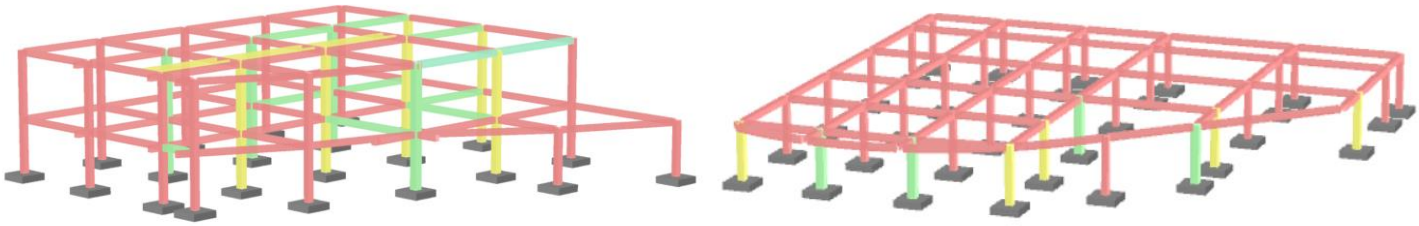
INFORME REVISION ESTRUCTURAL

HOSPITAL DE ENGATIVA EDIFICIOS NUEVOS.

Tv. 100a # 80a-50



Enero de 2020

Ing Mauricio Bustamante

Matrícula no. 17202-094951 CLD

1. INTRODUCCIÓN.

Se presenta el informe de revisión estructural del proyecto “HOSPITAL DE ENGATIVA EDIFICIOS NUEVOS,”, el cual contempla el diseño de dos edificios nuevos los cuales se denominan EDIFICIO 1 Y EDIFICIO 2, el proyecto se encuentra ubicado la Tv 100a # 80a-50, de la ciudad de Bogotá.

Mediante el presente oficio se determinará el cumplimiento de los requisitos de diseño contenidos en la norma sismo resistente NSR-10.

Para la revisión del diseño estructural de este proyecto se realizó por parte nuestra la modelación estructural con la ayuda del software RCB Engsolutions. La modelación estructural se realizó con los parámetros sísmicos y demás características presentadas en las memorias de cálculo por el ingeniero diseñador. Posteriormente se procedió a comparar los resultados obtenidos tanto del análisis de las estructuras como del diseño de los elementos.

A continuación, se describe los parámetros sísmicos y demás características utilizados por el ingeniero Estructural en el reforzamiento del proyecto. La información que se muestra a continuación fue tomada de los siguientes documentos presentados por el Ingeniero Diseñador vía correo electrónico:

- MEMORIAS DE CALCULO Y DISEÑO ESTRUCTURAL USS CALLE 80.
- ENGATIVA-ESTRUCTURAL-01.
- ENGATIVA-ESTRUCTURAL-02.
- ENGATIVA-ESTRUCTURAL-03
- ENGATIVA-ESTRUCTURAL-04.
- ENGATIVA-ESTRUCTURAL-05.
- ENGATIVA-ESTRUCTURAL-06.
- ENGATIVA-ESTRUCTURAL-07.
- ENGATIVA-ESTRUCTURAL-08.
- ENGATIVA-ESTRUCTURAL-09.
- ENGATIVA-ESTRUCTURAL-10.

2. INFORMACIÓN RECIBIDA PARA REVISIÓN ESTRUCTURAL.

- Sistema estructural combinado de muros de concreto DMO-Pórticos de concreto DMO, con un Ro=5.00 y un coeficiente de sobre resistencia Ω= 3.0
- Bogotá D.C, Zona de riesgo sísmico INTERMEDIO
- Aa = 0.15
- Av = 0.20
- Fa = 0.95

- Fv = 2.70
- Periodo largo TL = 5.00
- Coeficiente de Importancia I=1.50 (grupo de uso IV)
- Perfil del Suelo: Microzonificación sísmica de Bogotá: Lacustre – 500.
- Edificio 1.
  - Irregularidad en altura Øa=1.0
  - Irregularidad en planta Øp=0.80
  - Ausencia de redundancia Ørx=1.00
  - Ausencia de redundancia Øry=1.00
- Edificio 2.
  - Irregularidad en altura Øa=1.0
  - Irregularidad en planta Øp=0.90
  - Ausencia de redundancia Ørx=1.00
  - Ausencia de redundancia Øry=1.00

- Cimentación conformada por pilotes que asumen el 100% de la carga con cabezales unidos por vigas de amarre.
- Para la construcción de la cimentación, se utilizó concreto de 28MPa, para columnas y muros de 28Mpa.
- Resistencia del acero de refuerzo para barras corrugadas fy=420 MPa (60000 psi).
- Método de análisis: Análisis dinámico modal espectral.
- Método de diseño empleado: Estados límites de resistencia.
- Carga viva corredores y cuartos: 250 Kg/m2.
- Carga viva cuartos de cirugía: 400 Kg/m2
- Carga muerta sobreimpuesta:
  - Piso tipo: 531 Kg/m2.
  - Cubierta: 531Kg/m2.

3. VERIFICACIÓN DE ANÁLISIS Y DISEÑO.

3.1. Avaluó de cargas.

El avaluó de cargas realizado en las memorias de cálculo para la construcción del proyecto es adecuado y cumple con los requerimientos de la norma sismo resistente NSR-10.
La carga viva es adecuada y cumple con los requisitos del capítulo B.4 de la norma sismo resistente NSR-10.

3.2. Definición de parámetro de diseño sísmico.

- El coeficiente de importancia de I=1.50 es adecuado.
- El perfil de suelo Lacustre 500 coincide con el perfil dado en el estudio de suelos.
- El sistema estructural de Sistema combinado de muros de concreto DMO-Pórticos de concreto DMO es adecuado para esta estructura.
- Los parámetros sísmicos empleados para el diseño de la edificación cumplen con las especificaciones dadas en el estudio de suelos y con los requerimientos de la norma sismo resistente NSR-10.

3.3. Procedimiento de análisis estructural empleado.

El análisis de la estructura se realizó mediante análisis dinámico según NSR-10, se verifica contra el 80% de la fuerza horizontal equivalente si la estructura es regular y contra el 90% de la fuerza horizontal equivalente si la estructura es irregular.

3.4. Verificación de derivas y deflexiones verticales de la estructura.

Las derivas máximas de cada piso tanto en el centro de masa como en los puntos extremos del diafragma cumplen con los requisitos del Capitulo A.6 de la norma sismo resistente NSR-10. Esto se corroboro en las memorias de cálculo presentadas por el diseñador y en el modelo estructural realizado por nosotros.

3.5. Procedimientos de diseño de .los miembros estructurales.

Las combinaciones de carga utilizadas para el diseño de elementos estructurales cumplen con los requisitos del capítulo B.2-COBINACIONES DE CARGA de la norma sismo resistente NSR-10.

Se revisaron los resultados de diseño de los elementos estructurales teniendo en cuenta los resultados presentados por el ingeniero diseñador en las memorias de cálculo, el refuerzo propuesto en planos y los resultados obtenidos en nuestro análisis y se concluye que se cumple con lo requerido. El diseño de elementos estructurales cumple con los requisitos dados en la norma sismo resistente NSR-10.

3.6. Procedimiento de diseño de la resistencia al fuego de los elementos estructurales.

Se cumple con los requisitos de protección y diseño contra incendios de elementos estructurales del título J de la norma sismo resistente NSR-10.

3.7. Revisión de los planos estructurales.

Los planos contienen las especificaciones de materiales de construcción, tamaño y localización de elementos estructurales, notas de cargas de diseño tanto vivas como muertas, nota de capacidad de disipación de energía, grupo de uso, notas de parámetros de diseño, notas de recomendaciones constructivas y recomendaciones de estudio de suelos.

Los planos estructurales cumplen con los requisitos del título A de la norma sismo resistente NSR-10 y con las especificaciones dadas en el estudio de suelos.

3.8. Contenido de las especificaciones y recomendación de construcción.

Los planos contienen las especificaciones de materiales de construcción tales como resistencias del concreto, resistencia del acero, notas de cargas de diseño tanto vivas como muertas, notas de recomendaciones constructivas y recomendaciones de estudio de suelos.

3.9. Revisión del seguimiento de las recomendaciones del estudio de suelos.

En el diseño y en los planos estructurales se están teniendo en cuenta las recomendaciones de estudio de suelos.

4. CONCEPTO GENERAL.

De acuerdo a los resultados obtenidos de la revisión estructural realizada al proyecto “HOSPITAL DE ENGATIVA EDIFICIOS NUEVOS” y expuestas en este informe se considera que se están cumpliendo los requisitos de la Norma Sismo Resistente NSR-10.

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MAURICIO BUSTAMANTE GOMEZ
Mat N° 17202-094951 CLD

IPC
Ingeniería Estructural

Nit. 901.134.339-5
D: Calle 45 No.45 - 16 of 3801 T: 318 735 1464
C: ingenieriaipc@hotmail.com

ANEXO 1 REVISION ESTRUCTURAL
HOSPITAL DE ENGATIVA
ESTRUCTURAS NUEVAS EDIFICIO 1

1. DESCRIPCIÓN DEL SISTEMA ESTRUCTURAL

El proyecto fue revisado bajo el método de estados límites de resistencia, teniendo en cuenta las combinaciones de carga del numeral B2.4.2 de la NSR-10.

2. MATERIALES

Los materiales especificados para la estructura son los siguientes:

Acero refuerzo para concreto:		Fy = 420 MPa (4200 kg/cm² = 60000 psi)
Concreto:	Columnas y muros: .	f'c = 28 MPa (280kg/cm² = 4000 psi).
	Cimentación: .	f'c = 28 MPa (280kg/cm² = 4000 psi).

3. ANÁLISIS DE CARGAS PARA ESTRUCTURA.

3.1. Carga Muerta.

Las cargas muertas que se consideraron en el análisis de la estructura fueron:

- Piso tipo: 531 Kg/m2.
- Cubierta: 531 Kg/m2.

3.2. Carga Viva.

- Carga viva corredores y cuarto: 250 Kg/m2
- Carga viva cuartos de cirugía: 400 Kg/m2.

3.3 Carga de Granizo.

Se uso carga por Granizo de 100 Kg/m2.

4. PARAMETROS SÍSMICOS DE LA ESTRUCTURA.

Para el análisis sísmico se utilizó la siguiente metodología:

- Análisis Dinámico Modal Espectral.

  Fa = 0.95
  Fv = 2.70
  I= 1.50.

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D: Calle 45 No.45 - 16 of 3801 T: 318 735 1464
C: ingenieriaipc@hotmail.com

4.1. Coeficiente de modificación sísmica R.

El factor de disipación de energía R y factor de sobreresistencia para el sistema estructural usado son:

Ro= 5.0.
Ω=3.0.

5. RESISTENCIA AL FUEGO.

Para la norma colombiana de construcción sismo resistente NSR-10, las edificaciones deben clasificarse por grupos de ocupación para establecer la condición de protección al fuego.

De acuerdo a la NSR-10 tabla J.1.1-1 la edificación se encuentra dentro del grupo de ocupación I2-Institucional, Salud o Incapacidad; y de acuerdo al título J.3.3.1 pertenece a la Categoría I- Esta comprende las edificaciones con mayor riesgo de pérdidas de vidas humanas o con alta amenaza de combustión.

- **J.3.5.2.1 Columnas de concreto estructural**

(b) 250 mm DMO (2 horas) / (d) Recubrimiento C.7.7.4 40 mm (3 horas)	**Ancho mínimo de columnas en concreto propuesto**	**Verificación**
250 mm	30mm	**OK**

- **J.3.5.2.3 Losas macizas y viguetas de concreto estructural**

a) losas macizas / vigueta > 150 mm 3 horas b) losas macizas / vigueta > 125 mm 2 horas c) losas macizas / vigueta > 80 mm 1 hora d) recubrimiento C.7.7.1	**Ancho mínimo de losas propuesto**	**Verificación**
80mm	100 mm/ 150mm	**OK**

- **J.3.5.2.4 Vigas de concreto estructural**

(b) 200 mm DMO (2 horas) / (e) Recubrimiento C.7.7.4 40 mm (2 horas)	**Ancho mínimo de vigas propuesto**	**Verificación**
200mm	400mm	**OK**

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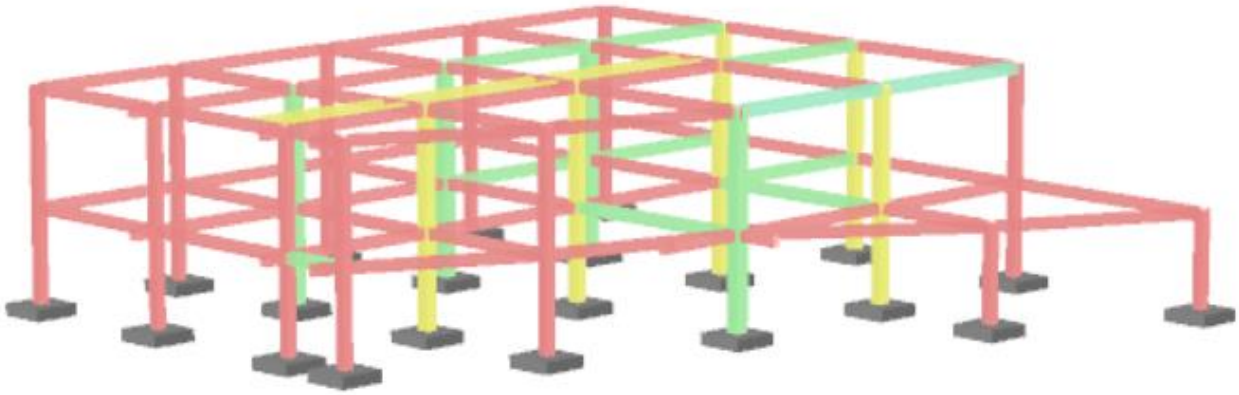
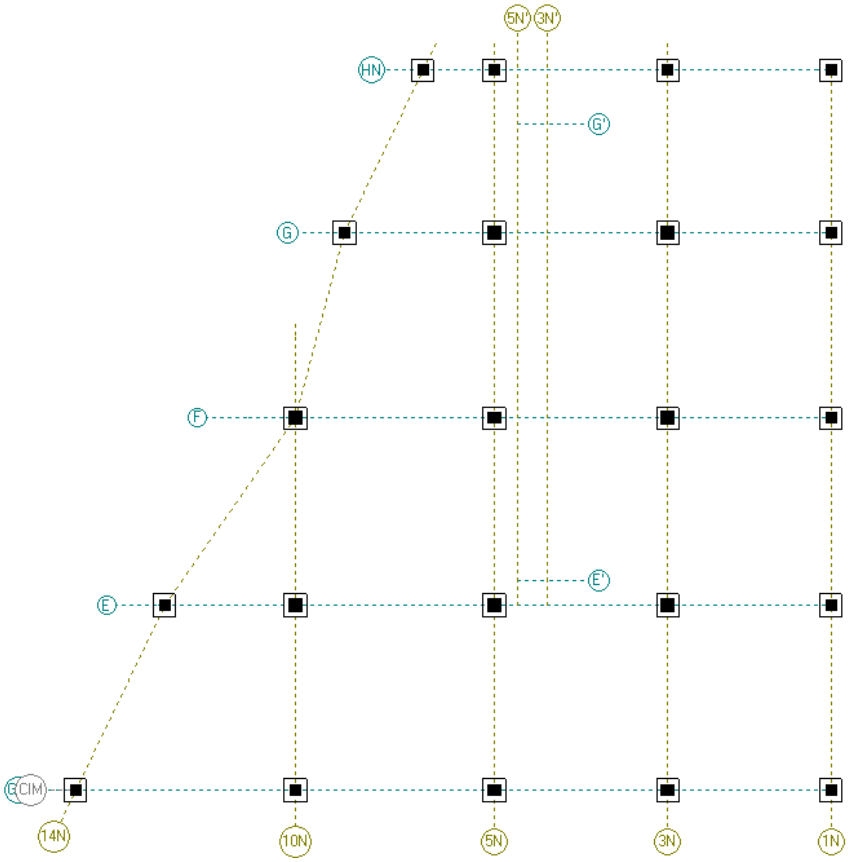
6. IMÁGENES MODELO





7. ANÁLISIS SÍSMICO

A continuación, se presentan los resultados del análisis sísmico de la estructura para diseño y el análisis sísmico por umbral de daño para el chequeo de derivas.

Company: IPC INGENIERIA ESTRUCTURAL SAS **Engineer: YEFRY MORENO PARRA**
Project: Untitled **12:09:32 p. m. 4/01/2020**
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S E I S M I C D E S I G N C O D E : COL BOGOTA-10

```
============================================================
 S E I S M I C   B A S E   L E V E L :  CIM
============================================================


S E I S M I C   F O R C E   R E S I S T I N G   S Y S T E M

System X-Direction:   C: Moment Res.Frame
System Y-Direction:   C: Moment Res.Frame
------------------------------------------------------------
Energy dissip capacity: 2: Moderate-DMO
------------------------------------------------------------
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RESPONSE SPECTRUM EARTHQUAKE FORCES COL BOGOTA-10

Elastic Modal Base Shear
Vm = Sam Wm'
Sam = Spectral modal acceleration
Wm' = Effective modal weight

```
A N A L Y S I S   P A R A M E T E R S

Number of modes to be included ... =     6

                                  X-direction   Y-direction
                                  -----------   -----------
Energy dissipation coefficient, Ro =    5             5
```

```
S P E C T R A L   M O D A L   A C C E L E R A T I O N

  Sam = 2.5 Aa Fa I               For Tm <= Tc
  Sam = 1.2 Av Fv I/Tm            For Tc < Tm < Tl
  Sam = 1.2 Av Fv Tl I/Tm²        For Tm > Tl

Eff. peak acceleration & veloc., Aa =    .15     Av =    .20

Importance coefficient, I ........ =    1.5

   GROUP                                          COEFFICIENT
   IV - Essential facilities                          1.50
   III- Public assistance facilities                  1.25
   II - Especial occupancy buildings                  1.10
   I  - Normal occupancy buildings                    1.00

Seismic zone No. ............... =      9

    B O G O T A,  D. C. - S E I S M I C  Z O N E S
    1: CERROS            9: LACUSTRE-500
    2: PIEDEMONTE A     10: LACUSTRE ALUVIAL-200
    3: PIEDEMONTE B     11: LACUSTRE ALUVIAL-300
    4: PIEDEMONTE C     12: ALUVIAL-50
    5: LACUSTRE-50      13: ALUVIAL-100
    6: LACUSTRE-100     14: ALUVIAL-200
    7: LACUSTRE-200     15: ALUVIAL-300
    8: LACUSTRE-300     16: DEPOSITO LADERA
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S P E C T R A L M O D A L A C C E L E R A T I O N

Sam = 2.5 Aa Fa I For Tm <= Tc
Sam = 1.2 Av Fv I/Tm For Tc < Tm < Tl
Sam = 1.2 Av Fv Tl I/Tm² For Tm > Tl

DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETERS

	Short Periods	Long Periods
Effect. peak acceleration & velc.,	Aa = 0.15	Av = 0.20
Site coefficients (Tables below),	Fa = 0.95	Fv = 2.70

Design response parameters, Aa Fa = 0.14 Av Fv= 0.54

Long-period transition period, Tl sec = 5.00

SEISMIC ZONE	Fa	Fv	Tl
1: Cerros	1.35	1.30	3.0
2: Piedemonte A	1.65	2.00	3.0
3: Piedemonte B	1.95	1.70	3.0
4: Piedemonte C	1.80	1.70	3.0
5: Lacustre-50	1.40	2.90	4.0
6: Lacustre-100	1.30	3.20	4.0
7: Lacustre-200	1.20	3.50	4.0
8: Lacustre-300	1.05	2.90	5.0
9: Lacustre-500	0.95	2.70	5.0*
10: Lacustre Aluvial-200	1.10	2.80	4.0
11: Lacustre Aluvial-300	1.00	2.50	5.0
12: Aluvial-50	1.35	1.80	3.5
13: Aluvial-100	1.20	2.10	3.5
14: Aluvial-200	1.05	2.10	3.5
15: Aluvial-300	0.95	2.10	3.5
16: Deposito ladera	1.65	1.70	3.0

Reduction in R for Irregularity and Lack of Redundancy:

PLAN IRREGULARITIES			ELEVATION IRREGULARITIES	
Type	Description	Øp	Type	Description	Øa
1aP	Torsional	0.9	1aA	Flexible	0.9
1bP	Torsional Extrme	0.8	1bA	Flexible Extrme	0.8
2P	Reentrant corners	0.9	2A	Mass	0.9
3P	Diaph. discontin.	0.9	3A	Geometrical	0.9
4P	Plane shifting	0.8	4A	Plane shifting	0.8
5P	Unparallel grid	0.9	5aA	Weak Story	0.9
			5bA	Weak Story Extr	0.8

NOTE: EngSolutions RCB assumes irregular building.
For regular buildings make (Øp . Øa)= 1.0

	X - D I R E C T I O N	Y - D I R E C T I O N
Reduct. factor, (Øp.Øa) =	.8	.8
Redundancy factor, Ør =	1	1

R = (Øp Øa) Ør Ro

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S T A T I C E Q U I V A L E N T B A S E S H E A R

Building Weight, W, (ton) = 1169.02

Peak Acceleration Coeffi., Aa Fa = .14
Peak Velocity Coefficient, Av Fv = .54
Importance factor, I . . . . . = 1.5
Seizmic zone . . . . . = LACUSTRE-500
Coeff. for upper limit period, Cu = 1.2

	X-direction	Y-direction
Computed Period =	0.610	0.628
Ta = Ct (H)^x =	0.047 H^0.9	0.047 H^0.9
=	0.295	0.295
Tmax = Cu Ta =	0.354	0.354
Fundamental Period =	0.354	0.354
Energ-Disspst coeff, R =	4	4
1.2 Av Fv I / T =	2.745	2.745
2.5 Aa Fa I =	.525	.525
Sa =	.525	.525
Base Shear, Vo =	613.74	613.74
Static Shear, .9Vo (ton) =	552.37	552.37

S P E C T R A L A C C E L E R A T I O N

MODE No	PERIOD (sec)	Sa (g)	Damping Ratio
1	.628	.525	.05
2	.61	.525	.05
3	.317	.525	.05
4	.182	.525	.05
5	.179	.525	.05
6	.101	.525	.05

M O D A L B A S E S H E A R

	X - D I R E C T I O N			Y - D I R E C T I O N		
MODE No	Sax (g)	W'x (ton)	Vx (ton)	Say (g)	W'y (ton)	Vy (ton)
1	.525	479.61	251.79	.525	484.14	254.17
2	.525	477.35	250.61	.525	477.18	250.52
3	.525	.09	.05	.525	2.64	1.39
4	.525	109.55	57.51	.525	99.32	52.14
5	.525	102.35	53.74	.525	105.48	55.38
6	.525	.07	.04	.525	.26	.13
ELASTIC Ve (combined):		363.87				364.9
STATIC(IREG) 0.9Sa(T1)W		552.37				552.37
Design Base Shear:		552.37				552.37

Total Building Weight, W = 1169.02 ton
Participating Mass, $\Sigma W'/W$ = 100% in X, 100% in Y
$W'xm=\{\Sigma Wj\ \phi xjm\}^2/\Sigma Wj\ \phi xjm^2$ $W'ym=\{\Sigma Wj\ \phi yjm\}^2/\Sigma Wj\ \phi yjm^2$
Combination of Modal Response: SRSS $V = (\text{Sum } Vi^2)^{1/2}$

A C C I D E N T A L T O R S I O N

	X-direction	Y-direction
Accidental eccentricity as a percentage of building dimension, (%)=	5	5

A C C I D E N T A L E C C E N T R I C I T Y:

	X - D I R E C T I O N (EQY)			Y - D I R E C T I O N (EQX)		
Level -	$\delta\varepsilon x_o$ (m)	Ax -	$\delta\varepsilon x$ (m)	$\delta\varepsilon y_o$ (m)	Ax -	$\delta\varepsilon y$ (m)
CUB	1.05	1.00	1.05	1.44	1.00	1.44
2	1.47	1.00	1.47	1.44	1.00	1.44

Ax: Amplification factor for accidental eccentricity

EQY: Envelope (1) $Ex = \varepsilon x$ EQX: Envelope (1) $Ey = \varepsilon y$
(2) $Ex = \varepsilon x + \delta\varepsilon x$ (2) $Ey = \varepsilon y + \delta\varepsilon y$
(3) $Ex = \varepsilon x - \delta\varepsilon x$ (3) $Ey = \varepsilon y - \delta\varepsilon y$

D E S I G N E C C E N T R I C I T Y : $E = \varepsilon + \delta\varepsilon$

	X - D I R E C T I O N (EQY)				Y - D I R E C T I O N (EQX)			
Level -	Center Mass CMx	Inherent Eccent. εx^*	Accident Eccent. $\delta\varepsilon x$	Design Eccent. Ex	Center Mass CMy	Inherent Eccent. εy^*	Accident Eccent. $\delta\varepsilon y$	Design Eccent. Ey
CUB	19.50	0.18	1.05	1.2323	13.75	0.25	1.44	1.6969
2	17.89	-0.72	1.47	-2.199	12.91	-0.18	1.44	-1.622

Note: * Inherent eccentricity: εx = CMx - CRx and εy = CMy - CRy
All values are in meters

D E S I G N E C C E N T R I C I T Y : $E = \varepsilon - \delta\varepsilon$

	X - D I R E C T I O N (EQY)				Y - D I R E C T I O N (EQX)			
Level -	Center Mass CMx	Inherent Eccent. εx^*	Accident Eccent. $\delta\varepsilon x$	Design Eccent. Ex	Center Mass CMy	Inherent Eccent. εy^*	Accident Eccent. $\delta\varepsilon y$	Design Eccent. Ey
CUB	19.50	0.18	1.05	-0.877	13.75	0.25	1.44	-1.199
2	17.89	-0.72	1.47	0.7575	12.91	-0.18	1.44	1.2626

Note: * Inherent eccentricity: εx = CMx - CRx and εy = CMy - CRy
All values are in meters

Modal nodal force:

$$Fim = Vm \ \phi im / \Sigma Wj \ \phi jm$$
$$Vm = (Sam / Rw) \ W'm$$
$$W'm = \{\Sigma Wj \ \phi jm\}^2 / \Sigma Wj \ \phi jm^2$$

C O M B I N E D M O D A L F O R C E

X - DIRECTION

Floor k -	Weight W (ton)	Force F (ton)	Shear V (ton)	Torsion T=F(E-ε) (ton-m)
CUB	545.5	387.2	387.2	558.4
2	623.4	165.1	552.3	238.5

C O M B I N E D M O D A L F O R C E

Y - DIRECTION

Floor k -	Weight W (ton)	Force F (ton)	Shear V (ton)	Torsion T=F(E-ε) (ton-m)
CUB	545.5	385.9	385.9	406.3
2	623.4	166.3	552.3	244.9

ACCELERATIONS ON NON-STRUCTURAL ELEMENTS- MZS BOGOTA-2010

F L O O R A C C E L E R A T I O N S

Level	hx	hx/heq	ax
CUB	7.69	1.33	0.630
2	3.50	0.61	0.369

Seismic base level . . . . . = CIM
Height above seismic base, hn . . . . . = 7.70 m
Equivalent height, heq = 0.75 hn . . . . . = 5.78 m
Ground acceleration, As = Aa Fa I . . . . . = 0.210
Spectral acceleration, Sa . . . . . = 0.473

ax = Sa hx/heq for hx > heq
ax = As + (Sa -As) hx/heq for hx < heq

Force on structural non-seismic element : Fp = ax Wp / Ro
Force on nonstructural element : Fp = ax ap Wp / Rp
> 0.5 Aa I Wp

ap : component amplification factor

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MODE - FREQUENCY ANALYSIS

Mass Matrix Combination (Weight / g)

M = (D0 + DL) / g

Total Building Weight: 1169.02 ton

Modal Information: frequency, period, participation factors & generalized mass

Mode No	Frequency Hz	Period sec	== X-Direction === Part.Fac	GenMass*	== Y-Direction === Part.Fac	GenMass*	== Z-Direction === Part.Fac	GenMass*
1	1.59	0.6280	-0.50	0.26	0.85	0.74	0.00	0.00
2	1.64	0.6100	0.85	0.75	0.50	0.26	0.00	0.00
3	3.16	0.3170	-0.02	1.87	-0.08	1.10	0.00	0.00
4	5.49	0.1820	-0.43	0.83	0.20	0.20	0.00	0.00
5	5.58	0.1790	-0.21	0.21	-0.41	0.81	0.00	0.00
6	9.91	0.1010	0.02	1.73	-0.03	1.26	0.00	0.00

* : ton-sec²/m

Effective Weight and Participating Mass

Mode No	X - Direction Weff*	%Mass	[%-Sum]	Y - Direction Weff*	%Mass	[%-Sum]	Z - Direction Weff*	%Mass	[%-Sum]
1	479.60	41.03	[41.0]	484.14	41.41	[41.4]	0.00	0.00	[0.0]
2	477.35	40.83	[81.9]	477.18	40.82	[82.2]	0.00	0.00	[0.0]
3	0.09	0.01	[81.9]	2.64	0.23	[82.5]	0.00	0.00	[0.0]
4	109.55	9.37	[91.2]	99.32	8.50	[91.0]	0.00	0.00	[0.0]
5	102.35	8.76	[100.0]	105.48	9.02	[100.0]	0.00	0.00	[0.0]
6	0.07	0.01	[100.0]	0.26	0.02	[100.0]	0.00	0.00	[0.0]

* : ton

Company: IPC INGENIERIA ESTRUCTURAL SAS **Engineer: YEFRY MORENO PARRA**
Project: Untitled **1:20:41 p. m. 4/01/2020**
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S E I S M I C D E S I G N C O D E : COL BOGOTA-10

```
============================================================
 S E I S M I C   B A S E   L E V E L :  CIM
============================================================


S E I S M I C   F O R C E   R E S I S T I N G   S Y S T E M

System X-Direction:   C: Moment Res.Frame
System Y-Direction:   C: Moment Res.Frame
------------------------------------------------------------
Energy dissip capacity: 2: Moderate-DMO
------------------------------------------------------------
```

RESPONSE SPECTRUM EARTHQUAKE FORCES COL BOGOTA-10

```
Elastic Modal Base Shear
                  Vm  = Sam  Wm'
                  Sam = Spectral modal acceleration
                  Wm' = Effective modal weight



A N A L Y S I S    P A R A M E T E R S

Number of modes to be included ... =     6

                                  X-direction   Y-direction
                                  -----------   -----------
Energy dissipation coefficient, Ro =    5             5
```

```
S P E C T R A L   M O D A L   A C C E L E R A T I O N

  Sam = 2.5 Aa Fa I               For Tm <= Tc
  Sam = 1.2 Av Fv I/Tm            For Tc < Tm < Tl
  Sam = 1.2 Av Fv Tl I/Tm²        For Tm > Tl

Eff. peak acceleration & veloc., Aa =    .15     Av =    .20

Importance coefficient, I ........ =    1

   GROUP                                          COEFFICIENT
   IV - Essential facilities                          1.50
   III- Public assistance facilities                  1.25
   II - Especial occupancy buildings                  1.10
   I  - Normal occupancy buildings                    1.00

Seismic zone No. ............... =      9

    B O G O T A,  D. C. - S E I S M I C  Z O N E S
    1: CERROS            9: LACUSTRE-500
    2: PIEDEMONTE A     10: LACUSTRE ALUVIAL-200
    3: PIEDEMONTE B     11: LACUSTRE ALUVIAL-300
    4: PIEDEMONTE C     12: ALUVIAL-50
    5: LACUSTRE-50      13: ALUVIAL-100
    6: LACUSTRE-100     14: ALUVIAL-200
    7: LACUSTRE-200     15: ALUVIAL-300
    8: LACUSTRE-300     16: DEPOSITO LADERA
```

S P E C T R A L M O D A L A C C E L E R A T I O N

Sam = 2.5 Aa Fa I For Tm <= Tc
Sam = 1.2 Av Fv I/Tm For Tc < Tm < Tl
Sam = 1.2 Av Fv Tl I/Tm² For Tm > Tl

DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETERS

	Short Periods	Long Periods
Effect. peak acceleration & velc.,	Aa = 0.15	Av = 0.20
Site coefficients (Tables below),	Fa = 0.95	Fv = 2.70

Design response parameters, Aa Fa = .165 Av Fv= .75

Long-period transition period, Tl sec = 5.00

SEISMIC ZONE	Fa	Fv	Tl
1: Cerros	1.35	1.30	3.0
2: Piedemonte A	1.65	2.00	3.0
3: Piedemonte B	1.95	1.70	3.0
4: Piedemonte C	1.80	1.70	3.0
5: Lacustre-50	1.40	2.90	4.0
6: Lacustre-100	1.30	3.20	4.0
7: Lacustre-200	1.20	3.50	4.0
8: Lacustre-300	1.05	2.90	5.0
9: Lacustre-500	0.95	2.70	5.0*
10: Lacustre Aluvial-200	1.10	2.80	4.0
11: Lacustre Aluvial-300	1.00	2.50	5.0
12: Aluvial-50	1.35	1.80	3.5
13: Aluvial-100	1.20	2.10	3.5
14: Aluvial-200	1.05	2.10	3.5
15: Aluvial-300	0.95	2.10	3.5
16: Deposito ladera	1.65	1.70	3.0

