

وزارة التعليم العالي والبحث العلمي
الجامعة التكنولوجية
قسم هندسة البناء والانشاءات
فرع الهندسة الانشائية

Analysis And Design Of Multi Storey Building

مشروع مقدم الى قسم هندسة البناء والانشاءات كجزء من
متطلبات نيل
شهادة بكالوريوس علوم هندسة البناء والانشاءات

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الاهداء

الى

بديع السماوات والارض مالك الوجود كله اقدم اعظم حمد و
شكر
الى

السفينة التي تشق بحر الوجود لتتقذ الغرقى وتوصلهم الى
بر الامان الى ذلك الكيان العظيم والقلب الرحيم قبس الرحمن
ونور الجنان وصاحب العلم والعرفان والملك والتيجان النبي
محمد (صلى الله عليه وسلم)
الى

مثلي الاعلى وقدوتي في حياتي والدي العزيز
الى

من غمرتني بحبها وحنانها وخص الله الجنة تحت اقدامها
والدتي العزيزة
الى

من اناروا حياتي بالعلم والمعرفة والى الجهود الخيرة التي
عملت من اجل تطوير المستوى العلمي أساتذتي الافاضل.

شكر وتقدير

اتقدم بشكري وتقديري الى استاذي الفاضل
(الاستاذ مشتاق سلمان)
لما قدمه لي من جهد و توجيه وارشاد لكي انجز هذا
البحث .

واتقدم بشكري وتقديري الى كل الاساتذة الذين
ساهموا في وصولي هذه المرحلة مع خالص امتناني
لكل من ساهم في مساعدتي من اجل تقديم هذا
البحث.

والله ولي التوفيق

الفصل الأول

الآلية

الابنية

يمكن تعريف الابنية على انها ذلك الجزء الذي يتكون من منظومة انشائية قادرة على تحمل الاحمال المسلطة عليها بدون حدوث الفشل او الانهيار في هذه البناية, ويجب ايضا ان تتوفر فيها بالاضافة الى المتطلبات الانشائية و كذلك المتطلبات الوظيفية والاقتصادية والمعمارية حتى تؤدي الغرض الذي صممت من اجله البناية.

انواع الابنية:

- تقسم الابنية حسب التصميم الانشائي الى ما يلي:
- أ- البناء الهيكلي.
- ب- البناء غير الهيكلي (الجدران الحاملة للثقيل)
- ج- البناء المشترك

1- البناء الهيكلي:

يتميز هذا النوع بوجود هيكل انشائي حامل لجميع الاثقال يتكون من عتبات و اعمدة (Beams & Columns) تقوم بنقل كافة انواع الاحمال الى الاسس التي بدورها تنقلها الى التربة وتكون الهياكل اما خرسانية او معدنية او مركبة .

عناصر البناء الهيكلي:

يتكون البناء الهيكلي من ثلاثة عناصر اساسية و رئيسية والتي يتكون من مجموعها الهيكل العام للابنية المختلفة سواء كانت صناعية سكنية او تعليمية ذات طابق واحد او متعددة الطوابق مع استعمال المواد المختلفة في انشائها كالحديد والخشب والخرسانة المسلحة .

ان النظام الهيكلي في الانشاء يتميز بمميزات كثيرة لا تتوافر في غيره من الانظمة البنائية الاخرى كنظام الجدران الحاملة للثقيل حيث يعطي مرونة كبيرة في تقسيم الفضاءات الداخلية وحسبما تتطلبه التصاميم المعدة لها كما ان بالامكان تغير حجوم هذه الفضاءات لمرات كثيرة اذا تتطلب الامر اعادة تصميم القواطع الداخلية لهذه الفضاءات وذلك بتغيير اماكن هذه القواطع الداخلية لانها عناصر غير انشائية بل

اجزاء و عناصر مألنة لتقسيم الفضاءات الداخلية ولا تتحمل اي نوع من الالقال سوى ثقل نفسها اما الالقال الانشائية فيتحملها الهيكل العام للابنية بمختلف انواعها من ائقال ثابتة او متحركة.

اما العناصر الانشائية الثلاثة فهي :

1-الاعمدة Columns.

2-العتبات Beams.

3-البلاطات slabs.

2-البناء غير الهيكلي:

تنقل احمال البلاطات في هذا النوع من البناء الى الاساس بواسطة جدران حاملة للالقال لا يمكن رفعها بعد البناء بخلاف البناء الهيكلي ويتبع هذا الاسلوب في الابنية الاعتيادية ذات الطوابق القليلة لان تعدد الطوابق يعني زيادة سمك الجدران الامر الذي يؤدي الى نقصان المساحات الصافية للطوابق وتسلط احمال كبيرة على الاسس ويجب ان تبني الجدران الحاملة قبل بناء السقوف والارضيات.

3-البناء المشترك:

في هذا النوع هنالك اعمدة وعتبات خرسانية او معدنية تعمل كهيكل في جزء من البناء وايضا جدران حاملة للالقال في بعض الاجزاء الاخرى ويتبع هذا الاسلوب لتنفيذ متطلبات انشائية ومعمارية ولاسباب اقتصادية ايضا ومن الضروري توفير التفاصيل الانشائية واعداد التصاميم بشكل ملائم لتجنب الهبوط التفاضلي للاسس اكثر من الحد المسموح به.

الخط الثاني

طريقة التظليل

طرق التحليل الانشائي

انواع المنشآت بالنسبة لطريقة التحليل:

Determinate structure منشآت محددة استاتيكيًا

طريقة التحليل باستخدام معادلات التوازن:

$$F_x=0, F_y=0, F_z=0$$

Indeterminate structure منشآت غير محددة استاتيكيًا

وهناك عدة طرق لتحليلها :

1- الطريقة المرنة Elastic Method

2- الطريقة اللدنة Plastic method

1- الطريقة المرنة Elastic Method :

القوة Force Method

الميل والانحراف Slope Deflection Method

توزيع العزوم Moment Distribution

مصفوفة الجساسة Stiffness Matrix Method

وهناك طرق تقريبية أخرى مثل:

Portal Frame Method

Cantilever Method

اما برنامج STAAD PRO يستخدم في اسلوب التحليل طريقة مصفوفة الجساسة

طريقة مصفوفة الاجزاء Stiffness Matrix Method

تعتمد هذه الطريقة على تجزئة المنشأ الاصلي الى عدد من الاجزاء المرتبطة بعقد عند كل طرف ويجب اختيار موقع العقد اينما حصل تغيير في المقطع او خواص المادة او الاحمال المسلطة او عند الضرورة.

ومن اهم المعادلات المستخدمة في حل طريقة مصفوفة الصلادة هي :

❖ توازن القوى.

❖ توافق الازاحات.

❖ علاقة القوة والازاحة.

طريقة مصفوفة الاجزاء لجزء من عتبة:

ان القوى او الانحرافات يفترض انها موجبة اذا كانت نحو الاسفل وكذلك العزوم يفترض انها موجبة اذا كانت عكس عقارب الساعة. ان مصفوفة الصلادة (K) لجزء من العتبة النموذجية يمكن الحصول عليها بنفس الطريقة اي بفرض ازاحة كل من عقدتي جزء من العتبة او احتساب قوى العقدتين وبالتالي اضافة النتائج مستحصلة من كل حالة منفردا ولكن يمكن الحصول على نفس العلاقة بين القوى والازاحات في العقدتين باستعمال معادلات طريقة الميل-الانحراف.

طريقة مصفوفة الاجزاء لجزء المنشأ بنظام الاحداثيات المصدري للمنشأ:

في المنشآت المتألفة من اجزاء من مستويات مختلفة واذا ان الاجزاء الملتقية غير واقعة في مستوي واحد فان الاحداثيات المحلية للاجزاء لا تنطبق على بعضها ولذلك فان مصفوفة الصلادة لكل جزء يجب ان تعرف بنظام احداثيات واحد يكون مشتركاً لكل اجزاء المنشأ وهذا النظام يسمى نظام الاحداثيات المصدري وان تحويل مصفوفة الاجزاء الى اجزاء المنشأ من نظام الاحداثيات المحلي الى نظام الاحداثيات المصدري لذلك المنشأ يجب اجراؤه قبل الايفاء بشروطي التوازن والتوافق في العقد.

الفصل الثاني

الاحكام

الاحمال

انواع الاحمال على الابنية:
الاحمال الرئيسية الموجودة على اي بناية هي الاحمال الميتة والاحمال الحية ولكن بصورة عامة تقسم الى:

- الاحمال الحية.
- الاحمال الميتة.
- احمال الرياح.
- احمال الهزات الارضية.
- احمال الجليد.
- احمال الامطار.
- ضغط السوائل في الخزانات.
- القوة الناتجة عن الحرارة وتغيراتها.
- قوى التربة مثل القوى المسلطة على الجدران الساندة او ارضيات الاعمدة.

الاحمال المستخدمة في هذا المشروع:

- الاحمال الميتة (Dead Load).
- الاحمال الحية (Live Load).
- احمال الرياح (Wind Load).

1- الحمل الميت (DEAD LOAD) :

وهو الحمل الذي يمثل وزن المنشأ والاجزاء الانشائية الداخلية فيه مثل الكاشي والبياض والقواطع والسقوف الثانوية وغيرها من الاجزاء الانشائية. ويمكن تحديد الحمل الميت بدقة عالية في الحسابات.

اما عند التصميم سيفرض للمنشأ ابعاد قد تكون اكبر من الابعاد الحقيقية او الابعاد التي نحتاجها على اساس قوى القص والعزوم المسلطة وفي هذه الحالة تكون هذه الخطوة امينة ضمن مدى محدد وان الاجزاء ذات الابعاد الكبيرة نسبيا تعتبر ذات تحمل اقوى من تلك الاجزاء ذات الابعاد الاقل. اما اذا حصل العكس فيجب اعتماد ابعاد اخرى تتناسب مع حجم الاحمال المسلطة وبذلك يتغير حساب الحمل الميت.

2- الحمل الحي (LIVE LOAD) :

وهو الحمل الذي يتغير مقداره وموقعه خلال فترة المنشأ ولا يمكن تحديده بدقة عالية لانه قد يكون موجودا وتأثيره الكامل موزع على كل المنشأ او يكون متحركا او فحلا من الحمل الحي يمكن ان يعطى كقيمة افتراضية اعتمادا على طريقة اشغال

3-احمال الرياح (WIND LOAD) :

وهي احمال يكون تأثيرها واضح في الابنية متعددة الطوابق ويكاد يكون تأثيرها معدوما في الابنية المنخفضة الارتفاع.
حيث تبلغ سرعة الرياح المعتمدة في هذا المشروع 150 KM/hr ,ينتج عنها (pressure) مقداره 1.25 KN/m^2 ومن ثم يتم تحويله الى قوة افقية مركزة في المفاصل.

وقد تم اعتماد الاحمال الميئة والاحمال الحية واحمال الرياح وحسب المعادلات التالية (Ref.2) حيث تم استخدام اربع حالات للتحميل

$$1-U=1.2D.L+1.6L.L$$

$$2-U=1.2D.L+1.6L.L+0.8W.L$$

$$3-U=0.9D.L+1.6W.L$$

$$4-U=1.2D.L+1.6W.L+1.0L.L$$

وسوف يقوم البرنامج باختيار الحالة الاخطر والتصميم على ضوئها.

3-بعدها من قائمة (Commands) يتم اختيار (Materials Constants) ثم ادخال قيم كل من الكثافة ومعامل المرونة ونسبة بوسون.

4-بعدها يتم ادخال نوع الاسناد للمنشأ من قائمة (Commands) ثم اختيار امر

(support specification) واختيار نوع الاسناد هو (Fixed)

5-بعد ذلك يتم تحديد الاحمال المسلطة على المنشأ من قائمة (Commands) ثم اختيار

(Loading) واختيار امر

(Primary Loading) فيظهر مربع حوار نقوم بادخال فيه اسم الحمل مثلا وليكن على

سبيل المثال (DEAD LOAD) ثم اختيار امر (self weight) فسوف يقوم البرنامج

بتخصيص هذا الحمل مباشرة ثم اختيار قيم الحمل الميت المسلط على البناية واختيار احمال

حية على البناية وحسب طبيعة اشغال البناية ووظيفتها.

6-نقوم بتحليل البناية عن طريق قائمة (Commands) ثم اختيار (Analysis) وبعدها

نختار (Load List) ثم اختيار (All).

7-اما التصميم فيتم من قائمة (commands) ايضا ونختار

(Concrete Design) ويتم ادخال متطلبات التصميم وهي

- $f_c' = 25 \text{ MPa}$
- $f_y = 420 \text{ MPa}$
- $CLB = 40 \text{ mm}$
- $CLS = 20 \text{ mm}$
- $CLT = 20 \text{ mm}$
- $\text{MaxMain} = 25 \text{ mm}$
- $\text{MinMain} = 16 \text{ mm}$
- $\text{Reinf} = 0$

ثم نقوم بتحديد (Beams columns slabs) المراد تصميمها.

8-بعد ذلك يقوم البرنامج بتحليل وتصميم المنشأ وبثواني قليلة وكذلك اظهار النتائج من

خلال امر (View Output).

الفصل الخامس

الحسابات التقديرية

حسابات الاحمال:

$$DL = \text{slab thickness} \times \gamma_{conc}$$

$$DL = 0.18 \times 24$$

$$DL = 4.32 \text{ KN} / \text{m}^2 \cong 5 \text{ KN} / \text{m}^2$$

$$\text{Imposed dead load} = 2 \text{ KN} / \text{m}^2$$

$$\text{live load} = 4 \text{ KN} / \text{m}^2$$

عملية نقل الاحمال من السقوف الى العتبات:

وقد تمت العملية كالآتي: لاحظ (Fig1).

$$\otimes \text{ for span length} = 7.5 \text{ m}$$

$$DL_{\text{on beam}} = \frac{[\text{area of trapezoid} \times DL \times 2]}{\text{span length}}$$

$$DL = \frac{[12 \times 7 \times 2]}{7.5}$$

$$DL = 22.4 \text{ KN} / \text{m}$$

$$LL = \frac{[12 \times 4 \times 2]}{7.5}$$

$$LL = 12.8 \text{ KN} / \text{m}$$

$$\otimes \text{ for span length} = 4 \text{ m}$$

$$DL = \frac{[\text{area of triangle} \times DL \times 2]}{\text{span length}}$$

$$DL = \frac{[4 \times 7 \times 2]}{4}$$

$$DL = 14 \text{ KN} / \text{m}$$

$$LL = \frac{[4 \times 4 \times 2]}{4}$$

$$LL = 8 \text{ KN} / \text{m}$$

⊗ WIND LOAD

$$= 1.25 \times 4.5 \times 4$$

$$= 22.5 \text{ KN}$$

تحديد سمك البلاطات المستخدمة:
في البداية يتم فرض سمك معين للبلاطة وليكن على سبيل المثال
(180) ملم ومن ثم القيام بتدقيق هذه القيمة لمعرفة ما اذا كانت مقبولة ام لا عن
طريق الحسابات التالية: لاحظ (fig.2).

