30x30 (21)	1	1	1
V. 35x30 (21)	1	1	1
VT 20x30 (21)	1	1	1

Table 1.6 - Frame Section Property Definitions - Concrete Rectangular (Part 1 of 2)

Name	Material	From File?	File Name	Section in File	Depth mm	Width mm	Rigid Zone?	Notional Size Type	Notional Auto Factor	Notional User Size mm	Design Type
C. 30x30 (21)	3000PSI	No			300	300	No	Auto	1		Column
V. 30x30 (21)	3000PSI	No			300	300	No	Auto	1		Beam
V. 35x30 (21)	3000PSI	No			300	350	No	Auto	1		Beam
VT 20x30 (21)	3000PSI	No			300	200	No	Auto	1		Beam

Table 1.6 - Frame Section Property Definitions - Concrete Rectangular (Part 2 of 2)

Name	Area Modifier	As2 Modifier	As3 Modifier	J Modifier	I22 Modifier	I33 Modifier	Mass Modifier	Weight Modifier	Color	Notes
C. 30x30 (21)	1	1	1	1	1	1	1	1	Red	
V. 30x30 (21)	1	1	1	1	1	1	1	1	Blue	
V. 35x30 (21)	1	1	1	1	1	1	1	1	Red	
VT 20x30 (21)	1	1	1	1	1	1	1	1	Gray8Dark	

Table 1.7 - Frame Section Property Definitions - Concrete Beam Reinforcing

Name	Longitudinal Bar Material	Tie Bar Material	Top Cover mm	Bottom Cover mm	Top I-End Area cm2	Top J-End Area cm2	Bottom I-End Area cm2	Bottom J-End Area cm2
V. 30x30 (21)	ASTM 706M-Gr60	ASTM 706M-Gr60	40	40	0	0	0	0
V. 35x30 (21)	ASTM 706M-Gr60	ASTM 706M-Gr60	40	40	0	0	0	0
VT 20x30 (21)	ASTM 706M-Gr60	ASTM 706M-Gr60	40	40	0	0	0	0

Table 1.8 - Frame Section Property Definitions - Concrete Column Reinforcing (Part 1 of 2)

Name	Longitudinal Bar Material	Tie Bar Material	Reinforcement Configuration	Is Spiral Ties?	Is Designed?	Clear Cover to Ties mm	Number Bars 3-Dir	Number Bars 2-Dir
C. 30x30 (21)	ASTM 706M-Gr60	ASTM 706M-Gr60	Rectangular		No	40	3	3

Table 1.8 - Frame Section Property Definitions - Concrete Column Reinforcing (Part 2 of 2)

Name	Number Longitudinal Bars	Longitudinal Bar Size	Corner Bar Size	Tie Bar Size	Tie Bar Spacing mm	Number Ties 3-Dir	Number Ties 2-Dir
C. 30x30 (21)		#4	#5	#3	70	3	3

1.3 Shell Sections

Table 1.9 - Area Section Property Definitions - Summary

Name	Type	Element Type	Material	Total Thickness mm	Deck Material	Deck Depth mm
Cubierta	Slab	Membrane	3000PSI	13.9		

Table 1.10 - Slab Property Definitions (Part 1 of 3)

Name	Modeling Type	Property Type	Material	Overall Depth mm	Slab Thickness mm	Rib Width at Top mm	Rib Width at Bottom mm	Rib Spacing 1 mm	Rib Spacing 2 mm	One Way Load Distribution?
Cubierta	Membrane	Slab	3000PSI		13.9					Yes

Table 1.10 - Slab Property Definitions (Part 2 of 3)

Name	Notional Size Type	Notional Auto Factor	Notional User Size mm	f11 Modifier	f22 Modifier	f12 Modifier	m11 Modifier	m22 Modifier	m12 Modifier	v13 Modifier
Cubierta	Auto	1		1	1	1	1	1	1	1

Table 1.10 - Slab Property Definitions (Part 3 of 3)

Name	Mass Modifier	Weight Modifier	Color	Notes
Cubierta	1	1	Orange	

MÓDULOS DE ELASTICIDAD DEL CONCRETO

- Concreto 3000PSI (21MPa)

The image shows two overlapping software dialog boxes. The left box, titled 'Material Property Data', contains several sections: 'General Data' with fields for Material Name (3000PSI), Material Type (Concrete), Directional Symmetry Type (Isotropic), Material Display Color (a green swatch), and Material Notes; 'Material Weight and Mass' with radio buttons for 'Specify Weight Density' and 'Specify Mass Density', and input fields for Weight per Unit Volume (23.536 kN/m³) and Mass per Unit Volume (2400 kg/m³); 'Mechanical Property Data' with input fields for Modulus of Elasticity, E (21538.11 MPa), Poisson's Ratio, U (0.2), Coefficient of Thermal Expansion, A (0.0000099 1/C), and Shear Modulus, G (8974.21 MPa); 'Design Property Data' with a button 'Modify/Show Material Property Design Data...'; 'Advanced Material Property Data' with buttons for 'Nonlinear Material Data...', 'Material Damping Properties...', and 'Time Dependent Properties...'; and 'Modulus of Rupture for Cracked Deflections' with radio buttons for 'Program Default (Based on Concrete Slab Design Code)' and 'User Specified'. The right box, titled 'Material Property Design Data', contains 'Material Name and Type' with fields for Material Name (3000PSI), Material Type (Concrete, Isotropic), and Grade; and 'Design Properties for Concrete Materials' with a field for Specified Concrete Compressive Strength, f'c (21 MPa), a checkbox for 'Lightweight Concrete', and a field for Shear Strength Reduction Factor. Both boxes have 'OK' and 'Cancel' buttons at the bottom.

Material Property Data

General Data

Material Name: 3000PSI

Material Type: Concrete

Directional Symmetry Type: Isotropic

Material Display Color: Change...

Material Notes: Modify/Show Notes...

