APOYO TÉCNICO EN EL DIAGNOSTICO Y DISEÑO DE PLANTAS FÍSICAS AL DEPARTAMENTO ADMINISTRATIVO DE INFRAESTRUCTURA, SECTOR EDUCACIÓN-ALCALDIA MUNICIPAL DE PASTO.

NESTOR IVAN GUERRERO CAGUASANGO

UNIVERSIDAD DE NARIÑO
FACULTAD DE INGENIERÍA
PROGRAMA DE INGENIERÍA CIVIL
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Trabajo presentado como requisito para optar el título de:
Ingeniero Civil

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Articulo 1° del acuerdo número 324 de octubre 11 de 1996, emanado del honorable consejo directivo de la Universidad de Nariño.

Nota de aceptación

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Firma del presidente del jurado

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Firma del jurado

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Firma del jurado

Pasto, Mayo de 2006

El presente trabajo lo dedico especialmente a:

MI MADRE. Miriam Lupe Caguasango, por ser la impulsadora de mis proyectos, ideales y sobre todo por su apoyo incondicional a lo largo de mi carrera.

MI PADRE. Jesús Vicente Guerrero, por su respaldo, su energía a la hora de brindarme orientación y por su inigualable comprensión y apoyo en el transcurso de todos mis estudios.

AGRADECIMIENTOS

Ing. William Castillo Valencia, docente y diseñador estructural, por sus consejos, asesoría, su apoyo y colaboración técnica.

Ing. Eduardo Muños y demás profesores de la Facultad de Ingeniería, Programa de Ingeniería Civil, por su formación académica y colaboración en el cumplimiento de los objetivos requeridos para la normal culminación de mi carrera.

A la Universidad de Nariño por impartir conocimiento para nuestra formación profesional.

A Greicy Dayana Mingan, por su incansable apoyo y colaboración en todo el tiempo de la pasantía.

Y a todas las personas que de una u otra forma me colaboraron para la realización de este trabajo.

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RESUMEN

El presente trabajo contiene una descripción de las labores realizadas como pasante en el DEPARTAMENTO ADMINISTRATIVO DE INFRAESTRUCTURA, SECTOR EDUCACION – ALCALDIA MUNICIPAL DE PASTO, especial mente en el área de diseño de estructuras de concreto, con base en la norma Colombiana de diseño y construcción sismorresistente NSR-98.

La estructura se somete a un modelo de **análisis Dinámico** (La solución se realiza mediante el método de la combinación cuadrática completa - CQC) con base en el Espectro Elástico de Diseño de Aceleraciones según la Norma **NSR-98,** se incluyeron en el análisis dinámico, todos los modos de vibración que contribuyen de una manera significativa a la respuesta dinámica de la estructura.

En las combinaciones de carga se incluyen los efectos ortogonales que se pueden presentar en la estructura por los efectos sísmicos, para ello, además de la posible ocurrencia de sismo en un sentido determinado, se contempla un 30% en el sentido ortogonal.

El análisis de diseño se hace por el sistema de estructura aporticada, con respecto a las fuerzas horizontales sísmicas a partir del período de vibración fundamental de la estructura.

Para el diseño de los miembros estructurales se emplean en las combinaciones básicas que involucran las fuerzas sísmicas **LAS FUERZAS SÍSMICAS REDUCIDAS DE DISEÑO (E = Fs/R')**; de igual manera se incluye en el análisis dinámico el Espectro Elástico de aceleraciones de acuerdo con los parámetros sísmicos de diseño.

ABSTRACT

The present work contains a description of labors accomplished as passing in the ADMINISTRATIVE INFRASTRUCTURE DEPARTMENT, EDUCATION SECTOR - MUNICIPAL MAYORALTY OF PASTO, specially in the area of structures design of concrete, based on the Colombian design norm and construction seismic-resistant NSR-98.

The structure is submitted to a Dynamical analysis model (The solution is accomplished through the method of the quadratic complete combination - CQC) based on the Elastic Spectrum of Accelerations Design according to the Norm NSR-98, they were included in the dynamical analysis, all the vibration manners that contribute in one way meaningful to dynamic response of the structure.

In the combinations of load are included the orthogonal effects that they can be presented in the structure by the seismic effects, for this, in addition to the possible earthquake occurrence in a given sense, is envisaged a 30% in the orthogonal direction.

The design analysis is made by the structure system “aporticada” (tied), with respect to the seismic horizontal forces from period of fundamental vibration of the structure.

For the design of the structural members are employed in the basic combinations that involve the seismic forces THE SEISMIC FORCES REDUCED OF DESIGN (E= Fs / R’); in same way is included in the dynamical analysis the Elastic Spectrum of accelerations according to the seismic design parameters.

INTRODUCCION

La infraestructura física de plantas educativas en el municipio de Pasto, no estará completa, ni aún adecuada para la población, si en ella no se incluye un centro de aprendizaje que brinde a la comunidad un servicio confortable, que cumplan con los requisitos establecidos por las normas, elementos que contribuyen a la organización integral del estudiante, y mejorar la eficiencia y el desarrollo mental de ellos.

La falta de instalaciones adecuadas produce como resultado la devaluación y poco aprovechamiento de la capacidad intelectual del estudiante. La implementación de instalaciones adecuadas permite que se lleve a cabo la integración horizontal requerida para un óptimo aprovechamiento en la educación. Es de importancia hablar de los futuros profesionales porque serán ellos quienes ayudarán al desarrollo de la sociedad.

Las mejoras en las instalaciones físicas del sector educativo produce ganancias en beneficio de la sociedad aportando de esta manera al desarrollo sostenido y a la tecnología.

En consecuencia, la Alcaldía del Municipio de San Juan de Pasto y el Departamento Administrativo de Infraestructura Sector Educación, en convenio con la Universidad de Nariño y la Facultad de Ingeniería, se vincularon para prestar el servicio de auxiliar de ingeniería en el apoyo técnico para el desarrollo del plan de acción 2005 de la Secretaria de Educación Municipal específicamente en la realización del Diagnóstico educativo para determinar la capacidad física instalada de los planteles educativos, seguimiento a proyectos en ejecución, atención a solicitudes y apoyo en la etapa de preinversión.

Por lo tanto, para una buena formación profesional y la obtención del título de Ingeniero Civil se hace necesario la realización de un trabajo de grado, tomando la opción de pasantía, donde se adquirirán la experiencia y se contribuirá al desarrollo satisfactorio de la sociedad.

1. OBJETIVOS

1.1 OBJETIVO GENERAL

Apoyo técnico a la revisión y diseño de estructuras del sector educativo

1.2 OBJETIVOS ESPECÍFICOS

Realizar el apoyo técnico en el diseño estructural sismorresistente en plantas físicas del sector educativo como son:

- Concentración escolar Juan XXIII: se diseñará un bloque de aulas.
- Colegio Cristo Rey San Fernando: se diseñará el bloque donde funcionara el laboratorio de producción.
- Liceo Central De Nariño: se diseñará el bloque destinado para la ubicación de baterías sanitarias.
- IEM Ciudadela De Paz. Diseño estructural para la construcción de la segunda etapa de bloques de aulas.
- Diseño estructural para la rehabilitación de la piscina en la Escuela Normal Superior De Pasto.

2. MARCO REFERENCIAL

En la actualidad, el gobierno se ha preocupado por mejorar el bienestar de los ciudadanos, promoviendo la aplicación de las normas, que desde hace muchos años fueron creadas, pero lastimosamente ahora se les viene a prestar el interés que merecen, de esta manera, es necesario empezar a cumplir con las personas y con el medio ambiente, prestando los servicios que se necesitan con la infraestructura adecuada sin causar daño a la naturaleza.

El desarrollo sostenido y la tecnología preventiva, son políticas que con obligatoriedad deben cumplir los proyectos de infraestructura con base en la norma colombiana de diseño y construcción NSR-98 tomadas por el gobierno en cuanto a las aprobaciones de proyectos.

3. DISEÑO ESTRUCTURAL

Para obtener una respuesta adecuada a eventos sísmicos, se partirá de una propuesta arquitectónica con base en la cual se elabora un esquema estructural (conjunto de pórticos), generando un modelo dinámico el cual tenga resistencia y rigidez adecuada ante las cargas mínimas de diseño, que están regidas por las Normas Colombianas de Construcciones Sismo-Resistente **(NSR-98)**; El análisis de diseño se hace por el sistema de estructura aporticada, (Titulo C) con respecto a las fuerzas horizontales sísmicas a partir del período de vibración fundamental de la estructura y espectro elástico de aceleraciones, deben definirse movimientos sísmicos de diseño en el lugar de la edificación de acuerdo con los requisitos del (Titulo A).

El Diseño cumple los requisitos mínimos con relación a las cargas verticales, las diferentes solicitaciones que deben ser tenidas en cuenta se combinan para obtener fuerzas internas de diseño de la estructura (Titulo B), para cumplir con funcionalidad.

Durante la ocurrencia de un eventual movimiento telúrico la deriva esta asociada con la deformación inelástica de los elementos estructurales, con la estabilidad de la estructura y el daño de elementos estructurales que no hacen parte del sistema de resistencia sísmica. Por estas razones es fundamental llevar a cabo durante el diseño estructural, un estricto cumplimiento de los requisitos de deriva establecidos en el capitulo A.6 de la Norma **NSR-98.**

Las cargas de cubierta y entrepiso se las transmite al suelo mediante vigas (de carga) columnas y a su vez por zapatas. Los elementos de carga están ¨amarrados¨ por vigas de enlace con el fin de rigidizar la estructura y en las funciones evitar los asentamientos diferenciales.

3.1 MODELO DE ANALISIS SISMICO

Se analiza el método de fuerza horizontal equivalente y el método de análisis modal, se elige el mayor cortante.

Si el mayor valor se obtiene por el método de fuerza horizontal equivalente, se obtiene una relación de cortantes entre los dos modelos y el resultado de este factor se utiliza en la amplificación del modelo dinámico en la aplicación del espectro, asi:

3.1.1 Caso 1: Si el método de fuerza horizontal equivalente > Cortante método análisis modal

$$\text{Factor espectral} = \frac{\text{Cortante fuerza horizontal equivalente}}{\text{Cortante análisis modal}} >= 1$$

3.1.2 Caso 2: Si el método de fuerza horizontal equivalente < Cortante método análisis modal

Factor espectral = 1 Cortante análisis modal

3.2 ANALISIS DINAMICO ELASTICO ESPECTRAL

Metodología del Análisis

Deben tenerse en cuenta los siguientes requisitos, cuando se utilice el método de análisis dinámico elástico espectral:

a) Obtención de los modos de vibración
b) Respuesta espectral modal
c) Respuesta total
d) Ajuste de los resultados
e) Evaluación de las derivas
f) Fuerza de diseño en los elementos
g) Diseño de los elementos estructurales

3.2.1 NUMERO DE MODOS DE VIBRACIÓN

Se incluyeron en el análisis dinámico, todos los modos de vibración que contribuyen de una manera significativa a la respuesta dinámica de la estructura. Según NSR – 98, se considera que se ha cumplido este requisito cuando se demuestra que, con el número de modos empleados, se ha incluido en el cálculo de la respuesta, de cada una de las direcciones horizontales principales, por lo menos el 90% de la masa participante de la estructura.[1]

3.2.2 MODELO DE ANALISIS DINAMICO

La estructura se somete a un modelo de **análisis Dinámico** (La solución se realiza mediante el método de la combinación cuadrática completa - CQC) con base en el Espectro Elástico de Diseño de Aceleraciones según la Norma **NSR-98.**

[1] NSR-98 Capitulo A.5.4.2

3.2.3 COMBINACIONES DE CARGA PARA LA ESTRUCTURA DE CONCRETO.

En las combinaciones indicadas se incluyen los efectos ortogonales que se pueden presentar en la estructura por los efectos sísmicos, para ello, además de la posible ocurrencia de sismo en un sentido determinado, se contempla un 30% en el sentido ortogonal.

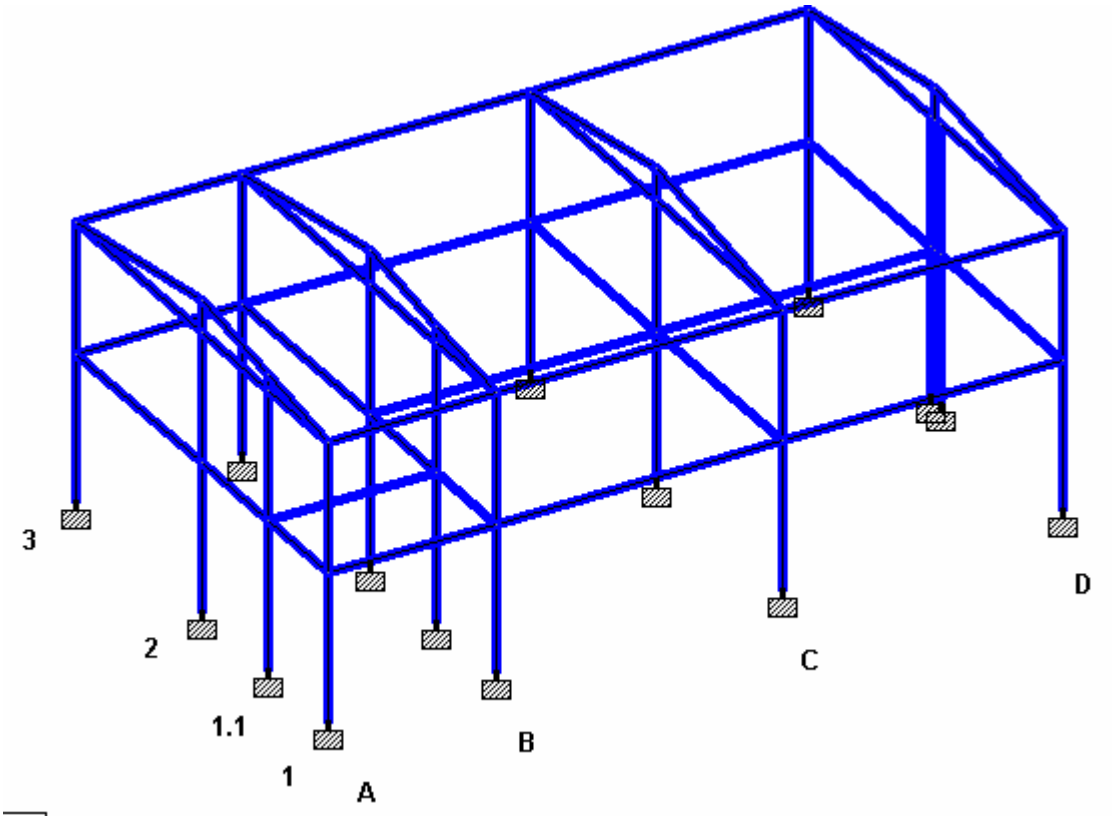
Para el diseño de los miembros estructurales se emplean en las combinaciones básicas que involucran las fuerzas sísmicas **LAS FUERZAS SÍSMICAS REDUCIDAS DE DISEÑO (E = Fs/R')**; de igual manera se incluye en el análisis dinámico el Espectro Elástico de aceleraciones de acuerdo con los parámetros sísmicos de diseño.

1- CU 1.4D+1.7L
2- 0.75CU + EX + 0.3EZ
3- 0.75CU + EX - 0.3EZ
4- 0.75CU – EX + 0.3EZ
5- 0.75CU – EX - 0.3EZ
6- 0.9D + EX + 0.3EZ
7- 0.9D + EX - 0.3EZ
8- 0.9D – EX + 0.3EZ
9- 0.9D – EX - 0.3EZ
10- 0.75CU + EZ + 0.3EX
11- 0.75CU + EZ - 0.3EX
12- 0.75CU – EZ + 0.3EX
13- 0.75CU – EZ - 0.3EX
14- 0.9D + EZ + 0.3EX
15- 0.9D + EZ - 0.3EX
16- 0.9D – EZ + 0.3EX
17- 0.9D – EZ - 0.3EX
18- D + L

4. MODELO ESTRUCTURAL COLEGIO JUAN XXIII BLOQUE 1

Obtención del modelo estructural del bloque 1 correspondiente a un bloque de aulas. (Ver figura 1)

Figura 1. Modelo tridimensional Colegio Juan XXIII bloque 1.



4.1 PARAMETROS SISMICOS DE DISEÑO

Ciudad:	PASTO	
Zona de Amenaza:	ALTA	NSR-98 A.2.3.3
Coeficiente de Aceleración Aa:	0.3	NSR-98 A.2.3.3
Sistema Estructural:	Aporticado	
Coeficiente de Sitio S_4:	2.0	NSR-98 A.2.4
Grupo de Uso:	II	NSR-98 A.2.5.1.3
Coeficiente de Importancia:	1.1	NSR-98 A.2.5.1.3
Método de Análisis Dinámico:	CQC	
Masa Edificación:	Peso Propio, Acabados	
Características Vibratorias:	Masa, Rigidez = Periodo de Vibración	

TIPO DE PERFIL	COEFICIENTE DE SITIO	USADO
S1	1.0	
S2	1.2	
S3	1.5	
S4	2.0	X

GRUPO DE USO: COEFICIENTE DE IMPORTANCIA NSR-98 A.2.5

GRUPO DE USO	COEFICIENTE DE IMPORTANCIA	USADO
IV	1.3	
III	1.2	
II	1.1	X
I	1.0	

DEFINICION DE LAS CARACTERISTICAS DE LA ESTRUCTURACION Y MATERIAL ESTRUCTURAL EMPLEADO

SISTEMA	CONSTRUIDO	PROYECTADO POR CONTROL DE DERIVAS
APORTICADO DUAL MUROS ESTRUC.	X	X

4.2 COEFICIENTE DE CAPACIDAD DE DISIPACION DE ENERGIA

El valor del coeficiente para la capacidad de disipación de energía al clasificar la estructura como irregular, se utiliza para vigas y columnas un valor equivalente al coeficiente de reducción en altura y planta al especificado por la norma, así:

GRADO DE IRREGULARIDAD DE LA ESTRUCTURA

1. IREGULARIDAD EN PLANTA φp (Tabla 2.7 NSR-98)

TORSIONAL	Φp = 0.9	
SALIENTES EXCESIVOS	Φp = 0.9	
DIAFRAGMA DISCONTINUO	Φp = 0.9	x
DESPLAZAMIENTO PLANO DEL PORTICO	Φp = 0.8	
EJES NO PARARLELOS	Φp = 0.9	

2. IREGULARIDAD EN ALTURA φa (Tabla 2.8 NSR-98)

PISO FLEXIBLE	Φa = 0.9	
VARIACION EN LA MASA	Φa = 0.9	x
RETROCESO EXCESIVO	Φa = 0.9	
DESPLAZAMIENTO DEL ELEMENTO	Φa = 0.8	
PISO DEBIL	Φa = 0.9	

Se presentan dos tipos de irregularidad en planta y un tipo de irregularidad en altura. Según la norma NSR-98 A.3.3.3 cuando la edificación tiene varios tipos de irregularidad en altura o en planta simultáneamente se aplica el menor valor así:

IRREGULARIDAD EN PLANTA φp = 0.9 (Tabla 2.7 NSR-98)
IRREGULARIDAD EN ALTURA φa= 0.9 (Tabla 2.8 NSR-98)

$R = R_O * \varphi p * \varphi a$
$R_O = 7$

$R = 7 * 0.9 * 0.9 = 5.67$

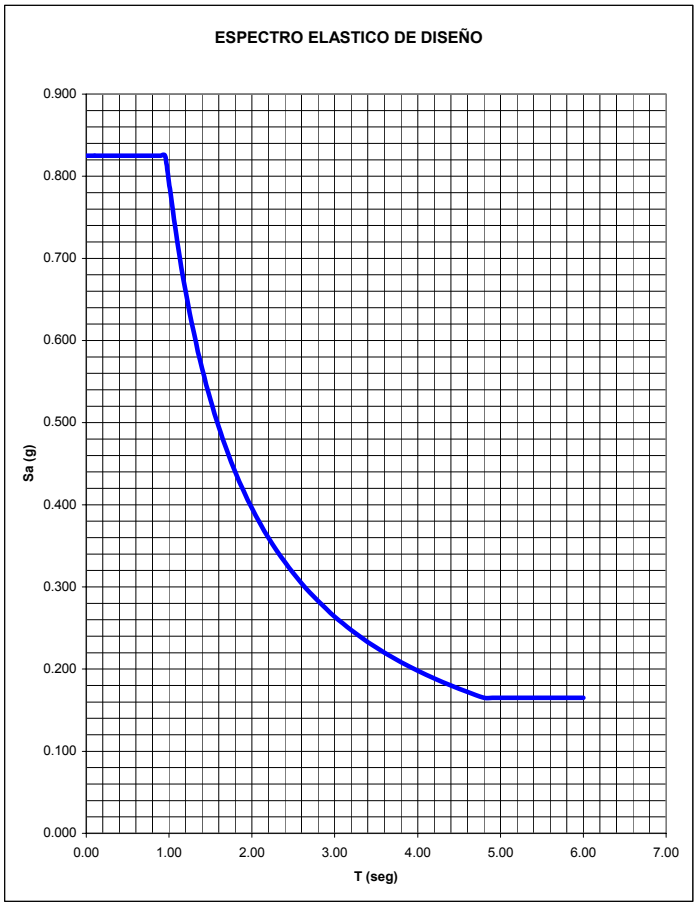
$E/R = 1 / 5.67 = 0.176$

$0.3*E/R = 0.3/5.67 = 0.053$

4.3 ESPECTRO ELASTICO DE DISEÑO

S = 2.00	Tc = 0.48 S = 0.960
I = 1.10	TL = 2.40 S = 4.800
Aa = 0.30	

T (seg)	Sa (g)
0.00	0.825
0.10	0.825
0.15	0.825
0.20	0.825
0.25	0.825
0.30	0.825
0.35	0.825
0.40	0.825
0.45	0.825
0.50	0.825
0.55	0.825
0.60	0.825
0.65	0.825
0.70	0.825
0.75	0.825
0.80	0.825
0.85	0.825
0.90	0.825
0.95	0.825
1.00	0.792
1.10	0.720
1.20	0.660
1.30	0.609
1.40	0.566
1.50	0.528
1.60	0.495
1.70	0.466
1.80	0.440
1.90	0.417
2.00	0.396
2.10	0.377
2.20	0.360
2.30	0.344
2.40	0.330
2.50	0.317
2.60	0.305
2.70	0.293
2.80	0.283
2.90	0.273
3.00	0.264
3.10	0.255
3.20	0.248
3.30	0.240
3.40	0.233
3.50	0.226
3.60	0.220
3.70	0.214
3.80	0.208
3.90	0.203
4.00	0.198
4.10	0.193
4.20	0.189
4.30	0.184
4.40	0.180
4.50	0.176
4.60	0.172
4.70	0.169
4.80	0.165
4.90	0.165
5.00	0.165
5.10	0.165
5.20	0.165
5.30	0.165
5.40	0.165
5.50	0.165
5.60	0.165
5.70	0.165
5.80	0.165
5.90	0.165
6.00	0.165

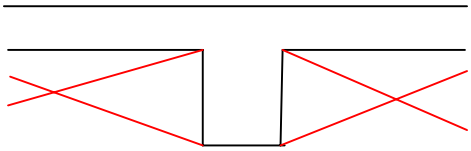


4.4 ANALISIS DE CARGA

4.4.1 CARGA MUERTA Y CARGA VIVA SOBRE LA LOSA

ANALISIS DE CARGA PARA LOSA ALIGERADA EN DOS DIRECCIONES

Proyecto: Bloque 1 Colegio Juan XXIII Fecha: Agosto 26 de 2005
Localización: Barrio Pandiaco



Loseta Superior = 0,08 m
Altura de Casetón = 0,22 m
0,30 m

Ancho del Nervio = 0,12 m
Ancho del Casetón = 0,90 m
Aferencia del Nervio = 1,02 m

Especificaciones:

f´c (concreto):	210,00	kg/cm^2
fy (refuerzo):	4200,00	kg/cm^2
Peso Específico Concreto:	2400,00	kg/cm^3

ANALISIS DE CARGAS:

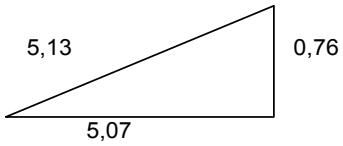
Muerta:	Divisiones o mampostería:	210,00 kg/m^2	=	0,210 t/m^2
	Acabados:	150,00 kg/m^2	=	0,150 t/m^2
	Concreto Reforzado:	299,08 kg/m^2	=	0,299 t/m^2
	Cielo razo	20,00 kg/m^2	=	0,020 t/m^2
	Total Carga Muerta:	679,08 kg/m^2	=	0,679 t/m^2
Viva:	Carga Viva:	200,00 kg/m^2	=	0,200 t/m^2
Estado C.U.	(1.7 L + 1.4 D)	1290,71 kg/m^2	=	1,291 t/m^2

NOTA: 1. Losa aligerada con casetón removible

4.4.2 CARGAS SOBRE LA CUBIERTA

CARGA GENERADA POR VIENTO

Vv.=	100	kph		B.6.5
Vd=Vv*s1*s2*s3				
S1	1			
S2	0,62		TABLA	B.6.5.2
S3	1			B.6.5.6
Vd =	62	kph		
$q=.000048*Vd^2*S4$				
S4	0,73			
q	0,1	kN/m²		
q	13,5	kg/m²		
$P=C_p*q$				
C_p	-1,1		TABLA	B.6.7.2
	-0,8		TABLA	B.6.7.2



Φ	8,53		
H =	7,21		
W =	10,14		
0,5	0,71	1,5	OK
P	-14,82	kg/m²	
	-10,78	kg/m²	

CARGA MUERTA

Teja Ajover =	5,60	kg/m²
Peso correa =	5,72	kg/ml
Long correa =	15,44	m
Nº Correas	8	
Area Cubierta =	158,41	m^2
Peso correa =	4,46016	kg/m²
Total =	10,06	kg/m²

CARGA VIVA

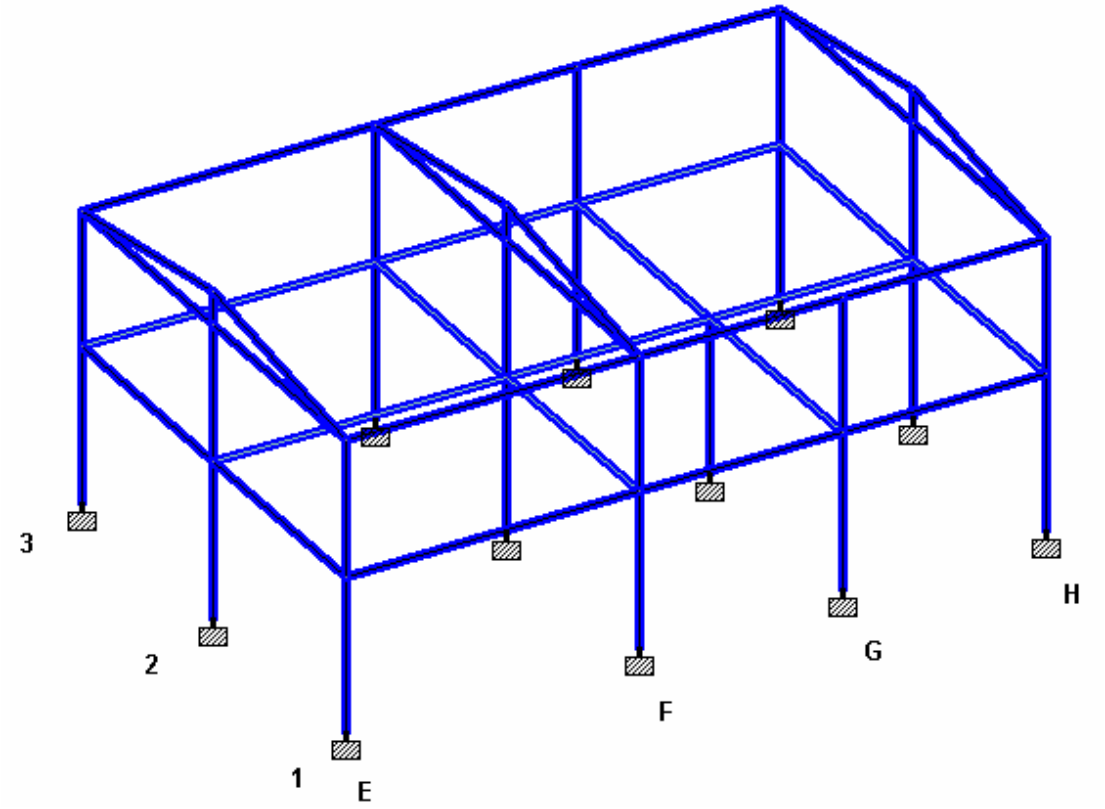
Total =	35	kg/m²

Ver memoria de cálculo en el anexo 1.

5. MODELO ESTRUCTURAL COLEGIO JUAN XXIII BLOQUE 2

Obtención del modelo estructural del bloque 2 correspondiente a un bloque de aulas y batería sanitaria. (Ver figura 2)

Figura 2. Modelo tridimensional Colegio Juan XXIII bloque 2.



5.1 PARAMETROS SISMICOS DE DISEÑO

Ciudad:	PASTO	
Zona de Amenaza:	ALTA	NSR-98 A.2.3.3
Coeficiente de Aceleración Aa:	0.3	NSR-98 A.2.3.3
Sistema Estructural:	Aporticado	
Coeficiente de Sitio S_4:	2.0	NSR-98 A.2.4
Grupo de Uso:	II	NSR-98 A.2.5.1.3
Coeficiente de Importancia:	1.1	NSR-98 A.2.5.1.3
Método de Análisis Dinámico:	CQC	
Masa Edificación:	Peso Propio, Acabados	
Características Vibratorias:	Masa, Rigidez = Periodo de Vibración	

TIPO DE PERFIL	COEFICIENTE DE SITIO	USADO
S1	1.0	
S2	1.2	
S3	1.5	
S4	2.0	X

GRUPO DE USO: COEFICIENTE DE IMPORTANCIA NSR-98 A.2.5

GRUPO DE USO	COEFICIENTE DE IMPORTANCIA	USADO
IV	1.3	
III	1.2	
II	1.1	X
I	1.0	

DEFINICION DE LAS CARACTERISTICAS DE LA ESTRUCTURACION Y MATERIAL ESTRUCTURAL EMPLEADO

SISTEMA	CONSTRUIDO	PROYECTADO POR CONTROL DE DERIVAS
APORTICADO DUAL MUROS ESTRUC.	X	X

5.2 COEFICIENTE DE CAPACIDAD DE DISIPACION DE ENERGIA

El valor del coeficiente para la capacidad de disipación de energía al clasificar la estructura como irregular, se utiliza para vigas y columnas un valor equivalente al coeficiente de reducción en altura y planta al especificado por la norma, así:

GRADO DE IRREGULARIDAD DE LA ESTRUCTURA

1. IREGULARIDAD EN PLANTA φp (Tabla 2.7 NSR-98)

TORSIONAL	Φp = 0.9	
SALIENTES EXCESIVOS	Φp = 0.9	
DIAFRAGMA DISCONTINUO	Φp = 0.9	x
DESPLAZAMIENTO PLANO DEL PORTICO	Φp = 0.8	
EJES NO PARARLELOS	Φp = 0.9	

2. IREGULARIDAD EN ALTURA φa (Tabla 2.8 NSR-98)

PISO FLEXIBLE	Φa = 0.9	
VARIACION EN LA MASA	Φa = 0.9	x
RETROCESO EXCESIVO	Φa = 0.9	
DESPLAZAMIENTO DEL ELEMENTO	Φa = 0.8	
PISO DEBIL	Φa = 0.9	

Se presentan dos tipos de irregularidad en planta y un tipo de irregularidad en altura. Según la norma NSR-98 A.3.3.3 cuando la edificación tiene varios tipos de irregularidad en altura o en planta simultáneamente se aplica el menor valor así:

IRREGULARIDAD EN PLANTA φp = 0.9 (Tabla 2.7 NSR-98)
IRREGULARIDAD EN ALTURA φa= 0.9 (Tabla 2.8 NSR-98)

$R = R_O * \varphi p * \varphi a$
$R_O = 7$

$R = 7 * 0.9 * 0.9 = 5.67$

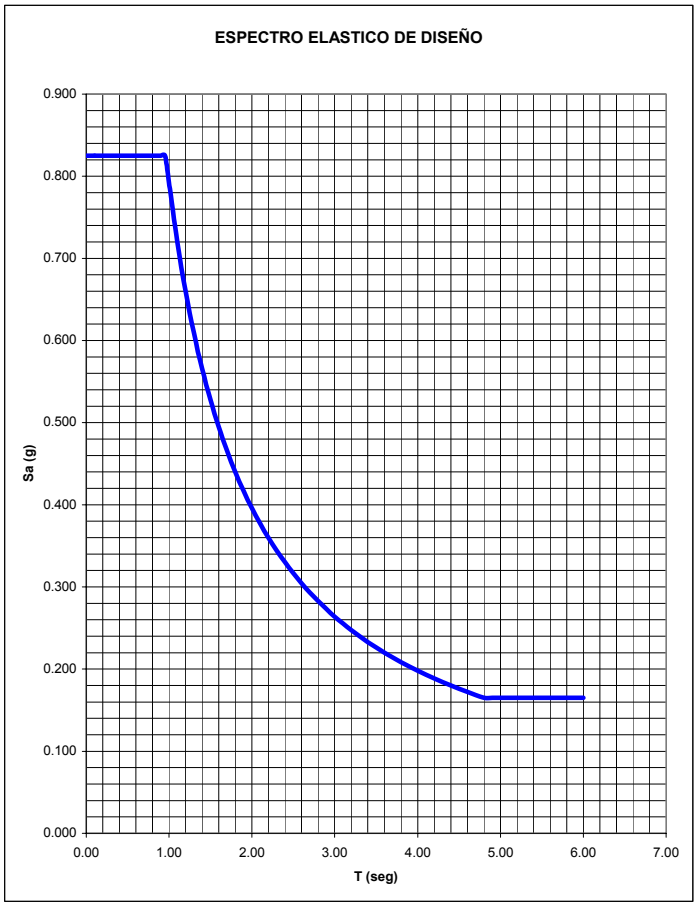
$E/R = 1 / 5.67 = 0.176$

$0.3*E/R = 0.3/5.67 = 0.053$

5.3 ESPECTRO ELASTICO DE DISEÑO

S = 2.00	Tc = 0.48 S = 0.960
I = 1.10	TL = 2.40 S = 4.800
Aa = 0.30	

T (seg)	Sa (g)
0.00	0.825
0.10	0.825
0.15	0.825
0.20	0.825
0.25	0.825
0.30	0.825
0.35	0.825
0.40	0.825
0.45	0.825
0.50	0.825
0.55	0.825
0.60	0.825
0.65	0.825
0.70	0.825
0.75	0.825
0.80	0.825
0.85	0.825
0.90	0.825
0.95	0.825
1.00	0.792
1.10	0.720
1.20	0.660
1.30	0.609
1.40	0.566
1.50	0.528
1.60	0.495
1.70	0.466
1.80	0.440
1.90	0.417
2.00	0.396
2.10	0.377
2.20	0.360
2.30	0.344
2.40	0.330
2.50	0.317
2.60	0.305
2.70	0.293
2.80	0.283
2.90	0.273
3.00	0.264
3.10	0.255
3.20	0.248
3.30	0.240
3.40	0.233
3.50	0.226
3.60	0.220
3.70	0.214
3.80	0.208
3.90	0.203
4.00	0.198
4.10	0.193
4.20	0.189
4.30	0.184
4.40	0.180
4.50	0.176
4.60	0.172
4.70	0.169
4.80	0.165
4.90	0.165
5.00	0.165
5.10	0.165
5.20	0.165
5.30	0.165
5.40	0.165
5.50	0.165
5.60	0.165
5.70	0.165
5.80	0.165
5.90	0.165
6.00	0.165

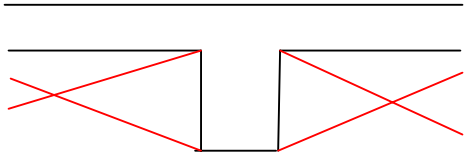


5.4 ANALISIS DE CARGA

5.4.1 CARGA MUERTA Y CARGA VIVA SOBRE LA LOSA

ANALISIS DE CARGA PARA LOSA ALIGERADA EN DOS DIRECCIONES

Proyecto: Bloque 2 Colegio Juan XXIII Fecha: Agosto 26 de 2005
Localización: Barrio Pandiaco



Loseta Superior =	0,08	m	
Altura de Casetón =	0,22	m	0,30 m

Ancho del Nervio =	0,12	m
Ancho del Casetón =	0,90	m
Aferencia del Nervio =	1,02	m

Especificaciones:

f´c (concreto):	210,00	kg/cm^2
fy (refuerzo):	4200,00	kg/cm^2
Peso Específico Concreto:	2400,00	kg/cm^3

ANALISIS DE CARGAS:

Muerta:	Divisiones o mampostería:	153,00 kg/m^2	=	0,153 t/m^2
	Acabados:	150,00 kg/m^2	=	0,150 t/m^2
	Concreto Reforzado:	299,08 kg/m^2	=	0,299 t/m^2
	Cielo razo	20,00 kg/m^2	=	0,020 t/m^2
	Total Carga Muerta:	622,08 kg/m^2	=	0,622 t/m^2
Viva:	Carga Viva:	200,00 kg/m^2	=	0,200 t/m^2
Estado C.U.	(1.7 L + 1.4 D)	1210,91 kg/m^2	=	1,211 t/m^2

NOTA: 1. Losa aligerada con casetón removible

5.4.2 CARGAS DE CUBIERTA

CARGA GENERADA POR VIENTO

Vv.=	100	kph		B.6.5
Vd=Vv*s1*s2*s3				
S1	1			
S2	0,62		TABLA	B.6.5.2
S3	1			B.6.5.6
Vd =	62	kph		
$q=.000048*Vd^2*S4$				
S4	0,73			
q	0,1	kN/m²		
q	13,5	kg/m²		

$P=C_p*q$

C_p	-1,1	TABLA	B.6.7.2
	-0,8	TABLA	B.6.7.2

Φ	8,53			
H =	7,21			
W =	10,14			
0,5	0,71	1,5	OK	
P	-14,82	kg/m²		
	-10,78	kg/m²		

CARGA MUERTA

Teja Ajover =	5,60	kg/m²
Peso correa =	5,72	kg/ml
Long correa =	15,44	m
Nº Correas	8	
Area Cubierta =	158,41	m^2
Peso correa =	4,46016	kg/m²
Total =	10,06	kg/m²

CARGA VIVA

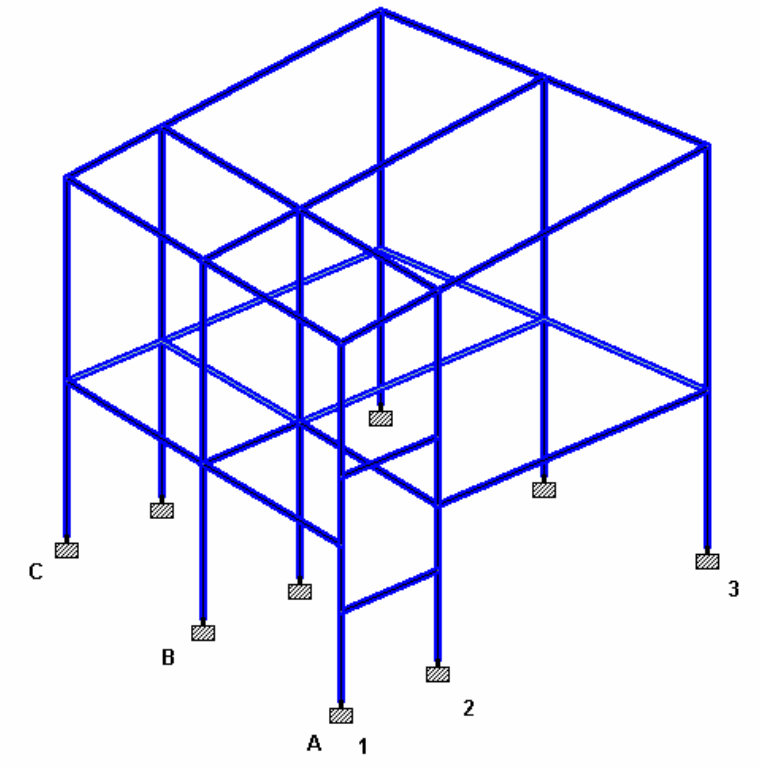
Total =	35	kg/m²

Ver memoria de cálculo en el anexo 2.

6. MODELO ESTRUCTURAL COLEGIO LICEO CENTRAL DE NARIÑO

Obtención del modelo estructural del bloque destinado a la ubicación de baterías sanitarias. (Ver figura 3)

Figura 3. Modelo tridimensional Colegio Liceo Central de Nariño.



6.1 PARAMETROS SISMICOS DE DISEÑO

Ciudad:	PASTO	
Zona de Amenaza:	ALTA	NSR-98 A.2.3.3
Coeficiente de Aceleración Aa:	0.3	NSR-98 A.2.3.3
Sistema Estructural:	Aporticado	
Coeficiente de Sitio S_1:	1.0	NSR-98 A.2.4
Grupo de Uso:	II	NSR-98 A.2.5.1.3
Coeficiente de Importancia:	1.1	NSR-98 A.2.5.1.3
Método de Análisis Dinámico:	CQC	
Masa Edificación:	Peso Propio, Acabados	
Características Vibratorias:	Masa, Rigidez = Periodo de Vibración	

TIPO DE PERFIL	COEFICIENTE DE SITIO	USADO
S1	1.0	X
S2	1.2	
S3	1.5	
S4	2.0	

GRUPO DE USO: COEFICIENTE DE IMPORTANCIA NSR-98 A.2.5

GRUPO DE USO	COEFICIENTE DE IMPORTANCIA	USADO
IV	1.3	
III	1.2	
II	1.1	X
I	1.0	

DEFINICION DE LAS CARACTERISTICAS DE LA ESTRUCTURACION Y MATERIAL ESTRUCTURAL EMPLEADO

SISTEMA	CONSTRUIDO	PROYECTADO POR CONTROL DE DERIVAS
APORTICADO DUAL MUROS ESTRUC.	X	X

6.2 COEFICIENTE DE CAPACIDAD DE DISIPACION DE ENERGIA

El valor del coeficiente para la capacidad de disipación de energía al clasificar la estructura como irregular, se utiliza para vigas y columnas un valor equivalente al coeficiente de reducción en altura y planta al especificado por la norma, así:

GRADO DE IRREGULARIDAD DE LA ESTRUCTURA

1. IREGULARIDAD EN PLANTA φp (Tabla 2.7 NSR-98)

TORSIONAL	Φp = 0.9	X
SALIENTES EXCESIVOS	Φp = 0.9	
DIAFRAGMA DISCONTINUO	Φp = 0.9	
DESPLAZAMIENTO PLANO DEL PORTICO	Φp = 0.8	
EJES NO PARARLELOS	Φp = 0.9	

2. IREGULARIDAD EN ALTURA φa (Tabla 2.8 NSR-98)

PISO FLEXIBLE	Φa = 0.9	X
VARIACION EN LA MASA	Φa = 0.9	
RETROCESO EXCESIVO	Φa = 0.9	
DESPLAZAMIENTO DEL ELEMENTO	Φa = 0.8	
PISO DEBIL	Φa = 0.9	

Se presentan dos tipos de irregularidad en planta y un tipo de irregularidad en altura. Según la norma NSR-98 A.3.3.3 cuando la edificación tiene varios tipos de irregularidad en altura o en planta simultáneamente se aplica el menor valor, así:

IRREGULARIDAD EN PLANTA φp = 0.9 (Tabla 2.7 NSR-98)
IRREGULARIDAD EN ALTURA φa= 0.9 (Tabla 2.8 NSR-98)

$R = R_O * \varphi p * \varphi a$
$R_O = 7$

$R = 7 * 0.9 * 0.9 = 5.67$

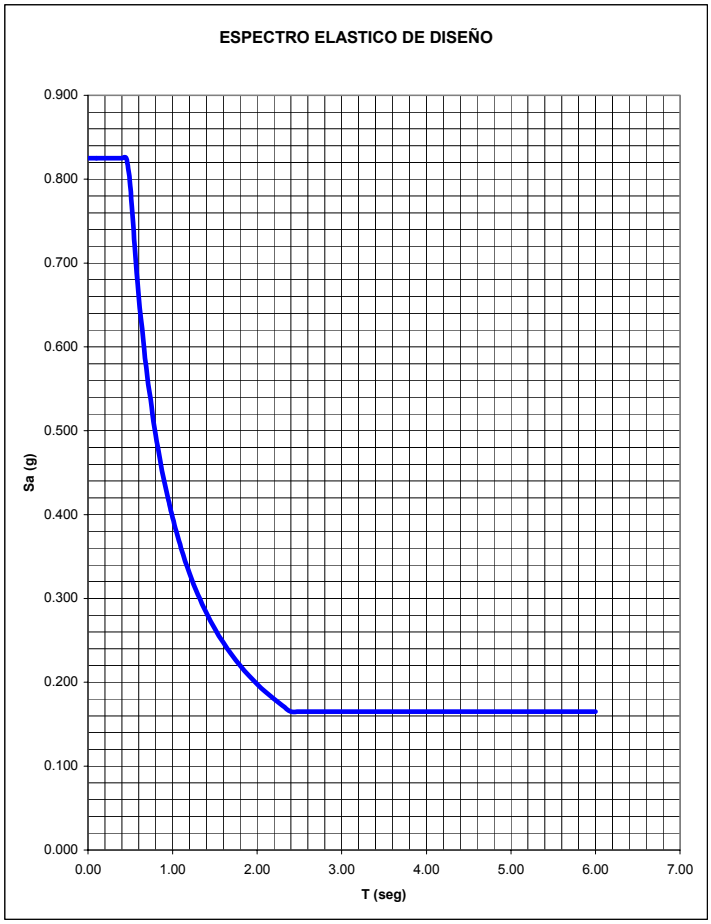
$E/R = 1 / 5.67 = 0.176$

$0.3*E/R = 0.3/5.67 = 0.053$

6.3 ESPECTRO ELASTICO DE DISEÑO

S = 1.00	Tc = 0.48 S = 0.480
I = 1.10	TL = 2.40 S = 2.400
Aa = 0.30	

T (seg)	Sa (g)
0.00	0.825
0.10	0.825
0.15	0.825
0.20	0.825
0.25	0.825
0.30	0.825
0.35	0.825
0.40	0.825
0.45	0.825
0.50	0.792
0.55	0.720
0.60	0.660
0.65	0.609
0.70	0.566
0.75	0.528
0.80	0.495
0.85	0.466
0.90	0.440
0.95	0.417
1.00	0.396
1.10	0.360
1.20	0.330
1.30	0.305
1.40	0.283
1.50	0.264
1.60	0.248
1.70	0.233
1.80	0.220
1.90	0.208
2.00	0.198
2.10	0.189
2.20	0.180
2.30	0.172
2.40	0.165
2.50	0.165
2.60	0.165
2.70	0.165
2.80	0.165
2.90	0.165
3.00	0.165
3.10	0.165
3.20	0.165
3.30	0.165
3.40	0.165
3.50	0.165
3.60	0.165
3.70	0.165
3.80	0.165
3.90	0.165
4.00	0.165
4.10	0.165
4.20	0.165
4.30	0.165
4.40	0.165
4.50	0.165
4.60	0.165
4.70	0.165
4.80	0.165
4.90	0.165
5.00	0.165
5.10	0.165
5.20	0.165
5.30	0.165
5.40	0.165
5.50	0.165
5.60	0.165
5.70	0.165
5.80	0.165
5.90	0.165
6.00	0.165

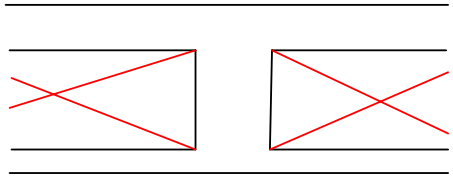


6.4 ANALISIS DE CARGA

6.4.1 CARGA MUERTA Y CARGA VIVA SOBRE LA LOSA

ANALISIS DE CARGA PARA LOSA ALIGERADA EN UNA DIRECCION

Proyecto: Liceo central de Nariño Fecha: Septiembre 15 de 2005
Localización:



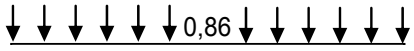
Loseta Superior =	0,07	m	
Altura de Casetón =	0,18	m	0,25 m
Loseta Inferior =	0,00	m	
Ancho del Nervio =	0,12	m	
Ancho del Casetón =	0,60	m	
Aferencia del Nervio =	0,72	m	

Especificaciones:

f´c (concreto):	210,00	kg/cm^2
fy (refuerzo):	4200,00	kg/cm^2
Peso Específico Concreto R	2400,00	kg/cm^3
Peso Específico Concreto S	2100,00	kg/cm^3

ANALISIS DE CARGAS:

Muerta:	Divisiones o mampostería:	230,00 kg/m^2	=	0,230 t/m^2
	Acabados:	150,00 kg/m^2	=	0,150 t/m^2
	Peso de Concreto:	219,84 kg/m^2	=	0,220 t/m^2
	Aligerante:	15,00 kg/m^2	=	0,015 t/m^2
	Total Carga Muerta:	614,84 kg/m^2	=	0,615 t/m^2
	Carga Muerta por metro	442,68 kg/m	=	0,443 t/m
Viva:	Carga Viva:	200,00 kg/m^2	=	0,200 t/m^2
Estado C.U.	(1.7 L + 1.4 D)	1200,78 kg/m^2	=	1,201 t/m^2
Carga Muerta en el nervio:		442,68 kg/m	=	0,443 t/m
Carga Viva en el nervio:		144,00 kg/m	=	0,144 t/m
Carga Ultima en el nervio:		864,56 kg/m	=	0,865 t/m



6.4.2 CARGAS DE CUBIERTA

CARGA GENERADA POR VIENTO

Vv.=	100	kph		B.6.5
Vd=Vv*s1*s2*s3				
S1	1			
S2	0,62		TABLA	B.6.5.2
S3	1			B.6.5.6
Vd =	62	kph		
$q=.000048*Vd^2*S4$				
S4	0,73			
q	0,1	kN/m²		
q	13,5	kg/m²		

$P=C_p*q$

C_p	-2		TABLA	B.6.7.3
	-1,5		TABLA	B.6.7.3

Φ	5,76		
H =	7,45		
W =	7,44		
0,5	1,00	1,5	OK
P	-26,94	kg/m²	
	-20,20	kg/m²	

CARGA MUERTA

Teja Ajover =	5,60	kg/m²
Peso correa =	3,62	kg/ml
Long correa =	7,85	m
Nº Correas	4	
Area Cubierta =	58,718	m^2
Peso correa =	1,93583	kg/m²
Total =	7,54	kg/m²

CARGA VIVA

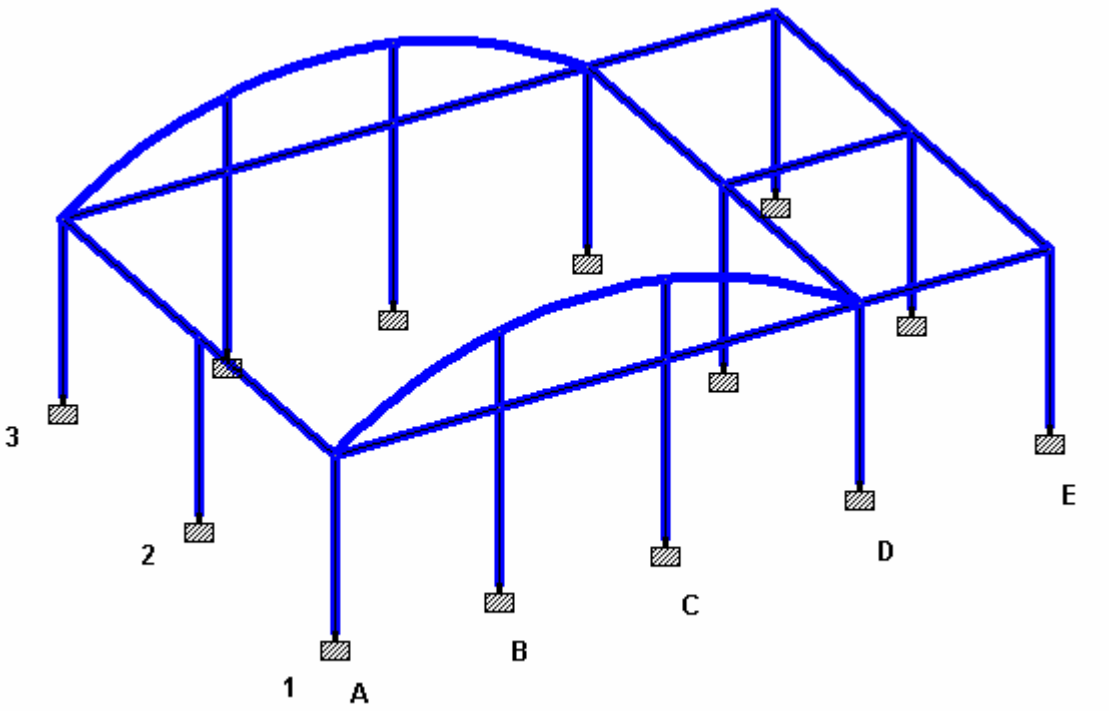
Total =	35	kg/m²

Ver memoria de cálculo en el anexo 3.