Reduction in R for Irregularity and Lack of Redundancy:

PLAN IRREGULARITIES			ELEVATION IRREGULARITIES	
Type	Description	Øp	Type	Description	Øa
1aP	Torsional	0.9	1aA	Flexible	0.9
1bP	Torsional Extrme	0.8	1bA	Flexible Extrme	0.8
2P	Reentrant corners	0.9	2A	Mass	0.9
3P	Diaph. discontin.	0.9	3A	Geometrical	0.9
4P	Plane shifting	0.8	4A	Plane shifting	0.8
5P	Unparallel grid	0.9	5aA	Weak Story	0.9
			5bA	Weak Story Extr	0.8

NOTE: EngSolutions RCB assumes irregular building.
For regular buildings make (Øp . Øa)= 1.0

	X - D I R E C T I O N	Y - D I R E C T I O N
Reduct. factor, (Øp.Øa) =	.8	.8
Redundancy factor, Ør =	1	1

R = (Øp Øa) Ør Ro

S T A T I C E Q U I V A L E N T B A S E S H E A R

Building Weight, W, (ton) = 1169.02

Peak Acceleration Coeffi., Aa Fa = .165
Peak Velocity Coefficient, Av Fv = .75
Importance factor, I . . . . . = 1
Seizmic zone . . . . . = LACUSTRE-500
Coeff. for upper limit period, Cu = 1.2

		X-direction	Y-direction
Computed Period	=	0.610	0.628
Ta = Ct (H)^x	=	0.047 H^0.9	0.047 H^0.9
	=	0.295	0.295
Tmax = Cu Ta	=	0.354	0.354
Fundamental Period	=	0.354	0.354
Energ-Disspst coeff, R	=	4	4
1.2 Av Fv I / T	=	2.542	2.542
2.5 Aa Fa I	=	.413	.413
Sa	=	.413	.413
Base Shear, Vo	=	482.22	482.22
Static Shear, .9Vo (ton)	=	208.32	208.32

S P E C T R A L A C C E L E R A T I O N

MODE No	PERIOD (sec)	Sa (g)	Damping Ratio
1	.628	.198	.05
2	.61	.198	.05
3	.317	.19	.05
4	.182	.143	.05
5	.179	.142	.05
6	.101	.115	.05

M O D A L B A S E S H E A R

MODE No	X - D I R E C T I O N Sax (g)	W'x (ton)	Vx (ton)	Y - D I R E C T I O N Say (g)	W'y (ton)	Vy (ton)
1	.198	479.61	94.96	.198	484.14	95.86
2	.198	477.35	94.51	.198	477.18	94.48
3	.19	.09	.02	.19	2.64	.5
4	.143	109.55	15.67	.143	99.32	14.2
5	.142	102.35	14.53	.142	105.48	14.98
6	.115	.07	.01	.115	.26	.03
ELASTIC Ve (combined):		135.67				136.17
STATIC(IREG) 0.9Sa(T1)W		208.32				208.32
Design Base Shear:		208.32				208.32

Total Building Weight, W = 1169.02 ton
Participating Mass, $\Sigma W'/W$ = 100% in X, 100% in Y
$W'xm=\{\Sigma Wj\ \phi xjm\}^2/\Sigma Wj\ \phi xjm^2$ $W'ym=\{\Sigma Wj\ \phi yjm\}^2/\Sigma Wj\ \phi yjm^2$
Combination of Modal Response: SRSS $V = (\text{Sum } Vi^2)^{1/2}$

A C C I D E N T A L T O R S I O N

	X-direction	Y-direction
Accidental eccentricity as a percentage of building dimension, (%)=	0	0

Modal nodal force:

$$Fim = Vm\ \phi im / \Sigma\ Wj\ \phi jm$$
$$Vm = (Sam / Rw)\ W'm$$
$$W'm = \{\Sigma\ Wj\ \phi jm\}^2 / \Sigma\ Wj\ \phi jm^2$$

C O M B I N E D M O D A L F O R C E

X - DIRECTION

Floor k -	Weight W (ton)	Force F (ton)	Shear V (ton)	Torsion T=F(E-ε) (ton-m)
CUB	545.5	146.6	146.6	0.0
2	623.4	61.70	208.3	0.0

C O M B I N E D M O D A L F O R C E

Y - DIRECTION

Floor k -	Weight W (ton)	Force F (ton)	Shear V (ton)	Torsion T=F(E-ε) (ton-m)
CUB	545.5	145.9	145.9	0.0
2	623.4	62.34	208.3	0.0

ACCELERATIONS ON NON-STRUCTURAL ELEMENTS- MZS BOGOTA-2010

FLOOR ACCELERATIONS

Level	hx	hx/heq	ax NSR-10	ax ASCE7-10	ax UBC-97	ax EUROCODE8	ax NZS1170.5
CUB	7.69	1.33	0.238	0.495	0.660	0.578	0.495
2	3.50	0.61	0.173	0.315	0.390	0.353	0.495

Seismic base level . . . . . = CIM
Height above seismic base, hn . . . . . = 7.70 m
Equivalent height, heq = 0.75 hn . . . . . = 5.78 m
Ground acceleration, As = Aa Fa I . . . . . = 0.165
Spectral acceleration, Sa . . . . . = 0.178

NSR-10: ax = Sa hx/heq for hi > heq
ax = As + (Sa -As) hi/heq for hi < heq
ASCE7-10: ax = As (1 + 2 hx/ hn)
UBC-97: ax = As (1 + 3 hx/ hn)
Eurocode 8: ax = As [3/2(1+ hx/hn) - 0.5] for (Ta/T1=0)
NZS 1170.5 ax = As (1 + 2 hx/hl) for hx < hl
ax = 3 As for hx > hl (hl = 0.2 hn)
Note: RCB recommends using ASCE7-10 accelerations for this project

Force on structural non-seismic element : Fp = ai Wp / Ro
Force on nonstructural element : Fp = ai ap Wp / Rp
> 0.5 Aa I Wp
ap : component amplification factor

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MODE - FREQUENCY ANALYSIS

Mass Matrix Combination (Weight / g)

M = (D0 + DL) / g

Total Building Weight: 1169.02 ton

Modal Information: frequency, period, participation factors & generalized mass

Mode No	Frequency Hz	Period sec	== X-Direction === Part.Fac	GenMass*	== Y-Direction === Part.Fac	GenMass*	== Z-Direction === Part.Fac	GenMass*
1	1.60	0.6260	-0.50	0.26	0.85	0.74	0.00	0.00
2	1.64	0.6090	0.85	0.75	0.50	0.26	0.00	0.00
3	3.17	0.3160	-0.02	1.87	-0.08	1.10	0.00	0.00
4	5.51	0.1820	-0.43	0.83	0.20	0.20	0.00	0.00
5	5.60	0.1790	-0.21	0.21	-0.41	0.81	0.00	0.00
6	9.93	0.1010	0.02	1.73	-0.03	1.26	0.00	0.00

* : ton-sec²/m

Effective Weight and Participating Mass

Mode No	X - D i r e c t i o n Weff*	%Mass	[%-Sum]	Y - D i r e c t i o n Weff*	%Mass	[%-Sum]	Z - D i r e c t i o n Weff*	%Mass	[%-Sum]
1	479.61	41.03	[41.0]	484.14	41.41	[41.4]	0.00	0.00	[0.0]
2	477.35	40.83	[81.9]	477.18	40.82	[82.2]	0.00	0.00	[0.0]
3	0.09	0.01	[81.9]	2.64	0.23	[82.5]	0.00	0.00	[0.0]
4	109.54	9.37	[91.2]	99.31	8.50	[91.0]	0.00	0.00	[0.0]
5	102.35	8.76	[100.0]	105.48	9.02	[100.0]	0.00	0.00	[0.0]
6	0.07	0.01	[100.0]	0.26	0.02	[100.0]	0.00	0.00	[0.0]

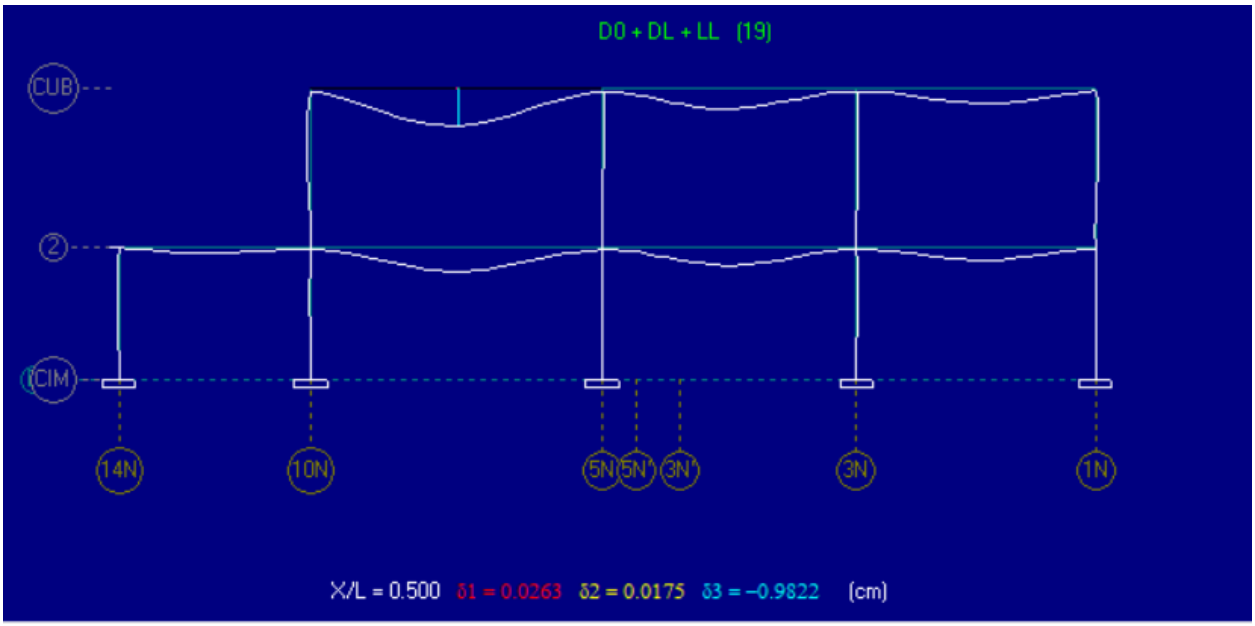
* : ton

IPC
Ingeniería Estructural

Nit. 901.134.339-5
D: Calle 45 No.45 - 16 of 3801 T: 318 735 1464
C: ingenieriaipc@hotmail.com

8. DEFLEXIONES VERTICALES Y DERIVAS.

La altura de las vigas del proyecto cumple con lo recomendado por la tabla CR9.5 de la NSR-10, aun así, presentamos el chequeo de deflexiones por cargas permanentes en algunas de las luces mayores de la estructura.



Deflexión máxima permitida: L/240

720/240= 3 cm.

Deflexión máxima presentada: 0.98.cm.

A continuación, mostramos los resultados de derivas donde se evidencia la revisión y cumplimiento según la NSR-10.

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P-DELTA ANALYSIS - SUMMARY MAXIMUM STORY DRIFT RATIO, Δ/h

	Drift-Ratio at CENTER OF MASS			MAXIMUM Corner Story-Drift-Ratio			
Story	DriftX	DriftY	DriftR	DriftX	DriftY	DriftR	Axis
2	0.0035	0.0035	0.0035	0.0039	0.0037	0.0039	GN-10N
CIM	0.0024	0.0025	0.0025	0.0025	0.0027	0.0027	HN-1N
Maxima	0.0035	0.0035	0.0035	0.0039	0.0037	0.0039	

DriftX = $(\Delta x/h)max$
DriftY = $(\Delta y/h)max$
DriftR = $([(\Delta x/h)^2 + (\Delta y/h)^2]^{1/2})max$

P-DELTA ANALYSIS - DETAILED MAXIMUM STORY DRIFT RATIO, δ/h

Story	ColAxis	$(\delta x/h)max$	$(\delta y/h)max$	$([(\delta x/h)^2 + (\delta y/h)^2]^{1/2})max$
2	GN-10N	0.0039	0.0034	0.0039
	E-10N	0.0037	0.0034	0.0037
	F-14N	0.0035	0.0034	0.0035
	G-10N	0.0033	0.0034	0.0034
	HN-10N	0.0032	0.0035	0.0035
	GN-5N	0.0039	0.0035	0.0039
	E-5N	0.0037	0.0035	0.0037
	F-5N	0.0035	0.0035	0.0035
	G-5N	0.0033	0.0035	0.0035
	HN-5N	0.0032	0.0035	0.0035
	GN-3N	0.0039	0.0036	0.0039
	E-3N	0.0037	0.0036	0.0037
	F-3N	0.0035	0.0036	0.0036
	G-3N	0.0033	0.0036	0.0036
	HN-3N	0.0032	0.0036	0.0036
	GN-1N	0.0039	0.0037	0.0039
	E-1N	0.0037	0.0037	0.0037
	F-1N	0.0035	0.0037	0.0037
	G-1N	0.0033	0.0037	0.0037
	HN-1N	0.0032	0.0037	0.0037
CIM	GN-14N	0.0025	0.0023	0.0026
	E-14N	0.0025	0.0024	0.0025
	GN-10N	0.0025	0.0024	0.0026
	E-10N	0.0025	0.0024	0.0025
	F-14N	0.0024	0.0024	0.0024
	G-10N	0.0023	0.0024	0.0024
	HN-10N	0.0023	0.0025	0.0025
	GN-5N	0.0025	0.0025	0.0025
	E-5N	0.0025	0.0025	0.0025
	F-5N	0.0024	0.0025	0.0025
	G-5N	0.0023	0.0025	0.0025
	HN-5N	0.0023	0.0025	0.0025
	GN-3N	0.0025	0.0026	0.0026
	E-3N	0.0025	0.0026	0.0026
	F-3N	0.0024	0.0026	0.0026
	G-3N	0.0023	0.0026	0.0026
	HN-3N	0.0023	0.0026	0.0026
	GN-1N	0.0025	0.0027	0.0027
	E-1N	0.0025	0.0027	0.0027
	F-1N	0.0024	0.0027	0.0027
	G-1N	0.0023	0.0027	0.0027
	HN-1N	0.0023	0.0027	0.0027

Note: Drift amplification factor, D: 1 in X; 1 in Y
MAXIMA DRIFT: $(\delta/h)x$ =0.0039; $(\delta/h)y$ =0.0037; $(\delta/h)r$ =0.0039

Nit. **901.134.339-5**
D: Calle 45 No.45 - 16 of 3801 **T:** 318 735 1464
C: ingenieriaipc@hotmail.com

9. DISEÑO DE ELEMENTOS.

- Diseño de columnas.

A continuación, mostramos los resultados de diseño de las columnas donde se evidencia la revisión y el cumplimiento de la NSR-10.

Company: IPC INGENIERIA ESTRUCTURAL SAS **Engineer:** YEFRY MORENO PARRA
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LOAD COMBINATIONS

No	Load combination
1	1.4D0 + 1.4DL
2	1.2D0 + 1.2DL + 1.6LL
3	1.2D0 + 1.2DL + LL + EQX + .3EQY
4	1.2D0 + 1.2DL + LL - EQX - .3EQY
5	1.2D0 + 1.2DL + LL + EQX - .3EQY
6	1.2D0 + 1.2DL + LL - EQX + .3EQY
7	1.2D0 + 1.2DL + LL + .3EQX + EQY
8	1.2D0 + 1.2DL + LL - .3EQX - EQY
9	1.2D0 + 1.2DL + LL - .3EQX + EQY
10	1.2D0 + 1.2DL + LL + .3EQX - EQY
11	.9D0 + .9DL + EQX + .3EQY
12	.9D0 + .9DL - EQX - .3EQY
13	.9D0 + .9DL + EQX - .3EQY
14	.9D0 + .9DL - EQX + .3EQY
15	.9D0 + .9DL + .3EQX + EQY
16	.9D0 + .9DL - .3EQX - EQY
17	.9D0 + .9DL - .3EQX + EQY
18	.9D0 + .9DL + .3EQX - EQY

MATERIALS

Number of materials = 2

REINFORCED CONCRETE

Mat	Name	f'c Kg/cm2	fy Kg/cm2	fys1 Kg/cm2	fys2 Kg/cm2	E Kg/cm2	G Kg/cm2	w Kg/m3
1	RConcrete1	210	4200	4200	4200	218540	87430	2400.0
2	RConcrete2	280	4200	4200	4200	252350	100940	2400.0

f'c: Compressive strength of concrete
fy: Yield strength of longitudinal reinforcement
fys1: Yiel strength of shear reinforcement, bar sizes <= 3/8"
fys2: Yiel strength of shear reinforcement, bar sizes > 3/8"

COLUMN SECTIONS

Number of prismatic sections = 3

Sec	Name	Shape	b (cm)	h (cm)	tw (cm)	tf (cm)	P1 (cm)	P2 (cm)	A (cm2)	I2 (cm4)	I3 (cm4)	J (cm4)
1	C40X40	Rectang	40.00	40.00	-	-	-	-	1600.0	213333	213333	315733
2	C45X45	Rectang	45.00	45.00	-	-	-	-	2025.0	341719	341719	505744
3	C50X50	Rectang	50.00	50.00	-	-	-	-	2500.0	520833	520833	770833

Design Results - Columns (DMO)

Column	Story	L (m)	Lu (m)	Sec Mat	bxh (cm)	TRANSVERSE REINFORCEMENT TIES	TRANSVERSE REINFORCEMENT XTIES	LONGITUDINAL REINFORCEMENT Sec	LdCmb critc	Pu (ton)	Mu2 (ton-m)	Mu3 (ton-m)	RHO -	As (cm2)
HN-1N	2	4.20	3.80	1	40x40	7 #3 @ 10 cm (end)	1 (b)	Top	4	19.06	7.98	15.34	0.0213	34.00
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	4	19.06	6.59	12.40	0.0154	24.63

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Column	Story	L	Lu	Sec	bxh	TIES	XTIES	Sec	LdCmb	Pu	Mu2	Mu3	RHO	As
HN-1N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	4	39.75	3.66	7.24	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	4	39.75	3.92	10.13	0.0100	16.00
G-1N	2	4.20	3.80	1	40x40	7 #3 @ 10 cm (end)	1 (b)	Top	4	31.09	5.34	17.48	0.0218	34.94
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	4	31.09	4.72	14.29	0.0160	25.56
G-1N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	8	59.37	6.82	5.66	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	4	63.75	3.56	10.79	0.0100	16.00
F-1N	2	4.20	3.80	1	40x40	7 #3 @ 10 cm (end)	1 (b)	Top	4	32.93	3.08	17.72	0.0195	31.19
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	4	32.93	2.74	14.62	0.0142	22.75
F-1N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	1	61.31	1.67	3.69	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	12	44.54	2.84	10.13	0.0100	16.00
E-1N	2	4.20	3.80	1	40x40	7 #3 @ 10 cm (end)	1 (b)	Top	4	33.61	3.94	18.30	0.0218	34.94
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	4	33.61	3.22	15.15	0.0154	24.63
E-1N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	1	61.88	1.69	3.65	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	12	45.32	2.85	10.38	0.0100	16.00
GN-1N	2	4.20	3.80	1	40x40	7 #3 @ 10 cm (end)	1 (b)	Top	6	18.90	10.21	13.81	0.0218	34.94
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	6	18.90	7.92	11.67	0.0160	25.56
GN-1N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	6	39.20	5.17	5.40	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	6	39.20	4.06	10.30	0.0100	16.00
HN-3N	2	4.20	3.80	1	40x40	7 #3 @ 10 cm (end)	1 (b)	Top	4	36.45	11.88	10.20	0.0195	31.19
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	4	36.45	9.68	8.97	0.0136	21.81
HN-3N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	1	74.16	3.86	2.02	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	13	50.35	3.96	9.70	0.0100	16.00
G-3N	2	4.20	3.80	3	50x50	6 #3 @ 12 cm (end)	2 (b)	Top	4	57.48	6.67	17.24	0.0100	25.00
				2		10 #3 @ 24 cm (ctr)	2 (h)	Bot	4	57.48	5.92	14.25	0.0100	25.00
G-3N	CIM	3.50	3.18	3	50x50	5 #3 @ 12 cm (end)	2 (b)	Top	1	117.12	3.54	3.54	0.0100	25.00
				2		9 #3 @ 24 cm (ctr)	2 (h)	Bot	12	74.33	6.05	20.25	0.0100	25.00
F-3N	2	4.20	3.80	3	50x50	6 #3 @ 12 cm (end)	2 (b)	Top	4	60.74	5.00	18.99	0.0100	25.00
				2		10 #3 @ 24 cm (ctr)	2 (h)	Bot	12	38.73	3.85	14.29	0.0100	25.00
F-3N	CIM	3.50	3.18	3	50x50	5 #3 @ 12 cm (end)	2 (b)	Top	1	123.92	3.75	3.75	0.0100	25.00
				2		9 #3 @ 24 cm (ctr)	2 (h)	Bot	12	79.37	5.64	20.82	0.0100	25.00
E-3N	2	4.20	3.80	3	50x50	6 #3 @ 12 cm (end)	2 (b)	Top	4	63.42	6.72	18.75	0.0100	25.00
				2		10 #3 @ 24 cm (ctr)	2 (h)	Bot	4	63.42	4.80	16.46	0.0100	25.00
E-3N	CIM	3.50	3.18	3	50x50	5 #3 @ 12 cm (end)	2 (b)	Top	1	127.68	3.86	3.86	0.0100	25.00
				2		9 #3 @ 24 cm (ctr)	2 (h)	Bot	12	81.38	5.60	21.60	0.0100	25.00
GN-3N	2	4.20	3.80	2	45x45	7 #3 @ 10 cm (end)	1 (b)	Top	6	32.70	19.43	15.82	0.0224	45.40
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	6	32.70	15.32	14.02	0.0166	33.54
GN-3N	CIM	3.50	3.18	2	45x45	6 #3 @ 10 cm (end)	1 (b)	Top	6	66.88	9.25	6.35	0.0100	20.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	6	66.88	7.14	15.39	0.0100	20.25
HN-5N	2	4.20	3.80	1	40x40	7 #3 @ 10 cm (end)	1 (b)	Top	5	23.64	8.94	21.54	0.0318	50.88
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	5	23.64	8.40	18.99	0.0277	44.31
HN-5N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	5	43.05	6.53	14.64	0.0183	29.31
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	5	43.05	5.26	13.92	0.0154	24.63
G-5N	2	4.20	3.80	2	45x45	7 #3 @ 10 cm (end)	1 (b)	Top	5	52.96	6.68	24.57	0.0201	40.66
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	5	52.96	6.09	16.75	0.0107	21.67
G-5N	CIM	3.50	3.18	2	45x45	6 #3 @ 10 cm (end)	1 (b)	Top	1	105.27	3.03	3.03	0.0100	20.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	13	66.06	5.12	14.94	0.0100	20.25
F-5N	2	4.20	3.80	2	45x45	7 #3 @ 10 cm (end)	1 (b)	Top	5	64.14	3.94	17.09	0.0100	20.25
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	14	40.50	2.49	12.12	0.0100	20.25
F-5N	CIM	3.50	3.18	2	45x45	6 #3 @ 10 cm (end)	1 (b)	Top	1	126.35	3.63	3.63	0.0100	20.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	14	81.23	3.83	16.55	0.0100	20.25
E-5N	2	4.20	3.80	2	45x45	7 #3 @ 10 cm (end)	1 (b)	Top	4	65.18	7.74	18.12	0.0130	26.42
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	4	65.18	4.21	16.87	0.0100	20.25
E-5N	CIM	3.50	3.18	2	45x45	6 #3 @ 10 cm (end)	1 (b)	Top	1	130.46	3.75	3.75	0.0100	20.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	14	82.86	4.48	16.26	0.0100	20.25
GN-5N	2	4.20	3.80	2	45x45	7 #3 @ 10 cm (end)	1 (b)	Top	6	36.76	20.36	18.70	0.0265	53.71
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	6	36.76	16.01	15.14	0.0183	37.10
GN-5N	CIM	3.50	3.18	2	45x45	6 #3 @ 10 cm (end)	1 (b)	Top	1	71.74	5.78	2.06	0.0100	20.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	14	46.60	5.84	14.85	0.0100	20.25

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Column	Story	L	Lu	Sec	bxh	TIES	XTIES	Sec	LdCmb	Pu	Mu2	Mu3	RHO	As
HN-10N	2	4.20	3.80	1	40x40	7 #3 @ 10 cm (end)	1 (b)	Top	4	5.25	8.43	13.24	0.0189	30.25
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	4	5.25	6.75	12.52	0.0166	26.50
HN-10N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	4	7.23	4.58	9.57	0.0113	18.06
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	4	7.23	3.70	11.20	0.0125	19.94
G-10N	2	4.20	3.80	1	40x40	7 #3 @ 10 cm (end)	1 (b)	Top	5	31.94	5.66	13.79	0.0160	25.56
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	5	31.94	4.13	11.52	0.0107	17.13
G-10N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	1	58.25	1.59	3.52	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	13	43.28	2.70	10.24	0.0100	16.00
F-14N	2	4.20	3.80	3	50x50	6 #3 @ 12 cm (end)	2 (b)	Top	7	40.22	12.23	26.76	0.0160	39.94
				2		10 #3 @ 24 cm (ctr)	2 (h)	Bot	5	42.99	5.40	20.58	0.0100	25.00
F-14N	CIM	3.50	3.18	3	50x50	5 #3 @ 12 cm (end)	2 (b)	Top	1	101.56	3.68	3.07	0.0100	25.00
				2		9 #3 @ 24 cm (ctr)	2 (h)	Bot	13	70.79	6.80	20.92	0.0100	25.00
E-10N	2	4.20	3.80	2	45x45	7 #3 @ 10 cm (end)	1 (b)	Top	10	40.19	15.48	23.59	0.0271	54.90
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	5	41.56	7.11	23.41	0.0189	38.29
E-10N	CIM	3.50	3.18	2	45x45	6 #3 @ 10 cm (end)	1 (b)	Top	13	63.69	3.11	11.92	0.0100	20.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	13	63.69	5.22	17.59	0.0101	20.49
GN-10N	2	4.20	3.80	1	40x40	7 #3 @ 10 cm (end)	1 (b)	Top	7	22.18	15.55	12.60	0.0277	44.31
				2		12 #3 @ 20 cm (ctr)	1 (h)	Bot	3	21.95	10.91	11.36	0.0195	31.19
GN-10N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	6	56.90	10.37	8.39	0.0130	20.88
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	6	56.90	6.91	11.65	0.0130	20.88
E-14N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	3	35.32	2.65	17.38	0.0183	29.31
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	3	35.32	2.20	15.56	0.0154	24.63
GN-14N	CIM	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	3	21.30	11.83	21.33	0.0353	56.50
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	3	21.30	6.25	17.61	0.0230	36.81

Nit. **901.134.339-5**
D: Calle 45 No.45 - 16 of 3801 **T:** 318 735 1464
C: ingenieriaipc@hotmail.com

- Vigas.

A continuación, mostramos los resultados de diseño de las vigas donde se evidencia la revisión y el cumplimiento de la NSR-10.

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LOAD COMBINATIONS

No	Load combination
1	1.4D0 + 1.4DL
2	1.2D0 + 1.2DL + 1.6LL
3	1.2D0 + 1.2DL + LL + EQX + .3EQY
4	1.2D0 + 1.2DL + LL - EQX - .3EQY
5	1.2D0 + 1.2DL + LL + EQX - .3EQY
6	1.2D0 + 1.2DL + LL - EQX + .3EQY
7	1.2D0 + 1.2DL + LL + .3EQX + EQY
8	1.2D0 + 1.2DL + LL - .3EQX - EQY
9	1.2D0 + 1.2DL + LL - .3EQX + EQY
10	1.2D0 + 1.2DL + LL + .3EQX - EQY
11	.9D0 + .9DL + EQX + .3EQY
12	.9D0 + .9DL - EQX - .3EQY
13	.9D0 + .9DL + EQX - .3EQY
14	.9D0 + .9DL - EQX + .3EQY
15	.9D0 + .9DL + .3EQX + EQY
16	.9D0 + .9DL - .3EQX - EQY
17	.9D0 + .9DL - .3EQX + EQY
18	.9D0 + .9DL + .3EQX - EQY

MATERIALS

Number of materials = 2

REINFORCED CONCRETE

Mat	Name	f'c Kg/cm2	fy Kg/cm2	fys1 Kg/cm2	fys2 Kg/cm2	E Kg/cm2	G Kg/cm2	w Kg/m3
1	RConcrete1	210	4200	4200	4200	218540	87430	2400.0
2	RConcrete2	280	4200	4200	4200	252350	100940	2400.0

f'c: Compressive strength of concrete
fy: Yield strength of longitudinal reinforcement
fys1: Yiel strength of shear reinforcement, bar sizes <= 3/8"
fys2: Yiel strength of shear reinforcement, bar sizes > 3/8"

BEAM SECTIONS

Number of prismatic sections = 4

Sec	Name	Shape	b (cm)	h (cm)	tw (cm)	tf (cm)	P1 (cm)	P2 (cm)	A (cm2)	I2 (cm4)	I3 (cm4)	J (cm4)
1	VG40X40	Rectang	30.00	40.00	-	-	-	-	1200.0	160000	90000	189900
2	VT15X40	Rectang	15.00	40.00	-	-	-	-	600.0	80000	11250	34369
3	VG45X40	Rectang	45.00	40.00	-	-	-	-	1800.0	240000	303750	422400
4	VG55X40	Rectang	55.00	40.00	-	-	-	-	2200.0	293333	554583	635733

Design Results - Beams (DMO)

BEAM: GN(0a-14N) FLOOR: 2

	Length:	L = 0.23 m Lu = 0.03 m	a = 0.00 m c = 0.20 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2				
X, m:	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03
Mu(-), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
DESIGN	GN:0a				1 #3 @ 17.5						GN-14N

BEAM: GN(14N-10N) FLOOR: 2

	Length:	L = 8.51 m Lu = 8.11 m	a = 0.20 m c = 0.20 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2				
X, m:	0.20	1.01	1.82	2.63	3.44	4.26	5.07	5.88	6.69	7.50	8.31
Mu(-), ton-m:	-13.96	-7.29	-3.58	-3.58	-3.58	-3.58	-3.58	-3.58	-4.26	-10.39	-17.92
Mu(+), ton-m:	4.65	3.58	4.83	6.79	7.43	7.34	6.65	5.20	3.58	3.58	5.97
As(-), cm2:	11.30	5.61	3.62	3.62	3.62	3.62	3.62	3.62	3.62	8.18	15.01
As(+), cm2:	3.62	3.62	3.66	5.21	5.73	5.66	5.10	3.95	3.62	3.62	4.56
Vu, ton:	9.87	8.99	7.39	5.79	4.20	3.58	5.18	6.78	8.37	9.97	10.86
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50
DESIGN	GN-14N			11 #3 @ 7.5		37 #3 @ 17.5		11 #3 @ 7.5			GN-10N

BEAM: GN(10N-5N) FLOOR: 2

	Length:	L = 7.72 m Lu = 7.30 m	a = 0.20 m c = 0.23 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2				
X, m:	0.20	0.93	1.66	2.39	3.12	3.85	4.58	5.31	6.04	6.77	7.50
Mu(-), ton-m:	-19.31	-11.50	-5.15	-3.86	-3.86	-3.86	-3.86	-3.86	-4.79	-10.84	-18.40
Mu(+), ton-m:	6.44	3.86	3.86	5.07	6.12	6.43	6.60	5.81	4.00	3.86	6.13
As(-), cm2:	16.39	9.14	3.91	3.62	3.62	3.62	3.62	3.62	3.63	8.57	15.48
As(+), cm2:	4.93	3.62	3.62	3.85	4.67	4.92	5.06	4.43	3.62	3.62	4.69
Vu, ton:	12.41	11.47	9.62	7.77	5.88	3.93	5.53	7.37	9.22	11.07	12.01
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	GN-10N			11 #3 @ 7.5		32 #3 @ 17.5		11 #3 @ 7.5			GN-5N

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BEAM: GN(5N-3N) FLOOR: 2

Length: L = 6.71 m a = 0.23 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.26 m c = 0.23 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.85	1.48	2.10	2.73	3.36	3.98	4.61	5.24	5.86	6.49
Mu(-), ton-m:	-16.45	-10.54	-5.62	-3.29	-3.29	-3.29	-3.29	-3.29	-5.42	-10.28	-16.16
Mu(+), ton-m:	5.48	4.15	4.74	5.22	5.12	4.41	5.07	5.20	4.71	4.13	5.39
As(-), cm2:	13.60	8.31	4.28	3.62	3.62	3.62	3.62	3.62	4.12	8.09	13.32
As(+), cm2:	4.17	3.62	3.62	3.96	3.89	3.62	3.85	3.95	3.62	3.62	4.09
Vu, ton:	10.22	9.61	8.19	6.76	5.33	3.91	5.27	6.70	8.12	9.55	10.16
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