Material Weight and Mass

☒ Specify Weight Density ☐ Specify Mass Density

Weight per Unit Volume: 23.536 kN/m³

Mass per Unit Volume: 2400 kg/m³

Mechanical Property Data

Modulus of Elasticity, E: 21538.11 MPa

Poisson's Ratio, U: 0.2

Coefficient of Thermal Expansion, A: 0.0000099 1/C

Shear Modulus, G: 8974.21 MPa

Design Property Data

Modify/Show Material Property Design Data...

Advanced Material Property Data

Nonlinear Material Data... Material Damping Properties... Time Dependent Properties...

Modulus of Rupture for Cracked Deflections

☒ Program Default (Based on Concrete Slab Design Code) ☐ User Specified

OK Cancel

Material Property Design Data

Material Name and Type

Material Name: 3000PSI

Material Type: Concrete, Isotropic

Grade:

Design Properties for Concrete Materials

Specified Concrete Compressive Strength, f'c: 21 MPa

☐ Lightweight Concrete

Shear Strength Reduction Factor:

OK Cancel

DISEÑO DE MUROS NO ESTRUCTURALES EN MAMPOSTERÍA REFORZADA

Grupo de uso	II
Coefficiente I	1.10
Grado de desempeño	Bueno
Tipo de muro=	Altura parcial
ap=	2.50
Tipo de acople	No dúctiles
Rp=	1.50
Aa=	0.25
Fa=	1.45
Sa=	0.99688
As=	0.39875
hn=	3.30 m
heq=	2.48 m
Material muro=	Mampostería arcilla
Densidad muro=	18.00 kN/m³

$$2.5 A_a F_a I$$

$$A_a F_a I$$

$$F_p = \frac{a_x a_p}{R_p} g M_p \geq \frac{A_a I}{2} g M_p$$

$$a_x = A_s + \frac{(S_s - A_s) h_x}{h_{eq}} \quad h_x \leq h_{eq}$$

$$a_x = S_s \frac{h_x}{h_{eq}} \quad h_x \geq h_{eq}$$

Cálculo de fuerzas sísmicas de diseño						
Piso	hx (m)	ax	h muro (m)	t muro (m)	Mp (kN/m)	Fp (kN/m)
N+3.30	3.30	1.329	1.20	0.12	2.59	5.742

Cálculo de reacciones			Fuerzas de diseño			
Piso	Ri (kN/m)	Mi (kN.m/m)	A aferente (m)	Vu (kN)	Mu (kN.m)	
N+3.30	5.742	6.890	0.90	5.17	6.20	$\phi V_n = 0.17 \phi \sqrt{f'_c} b d$ $\phi M_n = \phi A_s f_y d [1 - 0.59 \frac{f_y \rho}{f'_c}]$

Diseño de muro							
Piso	Vu (kN)	f'm (MPa)	B (m)	h (m)	d' (m)	Φ	ΦV_c (kN)
N+3.30	5.17	21	0.12	0.20	0.02	0.75	12.62

Piso	Mu (kN.m)	As (cm²)	ρ	Φ	ΦM_n (kN.m)	d/c
N+3.30	6.20	1.29	0.0060	0.90	8.16	0.76

Jaime Idárraga M

DISEÑADOR DE ELEMENTOS
NO ESTRUCTURALES
ING. JAIME IDÁRRAGA MARÍN
MP. 25394 CLD

Sergio González Palacio

RESPONSABLE DE LA
CONSTRUCCIÓN
ING. SERGIO GONZÁLEZ PALACIO
MP. 051037-0649726

DISEÑO DE MUROS NO ESTRUCTURALES EN MAMPOSTERÍA REFORZADA

Grupo de uso	II
Coefficiente I	1.10
Grado de desempeño	Bueno
Tipo de muro=	Altura total
ap=	1.00
Tipo de aclaje	No dúctiles
Rp=	1.50
Aa=	0.25
Fa=	1.45
Sa=	0.99688
As=	0.39875
hn=	3.30 m
heq=	2.48 m
Material muro=	Mampostería arcilla
Densidad muro=	18.00 kN/m³

$$2.5 A_a F_a I$$

$$A_a F_a I$$

$$F_p = \frac{a_x a_p}{R_p} g M_p \geq \frac{A_a I}{2} g M_p$$

$$a_x = A_s + \frac{(S_s - A_s) h_x}{h_{eq}} \quad h_x \leq h_{eq}$$

$$a_x = S_s \frac{h_x}{h_{eq}} \quad h_x \geq h_{eq}$$

Cálculo de fuerzas sísmicas de diseño						
Piso	hx (m)	ax	h muro (m)	t muro (m)	Mp (kN/m)	Fp (kN/m)
N+0.00	0.00	0.399	3.00	0.12	6.48	1.723

Cálculo de reacciones			Fuerzas de diseño		
Piso	Ri (kN/m)	Mi (kN.m/m)	A aferente (m)	Vu (kN)	Mu (kN.m)
N+0.00	0.861	1.292	1.50	1.29	1.94

$$\phi V_n = 0.17 \phi_s \sqrt{f'_c} b d$$

$$\phi M_n = \phi A_s f_y d [1 - 0.59 \frac{f_y \rho}{f'_c}]$$

Diseño de muro								
Piso	Vu (kN)	f'm (MPa)	B (m)	h (m)	d' (m)	Φ	ΦVc (kN)	d/c
N+0.00	1.29	8	0.10	0.10	0.02	0.75	2.88	0.448

Piso	Mu (kN.m)	As (cm²)	ρ	Φ	ΦMn (kN.m)	d/c
N+0.00	1.94	1.29	0.0161	0.90	1.95	0.99

Jaime Idarraga M

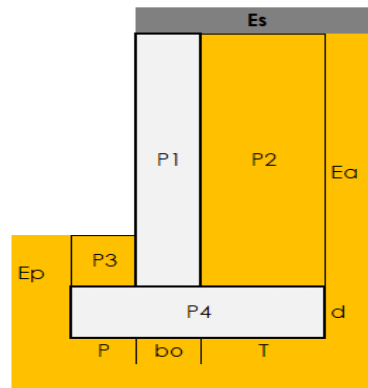
DISEÑADOR DE ELEMENTOS
NO ESTRUCTURALES
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MP. 25394 CLD