7. MODELO ESTRUCTURAL COLEGIO CRISTO REY SAN FERNANDO

Obtención del modelo estructural del bloque destinado a la ubicación del laboratorio de producción. (Ver figura 4)

Figura 4. Modelo tridimensional Colegio Cristo Rey San Fernando.



7.1 PARAMETROS SISMICOS DE DISEÑO

Ciudad:	PASTO	
Zona de Amenaza:	ALTA	NSR-98 A.2.3.3
Coeficiente de Aceleración Aa:	0.3	NSR-98 A.2.3.3
Sistema Estructural:	Aporticado	
Coeficiente de Sitio S_3:	1.5	NSR-98 A.2.4
Grupo de Uso:	II	NSR-98 A.2.5.1.3
Coeficiente de Importancia:	1.1	NSR-98 A.2.5.1.3
Método de Análisis Dinámico:	CQC	
Masa Edificación:	Peso Propio, Acabados	
Características Vibratorias:	Masa, Rigidez = Periodo de Vibración	

TIPO DE PERFIL	COEFICIENTE DE SITIO	USADO
S1	1.0	
S2	1.2	
S3	1.5	X
S4	2.0	

GRUPO DE USO: COEFICIENTE DE IMPORTANCIA NSR-98 A.2.5

GRUPO DE USO	COEFICIENTE DE IMPORTANCIA	USADO
IV	1.3	
III	1.2	
II	1.1	X
I	1.0	

DEFINICION DE LAS CARACTERISTICAS DE LA ESTRUCTURACION Y MATERIAL ESTRUCTURAL EMPLEADO

SISTEMA	CONSTRUIDO	PROYECTADO POR CONTROL DE DERIVAS
APORTICADO DUAL MUROS ESTRUC.	X	X

7.2 COEFICIENTE DE CAPACIDAD DE DISIPACION DE ENERGIA

El valor del coeficiente para la capacidad de disipación de energía al clasificar la estructura como irregular, se utiliza para vigas y columnas un valor equivalente al coeficiente de reducción en altura y planta al especificado por la norma, así:

GRADO DE IRREGULARIDAD DE LA ESTRUCTURA

1. IREGULARIDAD EN PLANTA φp (Tabla 2.7 NSR-98)

TORSIONAL	Φp = 0.9	X
SALIENTES EXCESIVOS	Φp = 0.9	
DIAFRAGMA DISCONTINUO	Φp = 0.9	
DESPLAZAMIENTO PLANO DEL PORTICO	Φp = 0.8	
EJES NO PARARLELOS	Φp = 0.9	

2. IREGULARIDAD EN ALTURA φa (Tabla 2.8 NSR-98)

PISO FLEXIBLE	Φa = 0.9	X
VARIACION EN LA MASA	Φa = 0.9	
RETROCESO EXCESIVO	Φa = 0.9	
DESPLAZAMIENTO DEL ELEMENTO	Φa = 0.8	
PISO DEBIL	Φa = 0.9	

Se presentan dos tipos de irregularidad en planta y un tipo de irregularidad en altura. Según la norma NSR-98 A.3.3.3 cuando la edificación tiene varios tipos de irregularidad en altura o en planta simultáneamente se aplica el menor valor, así:

IRREGULARIDAD EN PLANTA φp = 0.9 (Tabla 2.7 NSR-98)
IRREGULARIDAD EN ALTURA φa= 0.9 (Tabla 2.8 NSR-98)

$R = R_O * \varphi p * \varphi a$
$R_O = 7$

$R = 7 * 0.9 * 0.9 = 5.67$

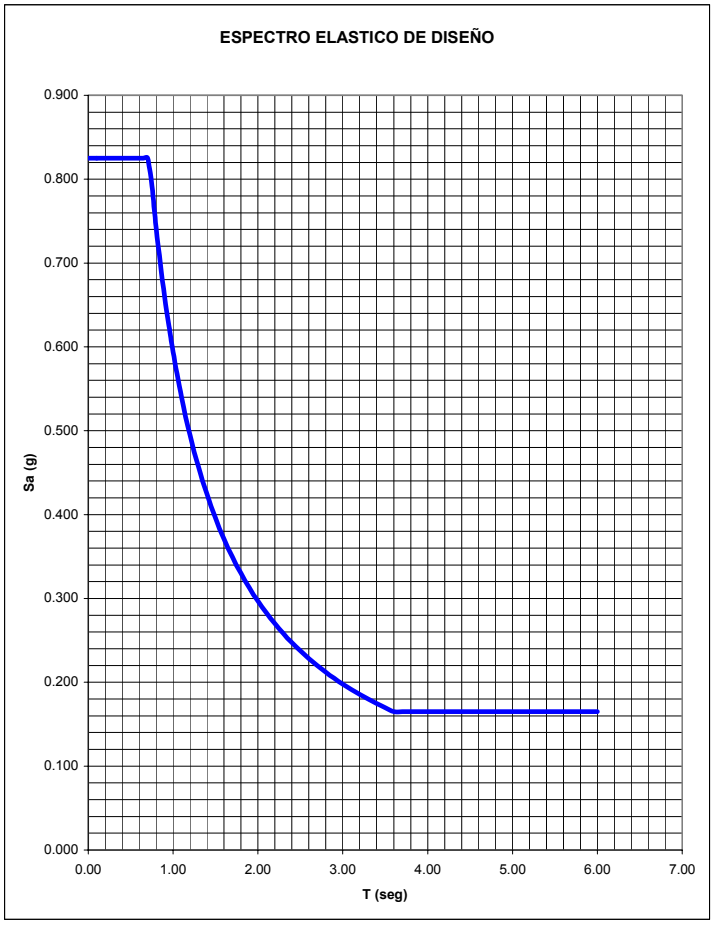
$E/R = 1 / 5.67 = 0.176$

$0.3*E/R = 0.3/5.67 = 0.053$

7.3 ESPECTRO ELASTICO DE DISEÑO

S = 1.50	Tc = 0.48 S = 0.720
I = 1.10	TL = 2.40 S = 3.600
Aa = 0.30	

T (seg)	Sa (g)
0.00	0.825
0.10	0.825
0.15	0.825
0.20	0.825
0.25	0.825
0.30	0.825
0.35	0.825
0.40	0.825
0.45	0.825
0.50	0.825
0.55	0.825
0.60	0.825
0.65	0.825
0.70	0.825
0.75	0.792
0.80	0.743
0.85	0.699
0.90	0.660
0.95	0.625
1.00	0.594
1.10	0.540
1.20	0.495
1.30	0.457
1.40	0.424
1.50	0.396
1.60	0.371
1.70	0.349
1.80	0.330
1.90	0.313
2.00	0.297
2.10	0.283
2.20	0.270
2.30	0.258
2.40	0.248
2.50	0.238
2.60	0.228
2.70	0.220
2.80	0.212
2.90	0.205
3.00	0.198
3.10	0.192
3.20	0.186
3.30	0.180
3.40	0.175
3.50	0.170
3.60	0.165
3.70	0.165
3.80	0.165
3.90	0.165
4.00	0.165
4.10	0.165
4.20	0.165
4.30	0.165
4.40	0.165
4.50	0.165
4.60	0.165
4.70	0.165
4.80	0.165
4.90	0.165
5.00	0.165
5.10	0.165
5.20	0.165
5.30	0.165
5.40	0.165
5.50	0.165
5.60	0.165
5.70	0.165
5.80	0.165
5.90	0.165
6.00	0.165



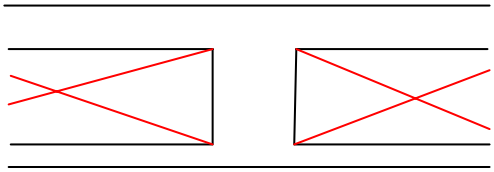
7.4 ANALISIS DE CARGA

7.4.1 CARGA MUERTA Y CARGA VIVA SOBRE LA LOSA

ANALISIS DE CARGA PARA LOSA ALIGERADA

Proyecto: SAN FERNANDO Fecha: _____

Localización: _____



Loseta Superior = 0,07 m

Altura de Casetón = 0,21 m } 0,30 m

Loseta Inferior = 0,02 m

Ancho del Nervio = 0,12 m

Ancho del Casetón = 0,60 m

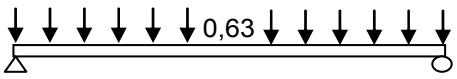
Aferencia del Nervio = 0,72 m

Especificaciones:

f´c (concreto):	210,00	kg/cm^2
fy (refuerzo):	4200,00	kg/cm^2
Peso Específico Concreto R	2400,00	kg/cm^3
Peso Específico Concreto S	2300,00	kg/cm3

ANALISIS DE CARGAS:

Muerta:	Divisiones o mampostería:	0,00 kg/m^2	=	0,000 t/m^2
	Acabados:	150,00 kg/m^2	=	0,150 t/m^2
	Concreto Reforzado:	274,72 kg/m^2	=	0,275 t/m^2
	Aligerante:	20,00 kg/m^2	=	0,020 t/m^2
	Total Carga Muerta:	444,72 kg/m^2	=	0,445 t/m^2
	Carga Muerta por metro	320,20 kg/m	=	0,320 t/m
Viva:	Carga Viva:	150,00 kg/m^2	=	0,150 t/m^2
Estado C.U.	(1.7 L + 1.4 D)	877,61 kg/m^2	=	0,878 t/m^2
Carga Muerta en el nervio:		320,20 kg/m	=	0,320 t/m
Carga Viva en el nervio:		108,00 kg/m	=	0,108 t/m
Carga Ultima en el nervio:		631,88 kg/m	=	0,632 t/m



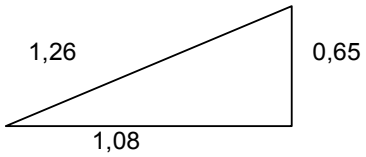
7.4.2 CARGA SOBRE LA CUBIERTA

CARGA GENERADA POR VIENTO

Vv.=	100	kph		B.6.5
Vd=Vv*s1*s2*s3				
S1	1			
S2	0,62		TABLA	B.6.5.2
S3	1			B.6.5.6
Vd =	62	kph		
$q=.000048*Vd^2*S4$				
S4	0,73		TABLA	B.6.6
q	0,1	kN/m²		
q	13,5	kg/m²		

$P=C_p*q$

C_p	-0,7	TABLA	B.6.7.2
	-0,6	TABLA	B.6.7.2



Φ	31,04		
H =	3,65		
W =	9,7		
0,5	0,38	1,5	
P	-9,43	kg/m²	
	-8,08	kg/m²	

CARGA MUERTA

Teja Ajover =	5,60	kg/m²
Peso correa =	4,53	kg/ml
Long correa =	9,7	m
Nº Correas	10	
Area Cubierta =	104,7	m^2
Peso correa =	4,19685	kg/m²
Total =	9,80	kg/m²

CARGA VIVA

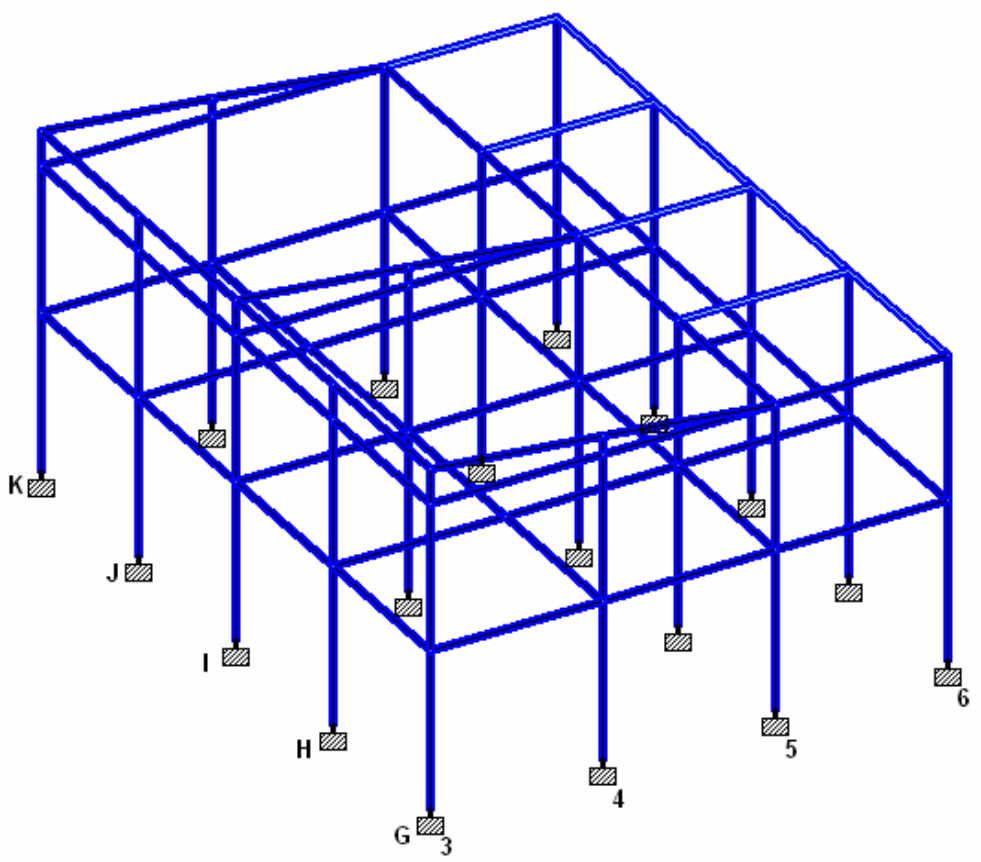
Total =	35	kg/m²

Ver memoria de cálculo en el anexo 4.

8. MODELO ESTRUCTURAL IEM CIUDADELA DE PAZ BLOQUE 1

Obtención del modelo estructural del bloque destinado a la ubicación del laboratorio de producción. (Ver figura 5)

Figura 5. Modelo tridimensional I.E.M Ciudadela de Paz Bloque 1.



8.1 PARAMETROS SISMICOS DE DISEÑO

Ciudad:	PASTO	
Zona de Amenaza:	ALTA	NSR-98 A.2.3.3
Coeficiente de Aceleración Aa:	0.3	NSR-98 A.2.3.3
Sistema Estructural:	Aporticado	
Coeficiente de Sitio S_3:	1.5	NSR-98 A.2.4
Grupo de Uso:	II	NSR-98 A.2.5.1.3

Coeficiente de Importancia: 1.1 NSR-98 A.2.5.1.3
Método de Análisis Dinámico: CQC
Masa Edificación: Peso Propio, Acabados
Características Vibratorias: Masa, Rigidez = Periodo de Vibración

TIPO DE PERFIL	COEFICIENTE DE SITIO	USADO
S1	1.0	
S2	1.2	
S3	1.5	X
S4	2.0	

GRUPO DE USO: COEFICIENTE DE IMPORTANCIA NSR-98 A.2.5

GRUPO DE USO	COEFICIENTE DE IMPORTANCIA	USADO
IV	1.3	
III	1.2	
II	1.1	X
I	1.0	

DEFINICION DE LAS CARACTERISTICAS DE LA ESTRUCTURACION Y MATERIAL ESTRUCTURAL EMPLEADO

SISTEMA	CONSTRUIDO	PROYECTADO POR CONTROL DE DERIVAS
APORTICADO DUAL MUROS ESTRUC.	X	X

8.2 COEFICIENTE DE CAPACIDAD DE DISIPACION DE ENERGIA

El valor del coeficiente para la capacidad de disipación de energía al clasificar la estructura como irregular, se utiliza para vigas y columnas un valor equivalente al coeficiente de reducción en altura y planta al especificado por la norma, así:

GRADO DE IRREGULARIDAD DE LA ESTRUCTURA

1. IREGULARIDAD EN PLANTA φp (Tabla 2.7 NSR-98)

TORSIONAL	Φp = 0.9	X
SALIENTES EXCESIVOS	Φp = 0.9	

DIAFRAGMA DISCONTINUO	Φp = 0.9	
DESPLAZAMIENTO PLANO DEL PORTICO	Φp = 0.8	
EJES NO PARARLELOS	Φp = 0.9	

2. IREGULARIDAD EN ALTURA φa (Tabla 2.8 NSR-98)

PISO FLEXIBLE	Φa = 0.9	
VARIACION EN LA MASA	Φa = 0.9	X
RETROCESO EXCESIVO	Φa = 0.9	
DESPLAZAMIENTO DEL ELEMENTO	Φa = 0.8	
PISO DEBIL	Φa = 0.9	

Se presentan dos tipos de irregularidad en planta y un tipo de irregularidad en altura. Según la norma NSR-98 A.3.3.3 cuando la edificación tiene varios tipos de irregularidad en altura o en planta simultáneamente se aplica el menor valor así:

IRREGULARIDAD EN PLANTA φp = 0.9 (Tabla 2.7 NSR-98)
IRREGULARIDAD EN ALTURA φa= 0.9 (Tabla 2.8 NSR-98)

$R = R_O * \varphi p * \varphi a$
$R_O = 7$

$R = 7 * 0.9 * 0.9 = 5.67$

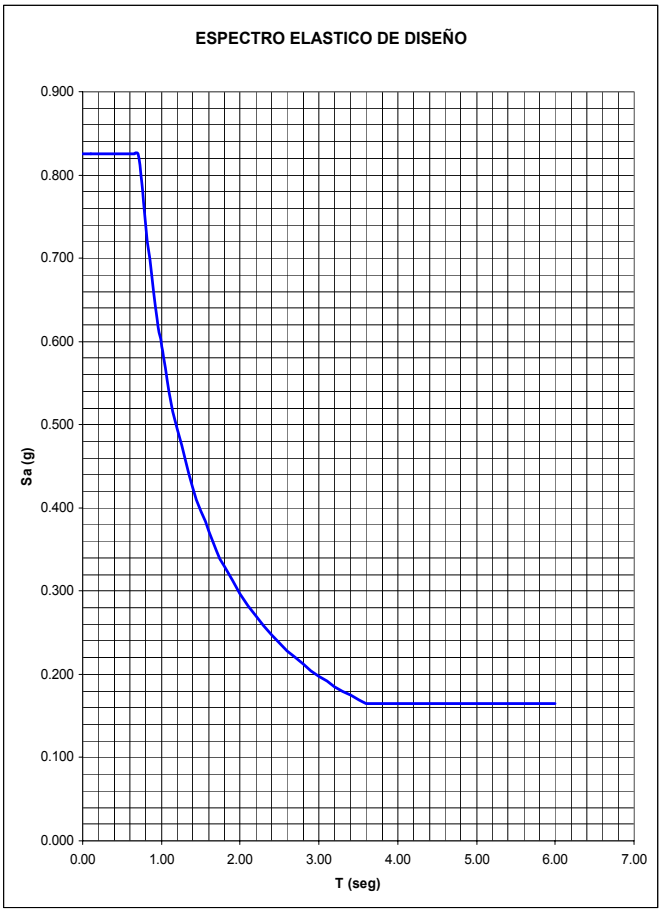
$E/R = 1 / 5.67 = 0.176$

$0.3*E/R = 0.3/5.67 = 0.053$

8.3 ESPECTRO ELASTICO DE DISEÑO

S = 1.50	Tc = 0.48 S = 0.720
I = 1.10	TL = 2.40 S = 3.600
Aa = 0.30	

T (seg)	Sa (g)
0.00	0.825
0.10	0.825
0.15	0.825
0.20	0.825
0.25	0.825
0.30	0.825
0.35	0.825
0.40	0.825
0.45	0.825
0.50	0.825
0.55	0.825
0.60	0.825
0.65	0.825
0.70	0.825
0.75	0.792
0.80	0.743
0.85	0.699
0.90	0.660
0.95	0.625
1.00	0.594
1.10	0.540
1.20	0.495
1.30	0.457
1.40	0.424
1.50	0.396
1.60	0.371
1.70	0.349
1.80	0.330
1.90	0.313
2.00	0.297
2.10	0.283
2.20	0.270
2.30	0.258
2.40	0.248
2.50	0.238
2.60	0.228
2.70	0.220
2.80	0.212
2.90	0.205
3.00	0.198
3.10	0.192
3.20	0.186
3.30	0.180
3.40	0.175
3.50	0.170
3.60	0.165
3.70	0.165
3.80	0.165
3.90	0.165
4.00	0.165
4.10	0.165
4.20	0.165
4.30	0.165
4.40	0.165
4.50	0.165
4.60	0.165
4.70	0.165
4.80	0.165
4.90	0.165
5.00	0.165
5.10	0.165
5.20	0.165
5.30	0.165
5.40	0.165
5.50	0.165
5.60	0.165
5.70	0.165
5.80	0.165
5.90	0.165
6.00	0.165



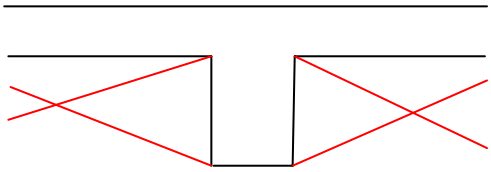
8.4 ANALISIS DE CARGA

8.4.1 CARGA MUERTA Y CARGA VIVA SOBRE LA LOSA

ANALISIS DE CARGA PARA LOSA ALIGERADA EN DOS DIRECCIONES

Proyecto: Bloque 1 I.E.M Ciudadela De Paz Fecha: _____

Localización: _____



Loseta Superior = 0,08 m

Altura de Casetón = 0,22 m

0,30 m

Ancho del Nervio = 0,12 m

Ancho del Casetón = 0,90 m

Aferencia del Nervio = 1,02 m

Especificaciones:

f´c (concreto): 210,00 kg/cm^2

fy (refuerzo): 4200,00 kg/cm^2

Peso Específico Concreto: 2400,00 kg/cm^3

ANALISIS DE CARGAS:

Muerta:	Divisiones o mampostería:	212,24 kg/m^2	=	0,212 t/m^2
	Acabados:	150,00 kg/m^2	=	0,150 t/m^2
	Concreto Reforzado:	299,08 kg/m^2	=	0,299 t/m^2
	Cielo razo	20,00 kg/m^2	=	0,020 t/m^2
	Total Carga Muerta:	681,32 kg/m^2	=	0,681 t/m^2
Viva:	Carga Viva:	200,00 kg/m^2	=	0,200 t/m^2
Estado C.U.	(1.7 L + 1.4 D)	1293,85 kg/m^2	=	1,294 t/m^2

NOTA: 1. Losa aligerada con casetón removible

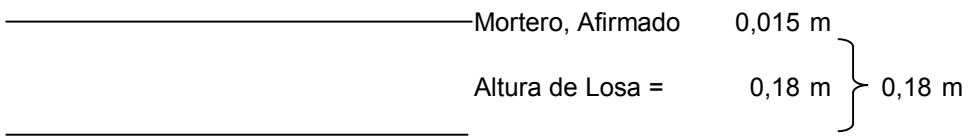
8.4.2 CARGA SOBRE LA CUBIERTA

CARGA GENERADA POR VIENTO				
Vv.=	100	kph		B.6.5
Vd=Vv*s1*s2*s3				
S1	1			
S2	0,88		TABLA	B.6.5.2
S3	1			B.6.5.6
Vd =	88	kph		
q=.000048*Vd^2*S4				
S4	0,73		TABLA	B.6.6
q	0,3	kN/m²		
q	27,1	kg/m²		
P=C_p*q				
C_p	-2		TABLA	B.6.7.3
	-1,5		TABLA	B.6.7.3
7,18		0,74		
7,14				
Φ	5,92			
H =	6,32			
W =	7,14			
0,5	0,89	1,5	OK	
P	-54,27	kg/m²		
	-40,70	kg/m²		
CARGA MUERTA				
Teja Ajover =		5,60	kg/m²	
Peso correa =		4,57	kg/ml	
Long correa =		14	m	
Nº Correas		5		
Area Cubierta =		99,96	m^2	
Peso correa =		3,20028	kg/m²	
	Total =	8,80	kg/m²	
CARGA VIVA				
	Total =	35	kg/m²	

8.4.3 CARGA PARA LOSA MACIZA

ANALISIS DE CARGA PARA LOSA MACIZA

Proyecto: IEM CIUDADELA B1 Fecha: Diciembre 4 de 2005
Localización:



Ancho del Nervio = 1,00 m

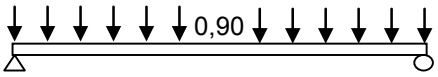
Aferencia del Nervio = 1,00 m

Especificaciones:

f´c (concreto):	210,00	kg/cm^2
fy (refuerzo):	4200,00	kg/cm^2
Peso Específico Concreto:	2400,00	kg/cm^3
Peso Específico Mortero:	2100,00	kg/cm^3

ANALISIS DE CARGAS:

Muerta:	Divisiones o mampostería:	0,00 kg/m^2	=	0,000 t/m^2
	acabados	0,00 kg/m^2	=	0,000 t/m^2
	Repello	31,50 kg/m^2	=	0,032 t/m^2
	Concreto Reforzado:	432,00 kg/m^2	=	0,432 t/m^2
	Total Carga Muerta:	463,50 kg/m^2	=	0,464 t/m^2
	Carga Muerta por metro	463,50 kg/m	=	0,464 t/m
Viva:	Carga Viva:	150,00 kg/m^2	=	0,150 t/m^2
Estado C.U.	(1.7 L + 1.4 D)	903,90 kg/m^2	=	0,904 t/m^2
Carga Muerta en la losa:		463,50 kg/m	=	0,464 t/m
Carga Viva en la losa:		150,00 kg/m	=	0,150 t/m
Carga Ultima en la losa:		903,90 kg/m	=	0,904 t/m

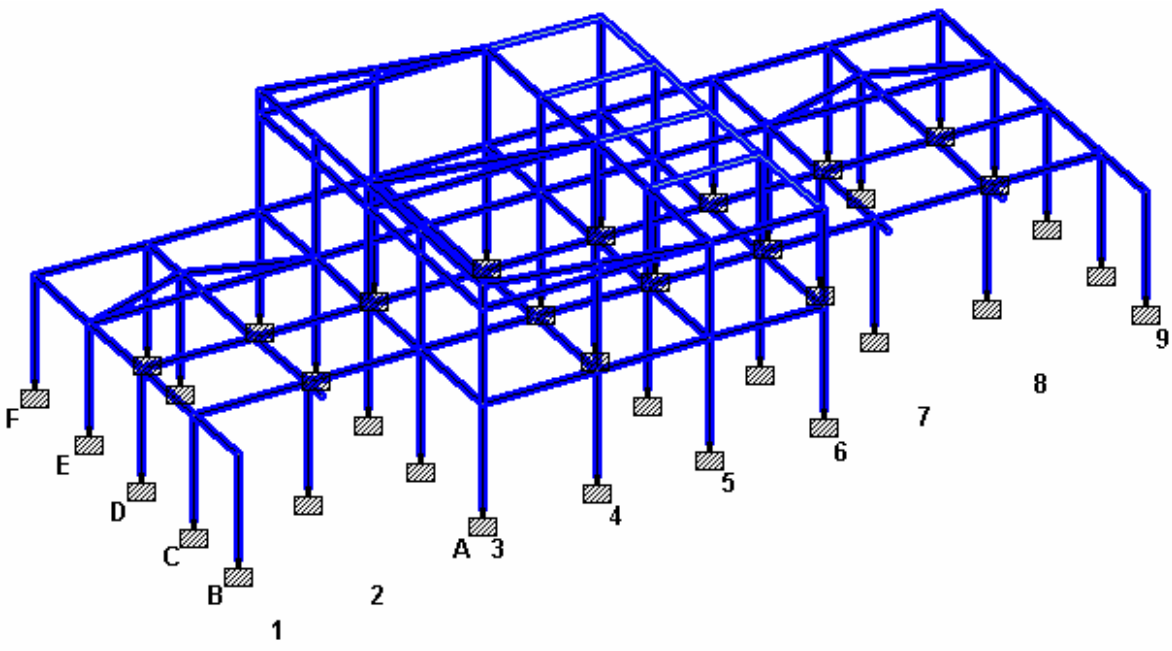


Ver memoria de cálculo en el anexo 5.

9. MODELO ESTRUCTURAL IEM CIUDADELA DE PAZ BLOQUE 2

Obtención del modelo estructural del bloque destinado a la ubicación de bloques de aulas. (Ver figura 9)

Figura 6. Modelo tridimensional I.E.M. Ciudadela De Paz Bloque 2



9.1 PARAMETROS SISMICOS DE DISEÑO

Ciudad:	PASTO	
Zona de Amenaza:	ALTA	NSR-98 A.2.3.3
Coeficiente de Aceleración Aa:	0.3	NSR-98 A.2.3.3
Sistema Estructural:	Aporticado	
Coeficiente de Sitio S_3:	1.5	NSR-98 A.2.4
Grupo de Uso:	II	NSR-98 A.2.5.1.3
Coeficiente de Importancia:	1.1	NSR-98 A.2.5.1.3
Método de Análisis Dinámico:	CQC	
Masa Edificación:	Peso Propio, Acabados	
Características Vibratorias:	Masa, Rigidez = Periodo de Vibración	

TIPO DE PERFIL	COEFICIENTE DE SITIO	USADO
S1	1.0	
S2	1.2	
S3	1.5	X
S4	2.0	

GRUPO DE USO: COEFICIENTE DE IMPORTANCIA NSR-98 A.2.5

GRUPO DE USO	COEFICIENTE DE IMPORTANCIA	USADO
IV	1.3	
III	1.2	
II	1.1	X
I	1.0	

DEFINICION DE LAS CARACTERISTICAS DE LA ESTRUCTURACION Y MATERIAL ESTRUCTURAL EMPLEADO

SISTEMA	CONSTRUIDO	PROYECTADO POR CONTROL DE DERIVAS
APORTICADO DUAL MUROS ESTRUC.	X	X

9.2 COEFICIENTE DE CAPACIDAD DE DISIPACION DE ENERGIA

El valor del coeficiente para la capacidad de disipación de energía al clasificar la estructura como irregular, se utiliza para vigas y columnas un valor equivalente al coeficiente de reducción en altura y planta al especificado por la norma, así:

GRADO DE IRREGULARIDAD DE LA ESTRUCTURA

1. IREGULARIDAD EN PLANTA φp (Tabla 2.7 NSR-98)

TORSIONAL	Φp = 0.9	X
SALIENTES EXCESIVOS	Φp = 0.9	
DIAFRAGMA DISCONTINUO	Φp = 0.9	
DESPLAZAMIENTO PLANO DEL PORTICO	Φp = 0.8	
EJES NO PARARLELOS	Φp = 0.9	

2. IREGULARIDAD EN ALTURA φa (Tabla 2.8 NSR-98)

PISO FLEXIBLE	Φa = 0.9	
VARIACION EN LA MASA	Φa = 0.9	X
RETROCESO EXCESIVO	Φa = 0.9	
DESPLAZAMIENTO DEL ELEMENTO	Φa = 0.8	
PISO DEBIL	Φa = 0.9	

Se presentan dos tipos de irregularidad en planta y un tipo de irregularidad en altura. Según la norma NSR-98 A.3.3.3 cuando la edificación tiene varios tipos de irregularidad en altura o en planta simultáneamente se aplica el menor valor así:

IRREGULARIDAD EN PLANTA $\varphi p = 0.9$ (Tabla 2.7 NSR-98)
IRREGULARIDAD EN ALTURA $\varphi a = 0.9$ (Tabla 2.8 NSR-98)

$R = R_O * \varphi p * \varphi a$
$R_O = 7$

$R = 7 * 0.9 * 0.9 = 5.67$

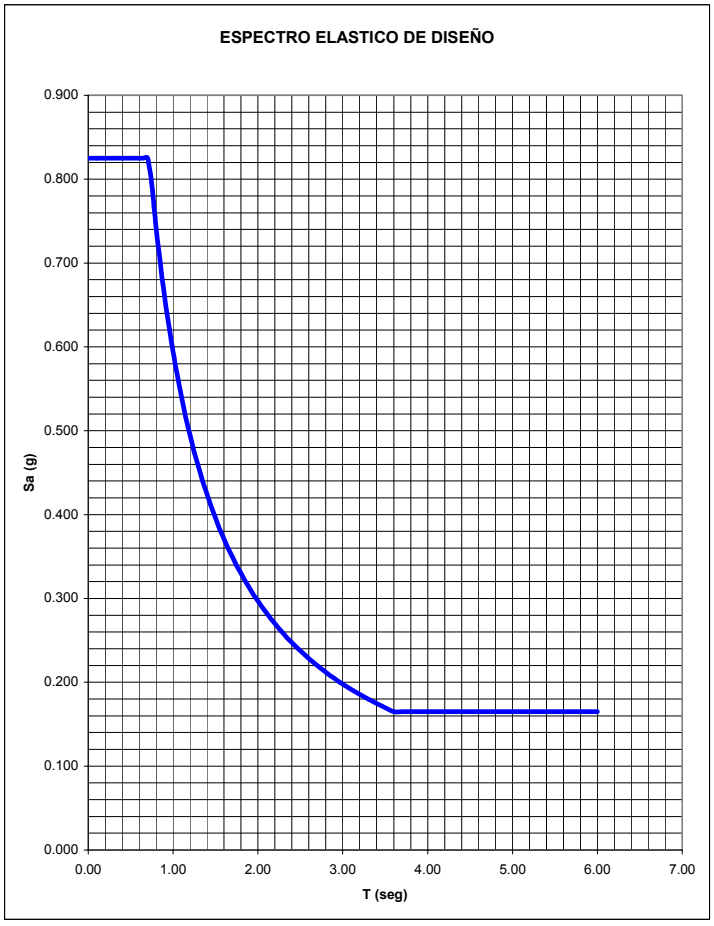
$E/R = 1 / 5.67 = 0.176$

$0.3*E/R = 0.3/5.67 = 0.053$

9.3 ESPECTRO ELASTICO DE DISEÑO

S = 1.50	Tc = 0.48 S = 0.720
I = 1.10	TL = 2.40 S = 3.600
Aa = 0.30	

T (seg)	Sa (g)
0.00	0.825
0.10	0.825
0.15	0.825
0.20	0.825
0.25	0.825
0.30	0.825
0.35	0.825
0.40	0.825
0.45	0.825
0.50	0.825
0.55	0.825
0.60	0.825
0.65	0.825
0.70	0.825
0.75	0.792
0.80	0.743
0.85	0.699
0.90	0.660
0.95	0.625
1.00	0.594
1.10	0.540
1.20	0.495
1.30	0.457
1.40	0.424
1.50	0.396
1.60	0.371
1.70	0.349
1.80	0.330
1.90	0.313
2.00	0.297
2.10	0.283
2.20	0.270
2.30	0.258
2.40	0.248
2.50	0.238
2.60	0.228
2.70	0.220
2.80	0.212
2.90	0.205
3.00	0.198
3.10	0.192
3.20	0.186
3.30	0.180
3.40	0.175
3.50	0.170
3.60	0.165
3.70	0.165
3.80	0.165
3.90	0.165
4.00	0.165
4.10	0.165
4.20	0.165
4.30	0.165
4.40	0.165
4.50	0.165
4.60	0.165
4.70	0.165
4.80	0.165
4.90	0.165
5.00	0.165
5.10	0.165
5.20	0.165
5.30	0.165
5.40	0.165
5.50	0.165
5.60	0.165
5.70	0.165
5.80	0.165
5.90	0.165
6.00	0.165



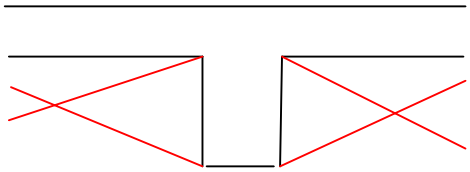
9.4 ANALISIS DE CARGA

9.4.1 CARGA MUERTA Y CARGA VIVA SOBRE LA LOSA

ANALISIS DE CARGA PARA LOSA ALIGERADA EN DOS DIRECCIONES

Proyecto: Bloque 2 I.E.M Ciudadela De Paz Fecha: _____

Localización: _____



Loseta Superior = 0,08 m

Altura de Casetón = 0,22 m } 0,30 m

Ancho del Nervio = 0,12 m

Ancho del Casetón = 0,90 m

Aferencia del Nervio = 1,02 m

Especificaciones:

f´c (concreto):	210,00	kg/cm^2
fy (refuerzo):	4200,00	kg/cm^2
Peso Específico Concreto:	2400,00	kg/cm^3

ANALISIS DE CARGAS:

Muerta:	Divisiones o mampostería:	147,40 kg/m^2	=	0,147 t/m^2
	Acabados:	150,00 kg/m^2	=	0,150 t/m^2
	Concreto Reforzado:	299,08 kg/m^2	=	0,299 t/m^2
	Cielo razo	20,00 kg/m^2	=	0,020 t/m^2
	Total Carga Muerta:	616,48 kg/m^2	=	0,616 t/m^2
Viva:	Carga Viva:	200,00 kg/m^2	=	0,200 t/m^2
Estado C.U.	(1.7 L + 1.4 D)	1203,07 kg/m^2	=	1,203 t/m^2

NOTA: 1. Losa aligerada con casetón remobible

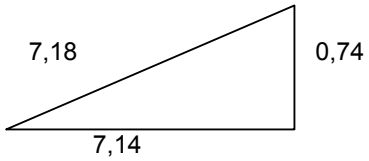
9.4.2 CARGA SOBRE LA CUBIERTA

CARGA GENERADA POR VIENTO

Vv.=	100	kph		B.6.5
Vd=Vv*s1*s2*s3				
S1	1			
S2	0,88		TABLA	B.6.5.2
S3	1			B.6.5.6
Vd =	88	kph		
$q=.000048*Vd^2*S4$				
S4	0,73		TABLA	B.6.6
q	0,3	kN/m²		
q	27,1	kg/m²		

$P=C_p*q$

C_p	-2	TABLA	B.6.7.3
	-1,5	TABLA	B.6.7.3



Φ	5,92		
H =	6,32		
W =	7,14		
0,5	0,89	1,5	OK
P	-54,27	kg/m²	
	-40,70	kg/m²	

CARGA MUERTA

Teja Ajover =	5,60	kg/m²
Peso correa =	3,58	kg/ml
Long correa =	12,17	m
Nº Correas	5	
Area Cubierta =	86,89	m^2
Peso correa =	2,50711	kg/m²
Total =	8,11	kg/m²

CARGA VIVA

Total =	35	kg/m²

9.4.3 CARGA PARA LOSA MACIZA

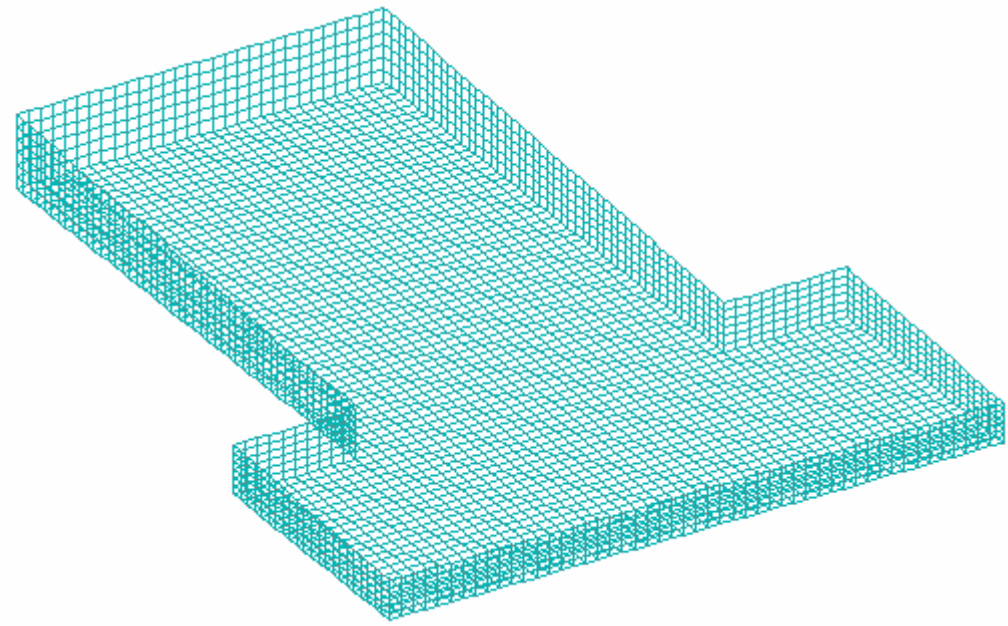
ANALISIS DE CARGA PARA LOSA MACIZA

Proyecto:	IEM CIUDADELA B2				Fecha:		Diciembre 4 de 2005	
Localización:								
		Mortero, Afirmado			0,015	m		
		Altura de Losa =			0,18	m	0,18	m
	Ancho del Nervio =	1,00	m					
	Aferencia del Nervio =	1,00	m					
Especificaciones:								
	f´c (concreto):	210,00	kg/cm^2					
	fy (refuerzo):	4200,00	kg/cm^2					
	Peso Específico Concreto:	2400,00	kg/cm^3					
	Peso Específico Mortero:	2100,00	kg/cm^3					
ANALISIS DE CARGAS:								
Muerta:	Divisiones o mampostería:	0,00	kg/m^2	=		0,000	t/m^2	
	acabados	0,00	kg/m^2	=		0,000	t/m^2	
	Repello	31,50	kg/m^2	=		0,032	t/m^2	
	Concreto Reforzado:	432,00	kg/m^2	=		0,432	t/m^2	
	Total Carga Muerta:	463,50	kg/m^2	=		0,464	t/m^2	
	Carga Muerta por metro	463,50	kg/m	=		0,464	t/m	
Viva:	Carga Viva:	150,00	kg/m^2	=		0,150	t/m^2	
Estado C.U.	(1.7 L + 1.4 D)	903,90	kg/m^2	=		0,904	t/m^2	
Carga Muerta en la losa:		463,50	kg/m	=		0,464	t/m	
Carga Viva en la losa:		150,00	kg/m	=		0,150	t/m	
Carga Ultima en la losa:		903,90	kg/m	=		0,904	t/m	
		0,90						

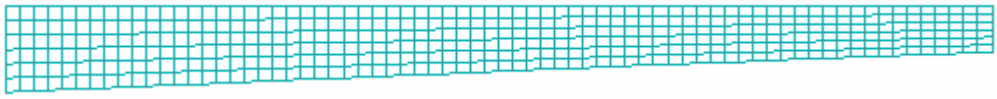
Ver memoria de cálculo en el anexo 6.

10. MODELO ESTRUCTURAL, PISCINA EN LA ESCUELA NORMAL SUPERIOR DE PASTO.

Figura 7. Modelo tridimensional, Piscina en la Escuela Normal Superior de Pasto.