GN-5N 11 #3 @ 7.5 26 #3 @ 17.5 11 #3 @ 7.5 GN-3N

BEAM: GN(3N-1N) FLOOR: 2

Length: L = 6.31 m a = 0.23 m Section: b = 30.0 cm Sec: VG40X40
Lu = 5.89 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.81	1.40	1.99	2.58	3.17	3.76	4.35	4.94	5.52	6.11
Mu(-), ton-m:	-15.30	-10.15	-5.78	-3.06	-3.06	-3.06	-3.06	-3.06	-5.29	-9.42	-14.37
Mu(+), ton-m:	5.10	4.88	4.93	4.87	4.43	3.63	4.79	5.46	5.47	5.52	5.28
As(-), cm2:	12.52	7.98	4.41	3.62	3.62	3.62	3.62	3.62	4.02	7.37	11.67
As(+), cm2:	3.87	3.70	3.73	3.69	3.62	3.62	3.62	4.15	4.16	4.20	4.01
Vu, ton:	9.20	8.75	7.57	6.39	5.22	4.06	4.90	6.08	7.26	8.44	8.89
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

GN-3N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 GN-1N

BEAM: E(1Na-14N) FLOOR: 2

Length: L = 0.21 m a = 0.00 m Section: b = 30.0 cm Sec: VG40X40
Lu = 0.01 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Mu(-), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

E:1Na 1 #3 @ 17.5 E-14N

BEAM: E(14N-10N) FLOOR: 2

	Length:	L = 5.05 m Lu = 4.63 m	a = 0.20 m c = 0.23 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.20	0.66	1.13	1.59	2.05	2.51	2.98	3.44	3.90	4.37	4.83
Mu(-), ton-m:	-11.11	-6.92	-3.71	-3.36	-3.36	-3.36	-3.36	-3.36	-6.78	-11.44	-16.82
Mu(+), ton-m:	6.07	6.22	6.29	5.97	4.98	3.89	4.46	4.41	4.35	4.10	5.61
As(-), cm2:	8.80	5.32	3.62	3.62	3.62	3.62	3.62	3.62	5.20	9.08	13.95
As(+), cm2:	4.64	4.75	4.81	4.55	3.77	3.62	3.62	3.62	3.62	3.62	4.27
Vu, ton:	10.44	10.12	8.70	7.27	5.84	6.57	8.00	9.42	10.85	12.28	12.59
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	E-14N	11 #3 @ 7.5	17 #3 @ 17.5	11 #3 @ 7.5	E-10N						

BEAM: E(10N-5N) FLOOR: 2

	Length:	L = 7.72 m Lu = 7.27 m	a = 0.23 m c = 0.23 m	Section:	b = 45.0 cm h = 40.0 cm	Sec: Mat:	VG45X40 RConcrete2			
X, m:	0.23	0.95	1.68	2.41	3.13	3.86	4.59	5.31	6.04	6.77	7.50
Mu(-), ton-m:	-31.06	-17.39	-6.54	-6.28	-6.28	-6.28	-6.28	-6.28	-6.85	-17.72	-31.40
Mu(+), ton-m:	10.35	6.28	6.28	9.41	11.80	12.83	12.07	9.68	6.28	6.28	10.47
As(-), cm2:	26.71	13.82	5.42	5.42	5.42	5.42	5.42	5.42	5.42	14.10	27.06
As(+), cm2:	7.95	5.42	5.42	7.20	9.13	9.97	9.34	7.42	5.42	5.42	8.04
Vu, ton:	21.50	19.65	15.99	12.33	8.67	5.02	8.68	12.34	16.00	19.66	21.51
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	E-10N	11 #3+1r @ 7.5	32 #3 @ 17.5	11 #3+1r @ 7.5	E-5N						

BEAM: E(5N-3N) FLOOR: 2

	Length:	L = 6.71 m Lu = 6.24 m	a = 0.23 m c = 0.25 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.23	0.85	1.47	2.10	2.72	3.34	3.97	4.59	5.22	5.84	6.46
Mu(-), ton-m:	-23.68	-14.43	-6.39	-4.89	-4.89	-4.89	-4.89	-4.89	-6.03	-14.15	-24.43
Mu(+), ton-m:	7.89	4.89	4.89	6.59	8.19	8.87	8.77	7.40	4.89	4.89	8.14
As(-), cm2:	20.64	11.73	4.89	3.70	3.70	3.70	3.70	3.70	4.60	11.47	21.26
As(+), cm2:	6.11	3.70	3.70	5.05	6.35	6.91	6.83	5.70	3.70	3.70	6.31
Vu, ton:	17.78	17.41	14.87	12.16	8.96	5.84	8.13	11.17	14.20	17.24	18.53
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	E-5N	11 #3 @ 7.5	26 #3 @ 17.5	11 #3 @ 7.5	E-3N						

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
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BEAM: E(3N-1N) FLOOR: 2

	Length:	L = 6.31 m Lu = 5.86 m	a = 0.25 m c = 0.20 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.25	0.84	1.42	2.01	2.60	3.18	3.77	4.35	4.94	5.53	6.11
Mu(-), ton-m:	-21.25	-13.21	-6.62	-4.25	-4.25	-4.25	-4.25	-4.25	-5.05	-11.15	-18.72
Mu(+), ton-m:	7.08	4.25	4.80	6.09	6.77	6.65	7.21	7.03	5.61	4.34	6.24
As(-), cm2:	18.37	10.63	5.08	3.62	3.62	3.62	3.62	3.62	3.83	8.83	15.79
As(+), cm2:	5.45	3.62	3.64	4.65	5.19	5.10	5.55	5.41	4.27	3.62	4.77
Vu, ton:	14.98	14.15	11.99	9.84	7.68	5.58	7.05	9.20	11.36	13.52	14.35
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	E-3N			11 #3 @ 7.5	24 #3 @ 17.5	11 #3 @ 7.5					E-1N

BEAM: F(3N'a-10N) FLOOR: 2

	Length:	L = 1.77 m Lu = 1.52 m	a = 0.00 m c = 0.25 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.00	0.15	0.30	0.46	0.61	0.76	0.91	1.07	1.22	1.37	1.52
Mu(-), ton-m:	0.00	-0.03	-0.10	-0.21	-0.37	-0.57	-0.81	-1.10	-1.44	-1.82	-2.24
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.00	0.29	0.59	0.88	1.17	1.47	1.76	2.05	2.24	2.24	2.24
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
DESIGN	F:3N'a				10 #3 @ 17.5						F-14N

BEAM: F(10N-5N) FLOOR: 2

	Length:	L = 7.72 m Lu = 7.25 m	a = 0.25 m c = 0.23 m	Section:	b = 45.0 cm h = 40.0 cm	Sec: Mat:	VG45X40 RConcrete2			
X, m:	0.25	0.97	1.70	2.42	3.15	3.87	4.60	5.32	6.05	6.77	7.50
Mu(-), ton-m:	-30.89	-18.05	-7.78	-6.18	-6.18	-6.18	-6.18	-6.18	-6.51	-16.59	-29.22
Mu(+), ton-m:	10.30	6.18	6.18	9.30	11.23	11.55	11.00	9.29	6.18	6.18	9.74
As(-), cm2:	26.54	14.40	5.91	5.42	5.42	5.42	5.42	5.42	5.42	13.13	24.83
As(+), cm2:	7.91	5.42	5.42	7.11	8.66	8.92	8.47	7.10	5.42	5.42	7.46
Vu, ton:	20.40	18.83	15.70	12.52	9.19	5.95	8.88	12.21	15.50	18.63	20.20
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	F-14N			11 #3+1r @ 7.5	32 #3 @ 17.5	11 #3+1r @ 7.5					F-5N

BEAM: F(5N-3N) FLOOR: 2

	Length:	L = 6.71 m Lu = 6.24 m	a = 0.23 m c = 0.25 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.23	0.85	1.47	2.10	2.72	3.34	3.97	4.59	5.22	5.84	6.46
Mu(-), ton-m:	-23.15	-14.16	-6.32	-4.79	-4.79	-4.79	-4.79	-4.79	-5.83	-13.81	-23.96
Mu(+), ton-m:	7.72	4.79	4.79	6.25	7.95	8.72	8.64	7.25	4.79	4.79	7.99
As(-), cm2:	20.20	11.48	4.83	3.63	3.63	3.63	3.63	3.63	4.44	11.17	20.86
As(+), cm2:	5.96	3.63	3.63	4.78	6.16	6.78	6.72	5.59	3.63	3.63	6.18
Vu, ton:	17.26	16.87	14.53	12.01	8.82	5.68	7.93	10.96	13.98	17.01	18.29
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-5N 11 #3 @ 7.5 26 #3 @ 17.5 11 #3 @ 7.5 F-3N

BEAM: F(3N-1N) FLOOR: 2

	Length:	L = 6.31 m Lu = 5.86 m	a = 0.25 m c = 0.20 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.25	0.84	1.42	2.01	2.60	3.18	3.77	4.35	4.94	5.53	6.11
Mu(-), ton-m:	-20.96	-12.97	-6.44	-4.19	-4.19	-4.19	-4.19	-4.19	-4.88	-10.93	-18.45
Mu(+), ton-m:	6.99	4.19	4.66	6.01	6.74	6.68	7.18	6.94	5.45	4.19	6.15
As(-), cm2:	18.07	10.42	4.93	3.62	3.62	3.62	3.62	3.62	3.70	8.64	15.53
As(+), cm2:	5.37	3.62	3.62	4.59	5.17	5.12	5.52	5.34	4.15	3.62	4.70
Vu, ton:	14.92	14.08	11.92	9.77	7.61	5.50	6.98	9.14	11.30	13.46	14.29
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-3N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 F-1N

BEAM: G(1Na-10N) FLOOR: 2

	Length:	L = 0.21 m Lu = 0.01 m	a = 0.00 m c = 0.20 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Mu(-), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

G:1Na 1 #3 @ 17.5 G-10N

BEAM: G(10N-5N) FLOOR: 2

Length: L = 5.81 m a = 0.20 m Section: b = 30.0 cm Sec: VG40X40
Lu = 5.39 m c = 0.23 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.74	1.28	1.82	2.36	2.89	3.43	3.97	4.51	5.05	5.59
Mu(-), ton-m:	-15.58	-9.63	-4.81	-3.53	-3.53	-3.53	-3.53	-3.53	-5.97	-11.28	-17.66
Mu(+), ton-m:	5.19	5.02	5.59	6.26	5.97	5.06	5.39	5.23	4.62	3.86	5.89
As(-), cm2:	12.79	7.55	3.65	3.62	3.62	3.62	3.62	3.62	4.55	8.94	14.76
As(+), cm2:	3.94	3.81	4.26	4.79	4.55	3.84	4.10	3.97	3.62	3.62	4.49
Vu, ton:	11.86	11.28	9.55	7.81	6.08	5.09	6.81	8.54	10.28	12.01	12.59
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-10N 11 #3 @ 7.5 21 #3 @ 17.5 11 #3 @ 7.5 G-5N

BEAM: G(5N-3N) FLOOR: 2

Length: L = 6.71 m a = 0.23 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.24 m c = 0.25 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.85	1.47	2.10	2.72	3.34	3.97	4.59	5.22	5.84	6.46
Mu(-), ton-m:	-21.90	-13.23	-5.72	-4.75	-4.75	-4.75	-4.75	-4.75	-5.82	-13.74	-23.77
Mu(+), ton-m:	7.30	4.75	4.75	6.60	8.13	8.74	8.50	7.04	4.75	4.75	7.92
As(-), cm2:	19.07	10.65	4.36	3.62	3.62	3.62	3.62	3.62	4.44	11.11	20.71
As(+), cm2:	5.62	3.62	3.62	5.06	6.30	6.80	6.60	5.41	3.62	3.62	6.13
Vu, ton:	16.65	16.27	13.98	11.52	8.41	5.46	7.96	10.91	13.86	16.82	18.06
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-5N 11 #3 @ 7.5 26 #3 @ 17.5 11 #3 @ 7.5 G-3N

BEAM: G(3N-1N) FLOOR: 2

Length: L = 6.31 m a = 0.25 m Section: b = 30.0 cm Sec: VG40X40
Lu = 5.86 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.25	0.84	1.42	2.01	2.60	3.18	3.77	4.35	4.94	5.53	6.11
Mu(-), ton-m:	-20.95	-12.89	-6.31	-4.19	-4.19	-4.19	-4.19	-4.19	-4.71	-10.78	-18.37
Mu(+), ton-m:	6.98	4.19	4.48	5.95	6.78	6.81	7.24	6.92	5.31	4.19	6.12
As(-), cm2:	18.06	10.34	4.82	3.62	3.62	3.62	3.62	3.62	3.62	8.52	15.45
As(+), cm2:	5.37	3.62	3.62	4.54	5.21	5.23	5.58	5.32	4.04	3.62	4.68
Vu, ton:	15.11	14.26	12.06	9.86	7.66	5.51	7.01	9.21	11.41	13.61	14.46
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-3N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 G-1N

BEAM: HN(10N-5N) FLOOR: 2

Length:	L = 2.77 m	a = 0.20 m	Section:	b = 45.0 cm	Sec:	VG45X40				
	Lu = 2.37 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.44	0.67	0.91	1.15	1.39	1.62	1.86	2.10	2.34	2.57
Mu(-), ton-m:	-17.33	-13.78	-10.36	-7.09	-3.96	-3.70	-3.70	-6.95	-10.66	-14.52	-18.51
Mu(+), ton-m:	15.28	12.45	9.54	6.53	3.70	3.70	3.70	4.99	7.73	10.38	12.94
As(-), cm2:	13.77	10.75	7.96	5.42	5.42	5.42	5.42	5.42	8.20	11.37	14.80
As(+), cm2:	12.01	9.66	7.30	5.42	5.42	5.42	5.42	5.42	5.87	7.97	10.06
Vu, ton:	16.78	16.78	16.51	15.97	16.20	16.74	17.28	17.82	18.36	18.63	18.63
Tu, ton-m:	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Stirrup:	#3+1r	#3+1r	#3+1r	#3+1r	#3	#3	#3	#3+1r	#3+1r	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	7.50	7.50	17.50	17.50	17.50	7.50	7.50	7.50	7.50

DESIGN

HN-10N 32 #3+1r @ 7.5 HN-5N

BEAM: HN(5N-3N) FLOOR: 2

Length:	L = 6.71 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40				
	Lu = 6.31 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.83	1.46	2.09	2.73	3.36	3.99	4.62	5.25	5.88	6.51
Mu(-), ton-m:	-15.57	-8.71	-3.61	-3.61	-3.61	-3.61	-3.61	-3.61	-4.38	-10.44	-18.03
Mu(+), ton-m:	5.19	3.61	3.61	5.15	6.40	6.97	6.76	5.43	3.61	3.61	6.01
As(-), cm2:	12.78	6.78	3.62	3.62	3.62	3.62	3.62	3.62	3.62	8.23	15.11
As(+), cm2:	3.94	3.62	3.62	3.91	4.90	5.35	5.19	4.13	3.62	3.62	4.59
Vu, ton:	12.63	12.19	10.09	7.90	5.58	3.55	5.83	8.15	10.46	12.78	13.78
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

HN-5N 11 #3 @ 7.5 26 #3 @ 17.5 11 #3 @ 7.5 HN-3N

BEAM: HN(3N-1N) FLOOR: 2

Length:	L = 6.31 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40				
	Lu = 5.91 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.79	1.38	1.97	2.57	3.16	3.75	4.34	4.93	5.52	6.11
Mu(-), ton-m:	-18.19	-11.12	-5.38	-3.64	-3.64	-3.64	-3.64	-3.64	-4.73	-9.94	-16.37
Mu(+), ton-m:	6.06	3.64	3.72	4.95	5.70	5.96	6.40	6.12	4.96	3.64	5.46
As(-), cm2:	15.27	8.80	4.09	3.62	3.62	3.62	3.62	3.62	3.62	7.80	13.52
As(+), cm2:	4.63	3.62	3.62	3.76	4.34	4.55	4.90	4.68	3.76	3.62	4.15
Vu, ton:	13.32	12.53	10.51	8.48	6.46	4.59	6.47	8.49	10.51	12.53	13.25
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

HN-3N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 HN-1N

BEAM: GN(10N-5N) FLOOR: CUB

	Length:	L = 7.72 m Lu = 7.30 m	a = 0.20 m c = 0.23 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.20	0.93	1.66	2.39	3.12	3.85	4.58	5.31	6.04	6.77	7.50
Mu(-), ton-m:	-14.53	-7.80	-3.75	-3.75	-3.75	-3.75	-3.75	-3.75	-4.69	-11.02	-18.77
Mu(+), ton-m:	4.84	3.75	5.77	7.51	7.92	7.31	6.58	5.21	3.75	3.75	6.26
As(-), cm2:	11.82	6.03	3.62	3.62	3.62	3.62	3.62	3.62	3.62	8.72	15.84
As(+), cm2:	3.67	3.62	4.40	5.79	6.12	5.63	5.05	3.96	3.62	3.62	4.78
Vu, ton:	10.90	10.01	8.26	6.50	4.75	4.20	5.96	7.71	9.47	11.22	12.11
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	GN-10N			11 #3 @ 7.5		32 #3 @ 17.5		11 #3 @ 7.5			GN-5N

BEAM: GN(5N-3N) FLOOR: CUB

	Length:	L = 6.71 m Lu = 6.26 m	a = 0.23 m c = 0.23 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.23	0.85	1.48	2.10	2.73	3.36	3.98	4.61	5.24	5.86	6.49
Mu(-), ton-m:	-15.03	-9.54	-4.98	-3.01	-3.01	-3.01	-3.01	-3.01	-4.36	-8.70	-14.00
Mu(+), ton-m:	5.01	3.01	3.41	4.11	4.36	3.95	4.49	4.43	3.73	3.01	4.67
As(-), cm2:	12.28	7.47	3.78	3.62	3.62	3.62	3.62	3.62	3.62	6.77	11.34
As(+), cm2:	3.80	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	9.72	9.13	7.76	6.39	5.02	3.65	4.71	6.08	7.45	8.83	9.41
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	GN-5N			11 #3 @ 7.5		26 #3 @ 17.5		11 #3 @ 7.5			GN-3N

BEAM: GN(3N-1N) FLOOR: CUB

	Length:	L = 6.31 m Lu = 5.89 m	a = 0.23 m c = 0.20 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.23	0.81	1.40	1.99	2.58	3.17	3.76	4.35	4.94	5.52	6.11
Mu(-), ton-m:	-13.62	-8.83	-4.79	-2.72	-2.72	-2.72	-2.72	-2.72	-3.91	-7.46	-11.82
Mu(+), ton-m:	4.54	3.44	3.87	4.18	4.11	3.69	4.72	5.20	4.99	4.70	4.17
As(-), cm2:	10.99	6.87	3.63	3.62	3.62	3.62	3.62	3.62	3.62	5.75	9.41
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.95	3.78	3.62	3.62
Vu, ton:	8.64	8.20	7.07	5.93	4.80	3.67	4.18	5.31	6.44	7.57	8.01
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	GN-3N			11 #3 @ 7.5		24 #3 @ 17.5		11 #3 @ 7.5			GN-1N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:13 p. m. 4/01/2020

BEAM: E(10N-5N) FLOOR: CUB

Length: L = 7.72 m a = 0.23 m Section: b = 30.0 cm Sec: VG40X40
Lu = 7.27 m c = 0.23 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.95	1.68	2.41	3.13	3.86	4.59	5.31	6.04	6.77	7.50
Mu(-), ton-m:	-23.78	-12.17	-5.68	-5.68	-5.68	-5.68	-5.68	-5.68	-5.68	-15.68	-28.39
Mu(+), ton-m:	7.93	5.68	5.69	10.09	12.11	12.34	10.37	7.24	5.68	5.68	9.46
As(-), cm2:	20.72	9.71	4.33	4.33	4.33	4.33	4.33	4.33	4.33	12.88	24.53
As(+), cm2:	6.13	4.33	4.33	7.93	9.66	9.86	8.16	5.57	4.33	4.33	7.40
Vu, ton:	18.69	16.99	13.62	10.26	6.90	5.00	8.36	11.73	15.09	18.45	20.15
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

E-10N 11 #3 @ 7.5 30 #3 @ 17.5 2 #3 @ 15 11 #3 @ 7.5 E-5N

BEAM: E(5N-3N) FLOOR: CUB

Length: L = 6.71 m a = 0.23 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.24 m c = 0.25 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.85	1.47	2.10	2.72	3.34	3.97	4.59	5.22	5.84	6.46
Mu(-), ton-m:	-24.75	-13.78	-4.95	-4.95	-4.95	-4.95	-4.95	-4.95	-5.80	-13.04	-21.96
Mu(+), ton-m:	8.25	4.95	4.95	8.17	8.77	8.44	7.69	5.92	4.95	4.95	7.32
As(-), cm2:	23.33	12.92	5.02	4.68	4.32	4.32	4.32	4.32	4.99	11.05	19.70
As(+), cm2:	8.21	5.53	5.02	7.26	7.40	7.12	6.51	5.09	4.32	4.32	6.21
Vu, ton:	21.29	20.90	16.65	12.12	6.82	6.33	8.82	11.20	13.57	15.95	16.96
Tu, ton-m:	1.23	1.21	0.86	0.63	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

E-5N 24 #3 @ 7.5 19 #3 @ 17.5 2 #3 @ 15 11 #3 @ 7.5 E-3N

BEAM: E(3N-1N) FLOOR: CUB

Length: L = 6.31 m a = 0.25 m Section: b = 30.0 cm Sec: VG40X40
Lu = 5.86 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.25	0.84	1.42	2.01	2.60	3.18	3.77	4.35	4.94	5.53	6.11
Mu(-), ton-m:	-19.82	-12.16	-5.86	-3.96	-3.96	-3.96	-3.96	-3.96	-3.96	-8.48	-15.21
Mu(+), ton-m:	6.61	3.96	3.96	5.40	6.48	6.69	7.24	7.04	5.57	3.96	5.07
As(-), cm2:	16.90	9.70	4.47	3.62	3.62	3.62	3.62	3.62	3.62	6.59	12.45
As(+), cm2:	5.07	3.62	3.62	4.10	4.96	5.14	5.58	5.41	4.24	3.62	3.85
Vu, ton:	14.44	13.64	11.58	9.51	7.44	5.38	6.12	8.19	10.26	12.32	13.12
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

E-3N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 E-1N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:13 p. m. 4/01/2020

BEAM: E'(5N'-3N') FLOOR: CUB

Length:	L = 1.15 m	a = 0.00 m	Section:	b = 15.0 cm	Sec:	VT15X40				
	Lu = 1.15 m	c = 0.00 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.00	0.11	0.23	0.34	0.46	0.57	0.69	0.80	0.92	1.03	1.15
Mu(-), ton-m:	-0.23	-0.15	-0.07	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.05	0.10	0.14	0.17	0.20	0.21	0.22
As(-), cm2:	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32
As(+), cm2:	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32
Vu, ton:	0.53	0.53	0.53	0.53	0.46	0.39	0.32	0.25	0.18	0.10	0.03
Tu, ton-m:	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

E'-5N' 7 #3 @ 17.5 E'-3N'

BEAM: F(3N'b-10N) FLOOR: CUB

Length:	L = 0.35 m	a = 0.00 m	Section:	b = 30.0 cm	Sec:	VG40X40				
	Lu = 0.10 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
Mu(-), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.00	0.01	0.01	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

F:3N'b 1 #3 @ 17.5 F-14N

BEAM: F(10N-5N) FLOOR: CUB

Length:	L = 7.72 m	a = 0.25 m	Section:	b = 30.0 cm	Sec:	VG40X40				
	Lu = 7.25 m	c = 0.23 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.25	0.97	1.70	2.42	3.15	3.87	4.60	5.32	6.05	6.77	7.50
Mu(-), ton-m:	-21.74	-11.25	-5.46	-5.46	-5.46	-5.46	-5.46	-5.46	-6.05	-15.56	-27.31
Mu(+), ton-m:	7.25	5.46	5.46	9.00	10.64	10.60	8.82	5.90	5.46	5.46	9.10
As(-), cm2:	18.90	8.92	4.15	4.15	4.15	4.15	4.15	4.15	4.62	12.76	23.64
As(+), cm2:	5.58	4.15	4.15	7.01	8.40	8.36	6.87	4.50	4.15	4.15	7.10
Vu, ton:	17.14	15.59	12.53	9.46	6.39	5.04	8.11	11.18	14.25	17.32	18.86
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-14N 11 #3 @ 7.5 32 #3 @ 17.5 11 #3 @ 7.5 F-5N

BEAM: F(5N-3N) FLOOR: CUB

Length: L = 6.71 m a = 0.23 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.24 m c = 0.25 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.85	1.47	2.10	2.72	3.34	3.97	4.59	5.22	5.84	6.46
Mu(-), ton-m:	-29.43	-14.60	-5.89	-5.89	-5.89	-5.89	-5.89	-5.89	-6.78	-14.30	-23.08
Mu(+), ton-m:	9.81	5.89	5.89	13.49	12.17	10.21	7.95	5.89	5.89	5.89	7.69
As(-), cm2:	25.92	12.40	4.49	4.49	4.49	4.49	4.49	4.49	5.21	11.61	20.14
As(+), cm2:	8.22	5.01	4.49	10.88	9.71	8.03	6.15	4.49	4.49	4.49	5.94
Vu, ton:	29.41	29.02	23.66	15.29	8.01	9.84	11.68	13.51	15.35	17.18	17.96
Tu, ton-m:	0.36	0.35	0.26	0.19	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	6.25	6.25	7.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-5N 13 #3 @ 6.25 13 #3 @ 7.5 20 #3 @ 17.5 11 #3 @ 7.5 F-3N

BEAM: F(3N-1N) FLOOR: CUB

Length: L = 6.31 m a = 0.25 m Section: b = 30.0 cm Sec: VG40X40
Lu = 5.86 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.25	0.84	1.42	2.01	2.60	3.18	3.77	4.35	4.94	5.53	6.11
Mu(-), ton-m:	-19.69	-12.06	-5.79	-3.94	-3.94	-3.94	-3.94	-3.94	-3.94	-8.13	-14.75
Mu(+), ton-m:	6.56	3.94	3.94	5.11	6.31	6.63	7.15	6.91	5.40	3.94	4.92
As(-), cm2:	16.77	9.62	4.41	3.62	3.62	3.62	3.62	3.62	3.62	6.30	12.02
As(+), cm2:	5.03	3.62	3.62	3.88	4.83	5.08	5.50	5.31	4.10	3.62	3.73
Vu, ton:	14.46	13.66	11.59	9.52	7.45	5.38	6.01	8.08	10.15	12.22	13.02
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-3N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 F-1N

BEAM: G(1Na-10N) FLOOR: CUB

Length: L = 0.21 m a = 0.00 m Section: b = 30.0 cm Sec: VG40X40
Lu = 0.01 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Mu(-), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

G:1Na 1 #3 @ 17.5 G-10N

BEAM: G(10N-5N) FLOOR: CUB

Length: L = 5.81 m a = 0.20 m Section: b = 30.0 cm Sec: VG40X40
Lu = 5.39 m c = 0.23 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.74	1.28	1.82	2.36	2.89	3.43	3.97	4.51	5.05	5.59
Mu(-), ton-m:	-10.86	-6.21	-3.73	-3.73	-3.73	-3.73	-3.73	-3.73	-6.81	-12.30	-18.67
Mu(+), ton-m:	3.73	4.80	5.66	6.05	5.51	4.20	3.73	3.73	3.73	3.73	6.22
As(-), cm2:	8.58	4.75	3.62	3.62	3.62	3.62	3.62	3.62	5.23	9.83	15.75
As(+), cm2:	3.62	3.63	4.31	4.62	4.19	3.62	3.62	3.62	3.62	3.62	4.76
Vu, ton:	10.37	9.82	8.16	6.50	4.89	6.07	7.73	9.39	11.06	12.72	13.27
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-10N 11 #3 @ 7.5 21 #3 @ 17.5 11 #3 @ 7.5 G-5N

BEAM: G(5N-3N) FLOOR: CUB

Length: L = 6.71 m a = 0.23 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.24 m c = 0.25 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.85	1.47	2.10	2.72	3.34	3.97	4.59	5.22	5.84	6.46
Mu(-), ton-m:	-26.12	-12.44	-5.22	-5.22	-5.22	-5.22	-5.22	-5.22	-6.63	-13.87	-22.29
Mu(+), ton-m:	8.71	5.22	6.00	13.18	11.85	9.89	7.59	5.22	5.22	5.22	7.43
As(-), cm2:	22.65	9.95	3.97	3.97	3.97	3.97	3.97	3.97	5.08	11.22	19.48
As(+), cm2:	6.77	3.97	4.58	10.60	9.43	7.76	5.86	3.97	3.97	3.97	5.73
Vu, ton:	27.14	26.76	21.50	13.83	7.57	9.30	11.03	12.76	14.49	16.21	16.95
Tu, ton-m:	0.34	0.32	0.12	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	10.00	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-5N 24 #3 @ 7.5 20 #3 @ 17.5 11 #3 @ 7.5 G-3N

BEAM: G(3N-1N) FLOOR: CUB

Length: L = 6.31 m a = 0.25 m Section: b = 30.0 cm Sec: VG40X40
Lu = 5.86 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.25	0.84	1.42	2.01	2.60	3.18	3.77	4.35	4.94	5.53	6.11
Mu(-), ton-m:	-19.51	-11.83	-5.55	-3.90	-3.90	-3.90	-3.90	-3.90	-3.90	-7.91	-14.58
Mu(+), ton-m:	6.50	3.90	3.90	5.07	6.38	6.80	7.22	6.86	5.21	3.90	4.86
As(-), cm2:	16.59	9.42	4.23	3.62	3.62	3.62	3.62	3.62	3.62	6.12	11.87
As(+), cm2:	4.98	3.62	3.62	3.85	4.88	5.22	5.56	5.27	3.96	3.62	3.68
Vu, ton:	14.59	13.77	11.66	9.55	7.44	5.33	6.01	8.13	10.24	12.35	13.16
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-3N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 G-1N

BEAM: G'(5N'-3N') FLOOR: CUB

Length:	L = 1.15 m		a = 0.00 m	Section:	b = 15.0 cm		Sec:	VT15X40		
	Lu = 1.15 m		c = 0.00 m		h = 40.0 cm		Mat:	RConcrete2		
X, m:	0.00	0.11	0.23	0.34	0.46	0.57	0.69	0.80	0.92	1.03	1.15
Mu(-), ton-m:	-0.13	-0.07	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.03	0.06	0.09	0.11	0.13	0.14	0.14	0.14
As(-), cm2:	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
As(+), cm2:	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
Vu, ton:	0.34	0.34	0.34	0.34	0.29	0.23	0.17	0.12	0.06	0.02	0.08
Tu, ton-m:	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
DESIGN	G'-5N'				7 #3 @ 17.5						G'-3N'

BEAM: HN(10N-5N) FLOOR: CUB

Length:	L = 2.77 m		a = 0.20 m	Section:	b = 30.0 cm		Sec:	VG40X40		
	Lu = 2.37 m		c = 0.20 m		h = 40.0 cm		Mat:	RConcrete2		
X, m:	0.20	0.44	0.67	0.91	1.15	1.39	1.62	1.86	2.10	2.34	2.57
Mu(-), ton-m:	-9.74	-7.92	-6.22	-4.66	-3.22	-2.74	-3.33	-5.61	-8.17	-10.87	-13.69
Mu(+), ton-m:	8.77	7.10	5.36	3.53	2.74	2.74	2.74	2.74	2.74	3.47	4.56
As(-), cm2:	7.64	6.13	4.76	3.62	3.62	3.62	3.62	4.27	6.33	8.59	11.06
As(+), cm2:	6.82	5.46	4.07	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	10.91	10.91	11.15	11.64	12.12	12.61	13.10	13.59	14.07	14.31	14.31
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	7.50	17.50	17.50	17.50	7.50	7.50	7.50	7.50
DESIGN	HN-10N				32 #3 @ 7.5						HN-5N

BEAM: HN(5N-3N) FLOOR: CUB

Length:	L = 6.71 m		a = 0.20 m	Section:	b = 30.0 cm		Sec:	VG40X40		
	Lu = 6.31 m		c = 0.20 m		h = 40.0 cm		Mat:	RConcrete2		
X, m:	0.20	0.83	1.46	2.09	2.73	3.36	3.99	4.62	5.25	5.88	6.51
Mu(-), ton-m:	-15.18	-7.04	-3.18	-3.18	-3.18	-3.18	-3.18	-3.18	-4.26	-9.55	-15.89
Mu(+), ton-m:	5.06	3.18	3.93	7.49	7.43	6.74	5.49	3.60	3.18	3.18	5.30
As(-), cm2:	13.48	6.48	4.42	4.20	3.62	3.62	3.62	3.62	3.62	7.48	13.07
As(+), cm2:	4.90	4.68	4.42	6.36	5.73	5.17	4.18	3.62	3.62	3.62	4.02
Vu, ton:	15.84	15.61	11.74	8.01	3.84	5.22	6.77	8.31	9.86	11.40	12.07
Tu, ton-m:	0.73	0.73	0.55	0.40	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	HN-5N			11 #3 @ 7.5	26 #3 @ 17.5		11 #3 @ 7.5				HN-3N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:13 p. m. 4/01/2020