RESPONSABLE DE LA
CONSTRUCCIÓN
ING. SERGIO GONZÁLEZ PALACIO
MP. 051037-0649726

DISEÑO MURO DE CONTENCIÓN EN CONCRETO REFORZADO H=3.00m

Propiedades		
H	4.50	m
f _y	4200	kgf/cm ²
f' _c	280	kgf/cm ²
γ _{suelo}	1.70	Ton/m ³
γ _{concreto}	2.40	Ton/m ³
Ø	25	°
K _a	0.406	0.406
K _p	2.464	
Desplante	1.50	m
μ	0.34	0.34
c'	0.35	Ton/m ²
q _a	10	Ton/m ²
q _s	1.0	Ton/m ²



P1: Peso de vástago
P2: Suelo sobre talón
P3: Suelo sobre pie
P4: Peso de zapata
Es= Empuje sobrecarga q_s*K_a
Ea= Empuje activo de suelo
Ep= Empuje pasivo de suelo

Predimensionamiento		
Corona muro (bo)	0.25	m
Ancho fundacion (B)	2.25	m
Pie (p)	0.75	m
Talón (t)	1.25	m
Espesor (d)	0.45	m

Dimensiones muro		
Corona muro (b1)	0.30	m
Base muro (bo)	0.57	m
Ancho fundacion (B)	3.27	m
Pie (p)	2.70	m
Talón (t)	0.00	m
Espesor (d)	0.50	m
b _{omin}	0.14	m

Diseño de vástago		
b	57	cm
bo	57	cm
d'	49.5	cm
Mu	13.08	ton.m
As	7.150	cm ²
ρ	0.0025	0.0033
As	9.31	cm ²
# barra	4	c. 0.14m
# barra	4	c. 0.27m
# barra	3	c. 0.14m

Diseño de apoyo		
Pie		
b	100	cm
d	50	cm
d'	42.5	cm
Vu	2.64	ton
Mu	20.08	ton.m
ΦVc	28.269	ton
As	12.842	cm ²
ρ	0.003022	0.0033
As	14.03	cm ²
# barra	6	c. 0.20m

Talón		
b	100	cm
d	50	cm
d'	42.5	cm
Vu	1.29	ton
Mu	0.00	ton.m
ΦVc	28.269	ton
As	0.000	cm ²
ρ	0.000000	0.0033
As	14.03	cm ²
# barra	5	c. 0.14m

Estado de fuerzas en el muro servicio					
Fuerza (ton)			X	Mv	Mh
F	V	H	m	(Ton.m)	(Ton.m)
P1	4.70		2.99	14.02	
P2	0.92		3.27	3.00	
P3	4.59		1.35	6.20	
P4	3.92		1.64	6.42	
Es		0.41	2.25		0.91
Ea		6.99	1.50		10.48
Ep		-2.09	1.00		-2.09
Σ	14.13	5.30		29.64	9.30

Estado de fuerzas en el muro para diseño					
Fuerza (ton)			X	Mv	Mh
F	V	H	m	(Ton.m)	(Ton.m)
P1	6.58		2.99	19.63	
P2	1.29		3.27	4.20	
P3	6.43		1.35	8.68	
P4	5.49		1.64	8.98	
Es		0.65	2.25		1.462
Ea		11.18	1.50		16.772
Ep		-2.51	1.00		-2.513
Σ	19.78	9.32		41.49	15.72

Vu (ton)	7.394	b0 (m)	0.57
σu (ton/m ²)	10.00	b2 (m)	0.30
X (m)	1.29	H dent (m)	0.50
e (m)	0.34	Ep dent (ton)	2.09
B/4	0.82	Cumple	

Factores de seguridad (Pseudo-estático)			
Volcamiento FS>2.00	FS	2.60	OK
Deslizamiento FS>1.05	FS	1.16	OK

Excentricidad FS>1/4	FS	0.11	OK
----------------------	----	------	----

Análisis de presiones en suelo		
σ1	7.05	ton/m ² Cumple
σ2	1.59	ton/m ² Cumple

$$As = \frac{0.85 * f'c * b * d}{fy} \left[1 - \sqrt{1 - \frac{2Mu}{0.85 * \phi * f'c * b * d^2}} \right]$$

Tabla H.6.9-1
Factores de seguridad indirectos mínimos

Condición	Construcción	Estático	Sismo	Seudo estático
Deslizamiento	1.60	1.60	Diseño	1.05
Volcamiento: el que resulte más crítico de Momento Resistente/ Momento Actante Excentricidad en el sentido del momento (e/B)	≥ 3.00 ≤ 1/6	≥ 3.00 ≤ 1/6	Diseño Diseño	≥ 2.00 ≤ 1/4
Capacidad portante	Iguales a los de la Tabla H.4.1			
Estabilidad Intrinseca materiales térreos (reforzados o no)	Iguales a los de la Tabla H.2.1			
Estabilidad Intrinseca materiales manufacturados	Según material (Concreto-Título C; Madera-Título G; etc.)			
Estabilidad general del sistema:				
Permanente o de Larga duración (> 6 meses)	1.20	1.50	Diseño	1.05
Temporal o de Corta duración (< 6 meses)	1.20	1.30	50% de Diseño	1.00
Laderas adyacentes (Zona de influencia > 2.5H)	1.20	1.50	Diseño	1.05

DISEÑO MURO DE CONTENCIÓN EN CONCRETO REFORZADO H=5.00m

Propiedades		
H	6.50	m
f _y	4200	kgf/cm ²
f' _c	280	kgf/cm ²
γ _{suelo}	1.70	Ton/m ³
γ _{concreto}	2.40	Ton/m ³
Ø	25	°
K _a	0.406	0.406
K _p	2.464	
Desplante	1.50	m
μ	0.34	0.34
c'	0.35	Ton/m ²
q _a	10	Ton/m ²
q _s	4.0	Ton/m ²