$$Y' (300 \times 600 + \frac{180}{2} \times 450) = 600 \times 300 \times \frac{600}{2} + 450 \times \frac{180}{2} \times \frac{180}{2}$$

$$Y' = 234.8 \text{ mm}$$

$$I_b = \frac{300 \times 600^3}{12} + 300 \times 600 \left(\frac{600}{2} - 234.8 \right)^2 + \frac{450 \times 180^3}{12} + 450 \times 180 \left(234.8 - \frac{180}{2} \right)^2$$

$$I_b = 8.08 \times 10^9 \text{ mm}^4$$

$$I_s = \frac{3750 \times 180^3}{12}$$

$$I_s = 1.8225 \times 10^9 \text{ mm}^4$$

$$\alpha_m = \frac{8.08 \times 10^9}{1.8225 \times 10^9}$$

$$\alpha_m = 4.43 > 2$$

use equation (9-13) ACI 318M-08

$$h = \frac{\ln \left(0.8 + \frac{f_y}{1400} \right)}{36 + 9 \beta}$$

$$h = \frac{7 \left(0.8 + \frac{420}{1400} \right)}{36 + 9 \times \frac{7.5}{4.5}}$$

$$h = 0.151 \text{ m} = 151 \text{ mm}$$

$$\therefore \text{ues } h = 180 \text{ mm}$$

الحسابات التصميمية باستخدام (ACI Coefficient) لاستخراج العزوم:
لاحظ (fig.4)

$$\begin{aligned} \text{Beam self weight} &= 0.45 \times 0.3 \times 24 \\ &= 3.25 \text{ KN/m} \end{aligned}$$

$$\begin{aligned} \text{Partition load, Brick wall} &= 0.25 \times 2 \times 18 \\ &= 9 \text{ KN/m} \end{aligned}$$

$$\begin{aligned} \text{DL on beam BC \& EG} &= 22.4 + 3.25 + 9 \\ &= 34.7 \text{ KN/m} \end{aligned}$$

$$\text{LL on beam BC \& EG} = 12.8 \text{ KN/m}$$

$$\begin{aligned} \text{DL on beam CE} &= 14 + 3.25 + 9 \\ &= 26.3 \text{ KN/m} \end{aligned}$$

$$\text{LL on beam CE} = 8 \text{ KN/m}$$

⊗ For beams BC & EG

$$W_u = 1.2 DL + 1.6 LL$$

$$W_u = 1.2 \times 34.7 + 1.6 \times 12.8$$

$$W_u = 62 \text{ KN/m}$$

$$M_u = C \times W_u \times l_n^2$$

$$M_u = \frac{1}{16} \times 62 \times 7.5^2$$

$$M_u = 218 \text{ KN.m (Negative moment)}$$

$$M_u = \frac{1}{14} \times 62 \times 7.5^2$$

$$M_u = 249 \text{ KN.m (positive moment)}$$

$$M_u = \frac{1}{9} \times 62 \times 7.5^2$$

$$M_u = 387.5 \text{ KN.m (Negative moment)}$$

⊗ Negative moment 218 KN.m

let $\phi = 0.9$, $a = 70 \text{ mm}$

$$M_u = \phi A_s f_y \left(d - \frac{a}{2} \right)$$

$$218 \times 10^6 = 0.9 \times A_s \times 420 \left(580 - \frac{70}{2} \right)$$

$$A_s = 1059 \text{ mm}^2$$

$$a = \frac{A_s f_y}{0.85 f_c' b}$$

$$a = \frac{1059 \times 420}{0.85 \times 25 \times 300}$$

$$a = 70 \text{ mm}$$

check for ϕ

$$\rho_{act} = \frac{A_s}{bd}$$

$$\rho = \frac{1059}{300 \times 580}$$

$$\rho = 0.00608$$

$$\phi = \frac{7}{30} + \frac{0.2125 \beta_1 f_c'}{\rho f_y}$$

$$\phi = \frac{7}{30} + \frac{0.2125 \times 0.85 \times 25}{0.00608 \times 420}$$

$$\phi = 1.99 > 0.9 \therefore \text{OK}$$

Check for ρ_{\min} & ρ_{\max}

$$\rho_{\max} = \frac{51 \beta_1 f_c'}{140 f_y}$$

$$\rho_{\max} = \frac{51 \times 0.85 \times 25}{140 \times 420}$$

$$\rho_{\max} = 0.019$$

$$\rho_{\min} = \frac{\sqrt{f_c'}}{4 f_y} \geq \frac{1.4}{f_y}$$

$$\rho_{\min} = \frac{\sqrt{25}}{4 \times 420} \geq \frac{1.4}{420}$$

$$\rho_{\min} = 0.0029 \geq 0.0033$$

$$\therefore \rho_{\min} = 0.0033$$

$$\rho_{\min} \leq \rho_{act} \leq \rho_{\max}$$

$$0.0033 \leq 0.00608 \leq 0.019$$

$$A_s_{\max} = \rho_{\max} \times b d$$

$$A_s_{\max} = 0.019 \times 300 \times 580$$

$$A_s_{\max} = 3306 \text{ mm}^2$$

$$A_s_{\min} = \rho_{\min} \times b d$$

$$A_s_{\min} = 0.0033 \times 300 \times 580$$

$$A_s_{\min} = 574.2 \text{ mm}^2$$

\therefore Use 2 ϕ 25 + 2 ϕ 16

$$A_s_{req} = 1384 \text{ mm}^2$$

$$A_s_{\min} \leq A_s_{req} \leq A_s_{\max}$$

$$270 < 1384 < 3306$$

See(Fig.5)

Positive moment 249 KN .m

let $\phi = 0.9$, $a = 81 \text{ mm}$

$$249 \times 10^6 = 0.9 \times A_s \times 420 \left(580 - \frac{81}{2} \right)$$

$$A_s = 1222 \text{ mm}^2$$

$$a = \frac{1222 \times 420}{0.85 \times 25 \times 300}$$

$$a = 81 \text{ mm}$$

check for ϕ

$$\rho_{act} = \frac{1222}{580 \times 300}$$

$$\rho_{act} = 0.00702$$

$$\rho_{min} < \rho_{act} < \rho_{max} \quad \therefore \text{ok}$$

$$\phi = \frac{7}{30} + \frac{0.2125 \times 0.85 \times 25}{0.00702 \times 420}$$

$$\phi = 1.76 > 0.9 \quad \therefore \text{ok}$$

\therefore use $2\phi 25 + 2\phi 16$

$$A_{s_{req}} = 1384 \text{ mm}^2$$

$$A_{s_{min}} < A_{s_{prov}} < A_{s_{max}} \quad \therefore \text{ok}$$

See(Fig.6)

Negative moment 387.5 kN.m

let $\phi = 0.9$, $a = 131 \text{ mm}$

$$387.5 \times 10^6 = 0.9 \times A_s \times 420 \left(580 - \frac{131}{2} \right)$$

$$A_s = 1993 \text{ mm}^2$$

$$a = \frac{1993 \times 420}{0.85 \times 25 \times 300}$$

$$a = 131 \text{ mm}$$

check for ϕ

$$\rho_{act} = \frac{1993}{580 \times 300}$$

$$\rho_{act} = 0.0114$$

$$\rho_{min} < \rho_{act} < \rho_{max} \quad \therefore \text{ok}$$

$$\phi = \frac{7}{30} + \frac{0.2125 \times 0.85 \times 25}{0.0114 \times 420}$$

$$\phi = 1.17 > 0.9 \quad \therefore \text{ok}$$

use $3\phi 25 + 2\phi 20$

$$A_{s_{prov}} = 2101 \text{ mm}^2$$

$$A_{s_{min}} < A_{s_{prov}} < A_{s_{max}} \quad \therefore \text{ok}$$

See(Fig.7)

⊗ For beam CE

$$W_u = 1.2 \times (14 + 3.25 + 9) + 1.6 \times 8$$

$$W_u = 44.3 \text{ KN/m}$$

$$M_u = \frac{1}{14} \times 44.3 \times 4^2$$

$$M_u = 51 \text{ KN.m (positive moment)}$$

$$M_u = \frac{1}{9} \times 44.3 \times 4^2$$

$$M_u = 79 \text{ KN.m (negative moment)}$$

⊗ Positive moment 51 KN.m

let $\phi = 0.9$, $a = 16 \text{ mm}$

$$51 \times 10^6 = 0.9 \times A_s \times 420 \left(580 - \frac{16}{2} \right)$$

$$A_s = 236 \text{ mm}^2$$

$$a = \frac{236 \times 420}{0.85 \times 25 \times 300}$$

$$a = 16 \text{ mm}$$

check for ϕ

$$\rho_{act} = \frac{236}{580 \times 300}$$

$$\rho_{act} = 0.00135$$

but, $\rho_{min} > \rho_{act}$

∴ use $\rho_{act} = \rho_{min}$

$$\phi = \frac{7}{30} + \frac{0.2125 \times 0.85 \times 25}{0.0033 \times 420}$$

$$3.5 > 0.9 \therefore \text{ok}$$

use 2 $\phi 16$

$$A_{s \text{ prov}} = 402 \text{ mm}^2$$

$$A_{s \text{ min}} < A_{s \text{ prov}} < A_{s \text{ max}}$$

See (Fig.8)

⊗ For negative moment 79 KN.m

let $\phi = 0.9$, $a = 24 \text{ mm}$

$$79 \times 10^6 = 0.9 \times A_s \times 420 \left(580 - \frac{24}{2} \right)$$

$$A_s = 368 \text{ mm}^2$$

$$a = \frac{368 \times 420}{0.85 \times 25 \times 300}$$

$$a = 24 \text{ mm}$$

check for ϕ

$$\rho_{act} = \frac{368}{580 \times 300}$$

$$\rho_{act} = 0.0021$$

but, $\rho_{min} > \rho_{act}$

\therefore use $\rho_{act} = \rho_{min}$

$$\phi = \frac{7}{30} + \frac{0.2125 \times 0.85 \times 25}{0.0033 \times 420}$$

$$\phi = 3.5 > 0.9 \therefore \text{ok}$$

use 2 ϕ 16

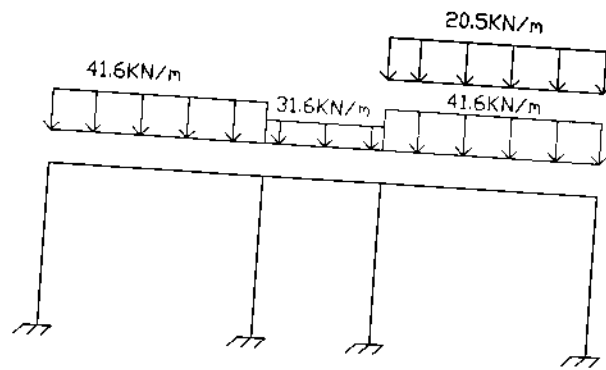
$$A_{s_{prov}} = 402 \text{ mm}^2$$

$$A_{s_{min}} < A_{s_{prov}} < A_{s_{max}} \therefore \text{ok}$$

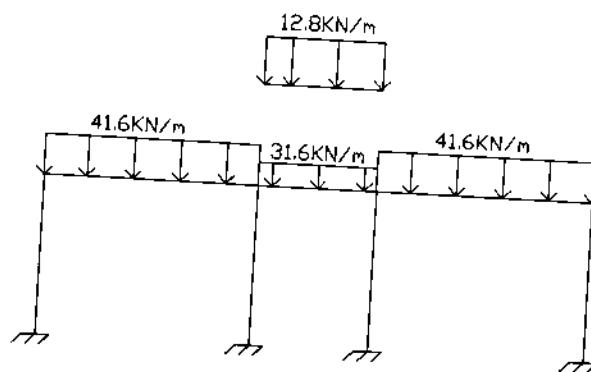
See (Fig.9)

تم القيام بعملية تجميع للتسليح الكلي للعتبات وكما موضح في (Fig.10).

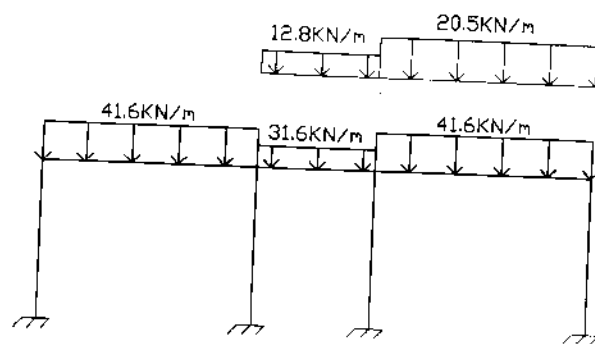
Patterns of loading



case I



case II



case III

وقد تم اختيار الحالة الثالثة (Case III) واعتبارها هي الحالة الحرجة واستخراج العزوم السالبة والموجبة باستخدام طريقة (Moment Distribution).

وكانت الحسابات كالتالي:- لاحظ (Fig.11).

$$\left\{ \begin{array}{l} KBA = \frac{4 EI}{4 \cdot 5} \\ KBA = \frac{4}{4 \cdot 5} \\ KBA = 0.888 \\ KBC = \frac{4}{7 \cdot 5} \\ KBC = 0.533 \end{array} \right\} \sum KB = 1.421$$

$$\left\{ \begin{array}{l} KCB = \frac{4}{7 \cdot 5} \\ KCB = 0.533 \\ KCD = \frac{4}{4 \cdot 5} \\ KCD = 0.888 \\ KCE = \frac{4}{4} \\ KCE = 1 \end{array} \right\} \sum KC = 2.421$$

$$\left\{ \begin{array}{l} KEF = \frac{4}{4 \cdot 5} \\ KEF = 0.888 \\ KEG = \frac{4}{7 \cdot 5} \\ KEG = 0.533 \\ KEC = \frac{4}{4} \\ KEC = 1 \end{array} \right\} \sum KE = 2.421$$

$$\left\{ \begin{array}{l} KGH = \frac{4}{4 \cdot 5} \\ KGH = 0.888 \\ KGE = \frac{4}{7 \cdot 5} \\ KGE = 0.533 \end{array} \right\} \sum KG = 1.421$$

DF for members (AB,DC,EF,HG)=0

$$DF_{BA} = \frac{0.888}{1.421}$$

$$\left\{ \begin{array}{l} DF_{BA} = 0.625 \\ DF_{BC} = 0.375 \end{array} \right\} \sum DF = 1$$

$$\left\{ \begin{array}{l} DF_{CB} = 0.22 \\ DF_{CD} = 0.37 \\ DF_{CE} = 0.41 \end{array} \right\} \sum DF = 1$$

$$\left\{ \begin{array}{l} DF_{EF} = 0.37 \\ DF_{EG} = 0.22 \\ DF_{EC} = 0.41 \end{array} \right\} \sum DF = 1$$

$$\left\{ \begin{array}{l} DF_{GH} = 0.625 \\ DF_{GE} = 0.375 \end{array} \right\} \sum DF = 1$$

$$MF (AB, BA, CD, DC, EF, FE, GH, HG) = 0$$

$$MFBC = \frac{-wl^2}{12}$$

$$MFBC = \frac{-41.6 \times 7.5^2}{12}$$

$$MFBC = -195 \text{ KN} \cdot \text{m}$$

$$MFCB = 195 \text{ KN} \cdot \text{m}$$

$$MFCE = \frac{-44.4 \times 4^2}{12}$$

$$MFCE = -59.2 \text{ KN} \cdot \text{m}$$

$$MFEC = 59.2 \text{ KN} \cdot \text{m}$$

$$MFEG = \frac{-62 \times 7.5^2}{12}$$

$$MFEG = -290.6 \text{ KN} \cdot \text{m}$$

$$MFGE = 290.6 \text{ KN} \cdot \text{m}$$

JOINT	A	B		C			D	E			F	G		H
MEMBER	AB	BA	BC	CB	CE	CD	DC	EC	EG	EF	FE	GE	GH	HG
DF	0	0.625	0.375	0.22	0.41	0.37	0	0.41	0.22	0.37	0	0.375	0.625	0
FEM	0	0	-195	195	-59.2	0	0	59.2	-290.6	0	0	290.6	0	0
BALL	0	121.9	73.1	-29.9	-55.7	-50.2	0	94.9	50.9	85.6	0	-109	-181.6	0
COM	61	0	-15	36.5	47.5	0	-25.1	-27.9	-54.5	0	42.8	25.5	0	-90.8
BALL	0	9.4	5.6	-18.5	-34.5	-31	0	33.8	18.1	30.5	0	-9.6	-15.9	0
COM	4.7	0	-9.3	2.8	16.9	0	-15.5	-17.3	-4.8	0	15.3	9	0	-8
BALL	0	3.5	5.8	-4.4	-8	-7.3	0	9.1	4.8	8.2	0	-3.4	-2.3	0
COM	1.8	0	-2.2	2.9	4.6	0	-3.7	-4	-1.7	0	4.1	2.4	0	-1.2
BALL	0	1.4	0.8	-1.7	-3.1	-2.7	0	2.3	1.2	2.1	0	-0.9	-1.5	0
Σ	67.5	136.2	-137	183.1	-91.5	-91.2	-44.3	150.1	-276.6	126.4	62.2	204.6	-204.6	-101.6