BEAM: HN(3N-1N) FLOOR: CUB

Length:	L = 6.31 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40				
	Lu = 5.91 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.79	1.38	1.97	2.57	3.16	3.75	4.34	4.93	5.52	6.11
Mu(-), ton-m:	-16.04	-9.44	-4.17	-3.21	-3.21	-3.21	-3.21	-3.21	-3.21	-7.27	-12.95
Mu(+), ton-m:	5.35	3.21	3.21	4.14	5.38	6.05	6.45	6.01	4.51	3.21	4.32
As(-), cm2:	13.21	7.39	3.62	3.62	3.62	3.62	3.62	3.62	3.62	5.60	10.40
As(+), cm2:	4.06	3.62	3.62	3.62	4.09	4.62	4.94	4.59	3.62	3.62	3.62
Vu, ton:	12.59	11.83	9.89	7.96	6.02	4.08	5.51	7.45	9.39	11.33	12.01
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

HN-3N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 HN-1N

BEAM: 14N(GN-E) FLOOR: 2

Length:	L = 7.94 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40				
	Lu = 7.54 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.95	1.71	2.46	3.22	3.97	4.73	5.48	6.23	6.99	7.74
Mu(-), ton-m:	-12.69	-6.01	-3.75	-3.75	-3.75	-3.75	-3.75	-3.75	-4.11	-10.68	-18.77
Mu(+), ton-m:	4.23	3.75	4.52	6.91	7.84	7.80	6.19	3.95	3.75	3.75	6.26
As(-), cm2:	10.17	4.59	3.62	3.62	3.62	3.62	3.62	3.62	3.62	8.43	15.85
As(+), cm2:	3.62	3.62	3.62	5.31	6.06	6.03	4.73	3.62	3.62	3.62	4.79
Vu, ton:	11.02	9.99	8.00	6.01	4.03	3.76	5.74	7.73	9.71	11.70	12.77
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

GN-14N 11 #3 @ 7.5 33 #3 @ 17.5 11 #3 @ 7.5 E-14N

BEAM: 14N(E-F) FLOOR: 2

Length:	L = 8.82 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40				
	Lu = 8.37 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	1.04	1.87	2.71	3.55	4.38	5.22	6.06	6.89	7.73	8.57
Mu(-), ton-m:	-18.54	-9.57	-3.96	-3.96	-3.96	-3.96	-3.96	-3.96	-3.96	-10.72	-19.81
Mu(+), ton-m:	6.18	3.96	3.96	5.44	7.85	8.79	7.87	5.61	3.96	3.96	6.60
As(-), cm2:	15.62	7.49	3.62	3.62	3.62	3.62	3.62	3.62	3.62	8.46	16.89
As(+), cm2:	4.72	3.62	3.62	4.14	6.07	6.85	6.09	4.27	3.62	3.62	5.06
Vu, ton:	12.23	10.82	8.48	6.25	4.02	2.05	4.18	6.41	8.64	10.99	12.40
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50

DESIGN

E-14N 11 #3 @ 7.5 38 #3 @ 17.5 11 #3 @ 7.5 F-14N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:13 p. m. 4/01/2020

BEAM: 14N(F-Fb) FLOOR: 2

	Length:	L = 3.67 m	a = 0.25 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 3.42 m	c = 0.00 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.25	0.59	0.93	1.28	1.62	1.96	2.30	2.64	2.99	3.33	3.67
Mu(-), ton-m:	-8.92	-7.25	-5.75	-4.42	-3.26	-2.28	-1.47	-0.83	-0.38	-0.10	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	6.95	5.58	4.38	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	4.64	4.64	4.15	3.63	3.12	2.60	2.08	1.56	1.05	0.52	0.00
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

F-14N 20 #3 @ 17.5 14N:Fb

BEAM: 10N(GN-E) FLOOR: 2

	Length:	L = 7.15 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 6.73 m	c = 0.23 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.87	1.55	2.22	2.89	3.56	4.24	4.91	5.58	6.25	6.93
Mu(-), ton-m:	-21.80	-11.39	-5.00	-5.00	-5.00	-5.00	-5.00	-5.00	-5.17	-13.96	-25.02
Mu(+), ton-m:	7.27	5.00	5.00	8.35	10.18	10.81	9.42	6.91	5.00	5.00	8.34
As(-), cm2:	18.96	9.03	3.80	3.80	3.80	3.80	3.80	3.80	3.93	11.31	21.75
As(+), cm2:	5.60	3.80	3.80	6.48	8.00	8.54	7.36	5.31	3.80	3.80	6.47
Vu, ton:	17.87	16.39	13.22	10.04	6.86	4.70	7.83	11.01	14.19	17.37	18.84
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

GN-10N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 E-10N

BEAM: 10N(E-F) FLOOR: 2

	Length:	L = 7.23 m	a = 0.23 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 6.75 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.23	0.90	1.58	2.25	2.93	3.60	4.28	4.95	5.63	6.30	6.98
Mu(-), ton-m:	-20.25	-11.81	-5.02	-4.05	-4.05	-4.05	-4.05	-4.05	-4.34	-10.77	-18.91
Mu(+), ton-m:	6.75	4.05	4.05	5.38	6.82	7.34	7.13	5.96	4.05	4.05	6.30
As(-), cm2:	17.33	9.40	3.80	3.62	3.62	3.62	3.62	3.62	3.62	8.50	15.99
As(+), cm2:	5.18	3.62	3.62	4.09	5.24	5.66	5.48	4.55	3.62	3.62	4.82
Vu, ton:	14.44	13.39	11.04	8.68	6.33	3.97	5.91	8.26	10.62	12.92	13.95
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

E-10N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 F-14N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:13 p. m. 4/01/2020

BEAM: 10N(F-G) FLOOR: 2

	Length:	L = 7.42 m	a = 0.25 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 6.97 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.25	0.95	1.64	2.34	3.04	3.73	4.43	5.13	5.83	6.52	7.22
Mu(-), ton-m:	-17.95	-10.45	-4.45	-3.59	-3.59	-3.59	-3.59	-3.59	-3.77	-9.70	-17.11
Mu(+), ton-m:	5.98	3.59	3.59	4.96	6.24	6.54	6.16	5.00	3.59	3.59	5.70
As(-), cm2:	15.04	8.23	3.62	3.62	3.62	3.62	3.62	3.62	3.62	7.60	14.23
As(+), cm2:	4.57	3.62	3.62	3.76	4.77	5.01	4.71	3.79	3.62	3.62	4.35
Vu, ton:	12.48	11.50	9.44	7.37	5.31	3.35	5.15	7.22	9.28	11.35	12.35
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	F-14N	11 #3 @ 7.5			30 #3 @ 17.5		11 #3 @ 7.5				G-10N

BEAM: 10N(G-HN) FLOOR: 2

	Length:	L = 6.98 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 6.58 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.86	1.52	2.17	2.83	3.49	4.15	4.81	5.47	6.12	6.78
Mu(-), ton-m:	-13.50	-8.05	-3.61	-2.70	-2.70	-2.70	-2.70	-2.70	-3.56	-7.87	-13.21
Mu(+), ton-m:	4.50	2.70	2.97	4.14	4.66	4.75	5.02	4.62	3.44	2.70	4.40
As(-), cm2:	10.89	6.23	3.62	3.62	3.62	3.62	3.62	3.62	3.62	6.09	10.63
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.81	3.62	3.62	3.62	3.62
Vu, ton:	9.30	8.67	7.28	5.89	4.50	3.11	4.33	5.72	7.11	8.50	9.13
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	G-10N	11 #3 @ 7.5			28 #3 @ 17.5		11 #3 @ 7.5				HN-10N

BEAM: 10N(HN-HNa) FLOOR: 2

	Length:	L = 1.16 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 0.96 m	c = 0.00 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.30	0.39	0.49	0.58	0.68	0.78	0.87	0.97	1.06	1.16
Mu(-), ton-m:	-0.57	-0.46	-0.36	-0.28	-0.20	-0.14	-0.09	-0.05	-0.03	-0.01	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.73	0.73	0.73	0.73	0.70	0.58	0.47	0.35	0.23	0.12	0.00
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
DESIGN	HN-10N	6 #3 @ 17.5									10N:HNa

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:14 p. m. 4/01/2020

BEAM: 5N(GN-E) FLOOR: 2

	Length:	L = 7.15 m	a = 0.23 m	Section:	b = 45.0 cm	Sec:	VG45X40			
		Lu = 6.70 m	c = 0.23 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.23	0.90	1.57	2.24	2.91	3.58	4.25	4.92	5.59	6.26	6.93
Mu(-), ton-m:	-24.96	-14.06	-5.58	-5.58	-5.58	-5.58	-5.58	-5.58	-7.00	-16.34	-27.89
Mu(+), ton-m:	8.32	5.58	5.99	9.10	10.37	10.32	9.42	7.47	5.58	5.58	9.30
As(-), cm2:	20.67	10.99	5.42	5.42	5.42	5.42	5.42	5.42	5.42	12.92	23.50
As(+), cm2:	6.33	5.42	5.42	6.95	7.97	7.92	7.20	5.67	5.42	5.42	7.11
Vu, ton:	18.78	17.41	14.44	11.46	8.42	6.22	9.39	12.43	15.41	18.38	19.75
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

GN-5N 11 #3+1r @ 7.5 29 #3 @ 17.5 11 #3+1r @ 7.5 E-5N

BEAM: 5N(E-F) FLOOR: 2

	Length:	L = 7.23 m	a = 0.23 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 6.78 m	c = 0.23 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.23	0.90	1.58	2.26	2.94	3.61	4.29	4.97	5.65	6.32	7.00
Mu(-), ton-m:	-24.03	-13.12	-4.91	-4.91	-4.91	-4.91	-4.91	-4.91	-4.91	-13.58	-24.57
Mu(+), ton-m:	8.01	4.91	4.91	6.88	9.21	10.34	9.22	6.82	4.91	4.91	8.19
As(-), cm2:	20.93	10.56	3.72	3.72	3.72	3.72	3.72	3.72	3.72	10.96	21.37
As(+), cm2:	6.20	3.72	3.72	5.29	7.19	8.14	7.20	5.24	3.72	3.72	6.35
Vu, ton:	17.93	16.36	13.10	9.85	6.60	3.47	6.72	9.98	13.23	16.48	18.06
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

E-5N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 F-5N

BEAM: 5N(F-G) FLOOR: 2

	Length:	L = 7.17 m	a = 0.23 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 6.72 m	c = 0.23 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.23	0.90	1.57	2.24	2.91	3.58	4.26	4.93	5.60	6.27	6.94
Mu(-), ton-m:	-23.75	-13.21	-4.88	-4.75	-4.75	-4.75	-4.75	-4.75	-4.75	-12.82	-23.27
Mu(+), ton-m:	7.92	4.75	4.75	6.64	8.84	9.85	8.89	6.78	4.75	4.75	7.76
As(-), cm2:	20.69	10.63	3.70	3.62	3.62	3.62	3.62	3.62	3.62	10.28	20.29
As(+), cm2:	6.12	3.62	3.62	5.09	6.88	7.73	6.93	5.20	3.62	3.62	5.99
Vu, ton:	17.51	16.06	12.95	9.83	6.71	3.59	6.58	9.70	12.81	15.93	17.38
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-5N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 G-5N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:14 p. m. 4/01/2020

BEAM: 5N(G-HN) FLOOR: 2

	Length:	L = 6.29 m	a = 0.23 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 5.86 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.23	0.81	1.40	1.98	2.57	3.16	3.74	4.33	4.91	5.50	6.09
Mu(-), ton-m:	-19.59	-11.81	-5.47	-3.92	-3.92	-3.92	-3.92	-3.92	-3.92	-9.58	-16.80
Mu(+), ton-m:	6.53	3.92	3.92	5.17	6.32	6.73	7.00	6.45	4.61	3.92	5.60
As(-), cm2:	16.67	9.40	4.16	3.62	3.62	3.62	3.62	3.62	3.62	7.50	13.93
As(+), cm2:	5.00	3.62	3.62	3.93	4.83	5.16	5.38	4.94	3.62	3.62	4.26
Vu, ton:	14.85	14.01	11.81	9.61	7.42	5.23	6.53	8.73	10.93	13.12	13.97
Tu, ton-m:	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-5N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 HN-5N

BEAM: 5N(HN-HNa) FLOOR: 2

	Length:	L = 1.04 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 0.84 m	c = 0.00 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.28	0.37	0.45	0.54	0.62	0.71	0.79	0.88	0.96	1.04
Mu(-), ton-m:	-0.65	-0.53	-0.42	-0.32	-0.24	-0.16	-0.11	-0.06	-0.03	-0.01	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.88	0.88	0.88	0.88	0.88	0.77	0.61	0.46	0.31	0.15	0.00
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

HN-5N 6 #3 @ 17.5 5N:HNa

BEAM: 3N(GN-E) FLOOR: 2

	Length:	L = 7.15 m	a = 0.23 m	Section:	b = 45.0 cm	Sec:	VG45X40			
		Lu = 6.68 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.23	0.89	1.56	2.23	2.90	3.56	4.23	4.90	5.57	6.23	6.90
Mu(-), ton-m:	-25.42	-14.33	-5.70	-5.70	-5.70	-5.70	-5.70	-5.70	-7.33	-16.78	-28.51
Mu(+), ton-m:	8.47	5.70	6.21	9.33	10.56	10.49	9.71	7.79	5.70	5.70	9.50
As(-), cm2:	21.10	11.22	5.42	5.42	5.42	5.42	5.42	5.42	5.55	13.30	24.12
As(+), cm2:	6.45	5.42	5.42	7.14	8.12	8.06	7.44	5.92	5.42	5.42	7.27
Vu, ton:	19.13	17.74	14.74	11.74	8.73	6.59	9.59	12.59	15.60	18.60	19.99
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

GN-3N 11 #3+1r @ 7.5 28 #3 @ 17.5 11 #3+1r @ 7.5 E-3N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:14 p. m. 4/01/2020

BEAM: 3N(E-F) FLOOR: 2

	Length:	L = 7.23 m	a = 0.25 m	Section:	b = 45.0 cm	Sec:	VG45X40			
		Lu = 6.73 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.25	0.92	1.60	2.27	2.94	3.61	4.29	4.96	5.63	6.30	6.98
Mu(-), ton-m:	-27.67	-16.01	-6.71	-5.63	-5.63	-5.63	-5.63	-5.63	-7.04	-16.44	-28.17
Mu(+), ton-m:	9.22	5.63	5.63	8.21	9.89	10.33	9.92	8.17	5.63	5.63	9.39
As(-), cm2:	23.29	12.64	5.42	5.42	5.42	5.42	5.42	5.42	5.42	13.00	23.78
As(+), cm2:	7.05	5.42	5.42	6.24	7.58	7.93	7.60	6.21	5.42	5.42	7.18
Vu, ton:	19.84	18.41	15.30	12.00	8.70	5.52	8.82	12.12	15.42	18.53	19.95
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	E-3N	11 #3+1r @ 7.5	29 #3 @ 17.5	11 #3+1r @ 7.5	F-3N						

BEAM: 3N(F-G) FLOOR: 2

	Length:	L = 7.17 m	a = 0.25 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 6.67 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.25	0.92	1.58	2.25	2.92	3.58	4.25	4.92	5.59	6.25	6.92
Mu(-), ton-m:	-24.25	-13.59	-5.16	-4.85	-4.85	-4.85	-4.85	-4.85	-5.10	-13.47	-24.09
Mu(+), ton-m:	8.08	4.85	4.85	6.81	8.93	9.88	9.02	6.94	4.85	4.85	8.03
As(-), cm2:	21.11	10.97	3.92	3.67	3.67	3.67	3.67	3.67	3.87	10.86	20.98
As(+), cm2:	6.26	3.67	3.67	5.23	6.96	7.75	7.03	5.33	3.67	3.67	6.22
Vu, ton:	17.94	16.49	13.33	10.17	7.01	3.85	6.95	10.11	13.26	16.42	17.88
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	F-3N	11 #3 @ 7.5	28 #3 @ 17.5	11 #3 @ 7.5	G-3N						

BEAM: 3N(G-HN) FLOOR: 2

	Length:	L = 6.29 m	a = 0.25 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 5.84 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.25	0.83	1.42	2.00	2.58	3.17	3.75	4.33	4.92	5.50	6.09
Mu(-), ton-m:	-20.43	-12.34	-5.78	-4.09	-4.09	-4.09	-4.09	-4.09	-4.11	-10.13	-17.72
Mu(+), ton-m:	6.81	4.09	4.09	5.57	6.71	7.00	7.20	6.60	4.68	4.09	5.91
As(-), cm2:	17.52	9.86	4.41	3.62	3.62	3.62	3.62	3.62	3.62	7.96	14.81
As(+), cm2:	5.23	3.62	3.62	4.24	5.15	5.38	5.54	5.06	3.62	3.62	4.51
Vu, ton:	15.40	14.52	12.23	9.94	7.65	5.41	6.96	9.25	11.54	13.84	14.71
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	G-3N	11 #3 @ 7.5	24 #3 @ 17.5	11 #3 @ 7.5	HN-3N						

BEAM: 3N(HN-HNa) FLOOR: 2

Length: L = 1.04 m a = 0.20 m Section: b = 30.0 cm Sec: VG40X40
Lu = 0.84 m c = 0.00 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.28	0.37	0.45	0.54	0.62	0.71	0.79	0.88	0.96	1.04
Mu(-), ton-m:	-0.63	-0.51	-0.41	-0.31	-0.23	-0.16	-0.10	-0.06	-0.03	-0.01	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.85	0.85	0.85	0.85	0.85	0.74	0.60	0.45	0.30	0.15	0.00
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

HN-3N 6 #3 @ 17.5 3N:HNa

BEAM: 1N(GN-E) FLOOR: 2

Length: L = 7.15 m a = 0.20 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.75 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.88	1.55	2.23	2.90	3.58	4.25	4.93	5.60	6.28	6.95
Mu(-), ton-m:	-14.80	-8.59	-3.64	-3.25	-3.25	-3.25	-3.25	-3.25	-4.32	-9.68	-16.25
Mu(+), ton-m:	4.93	3.25	4.04	5.58	6.05	5.73	5.39	4.54	3.25	3.25	5.42
As(-), cm2:	12.07	6.68	3.62	3.62	3.62	3.62	3.62	3.62	3.62	7.59	13.41
As(+), cm2:	3.74	3.62	3.62	4.24	4.62	4.36	4.10	3.62	3.62	3.62	4.12
Vu, ton:	10.53	9.77	8.13	6.50	4.86	3.75	5.39	7.02	8.66	10.29	11.06
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

GN-1N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 E-1N

BEAM: 1N(E-F) FLOOR: 2

Length: L = 7.23 m a = 0.20 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.83 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.88	1.57	2.25	2.93	3.61	4.30	4.98	5.66	6.34	7.03
Mu(-), ton-m:	-15.37	-8.99	-3.86	-3.12	-3.12	-3.12	-3.12	-3.12	-4.01	-9.19	-15.62
Mu(+), ton-m:	5.12	3.12	3.12	4.65	5.44	5.53	5.41	4.58	3.12	3.12	5.21
As(-), cm2:	12.59	7.01	3.62	3.62	3.62	3.62	3.62	3.62	3.62	7.18	12.82
As(+), cm2:	3.89	3.62	3.62	3.62	4.14	4.21	4.11	3.62	3.62	3.62	3.95
Vu, ton:	10.75	9.96	8.31	6.64	4.90	3.21	4.96	6.71	8.38	10.03	10.81
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

E-1N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 F-1N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:14 p. m. 4/01/2020

BEAM: 1N(F-G) FLOOR: 2

	Length:	L = 7.17 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 6.77 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.88	1.55	2.23	2.91	3.58	4.26	4.94	5.62	6.29	6.97
Mu(-), ton-m:	-15.39	-9.05	-3.94	-3.08	-3.08	-3.08	-3.08	-3.08	-3.73	-8.78	-15.07
Mu(+), ton-m:	5.13	3.08	3.08	4.62	5.43	5.53	5.42	4.66	3.08	3.08	5.02
As(-), cm2:	12.61	7.06	3.62	3.62	3.62	3.62	3.62	3.62	3.62	6.84	12.31
As(+), cm2:	3.89	3.62	3.62	3.62	4.13	4.21	4.12	3.62	3.62	3.62	3.81
Vu, ton:	10.72	9.95	8.31	6.67	4.97	3.23	4.89	6.59	8.24	9.88	10.65
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-1N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 G-1N

BEAM: 1N(G-HN) FLOOR: 2

	Length:	L = 6.29 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 5.89 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.79	1.38	1.97	2.55	3.14	3.73	4.32	4.91	5.50	6.09
Mu(-), ton-m:	-13.61	-8.68	-4.55	-2.72	-2.72	-2.72	-2.72	-2.72	-4.15	-7.95	-12.61
Mu(+), ton-m:	4.54	2.91	3.46	3.90	3.96	3.73	4.58	4.82	4.37	3.94	4.20
As(-), cm2:	10.99	6.75	3.62	3.62	3.62	3.62	3.62	3.62	3.62	6.15	10.10
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.65	3.62	3.62	3.62
Vu, ton:	9.04	8.56	7.32	6.08	4.84	3.60	4.37	5.61	6.85	8.09	8.57
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-1N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 HN-1N

BEAM: 10N(GN-E) FLOOR: CUB

	Length:	L = 7.15 m	a = 0.20 m	Section:	b = 55.0 cm	Sec:	VG55X40			
		Lu = 6.73 m	c = 0.23 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.87	1.55	2.22	2.89	3.56	4.24	4.91	5.58	6.25	6.93
Mu(-), ton-m:	-13.74	-7.53	-3.58	-3.58	-3.58	-3.58	-3.58	-3.58	-4.78	-10.70	-17.88
Mu(+), ton-m:	4.58	3.76	5.49	6.96	7.20	6.40	5.84	4.64	3.58	3.58	5.96
As(-), cm2:	10.59	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63	8.16	14.02
As(+), cm2:	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63
Vu, ton:	10.78	9.98	8.25	6.52	4.79	4.36	6.09	7.82	9.55	11.27	12.08
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

GN-10N 12 #3+1r @ 7.5 28 #3 @ 17.5 12 #3+1r @ 7.5 E-10N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:14 p. m. 4/01/2020

BEAM: 10N(E-F) FLOOR: CUB

	Length:	L = 7.23 m	a = 0.23 m	Section:	b = 55.0 cm	Sec:	VG55X40			
		Lu = 6.75 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.23	0.90	1.58	2.25	2.93	3.60	4.28	4.95	5.63	6.30	6.98
Mu(-), ton-m:	-17.12	-10.04	-4.30	-3.88	-3.88	-3.88	-3.88	-3.88	-6.07	-12.08	-19.41
Mu(+), ton-m:	5.71	3.88	3.88	5.11	5.65	5.81	6.33	5.60	4.18	3.88	6.47
As(-), cm2:	13.38	7.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63	9.26	15.31
As(+), cm2:	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63
Vu, ton:	12.03	11.19	9.39	7.59	5.78	4.33	6.09	7.89	9.69	11.49	12.33
Tu, ton-m:	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

E-10N 12 #3+1r @ 7.5 28 #3 @ 17.5 12 #3+1r @ 7.5 F-14N

BEAM: 10N(F-G) FLOOR: CUB

	Length:	L = 7.42 m	a = 0.25 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 6.97 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.25	0.95	1.64	2.34	3.04	3.73	4.43	5.13	5.83	6.52	7.22
Mu(-), ton-m:	-16.16	-8.73	-3.25	-3.25	-3.25	-3.25	-3.25	-3.25	-3.25	-8.71	-16.26
Mu(+), ton-m:	5.39	3.25	3.25	5.39	6.92	7.32	6.54	4.87	3.25	3.25	5.42
As(-), cm2:	13.32	6.79	3.62	3.62	3.62	3.62	3.62	3.62	3.62	6.78	13.42
As(+), cm2:	4.09	3.62	3.62	4.09	5.32	5.64	5.01	3.69	3.62	3.62	4.12
Vu, ton:	11.85	10.81	8.65	6.49	4.33	2.33	4.48	6.64	8.80	10.96	12.01
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-14N 11 #3 @ 7.5 30 #3 @ 17.5 11 #3 @ 7.5 G-10N

BEAM: 10N(G-HN) FLOOR: CUB

	Length:	L = 6.98 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 6.58 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.86	1.52	2.17	2.83	3.49	4.15	4.81	5.47	6.12	6.78
Mu(-), ton-m:	-12.76	-7.52	-3.24	-2.55	-2.55	-2.55	-2.55	-2.55	-2.55	-5.77	-10.43
Mu(+), ton-m:	4.25	2.55	2.55	3.07	4.03	4.57	4.98	4.60	3.29	2.55	3.48
As(-), cm2:	10.23	5.80	3.62	3.62	3.62	3.62	3.62	3.62	3.62	4.39	8.21
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.78	3.62	3.62	3.62	3.62
Vu, ton:	9.11	8.51	7.17	5.83	4.50	3.16	3.66	5.00	6.33	7.67	8.28
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-10N 11 #3 @ 7.5 28 #3 @ 17.5 11 #3 @ 7.5 HN-10N

BEAM: 10N(HN-HNa) FLOOR: CUB

	Length:	L = 1.16 m	a = 0.20 m	Section:	b = 30.0 cm	Sec:	VG40X40			
		Lu = 0.96 m	c = 0.00 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.30	0.39	0.49	0.58	0.68	0.78	0.87	0.97	1.06	1.16
Mu(-), ton-m:	-0.54	-0.44	-0.35	-0.26	-0.19	-0.14	-0.09	-0.05	-0.02	-0.01	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.70	0.70	0.70	0.70	0.67	0.56	0.45	0.33	0.22	0.11	0.00
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

HN-10N 6 #3 @ 17.5 10N:HNa

BEAM: 5N(GN-E) FLOOR: CUB

	Length:	L = 7.15 m	a = 0.23 m	Section:	b = 45.0 cm	Sec:	VG45X40				
		Lu = 6.70 m	c = 0.23 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.23	0.90	1.57	2.24	2.91	3.58	4.25	4.92	5.59	6.26	6.93
Mu(-), ton-m:	-20.78	-10.80	-4.83	-4.83	-4.83	-4.83	-4.83	-4.83	-4.83	-13.35	-24.15
Mu(+), ton-m:	6.93	4.83	5.92	9.39	10.88	10.94	9.67	7.38	4.83	4.83	8.05
As(-), cm2:	16.81	8.31	5.42	5.42	5.42	5.42	5.42	5.42	5.42	10.40	19.90
As(+), cm2:	5.42	5.42	5.42	7.18	8.38	8.43	7.40	5.59	5.42	5.42	6.12
Vu, ton:	17.31	15.99	13.12	10.08	7.04	5.14	8.18	11.23	14.26	17.13	18.45
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

GN-5N 11 #3+1r @ 7.5 29 #3 @ 17.5 11 #3+1r @ 7.5 E-5N

BEAM: 5N(E-F) FLOOR: CUB

	Length:	L = 7.23 m	a = 0.23 m	Section:	b = 30.0 cm	Sec:	VG40X40				
		Lu = 6.78 m	c = 0.23 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.23	0.90	1.58	2.26	2.94	3.61	4.29	4.97	5.65	6.32	7.00
Mu(-), ton-m:	-17.13	-9.85	-4.00	-3.43	-3.43	-3.43	-3.43	-3.43	-3.43	-8.76	-15.72
Mu(+), ton-m:	5.71	3.43	3.43	3.93	5.47	6.14	5.93	4.71	3.43	3.43	5.24
As(-), cm2:	14.25	7.73	3.62	3.62	3.62	3.62	3.62	3.62	3.62	6.81	12.91
As(+), cm2:	4.35	3.62	3.62	3.62	4.16	4.69	4.53	3.62	3.62	3.62	3.98
Vu, ton:	12.25	11.27	9.19	7.11	5.03	2.95	4.56	6.65	8.73	10.81	11.78
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

E-5N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 F-5N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:14 p. m. 4/01/2020

BEAM: 5N(F-G) FLOOR: CUB

Length: L = 7.17 m a = 0.23 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.72 m c = 0.23 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.90	1.57	2.24	2.91	3.58	4.26	4.93	5.60	6.27	6.94
Mu(-), ton-m:	-15.72	-8.92	-3.49	-3.14	-3.14	-3.14	-3.14	-3.14	-3.27	-8.63	-15.38
Mu(+), ton-m:	5.24	3.14	3.14	4.53	5.77	6.11	5.76	4.57	3.14	3.14	5.13
As(-), cm2:	12.91	6.95	3.62	3.62	3.62	3.62	3.62	3.62	3.62	6.71	12.59
As(+), cm2:	3.98	3.62	3.62	3.62	4.40	4.67	4.39	3.62	3.62	3.62	3.89
Vu, ton:	11.49	10.58	8.61	6.63	4.66	2.69	4.58	6.55	8.52	10.49	11.41
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-5N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 G-5N

BEAM: 5N(G-HN) FLOOR: CUB

Length: L = 6.29 m a = 0.23 m Section: b = 30.0 cm Sec: VG40X40
Lu = 5.86 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.81	1.40	1.98	2.57	3.16	3.74	4.33	4.91	5.50	6.09
Mu(-), ton-m:	-13.40	-8.28	-4.05	-2.68	-2.68	-2.68	-2.68	-2.68	-2.68	-6.20	-10.74
Mu(+), ton-m:	4.47	2.68	2.68	3.50	4.12	4.24	4.81	4.75	3.86	2.90	3.58
As(-), cm2:	10.80	6.43	3.62	3.62	3.62	3.62	3.62	3.62	3.62	4.74	8.48
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.64	3.62	3.62	3.62	3.62
Vu, ton:	9.65	9.12	7.76	6.39	5.03	3.66	4.14	5.50	6.87	8.23	8.76
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-5N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 HN-5N

BEAM: 5N(HN-HNa) FLOOR: CUB

Length: L = 1.04 m a = 0.20 m Section: b = 30.0 cm Sec: VG40X40
Lu = 0.84 m c = 0.00 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.28	0.37	0.45	0.54	0.62	0.71	0.79	0.88	0.96	1.04
Mu(-), ton-m:	-0.62	-0.50	-0.40	-0.30	-0.22	-0.15	-0.10	-0.06	-0.03	-0.01	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.84	0.84	0.84	0.84	0.84	0.73	0.58	0.44	0.29	0.15	0.00
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

HN-5N 6 #3 @ 17.5 5N:HNa

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:14 p. m. 4/01/2020

BEAM: 5N'(E-F) FLOOR: CUB

Length: L = 7.23 m a = 0.15 m Section: b = 15.0 cm Sec: VT15X40
Lu = 6.93 m c = 0.15 m h = 40.0 cm Mat: RConcrete2

X, m:	0.15	0.84	1.54	2.23	2.92	3.61	4.31	5.00	5.69	6.38	7.08
Mu(-), ton-m:	-0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.41	-1.77	-3.69
Mu(+), ton-m:	0.31	1.69	2.68	3.09	3.14	2.84	2.19	1.21	0.31	0.03	0.00
As(-), cm2:	2.54	2.54	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	2.85
As(+), cm2:	2.54	2.54	2.04	2.36	2.40	2.16	1.81	1.81	1.81	1.81	1.81
Vu, ton:	2.44	2.09	0.81	0.32	0.17	0.66	1.15	1.64	2.13	2.62	2.86
Tu, ton-m:	0.21	0.21	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

E-5N' 40 #3 @ 17.5 F-5N'

BEAM: 5N'(F-G) FLOOR: CUB

Length: L = 7.17 m a = 0.15 m Section: b = 15.0 cm Sec: VT15X40
Lu = 6.87 m c = 0.15 m h = 40.0 cm Mat: RConcrete2

X, m:	0.15	0.84	1.52	2.21	2.90	3.58	4.27	4.96	5.65	6.33	7.02
Mu(-), ton-m:	-3.70	-2.13	-0.87	-0.01	0.00	0.00	0.00	0.00	-0.64	-1.79	-3.28
Mu(+), ton-m:	0.00	0.00	0.00	0.06	0.62	0.85	0.70	0.22	0.02	0.00	0.00
As(-), cm2:	2.85	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	2.51
As(+), cm2:	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
Vu, ton:	2.30	2.07	1.56	1.06	0.56	0.06	0.44	0.94	1.44	1.94	2.18
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

F-5N' 40 #3 @ 17.5 G-5N'

BEAM: 5N'(G-HN) FLOOR: CUB

Length: L = 6.29 m a = 0.15 m Section: b = 15.0 cm Sec: VT15X40
Lu = 5.99 m c = 0.15 m h = 40.0 cm Mat: RConcrete2