Vista en perfil, piscina Escuela Normal Superior De Pasto



10.1 ANALISIS DE CARGAS

10.1.1 Empuje del terreno

Ps = Ka * γ * h

Donde:

Ps= Empuje del terreno
Ka = Coeficiente de presión de tierras, estado activo
h = altura total del muro

Ka = $\frac{1-sen\phi}{1+sen\phi}$ ϕ = Angulo de fricción interna

Ka = $\frac{1-sen22.7}{1+sen22.7} = 0.04431$

Ps = 0.04431 * 1.75 $\frac{T}{m^3}$ *1.5 m

Ps = 1.163 $\frac{T}{m^2}$

10.1.2 Empuje de sismo en relleno

Donde:

Ps_1= Empuje de sismo en relleno
Aa = aceleración pico efectiva de la zona

Ps_1 = $\frac{3}{4}$ * Aa * Ps

Ps_1 = $\frac{3}{4}$ * 0.3 * 1.163 $\frac{T}{m^2}$

Ps_1 = 0.262 $\frac{T}{m^2}$

10.1.3 Empuje hidrostático

Donde:

Pw = Empuje hidrostático

γ_L = Peso específico del líquido

Pw = γ_L * h

Pw = 1 $\frac{T}{m^3}$ * 1.5 m

Pw = 1.5 $\frac{T}{m^2}$

10.1.4 Empuje hidrodinámico

Donde:

Pw_1 = Empuje hidrodinámico

$Pw_1 = \frac{7}{8}$ * Aa * Pw

$Pw_1 = \frac{7}{8}$ * 0.3 *1.5 $\frac{T}{m^2}$

Pw_1 = 0.394 $\frac{T}{m^2}$

Según estudio de suelos, en la zona donde se construirá la piscina no se encuentra presencia de nivel de agua freática.

Ver memoria de cálculo en el anexo 7.

11. CONCLUSIONES

A través del diseño estructural fue posible poner en práctica los conocimientos adquiridos a lo largo de la carrera, demostrando la excelente formación recibida en la Universidad de Nariño.

La realización del trabajo de grado en modalidad de pasantía, nos permite analizar diferentes puntos de vista, con los que se pueden desarrollar algunos conceptos, y así obtener un mejor criterio que nos llevara a desempeñarnos como excelentes ingenieros.

El diseño estructural fue de gran importancia para la comunidad en general, demostrando una vez más que la ingeniería civil busca mejorar la calidad de vida de la sociedad.

Es de gran importancia la utilización de programas de cálculo, ya que con ellos se puede cumplir de una manera más sencilla los requisitos mínimos asignados por la NSR-98, para garantizar un comportamiento adecuado de las estructuras a eventuales movimientos telúricos.

En el desarrollo de la pasantía se aplicaron los requisitos planteados en la norma NSR-98 para lo cual conlleva a crear en el ingeniero un sentido de responsabilidad y compromiso con la vida, ya que a su cargo no solamente esta el diseño de estas estructuras, sino también el velar por la seguridad de las personas que las habitarán.

BIBLIOGRAFIA

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Segura. Franco Jorge, Estructuras de concreto I, Universidad Nacional de Colombia, Santafé de Bogotá, 2002.

Norma colombiana de construcciones sismo resistentes NSR-98

Guía para el calculo de estructuras de concreto reforzado, ACERIAS PAZ DEL RIO

Manual técnico Metaldeck, ACESCO

ANEXOS

ANEXO 1

MEMORIAS DISEÑO ESTRUCTURAL COLEGIO JUAN XXIII BLOQUE 1

```
INPUT FILE: BLOQUE 1.STD
1. STAAD SPACE BLOQUE 1
2. START JOB INFORMATION
3. ENGINEER DATE 17-AUG-05
4. END JOB INFORMATION
5. INPUT WIDTH 79
6. UNIT METER MTON
7. JOINT COORDINATES
8. 1 0 0 0; 2 17.035 0 0; 3 0 0 5.07; 5 0 0 10.14; 6 17.035 0 10.14; 7 3.9 0 0
9. 8 3.9 0 5.07; 9 3.9 0 10.14; 10 10.55 0 0; 11 10.55 0 5.07; 12 10.55 0 10.14
10. 13 0 0 7.77; 14 3.9 0 7.77; 15 0 3.425 0; 16 3.9 3.425 0; 17 0 3.425 5.07
11. 18 3.9 3.425 5.07; 19 0 3.425 10.14; 20 3.9 3.425 10.14; 21 0 3.425 7.77
12. 22 10.55 3.425 0; 23 10.55 3.425 5.07; 24 10.55 3.425 10.14; 25 3.9 3.425 7.77
13. 26 17.035 3.425 0; 27 17.035 3.425 5.07; 28 17.035 3.425 10.14; 29 0 6.455 0
14. 30 3.9 6.455 0; 31 0 6.455 5.07; 32 3.9 6.455 5.07; 33 0 6.455 10.14
15. 34 3.9 6.455 10.14; 35 0 6.455 7.77; 36 10.55 6.455 0; 37 10.55 6.455 5.07
16. 38 10.55 6.455 10.14; 39 3.9 6.455 7.77; 40 17.035 6.455 0
17. 41 17.035 6.455 5.07; 42 17.035 6.455 10.14; 43 0 7.215 5.07
18. 44 3.9 7.215 5.07; 45 10.55 7.215 5.07; 46 17.035 7.215 5.07; 47 0 6.8103 7.77
19. 48 3.9 6.8103 7.77; 49 17.035 6.455 4.87; 50 17.035 6.455 5.27
20. 51 17.035 3.425 4.87; 52 17.035 3.425 5.27; 53 17.035 0 4.87; 54 17.035 0 5.27
21. MEMBER INCIDENCES
22. 21 15 16; 23 19 20; 24 15 17; 25 17 21; 26 16 22; 27 18 23; 28 16 18; 29 20 24
23. 30 18 25; 31 22 26; 32 23 27; 33 22 23; 34 24 28; 35 23 24; 36 26 51; 37 27 52
24. 38 21 19; 39 25 20; 40 21 25; 41 29 30; 43 33 34; 44 29 31; 45 31 35; 46 30 36
25. 48 30 32; 49 34 38; 50 32 39; 51 36 40; 53 36 37; 54 38 42; 55 37 38; 56 40 49
26. 57 41 50; 58 35 33; 59 39 34; 61 1 15; 62 15 29; 63 7 16; 64 16 30; 65 10 22
27. 66 22 36; 67 2 26; 68 26 40; 69 3 17; 70 17 31; 71 31 43; 72 8 18; 73 18 32
28. 74 32 44; 75 11 23; 76 23 37; 77 37 45; 80 41 46; 81 13 21; 82 21 35; 83 35 47
29. 84 14 25; 85 25 39; 86 39 48; 87 5 19; 88 19 33; 89 9 20; 90 20 34; 91 12 24
30. 92 24 38; 93 6 28; 94 28 42; 95 29 43; 96 43 47; 97 47 33; 98 30 44; 99 44 48
31. 100 48 34; 101 36 45; 102 45 38; 103 40 46; 104 46 42; 110 49 41; 111 50 42
32. 112 51 27; 113 52 28
33. ELEMENT INCIDENCES SHELL
34. 114 54 52 51 53; 115 52 50 49 51
35. DEFINE MATERIAL START
36. ISOTROPIC CONCRETE
37. E 1.79E+006
38. POISSON 0.17
39. DENSITY 2.4
40. ALPHA 1E-005
41. DAMP 0.05
42. END DEFINE MATERIAL
43. CONSTANTS
44. MATERIAL CONCRETE MEMB 21 23 TO 41 43 TO 46 48 TO 51 53 TO 59 61 TO 77
80 -
45. 81 TO 104 110 TO 115
46. *105 21 19 20 25; 106 20 24 23 18; 107 23 24 28 27; 108 16 18 23 22
47. *109 22 23 27 26
48. ELEMENT PROPERTY
49. *105 TO 109 THICKNESS 0.15
50. 114 115 THICKNESS 0.25
51. MEMBER PROPERTY AMERICAN
52. 61 TO 64 67 TO 71 81 TO 86 93 94 PRIS YD 0.3 ZD 0.3
53. 24 25 28 30 33 35 TO 39 112 113 PRIS YD 0.3 ZD 0.3
54. 41 43 TO 46 48 TO 51 53 TO 59 110 111 PRIS YD 0.3 ZD 0.25
55. 95 TO 104 PRIS YD 0.25 ZD 0.25
56. 87 TO 92 PRIS YD 0.35
57. 65 66 PRIS YD 0.35 ZD 0.3
58. 72 TO 77 PRIS YD 0.3 ZD 0.35
59. 80 PRIS YD 0.25 ZD 0.3
60. 27 32 PRIS YD 0.4 ZD 0.35
61. 21 23 26 29 31 34 40 PRIS YD 0.35 ZD 0.3
```

```
62. SUPPORTS
63. 1 TO 3 5 TO 14 FIXED
64. 53 54 FIXED
65. LOAD 1 CARGA MUERTA
66. SELFWEIGHT Y -1
67. MEMBER LOAD
68. 41 43 46 49 51 54 UNI GY -0.144
69. 44 48 53 TRAP GY 0 -0.135
70. 56 TRAP GY 0 -0.129675 0 4.87
71. 55 TRAP GY -0.135 0
72. 111 TRAP GY -0.129675 0 0 4.87
73. 57 TRAP GY -0.135 -0.129675 0 0.2
74. 58 59 TRAP GY -0.0631 0
75. 45 50 TRAP GY -0.135 -0.0631
76. 21 24 25 UNI GY -0.54
77. 40 CON GY -1.09 2.925
78. 95 TO 97 UNI GY -0.0196
79. 98 TO 100 UNI GY -0.0531
80. 101 102 UNI GY -0.066
81. 103 104 UNI GY -0.0326
82. 26 29 UNI GY -1.238
83. 31 34 UNI GY -1.2
84. 36 113 UNI GY -0.621
85. 33 35 UNI GY -1.1
86. 28 30 UNI GY -0.52
87. 39 UNI GY -0.65
88. 38 UNI GY -0.138
89. 23 40 UNI GY -0.732
90. 27 UNI GY -2
91. 32 UNI GY -2
92. LOAD 2 CARGA VIVA
93. MEMBER LOAD
94. 40 CON GY -0.327 2.925
95. 26 29 UNI GY -0.365
96. 23 40 UNI GY -0.19
97. 31 34 UNI GY -0.351
98. 28 30 UNI GY -0.15
99. 39 UNI GY -0.186
100. 33 35 UNI GY -0.309
101. 36 37 112 113 UNI GY -0.159
102. 95 TO 97 UNI GY -0.0683
103. 98 TO 100 UNI GY -0.1846
104. 101 102 UNI GY -0.2298
105. 103 104 UNI GY -0.1134
106. 27 UNI GY -0.7
107. 32 UNI GY -0.7
108. LOAD 3 SISMO MODAL EN X
109. SELFWEIGHT X -1
110. MEMBER LOAD
111. 41 43 46 49 51 54 UNI GX -0.144
112. 44 48 53 TRAP GX 0 -0.135
113. 56 TRAP GX 0 -0.129675 0 4.87
114. 55 TRAP GX -0.135 0
115. 111 TRAP GX -0.129675 0 0 4.87
116. 57 TRAP GX -0.135 -0.129675 0 0.2
117. 58 59 TRAP GX -0.0631 0
118. 45 50 TRAP GX -0.135 -0.0631
119. 21 24 25 UNI GX -0.54
120. 40 CON GX -1.09 2.925
121. 95 TO 97 UNI GX -0.0196
122. 98 TO 100 UNI GX -0.0531
```

```
123. 101 102 UNI GX -0.066
124. 103 104 UNI GX -0.0326
125. 26 29 UNI GX -1.397
126. 31 34 UNI GX -1.36
127. 36 113 UNI GX -0.621
128. 33 35 UNI GX -1.2
129. 28 30 UNI GX -0.588
130. 39 UNI GX -0.726
131. 38 UNI GX -0.138
132. 23 40 UNI GX -0.732
133. 27 UNI GX -2.794
134. 32 UNI GX -2.72
135. SELFWEIGHT Z -1
136. MEMBER LOAD
137. 41 43 46 49 51 54 UNI GZ -0.144
138. 44 48 53 TRAP GZ 0 -0.135
139. 56 TRAP GZ 0 -0.129675 0 4.87
140. 55 TRAP GZ -0.135 0
141. 111 TRAP GZ -0.129675 0 0 4.87
142. 57 TRAP GZ -0.135 -0.129675 0 0.2
143. 58 59 TRAP GZ -0.0631 0
144. 45 50 TRAP GZ -0.135 -0.0631
145. 21 24 25 UNI GZ -0.54
146. 40 CON GZ -1.09 2.925
147. 95 TO 97 UNI GZ -0.0196
148. 98 TO 100 UNI GZ -0.0531
149. 101 102 UNI GZ -0.066
150. 103 104 UNI GZ -0.0326
151. 26 29 UNI GZ -1.397
152. 31 34 UNI GZ -1.36
153. 36 113 UNI GZ -0.621
154. 33 35 UNI GZ -1.2
155. 28 30 UNI GZ -0.588
156. 39 UNI GZ -0.726
157. 38 UNI GZ -0.138
158. 23 40 UNI GZ -0.732
159. 27 UNI GZ -2.794
160. 32 UNI GZ -2.72
161. SPECTRUM CQC X 1 ACC SCALE 9.81 DAMP 0.05
162. 0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
163. 0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
164. 0.7 0.825; 0.75 0.825; 0.8 0.825; 0.85 0.825; 0.9 0.825; 0.95 0.825
165. 1 0.792; 1.1 0.72; 1.2 0.66; 1.3 0.609; 1.4 0.566; 1.5 0.528; 1.6 0.495
166. 1.7 0.466; 1.8 0.44; 1.9 0.417; 2 0.396; 2.1 0.377; 2.2 0.36; 2.3 0.344
167. 2.4 0.33; 2.5 0.317; 2.6 0.305; 2.7 0.293; 2.8 0.283; 2.9 0.273; 3 0.264
168. 3.1 0.255; 3.2 0.248; 3.3 0.24; 3.4 0.233; 3.5 0.226; 3.6 0.22; 3.7 0.214
169. 3.8 0.208; 3.9 0.203; 4 0.198; 4.1 0.193; 4.2 0.189; 4.3 0.184; 4.4 0.18
170. 4.5 0.176; 4.6 0.172; 4.7 0.169; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165
171. 5.2 0.165; 5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165
172. 5.9 0.165; 6 0.165
173. LOAD 4 SISMO MODAL EN Z
174. SPECTRUM CQC Z 1 ACC SCALE 9.81 DAMP 0.05
175. 0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
176. 0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
177. 0.7 0.825; 0.75 0.825; 0.8 0.825; 0.85 0.825; 0.9 0.825; 0.95 0.825
178. 1 0.792; 1.1 0.72; 1.2 0.66; 1.3 0.609; 1.4 0.566; 1.5 0.528; 1.6 0.495
179. 1.7 0.466; 1.8 0.44; 1.9 0.417; 2 0.396; 2.1 0.377; 2.2 0.36; 2.3 0.344
180. 2.4 0.33; 2.5 0.317; 2.6 0.305; 2.7 0.293; 2.8 0.283; 2.9 0.273; 3 0.264
181. 3.1 0.255; 3.2 0.248; 3.3 0.24; 3.4 0.233; 3.5 0.226; 3.6 0.22; 3.7 0.214
182. 3.8 0.208; 3.9 0.203; 4 0.198; 4.1 0.193; 4.2 0.189; 4.3 0.184; 4.4 0.18
183. 4.5 0.176; 4.6 0.172; 4.7 0.169; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165
```

```
184. 5.2 0.165; 5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165
185. 5.9 0.165; 6 0.165
186. LOAD COMB 5 CU  1.4D+1.7L
187. 1 1.4 2 1.7
188. LOAD COMB 6 0.75CU+EX+0.3EZ
189. 1 1.05 2 1.28 3 0.176 4 0.053
190. LOAD COMB 7 0.75CU+EX-0.3EZ
191. 1 1.05 2 1.28 3 0.176 4 -0.053
192. LOAD COMB 8 0.75CU-EX+0.3EZ
193. 1 1.05 2 1.28 3 -0.176 4 0.053
194. LOAD COMB 9 0.75CU-EX-0.3EZ
195. 1 1.05 2 1.28 3 -0.176 4 -0.053
196. LOAD COMB 10 0.9D+EX+0.3EZ
197. 1 0.9 3 0.176 4 0.053
198. LOAD COMB 11 0.9D+EX-0.3EZ
199. 1 0.9 3 0.176 4 -0.053
200. LOAD COMB 12 0.9D-EX+0.3EZ
201. 1 0.9 3 -0.176 4 0.053
202. LOAD COMB 13 0.9D-EX-0.3EZ
203. 1 0.9 3 -0.176 4 -0.053
204. LOAD COMB 14 0.75CU+EZ+0.3EX
205. 1 1.05 2 1.28 3 0.053 4 0.176
206. LOAD COMB 15 0.75CU+EZ-0.3EX
207. 1 1.05 2 1.28 3 -0.053 4 0.176
208. LOAD COMB 16 0.75CU-EZ+0.3EX
209. 1 1.05 2 1.28 3 0.053 4 -0.176
210. LOAD COMB 17 0.75CU-EZ-0.3EX
211. 1 1.05 2 1.28 3 -0.053 4 -0.176
212. LOAD COMB 18 0.9D+EZ+0.3EX
213. 1 0.9 3 0.053 4 0.176
214. LOAD COMB 19 0.9D+EZ-0.3EX
215. 1 0.9 3 -0.053 4 0.176
216. LOAD COMB 20 0.9D-EZ+0.3EX
217. 1 0.9 3 0.053 4 -0.176
218. LOAD COMB 21 0.9D-EZ-0.3EX
219. 1 0.9 3 -0.053 4 -0.176
220. LOAD COMB 22 D+L
221. 1 1.0 2 1.0
222. ****************************************************
223. * * * ----COMBINACIONES REACCIONDE SUELO MODAL-- * * *
224. LOAD COMB 30 SUELO-M D + 70% EX/R
225. 1 1.0 3 0.1235
226. LOAD COMB 31 SUELO-M D - 70% EX/R
227. 1 1.0 3 -0.1235
228. LOAD COMB 32 SUELO-M D + 70% EZ/R
229. 1 1.0 4 0.1235
230. LOAD COMB 33 SUELO-M D - 70% EZ/R
231. 1 1.0 4 -0.1235
232. LOAD COMB 34 SUELO-M  L  + D + 70% EX/R
233. 1 1.0 2 1.0 3 0.1235
234. LOAD COMB 35 SUELO-M L + D - 70% EX/R
235. 1 1.0 2 1.0 3 -0.1235
236. LOAD COMB 36 SUELO-M L + D + 70% EZ/R
237. 1 1.0 2 1.0 4 0.1235
238. LOAD COMB 37 SUELO-M L + D - 70% EZ/R
239. 1 1.0 2 1.0 4 -0.1235
240. LOAD COMB 38 SUELO-M L + D
241. 1 1.0 2 1.0
242. * * * --------------- * * *
243. ********************************
244. ****************************************************
```

245. PERFORM ANALYSIS

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 53/ 83/ 15
ORIGINAL/FINAL BAND-WIDTH= 25/ 12/ 72 DOF
TOTAL PRIMARY LOAD CASES = 4, TOTAL DEGREES OF FREEDOM = 240
SIZE OF STIFFNESS MATRIX = 18 DOUBLE KILO-WORDS
REQRD/AVAIL. DISK SPACE = 12.5/ 5878.5 MB, EXMEM = 717.0 MB

NUMBER OF MODES REQUESTED = 6
NUMBER OF EXISTING MASSES IN THE MODEL = 91
NUMBER OF MODES THAT WILL BE USED = 6

*** □EIGENSOLUTION□: SUBSPACE METHOD ***
CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
1	2.031	0.49237	2.600E-13
2	2.184	0.45785	1.894E-13
3	2.615	0.38245	3.018E-13
4	2.802	0.35689	7.839E-11
5	3.205	0.31199	7.328E-12
6	3.593	0.27831	1.568E-09

The following Frequencies are estimates that were calculated. These are for information only and will not be used. Remaining values are either above the cut off mode/freq values or are of low accuracy. To use these frequencies, rerun with a higher cutoff mode (or mode + freq) value.
CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
7	4.185	0.23896	4.920E-08
8	4.618	0.21655	4.401E-07
9	4.692	0.21315	4.780E-07
10	5.227	0.19131	7.364E-07
11	5.308	0.18840	2.679E-07
12	5.930	0.16864	4.931E-06
13	6.695	0.14937	9.548E-08
14	7.177	0.13933	2.222E-05

RESPONSE LOAD CASE 3

CQC MODAL COMBINATION METHOD USED.
DYNAMIC WEIGHT X Y Z 1.785028E+02 5.737391E-08 1.785028E+02 MTON
MISSING WEIGHT X Y Z -1.541827E+01 -5.737391E-08 -9.821885E+00 MTON
MODAL WEIGHT X Y Z 1.630845E+02 3.626457E-23 1.686809E+02 MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000

3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000

PARTICIPATION FACTORS□

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	0.00	0.00	67.66	0.001	0.000	67.656	0.00	0.00	0.00
2	90.45	0.00	0.00	90.453	0.000	67.657	133.25	0.00	0.00
3	0.65	0.00	1.36	91.106	0.000	69.019	0.96	0.00	0.00
4	0.03	0.00	12.51	91.136	0.000	81.532	0.04	0.00	0.00
5	0.00	0.00	12.93	91.138	0.000	94.458	0.00	0.00	0.00
6	0.22	0.00	0.04	91.362	0.000	94.498	0.33	0.00	0.00
					TOTAL SRSS	SHEAR	133.25	0.00	0.00
					TOTAL 10PCT	SHEAR	133.26	0.00	0.00
					TOTAL ABS	SHEAR	134.59	0.00	0.00
					TOTAL CQC	SHEAR	133.50	0.00	0.00

RESPONSE LOAD CASE 4

CQC MODAL COMBINATION METHOD USED.
DYNAMIC WEIGHT X Y Z 1.785028E+02 5.737391E-08 1.785028E+02 MTON
MISSING WEIGHT X Y Z -1.541827E+01 -5.737391E-08 -9.821885E+00 MTON
MODAL WEIGHT X Y Z 1.630845E+02 3.626457E-23 1.686809E+02 MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000

PARTICIPATION FACTORS

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	0.00	0.00	67.66	0.001	0.000	67.656	0.00	0.00	99.67
2	90.45	0.00	0.00	90.453	0.000	67.657	0.00	0.00	0.00
3	0.65	0.00	1.36	91.106	0.000	69.019	0.00	0.00	2.01
4	0.03	0.00	12.51	91.136	0.000	81.532	0.00	0.00	18.43
5	0.00	0.00	12.93	91.138	0.000	94.458	0.00	0.00	19.04
6	0.22	0.00	0.04	91.362	0.000	94.498	0.00	0.00	0.06
					TOTAL SRSS	SHEAR	0.00	0.00	103.15

TOTAL 10PCT SHEAR	0.00	0.00	103.51
TOTAL ABS SHEAR	0.00	0.00	139.21
TOTAL CQC SHEAR	0.00	0.00	107.21

246. LOAD LIST 3 4
247. PRINT STORY DRIFT
STORY DRIFT

STORY	HEIGHT (METE)	LOAD	DRIFT(CM) X	DRIFT(CM) Z	ECCENTRICITY (METE)	RATIO
BASE=	0.00					
1	3.42	3	3.3077	0.0943	0.0000	L / 103
		4	0.2285	2.5796	0.0000	L / 133
2	6.45	3	6.3476	0.1548	0.0000	L / 101
		4	0.3448	4.1113	0.0000	L / 157
3	6.81	3	6.1448	0.1710	0.0000	L / 111
		4	0.3408	2.8255	0.0000	L / 241
4	7.21	3	7.6415	0.1450	0.0000	L / 94
		4	0.0839	4.4313	0.0000	L / 163

248. LOAD LIST 30 TO 38
249. PRINT SUPPORT REACTION ALL

SUPPORT REACTION ALL

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	30	1.24	7.40	0.27	0.33	0.01	1.98
	31	-0.98	4.44	0.19	0.16	-0.03	-2.45
	32	0.23	6.23	0.59	1.00	0.05	-0.04
	33	0.03	5.61	-0.13	-0.51	-0.07	-0.43
	34	1.24	7.48	0.27	0.32	0.00	1.96
	35	-0.98	4.51	0.19	0.16	-0.03	-2.47
	36	0.23	6.31	0.59	1.00	0.05	-0.06
	37	0.03	5.68	-0.13	-0.52	-0.07	-0.45
	38	0.13	5.99	0.23	0.24	-0.01	-0.26
2	30	0.36	10.38	0.27	0.33	0.05	2.76
	31	-1.66	8.96	0.22	0.22	0.02	-1.45
	32	-0.56	10.46	0.69	1.24	0.15	0.84
	33	-0.74	8.88	-0.20	-0.68	-0.08	0.47
	34	0.20	12.09	0.31	0.38	0.06	2.92
	35	-1.83	10.67	0.26	0.27	0.03	-1.28
	36	-0.72	12.17	0.73	1.29	0.15	1.00
	37	-0.91	10.59	-0.16	-0.63	-0.07	0.63
	38	-0.82	11.38	0.29	0.33	0.04	0.82
3	30	0.49	6.60	-0.11	-0.11	0.04	1.15
	31	-0.36	6.49	-0.21	-0.29	-0.04	-1.37
	32	0.09	6.82	0.30	0.67	0.03	-0.05
	33	0.03	6.27	-0.62	-1.08	-0.02	-0.17
	34	0.50	6.89	-0.11	-0.11	0.04	1.12
	35	-0.35	6.78	-0.21	-0.30	-0.03	-1.40
	36	0.11	7.11	0.30	0.67	0.03	-0.08
	37	0.04	6.56	-0.62	-1.08	-0.02	-0.20
	38	0.08	6.84	-0.16	-0.20	0.00	-0.14
5	30	1.17	5.88	0.01	0.03	0.01	1.69
	31	-0.80	3.12	-0.09	-0.16	-0.02	-2.25
	32	0.32	5.41	0.40	0.82	0.07	-0.01
	33	0.04	3.58	-0.48	-0.95	-0.08	-0.54
	34	1.21	6.26	0.01	0.02	0.01	1.63
	35	-0.76	3.49	-0.09	-0.17	-0.02	-2.31
	36	0.36	5.79	0.40	0.81	0.07	-0.08
	37	0.08	3.96	-0.49	-0.96	-0.08	-0.61
	38	0.22	4.87	-0.04	-0.07	-0.01	-0.34
6	30	0.13	10.30	-0.22	-0.22	-0.01	2.40
	31	-1.48	9.08	-0.27	-0.33	-0.06	-1.00
	32	-0.56	10.47	0.20	0.69	0.07	0.93
	33	-0.79	8.91	-0.69	-1.24	-0.14	0.47
	34	-0.04	12.01	-0.26	-0.27	-0.02	2.58
	35	-1.65	10.79	-0.31	-0.38	-0.07	-0.83
	36	-0.73	12.18	0.16	0.64	0.06	1.10
	37	-0.96	10.62	-0.73	-1.28	-0.15	0.65
	38	-0.85	11.40	-0.29	-0.32	-0.04	0.88
7	30	1.87	13.74	0.26	0.30	0.02	1.68

	31	-0.71	11.84	0.21	0.20	0.00	-3.16
	32	0.70	13.22	0.91	1.63	0.12	-0.53
	33	0.47	12.36	-0.44	-1.13	-0.10	-0.95
	34	2.06	15.84	0.30	0.34	0.02	1.45
	35	-0.53	13.94	0.25	0.25	0.00	-3.39
	36	0.88	15.33	0.95	1.68	0.12	-0.76
	37	0.65	14.46	-0.40	-1.08	-0.10	-1.18
	38	0.77	14.89	0.27	0.30	0.01	-0.97
8	30	2.71	14.26	-0.14	-0.14	0.02	0.14
	31	0.52	13.41	-0.23	-0.31	-0.08	-4.30
	32	1.65	14.37	0.97	2.05	0.08	-2.03
	33	1.59	13.30	-1.34	-2.50	-0.14	-2.13
	34	3.20	17.73	-0.17	-0.18	0.01	-0.48
	35	1.01	16.88	-0.26	-0.35	-0.09	-4.92
	36	2.13	17.84	0.94	2.01	0.07	-2.65
	37	2.08	16.77	-1.37	-2.54	-0.15	-2.75
	38	2.10	17.31	-0.22	-0.26	-0.04	-2.70
9	30	1.61	12.61	-0.03	-0.03	0.03	1.49
	31	-0.62	10.80	-0.09	-0.14	-0.01	-2.75
	32	0.65	13.01	0.73	1.49	0.15	-0.35
	33	0.34	10.40	-0.86	-1.66	-0.13	-0.91
	34	1.75	14.65	-0.04	-0.04	0.03	1.32
	35	-0.49	12.85	-0.10	-0.15	-0.01	-2.93
	36	0.78	15.06	0.72	1.47	0.15	-0.52
	37	0.48	12.44	-0.87	-1.67	-0.13	-1.09
	38	0.63	13.75	-0.07	-0.10	0.01	-0.81
10	30	1.84	18.49	0.44	0.50	0.04	3.21
	31	-1.61	18.12	0.42	0.47	-0.01	-3.72
	32	0.27	19.42	2.28	4.26	0.06	0.04
	33	-0.04	17.19	-1.42	-3.29	-0.03	-0.56
	34	1.87	22.31	0.53	0.60	0.04	3.14
	35	-1.58	21.94	0.51	0.57	-0.01	-3.80
	36	0.30	23.24	2.37	4.36	0.06	-0.03
	37	0.00	21.01	-1.33	-3.19	-0.02	-0.63
	38	0.15	22.13	0.52	0.59	0.02	-0.33
11	30	1.81	28.37	0.01	0.01	0.02	2.04
	31	-1.17	27.52	-0.02	-0.04	-0.01	-3.29
	32	0.35	27.95	2.66	5.29	0.03	-0.57
	33	0.29	27.94	-2.67	-5.31	-0.02	-0.68
	34	1.90	36.19	0.01	0.01	0.02	1.86
	35	-1.08	35.33	-0.02	-0.04	-0.01	-3.47
	36	0.44	35.77	2.66	5.29	0.03	-0.75
	37	0.38	35.75	-2.67	-5.31	-0.02	-0.86
	38	0.41	35.76	-0.01	-0.01	0.00	-0.81
12	30	1.14	18.26	-0.41	-0.46	-0.01	1.92
	31	-1.00	17.97	-0.42	-0.49	-0.03	-2.22
	32	0.21	19.23	1.34	3.09	0.02	0.12
	33	-0.07	17.01	-2.17	-4.03	-0.06	-0.42
	34	1.16	22.06	-0.49	-0.55	-0.02	1.87
	35	-0.97	21.77	-0.51	-0.59	-0.04	-2.27
	36	0.24	23.03	1.25	2.99	0.01	0.07
	37	-0.05	20.81	-2.25	-4.13	-0.06	-0.46
	38	0.10	21.92	-0.50	-0.57	-0.03	-0.20
13	30	1.13	6.76	0.02	0.04	0.02	1.28

	31	-0.53	4.78	-0.09	-0.15	0.00	-2.09
	32	0.35	6.11	0.46	0.85	0.06	-0.29
	33	0.24	5.43	-0.53	-0.97	-0.04	-0.51
	34	1.19	7.32	0.02	0.03	0.02	1.19
	35	-0.46	5.34	-0.09	-0.16	0.00	-2.18
	36	0.42	6.67	0.46	0.85	0.06	-0.39
	37	0.31	5.99	-0.53	-0.97	-0.04	-0.61
	38	0.36	6.33	-0.03	-0.06	0.01	-0.50
14	30	0.85	8.64	0.03	0.05	-0.01	1.73
	31	-0.93	6.69	-0.03	-0.07	-0.05	-1.78
	32	0.02	8.02	0.89	1.61	0.01	0.09
	33	-0.10	7.31	-0.89	-1.63	-0.06	-0.14
	34	0.86	10.22	0.04	0.05	-0.02	1.70
	35	-0.92	8.26	-0.03	-0.07	-0.05	-1.81
	36	0.03	9.60	0.90	1.61	0.00	0.06
	37	-0.09	8.89	-0.89	-1.63	-0.07	-0.16
	38	-0.03	9.24	0.00	-0.01	-0.03	-0.05
53	30	-0.05	8.48	6.54	1.96	0.53	4.55
	31	-2.48	6.82	6.37	1.88	-0.66	-0.49
	32	-0.56	24.92	7.71	2.79	0.05	2.25
	33	-1.97	-9.62	5.19	1.05	-0.19	1.81
	34	-0.43	10.24	7.42	2.20	0.51	5.16
	35	-2.85	8.59	7.26	2.11	-0.68	0.11
	36	-0.94	26.68	8.60	3.02	0.03	2.86
	37	-2.34	-7.86	6.08	1.29	-0.21	2.41
	38	-1.64	9.41	7.34	2.16	-0.09	2.64
54	30	0.23	8.95	-6.38	-1.84	0.72	4.67
	31	-2.72	6.26	-6.52	-2.00	-0.59	-0.64
	32	-0.49	24.88	-5.18	-1.05	0.19	2.14
	33	-2.00	-9.67	-7.71	-2.79	-0.06	1.89
	34	-0.14	10.70	-7.27	-2.08	0.73	5.27
	35	-3.09	8.01	-7.41	-2.24	-0.57	-0.04
	36	-0.86	26.63	-6.07	-1.29	0.21	2.74
	37	-2.37	-7.92	-8.60	-3.03	-0.05	2.50
	38	-1.62	9.36	-7.34	-2.16	0.08	2.62

********** END OF LATEST ANALYSIS RESULT **********

250. LOAD LIST 5 TO 22

251. START CONCRETE DESIGN
CONCRETE DESIGN
252. CODE ACI
253. FYMAIN 42000 ALL
254. FYSEC 42000 ALL
255. FC 2100 ALL
256. DESIGN COLUMN 57 61 TO 77 80 TO 94 110

==========

COLUMN NO. 61 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1152.0 SQ. MM

==========

COLUMN NO. 62 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 63 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1341.0 SQ. MM

==========

COLUMN NO. 64 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1215.0 SQ. MM

==========

COLUMN NO. 65 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 300.0 X 350.0 MMS, TIED

AREA OF STEEL REQUIRED = 2005.5 SQ. MM

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COLUMN NO. 66 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 300.0 X 350.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 1050.0 SQ. MM

==========

COLUMN NO. 67 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1152.0 SQ. MM

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COLUMN NO. 68 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1215.0 SQ. MM

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COLUMN NO. 69 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

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COLUMN NO. 70 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

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COLUMN  NO.    71  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

==========================================================================

COLUMN  NO.    72  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  2152.5  SQ. MM
==========================================================================

COLUMN  NO.    73  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =  1050.0  SQ. MM

==========================================================================

COLUMN  NO.    74  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =  1050.0  SQ. MM

==========================================================================

COLUMN  NO.    75  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1858.5  SQ. MM


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COLUMN  NO.    76  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =  1050.0  SQ. MM
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COLUMN  NO.    77  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =  1050.0  SQ. MM

=====================================================================

COLUMN  NO.    81  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    82  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM


=====================================================================

COLUMN  NO.    83  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM


=====================================================================

COLUMN  NO.    84  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM


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COLUMN NO. 85 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

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COLUMN NO. 86 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

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COLUMN NO. 87 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, CIRC SIZE 350.0 MMS DIAMETER TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 962.1 SQ. MM

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COLUMN NO. 88 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, CIRC SIZE 350.0 MMS DIAMETER TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 962.1 SQ. MM

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COLUMN NO. 89 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, CIRC SIZE 350.0 MMS DIAMETER TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 962.1 SQ. MM

==========

COLUMN NO. 90 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, CIRC SIZE 350.0 MMS DIAMETER TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 962.1 SQ. MM

==========

COLUMN NO. 91 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, CIRC SIZE 350.0 MMS DIAMETER TIED

AREA OF STEEL REQUIRED = 1366.2 SQ. MM

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COLUMN NO. 92 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, CIRC SIZE 350.0 MMS DIAMETER TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 962.1 SQ. MM

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COLUMN NO. 93 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1089.0 SQ. MM

==========

COLUMN NO. 94 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1278.0 SQ. MM

==========
**********END OF COLUMN DESIGN RESULTS**********

Columna A-3

Nivel H	Libre	Losa	B	H	Cuantia
N6.6		.30	.30	.30	
	2.70				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
N3.6		.35	.30	.30	
	3.25				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
		1.50			

Columna B-3

Nivel H	Libre	Losa	B	H	Cuantia
N6.6		.30	.30	.30	
	2.70				8/#5 (1.8%)
					8/#5 (1.8%)
N3.6		.35	.30	.30	
	3.25				8/#5 (1.8%)
					8/#5 (1.8%)
		1.50			

Columna C-3

Nivel H	Libre	Losa	B	H	Cuantia
N6.6		.30	.30	.35	
	2.70				8/#6 (2.2%)
					8/#6 (2.2%)
N3.6		.35	.30	.35	
	3.25				8/#6 (2.2%)
					8/#6 (2.2%)
		1.50			

Columna D-3

Nivel H	Libre	Losa	B	H	Cuantia
N6.6		.30	.30	.30	
	2.70				8/#5 #4(1.5%)
					8/#5 #4(1.5%)
N3.6		.35	.30	.30	
	3.25				8/#5 #4(1.5%)
					8/#5 #4(1.5%)
		1.50			

Columna A-2

Nivel H	Libre	Losa	B	H	Cuantia
N7.34		.25	.30	.30	
	.51				8/#4(1.1%)
					8/#4(1.1%)
N6.6		.30	.30	.30	
	2.70				8/#4(1.1%)
					8/#4(1.1%)
N3.6		.30	.30	.30	
	3.30				8/#4(1.1%)
					8/#4(1.1%)
		1.50			

Columna B-2

Nivel H	Libre	Losa	B	H	Cuantia
N7.34		.25	.35	.30	
	.51				8/#6 (2.2%)
					8/#6 (2.2%)
N6.6		.30	.35	.30	
	2.70				8/#6 (2.2%)
					8/#6 (2.2%)
N3.6		.40	.35	.30	
	3.20				8/#6 (2.2%)
					8/#6 (2.2%)
		1.50			

Columna C-2

Nivel H	Libre	Losa	B	H	Cuantia
N7.34		.25	.35	.30	
	.51				8/#5 #6 (1.8%)
					8/#5 #6 (1.8%)
N6.6		.30	.35	.30	
	2.70				8/#5 #6 (1.8%)
					8/#5 #6 (1.8%)
N3.6		.40	.35	.30	
	3.20				8/#5 #6 (1.8%)
					8/#5 #6 (1.8%)
		1.50			

Columna A-1-1

Nivel H	Libre	Losa	B	H	Cuantia
N 7.34		.25	.30	.30	
	.10				8/#4 (1.1%)
					8/#4 (1.1%)
N 7.34		.30	.30	.30	
	2.70				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.6		.35	.30	.30	
	3.25				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna B-1-1

Nivel H	Libre	Losa	B	H	Cuantia
N 7.34		.25	.30	.30	
	.10				8/#4 (1.1%)
					8/#4 (1.1%)
N 7.34		.30	.30	.30	
	2.70				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.6		.35	.30	.30	
	3.25				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna A-1

Nivel H	Libre	Losa	B	H	Cuantia
N6.6		.30	.35	Circ	
	2.70				9/#4 (1.2%)
					9/#4 (1.2%)
N3.6		.35	.35	Circ	
	3.25				9/#4 (1.2%)
					9/#4 (1.2%)
		1.50			

Columna B-1

Nivel H	Libre	Losa	B	H	Cuantia
N6.6		.30	.35	Circ	
	2.70				9/#4 (1.2%)
					9/#4 (1.2%)
N3.6		.35	.35	Circ	
	3.25				9/#4 (1.2%)
					9/#4 (1.2%)
		1.50			

Columna C-1

Nivel H	Libre	Losa	B	H	Cuantia
N6.6		.30	.35	Circ	
	2.70				8/#5 (1.7%)
					8/#5 (1.7%)
N3.6		.35	.35	Circ	
	3.25				8/#5 (1.7%)
					8/#5 (1.7%)
		1.50			

Columna D-1

Nivel H	Libre	Losa	B	H	Cuantia
N 6.6		.30	.30	.30	
	2.70				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
N 3.6		.35	.30	.30	
	3.25				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
		1.50			

EJE 1/N 3.6

B=0.30 H=0.35 L=3.55			B=0.30 H=0.35 L=6.30			B=0.30 H=0.35 L=6.16		
M=-3.60		M=-5.64	M=-8.89		M=-10.37	M=-10.68		M=-6.92
A=3.32		A=5.35	A=8.87		A=10.62	A=11.00		A=6.69
	M=3.13			M=5.48			M=5.94	
	A=3.02			A=5.18			A=5.66	
u=-3.26	u=1.96	u=4.45	u=-8.78	u=0.61	u=9.22	u=-9.18	u=-1.10	u=7.87

EJE 1.1/N 3.6

B=0.30 H=0.35 L=3.60		
M=-4.47		M=-4.98
A=4.17		A=4.68
	M=4.24	
	A=3.94	
u=-4.19	u=-1.70	u=5.31

EJE 2/N 3.6

B=0.35 H=0.40 L=6.35			B=0.35 H=0.40 L=6.18		
M=-10.76		M=-18.68	M=-19.04		M=-12.62
A=8.89		A=16.84	A=17.25		A=10.62
	M=10.01			M=11.13	
	A=8.21			A=9.42	
u=-13.62	u=1.63	u=16.04	u=-15.91	u=-2.41	u=13.02

EJE 3/N 3.6

B=0.30 H=0.35 L=3.60			B=0.30 H=0.35 L=6.32			B=0.30 H=0.35 L=6.16		
M=-3.67		M=-5.72	M=-8.49		M=-10.52	M=-10.79		M=-7.34
A=3.39		A=5.43	A=8.41		A=10.80	A=11.14		A=7.14
	M=3.18			M=6.00			M=6.47	
	A=3.06			A=5.72			A=6.21	
u=-2.55	u=2.21	u=3.83	u=-8.69	u=0.80	u=9.30	u=-9.21	u=-1.29	u=7.84

EJE A/N 3.6

B=0.30 H=0.30 L=4.77			B=0.30 H=0.30 L=2.40			B=0.30 H=0.30 L=2.05		
M=-2.10		M=-2.32	M=-1.67		M=-1.08	M=-1.05		M=-1.39
A=2.48		A=2.56	A=2.48		A=2.48	A=2.48		A=2.48
	M=1.68			M=0.94			M=1.14	
	A=2.48			A=2.48			A=2.48	
u=-2.59	u=0.33	u=2.77	u=-1.85	u=-0.78	u=1.47	u=-1.27	u=0.94	u=1.38

EJE B/N 3.6

B=0.30 H=0.30 L=4.74			B=0.30 H=0.30 L=2.38			B=0.30 H=0.30 L=2.05		
M=-2.90		M=-3.29	M=-2.47		M=-1.98	M=-2.06		M=-2.18
A=3.23		A=3.70	A=2.73		A=2.48	A=2.48		A=2.48
	M=2.41			M=1.70			M=1.98	
	A=2.66			A=2.48			A=2.48	
u=-3.14	u=0.56	u=3.38	u=-2.48	u=-1.18	u=2.38	u=-2.86	u=-1.51	u=2.63

EJE C/N 3.6

B=0.30 H=0.30 L=4.74			B=0.30 H=0.30 L=4.72		
M=-6.02		M=-6.88	M=-6.87		M=-6.95
A=7.18		A=8.38	A=8.37		A=7.08
	M=4.93			M=4.89	
	A=5.73			A=5.68	
u=-5.75	u=1.31	u=6.26	u=-6.27	u=-1.30	u=5.74

EJE D/N 3.6

B=0.30 H=0.30 L=4.72			B=0.30 H=0.30 L=4.75		
M=-3.39		M=-4.47	M=-4.48		M=-3.39
A=3.82		A=5.15	A=5.16		A=3.82
	M=3.11			M=3.11	
	A=3.48			A=3.48	
u=-3.33	u=0.92	u=3.69	u=-3.70	u=-0.93	u=3.33

EJE 1/N 6.6

B=0.25 H=0.30 L=3.55			B=0.25 H=0.30 L=6.30			B=0.25 H=0.30 L=6.16		
M=-1.73		M=-1.61	M=-1.95		M=-1.87	M=-2.02		M=-2.01
A=2.06		A=2.06	A=2.15		A=2.06	A=2.23		A=2.22
	M=1.45			M=1.33			M=1.41	
	A=2.06			A=2.06			A=2.06	
u=-1.30	u=0.65	u=1.29	u=-1.53	u=-0.22	u=1.49	u=-1.49	u=-0.28	u=1.45

EJE 3/N 6.6

B=0.25 H=0.30 L=3.60			B=0.25 H=0.30 L=6.32			B=0.25 H=0.30 L=6.16		
M=-1.71		M=-1.60	M=-2.06		M=-1.99	M=-2.18		M=-2.14
A=2.06		A=2.06	A=2.28		A=2.20	A=2.42		A=2.37
	M=1.51			M=1.42			M=1.56	
	A=2.06			A=2.06			A=2.06	
u=-1.31	u=0.67	u=1.30	u=-1.53	u=-0.25	u=1.48	u=-1.49	u=-0.32	u=1.45

EJE A/N 6.6

B=0.25 H=0.30 L=4.77			B=0.25 H=0.30 L=2.40			B=0.25 H=0.30 L=2.05		
M=-0.48		M=-0.93	M=-0.41		M=-0.38	M=-0.33		M=-0.39
A=2.06		A=2.06	A=2.06		A=2.06	A=2.06		A=2.06
	M=0.52			M=0.29			M=0.33	
	A=2.06			A=2.06			A=2.06	
u=-0.69	u=0.12	u=1.07	u=-0.58	u=-0.16	u=0.52	u=-0.50	u=0.23	u=0.48

EJE B/N 6.6

B=0.25 H=0.30 L=4.74			B=0.25 H=0.30 L=2.38			B=0.25 H=0.30 L=2.05		
M=-0.54		M=-0.99	M=-0.44		M=-0.59	M=-0.55		M=-0.45
A=2.06		A=2.06	A=2.06		A=2.06	A=2.06		A=2.06
	M=0.62			M=0.39			M=0.44	
	A=2.06			A=2.06			A=2.06	
u=-0.65	u=0.18	u=1.11	u=-0.59	u=0.30	u=0.67	u=-0.68	u=-0.40	u=0.50

EJE C/N 6.6

B=0.25 H=0.30 L=4.74			B=0.25 H=0.30 L=4.72		
M=-1.06		M=-1.22	M=-1.21		M=-1.05
A=2.06		A=2.06	A=2.06		A=2.06
	M=0.97			M=0.97	
	A=2.06			A=2.06	
u=-0.77	u=0.29	u=1.05	u=-1.05	u=-0.28	u=0.77

EJE D/N 6.6

B=0.25 H=0.30 L=4.72			B=0.25 H=0.30 L=4.75		
M=-0.92		M=-1.10	M=-1.10		M=-0.92
A=2.06		A=2.06	A=2.06		A=2.06
	M=0.88			M=0.88	
	A=2.06			A=2.06	
u=-0.73	u=0.28	u=-5.34	u=5.36	u=-0.28	u=0.73

EJE A/N CUBIERTA

B=0.25 H=0.25 L=4.83			B=0.25 H=0.25 L=2.43			B=0.25 H=0.25 L=2.07		
M=-0.59		M=-0.80	M=-0.32		M=-0.17	M=-0.22		M=-0.26
A=1.65		A=1.65	A=1.65		A=1.65	A=1.65		A=1.65
	M=0.45			M=0.10			M=0.18	
	A=1.65			A=1.65			A=1.65	
u=-0.85	u=0.06	u=0.94	u=-0.53	u=-0.06	u=0.42	u=-0.42	u=-0.10	u=0.41

EJE B/N CUBIERTA

B=0.25 H=0.25 L=4.80			B=0.25 H=0.25 L=2.41			B=0.25 H=0.25 L=2.07		
M=-1.07		M=-1.34	M=-0.44		M=-0.37	M=-0.40		M=-0.37
A=1.65		A=1.85	A=1.65		A=1.65	A=1.65		A=1.65
	M=0.74			M=0.17			M=0.28	
	A=1.65			A=1.65			A=1.65	
u=-1.46	u=0.08	u=1.67	u=-0.83	u=-0.06	u=0.78	u=-0.77	u=-0.19	u=0.65

EJE C/N CUBIERTA

B=0.25 H=0.25 L=4.80			B=0.25 H=0.25 L=4.78		
M=-1.34		M=-1.56	M=-1.56		M=-1.34
A=1.85		A=2.17	A=2.17		A=1.85
	M=0.84			M=0.84	
	A=1.65			A=1.65	
u=-1.71	u=0.13	u=1.80	u=-1.80	u=-0.12	u=1.71