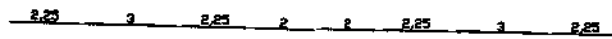
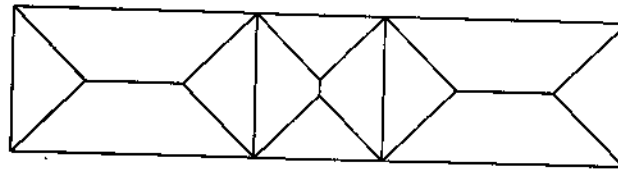


fig.1

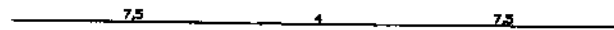
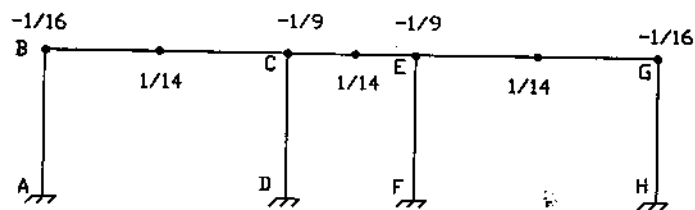


fig.4

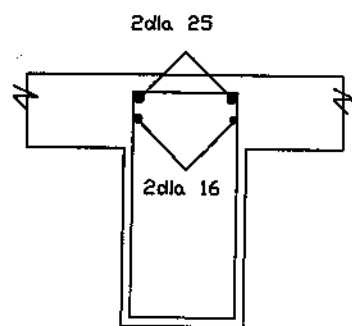


fig.5

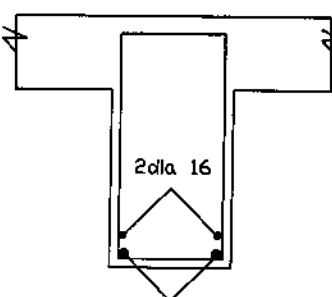


fig.6

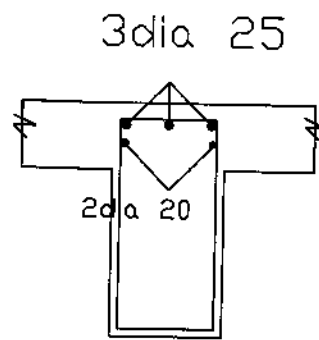


fig.7

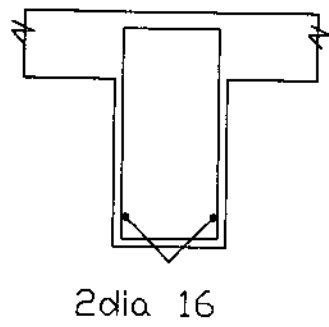


fig.8

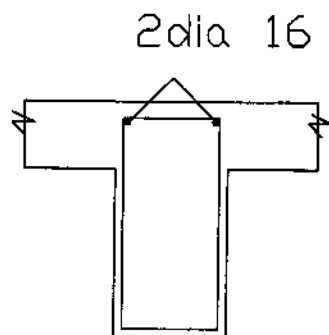


fig.9

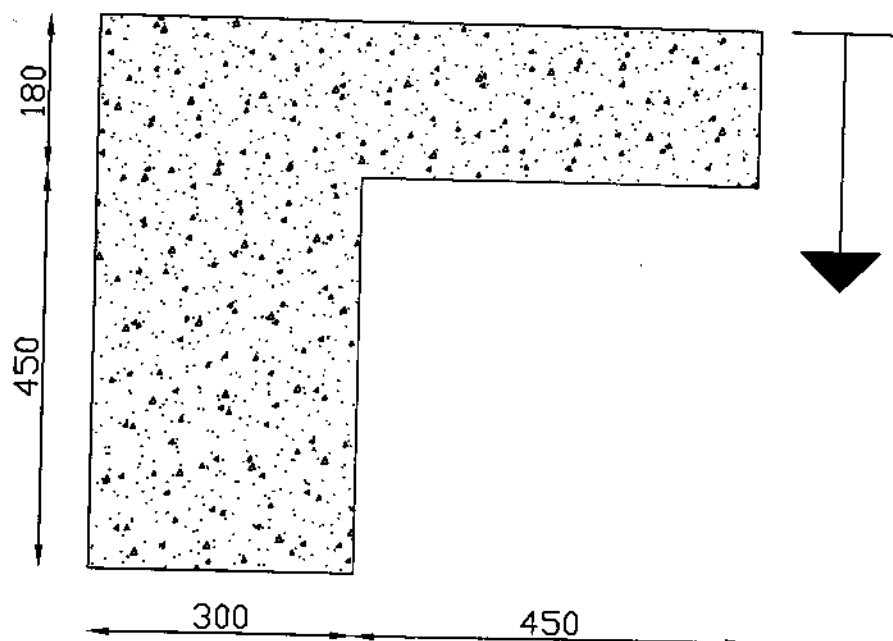


fig.2

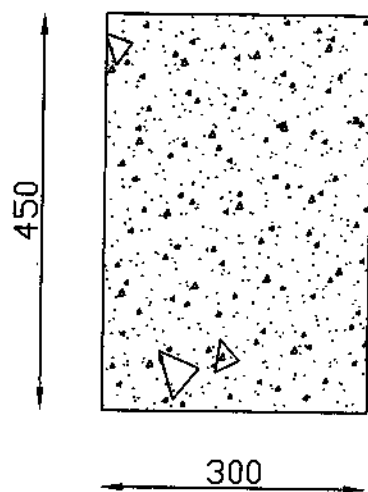


fig.3

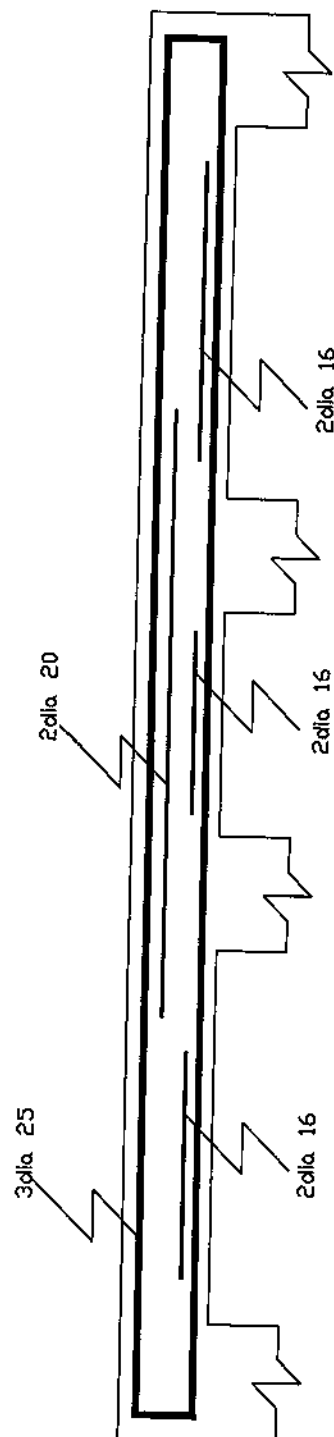


fig.10

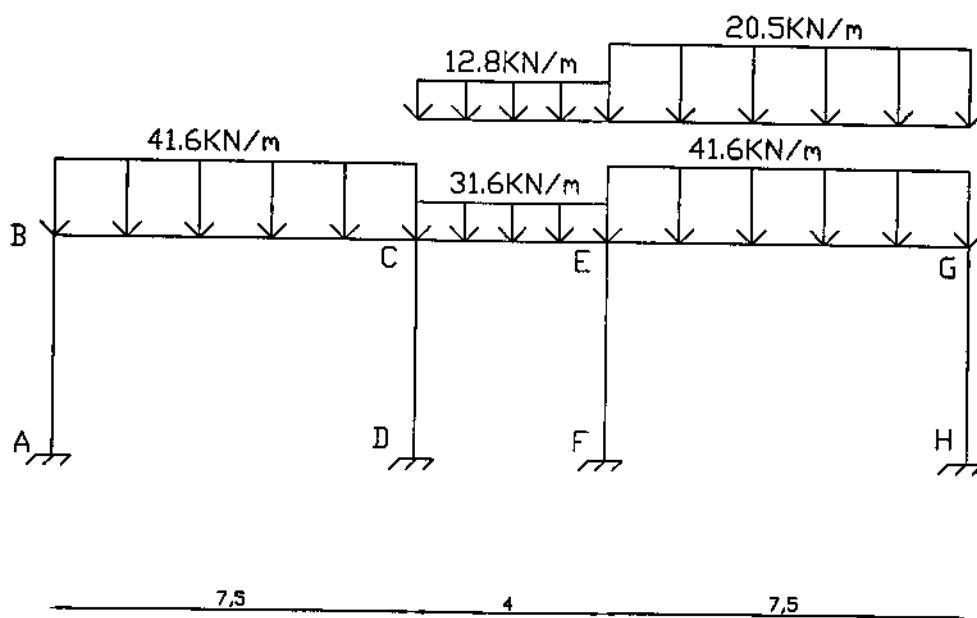


fig.11

الفصل السادس

STAAD PRO شرح برنامج

```

*****
*
*          STAAD.Pro
*          Version 2007    Build 01
*          Proprietary Program of
*          Research Engineers, Intl.
*          Date=    APR 4, 2010
*          Time=    9:59: 6
*
*          USER ID:
*****

```

```

1. STAAD SPACE
INPUT FILE: design.STD
2. START JOB INFORMATION
3. ENGINEER DATE 04-APR-10
4. END JOB INFORMATION
5. INPUT WIDTH 79
6. UNIT METER KN
7. JOINT COORDINATES
8. 1 0 0 0; 2 0 4.50001 0; 3 7.50002 4.50001 0; 4 7.50002 0 0
9. 5 11.5 4.50001 0; 6 11.5 0 0; 7 19 4.50001 0; 8 19 0 0; 9 0 9.00002 0
10. 10 7.50002 9.00002 0; 11 11.5 9.00002 0; 12 19 9.00002 0; 13 0 13.5 0
11. 14 7.50002 13.5 0; 15 11.5 13.5 0; 16 19 13.5 0
12. MEMBER INCIDENCES
13. 1 1 2; 2 2 3; 3 3 4; 4 3 5; 5 5 6; 6 5 7; 7 7 8; 8 2 9; 9 9 10; 10 10 3
14. 11 10 11; 12 11 5; 13 11 12; 14 12 7; 15 9 13; 16 13 14; 17 14 10
15. 18 14 15; 19 15 11; 20 15 16; 21 16 12
16. MEMBER PROPERTY
17. 2 4 6 9 11 13 16 18 20 PRIS YD 0.45 ZD 0.3
18. 1 3 5 7 8 10 12 14 15 17 19 21 PRIS YD 0.6 ZD 0.4
19. CONSTANTS
20. E 2.2E+007 ALL
21. DENSITY 24 ALL
22. POISSON 0.15 ALL
23. SUPPORTS
24. 1 4 6 8 FIXED
25. LOAD 1 LOADTYPE NONE TITLE DEAD 7.5
26. MEMBER LOAD
27. 2 6 9 13 16 20 UNI GY -34.7
28. LOAD 2 LOADTYPE NONE TITLE LIVE 7.5
29. MEMBER LOAD
30. 2 6 9 13 16 20 UNI GY -12.8
31. LOAD 3 LOADTYPE NONE TITLE DEAD 4
32. MEMBER LOAD
33. 4 11 18 UNI GY -26.3
34. LOAD 4 LOADTYPE NONE TITLE LIVE 4
35. MEMBER LOAD
36. 4 11 18 UNI GY -8
37. LOAD 5 LOADTYPE NONE TITLE WIND LOAD
38. JOINT LOAD
39. 2 9 13 FX 22.5
40. LOAD 6 LOADTYPE NONE TITLE SELF

```

STAAD SPACE

-- PAGE NO. 2

41. SELFWEIGHT Y -1
 42. UNIT MMS NEWTON
 43. LOAD COMB 7 COMBINATION LOAD CASE 7
 44. 1 1.2 3 1.2 6 1.2 2 1.6 4 1.6
 45. LOAD COMB 8 COMBINATION LOAD CASE 8
 46. 1 1.2 3 1.2 6 1.2 2 1.6 4 1.6 5 0.8
 47. LOAD COMB 9 COMBINATION LOAD CASE 9
 48. 1 0.9 3 0.9 6 0.9 5 1.6
 49. LOAD COMB 10 COMBINATION LOAD CASE 10
 50. 1 1.2 3 1.2 2 1.0 4 1.0 6 1.2 5 1.6
 51. UNIT METER KN
 52. PERFORM ANALYSIS

PROBLEM STATISTICS

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 16/ 21/ 4
 TOTAL PRIMARY LOAD CASES = 6, TOTAL DEGREES OF FREEDOM = 72
 SIZE OF STIFFNESS MATRIX = 1 DOUBLE KILO-WORDS
 REQD/AVAIL. DISK SPACE = 12.0/ 24004.1 MB

53. START CONCRETE DESIGN
 54. CODE ACI
 55. UNIT MMS NEWTON
 56. CLB 40 MEMB 2 4 6 9 11 13 16 18 20
 57. CLS 20 MEMB 2 4 6 9 11 13 16 18 20
 58. CLT 20 MEMB 2 4 6 9 11 13 16 18 20
 59. FC 25 ALL
 60. FYMAIN 420 ALL
 61. MAXMAIN 25 ALL
 62. MINMAIN 16 ALL
 63. REINF 0 MEMB 1 3 5 7 8 10 12 14 15 17 19 21
 64. DESIGN BEAM 2 4 6 9 11 13 16 18 20

=====

BEAM NO. 2 DESIGN RESULTS - FLEXURE PER CODE ACI 318-05

LEN - 7500. MM FY - 420. FC - 25. MPA, SIZE - 300. X 450. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA END
-------	----------------	----------	--------------	------------	-------------------

1	65.	3 - 25MM	0.	6308.	YES NO
---	-----	----------	----	-------	--------

***MEMBER FAILS IN MAX REINFORCEMENT.

INCREASE MEMBER SIZE.

MAX NEG MOMENT = 318.92 KN-MET, LOADING 8

2J 7500X 300X 450 3J

3No25 H 65. 0.TO 6308

3#25

ooo

3#25

ooo

3#25

ooo

3#25

ooo

3#25

ooo

=====

BEAM NO. 4 DESIGN RESULTS - FLEXURE PER CODE ACI 318-05

LEN - 4000. MM FY - 420. FC - 25. MPA, SIZE - 300. X 450. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA END
-------	----------------	----------	--------------	------------	-------------------

1	61.	2 - 16MM	0.	3463.	YES NO
2	407.	3 - 20MM	0.	4000.	YES YES

BEAM NO. 4 DESIGN RESULTS - SHEAR

AT END SUPPORT - Vu= 42.48 KNS Vc= 96.59 KNS Vs= 0.00 KNS
 Tu= 0.00 KN-MET Tc= 3.8 KN-MET Ts= 0.0 KN-MET LOAD 3
 NO STIRRUPS ARE REQUIRED FOR TORSION.
 REINFORCEMENT FOR SHEAR IS PER CL.11.5.5.1.
 PROVIDE 12 MM 2-LEGGED STIRRUPS AT 195. MM C/C FOR 1615. MM

[illegible]

000 3#20	000 3#20	000 3#20	000 3#20	000 3#20	000 3#20
2#16 00	2#16 00	2#16 00	2#16 00	2#16 00	

LEVEL	HEIGHT	BAR INFO	FROM	TO	ANCHOR
	(MM)		(MM)	(MM)	STA END

1	65.	3 - 25MM	0.	7500.	YES	YES
---	-----	----------	----	-------	-----	-----

MAX NEG MOMENT = 313.32 KN-MET, LOADING 8

STAAD SPACE

-- PAGE NO. 5

5J

7499X 300X 450

7J

3No25 H 65. 0.TO 7500

3#25
ooo3#25
ooo3#25
ooo3#25
ooo3#25
ooo3#25
ooo

BEAM NO. 9 DESIGN RESULTS - FLEXURE PER CODE ACI 318-05

LEN - 7500. MM FY - 420. FC - 25. MPA, SIZE - 300. X 450. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA END
-------	----------------	----------	--------------	------------	-------------------

1	63.	4 - 20MM	0.	6308.	YES NO
---	-----	----------	----	-------	--------

***MEMBER FAILS IN MAX REINFORCEMENT.
INCREASE MEMBER SIZE.

MAX NEG MOMENT = 318.71 KN-MET, LOADING 8

9J

7500X 300X 450

10J

4No20 H 63. 0.TO 6308

4#20
oooo4#20
oooo4#20
oooo4#20
oooo4#20
oooo

STAAD SPACE

-- PAGE NO. 7

=====

BEAM NO. 13 DESIGN RESULTS - FLEXURE PER CODE ACI 318-05

LEN - 7500. MM FY - 420. FC - 25. MPA, SIZE - 300. X 450. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA END
-------	----------------	----------	--------------	------------	-------------------

1	63.	4 - 20MM	0.	6306.	YES NO
---	-----	----------	----	-------	--------

***MEMBER FAILS IN MAX REINFORCEMENT.

INCREASE MEMBER SIZE.

MAX NEG MOMENT = 319.29 KN-MET, LOADING 8

11J _____ 7499X 300X 450 _____ 12J

4No20 H 63. 0.TO 6306

4#20 oooo	4#20 oooo	4#20 oooo	4#20 oooo	4#20 oooo	
--------------	--------------	--------------	--------------	--------------	--

=====

BEAM NO. 16 DESIGN RESULTS - FLEXURE PER CODE ACI 318-05

LEN - 7500. MM FY - 420. FC - 25. MPA, SIZE - 300. X 450. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA END
-------	----------------	----------	--------------	------------	-------------------

1	65.	3 - 25MM	0.	6357.	YES NO
---	-----	----------	----	-------	--------

***MEMBER FAILS IN MAX REINFORCEMENT.

INCREASE MEMBER SIZE.