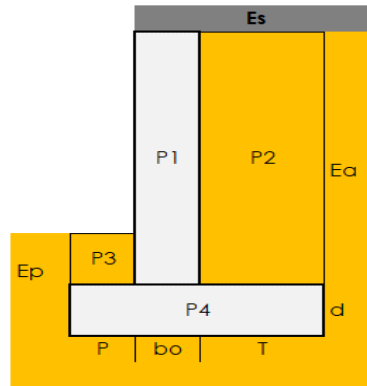
Predimensionamiento		
Corona muro (b _o)	0.25	m
Ancho fundacion (B)	3.25	m
Pie (p)	1.08	m
Talon (t)	1.92	m
Espesor (d)	0.65	m

Dimensiones muro		
Corona muro (b ₁)	0.30	m
Base muro (b _o)	0.70	m
Ancho fundacion (B)	4.50	m
Pie (p)	3.80	m
Talon (t)	0.00	m
Espesor (d)	0.50	m
b _{omin}	0.15	m

Diseño de vástago		
b	70	cm
b _o	70	cm
d'	62.5	cm
Mu	47.55	ton.m
As	21.018	cm ²
ρ	0.0048	0.0033
As	21.02	cm ²
# barra	5	c. 0.10m
# barra	5	c. 0.20m
# barra	4	c. 0.20m

Diseño de apoyo		
Pie		
b	100	cm
d	50	cm
d'	42.5	cm
Vu	8.43	ton
Mu	52.59	ton.m
ΦVc	28.269	ton
As	35.323	cm ²
ρ	0.008311	0.0033
As	35.32	cm ²
# barra	6	c. 0.08m

Talón		
b	100	cm
d	50	cm
d'	42.5	cm
Vu	2.86	ton
Mu	0.00	ton.m
ΦVc	28.269	ton
As	0.000	cm ²
ρ	0.000000	0.0033
As	14.03	cm ²
# barra	5	c. 0.14m



P1: Peso de vástago
P2: Suelo sobre talón
P3: Suelo sobre pie
P4: Peso de zapata
Es= Empuje sobrecarga q_s*K_a
Ea= Empuje activo de suelo
Ep= Empuje pasivo de suelo

Estado de fuerzas en el muro servicio					
Fuerza (ton)			X	Mv	Mh
F	V	H	m	(Ton.m)	(Ton.m)
P1	10.08		4.15	41.83	
P2	2.04		4.50	9.18	
P3	6.46		1.90	12.27	
P4	5.40		2.25	12.15	
Es		1.62	3.25		5.28
Ea		14.58	2.17		31.59
Ep		-13.09	1.00		-13.09
Σ	23.98	3.11		75.44	23.78

Estado de fuerzas en el muro para diseño					
Fuerza (ton)			X	Mv	Mh
F	V	H	m	(Ton.m)	(Ton.m)
P1	14.11		4.15	58.56	
P2	2.86		4.50	12.85	
P3	9.04		1.90	17.18	
P4	7.56		2.25	17.01	
Es		2.60	3.25		8.445
Ea		23.33	2.17		50.546
Ep		-15.71	1.00		-15.707
Σ	33.57	10.22		105.61	43.28

Vu (ton)	16.204	b ₀ (m)	0.70
σ _u (ton/m ²)	10.00	b ₂ (m)	0.50
X (m)	1.61	H dent (m)	2.00
e (m)	0.64	Ep dent (ton)	13.09
B/4	1.13	Cumple	

Factores de seguridad (Pseudo-estático)			
Volcamiento FS>2.00	FS	2.05	OK
Deslizamiento FS>1.05	FS	3.01	OK

Excentricidad FS>1/4	FS	0.14	OK
----------------------	----	------	----

Análisis de presiones en suelo		
σ ₁	9.89	ton/m ² Cumple
σ ₂	0.77	ton/m ² Cumple

$$As = \frac{0.85 * f'c * b * d}{fy} \left[1 - \sqrt{1 - \frac{2Mu}{0.85 * \phi * f'c * b * d^2}} \right]$$

Tabla H.6.9-1
Factores de seguridad indirectos mínimos

Condición	Construcción	Estático	Sismo	Seudo estático
Deslizamiento	1.60	1.60	Diseño	1.05
Volcamiento: el que resulte más crítico de Momento Resistente/ Momento Actuante	≥ 3.00	≥ 3.00	Diseño	≥ 2.00
Excentricidad en el sentido del momento (e/B)	≤ 1/6	≤ 1/6	Diseño	≤ 1/4
Capacidad portante	Iguales a los de la Tabla H.4.1			
Estabilidad Intrínseca materiales térreos (reforzados o no)	Iguales a los de la Tabla H.2.1			
Estabilidad Intrínseca materiales manufacturados	Según material (Concreto-Título C; Madera-Título G; etc.)			
Estabilidad general del sistema:				
Permanente o de Larga duración (> 6 meses)	1.20	1.50	Diseño	1.05
Temporal o de Corta duración (< 6 meses)	1.20	1.30	50% de Diseño	1.00
Laderas adyacentes (Zona de influencia > 2.5H)	1.20	1.50	Diseño	1.05

EVALUACIÓN DE RESISTENCIA CONTRA EL FUEGO

Grupo de ocupación	I	Institucional
Subgrupo de ocupación	I-3	
Numero de pisos	1	Área aproximada de ocupación
Área	160 m ²	
Categorización	II	

Tabla J.3.3-1
Categorización de las edificaciones para efectos de resistencia contra el fuego de acuerdo con su uso, área construida, y número de pisos.