EJE D/N CUBIERTA

B=0.25 H=0.25 L=4.83			B=0.25 H=0.25 L=4.83		
M=-0.87		M=-1.04	M=-1.04		M=-0.87
A=1.65		A=1.65	A=1.65		A=1.65
	M=0.58			M=0.58	
	A=1.65			A=1.65	
u=-1.09	u=0.11	u=1.18	u=-1.18	u=-0.11	u=1.09

ANEXO 2

MEMORIAS DISEÑO ESTRUCTURAL COLEGIO JUAN XXIII BLOQUE 2

```
INPUT FILE: BLOQUE 2.STD
1. STAAD SPACE BLOQUE 2
2. START JOB INFORMATION
3. ENGINEER DATE 17-AUG-05
4. END JOB INFORMATION
5. INPUT WIDTH 79
6. UNIT METER MTON
7. JOINT COORDINATES
8. 1 0 0 0; 2 15.435 0 0; 3 0 0 5.07; 4 15.435 0 5.07; 5 0 0 10.14
9. 6 15.435 0 10.14; 7 6.485 0 0; 8 6.485 0 5.07; 9 6.485 0 10.14; 10 10.965 0 0
10. 11 10.965 0 5.07; 12 10.965 0 10.14; 13 0 3.45 0; 14 6.485 3.45 0
11. 15 0 3.45 5.07; 16 6.485 3.45 5.07; 17 0 3.45 10.14; 18 6.485 3.45 10.14
12. 19 10.965 3.45 0; 20 10.965 3.45 5.07; 21 10.965 3.45 10.14; 22 15.435 3.45 0
13. 23 15.435 3.45 5.07; 24 15.435 3.45 10.14; 25 0 6.45 0; 26 6.485 6.45 0
14. 27 0 6.45 5.07; 28 6.485 6.45 5.07; 29 0 6.45 10.14; 30 6.485 6.45 10.14
15. 31 10.965 6.45 0; 33 10.965 6.45 10.14; 34 15.435 6.45 0; 35 15.435 6.45 5.07
16. 36 15.435 6.45 10.14; 37 0 7.2103 5.07; 38 6.485 7.2103 5.07
17. 40 15.435 7.2103 5.07
18. MEMBER INCIDENCES
19. 18 13 14; 19 15 16; 20 17 18; 21 13 15; 22 15 17; 23 14 19; 24 16 20; 25 14
16
20. 26 18 21; 27 16 18; 28 19 22; 29 20 23; 30 19 20; 31 21 24; 32 20 21; 33 22
23
21. 34 23 24; 35 25 26; 37 29 30; 38 25 27; 39 27 29; 40 26 31; 42 26 28; 43 30
33
22. 44 28 30; 45 31 34; 48 33 36; 50 34 35; 51 35 36; 52 1 13; 53 13 25; 54 7 14
23. 55 14 26; 56 10 19; 57 19 31; 58 2 22; 59 22 34; 60 3 15; 61 15 27; 62 27 37
24. 63 8 16; 64 16 28; 65 28 38; 66 11 20; 69 4 23; 70 23 35; 71 35 40; 72 5 17
25. 73 17 29; 74 9 18; 75 18 30; 76 12 21; 77 21 33; 78 6 24; 79 24 36; 80 25 37
26. 81 37 29; 82 26 38; 83 38 30; 84 34 40; 85 40 36
27. DEFINE MATERIAL START
28. ISOTROPIC CONCRETE
29. E 1.79E+006
30. POISSON 0.17
31. DENSITY 2.4
32. ALPHA 1E-005
33. DAMP 0.05
34. END DEFINE MATERIAL
35. CONSTANTS
36. MATERIAL CONCRETE MEMB 18 TO 35 37 TO 40 42 TO 45 48 50 TO 66 69 TO 85
37. MEMBER PROPERTY AMERICAN
38. 52 53 56 TO 59 72 73 78 79 PRIS YD 0.3 ZD 0.3
39. 74 TO 77 PRIS YD 0.35
40. 21 22 33 34 PRIS YD 0.3 ZD 0.3
41. 35 37 TO 40 42 TO 45 48 50 51 PRIS YD 0.3 ZD 0.25
42. 80 TO 85 PRIS YD 0.25 ZD 0.25
43. 60 TO 62 PRIS YD 0.3 ZD 0.35
44. 54 55 PRIS YD 0.35 ZD 0.3
45. 18 20 23 26 28 31 PRIS YD 0.35 ZD 0.3
46. 63 TO 66 69 TO 71 PRIS YD 0.3 ZD 0.35
47. 19 24 29 PRIS YD 0.4 ZD 0.35
48. MEMBER PROPERTY AMERICAN
49. 25 27 30 32 PRIS YD 0.35 ZD 0.3
50. SUPPORTS
51. 1 TO 12 FIXED
52. LOAD 1 CARGA MUERTA
53. SELFWEIGHT Y -1
54. MEMBER LOAD
55. 38 42 50 TRAP GY 0 -0.135
56. 39 44 51 TRAP GY -0.135 0
57. 35 37 40 43 45 48 UNI GY -0.144
```

```
58. 80 81 UNI GY -0.0326
59. 82 83 UNI GY -0.055
60. 84 85 UNI GY -0.0225
61. JOINT LOAD
62. 31 33 FY -0.241
63. MEMBER LOAD
64. 18 UNI GY -1.1
65. 23 28 UNI GY -0.564
66. 19 UNI GY -2.2
67. 24 29 UNI GY -1.128
68. 20 UNI GY -1.1
69. 26 31 UNI GY -0.564
70. 21 22 UNI GY -0.5
71. 25 27 UNI GY -1.319
72. 30 32 UNI GY -1.638
73. 33 34 UNI GY -0.819
74. LOAD 2 CARGA VIVA
75. MEMBER LOAD
76. 80 81 UNI GY -0.1135
77. 82 83 UNI GY -0.192
78. 84 85 UNI GY -0.078
79. JOINT LOAD
80. 31 33 FY -0.8
81. MEMBER LOAD
82. 18 20 UNI GY -0.356
83. 23 26 28 31 UNI GY -0.181
84. 19 UNI GY -0.712
85. 24 29 UNI GY -0.362
86. 21 22 UNI GY -0.162
87. 25 27 UNI GY -0.425
88. 30 32 UNI GY -0.526
89. 33 34 UNI GY -0.263
90. LOAD 3 SISMO MODAL EN X
91. SELFWEIGHT X -1
92. MEMBER LOAD
93. 38 42 50 TRAP GX 0 -0.135
94. 39 44 51 TRAP GX -0.135 0
95. 35 37 40 43 45 48 UNI GX -0.144
96. 80 81 UNI GX -0.0326

97. 82 83 UNI GX -0.055
98. 84 85 UNI GX -0.0225
99. JOINT LOAD
100. 31 33 FX -0.241
101. MEMBER LOAD
102. 18 UNI GX -1.1
103. 23 28 UNI GX -0.564
104. 19 UNI GX -2.2
105. 24 29 UNI GX -1.128
106. 20 UNI GX -1.1
107. 26 31 UNI GX -0.564
108. 21 22 UNI GX -0.5
109. 25 27 UNI GX -1.319
110. 30 32 UNI GX -1.638
111. 33 34 UNI GX -0.819
112. SELFWEIGHT Z -1
113. MEMBER LOAD
114. 38 42 50 TRAP GZ 0 -0.135
115. 39 44 51 TRAP GZ -0.135 0
116. 35 37 40 43 45 48 UNI GZ -0.144
117. 80 81 UNI GZ -0.0326
```

```
118. 82 83 UNI GZ -0.055
119. 84 85 UNI GZ -0.0225
120. JOINT LOAD
121. 31 33 FZ -0.241
122. MEMBER LOAD
123. 18 UNI GZ -1.1
124. 23 28 UNI GZ -0.564
125. 19 UNI GZ -2.2
126. 24 29 UNI GZ -1.128
127. 20 UNI GZ -1.1
128. 26 31 UNI GZ -0.564
129. 21 22 UNI GZ -0.5
130. 25 27 UNI GZ -1.319
131. 30 32 UNI GZ -1.638
132. 33 34 UNI GZ -0.819
133. *.............................I=1.1.......S4=2.0.......................
134. SPECTRUM CQC X 1 ACC SCALE 9.81 DAMP 0.05
135. 0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
136. 0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
137. 0.7 0.825; 0.75 0.825; 0.8 0.825; 0.85 0.825; 0.9 0.825; 0.95 0.825
138. 1 0.792; 1.1 0.72; 1.2 0.66; 1.3 0.609; 1.4 0.566; 1.5 0.528; 1.6 0.495
139. 1.7 0.466; 1.8 0.44; 1.9 0.417; 2 0.396; 2.1 0.377; 2.2 0.36; 2.3 0.344
140. 2.4 0.33; 2.5 0.317; 2.6 0.305; 2.7 0.293; 2.8 0.283; 2.9 0.273; 3 0.264
141. 3.1 0.255; 3.2 0.248; 3.3 0.24; 3.4 0.233; 3.5 0.226; 3.6 0.22; 3.7 0.214
142. 3.8 0.208; 3.9 0.203; 4 0.198; 4.1 0.193; 4.2 0.189; 4.3 0.184; 4.4 0.18
143. 4.5 0.176; 4.6 0.172; 4.7 0.169; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165
144. 5.2 0.165; 5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165
145. 5.9 0.165; 6 0.165
146. LOAD 4 SISMO MODAL EN Z
147. SPECTRUM CQC Z 1 ACC SCALE 9.81 DAMP 0.05
148. *............................R=5.67......
149. 0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
150. 0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
151. 0.7 0.825; 0.75 0.825; 0.8 0.825; 0.85 0.825; 0.9 0.825; 0.95 0.825
152. 1 0.792; 1.1 0.72; 1.2 0.66; 1.3 0.609; 1.4 0.566; 1.5 0.528; 1.6 0.495
153. 1.7 0.466; 1.8 0.44; 1.9 0.417; 2 0.396; 2.1 0.377; 2.2 0.36; 2.3 0.344
154. 2.4 0.33; 2.5 0.317; 2.6 0.305; 2.7 0.293; 2.8 0.283; 2.9 0.273; 3 0.264
155. 3.1 0.255; 3.2 0.248; 3.3 0.24; 3.4 0.233; 3.5 0.226; 3.6 0.22; 3.7 0.214
156. 3.8 0.208; 3.9 0.203; 4 0.198; 4.1 0.193; 4.2 0.189; 4.3 0.184; 4.4 0.18
157. 4.5 0.176; 4.6 0.172; 4.7 0.169; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165
158. 5.2 0.165; 5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165
159. 5.9 0.165; 6 0.165
160. LOAD COMB 5 CU  1.4D+1.7L
161. 1 1.4 2 1.7
162. LOAD COMB 6 0.75CU+EX+0.3EZ
163. 1 1.05 2 1.28 3 0.176 4 0.053
164. LOAD COMB 7 0.75CU+EX-0.3EZ
165. 1 1.05 2 1.28 3 0.176 4 -0.053
166. LOAD COMB 8 0.75CU-EX+0.3EZ
167. 1 1.05 2 1.28 3 -0.176 4 0.053
168. LOAD COMB 9 0.75CU-EX-0.3EZ
169. 1 1.05 2 1.28 3 -0.176 4 -0.053
170. LOAD COMB 10 0.9D+EX+0.3EZ
171. 1 0.9 3 0.176 4 0.053
172. LOAD COMB 11 0.9D+EX-0.3EZ
173. 1 0.9 3 0.176 4 -0.053
174. LOAD COMB 12 0.9D-EX+0.3EZ
175. 1 0.9 3 -0.176 4 0.053
176. LOAD COMB 13 0.9D-EX-0.3EZ
177. 1 0.9 3 -0.176 4 -0.053
178. LOAD COMB 14 0.75CU+EZ+0.3EX
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179. 1 1.05 2 1.28 3 0.053 4 0.176
180. LOAD COMB 15 0.75CU+EZ-0.3EX
181. 1 1.05 2 1.28 3 -0.053 4 0.176
182. LOAD COMB 16 0.75CU-EZ+0.3EX
183. 1 1.05 2 1.28 3 0.053 4 -0.176
184. LOAD COMB 17 0.75CU-EZ-0.3EX
185. 1 1.05 2 1.28 3 -0.053 4 -0.176
186. LOAD COMB 18 0.9D+EZ+0.3EX
187. 1 0.9 3 0.053 4 0.176
188. LOAD COMB 19 0.9D+EZ-0.3EX
189. 1 0.9 3 -0.053 4 0.176
190. LOAD COMB 20 0.9D-EZ+0.3EX
191. 1 0.9 3 0.053 4 -0.176
192. LOAD COMB 21 0.9D-EZ-0.3EX
193. 1 0.9 3 -0.053 4 -0.176
194. LOAD COMB 22 D+L
195. 1 1.0 2 1.0
196. ************************************************
197. * * * ----COMBINACIONES REACCIONDE SUELO MODAL-- * * *
198. LOAD COMB 30 SUELO-M D + 70% EX/R
199. 1 1.0 3 0.1235
200. LOAD COMB 31 SUELO-M D - 70% EX/R
201. 1 1.0 3 -0.1235
202. LOAD COMB 32 SUELO-M D + 70% EZ/R
203. 1 1.0 4 0.1235
204. LOAD COMB 33 SUELO-M D - 70% EZ/R
205. 1 1.0 4 -0.1235
206. LOAD COMB 34 SUELO-M  L  + D + 70% EX/R
207. 1 1.0 2 1.0 3 0.1235
208. LOAD COMB 35 SUELO-M L + D - 70% EX/R
209. 1 1.0 2 1.0 3 -0.1235
210. LOAD COMB 36 SUELO-M L + D + 70% EZ/R
211. 1 1.0 2 1.0 4 0.1235
212. LOAD COMB 37 SUELO-M L + D - 70% EZ/R
213. 1 1.0 2 1.0 4 -0.1235
214. LOAD COMB 38 SUELO-M L + D
215. 1 1.0 2 1.0
216. * * * --------------- * * *
217. ********************************
218. ************************************************
219. PERFORM ANALYSIS

           P R O B L E M   S T A T I S T I C S
           -----------------------------------

     NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    38/    61/    12
     ORIGINAL/FINAL BAND-WIDTH=    20/    11/     54 DOF
     TOTAL PRIMARY LOAD CASES =    4, TOTAL DEGREES OF FREEDOM =    156
     SIZE OF STIFFNESS MATRIX =       9 DOUBLE  KILO-WORDS
     REQRD/AVAIL. DISK SPACE  =    12.3/  5878.2 MB,  EXMEM =  697.1 MB


 NUMBER OF MODES REQUESTED              =     6
 NUMBER OF EXISTING MASSES IN THE MODEL =    58
 NUMBER OF MODES THAT WILL BE USED      =     6



   *** □EIGENSOLUTION□: SUBSPACE METHOD ***
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CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
1	2.175	0.45971	6.436E-14
2	2.226	0.44915	9.898E-13
3	2.421	0.41308	4.734E-12
4	2.861	0.34958	1.237E-11
5	3.017	0.33140	7.763E-11
6	3.619	0.27635	5.022E-11

The following Frequencies are estimates that were calculated. These are for information only and will not be used. Remaining values are either above the cut off mode/freq values or are of low accuracy. To use these frequencies, rerun with a higher cutoff mode (or mode + freq) value.

CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
7	4.417	0.22640	1.277E-08
8	4.600	0.21741	8.638E-09
9	4.697	0.21292	2.167E-08
10	4.956	0.20177	1.387E-07
11	5.786	0.17283	6.372E-09
12	6.151	0.16258	6.250E-08
13	6.904	0.14485	1.124E-06
14	7.054	0.14177	4.011E-06
15	7.295	0.13708	1.852E-06
16	7.495	0.13343	2.861E-08

RESPONSE LOAD CASE 3

CQC MODAL COMBINATION METHOD USED.

DYNAMIC WEIGHT X Y Z	1.513534E+02	2.221904E-08	1.513534E+02	MTON
MISSING WEIGHT X Y Z	-8.056696E+00	-2.221904E-08	-6.662733E+00	MTON
MODAL WEIGHT X Y Z	1.432967E+02	1.413498E-23	1.446907E+02	MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000

PARTICIPATION FACTORS

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	0.34	0.00	87.10	0.336	0.000	87.104	0.42	0.00	0.00

2	93.83	0.00	0.52	94.166	0.000	87.620	117.20	0.00	0.00
3	0.43	0.00	5.76	94.593	0.000	93.384	0.53	0.00	0.00
4	0.07	0.00	0.40	94.658	0.000	93.783	0.08	0.00	0.00
5	0.02	0.00	1.81	94.677	0.000	95.598	0.02	0.00	0.00
6	0.00	0.00	0.00	94.677	0.000	95.598	0.00	0.00	0.00
					TOTAL SRSS	SHEAR	117.20	0.00	0.00
					TOTAL 10PCT	SHEAR	118.15	0.00	0.00
					TOTAL ABS	SHEAR	118.26	0.00	0.00
					TOTAL CQC	SHEAR	117.93	0.00	0.00

RESPONSE LOAD CASE 4

CQC MODAL COMBINATION METHOD USED.
DYNAMIC WEIGHT X Y Z 1.513534E+02 2.221904E-08 1.513534E+02 MTON
MISSING WEIGHT X Y Z -8.056696E+00 -2.221904E-08 -6.662733E+00 MTON
MODAL WEIGHT X Y Z 1.432967E+02 1.413498E-23 1.446907E+02 MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000

PARTICIPATION FACTORS

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	0.34	0.00	87.10	0.336	0.000	87.104	0.00	0.00	108.80
2	93.83	0.00	0.52	94.166	0.000	87.620	0.00	0.00	0.64
3	0.43	0.00	5.76	94.593	0.000	93.384	0.00	0.00	7.20
4	0.07	0.00	0.40	94.658	0.000	93.783	0.00	0.00	0.50
5	0.02	0.00	1.81	94.677	0.000	95.598	0.00	0.00	2.27
6	0.00	0.00	0.00	94.677	0.000	95.598	0.00	0.00	0.00
					TOTAL SRSS	SHEAR	0.00	0.00	109.07
					TOTAL 10PCT	SHEAR	0.00	0.00	109.76
					TOTAL ABS	SHEAR	0.00	0.00	119.41
					TOTAL CQC	SHEAR	0.00	0.00	113.25

220. LOAD LIST 3 4
221. PRINT STORY DRIFT

STORY STORY	DRIFT HEIGHT (METE)	LOAD	DRIFT(CM) X	Z	ECCENTRICITY (METE)	RATIO
BASE=	0.00					
1	3.45	3	3.4346	0.1655	0.0000	L / 100
		4	0.3858	3.4311	0.0000	L / 100
2	6.45	3	5.5542	0.2726	0.0000	L / 116
		4	0.6188	5.5229	0.0000	L / 117
3	7.21	3	7.1301	0.2764	0.0000	L / 101
		4	0.1464	5.5110	0.0000	L / 131

222. LOAD LIST 30 TO 38
223. PRINT SUPPORT REACTION ALL
SUPPORT REACTION ALL
SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	30	1.56	9.88	0.28	0.38	0.00	0.93
	31	-0.12	8.78	0.16	0.12	-0.07	-2.52
	32	0.88	10.14	1.25	2.40	0.01	-0.48
	33	0.57	8.53	-0.81	-1.90	-0.07	-1.10
	34	1.77	11.67	0.33	0.43	0.00	0.71
	35	0.09	10.57	0.21	0.18	-0.07	-2.74
	36	1.08	11.92	1.30	2.45	0.00	-0.71
	37	0.78	10.31	-0.76	-1.85	-0.07	-1.33
	38	0.93	11.12	0.27	0.30	-0.04	-1.02
2	30	0.66	8.26	0.41	0.53	0.02	2.07
	31	-1.11	6.45	0.29	0.28	-0.04	-1.49
	32	-0.06	7.97	0.95	1.68	0.04	0.61
	33	-0.39	6.75	-0.25	-0.86	-0.05	-0.03
	34	0.60	9.50	0.50	0.64	0.02	2.15
	35	-1.17	7.70	0.38	0.39	-0.04	-1.41
	36	-0.12	9.21	1.04	1.78	0.04	0.68
	37	-0.44	7.99	-0.16	-0.76	-0.06	0.05
	38	-0.28	8.60	0.44	0.51	-0.01	0.37
3	30	2.73	16.34	0.10	0.20	0.01	0.88
	31	0.27	15.07	-0.11	-0.22	-0.02	-4.11
	32	1.52	15.72	1.69	3.47	0.04	-1.56
	33	1.47	15.69	-1.70	-3.49	-0.05	-1.67
	34	3.15	19.96	0.10	0.19	0.01	0.43
	35	0.69	18.69	-0.11	-0.22	-0.02	-4.56
	36	1.94	19.34	1.69	3.47	0.04	-2.02
	37	1.89	19.31	-1.70	-3.49	-0.05	-2.12
	38	1.92	19.32	-0.01	-0.01	0.00	-2.07
4	30	0.85	13.73	0.10	0.21	0.01	3.20
	31	-1.79	11.79	-0.09	-0.18	-0.02	-1.98
	32	-0.44	12.78	1.00	2.08	0.06	0.66
	33	-0.49	12.74	-0.99	-2.05	-0.06	0.55
	34	0.73	16.31	0.11	0.22	0.01	3.36
	35	-1.91	14.37	-0.09	-0.18	-0.02	-1.82
	36	-0.56	15.36	1.01	2.08	0.06	0.82
	37	-0.61	15.32	-0.99	-2.05	-0.06	0.71
	38	-0.59	15.34	0.01	0.02	0.00	0.77
5	30	1.67	9.90	-0.17	-0.14	0.05	1.19
	31	-0.23	8.82	-0.29	-0.39	0.01	-2.72
	32	0.87	10.17	0.80	1.89	0.06	-0.46
	33	0.56	8.55	-1.26	-2.41	-0.01	-1.08
	34	1.87	11.69	-0.22	-0.19	0.06	0.97
	35	-0.03	10.61	-0.34	-0.45	0.02	-2.94
	36	1.08	11.96	0.75	1.83	0.07	-0.67
	37	0.77	10.34	-1.31	-2.47	0.00	-1.30
	38	0.92	11.15	-0.28	-0.32	0.04	-0.98
6	30	0.77	8.36	-0.28	-0.26	0.02	2.36
	31	-1.26	6.41	-0.40	-0.51	-0.01	-1.70

	32	-0.08	7.99	0.26	0.88	0.05	0.65
	33	-0.41	6.78	-0.94	-1.65	-0.04	0.01
	34	0.71	9.61	-0.37	-0.36	0.02	2.45
	35	-1.32	7.66	-0.49	-0.61	-0.01	-1.61
	36	-0.14	9.24	0.17	0.78	0.06	0.74
	37	-0.47	8.03	-1.03	-1.76	-0.04	0.10
	38	-0.31	8.63	-0.43	-0.49	0.01	0.42
7	30	0.85	15.20	0.51	0.60	0.04	3.61
	31	-2.05	14.62	0.45	0.49	-0.01	-2.13
	32	-0.34	16.04	1.94	3.48	0.07	1.25
	33	-0.86	13.79	-0.98	-2.39	-0.04	0.22
	34	0.67	18.38	0.63	0.74	0.05	3.82
	35	-2.23	17.80	0.57	0.63	0.00	-1.92
	36	-0.52	19.22	2.06	3.62	0.08	1.47
	37	-1.04	16.97	-0.85	-2.25	-0.04	0.44
	38	-0.78	18.09	0.60	0.69	0.02	0.95
8	30	0.58	25.47	0.04	0.08	0.01	4.08
	31	-2.56	25.46	-0.04	-0.08	-0.02	-1.67
	32	-0.96	25.48	2.15	4.18	0.06	1.27
	33	-1.02	25.45	-2.15	-4.18	-0.06	1.15
	34	0.29	32.22	0.04	0.08	0.01	4.43
	35	-2.84	32.21	-0.04	-0.08	-0.02	-1.32
	36	-1.24	32.23	2.15	4.18	0.06	1.61
	37	-1.31	32.20	-2.15	-4.18	-0.06	1.49
	38	-1.28	32.22	0.00	0.00	0.00	1.55
9	30	0.72	15.10	-0.44	-0.48	-0.01	3.04
	31	-1.78	14.47	-0.49	-0.59	-0.03	-1.71
	32	-0.33	15.90	0.91	2.23	0.04	1.04
	33	-0.73	13.67	-1.85	-3.30	-0.08	0.29
	34	0.56	18.28	-0.56	-0.62	-0.01	3.23
	35	-1.94	17.65	-0.61	-0.73	-0.04	-1.52
	36	-0.49	19.08	0.79	2.10	0.03	1.23
	37	-0.89	16.85	-1.97	-3.44	-0.08	0.48
	38	-0.69	17.97	-0.59	-0.67	-0.02	0.86
10	30	1.09	10.97	0.71	0.84	0.01	2.00
	31	-1.05	10.88	0.63	0.68	-0.02	-1.98
	32	0.21	11.51	1.51	2.50	0.07	0.36
	33	-0.17	10.35	-0.18	-0.98	-0.08	-0.35
	34	1.10	13.73	0.89	1.05	0.00	2.00
	35	-1.04	13.64	0.81	0.89	-0.02	-1.98
	36	0.22	14.26	1.70	2.71	0.07	0.36
	37	-0.16	13.10	0.01	-0.77	-0.08	-0.34
	38	0.03	13.68	0.85	0.97	-0.01	0.01
11	30	1.80	17.56	0.07	0.14	0.01	3.02
	31	-1.62	16.92	-0.07	-0.12	-0.01	-3.06
	32	0.12	17.25	1.62	3.08	0.09	0.04
	33	0.05	17.23	-1.62	-3.06	-0.09	-0.08
	34	1.82	21.88	0.07	0.14	0.01	3.01
	35	-1.60	21.25	-0.06	-0.12	-0.01	-3.06
	36	0.15	21.58	1.62	3.08	0.09	0.04
	37	0.08	21.55	-1.61	-3.06	-0.09	-0.09
	38	0.11	21.56	0.00	0.01	0.00	-0.03
12	30	1.30	11.12	-0.65	-0.70	0.01	2.47
	31	-1.28	10.80	-0.72	-0.85	0.00	-2.38

32	0.21	11.55	0.21	1.10	0.10	0.43
33	-0.20	10.37	-1.59	-2.65	-0.09	-0.33
34	1.30	13.86	-0.85	-0.92	0.02	2.49
35	-1.28	13.54	-0.92	-1.07	0.00	-2.36
36	0.22	14.29	0.02	0.88	0.10	0.44
37	-0.19	13.12	-1.78	-2.87	-0.09	-0.32
38	0.01	13.70	-0.88	-0.99	0.01	0.06

********** END OF LATEST ANALYSIS RESULT **********

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224. LOAD LIST 5 TO 22
225. START CONCRETE DESIGN
CONCRETE DESIGN
226. CODE ACI
227. FYMAIN 42000 MEMB 18 TO 35 37 TO 40 42 TO 45 48 50 TO 66 69 TO 85
228. FYSEC 42000 ALL
229. FC 2100 MEMB 18 TO 35 37 TO 40 42 TO 45 48 50 TO 66 69 TO 85
230. DESIGN COLUMN 52 TO 66 69 TO 79
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COLUMN  NO.    52  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1404.0  SQ. MM

=====================================================================

COLUMN  NO.    53  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1341.0  SQ. MM

=====================================================================

COLUMN  NO.    54  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 300.0 X 350.0 MMS, TIED

AREA OF STEEL REQUIRED =  1417.5  SQ. MM

=====================================================================

COLUMN  NO.    55  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 300.0 X 350.0 MMS, TIED

AREA OF STEEL REQUIRED =  1197.0  SQ. MM

=====================================================================

COLUMN  NO.    56  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1152.0  SQ. MM

=====================================================================

COLUMN  NO.    57  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    58  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED
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```
ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

 ========================================================================

COLUMN  NO.    59  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM


========================================================================

COLUMN  NO.    60  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  2299.5  SQ. MM

========================================================================

COLUMN  NO.    61  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =  1050.0  SQ. MM

========================================================================

COLUMN  NO.    62  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =  1050.0  SQ. MM

========================================================================

COLUMN  NO.    63  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1711.5  SQ. MM

========================================================================

COLUMN  NO.    64  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 350.0 X 300.0 MMS, TIED
```

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 1050.0 SQ. MM

==========

COLUMN NO. 65 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 350.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 1050.0 SQ. MM

==========

COLUMN NO. 66 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 350.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1197.0 SQ. MM

==========

COLUMN NO. 69 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 350.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1123.5 SQ. MM

==========

COLUMN NO. 70 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 350.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 1050.0 SQ. MM

==========

COLUMN NO. 71 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 350.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 1050.0 SQ. MM

==========

COLUMN NO. 72 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED
AREA OF STEEL REQUIRED = 1278.0 SQ. MM

```
=====================================================================

COLUMN  NO.    73  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1341.0  SQ. MM

=====================================================================

COLUMN  NO.    74  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  CIRC SIZE  350.0 MMS DIAMETER  TIED

AREA OF STEEL REQUIRED =  1231.5  SQ. MM

=====================================================================

COLUMN  NO.    75  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  CIRC SIZE  350.0 MMS DIAMETER  TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   962.1  SQ. MM

=====================================================================

COLUMN  NO.    76  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  CIRC SIZE  350.0 MMS DIAMETER  TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   962.1  SQ. MM

=====================================================================

COLUMN  NO.    77  DESIGN PER ACI 318-02 - AXIAL + BENDING
FY - 411.9  FC -  20.6 MPA,  CIRC SIZE  350.0 MMS DIAMETER  TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   962.1  SQ. MM

=====================================================================

COLUMN  NO.    78  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1026.0  SQ. MM

=====================================================================
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COLUMN NO. 79 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

**********END OF COLUMN DESIGN RESULTS**********

Columna E-3

Nivel H	Libre	Losa	B	H	Cuantia
N6.6		.30	.30	.30	
	2.70				S/#5 (1.8%)
					S/#5 (1.8%)
N3.6		.35	.30	.30	
	3.25				S/#5 (1.8%)
					S/#5 (1.8%)
		1.50			

Columna F-3

Nivel H	Libre	Losa	B	H	Cuantia
N6.6		.30	.30	.35	
	2.70				S/#5 (1.5%)
					S/#5 (1.5%)
N3.6		.35	.30	.35	
	3.25				S/#5 (1.5%)
					S/#5 (1.5%)
		1.50			

Columna G-3

Nivel H	Libre	Losa	B	H	Cuantia
N6.6		.30	.30	.30	
	2.70				S/#5 #4 (1.5%)
					S/#5 #4 (1.5%)
N3.6		.35	.30	.30	
	3.25				S/#5 #4 (1.5%)
					S/#5 #4 (1.5%)
		1.50			

Columna H-3

Nivel	H Libre	Losa	B	H	Cuantia
N6.6		.30	.30	.30	
	2.70				8/#4 (1.1%)
					8/#4 (1.1%)
N3.6		.35	.30	.30	
	3.25				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna E-2

Nivel	H Libre	Losa	B	H	Cuantia
C CUBIERTA		.25	.35	.30	
	.51				8/#6 (2.2%)
					8/#6 (2.2%)
N6.6		.30	.35	.30	
	2.70				8/#6 (2.2%)
					8/#6 (2.2%)
N3.6		.40	.35	.30	
	3.20				8/#6 (2.2%)
					8/#6 (2.2%)
		1.50			

Columna F-2

Nivel	H Libre	Losa	B	H	Cuantia
C CUBIERTA		.25	.35	.30	
	.51				8#5 #6 (1.8%)
					8#5 #6 (1.8%)
N 6.6		.30	.35	.30	
	2.70				8#5 #6 (1.8%)
					8#5 #6 (1.8%)
N 3.6		.40	.35	.30	
	3.20				8#5 #6 (1.8%)
					8#5 #6 (1.8%)
		1.50			

Columna G-2

Nivel	H Libre	Losa	B	H	Cuantia
N 3.6		.40	.35	.30	
	3.20				8#5 #4 (1.2%)
					8#5 #4 (1.2%)
		1.50			

Columna H-2

Nivel	H Libre	Losa	B	H	Cuantia
C CUBIERTA		.25	.35	.30	
	.51				8#5 #4 (1.2%)
					8#5 #4 (1.2%)
N 6.6		.30	.35	.30	
	2.70				8#5 #4 (1.2%)
					8#5 #4 (1.2%)
N 3.6		.40	.35	.30	
	3.20				8#5 #4 (1.2%)
					8#5 #4 (1.2%)
		1.50			

Columna E-1

Nivel H	Libre	Losa	B	H	Cuantia
N 6.6		.30	.30	.30	
	2.70				8.#5 (1.8 %)
					8.#5 (1.8 %)
N 3.6		.35	.30	.30	
	3.25				8.#5 (1.8 %)
					8.#5 (1.8 %)
		1.50			

Columna F-1

Nivel H	Libre	Losa	B	H	Cuantia
N 6.6		.30	.35	Circ	
	2.70				7.#5 (1.4 %)
					7.#5 (1.4 %)
N 3.6		.35	.35	Circ	
	3.25				7.#5 (1.4 %)
					7.#5 (1.4 %)
		1.50			

Columna G-1

Nivel H	Libre	Losa	B	H	Cuantia
N 6.6		.30	.35	Circ	
	2.70				9.#4 (1.2 %)
					9.#4 (1.2 %)
N 3.6		.35	.35	Circ	
	3.25				9.#4 (1.2 %)
					9.#4 (1.2 %)
		1.50			

Columna H-1

Nivel H	Libre	Losa	B	H	Cuantia
N 6.6		.30	.30	.30	
	2.70				8.#4 (1.1%)
					8.#4 (1.1%)
N 3.6		.35	.30	.30	
	3.25				8.#4 (1.1%)
					8.#4 (1.1%)
		1.50			

EJE 1/N 3.6

B=0.30 H=0.35 L=6.16			B=0.30 H=0.35 L=4.13			B=0.30 H=0.35 L=4.14		
M=-7.01 A=6.78		M=-8.70 A=8.65	M=-5.30 A=5.00		M=-3.50 A=3.22	M=-3.92 A=3.63		M=-4.09 A=3.79
	M=6.08 A=5.80			M=2.48 A=2.97			M=3.60 A=3.32	
v=-7.77	v=0.85	v=8.43	v=-3.76	v=-1.31	v=2.98	v=-3.57	v=-1.14	v=3.49

EJE 2/N 3.6

B=0.35 H=0.40 L=6.18			B=0.35 H=0.40 L=4.18			B=0.35 H=0.40 L=4.17		
M=-10.89 A=9.01		M=-16.27 A=14.25	M=-10.14 A=8.33		M=-4.14 A=4.04	M=-5.32 A=4.19		M=-5.84 A=4.62
	M=11.82 A=9.87			M=2.54 A=4.04			M=5.56 A=4.39	
v=-14.49	v=1.61	v=16.38	v=-7.53	v=-2.08	v=4.41	v=-6.16	v=-1.53	v=5.75

EJE 3/N 3.6

B=0.30 H=0.35 L=6.16			B=0.30 H=0.35 L=4.16			B=0.30 H=0.35 L=4.17		
M=-6.86 A=6.62		M=-8.93 A=8.91	M=-5.15 A=4.85		M=-3.40 A=3.13	M=-3.67 A=3.39		M=-3.73 A=3.44
	M=5.98 A=5.70			M=2.53 A=2.97			M=3.29 A=3.02	
v=-7.73	v=0.87	v=8.47	v=-3.67	v=-1.23	v=3.03	v=-3.46	v=-1.03	v=3.31

EJE E/N 3.6

B=0.30 H=0.30 L=4.74			B=0.30 H=0.30 L=4.74		
M=-3.75 A=4.25		M=-4.33 A=4.97	M=-4.32 A=4.96		M=-3.76 A=4.26
	M=3.25 A=3.65			M=3.25 A=3.65	
v=-3.14	v=0.96	v=3.41	v=-3.40	v=-0.95	v=3.14

EJE F/N 3.6

B=0.30 H=0.35 L=4.74			B=0.30 H=0.35 L=4.72		
M=-6.51 A=6.25		M=-8.20 A=8.09	M=-8.18 A=8.06		M=-6.41 A=6.15
	M=5.72 A=5.43			M=5.69 A=5.40	
v=-6.91	v=1.56	v=7.90	v=-7.92	v=-1.56	v=6.90

EJE G/N 3.6

B=0.30 H=0.35 L=4.74			B=0.30 H=0.35 L=4.72		
M=-5.68 Ae=5.39		M=-9.04 Ae=9.04	M=-9.03 Ae=9.03		M=-5.82 Ae=5.53
	M=5.55 Ae=5.29			M=5.58 Ae=5.31	
v=-8.09	v=1.50	v=9.86	v=-9.84	v=-1.50	v=8.11

EJE H/N 3.6

B=0.30 H=0.30 L=4.74			B=0.30 H=0.30 L=4.74		
M=-3.69 Ae=4.18		M=-4.71 Ae=5.46	M=-4.72 Ae=5.46		M=-3.68 Ae=4.17
	M=3.05 Ae=3.41			M=3.05 Ae=3.41	
v=-4.53	v=0.74	v=5.08	v=-5.09	v=-0.74	v=4.52

EJE 1/N 6.6

B=0.25 H=0.30 L=6.16			B=0.25 H=0.30 L=4.13			B=0.25 H=0.30 L=4.14		
M=-1.86 Ae=2.06		M=-1.94 Ae=2.14	M=-1.27 Ae=2.06		M=-1.41 Ae=2.06	M=-1.37 Ae=2.06		M=-1.50 Ae=2.06
	M=1.30 Ae=2.06			M=1.10 Ae=2.06			M=1.17 Ae=2.06	
v=-1.44	v=0.24	v=1.50	v=-1.07	v=0.40	v=1.16	v=-1.15	v=-0.40	v=1.16

EJE 3/N 6.6

B=0.25 H=0.30 L=6.16			B=0.25 H=0.30 L=4.16			B=0.25 H=0.30 L=4.17		
M=-1.86 Ae=2.06		M=-1.95 Ae=2.15	M=-1.29 Ae=2.06		M=-1.33 Ae=2.06	M=-1.32 Ae=2.06		M=-1.42 Ae=2.06
	M=1.30 Ae=2.06			M=1.09 Ae=2.06			M=1.11 Ae=2.06	
v=-1.44	v=0.24	v=1.50	v=-1.07	v=0.38	v=1.14	v=-1.13	v=-0.38	v=1.12

EJE E/N 6.6

B=0.25 H=0.30 L=4.74			B=0.25 H=0.30 L=4.74		
M=-0.90 Ae=2.06		M=-1.16 Ae=2.06	M=-1.16 Ae=2.06		M=-0.91 Ae=2.06
	M=0.88 Ae=2.06			M=0.88 Ae=2.06	
v=-0.73	v=0.26	v=1.06	v=-1.06	v=-0.26	v=0.74

EJE F/N 6.6

B=0.25 H=0.30 L=4.74			B=0.25 H=0.30 L=4.72		
M=-1.08 A=2.06		M=-1.17 A=2.06	M=-1.17 A=2.06		M=-1.07 A=2.06
	M=0.95 A=2.06			M=0.95 A=2.06	
v=-0.79	v=0.26	v=1.02	v=-1.03	v=-0.26	v=0.79

EJE H/N 6.6

B=0.25 H=0.30 L=4.74			B=0.25 H=0.30 L=4.74		
M=-0.85 A=2.06		M=-1.00 A=2.06	M=-1.00 A=2.06		M=-0.85 A=2.06
	M=0.73 A=2.06			M=0.73 A=2.06	
v=-0.73	v=0.18	v=1.03	v=-1.03	v=-0.18	v=0.73

EJE E/N CUBIERTA

B=0.25 H=0.25 L=4.80			B=0.25 H=0.25 L=4.80		
M=-0.87 A=1.65		M=-1.05 A=1.65	M=-1.05 A=1.65		M=-0.87 A=1.65
	M=0.61 A=1.65			M=0.61 A=1.65	
v=-1.09	v=0.12	v=1.19	v=-1.19	v=-0.12	v=1.09

EJE F/N CUBIERTA

B=0.25 H=0.25 L=4.80			B=0.25 H=0.25 L=4.78		
M=-1.24 A=1.71		M=-1.36 A=1.88	M=-1.36 A=1.88		M=-1.23 A=1.69
	M=0.77 A=1.65			M=0.77 A=1.65	
v=-1.53	v=0.12	v=1.58	v=-1.58	v=-0.11	v=1.53

EJE H/N CUBIERTA

B=0.25 H=0.25 L=4.80			B=0.25 H=0.25 L=4.80		
M=-0.75 A=1.65		M=-0.85 A=1.65	M=-0.85 A=1.65		M=-0.74 A=1.65
	M=0.49 A=1.65			M=0.49 A=1.65	
v=-0.92	v=0.08	v=0.98	v=-0.98	v=-0.09	v=0.92

ANEXO 3

MEMORIAS DISEÑO ESTRUCTURAL COLEGIO LICEO CENTRAL DE NARIÑO

```
INPUT FILE: LICEO CENTRAL DE NARIÑO.STD
1. STAAD SPACE LICEO CENTRAL DE NARIÑO
2. START JOB INFORMATION
3. ENGINEER DATE 15-SEP-05
4. END JOB INFORMATION
5. INPUT WIDTH 79
6. UNIT METER MTON
7. JOINT COORDINATES
8. 1 0 3.225 0; 2 2.26 3.225 0; 3 7.44 3.225 0; 4 0 3.225 3.8761
9. 5 2.26 3.225 3.8761; 6 8.05 3.225 3.8761; 7 0 3.225 7.7522
10. 8 2.26 3.225 7.7522; 9 8.66 3.225 7.7522; 10 0 4.65 7.7522
11. 11 2.26 4.65 7.7522; 12 0 7.45 0; 13 2.26 7.685 0; 14 7.44 8.2 0
12. 15 0 7.45 7.7522; 16 2.26 7.685 7.7522; 17 8.66 8.325 7.7522; 18 0 7.45 3.8761
13. 19 8.05 8.265 3.8761; 20 0 1.85 7.7522; 21 2.26 1.85 7.7522; 22 0 0 0
14. 23 2.26 0 0; 24 7.44 0 0; 25 0 0 3.8761; 26 2.26 0 3.8761; 27 8.05 0 3.8761
15. 28 0 0 7.7522; 29 2.26 0 7.7522; 30 8.66 0 7.7522; 31 2.26 7.685 3.8761
16. MEMBER INCIDENCES
17. 1 1 2; 2 2 3; 3 4 5; 4 5 6; 6 8 9; 7 1 4; 8 4 7; 9 2 5; 10 5 8; 11 3 6; 12 6 9
18. 13 10 11; 14 12 13; 15 13 14; 16 15 16; 17 16 17; 18 12 18; 19 18 15; 20 14 19
19. 21 19 17; 22 20 21; 23 22 1; 24 1 12; 25 23 2; 26 2 13; 27 24 3; 28 3 14
20. 29 25 4; 30 4 18; 31 26 5; 32 27 6; 33 6 19; 34 28 20; 35 20 7; 36 7 10
21. 37 10 15; 38 29 21; 39 21 8; 40 8 11; 41 11 16; 42 30 9; 43 9 17; 44 18 31
22. 45 31 19; 46 5 31; 50 13 31; 51 31 16
23. DEFINE MATERIAL START
24. ISOTROPIC CONCRETE
25. E 1.79E+006
26. POISSON 0.17
27. DENSITY 2.4
28. ALPHA 1E-005
29. DAMP 0.05
30. END DEFINE MATERIAL
31. CONSTANTS
32. MATERIAL CONCRETE MEMB 1 TO 4 6 TO 46 50 51
33. MEMBER PROPERTY AMERICAN
34. 23 24 27 28 34 TO 43 PRIS YD 0.3 ZD 0.3
35. 7 TO 12 PRIS YD 0.35 ZD 0.25
36. 1 2 6 PRIS YD 0.35 ZD 0.3
37. 14 TO 21 44 45 50 51 PRIS YD 0.3 ZD 0.25
38. MEMBER PROPERTY AMERICAN
39. 13 22 PRIS YD 0.3 ZD 0.3
40. MEMBER PROPERTY AMERICAN
41. 29 TO 33 46 PRIS YD 0.3 ZD 0.4
42. MEMBER PROPERTY AMERICAN
43. 3 4 PRIS YD 0.35 ZD 0.4
44. MEMBER PROPERTY AMERICAN
45. 25 26 PRIS YD 0.4 ZD 0.3
46. SUPPORTS
47. 22 TO 30 FIXED
48. LOAD 1 CARGA MUERTA
49. SELFWEIGHT Y -1
50. MEMBER LOAD
51. 2 6 UNI GY -0.882
52. 1 3 UNI GY -1.167
53. 4 UNI GY -2.94
54. 7 TO 12 UNI GY -0.864
55. 22 CON GY -4.34 1.13
56. 3 13 CON GY -3.21 1.13
57. 14 TO 17 UNI GY -0.015
58. 44 45 UNI GY -0.03
59. 18 19 UNI GY -0.192
60. LOAD 2 CARGA VIVA
61. MEMBER LOAD
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62. 2 6 UNI GY -0.294
63. 1 3 UNI GY -0.389
64. 4 UNI GY -0.981
65. 7 9 TO 12 UNI GY -0.288
66. 22 CON GY -1.53 1.13
67. 13 CON GY -1.23 1.13
68. 3 CON GY -1.21 1.13
69. 14 TO 17 UNI GY -0.07
70. 44 45 UNI GY -0.14
71. LOAD 3 SISMO EN X
72. SELFWEIGHT X -1
73. MEMBER LOAD
74. 2 6 UNI GX -0.882
75. 1 3 UNI GX -1.167
76. 4 UNI GX -2.94
77. 7 TO 12 UNI GX -0.864
78. 22 CON GX -4.34 1.13
79. 3 13 CON GX -3.21 1.13
80. 14 TO 17 UNI GX -0.015
81. 44 45 UNI GX -0.03
82. 18 19 UNI GX -0.192
83. SELFWEIGHT Z -1
84. MEMBER LOAD
85. 2 6 UNI GZ -0.882
86. 1 3 UNI GZ -1.167
87. 4 UNI GZ -2.94
88. 7 TO 12 UNI GZ -0.864
89. 22 CON GZ -4.34 1.13
90. 3 13 CON GZ -3.21 1.13
91. 14 TO 17 UNI GZ -0.015
92. 44 45 UNI GZ -0.03
93. 18 19 UNI GZ -0.192
94. SPECTRUM CQC X 1 ACC SCALE 9.81 DAMP 0.05
95. 0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
96. 0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
97. 0.7 0.825; 0.75 0.792; 0.8 0.743; 0.85 0.699; 0.9 0.66; 0.95 0.625; 1 0.594
98. 1.1 0.54; 1.2 0.495; 1.3 0.457; 1.4 0.424; 1.5 0.396; 1.6 0.371; 1.7 0.349
99. 1.8 0.33; 1.9 0.313; 2 0.297; 2.1 0.283; 2.2 0.27; 2.3 0.258; 2.4 0.248
100. 2.5 0.238; 2.6 0.228; 2.7 0.22; 2.8 0.212; 2.9 0.205; 3 0.198; 3.1 0.192
101. 3.2 0.186; 3.3 0.18; 3.4 0.175; 3.5 0.17; 3.6 0.165; 3.7 0.165; 3.8 0.165
102. 3.9 0.165; 4 0.165; 4.1 0.165; 4.2 0.165; 4.3 0.165; 4.4 0.165; 4.5 0.165
103. 4.6 0.165; 4.7 0.165; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165; 5.2 0.165
104. 5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165; 5.9 0.165
105. 6 0.165
106. LOAD 4 SISMO EN Z
107. SPECTRUM CQC Z 1 ACC SCALE 9.81 DAMP 0.05
108. *....0A= 0.9
109. *....0B= 0.9
110. *....R= 7*OA*OB =5.67
111. 0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
112. 0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
113. 0.7 0.825; 0.75 0.792; 0.8 0.743; 0.85 0.699; 0.9 0.66; 0.95 0.625; 1 0.594
114. 1.1 0.54; 1.2 0.495; 1.3 0.457; 1.4 0.424; 1.5 0.396; 1.6 0.371; 1.7 0.349
115. 1.8 0.33; 1.9 0.313; 2 0.297; 2.1 0.283; 2.2 0.27; 2.3 0.258; 2.4 0.248
116. 2.5 0.238; 2.6 0.228; 2.7 0.22; 2.8 0.212; 2.9 0.205; 3 0.198; 3.1 0.192
117. 3.2 0.186; 3.3 0.18; 3.4 0.175; 3.5 0.17; 3.6 0.165; 3.7 0.165; 3.8 0.165
118. 3.9 0.165; 4 0.165; 4.1 0.165; 4.2 0.165; 4.3 0.165; 4.4 0.165; 4.5 0.165
119. 4.6 0.165; 4.7 0.165; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165; 5.2 0.165
120. 5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165; 5.9 0.165
121. 6 0.165
122. LOAD COMB 5 CU  1.4D+1.7L
```

```
123. 1 1.4 2 1.7
124. LOAD COMB 6 0.75CU+EX+0.3EZ
125. 1 1.05 2 1.28 3 0.176 4 0.053
126. LOAD COMB 7 0.75CU+EX-0.3EZ
127. 1 1.05 2 1.28 3 0.176 4 -0.053
128. LOAD COMB 8 0.75CU-EX+0.3EZ
129. 1 1.05 2 1.28 3 -0.176 4 0.053
130. LOAD COMB 9 0.75CU-EX-0.3EZ
131. 1 1.05 2 1.28 3 -0.176 4 -0.053
132. LOAD COMB 10 0.9D+EX+0.3EZ
133. 1 0.9 3 0.176 4 0.053
134. LOAD COMB 11 0.9D+EX-0.3EZ
135. 1 0.9 3 0.176 4 -0.053
136. LOAD COMB 12 0.9D-EX+0.3EZ
137. 1 0.9 3 -0.176 4 0.053
138. LOAD COMB 13 0.9D-EX-0.3EZ
139. 1 0.9 3 -0.176 4 -0.053
140. LOAD COMB 14 0.75CU+EZ+0.3EX
141. 1 1.05 2 1.28 3 0.053 4 0.176
142. LOAD COMB 15 0.75CU+EZ-0.3EX
143. 1 1.05 2 1.28 3 -0.053 4 0.176
144. LOAD COMB 16 0.75CU-EZ+0.3EX
145. 1 1.05 2 1.28 3 0.053 4 -0.176
146. LOAD COMB 17 0.75CU-EZ-0.3EX
147. 1 1.05 2 1.28 3 -0.053 4 -0.176
148. LOAD COMB 18 0.9D+EZ+0.3EX
149. 1 0.9 3 0.053 4 0.176
150. LOAD COMB 19 0.9D+EZ-0.3EX
151. 1 0.9 3 -0.053 4 0.176
152. LOAD COMB 20 0.9D-EZ+0.3EX
153. 1 0.9 3 0.053 4 -0.176
154. LOAD COMB 21 0.9D-EZ-0.3EX
155. 1 0.9 3 -0.053 4 -0.176
156. LOAD COMB 22 D+L
157. 1 1.0 2 1.0
158. ***************************************************
159. * * * ----COMBINACIONES REACCIONDE SUELO MODAL-- * * *
160. LOAD COMB 30 SUELO-M D + 70% EX/R
161. 1 1.0 3 0.111
162. LOAD COMB 31 SUELO-M D - 70% EX/R
163. 1 1.0 3 -0.111
164. LOAD COMB 32 SUELO-M D + 70% EZ/R
165. 1 1.0 4 0.111
166. LOAD COMB 33 SUELO-M D - 70% EZ/R
167. 1 1.0 4 -0.111
168. LOAD COMB 34 SUELO-M  L  + D + 70% EX/R
169. 1 1.0 2 1.0 3 0.11
170. LOAD COMB 35 SUELO-M L + D - 70% EX/R
171. 1 1.0 2 1.0 3 -0.11
172. LOAD COMB 36 SUELO-M L + D + 70% EZ/R
173. 1 1.0 2 1.0 4 0.11
174. LOAD COMB 37 SUELO-M L + D - 70% EZ/R
175. 1 1.0 2 1.0 4 -0.11
176. LOAD COMB 38 SUELO-M L + D
177. 1 1.0 2 1.0
178. * * * --------------- * * *
179. PDELTA 10 ANALYSIS
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 31/ 47/ 9
ORIGINAL/FINAL BAND-WIDTH= 26/ 9/ 42 DOF
TOTAL PRIMARY LOAD CASES = 4, TOTAL DEGREES OF FREEDOM = 132
SIZE OF STIFFNESS MATRIX = 6 DOUBLE KILO-WORDS
REQRD/AVAIL. DISK SPACE = 12.2/ 19305.0 MB, EXMEM = 751.8 MB

++ Adjusting Displacements 14:14:28
++ Adjusting Displacements 14:14:28
++ Adjusting Displacements 14:14:28
++ Adjusting Displacements 14:14:28
++ Adjusting Displacements 14:14:28
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++ Adjusting Displacements 14:14:28
++ Adjusting Displacements 14:14:28
++ Adjusting Displacements 14:14:28
*

1 TRIVIAL MASS TERMS SET TO ZERO.
NUMBER OF MODES REQUESTED = 6
NUMBER OF EXISTING MASSES IN THE MODEL = 52
NUMBER OF MODES THAT WILL BE USED = 6

*** □EIGENSOLUTION□: SUBSPACE METHOD ***

CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
1	2.144	0.46646	2.750E-11
2	2.257	0.44314	5.691E-11
3	2.454	0.40750	2.876E-12
4	3.399	0.29424	1.043E-08
5	3.733	0.26787	3.981E-09
6	4.259	0.23482	5.264E-10

The following Frequencies are estimates that were calculated. These are for
information only and will not be used. Remaining values are either above
the cut off mode/freq values or are of low accuracy. To use these
frequencies, rerun with a higher cutoff mode (or mode + freq) value.

CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
7	4.879	0.20495	1.084E-07
8	4.971	0.20115	7.547E-08
9	5.886	0.16989	3.661E-08
10	6.594	0.15165	4.352E-08

11	6.835	0.14631	2.999E-06

RESPONSE LOAD CASE 3

CQC MODAL COMBINATION METHOD USED.
DYNAMIC WEIGHT X Y Z 1.001646E+02 2.360122E-08 1.001646E+02 MTON
MISSING WEIGHT X Y Z -1.250495E+01 -2.360122E-08 -6.274365E+00 MTON
MODAL WEIGHT X Y Z 8.765962E+01 5.838442E-22 9.389021E+01 MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000

PARTICIPATION FACTORS

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	5.11	0.00	73.01	5.115	0.000	73.012	4.23	0.00	0.00
2	80.34	0.00	5.90	85.458	0.000	78.915	66.41	0.00	0.00
3	1.26	0.00	3.96	86.719	0.000	82.875	1.04	0.00	0.00
4	0.03	0.00	0.01	86.753	0.000	82.882	0.03	0.00	0.00
5	0.76	0.00	0.06	87.509	0.000	82.946	0.63	0.00	0.00
6	0.01	0.00	10.79	87.516	0.000	93.736	0.01	0.00	0.00
					TOTAL SRSS SHEAR		66.56	0.00	0.00
					TOTAL 10PCT SHEAR		71.63	0.00	0.00
					TOTAL ABS SHEAR		72.34	0.00	0.00
					TOTAL CQC SHEAR		70.45	0.00	0.00

RESPONSE LOAD CASE 4

CQC MODAL COMBINATION METHOD USED.
DYNAMIC WEIGHT X Y Z 1.001646E+02 2.360122E-08 1.001646E+02 MTON
MISSING WEIGHT X Y Z -1.250495E+01 -2.360122E-08 -6.274365E+00 MTON
MODAL WEIGHT X Y Z 8.765962E+01 5.838442E-22 9.389021E+01 MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000

PARTICIPATION FACTORS

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	5.11	0.00	73.01	5.115	0.000	73.012	0.00	0.00	60.35
2	80.34	0.00	5.90	85.458	0.000	78.915	0.00	0.00	4.88
3	1.26	0.00	3.96	86.719	0.000	82.875	0.00	0.00	3.27
4	0.03	0.00	0.01	86.753	0.000	82.882	0.00	0.00	0.01
5	0.76	0.00	0.06	87.509	0.000	82.946	0.00	0.00	0.05
6	0.01	0.00	10.79	87.516	0.000	93.736	0.00	0.00	8.92
					TOTAL SRSS	SHEAR	0.00	0.00	61.29
					TOTAL 10PCT	SHEAR	0.00	0.00	66.16
					TOTAL ABS	SHEAR	0.00	0.00	77.49
					TOTAL CQC	SHEAR	0.00	0.00	66.38

180. LOAD LIST 3 4
181. PRINT STORY DRIFT
STORY DRIFT

STORY	HEIGHT	LOAD	DRIFT(CM)		ECCENTRICITY	RATIO
	(METE)		X	Z	(METE)	
BASE=	0.00					
1	1.85	3	1.2418	0.2333	0.0000	L / 149
		4	0.3542	1.3617	0.0000	L / 136
2	4.65	3	3.8592	0.6687	0.0000	L / 120
		4	1.0984	3.9384	0.0000	L / 118
3	7.68	3	6.1106	1.0450	0.0000	L / 126
		4	1.2555	6.5881	0.0000	L / 116

182. LOAD LIST 30 TO 38
183. PRINT SUPPORT REACTION
SUPPORT REACTION

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
22	30	0.61	7.35	0.29	0.37	0.04	0.82
	31	-0.44	3.71	0.10	0.01	-0.02	-1.07
	32	0.18	6.46	0.68	1.14	0.04	0.04
	33	-0.01	4.59	-0.30	-0.76	-0.03	-0.29
	34	0.63	8.25	0.35	0.44	0.04	0.77
	35	-0.41	4.65	0.16	0.07	-0.02	-1.10
	36	0.20	7.37	0.74	1.19	0.04	0.00
	37	0.02	5.52	-0.23	-0.69	-0.03	-0.33
	38	0.11	6.45	0.26	0.25	0.01	-0.16
23	30	1.58	11.70	0.35	0.45	0.04	1.45
	31	-0.58	9.21	0.13	0.01	-0.03	-2.67
	32	0.69	11.24	0.95	1.64	0.07	-0.25
	33	0.31	9.68	-0.47	-1.17	-0.05	-0.97
	34	1.70	13.88	0.42	0.52	0.04	1.28
	35	-0.45	11.42	0.20	0.08	-0.02	-2.81
	36	0.81	13.43	1.02	1.69	0.07	-0.41
	37	0.44	11.87	-0.40	-1.09	-0.05	-1.12
	38	0.63	12.65	0.31	0.30	0.01	-0.76
24	30	0.00	7.76	0.37	0.44	0.05	1.29
	31	-0.89	6.88	0.12	-0.03	-0.03	-0.43
	32	-0.34	8.30	0.89	1.46	0.04	0.61
	33	-0.54	6.34	-0.41	-1.04	-0.02	0.26
	34	-0.11	9.18	0.43	0.50	0.05	1.40
	35	-0.99	8.31	0.19	0.04	-0.02	-0.31
	36	-0.45	9.71	0.96	1.51	0.05	0.72
	37	-0.66	7.78	-0.34	-0.97	-0.01	0.37
	38	-0.55	8.74	0.31	0.27	0.02	0.54
25	30	1.26	11.79	0.19	0.36	0.02	1.67
	31	-0.92	7.55	-0.24	-0.47	-0.03	-2.25
	32	0.33	10.00	1.07	2.11	0.06	0.00
	33	0.01	9.34	-1.12	-2.23	-0.06	-0.58
	34	1.31	12.94	0.11	0.26	0.02	1.56
	35	-0.86	8.74	-0.31	-0.56	-0.03	-2.32
	36	0.38	11.17	0.98	2.00	0.06	-0.09
	37	0.06	10.52	-1.19	-2.30	-0.06	-0.67
	38	0.22	10.84	-0.10	-0.15	0.00	-0.38
26	30	2.35	25.19	0.18	0.33	0.03	0.82
	31	-0.12	21.86	-0.23	-0.46	-0.02	-3.41
	32	1.30	23.77	1.27	2.44	0.06	-0.98
	33	0.93	23.28	-1.31	-2.58	-0.05	-1.62
	34	2.66	31.57	0.16	0.30	0.03	0.43
	35	0.21	28.27	-0.24	-0.48	-0.02	-3.76
	36	1.62	30.16	1.24	2.40	0.06	-1.35
	37	1.25	29.68	-1.32	-2.58	-0.05	-1.98
	38	1.43	29.92	-0.04	-0.09	0.01	-1.67

27	30	-0.69	17.79	0.31	0.45	0.03	3.43
	31	-2.58	16.87	-0.23	-0.64	-0.02	-0.19
	32	-1.50	17.43	1.51	2.80	0.05	1.87

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	33	-1.77	17.24	-1.43	-2.99	-0.04	1.36
	34	-1.17	22.10	0.32	0.43	0.03	3.89
	35	-3.05	21.19	-0.22	-0.66	-0.02	0.30
	36	-1.98	21.74	1.51	2.75	0.05	2.35
	37	-2.25	21.55	-1.40	-2.99	-0.04	1.84
	38	-2.11	21.65	0.05	-0.12	0.01	2.09
28	30	2.16	11.61	-0.13	-0.08	0.01	0.39
	31	0.08	6.39	-0.32	-0.43	-0.02	-2.14
	32	1.42	10.33	0.28	0.71	0.03	-0.52
	33	0.82	7.67	-0.73	-1.22	-0.04	-1.24
	34	2.47	13.12	-0.14	-0.08	0.01	0.13
	35	0.40	7.95	-0.32	-0.44	-0.01	-2.37
	36	1.73	11.85	0.27	0.69	0.03	-0.76
	37	1.14	9.22	-0.73	-1.21	-0.03	-1.48
	38	1.44	10.53	-0.23	-0.26	0.00	-1.12
29	30	0.90	14.85	-0.14	-0.09	0.01	1.00
	31	-0.98	10.15	-0.33	-0.45	-0.01	-1.41
	32	0.23	13.25	0.37	0.84	0.04	0.14
	33	-0.31	11.74	-0.84	-1.38	-0.03	-0.55
	34	0.86	17.93	-0.20	-0.16	0.02	0.96
	35	-1.00	13.27	-0.39	-0.52	0.00	-1.44
	36	0.20	16.34	0.30	0.76	0.04	0.10
	37	-0.34	14.85	-0.89	-1.44	-0.03	-0.58
	38	-0.07	15.60	-0.30	-0.34	0.01	-0.24
30	30	-0.34	8.58	-0.08	-0.02	0.02	1.92
	31	-1.40	7.70	-0.34	-0.51	-0.04	-0.11
	32	-0.74	9.02	0.47	1.03	0.02	1.17
	33	-1.00	7.25	-0.88	-1.56	-0.04	0.64
	34	-0.57	10.21	-0.14	-0.09	0.01	2.15
	35	-1.62	9.34	-0.39	-0.58	-0.04	0.13
	36	-0.96	10.65	0.40	0.95	0.01	1.40
	37	-1.22	8.90	-0.93	-1.62	-0.04	0.87
	38	-1.09	9.78	-0.26	-0.34	-0.01	1.14

********** END OF LATEST ANALYSIS RESULT **********

184. LOAD LIST 5 TO 22
185. START CONCRETE DESIGN
CONCRETE DESIGN
186. CODE ACI
187. FYMAIN 42000 MEMB 23 TO 43 46
188. FYSEC 42000 MEMB 23 TO 43 46
189. FC 2100 MEMB 23 TO 43 46
190. DESIGN COLUMN 23 TO 43 46

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==========================================================================

COLUMN  NO.    23  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

==========================================================================

COLUMN  NO.    24  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

==========================================================================

COLUMN  NO.    25  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 300.0 X 400.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =  1200.0  SQ. MM

==========================================================================

COLUMN  NO.    26  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 300.0 X 400.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =  1200.0  SQ. MM

==========================================================================

COLUMN  NO.    27  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

==========================================================================

COLUMN  NO.    28  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM
```

BAR CONFIGURATION	REINF PCT.	LOAD	LOCATION	PHI
8 - 12 MM	1.005	5	END	0.650

(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)

==========

COLUMN NO. 29 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 400.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 1200.0 SQ. MM

==========

COLUMN NO. 30 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 400.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 1200.0 SQ. MM

==========

COLUMN NO. 31 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 400.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1284.0 SQ. MM

==========

COLUMN NO. 32 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 400.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 2040.0 SQ. MM

==========

COLUMN NO. 33 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, RECT SIZE - 400.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1368.0 SQ. MM

==========

COLUMN NO. 34 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

```
AREA OF STEEL REQUIRED =   963.0  SQ. MM

=====================================================================

COLUMN  NO.    35  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    36  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    37  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    38  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM
=====================================================================

COLUMN  NO.    39  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    40  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
```

```
AREA OF STEEL REQUIRED =   900.0  SQ. MM

========================================================================

COLUMN  NO.    41  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

========================================================================

COLUMN  NO.    42  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1278.0  SQ. MM

========================================================================

COLUMN  NO.    43  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

========================================================================

COLUMN  NO.    46  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  RECT SIZE - 400.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =  1200.0  SQ. MM
```

Columna C-1

Nivel H	Libre	Losa	B	H	Cuantia
N 7.685		.30	.30	.30	
	3.90				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.225		.35	.30	.30	
	3.05				8/#4 (1.1%)
					8/#4 (1.1%)
1.95		1.50			

Columna C-2

Nivel H	Libre	Losa	B	H	Cuantia
N 7.685		.30	.30	.40	
	4.14				8/#5 #4 (1.1%)
					8/#5 #4 (1.1%)
N 3.225		.35	.30	.40	
	3.05				8/#5 #4 (1.1%)
					8/#5 #4 (1.1%)
1.95		1.50			

Columna C-3

Nivel H	Libre	Losa	B	H	Cuantia
N 8.325		.30	.30	.30	
	4.65				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.225		.35	.30	.30	
	3.05				8/#4 (1.1%)
					8/#4 (1.1%)
1.95		1.50			

Columna B-1

Nivel H	Libre	Losa	B	H	Cuantia
N 7.685		.30	.40	.30	
	3.90				8/#5 #4 (1.1%)
					8/#5 #4 (1.1%)
N 3.225		.35	.40	.30	
	3.05				8/#5 #4 (1.1%)
					8/#5 #4 (1.1%)
1.95		1.50			

Columna B-2

Nivel H	Libre	Losa	B	H	Cuantia
N 7.685		.30	.40	.30	
	4.14				8/#5 #4 (1.1%)
					8/#5 #4 (1.1%)
N 3.225		.35	.40	.30	
	3.05				8/#5 #4 (1.1%)
					8/#5 #4 (1.1%)
1.95		1.50			

Columna B-3

Nivel H	Libre	Losa	B	H	Cuantia
N 8.325		.30	.40	.30	
	4.72				8/#5 #4 (1.1%)
					8/#5 (1.3%)
N 3.225		.35	.40	.30	
	3.05				8/#5 (1.3%)
					8/#5 (1.3%)
1.95		1.50			

Columna A-1

Nivel H	Libre	Losa	B	H	Cuantia
N 7.685		.30	.30	.30	
	2.50				8/#4 (1.1%)
					8/#4 (1.1%)
N 4.65		.30	.30	.30	
	1.10				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.225		.35	.30	.30	
	1.05				8/#4 (1.1%)
					8/#4 (1.1%)
N 1.85		.30	.30	.30	
	1.70				8/#4 (1.1%)
					8/#4 (1.1%)
1.95		1.50			

Columna A-2

Nivel H	Libre	Losa	B	H	Cuantia
N 7.685		.30	.30	.30	
	2.73				8/#4 (1.1%)
					8/#4 (1.1%)
N 4.65		.30	.30	.30	
	1.10				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.225		.35	.30	.30	
	1.05				8/#4 (1.1%)
					8/#4 (1.1%)
N 1.85		.30	.30	.30	
	1.70				8/#4 (1.1%)
					8/#4 (1.1%)
1.95		1.50			

Columna A-3

Nivel H	Libre	Losa	B	H	Cuantia
N 8.325		.30	.30	.30	
	4.78				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.225		.35	.30	.30	
	3.05				8/#4 (1.1%)
					8/#4 (1.1%)
1.95		1.50			

EJE A/N 1.85

B=0.30 H=0.30 L=1.96		
M=-3.49 A=3.94		M=-2.99 A=3.34
	M=3.90 A=4.44	
u=-4.81	u=-4.55	u=4.21

EJE 1/N 3.225

B=0.25 H=0.35 L=3.53			B=0.25 H=0.35 L=3.53		
M=-2.20 A=2.47		M=-2.66 A=2.47	M=-1.64 A=2.47		M=-1.40 A=2.47
	M=1.93 A=2.47			M=1.29 A=2.47	
u=-3.27	u=0.58	u=3.52	u=-1.12	u=-0.70	u=0.97

EJE 2/N 3.225

B=0.25 H=0.35 L=3.53			B=0.25 H=0.35 L=3.53		
M=-1.92 A=2.47		M=-2.60 A=2.47	M=-2.69 A=2.47		M=-2.13 A=2.47
	M=1.81 A=2.47			M=1.82 A=2.47	
u=-3.16	u=0.59	u=3.62	u=-3.60	u=-0.61	u=3.18

EJE 3/N 3.225

B=0.25 H=0.35 L=3.57			B=0.25 H=0.35 L=3.57		
M=-2.38 A=2.47		M=-2.94 A=2.71	M=-3.32 A=3.08		M=-2.20 A=2.47
	M=2.26 A=2.47			M=2.13 A=2.47	
u=-3.26	u=0.74	u=3.61	u=-3.80	u=-0.87	u=3.07

EJE A/N 3.225

B=0.30 H=0.35 L=6.10		
M=-6.36 A=5.05		M=-6.01 A=4.71
	M=4.16 A=3.86	
u=-6.86	u=-0.38	u=5.76

EJE B/N 3.225

B=0.40 H=0.35 L=1.96			B=0.40 H=0.35 L=5.49		
M=-2.35 A=3.96		M=-7.63 A=7.24	M=-14.58 A=15.09		M=-11.74 A=11.69
	M=2.05 A=3.96			M=9.31 A=9.00	
u=-2.96	u=1.91	u=8.28	u=-16.02	u=-0.61	u=16.03

EJE C/N 3.225

B=0.30 H=0.35 L=1.91			B=0.30 H=0.35 L=4.83		
M=-1.89 A=2.97		M=-3.01 A=2.97	M=-4.21 A=3.91		M=-3.15 A=2.97
	M=1.65 A=2.97			M=2.78 A=2.97	
u=-2.86	u=1.74	u=3.70	u=-4.94	u=-0.53	u=4.46

EJE A/N 4.65

B=0.30 H=0.30 L=1.96		
M=-2.39 A=2.64		M=-2.37 A=2.62
	M=2.97 A=3.32	
u=-3.48	u=-3.23	u=3.46

EJE 1/N 7.685

B=0.25 H=0.30 L=3.53			B=0.25 H=0.30 L=3.53		
M=-0.87 A=2.06		M=-1.18 A=2.06	M=-1.04 A=2.06		M=-0.78 A=2.06
	M=0.83 A=2.06			M=0.80 A=2.06	
u=-0.97	u=0.37	u=1.12	u=-1.08	u=-0.31	u=0.95

EJE 2/N 7.685

B=0.25 H=0.30 L=3.53			B=0.25 H=0.30 L=3.53		
M=-0.93 A=2.06		M=-0.86 A=2.06	M=-0.76 A=2.06		M=-0.78 A=2.06
	M=0.78 A=2.06			M=0.71 A=2.06	
u=-0.72	u=-0.36	u=0.69	u=-0.64	u=0.31	u=0.68

EJE A/N 7.685

B=0.25 H=0.30 L=1.97			B=0.25 H=0.30 L=6.13		
M=-1.06 A=2.06		M=-0.96 A=2.06	M=-1.11 A=2.06		M=-1.26 A=2.06
	M=0.59 A=2.06			M=0.87 A=2.06	
u=-0.90	u=0.69	u=0.96	u=-1.14	u=0.12	u=1.18

EJE B/N 7.685

B=0.25 H=0.30 L=1.97			B=0.25 H=0.30 L=5.52		
M=-1.13 A=2.06		M=-0.97 A=2.06	M=-1.29 A=2.06		M=-1.56 A=2.06
	M=0.94 A=2.06			M=0.93 A=2.06	
u=-1.23	u=-0.82	u=1.11	u=-1.33	u=0.18	u=1.42

EJE C/N 7.685

B=0.25 H=0.30 L=1.92			B=0.25 H=0.30 L=4.86		
M=-0.85 A=2.06		M=-1.06 A=2.06	M=-1.07 A=2.06		M=-0.98 A=2.06
	M=0.89 A=2.06			M=0.79 A=2.06	
u=-0.98	u=0.80	u=1.10	u=-0.96	u=-0.20	u=0.92

EJE 3/N 8.325

B=0.25 H=0.30 L=3.57			B=0.25 H=0.30 L=3.57		
M=-1.08 A=2.06		M=-1.16 A=2.06	M=-1.09 A=2.06		M=-1.08 A=2.06
	M=1.01 A=2.06			M=1.02 A=2.06	
u=-0.81	u=0.47	u=0.83	u=-0.80	u=-0.45	u=0.82

Memoria de diseño de Nervios

NERVIO 1/

B=0.12 H=0.25 L=3.53		
M=-0.00 A=0.79		M=-0.00 A=0.79
	M=1.36 A=1.99	
v=1.30	v=0.02	v=-1.27

NERVIO 1/

B=0.12 H=0.25 L=3.57			B=0.12 H=0.25 L=3.57		
M=-0.00 A=0.79		M=-1.12 A=1.61	M=-1.12 A=1.61		M=0.00 A=0.79
	M=0.67 A=1.04			M=0.67 A=1.04	
v=0.95	v=-0.35	v=-1.65	v=1.65	v=0.35	v=-0.95

ANEXO 4

MEMORIAS DISEÑO ESTRUCTURAL COLEGIO CRISTO REY SAN FERNANDO

```
INPUT FILE: BLOQUE SAN FERNANDO.STD
1. STAAD SPACE SAN FERNANDO
2. START JOB INFORMATION
3. ENGINEER DATE 30-AUG-05
4. END JOB INFORMATION
5. INPUT WIDTH 79
6. UNIT METER MTON
7. JOINT COORDINATES
8. 1 0 0 0; 2 3.4 0 0; 3 6.8 0 0; 4 10.8 0 0; 5 14.7 0 0; 6 10.8 0 4.85
9. 7 14.7 0 4.85; 8 0 0 9.7; 9 3.4 0 9.7; 10 6.8 0 9.7; 11 10.8 0 9.7
10. 12 14.7 0 9.7; 13 0 0 4.85; 14 0 3.65 0; 15 3.4 3.65 0; 16 6.8 3.65 0
11. 17 10.8 3.65 0; 18 14.7 3.65 0; 19 10.8 3.65 4.85; 20 14.7 3.65 4.85
12. 21 0 3.65 9.7; 22 3.4 3.65 9.7; 23 6.8 3.65 9.7; 24 10.8 3.65 9.7
13. 25 14.7 3.65 9.7; 26 0 3.65 4.85; 27 3.4 5.19 0; 29 6.8 5.3 0; 30 3.4 5.19
9.7
14. 31 6.8 5.3 9.7
15. MEMBER INCIDENCES
16. 16 14 15; 17 15 16; 18 16 17; 19 17 18; 20 19 20; 21 21 22; 22 22 23; 23 23
24
17. 24 24 25; 25 14 26; 26 26 21; 27 17 19; 28 19 24; 29 18 20; 30 20 25; 31 1 14
18. 32 2 15; 33 3 16; 34 4 17; 35 5 18; 36 15 27; 38 16 29; 55 13 26; 56 6 19
19. 57 7 20; 61 8 21; 62 9 22; 63 10 23; 64 11 24; 65 12 25; 66 22 30; 67 23 31
20. 68 14 27; 69 27 29; 70 29 17; 71 21 30; 72 30 31; 73 31 24
21. DEFINE MATERIAL START
22. ISOTROPIC CONCRETE
23. E 1.79E+006
24. POISSON 0.17
25. DENSITY 2.4
26. ALPHA 1E-005
27. DAMP 0.05
28. END DEFINE MATERIAL
29. CONSTANTS
30. MATERIAL CONCRETE MEMB 16 TO 36 38 55 TO 57 61 TO 73
31. MEMBER CURVE
32. 68 71 RADIUS 9.8
33. 69 72 RADIUS 9.8
34. 70 73 RADIUS 9.8
35. MEMBER PROPERTY AMERICAN
36. 31 TO 36 38 55 TO 57 61 TO 67 PRIS YD 0.3 ZD 0.3
37. 16 TO 30 PRIS YD 0.3 ZD 0.25
38. MEMBER PROPERTY AMERICAN
39. 68 TO 73 PRIS YD 0.2 ZD 0.2
40. SUPPORTS
41. 1 TO 13 FIXED
42. CUT OFF MODE SHAPE 10
43. LOAD 1 CARGA MUERTA
44. SELFWEIGHT Y -1
45. JOINT LOAD
46. 19 26 FY -0.77
47. MEMBER LOAD
48. 68 TO 73 UNI GY -0.03
49. 27 TO 30 UNI GY -0.866
50. 19 20 24 UNI GY -0.64
51. LOAD 2 CARGA VIVA
52. MEMBER LOAD
53. 27 TO 30 UNI GY -0.107
54. 19 20 24 UNI GY -0.08
55. 68 TO 73 UNI GY -0.085
56. JOINT LOAD
57. 19 26 FY -0.98
58. LOAD 3 SISMO EN X
```

```
SELFWEIGHT X -1
JOINT LOAD
19 26 FX -0.77
MEMBER LOAD
68 TO 73 UNI GX -0.03
27 TO 30 UNI GX -0.866
19 20 24 UNI GX -0.64
SELFWEIGHT Z -1
JOINT LOAD
19 26 FZ -0.77
MEMBER LOAD
68 TO 73 UNI GZ -0.03
27 TO 30 UNI GZ -0.866
19 20 24 UNI GZ -0.64
*....ESPECTRO ELASTICO DE DISEÑO NSR 98
*....COEFICIENTE DE IMPORTANCIA I= 1.1
*....COEFICIENTE DE SITIO S=  S3= 1.5
SPECTRUM CQC X 1 ACC SCALE 9.81 DAMP 0.05
0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
0.7 0.825; 0.75 0.792; 0.8 0.743; 0.85 0.699; 0.9 0.66; 0.95 0.625; 1 0.594
1.1 0.54; 1.2 0.495; 1.3 0.457; 1.4 0.424; 1.5 0.396; 1.6 0.371; 1.7 0.349
1.8 0.33; 1.9 0.313; 2 0.297; 2.1 0.283; 2.2 0.27; 2.3 0.258; 2.4 0.248
2.5 0.238; 2.6 0.228; 2.7 0.22; 2.8 0.212; 2.9 0.205; 3 0.198; 3.1 0.192
3.2 0.186; 3.3 0.18; 3.4 0.175; 3.5 0.17; 3.6 0.165; 3.7 0.165; 3.8 0.165
3.9 0.165; 4 0.165; 4.1 0.165; 4.2 0.165; 4.3 0.165; 4.4 0.165; 4.5 0.165
4.6 0.165; 4.7 0.165; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165; 5.2 0.165
5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165; 5.9 0.165
6 0.165
LOAD 4 SISMO EN Z
SPECTRUM CQC Z 1 ACC SCALE 9.81 DAMP 0.05
*....0A= 0.9
*....0B= 0.9
*....R= 7*OA*OB =5.67
0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
0.7 0.825; 0.75 0.792; 0.8 0.743; 0.85 0.699; 0.9 0.66; 0.95 0.625; 1 0.594
1.1 0.54; 1.2 0.495; 1.3 0.457; 1.4 0.424; 1.5 0.396; 1.6 0.371; 1.7 0.349
1.8 0.33; 1.9 0.313; 2 0.297; 2.1 0.283; 2.2 0.27; 2.3 0.258; 2.4 0.248
2.5 0.238; 2.6 0.228; 2.7 0.22; 2.8 0.212; 2.9 0.205; 3 0.198; 3.1 0.192
3.2 0.186; 3.3 0.18; 3.4 0.175; 3.5 0.17; 3.6 0.165; 3.7 0.165; 3.8 0.165
3.9 0.165; 4 0.165; 4.1 0.165; 4.2 0.165; 4.3 0.165; 4.4 0.165; 4.5 0.165
4.6 0.165; 4.7 0.165; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165; 5.2 0.165
5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165; 5.9 0.165
6 0.165
LOAD COMB 5 CU  1.4D+1.7L
1 1.4 2 1.7
LOAD COMB 6 0.75CU+EX+0.3EZ
1 1.05 2 1.28 3 0.176 4 0.053
LOAD COMB 7 0.75CU+EX-0.3EZ
1 1.05 2 1.28 3 0.176 4 -0.053
LOAD COMB 8 0.75CU-EX+0.3EZ
1 1.05 2 1.28 3 -0.176 4 0.053
LOAD COMB 9 0.75CU-EX-0.3EZ
1 1.05 2 1.28 3 -0.176 4 -0.053
LOAD COMB 10 0.9D+EX+0.3EZ
1 0.9 3 0.176 4 0.053
LOAD COMB 11 0.9D+EX-0.3EZ
1 0.9 3 0.176 4 -0.053
LOAD COMB 12 0.9D-EX+0.3EZ
1 0.9 3 -0.176 4 0.053
```

```
120. LOAD COMB 13 0.9D-EX-0.3EZ
121. 1 0.9 3 -0.176 4 -0.053
122. LOAD COMB 14 0.75CU+EZ+0.3EX
123. 1 1.05 2 1.28 3 0.053 4 0.176
124. LOAD COMB 15 0.75CU+EZ-0.3EX
125. 1 1.05 2 1.28 3 -0.053 4 0.176
126. LOAD COMB 16 0.75CU-EZ+0.3EX
127. 1 1.05 2 1.28 3 0.053 4 -0.176
128. LOAD COMB 17 0.75CU-EZ-0.3EX
129. 1 1.05 2 1.28 3 -0.053 4 -0.176
130. LOAD COMB 18 0.9D+EZ+0.3EX
131. 1 0.9 3 0.053 4 0.176
132. LOAD COMB 19 0.9D+EZ-0.3EX
133. 1 0.9 3 -0.053 4 0.176
134. LOAD COMB 20 0.9D-EZ+0.3EX
135. 1 0.9 3 0.053 4 -0.176
136. LOAD COMB 21 0.9D-EZ-0.3EX
137. 1 0.9 3 -0.053 4 -0.176
138. LOAD COMB 22 D+L
139. 1 1.0 2 1.0
140. ************************************************
141. * * * ----COMBINACIONES REACCIONDE SUELO MODAL-- * * *
142. LOAD COMB 30 SUELO-M D + 70% EX/R
143. 1 1.0 3 0.1235
144. LOAD COMB 31 SUELO-M D - 70% EX/R
145. 1 1.0 3 -0.1235
146. LOAD COMB 32 SUELO-M D + 70% EZ/R
147. 1 1.0 4 0.1235
148. LOAD COMB 33 SUELO-M D - 70% EZ/R
149. 1 1.0 4 -0.1235
150. LOAD COMB 34 SUELO-M  L  + D + 70% EX/R
151. 1 1.0 2 1.0 3 0.1235
152. LOAD COMB 35 SUELO-M L + D - 70% EX/R
153. 1 1.0 2 1.0 3 -0.1235
154. LOAD COMB 36 SUELO-M L + D + 70% EZ/R
155. 1 1.0 2 1.0 4 0.1235
156. LOAD COMB 37 SUELO-M L + D - 70% EZ/R
157. 1 1.0 2 1.0 4 -0.1235
158. LOAD COMB 38 SUELO-M L + D
159. 1 1.0 2 1.0
160. * * * --------------- * * *
161. PDELTA 10 ANALYSIS

           P R O B L E M   S T A T I S T I C S
           -----------------------------------

     NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    30/    38/    13
     ORIGINAL/FINAL BAND-WIDTH=    13/     7/     30 DOF
     TOTAL PRIMARY LOAD CASES =     4, TOTAL DEGREES OF FREEDOM =    102
     SIZE OF STIFFNESS MATRIX =       4 DOUBLE  KILO-WORDS
     REQRD/AVAIL. DISK SPACE  =    12.1/ 19305.6 MB,  EXMEM =  753.7 MB

++ Adjusting Displacements                          11:32:32
++ Adjusting Displacements                          11:32:32
++ Adjusting Displacements                          11:32:32
++ Adjusting Displacements                          11:32:32
++ Adjusting Displacements                          11:32:32
++ Adjusting Displacements                          11:32:32
++ Adjusting Displacements                          11:32:32
++ Adjusting Displacements                          11:32:32
++ Adjusting Displacements                          11:32:32
```

++ Adjusting Displacements 11:32:32

NUMBER OF MODES REQUESTED = 10
NUMBER OF EXISTING MASSES IN THE MODEL = 42
NUMBER OF MODES THAT WILL BE USED = 10

EIGENSOLUTION□: SUBSPACE METHOD ***

CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
1	2.881	0.34707	2.593E-11
2	3.114	0.32111	2.491E-12
3	3.578	0.27951	3.675E-11
4	3.923	0.25492	3.129E-10
5	4.228	0.23652	2.363E-10
6	4.524	0.22106	2.564E-09
7	4.643	0.21539	1.283E-09
8	5.347	0.18701	1.134E-09
9	6.024	0.16600	6.538E-10
10	8.726	0.11459	6.743E-09

The following Frequencies are estimates that were calculated. These are for information only and will not be used. Remaining values are either above the cut off mode/freq values or are of low accuracy. To use these frequencies, rerun with a higher cutoff mode (or mode + freq) value.

CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
11	9.172	0.10903	1.848E-09
12	18.455	0.05419	2.307E-07
13	18.458	0.05418	5.569E-09
14	21.982	0.04549	4.660E-08
15	21.993	0.04547	1.764E-08
16	36.739	0.02722	5.903E-05

RESPONSE LOAD CASE 3

CQC MODAL COMBINATION METHOD USED.
DYNAMIC WEIGHT X Y Z 4.647051E+01 2.286711E-04 4.647084E+01 MTON
MISSING WEIGHT X Y Z -4.012577E-03 -2.286711E-04 -5.408856E-01 MTON
MODAL WEIGHT X Y Z 4.646650E+01 1.113819E-15 4.592995E+01 MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000

5	0.82528	0.05000
6	0.82528	0.05000
7	0.82528	0.05000
8	0.82528	0.05000
9	0.82528	0.05000
10	0.82528	0.05000

PARTICIPATION FACTORS

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	0.00	0.00	90.11	0.005	0.000	90.107	0.00	0.00	0.00
2	57.54	0.00	0.00	57.543	0.000	90.112	22.07	0.00	0.00
3	0.00	0.00	0.51	57.543	0.000	90.618	0.00	0.00	0.00
4	4.64	0.00	0.00	62.183	0.000	90.618	1.78	0.00	0.00
5	0.06	0.00	1.72	62.247	0.000	92.337	0.02	0.00	0.00
6	35.16	0.00	0.00	97.411	0.000	92.337	13.49	0.00	0.00
7	0.08	0.00	0.79	97.491	0.000	93.131	0.03	0.00	0.00
8	2.50	0.00	0.00	99.987	0.000	93.132	0.96	0.00	0.00
9	0.00	0.00	5.70	99.989	0.000	98.836	0.00	0.00	0.00
10	0.00	0.00	0.00	99.991	0.000	98.836	0.00	0.00	0.00
					TOTAL SRSS	SHEAR	25.94	0.00	0.00
					TOTAL 10PCT	SHEAR	25.97	0.00	0.00
					TOTAL ABS	SHEAR	38.35	0.00	0.00
					TOTAL CQC	SHEAR	27.38	0.00	0.00

RESPONSE LOAD CASE 4

CQC MODAL COMBINATION METHOD USED.
DYNAMIC WEIGHT X Y Z 4.647051E+01 2.286711E-04 4.647084E+01 MTON
MISSING WEIGHT X Y Z -4.012577E-03 -2.286711E-04 -5.408856E-01 MTON
MODAL WEIGHT X Y Z 4.646650E+01 1.113819E-15 4.592995E+01 MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000
7	0.82528	0.05000
8	0.82528	0.05000
9	0.82528	0.05000
10	0.82528	0.05000

PARTICIPATION FACTORS

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	0.00	0.00	90.11	0.005	0.000	90.107	0.00	0.00	34.56
2	57.54	0.00	0.00	57.543	0.000	90.112	0.00	0.00	0.00
3	0.00	0.00	0.51	57.543	0.000	90.618	0.00	0.00	0.19
4	4.64	0.00	0.00	62.183	0.000	90.618	0.00	0.00	0.00
5	0.06	0.00	1.72	62.247	0.000	92.337	0.00	0.00	0.66
6	35.16	0.00	0.00	97.411	0.000	92.337	0.00	0.00	0.00
7	0.08	0.00	0.79	97.491	0.000	93.131	0.00	0.00	0.30
8	2.50	0.00	0.00	99.987	0.000	93.132	0.00	0.00	0.00
9	0.00	0.00	5.70	99.989	0.000	98.836	0.00	0.00	2.19
10	0.00	0.00	0.00	99.991	0.000	98.836	0.00	0.00	0.00
					TOTAL SRSS	SHEAR	0.00	0.00	34.63
					TOTAL 10PCT	SHEAR	0.00	0.00	34.64
					TOTAL ABS	SHEAR	0.00	0.00	37.91
					TOTAL CQC	SHEAR	0.00	0.00	34.77

162. LOAD LIST 3 4
163. PRINT STORY DRIFT

STORY DRIFT

STORY	HEIGHT (METE)	LOAD	DRIFT(CM) X	DRIFT(CM) Z	ECCENTRICITY (METE)	RATIO
BASE=	0.00					
1	3.65	3	1.1904	0.1840	0.0000	L / 306
		4	0.0746	1.8023	0.0000	L / 202
2	5.19	3	0.8919	0.8741	0.0000	L / 582
		4	0.1015	2.1731	0.0000	L / 239
3	5.30	3	0.8952	0.9919	0.0000	L / 534
		4	0.0995	3.4660	0.0000	L / 153

164. LOAD LIST 30 TO 38

165. PRINT SUPPORT REACTION

SUPPORT REACTION

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	30	0.24	1.88	0.10	0.12	0.05	0.37
	31	-0.16	1.41	0.07	0.08	-0.04	-0.49
	32	0.06	1.70	0.19	0.34	0.06	-0.01
	33	0.02	1.59	-0.01	-0.14	-0.05	-0.10
	34	0.24	2.03	0.12	0.12	0.05	0.37
	35	-0.16	1.56	0.09	0.09	-0.04	-0.49
	36	0.06	1.85	0.20	0.34	0.06	-0.01
	37	0.02	1.74	0.00	-0.13	-0.05	-0.10
	38	0.04	1.80	0.10	0.11	0.01	-0.06
2	30	0.28	2.40	0.05	0.13	0.05	0.48
	31	-0.25	2.11	-0.05	-0.21	-0.02	-0.54
	32	0.04	2.29	0.09	0.35	0.10	0.02
	33	-0.01	2.22	-0.09	-0.43	-0.07	-0.08
	34	0.29	2.70	0.04	0.12	0.05	0.48
	35	-0.25	2.42	-0.05	-0.23	-0.02	-0.55
	36	0.05	2.60	0.09	0.34	0.10	0.01
	37	-0.01	2.52	-0.09	-0.45	-0.07	-0.09
	38	0.02	2.56	0.00	-0.05	0.01	-0.04
3	30	0.28	2.33	0.08	0.18	0.02	0.48
	31	-0.25	2.23	-0.02	-0.21	-0.03	-0.54
	32	0.04	2.29	0.22	0.67	0.06	0.02
	33	-0.01	2.26	-0.16	-0.71	-0.07	-0.08
	34	0.28	2.64	0.09	0.18	0.02	0.47
	35	-0.24	2.55	-0.01	-0.21	-0.04	-0.54
	36	0.04	2.61	0.23	0.68	0.05	0.02
	37	-0.01	2.58	-0.15	-0.71	-0.07	-0.09
	38	0.02	2.59	0.04	-0.01	-0.01	-0.03
4	30	0.43	5.51	0.50	0.60	0.05	0.26
	31	-0.07	5.41	0.46	0.55	-0.05	-0.72
	32	0.21	5.73	1.02	1.82	0.01	-0.18
	33	0.16	5.18	-0.07	-0.68	-0.02	-0.28
	34	0.45	6.12	0.53	0.65	0.05	0.23
	35	-0.04	6.02	0.49	0.59	-0.06	-0.76
	36	0.23	6.34	1.06	1.87	0.01	-0.21
	37	0.18	5.80	-0.04	-0.63	-0.02	-0.31
	38	0.21	6.07	0.51	0.62	0.00	-0.26
5	30	-0.07	4.74	0.52	0.63	0.07	0.74
	31	-0.46	4.46	0.51	0.61	-0.07	-0.13
	32	-0.24	4.86	1.02	1.76	0.02	0.35
	33	-0.28	4.34	0.01	-0.53	-0.02	0.26
	34	-0.09	5.12	0.57	0.70	0.07	0.76
	35	-0.48	4.85	0.56	0.67	-0.07	-0.10
	36	-0.27	5.25	1.07	1.83	0.02	0.38

	37	-0.31	4.72	0.06	-0.46	-0.02	0.29
	38	-0.29	4.98	0.57	0.68	0.00	0.33
6	30	0.96	9.15	0.01	0.03	0.00	1.05
	31	-0.37	8.23	0.00	0.00	0.00	-1.78
	32	0.30	8.69	0.76	1.51	0.02	-0.35
	33	0.29	8.69	-0.75	-1.49	-0.02	-0.38
	34	0.99	10.84	0.03	0.05	0.00	1.01
	35	-0.34	9.93	0.01	0.02	0.00	-1.82
	36	0.33	10.39	0.78	1.54	0.02	-0.39
	37	0.32	10.38	-0.73	-1.46	-0.01	-0.41
	38	0.33	10.39	0.02	0.04	0.00	-0.40
7	30	0.37	8.39	0.01	0.01	0.00	1.75
	31	-0.96	7.47	0.00	-0.01	0.00	-1.07
	32	-0.29	7.93	0.68	1.37	0.01	0.35
	33	-0.30	7.92	-0.68	-1.36	-0.01	0.33
	34	0.34	9.11	0.01	0.02	0.00	1.79
	35	-0.98	8.19	0.00	0.00	0.00	-1.03
	36	-0.32	8.66	0.69	1.37	0.01	0.39
	37	-0.33	8.65	-0.68	-1.35	-0.01	0.37
	38	-0.32	8.65	0.01	0.01	0.00	0.38
8	30	0.24	1.97	-0.06	-0.08	0.04	0.36
	31	-0.15	1.49	-0.10	-0.13	-0.05	-0.49
	32	0.07	1.82	0.01	0.13	0.05	-0.02
	33	0.02	1.64	-0.18	-0.34	-0.06	-0.12
	34	0.24	2.15	-0.06	-0.08	0.04	0.37
	35	-0.16	1.67	-0.09	-0.13	-0.05	-0.49
	36	0.06	2.00	0.02	0.13	0.04	-0.01
	37	0.02	1.82	-0.17	-0.34	-0.06	-0.11
	38	0.04	1.91	-0.07	-0.10	-0.01	-0.06
9	30	0.28	2.35	0.04	0.20	0.02	0.48
	31	-0.25	2.05	-0.05	-0.14	-0.05	-0.55
	32	0.05	2.23	0.09	0.42	0.07	0.03
	33	-0.01	2.16	-0.09	-0.36	-0.10	-0.09
	34	0.29	2.65	0.04	0.19	0.02	0.48
	35	-0.25	2.35	-0.05	-0.14	-0.05	-0.55
	36	0.05	2.53	0.09	0.42	0.07	0.02
	37	-0.01	2.46	-0.10	-0.37	-0.10	-0.10
	38	0.02	2.50	-0.01	0.02	-0.02	-0.04
10	30	0.27	2.22	0.03	0.21	0.03	0.48
	31	-0.25	2.14	-0.07	-0.16	-0.02	-0.54
	32	0.04	2.19	0.17	0.72	0.06	0.03
	33	-0.02	2.17	-0.22	-0.67	-0.06	-0.08
	34	0.28	2.53	0.03	0.22	0.02	0.47
	35	-0.25	2.44	-0.07	-0.15	-0.03	-0.54
	36	0.04	2.50	0.17	0.72	0.06	0.02
	37	-0.01	2.47	-0.21	-0.66	-0.06	-0.09
	38	0.02	2.48	-0.02	0.03	0.00	-0.03
11	30	0.43	5.56	-0.47	-0.56	0.06	0.26
	31	-0.06	5.50	-0.50	-0.60	-0.05	-0.73
	32	0.21	5.83	0.06	0.67	0.02	-0.18
	33	0.16	5.23	-1.03	-1.83	-0.01	-0.29
	34	0.45	6.15	-0.54	-0.64	0.06	0.23
	35	-0.04	6.10	-0.57	-0.67	-0.05	-0.76
	36	0.24	6.42	-0.01	0.60	0.02	-0.21

	37	0.18	5.83	-1.10	-1.90	-0.01	-0.32
	38	0.21	6.13	-0.55	-0.65	0.00	-0.27
12	30	-0.07	4.74	-0.51	-0.60	0.07	0.73
	31	-0.46	4.46	-0.52	-0.63	-0.07	-0.13
	32	-0.24	4.86	-0.01	0.53	0.02	0.35
	33	-0.29	4.34	-1.02	-1.76	-0.02	0.25
	34	-0.09	5.12	-0.56	-0.66	0.07	0.76
	35	-0.48	4.84	-0.57	-0.68	-0.07	-0.10
	36	-0.27	5.24	-0.06	0.47	0.02	0.38
	37	-0.31	4.72	-1.07	-1.82	-0.02	0.28
	38	-0.29	4.98	-0.57	-0.67	0.00	0.33
13	30	0.18	2.53	0.00	0.00	0.00	0.50
	31	-0.16	2.49	-0.01	-0.03	0.00	-0.54
	32	0.01	2.51	0.15	0.30	0.02	-0.02
	33	0.01	2.51	-0.17	-0.33	-0.02	-0.03
	34	0.18	3.50	-0.02	-0.03	0.00	0.49
	35	-0.16	3.47	-0.03	-0.06	0.00	-0.54
	36	0.01	3.49	0.14	0.27	0.02	-0.02
	37	0.01	3.49	-0.19	-0.36	-0.02	-0.03
	38	0.01	3.49	-0.02	-0.04	0.00	-0.03