MAX NEG MOMENT = 306.43 KN-MET, LOADING 8

STAAD SPACE

-- PAGE NO. 8

13J

7500X 300X 450

14J

3No25 H 65. 0.TO 6357

3#25

000

3#25

000

3#25

000

3#25

000

3#25

000

BEAM NO. 18 DESIGN RESULTS - FLEXURE PER CODE ACI 318-05

LEN - 4000. MM FY - 420. FC - 25. MPA, SIZE - 300. X 450. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA END
-------	----------------	----------	--------------	------------	-------------------

1	61.	2 - 16MM	0.	3463.	YES NO
2	409.	4 - 16MM	0.	4000.	YES YES

BEAM NO. 18 DESIGN RESULTS - SHEAR

AT START SUPPORT - $V_u = 42.48$ KNS $V_c = 102.48$ KNS $V_s = 0.00$ KNS
 $T_u = 0.00$ KN-MET $T_c = 3.9$ KN-MET $T_s = 0.0$ KN-MET LOAD 3
 NO STIRRUPS ARE REQUIRED FOR TORSION.
 REINFORCEMENT FOR SHEAR IS PER CL.11.5.5.1.
 PROVIDE 12 MM 2-LEGGED STIRRUPS AT 195. MM C/C FOR 1615. MM

AT END SUPPORT - $V_u = 42.48$ KNS $V_c = 102.48$ KNS $V_s = 0.00$ KNS
 $T_u = 0.00$ KN-MET $T_c = 3.9$ KN-MET $T_s = 0.0$ KN-MET LOAD 3
 NO STIRRUPS ARE REQUIRED FOR TORSION.
 REINFORCEMENT FOR SHEAR IS PER CL.11.5.5.1.
 PROVIDE 12 MM 2-LEGGED STIRRUPS AT 195. MM C/C FOR 1615. MM

STAAD SPACE

-- PAGE NO. 9

14J 3999X 300X 450 15J

```

=====
4No16 H 409. 0.TO 4000
10*12c/c195 10*12c/c195
2No16 H 61. 0.TO 3463
=====

```

0000 4#16	0000 4#16	0000 4#16	0000 4#16	0000 4#16	0000 4#16
2#16 00	2#16 00	2#16 00	2#16 00	2#16 00	

BEAM NO. 20 DESIGN RESULTS - FLEXURE PER CODE ACI 318-05

LEN - 7500. MM FY - 420. FC - 25. MPA, SIZE - 300. X 450. MMS

LEVEL	HEIGHT (MM)	BAR INFO	FROM (MM)	TO (MM)	ANCHOR STA END
-------	----------------	----------	--------------	------------	-------------------

1	65.	3 - 25MM	0.	7500.	YES YES
---	-----	----------	----	-------	---------

***MEMBER FAILS IN MAX REINFORCEMENT.
INCREASE MEMBER SIZE.

MAX NEG MOMENT = 297.79 KN-MET, LOADING 7

15J 7499X 300X 450 16J

```

=====
3No25 H 65. 0.TO 7500
=====

```

3#25 000	3#25 000	3#25 000	3#25 000	3#25 000	3#25 000
-------------	-------------	-------------	-------------	-------------	-------------

STAAD SPACE

-- PAGE NO. 10

*****END OF BEAM DESIGN*****

65. DESIGN COLUMN 1 3 5 7 8 10 12 14 15 17 19 21

STAAD SPACE

-- PAGE NO. 11

=====

COLUMN NO. 1 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.

AREA OF STEEL REQUIRED = 2400.0 SQ. MM

BAR CONFIGURATION REINF PCT. LOAD LOCATION PHI

12 - 16 MM 1.005 1 END 0.650

(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)

TIE BAR NUMBER 12 SPACING 256.00 MM

=====

COLUMN NO. 3 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.

AREA OF STEEL REQUIRED = 2400.0 SQ. MM

BAR CONFIGURATION REINF PCT. LOAD LOCATION PHI

12 - 16 MM 1.005 1 END 0.650

(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)

TIE BAR NUMBER 12 SPACING 256.00 MM

=====

COLUMN NO. 5 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.

AREA OF STEEL REQUIRED = 2400.0 SQ. MM

BAR CONFIGURATION REINF PCT. LOAD LOCATION PHI

12 - 16 MM 1.005 1 END 0.650

(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)

TIE BAR NUMBER 12 SPACING 256.00 MM

STAAD SPACE

-- PAGE NO. 12

=====

COLUMN NO. 7 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
 ONLY MINIMUM STEEL IS REQUIRED.
 AREA OF STEEL REQUIRED = 2400.0 SQ. MM

BAR CONFIGURATION	REINF PCT.	LOAD	LOCATION	PHI
12 - 16 MM	1.005	1	END	0.650
(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)				
TIE BAR NUMBER 12 SPACING 256.00 MM				

=====

COLUMN NO. 8 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
 ONLY MINIMUM STEEL IS REQUIRED.
 AREA OF STEEL REQUIRED = 2400.0 SQ. MM

BAR CONFIGURATION	REINF PCT.	LOAD	LOCATION	PHI
12 - 16 MM	1.005	1	END	0.650
(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)				
TIE BAR NUMBER 12 SPACING 256.00 MM				

=====

COLUMN NO. 10 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
 ONLY MINIMUM STEEL IS REQUIRED.
 AREA OF STEEL REQUIRED = 2400.0 SQ. MM

BAR CONFIGURATION	REINF PCT.	LOAD	LOCATION	PHI
12 - 16 MM	1.005	1	END	0.650
(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)				
TIE BAR NUMBER 12 SPACING 256.00 MM				

STAAD SPACE

-- PAGE NO. 13

=====

COLUMN NO. 12 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.

AREA OF STEEL REQUIRED = 2400.0 SQ. MM

BAR CONFIGURATION	REINF PCT.	LOAD	LOCATION	PHI
12 - 16 MM	1.005	1	END	0.650

(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)
TIE BAR NUMBER 12 SPACING 256.00 MM

=====

COLUMN NO. 14 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.

AREA OF STEEL REQUIRED = 2400.0 SQ. MM

BAR CONFIGURATION	REINF PCT.	LOAD	LOCATION	PHI
12 - 16 MM	1.005	1	END	0.650

(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)
TIE BAR NUMBER 12 SPACING 256.00 MM

=====

COLUMN NO. 15 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
AREA OF STEEL REQUIRED = 3408.0 SQ. MM

BAR CONFIGURATION	REINF PCT.	LOAD	LOCATION	PHI
12 - 20 MM	1.571	7	END	0.650

(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)
TIE BAR NUMBER 12 SPACING 256.00 MM

STAAD SPACE

-- PAGE NO. 14

COLUMN NO. 17 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.

AREA OF STEEL REQUIRED = 2400.0 SQ. MM

BAR CONFIGURATION	REINF PCT.	LOAD	LOCATION	PHI
12 - 16 MM	1.005	1	END	0.650

(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)
TIE BAR NUMBER 12 SPACING 256.00 MM

COLUMN NO. 19 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
ONLY MINIMUM STEEL IS REQUIRED.

AREA OF STEEL REQUIRED = 2400.0 SQ. MM

BAR CONFIGURATION	REINF PCT.	LOAD	LOCATION	PHI
12 - 16 MM	1.005	1	END	0.650

(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)
TIE BAR NUMBER 12 SPACING 256.00 MM

COLUMN NO. 21 DESIGN PER ACI 318-05 - AXIAL + BENDING

FY - 420.0 FC - 25.0 MPA, RECT SIZE - 400.0 X 600.0 MMS, TIED
AREA OF STEEL REQUIRED = 3408.0 SQ. MM

BAR CONFIGURATION	REINF PCT.	LOAD	LOCATION	PHI
12 - 20 MM	1.571	7	STA	0.650

(PROVIDE EQUAL NUMBER OF BARS ON EACH FACE)
TIE BAR NUMBER 12 SPACING 256.00 MM

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

66. END CONCRETE DESIGN

67. LOAD LIST 1 TO 10

68. PERFORM ANALYSIS

69. FINISH

***** END OF THE STAAD.Pro RUN *****

**** DATE= APR 4,2010 TIME= 9:59: 8 ****

* For questions on STAAD.Pro, please contact *

* Research Engineers Offices at the following locations *

* Telephone Email *

* USA:	+1 (714) 974-2500	support@bentley.com	*
* CANADA	+1 (905) 632-4771	detect@odandetect.com	*
* CANADA	+1 (604) 629 6087	staad@dowco.com	*
* UK	+44 (1454) 207-000	support@reel.co.uk	*
* FRANCE	+33 (0) 1 64551084	support@reel.co.uk	*
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* North America		support@reiusa.com	*
* Europe		support@reel.co.uk	*
* Asia		support@reiasia.net	*

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*****
*
*          STAAD.Pro
*          Version  2007    Build 01
*          Proprietary Program of
*          Research Engineers, Intl.
*          Date=    APR  4, 2010
*          Time=    10: 4:25
*
*          USER ID:
*****

```

1. STAAD SPACE

INPUT FILE: slab180.STD

2. START JOB INFORMATION

3. ENGINEER DATE 18-MAR-10

4. END JOB INFORMATION

5. INPUT WIDTH 79

6. UNIT METER KN

7. JOINT COORDINATES

```

8. 1 0 0 0; 2 0 4.5 0; 3 7.5 4.5 0; 4 7.5 0 0; 5 0 0.5 0; 6 0.5 0.5 0; 7 0.5 0 0
9. 8 0 1 0; 9 0.5 1 0; 10 0 1.5 0; 11 0.5 1.5 0; 12 0 2 0; 13 0.5 2 0; 14 0 2.5 0
10. 15 0.5 2.5 0; 16 0 3 0; 17 0.5 3 0; 18 0 3.5 0; 19 0.5 3.5 0; 20 0 4 0
11. 21 0.5 4 0; 22 0.5 4.5 0; 23 1 0.5 0; 24 1 0 0; 25 1 1 0; 26 1 1.5 0; 27 1 2 0
12. 28 1 2.5 0; 29 1 3 0; 30 1 3.5 0; 31 1 4 0; 32 1 4.5 0; 33 1.5 0.5 0
13. 34 1.5 0 0; 35 1.5 1 0; 36 1.5 1.5 0; 37 1.5 2 0; 38 1.5 2.5 0; 39 1.5 3 0
14. 40 1.5 3.5 0; 41 1.5 4 0; 42 1.5 4.5 0; 43 2 0.5 0; 44 2 0 0; 45 2 1 0
15. 46 2 1.5 0; 47 2 2 0; 48 2 2.5 0; 49 2 3 0; 50 2 3.5 0; 51 2 4 0; 52 2 4.5 0
16. 53 2.5 0.5 0; 54 2.5 0 0; 55 2.5 1 0; 56 2.5 1.5 0; 57 2.5 2 0; 58 2.5 2.5 0
17. 59 2.5 3 0; 60 2.5 3.5 0; 61 2.5 4 0; 62 2.5 4.5 0; 63 3 0.5 0; 64 3 0 0
18. 65 3 1 0; 66 3 1.5 0; 67 3 2 0; 68 3 2.5 0; 69 3 3 0; 70 3 3.5 0; 71 3 4 0
19. 72 3 4.5 0; 73 3.5 0.5 0; 74 3.5 0 0; 75 3.5 1 0; 76 3.5 1.5 0; 77 3.5 2 0
20. 78 3.5 2.5 0; 79 3.5 3 0; 80 3.5 3.5 0; 81 3.5 4 0; 82 3.5 4.5 0; 83 4 0.5 0
21. 84 4 0 0; 85 4 1 0; 86 4 1.5 0; 87 4 2 0; 88 4 2.5 0; 89 4 3 0; 90 4 3.5 0
22. 91 4 4 0; 92 4 4.5 0; 93 4.5 0.5 0; 94 4.5 0 0; 95 4.5 1 0; 96 4.5 1.5 0
23. 97 4.5 2 0; 98 4.5 2.5 0; 99 4.5 3 0; 100 4.5 3.5 0; 101 4.5 4 0
24. 102 4.5 4.5 0; 103 5 0.5 0; 104 5 0 0; 105 5 1 0; 106 5 1.5 0; 107 5 2 0
25. 108 5 2.5 0; 109 5 3 0; 110 5 3.5 0; 111 5 4 0; 112 5 4.5 0; 113 5.5 0.5 0
26. 114 5.5 0 0; 115 5.5 1 0; 116 5.5 1.5 0; 117 5.5 2 0; 118 5.5 2.5 0
27. 119 5.5 3 0; 120 5.5 3.5 0; 121 5.5 4 0; 122 5.5 4.5 0; 123 6 0.5 0; 124 6 0 0
28. 125 6 1 0; 126 6 1.5 0; 127 6 2 0; 128 6 2.5 0; 129 6 3 0; 130 6 3.5 0
29. 131 6 4 0; 132 6 4.5 0; 133 6.5 0.5 0; 134 6.5 0 0; 135 6.5 1 0; 136 6.5 1.5 0
30. 137 6.5 2 0; 138 6.5 2.5 0; 139 6.5 3 0; 140 6.5 3.5 0; 141 6.5 4 0
31. 142 6.5 4.5 0; 143 7 0.5 0; 144 7 0 0; 145 7 1 0; 146 7 1.5 0; 147 7 2 0
32. 148 7 2.5 0; 149 7 3 0; 150 7 3.5 0; 151 7 4 0; 152 7 4.5 0; 153 7.5 0.5 0
33. 154 7.5 1 0; 155 7.5 1.5 0; 156 7.5 2 0; 157 7.5 2.5 0; 158 7.5 3 0
34. 159 7.5 3.5 0; 160 7.5 4 0