Grupos y subgrupos de ocupación	Área total construida, A_T m ²	Número de pisos						
		1	2	3	4	5	6	≥ 7
(C-1)	$A_T > 1500$	III	III	II	II	II	I	I
	$A_T < 1500$	III	III	III	II	II	II	I
(C-2)	$A_T > 500$	II	I	I	I	I	I	I
	$A_T < 500$			I	I	I	I	I
(E)	Sin límite	III	III	III	II	II	II	I
(I-2), (I-4)	$A_T > 1000$	III	II	II	I	I	I	I
	$500 < A_T < 1000$	III	III	II	II	I	I	I
	$A_T < 500$	III	III	III	II	II	II	I
(I-3)	$A_T > 1000$	II	II	I	I	I	I	I
	$A_T < 1000$		III	II	II	I	I	I
(L-1), (L-2), (L-3), (L-4)	$A_T > 1000$	II	I	I	I	I	I	I
(L-5), (I-1), (I-5)	$500 < A_T < 1000$	II	II	I	I	I	I	I
	$A_T < 500$	III	III	II	II	I	I	I
(R-1), (R-2)	Unidades > 140 m ²				II	I	I	I
	Unidades ≤ 140 m ²				III	II	II	I
(R-3)	$A_T > 5000$	III	II	I	I	I	I	I
	$A_T < 5000$	III	II	II	II	I	I	I

Notas: (1). En edificios para vivienda, el límite de 140 m² por unidad corresponde al promedio aritmético de las áreas de todas las unidades, sin tener en cuenta las zonas comunes.

Tabla J.3.4-3
Resistencia requerida al fuego normalizado NTC 1480 (ISO 834), en horas, de elementos de una edificación de todos los grupos de ocupación excepto R-1 y R-2. (Véase Nota 1)

Elementos de la construcción	Categoría según la clasificación dada en J.3.3.1		
	I	II	III
Muros Cortafuego	3	2	1
Muros de cerramiento de escaleras, ascensores, buitrones, ductos para basuras y corredores de evacuación protegidos	2	2	1
Muros divisorios entre unidades	1	1	1
Muros interiores no portantes	½	¼	-
Elementos estructurales de los materiales cubiertos por los Títulos C a G del Reglamento NSR-10	2	1	1
Cubiertas	1	1	½
Escaleras interiores no encerradas con muros	2	1	1

Nota 1. En la sección J.3.3.3 se indican los grupos de ocupación que están exentos de cuantificación de resistencia contra el fuego y para los cuales no hay necesidad de aplicar la presente tabla.

Se toman requerimientos de categoría II

Se indican en la siguiente tabla los requisitos mas críticos según el tipo de estructura y su categorización.

Elemento	Resistencia horas	Dimensión min mm	Dimensión usada mm	Chequeo
Muros cortafuego				
Muros cortafuego	2	65	100	Cumple

Muros de cerramiento de escaleras, ascensores, buitrones, ductos para basuras y corredores de evacuación protegidos				
Muro de contención	2	100	250	Cumple
Cerramiento escaleras	2	65	100	Cumple
Muros divisorios entre unidades				
Muros de mampostería	1	45	100	Cumple
Muros livianos	-	-	-	No aplica
Muros interiores no portantes				
Muros de mampostería	0.25	60	71.4	Cumple
Muros livianos	-	-	-	No aplica
Elementos estructurales de los materiales cubiertos por los tptitulos C a G del Reglamento NSR-10				
Columnas DES	1	200	300	Cumple
Muros estructurales	1	100	200	Cumple
Losas macizas	1	80	120	Cumple
Viguetas	1	80	100	Cumple
Vigas DES	1	120	250	Cumple
Elementos metálicos	1	-	-	Cumple
Cubiertas				
Elementos de cubierta	1	-	-	Cumple
Escaleras interiores no encerradas con muros				
Escaleras metálicas	-	-	-	Cumple

Para elementos tipo PHR-C se debe aplicar recubrimiento intumescente tipo Nullifire SC802 de toxement o similar, que proporcione una resistencia al fuego de 60 minutos.

Para elementos tipo PTE se debe aplicar recubrimiento intumescente tipo Nullifire S605 de toxement o similar, que proporcione una resistencia al fuego de 60 minutos.

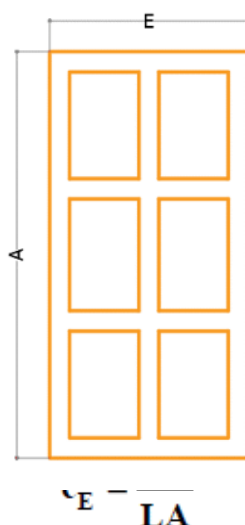
Mampostería muros divisorios y no portantes

L (mm)	300
A (mm)	200
E (mm)	100

V _E (mm ³)	6000000
t _{tabiques} (mm)	12
h _{vacío} (mm)	50.7
a _{vacío} (mm)	32
V _v (mm ³)	2918400
V (mm ³)	3081600

e _{revoque} (mm)	20
---------------------------	----

e _E (mm)	71.4
---------------------	------



Resistencia mínima 1/2 hora muros entre unidades
Resistencia mínima 1 hora muros divisorios entre unidades

Tabla J.3.5-1. Espesor mínimo equivalente, e_E de muros de mampostería de arcilla en mm, en función de la resistencia al fuego en horas.

Tipo de Unidad	Resistencia al fuego en horas		
	1	2	3
Maciza	60	90	110
De perforación vertical	50	80	100
De perforación horizontal	45	65	90

Ademas se cumple implícitamente con la resistencia al fuego según la **Nota-2** en **J.3.5.3.**

Señores

CURADURÍA URBANA 2 DE MANIZALES

Asunto: RESPUESTA A OBSERVACIONES ESTRUCTURALES PROYECTO CISCO LAS AMERICAS

No. De radicación: 17001-2-25-02930

Cordial saludo,

Teniendo en cuenta las observaciones se da respuesta a los numerales referentes a la revisión técnico-estructural:

18. Las memorias de cálculo deben de estar firmadas por el profesional responsable de los diseños.

R/. Se entregan memorias firmadas.