X, m:	0.15	0.75	1.35	1.95	2.54	3.14	3.74	4.34	4.94	5.54	6.14
Mu(-), ton-m:	-3.37	-1.64	-0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.15
Mu(+), ton-m:	0.00	0.00	0.14	1.06	2.04	2.74	3.18	3.21	2.68	1.67	0.35
As(-), cm2:	2.58	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
As(+), cm2:	1.81	1.81	1.81	1.81	1.81	2.08	2.43	2.46	2.03	1.81	1.81
Vu, ton:	2.86	2.69	2.25	1.82	1.38	0.95	0.51	0.51	1.28	2.05	2.36
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.09	0.09	0.09	0.09
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

G-5N' 35 #3 @ 17.5 HN-5N'

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:14 p. m. 4/01/2020

BEAM: 3N'(E-F) FLOOR: CUB

Length: L = 7.23 m a = 0.15 m Section: b = 15.0 cm Sec: VT15X40
Lu = 6.93 m c = 0.15 m h = 40.0 cm Mat: RConcrete2

X, m:	0.15	0.84	1.54	2.23	2.92	3.61	4.31	5.00	5.69	6.38	7.08
Mu(-), ton-m:	-0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.18	-5.20	-10.95
Mu(+), ton-m:	0.56	3.19	5.84	7.63	8.28	7.79	6.18	3.50	0.92	0.10	0.00
As(-), cm2:	2.50	2.50	1.81	1.81	1.81	1.81	1.81	1.81	1.81	4.09	9.53
As(+), cm2:	2.50	3.13	4.64	6.25	6.85	6.39	4.94	2.69	1.81	1.81	1.81
Vu, ton:	5.27	4.77	3.31	1.72	0.22	1.45	3.03	4.62	6.21	7.79	8.55
Tu, ton-m:	0.20	0.20	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

E-3N' 40 #3 @ 17.5 F-3N'

BEAM: 3N'(F-G) FLOOR: CUB

Length: L = 7.17 m a = 0.15 m Section: b = 15.0 cm Sec: VT15X40
Lu = 6.87 m c = 0.15 m h = 40.0 cm Mat: RConcrete2

X, m:	0.15	0.84	1.52	2.21	2.90	3.58	4.27	4.96	5.65	6.33	7.02
Mu(-), ton-m:	-10.82	-6.08	-2.33	0.00	0.00	0.00	0.00	0.00	-1.27	-4.53	-8.88
Mu(+), ton-m:	0.00	0.00	0.04	0.49	2.25	3.00	2.64	1.27	0.14	0.00	0.00
As(-), cm2:	9.39	4.85	1.81	1.81	1.81	1.81	1.81	1.81	1.81	3.53	7.43
As(+), cm2:	1.81	1.81	1.81	1.81	1.81	2.29	2.01	1.81	1.81	1.81	1.81
Vu, ton:	6.92	6.22	4.73	3.25	1.77	0.28	1.20	2.69	4.17	5.65	6.36
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

F-3N' 40 #3 @ 17.5 G-3N'

BEAM: 3N'(G-HN) FLOOR: CUB

Length: L = 6.29 m a = 0.15 m Section: b = 15.0 cm Sec: VT15X40
Lu = 5.99 m c = 0.15 m h = 40.0 cm Mat: RConcrete2

X, m:	0.15	0.75	1.35	1.95	2.54	3.14	3.74	4.34	4.94	5.54	6.14
Mu(-), ton-m:	-8.85	-4.18	-0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.59
Mu(+), ton-m:	0.00	0.00	0.36	2.72	4.94	6.21	6.66	6.26	4.96	2.87	0.58
As(-), cm2:	7.40	3.24	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
As(+), cm2:	1.81	1.81	1.81	2.07	3.87	4.96	5.37	5.01	3.89	2.19	1.81
Vu, ton:	7.74	7.17	5.74	4.30	2.86	1.43	0.16	1.48	2.81	4.14	4.67
Tu, ton-m:	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.10	0.10	0.10	0.10
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50

DESIGN

G-3N' 35 #3 @ 17.5 HN-3N'

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 12:20:14 p. m. 4/01/2020

BEAM: 3N(GN-E) FLOOR: CUB

Length: L = 7.15 m a = 0.23 m Section: b = 45.0 cm Sec: VG45X40
Lu = 6.68 m c = 0.25 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.89	1.56	2.23	2.90	3.56	4.23	4.90	5.57	6.23	6.90
Mu(-), ton-m:	-20.56	-10.64	-5.24	-5.24	-5.24	-5.24	-5.24	-5.24	-6.02	-15.02	-26.19
Mu(+), ton-m:	6.85	5.24	6.28	9.54	10.79	10.63	9.35	6.88	5.24	5.24	8.73
As(-), cm2:	16.61	8.18	5.42	5.42	5.42	5.42	5.42	5.42	5.42	11.80	21.84
As(+), cm2:	5.42	5.42	5.42	7.30	8.31	8.18	7.15	5.42	5.42	5.42	6.66
Vu, ton:	17.53	16.21	13.32	10.44	7.37	6.04	9.12	12.09	14.97	17.85	19.18
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

GN-3N 11 #3+1r @ 7.5 28 #3 @ 17.5 11 #3+1r @ 7.5 E-3N

BEAM: 3N(E-F) FLOOR: CUB

Length: L = 7.23 m a = 0.25 m Section: b = 45.0 cm Sec: VG45X40
Lu = 6.73 m c = 0.25 m h = 40.0 cm Mat: RConcrete2

X, m:	0.25	0.92	1.60	2.27	2.94	3.61	4.29	4.96	5.63	6.30	6.98
Mu(-), ton-m:	-24.20	-13.83	-5.56	-4.84	-4.84	-4.84	-4.84	-4.84	-5.43	-13.59	-23.86
Mu(+), ton-m:	8.07	4.84	4.84	6.61	8.46	9.06	8.71	6.96	4.84	4.84	7.95
As(-), cm2:	19.95	10.80	5.42	5.42	5.42	5.42	5.42	5.42	5.42	10.60	19.63
As(+), cm2:	6.13	5.42	5.42	5.42	6.45	6.92	6.64	5.42	5.42	5.42	6.04
Vu, ton:	17.58	16.19	13.21	10.22	7.24	4.25	7.09	10.07	13.06	16.04	17.43
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

E-3N 11 #3+1r @ 7.5 29 #3 @ 17.5 11 #3+1r @ 7.5 F-3N

BEAM: 3N(F-G) FLOOR: CUB

Length: L = 7.17 m a = 0.25 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.67 m c = 0.25 m h = 40.0 cm Mat: RConcrete2

X, m:	0.25	0.92	1.58	2.25	2.92	3.58	4.25	4.92	5.59	6.25	6.92
Mu(-), ton-m:	-21.15	-11.68	-4.23	-4.23	-4.23	-4.23	-4.23	-4.23	-4.23	-11.50	-20.90
Mu(+), ton-m:	7.05	4.23	4.23	5.79	7.85	8.72	7.98	5.99	4.23	4.23	6.97
As(-), cm2:	18.27	9.29	3.62	3.62	3.62	3.62	3.62	3.62	3.62	9.13	18.01
As(+), cm2:	5.42	3.62	3.62	4.41	6.07	6.78	6.17	4.57	3.62	3.62	5.35
Vu, ton:	15.75	14.44	11.59	8.75	5.90	3.06	5.81	8.65	11.50	14.34	15.65
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-3N 11 #3 @ 7.5 28 #3 @ 17.5 11 #3 @ 7.5 G-3N

BEAM: 3N(G-HN) FLOOR: CUB

	Length:	L = 6.29 m Lu = 5.84 m	a = 0.25 m c = 0.20 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.25	0.83	1.42	2.00	2.58	3.17	3.75	4.33	4.92	5.50	6.09
Mu(-), ton-m:	-18.87	-11.27	-5.09	-3.77	-3.77	-3.77	-3.77	-3.77	-3.77	-7.16	-13.69
Mu(+), ton-m:	6.29	3.77	3.77	4.65	6.20	6.85	7.11	6.57	4.72	3.77	4.56
As(-), cm2:	15.94	8.94	3.86	3.62	3.62	3.62	3.62	3.62	3.62	5.51	11.06
As(+), cm2:	4.81	3.62	3.62	3.62	4.74	5.26	5.47	5.04	3.62	3.62	3.62
Vu, ton:	14.64	13.81	11.67	9.52	7.37	5.23	5.84	7.99	10.14	12.29	13.11
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	G-3N			11 #3 @ 7.5		24 #3 @ 17.5		11 #3 @ 7.5			HN-3N

BEAM: 3N(HN-HNa) FLOOR: CUB

	Length:	L = 1.04 m Lu = 0.84 m	a = 0.20 m c = 0.00 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.20	0.28	0.37	0.45	0.54	0.62	0.71	0.79	0.88	0.96	1.04
Mu(-), ton-m:	-0.60	-0.49	-0.38	-0.30	-0.22	-0.15	-0.10	-0.06	-0.03	-0.01	0.00
Mu(+), ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As(-), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	0.81	0.81	0.81	0.81	0.81	0.71	0.56	0.42	0.28	0.14	0.00
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
DESIGN	HN-3N				6 #3 @ 17.5						3N:HNa

BEAM: 1N(GN-E) FLOOR: CUB

	Length:	L = 7.15 m Lu = 6.75 m	a = 0.20 m c = 0.20 m	Section:	b = 30.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.20	0.88	1.55	2.23	2.90	3.58	4.25	4.93	5.60	6.28	6.95
Mu(-), ton-m:	-11.89	-6.37	-2.94	-2.94	-2.94	-2.94	-2.94	-2.94	-3.42	-8.48	-14.69
Mu(+), ton-m:	3.96	2.94	3.96	5.61	6.15	5.81	5.09	3.88	2.94	2.94	4.90
As(-), cm2:	9.47	4.88	3.62	3.62	3.62	3.62	3.62	3.62	3.62	6.58	11.96
As(+), cm2:	3.62	3.62	3.62	4.27	4.70	4.43	3.87	3.62	3.62	3.62	3.71
Vu, ton:	9.61	8.88	7.31	5.73	4.16	3.55	5.12	6.69	8.26	9.84	10.57
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	GN-1N			11 #3 @ 7.5		29 #3 @ 17.5		11 #3 @ 7.5			E-1N

BEAM: 1N(E-F) FLOOR: CUB

Length: L = 7.23 m a = 0.20 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.83 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.88	1.57	2.25	2.93	3.61	4.30	4.98	5.66	6.34	7.03
Mu(-), ton-m:	-13.63	-7.74	-3.03	-2.73	-2.73	-2.73	-2.73	-2.73	-3.01	-7.70	-13.57
Mu(+), ton-m:	4.54	2.73	2.73	3.79	4.84	5.15	4.91	3.88	2.73	2.73	4.52
As(-), cm2:	11.00	5.98	3.62	3.62	3.62	3.62	3.62	3.62	3.62	5.95	10.95
As(+), cm2:	3.62	3.62	3.62	3.62	3.67	3.91	3.72	3.62	3.62	3.62	3.62
Vu, ton:	9.79	9.00	7.31	5.63	3.95	2.27	3.92	5.60	7.28	8.96	9.76
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

E-1N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 F-1N

BEAM: 1N(F-G) FLOOR: CUB

Length: L = 7.17 m a = 0.20 m Section: b = 30.0 cm Sec: VG40X40
Lu = 6.77 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.88	1.55	2.23	2.91	3.58	4.26	4.94	5.62	6.29	6.97
Mu(-), ton-m:	-13.51	-7.68	-3.01	-2.70	-2.70	-2.70	-2.70	-2.70	-2.70	-7.20	-12.94
Mu(+), ton-m:	4.50	2.70	2.70	3.92	4.98	5.26	4.98	4.00	2.70	2.70	4.31
As(-), cm2:	10.90	5.93	3.62	3.62	3.62	3.62	3.62	3.62	3.62	5.54	10.39
As(+), cm2:	3.62	3.62	3.62	3.62	3.78	4.00	3.77	3.62	3.62	3.62	3.62
Vu, ton:	9.83	9.04	7.37	5.71	4.04	2.37	3.90	5.57	7.24	8.91	9.69
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

F-1N 11 #3 @ 7.5 29 #3 @ 17.5 11 #3 @ 7.5 G-1N

BEAM: 1N(G-HN) FLOOR: CUB

Length: L = 6.29 m a = 0.20 m Section: b = 30.0 cm Sec: VG40X40
Lu = 5.89 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.79	1.38	1.97	2.55	3.14	3.73	4.32	4.91	5.50	6.09
Mu(-), ton-m:	-12.17	-7.57	-3.72	-2.43	-2.43	-2.43	-2.43	-2.43	-2.63	-5.72	-9.69
Mu(+), ton-m:	4.06	2.43	2.43	2.96	3.48	3.72	4.52	4.62	3.99	3.21	3.23
As(-), cm2:	9.72	5.84	3.62	3.62	3.62	3.62	3.62	3.62	3.62	4.36	7.60
As(+), cm2:	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Vu, ton:	8.64	8.18	6.99	5.80	4.60	3.41	3.60	4.79	5.98	7.17	7.64
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

G-1N 11 #3 @ 7.5 24 #3 @ 17.5 11 #3 @ 7.5 HN-1N

Nit. **901.134.339-5**
D: Calle 45 No.45 - 16 of 3801 **T:** 318 735 1464
C: ingenieriaipc@hotmail.com

10. REACCIONES

A continuación, mostramos las reacciones para el Edificio 1.

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P-Delta Analysis- Support Reactions

Support		Load	Force (ton)			Moment (ton-m)		
Axis	Floor	LdCase	Fx	Fy	Fz	Mx	My	Mz
GN-14N	CIM	D0	0.80	0.40	3.50	-0.43	0.90	0.00
		DL	3.36	2.24	10.02	-2.50	3.78	0.00
		LL	1.08	0.72	3.22	-0.81	1.22	0.00
		EQX	4.74	0.23	1.59	0.24	10.49	0.00
		EQY	0.71	3.04	0.93	-7.19	0.95	0.00
E-14N	CIM	D0	0.25	-0.09	4.39	0.12	0.27	0.00
		DL	1.70	-0.30	17.44	0.37	1.91	0.00
		LL	0.54	-0.10	5.59	0.12	0.61	0.00
		EQX	6.18	0.75	3.69	-0.41	11.99	0.00
		EQY	0.99	3.97	-0.50	-8.32	1.12	0.00
GN-10N	CIM	D0	-0.23	0.11	8.83	-0.10	-0.26	0.00
		DL	-0.63	2.51	31.32	-2.79	-0.72	0.00
		LL	-0.16	0.84	9.37	-0.93	-0.18	0.00
		EQX	4.59	-0.09	1.72	0.44	10.37	0.00
		EQY	0.12	2.56	3.60	-6.86	0.29	0.00
E-10N	CIM	D0	0.20	-0.02	13.06	0.06	0.22	0.00
		DL	0.87	-0.95	57.12	1.12	0.97	0.00
		LL	0.37	-0.31	16.85	0.37	0.42	0.00
		EQX	7.46	-0.19	0.68	0.76	16.49	0.00
		EQY	-0.09	4.42	0.52	-11.32	-0.08	0.00
F-14N	CIM	D0	0.10	0.12	14.92	-0.08	0.09	0.00
		DL	0.71	-1.46	57.62	1.71	0.80	0.00
		LL	0.34	-0.46	16.96	0.54	0.39	0.00
		EQX	7.38	0.51	4.87	0.25	20.20	0.01
		EQY	0.52	6.53	-2.11	-16.94	0.27	0.01
G-10N	CIM	D0	0.17	-0.07	8.44	0.10	0.18	0.00
		DL	1.06	-0.40	33.17	0.49	1.21	0.00
		LL	0.37	-0.15	9.51	0.18	0.42	0.00
		EQX	3.76	0.44	5.70	-0.19	9.03	0.00
		EQY	0.35	3.43	-0.44	-7.87	0.14	0.00
HN-10N	CIM	D0	-0.01	-0.16	5.97	0.20	-0.02	0.00
		DL	-0.07	-0.74	11.77	0.87	-0.06	0.00
		LL	-0.04	-0.26	3.42	0.31	-0.03	0.00
		EQX	5.89	0.22	18.91	-0.01	11.26	0.00
		EQY	-0.22	2.62	-4.81	-6.98	-0.63	0.00
GN-5N	CIM	D0	-0.01	0.26	10.60	-0.27	-0.01	0.00
		DL	-0.17	1.70	40.64	-1.84	-0.21	0.00
		LL	-0.08	0.63	11.66	-0.68	-0.10	0.00
		EQX	5.78	-0.16	0.89	0.47	14.79	0.00
		EQY	0.22	4.49	4.57	-11.61	0.48	0.00
E-5N	CIM	D0	-0.28	-0.13	14.31	0.18	-0.32	0.00
		DL	-0.66	0.35	78.87	-0.32	-0.75	0.00
		LL	-0.24	0.08	22.68	-0.07	-0.27	0.00
		EQX	6.38	-0.20	0.50	0.52	15.32	0.00
		EQY	0.03	5.46	-1.67	-12.76	0.06	0.00
F-5N	CIM	D0	-0.36	-0.02	14.28	0.05	-0.42	0.00
		DL	-0.81	-0.20	75.97	0.29	-0.91	0.00
		LL	-0.26	-0.06	21.85	0.09	-0.28	0.00
		EQX	6.50	-0.17	0.05	0.49	15.23	0.00
		EQY	-0.22	4.93	0.18	-12.17	-0.45	0.00
G-5N	CIM	D0	-0.11	-0.07	12.99	0.11	-0.14	0.00
		DL	0.23	-0.72	62.20	0.87	0.28	0.00
		LL	0.11	-0.24	17.87	0.29	0.14	0.00
		EQX	6.13	-0.20	-1.21	0.52	14.55	0.00
		EQY	-0.42	5.15	1.34	-12.38	-0.89	0.00

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Axis	Floor	LdCase	Fx	Fy	Fz	Mx	My	Mz
HN-5N	CIM	D0	0.06	-0.13	8.94	0.16	0.06	0.00
		DL	0.88	-1.39	32.54	1.61	1.02	0.00
		LL	0.30	-0.47	9.35	0.55	0.35	0.00
		EQX	6.47	-0.11	-16.67	0.31	11.95	0.00
		EQY	-0.61	3.03	-1.95	-7.53	-1.07	0.00
GN-3N	CIM	D0	-0.01	0.26	10.15	-0.27	-0.02	0.00
		DL	-0.12	1.77	36.25	-1.90	-0.16	0.00
		LL	-0.04	0.65	10.41	-0.70	-0.05	0.00
		EQX	6.22	-0.13	0.67	0.23	15.27	0.00
		EQY	0.22	4.69	4.87	-12.03	0.49	0.00
E-3N	CIM	D0	0.04	-0.04	14.54	0.08	0.03	0.00
		DL	-0.51	-0.02	76.66	0.15	-0.58	0.00
		LL	-0.17	-0.03	22.04	0.07	-0.19	0.00
		EQX	7.83	-0.20	0.73	0.36	21.08	0.01
		EQY	0.03	7.89	-0.12	-19.15	0.07	0.01
F-3N	CIM	D0	0.08	-0.14	13.55	0.19	0.07	0.00
		DL	-0.39	-0.14	74.96	0.29	-0.42	0.00
		LL	-0.14	-0.05	21.61	0.09	-0.14	0.00
		EQX	7.78	-0.19	0.71	0.35	20.67	0.01
		EQY	-0.23	7.35	-1.39	-18.55	-0.56	0.01
G-3N	CIM	D0	0.06	-0.07	12.34	0.12	0.04	0.00
		DL	-0.36	-0.72	71.32	0.94	-0.36	0.00
		LL	-0.13	-0.24	20.55	0.31	-0.12	0.00
		EQX	7.77	-0.19	0.70	0.34	20.32	0.01
		EQY	-0.50	6.99	0.90	-18.14	-1.20	0.01
HN-3N	CIM	D0	0.00	-0.13	9.00	0.17	-0.02	0.00
		DL	-0.16	-1.25	43.97	1.46	-0.16	0.00
		LL	-0.05	-0.45	12.67	0.52	-0.04	0.00
		EQX	4.36	-0.08	1.34	0.15	9.60	0.00
		EQY	-0.39	3.16	-4.42	-7.82	-0.83	0.00
GN-1N	CIM	D0	-0.14	0.17	6.39	-0.18	-0.16	0.00
		DL	-0.55	0.91	17.15	-0.96	-0.64	0.00
		LL	-0.21	0.33	4.92	-0.35	-0.23	0.00
		EQX	3.57	-0.06	-5.16	0.00	9.19	0.00
		EQY	0.13	3.06	2.90	-7.79	0.30	0.00
E-1N	CIM	D0	-0.15	-0.02	8.63	0.03	-0.17	0.00
		DL	-1.13	-0.06	35.58	0.13	-1.28	0.00
		LL	-0.41	-0.03	10.20	0.05	-0.46	0.00
		EQX	3.54	-0.04	-5.42	-0.02	9.07	0.00
		EQY	0.01	4.04	-0.37	-8.92	0.03	0.00
F-1N	CIM	D0	-0.15	-0.02	8.54	0.03	-0.18	0.00
		DL	-1.14	-0.07	35.25	0.14	-1.28	0.00
		LL	-0.41	-0.02	10.11	0.05	-0.46	0.00
		EQX	3.52	-0.04	-5.15	-0.03	8.90	0.00
		EQY	-0.10	3.98	0.11	-8.86	-0.24	0.00
G-1N	CIM	D0	-0.15	-0.05	8.35	0.07	-0.18	0.00
		DL	-1.15	-0.36	33.17	0.47	-1.29	0.00
		LL	-0.42	-0.12	9.51	0.16	-0.47	0.00
		EQX	3.49	-0.04	-4.84	-0.03	8.72	0.00
		EQY	-0.22	4.19	1.42	-9.09	-0.51	0.00
HN-1N	CIM	D0	-0.15	-0.16	6.14	0.19	-0.18	0.00
		DL	-0.96	-0.68	18.17	0.83	-1.06	0.00
		LL	-0.35	-0.24	5.22	0.29	-0.38	0.00
		EQX	3.42	-0.06	-4.30	0.00	8.48	0.00
		EQY	-0.32	3.22	-3.56	-7.96	-0.74	0.00

IPC
Ingeniería Estructural

Nit. 901.134.339-5
D: Calle 45 No.45 - 16 of 3801 T: 318 735 1464
C: ingenieriaipc@hotmail.com

ANEXO 2 REVISION ESTRUCTURAL
HOSPITAL DE ENGATIVA
ESTRUCTURAS NUEVAS EDIFICIO 2

1. DESCRIPCIÓN DEL SISTEMA ESTRUCTURAL

El proyecto fue revisado bajo el método de estados límites de resistencia, teniendo en cuenta las combinaciones de carga del numeral B2.4.2 de la NSR-10.

2. MATERIALES

Los materiales especificados para la estructura son los siguientes:

Acero refuerzo para concreto:		Fy = 420 MPa (4200 kg/cm² = 60000 psi)
Concreto:	Columnas y muros: .	f'c = 28 MPa (280kg/cm² = 4000 psi).
	Cimentación: .	f'c = 28 MPa (280kg/cm² = 4000 psi).

3. ANÁLISIS DE CARGAS PARA ESTRUCTURA.

3.1. Carga Muerta.

Las cargas muertas que se consideraron en el análisis de la estructura fueron:

- Piso tipo: 531 Kg/m2.
- Cubierta: 531 Kg/m2.

3.2. Carga Viva.

- Carga viva corredores y cuarto: 250 Kg/m2
- Carga viva cuartos de cirugía: 400 Kg/m2.

3.3 Carga de Granizo.

Se uso carga por Granizo de 100 Kg/m2.

4. PARAMETROS SÍSMICOS DE LA ESTRUCTURA.

Para el análisis sísmico se utilizó la siguiente metodología:

- Análisis Dinámico Modal Espectral.

  Fa = 0.95
  Fv = 2.70
  I= 1.50.

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C: ingenieriaipc@hotmail.com

4.1. Coeficiente de modificación sísmica R.

El factor de disipación de energía R y factor de sobreresistencia para el sistema estructural usado son:

Ro= 5.0.
Ω=3.0.

5. RESISTENCIA AL FUEGO.

Para la norma colombiana de construcción sismo resistente NSR-10, las edificaciones deben clasificarse por grupos de ocupación para establecer la condición de protección al fuego.

De acuerdo a la NSR-10 tabla J.1.1-1 la edificación se encuentra dentro del grupo de ocupación I2-Institucional, Salud o Incapacidad; y de acuerdo al título J.3.3.1 pertenece a la Categoría I- Esta comprende las edificaciones con mayor riesgo de pérdidas de vidas humanas o con alta amenaza de combustión.

- **J.3.5.2.1 Columnas de concreto estructural**

(b) 250 mm DMO (2 horas) / (d) Recubrimiento C.7.7.4 40 mm (3 horas)	**Ancho mínimo de columnas en concreto propuesto**	**Verificación**
250 mm	30mm	**OK**

- **J.3.5.2.3 Losas macizas y viguetas de concreto estructural**

a) losas macizas / vigueta > 150 mm 3 horas b) losas macizas / vigueta > 125 mm 2 horas c) losas macizas / vigueta > 80 mm 1 hora d) recubrimiento C.7.7.1	**Ancho mínimo de losas propuesto**	**Verificación**
80mm	100 mm/ 150mm	**OK**

- **J.3.5.2.4 Vigas de concreto estructural**

(b) 200 mm DMO (2 horas) / (e) Recubrimiento C.7.7.4 40 mm (2 horas)	**Ancho mínimo de vigas propuesto**	**Verificación**
200mm	400mm	**OK**

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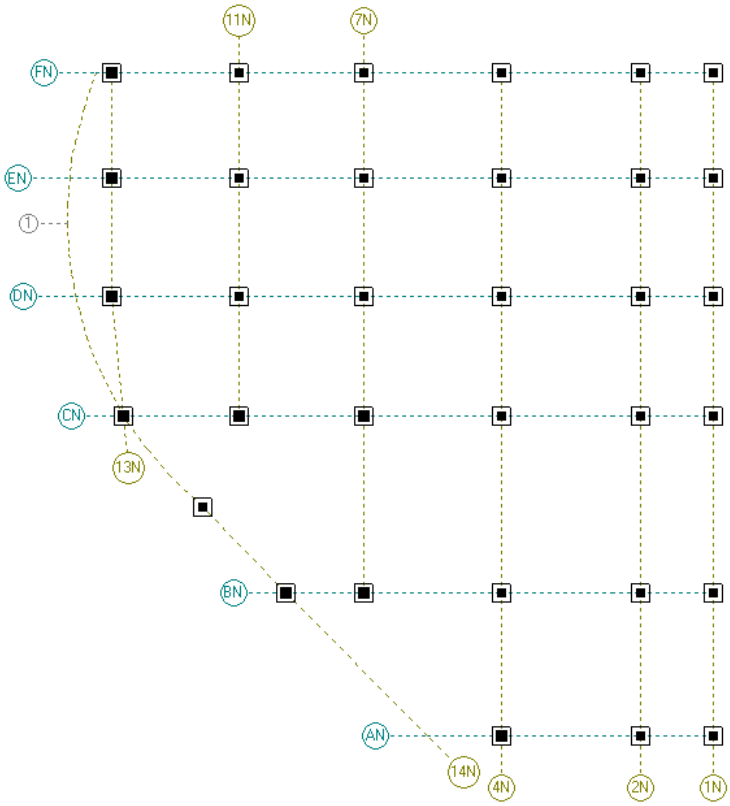
D: Calle 45 No.45 - 16 of 3801 T: 318 735 1464
C: ingenieriaipc@hotmail.com

6. IMÁGENES MODELO



7. ANÁLISIS SÍSMICO

A continuación, se presentan los resultados del análisis sísmico de la estructura para diseño y el análisis sísmico por umbral de daño para el chequeo de derivas.

Company: IPC INGENIERIA ESTRUCTURAL SAS **Engineer: YEFRY MORENO PARRA**
Project: Untitled **12:55:28 p. m. 4/01/2020**
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S E I S M I C D E S I G N C O D E : COL BOGOTA-10

```
============================================================
 S E I S M I C   B A S E   L E V E L :  1
============================================================


S E I S M I C   F O R C E   R E S I S T I N G   S Y S T E M

System X-Direction:   C: Moment Res.Frame
System Y-Direction:   C: Moment Res.Frame
------------------------------------------------------------
Energy dissip capacity: 2: Moderate-DMO
------------------------------------------------------------
```

RESPONSE SPECTRUM EARTHQUAKE FORCES COL BOGOTA-10

Elastic Modal Base Shear
Vm = Sam Wm'
Sam = Spectral modal acceleration
Wm' = Effective modal weight

A N A L Y S I S P A R A M E T E R S

Number of modes to be included ... = 3

	X-direction	Y-direction
Energy dissipation coefficient, Ro =	5	5

S P E C T R A L M O D A L A C C E L E R A T I O N

Sam = 2.5 Aa Fa I For Tm <= Tc
Sam = 1.2 Av Fv I/Tm For Tc < Tm < Tl
Sam = 1.2 Av Fv Tl I/Tm² For Tm > Tl

Eff. peak acceleration & veloc., Aa = .15 Av = .20

Importance coefficient, I ..... = 1.5

GROUP	COEFFICIENT
IV - Essential facilities	1.50
III- Public assistance facilities	1.25
II - Especial occupancy buildings	1.10
I - Normal occupancy buildings	1.00

Seismic zone No. ..... = 9

B O G O T A, D. C. - S E I S M I C Z O N E S

1: CERROS	9: LACUSTRE-500
2: PIEDEMONTE A	10: LACUSTRE ALUVIAL-200
3: PIEDEMONTE B	11: LACUSTRE ALUVIAL-300
4: PIEDEMONTE C	12: ALUVIAL-50
5: LACUSTRE-50	13: ALUVIAL-100
6: LACUSTRE-100	14: ALUVIAL-200
7: LACUSTRE-200	15: ALUVIAL-300
8: LACUSTRE-300	16: DEPOSITO LADERA

S P E C T R A L M O D A L A C C E L E R A T I O N

Sam = 2.5 Aa Fa I For Tm <= Tc
Sam = 1.2 Av Fv I/Tm For Tc < Tm < Tl
Sam = 1.2 Av Fv Tl I/Tm² For Tm > Tl

DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETERS

	Short Periods	Long Periods
Effect. peak acceleration & velc.,	Aa = 0.15	Av = 0.20
Site coefficients (Tables below),	Fa = 0.95	Fv = 2.70

Design response parameters, Aa Fa = 0.14 Av Fv= 0.54

Long-period transition period, Tl sec = 5.00

SEISMIC ZONE	Fa	Fv	Tl
1: Cerros	1.35	1.30	3.0
2: Piedemonte A	1.65	2.00	3.0
3: Piedemonte B	1.95	1.70	3.0
4: Piedemonte C	1.80	1.70	3.0
5: Lacustre-50	1.40	2.90	4.0
6: Lacustre-100	1.30	3.20	4.0
7: Lacustre-200	1.20	3.50	4.0
8: Lacustre-300	1.05	2.90	5.0
9: Lacustre-500	0.95	2.70	5.0*
10: Lacustre Aluvial-200	1.10	2.80	4.0
11: Lacustre Aluvial-300	1.00	2.50	5.0
12: Aluvial-50	1.35	1.80	3.5
13: Aluvial-100	1.20	2.10	3.5
14: Aluvial-200	1.05	2.10	3.5
15: Aluvial-300	0.95	2.10	3.5
16: Deposito ladera	1.65	1.70	3.0

Reduction in R for Irregularity and Lack of Redundancy:

PLAN IRREGULARITIES			ELEVATION IRREGULARITIES	
Type	Description	Øp	Type	Description	Øa
1aP	Torsional	0.9	1aA	Flexible	0.9
1bP	Torsional Extrme	0.8	1bA	Flexible Extrme	0.8
2P	Reentrant corners	0.9	2A	Mass	0.9
3P	Diaph. discontin.	0.9	3A	Geometrical	0.9
4P	Plane shifting	0.8	4A	Plane shifting	0.8
5P	Unparallel grid	0.9	5aA	Weak Story	0.9
			5bA	Weak Story Extr	0.8

NOTE: EngSolutions RCB assumes irregular building.
For regular buildings make (Øp . Øa)= 1.0

	X - D I R E C T I O N	Y - D I R E C T I O N
Reduct. factor, (Øp.Øa) =	.9	.9
Redundancy factor, Ør =	1	1

R = (Øp Øa) Ør Ro

S T A T I C E Q U I V A L E N T B A S E S H E A R

Building Weight, W, (ton) = 795.84

Peak Acceleration Coeffi., Aa Fa = .14
Peak Velocity Coefficient, Av Fv = .54
Importance factor, I . . . . . = 1.5
Seizmic zone . . . . . = LACUSTRE-500
Coeff. for upper limit period, Cu = 1.2