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35. MEMBER INCIDENCES

```

36. 1 1 5; 2 2 22; 3 3 160; 4 4 144; 6 5 8; 7 7 1; 9 8 10; 11 10 12; 13 12 14
37. 15 14 16; 17 16 18; 19 18 20; 21 20 2; 23 22 32; 25 24 7; 34 32 42; 36 34 24
38. 45 42 52; 47 44 34; 56 52 62; 58 54 44; 67 62 72; 69 64 54; 78 72 82; 80 74 64
39. 89 82 92; 91 84 74; 100 92 102; 102 94 84; 111 102 112; 113 104 94
40. 122 112 122; 124 114 104; 133 122 132; 135 124 114; 144 132 142; 146 134 124

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STAAD SPACE

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41. 155 142 152; 157 144 134; 166 152 3; 168 153 4; 170 154 153; 172 155 154
42. 174 156 155; 176 157 156; 178 158 157; 180 159 158; 182 160 159
43. ELEMENT INCIDENCES SHELL
44. 8 1 5 6 7; 10 5 8 9 6; 12 8 10 11 9; 14 10 12 13 11; 16 12 14 15 13
45. 18 14 16 17 15; 20 16 18 19 17; 22 18 20 21 19; 24 20 2 22 21; 26 7 6 23 24
46. 27 6 9 25 23; 28 9 11 26 25; 29 11 13 27 26; 30 13 15 28 27; 31 15 17 29 28
47. 32 17 19 30 29; 33 19 21 31 30; 35 21 22 32 31; 37 24 23 33 34; 38 23 25 35 33
48. 39 25 26 36 35; 40 26 27 37 36; 41 27 28 38 37; 42 28 29 39 38; 43 29 30 40 39
49. 44 30 31 41 40; 46 31 32 42 41; 48 34 33 43 44; 49 33 35 45 43; 50 35 36 46 45
50. 51 36 37 47 46; 52 37 38 48 47; 53 38 39 49 48; 54 39 40 50 49; 55 40 41 51 50
51. 57 41 42 52 51; 59 44 43 53 54; 60 43 45 55 53; 61 45 46 56 55; 62 46 47 57 56
52. 63 47 48 58 57; 64 48 49 59 58; 65 49 50 60 59; 66 50 51 61 60; 68 51 52 62 61
53. 70 54 53 63 64; 71 53 55 65 63; 72 55 56 66 65; 73 56 57 67 66; 74 57 58 68 67
54. 75 58 59 69 68; 76 59 60 70 69; 77 60 61 71 70; 79 61 62 72 71; 81 64 63 73 74
55. 82 63 65 75 73; 83 65 66 76 75; 84 66 67 77 76; 85 67 68 78 77; 86 68 69 79 78
56. 87 69 70 80 79; 88 70 71 81 80; 90 71 72 82 81; 92 74 73 83 84; 93 73 75 85 83
57. 94 75 76 86 85; 95 76 77 87 86; 96 77 78 88 87; 97 78 79 89 88; 98 79 80 90 89
58. 99 80 81 91 90; 101 81 82 92 91; 103 84 83 93 94; 104 83 85 95 93
59. 105 85 86 96 95; 106 86 87 97 96; 107 87 88 98 97; 108 88 89 99 98
60. 109 89 90 100 99; 110 90 91 101 100; 112 91 92 102 101; 114 94 93 103 104
61. 115 93 95 105 103; 116 95 96 106 105; 117 96 97 107 106; 118 97 98 108 107
62. 119 98 99 109 108; 120 99 100 110 109; 121 100 101 111 110
63. 123 101 102 112 111; 125 104 103 113 114; 126 103 105 115 113
64. 127 105 106 116 115; 128 106 107 117 116; 129 107 108 118 117
65. 130 108 109 119 118; 131 109 110 120 119; 132 110 111 121 120
66. 134 111 112 122 121; 136 114 113 123 124; 137 113 115 125 123
67. 138 115 116 126 125; 139 116 117 127 126; 140 117 118 128 127
68. 141 118 119 129 128; 142 119 120 130 129; 143 120 121 131 130
69. 145 121 122 132 131; 147 124 123 133 134; 148 123 125 135 133
70. 149 125 126 136 135; 150 126 127 137 136; 151 127 128 138 137
71. 152 128 129 139 138; 153 129 130 140 139; 154 130 131 141 140
72. 156 131 132 142 141; 158 134 133 143 144; 159 133 135 145 143
73. 160 135 136 146 145; 161 136 137 147 146; 162 137 138 148 147
74. 163 138 139 149 148; 164 139 140 150 149; 165 140 141 151 150
75. 167 141 142 152 151; 169 144 143 153 4; 171 143 145 154 153
76. 173 145 146 155 154; 175 146 147 156 155; 177 147 148 157 156
77. 179 148 149 158 157; 181 149 150 159 158; 183 150 151 160 159
78. 184 151 152 3 160
79. ELEMENT PROPERTY
80. 8 10 12 14 16 18 20 22 24 26 TO 33 35 37 TO 44 46 48 TO 55 57 59 TO 66 68 -
81. 70 TO 77 79 81 TO 88 90 92 TO 99 101 103 TO 110 112 114 TO 121 123 -
82. 125 TO 132 134 136 TO 143 145 147 TO 154 156 158 TO 165 167 169 171 173 175 -
83. 177 179 181 183 184 THICKNESS 0.18
84. MEMBER PROPERTY AMERICAN
85. 1 TO 4 6 7 9 11 13 15 17 19 21 23 25 34 36 45 47 56 58 67 69 78 80 89 91 100 -
86. 102 111 113 122 124 133 135 144 146 155 157 166 168 170 172 174 176 178 180 -
87. 182 PRIS YD 0.45 ZD 0.3
88. UNIT MMS NEWTON
89. DEFINE MATERIAL START
90. ISOTROPIC MATERIAL1
91. E 22000
92. POISSON 0.15
93. DENSITY 2.4E-005
94. END DEFINE MATERIAL
95. UNIT METER KN
96. CONSTANTS

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97. MATERIAL MATERIAL1 ALL
 98. SUPPORTS
 99. 1 TO 4 FIXED
 100. LOAD 1 LOADTYPE NONE TITLE DEAD LOAD
 101. SELFWEIGHT Z -1
 102. ELEMENT LOAD
 103. 8 10 12 14 16 18 20 22 24 26 TO 33 35 37 TO 44 46 48 TO 55 57 59 TO 66 68 -
 104. 70 TO 77 79 81 TO 88 90 92 TO 99 101 103 TO 110 112 114 TO 121 123 -
 105. 125 TO 132 134 136 TO 143 145 147 TO 154 156 158 TO 165 167 169 171 173 175 -
 106. 177 179 181 183 184 PR GZ -5
 107. ELEMENT LOAD
 108. 8 10 12 14 16 18 20 22 24 26 TO 33 35 37 TO 44 46 48 TO 55 57 59 TO 66 68 -
 109. 70 TO 77 79 81 TO 88 90 92 TO 99 101 103 TO 110 112 114 TO 121 123 -
 110. 125 TO 132 134 136 TO 143 145 147 TO 154 156 158 TO 165 167 169 171 173 175 -
 111. 177 179 181 183 184 PR GZ -2
 112. LOAD 2 LOADTYPE NONE TITLE LIVE LOAD
 113. ELEMENT LOAD
 114. 8 10 12 14 16 18 20 22 24 26 TO 33 35 37 TO 44 46 48 TO 55 57 59 TO 66 68 -
 115. 70 TO 77 79 81 TO 88 90 92 TO 99 101 103 TO 110 112 114 TO 121 123 -
 116. 125 TO 132 134 136 TO 143 145 147 TO 154 156 158 TO 165 167 169 171 173 175 -
 117. 177 179 181 183 184 PR GZ -4
 118. UNIT MMS NEWTON
 119. LOAD COMB 3 COMBINATION LOAD CASE 3
 120. 1 1.2 2 1.6
 121. UNIT METER KN
 122. PERFORM ANALYSIS

PROBLEM STATISTICS

 NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 160/ 183/ 4
 TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 936
 SIZE OF STIFFNESS MATRIX = 18 DOUBLE KILO-WORDS
 REQRD/AVAIL. DISK SPACE = 13.0/ 7042.1 MB

123. START CONCRETE DESIGN

STAAD SPACE

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124. CODE ACI
125. UNIT MMS NEWTON
126. CLB 50 ALL
127. CLS 25 ALL
128. CLT 25 ALL
129. FC 25 ALL
130. FYMAIN 420 ALL
131. MAXMAIN 12 ALL
132. MINMAIN 10 ALL
133. TRACK 1 ALL
134. DESIGN ELEMENT 8 10 12 14 16 18 20 22 24 26 TO 33 35 37 TO 44 46 48 TO 55 -
135. 57 59 TO 66 68 70 TO 77 79 81 TO 88 90 92 TO 99 101 103 TO 110 112 -
136. 114 TO 121 123 125 TO 132 134 136 TO 143 145 147 TO 154 156 158 TO 165 167 -
137. 169 171 173 175 177 179 181 183 184

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ELEMENT DESIGN SUMMARY

ELEMENT	LONG. REINF (SQ.MM/MM)	MOM-X /LOAD (KN-MM/MM)	TRANS. REINF (SQ.MM/MM)	MOM-Y /LOAD (KN-MM/MM)
8 TOP : Longitudinal direction - Only minimum steel required.				
8 TOP : Transverse direction - Only minimum steel required.				
8 TOP :	0.319	0.00 / 0	0.319	0.00 / 0
BOTT:	0.533	23.86 / 3	1.265	47.07 / 3
10 TOP : Longitudinal direction - Only minimum steel required.				
10 BOTT: Longitudinal direction - Only minimum steel required.				
10 TOP : Transverse direction - Only minimum steel required.				
10 TOP :	0.319	0.00 / 0	0.319	0.00 / 0
BOTT:	0.319	6.65 / 3	0.815	31.70 / 3
12 TOP : Longitudinal direction - Only minimum steel required.				
12 BOTT: Longitudinal direction - Only minimum steel required.				
12 TOP : Transverse direction - Only minimum steel required.				
12 TOP :	0.319	4.01 / 3	0.319	0.00 / 0
BOTT:	0.319	0.00 / 3	0.566	22.54 / 3
14 TOP : Longitudinal direction - Only minimum steel required.				
14 BOTT: Longitudinal direction - Only minimum steel required.				
14 TOP : Transverse direction - Only minimum steel required.				
14 TOP :	0.319	9.99 / 3	0.319	0.00 / 0
BOTT:	0.319	0.00 / 3	0.448	18.04 / 3
16 TOP : Longitudinal direction - Only minimum steel required.				
16 BOTT: Longitudinal direction - Only minimum steel required.				
16 TOP : Transverse direction - Only minimum steel required.				
16 TOP :	0.319	11.97 / 3	0.319	0.00 / 0
BOTT:	0.319	0.00 / 3	0.412	16.63 / 3
18 TOP : Longitudinal direction - Only minimum steel required.				
18 BOTT: Longitudinal direction - Only minimum steel required.				
18 TOP : Transverse direction - Only minimum steel required.				
18 TOP :	0.319	9.99 / 3	0.319	0.00 / 0
BOTT:	0.319	0.00 / 3	0.448	18.04 / 3
20 TOP : Longitudinal direction - Only minimum steel required.				
20 BOTT: Longitudinal direction - Only minimum steel required.				
20 TOP : Transverse direction - Only minimum steel required.				
20 TOP :	0.319	4.01 / 3	0.319	0.00 / 0
BOTT:	0.319	0.00 / 3	0.566	22.54 / 3
22 TOP : Longitudinal direction - Only minimum steel required.				
22 BOTT: Longitudinal direction - Only minimum steel required.				
22 TOP : Transverse direction - Only minimum steel required.				
22 TOP :	0.319	0.00 / 3	0.319	0.00 / 0
BOTT:	0.319	6.65 / 3	0.815	31.70 / 3
24 TOP : Longitudinal direction - Only minimum steel required.				
24 TOP : Transverse direction - Only minimum steel required.				

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24 TOP :	0.319	0.00 /	3	0.319	0.00 /	0
BOTT:	0.533	23.86 /	3	1.265	47.07 /	3
26 TOP : Longitudinal direction - Only minimum steel required.						
26 TOP : Transverse direction - Only minimum steel required.						
26 TOP :	0.319	0.00 /	3	0.319	0.00 /	0
BOTT:	0.370	16.77 /	3	0.666	26.27 /	3
27 TOP : Longitudinal direction - Only minimum steel required.						
27 BOTT: Longitudinal direction - Only minimum steel required.						
27 TOP : Transverse direction - Only minimum steel required.						
27 TOP :	0.319	0.00 /	3	0.319	0.00 /	0
BOTT:	0.319	1.74 /	3	0.474	19.02 /	3
28 TOP : Longitudinal direction - Only minimum steel required.						
28 BOTT: Longitudinal direction - Only minimum steel required.						
28 TOP : Transverse direction - Only minimum steel required.						
28 TOP :	0.319	8.17 /	3	0.319	0.00 /	0
BOTT:	0.319	0.00 /	3	0.326	13.28 /	3
29 TOP : Longitudinal direction - Only minimum steel required.						
29 BOTT: Longitudinal direction - Only minimum steel required.						
29 TOP : Transverse direction - Only minimum steel required.						
29 BOTT: Transverse direction - Only minimum steel required.						
29 TOP :	0.319	13.84 /	3	0.319	0.00 /	0
BOTT:	0.319	0.00 /	3	0.319	9.74 /	3
30 TOP : Longitudinal direction - Only minimum steel required.						
30 BOTT: Longitudinal direction - Only minimum steel required.						
30 TOP : Transverse direction - Only minimum steel required.						
30 BOTT: Transverse direction - Only minimum steel required.						
30 TOP :	0.319	15.70 /	3	0.319	0.00 /	0
BOTT:	0.319	0.00 /	3	0.319	8.58 /	3
31 TOP : Longitudinal direction - Only minimum steel required.						
31 BOTT: Longitudinal direction - Only minimum steel required.						
31 TOP : Transverse direction - Only minimum steel required.						
31 BOTT: Transverse direction - Only minimum steel required.						
31 TOP :	0.319	13.84 /	3	0.319	0.00 /	0
BOTT:	0.319	0.00 /	3	0.319	9.74 /	3
32 TOP : Longitudinal direction - Only minimum steel required.						
32 BOTT: Longitudinal direction - Only minimum steel required.						
32 TOP : Transverse direction - Only minimum steel required.						
32 TOP :	0.319	8.17 /	3	0.319	0.00 /	0
BOTT:	0.319	0.00 /	3	0.326	13.28 /	3
33 TOP : Longitudinal direction - Only minimum steel required.						
33 BOTT: Longitudinal direction - Only minimum steel required.						
33 TOP : Transverse direction - Only minimum steel required.						
33 TOP :	0.319	0.00 /	3	0.319	0.00 /	0
BOTT:	0.319	1.74 /	3	0.474	19.02 /	3
35 TOP : Longitudinal direction - Only minimum steel required.						
35 TOP : Transverse direction - Only minimum steel required.						

STAAD SPACE

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35 TOP :	0.319	0.00 /	3	0.319	0.00 /	0
BOTT:	0.370	16.77 /	3	0.666	26.27 /	3
37 TOP : Longitudinal direction - Only minimum steel required.						
37 BOTT: Longitudinal direction - Only minimum steel required.						
37 TOP : Transverse direction - Only minimum steel required.						
37 BOTT: Transverse direction - Only minimum steel required.						
37 TOP :	0.319	0.00 /	3	0.319	0.00 /	0
BOTT:	0.319	9.47 /	3	0.319	8.31 /	3
38 TOP : Longitudinal direction - Only minimum steel required.						
38 BOTT: Longitudinal direction - Only minimum steel required.						
38 TOP : Transverse direction - Only minimum steel required.						
38 BOTT: Transverse direction - Only minimum steel required.						
38 TOP :	0.319	1.76 /	3	0.319	0.00 /	0
BOTT:	0.319	0.00 /	3	0.319	4.52 /	3
39 TOP : Longitudinal direction - Only minimum steel required.						
39 BOTT: Longitudinal direction - Only minimum steel required.						
39 TOP : Transverse direction - Only minimum steel required.						
39 BOTT: Transverse direction - Only minimum steel required.						
39 TOP :	0.319	10.69 /	3	0.319	0.00 /	0
BOTT:	0.319	0.00 /	3	0.319	1.65 /	3
40 TOP : Longitudinal direction - Only minimum steel required.						
40 BOTT: Longitudinal direction - Only minimum steel required.						
40 TOP : Transverse direction - Only minimum steel required.						
40 BOTT: Transverse direction - Only minimum steel required.						
40 TOP :	0.319	16.10 /	3	0.319	0.37 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
41 BOTT: Longitudinal direction - Only minimum steel required.						
41 TOP : Transverse direction - Only minimum steel required.						
41 BOTT: Transverse direction - Only minimum steel required.						
41 TOP :	0.325	17.88 /	3	0.319	1.08 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
42 TOP : Longitudinal direction - Only minimum steel required.						
42 BOTT: Longitudinal direction - Only minimum steel required.						
42 TOP : Transverse direction - Only minimum steel required.						
42 BOTT: Transverse direction - Only minimum steel required.						
42 TOP :	0.319	16.10 /	3	0.319	0.37 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
43 TOP : Longitudinal direction - Only minimum steel required.						
43 BOTT: Longitudinal direction - Only minimum steel required.						
43 TOP : Transverse direction - Only minimum steel required.						
43 BOTT: Transverse direction - Only minimum steel required.						
43 TOP :	0.319	10.69 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.319	1.65 /	3
44 TOP : Longitudinal direction - Only minimum steel required.						
44 BOTT: Longitudinal direction - Only minimum steel required.						
44 TOP : Transverse direction - Only minimum steel required.						
44 BOTT: Transverse direction - Only minimum steel required.						

44 TOP :	0.319	1.76 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.319	4.52 /	3
46 TOP : Longitudinal direction - Only minimum steel required.						
46 BOTT: Longitudinal direction - Only minimum steel required.						
46 TOP : Transverse direction - Only minimum steel required.						
46 BOTT: Transverse direction - Only minimum steel required.						
46 TOP :	0.319	0.00 /	3	0.319	0.00 /	3
BOTT:	0.319	9.47 /	3	0.319	8.31 /	3
48 TOP : Longitudinal direction - Only minimum steel required.						
48 BOTT: Longitudinal direction - Only minimum steel required.						
48 TOP : Transverse direction - Only minimum steel required.						
48 BOTT: Transverse direction - Only minimum steel required.						
48 TOP :	0.319	0.00 /	3	0.319	5.61 /	3
BOTT:	0.319	4.36 /	3	0.319	0.00 /	3
49 TOP : Longitudinal direction - Only minimum steel required.						
49 BOTT: Longitudinal direction - Only minimum steel required.						
49 TOP : Transverse direction - Only minimum steel required.						
49 BOTT: Transverse direction - Only minimum steel required.						
49 TOP :	0.319	4.93 /	3	0.319	7.99 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
50 TOP : Longitudinal direction - Only minimum steel required.						
50 BOTT: Longitudinal direction - Only minimum steel required.						
50 TOP : Transverse direction - Only minimum steel required.						
50 BOTT: Transverse direction - Only minimum steel required.						
50 TOP :	0.319	12.62 /	3	0.319	9.53 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
51 TOP : Longitudinal direction - Only minimum steel required.						
51 BOTT: Longitudinal direction - Only minimum steel required.						
51 TOP : Transverse direction - Only minimum steel required.						
51 BOTT: Transverse direction - Only minimum steel required.						
51 TOP :	0.319	17.52 /	3	0.319	10.55 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
52 BOTT: Longitudinal direction - Only minimum steel required.						
52 TOP : Transverse direction - Only minimum steel required.						
52 BOTT: Transverse direction - Only minimum steel required.						
52 TOP :	0.350	19.19 /	3	0.319	10.91 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
53 TOP : Longitudinal direction - Only minimum steel required.						
53 BOTT: Longitudinal direction - Only minimum steel required.						
53 TOP : Transverse direction - Only minimum steel required.						
53 BOTT: Transverse direction - Only minimum steel required.						
53 TOP :	0.319	17.52 /	3	0.319	10.55 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
54 TOP : Longitudinal direction - Only minimum steel required.						
54 BOTT: Longitudinal direction - Only minimum steel required.						
54 TOP : Transverse direction - Only minimum steel required.						
54 BOTT: Transverse direction - Only minimum steel required.						

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54 TOP :	0.319	12.62 /	3	0.319	9.53 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
55 TOP : Longitudinal direction - Only minimum steel required.						
55 BOTT: Longitudinal direction - Only minimum steel required.						
55 TOP : Transverse direction - Only minimum steel required.						
55 BOTT: Transverse direction - Only minimum steel required.						