19. De acuerdo con los lineamientos para la identificación del predio, se debe indicar la dirección exacta en el informe (K 16 16 60). Revisar e incluir.

R/. Se ajusta dirección.

20. Actualizar la fecha de presentación del informe.

R/. Se ajusta fecha.

21. Coordinar con arquitectura la altura total de la edificación (Pág. 3), no hay coincidencia.

R/. Se toma una altura de 3.30 m.

22. Las cargas vivas y usos mencionados en el punto 2 de la página 3 no corresponden al proyecto, revisar y ajustar.

R/. Se realiza ajuste.

23. La estructura o presenta irregularidad en altura, corregir información de la página 4.

R/. Se realiza ajuste.

24. Corregir el valor del periodo T_2 en la página 20.

R/. Se realiza ajuste.

25. Los factores de ajuste presentados en la corrección de la página 23 implican trabajar por debajo del valor de la gravedad. Revisar y aclarar.

R/. Aunque dan valores inferiores a 1. El factor de corrección utilizado en el modelo es 1. Se realiza ajuste.

26. Ajustar texto superpuesto en las tablas de los reportes obtenidos del programa de modelamiento (Pág. 25-32, 35-53, 109).

R/. Se realiza ajuste.

27. De acuerdo con el reporte de diseño de nudos de la página 53 no se está cumpliendo con el criterio de columna fuerte – viga débil definido en C.21.6.2.2 NSR-10. Revisar y corregir, teniendo en cuenta que, al definir las columnas para diseñar, el análisis del nudo no se realiza con el acero realmente dispuesto para las columnas.

R/. De acuerdo con el título C.21.6.1, el alcance de estos requisitos de columna fuerte – viga débil no aplican si la carga axial es menor a $0.1 \cdot A_g \cdot f'_c$.

Para este caso $(0.10) \cdot (300\text{mm} \cdot 300\text{mm}) \cdot (21\text{MPa}) = 189 \text{ kN}$

Y la carga máxima mayorada que baja por las columnas es de 122 kN

Por lo cual, no es necesario realizar este chequeo.

28. Corregir la carga de diseño P_u para las vigas de cimentación (Pág. 97).

R/. Se realiza ajuste.

29. La carga muerta de cubierta considerada en los reportes de diseño de las correas metálicas (Pág. 98 y 103) no coinciden con el análisis de carga de la página 6. Revisar y ajustar.

R/. Se realiza ajuste.

30. Corregir luz de diseño en el reporte de diseño de correas de la página 103.

R/. Se realiza ajuste.

31. Verificar si es necesario actualizar los diseños de las correas metálicas según observaciones arquitectónicas en cubierta.

R/. Se realiza ajuste.

32. Incluir propiedades mecánicas de los materiales considerados en el modelo de la estructura (Pág. 109). Puede ser con una captura de pantalla de la definición en el programa

R/. A continuación, se presentan pantallazos.

E Material Property Data

General Data

Material Name: 3000PSI

Material Type: Concrete

Directional Symmetry Type: Isotropic

Material Display Color: Change...

Material Notes: Modify/Show Notes...

Material Weight and Mass

☒ Specify Weight Density ☐ Specify Mass Density

Weight per Unit Volume: 23.536 kN/m³

Mass per Unit Volume: 2400 kg/m³

Mechanical Property Data

Modulus of Elasticity, E: 21538.11 MPa

Poisson's Ratio, U: 0.2

Coefficient of Thermal Expansion, A: 0.000099 1/C

Shear Modulus, G: 8974.21 MPa

Design Property Data

Modify/Show Material Property Design Data...

Advanced Material Property Data

Nonlinear Material Data... Material Damping Properties... Time Dependent Properties...

Modulus of Rupture for Cracked Deflections

☒ Program Default (Based on Concrete Slab Design Code) ☐ User Specified

OK Cancel

E Material Property Design Data

Material Name and Type

Material Name: 3000PSI

Material Type: Concrete, Isotropic

Grade:

Design Properties for Concrete Materials

Specified Concrete Compressive Strength, f_c: 21 MPa

☐ Lightweight Concrete

Shear Strength Reduction Factor:

OK Cancel

E Material Property Data

General Data

Material Name: ASTM 706M-Gr60

Material Type: Rebar

Directional Symmetry Type: Uniaxial

Material Display Color: Change...

Material Notes: Modify/Show Notes...

Material Weight and Mass

☒ Specify Weight Density ☐ Specify Mass Density

Weight per Unit Volume: 76.9729 kN/m³

Mass per Unit Volume: 7849.047 kg/m³

Mechanical Property Data

Modulus of Elasticity, E: 199947.98 MPa

Coefficient of Thermal Expansion, A: 0.0000117 1/C

Design Property Data

Modify/Show Material Property Design Data...

Advanced Material Property Data

Nonlinear Material Data... Material Damping Properties... Time Dependent Properties...

OK Cancel

E Material Property Design Data

Material Name and Type

Material Name: ASTM 706M-Gr60

Material Type: Rebar, Uniaxial

Grade:

Design Properties for Rebar Materials

Minimum Yield Strength, F_y: 413.64 MPa

Minimum Tensile Strength, F_u: 620.53 MPa

Expected Yield Strength, F_{ye}: 455.05 MPa

Expected Tensile Strength, F_{ue}: 682.58 MPa

OK Cancel

33. Presentar diseño de muros no estructurales de altura total y altura parcial según A.9 NSR-10.

R/. Se añade diseño.

34. El constructor responsable debe de firmar los diseños de los elementos no estructurales, según la sección A.1.3.6.5 NSR-10. Incluir nombre, matrícula profesional, calidad como constructor y firma.

R/. Se solicita al constructor firmar los diseños.

35. Verificar parámetros del suelo utilizados para el diseño de estructuras de contención una vez se incluya información solicitada en el informe geotécnico (Pág. 111).

R/. Se realiza ajuste.