```
   166. LOAD LIST 5 TO 22
   167. START CONCRETE DESIGN
   CONCRETE DESIGN
   168. CODE ACI
   169. FC 2100 MEMB 31 TO 36 38 55 TO 57 61 TO 67
   170. FYMAIN 42000 MEMB 31 TO 36 38 55 TO 57 61 TO 67
   171. FYSEC 42000 MEMB 31 TO 36 38 55 TO 57 61 TO 67
   172. DESIGN COLUMN 31 TO 36 38 55 TO 57 61 TO 67

=========================================================================

COLUMN  NO.    31  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=========================================================================
COLUMN  NO.    32  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=========================================================================

COLUMN  NO.    33  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=========================================================================

COLUMN  NO.    34  DESIGN PER ACI 318-02 - AXIAL + BENDING
```

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   35 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   36 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   38 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   55 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   56 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

```
=====================================================================

COLUMN  NO.    57  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    61  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    62  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    63  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    64  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    65  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM
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=====================================================================

COLUMN  NO.    66  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    67  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM


********************END OF COLUMN DESIGN RESULTS********************
```

Columna A-3

Nivel	H Libre	Losa	B	H	Cuantia
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna B-3

Nivel	H Libre	Losa	B	H	Cuantia
N 5.3		.20	.30	.30	
	1.29				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna C-3

Nivel	H Libre	Losa	B	H	Cuantia
N 5.3		.20	.30	.30	
	1.40				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna D-3

Nivel	H Libre	Losa	B	H	Cuantia
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna E-3

Nivel	H Libre	Losa	B	H	Cuantia
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna A-2

Nivel	H Libre	Losa	B	H	Cuantia
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna D-2

Nivel	H Libre	Losa	B	H	Cuantia
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna E-2

Nivel	H Libre	Losa	B	H	Cuantia
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna A-1

Nivel	H Libre	Losa	B	H	Cuantia
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna B-1

Nivel	H Libre	Losa	B	H	Cuantia
N 5.3		.20	.30	.30	
	1.29				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna C-1

Nivel	H Libre	Losa	B	H	Cuantia
N 5.3		.20	.30	.30	
	1.40				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna D-1

Nivel	H Libre	Losa	B	H	Cuantia
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

Columna E-1

Nivel	H Libre	Losa	B	H	Cuantia
N 3.65		.30	.30	.30	
	3.50				8/#4 (1.1%)
					8/#4 (1.1%)
		1.50			

EJE 1/N 3.8

B=0.25 H=0.30 L=3.10			B=0.25 H=0.30 L=3.10			B=0.25 H=0.30 L=3.70			B=0.25 H=0.30 L=3.60		
M=-0.41		M=-0.47	M=-0.36		M=-0.34	M=-0.35		M=-0.63	M=-1.29		M=-0.93
A=2.06		A=2.06	A=2.06		A=2.06	A=2.06		A=2.06	A=2.06		A=2.06
	M=0.41			M=0.26			M=0.26			M=0.97	
	A=2.06			A=2.06			A=2.06			A=2.06	
v=-0.44	v=0.22	v=0.54	v=-0.44	v=-0.11	v=0.42	v=-0.42	v=0.16	v=0.59	v=-2.08	v=-0.26	v=1.81

EJE 2/N 3.8

B=0.25 H=0.30 L=3.60		
M=-1.61		M=-1.57
A=2.06		A=2.06
	M=1.63	
	A=2.06	
v=-1.96	v=-0.47	v=1.93

EJE 3/N 3.8

B=0.25 H=0.30 L=3.10			B=0.25 H=0.30 L=3.10			B=0.25 H=0.30 L=3.70			B=0.25 H=0.30 L=3.60		
M=-0.41		M=-0.47	M=-0.36		M=-0.34	M=-0.35		M=-0.63	M=-1.29		M=-0.93
A=2.06		A=2.06	A=2.06		A=2.06	A=2.06		A=2.06	A=2.06		A=2.06
	M=0.41			M=0.26			M=0.26			M=0.97	
	A=2.06			A=2.06			A=2.06			A=2.06	
v=-0.44	v=0.22	v=0.54	v=-0.44	v=-0.11	v=0.42	v=-0.42	v=0.16	v=0.59	v=-2.08	v=-0.26	v=1.81

EJE A/N 3.8

B=0.25 H=0.30 L=4.55			B=0.25 H=0.30 L=4.55		
M=-0.62		M=-0.70	M=-0.70		M=-0.62
A=2.06		A=2.06	A=2.06		A=2.06
	M=0.54			M=0.54	
	A=2.06			A=2.06	
v=-0.56	v=0.17	v=0.67	v=-0.67	v=-0.17	v=0.56

EJE D/N 3.8

B=0.25 H=0.30 L=4.55			B=0.25 H=0.30 L=4.55		
M=-1.73		M=-2.32	M=-2.32		M=-1.73
A=2.06		A=2.58	A=2.58		A=2.06
	M=1.56			M=1.56	
	A=2.06			A=2.06	
v=-2.20	v=0.45	v=2.63	v=-2.63	v=-0.45	v=2.20

EJE E/N 3.8

B=0.25 H=0.30 L=4.55			B=0.25 H=0.30 L=4.55		
M=-1.46		M=-2.31	M=-2.31		M=-1.46
A=2.06		A=2.57	A=2.57		A=2.06
	M=1.38			M=1.38	
	A=2.06			A=2.06	
v=-2.19	v=0.38	v=2.64	v=-2.64	v=-0.38	v=2.19

V.CUBIERTA/

B=0.20 H=0.20 L=3.45			B=0.20 H=0.20 L=3.12			B=0.20 H=0.20 L=4.06		
M=-0.00		M=-0.71	M=-0.79		M=-1.18	M=-1.10		M=-0.00
A=0.99		A=1.32	A=1.48		A=2.29	A=2.11		A=1.27
	M=0.91			M=0.30			M=1.19	
	A=1.81			A=0.99			A=2.44	
v=1.12	v=-0.25	v=-1.63	v=1.12	v=-0.13	v=-1.37	v=1.93	v=0.32	v=-1.30

NERVIO/

B=0.12 H=0.30 L=3.90		
M=-0.00		M=-0.00
A=1.03		A=1.03
	M=1.03	
	A=1.09	
v=0.91	v=0.00	v=-0.91

ANEXO 5

MEMORIAS DISEÑO ESTRUCTURAL IEM CIUDADELA DE PAZ BLOQUE 1

```
INPUT FILE: CIUDADELA DE PAZ BLOQUE 1.STD
1. STAAD SPACE CIUDADELA DE PAZ BLOQUE 1
2. START JOB INFORMATION
3. ENGINEER DATE 10-NOV-05
4. END JOB INFORMATION
5. INPUT WIDTH 79
6. UNIT METER MTON
7. JOINT COORDINATES
8. 1 0 0 0; 2 3.57 0 0; 3 7.14 0 0; 4 10.71 0 0; 5 0 0 3.475; 7 7.14 0 3.475
9. 8 10.71 0 3.475; 9 0 0 6.975; 10 3.57 0 6.975; 11 7.14 0 6.975
10. 12 10.71 0 6.975; 13 0 0 10.475; 15 7.14 0 10.475; 16 10.71 0 10.475
11. 17 0 0 13.95; 18 3.57 0 13.95; 19 7.14 0 13.95; 20 10.71 0 13.95; 21 0 3.29 0
12. 22 3.57 3.29 0; 23 7.14 3.29 0; 24 10.71 3.29 0; 25 0 3.29 3.475
13. 26 3.57 3.29 3.475; 27 7.14 3.29 3.475; 28 10.71 3.29 3.475; 29 0 3.29 6.975
14. 30 3.57 3.29 6.975; 31 7.14 3.29 6.975; 32 10.71 3.29 6.975; 33 0 3.29 10.475
15. 34 3.57 3.29 10.475; 35 7.14 3.29 10.475; 36 10.71 3.29 10.475
16. 37 0 3.29 13.95; 38 3.57 3.29 13.95; 39 7.14 3.29 13.95; 40 10.71 3.29 13.95
17. 41 0 6.315 0; 42 3.57 6.315 0; 43 7.14 6.315 0; 44 10.71 6.315 0
18. 45 0 6.315 3.475; 46 7.14 6.315 3.475; 47 10.71 6.315 3.475; 48 0 6.315 6.975
19. 49 3.57 6.315 6.975; 50 7.14 6.315 6.975; 51 10.71 6.315 6.975
20. 52 0 6.315 10.475; 53 7.14 6.315 10.475; 54 10.71 6.315 10.475
21. 55 0 6.315 13.95; 56 3.57 6.315 13.95; 57 7.14 6.315 13.95
22. 58 10.71 6.315 13.95; 59 0 7.055 0; 61 0 7.055 3.475; 62 0 7.055 6.975
23. 64 0 7.055 10.475; 65 0 7.055 13.95; 66 3.57 6.685 0; 67 3.57 6.685 6.975
24. 68 3.57 6.685 13.95
25. MEMBER INCIDENCES
26. 1 21 22; 2 22 23; 3 23 24; 4 25 26; 5 26 27; 6 27 28; 7 29 30; 8 30 31
27. 9 31 32; 10 33 34; 11 34 35; 12 35 36; 13 37 38; 14 38 39; 15 39 40; 16 21 25
28. 17 25 29; 18 29 33; 19 33 37; 20 22 26; 21 26 30; 22 30 34; 23 34 38; 24 23
27
29. 25 27 31; 26 31 35; 27 35 39; 28 24 28; 29 28 32; 30 32 36; 31 36 40; 32 41
42
30. 33 42 43; 34 43 44; 35 46 47; 36 48 49; 37 49 50; 38 50 51; 39 53 54; 40 55
56
31. 41 56 57; 42 57 58; 43 41 45; 44 45 48; 45 48 52; 46 52 55; 47 43 46; 48 46
50
32. 49 50 53; 50 53 57; 51 44 47; 52 47 51; 53 51 54; 54 54 58; 61 59 61; 62 61
62
33. 63 62 64; 64 64 65; 65 1 21; 66 21 41; 67 41 59; 68 2 22; 69 22 42; 71 3 23
34. 72 23 43; 73 4 24; 74 24 44; 75 5 25; 76 25 45; 77 45 61; 78 7 27; 79 27 46
35. 80 8 28; 81 28 47; 82 9 29; 83 29 48; 84 48 62; 85 10 30; 86 30 49; 88 11 31
36. 89 31 50; 90 12 32; 91 32 51; 92 13 33; 93 33 52; 94 52 64; 95 15 35; 96 35
53
37. 97 16 36; 98 36 54; 99 17 37; 100 37 55; 101 55 65; 102 18 38; 103 38 56
38. 105 19 39; 106 39 57; 107 20 40; 108 40 58; 109 42 66; 110 49 67; 111 56 68
39. 112 59 66; 113 66 43; 114 62 67; 115 67 50; 116 65 68; 117 68 57; 134 1 2
40. 135 2 3; 136 3 4; 137 7 8; 138 9 10; 139 10 11; 140 11 12; 141 15 16
41. 142 17 18; 143 18 19; 144 19 20; 145 1 5; 146 5 9; 147 9 13; 148 13 17
42. 149 3 7; 150 7 11; 151 11 15; 152 15 19; 153 4 8; 154 8 12; 155 12 16
43. 156 16 20
44. ELEMENT INCIDENCES SHELL
45. 130 46 47 44 43; 131 50 51 47 46; 132 53 54 51 50; 133 57 58 54 53
46. ELEMENT PROPERTY
47. 130 TO 133 THICKNESS 0.18
48. DEFINE MATERIAL START
49. ISOTROPIC CONCRETE
50. E 1.79E+006
51. POISSON 0.17
52. DENSITY 2.4
53. ALPHA 1E-005
54. DAMP 0.05
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55. ISOTROPIC LOSA
56. E 1.79E+006
57. POISSON 0.17
58. DENSITY 0
59. ALPHA 1E-005
60. DAMP 0.05
61. END DEFINE MATERIAL
62. CONSTANTS
63. MATERIAL CONCRETE MEMB 1 TO 54 61 TO 69 71 TO 86 88 TO 103 105 TO 117 134 -
64. 135 TO 156
65. MATERIAL LOSA MEMB 130 TO 133
66. MEMBER PROPERTY AMERICAN
67. 7 TO 9 24 TO 27 PRIS YD 0.3 ZD 0.3
68. 32 33 36 37 40 41 43 TO 46 PRIS YD 0.25 ZD 0.25
69. 65 TO 69 71 TO 86 88 TO 103 105 TO 111 PRIS YD 0.3 ZD 0.3
70. 61 TO 64 PRIS YD 0.25 ZD 0.25
71. MEMBER PROPERTY AMERICAN
72. 47 TO 54 PRIS YD 0.25 ZD 0.25
73. 34 35 38 39 42 PRIS YD 0.25 ZD 0.25
74. 112 TO 117 PRIS YD 0.25 ZD 0.25
75. 1 TO 3 13 TO 19 28 TO 31 PRIS YD 0.3 ZD 0.25
76. MEMBER PROPERTY AMERICAN
77. 4 TO 6 10 TO 12 PRIS YD 0.3 ZD 0.3
78. 20 TO 23 PRIS YD 0.4 ZD 0.3
79. MEMBER PROPERTY AMERICAN
80. 134 TO 156 PRIS YD 0.3 ZD 0.25
81. SUPPORTS
82. 1 TO 5 7 TO 13 15 TO 20 FIXED
83. LOAD 1 CARGA MUERTA
84. SELFWEIGHT Y -1
85. MEMBER LOAD
86. 47 TO 54 UNI GY -0.828
87. 34 35 38 39 42 UNI GY -0.424
88. 43 TO 46 UNI GY -0.11
89. 32 36 40 TRAP GY -0.11 -0.055
90. 33 37 41 TRAP GY -0.055 0
91. 114 115 UNI GY -0.031
92. JOINT LOAD
93. 46 53 61 64 FY -0.1885
94. MEMBER LOAD
95. 112 113 116 117 UNI GY -0.016
96. 1 TO 3 13 TO 15 UNI GY -0.583
97. 16 TO 19 28 TO 31 UNI GY -0.33
98. 4 TO 12 UNI GY -1.166
99. 20 TO 27 UNI GY -1.066
100. LOAD 2 CARGA VIVA
101. MEMBER LOAD
102. 1 TO 3 13 TO 15 UNI GY -0.171
103. 4 TO 12 UNI GY -0.342
104. 16 TO 19 28 TO 31 UNI GY -0.156
105. 20 TO 27 UNI GY -0.312
106. 47 TO 54 UNI GY -0.089
107. 34 35 38 39 42 UNI GY -0.05
108. 114 115 UNI GY -0.1225
109. 112 113 116 117 UNI GY -0.06125
110. JOINT LOAD
111. 46 53 61 64 FY -0.44
112. LOAD 3 SISMO EN X
113. SELFWEIGHT X -1
114. MEMBER LOAD
115. 47 TO 54 UNI GX -0.828
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```
116. 34 35 38 39 42 UNI GX -0.424
117. 43 TO 46 UNI GX -0.11
118. 32 36 40 TRAP GX -0.11 -0.055
119. 33 37 41 TRAP GX -0.055 0
120. 114 115 UNI GX -0.031
121. JOINT LOAD
122. 46 53 61 64 FX -0.1885
123. MEMBER LOAD
124. 112 113 116 117 UNI GX -0.016
125. 1 TO 3 13 TO 15 UNI GX -0.583
126. 16 TO 19 28 TO 31 UNI GX -0.33
127. 4 TO 12 UNI GX -1.166
128. 20 TO 27 UNI GX -1.066
129. SELFWEIGHT Z -1
130. MEMBER LOAD
131. 47 TO 54 UNI GZ -0.828
132. 34 35 38 39 42 UNI GZ -0.424
133. 43 TO 46 UNI GZ -0.11
134. 32 36 40 TRAP GZ -0.11 -0.055
135. 33 37 41 TRAP GZ -0.055 0
136. 114 115 UNI GZ -0.031
137. JOINT LOAD
138. 46 53 61 64 FZ -0.1885
139. MEMBER LOAD
140. 112 113 116 117 UNI GZ -0.016
141. 1 TO 3 13 TO 15 UNI GZ -0.583
142. 16 TO 19 28 TO 31 UNI GZ -0.33
143. 4 TO 12 UNI GZ -1.166
144. 20 TO 27 UNI GZ -1.066
145. *....ESPECTRO ELASTICO DE DISEÑO NSR 98
146. *....COEFICIENTE DE IMPORTANCIA I= 1.1
147. *....COEFICIENTE DE SITIO S=  S3= 1.5
148. SPECTRUM CQC X 1 ACC SCALE 9.81 DAMP 0.05
149. 0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
150. 0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
151. 0.7 0.825; 0.75 0.792; 0.8 0.743; 0.85 0.699; 0.9 0.66; 0.95 0.625; 1 0.594
152. 1.1 0.54; 1.2 0.495; 1.3 0.457; 1.4 0.424; 1.5 0.396; 1.6 0.371; 1.7 0.349
153. 1.8 0.33; 1.9 0.313; 2 0.297; 2.1 0.283; 2.2 0.27; 2.3 0.258; 2.4 0.248
154. 2.5 0.238; 2.6 0.228; 2.7 0.22; 2.8 0.212; 2.9 0.205; 3 0.198; 3.1 0.192
155. 3.2 0.186; 3.3 0.18; 3.4 0.175; 3.5 0.17; 3.6 0.165; 3.7 0.165; 3.8 0.165
156. 3.9 0.165; 4 0.165; 4.1 0.165; 4.2 0.165; 4.3 0.165; 4.4 0.165; 4.5 0.165
157. 4.6 0.165; 4.7 0.165; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165; 5.2 0.165
158. 5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165; 5.9 0.165
159. 6 0.165
160. LOAD 4 SISMO EN Z
161. SPECTRUM CQC Z 1 ACC SCALE 9.81 DAMP 0.05
162. *....0A= 0.9
163. *....0B= 0.9
164. *....R= 7*OA*OB =5.67
165. 0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
166. 0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
167. 0.7 0.825; 0.75 0.792; 0.8 0.743; 0.85 0.699; 0.9 0.66; 0.95 0.625; 1 0.594
168. 1.1 0.54; 1.2 0.495; 1.3 0.457; 1.4 0.424; 1.5 0.396; 1.6 0.371; 1.7 0.349
169. 1.8 0.33; 1.9 0.313; 2 0.297; 2.1 0.283; 2.2 0.27; 2.3 0.258; 2.4 0.248
170. 2.5 0.238; 2.6 0.228; 2.7 0.22; 2.8 0.212; 2.9 0.205; 3 0.198; 3.1 0.192
171. 3.2 0.186; 3.3 0.18; 3.4 0.175; 3.5 0.17; 3.6 0.165; 3.7 0.165; 3.8 0.165
172. 3.9 0.165; 4 0.165; 4.1 0.165; 4.2 0.165; 4.3 0.165; 4.4 0.165; 4.5 0.165
173. 4.6 0.165; 4.7 0.165; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165; 5.2 0.165
174. 5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165; 5.9 0.165
175. 6 0.165
176. LOAD 29 CIMENTACION
```

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177. MEMBER LOAD
178. 134 142 UNI GY 0.21
179. 135 143 UNI GY 0.269
180. 136 144 UNI GY 0.214
181. 138 UNI GY 0.376
182. 139 UNI GY 0.474
183. 140 UNI GY 0.339
184. 145 148 UNI GY 0.191
185. 146 147 UNI GY 0.228
186. 149 152 UNI GY 0.372
187. 150 151 UNI GY 0.445
188. 153 156 UNI GY 0.224
189. 154 155 UNI GY 0.274
190. 137 141 UNI GY 0.365
191. LOAD COMB 5 CU  1.4D+1.7L
192. 1 1.4 2 1.7
193. LOAD COMB 6 0.75CU+EX+0.3EZ
194. 1 1.05 2 1.28 3 0.176 4 0.053
195. LOAD COMB 7 0.75CU+EX-0.3EZ
196. 1 1.05 2 1.28 3 0.176 4 -0.053
197. LOAD COMB 8 0.75CU-EX+0.3EZ
198. 1 1.05 2 1.28 3 -0.176 4 0.053
199. LOAD COMB 9 0.75CU-EX-0.3EZ
200. 1 1.05 2 1.28 3 -0.176 4 -0.053
201. LOAD COMB 10 0.9D+EX+0.3EZ
202. 1 0.9 3 0.176 4 0.053
203. LOAD COMB 11 0.9D+EX-0.3EZ
204. 1 0.9 3 0.176 4 -0.053
205. LOAD COMB 12 0.9D-EX+0.3EZ
206. 1 0.9 3 -0.176 4 0.053
207. LOAD COMB 13 0.9D-EX-0.3EZ
208. 1 0.9 3 -0.176 4 -0.053
209. LOAD COMB 14 0.75CU+EZ+0.3EX
210. 1 1.05 2 1.28 3 0.053 4 0.176
211. LOAD COMB 15 0.75CU+EZ-0.3EX
212. 1 1.05 2 1.28 3 -0.053 4 0.176
213. LOAD COMB 16 0.75CU-EZ+0.3EX
214. 1 1.05 2 1.28 3 0.053 4 -0.176
215. LOAD COMB 17 0.75CU-EZ-0.3EX
216. 1 1.05 2 1.28 3 -0.053 4 -0.176
217. LOAD COMB 18 0.9D+EZ+0.3EX
218. 1 0.9 3 0.053 4 0.176
219. LOAD COMB 19 0.9D+EZ-0.3EX
220. 1 0.9 3 -0.053 4 0.176
221. LOAD COMB 20 0.9D-EZ+0.3EX
222. 1 0.9 3 0.053 4 -0.176
223. LOAD COMB 21 0.9D-EZ-0.3EX
224. 1 0.9 3 -0.053 4 -0.176
225. LOAD COMB 22 D+L
226. 1 1.0 2 1.0
227. ***************************************************
228. * * * ----COMBINACIONES REACCIONDE SUELO MODAL-- * * *
229. LOAD COMB 30 SUELO-M D + 70% EX/R
230. 1 1.0 3 0.1235
231. LOAD COMB 31 SUELO-M D - 70% EX/R
232. 1 1.0 3 -0.1235
233. LOAD COMB 32 SUELO-M D + 70% EZ/R
234. 1 1.0 4 0.1235
235. LOAD COMB 33 SUELO-M D - 70% EZ/R
236. 1 1.0 4 -0.1235
237. LOAD COMB 34 SUELO-M  L  + D + 70% EX/R
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238. 1 1.0 2 1.0 3 0.1235
239. LOAD COMB 35 SUELO-M L + D - 70% EX/R
240. 1 1.0 2 1.0 3 -0.1235
241. LOAD COMB 36 SUELO-M L + D + 70% EZ/R
242. 1 1.0 2 1.0 4 0.1235
243. LOAD COMB 37 SUELO-M L + D - 70% EZ/R
244. 1 1.0 2 1.0 4 -0.1235
245. LOAD COMB 38 SUELO-M L + D
246. 1 1.0 2 1.0
247. ************************************************
248. PDELTA 10 ANALYSIS

            P R O B L E M   S T A T I S T I C S
            -----------------------------------

     NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    64/   135/    18
     ORIGINAL/FINAL BAND-WIDTH=    22/    14/     72 DOF
     TOTAL PRIMARY LOAD CASES =    5, TOTAL DEGREES OF FREEDOM =    276
     SIZE OF STIFFNESS MATRIX =      20 DOUBLE  KILO-WORDS
     REQRD/AVAIL. DISK SPACE  =    12.6/ 19306.2 MB,  EXMEM =  757.7 MB


++ Adjusting Displacements                          14:43:15
++ Adjusting Displacements                          14:43:15
++ Adjusting Displacements                          14:43:15
++ Adjusting Displacements                          14:43:15
++ Adjusting Displacements                          14:43:15
++ Adjusting Displacements                          14:43:15
++ Adjusting Displacements                          14:43:15
++ Adjusting Displacements                          14:43:15
++ Adjusting Displacements                          14:43:15
++ Adjusting Displacements                          14:43:15



NUMBER OF MODES REQUESTED              =     6
NUMBER OF EXISTING MASSES IN THE MODEL =   101
NUMBER OF MODES THAT WILL BE USED      =     6
```

*** □EIGENSOLUTION□: SUBSPACE METHOD ***

CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
1	2.301	0.43460	2.053E-14
2	2.304	0.43407	4.368E-14
3	2.625	0.38100	4.007E-13
4	3.508	0.28504	9.812E-12
5	4.916	0.20341	2.558E-10
6	5.918	0.16897	1.199E-08

The following Frequencies are estimates that were calculated. These are for information only and will not be used. Remaining values are either above the cut off mode/freq values or are of low accuracy. To use these frequencies, rerun with a higher cutoff mode (or mode + freq) value.

CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
7	5.928	0.16868	6.021E-09
8	6.743	0.14830	2.636E-07
9	6.889	0.14516	1.625E-07
10	7.236	0.13819	2.184E-07
11	7.908	0.12645	2.427E-06
12	8.099	0.12347	3.302E-05
13	8.298	0.12052	4.537E-05
14	8.601	0.11626	1.363E-05
15	8.688	0.11510	5.271E-06
16	10.268	0.09739	1.234E-05
17	10.270	0.09737	1.201E-05
18	10.366	0.09647	2.279E-05

RESPONSE LOAD CASE 3

CQC MODAL COMBINATION METHOD USED.

DYNAMIC WEIGHT X Y Z	1.830234E+02	2.131354E-08	1.830234E+02	MTON
MISSING WEIGHT X Y Z	-1.016263E+01	-2.131354E-08	-7.176404E+00	MTON
MODAL WEIGHT X Y Z	1.728607E+02	1.019429E-23	1.758470E+02	MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000

PARTICIPATION FACTORS□

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	94.45	0.00	0.00	94.447	0.000	0.000	142.66	0.00	0.00
2	0.00	0.00	87.20	94.447	0.000	87.200	0.00	0.00	0.00
3	0.00	0.00	5.48	94.447	0.000	92.683	0.00	0.00	0.00
4	0.00	0.00	2.36	94.447	0.000	95.045	0.00	0.00	0.00
5	0.00	0.00	1.03	94.447	0.000	96.078	0.00	0.00	0.00
6	0.00	0.00	0.00	94.447	0.000	96.079	0.00	0.00	0.00
					TOTAL SRSS	SHEAR	142.66	0.00	0.00
					TOTAL 10PCT	SHEAR	142.66	0.00	0.00
					TOTAL ABS	SHEAR	142.66	0.00	0.00
					TOTAL CQC	SHEAR	142.66	0.00	0.00

RESPONSE LOAD CASE 4

CQC MODAL COMBINATION METHOD USED.
DYNAMIC WEIGHT X Y Z 1.830234E+02 2.131354E-08 1.830234E+02 MTON
MISSING WEIGHT X Y Z -1.016263E+01 -2.131354E-08 -7.176404E+00 MTON
MODAL WEIGHT X Y Z 1.728607E+02 1.019429E-23 1.758470E+02 MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000

PARTICIPATION FACTORS□

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	94.45	0.00	0.00	94.447	0.000	0.000	0.00	0.00	0.00
2	0.00	0.00	87.20	94.447	0.000	87.200	0.00	0.00	131.71
3	0.00	0.00	5.48	94.447	0.000	92.683	0.00	0.00	8.28
4	0.00	0.00	2.36	94.447	0.000	95.045	0.00	0.00	3.57
5	0.00	0.00	1.03	94.447	0.000	96.078	0.00	0.00	1.56
6	0.00	0.00	0.00	94.447	0.000	96.079	0.00	0.00	0.00
					TOTAL SRSS	SHEAR	0.00	0.00	132.03
					TOTAL 10PCT	SHEAR	0.00	0.00	132.03
					TOTAL ABS	SHEAR	0.00	0.00	145.12
					TOTAL CQC	SHEAR	0.00	0.00	135.28

249. LOAD LIST 3 4
250. PRINT STORY DRIFT
STORY DRIFT

STORY	HEIGHT (METE)	LOAD	DRIFT(CM) X	DRIFT(CM) Z	ECCENTRICITY (METE)	RATIO
BASE=	0.00					
1	3.29	3	3.0125	0.0014	0.0000	L / 109
		4	0.4324	2.7544	0.0000	L / 119
2	6.32	3	4.9135	0.0108	0.0000	L / 128
		4	0.7143	4.5208	0.0000	L / 139
3	6.68	3	4.9323	0.0558	0.0000	L / 135
		4	0.7770	4.4472	0.0000	L / 150
4	7.05	3	5.1616	0.0003	0.0000	L / 136
		4	0.7464	3.2945	0.0000	L / 214

```
251. LOAD LIST 30 TO 38
   252. PRINT SUPPORT REACTION

   SUPPORT REACTIONS -UNIT MTON METE    STRUCTURE TYPE = SPACE
   -----------------
```

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	30	0.94	6.67	0.13	-0.04	0.02	1.69
	31	-0.65	4.73	0.13	-0.04	-0.02	-1.60
	32	0.35	6.44	0.69	1.09	0.05	0.46
	33	-0.06	4.96	-0.43	-1.17	-0.05	-0.36
	34	0.98	7.34	0.17	0.00	0.02	1.66
	35	-0.62	5.40	0.17	0.00	-0.02	-1.63
	36	0.38	7.10	0.72	1.13	0.05	0.42
	37	-0.02	5.63	-0.39	-1.13	-0.05	-0.40
	38	0.18	6.37	0.17	0.00	0.00	0.01
2	30	1.00	11.52	1.13	1.22	0.01	1.95
	31	-1.07	11.29	1.11	1.20	-0.02	-1.84
	32	0.22	11.84	2.06	2.99	0.04	0.52
	33	-0.29	10.98	0.19	-0.56	-0.06	-0.41
	34	0.99	13.59	1.40	1.51	0.01	1.96
	35	-1.08	13.36	1.38	1.49	-0.02	-1.83
	36	0.21	13.91	2.33	3.27	0.04	0.53
	37	-0.30	13.05	0.45	-0.27	-0.06	-0.40
	38	-0.05	13.48	1.39	1.50	-0.01	0.07
3	30	0.94	10.71	0.23	0.07	0.01	1.88
	31	-1.01	10.30	0.21	0.05	-0.02	-1.78
	32	0.20	11.82	1.22	2.03	0.03	0.50
	33	-0.27	9.19	-0.78	-1.92	-0.04	-0.40
	34	0.93	12.23	0.28	0.13	0.01	1.89
	35	-1.01	11.81	0.27	0.11	-0.02	-1.77
	36	0.20	13.33	1.28	2.09	0.03	0.51
	37	-0.28	10.70	-0.73	-1.85	-0.04	-0.39
	38	-0.04	12.02	0.28	0.12	-0.01	0.06
4	30	0.66	7.83	0.07	-0.10	0.01	1.62
	31	-0.94	5.57	0.05	-0.12	-0.02	-1.67
	32	0.07	7.87	0.98	1.75	0.02	0.39
	33	-0.35	5.53	-0.85	-1.97	-0.03	-0.44
	34	0.62	8.62	0.10	-0.07	0.01	1.66
	35	-0.97	6.35	0.08	-0.09	-0.02	-1.63
	36	0.03	8.65	1.00	1.78	0.02	0.43
	37	-0.38	6.31	-0.82	-1.94	-0.03	-0.40
	38	-0.17	7.48	0.09	-0.08	0.00	0.01
5	30	1.67	9.75	-0.02	-0.02	0.01	1.09
	31	-0.17	8.92	-0.02	-0.02	-0.01	-2.64
	32	0.86	9.48	0.68	1.26	0.05	-0.55
	33	0.64	9.20	-0.72	-1.30	-0.05	-1.00
	34	1.85	11.65	-0.02	-0.03	0.00	0.90
	35	0.01	10.82	-0.02	-0.03	-0.01	-2.83
	36	1.04	11.37	0.67	1.25	0.05	-0.73
	37	0.82	11.10	-0.72	-1.31	-0.05	-1.19
	38	0.93	11.23	-0.02	-0.03	0.00	-0.96
7	30	0.72	19.39	-0.02	-0.02	0.01	2.76

	31	-1.54	17.21	-0.02	-0.02	-0.01	-1.42
	32	-0.27	18.56	1.20	2.18	0.03	0.94
	33	-0.56	18.05	-1.23	-2.23	-0.03	0.41
	34	0.62	22.97	-0.02	-0.02	0.01	2.88
	35	-1.64	20.78	-0.03	-0.03	-0.01	-1.30
	36	-0.36	22.13	1.19	2.18	0.03	1.05
	37	-0.66	21.62	-1.24	-2.23	-0.03	0.52
	38	-0.51	21.87	-0.02	-0.03	0.00	0.79
8	30	0.76	12.20	0.01	0.01	0.01	2.00
	31	-1.19	9.49	0.00	0.00	-0.01	-1.84
	32	-0.09	11.17	1.11	2.07	0.03	0.33
	33	-0.34	10.51	-1.10	-2.07	-0.03	-0.16
	34	0.70	13.69	0.01	0.01	0.01	2.08
	35	-1.25	10.98	0.00	0.00	-0.01	-1.77
	36	-0.15	12.66	1.11	2.07	0.03	0.40
	37	-0.40	12.00	-1.10	-2.07	-0.03	-0.09
	38	-0.28	12.33	0.00	0.00	0.00	0.15
9	30	1.23	9.81	0.00	0.00	0.00	1.86
	31	-0.72	7.80	0.00	0.00	0.00	-1.99
	32	0.26	8.81	0.67	1.25	0.05	-0.07
	33	0.26	8.81	-0.67	-1.25	-0.05	-0.07
	34	1.30	11.17	0.00	0.00	0.00	1.79
	35	-0.65	9.16	0.00	0.00	0.00	-2.05
	36	0.32	10.16	0.67	1.25	0.05	-0.13
	37	0.32	10.16	-0.67	-1.25	-0.05	-0.13
	38	0.32	10.16	0.00	0.00	0.00	-0.13
10	30	1.19	21.56	0.00	0.00	0.00	2.32
	31	-1.32	21.06	0.00	0.00	0.00	-2.13
	32	-0.06	21.31	1.12	1.97	0.05	0.09
	33	-0.06	21.31	-1.12	-1.97	-0.05	0.09
	34	1.17	26.27	0.00	0.00	0.00	2.34
	35	-1.33	25.77	0.00	0.00	0.00	-2.11
	36	-0.08	26.02	1.12	1.97	0.05	0.11
	37	-0.08	26.02	-1.12	-1.97	-0.05	0.11
	38	-0.08	26.02	0.00	0.00	0.00	0.11
11	30	1.10	17.75	0.00	0.00	0.00	2.21
	31	-1.22	17.02	0.00	0.00	0.00	-2.04
	32	-0.06	17.38	1.18	2.17	0.03	0.08
	33	-0.06	17.38	-1.18	-2.17	-0.03	0.08
	34	1.09	20.78	0.00	0.00	0.00	2.22
	35	-1.23	20.05	0.00	0.00	0.00	-2.02
	36	-0.07	20.41	1.18	2.17	0.03	0.10
	37	-0.07	20.41	-1.18	-2.17	-0.03	0.10
	38	-0.07	20.41	0.00	0.00	0.00	0.10
12	30	0.73	12.20	0.00	0.00	0.00	2.02
	31	-1.22	9.64	0.00	0.00	0.00	-1.82
	32	-0.25	10.92	1.09	2.05	0.03	0.10
	33	-0.25	10.92	-1.09	-2.05	-0.03	0.10
	34	0.66	13.74	0.00	0.00	0.00	2.09
	35	-1.28	11.18	0.00	0.00	0.00	-1.75
	36	-0.31	12.46	1.09	2.05	0.03	0.17
	37	-0.31	12.46	-1.09	-2.05	-0.03	0.17
	38	-0.31	12.46	0.00	0.00	0.00	0.17
13	30	1.67	9.75	0.02	0.02	0.01	1.09

	31	-0.17	8.92	0.02	0.02	-0.01	-2.64
	32	0.86	9.48	0.72	1.30	0.05	-0.55
	33	0.64	9.20	-0.68	-1.26	-0.05	-1.00
	34	1.85	11.65	0.02	0.03	0.01	0.90
	35	0.01	10.82	0.02	0.03	0.00	-2.83
	36	1.04	11.37	0.72	1.31	0.05	-0.73
	37	0.82	11.10	-0.67	-1.25	-0.05	-1.19
	38	0.93	11.23	0.02	0.03	0.00	-0.96
15	30	0.72	19.39	0.02	0.02	0.01	2.76
	31	-1.54	17.21	0.02	0.02	-0.01	-1.42
	32	-0.27	18.56	1.23	2.23	0.03	0.94
	33	-0.56	18.05	-1.20	-2.18	-0.03	0.41
	34	0.62	22.97	0.03	0.03	0.01	2.88
	35	-1.64	20.78	0.02	0.02	-0.01	-1.30
	36	-0.36	22.13	1.24	2.23	0.03	1.05
	37	-0.66	21.62	-1.19	-2.18	-0.03	0.52
	38	-0.51	21.87	0.02	0.03	0.00	0.79
16	30	0.76	12.20	0.00	0.00	0.01	2.00
	31	-1.19	9.49	-0.01	-0.01	-0.01	-1.84
	32	-0.09	11.17	1.10	2.07	0.03	0.33
	33	-0.34	10.51	-1.11	-2.07	-0.03	-0.16
	34	0.70	13.69	0.00	0.00	0.01	2.08
	35	-1.25	10.98	-0.01	-0.01	-0.01	-1.77
	36	-0.15	12.66	1.10	2.07	0.03	0.40
	37	-0.40	12.00	-1.11	-2.07	-0.03	-0.09
	38	-0.28	12.33	0.00	0.00	0.00	0.15
17	30	0.94	6.67	-0.13	0.04	0.02	1.69
	31	-0.65	4.73	-0.13	0.04	-0.02	-1.60
	32	0.35	6.44	0.43	1.17	0.05	0.46
	33	-0.06	4.96	-0.69	-1.09	-0.05	-0.36
	34	0.98	7.34	-0.17	0.00	0.02	1.66
	35	-0.62	5.40	-0.17	0.00	-0.02	-1.63
	36	0.38	7.10	0.39	1.13	0.05	0.42
	37	-0.02	5.63	-0.72	-1.13	-0.05	-0.40
	38	0.18	6.37	-0.17	0.00	0.00	0.01
18	30	1.00	11.52	-1.11	-1.20	0.02	1.95
	31	-1.07	11.29	-1.13	-1.22	-0.01	-1.84
	32	0.22	11.84	-0.19	0.56	0.06	0.52
	33	-0.29	10.98	-2.06	-2.99	-0.04	-0.41
	34	0.99	13.59	-1.38	-1.49	0.02	1.96
	35	-1.08	13.36	-1.40	-1.51	-0.01	-1.83
	36	0.21	13.91	-0.45	0.27	0.06	0.53
	37	-0.30	13.05	-2.33	-3.27	-0.04	-0.40
	38	-0.05	13.48	-1.39	-1.50	0.01	0.07
19	30	0.94	10.71	-0.21	-0.05	0.02	1.88
	31	-1.01	10.30	-0.23	-0.07	-0.01	-1.78
	32	0.20	11.82	0.78	1.92	0.04	0.50
	33	-0.27	9.19	-1.22	-2.03	-0.03	-0.40
	34	0.93	12.23	-0.27	-0.11	0.02	1.89
	35	-1.01	11.81	-0.28	-0.13	-0.01	-1.77
	36	0.20	13.33	0.73	1.85	0.04	0.51
	37	-0.28	10.70	-1.28	-2.09	-0.03	-0.39
	38	-0.04	12.02	-0.28	-0.12	0.01	0.06
20	30	0.66	7.83	-0.05	0.12	0.02	1.62

31	-0.94	5.57	-0.07	0.10	-0.01	-1.67
32	0.07	7.87	0.85	1.97	0.03	0.39
33	-0.35	5.53	-0.98	-1.75	-0.02	-0.44
34	0.62	8.62	-0.08	0.09	0.02	1.66
35	-0.97	6.35	-0.10	0.07	-0.01	-1.63
36	0.03	8.65	0.82	1.94	0.03	0.43
37	-0.38	6.31	-1.00	-1.78	-0.02	-0.40
38	-0.17	7.48	-0.09	0.08	0.00	0.01

********** END OF LATEST ANALYSIS RESULT **********

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253. LOAD LIST 5 TO 22
255. *.............DISEÑO DE COLUMNAS.................
256. START CONCRETE DESIGN

CONCRETE DESIGN
257. CODE ACI
258. FYMAIN 42000 MEMB 65 TO 69 71 TO 86 88 TO 103 105 TO 111
259. FYSEC 42000 MEMB 65 TO 69 71 TO 86 88 TO 103 105 TO 111
260. FC 2100 MEMB 65 TO 69 71 TO 86 88 TO 103 105 TO 111
261. DESIGN COLUMN 65 TO 69 71 TO 86 88 TO 103 105 TO 111


============================================================================

COLUMN  NO.    65  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

============================================================================

COLUMN  NO.    66  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

============================================================================

COLUMN  NO.    67  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

============================================================================

COLUMN  NO.    68  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1593.0  SQ. MM

============================================================================

COLUMN  NO.    69  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED
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AREA OF STEEL REQUIRED = 963.0 SQ. MM

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COLUMN NO. 71 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1026.0 SQ. MM

==========

COLUMN NO. 72 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 73 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1026.0 SQ. MM

==========

COLUMN NO. 74 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

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COLUMN NO. 75 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1026.0 SQ. MM

==========

COLUMN NO. 76 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

```
================================================================

COLUMN  NO.    77  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

================================================================

COLUMN  NO.    78  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

================================================================

COLUMN  NO.    79  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

================================================================

COLUMN  NO.    80  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

================================================================

COLUMN  NO.    81  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

================================================================

COLUMN  NO.    82  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM
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================================================================

COLUMN  NO.    83  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM


================================================================

COLUMN  NO.    84  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

BAR CONFIGURATION       REINF PCT.   LOAD   LOCATION   PHI
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================================================================

COLUMN  NO.    85  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM


================================================================

COLUMN  NO.    86  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

================================================================

COLUMN  NO.    88  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM


================================================================
```

COLUMN NO. 89 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 90 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 91 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 92 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1026.0 SQ. MM

==========

COLUMN NO. 93 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 94 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 95 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 96 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

```
=====================================================================

COLUMN  NO.    97  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM


=====================================================================

COLUMN  NO.    98  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.    99  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM


=====================================================================

COLUMN  NO.   100  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
```

AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 101 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 102 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1719.0 SQ. MM

==========

COLUMN NO. 103 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 963.0 SQ. MM

==========

COLUMN NO. 105 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 963.0 SQ. MM

==========

COLUMN NO. 106 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 107 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 963.0 SQ. MM

==========

COLUMN NO. 108 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 109 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 110 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

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=====================================================================