55 TOP :	0.319	4.93 /	3	0.319	7.99 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
57 TOP : Longitudinal direction - Only minimum steel required.						
57 BOTT: Longitudinal direction - Only minimum steel required.						
57 TOP : Transverse direction - Only minimum steel required.						
57 BOTT: Transverse direction - Only minimum steel required.						
57 TOP :	0.319	0.00 /	3	0.319	5.61 /	3
BOTT:	0.319	4.36 /	3	0.319	0.00 /	3
59 TOP : Longitudinal direction - Only minimum steel required.						
59 BOTT: Longitudinal direction - Only minimum steel required.						
59 BOTT: Transverse direction - Only minimum steel required.						
59 TOP :	0.319	0.00 /	3	0.320	16.08 /	3
BOTT:	0.319	0.98 /	3	0.319	0.00 /	3
60 TOP : Longitudinal direction - Only minimum steel required.						
60 BOTT: Longitudinal direction - Only minimum steel required.						
60 BOTT: Transverse direction - Only minimum steel required.						
60 TOP :	0.319	7.38 /	3	0.356	17.82 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
61 TOP : Longitudinal direction - Only minimum steel required.						
61 BOTT: Longitudinal direction - Only minimum steel required.						
61 BOTT: Transverse direction - Only minimum steel required.						
61 TOP :	0.319	14.13 /	3	0.376	18.80 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
62 BOTT: Longitudinal direction - Only minimum steel required.						
62 BOTT: Transverse direction - Only minimum steel required.						
62 TOP :	0.337	18.51 /	3	0.388	19.38 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
63 BOTT: Longitudinal direction - Only minimum steel required.						
63 BOTT: Transverse direction - Only minimum steel required.						
63 TOP :	0.365	20.01 /	3	0.392	19.56 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
64 BOTT: Longitudinal direction - Only minimum steel required.						
64 BOTT: Transverse direction - Only minimum steel required.						
64 TOP :	0.337	18.51 /	3	0.388	19.38 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
65 TOP : Longitudinal direction - Only minimum steel required.						
65 BOTT: Longitudinal direction - Only minimum steel required.						
65 BOTT: Transverse direction - Only minimum steel required.						
65 TOP :	0.319	14.13 /	3	0.376	18.80 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3

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66 TOP : Longitudinal direction - Only minimum steel required.
 66 BOTT: Longitudinal direction - Only minimum steel required.
 66 BOTT: Transverse direction - Only minimum steel required.
 66 TOP : 0.319 7.38 / 3 0.356 17.82 / 3
 BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

68 TOP : Longitudinal direction - Only minimum steel required.
 68 BOTT: Longitudinal direction - Only minimum steel required.
 68 BOTT: Transverse direction - Only minimum steel required.
 68 TOP : 0.319 0.00 / 3 0.320 16.08 / 3
 BOTT: 0.319 0.98 / 3 0.319 0.00 / 3

70 TOP : Longitudinal direction - Only minimum steel required.
 70 BOTT: Longitudinal direction - Only minimum steel required.
 70 BOTT: Transverse direction - Only minimum steel required.
 70 TOP : 0.319 1.10 / 3 0.472 23.41 / 3
 BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

71 TOP : Longitudinal direction - Only minimum steel required.
 71 BOTT: Longitudinal direction - Only minimum steel required.
 71 BOTT: Transverse direction - Only minimum steel required.
 71 TOP : 0.319 9.04 / 3 0.502 24.85 / 3
 BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

72 TOP : Longitudinal direction - Only minimum steel required.
 72 BOTT: Longitudinal direction - Only minimum steel required.
 72 BOTT: Transverse direction - Only minimum steel required.
 72 TOP : 0.319 15.24 / 3 0.518 25.62 / 3
 BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

73 BOTT: Longitudinal direction - Only minimum steel required.
 73 BOTT: Transverse direction - Only minimum steel required.
 73 TOP : 0.350 19.21 / 3 0.527 26.04 / 3
 BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

74 BOTT: Longitudinal direction - Only minimum steel required.
 74 BOTT: Transverse direction - Only minimum steel required.
 74 TOP : 0.376 20.58 / 3 0.530 26.16 / 3
 BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

75 BOTT: Longitudinal direction - Only minimum steel required.
 75 BOTT: Transverse direction - Only minimum steel required.
 75 TOP : 0.350 19.21 / 3 0.527 26.04 / 3
 BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

76 TOP : Longitudinal direction - Only minimum steel required.
 76 BOTT: Longitudinal direction - Only minimum steel required.
 76 BOTT: Transverse direction - Only minimum steel required.
 76 TOP : 0.319 15.24 / 3 0.518 25.62 / 3
 BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

77 TOP : Longitudinal direction - Only minimum steel required.
 77 BOTT: Longitudinal direction - Only minimum steel required.
 77 BOTT: Transverse direction - Only minimum steel required.

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77 TOP :	0.319	9.04 /	3	0.502	24.85 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
79 TOP : Longitudinal direction - Only minimum steel required.						
79 BOTT: Longitudinal direction - Only minimum steel required.						
79 BOTT: Transverse direction - Only minimum steel required.						
79 TOP :	0.319	1.10 /	3	0.472	23.41 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
81 TOP : Longitudinal direction - Only minimum steel required.						
81 BOTT: Longitudinal direction - Only minimum steel required.						
81 BOTT: Transverse direction - Only minimum steel required.						
81 TOP :	0.319	2.23 /	3	0.563	27.76 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
82 TOP : Longitudinal direction - Only minimum steel required.						
82 BOTT: Longitudinal direction - Only minimum steel required.						
82 BOTT: Transverse direction - Only minimum steel required.						
82 TOP :	0.319	10.00 /	3	0.591	29.07 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
83 TOP : Longitudinal direction - Only minimum steel required.						
83 BOTT: Longitudinal direction - Only minimum steel required.						
83 BOTT: Transverse direction - Only minimum steel required.						
83 TOP :	0.319	15.90 /	3	0.606	29.77 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
84 BOTT: Longitudinal direction - Only minimum steel required.						
84 BOTT: Transverse direction - Only minimum steel required.						
84 TOP :	0.358	19.64 /	3	0.614	30.15 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
85 BOTT: Longitudinal direction - Only minimum steel required.						
85 BOTT: Transverse direction - Only minimum steel required.						
85 TOP :	0.382	20.92 /	3	0.616	30.26 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
86 BOTT: Longitudinal direction - Only minimum steel required.						
86 BOTT: Transverse direction - Only minimum steel required.						
86 TOP :	0.358	19.64 /	3	0.614	30.15 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
87 TOP : Longitudinal direction - Only minimum steel required.						
87 BOTT: Longitudinal direction - Only minimum steel required.						
87 BOTT: Transverse direction - Only minimum steel required.						
87 TOP :	0.319	15.90 /	3	0.606	29.77 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
88 TOP : Longitudinal direction - Only minimum steel required.						
88 BOTT: Longitudinal direction - Only minimum steel required.						
88 BOTT: Transverse direction - Only minimum steel required.						
88 TOP :	0.319	10.00 /	3	0.591	29.07 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
90 TOP : Longitudinal direction - Only minimum steel required.						
90 BOTT: Longitudinal direction - Only minimum steel required.						

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90 BOT: Transverse direction - Only minimum steel required.
 90 TOP : 0.319 2.23 / 3 0.563 27.76 / 3
 BOT: 0.319 0.00 / 3 0.319 0.00 / 3

92 TOP : Longitudinal direction - Only minimum steel required.
 92 BOT: Longitudinal direction - Only minimum steel required.
 92 BOT: Transverse direction - Only minimum steel required.
 92 TOP : 0.319 2.58 / 3 0.594 29.20 / 3
 BOT: 0.319 0.00 / 3 0.319 0.00 / 3

93 TOP : Longitudinal direction - Only minimum steel required.
 93 BOT: Longitudinal direction - Only minimum steel required.
 93 BOT: Transverse direction - Only minimum steel required.
 93 TOP : 0.319 10.31 / 3 0.621 30.48 / 3
 BOT: 0.319 0.00 / 3 0.319 0.00 / 3

94 TOP : Longitudinal direction - Only minimum steel required.
 94 BOT: Longitudinal direction - Only minimum steel required.
 94 BOT: Transverse direction - Only minimum steel required.
 94 TOP : 0.319 16.12 / 3 0.636 31.17 / 3
 BOT: 0.319 0.00 / 3 0.319 0.00 / 3

95 BOT: Longitudinal direction - Only minimum steel required.
 95 BOT: Transverse direction - Only minimum steel required.
 95 TOP : 0.361 19.79 / 3 0.644 31.53 / 3
 BOT: 0.319 0.00 / 3 0.319 0.00 / 3

96 BOT: Longitudinal direction - Only minimum steel required.
 96 BOT: Transverse direction - Only minimum steel required.
 96 TOP : 0.384 21.04 / 3 0.646 31.64 / 3
 BOT: 0.319 0.00 / 3 0.319 0.00 / 3

97 BOT: Longitudinal direction - Only minimum steel required.
 97 BOT: Transverse direction - Only minimum steel required.
 97 TOP : 0.361 19.79 / 3 0.644 31.53 / 3
 BOT: 0.319 0.00 / 3 0.319 0.00 / 3

98 TOP : Longitudinal direction - Only minimum steel required.
 98 BOT: Longitudinal direction - Only minimum steel required.
 98 BOT: Transverse direction - Only minimum steel required.
 98 TOP : 0.319 16.12 / 3 0.636 31.17 / 3
 BOT: 0.319 0.00 / 3 0.319 0.00 / 3

99 TOP : Longitudinal direction - Only minimum steel required.
 99 BOT: Longitudinal direction - Only minimum steel required.
 99 BOT: Transverse direction - Only minimum steel required.
 99 TOP : 0.319 10.31 / 3 0.621 30.48 / 3
 BOT: 0.319 0.00 / 3 0.319 0.00 / 3

101 TOP : Longitudinal direction - Only minimum steel required.
 101 BOT: Longitudinal direction - Only minimum steel required.
 101 BOT: Transverse direction - Only minimum steel required.
 101 TOP : 0.319 2.58 / 3 0.594 29.20 / 3
 BOT: 0.319 0.00 / 3 0.319 0.00 / 3

103 TOP : Longitudinal direction - Only minimum steel required.

103 BOTT: Longitudinal direction - Only minimum steel required.
103 BOTT: Transverse direction - Only minimum steel required.
103 TOP : 0.319 2.23 / 3 0.563 27.76 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

104 TOP : Longitudinal direction - Only minimum steel required.
104 BOTT: Longitudinal direction - Only minimum steel required.
104 BOTT: Transverse direction - Only minimum steel required.
104 TOP : 0.319 10.00 / 3 0.591 29.07 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

105 TOP : Longitudinal direction - Only minimum steel required.
105 BOTT: Longitudinal direction - Only minimum steel required.
105 BOTT: Transverse direction - Only minimum steel required.
105 TOP : 0.319 15.90 / 3 0.606 29.77 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

106 BOTT: Longitudinal direction - Only minimum steel required.
106 BOTT: Transverse direction - Only minimum steel required.
106 TOP : 0.358 19.64 / 3 0.614 30.15 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

107 BOTT: Longitudinal direction - Only minimum steel required.
107 BOTT: Transverse direction - Only minimum steel required.
107 TOP : 0.382 20.92 / 3 0.616 30.26 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

108 BOTT: Longitudinal direction - Only minimum steel required.
108 BOTT: Transverse direction - Only minimum steel required.
108 TOP : 0.358 19.64 / 3 0.614 30.15 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

109 TOP : Longitudinal direction - Only minimum steel required.
109 BOTT: Longitudinal direction - Only minimum steel required.
109 BOTT: Transverse direction - Only minimum steel required.
109 TOP : 0.319 15.90 / 3 0.606 29.77 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

110 TOP : Longitudinal direction - Only minimum steel required.
110 BOTT: Longitudinal direction - Only minimum steel required.
110 BOTT: Transverse direction - Only minimum steel required.
110 TOP : 0.319 10.00 / 3 0.591 29.07 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

112 TOP : Longitudinal direction - Only minimum steel required.
112 BOTT: Longitudinal direction - Only minimum steel required.
112 BOTT: Transverse direction - Only minimum steel required.
112 TOP : 0.319 2.23 / 3 0.563 27.76 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

114 TOP : Longitudinal direction - Only minimum steel required.
114 BOTT: Longitudinal direction - Only minimum steel required.
114 BOTT: Transverse direction - Only minimum steel required.
114 TOP : 0.319 1.10 / 3 0.472 23.41 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

115 TOP : Longitudinal direction - Only minimum steel required.
115 BOTT: Longitudinal direction - Only minimum steel required.
115 BOTT: Transverse direction - Only minimum steel required.
115 TOP : 0.319 9.04 / 3 0.502 24.85 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

116 TOP : Longitudinal direction - Only minimum steel required.
116 BOTT: Longitudinal direction - Only minimum steel required.
116 BOTT: Transverse direction - Only minimum steel required.
116 TOP : 0.319 15.24 / 3 0.518 25.62 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

117 BOTT: Longitudinal direction - Only minimum steel required.
117 BOTT: Transverse direction - Only minimum steel required.
117 TOP : 0.350 19.21 / 3 0.527 26.04 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

118 BOTT: Longitudinal direction - Only minimum steel required.
118 BOTT: Transverse direction - Only minimum steel required.
118 TOP : 0.376 20.58 / 3 0.530 26.16 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

119 BOTT: Longitudinal direction - Only minimum steel required.
119 BOTT: Transverse direction - Only minimum steel required.
119 TOP : 0.350 19.21 / 3 0.527 26.04 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

120 TOP : Longitudinal direction - Only minimum steel required.
120 BOTT: Longitudinal direction - Only minimum steel required.
120 BOTT: Transverse direction - Only minimum steel required.
120 TOP : 0.319 15.24 / 3 0.518 25.62 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

121 TOP : Longitudinal direction - Only minimum steel required.
121 BOTT: Longitudinal direction - Only minimum steel required.
121 BOTT: Transverse direction - Only minimum steel required.
121 TOP : 0.319 9.04 / 3 0.502 24.85 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

123 TOP : Longitudinal direction - Only minimum steel required.
123 BOTT: Longitudinal direction - Only minimum steel required.
123 BOTT: Transverse direction - Only minimum steel required.
123 TOP : 0.319 1.10 / 3 0.472 23.41 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

125 TOP : Longitudinal direction - Only minimum steel required.
125 BOTT: Longitudinal direction - Only minimum steel required.
125 BOTT: Transverse direction - Only minimum steel required.
125 TOP : 0.319 0.00 / 3 0.320 16.08 / 3
BOTT: 0.319 0.98 / 3 0.319 0.00 / 3

126 TOP : Longitudinal direction - Only minimum steel required.
126 BOTT: Longitudinal direction - Only minimum steel required.
126 BOTT: Transverse direction - Only minimum steel required.

126 TOP :	0.319	7.38 /	3	0.356	17.82 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
127 TOP : Longitudinal direction - Only minimum steel required.						
127 BOTT: Longitudinal direction - Only minimum steel required.						
127 BOTT: Transverse direction - Only minimum steel required.						
127 TOP :	0.319	14.13 /	3	0.376	18.80 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
128 BOTT: Longitudinal direction - Only minimum steel required.						
128 BOTT: Transverse direction - Only minimum steel required.						
128 TOP :	0.337	18.51 /	3	0.388	19.38 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
129 BOTT: Longitudinal direction - Only minimum steel required.						
129 BOTT: Transverse direction - Only minimum steel required.						
129 TOP :	0.365	20.01 /	3	0.392	19.56 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
130 BOTT: Longitudinal direction - Only minimum steel required.						
130 BOTT: Transverse direction - Only minimum steel required.						
130 TOP :	0.337	18.51 /	3	0.388	19.38 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
131 TOP : Longitudinal direction - Only minimum steel required.						
131 BOTT: Longitudinal direction - Only minimum steel required.						
131 BOTT: Transverse direction - Only minimum steel required.						
131 TOP :	0.319	14.13 /	3	0.376	18.80 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
132 TOP : Longitudinal direction - Only minimum steel required.						
132 BOTT: Longitudinal direction - Only minimum steel required.						
132 BOTT: Transverse direction - Only minimum steel required.						
132 TOP :	0.319	7.38 /	3	0.356	17.82 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3
134 TOP : Longitudinal direction - Only minimum steel required.						
134 BOTT: Longitudinal direction - Only minimum steel required.						
134 BOTT: Transverse direction - Only minimum steel required.						
134 TOP :	0.319	0.00 /	3	0.320	16.08 /	3