36. Corregir dimensiones del muro de contención en voladizo, no coincide con el proyecto arquitectónico.

R/. Se cambia muro de contención en voladizo por un muro anclado.

37. El muro de contención en voladizo no cumple los factores de seguridad mínimos establecidos en H.6.9 NSR-10. Indicar en el diseño los valores de los factores de seguridad que se deben cumplir para deslizamiento, vuelco, excentricidad.

R/. Se cambia muro de contención en voladizo por un muro anclado.

38. El muro de contención de la carrera 16 tiene alturas variables, presentar diseño según sus condiciones particulares.

R/. Se cambia muro de contención en voladizo por un muro anclado, para la zona que tiene alturas variables se realizó el chequeo con la altura más crítica (4.93 m).

39. Anexar cuantificación de la resistencia requerida contra el fuego una vez se aclare el grupo y subgrupo de ocupación de la estructura.

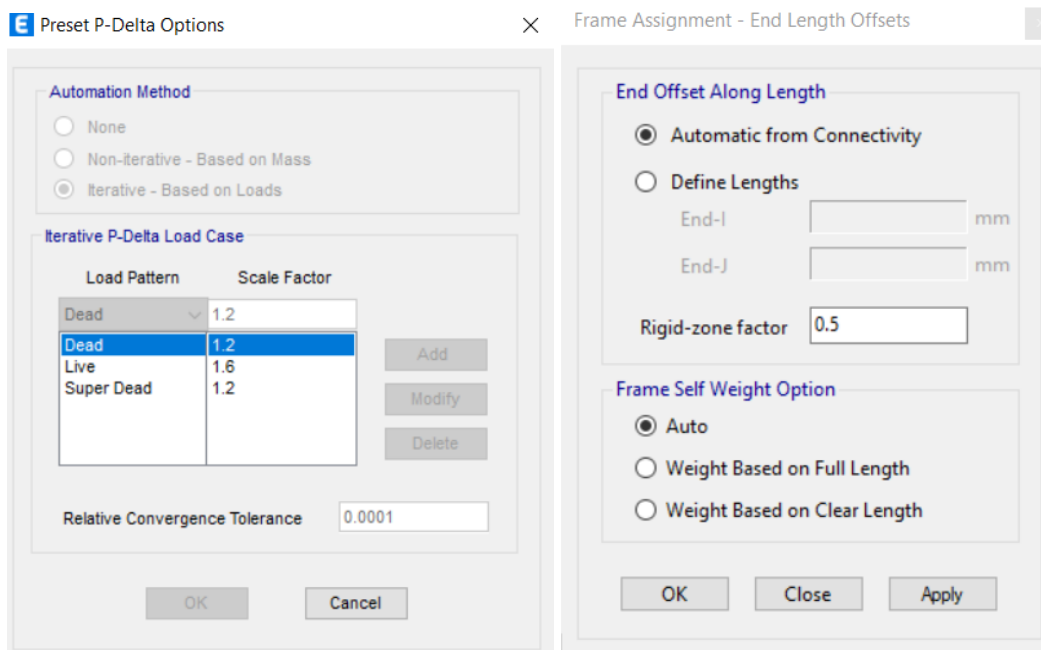
R/. Se añade chequeo de resistencia al fuego.

40. De acuerdo con lo establecido en la Sección A.3.6.13 (NSR-10), se deben considerar los efectos de las aceleraciones verticales en los voladizos, mediante la aplicación de una fuerza vertical, ascendente o descendente, en la punta del elemento, con un valor equivalente al 30% de la carga muerta del voladizo.

R/. Se consideran efectos, se actualiza evaluación de cargas.

41. El diseñador estructural debe incluir en su descripción las evaluaciones de esbeltez de los elementos utilizados en el programa de computador, explicando, bajo el cumplimiento del Reglamento NSR-10, los efectos de primer orden, de segundo orden y las rigideces que asignó a los miembros estructurales. Las rigideces empleadas deben ser las mismas durante la evaluación de derivas como en la obtención de las fuerzas internas de diseño.

R/. Se presentan pantallazos en los que se muestran los efectos de segundo orden tomado y las rigideces.



PLANOS ESTRUCTURALES

42. De acuerdo con los lineamientos para la identificación del predio, se debe indicar la dirección exacta en el informe (K 16 16 60). Revisar y corregir.

R/. Se realiza ajuste.

43. La totalidad de planos estructurales deben de estar firmados por el profesional responsable de los diseños.

R/. Se firman planos.

44. El constructor responsable debe de firmar los planos con los detalles de los elementos no estructurales, según la sección A.1.3.6.5 NSR-10. Incluir campo con nombre, matrícula profesional, calidad como constructor y firma en el plano.

R/. Se solicita firma del constructor responsable.

45. El ingeniero geotecnista debe de firmar los planos de diseño y construcción que guarden relación con el estudio geotécnico, según la sección H.1.1.2.1 NSR-10. Incluir campo con nombre, matrícula profesional, calidad como geotecnista y firma en el plano.

R/. Se solicita firma.

46. Actualizar la fecha de presentación en el rotulo de los planos.

R/. Se realiza ajuste.

47. Revisar configuraciones de ploteo para la generación de los planos en pdf, las columnas en plantas y detalle están en una capa que no se imprime.

R/. Se realiza ajuste.

48. Presentar una planta general con la ubicación de los muros de contención y las escaleras exteriores sobre terreno.

R/. Se añade planta general.

49. Para la viga sobre el eje F N+3.00 se contempla un cambio de sección, lo cual no está correctamente representado en la planta estructural del plano 1/3.

R/. Se realiza ajuste.

50. En el detalle de zapatas del plano 1/3 debe quedar representada la sustitución de suelo definida en el informe geotécnico

R/. Se realiza ajuste.

51. Corregir el tipo de perfil de suelo en el cuadro "Análisis sísmico" del plano 1/3.

R/. Se realiza ajuste.