	X-direction	Y-direction
Computed Period	0.258	0.268
Ta = Ct (H)^x	0.047 H^0.9	0.047 H^0.9
	0.145	0.145
Tmax = Cu Ta	0.174	0.174
Fundamental Period	0.174	0.174
Energ-Disspst coeff, R	4.5	4.5
1.2 Av Fv I / T	5.581	5.581
2.5 Aa Fa I	.525	.525
Sa	.525	.525
Base Shear, Vo	417.82	417.82
Static Shear, .9Vo (ton)	376.04	376.04

S P E C T R A L A C C E L E R A T I O N

MODE No	PERIOD (sec)	Sa (g)	Damping Ratio
1	.268	.525	.05
2	.258	.525	.05
3	.134	.525	.05

M O D A L B A S E S H E A R

MODE No	X - D I R E C T I O N Sax (g)	W'x (ton)	Vx (ton)	Y - D I R E C T I O N Say (g)	W'y (ton)	Vy (ton)
1	.525	397.43	208.65	.525	403.28	211.72
2	.525	398.07	208.99	.525	392.32	205.97
3	.525	.34	.18	.525	.24	.13
ELASTIC Ve (combined):		295.31				295.38
STATIC(IREG) 0.9Sa(T1)W		376.04				376.04
Design Base Shear:		376.04				376.04

Total Building Weight, W = 795.84 ton
Participating Mass, ΣW'/W = 100% in X, 100% in Y
W'xm={ΣWj ϕxjm}²/ΣWj ϕxjm² W'ym={ΣWj ϕyjm}²/ΣWj ϕyjm²
Combination of Modal Response: SRSS V = (Sum Vi²)½

A C C I D E N T A L T O R S I O N

	X-direction	Y-direction
Accidental eccentricity as a percentage of building dimension, (%)=	5	5

A C C I D E N T A L E C C E N T R I C I T Y:

	X - D I R E C T I O N (EQY)			Y - D I R E C T I O N (EQX)		
Level -	$\delta\varepsilon^{xo}$ (m)	Ax -	$\delta\varepsilon^{x}$ (m)	$\delta\varepsilon^{yo}$ (m)	Ax -	$\delta\varepsilon^{y}$ (m)
2	1.55	1.00	1.55	1.59	1.00	1.59

Ax: Amplification factor for accidental eccentricity

EQY: Envelope (1) $E^x = \varepsilon^x$
(2) $E^x = \varepsilon^x + \delta\varepsilon^x$
(3) $E^x = \varepsilon^x - \delta\varepsilon^x$

EQX: Envelope (1) $E^y = \varepsilon^y$
(2) $E^y = \varepsilon^y + \delta\varepsilon^y$
(3) $E^y = \varepsilon^y - \delta\varepsilon^y$

D E S I G N E C C E N T R I C I T Y : $E = \varepsilon + \delta\varepsilon$

	X - D I R E C T I O N (EQY)				Y - D I R E C T I O N (EQX)			
Level -	Center Mass CMx	Inherent Eccent. ε^{x*}	Accident Eccent. $\delta\varepsilon^x$	Design Eccent. E^x	Center Mass CMy	Inherent Eccent. ε^{y*}	Accident Eccent. $\delta\varepsilon^y$	Design Eccent. E^y
2	17.43	1.24	1.55	2.7979	18.50	0.54	1.59	2.1313

Note: * Inherent eccentricity: εx = CMx - CRx and εy = CMy - CRy
All values are in meters

D E S I G N E C C E N T R I C I T Y : $E = \varepsilon - \delta\varepsilon$

	X - D I R E C T I O N (EQY)				Y - D I R E C T I O N (EQX)			
Level -	Center Mass CMx	Inherent Eccent. ε^{x*}	Accident Eccent. $\delta\varepsilon^x$	Design Eccent. E^x	Center Mass CMy	Inherent Eccent. ε^{y*}	Accident Eccent. $\delta\varepsilon^y$	Design Eccent. E^y
2	17.43	1.24	1.55	-0.311	18.50	0.54	1.59	-1.055

Note: * Inherent eccentricity: εx = CMx - CRx and εy = CMy - CRy
All values are in meters

Modal nodal force:

$$Fim = Vm \ \phi im / \Sigma Wj \ \phi jm$$
$$Vm = (Sam / Rw) \ W'm$$
$$W'm = \{\Sigma Wj \ \phi jm\}^2 / \Sigma Wj \ \phi jm^2$$

C O M B I N E D M O D A L F O R C E

X - DIRECTION

Floor k -	Weight W (ton)	Force F (ton)	Shear V (ton)	Torsion T=F(E-ε) (ton-m)
2	795.8	376.0	376.0	599.0

C O M B I N E D M O D A L F O R C E

Y - DIRECTION

Floor k -	Weight W (ton)	Force F (ton)	Shear V (ton)	Torsion T=F(E-ε) (ton-m)
2	795.8	376.0	376.0	582.9

ACCELERATIONS ON NON-STRUCTURAL ELEMENTS- MZS BOGOTA-2010

F L O O R A C C E L E R A T I O N S

Level	hx	hx/heq	ax
2	3.50	1.33	0.630

Seismic base level . . . . . = 1
Height above seismic base, hn . . . . . = 3.50 m
Equivalent height, heq = 0.75 hn . . . . . = 2.63 m
Ground acceleration, As = Aa Fa I . . . . . = 0.210
Spectral acceleration, Sa . . . . . = 0.473

ax = Sa hx/heq for hx > heq
ax = As + (Sa -As) hx/heq for hx < heq

Force on structural non-seismic element : Fp = ax Wp / Ro
Force on nonstructural element : Fp = ax ap Wp / Rp
> 0.5 Aa I Wp

ap : component amplification factor

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MODE - FREQUENCY ANALYSIS

Mass Matrix Combination (Weight / g)

M = (D0 + DL) / g

Total Building Weight: 795.84 ton

Modal Information: frequency, period, participation factors & generalized mass

Mode No	Frequency Hz	Period sec	== X-Direction === Part.Fac	GenMass*	== Y-Direction === Part.Fac	GenMass*	== Z-Direction === Part.Fac	GenMass*
1	3.74	0.2680	0.28	0.10	0.86	0.90	0.00	0.00
2	3.88	0.2580	-0.85	0.90	0.28	0.10	0.00	0.00
3	7.47	0.1340	0.03	1.45	-0.03	1.51	0.00	0.00

* : ton-sec²/m

Effective Weight and Participating Mass

Mode No	X - Direction Weff*	%Mass	[%-Sum]	Y - Direction Weff*	%Mass	[%-Sum]	Z - Direction Weff*	%Mass	[%-Sum]
1	397.43	49.94	[49.9]	403.28	50.67	[50.7]	0.00	0.00	[0.0]
2	398.07	50.02	[100.0]	392.31	49.30	[100.0]	0.00	0.00	[0.0]
3	0.34	0.04	[100.0]	0.24	0.03	[100.0]	0.00	0.00	[0.0]

* : ton

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S E I S M I C D E S I G N C O D E : COL BOGOTA-10

```
============================================================
 S E I S M I C   B A S E   L E V E L :  1
============================================================


S E I S M I C   F O R C E   R E S I S T I N G   S Y S T E M

System X-Direction:   C: Moment Res.Frame
System Y-Direction:   C: Moment Res.Frame
------------------------------------------------------------
Energy dissip capacity: 2: Moderate-DMO
------------------------------------------------------------
```

RESPONSE SPECTRUM EARTHQUAKE FORCES COL BOGOTA-10

Elastic Modal Base Shear
Vm = Sam Wm'
Sam = Spectral modal acceleration
Wm' = Effective modal weight

A N A L Y S I S P A R A M E T E R S

Number of modes to be included ... = 3

	X-direction	Y-direction
Energy dissipation coefficient, Ro =	5	5

S P E C T R A L M O D A L A C C E L E R A T I O N

Sam = 2.5 Aa Fa I For Tm <= Tc
Sam = 1.2 Av Fv I/Tm For Tc < Tm < Tl
Sam = 1.2 Av Fv Tl I/Tm² For Tm > Tl

Eff. peak acceleration & veloc., Aa = .15 Av = .20

Importance coefficient, I ..... = 1.0

GROUP	COEFFICIENT
IV - Essential facilities	1.50
III- Public assistance facilities	1.25
II - Especial occupancy buildings	1.10
I - Normal occupancy buildings	1.00

Seismic zone No. ..... = 9

B O G O T A, D. C. - S E I S M I C Z O N E S

1: CERROS	9: LACUSTRE-500
2: PIEDEMONTE A	10: LACUSTRE ALUVIAL-200
3: PIEDEMONTE B	11: LACUSTRE ALUVIAL-300
4: PIEDEMONTE C	12: ALUVIAL-50
5: LACUSTRE-50	13: ALUVIAL-100
6: LACUSTRE-100	14: ALUVIAL-200
7: LACUSTRE-200	15: ALUVIAL-300
8: LACUSTRE-300	16: DEPOSITO LADERA

S P E C T R A L M O D A L A C C E L E R A T I O N

Sam = 2.5 Aa Fa I For Tm <= Tc
Sam = 1.2 Av Fv I/Tm For Tc < Tm < Tl
Sam = 1.2 Av Fv Tl I/Tm² For Tm > Tl

DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETERS

	Short Periods	Long Periods
Effect. peak acceleration & velc.,	Aa = 0.15	Av = 0.20
Site coefficients (Tables below),	Fa = 0.95	Fv = 2.70

Design response parameters, Aa Fa = .165 Av Fv= .75

Long-period transition period, Tl sec = 5.00

SEISMIC ZONE	Fa	Fv	Tl
1: Cerros	1.35	1.30	3.0
2: Piedemonte A	1.65	2.00	3.0
3: Piedemonte B	1.95	1.70	3.0
4: Piedemonte C	1.80	1.70	3.0
5: Lacustre-50	1.40	2.90	4.0
6: Lacustre-100	1.30	3.20	4.0
7: Lacustre-200	1.20	3.50	4.0
8: Lacustre-300	1.05	2.90	5.0
9: Lacustre-500	0.95	2.70	5.0*
10: Lacustre Aluvial-200	1.10	2.80	4.0
11: Lacustre Aluvial-300	1.00	2.50	5.0
12: Aluvial-50	1.35	1.80	3.5
13: Aluvial-100	1.20	2.10	3.5
14: Aluvial-200	1.05	2.10	3.5
15: Aluvial-300	0.95	2.10	3.5
16: Deposito ladera	1.65	1.70	3.0

Reduction in R for Irregularity and Lack of Redundancy:

PLAN IRREGULARITIES			ELEVATION IRREGULARITIES	
Type	Description	Øp	Type	Description	Øa
1aP	Torsional	0.9	1aA	Flexible	0.9
1bP	Torsional Extrme	0.8	1bA	Flexible Extrme	0.8
2P	Reentrant corners	0.9	2A	Mass	0.9
3P	Diaph. discontin.	0.9	3A	Geometrical	0.9
4P	Plane shifting	0.8	4A	Plane shifting	0.8
5P	Unparallel grid	0.9	5aA	Weak Story	0.9
			5bA	Weak Story Extr	0.8

NOTE: EngSolutions RCB assumes irregular building.
For regular buildings make (Øp . Øa)= 1.0

	X - D I R E C T I O N	Y - D I R E C T I O N
Reduct. factor, (Øp.Øa) =	.9	.9
Redundancy factor, Ør =	1	1

R = (Øp Øa) Ør Ro

S T A T I C E Q U I V A L E N T B A S E S H E A R

Building Weight, W, (ton) = 795.84

		X-direction	Y-direction
Peak Acceleration Coeffi., Aa Fa	=	.165	
Peak Velocity Coefficient, Av Fv	=	.75	
Importance factor, I	=	1	
Seizmic zone	=	LACUSTRE-500	
Coeff. for upper limit period, Cu	=	1.2	
Computed Period	=	0.258	0.268
Ta = Ct (H)^x	=	0.047 H^0.9	0.047 H^0.9
	=	0.145	0.145
Tmax = Cu Ta	=	0.174	0.174
Fundamental Period	=	0.174	0.174
Energ-Disspst coeff, R	=	4.5	4.5
1.2 Av Fv I / T	=	5.168	5.168
2.5 Aa Fa I	=	.413	.413
Sa	=	.413	.413
Base Shear, Vo	=	328.28	328.28
Static Shear, .9Vo (ton)	=	121.43	123.92

S P E C T R A L A C C E L E R A T I O N

MODE No	PERIOD (sec)	Sa (g)	Damping Ratio
1	.268	.173	.05
2	.258	.17	.05
3	.134	.127	.05

M O D A L B A S E S H E A R

MODE No	X - D I R E C T I O N Sax (g)	W'x (ton)	Vx (ton)	Y - D I R E C T I O N Say (g)	W'y (ton)	Vy (ton)
1	.173	397.43	68.75	.173	403.28	69.77
2	.17	398.07	67.67	.17	392.32	66.69
3	.127	.34	.04	.127	.24	.03
ELASTIC Ve (combined):			96.47			96.52
STATIC(IREG) 0.9Sa(T1)W			121.43			123.92
Design Base Shear:			121.43			123.92

Total Building Weight, W = 795.84 ton
Participating Mass, $\Sigma W'/W$ = 100% in X, 100% in Y
$W'xm=\{\Sigma Wj\ \phi xjm\}^2/\Sigma Wj\ \phi xjm^2$ $W'ym=\{\Sigma Wj\ \phi yjm\}^2/\Sigma Wj\ \phi yjm^2$
Combination of Modal Response: SRSS V = (Sum Vi^2)½

A C C I D E N T A L T O R S I O N

	X-direction	Y-direction
Accidental eccentricity as a percentage of building dimension, (%)=	0	0

Modal nodal force:

$$Fim = Vm \ \phi im / \Sigma Wj \ \phi jm$$
$$Vm = (Sam / Rw) \ W'm$$
$$W'm = \{\Sigma Wj \ \phi jm\}^2 / \Sigma Wj \ \phi jm^2$$

C O M B I N E D M O D A L F O R C E

X - DIRECTION

Floor k -	Weight W (ton)	Force F (ton)	Shear V (ton)	Torsion T=F(E-ε) (ton-m)
2	795.8	121.4	121.4	0.0

C O M B I N E D M O D A L F O R C E

Y - DIRECTION

Floor k -	Weight W (ton)	Force F (ton)	Shear V (ton)	Torsion T=F(E-ε) (ton-m)
2	795.8	123.9	123.9	0.0

ACCELERATIONS ON NON-STRUCTURAL ELEMENTS- MZS BOGOTA-2010

FLOOR ACCELERATIONS

Level	hx	hx/heq	ax NSR-10	ax ASCE7-10	ax UBC-97	ax EUROCODE8	ax NZS1170.5
2	3.50	1.33	0.208	0.495	0.660	0.578	0.495

Seismic base level . . . . . = 1
Height above seismic base, hn . . . . . = 3.50 m
Equivalent height, heq = 0.75 hn . . . . . = 2.63 m
Ground acceleration, As = Aa Fa I . . . . . = 0.165
Spectral acceleration, Sa . . . . . = 0.156

NSR-10: ax = Sa hx/heq for hi > heq
ax = As + (Sa -As) hi/heq for hi < heq
ASCE7-10: ax = As (1 + 2 hx/ hn)
UBC-97: ax = As (1 + 3 hx/ hn)
Eurocode 8: ax = As [3/2(1+ hx/hn) - 0.5] for (Ta/T1=0)
NZS 1170.5 ax = As (1 + 2 hx/hl) for hx < hl
ax = 3 As for hx > hl (hl = 0.2 hn)
Note: RCB recommends using ASCE7-10 accelerations for this project

Force on structural non-seismic element : Fp = ai Wp / Ro
Force on nonstructural element : Fp = ai ap Wp / Rp
> 0.5 Aa I Wp
ap : component amplification factor

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MODE - FREQUENCY ANALYSIS

Mass Matrix Combination (Weight / g)

M = (D0 + DL) / g

Total Building Weight: 795.84 ton

Modal Information: frequency, period, participation factors & generalized mass

Mode No	Frequency Hz	Period sec	== X-Direction === Part.Fac	GenMass*	== Y-Direction === Part.Fac	GenMass*	== Z-Direction === Part.Fac	GenMass*
1	3.74	0.2680	0.28	0.10	0.86	0.90	0.00	0.00
2	3.88	0.2580	-0.85	0.90	0.28	0.10	0.00	0.00
3	7.47	0.1340	0.03	1.45	-0.03	1.51	0.00	0.00

* : ton-sec²/m

Effective Weight and Participating Mass

Mode No	X - Direction Weff*	%Mass	[%-Sum]	Y - Direction Weff*	%Mass	[%-Sum]	Z - Direction Weff*	%Mass	[%-Sum]
1	397.43	49.94	[49.9]	403.28	50.67	[50.7]	0.00	0.00	[0.0]
2	398.07	50.02	[100.0]	392.31	49.30	[100.0]	0.00	0.00	[0.0]
3	0.34	0.04	[100.0]	0.24	0.03	[100.0]	0.00	0.00	[0.0]

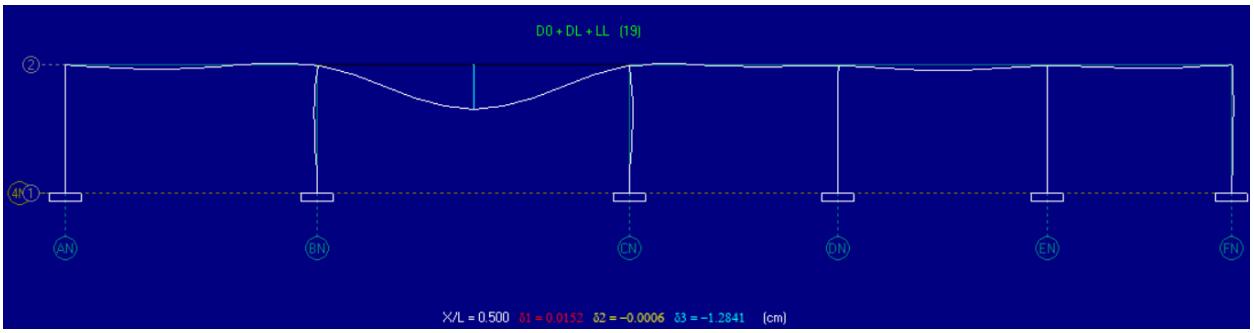
* : ton

IPC
Ingeniería Estructural

Nit. 901.134.339-5
D: Calle 45 No.45 - 16 of 3801 T: 318 735 1464
C: ingenieriaipc@hotmail.com

8. DEFLEXIONES VERTICALES Y DERIVAS.

La altura de las vigas del proyecto cumple con lo recomendado por la tabla CR9.5 de la NSR-10, aun así, presentamos el chequeo de deflexiones por cargas permanentes en algunas de las luces mayores de la estructura.



Deflexión máxima permitida: L/240

850/240= 3.5 cm.

Deflexión máxima presentada: 1.28 cm.

A continuación, mostramos los resultados de derivas donde se evidencia la revisión y cumplimiento según la NSR-10.

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P-DELTA ANALYSIS - SUMMARY MAXIMUM STORY DRIFT RATIO, Δ/h

	Drift-Ratio at CENTER OF MASS			MAXIMUM Corner Story-Drift-Ratio			
Story	DriftX	DriftY	DriftR	DriftX	DriftY	DriftR	Axis
1	0.0007	0.0008	0.0008	0.0008	0.0009	0.0009	AN-1N
Maxima	0.0007	0.0008	0.0008	0.0008	0.0009	0.0009	

DriftX = $(\Delta x/h)max$
DriftY = $(\Delta y/h)max$
DriftR = $([(\Delta x/h)^2 + (\Delta y/h)^2]^{1/2})max$

P-DELTA ANALYSIS - DETAILED MAXIMUM STORY DRIFT RATIO, δ/h

Story	ColAxis	$(\delta x/h)max$	$(\delta y/h)max$	$([(\delta x/h)^2 + (\delta y/h)^2]^{1/2})max$
1	DN-13N	0.0007	0.0007	0.0007
	EN-13N	0.0007	0.0007	0.0007
	FN-13N	0.0008	0.0007	0.0008
	CN-14N	0.0007	0.0007	0.0007
	14N:BNa	0.0007	0.0007	0.0007
	CN-11N	0.0007	0.0007	0.0007
	DN-11N	0.0007	0.0007	0.0007
	EN-11N	0.0007	0.0007	0.0007
	FN-11N	0.0008	0.0007	0.0008
	BN-14N	0.0007	0.0008	0.0008
	BN-7N	0.0007	0.0008	0.0008
	CN-7N	0.0007	0.0008	0.0008
	DN-7N	0.0007	0.0008	0.0008
	EN-7N	0.0007	0.0008	0.0008
	FN-7N	0.0008	0.0008	0.0008
	AN-4N	0.0007	0.0008	0.0008
	BN-4N	0.0007	0.0008	0.0008
	CN-4N	0.0007	0.0008	0.0008
	DN-4N	0.0007	0.0008	0.0008
	EN-4N	0.0007	0.0008	0.0008
	FN-4N	0.0008	0.0008	0.0008
	AN-2N	0.0007	0.0008	0.0009
	BN-2N	0.0007	0.0008	0.0009
	CN-2N	0.0007	0.0008	0.0008
	DN-2N	0.0007	0.0008	0.0008
	EN-2N	0.0007	0.0008	0.0008
	FN-2N	0.0008	0.0008	0.0008
	AN-1N	0.0007	0.0009	0.0009
	BN-1N	0.0007	0.0009	0.0009
	CN-1N	0.0007	0.0009	0.0009
	DN-1N	0.0007	0.0009	0.0009
	EN-1N	0.0007	0.0009	0.0009
	FN-1N	0.0008	0.0009	0.0009

Note: Drift amplification factor, D: 1 in X; 1 in Y
MAXIMA DRIFT: $(\delta/h)x$ =0.0008; $(\delta/h)y$ =0.0009; $(\delta/h)r$ =0.0009

Nit. **901.134.339-5**
D: Calle 45 No.45 - 16 of 3801 **T:** 318 735 1464
C: ingenieriaipc@hotmail.com

9. DISEÑO DE ELEMENTOS.

- Diseño de columnas.

A continuación, mostramos los resultados de diseño de las columnas donde se evidencia la revisión y el cumplimiento de la NSR-10.

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LOAD COMBINATIONS

No	Load combination
1	1.4D0 + 1.4DL
2	1.2D0 + 1.2DL + 1.6LL
3	1.2D0 + 1.2DL + LL + EQX + .3EQY
4	1.2D0 + 1.2DL + LL - EQX - .3EQY
5	1.2D0 + 1.2DL + LL + EQX - .3EQY
6	1.2D0 + 1.2DL + LL - EQX + .3EQY
7	1.2D0 + 1.2DL + LL + .3EQX + EQY
8	1.2D0 + 1.2DL + LL - .3EQX - EQY
9	1.2D0 + 1.2DL + LL - .3EQX + EQY
10	1.2D0 + 1.2DL + LL + .3EQX - EQY
11	.9D0 + .9DL + EQX + .3EQY
12	.9D0 + .9DL - EQX - .3EQY
13	.9D0 + .9DL + EQX - .3EQY
14	.9D0 + .9DL - EQX + .3EQY
15	.9D0 + .9DL + .3EQX + EQY
16	.9D0 + .9DL - .3EQX - EQY
17	.9D0 + .9DL - .3EQX + EQY
18	.9D0 + .9DL + .3EQX - EQY

MATERIALS

Number of materials = 2

REINFORCED CONCRETE

Mat	Name	f'c Kg/cm2	fy Kg/cm2	fys1 Kg/cm2	fys2 Kg/cm2	E Kg/cm2	G Kg/cm2	w Kg/m3
1	RConcrete1	210	4200	4200	4200	218540	87430	2400.0
2	RConcrete2	280	4200	4200	4200	252350	100940	2400.0

f'c: Compressive strength of concrete
fy: Yield strength of longitudinal reinforcement
fys1: Yiel strength of shear reinforcement, bar sizes <= 3/8"
fys2: Yiel strength of shear reinforcement, bar sizes > 3/8"

COLUMN SECTIONS

Number of prismatic sections = 3

Sec	Name	Shape	b (cm)	h (cm)	tw (cm)	tf (cm)	P1 (cm)	P2 (cm)	A (cm2)	I2 (cm4)	I3 (cm4)	J (cm4)
1	C40X40	Rectang	40.00	40.00	-	-	-	-	1600.0	213333	213333	315733
2	C45X45	Rectang	45.00	45.00	-	-	-	-	2025.0	341719	341719	505744
3	C50X50	Rectang	50.00	50.00	-	-	-	-	2500.0	520833	520833	770833

Design Results - Columns (DMO)

Column	Story	L (m)	Lu (m)	Sec Mat	bxh (cm)	TRANSVERSE REINFORCEMENT TIES	TRANSVERSE REINFORCEMENT XTIES	LONGITUDINAL REINFORCEMENT Sec	LdCmb critc	Pu (ton)	Mu2 (ton-m)	Mu3 (ton-m)	RHO -	As (cm2)
FN-1N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	5	5.04	4.13	4.13	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	10	7.32	6.33	2.19	0.0100	16.00

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Column	Story	L	Lu	Sec	bxh	TIES	XTIES	Sec	LdCmb	Pu	Mu2	Mu3	RHO	As
EN-1N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	10	12.33	6.90	1.53	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	10	12.33	6.59	1.84	0.0100	16.00
DN-1N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	15	8.17	5.02	1.44	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	18	8.47	5.61	1.30	0.0100	16.00
CN-1N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	8	18.07	9.41	1.23	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	8	18.07	7.54	1.41	0.0100	16.00
BN-1N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	7	18.40	6.54	1.71	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	15	11.61	5.39	1.99	0.0100	16.00
AN-1N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	7	8.79	8.21	1.92	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	7	8.79	6.39	2.27	0.0100	16.00
FN-2N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	4	18.70	5.48	8.17	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	4	18.70	3.44	6.21	0.0100	16.00
EN-2N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	4	38.70	3.04	11.26	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	4	38.70	2.33	7.57	0.0100	16.00
DN-2N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	6	37.54	3.03	11.95	0.0101	16.19
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	6	37.54	2.19	7.83	0.0100	16.00
CN-2N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	8	48.70	15.63	8.66	0.0236	37.75
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	8	48.70	10.25	4.79	0.0100	16.00
BN-2N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	6	53.12	8.03	12.10	0.0160	25.56
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	6	53.12	4.47	7.92	0.0100	16.00
AN-2N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	6	23.84	11.72	8.75	0.0171	27.44
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	6	23.84	6.15	6.44	0.0100	16.00
FN-4N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	10	25.74	8.11	2.37	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	10	25.74	6.58	2.48	0.0100	16.00
EN-4N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	1	49.66	1.36	1.35	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	1	49.66	1.35	1.35	0.0100	16.00
DN-4N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	1	51.01	1.39	1.39	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	1	51.01	1.39	1.39	0.0100	16.00
CN-4N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	10	65.63	18.51	3.00	0.0201	32.13
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	8	65.78	11.42	1.79	0.0100	16.00
BN-4N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	7	57.52	18.58	8.11	0.0283	45.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	7	57.52	10.93	4.86	0.0100	16.00
AN-4N	1	3.50	3.18	2	45x45	6 #3 @ 10 cm (end)	1 (b)	Top	7	21.21	8.29	3.41	0.0100	20.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	7	21.21	7.73	3.77	0.0100	20.25
FN-7N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	5	23.16	5.81	5.89	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	5	23.16	3.47	5.70	0.0100	16.00
EN-7N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	10	46.41	6.02	4.00	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	1	46.61	1.27	1.27	0.0100	16.00
DN-7N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	1	47.10	1.28	1.78	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	1	47.10	1.28	1.28	0.0100	16.00
CN-7N	1	3.50	3.18	3	50x50	5 #3 @ 12 cm (end)	2 (b)	Top	8	64.13	24.35	1.94	0.0100	25.00
				2		9 #3 @ 24 cm (ctr)	2 (h)	Bot	8	64.13	17.64	2.65	0.0100	25.00
BN-7N	1	3.50	3.18	3	50x50	5 #3 @ 12 cm (end)	2 (b)	Top	3	32.60	31.65	11.92	0.0195	48.73
				2		9 #3 @ 24 cm (ctr)	2 (h)	Bot	7	34.35	20.65	6.36	0.0100	25.00
BN-14N	1	3.50	3.18	3	50x50	5 #3 @ 12 cm (end)	2 (b)	Top	6	17.12	5.59	8.35	0.0100	25.00
				2		9 #3 @ 24 cm (ctr)	2 (h)	Bot	4	16.39	0.50	9.99	0.0100	25.00
FN-11N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	4	22.95	6.40	4.86	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	4	22.95	4.12	4.70	0.0100	16.00

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Column	Story	L	Lu	Sec	bxh	TIES	XTIES	Sec	LdCmb	Pu	Mu2	Mu3	RHO	As
EN-11N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	1	44.20	1.20	1.20	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	1	44.20	1.20	1.20	0.0100	16.00
DN-11N	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	1	46.36	1.26	1.26	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	1	46.36	1.26	1.26	0.0100	16.00
CN-11N	1	3.50	3.18	2	45x45	6 #3 @ 10 cm (end)	1 (b)	Top	3	37.38	9.59	7.95	0.0100	20.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	3	37.38	5.76	7.55	0.0100	20.25
14N:BNa	1	3.50	3.18	1	40x40	6 #3 @ 10 cm (end)	1 (b)	Top	5	20.10	4.29	4.04	0.0100	16.00
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	10	20.19	4.68	2.66	0.0100	16.00
CN-14N	1	3.50	3.18	2	45x45	6 #3 @ 10 cm (end)	1 (b)	Top	7	26.51	9.37	8.04	0.0100	20.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	3	26.99	3.10	9.13	0.0100	20.25
FN-13N	1	3.50	3.18	2	45x45	6 #3 @ 10 cm (end)	1 (b)	Top	10	19.36	9.39	5.19	0.0100	20.25
				2		10 #3 @ 20 cm (ctr)	1 (h)	Bot	10	19.36	8.28	4.57	0.0100	20.25
EN-13N	1	3.50	3.18	3	50x50	5 #3 @ 12 cm (end)	2 (b)	Top	1	42.06	1.48	3.65	0.0100	25.00
				2		9 #3 @ 24 cm (ctr)	2 (h)	Bot	12	25.83	5.13	8.53	0.0100	25.00
DN-13N	1	3.50	3.18	3	50x50	5 #3 @ 12 cm (end)	2 (b)	Top	1	41.96	1.27	1.27	0.0100	25.00
				2		9 #3 @ 24 cm (ctr)	2 (h)	Bot	1	41.96	1.27	1.27	0.0100	25.00

Nit. **901.134.339-5**
D: Calle 45 No.45 - 16 of 3801 **T:** 318 735 1464
C: ingenieriaipc@hotmail.com

- Vigas.

A continuación, mostramos los resultados de diseño de las vigas donde se evidencia la revisión y el cumplimiento de la NSR-10.