BOTT:	0.319	0.98 /	3	0.319	0.00 /	3
136 TOP : Longitudinal direction - Only minimum steel required.						
136 BOTT: Longitudinal direction - Only minimum steel required.						
136 TOP : Transverse direction - Only minimum steel required.						
136 BOTT: Transverse direction - Only minimum steel required.						
136 TOP :	0.319	0.00 /	3	0.319	5.61 /	3
BOTT:	0.319	4.36 /	3	0.319	0.00 /	3
137 TOP : Longitudinal direction - Only minimum steel required.						
137 BOTT: Longitudinal direction - Only minimum steel required.						
137 TOP : Transverse direction - Only minimum steel required.						
137 BOTT: Transverse direction - Only minimum steel required.						
137 TOP :	0.319	4.93 /	3	0.319	7.99 /	3
BOTT:	0.319	0.00 /	3	0.319	0.00 /	3

138 TOP : Longitudinal direction - Only minimum steel required.
138 BOTT: Longitudinal direction - Only minimum steel required.
138 TOP : Transverse direction - Only minimum steel required.
138 BOTT: Transverse direction - Only minimum steel required.
138 TOP : 0.319 12.62 / 3 0.319 9.53 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

139 TOP : Longitudinal direction - Only minimum steel required.
139 BOTT: Longitudinal direction - Only minimum steel required.
139 TOP : Transverse direction - Only minimum steel required.
139 BOTT: Transverse direction - Only minimum steel required.
139 TOP : 0.319 17.52 / 3 0.319 10.55 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

140 BOTT: Longitudinal direction - Only minimum steel required.
140 TOP : Transverse direction - Only minimum steel required.
140 BOTT: Transverse direction - Only minimum steel required.
140 TOP : 0.350 19.19 / 3 0.319 10.91 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

141 TOP : Longitudinal direction - Only minimum steel required.
141 BOTT: Longitudinal direction - Only minimum steel required.
141 TOP : Transverse direction - Only minimum steel required.
141 BOTT: Transverse direction - Only minimum steel required.
141 TOP : 0.319 17.52 / 3 0.319 10.55 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

142 TOP : Longitudinal direction - Only minimum steel required.
142 BOTT: Longitudinal direction - Only minimum steel required.
142 TOP : Transverse direction - Only minimum steel required.
142 BOTT: Transverse direction - Only minimum steel required.
142 TOP : 0.319 12.62 / 3 0.319 9.53 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

143 TOP : Longitudinal direction - Only minimum steel required.
143 BOTT: Longitudinal direction - Only minimum steel required.
143 TOP : Transverse direction - Only minimum steel required.
143 BOTT: Transverse direction - Only minimum steel required.
143 TOP : 0.319 4.93 / 3 0.319 7.99 / 3
BOTT: 0.319 0.00 / 3 0.319 0.00 / 3

145 TOP : Longitudinal direction - Only minimum steel required.
145 BOTT: Longitudinal direction - Only minimum steel required.
145 TOP : Transverse direction - Only minimum steel required.
145 BOTT: Transverse direction - Only minimum steel required.
145 TOP : 0.319 0.00 / 3 0.319 5.61 / 3
BOTT: 0.319 4.36 / 3 0.319 0.00 / 3

147 TOP : Longitudinal direction - Only minimum steel required.
147 BOTT: Longitudinal direction - Only minimum steel required.
147 TOP : Transverse direction - Only minimum steel required.
147 BOTT: Transverse direction - Only minimum steel required.
147 TOP : 0.319 0.00 / 3 0.319 0.00 / 3
BOTT: 0.319 9.47 / 3 0.319 8.31 / 3

148 TOP : Longitudinal direction - Only minimum steel required.

148 BOT: Longitudinal direction - Only minimum steel required.
148 TOP : Transverse direction - Only minimum steel required.
148 BOT: Transverse direction - Only minimum steel required.
148 TOP : 0.319 1.76 / 3 0.319 0.00 / 3
BOT: 0.319 0.00 / 3 0.319 4.52 / 3

149 TOP : Longitudinal direction - Only minimum steel required.
149 BOT: Longitudinal direction - Only minimum steel required.
149 TOP : Transverse direction - Only minimum steel required.
149 BOT: Transverse direction - Only minimum steel required.
149 TOP : 0.319 10.69 / 3 0.319 0.00 / 3
BOT: 0.319 0.00 / 3 0.319 1.65 / 3

150 TOP : Longitudinal direction - Only minimum steel required.
150 BOT: Longitudinal direction - Only minimum steel required.
150 TOP : Transverse direction - Only minimum steel required.
150 BOT: Transverse direction - Only minimum steel required.
150 TOP : 0.319 16.10 / 3 0.319 0.37 / 3
BOT: 0.319 0.00 / 3 0.319 0.00 / 3

151 BOT: Longitudinal direction - Only minimum steel required.
151 TOP : Transverse direction - Only minimum steel required.
151 BOT: Transverse direction - Only minimum steel required.
151 TOP : 0.325 17.88 / 3 0.319 1.08 / 3
BOT: 0.319 0.00 / 3 0.319 0.00 / 3

152 TOP : Longitudinal direction - Only minimum steel required.
152 BOT: Longitudinal direction - Only minimum steel required.
152 TOP : Transverse direction - Only minimum steel required.
152 BOT: Transverse direction - Only minimum steel required.
152 TOP : 0.319 16.10 / 3 0.319 0.37 / 3
BOT: 0.319 0.00 / 3 0.319 0.00 / 3

153 TOP : Longitudinal direction - Only minimum steel required.
153 BOT: Longitudinal direction - Only minimum steel required.
153 TOP : Transverse direction - Only minimum steel required.
153 BOT: Transverse direction - Only minimum steel required.
153 TOP : 0.319 10.69 / 3 0.319 0.00 / 3
BOT: 0.319 0.00 / 3 0.319 1.65 / 3

154 TOP : Longitudinal direction - Only minimum steel required.
154 BOT: Longitudinal direction - Only minimum steel required.
154 TOP : Transverse direction - Only minimum steel required.
154 BOT: Transverse direction - Only minimum steel required.
154 TOP : 0.319 1.76 / 3 0.319 0.00 / 3
BOT: 0.319 0.00 / 3 0.319 4.52 / 3

156 TOP : Longitudinal direction - Only minimum steel required.
156 BOT: Longitudinal direction - Only minimum steel required.
156 TOP : Transverse direction - Only minimum steel required.
156 BOT: Transverse direction - Only minimum steel required.
156 TOP : 0.319 0.00 / 3 0.319 0.00 / 3
BOT: 0.319 9.47 / 3 0.319 8.31 / 3

158 TOP : Longitudinal direction - Only minimum steel required.
158 TOP : Transverse direction - Only minimum steel required.

158 TOP :	0.319	0.00 /	3	0.319	0.00 /	3
BOTT:	0.370	16.77 /	3	0.666	26.27 /	3
159 TOP : Longitudinal direction - Only minimum steel required.						
159 BOTT: Longitudinal direction - Only minimum steel required.						
159 TOP : Transverse direction - Only minimum steel required.						
159 TOP :	0.319	0.00 /	3	0.319	0.00 /	3
BOTT:	0.319	1.74 /	3	0.474	19.02 /	3
160 TOP : Longitudinal direction - Only minimum steel required.						
160 BOTT: Longitudinal direction - Only minimum steel required.						
160 TOP : Transverse direction - Only minimum steel required.						
160 TOP :	0.319	8.17 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.326	13.28 /	3
161 TOP : Longitudinal direction - Only minimum steel required.						
161 BOTT: Longitudinal direction - Only minimum steel required.						
161 TOP : Transverse direction - Only minimum steel required.						
161 BOTT: Transverse direction - Only minimum steel required.						
161 TOP :	0.319	13.84 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.319	9.74 /	3
162 TOP : Longitudinal direction - Only minimum steel required.						
162 BOTT: Longitudinal direction - Only minimum steel required.						
162 TOP : Transverse direction - Only minimum steel required.						
162 BOTT: Transverse direction - Only minimum steel required.						
162 TOP :	0.319	15.70 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.319	8.58 /	3
163 TOP : Longitudinal direction - Only minimum steel required.						
163 BOTT: Longitudinal direction - Only minimum steel required.						
163 TOP : Transverse direction - Only minimum steel required.						
163 BOTT: Transverse direction - Only minimum steel required.						
163 TOP :	0.319	13.84 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.319	9.74 /	3
164 TOP : Longitudinal direction - Only minimum steel required.						
164 BOTT: Longitudinal direction - Only minimum steel required.						
164 TOP : Transverse direction - Only minimum steel required.						
164 TOP :	0.319	8.17 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.326	13.28 /	3
165 TOP : Longitudinal direction - Only minimum steel required.						
165 BOTT: Longitudinal direction - Only minimum steel required.						
165 TOP : Transverse direction - Only minimum steel required.						
165 TOP :	0.319	0.00 /	3	0.319	0.00 /	3
BOTT:	0.319	1.74 /	3	0.474	19.02 /	3
167 TOP : Longitudinal direction - Only minimum steel required.						
167 TOP : Transverse direction - Only minimum steel required.						
167 TOP :	0.319	0.00 /	3	0.319	0.00 /	3
BOTT:	0.370	16.77 /	3	0.666	26.27 /	3
169 TOP : Longitudinal direction - Only minimum steel required.						
169 TOP : Transverse direction - Only minimum steel required.						

169 TOP :	0.319	0.00 /	3	0.319	0.00 /	3
BOTT:	0.533	23.86 /	3	1.265	47.07 /	3
171 TOP : Longitudinal direction - Only minimum steel required.						
171 BOTT: Longitudinal direction - Only minimum steel required.						
171 TOP : Transverse direction - Only minimum steel required.						
171 TOP :	0.319	0.00 /	3	0.319	0.00 /	3
BOTT:	0.319	6.65 /	3	0.815	31.70 /	3
173 TOP : Longitudinal direction - Only minimum steel required.						
173 BOTT: Longitudinal direction - Only minimum steel required.						
173 TOP : Transverse direction - Only minimum steel required.						
173 TOP :	0.319	4.01 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.566	22.54 /	3
175 TOP : Longitudinal direction - Only minimum steel required.						
175 BOTT: Longitudinal direction - Only minimum steel required.						
175 TOP : Transverse direction - Only minimum steel required.						
175 TOP :	0.319	9.99 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.448	18.04 /	3
177 TOP : Longitudinal direction - Only minimum steel required.						
177 BOTT: Longitudinal direction - Only minimum steel required.						
177 TOP : Transverse direction - Only minimum steel required.						
177 TOP :	0.319	11.97 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.412	16.63 /	3
179 TOP : Longitudinal direction - Only minimum steel required.						
179 BOTT: Longitudinal direction - Only minimum steel required.						
179 TOP : Transverse direction - Only minimum steel required.						
179 TOP :	0.319	9.99 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.448	18.04 /	3
181 TOP : Longitudinal direction - Only minimum steel required.						
181 BOTT: Longitudinal direction - Only minimum steel required.						
181 TOP : Transverse direction - Only minimum steel required.						
181 TOP :	0.319	4.01 /	3	0.319	0.00 /	3
BOTT:	0.319	0.00 /	3	0.566	22.54 /	3
183 TOP : Longitudinal direction - Only minimum steel required.						
183 BOTT: Longitudinal direction - Only minimum steel required.						
183 TOP : Transverse direction - Only minimum steel required.						
183 TOP :	0.319	0.00 /	3	0.319	0.00 /	3
BOTT:	0.319	6.65 /	3	0.815	31.70 /	3
184 TOP : Longitudinal direction - Only minimum steel required.						
184 TOP : Transverse direction - Only minimum steel required.						
184 TOP :	0.319	0.00 /	3	0.319	0.00 /	3
BOTT:	0.533	23.86 /	3	1.265	47.07 /	3

*****END OF ELEMENT DESIGN*****

138. END CONCRETE DESIGN
139. LOAD LIST 3
140. PERFORM ANALYSIS

** ALL CASES BEING MADE ACTIVE BEFORE RE-ANALYSIS. **

141. UNIT METER KN

142. LOAD LIST 1 TO 3

143. PERFORM ANALYSIS PRINT ALL

LOADING 1 LOADTYPE NONE TITLE DEAD LOAD

SELFWIGHT 2 -1.000

ACTUAL WEIGHT OF THE STRUCTURE = 223.560 KN

ELEMENT LOAD (UNITS ARE KN METE)

ELEMENT	PRESSURE
---------	----------

8	-5.000000
10	-5.000000
12	-5.000000
14	-5.000000
16	-5.000000
18	-5.000000
20	-5.000000
22	-5.000000
24	-5.000000
26	-5.000000
27	-5.000000
28	-5.000000
29	-5.000000
30	-5.000000
31	-5.000000
32	-5.000000
33	-5.000000
35	-5.000000
37	-5.000000
38	-5.000000
39	-5.000000
40	-5.000000
41	-5.000000
42	-5.000000
43	-5.000000
44	-5.000000
46	-5.000000
48	-5.000000
49	-5.000000
50	-5.000000
51	-5.000000
52	-5.000000
53	-5.000000
54	-5.000000
55	-5.000000
57	-5.000000
59	-5.000000
60	-5.000000
61	-5.000000
62	-5.000000
63	-5.000000

64	-5.000000
65	-5.000000
66	-5.000000
68	-5.000000
70	-5.000000
71	-5.000000
72	-5.000000
73	-5.000000
74	-5.000000
75	-5.000000
76	-5.000000
77	-5.000000
79	-5.000000
81	-5.000000
82	-5.000000
83	-5.000000
84	-5.000000
85	-5.000000
86	-5.000000
87	-5.000000
88	-5.000000
90	-5.000000
92	-5.000000
93	-5.000000
94	-5.000000
95	-5.000000
96	-5.000000
97	-5.000000
98	-5.000000
99	-5.000000
101	-5.000000
103	-5.000000
104	-5.000000
105	-5.000000
106	-5.000000
107	-5.000000
108	-5.000000
109	-5.000000
110	-5.000000
112	-5.000000
114	-5.000000
115	-5.000000
116	-5.000000
117	-5.000000
118	-5.000000
119	-5.000000
120	-5.000000
121	-5.000000
123	-5.000000
125	-5.000000
126	-5.000000
127	-5.000000
128	-5.000000
129	-5.000000
130	-5.000000
131	-5.000000

132	-5.000000
134	-5.000000
136	-5.000000
137	-5.000000
138	-5.000000
139	-5.000000
140	-5.000000
141	-5.000000
142	-5.000000
143	-5.000000
145	-5.000000
147	-5.000000
148	-5.000000
149	-5.000000
150	-5.000000
151	-5.000000
152	-5.000000
153	-5.000000
154	-5.000000
156	-5.000000
158	-5.000000
159	-5.000000
160	-5.000000
161	-5.000000
162	-5.000000
163	-5.000000
164	-5.000000
165	-5.000000
167	-5.000000
169	-5.000000
171	-5.000000
173	-5.000000
175	-5.000000
177	-5.000000
179	-5.000000
181	-5.000000
183	-5.000000
184	-5.000000

ELEMENT LOAD (UNITS ARE KN METE)

ELEMENT	PRESSURE
8	-2.000000
10	-2.000000
12	-2.000000
14	-2.000000
16	-2.000000
18	-2.000000
20	-2.000000
22	-2.000000
24	-2.000000
26	-2.000000
27	-2.000000

28	-2.000000
29	-2.000000
30	-2.000000
31	-2.000000
32	-2.000000
33	-2.000000
35	-2.000000
37	-2.000000
38	-2.000000
39	-2.000000
40	-2.000000
41	-2.000000
42	-2.000000
43	-2.000000
44	-2.000000
46	-2.000000
48	-2.000000
49	-2.000000
50	-2.000000
51	-2.000000
52	-2.000000
53	-2.000000
54	-2.000000
55	-2.000000
57	-2.000000
59	-2.000000
60	-2.000000
61	-2.000000
62	-2.000000
63	-2.000000
64	-2.000000
65	-2.000000
66	-2.000000
68	-2.000000
70	-2.000000
71	-2.000000
72	-2.000000
73	-2.000000
74	-2.000000
75	-2.000000
76	-2.000000
77	-2.000000
79	-2.000000
81	-2.000000
82	-2.000000
83	-2.000000
84	-2.000000
85	-2.000000
86	-2.000000
87	-2.000000
88	-2.000000
90	-2.000000
92	-2.000000
93	-2.000000
94	-2.000000
95	-2.000000

96	-2.000000
97	-2.000000
98	-2.000000
99	-2.000000
101	-2.000000
103	-2.000000
104	-2.000000
105	-2.000000
106	-2.000000
107	-2.000000
108	-2.000000
109	-2.000000
110	-2.000000
112	-2.000000
114	-2.000000
115	-2.000000
116	-2.000000
117	-2.000000
118	-2.000000
119	-2.000000
120	-2.000000
121	-2.000000
123	-2.000000
125	-2.000000
126	-2.000000
127	-2.000000
128	-2.000000
129	-2.000000
130	-2.000000
131	-2.000000
132	-2.000000
134	-2.000000
136	-2.000000
137	-2.000000
138	-2.000000
139	-2.000000
140	-2.000000
141	-2.000000
142	-2.000000
143	-2.000000
145	-2.000000
147	-2.000000
148	-2.000000
149	-2.000000
150	-2.000000
151	-2.000000
152	-2.000000
153	-2.000000
154	-2.000000
156	-2.000000
158	-2.000000
159	-2.000000
160	-2.000000
161	-2.000000
162	-2.000000
163	-2.000000

STAAD SPACE

-- PAGE NO. 26

164	-2.000000
165	-2.000000
167	-2.000000
169	-2.000000
171	-2.000000
173	-2.000000
175	-2.000000
177	-2.000000
179	-2.000000
181	-2.000000
183	-2.000000
184	-2.000000

LOADING 2 LOADTYPE NONE TITLE LIVE LOAD

ELEMENT LOAD (UNITS ARE KN METE)

ELEMENT	PRESSURE
---------	----------

8	-4.000000
10	-4.000000
12	-4.000000
14	-4.000000
16	-4.000000
18	-4.000000
20	-4.000000
22	-4.000000
24	-4.000000
26	-4.000000
27	-4.000000
28	-4.000000
29	-4.000000
30	-4.000000
31	-4.000000
32	-4.000000
33	-4.000000
35	-4.000000
37	-4.000000
38	-4.000000
39	-4.000000
40	-4.000000
41	-4.000000
42	-4.000000
43	-4.000000
44	-4.000000
46	-4.000000
48	-4.000000
49	-4.000000
50	-4.000000
51	-4.000000
52	-4.000000
53	-4.000000

54	-4.000000
55	-4.000000
57	-4.000000
59	-4.000000
60	-4.000000
61	-4.000000
62	-4.000000
63	-4.000000
64	-4.000000
65	-4.000000
66	-4.000000
68	-4.000000
70	-4.000000
71	-4.000000
72	-4.000000
73	-4.000000
74	-4.000000
75	-4.000000
76	-4.000000
77	-4.000000
79	-4.000000
81	-4.000000
82	-4.000000
83	-4.000000
84	-4.000000
85	-4.000000
86	-4.000000
87	-4.000000
88	-4.000000
90	-4.000000
92	-4.000000
93	-4.000000
94	-4.000000
95	-4.000000
96	-4.000000
97	-4.000000
98	-4.000000
99	-4.000000
101	-4.000000
103	-4.000000
104	-4.000000
105	-4.000000
106	-4.000000
107	-4.000000
108	-4.000000
109	-4.000000
110	-4.000000
112	-4.000000
114	-4.000000
115	-4.000000
116	-4.000000
117	-4.000000
118	-4.000000
119	-4.000000
120	-4.000000
121	-4.000000

123	-4.000000
125	-4.000000
126	-4.000000
127	-4.000000
128	-4.000000
129	-4.000000
130	-4.000000
131	-4.000000
132	-4.000000
134	-4.000000
136	-4.000000
137	-4.000000
138	-4.000000
139	-4.000000
140	-4.000000
141	-4.000000
142	-4.000000
143	-4.000000
145	-4.000000
147	-4.000000
148	-4.000000
149	-4.000000
150	-4.000000
151	-4.000000
152	-4.000000
153	-4.000000
154	-4.000000
156	-4.000000
158	-4.000000
159	-4.000000
160	-4.000000
161	-4.000000
162	-4.000000
163	-4.000000
164	-4.000000
165	-4.000000
167	-4.000000
169	-4.000000
171	-4.000000
173	-4.000000
175	-4.000000
177	-4.000000
179	-4.000000
181	-4.000000