52. Ajustar las cargas muertas de cubierta en el cuadro del plano 1/3, no coincide con memorias de cálculo (Pág. 6).

R/. Se realiza ajuste.

53. En las notas del plano 1/3 incluir resistencia f_y de las mallas electrosoldadas.

R/. Se realiza ajuste.

54. Corregir grado de desempeño de elementos no estructurales en notas del plano 1/3.

R/. Se realiza ajuste.

55. Presentar detalles con la sección transversal acotada de los dos tipos de correas metálicas consideradas.

R/. Se realiza ajuste.

56. Anexar detalles del arriostramiento de las correas metálicas.

R/. Se añade detalle.

57. Incluir detalle constructivo de las escaleras exteriores sobre terreno que se observan en planta y corte arquitectónico C-C' (Plano 5/7).

R/. Se añade detalle.

58. Corregir el nivel en los despieces de todas las vigas de cimentación.

R/. Se realiza ajuste.

59. Verificar nivel en los despieces de las vigas de cubierta una vez se coordine con arquitectura.

R/. Se realiza ajuste.

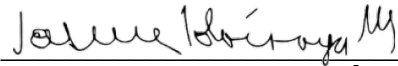
60. Ajustar despieces de vigas, según lo establecido en la Sección C.21.5.2.3 (NSR-10), en las vigas del sistema de resistencia sísmica solo se permiten empalmes por traslape de refuerzo de flexión cuando se proporcionan estribos cerrados de confinamiento en la longitud del empalme. Se incluye detalle, pero no está reflejado correctamente en los despieces.

R/. Se realiza ajuste para las vigas de resistencia sísmica.

61. El muro de contención de la carrera 16 tiene alturas variables, presentar una vista frontal mostrando sus cotas de implantación.
--

R/. Se revisa muro de contención y se realiza el ajuste correspondiente

Cordialmente,



JAIME IDARRAGA MARÍN

Ingeniero Civil

Especialista en Estructuras

Manizales, marzo de 2026

Señores

CURADURÍA DOS DE MANIZALES

Ab. María del Socorro Zuluaga Restrepo

Ing. Julián Gallego Giraldo

Asunto: RESPUESTA A OBSERVACIONES ESTRUCTURALES PROYECTO CISCO LAS AMÉRICAS

No. De radicación: 17001-2-25-0293

Cordial saludo,

Teniendo en cuenta el acta de observaciones se da respuesta a los numerales referentes a la revisión técnico-estructural:

MEMORIAS DE CÁLCULO

24. Corregir el valor del periodo T2 en la página 19.

R/. Se corrige el valor del periodo T2 en sección de análisis sísmico.

34. *El constructor responsable debe firmar los diseños de los elementos no estructurales, según la sección A.1.3.6.5 NSR-10.*

R/. Se solicita al ingeniero constructor adjuntar firma correspondiente.

35. *Verificar parámetros del suelo utilizados para el diseño de estructuras de contención una vez se incluya información solicitada en el informe geotécnico.*

R/. De acuerdo con el apartado de análisis de estabilidad del muro (pág. 24), se utilizan los criterios allí expuestos para chequear y diseñar el muro, teniendo en cuenta los valores de los factores de seguridad calculados por el geotecnista y los factores de presión de tierras allí expuestos.

A partir de la teoría de presión de tierras de Rankine y utilizando un ángulo de fricción 25° , se determinó que el coeficiente de presión activa del suelo es $K_a=0,406$, el coeficiente de presión pasiva del suelo es $K_p=2,464$. Así mismo, la metodología Jaky(1944) permite la asignación de un coeficiente de presión de tierras en reposo de $K_0=0,577$

Ilustración 1. Coeficientes de presión de tierras.

De acuerdo con lo allí mencionado, y dada la tipología de muro, donde se toma como hipótesis de diseño que el muro de contención se desplaza en la corona (o puede ceder) ya que no tiene ninguna restricción para su

movimiento, por lo tanto, se emplea el coeficiente de presión de tierras en estado activo según lo definido en H.6.4.

H.6.4 — PRESIÓN DE TIERRAS

La presión que las tierras ejercen sobre la estructura que las contiene mantiene una estrecha interacción entre una y otro. Depende, en términos generales del desplazamiento del conjunto, así: en el estado natural sin deformaciones laterales, se dice que la presión es la del reposo; si el muro cede, la presión disminuye hasta un mínimo que se identifica como el estado activo; si por el contrario, el muro se desplaza contra el frente de tierra, la presión sube hasta un máximo que se identifica como el estado pasivo. Si el desplazamiento del muro es vertical o implica un giro sobre la base, su distribución debe ser lineal o similar a la hidrostática; si el giro se efectúa alrededor del extremo superior del muro, la distribución debe adoptar una forma curvilínea. Los desplazamientos relativos se presentan en la figura H.6.4-1, y se cuantifican en la Tabla H.6.4-1.

Ilustración 2. Art. H..6.4 NSR-10.

37. *El muro de contención en voladizo no cumple con los factores de seguridad mínimos establecidos en H.6.9 NSR-10. Indicar en el diseño los valores de los factores de seguridad que se deben cumplir para deslizamiento, vuelco, excentricidad.*

R/. De acuerdo con el chequeo realizado por el geotecnista, se tiene en cuenta los factores de seguridad indirectos para la condición pseudoestática. Se complementan cálculos incluyendo explícitamente dichos valores.

PLANOS ESTRUCTURALES

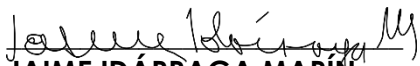
54. *Corregir el grado de desempeño de los elementos no estructurales en notas del plano 1/3.*

R/. Se revisa nota respectiva y se hace corrección.

61. *El muro de contención de la carrera 16 tiene alturas variables, presentar una vista frontal mostrando sus cotas de implantación.*

R/. Se adjunta vista frontal del muro y se revisan refuerzos.

Cordialmente,



JAIME IDÁRRAGA MARÍN

Ingeniero Civil, Esp. en Estructuras