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LOAD COMBINATIONS

No	Load combination
1	1.4D0 + 1.4DL
2	1.2D0 + 1.2DL + 1.6LL
3	1.2D0 + 1.2DL + LL + EQX + .3EQY
4	1.2D0 + 1.2DL + LL - EQX - .3EQY
5	1.2D0 + 1.2DL + LL + EQX - .3EQY
6	1.2D0 + 1.2DL + LL - EQX + .3EQY
7	1.2D0 + 1.2DL + LL + .3EQX + EQY
8	1.2D0 + 1.2DL + LL - .3EQX - EQY
9	1.2D0 + 1.2DL + LL - .3EQX + EQY
10	1.2D0 + 1.2DL + LL + .3EQX - EQY
11	.9D0 + .9DL + EQX + .3EQY
12	.9D0 + .9DL - EQX - .3EQY
13	.9D0 + .9DL + EQX - .3EQY
14	.9D0 + .9DL - EQX + .3EQY
15	.9D0 + .9DL + .3EQX + EQY
16	.9D0 + .9DL - .3EQX - EQY
17	.9D0 + .9DL - .3EQX + EQY
18	.9D0 + .9DL + .3EQX - EQY

MATERIALS

Number of materials = 2

REINFORCED CONCRETE

Mat	Name	f'c Kg/cm2	fy Kg/cm2	fys1 Kg/cm2	fys2 Kg/cm2	E Kg/cm2	G Kg/cm2	w Kg/m3
1	RConcrete1	210	4200	4200	4200	218540	87430	2400.0
2	RConcrete2	280	4200	4200	4200	252350	100940	2400.0

f'c: Compressive strength of concrete
fy: Yield strength of longitudinal reinforcement
fys1: Yiel strength of shear reinforcement, bar sizes <= 3/8"
fys2: Yiel strength of shear reinforcement, bar sizes > 3/8"

BEAM SECTIONS

Number of prismatic sections = 2

Sec	Name	Shape	b (cm)	h (cm)	tw (cm)	tf (cm)	P1 (cm)	P2 (cm)	A (cm2)	I2 (cm4)	I3 (cm4)	J (cm4)
1	VG40X40	Rectang	40.00	40.00	-	-	-	-	1600.0	213333	213333	315733
2	VT15X40	Rectang	15.00	40.00	-	-	-	-	600.0	80000	11250	34369

Design Results - Beams (DMO)

BEAM: AN(14N-4N) FLOOR: 2

	Length:	L = 3.56 m Lu = 3.14 m	a = 0.20 m c = 0.23 m	Section:	b = 40.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.20	0.51	0.83	1.14	1.46	1.77	2.08	2.40	2.71	3.02	3.34
Mu(-), ton-m:	-1.72	-1.72	-1.72	-2.11	-2.87	-3.69	-4.56	-5.49	-6.47	-7.50	-8.58
Mu(+), ton-m:	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	2.86
As(-), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.90	5.71	6.57
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	4.74	4.74	4.88	5.05	5.22	5.38	5.51	5.64	5.77	5.88	5.88
Tu, ton-m:	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50	7.50

DESIGN

AN-14N 12 #3 @ 7.5 7 #3 @ 17.5 12 #3 @ 7.5 AN-4N

BEAM: AN(4N-2N) FLOOR: 2

	Length:	L = 6.68 m Lu = 6.25 m	a = 0.23 m c = 0.20 m	Section:	b = 40.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.23	0.85	1.48	2.10	2.73	3.35	3.98	4.60	5.23	5.85	6.48
Mu(-), ton-m:	-11.00	-6.15	-2.33	-2.20	-2.20	-2.20	-2.20	-2.20	-2.20	-4.29	-8.86
Mu(+), ton-m:	3.67	2.20	2.20	3.44	4.60	4.87	4.46	3.36	2.20	2.20	2.95
As(-), cm2:	8.53	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	6.79
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	8.73	8.08	6.55	5.03	3.50	2.00	3.05	4.57	6.10	7.63	8.27
Tu, ton-m:	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

AN-4N 12 #3 @ 7.5 25 #3 @ 17.5 12 #3 @ 7.5 AN-2N

BEAM: AN(2N-1N) FLOOR: 2

	Length:	L = 3.49 m Lu = 3.09 m	a = 0.20 m c = 0.20 m	Section:	b = 40.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.20	0.51	0.82	1.13	1.44	1.74	2.05	2.36	2.67	2.98	3.29
Mu(-), ton-m:	-6.87	-5.20	-3.66	-2.25	-1.37	-1.37	-1.37	-1.43	-2.09	-2.84	-3.71
Mu(+), ton-m:	2.29	1.37	1.37	1.37	1.37	1.37	1.37	1.97	2.67	3.23	3.70
As(-), cm2:	5.21	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	6.55	6.55	6.22	5.82	5.42	5.03	4.63	4.23	3.84	4.10	4.10
Tu, ton-m:	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50	7.50

DESIGN

AN-2N 12 #3 @ 7.5 7 #3 @ 17.5 12 #3 @ 7.5 AN-1N

BEAM: BN(14N-7N) FLOOR: 2

	Length:	L = 3.73 m Lu = 3.23 m	a = 0.25 m c = 0.25 m	Section:	b = 40.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.25	0.57	0.90	1.22	1.54	1.87	2.19	2.51	2.84	3.16	3.48
Mu(-), ton-m:	-6.38	-4.67	-3.15	-1.83	-1.51	-1.51	-1.51	-2.18	-3.79	-5.58	-7.56
Mu(+), ton-m:	4.22	3.69	3.05	2.31	1.51	1.51	1.51	1.73	2.30	2.75	3.08
As(-), cm2:	4.83	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.76
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	5.63	5.63	5.18	4.66	4.15	4.46	4.98	5.49	6.01	6.46	6.46
Tu, ton-m:	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50	7.50
DESIGN	BN-14N			12 #3 @ 7.5		8 #3 @ 17.5		12 #3 @ 7.5			BN-7N

BEAM: BN(7N-4N) FLOOR: 2

	Length:	L = 6.63 m Lu = 6.18 m	a = 0.25 m c = 0.20 m	Section:	b = 40.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.25	0.87	1.49	2.10	2.72	3.34	3.96	4.58	5.20	5.81	6.43
Mu(-), ton-m:	-8.15	-4.14	-2.49	-2.49	-2.49	-2.49	-2.49	-2.49	-3.47	-7.55	-12.47
Mu(+), ton-m:	2.72	2.49	2.49	3.22	3.76	3.57	2.79	2.49	2.49	2.49	4.16
As(-), cm2:	6.23	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.75	9.75
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	7.82	7.21	5.75	4.28	2.82	2.80	4.26	5.73	7.19	8.66	9.27
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	BN-7N			12 #3 @ 7.5		25 #3 @ 17.5		12 #3 @ 7.5			BN-4N

BEAM: BN(4N-2N) FLOOR: 2

	Length:	L = 6.68 m Lu = 6.28 m	a = 0.20 m c = 0.20 m	Section:	b = 40.0 cm h = 40.0 cm	Sec: Mat:	VG40X40 RConcrete2			
X, m:	0.20	0.83	1.46	2.08	2.71	3.34	3.97	4.59	5.22	5.85	6.48
Mu(-), ton-m:	-16.79	-8.01	-3.36	-3.36	-3.36	-3.36	-3.36	-3.36	-3.36	-7.14	-14.72
Mu(+), ton-m:	5.60	3.36	3.36	5.87	8.78	10.02	8.89	5.88	3.36	3.36	4.91
As(-), cm2:	13.45	6.12	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.43	11.65
As(+), cm2:	4.82	4.82	4.82	4.82	6.73	7.73	6.82	4.82	4.82	4.82	4.82
Vu, ton:	15.49	14.07	10.74	7.41	4.31	1.42	4.22	7.46	10.92	12.62	13.22
Tu, ton-m:	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	BN-4N			11 #3 @ 7.5		26 #3 @ 17.5		11 #3 @ 7.5			BN-2N

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BEAM: BN(2N-1N) FLOOR: 2

Length: L = 3.49 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 3.09 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.51	0.82	1.13	1.44	1.74	2.05	2.36	2.67	2.98	3.29
Mu(-), ton-m:	-10.18	-7.74	-5.51	-3.52	-2.04	-2.04	-2.04	-2.04	-2.04	-2.51	-3.38
Mu(+), ton-m:	3.39	2.04	2.04	2.04	2.04	2.04	2.04	2.05	2.84	3.40	3.76
As(-), cm2:	7.86	5.90	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.98	9.98	9.42	8.74	8.07	7.39	6.71	6.04	5.36	5.23	5.23
Tu, ton-m:	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50	7.50

DESIGN

BN-2N 11 #3 @ 7.5 8 #3 @ 17.5 11 #3 @ 7.5 BN-1N

BEAM: CN(13N-11N) FLOOR: 2

Length: L = 5.54 m a = 0.23 m Section: b = 40.0 cm Sec: VG40X40
Lu = 5.09 m c = 0.23 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.73	1.24	1.75	2.26	2.77	3.28	3.79	4.30	4.80	5.31
Mu(-), ton-m:	-8.57	-4.21	-2.59	-2.59	-2.59	-2.59	-2.59	-2.59	-3.15	-7.55	-12.93
Mu(+), ton-m:	2.86	2.59	3.15	4.61	5.13	4.90	3.93	2.59	2.59	2.59	4.31
As(-), cm2:	6.56	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.75	10.13
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	10.10	9.59	7.82	6.06	4.16	4.07	5.99	7.89	9.65	11.42	11.93
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

CN-14N 11 #3 @ 7.5 19 #3 @ 17.5 11 #3 @ 7.5 CN-11N

BEAM: CN(11N-7N) FLOOR: 2

Length: L = 6.00 m a = 0.23 m Section: b = 40.0 cm Sec: VG40X40
Lu = 5.53 m c = 0.25 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.78	1.33	1.88	2.44	2.99	3.54	4.09	4.65	5.20	5.75
Mu(-), ton-m:	-14.47	-7.46	-3.14	-3.14	-3.14	-3.14	-3.14	-3.14	-3.14	-8.49	-15.68
Mu(+), ton-m:	4.82	3.14	3.14	4.26	6.08	6.85	6.02	4.10	3.14	3.14	5.23
As(-), cm2:	11.44	5.68	4.82	4.82	4.82	4.82	4.82	4.82	4.82	6.50	12.48
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	5.20	4.82	4.82	4.82	4.82	4.82
Vu, ton:	13.71	12.70	9.98	7.31	4.64	2.38	4.97	7.64	10.32	13.07	14.09
Tu, ton-m:	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

CN-11N 11 #3 @ 7.5 22 #3 @ 17.5 11 #3 @ 7.5 CN-7N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 1:02:59 p. m. 4/01/2020

BEAM: CN(7N-4N) FLOOR: 2

Length:	L = 6.63 m	a = 0.25 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 6.18 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.25	0.87	1.49	2.10	2.72	3.34	3.96	4.58	5.20	5.81	6.43
Mu(-), ton-m:	-15.99	-8.36	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-3.33	-8.82	-16.67
Mu(+), ton-m:	5.33	3.33	3.33	4.37	6.41	7.19	6.19	3.78	3.33	3.33	5.56
As(-), cm2:	12.75	6.39	4.82	4.82	4.82	4.82	4.82	4.82	4.82	6.76	13.34
As(+), cm2:	4.82	4.82	4.82	4.82	4.85	5.47	4.82	4.82	4.82	4.82	4.82
Vu, ton:	13.39	12.18	9.29	6.64	3.99	1.67	4.32	6.97	9.65	12.55	13.76
Tu, ton-m:	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	CN-7N			11 #3 @ 7.5		26 #3 @ 17.5		11 #3 @ 7.5			CN-4N

BEAM: CN(4N-2N) FLOOR: 2

Length:	L = 6.68 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 6.28 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.83	1.46	2.08	2.71	3.34	3.97	4.59	5.22	5.85	6.48
Mu(-), ton-m:	-17.89	-8.98	-3.58	-3.58	-3.58	-3.58	-3.58	-3.58	-3.58	-6.48	-13.71
Mu(+), ton-m:	5.96	3.58	3.58	4.81	7.88	9.34	8.50	5.78	3.58	3.58	4.57
As(-), cm2:	14.42	6.89	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.91	10.79
As(+), cm2:	4.82	4.82	4.82	4.82	6.01	7.18	6.51	4.82	4.82	4.82	4.82
Vu, ton:	15.68	14.30	11.06	7.81	4.72	1.76	3.90	7.09	10.52	12.23	12.84
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	CN-4N			11 #3 @ 7.5		26 #3 @ 17.5		11 #3 @ 7.5			CN-2N

BEAM: CN(2N-1N) FLOOR: 2

Length:	L = 3.49 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 3.09 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.51	0.82	1.13	1.44	1.74	2.05	2.36	2.67	2.98	3.29
Mu(-), ton-m:	-9.61	-7.31	-5.22	-3.34	-1.92	-1.92	-1.92	-1.92	-1.92	-2.28	-3.07
Mu(+), ton-m:	3.20	1.92	1.92	1.92	1.92	1.92	1.92	1.94	2.69	3.24	3.58
As(-), cm2:	7.40	5.57	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.45	9.45	8.92	8.29	7.66	7.03	6.40	5.77	5.14	4.87	4.87
Tu, ton-m:	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50	7.50
DESIGN	CN-2N			12 #3 @ 7.5		7 #3 @ 17.5		12 #3 @ 7.5			CN-1N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 1:02:59 p. m. 4/01/2020

BEAM: DN(14N-13N) FLOOR: 2

	Length:	L = 1.71 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 1.26 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.33	0.45	0.58	0.71	0.83	0.96	1.09	1.21	1.34	1.46
Mu(-), ton-m:	-2.71	-2.71	-3.59	-4.75	-5.93	-7.14	-8.38	-9.63	-10.91	-12.23	-13.57
Mu(+), ton-m:	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	4.52
As(-), cm2:	4.82	4.82	4.82	4.82	4.82	5.43	6.41	7.42	8.46	9.54	10.67
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	18.93	18.93	18.93	18.96	19.16	19.36	19.56	19.77	19.80	19.80	19.80
Tu, ton-m:	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50
DESIGN	DN-14N				17 #3 @ 7.5						DN-13N

BEAM: DN(13N-11N) FLOOR: 2

	Length:	L = 6.13 m	a = 0.25 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 5.68 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.25	0.82	1.39	1.96	2.52	3.09	3.66	4.23	4.80	5.37	5.93
Mu(-), ton-m:	-13.86	-7.79	-3.03	-2.77	-2.77	-2.77	-2.77	-2.77	-2.77	-6.49	-12.42
Mu(+), ton-m:	4.62	2.77	2.77	3.66	5.12	5.50	4.91	3.40	2.77	2.77	4.14
As(-), cm2:	10.91	5.94	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.92	9.70
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	11.66	10.87	8.71	6.55	4.39	2.34	4.12	6.28	8.44	10.60	11.39
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	DN-13N			11 #3 @ 7.5		23 #3 @ 17.5		11 #3 @ 7.5			DN-11N

BEAM: DN(11N-7N) FLOOR: 2

	Length:	L = 6.00 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 5.60 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.76	1.32	1.88	2.44	3.00	3.56	4.12	4.68	5.24	5.80
Mu(-), ton-m:	-11.83	-6.11	-2.63	-2.63	-2.63	-2.63	-2.63	-2.63	-2.63	-7.20	-13.17
Mu(+), ton-m:	3.94	2.63	2.63	3.21	4.73	5.35	4.53	2.82	2.63	2.63	4.39
As(-), cm2:	9.21	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.47	10.33
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	11.09	10.23	7.89	5.69	3.49	1.73	3.93	6.13	8.33	10.72	11.57
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	DN-11N			11 #3 @ 7.5		22 #3 @ 17.5		11 #3 @ 7.5			DN-7N

BEAM: DN(7N-4N) FLOOR: 2

Length:	L = 6.63 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 6.23 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.82	1.45	2.07	2.69	3.32	3.94	4.56	5.19	5.81	6.43
Mu(-), ton-m:	-14.88	-7.29	-3.39	-3.39	-3.39	-3.39	-3.39	-3.39	-3.39	-8.97	-16.97
Mu(+), ton-m:	4.96	3.39	3.39	4.62	6.85	7.64	6.39	3.82	3.39	3.39	5.66
As(-), cm2:	11.78	5.55	4.82	4.82	4.82	4.82	4.82	4.82	4.82	6.88	13.60
As(+), cm2:	4.82	4.82	4.82	4.82	5.20	5.82	4.84	4.82	4.82	4.82	4.82
Vu, ton:	13.48	12.25	9.32	6.52	3.85	1.83	4.51	7.18	10.05	12.98	14.21
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	DN-7N			11 #3 @ 7.5		26 #3 @ 17.5		11 #3 @ 7.5			DN-4N

BEAM: DN(4N-2N) FLOOR: 2

Length:	L = 6.68 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 6.28 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.83	1.46	2.08	2.71	3.34	3.97	4.59	5.22	5.85	6.48
Mu(-), ton-m:	-18.17	-9.35	-3.63	-3.63	-3.63	-3.63	-3.63	-3.63	-3.63	-6.55	-14.03
Mu(+), ton-m:	6.06	3.63	3.63	4.63	7.74	9.39	8.80	6.22	3.63	3.63	4.68
As(-), cm2:	14.67	7.19	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.96	11.06
As(+), cm2:	4.82	4.82	4.82	4.82	5.90	7.22	6.74	4.82	4.82	4.82	4.82
Vu, ton:	15.93	14.59	11.45	8.30	5.31	2.43	3.86	7.38	11.39	13.08	13.64
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	DN-4N			11 #3 @ 7.5		26 #3 @ 17.5		11 #3 @ 7.5			DN-2N

BEAM: DN(2N-1N) FLOOR: 2

Length:	L = 3.49 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 3.09 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.51	0.82	1.13	1.44	1.74	2.05	2.36	2.67	2.98	3.29
Mu(-), ton-m:	-9.79	-7.53	-5.46	-3.58	-1.96	-1.96	-1.96	-1.96	-1.96	-2.23	-2.95
Mu(+), ton-m:	3.26	1.96	1.96	1.96	1.96	1.96	1.96	1.96	2.75	3.41	3.88
As(-), cm2:	7.54	5.74	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.54	9.54	9.06	8.49	7.91	7.34	6.76	6.19	5.61	5.13	5.13
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50	7.50
DESIGN	DN-2N			12 #3 @ 7.5		7 #3 @ 17.5		12 #3 @ 7.5			DN-1N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 1:02:59 p. m. 4/01/2020

BEAM: EN(14N-13N) FLOOR: 2

Length:	L = 2.02 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 1.57 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.36	0.51	0.67	0.83	0.98	1.14	1.30	1.45	1.61	1.77
Mu(-), ton-m:	-3.27	-3.27	-3.97	-5.36	-6.80	-8.28	-9.82	-11.39	-13.00	-14.66	-16.37
Mu(+), ton-m:	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	3.27	5.46
As(-), cm2:	4.82	4.82	4.82	4.82	5.16	6.33	7.56	8.85	10.19	11.59	13.08
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	18.48	18.48	18.48	18.68	18.96	19.25	19.53	19.81	20.01	20.01	20.01
Tu, ton-m:	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50

DESIGN

EN-14N 21 #3 @ 7.5 EN-13N

BEAM: EN(13N-11N) FLOOR: 2

Length:	L = 6.13 m	a = 0.25 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 5.68 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.25	0.82	1.39	1.96	2.52	3.09	3.66	4.23	4.80	5.37	5.93
Mu(-), ton-m:	-14.82	-8.55	-3.58	-2.96	-2.96	-2.96	-2.96	-2.96	-2.96	-6.46	-12.40
Mu(+), ton-m:	4.94	2.96	2.96	3.49	5.03	5.43	4.94	3.56	2.96	2.96	4.13
As(-), cm2:	11.73	6.54	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.89	9.69
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	12.25	11.45	9.27	7.08	4.90	2.78	4.31	6.49	8.68	10.86	11.66
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

EN-13N 11 #3 @ 7.5 23 #3 @ 17.5 11 #3 @ 7.5 EN-11N

BEAM: EN(11N-7N) FLOOR: 2

Length:	L = 6.00 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 5.60 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.76	1.32	1.88	2.44	3.00	3.56	4.12	4.68	5.24	5.80
Mu(-), ton-m:	-11.79	-6.15	-2.62	-2.62	-2.62	-2.62	-2.62	-2.62	-2.62	-7.22	-13.10
Mu(+), ton-m:	3.93	2.62	2.62	3.18	4.59	5.21	4.44	2.81	2.62	2.62	4.37
As(-), cm2:	9.18	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.49	10.28
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	10.92	10.08	7.85	5.70	3.55	1.82	3.98	6.13	8.28	10.55	11.39
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

EN-11N 11 #3 @ 7.5 22 #3 @ 17.5 11 #3 @ 7.5 EN-7N

BEAM: EN(7N-4N) FLOOR: 2

Length: L = 6.63 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 6.23 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.82	1.45	2.07	2.69	3.32	3.94	4.56	5.19	5.81	6.43
Mu(-), ton-m:	-14.99	-7.42	-3.31	-3.31	-3.31	-3.31	-3.31	-3.31	-3.31	-8.69	-16.56
Mu(+), ton-m:	5.00	3.31	3.31	4.63	6.82	7.65	6.48	4.05	3.31	3.31	5.52
As(-), cm2:	11.88	5.65	4.82	4.82	4.82	4.82	4.82	4.82	4.82	6.66	13.24
As(+), cm2:	4.82	4.82	4.82	4.82	5.17	5.83	4.91	4.82	4.82	4.82	4.82
Vu, ton:	13.36	12.14	9.26	6.55	3.91	1.76	4.40	7.04	9.80	12.69	13.90
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

EN-7N 11 #3 @ 7.5 26 #3 @ 17.5 11 #3 @ 7.5 EN-4N

BEAM: EN(4N-2N) FLOOR: 2

Length: L = 6.68 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 6.28 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.83	1.46	2.08	2.71	3.34	3.97	4.59	5.22	5.85	6.48
Mu(-), ton-m:	-17.01	-8.90	-3.40	-3.40	-3.40	-3.40	-3.40	-3.40	-3.40	-5.88	-13.29
Mu(+), ton-m:	5.67	3.40	3.40	4.20	6.93	8.33	7.69	5.40	3.40	3.40	4.43
As(-), cm2:	13.64	6.83	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	10.43
As(+), cm2:	4.82	4.82	4.82	4.82	5.26	6.37	5.86	4.82	4.82	4.82	4.82
Vu, ton:	14.55	13.31	10.41	7.52	4.84	2.18	3.72	6.38	9.20	12.10	13.34
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

EN-4N 11 #3 @ 7.5 26 #3 @ 17.5 11 #3 @ 7.5 EN-2N

BEAM: EN(2N-1N) FLOOR: 2

Length: L = 3.49 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 3.09 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.51	0.82	1.13	1.44	1.74	2.05	2.36	2.67	2.98	3.29
Mu(-), ton-m:	-9.92	-7.48	-5.26	-3.27	-1.98	-1.98	-1.98	-1.98	-1.98	-2.49	-3.39
Mu(+), ton-m:	3.31	1.98	1.98	1.98	1.98	1.98	1.98	2.26	3.03	3.58	3.90
As(-), cm2:	7.65	5.70	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.89	9.89	9.32	8.64	7.96	7.28	6.59	5.91	5.23	5.28	5.28
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50	7.50

DESIGN

EN-2N 11 #3 @ 7.5 8 #3 @ 17.5 11 #3 @ 7.5 EN-1N

BEAM: FN(14N-13N) FLOOR: 2

Length: L = 0.72 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 0.30 m c = 0.23 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.23	0.26	0.29	0.32	0.35	0.38	0.41	0.44	0.47	0.50
Mu(-), ton-m:	-1.43	-1.51	-1.59	-1.67	-1.76	-1.84	-1.93	-2.01	-2.10	-2.19	-2.28
Mu(+), ton-m:	0.48	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.76
As(-), cm2:	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57
As(+), cm2:	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57
Vu, ton:	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87	5.87
Tu, ton-m:	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50

DESIGN

FN-14N 4 #3 @ 7.5 FN-13N

BEAM: FN(13N-11N) FLOOR: 2

Length: L = 6.13 m a = 0.23 m Section: b = 40.0 cm Sec: VG40X40
Lu = 5.71 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.23	0.80	1.37	1.94	2.51	3.08	3.65	4.22	4.79	5.36	5.93
Mu(-), ton-m:	-8.48	-4.86	-2.02	-1.73	-1.73	-1.73	-1.73	-1.73	-1.82	-4.88	-8.67
Mu(+), ton-m:	2.83	1.73	2.27	3.34	3.77	3.52	3.05	2.42	1.73	1.73	2.89
As(-), cm2:	6.49	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	6.64
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	7.08	6.65	5.51	4.36	3.22	2.28	3.51	4.69	5.84	6.99	7.41
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

FN-13N 12 #3 @ 7.5 22 #3 @ 17.5 12 #3 @ 7.5 FN-11N

BEAM: FN(11N-7N) FLOOR: 2

Length: L = 6.00 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 5.60 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.76	1.32	1.88	2.44	3.00	3.56	4.12	4.68	5.24	5.80
Mu(-), ton-m:	-7.88	-4.47	-1.75	-1.64	-1.64	-1.64	-1.64	-1.64	-1.98	-4.75	-8.20
Mu(+), ton-m:	2.63	1.64	1.64	2.04	2.66	2.85	2.71	2.05	1.64	1.64	2.73
As(-), cm2:	6.01	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	6.27
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	6.77	6.34	5.13	3.93	2.72	1.59	2.80	4.00	5.21	6.42	6.85
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

FN-11N 12 #3 @ 7.5 21 #3 @ 17.5 12 #3 @ 7.5 FN-7N

BEAM: FN(7N-4N) FLOOR: 2

Length: L = 6.63 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 6.23 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.82	1.45	2.07	2.69	3.32	3.94	4.56	5.19	5.81	6.43
Mu(-), ton-m:	-9.29	-4.93	-2.01	-2.01	-2.01	-2.01	-2.01	-2.01	-2.01	-5.53	-10.03
Mu(+), ton-m:	3.10	2.01	2.01	2.89	3.82	4.15	3.72	2.66	2.01	2.01	3.34
As(-), cm2:	7.14	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	7.74
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	7.74	7.13	5.69	4.24	2.80	1.58	3.02	4.47	5.91	7.36	7.97
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

FN-7N 12 #3 @ 7.5 25 #3 @ 17.5 12 #3 @ 7.5 FN-4N

BEAM: FN(4N-2N) FLOOR: 2

Length: L = 6.68 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 6.28 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.83	1.46	2.08	2.71	3.34	3.97	4.59	5.22	5.85	6.48
Mu(-), ton-m:	-10.27	-5.65	-2.05	-2.05	-2.05	-2.05	-2.05	-2.05	-2.05	-3.88	-8.12
Mu(+), ton-m:	3.42	2.05	2.05	2.68	3.94	4.49	4.14	3.19	2.05	2.05	2.71
As(-), cm2:	7.93	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	6.20
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	8.19	7.56	6.11	4.65	3.20	1.74	2.59	4.05	5.50	6.96	7.58
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

FN-4N 12 #3 @ 7.5 25 #3 @ 17.5 12 #3 @ 7.5 FN-2N

BEAM: FN(2N-1N) FLOOR: 2

Length: L = 3.49 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 3.09 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.51	0.82	1.13	1.44	1.74	2.05	2.36	2.67	2.98	3.29
Mu(-), ton-m:	-7.36	-5.52	-3.82	-2.28	-1.47	-1.47	-1.47	-1.47	-2.01	-2.82	-3.75
Mu(+), ton-m:	2.45	1.47	1.47	1.47	1.47	1.47	1.47	2.26	2.99	3.56	4.01
As(-), cm2:	5.60	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	7.19	7.19	6.81	6.35	5.90	5.44	4.98	4.52	4.15	4.49	4.49
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	7.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50	7.50

DESIGN

FN-2N 12 #3 @ 7.5 7 #3 @ 17.5 12 #3 @ 7.5 FN-1N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 1:02:59 p. m. 4/01/2020

BEAM: 14N(AN-BN) FLOOR: 2

Length:	L = 9.67 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 9.22 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	1.12	2.04	2.97	3.89	4.81	5.73	6.66	7.58	8.50	9.42
Mu(-), ton-m:	-1.47	-1.47	-1.47	-1.47	-1.47	-1.47	-1.47	-1.47	-2.60	-4.77	-7.35
Mu(+), ton-m:	1.47	1.80	2.64	3.02	2.95	2.46	1.69	1.47	1.47	1.47	2.45
As(-), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.59
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	2.11	1.86	1.46	1.05	1.28	1.68	2.09	2.49	2.90	3.30	3.55
Tu, ton-m:	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50

DESIGN

AN-14N 12 #3 @ 7.5 42 #3 @ 17.5 12 #3 @ 7.5 BN-14N

BEAM: 14N(BN-BNa) FLOOR: 2

Length:	L = 5.75 m	a = 0.25 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 5.30 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.25	0.78	1.31	1.84	2.37	2.90	3.43	3.96	4.49	5.02	5.55
Mu(-), ton-m:	-11.34	-6.18	-2.27	-2.27	-2.27	-2.27	-2.27	-2.27	-2.27	-5.40	-10.50
Mu(+), ton-m:	3.78	2.27	2.27	3.60	4.80	5.12	4.58	3.29	2.27	2.27	3.50
As(-), cm2:	8.81	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	8.12
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	10.51	9.87	7.90	5.93	3.96	2.12	3.85	5.82	7.80	9.77	10.40
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

BN-14N 11 #3 @ 7.5 21 #3 @ 17.5 11 #3 @ 7.5 14N:BNa

BEAM: 14N(BNa-CN) FLOOR: 2

Length:	L = 5.82 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 5.40 m	c = 0.23 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.74	1.28	1.82	2.36	2.90	3.44	3.98	4.52	5.06	5.60
Mu(-), ton-m:	-8.70	-4.80	-1.81	-1.74	-1.74	-1.74	-1.74	-1.74	-1.74	-3.61	-6.10
Mu(+), ton-m:	2.90	1.74	1.74	1.85	2.52	2.68	2.54	1.91	1.74	1.74	2.03
As(-), cm2:	6.66	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	7.68	7.15	5.56	3.96	2.51	1.47	2.59	3.68	4.47	5.10	5.25
Tu, ton-m:	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.19	0.19	0.20	0.20
Stirrup:	#3+1r	#3+1r	#3	#3	#3	#3	#3	#3	#3	#3+1r	#3+1r
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

14N:BNa 12 #3+1r @ 7.5 20 #3 @ 17.5 12 #3+1r @ 7.5 CN-14N

BEAM: 14N(CN-DN) FLOOR: 2

Length:	L = 6.18 m	a = 0.23 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 5.76 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.23	0.80	1.38	1.95	2.53	3.10	3.68	4.26	4.83	5.41	5.98
Mu(-), ton-m:	-3.96	-2.60	-1.46	-0.92	-0.92	-0.92	-0.92	-0.92	-1.20	-2.72	-4.62
Mu(+), ton-m:	1.32	0.92	0.92	0.92	1.13	1.15	0.92	0.92	0.92	0.92	1.54
As(-), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	2.60	2.47	2.07	1.60	1.09	0.60	1.24	1.91	2.64	3.37	3.60
Tu, ton-m:	0.19	0.19	0.19	0.19	0.14	0.13	0.10	0.10	0.10	0.26	0.27
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

CN-14N 12 #3 @ 7.5 22 #3 @ 17.5 12 #3 @ 7.5 DN-14N

BEAM: 14N(DN-EN) FLOOR: 2

Length:	L = 5.74 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 5.34 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.73	1.27	1.80	2.34	2.87	3.40	3.94	4.47	5.01	5.54
Mu(-), ton-m:	-4.39	-2.21	-0.88	-0.88	-0.88	-0.88	-0.88	-0.88	-0.88	-1.33	-3.17
Mu(+), ton-m:	1.46	0.88	0.88	1.05	1.83	2.17	1.99	1.33	0.88	0.88	1.06
As(-), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	4.31	4.03	3.13	2.19	1.25	0.39	0.96	1.84	2.71	3.35	3.55
Tu, ton-m:	0.17	0.17	0.19	0.19	0.06	0.06	0.06	0.06	0.06	0.07	0.07
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

DN-14N 12 #3 @ 7.5 20 #3 @ 17.5 12 #3 @ 7.5 EN-14N

BEAM: 14N(EN-FN) FLOOR: 2

Length:	L = 5.23 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 4.83 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.68	1.17	1.65	2.13	2.61	3.10	3.58	4.06	4.55	5.03
Mu(-), ton-m:	-3.22	-1.58	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-0.64	-1.22
Mu(+), ton-m:	1.07	0.64	0.64	0.90	1.60	1.95	2.01	1.77	1.28	0.64	0.64
As(-), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	3.74	3.63	3.01	2.26	1.54	0.87	0.81	1.39	1.93	2.43	2.55
Tu, ton-m:	0.14	0.14	0.09	0.09	0.14	0.22	0.22	0.31	0.31	0.36	0.36
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

EN-14N 12 #3 @ 7.5 17 #3 @ 17.5 12 #3 @ 7.5 FN-14N

BEAM: 13N(CN-DN) FLOOR: 2

	Length:	L = 5.73 m	a = 0.23 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 5.26 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.23	0.75	1.28	1.80	2.33	2.85	3.38	3.91	4.43	4.96	5.48
Mu(-), ton-m:	-7.60	-4.07	-2.00	-2.00	-2.00	-2.00	-2.00	-2.00	-2.74	-5.99	-9.98
Mu(+), ton-m:	2.53	2.00	2.28	3.29	3.61	3.47	3.21	2.44	2.00	2.00	3.33
As(-), cm2:	5.79	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	7.70
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	7.61	7.21	5.97	4.73	3.48	3.05	4.29	5.54	6.78	8.03	8.42
Tu, ton-m:	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	CN-14N			12 #3 @ 7.5		20 #3 @ 17.5		12 #3 @ 7.5			DN-13N

BEAM: 13N(DN-EN) FLOOR: 2

	Length:	L = 5.71 m	a = 0.25 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 5.21 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.25	0.77	1.29	1.81	2.33	2.85	3.37	3.89	4.42	4.94	5.46
Mu(-), ton-m:	-10.39	-5.95	-2.44	-2.08	-2.08	-2.08	-2.08	-2.08	-2.40	-5.93	-10.38
Mu(+), ton-m:	3.46	2.08	2.08	3.15	3.88	4.01	3.81	3.07	2.08	2.08	3.46
As(-), cm2:	8.03	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	8.02
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.40	8.94	7.39	5.74	4.10	2.48	4.12	5.76	7.41	8.96	9.42
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	DN-13N			12 #3 @ 7.5		19 #3 @ 17.5		12 #3 @ 7.5			EN-13N

BEAM: 13N(EN-FN) FLOOR: 2

	Length:	L = 5.05 m	a = 0.25 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 4.57 m	c = 0.23 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.25	0.71	1.16	1.62	2.08	2.54	2.99	3.45	3.91	4.36	4.82
Mu(-), ton-m:	-9.37	-5.90	-3.00	-1.87	-1.87	-1.87	-1.87	-1.87	-1.87	-3.88	-6.75
Mu(+), ton-m:	3.12	1.87	1.87	2.32	2.76	2.88	3.41	3.53	3.11	2.53	2.25
As(-), cm2:	7.20	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.12
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	8.02	7.78	6.68	5.59	4.49	3.39	3.36	4.46	5.55	6.65	6.89
Tu, ton-m:	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	EN-13N			12 #3 @ 7.5		16 #3 @ 17.5		12 #3 @ 7.5			FN-13N