COLUMN  NO.   111  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM
********************END OF COLUMN DESIGN RESULTS********************
```

Columna K-3

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.49				8/#4 (1.1%)
					8/#4 (1.1%)
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna K-4

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.12				8/#6 #5 (2.1%)
					8/#6 #5 (2.1%)
N 6.44		.25	.30	.30	
	2.75				8/#6 #5 (2.1%)
					8/#6 #5 (2.1%)
N 3.44		.40	.30	.30	
	3.04				8/#6 #5 (2.1%)
					8/#6 #5 (2.1%)
		1.10			

Columna K-5

Nivel	H Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
N 3.44		.30	.30	.30	
	3.14				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
		1.10			

Columna K-6

Nivel	H Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna J-3

Nivel	H Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.49				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
N 6.44		.25	.30	.30	
	2.75				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
N 3.44		.30	.30	.30	
	3.14				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
		1.10			

Columna J-5

Nivel	H Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna J-6

Nivel	H Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna I-3

Nivel	H Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.49				8/#4 (1.1%)
					8/#4 (1.1%)
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna I-4

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.12				8/#4 (1.1%)
					8/#4 (1.1%)
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.40	.30	.30	
	3.04				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna I-5

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna I-6

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna H-3

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.49				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
N 6.44		.25	.30	.30	
	2.75				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
N 3.44		.30	.30	.30	
	3.14				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
		1.10			

Columna H-5

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna H-6

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna G-3

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.49				8/#4 (1.1%)
					8/#4 (1.1%)
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna G-4

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.12				8/#6 #5 (2.1%)
					8/#6 #5 (2.1%)
N 6.44		.25	.30	.30	
	2.75				8/#6 #5 (2.1%)
					8/#6 #5 (2.1%)
N 3.44		.40	.30	.30	
	3.04				8/#6 #5 (2.1%)
					8/#6 #5 (2.1%)
		1.10			

Columna G-5

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

Columna G-6

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#4 (1.1%)
					8/#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8/#4 (1.1%)
					8/#4 (1.1%)
		1.10			

EJE 3/N 3.44

B=0.25 H=0.30 L=3.17			B=0.25 H=0.30 L=3.20			B=0.25 H=0.30 L=3.20			B=0.25 H=0.30 L=3.17		
M=-1.70		M=-1.83	M=-1.69		M=-1.69	M=-1.69		M=-1.69	M=-1.83		M=-1.70
A=2.06		A=2.06	A=2.06		A=2.06	A=2.06		A=2.06	A=2.06		A=2.06
	M=1.58			M=1.29			M=1.29			M=1.58	
	A=2.06			A=2.06			A=2.06			A=2.06	
v=-1.83	v=0.73	v=2.01	v=-1.83	v=-0.54	v=1.81	v=-1.81	v=0.54	v=1.83	v=-2.01	v=-0.73	v=1.83

EJE 4/N 3.44

B=0.30 H=0.40 L=6.68			B=0.30 H=0.40 L=6.68		
M=-8.37		M=-15.79	M=-15.79		M=-8.37
A=6.85		A=14.19	A=14.19		A=6.85
	M=9.85			M=9.85	
	A=8.20			A=8.20	
v=-9.37	v=3.08	v=11.57	v=-11.57	v=-3.08	v=9.37

EJE 5/N 3.44

B=0.30 H=0.30 L=3.17			B=0.30 H=0.30 L=3.20			B=0.30 H=0.30 L=3.20			B=0.30 H=0.30 L=3.17		
M=-3.53		M=-3.79	M=-3.50		M=-3.51	M=-3.51		M=-3.50	M=-3.79		M=-3.53
A=3.98		A=4.30	A=3.95		A=3.96	A=3.96		A=3.95	A=4.30		A=3.98
	M=3.13			M=2.59			M=2.59			M=3.13	
	A=3.50			A=2.87			A=2.87			A=3.50	
v=-4.06	v=1.37	v=4.40	v=-4.08	v=-0.99	v=4.05	v=-4.05	v=0.99	v=4.08	v=-4.40	v=-1.37	v=4.06

EJE 6/N 3.44

B=0.25 H=0.30 L=3.17			B=0.25 H=0.30 L=3.20			B=0.25 H=0.30 L=3.20			B=0.25 H=0.30 L=3.17		
M=-2.75		M=-2.65	M=-2.43		M=-2.45	M=-2.45		M=-2.43	M=-2.65		M=-2.75
A=3.09		A=2.97	A=2.71		A=2.73	A=2.73		A=2.71	A=2.97		A=3.09
	M=2.41			M=2.07			M=2.07			M=2.41	
	A=2.69			A=2.29			A=2.29			A=2.69	
v=-2.39	v=1.19	v=2.47	v=-2.25	v=-0.97	v=2.25	v=-2.25	v=-0.97	v=2.25	v=-2.47	v=-1.19	v=2.39

EJE G/N 3.44

B=0.25 H=0.30 L=3.27			B=0.25 H=0.30 L=3.27			B=0.25 H=0.30 L=3.27		
M=-2.74		M=-2.82	M=-2.57		M=-2.60	M=-3.00		M=-2.88
A=3.08		A=3.17	A=2.88		A=2.91	A=3.39		A=3.25
	M=2.45			M=2.04			M=2.52	
	A=2.73			A=2.25			A=2.82	
v=-2.72	v=1.12	v=2.94	v=-2.67	v=-0.85	v=2.65	v=-2.99	v=-1.17	v=2.80

EJE H/N 3.44

B=0.30 H=0.30 L=3.27			B=0.30 H=0.30 L=3.27			B=0.30 H=0.30 L=3.27		
M=-6.05		M=-1.51	M=-1.80		M=-7.20	M=-5.12		M=-3.49
A=7.22		A=4.33	A=5.31		A=8.85	A=5.98		A=3.94
	M=3.03			M=1.98			M=3.04	
	A=3.43			A=2.77			A=3.50	
v=-6.77	v=-2.31	v=2.25	v=-1.81	v=2.68	v=7.17	v=-5.19	v=-1.74	v=4.06

EJE I/N 3.44

B=0.30 H=0.30 L=3.27			B=0.30 H=0.30 L=3.27			B=0.30 H=0.30 L=3.27		
M=-3.45		M=-3.77	M=-3.42		M=-3.55	M=-4.14		M=-3.68
A=3.89		A=4.28	A=3.85		A=4.01	A=4.73		A=4.17
	M=3.06			M=2.47			M=3.18	
	A=3.42			A=2.73			A=3.56	
v=-4.22	v=1.23	v=4.76	v=-4.50	v=-0.83	v=4.49	v=-4.77	v=-1.35	v=4.31

EJE J/N 3.44

B=0.30 H=0.30 L=3.27			B=0.30 H=0.30 L=3.27			B=0.30 H=0.30 L=3.27		
M=-6.05		M=-1.51	M=-1.80		M=-7.20	M=-5.12		M=-3.49
A=7.22		A=4.33	A=5.31		A=8.85	A=5.98		A=3.94
	M=3.03			M=1.98			M=3.04	
	A=3.43			A=2.77			A=3.50	
v=-6.77	v=-2.31	v=2.25	v=-1.81	v=2.68	v=7.17	v=-5.19	v=-1.74	v=4.06

EJE K/N 3.44

B=0.25 H=0.30 L=3.27			B=0.25 H=0.30 L=3.27			B=0.25 H=0.30 L=3.27		
M=-2.74		M=-2.82	M=-2.57		M=-2.60	M=-3.00		M=-2.88
A=3.08		A=3.17	A=2.88		A=2.91	A=3.39		A=3.25
	M=2.45			M=2.04			M=2.52	
	A=2.73			A=2.25			A=2.82	
v=-2.72	v=1.12	v=2.94	v=-2.67	v=-0.85	v=2.65	v=-2.99	v=-1.17	v=2.80

EJE 3/N 6.44

B=0.25 H=0.25 L=3.17			B=0.25 H=0.25 L=3.20			B=0.25 H=0.25 L=3.20			B=0.25 H=0.25 L=3.17		
M=-0.65		M=-0.60	M=-0.60		M=-0.63	M=-0.63		M=-0.60	M=-0.60		M=-0.65
A=1.65		A=1.65	A=1.65		A=1.65	A=1.65		A=1.65	A=1.65		A=1.65
	M=0.48			M=0.48			M=0.48			M=0.48	
	A=1.65			A=1.65			A=1.65			A=1.65	
v=-0.69	v=-0.21	v=0.66	v=-0.66	v=0.20	v=0.68	v=-0.68	v=-0.20	v=0.66	v=-0.66	v=0.21	v=0.69

EJE 5/N 6.44

B=0.25 H=0.25 L=3.17			B=0.25 H=0.25 L=3.20			B=0.25 H=0.25 L=3.20			B=0.25 H=0.25 L=3.17		
M=-1.42		M=-1.52	M=-1.56		M=-1.56	M=-1.56		M=-1.56	M=-1.52		M=-1.42
A=1.97		A=2.12	A=2.17		A=2.17	A=2.17		A=2.17	A=2.12		A=1.97
	M=0.86			M=0.77			M=0.77			M=0.86	
	A=1.65			A=1.65			A=1.65			A=1.65	
v=-2.61	v=0.16	v=2.67	v=-2.66	v=-0.10	v=2.66	v=-2.66	v=-0.10	v=2.66	v=-2.67	v=-0.16	v=2.61

EJE 6/N 6.44

B=0.25 H=0.25 L=3.17			B=0.25 H=0.25 L=3.20			B=0.25 H=0.25 L=3.20			B=0.25 H=0.25 L=3.17		
M=-1.35		M=-1.58	M=-1.59		M=-1.54	M=-1.54		M=-1.59	M=-1.58		M=-1.35
A=1.87		A=2.20	A=2.22		A=2.15	A=2.15		A=2.22	A=2.20		A=1.87
	M=0.95			M=0.78			M=0.78			M=0.95	
	A=1.65			A=1.65			A=1.65			A=1.65	
v=-2.56	v=0.24	v=2.72	v=-2.68	v=-0.13	v=2.65	v=-2.65	v=0.13	v=2.68	v=-2.72	v=-0.24	v=2.56

EJE G/N 6.44

B=0.25 H=0.25 L=3.27			B=0.25 H=0.25 L=3.27			B=0.25 H=0.25 L=3.27		
M=-0.75		M=-0.65	M=-0.60		M=-0.56	M=-1.02		M=-1.01
A=1.65		A=1.65	A=1.65		A=1.65	A=1.65		A=1.65
	M=0.57			M=0.47			M=0.73	
	A=1.65			A=1.65			A=1.65	
v=-0.73	v=-0.27	v=0.64	v=-0.56	v=0.22	v=0.53	v=-1.61	v=-0.21	v=1.56

EJE H/N 6.44

B=0.25 H=0.25 L=3.27		
M=-0.76		M=-0.92
A=1.65		A=1.65
	M=0.58	
	A=1.65	
v=-1.54	v=0.11	v=1.63

EJE I/N 6.44

B=0.25 H=0.25 L=3.27			B=0.25 H=0.25 L=3.27			B=0.25 H=0.25 L=3.27		
M=-0.74		M=-0.52	M=-0.50		M=-0.43	M=-0.95		M=-0.86
A=1.65		A=1.65	A=1.65		A=1.65	A=1.65		A=1.65
	M=0.49			M=0.36			M=0.51	
	A=1.65			A=1.65			A=1.65	
v=-0.72	v=-0.26	v=0.56	v=-0.49	v=0.16	v=0.47	v=-1.61	v=-0.09	v=1.56

EJE J/N 6.44

B=0.25 H=0.25 L=3.27		
M=-0.76 A=1.65		M=-0.92 A=1.65
	M=0.58 A=1.65	
v=-1.54	v=0.11	v=1.63

EJE K/N 6.44

B=0.25 H=0.25 L=3.27			B=0.25 H=0.25 L=3.27			B=0.25 H=0.25 L=3.27		
M=-0.75 A=1.65		M=-0.65 A=1.65	M=-0.60 A=1.65		M=-0.56 A=1.65	M=-1.02 A=1.65		M=-1.01 A=1.65
	M=0.57 A=1.65			M=0.47 A=1.65			M=0.73 A=1.65	
v=-0.73	v=-0.27	v=0.64	v=-0.56	v=0.22	v=0.53	v=-1.61	v=-0.21	v=1.56

EJE 3/N 7.18

B=0.25 H=0.25 L=3.17			B=0.25 H=0.25 L=3.20			B=0.25 H=0.25 L=3.20			B=0.25 H=0.25 L=3.17		
M=-0.39 A=1.65		M=-0.34 A=1.65	M=-0.34 A=1.65		M=-0.36 A=1.65	M=-0.36 A=1.65		M=-0.34 A=1.65	M=-0.34 A=1.65		M=-0.39 A=1.65
	M=0.29 A=1.65			M=0.27 A=1.65			M=0.27 A=1.65			M=0.29 A=1.65	
v=-0.40	v=-0.13	v=0.38	v=-0.38	v=0.12	v=0.39	v=-0.39	v=-0.12	v=0.38	v=-0.38	v=0.13	v=0.40

EJE G/N 7.18

B=0.25 H=0.25 L=3.29			B=0.25 H=0.25 L=3.29		
M=-0.46 A=1.65		M=-0.49 A=1.65	M=-0.54 A=1.65		M=-0.58 A=1.65
	M=0.36 A=1.65			M=0.41 A=1.65	
v=-0.60	v=-0.12	v=0.60	v=-0.60	v=0.17	v=0.62

EJE I/N 7.18

B=0.25 H=0.25 L=3.29			B=0.25 H=0.25 L=3.29		
M=-0.58 A=1.65		M=-0.51 A=1.65	M=-0.56 A=1.65		M=-0.56 A=1.65
	M=0.39 A=1.65			M=0.37 A=1.65	
v=-0.86	v=-0.13	v=0.79	v=-0.81	v=0.11	v=0.84

EJE K/N 7.18

B=0.25 H=0.25 L=3.29			B=0.25 H=0.25 L=3.29		
M=-0.46		M=-0.49	M=-0.54		M=-0.58
A=1.65		A=1.65	A=1.65		A=1.65
	M=0.36			M=0.41	
	A=1.65			A=1.65	
v=-0.60	v=-0.12	v=0.60	v=-0.60	v=0.17	v=0.62

ANEXO 6

MEMORIAS DISEÑO ESTRUCTURAL IEM CIUDADELA DE PAZ BLOQUE 2

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INPUT FILE: CIUDADELA DE PAZ BLOQUE 2.STD
1. STAAD SPACE CIUDADELA BLOQUE 2
2. START JOB INFORMATION
3. ENGINEER DATE 11-NOV-05
4. END JOB INFORMATION
5. INPUT WIDTH 79
6. UNIT METER MTON
7. JOINT COORDINATES
8. 1 0 0 0; 2 3.57 0 0; 3 7.15 0 0; 4 10.72 0 0; 5 14.29 0 0; 6 17.86 0 0
9. 7 21.43 0 0; 8 25.01 0 0; 9 28.58 0 0; 10 3.57 0 1.84; 11 25.01 0 1.84
10. 12 0 0 2.97; 14 7.15 0 2.97; 16 14.29 0 2.97; 17 17.86 0 2.97; 18 21.43 0 2.97
11. 20 28.58 0 2.97; 21 0 0 5.87; 23 7.15 0 5.87; 25 14.29 0 5.87; 27 21.43 0 5.87
12. 29 28.58 0 5.87; 30 0 0 8.77; 31 3.57 0 8.77; 32 7.15 0 8.77; 34 14.29 0 8.77
13. 35 17.86 0 8.77; 36 21.43 0 8.77; 37 25.01 0 8.77; 38 28.58 0 8.77
14. 42 0 0 11.17; 43 7.15 0 12.17; 44 10.72 0 12.17; 45 14.29 0 12.17
15. 46 17.86 0 12.17; 47 28.58 0 11.17; 48 0 3.29 0; 49 3.57 3.29 0
16. 50 7.15 3.29 0; 51 10.72 3.29 0; 52 14.29 3.29 0; 53 17.86 3.29 0
17. 54 21.43 3.29 0; 55 25.01 3.29 0; 56 28.58 3.29 0; 57 3.57 3.29 1.84
18. 58 25.01 3.29 1.84; 59 0 3.29 2.97; 60 3.57 3.29 2.97; 61 7.15 3.29 2.97
19. 62 10.72 3.29 2.97; 63 14.29 3.29 2.97; 64 17.86 3.29 2.97; 65 21.43 3.29 2.97
20. 66 25.01 3.29 2.97; 67 28.58 3.29 2.97; 68 0 3.29 5.87; 69 3.57 3.29 5.87
21. 70 7.15 3.29 5.87; 71 10.72 3.29 5.87; 72 14.29 3.29 5.87; 73 17.86 3.29 5.87
22. 74 21.43 3.29 5.87; 75 25.01 3.29 5.87; 76 28.58 3.29 5.87; 77 0 3.29 8.77
23. 78 3.57 3.29 8.77; 79 7.15 3.29 8.77; 80 10.72 3.29 8.77; 81 14.29 3.29 8.77
24. 82 17.86 3.29 8.77; 83 21.43 3.29 8.77; 84 25.01 3.29 8.77; 85 28.58 3.29 8.77
25. 86 3.57 3.29 9.545; 87 21.43 3.29 9.545; 88 25.01 3.29 9.545; 89 0 3.29 11.17
26. 90 7.15 3.29 12.17; 91 10.72 3.29 12.17; 92 14.29 3.29 12.17
27. 93 17.86 3.29 12.17; 94 28.58 3.29 11.17; 95 7.15 6.315 0; 96 10.72 6.315 0
28. 97 14.29 6.315 0; 98 17.86 6.315 0; 99 7.15 6.315 2.97; 100 14.29 6.315 2.97
29. 101 17.86 6.315 2.97; 102 7.15 6.315 5.87; 103 14.29 6.315 5.87
30. 104 17.86 6.315 5.87; 105 7.15 6.315 8.77; 106 14.29 6.315 8.77
31. 107 17.86 6.315 8.77; 108 7.15 6.315 12.17; 109 10.72 6.315 12.17
32. 110 14.29 6.315 12.17; 111 17.86 6.315 12.17; 112 7.15 7.055 0
33. 113 7.15 7.055 2.97; 114 7.15 7.055 5.87; 115 7.15 7.055 8.77
34. 116 7.15 7.055 12.17; 117 10.72 6.685 0; 118 10.72 6.685 12.17
35. MEMBER INCIDENCES
36. 1 48 49; 2 49 50; 3 50 51; 4 51 52; 5 52 53; 6 53 54; 7 54 55; 8 55 56
37. 9 59 57; 10 57 61; 11 65 58; 12 58 67; 13 59 60; 14 60 61; 15 61 62; 16 62 63
38. 17 63 64; 18 64 65; 19 65 66; 20 66 67; 21 68 69; 22 69 70; 23 70 71; 24 71 72
39. 25 72 73; 26 73 74; 27 74 75; 28 75 76; 29 77 78; 30 78 79; 31 79 80; 32 80 81
40. 33 81 82; 34 82 83; 35 83 84; 36 84 85; 37 90 91; 38 91 92; 39 92 93; 40 48 59
41. 41 59 68; 42 68 77; 43 77 89; 44 49 57; 45 57 60; 46 60 69; 47 69 78; 48 78 86
42. 49 50 61; 50 61 70; 51 70 79; 52 79 90; 53 51 62; 54 62 71; 55 71 80; 56 80 91
43. 57 52 63; 58 63 72; 59 72 81; 60 81 92; 61 53 64; 62 64 73; 63 73 82; 64 82 93
44. 65 54 65; 66 65 74; 67 74 83; 68 83 87; 69 55 58; 70 58 66; 71 66 75; 72 75 84
45. 73 84 88; 74 56 67; 75 67 76; 76 76 85; 77 85 94; 78 95 96; 79 96 97; 80 97 98
46. 82 100 101; 83 102 103; 84 103 104; 86 106 107; 87 108 109; 88 109 110
47. 89 110 111; 90 95 99; 91 99 102; 92 102 105; 93 105 108; 94 97 100; 95 100 103
48. 96 103 106; 97 106 110; 98 98 101; 99 101 104; 100 104 107; 101 107 111
49. 104 112 113; 105 113 114; 106 114 115; 107 115 116; 108 1 48; 109 2 49
50. 110 3 50; 111 50 95; 112 95 112; 113 4 51; 114 51 96; 115 5 52; 116 52 97
51. 117 6 53; 118 53 98; 119 7 54; 120 8 55; 121 9 56; 122 10 57; 123 11 58
52. 124 12 59; 125 14 61; 126 61 99; 127 99 113; 128 16 63; 129 63 100; 130 17 64
53. 131 64 101; 132 18 65; 133 20 67; 134 21 68; 135 23 70; 136 70 102
54. 137 102 114; 138 25 72; 139 72 103; 140 27 74; 141 29 76; 142 30 77; 143 31 78
55. 144 32 79; 145 79 105; 146 105 115; 147 34 81; 148 81 106; 149 35 82
56. 150 82 107; 151 36 83; 152 37 84; 153 38 85; 154 42 89; 155 43 90; 156 90 108
57. 157 108 116; 158 44 91; 159 91 109; 160 45 92; 161 92 110; 162 46 93
58. 163 93 111; 164 47 94; 165 114 103; 166 96 117; 167 109 118; 168 112 117
59. 169 117 97; 170 116 118; 171 118 110; 207 1 2; 208 2 3; 209 3 4; 210 4 5
60. 211 5 6; 212 6 7; 213 7 8; 214 8 9; 215 12 10; 216 10 14; 217 16 17; 218 17 18
61. 219 18 11; 220 11 20; 221 30 31; 222 31 32; 223 34 35; 224 35 36; 225 36 37
62. 226 37 38; 227 43 44; 228 44 45; 229 45 46; 230 1 12; 231 12 21; 232 21 30
63. 233 30 42; 234 2 10; 235 3 14; 236 14 23; 237 23 32; 238 32 43; 239 5 16
64. 240 16 25; 241 25 34; 242 34 45; 243 6 17; 244 35 46; 245 7 18; 246 18 27
65. 247 27 36; 248 8 11; 249 9 20; 250 20 29; 251 29 38; 252 38 47
66. ELEMENT INCIDENCES SHELL
67. 203 100 101 98 97; 204 103 104 101 100; 205 106 107 104 103
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68. 206 110 111 107 106
69. ELEMENT PROPERTY
70. 203 TO 206 THICKNESS 0.18
71. DEFINE MATERIAL START
72. ISOTROPIC CONCRETE
73. E 1.79E+006
74. POISSON 0.17
75. DENSITY 2.4
76. ALPHA 1E-005
77. DAMP 0.05
78. ISOTROPIC LOSA
79. E 1.79E+006
80. POISSON 0.17
81. DENSITY 0
82. ALPHA 1E-005
83. DAMP 0.05
84. END DEFINE MATERIAL
85. CONSTANTS
86. MATERIAL CONCRETE MEMB 1 TO 80 82 TO 84 86 TO 101 104 TO 171 207 TO 252
87. MATERIAL LOSA MEMB 203 TO 206
88. MEMBER PROPERTY AMERICAN
89. 108 TO 133 142 TO 153 155 TO 163 166 167 PRIS YD 0.3 ZD 0.3
90. 9 TO 12 37 TO 39 44 TO 73 PRIS YD 0.3 ZD 0.3
91. 83 84 PRIS YD 0.4 ZD 0.25
92. 78 TO 80 82 86 TO 97 PRIS YD 0.25 ZD 0.25
93. 165 PRIS YD 0.35 ZD 0.25
94. 104 TO 107 168 TO 171 PRIS YD 0.25 ZD 0.25
95. 1 TO 8 40 TO 43 74 TO 77 PRIS YD 0.3 ZD 0.25
96. MEMBER PROPERTY AMERICAN
97. 13 TO 20 29 TO 36 PRIS YD 0.4 ZD 0.3
98. MEMBER PROPERTY AMERICAN
99. 134 TO 141 PRIS YD 0.3 ZD 0.3
100. 21 TO 28 PRIS YD 0.4 ZD 0.3
101. MEMBER PROPERTY AMERICAN
102. 98 TO 101 PRIS YD 0.3 ZD 0.25
103. MEMBER PROPERTY AMERICAN
104. 207 TO 252 PRIS YD 0.3 ZD 0.25
105. MEMBER PROPERTY AMERICAN
106. 154 164 PRIS YD 0.25 ZD 0.25
107. SUPPORTS
108. 1 TO 12 14 16 TO 18 20 21 23 25 27 29 TO 32 34 TO 38 42 TO 47 FIXED
109. CUT OFF MODE SHAPE 15
110. LOAD 1 CARGA MUERTA
111. SELFWEIGHT Y -1
112. MEMBER LOAD
113. 1 TO 8 UNI GY -0.582
114. 13 TO 20 UNI GY -1.165
115. 21 TO 28 UNI GY -1.166
116. 44 45 49 53 57 61 65 69 70 UNI GY -0.604
117. 40 74 UNI GY -0.302
118. 46 47 50 51 54 55 58 59 62 63 66 67 71 72 UNI GY -0.574
119. 41 42 75 76 UNI GY -0.287
120. 31 TO 33 UNI GY -1.122
121. 37 TO 39 UNI GY -0.539
122. 29 30 34 TO 36 UNI GY -0.971
123. 52 64 UNI GY -0.454
124. 56 60 UNI GY -0.908
125. 9 TO 12 UNI GY -0.582
126. 94 TO 101 UNI GY -0.828
127. 80 82 84 86 89 UNI GY -0.464
128. 90 TO 93 UNI GY -0.11
129. 83 TRAP GY -0.11 0
130. 78 87 TRAP GY -0.11 -0.055
131. 79 88 TRAP GY -0.055 0
132. 48 68 73 UNI GY -0.194
133. 165 UNI GY -0.0235
134. 168 169 UNI GY -0.012
135. 170 171 UNI GY -0.0138
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136. JOINT LOAD
137. 100 113 FY -0.163
138. 106 115 FY -0.169
139. LOAD 2 CARGA VIVA
140. MEMBER LOAD
141. 1 TO 8 UNI GY -0.189
142. 13 TO 20 UNI GY -0.378
143. 21 TO 28 UNI GY -0.379
144. 44 45 49 53 57 61 65 69 70 UNI GY -0.196
145. 40 74 UNI GY -0.098
146. 46 47 50 51 54 55 58 59 62 63 66 67 71 72 UNI GY -0.186
147. 41 42 75 76 UNI GY -0.093
148. 31 TO 33 UNI GY -0.268
149. 37 TO 39 UNI GY -0.175
150. 29 30 34 TO 36 UNI GY -0.315
151. 52 64 UNI GY -0.147
152. 56 60 UNI GY -0.294
153. 94 TO 101 UNI GY -0.054
154. 80 82 84 86 89 UNI GY -0.03
155. 9 TO 12 UNI GY -0.098
156. 168 169 UNI GY -0.052
157. 165 UNI GY -0.1015
158. 170 171 UNI GY -0.0595
159. JOINT LOAD
160. 100 113 FY -0.37
161. 106 115 FY -0.396
162. MEMBER LOAD
163. 48 68 73 UNI GY -0.1
164. LOAD 3 SISMO EN X
165. SELFWEIGHT X -1
166. MEMBER LOAD
167. 1 TO 8 UNI GX -0.582
168. 13 TO 20 UNI GX -1.165
169. 21 TO 28 UNI GX -1.166
170. 44 45 49 53 57 61 65 69 70 UNI GX -0.604
171. 40 74 UNI GX -0.302
172. 46 47 50 51 54 55 58 59 62 63 66 67 71 72 UNI GX -0.574
173. 41 42 75 76 UNI GX -0.287
174. 31 TO 33 UNI GX -1.122
175. 37 TO 39 UNI GX -0.539
176. 29 30 34 TO 36 UNI GX -0.971
177. 52 64 UNI GX -0.454
178. 56 60 UNI GX -0.908
179. 9 TO 12 UNI GX -0.582
180. 94 TO 101 UNI GX -0.828
181. 80 82 84 86 89 UNI GX -0.464
182. 90 TO 93 UNI GX -0.11
183. 83 TRAP GX -0.11 0
184. 78 87 TRAP GX -0.11 -0.055
185. 79 88 TRAP GX -0.055 0
186. 48 68 73 UNI GX -0.194
187. 165 UNI GX -0.0235
188. 168 169 UNI GX -0.012
189. 170 171 UNI GX -0.0138
190. JOINT LOAD
191. 100 113 FX -0.163
192. 106 115 FX -0.169
193. SELFWEIGHT Z -1
194. MEMBER LOAD
195. 1 TO 8 UNI GZ -0.582
196. 13 TO 20 UNI GZ -1.165
197. 21 TO 28 UNI GZ -1.166
198. 44 45 49 53 57 61 65 69 70 UNI GZ -0.604
199. 40 74 UNI GZ -0.302
200. 46 47 50 51 54 55 58 59 62 63 66 67 71 72 UNI GZ -0.574
201. 41 42 75 76 UNI GZ -0.287
202. 31 TO 33 UNI GZ -1.122
203. 37 TO 39 UNI GZ -0.539
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204. 29 30 34 TO 36 UNI GZ -0.971
205. 52 64 UNI GZ -0.454
206. 56 60 UNI GZ -0.908
207. 9 TO 12 UNI GZ -0.582
208. 94 TO 101 UNI GZ -0.828
209. 80 82 84 86 89 UNI GZ -0.464
210. 90 TO 93 UNI GZ -0.11
211. 83 TRAP GZ -0.11 0
212. 78 87 TRAP GZ -0.11 -0.055
213. 79 88 TRAP GZ -0.055 0
214. 48 68 73 UNI GZ -0.194
215. 165 UNI GZ -0.0235
216. 168 169 UNI GZ -0.012
217. 170 171 UNI GZ -0.0138
218. JOINT LOAD
219. 100 113 FZ -0.163
220. 106 115 FZ -0.169
221. *....ESPECTRO ELASTICO DE DISEÑO NSR 98
222. *....COEFICIENTE DE IMPORTANCIA I= 1.1
223. *....COEFICIENTE DE SITIO S=  S3= 1.5
224. SPECTRUM CQC X 1 ACC SCALE 9.81 DAMP 0.05
225. 0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
226. 0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
227. 0.7 0.825; 0.75 0.792; 0.8 0.743; 0.85 0.699; 0.9 0.66; 0.95 0.625; 1 0.594
228. 1.1 0.54; 1.2 0.495; 1.3 0.457; 1.4 0.424; 1.5 0.396; 1.6 0.371; 1.7 0.349
229. 1.8 0.33; 1.9 0.313; 2 0.297; 2.1 0.283; 2.2 0.27; 2.3 0.258; 2.4 0.248
230. 2.5 0.238; 2.6 0.228; 2.7 0.22; 2.8 0.212; 2.9 0.205; 3 0.198; 3.1 0.192
231. 3.2 0.186; 3.3 0.18; 3.4 0.175; 3.5 0.17; 3.6 0.165; 3.7 0.165; 3.8 0.165
232. 3.9 0.165; 4 0.165; 4.1 0.165; 4.2 0.165; 4.3 0.165; 4.4 0.165; 4.5 0.165
233. 4.6 0.165; 4.7 0.165; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165; 5.2 0.165
234. 5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165; 5.9 0.165
235. 6 0.165
236. LOAD 4 SISMO EN Z
237. SPECTRUM CQC Z 1 ACC SCALE 9.81 DAMP 0.05
238. *....0A= 0.9
239. *....0B= 0.9
240. *....R= 7*OA*OB =5.67
241. 0 0.825; 0.1 0.825; 0.15 0.825; 0.2 0.825; 0.25 0.825; 0.3 0.825; 0.35 0.825
242. 0.4 0.825; 0.45 0.825; 0.5 0.825; 0.55 0.825; 0.6 0.825; 0.65 0.825
243. 0.7 0.825; 0.75 0.792; 0.8 0.743; 0.85 0.699; 0.9 0.66; 0.95 0.625; 1 0.594
244. 1.1 0.54; 1.2 0.495; 1.3 0.457; 1.4 0.424; 1.5 0.396; 1.6 0.371; 1.7 0.349
245. 1.8 0.33; 1.9 0.313; 2 0.297; 2.1 0.283; 2.2 0.27; 2.3 0.258; 2.4 0.248
246. 2.5 0.238; 2.6 0.228; 2.7 0.22; 2.8 0.212; 2.9 0.205; 3 0.198; 3.1 0.192
247. 3.2 0.186; 3.3 0.18; 3.4 0.175; 3.5 0.17; 3.6 0.165; 3.7 0.165; 3.8 0.165
248. 3.9 0.165; 4 0.165; 4.1 0.165; 4.2 0.165; 4.3 0.165; 4.4 0.165; 4.5 0.165
249. 4.6 0.165; 4.7 0.165; 4.8 0.165; 4.9 0.165; 5 0.165; 5.1 0.165; 5.2 0.165
250. 5.3 0.165; 5.4 0.165; 5.5 0.165; 5.6 0.165; 5.7 0.165; 5.8 0.165; 5.9 0.165
251. 6 0.165
252. LOAD 29 CIMENTACION
253. MEMBER LOAD
254. 207 214 UNI GY 0.076
255. 208 UNI GY 0.134
256. 209 UNI GY 0.194
257. 210 211 UNI GY 0.22
258. 212 UNI GY 0.162
259. 213 UNI GY 0.098
260. 215 UNI GY 0.223
261. 216 UNI GY 0.354
262. 217 UNI GY 0.416
263. 218 UNI GY 0.354
264. 219 UNI GY 0.301
265. 220 UNI GY 0.239
266. 221 UNI GY 0.151
267. 222 UNI GY 0.282
268. 223 UNI GY 0.429
269. 224 UNI GY 0.28
270. 225 UNI GY 0.205
271. 226 UNI GY 0.165
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272. 227 UNI GY 0.182
273. 228 UNI GY 0.236
274. 229 UNI GY 0.21
275. 230 UNI GY 0.145
276. 231 UNI GY 0.215
277. 232 UNI GY 0.172
278. 233 UNI GY 0.093
279. 234 UNI GY 0.371
280. 235 UNI GY 0.386
281. 236 UNI GY 0.584
282. 237 UNI GY 0.533
283. 238 UNI GY 0.264
284. 239 UNI GY 0.42
285. 240 UNI GY 0.618
286. 241 UNI GY 0.635
287. 242 UNI GY 0.382
288. 243 UNI GY 0.366
289. 244 UNI GY 0.289
290. 245 UNI GY 0.259
291. 246 UNI GY 0.419
292. 247 UNI GY 0.34
293. 248 UNI GY 0.394
294. 249 UNI GY 0.151
295. 250 UNI GY 0.221
296. 251 UNI GY 0.173
297. 252 UNI GY 0.091
298. LOAD COMB 5 CU  1.4D+1.7L
299. 1 1.4 2 1.7
300. LOAD COMB 6 0.75CU+EX+0.3EZ
301. 1 1.05 2 1.28 3 0.176 4 0.053
302. LOAD COMB 7 0.75CU+EX-0.3EZ
303. 1 1.05 2 1.28 3 0.176 4 -0.053
304. LOAD COMB 8 0.75CU-EX+0.3EZ
305. 1 1.05 2 1.28 3 -0.176 4 0.053
306. LOAD COMB 9 0.75CU-EX-0.3EZ
307. 1 1.05 2 1.28 3 -0.176 4 -0.053
308. LOAD COMB 10 0.9D+EX+0.3EZ
309. 1 0.9 3 0.176 4 0.053
310. LOAD COMB 11 0.9D+EX-0.3EZ
311. 1 0.9 3 0.176 4 -0.053
312. LOAD COMB 12 0.9D-EX+0.3EZ
313. 1 0.9 3 -0.176 4 0.053
314. LOAD COMB 13 0.9D-EX-0.3EZ
315. 1 0.9 3 -0.176 4 -0.053
316. LOAD COMB 14 0.75CU+EZ+0.3EX
317. 1 1.05 2 1.28 3 0.053 4 0.176
318. LOAD COMB 15 0.75CU+EZ-0.3EX
319. 1 1.05 2 1.28 3 -0.053 4 0.176
320. LOAD COMB 16 0.75CU-EZ+0.3EX
321. 1 1.05 2 1.28 3 0.053 4 -0.176
322. LOAD COMB 17 0.75CU-EZ-0.3EX
323. 1 1.05 2 1.28 3 -0.053 4 -0.176
324. LOAD COMB 18 0.9D+EZ+0.3EX
325. 1 0.9 3 0.053 4 0.176
326. LOAD COMB 19 0.9D+EZ-0.3EX
327. 1 0.9 3 -0.053 4 0.176
328. LOAD COMB 20 0.9D-EZ+0.3EX
329. 1 0.9 3 0.053 4 -0.176
330. LOAD COMB 21 0.9D-EZ-0.3EX
331. 1 0.9 3 -0.053 4 -0.176
332. LOAD COMB 22 D+L
333. 1 1.0 2 1.0
334. ****************************************************
335. * * * ----COMBINACIONES REACCIONDE SUELO MODAL-- * * *
336. LOAD COMB 30 SUELO-M D + 70% EX/R
337. 1 1.0 3 0.1235
338. LOAD COMB 31 SUELO-M D - 70% EX/R
339. 1 1.0 3 -0.1235
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340. LOAD COMB 32 SUELO-M D + 70% EZ/R
341. 1 1.0 4 0.1235
342. LOAD COMB 33 SUELO-M D - 70% EZ/R
343. 1 1.0 4 -0.1235
344. LOAD COMB 34 SUELO-M  L  + D + 70% EX/R
345. 1 1.0 2 1.0 3 0.1235
346. LOAD COMB 35 SUELO-M L + D - 70% EX/R
347. 1 1.0 2 1.0 3 -0.1235
348. LOAD COMB 36 SUELO-M L + D + 70% EZ/R
349. 1 1.0 2 1.0 4 0.1235
350. LOAD COMB 37 SUELO-M L + D - 70% EZ/R
351. 1 1.0 2 1.0 4 -0.1235
352. LOAD COMB 38 SUELO-M L + D
353. 1 1.0 2 1.0
354. * * * --------------- * * *
355. ********************************
356. ****************************************************
357. PDELTA 10 ANALYSIS
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 P R O B L E M   S T A T I S T I C S
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     NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =   107/   217/    36
     ORIGINAL/FINAL BAND-WIDTH=    47/    17/     84 DOF
     TOTAL PRIMARY LOAD CASES =    5, TOTAL DEGREES OF FREEDOM =    426
     SIZE OF STIFFNESS MATRIX =      36 DOUBLE  KILO-WORDS
     REQRD/AVAIL. DISK SPACE  =    13.1/ 19307.2 MB,  EXMEM =  730.5 MB

++ Adjusting Displacements                          15:15:26
++ Adjusting Displacements                          15:15:26
++ Adjusting Displacements                          15:15:26
++ Adjusting Displacements                          15:15:26
++ Adjusting Displacements                          15:15:26
++ Adjusting Displacements                          15:15:26
++ Adjusting Displacements                          15:15:26
++ Adjusting Displacements                          15:15:26
++ Adjusting Displacements                          15:15:26
++ Adjusting Displacements                          15:15:26
NUMBER OF MODES REQUESTED              =    15
NUMBER OF EXISTING MASSES IN THE MODEL =   150
NUMBER OF MODES THAT WILL BE USED      =    15
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EIGENSOLUTION : SUBSPACE METHOD ***

CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
1	2.349	0.42577	7.700E-15
2	2.707	0.36937	3.241E-14
3	3.030	0.33001	3.734E-13
4	3.683	0.27149	1.039E-11
5	3.850	0.25975	2.997E-12
6	4.572	0.21874	1.034E-11
7	5.063	0.19753	2.215E-10
8	5.414	0.18471	3.021E-10
9	5.621	0.17791	1.596E-09
10	6.005	0.16654	9.964E-09
11	7.042	0.14201	1.861E-08
12	7.356	0.13594	7.109E-09
13	7.530	0.13280	1.516E-08
14	8.045	0.12431	2.428E-08
15	8.411	0.11889	1.492E-07

The following Frequencies are estimates that were calculated. These are for information only and will not be used. Remaining values are either above the cut off mode/freq values or are of low accuracy. To use these frequencies, rerun with a higher cutoff mode (or mode + freq) value.

CALCULATED FREQUENCIES FOR LOAD CASE 3

MODE	FREQUENCY(CYCLES/SEC)	PERIOD(SEC)	ACCURACY
16	8.889	0.11249	2.317E-07
17	9.115	0.10971	1.838E-06
18	9.296	0.10758	2.271E-06
19	10.538	0.09489	6.701E-06
20	10.638	0.09401	6.936E-07
21	10.845	0.09220	9.515E-06
22	11.361	0.08802	9.601E-07
23	11.498	0.08697	1.938E-06

RESPONSE LOAD CASE 3

CQC MODAL COMBINATION METHOD USED.

DYNAMIC WEIGHT X Y Z	3.080728E+02	9.319809E-09	3.080728E+02	MTON
MISSING WEIGHT X Y Z	-7.689517E-01	-9.319809E-09	-3.756129E-01	MTON
MODAL WEIGHT X Y Z	3.073038E+02	2.027664E-23	3.076971E+02	MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000
7	0.82528	0.05000
8	0.82528	0.05000
9	0.82528	0.05000

10	0.82528	0.05000
11	0.82528	0.05000
12	0.82528	0.05000
13	0.82528	0.05000
14	0.82528	0.05000
15	0.82528	0.05000

PARTICIPATION FACTORS

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	0.01	0.00	71.65	0.007	0.000	71.650	0.02	0.00	0.00
2	92.49	0.00	0.03	92.500	0.000	71.685	235.16	0.00	0.00
3	1.23	0.00	2.82	93.729	0.000	74.508	3.13	0.00	0.00
4	0.55	0.00	10.24	94.278	0.000	84.748	1.39	0.00	0.00
5	0.27	0.00	9.60	94.546	0.000	94.346	0.68	0.00	0.00
6	0.07	0.00	2.23	94.613	0.000	96.572	0.17	0.00	0.00
7	2.66	0.00	0.03	97.277	0.000	96.602	6.77	0.00	0.00
8	0.01	0.00	1.77	97.289	0.000	98.373	0.03	0.00	0.00
9	0.75	0.00	0.26	98.041	0.000	98.638	1.91	0.00	0.00
10	0.09	0.00	0.00	98.128	0.000	98.642	0.22	0.00	0.00
11	0.04	0.00	1.12	98.170	0.000	99.767	0.11	0.00	0.00
12	0.88	0.00	0.03	99.053	0.000	99.796	2.25	0.00	0.00
13	0.60	0.00	0.06	99.652	0.000	99.858	1.52	0.00	0.00
14	0.01	0.00	0.02	99.664	0.000	99.877	0.03	0.00	0.00
15	0.09	0.00	0.00	99.750	0.000	99.878	0.22	0.00	0.00
					TOTAL SRSS	SHEAR	235.31	0.00	0.00
					TOTAL 10PCT	SHEAR	235.33	0.00	0.00
					TOTAL ABS	SHEAR	253.61	0.00	0.00
					TOTAL CQC	SHEAR	237.14	0.00	0.00

RESPONSE LOAD CASE 4

CQC MODAL COMBINATION METHOD USED.
DYNAMIC WEIGHT X Y Z 3.080728E+02 9.319809E-09 3.080728E+02 MTON
MISSING WEIGHT X Y Z -7.689517E-01 -9.319809E-09 -3.756129E-01 MTON
MODAL WEIGHT X Y Z 3.073038E+02 2.027664E-23 3.076971E+02 MTON

MODE	ACCELERATION-G	DAMPING
1	0.82528	0.05000
2	0.82528	0.05000
3	0.82528	0.05000
4	0.82528	0.05000
5	0.82528	0.05000
6	0.82528	0.05000
7	0.82528	0.05000
8	0.82528	0.05000

MODE	ACCELERATION-G	DAMPING
9	0.82528	0.05000
10	0.82528	0.05000
11	0.82528	0.05000
12	0.82528	0.05000
13	0.82528	0.05000
14	0.82528	0.05000
15	0.82528	0.05000

PARTICIPATION FACTORS

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN MTON		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	0.01	0.00	71.65	0.007	0.000	71.650	0.00	0.00	182.17
2	92.49	0.00	0.03	92.500	0.000	71.685	0.00	0.00	0.09
3	1.23	0.00	2.82	93.729	0.000	74.508	0.00	0.00	7.18
4	0.55	0.00	10.24	94.278	0.000	84.748	0.00	0.00	26.03
5	0.27	0.00	9.60	94.546	0.000	94.346	0.00	0.00	24.40
6	0.07	0.00	2.23	94.613	0.000	96.572	0.00	0.00	5.66
7	2.66	0.00	0.03	97.277	0.000	96.602	0.00	0.00	0.08
8	0.01	0.00	1.77	97.289	0.000	98.373	0.00	0.00	4.50
9	0.75	0.00	0.26	98.041	0.000	98.638	0.00	0.00	0.67
10	0.09	0.00	0.00	98.128	0.000	98.642	0.00	0.00	0.01
11	0.04	0.00	1.12	98.170	0.000	99.767	0.00	0.00	2.86
12	0.88	0.00	0.03	99.053	0.000	99.796	0.00	0.00	0.08
13	0.60	0.00	0.06	99.652	0.000	99.858	0.00	0.00	0.16
14	0.01	0.00	0.02	99.664	0.000	99.877	0.00	0.00	0.05
15	0.09	0.00	0.00	99.750	0.000	99.878	0.00	0.00	0.00
					TOTAL SRSS SHEAR		0.00	0.00	185.93
					TOTAL 10PCT SHEAR		0.00	0.00	189.34
					TOTAL ABS SHEAR		0.00	0.00	253.94
					TOTAL CQC SHEAR		0.00	0.00	192.73

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358. LOAD LIST 3 4
   359. PRINT STORY DRIFT
   STORY    DRIFT
   STORY   HEIGHT    LOAD         DRIFT(CM  )       ECCENTRICITY      RATIO
  ------------------------------------------------------------------------
          (METE)                 X           Z         (METE)

BASE=       0.00

    1       3.29       3      2.2482      0.2082       0.0000       L /   146
                       4      0.2001      2.1084       0.0000       L /   156

    2       6.32       3      3.9589      0.3238       0.0000       L /   159
                       4      0.4190      5.0800       0.0000       L /   124

    3       6.68       3      4.0254      0.2896       0.0000       L /   166
                       4      0.6310      5.2239       0.0000       L /   128

    4       7.05       3      4.1030      0.5033       0.0000       L /   172
                       4      0.4092      3.6790       0.0000       L /   192
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360. LOAD LIST 30 TO 38
361. PRINT SUPPORT REACTION
SUPPORT  REACTION
SUPPORT REACTIONS -UNIT MTON METE    STRUCTURE TYPE = SPACE
   -----------------
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JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	30	0.84	3.50	0.14	0.10	0.02	1.06
	31	-0.33	2.61	-0.04	-0.26	-0.02	-1.24
	32	0.34	3.29	0.32	0.45	0.04	0.08
	33	0.17	2.82	-0.22	-0.61	-0.04	-0.25
	34	0.90	3.90	0.15	0.10	0.02	1.00
	35	-0.26	3.02	-0.04	-0.25	-0.02	-1.31
	36	0.40	3.69	0.33	0.46	0.04	0.01
	37	0.23	3.23	-0.22	-0.60	-0.04	-0.32
	38	0.32	3.46	0.06	-0.07	0.00	-0.16
2	30	0.71	3.84	0.01	0.06	0.04	1.38
	31	-0.79	3.54	-0.20	-0.33	-0.05	-1.29
	32	0.07	4.48	0.44	0.83	0.01	0.24
	33	-0.15	2.91	-0.62	-1.11	-0.01	-0.15
	34	0.70	4.38	-0.01	0.03	0.04	1.39
	35	-0.80	4.08	-0.22	-0.35	-0.05	-1.28
	36	0.06	5.02	0.41	0.81	0.01	0.25
	37	-0.16	3.44	-0.64	-1.13	-0.01	-0.14
	38	-0.05	4.23	-0.11	-0.16	0.00	0.05
3	30	0.64	7.95	0.21	0.19	0.02	1.20
	31	-0.63	7.19	0.02	-0.18	-0.02	-1.22
	32	0.09	8.56	0.81	1.36	0.06	0.16
	33	-0.08	6.59	-0.59	-1.36	-0.05	-0.18
	34	0.65	8.99	0.24	0.22	0.02	1.20
	35	-0.63	8.24	0.04	-0.15	-0.02	-1.23
	36	0.10	9.60	0.84	1.39	0.06	0.15
	37	-0.08	7.63	-0.56	-1.33	-0.05	-0.18
	38	0.01	8.62	0.14	0.03	0.00	-0.02
4	30	0.67	8.64	0.68	0.80	0.02	1.23
	31	-0.66	8.56	0.54	0.54	-0.02	-1.25
	32	0.09	9.07	1.59	2.61	0.05	0.16
	33	-0.08	8.13	-0.37	-1.27	-0.05	-0.18
	34	0.67	10.11	0.84	0.97	0.02	1.23
	35	-0.66	10.03	0.69	0.70	-0.02	-1.25
	36	0.09	10.54	1.74	2.78	0.05	0.16
	37	-0.08	9.60	-0.21	-1.10	-0.05	-0.18
	38	0.01	10.07	0.76	0.84	0.00	-0.01
5	30	0.59	9.32	0.13	0.04	0.02	1.24
	31	-0.67	8.96	0.08	-0.05	-0.03	-1.17
	32	0.04	10.98	1.23	2.20	0.02	0.20
	33	-0.12	7.29	-1.02	-2.21	-0.02	-0.12
	34	0.58	10.52	0.15	0.07	0.02	1.25
	35	-0.67	10.16	0.11	-0.02	-0.03	-1.16
	36	0.04	12.18	1.26	2.23	0.02	0.20
	37	-0.13	8.50	-1.00	-2.18	-0.02	-0.12
	38	-0.05	10.34	0.13	0.02	0.00	0.04
6	30	0.65	8.63	0.12	0.05	0.02	1.18

	31	-0.61	7.61	0.02	-0.14	-0.02	-1.23
	32	0.10	10.06	1.08	1.96	0.05	0.14
	33	-0.07	6.18	-0.94	-2.05	-0.05	-0.18
	34	0.65	9.64	0.14	0.07	0.02	1.18
	35	-0.61	8.63	0.04	-0.12	-0.02	-1.23
	36	0.10	11.08	1.10	1.98	0.05	0.13
	37	-0.06	7.19	-0.92	-2.03	-0.05	-0.19
	38	0.02	9.14	0.09	-0.03	0.00	-0.03
7	30	0.75	5.42	0.17	0.10	0.02	1.29
	31	-0.72	5.26	0.06	-0.11	-0.02	-1.34
	32	0.12	5.88	0.74	1.20	0.06	0.15
	33	-0.08	4.81	-0.52	-1.21	-0.07	-0.20
	34	0.76	6.33	0.19	0.13	0.02	1.28
	35	-0.71	6.17	0.08	-0.08	-0.02	-1.35
	36	0.12	6.79	0.77	1.23	0.06	0.14
	37	-0.08	5.71	-0.49	-1.18	-0.07	-0.21
	38	0.02	6.25	0.14	0.02	0.00	-0.03
8	30	0.77	3.60	-0.05	-0.04	0.05	1.25
	31	-0.68	3.44	-0.18	-0.28	-0.05	-1.36
	32	0.14	4.36	0.46	0.88	0.01	0.12
	33	-0.05	2.67	-0.68	-1.20	-0.01	-0.23
	34	0.78	4.10	-0.07	-0.07	0.05	1.23
	35	-0.67	3.94	-0.20	-0.30	-0.05	-1.37
	36	0.15	4.86	0.43	0.86	0.01	0.10
	37	-0.04	3.17	-0.71	-1.23	-0.01	-0.24
	38	0.06	4.02	-0.14	-0.19	0.00	-0.07
9	30	0.33	3.48	0.13	0.07	0.02	1.21
	31	-0.83	2.59	-0.04	-0.24	-0.02	-1.07
	32	-0.17	3.33	0.44	0.68	0.03	0.22
	33	-0.33	2.74	-0.35	-0.85	-0.02	-0.08
	34	0.27	3.87	0.14	0.08	0.02	1.27
	35	-0.89	2.98	-0.03	-0.23	-0.02	-1.01
	36	-0.23	3.72	0.44	0.69	0.03	0.29
	37	-0.39	3.13	-0.34	-0.84	-0.02	-0.02
	38	-0.31	3.43	0.05	-0.08	0.00	0.13
10	30	0.77	12.40	0.87	0.95	0.02	1.71
	31	-1.01	12.06	0.64	0.55	-0.03	-1.44
	32	0.00	12.74	1.36	1.80	0.04	0.36
	33	-0.25	11.73	0.15	-0.30	-0.05	-0.08
	34	0.73	14.66	1.05	1.15	0.02	1.75
	35	-1.04	14.33	0.81	0.74	-0.03	-1.40
	36	-0.03	15.00	1.54	2.00	0.04	0.40
	37	-0.28	13.99	0.32	-0.11	-0.05	-0.05
	38	-0.15	14.50	0.93	0.95	0.00	0.17
11	30	0.94	13.53	0.90	0.95	0.03	1.47
	31	-0.80	12.91	0.78	0.74	-0.03	-1.63
	32	0.17	13.81	1.49	1.97	0.03	0.11
	33	-0.04	12.63	0.19	-0.28	-0.03	-0.27
	34	0.95	16.04	1.10	1.17	0.03	1.45
	35	-0.79	15.42	0.98	0.96	-0.03	-1.65
	36	0.19	16.33	1.69	2.20	0.03	0.09
	37	-0.02	15.14	0.39	-0.06	-0.03	-0.28
	38	0.08	15.73	1.04	1.07	0.00	-0.10
12	30	1.63	8.15	0.24	0.41	0.01	0.97

	31	-0.13	7.04	0.05	0.04	-0.02	-2.17
	32	0.82	7.72	0.50	0.84	0.04	-0.47
	33	0.67	7.46	-0.21	-0.39	-0.05	-0.73
	34	1.80	9.44	0.29	0.45	0.01	0.78
	35	0.04	8.33	0.09	0.09	-0.02	-2.36
	36	1.00	9.02	0.54	0.89	0.04	-0.66
	37	0.85	8.76	-0.16	-0.35	-0.05	-0.92
	38	0.92	8.89	0.19	0.27	-0.01	-0.79
14	30	1.10	18.18	0.26	0.44	0.02	1.25
	31	-0.76	17.60	0.01	0.02	-0.02	-2.01
	32	0.24	18.38	1.02	1.79	0.05	-0.24
	33	0.09	17.40	-0.75	-1.34	-0.05	-0.51
	34	1.15	21.92	0.29	0.48	0.02	1.20
	35	-0.71	21.34	0.05	0.06	-0.02	-2.06
	36	0.29	22.12	1.06	1.83	0.05	-0.30
	37	0.14	21.14	-0.71	-1.29	-0.05	-0.57
	38	0.22	21.63	0.17	0.27	0.00	-0.43
16	30	0.39	18.88	0.10	0.14	0.02	2.33
	31	-1.40	16.91	0.03	0.03	-0.02	-0.86
	32	-0.42	18.51	1.45	2.57	0.02	0.87
	33	-0.58	17.28	-1.32	-2.40	-0.02	0.60
	34	0.27	22.29	0.11	0.16	0.02	2.46
	35	-1.52	20.33	0.05	0.05	-0.02	-0.72
	36	-0.55	21.92	1.46	2.58	0.02	1.00
	37	-0.71	20.70	-1.30	-2.38	-0.02	0.73
	38	-0.63	21.31	0.08	0.10	0.00	0.87
17	30	0.98	16.73	0.25	0.45	0.02	1.60
	31	-0.91	14.94	0.13	0.24	-0.02	-1.68
	32	0.11	17.12	1.37	2.54	0.06	0.09
	33	-0.04	14.56	-0.99	-1.84	-0.06	-0.17
	34	0.98	18.95	0.30	0.51	0.02	1.59
	35	-0.90	17.16	0.19	0.30	-0.02	-1.69
	36	0.12	19.33	1.43	2.60	0.06	0.09
	37	-0.04	16.77	-0.94	-1.78	-0.06	-0.18
	38	0.04	18.05	0.25	0.41	0.00	-0.05
18	30	1.32	13.05	0.21	0.35	0.02	1.37
	31	-0.69	12.76	0.08	0.11	-0.02	-2.05
	32	0.39	13.26	0.93	1.60	0.07	-0.20
	33	0.24	12.55	-0.64	-1.13	-0.07	-0.47
	34	1.40	15.61	0.26	0.40	0.02	1.29
	35	-0.62	15.33	0.12	0.16	-0.02	-2.13
	36	0.47	15.82	0.97	1.65	0.07	-0.28
	37	0.31	15.12	-0.59	-1.09	-0.07	-0.55
	38	0.39	15.47	0.19	0.28	0.00	-0.42
20	30	0.11	8.12	0.25	0.41	0.02	2.18
	31	-1.64	6.99	0.09	0.10	-0.02	-0.94
	32	-0.68	7.73	0.68	1.14	0.03	0.77
	33	-0.85	7.37	-0.34	-0.64	-0.03	0.47
	34	-0.07	9.40	0.30	0.46	0.03	2.37
	35	-1.82	8.27	0.14	0.15	-0.02	-0.75
	36	-0.86	9.02	0.73	1.19	0.03	0.96
	37	-1.03	8.65	-0.29	-0.59	-0.03	0.66
	38	-0.94	8.83	0.22	0.30	0.00	0.81
21	30	2.14	7.77	0.06	0.14	0.01	0.32

	31	0.36	7.10	-0.17	-0.26	-0.01	-2.99
	32	1.28	7.51	0.29	0.55	0.03	-1.29
	33	1.22	7.36	-0.41	-0.68	-0.04	-1.39
	34	2.45	9.29	0.04	0.12	0.01	-0.02
	35	0.67	8.62	-0.19	-0.28	-0.01	-3.33
	36	1.59	9.03	0.28	0.53	0.03	-1.63
	37	1.53	8.88	-0.42	-0.69	-0.04	-1.72
	38	1.56	8.95	-0.07	-0.08	0.00	-1.67
23	30	1.12	20.33	0.10	0.20	0.01	1.61
	31	-0.84	19.91	-0.13	-0.21	-0.01	-1.90
	32	0.18	20.21	0.85	1.53	0.05	-0.08
	33	0.10	20.03	-0.88	-1.55	-0.05	-0.21
	34	1.15	24.48	0.09	0.20	0.01	1.59
	35	-0.82	24.06	-0.14	-0.22	-0.01	-1.93
	36	0.20	24.36	0.84	1.53	0.05	-0.11
	37	0.12	24.18	-0.88	-1.55	-0.05	-0.23
	38	0.16	24.27	-0.02	-0.01	0.00	-0.17
25	30	0.57	22.75	0.04	0.07	0.01	2.15
	31	-1.34	22.49	-0.02	-0.04	-0.01	-1.31
	32	-0.35	22.63	1.41	2.52	0.02	0.48
	33	-0.42	22.61	-1.39	-2.48	-0.02	0.36
	34	0.48	26.95	0.04	0.07	0.01	2.25
	35	-1.44	26.68	-0.02	-0.04	-0.01	-1.21
	36	-0.44	26.82	1.41	2.52	0.02	0.58
	37	-0.52	26.80	-1.39	-2.48	-0.02	0.46
	38	-0.48	26.81	0.01	0.02	0.00	0.52
27	30	1.37	14.73	0.04	0.10	0.01	1.48
	31	-0.74	14.67	-0.10	-0.15	-0.01	-2.18
	32	0.35	14.97	0.80	1.39	0.06	-0.30
	33	0.28	14.43	-0.86	-1.44	-0.06	-0.40
	34	1.45	18.13	0.03	0.09	0.01	1.40
	35	-0.66	18.07	-0.11	-0.15	-0.01	-2.27
	36	0.42	18.37	0.79	1.39	0.06	-0.38
	37	0.36	17.83	-0.86	-1.45	-0.07	-0.49
	38	0.39	18.10	-0.04	-0.03	0.00	-0.43
29	30	-0.44	7.87	0.04	0.11	0.01	3.03
	31	-2.18	7.25	-0.16	-0.24	-0.01	-0.23
	32	-1.27	7.64	0.44	0.81	0.03	1.45
	33	-1.34	7.47	-0.56	-0.95	-0.02	1.35
	34	-0.77	9.41	0.02	0.09	0.01	3.39
	35	-2.51	8.79	-0.18	-0.26	-0.01	0.13
	36	-1.61	9.19	0.42	0.79	0.03	1.81
	37	-1.68	9.01	-0.58	-0.96	-0.02	1.70
	38	-1.64	9.10	-0.08	-0.08	0.00	1.76
30	30	1.16	5.07	0.00	0.12	0.02	1.47
	31	-0.58	3.77	-0.21	-0.26	-0.03	-1.70
	32	0.35	4.49	0.22	0.51	0.03	-0.01
	33	0.23	4.35	-0.43	-0.66	-0.05	-0.22
	34	1.23	5.70	-0.03	0.08	0.02	1.39
	35	-0.51	4.40	-0.24	-0.29	-0.04	-1.78
	36	0.42	5.12	0.19	0.48	0.03	-0.09
	37	0.30	4.98	-0.46	-0.69	-0.05	-0.30
	38	0.36	5.05	-0.13	-0.11	-0.01	-0.19
31	30	0.92	8.40	-0.64	-0.59	0.01	2.01

	31	-1.26	8.11	-0.83	-0.96	-0.01	-1.64
	32	-0.10	8.49	-0.27	0.12	0.06	0.31
	33	-0.24	8.01	-1.19	-1.67	-0.06	0.06
	34	0.88	10.15	-0.82	-0.78	0.01	2.05
	35	-1.29	9.86	-1.01	-1.15	-0.01	-1.59
	36	-0.13	10.24	-0.46	-0.08	0.06	0.35
	37	-0.28	9.77	-1.37	-1.86	-0.05	0.11
	38	-0.21	10.01	-0.91	-0.97	0.00	0.23
32	30	1.55	15.36	0.06	0.11	0.01	0.79
	31	-0.31	14.85	-0.17	-0.30	-0.01	-2.52
	32	0.69	15.25	0.80	1.44	0.05	-0.75
	33	0.56	14.95	-0.91	-1.63	-0.05	-0.98
	34	1.68	18.21	0.04	0.10	0.01	0.65
	35	-0.18	17.70	-0.18	-0.31	-0.01	-2.66
	36	0.82	18.10	0.79	1.43	0.05	-0.89
	37	0.69	17.81	-0.93	-1.64	-0.05	-1.11
	38	0.75	17.96	-0.07	-0.11	0.00	-1.00
34	30	0.33	20.41	0.05	0.04	0.02	2.48
	31	-1.51	18.09	-0.01	-0.07	-0.01	-0.81
	32	-0.52	19.51	1.39	2.45	0.03	0.95
	33	-0.66	18.99	-1.34	-2.48	-0.02	0.72
	34	0.20	23.69	0.06	0.04	0.02	2.62
	35	-1.64	21.36	0.00	-0.06	-0.01	-0.67
	36	-0.65	22.79	1.40	2.46	0.03	1.09
	37	-0.79	22.26	-1.34	-2.47	-0.02	0.86
	38	-0.72	22.52	0.03	-0.01	0.00	0.97
35	30	1.04	17.13	-0.12	-0.26	0.01	1.60
	31	-0.88	14.90	-0.24	-0.47	-0.01	-1.77
	32	0.14	17.03	0.98	1.80	0.06	0.03
	33	0.01	15.00	-1.34	-2.53	-0.06	-0.20
	34	1.06	19.12	-0.18	-0.32	0.01	1.58
	35	-0.87	16.89	-0.29	-0.52	-0.01	-1.80
	36	0.16	19.03	0.92	1.74	0.06	0.01
	37	0.03	16.99	-1.39	-2.59	-0.06	-0.22
	38	0.10	18.01	-0.23	-0.42	0.00	-0.11
36	30	1.02	7.79	-0.13	0.04	0.01	1.79
	31	-1.06	7.32	-0.24	-0.17	-0.01	-1.74
	32	0.05	8.03	0.44	1.13	0.09	0.14
	33	-0.09	7.08	-0.81	-1.26	-0.10	-0.09
	34	1.01	9.24	-0.17	-0.01	0.01	1.79
	35	-1.06	8.76	-0.29	-0.22	-0.01	-1.74
	36	0.04	9.48	0.39	1.09	0.09	0.14
	37	-0.09	8.52	-0.85	-1.31	-0.10	-0.09
	38	-0.03	9.00	-0.23	-0.11	0.00	0.03
37	30	1.12	9.74	-0.74	-0.74	0.01	1.71
	31	-0.99	9.02	-0.88	-0.98	-0.01	-1.86
	32	0.13	9.60	-0.33	0.09	0.03	0.04
	33	-0.01	9.15	-1.29	-1.81	-0.04	-0.19
	34	1.14	11.74	-0.94	-0.95	0.01	1.70
	35	-0.98	11.02	-1.08	-1.19	-0.01	-1.87
	36	0.15	11.60	-0.53	-0.12	0.03	0.03
	37	0.01	11.15	-1.49	-2.02	-0.04	-0.21
	38	0.08	11.38	-1.01	-1.07	0.00	-0.09
38	30	0.61	4.95	-0.01	0.09	0.03	1.67

	31	-1.13	3.60	-0.20	-0.25	-0.02	-1.49
	32	-0.20	4.39	0.36	0.77	0.04	0.19
	33	-0.32	4.17	-0.58	-0.92	-0.02	-0.02
	34	0.54	5.55	-0.04	0.06	0.03	1.74
	35	-1.20	4.20	-0.23	-0.28	-0.02	-1.42
	36	-0.27	4.98	0.33	0.74	0.04	0.26
	37	-0.39	4.77	-0.61	-0.95	-0.02	0.06
	38	-0.33	4.87	-0.14	-0.11	0.01	0.16
42	30	0.17	0.88	0.05	0.18	0.04	0.38
	31	-0.12	0.74	-0.06	-0.01	-0.06	-0.38
	32	0.05	1.04	0.17	0.38	0.00	0.06
	33	0.00	0.57	-0.17	-0.22	-0.02	-0.06
	34	0.17	0.85	0.05	0.18	0.04	0.38
	35	-0.12	0.71	-0.05	-0.01	-0.06	-0.38
	36	0.05	1.02	0.17	0.38	-0.01	0.06
	37	0.00	0.55	-0.17	-0.21	-0.02	-0.06
	38	0.03	0.78	0.00	0.09	-0.01	0.00
43	30	0.92	6.78	-0.02	0.24	0.02	1.55
	31	-0.61	4.92	-0.21	-0.13	-0.02	-1.51
	32	0.28	6.72	0.56	1.39	0.06	0.27
	33	0.03	4.98	-0.79	-1.28	-0.06	-0.22
	34	0.96	7.42	-0.05	0.21	0.02	1.51
	35	-0.57	5.56	-0.24	-0.15	-0.02	-1.55
	36	0.32	7.36	0.53	1.37	0.06	0.22
	37	0.07	5.62	-0.82	-1.31	-0.06	-0.27
	38	0.19	6.49	-0.14	0.03	0.00	-0.02
44	30	0.93	9.39	-0.61	-0.59	0.02	1.73
	31	-0.95	9.21	-0.75	-0.85	-0.01	-1.71
	32	0.14	9.69	0.29	1.20	0.07	0.29
	33	-0.16	8.91	-1.64	-2.65	-0.07	-0.27
	34	0.93	10.99	-0.76	-0.76	0.02	1.73
	35	-0.95	10.81	-0.90	-1.02	-0.01	-1.72
	36	0.14	11.29	0.13	1.04	0.07	0.28
	37	-0.16	10.51	-1.80	-2.81	-0.07	-0.27
	38	-0.01	10.90	-0.83	-0.89	0.00	0.00
45	30	0.89	10.29	-0.15	0.04	0.02	1.71
	31	-0.93	9.84	-0.20	-0.06	-0.02	-1.67
	32	0.12	11.60	0.92	2.16	0.03	0.29
	33	-0.16	8.53	-1.27	-2.18	-0.02	-0.25
	34	0.89	11.68	-0.20	-0.01	0.02	1.71
	35	-0.93	11.22	-0.25	-0.11	-0.02	-1.67
	36	0.12	12.99	0.88	2.11	0.03	0.28
	37	-0.16	9.92	-1.32	-2.24	-0.02	-0.25
	38	-0.02	11.45	-0.22	-0.06	0.00	0.02
46	30	0.66	7.70	-0.02	0.20	0.02	1.44
	31	-0.86	5.60	-0.12	0.01	-0.02	-1.61
	32	0.03	8.25	0.90	2.07	0.02	0.16
	33	-0.23	5.05	-1.04	-1.86	-0.02	-0.34
	34	0.64	8.32	-0.03	0.19	0.02	1.46
	35	-0.88	6.22	-0.13	-0.01	-0.02	-1.59
	36	0.01	8.88	0.89	2.05	0.02	0.19
	37	-0.25	5.67	-1.05	-1.88	-0.02	-0.32
	38	-0.12	7.27	-0.08	0.09	0.00	-0.06
47	30	0.13	0.86	0.04	0.17	0.06	0.38

31	-0.16	0.74	-0.05	0.00	-0.04	-0.38
32	0.00	1.13	0.24	0.51	0.02	0.05
33	-0.04	0.47	-0.25	-0.34	0.00	-0.04
34	0.12	0.83	0.05	0.17	0.06	0.38
35	-0.17	0.71	-0.04	0.01	-0.04	-0.37
36	-0.01	1.10	0.25	0.52	0.02	0.05
37	-0.04	0.44	-0.24	-0.34	0.01	-0.04
38	-0.02	0.77	0.00	0.09	0.01	0.00

********** END OF LATEST ANALYSIS RESULT **********

362. LOAD LIST 5 TO 22
364. *.....DISEÑO DE COLUMNAS.....
365. START CONCRETE DESIGN

CONCRETE DESIGN
366. CODE ACI
367. FYMAIN 42000 MEMB 108 TO 164 166 167
368. FYSEC 42000 MEMB 108 TO 164 166 167
369. FC 2100 MEMB 108 TO 164 166 167
370. DESIGN COLUMN 108 TO 164 166 167

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COLUMN NO. 108 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

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COLUMN NO. 109 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

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COLUMN NO. 110 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

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COLUMN NO. 111 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

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COLUMN NO.   112 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

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COLUMN NO.   113 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1026.0 SQ. MM

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COLUMN NO.   114 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

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COLUMN NO.   115 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1026.0 SQ. MM

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COLUMN NO.   116 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   117 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =   963.0 SQ. MM

==========

COLUMN NO.   118 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   119 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.

AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 120 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 121 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 122 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 123 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1026.0 SQ. MM