BEAM: 11N(CN-DN) FLOOR: 2

	Length:	L = 5.70 m	a = 0.23 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 5.28 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.23	0.75	1.28	1.81	2.34	2.86	3.39	3.92	4.45	4.98	5.50
Mu(-), ton-m:	-9.23	-4.59	-2.47	-2.47	-2.47	-2.47	-2.47	-2.47	-2.54	-6.91	-12.37
Mu(+), ton-m:	3.08	2.47	3.18	4.84	5.51	5.30	4.30	2.79	2.47	2.47	4.12
As(-), cm2:	7.09	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.25	9.67
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	10.21	9.64	7.84	5.92	3.99	3.48	5.41	7.34	9.27	11.15	11.71
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	CN-11N			11 #3 @ 7.5		21 #3 @ 17.5		11 #3 @ 7.5			DN-11N

BEAM: 11N(DN-EN) FLOOR: 2

	Length:	L = 5.71 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 5.31 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.73	1.26	1.79	2.32	2.85	3.38	3.91	4.45	4.98	5.51
Mu(-), ton-m:	-11.27	-6.01	-2.25	-2.25	-2.25	-2.25	-2.25	-2.25	-2.25	-5.50	-10.64
Mu(+), ton-m:	3.76	2.25	2.25	2.92	4.34	5.05	4.46	3.16	2.25	2.25	3.55
As(-), cm2:	8.75	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	8.23
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	10.59	9.87	7.75	5.70	3.65	1.61	3.42	5.47	7.51	9.62	10.33
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	DN-11N			11 #3 @ 7.5		21 #3 @ 17.5		11 #3 @ 7.5			EN-11N

BEAM: 11N(EN-FN) FLOOR: 2

	Length:	L = 5.05 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 4.65 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.66	1.13	1.59	2.06	2.52	2.99	3.45	3.92	4.38	4.85
Mu(-), ton-m:	-10.25	-6.07	-2.62	-2.05	-2.05	-2.05	-2.05	-2.05	-2.05	-3.31	-6.57
Mu(+), ton-m:	3.42	2.05	2.05	2.05	3.07	3.83	4.26	4.06	3.15	2.05	2.19
As(-), cm2:	7.92	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.98
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.95	9.63	8.18	6.74	5.30	3.86	3.54	4.98	6.42	7.87	8.19
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	EN-11N			11 #3 @ 7.5		17 #3 @ 17.5		11 #3 @ 7.5			FN-11N

BEAM: 7N(BN-CN) FLOOR: 2

Length:	L = 8.52 m	a = 0.25 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 8.02 m	c = 0.25 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.25	1.05	1.85	2.66	3.46	4.26	5.06	5.86	6.67	7.47	8.27
Mu(-), ton-m:	-27.52	-12.68	-6.06	-6.06	-6.06	-6.06	-6.06	-6.06	-6.06	-14.62	-30.31
Mu(+), ton-m:	9.17	6.06	6.06	9.97	14.89	16.60	14.31	8.73	6.06	6.06	10.10
As(-), cm2:	23.65	9.92	4.82	4.82	4.82	4.82	4.82	4.82	4.82	11.56	26.47
As(+), cm2:	7.04	4.82	4.82	7.69	11.80	13.28	11.30	6.69	4.82	4.82	7.80
Vu, ton:	20.92	18.46	14.00	9.53	5.33	1.92	6.00	10.25	14.72	19.19	21.65
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	15.00	7.50

DESIGN

BN-7N 11 #3 @ 7.5 36 #3 @ 17.5 11 #3 @ 7.5 CN-7N

BEAM: 7N(CN-DN) FLOOR: 2

Length:	L = 5.70 m	a = 0.25 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 5.25 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.25	0.78	1.30	1.83	2.35	2.88	3.40	3.93	4.45	4.98	5.50
Mu(-), ton-m:	-14.57	-9.16	-4.67	-2.91	-2.91	-2.91	-2.91	-2.91	-2.91	-5.26	-9.83
Mu(+), ton-m:	4.86	2.91	2.91	2.91	2.91	3.39	3.34	2.91	2.91	2.91	3.28
As(-), cm2:	11.52	7.04	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	7.57
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	11.94	11.34	9.43	7.52	5.61	3.70	4.01	5.92	7.82	9.73	10.34
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

CN-7N 11 #3 @ 7.5 20 #3 @ 17.5 11 #3 @ 7.5 DN-7N

BEAM: 7N(DN-EN) FLOOR: 2

Length:	L = 5.71 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40				
	Lu = 5.31 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2				
X, m:	0.20	0.73	1.26	1.79	2.32	2.85	3.38	3.91	4.45	4.98	5.51
Mu(-), ton-m:	-10.18	-5.19	-2.13	-2.13	-2.13	-2.13	-2.13	-2.13	-2.13	-5.56	-10.65
Mu(+), ton-m:	3.39	2.13	2.13	3.27	4.54	5.12	4.42	3.06	2.13	2.13	3.55
As(-), cm2:	7.86	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	8.24
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	10.00	9.31	7.29	5.31	3.33	1.53	3.51	5.49	7.47	9.51	10.21
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

DN-7N 11 #3 @ 7.5 21 #3 @ 17.5 11 #3 @ 7.5 EN-7N

BEAM: 7N(EN-FN) FLOOR: 2

	Length:	L = 5.05 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 4.65 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.66	1.13	1.59	2.06	2.52	2.99	3.45	3.92	4.38	4.85
Mu(-), ton-m:	-10.02	-5.95	-2.58	-2.00	-2.00	-2.00	-2.00	-2.00	-2.00	-3.25	-6.44
Mu(+), ton-m:	3.34	2.00	2.00	2.00	2.95	3.69	4.12	3.93	3.05	2.00	2.15
As(-), cm2:	7.73	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.88
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.70	9.38	7.98	6.57	5.17	3.77	3.45	4.86	6.26	7.66	7.98
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

EN-7N 11 #3 @ 7.5 17 #3 @ 17.5 11 #3 @ 7.5 FN-7N

BEAM: 4N(AN-BN) FLOOR: 2

	Length:	L = 6.88 m	a = 0.23 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 6.45 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.23	0.87	1.52	2.16	2.81	3.45	4.10	4.74	5.39	6.03	6.68
Mu(-), ton-m:	-6.93	-3.42	-3.42	-3.42	-3.42	-3.42	-3.42	-3.42	-6.02	-11.11	-17.12
Mu(+), ton-m:	3.42	3.42	3.46	4.40	4.36	3.42	3.42	3.42	3.42	3.42	5.71
As(-), cm2:	5.26	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	8.62	13.73
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	8.08	7.44	6.00	4.56	3.38	4.88	6.41	7.91	9.35	10.79	11.43
Tu, ton-m:	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

AN-4N 11 #3 @ 7.5 27 #3 @ 17.5 11 #3 @ 7.5 BN-4N

BEAM: 4N(BN-CN) FLOOR: 2

	Length:	L = 8.52 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 8.12 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	1.01	1.82	2.64	3.45	4.26	5.07	5.88	6.70	7.51	8.32
Mu(-), ton-m:	-29.01	-12.57	-5.91	-5.91	-5.91	-5.91	-5.91	-5.91	-5.91	-13.00	-29.56
Mu(+), ton-m:	9.67	5.91	5.91	10.20	15.91	17.90	15.80	9.98	5.91	5.91	9.85
As(-), cm2:	25.21	9.83	4.82	4.82	4.82	4.82	4.82	4.82	4.82	10.19	25.81
As(+), cm2:	7.45	4.82	4.82	7.88	12.68	14.43	12.58	7.70	4.82	4.82	7.60
Vu, ton:	21.36	18.79	14.19	9.58	4.99	0.88	5.12	9.72	14.33	18.93	21.50
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50

DESIGN

BN-4N 11 #3 @ 7.5 37 #3 @ 17.5 11 #3 @ 7.5 CN-4N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 1:02:59 p. m. 4/01/2020

BEAM: 4N(CN-DN) FLOOR: 2

Length: L = 5.70 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 5.30 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.73	1.26	1.79	2.32	2.85	3.38	3.91	4.44	4.97	5.50
Mu(-), ton-m:	-16.99	-11.08	-6.13	-3.40	-3.40	-3.40	-3.40	-3.40	-3.40	-4.58	-8.89
Mu(+), ton-m:	5.66	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40	3.40
As(-), cm2:	13.62	8.60	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	6.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	13.32	12.63	10.63	8.66	6.68	4.71	3.67	5.64	7.61	9.59	10.22
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

CN-4N 11 #3 @ 7.5 21 #3 @ 17.5 11 #3 @ 7.5 DN-4N

BEAM: 4N(DN-EN) FLOOR: 2

Length: L = 5.71 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 5.31 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.73	1.26	1.79	2.32	2.85	3.38	3.91	4.45	4.98	5.51
Mu(-), ton-m:	-9.96	-5.07	-2.15	-2.15	-2.15	-2.15	-2.15	-2.15	-2.15	-5.67	-10.73
Mu(+), ton-m:	3.32	2.15	2.15	3.46	4.61	5.08	4.37	3.04	2.15	2.15	3.58
As(-), cm2:	7.68	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	8.31
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.87	9.24	7.30	5.36	3.42	1.80	3.74	5.68	7.62	9.56	10.22
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

DN-4N 11 #3 @ 7.5 21 #3 @ 17.5 11 #3 @ 7.5 EN-4N

BEAM: 4N(EN-FN) FLOOR: 2

Length: L = 5.05 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 4.65 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.66	1.13	1.59	2.06	2.52	2.99	3.45	3.92	4.38	4.85
Mu(-), ton-m:	-9.98	-5.94	-2.61	-2.00	-2.00	-2.00	-2.00	-2.00	-2.00	-3.40	-6.58
Mu(+), ton-m:	3.33	2.00	2.00	2.00	2.92	3.62	4.09	3.93	3.09	2.00	2.19
As(-), cm2:	7.70	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.99
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.57	9.26	7.88	6.50	5.12	3.74	3.47	4.85	6.23	7.61	7.92
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

EN-4N 12 #3 @ 7.5 16 #3 @ 17.5 12 #3 @ 7.5 FN-4N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 1:02:59 p. m. 4/01/2020

BEAM: 2N(AN-BN) FLOOR: 2

	Length:	L = 6.88 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 6.48 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.85	1.50	2.14	2.79	3.44	4.09	4.73	5.38	6.03	6.68
Mu(-), ton-m:	-11.04	-4.46	-4.22	-4.22	-4.22	-4.22	-4.22	-4.22	-5.01	-12.27	-21.10
Mu(+), ton-m:	4.22	4.22	4.42	7.01	8.01	7.85	5.72	4.22	4.22	4.22	7.03
As(-), cm2:	8.57	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	9.58	17.35
As(+), cm2:	4.82	4.82	4.82	5.33	6.12	5.99	4.82	4.82	4.82	4.82	5.34
Vu, ton:	12.89	11.70	9.18	6.66	4.14	4.81	7.33	9.85	12.41	15.16	16.37
Tu, ton-m:	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	AN-2N			11 #3 @ 7.5		27 #3 @ 17.5		11 #3 @ 7.5			BN-2N

BEAM: 2N(BN-CN) FLOOR: 2

	Length:	L = 8.52 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 8.12 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	1.01	1.82	2.64	3.45	4.26	5.07	5.88	6.70	7.51	8.32
Mu(-), ton-m:	-26.35	-12.31	-5.27	-5.27	-5.27	-5.27	-5.27	-5.27	-5.27	-11.09	-24.73
Mu(+), ton-m:	8.78	5.27	5.27	7.79	12.77	14.68	13.10	8.40	5.27	5.27	8.24
As(-), cm2:	22.46	9.61	4.82	4.82	4.82	4.82	4.82	4.82	4.82	8.60	20.83
As(+), cm2:	6.73	4.82	4.82	5.94	10.00	11.61	10.27	6.42	4.82	4.82	6.30
Vu, ton:	18.67	16.49	12.57	8.65	4.80	1.22	4.43	8.24	12.16	16.08	18.26
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50
DESIGN	BN-2N			11 #3 @ 7.5		37 #3 @ 17.5		11 #3 @ 7.5			CN-2N

BEAM: 2N(CN-DN) FLOOR: 2

	Length:	L = 5.70 m	a = 0.20 m	Section:	b = 40.0 cm	Sec:	VG40X40			
		Lu = 5.30 m	c = 0.20 m		h = 40.0 cm	Mat:	RConcrete2			
X, m:	0.20	0.73	1.26	1.79	2.32	2.85	3.38	3.91	4.44	4.97	5.50
Mu(-), ton-m:	-15.36	-9.83	-5.21	-3.07	-3.07	-3.07	-3.07	-3.07	-3.07	-5.01	-9.36
Mu(+), ton-m:	5.12	3.07	3.07	3.07	3.07	3.07	3.24	3.07	3.07	3.07	3.12
As(-), cm2:	12.20	7.58	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	7.20
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	12.22	11.62	9.73	7.85	5.97	4.08	3.74	5.63	7.51	9.40	10.00
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50
DESIGN	CN-2N			11 #3 @ 7.5		21 #3 @ 17.5		11 #3 @ 7.5			DN-2N

BEAM: 2N(DN-EN) FLOOR: 2

Length: L = 5.71 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 5.31 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.73	1.26	1.79	2.32	2.85	3.38	3.91	4.45	4.98	5.51
Mu(-), ton-m:	-10.10	-5.26	-2.12	-2.12	-2.12	-2.12	-2.12	-2.12	-2.12	-5.65	-10.62
Mu(+), ton-m:	3.37	2.12	2.12	3.42	4.52	4.95	4.32	3.09	2.12	2.12	3.54
As(-), cm2:	7.80	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	8.22
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.81	9.21	7.31	5.42	3.52	1.86	3.75	5.65	7.54	9.43	10.04
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

DN-2N 11 #3 @ 7.5 21 #3 @ 17.5 11 #3 @ 7.5 EN-2N

BEAM: 2N(EN-FN) FLOOR: 2

Length: L = 5.05 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 4.65 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.66	1.13	1.59	2.06	2.52	2.99	3.45	3.92	4.38	4.85
Mu(-), ton-m:	-9.81	-5.94	-2.72	-1.96	-1.96	-1.96	-1.96	-1.96	-1.96	-3.60	-6.67
Mu(+), ton-m:	3.27	1.96	1.96	1.96	2.75	3.35	3.91	3.86	3.17	2.23	2.22
As(-), cm2:	7.56	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.06
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	9.12	8.83	7.53	6.24	4.95	3.66	3.39	4.68	5.98	7.27	7.56
Tu, ton-m:	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

EN-2N 12 #3 @ 7.5 16 #3 @ 17.5 12 #3 @ 7.5 FN-2N

BEAM: 1N(AN-BN) FLOOR: 2

Length: L = 6.88 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 6.48 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.85	1.50	2.14	2.79	3.44	4.09	4.73	5.38	6.03	6.68
Mu(-), ton-m:	-7.00	-3.39	-2.38	-2.38	-2.38	-2.38	-2.38	-2.38	-3.22	-7.17	-11.92
Mu(+), ton-m:	2.38	2.38	3.26	4.29	4.51	4.03	3.18	2.38	2.38	2.38	3.97
As(-), cm2:	5.32	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.45	9.29
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	6.97	6.44	5.24	4.04	2.84	3.25	4.45	5.65	6.85	8.05	8.59
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

AN-1N 12 #3 @ 7.5 27 #3 @ 17.5 12 #3 @ 7.5 BN-1N

BEAM: 1N(BN-CN) FLOOR: 2

Length: L = 8.52 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 8.12 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	1.01	1.82	2.64	3.45	4.26	5.07	5.88	6.70	7.51	8.32
Mu(-), ton-m:	-12.96	-6.52	-2.59	-2.59	-2.59	-2.59	-2.59	-2.59	-2.59	-6.11	-12.45
Mu(+), ton-m:	4.32	2.59	2.59	3.96	5.81	6.66	5.91	4.16	2.59	2.59	4.15
As(-), cm2:	10.16	4.94	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	9.73
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	5.05	4.82	4.82	4.82	4.82	4.82
Vu, ton:	8.77	7.77	6.01	4.34	2.68	1.01	2.55	4.22	5.88	7.64	8.64
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50

DESIGN

BN-1N 12 #3 @ 7.5 36 #3 @ 17.5 12 #3 @ 7.5 CN-1N

BEAM: 1N(CN-DN) FLOOR: 2

Length: L = 5.70 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 5.30 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.73	1.26	1.79	2.32	2.85	3.38	3.91	4.44	4.97	5.50
Mu(-), ton-m:	-9.00	-5.80	-3.12	-1.80	-1.80	-1.80	-1.80	-1.80	-1.80	-3.99	-6.76
Mu(+), ton-m:	3.00	1.80	1.80	1.80	1.80	1.86	2.09	1.95	1.80	1.80	2.25
As(-), cm2:	6.90	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.13
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	6.95	6.64	5.67	4.70	3.73	2.76	2.93	3.90	4.87	5.84	6.15
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

CN-1N 12 #3 @ 7.5 20 #3 @ 17.5 12 #3 @ 7.5 DN-1N

BEAM: 1N(DN-EN) FLOOR: 2

Length: L = 5.71 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 5.31 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.73	1.26	1.79	2.32	2.85	3.38	3.91	4.45	4.98	5.51
Mu(-), ton-m:	-6.65	-3.77	-1.49	-1.39	-1.39	-1.39	-1.39	-1.39	-1.63	-4.01	-6.97
Mu(+), ton-m:	2.22	1.39	1.50	2.34	2.72	2.68	2.54	2.08	1.39	1.39	2.32
As(-), cm2:	5.04	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	5.30
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	6.04	5.73	4.76	3.79	2.76	1.87	2.91	3.94	4.92	5.89	6.20
Tu, ton-m:	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

DN-1N 12 #3 @ 7.5 20 #3 @ 17.5 12 #3 @ 7.5 EN-1N

Company: IPC INGENIERIA ESTRUCTURAL SAS Engineer: YEFRY MORENO PARRA
Project: Untitled 1:02:59 p. m. 4/01/2020

BEAM: 1N(EN-FN) FLOOR: 2

Length: L = 5.05 m a = 0.20 m Section: b = 40.0 cm Sec: VG40X40
Lu = 4.65 m c = 0.20 m h = 40.0 cm Mat: RConcrete2

X, m:	0.20	0.66	1.13	1.59	2.06	2.52	2.99	3.45	3.92	4.38	4.85
Mu(-), ton-m:	-6.65	-4.26	-2.23	-1.33	-1.33	-1.33	-1.33	-1.33	-1.83	-3.41	-5.41
Mu(+), ton-m:	2.22	1.33	1.36	1.58	1.70	1.90	2.51	2.77	2.69	2.49	2.18
As(-), cm2:	5.04	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
As(+), cm2:	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82
Vu, ton:	5.44	5.28	4.58	3.88	3.18	2.49	2.44	3.13	3.83	4.53	4.69
Tu, ton-m:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stirrup:	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3	#3
Spacing, cm:	7.50	7.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50	7.50	7.50

DESIGN

EN-1N 12 #3 @ 7.5 16 #3 @ 17.5 12 #3 @ 7.5 FN-1N

Nit. **901.134.339-5**
D: Calle 45 No.45 - 16 of 3801 **T:** 318 735 1464
C: ingenieriaipc@hotmail.com

10. REACCIONES

A continuación, mostramos las reacciones para el Edificio 2.

Company: IPC INGENIERIA ESTRUCTURAL SAS **Engineer:** YEFRY MORENO PARRA
Project: Untitled 1:01:15 p. m. 4/01/2020
File: C:\Users\Laura\Documents\LAURA\IPC\IP\CALLE 80\ESTRUCTURA EDIFICIO NUEVO 20191126\ING\MODELO RCB EDIF 2

P-Delta Analysis- Support Reactions

Support		Load	Force (ton)			Moment (ton-m)		
Axis	Floor	LdCase	Fx	Fy	Fz	Mx	My	Mz
DN-13N	1	D0	-0.93	-0.03	8.54	0.00	-0.87	0.00
		DL	0.56	0.12	21.43	0.02	0.55	0.00
		LL	0.14	0.03	5.41	0.00	0.14	0.00
		EQX	2.99	0.72	0.95	-1.52	7.29	0.00
		EQY	0.11	4.47	-0.20	-9.06	0.22	0.01
EN-13N	1	D0	-1.17	0.03	8.35	-0.07	-1.14	0.00
		DL	-0.03	-0.60	21.69	0.83	-0.07	0.00
		LL	-0.01	-0.15	5.47	0.21	-0.02	0.00
		EQX	3.15	0.83	1.04	-1.65	7.71	0.00
		EQY	-0.40	4.71	0.56	-9.33	-0.86	0.01
FN-13N	1	D0	0.20	-0.36	4.78	0.39	0.34	0.00
		DL	0.97	-1.27	8.09	1.52	1.08	0.00
		LL	0.24	-0.32	2.04	0.38	0.27	0.00
		EQX	2.58	0.51	0.86	-1.04	5.77	0.00
		EQY	-0.36	2.90	-1.62	-5.92	-0.87	0.00
CN-14N	1	D0	0.39	0.43	6.01	-0.51	0.54	0.00
		DL	1.94	0.91	12.31	-0.92	2.11	0.00
		LL	0.49	0.23	3.11	-0.23	0.53	0.00
		EQX	2.70	-0.57	1.62	0.75	5.56	0.00
		EQY	-0.47	3.28	0.93	-6.35	-0.46	0.00
14N:BNa	1	D0	-0.01	0.03	3.20	-0.05	0.06	0.00
		DL	0.38	-0.46	11.10	0.59	0.37	0.00
		LL	0.10	-0.12	2.80	0.15	0.09	0.00
		EQX	1.55	-0.89	0.07	1.04	3.36	0.00
		EQY	-0.96	1.68	-0.21	-3.56	-1.04	0.00
CN-11N	1	D0	0.15	0.38	4.85	-0.45	0.27	0.00
		DL	0.55	1.94	21.65	-2.05	0.54	0.00
		LL	0.14	0.49	5.46	-0.52	0.14	0.00
		EQX	3.37	0.27	-0.15	-0.61	6.31	0.00
		EQY	0.26	2.45	0.89	-5.42	0.44	0.00
DN-11N	1	D0	0.15	-0.01	5.64	-0.01	0.24	0.00
		DL	-0.11	-0.15	27.47	0.25	-0.15	0.00
		LL	-0.03	-0.04	6.93	0.06	-0.04	0.00
		EQX	2.50	0.29	-0.33	-0.52	4.45	0.00
		EQY	0.06	2.57	-0.36	-4.58	0.12	0.00
EN-11N	1	D0	0.17	0.01	5.51	-0.02	0.26	0.00
		DL	-0.12	-0.42	26.06	0.55	-0.15	0.00
		LL	-0.03	-0.10	6.57	0.14	-0.04	0.00
		EQX	2.65	0.29	-0.27	-0.52	4.72	0.00
		EQY	-0.26	2.58	0.44	-4.59	-0.46	0.00
FN-11N	1	D0	0.08	-0.22	4.39	0.23	0.17	0.00
		DL	-0.14	-1.29	11.69	1.54	-0.16	0.00
		LL	-0.03	-0.33	2.95	0.39	-0.04	0.00
		EQX	2.76	0.22	-0.37	-0.44	4.91	0.00
		EQY	-0.44	1.97	-1.12	-3.88	-0.79	0.00
BN-14N	1	D0	1.08	-1.13	6.06	1.23	1.36	0.00
		DL	-1.18	1.73	8.17	-1.72	-1.49	0.00
		LL	-0.30	0.44	2.06	-0.43	-0.38	0.00
		EQX	4.64	-0.76	2.38	0.86	9.17	0.00
		EQY	-0.59	2.61	1.23	-6.97	0.97	0.01
BN-7N	1	D0	0.34	0.94	5.82	-1.08	0.53	0.00
		DL	0.83	7.64	19.05	-8.29	0.76	0.00
		LL	0.21	1.93	4.81	-2.09	0.19	0.00
		EQX	4.83	0.14	-2.16	-0.37	9.40	0.00
		EQY	0.96	2.82	0.34	-7.20	1.80	0.01

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Axis	Floor	LdCase	Fx	Fy	Fz	Mx	My	Mz
CN-7N	1	D0	0.25	-0.43	7.16	0.45	0.44	0.00
		DL	-0.03	-4.98	38.46	5.79	-0.15	0.00
		LL	-0.01	-1.26	9.70	1.46	-0.04	0.00
		EQX	3.88	0.21	-0.22	-0.44	8.20	0.00
		EQY	0.23	4.02	0.38	-8.55	0.50	0.01
DN-7N	1	D0	0.15	0.05	5.77	-0.07	0.23	0.00
		DL	0.49	0.25	27.87	-0.19	0.53	0.00
		LL	0.12	0.06	7.03	-0.05	0.13	0.00
		EQX	2.29	0.13	-0.07	-0.23	4.21	0.00
		EQY	0.06	2.55	-0.32	-4.55	0.11	0.00
EN-7N	1	D0	0.15	0.00	5.83	-0.01	0.24	0.00
		DL	0.56	-0.48	27.46	0.64	0.62	0.00
		LL	0.14	-0.12	6.93	0.16	0.16	0.00
		EQX	2.43	0.13	-0.05	-0.23	4.47	0.00
		EQY	-0.24	2.58	0.46	-4.58	-0.44	0.00
FN-7N	1	D0	0.16	-0.22	4.49	0.24	0.25	0.00
		DL	0.28	-1.27	12.10	1.53	0.32	0.00
		LL	0.07	-0.32	3.05	0.39	0.08	0.00
		EQX	2.57	0.10	-0.13	-0.20	4.70	0.00
		EQY	-0.41	1.96	-1.12	-3.87	-0.75	0.00
AN-4N	1	D0	-1.61	0.48	6.97	-0.56	-1.70	0.00
		DL	1.88	1.07	7.99	-1.01	1.97	0.00
		LL	0.47	0.27	2.02	-0.26	0.50	0.00
		EQX	2.43	0.07	0.62	-0.19	5.43	0.00
		EQY	0.53	2.43	1.06	-5.53	1.33	0.00
BN-4N	1	D0	0.12	0.21	6.89	-0.25	0.20	0.00
		DL	1.64	3.80	34.27	-4.17	1.78	0.00
		LL	0.41	0.96	8.64	-1.05	0.45	0.00
		EQX	2.29	0.10	-0.21	-0.19	4.24	0.00
		EQY	0.41	2.44	-0.44	-4.52	0.76	0.00
CN-4N	1	D0	0.13	-0.32	6.61	0.35	0.21	0.00
		DL	0.48	-3.84	40.09	4.45	0.50	0.00
		LL	0.12	-0.97	10.11	1.12	0.13	0.00
		EQX	2.24	0.10	-0.25	-0.18	4.12	0.00
		EQY	0.14	2.40	0.45	-4.49	0.26	0.00
DN-4N	1	D0	0.12	0.06	5.92	-0.08	0.20	0.00
		DL	0.38	0.34	30.52	-0.27	0.40	0.00
		LL	0.10	0.08	7.70	-0.07	0.10	0.00
		EQX	2.21	0.11	-0.09	-0.19	4.12	0.00
		EQY	0.06	2.59	-0.10	-4.70	0.11	0.00
EN-4N	1	D0	0.12	-0.01	6.00	0.00	0.20	0.00
		DL	0.14	-0.52	29.47	0.70	0.14	0.00
		LL	0.03	-0.13	7.43	0.18	0.04	0.00
		EQX	2.34	0.11	-0.11	-0.20	4.37	0.00
		EQY	-0.23	2.74	0.46	-4.86	-0.43	0.00
FN-4N	1	D0	0.12	-0.22	4.69	0.24	0.20	0.00
		DL	0.07	-1.27	13.08	1.55	0.08	0.00
		LL	0.02	-0.32	3.30	0.39	0.02	0.00
		EQX	2.47	0.08	-0.13	-0.17	4.59	0.00
		EQY	-0.40	2.07	-1.16	-4.09	-0.73	0.00
AN-2N	1	D0	0.03	0.46	4.27	-0.53	0.10	0.00
		DL	-1.15	2.53	13.61	-2.72	-1.38	0.00
		LL	-0.29	0.64	3.43	-0.69	-0.35	0.00
		EQX	2.89	-0.15	1.39	0.31	4.96	0.00
		EQY	0.79	2.00	1.13	-4.17	1.35	0.00
BN-2N	1	D0	-0.09	0.19	6.52	-0.22	-0.03	0.00
		DL	-2.03	1.57	32.30	-1.63	-2.36	0.00
		LL	-0.51	0.40	8.15	-0.41	-0.59	0.00
		EQX	2.71	-0.20	1.51	0.37	4.71	0.00
		EQY	0.49	2.61	-0.30	-4.87	0.85	0.00

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Axis	Floor	LdCase	Fx	Fy	Fz	Mx	My	Mz
CN-2N	1	D0	-0.08	-0.32	6.21	0.35	-0.03	0.00
		DL	-1.87	-2.96	29.12	3.47	-2.15	0.00
		LL	-0.47	-0.75	7.34	0.88	-0.54	0.00
		EQX	2.60	-0.20	1.52	0.37	4.52	0.00
		EQY	0.16	2.63	0.59	-4.90	0.28	0.00
DN-2N	1	D0	-0.08	0.06	5.50	-0.07	-0.02	0.00
		DL	-1.93	0.23	22.38	-0.13	-2.20	0.00
		LL	-0.49	0.06	5.64	-0.03	-0.56	0.00
		EQX	2.67	-0.21	1.51	0.38	4.64	0.00
		EQY	0.07	2.83	-0.15	-5.11	0.12	0.00
EN-2N	1	D0	-0.08	-0.01	5.59	0.00	-0.02	0.00
		DL	-1.68	-0.57	23.20	0.78	-1.91	0.00
		LL	-0.42	-0.14	5.85	0.20	-0.48	0.00
		EQX	2.84	-0.22	1.56	0.40	4.92	0.00
		EQY	-0.28	2.99	0.46	-5.29	-0.49	0.00
FN-2N	1	D0	-0.07	-0.22	4.27	0.24	-0.01	0.00
		DL	-0.78	-1.19	10.25	1.47	-0.88	0.00
		LL	-0.20	-0.30	2.58	0.37	-0.22	0.00
		EQX	2.99	-0.17	1.77	0.33	5.17	0.00
		EQY	-0.48	2.26	-1.55	-4.46	-0.83	0.00
AN-1N	1	D0	0.00	0.46	2.87	-0.52	0.07	0.00
		DL	-0.08	1.07	3.64	-1.06	-0.18	0.00
		LL	-0.02	0.27	0.92	-0.27	-0.04	0.00
		EQX	2.31	-0.21	-1.96	0.44	4.30	0.00
		EQY	0.62	2.09	0.65	-4.35	1.16	0.00
BN-1N	1	D0	0.04	0.19	4.71	-0.22	0.11	0.00
		DL	-0.05	0.39	9.73	-0.30	-0.13	0.00
		LL	-0.01	0.10	2.45	-0.08	-0.03	0.00
		EQX	2.26	-0.28	-2.05	0.52	4.19	0.00
		EQY	0.41	2.74	-0.76	-5.08	0.76	0.00
CN-1N	1	D0	0.04	-0.32	4.39	0.35	0.11	0.00
		DL	-0.01	-1.20	8.68	1.49	-0.06	0.00
		LL	0.00	-0.30	2.19	0.38	-0.02	0.00
		EQX	2.17	-0.28	-1.93	0.52	4.03	0.00
		EQY	0.13	2.76	0.40	-5.11	0.25	0.00
DN-1N	1	D0	0.04	0.06	3.68	-0.07	0.12	0.00
		DL	0.09	-0.05	6.22	0.20	0.07	0.00
		LL	0.02	-0.01	1.57	0.05	0.02	0.00
		EQX	2.23	-0.30	-1.98	0.55	4.13	0.00
		EQY	0.06	2.96	-0.15	-5.33	0.11	0.00
EN-1N	1	D0	0.04	-0.01	3.77	0.01	0.12	0.00
		DL	-0.02	-0.42	6.32	0.61	-0.03	0.00
		LL	0.00	-0.11	1.59	0.15	-0.01	0.00
		EQX	2.36	-0.32	-2.16	0.56	4.38	0.00
		EQY	-0.23	3.13	0.72	-5.52	-0.43	0.00
FN-1N	1	D0	0.05	-0.22	2.45	0.25	0.12	0.00
		DL	-0.04	-0.64	2.64	0.86	-0.05	0.00
		LL	-0.01	-0.16	0.67	0.22	-0.01	0.00
		EQX	2.48	-0.24	-2.08	0.48	4.60	0.00
		EQY	-0.40	2.36	-1.17	-4.65	-0.73	0.00