```
=====================================================================

COLUMN  NO.   124  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1278.0  SQ. MM

=====================================================================

COLUMN  NO.   125  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.   126  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.   127  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM
```

```
=====================================================================

COLUMN  NO.   128  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.   129  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM
=====================================================================

COLUMN  NO.   130  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.   131  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =   963.0  SQ. MM

=====================================================================
```

COLUMN NO. 132 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 133 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1215.0 SQ. MM

==========

COLUMN NO. 134 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1719.0 SQ. MM

==========

COLUMN NO. 135 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 136 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 137 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 138 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   139 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   140 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   141 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1908.0 SQ. MM

==========

COLUMN NO.   142 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   143 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1404.0 SQ. MM

==========

COLUMN NO.   144 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

```
ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

========================================================================

COLUMN  NO.   145  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

========================================================================

COLUMN  NO.   146  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

========================================================================

COLUMN  NO.   147  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

========================================================================

COLUMN  NO.   148  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

========================================================================

COLUMN  NO.   149  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

========================================================================

COLUMN  NO.   150  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED
```

AREA OF STEEL REQUIRED = 1152.0 SQ. MM

==========

COLUMN NO.   151 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   152 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 1152.0 SQ. MM
==========

COLUMN NO.   153 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   154 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 250.0 X 250.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   625.0 SQ. MM

==========

COLUMN NO.   155 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   156 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

```
=====================================================================

COLUMN  NO.   157  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.   158  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =  1152.0  SQ. MM

=====================================================================

COLUMN  NO.   159  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0  SQ. MM

=====================================================================

COLUMN  NO.   160  DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9  FC -  20.6 MPA,  SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED =   963.0  SQ. MM

=====================================================================
```

COLUMN NO. 161 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 162 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

AREA OF STEEL REQUIRED = 963.0 SQ. MM

==========

COLUMN NO. 163 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 900.0 SQ. MM

==========

COLUMN NO. 164 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 250.0 X 250.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED = 625.0 SQ. MM

==========

COLUMN NO. 166 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM

==========

COLUMN NO.   167 DESIGN PER ACI 318-02 - AXIAL + BENDING

FY - 411.9 FC - 20.6 MPA, SQRE SIZE - 300.0 X 300.0 MMS, TIED

ONLY MINIMUM STEEL IS REQUIRED.
AREA OF STEEL REQUIRED =   900.0 SQ. MM
**********END OF COLUMN DESIGN RESULTS**********

Columna F-4

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.12				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
N 6.44		.25	.30	.30	
	2.75				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
N 3.44		.30	.30	.30	
	3.14				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
		1.10			

Columna F-5

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
N 3.44		.30	.30	.30	
	3.14				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
		1.10			

Columna F-6

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.30	.30	.30	
	2.70				8.#4 (1.1%)
					8.#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

Columna F-7

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.30	.30	.30	
	3.14				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

Columna F-8

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.30	.30	.30	
	3.14				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

Columna F-9

Nivel	H Libre	Losa	B	H	Cuantia
N 3.44		.30	.30	.30	
	3.14				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna E'-2

Nivel	H Libre	Losa	B	H	Cuantia
N 3.44		.30	.30	.30	
	3.14				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna E'-8

Nivel	H Libre	Losa	B	H	Cuantia
N 3.44		.30	.30	.30	
	3.14				8/#5 #4 (1.5%)
					8/#5 #4 (1.5%)
		1.10			

Columna E-1

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8#5 (1.8%)
					8#5 (1.8%)
		1.10			

Columna E-3

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.49				8#4 (1.1%)
					8#4 (1.1%)
N 6.44		.25	.30	.30	
	2.75				8#4 (1.1%)
					8#4 (1.1%)
N 3.44		.40	.30	.30	
	3.04				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna E-5

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8#4 (1.1%)
					8#4 (1.1%)
N 3.44		.40	.30	.30	
	3.04				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna E-6

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.30	.30	.30	
	2.70				8#4 (1.1%)
					8#4 (1.1%)
N 3.44		.40	.30	.30	
	3.04				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna E-7

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna E-9

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8#5 (1.8%)
					8#5 (1.8%)
		1.10			

Columna D-1

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8.#6 #5 (2.1%)
					8.#6 #5 (2.1%)
		1.10			

Columna D-3

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.35	.30	.30	
	.39				8.#4 (1.1%)
					8.#4 (1.1%)
N 6.44		.40	.30	.30	
	2.60				8.#4 (1.1%)
					8.#4 (1.1%)
N 3.44		.40	.30	.30	
	3.04				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

Columna D-5

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.40	.30	.30	
	2.60				8.#4 (1.1%)
					8.#4 (1.1%)
N 3.44		.40	.30	.30	
	3.04				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

Columna D-7

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna D-9

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8#6 (2.5%)
					8#6 (2.5%)
		1.10			

Columna C-1

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna C-2

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8.#5 (1.8%)
					8.#5 (1.8%)
		1.10			

Columna C-3

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.49				8.#4 (1.1%)
					8.#4 (1.1%)
N 6.44		.25	.30	.30	
	2.75				8.#4 (1.1%)
					8.#4 (1.1%)
N 3.44		.40	.30	.30	
	3.04				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

Columna C-5

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8.#4 (1.1%)
					8.#4 (1.1%)
N 3.44		.40	.30	.30	
	3.04				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

Columna C-6

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.30	.30	.30	
	2.70				8.#5 #4 (1.5%)
					8.#5 #4 (1.5%)
N 3.44		.40	.30	.30	
	3.04				8.#5 #4 (1.5%)
					8.#5 #4 (1.5%)
		1.10			

Columna C-7

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

Columna C-8

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8.#5 #4 (1.5%)
					8.#5 #4 (1.5%)
		1.10			

Columna C-9

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.40	.30	.30	
	3.04				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna B-1

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.30	.30	.30	
	3.14				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna A-3

Nivel H	Libre	Losa	B	H	Cuantia
N 7.18		.25	.30	.30	
	.49				8#4 (1.1%)
					8#4 (1.1%)
N 6.44		.25	.30	.30	
	2.75				8#4 (1.1%)
					8#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8#4 (1.1%)
					8#4 (1.1%)
		1.10			

Columna B-9

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.30	.30	.30	
	3.14				8.#5 #4 (1.5%)
					8.#5 #4 (1.5%)
		1.10			

Columna A-5

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.25	.30	.30	
	2.75				8.#4 (1.1%)
					8.#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

Columna A-6

Nivel H	Libre	Losa	B	H	Cuantia
N 6.44		.30	.30	.30	
	2.70				8.#4 (1.1%)
					8.#4 (1.1%)
N 3.44		.30	.30	.30	
	3.14				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

Columna B-9

Nivel H	Libre	Losa	B	H	Cuantia
N 3.44		.30	.30	.30	
	3.14				8.#4 (1.1%)
					8.#4 (1.1%)
		1.10			

EJE 1/N 3.44

B=0.25 H=0.30 L=2.67			B=0.25 H=0.30 L=2.60			B=0.25 H=0.30 L=2.60			B=0.25 H=0.30 L=2.10		
M=-0.75 A=2.06		M=-1.32 A=2.06	M=-0.41 A=2.06		M=-0.82 A=2.06	M=-1.02 A=2.06		M=-0.48 A=2.06	M=-0.89 A=2.06		M=-0.61 A=2.06
	M=0.66 A=2.06			M=0.71 A=2.06			M=0.61 A=2.06			M=0.54 A=2.06	
v=-1.04	v=0.57	v=1.56	v=-0.99	v=0.38	v=1.36	v=-1.43	v=-0.44	v=0.94	v=-0.85	v=-0.62	v=0.55

EJE 2/N 3.44

B=0.30 H=0.30 L=1.54			B=0.30 H=0.30 L=0.83			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=2.60		
M=-0.94 A=3.07		M=-4.45 A=5.12	M=-7.31 A=9.01		M=-1.83 A=5.41	M=-0.74 A=2.48		M=-0.74 A=2.48	M=-1.19 A=3.30		M=-4.75 A=5.50
	M=0.45 A=2.48			M=1.83 A=2.48			M=2.69 A=3.21			M=1.19 A=2.48	
v=2.22	v=3.24	v=4.26	v=-9.85	v=-9.01	v=-8.17	v=-2.95	v=-0.89	v=1.18	v=0.89	v=2.83	v=4.89

B=0.30 H=0.30 L=0.52		
M=-0.17 A=2.48		M=-0.00 A=2.48
	M=0.00 A=2.48	
v=-0.44	v=-0.22	v=0.00

EJE 3/N 3.44

B=0.30 H=0.30 L=2.67			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=3.10		
M=-2.29 A=2.52		M=-2.52 A=2.79	M=-1.65 A=2.48		M=-1.96 A=2.48	M=-2.13 A=2.48		M=-1.83 A=2.48	M=-2.50 A=2.77		M=-2.18 A=2.48
	M=1.95 A=2.48			M=1.70 A=2.48			M=1.67 A=2.48			M=2.00 A=2.48	
v=-2.51	v=1.25	v=2.90	v=-2.28	v=0.91	v=2.46	v=-2.52	v=-0.98	v=2.31	v=-2.60	v=-1.08	v=2.23

EJE 4/N 3.44

B=0.30 H=0.30 L=2.67			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=3.10		
M=-5.08 A=5.93		M=-1.27 A=3.56	M=-0.34 A=2.48		M=-1.01 A=2.48	M=-1.20 A=2.48		M=-0.32 A=2.48	M=-1.38 A=3.90		M=-5.52 A=6.51
	M=1.38 A=2.48			M=1.27 A=2.48			M=1.15 A=2.48			M=1.94 A=2.48	
v=-4.40	v=-2.38	v=0.74	v=-1.53	v=0.55	v=2.59	v=-2.65	v=-0.59	v=1.47	v=-1.76	v=2.13	v=5.53

EJE 5/N 3.44

B=0.30 H=0.30 L=2.67			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=3.10		
M=-3.41		M=-3.29	M=-2.69		M=-2.65	M=-2.63		M=-2.93	M=-3.75		M=-3.69
A=3.84		A=3.70	A=2.99		A=2.94	A=2.92		A=3.27	A=4.25		A=4.18
	M=3.01			M=2.40			M=2.37			M=3.27	
	A=3.40			A=2.65			A=2.62			A=3.67	
v=-3.26	v=1.84	v=3.49	v=-2.91	v=-1.37	v=2.91	v=-2.86	v=1.47	v=3.02	v=-4.18	v=-1.54	v=3.90

EJE 6/N 3.44

B=0.30 H=0.30 L=2.67			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=3.10		
M=-3.38		M=-3.94	M=-4.51		M=-1.13	M=-1.13		M=-4.51	M=-3.83		M=-3.24
A=3.80		A=4.48	A=5.20		A=3.12	A=3.12		A=5.20	A=4.35		A=3.64
	M=3.03			M=1.43			M=1.46			M=2.92	
	A=3.47			A=2.48			A=2.48			A=3.34	
v=-3.20	v=2.14	v=3.79	v=-4.36	v=-2.34	v=-0.79	v=0.78	v=2.33	v=4.32	v=-3.30	v=-1.78	v=2.77

EJE 7/N 3.44

B=0.30 H=0.30 L=2.67			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=0.52		
M=-1.72		M=-2.31	M=-1.16		M=-1.43	M=-1.96		M=-1.44	M=-0.17		M=-0.00
A=2.48		A=2.55	A=2.48		A=2.48	A=2.48		A=2.48	A=2.48		A=2.48
	M=1.54			M=1.23			M=1.61			M=0.00	
	A=2.48			A=2.48			A=2.48			A=2.48	
v=-2.15	v=1.07	v=2.72	v=-1.91	v=0.61	v=2.23	v=-2.61	v=-1.06	v=1.99	v=-0.44	v=-0.22	v=0.00

EJE 8/N 3.44

B=0.30 H=0.30 L=1.54			B=0.30 H=0.30 L=0.83			B=0.30 H=0.30 L=2.60			B=0.30 H=0.30 L=2.60		
M=-0.91		M=-4.94	M=-8.01		M=-2.00	M=-0.80		M=-0.80	M=-1.27		M=-5.08
A=3.45		A=5.75	A=10.07		A=6.04	A=2.48		A=2.48	A=3.56		A=5.93
	M=0.38			M=2.00			M=2.90			M=1.27	
	A=2.48			A=2.48			A=3.49			A=2.48	
v=2.49	v=3.51	v=4.54	v=-10.83	v=-10.00	v=-9.16	v=-3.00	v=-0.94	v=1.12	v=1.09	v=3.08	v=5.14

B=0.30 H=0.30 L=0.52		
M=-0.17		M=-0.00
A=2.48		A=2.48
	M=0.00	
	A=2.48	
v=-0.44	v=-0.22	v=0.00

EJE 9/N 3.44

B=0.25 H=0.30 L=2.67			B=0.25 H=0.30 L=2.60			B=0.25 H=0.30 L=2.60			B=0.25 H=0.30 L=2.10		
M=-0.91		M=-1.51	M=-0.49		M=-0.93	M=-1.16		M=-0.57	M=-1.07		M=-0.80
A=2.06		A=2.06	A=2.06		A=2.06	A=2.06		A=2.06	A=2.06		A=2.06
	M=0.79			M=0.84			M=0.72			M=0.71	
	A=2.06			A=2.06			A=2.06			A=2.06	
v=-1.13	v=0.69	v=1.63	v=-1.04	v=0.47	v=1.39	v=-1.45	v=-0.53	v=1.00	v=-1.01	v=-0.78	v=0.69

EJE A/N 3.44

B=0.30 H=0.30 L=3.27			B=0.30 H=0.30 L=3.27			B=0.30 H=0.30 L=3.27		
M=-2.70		M=-2.84	M=-2.63		M=-2.51	M=-3.01		M=-2.81
A=3.00		A=3.16	A=2.92		A=2.78	A=3.36		A=3.13
	M=2.46			M=2.04			M=2.49	
	A=2.72			A=2.48			A=2.75	
v=-2.71	v=1.13	v=2.94	v=-2.70	v=-0.88	v=2.61	v=-3.00	v=-1.18	v=2.75

EJE C/N 3.44

B=0.30 H=0.40 L=3.27			B=0.30 H=0.40 L=3.28			B=0.30 H=0.40 L=6.84			B=0.30 H=0.40 L=3.27		
M=-2.57		M=-2.85	M=-2.32		M=-6.81	M=-11.63		M=-11.72	M=-7.66		M=-2.85
A=3.47		A=3.47	A=3.47		A=5.48	A=9.89		A=9.97	A=6.22		A=3.47
	M=3.31			M=1.70			M=9.16			M=2.53	
	A=3.47			A=3.47			A=7.56			A=3.47	
v=-3.72	v=1.20	v=4.48	v=-2.82	v=1.89	v=5.56	v=-10.15	v=1.60	v=10.19	v=-6.06	v=-2.54	v=3.21

B=0.30 H=0.40 L=3.27			B=0.30 H=0.40 L=3.28			B=0.30 H=0.40 L=3.27		
M=-2.94		M=-3.59	M=-2.92		M=-2.98	M=-3.52		M=-2.46
A=3.47		A=3.47	A=3.47		A=3.47	A=3.47		A=3.47
	M=2.69			M=1.76			M=3.17	
	A=3.47			A=3.47			A=3.47	
v=-3.73	v=1.18	v=4.48	v=-4.06	v=0.58	v=4.17	v=-4.74	v=-1.43	v=3.56

EJE D/N 3.44

B=0.30 H=0.40 L=6.85			B=0.30 H=0.40 L=6.84			B=0.30 H=0.40 L=6.84			B=0.30 H=0.40 L=6.85		
M=-6.19		M=-15.12	M=-16.32		M=-14.65	M=-11.93		M=-11.60	M=-13.12		M=-6.39
A=4.95		A=13.46	A=14.78		A=12.95	A=10.18		A=9.86	A=11.36		A=5.12
	M=7.48			M=10.98			M=4.59			M=7.77	
	A=6.07			A=9.26			A=3.62			A=6.32	
v=-8.47	v=1.60	v=11.10	v=-12.43	v=-2.86	v=11.95	v=-9.39	v=0.60	v=9.32	v=-10.63	v=-1.19	v=8.65

EJE E/N 3.44

B=0.30 H=0.40 L=6.85			B=0.30 H=0.40 L=6.84			B=0.30 H=0.40 L=3.27			B=0.30 H=0.40 L=3.27		
M=-3.58		M=-9.09	M=-13.06		M=-10.89	M=-7.33		M=-2.70	M=-2.46		M=-5.73
A=3.47		A=7.50	A=11.30		A=9.17	A=5.94		A=3.47	A=3.47		A=4.56
	M=3.84			M=7.85			M=2.50			M=2.27	
	A=3.47			A=6.39			A=3.47			A=3.47	
v=-6.11	v=3.46	v=7.81	v=-10.64	v=-1.22	v=10.01	v=-6.43	v=-2.36	v=3.46	v=-3.51	v=1.75	v=6.05

B=0.30 H=0.40 L=6.85		
M=-6.19		M=-3.64
A=4.95		A=3.47
	M=3.10	
	A=3.47	
v=-6.91	v=-3.48	v=6.07

EJE E,E' (1)/N 3.44

B=0.30 H=0.30 L=3.44			B=0.30 H=0.30 L=3.45		
M=-0.80		M=-1.87	M=-1.49		M=-2.55
A=2.48		A=2.48	A=2.48		A=2.82
	M=2.05			M=1.32	
	A=2.48			A=2.48	
v=-1.97	v=0.76	v=2.84	v=-2.03	v=0.73	v=2.79

EJE E,E' (2)/N 3.44

B=0.30 H=0.30 L=3.45			B=0.30 H=0.30 L=3.44		
M=-1.30		M=-1.70	M=-1.98		M=-0.78
A=2.48		A=2.48	A=2.48		A=2.48
	M=1.53			M=2.06	
	A=2.48			A=2.48	
v=-2.33	v=0.41	v=2.49	v=-2.89	v=-0.81	v=1.92

EJE G/N 3.44

B=0.25 H=0.30 L=3.27			B=0.25 H=0.30 L=3.28			B=0.25 H=0.30 L=3.27			B=0.25 H=0.30 L=3.27		
M=-1.65		M=-2.17	M=-2.09		M=-2.02	M=-2.24		M=-2.17	M=-2.27		M=-2.16
A=2.06		A=2.41	A=2.31		A=2.23	A=2.49		A=2.41	A=2.52		A=2.39
	M=1.71			M=1.45			M=1.66			M=1.71	
	A=2.06			A=2.06			A=2.06			A=2.06	
v=-2.21	v=0.76	v=2.75	v=-2.57	v=-0.57	v=2.40	v=-2.49	v=-0.63	v=2.47	v=-2.54	v=-0.68	v=2.45

EJE 3/N 6.44

B=0.25 H=0.25 L=2.67			B=0.25 H=0.25 L=2.60			B=0.25 H=0.25 L=2.60			B=0.25 H=0.25 L=3.10		
M=-0.78 Ae1.65		M=-0.58 Ae1.65	M=-0.74 Ae1.65		M=-0.63 Ae1.65	M=-0.59 Ae1.65		M=-0.76 Ae1.65	M=-0.63 Ae1.65		M=-0.75 Ae1.65
	M=0.59 Ae1.65			M=0.58 Ae1.65			M=0.58 Ae1.65			M=0.57 Ae1.66	
v=-0.79	v=-0.39	v=0.66	v=-0.77	v=-0.38	v=0.70	v=-0.67	v=0.39	v=0.78	v=-0.69	v=0.28	v=0.75

EJE 5/N 6.44

B=0.25 H=0.25 L=2.67			B=0.25 H=0.25 L=2.60			B=0.25 H=0.25 L=2.60			B=0.25 H=0.25 L=3.10		
M=-1.09 Ae1.65		M=-1.18 Ae1.65	M=-1.05 Ae1.65		M=-1.00 Ae1.65	M=-1.00 Ae1.65		M=-1.05 Ae1.65	M=-1.49 Ae2.07		M=-1.31 Ae1.81
	M=0.77 Ae1.65			M=0.69 Ae1.65			M=0.67 Ae1.65			M=0.87 Ae1.66	
v=-2.09	v=0.29	v=2.25	v=-2.14	v=-0.21	v=2.10	v=-2.09	v=0.20	v=2.14	v=-2.55	v=-0.24	v=2.42

EJE 6/N 6.44

B=0.25 H=0.30 L=2.67			B=0.25 H=0.30 L=5.50			B=0.25 H=0.30 L=3.10		
M=-1.33 Ae2.06		M=-1.91 Ae2.10	M=-2.92 Ae3.29		M=-2.99 Ae3.38	M=-2.09 Ae2.31		M=-1.46 Ae2.06
	M=1.00 Ae2.06			M=1.41 Ae2.06			M=1.14 Ae2.06	
v=-1.89	v=0.72	v=2.57	v=-3.61	v=0.75	v=3.64	v=-2.86	v=-0.61	v=2.25

EJE A/N 6.44

B=0.25 H=0.25 L=3.27			B=0.25 H=0.25 L=3.27			B=0.25 H=0.25 L=3.27		
M=-0.74 Ae1.65		M=-0.66 Ae1.65	M=-0.61 Ae1.65		M=-0.51 Ae1.65	M=-1.07 Ae1.65		M=-0.97 Ae1.65
	M=0.57 Ae1.65			M=0.47 Ae1.65			M=0.72 Ae1.65	
v=-0.72	v=-0.26	v=0.65	v=-0.57	v=-0.21	v=0.51	v=-1.68	v=-0.22	v=1.57

EJE C/N 6.44

B=0.25 H=0.25 L=3.27		
M=-0.74 Ae1.65		M=-0.94 Ae1.65
	M=0.80 Ae1.65	
v=-1.54	v=0.21	v=1.71

EJE D/N 6.44

B=0.25 H=0.40 L=6.84			B=0.25 H=0.40 L=3.30		
M=-1.71 Ae2.89		M=-1.85 Ae2.89	M=-3.13 Ae2.89		M=-0.78 Ae2.89
	M=1.22 Ae2.89			M=0.78 Ae2.89	
v=-1.52	v=0.21	v=1.43	v=-2.51	v=0.66	v=1.19

EJE E/N 6.44

B=0.25 H=0.25 L=3.27		
M=-0.68 Ae1.65		M=-0.90 Ae1.65
	M=0.73 Ae1.65	
v=-1.55	v=0.18	v=1.70

EJE G/N 6.44

B=0.25 H=0.25 L=3.27			B=0.25 H=0.25 L=3.27			B=0.25 H=0.25 L=3.27		
M=-0.69 Ae1.65		M=-0.64 Ae1.65	M=-0.55 Ae1.65		M=-0.47 Ae1.65	M=-1.06 Ae1.65		M=-0.91 Ae1.65
	M=0.55 Ae1.65			M=0.41 Ae1.65			M=0.72 Ae1.65	
v=-0.69	v=0.24	v=0.64	v=-0.53	v=-0.17	v=0.48	v=-1.71	v=-0.23	v=1.54

EJE 3/N 7.18

B=0.25 H=0.25 L=2.67			B=0.25 H=0.25 L=2.60			B=0.25 H=0.25 L=2.60			B=0.25 H=0.25 L=3.10		
M=-0.45 Ae1.65		M=-0.31 Ae1.65	M=-0.40 Ae1.65		M=-0.32 Ae1.65	M=-0.29 Ae1.65		M=-0.42 Ae1.65	M=-0.36 Ae1.65		M=-0.44 Ae1.65
	M=0.33 Ae1.65			M=0.32 Ae1.65			M=0.31 Ae1.65			M=0.33 Ae1.65	
v=-0.45	v=-0.22	v=0.37	v=-0.40	v=-0.20	v=0.38	v=-0.36	v=0.22	v=0.44	v=-0.40	v=0.16	v=0.43

EJE A/N 7.18

B=0.25 H=0.25 L=3.29			B=0.25 H=0.25 L=3.29		
M=-0.54 Ae1.65		M=-0.62 Ae1.65	M=-0.65 Ae1.65		M=-0.63 Ae1.65
	M=0.42 Ae1.65			M=0.47 Ae1.65	
v=-0.81	v=0.14	v=0.84	v=-0.94	v=-0.16	v=0.81

EJE D/N 7.18

B=0.25 H=0.35 L=6.88		
M=-1.81 A=2.47		M=-2.60 A=2.47
	M=1.29 A=2.47	
v=-1.84	v=0.13	v=2.06

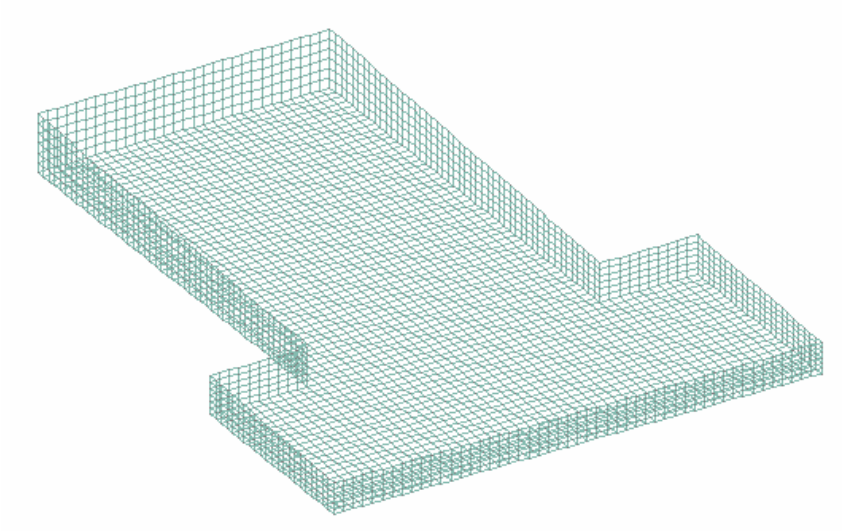
EJE G/N 7.18

B=0.25 H=0.25 L=3.29			B=0.25 H=0.25 L=3.29		
M=-0.51 A=1.65		M=-0.60 A=1.65	M=-0.61 A=1.65		M=-0.61 A=1.65
	M=0.41 A=1.65			M=0.42 A=1.65	
v=-0.80	v=0.13	v=0.85	v=-0.83	v=-0.13	v=0.82

ANEXO 7

MEMORIAS DISEÑO ESTRUCTURAL PISCINA ESCUELA NORMAL SUPERIOR DE PASTO

```
INPUT FILE: PISCINA.STD
     1. STAAD SPACE PISCINA LA NORMAL
     2. START JOB INFORMATION
     3. ENGINEER DATE 26-SEP-05
     4. END JOB INFORMATION
     5. INPUT WIDTH 79
     6. UNIT METER MTON
```



```
  2620. ELEMENT PROPERTY
  2621. 1 TO 2540 THICKNESS 0.2       (LOSA DE FONDO)
  2622. 2541 TO 3980 THICKNESS 0.15   (MUROS VERTICALES)
  2623. DEFINE MATERIAL START
  2624. ISOTROPIC CONCRETE
  2625. ****************CONCRETO DE 3500 PSI ********
  2626. E 1.93E+006
  2627. POISSON 0.17
  2628. DENSITY 2.4
  2629. ALPHA 1E-005
  2630. DAMP 0.05
  2631. END DEFINE MATERIAL
  2632. CONSTANTS
  2633. MATERIAL CONCRETE MEMB 1 TO 3980
  2634. SUPPORTS
  2635. 1 2 5 7 9 12 TO 14 17 TO 2669 ELASTIC MAT DIRECT Y SUBGRADE 2272
  2637. LOAD 1 CARGA PESO PROPIO
  2638. SELFWEIGHT Y -1
  2639. LOAD 2 CARGA HIDROSTATICA
  3516. LOAD 3 CARGA HIDRODINAMICA
  4377. LOAD 4 CARGA POR EMPUJE DE SUELO
  5238. LOAD 5 CARGA POR EMPUJE DE SISMO EN RELLENO
  6099. LOAD 6 LOSA DE FONDO
  6174. LOAD COMB 7 U1
```

```
  6175. 3 1.7 4 1.1
  6176. LOAD COMB 8 U2
  6177. 1 1.7
  6178. LOAD COMB 9 U3
  6179. 6 1.5

          P R O B L E M   S T A T I S T I C S
          -----------------------------------

     NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =  4101/  3980/  2634
     ORIGINAL/FINAL BAND-WIDTH=  4097/    87/    528 DOF
     TOTAL PRIMARY LOAD CASES =    6, TOTAL DEGREES OF FREEDOM =  24606
     SIZE OF STIFFNESS MATRIX =   12992 DOUBLE  KILO-WORDS
     REQRD/AVAIL. DISK SPACE  =   174.0/ 48831.3 MB,  EXMEM =  659.5 MB


  6183. START CONCRETE DESIGN

CONCRETE DESIGN
  6184. CODE ACI
  6185. FYMAIN 42000 MEMB 2541 TO 2720
  6186. FC 2450 MEMB ALL
```

DISEÑO Llosa DE FONDO

```
   TOP : Longitudinal direction - Only minimum steel required.
   BOTT: Longitudinal direction - Only minimum steel required.
   TOP :     0.400         0.71 /    8     0.400     1.44 /    8
   BOTT:     0.400         1.12 /    9     0.400     1.73 /    7
```

DISEÑO MUROS VETICALES

```
   TOP : Longitudinal direction - Only minimum steel required.
   BOTT: Longitudinal direction - Only minimum steel required.
   TOP :     0.300         0.26 /    8     0.300     3.00 /    8
   BOTT:     0.300         0.20 /    7     0.300     2.10 /    7
```