183	-4.000000
184	-4.000000

FOR LOADING - 1

APPLIED JOINT EQUIVALENT LOADS

JOINT	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
1	0.00000E+00	0.00000E+00	-2.32750E+03	-6.75000E+04	6.75000E+04	0.00000E+00
2	0.00000E+00	0.00000E+00	-2.32750E+03	6.75000E+04	6.75000E+04	0.00000E+00
3	0.00000E+00	0.00000E+00	-2.32750E+03	6.75000E+04	-6.75001E+04	0.00000E+00
4	0.00000E+00	0.00000E+00	-2.32750E+03	-6.75000E+04	-6.75001E+04	0.00000E+00
5	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	0.00000E+00	0.00000E+00

APPLIED JOINT EQUIVALENT LOADS

[illegible]

APPLIED JOINT EQUIVALENT LOADS

JOINT	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
112	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	-1.01016E-01	0.00000E+00
113	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
114	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	1.01016E-01	0.00000E+00
115	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
116	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
117	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
118	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
119	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
120	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
121	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
122	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	1.01016E-01	0.00000E+00
123	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
124	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	0.00000E+00	0.00000E+00
125	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
126	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
127	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
128	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
129	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
130	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
131	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
132	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	0.00000E+00	0.00000E+00
133	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
134	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	-1.01016E-01	0.00000E+00
135	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
136	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
137	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
138	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
139	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
140	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
141	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
142	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	-1.01016E-01	0.00000E+00
143	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
144	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	2.08767E-01	0.00000E+00
145	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
146	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
147	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
148	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
149	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
150	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
151	0.00000E+00	0.00000E+00	-2.83000E+03	0.00000E+00	0.00000E+00	0.00000E+00
152	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	2.08767E-01	0.00000E+00
153	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	0.00000E+00	0.00000E+00
154	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	0.00000E+00	0.00000E+00
155	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	0.00000E+00	0.00000E+00
156	0.00000E+00	0.00000E+00	-3.03500E+03	-2.02033E-02	0.00000E+00	0.00000E+00
157	0.00000E+00	0.00000E+00	-3.03500E+03	4.71409E-02	0.00000E+00	0.00000E+00
158	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	0.00000E+00	0.00000E+00
159	0.00000E+00	0.00000E+00	-3.03500E+03	-4.71409E-02	0.00000E+00	0.00000E+00
160	0.00000E+00	0.00000E+00	-3.03500E+03	0.00000E+00	0.00000E+00	0.00000E+00

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 1
LOADTYPE NONE TITLE DEAD LOAD

***TOTAL APPLIED LOAD (NEWT MMS) SUMMARY (LOADING 1)
 SUMMATION FORCE-X = 0.00
 SUMMATION FORCE-Y = 0.00
 SUMMATION FORCE-Z = -459810.04

SUMMATION OF MOMENTS AROUND THE ORIGIN-
 MX= -1034572581.52 MY= 1724287650.50 MZ= 0.00

***TOTAL REACTION LOAD(NEWT MMS) SUMMARY (LOADING 1)
 SUMMATION FORCE-X = 0.00
 SUMMATION FORCE-Y = 0.00
 SUMMATION FORCE-Z = 459810.31

SUMMATION OF MOMENTS AROUND THE ORIGIN-
 MX= 1034573245.30 MY= -1724289525.93 MZ= 0.00

MAXIMUM DISPLACEMENTS (CM /RADIANS) (LOADING 1)
 MAXIMUMS AT NODE
 X = 0.00000E+00 0
 Y = 0.00000E+00 0
 Z = -7.41008E-01 88
 RX= 1.05119E-03 111
 RY= -2.45393E-03 123
 RZ= 0.00000E+00 0

EXTERNAL AND INTERNAL JOINT LOAD SUMMARY (NEWT MMS)-

JT	EXT FX/ INT FX	EXT FY/ INT FY	EXT FZ/ INT FZ	EXT MX/ INT MX	EXT MY/ INT MY	EXT MZ/ INT MZ	
							SUPPORT=1
1	0.00E+00 0.00E+00	0.00E+00 0.00E+00	-2.33E+03 -1.13E+05	-6.750E+04 -5.985E+07	6.750E+04 1.255E+08	0.000E+00 0.000E+00	111111
2	0.00E+00 0.00E+00	0.00E+00 0.00E+00	-2.33E+03 -1.13E+05	6.750E+04 5.985E+07	6.750E+04 1.255E+08	0.000E+00 0.000E+00	111111
3	0.00E+00 0.00E+00	0.00E+00 0.00E+00	-2.33E+03 -1.13E+05	6.750E+04 5.985E+07	-6.750E+04 -1.255E+08	0.000E+00 0.000E+00	111111
4	0.00E+00 0.00E+00	0.00E+00 0.00E+00	-2.33E+03 -1.13E+05	-6.750E+04 -5.985E+07	-6.750E+04 -1.255E+08	0.000E+00 0.000E+00	111111
12	0.00 0.00	0.00 0.00	-3035.00 3035.00	-0.02 0.52	0.00 -0.65	0.00 0.00	000000
13	0.00 0.00	0.00 0.00	-2830.00 2830.00	0.00 0.91	0.00 -0.01	0.00 0.00	000000
14	0.00 0.00	0.00 0.00	-3035.00 3034.99	0.05 -3.31	0.00 1.23	0.00 0.00	000000
15	0.00 0.00	0.00 0.00	-2830.00 2829.98	0.00 -7.03	0.00 0.22	0.00 0.00	000000
16	0.00 0.00	0.00 0.00	-3035.00 3034.99	0.00 -6.17	0.00 2.40	0.00 0.00	000000
17	0.00 0.00	0.00 0.00	-2830.00 2829.98	0.00 -14.49	0.00 0.24	0.00 0.00	000000
18	0.00 0.00	0.00 0.00	-3035.00 3035.04	-0.05 0.83	0.00 -4.78	0.00 0.00	000000

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19	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.09	2.20	-1.08	0.00	000000
20	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3035.00	6.98	-1.93	0.00	000000
21	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.99	19.05	-0.16	0.00	000000
22	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.96	9.57	0.86	0.00	000000
27	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.00	0.99	0.09	0.00	000000
28	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.98	-7.66	0.05	0.00	000000
29	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.98	-15.87	-0.15	0.00	000000
30	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.09	2.88	-0.26	0.00	000000
31	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.99	22.90	-0.17	0.00	000000
32	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.95	11.76	0.34	0.00	000000
37	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.00	0.99	0.13	0.00	000000
38	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.98	-7.67	-0.04	0.00	000000
39	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.98	-15.93	-0.28	0.00	000000
40	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.10	3.18	0.03	0.00	000000
41	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.00	24.51	-0.12	0.00	000000
42	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.95	12.68	0.15	0.00	000000
43	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.90	-0.07	24.88	0.00	000000
44	0.00	0.00	-3035.00	0.00	0.02	0.00	
	0.00	0.00	3034.95	-5.90	12.30	0.00	000000
45	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.90	-0.02	24.75	0.00	000000
46	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.90	0.02	24.50	0.00	000000
47	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.90	0.97	24.45	0.00	000000
48	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.88	-7.44	24.27	0.00	000000
49	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.88	-15.54	24.24	0.00	000000

50	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.99	3.44	24.85	0.00	000000
51	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.90	25.15	24.83	0.00	000000
52	0.00	0.00	-3035.00	0.00	0.02	0.00	
	0.00	0.00	3034.90	18.98	12.37	0.00	000000
53	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.18	-0.02	9.31	0.00	000000
54	0.00	0.00	-3035.00	0.00	-0.05	0.00	
	0.00	0.00	3035.09	10.55	4.81	0.00	000000

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55	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.18	-0.12	9.29	0.00	000000
56	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.18	-0.13	9.19	0.00	000000
57	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.18	0.87	9.22	0.00	000000
58	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.15	-7.13	9.07	0.00	000000
59	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.16	-14.97	8.99	0.00	000000
60	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.27	3.71	9.39	0.00	000000
61	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.18	25.24	9.31	0.00	000000
62	0.00	0.00	-3035.00	0.00	-0.05	0.00	
	0.00	0.00	3035.04	2.67	4.84	0.00	000000
63	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.96	0.18	-28.44	0.00	000000
64	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.98	-2.37	-14.21	0.00	000000
65	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.96	0.18	-28.28	0.00	000000
66	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.96	0.13	-28.00	0.00	000000
67	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.96	0.94	-27.75	0.00	000000
68	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.94	-7.05	-27.84	0.00	000000
69	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.95	-14.92	-28.12	0.00	000000
70	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.05	3.52	-28.21	0.00	000000
71	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.97	25.04	-28.42	0.00	000000
72	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.93	15.63	-14.19	0.00	000000
73	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.96	0.01	-13.13	0.00	000000
74	0.00	0.00	-3035.00	0.00	0.05	0.00	
	0.00	0.00	3034.98	-2.33	-6.75	0.00	000000
75	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.96	0.03	-13.06	0.00	000000
76	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.96	0.03	-12.93	0.00	000000
77	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.96	0.89	-12.83	0.00	000000

78	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.94	-6.92	-12.86	0.00	000000
79	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.94	-14.66	-12.98	0.00	000000
80	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.05	3.72	-13.03	0.00	000000
81	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.96	25.18	-13.12	0.00	000000
82	0.00	0.00	-3035.00	0.00	0.05	0.00	
	0.00	0.00	3034.93	15.61	-6.75	0.00	000000

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83	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.04	-0.19	-9.80	0.00	000000
84	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3035.02	2.57	-4.90	0.00	000000
85	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.04	-0.18	-9.74	0.00	000000
86	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.04	-0.13	-9.65	0.00	000000
87	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.04	0.83	-9.60	0.00	000000
88	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.02	-6.86	-9.57	0.00	000000
89	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.02	-14.50	-9.61	0.00	000000
90	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.13	3.92	-9.76	0.00	000000
91	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.04	25.37	-9.81	0.00	000000
92	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.97	10.70	-4.90	0.00	000000
93	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.04	-0.18	-28.44	0.00	000000
94	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3035.02	2.37	-14.21	0.00	000000
95	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.04	-0.18	-28.28	0.00	000000
96	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.04	-0.13	-28.00	0.00	000000
97	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.04	0.84	-27.87	0.00	000000
98	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.01	-6.95	-27.78	0.00	000000
99	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.02	-14.65	-27.88	0.00	000000
100	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.13	3.88	-28.34	0.00	000000
101	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.04	25.39	-28.46	0.00	000000
102	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.97	10.90	-14.22	0.00	000000
103	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.61	0.20	62.85	0.00	000000
104	0.00	0.00	-3035.00	0.00	-0.10	0.00	
	0.00	0.00	3034.80	-23.07	31.67	0.00	000000
105	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.61	0.41	62.58	0.00	000000

106	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.62	0.39	61.94	0.00	000000
107	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.62	1.07	61.39	0.00	000000
108	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.60	-7.33	61.53	0.00	000000
109	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.60	-15.48	62.14	0.00	000000
110	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.70	3.19	62.48	0.00	000000

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111	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.61	25.02	62.84	0.00	000000
112	0.00	0.00	-3035.00	0.00	-0.10	0.00	
	0.00	0.00	3034.75	36.29	31.64	0.00	000000
113	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.43	0.17	44.28	0.00	000000
114	0.00	0.00	-3035.00	0.00	0.10	0.00	
	0.00	0.00	3035.22	25.01	21.74	0.00	000000
115	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.43	-0.09	43.92	0.00	000000
116	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.43	-0.17	43.41	0.00	000000
117	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.42	0.88	42.93	0.00	000000
118	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.40	-7.36	43.11	0.00	000000
119	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.41	-15.35	43.68	0.00	000000
120	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.53	3.51	43.81	0.00	000000
121	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.43	24.90	44.33	0.00	000000
122	0.00	0.00	-3035.00	0.00	0.10	0.00	
	0.00	0.00	3035.16	-11.94	21.67	0.00	000000
123	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.00	-0.02	-59.48	0.00	000000
124	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3035.00	0.67	-29.31	0.00	000000
125	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.00	-0.04	-59.77	0.00	000000
126	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.00	0.00	-59.59	0.00	000000
127	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.00	0.99	-59.56	0.00	000000
128	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.98	-7.67	-59.39	0.00	000000
129	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.98	-15.93	-59.31	0.00	000000
130	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.10	3.22	-59.80	0.00	000000
131	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.00	24.53	-59.36	0.00	000000
132	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.95	12.01	-29.46	0.00	000000
133	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.56	-1.48	42.47	0.00	000000

134	0.00	0.00	-3035.00	0.00	-0.10	0.00	
	0.00	0.00	3034.78	-26.33	19.96	0.00	000000
135	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.55	-1.16	46.94	0.00	000000
136	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.54	-0.68	50.16	0.00	000000
137	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.54	0.76	51.75	0.00	000000
138	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.51	-7.43	51.80	0.00	000000

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139	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.52	-15.18	50.31	0.00	000000
140	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.64	4.04	47.20	0.00	000000
141	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2829.56	24.38	42.63	0.00	000000
142	0.00	0.00	-3035.00	0.00	-0.10	0.00	
	0.00	0.00	3034.74	38.09	19.62	0.00	000000
143	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.63	9.55	15.00	0.00	000000
144	0.00	0.00	-3035.00	0.00	0.21	0.00	
	0.00	0.00	3035.29	37.57	12.35	0.00	000000
145	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.72	6.57	-4.56	0.00	000000
146	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.78	3.53	-16.79	0.00	000000
147	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.81	2.05	-22.42	0.00	000000
148	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.78	-8.18	-22.65	0.00	000000
149	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.76	-18.02	-17.03	0.00	000000
150	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.80	-4.37	-3.48	0.00	000000
151	0.00	0.00	-2830.00	0.00	0.00	0.00	
	0.00	0.00	2830.62	9.50	15.15	0.00	000000
152	0.00	0.00	-3035.00	0.00	0.21	0.00	
	0.00	0.00	3035.26	-28.00	11.49	0.00	000000
153	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.68	-4.04	-88.59	0.00	000000
154	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.61	-3.31	-105.07	0.00	000000
155	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.56	-1.99	-115.59	0.00	000000
156	0.00	0.00	-3035.00	-0.02	0.00	0.00	
	0.00	0.00	3034.54	-0.14	-120.08	0.00	000000
157	0.00	0.00	-3035.00	0.05	0.00	0.00	
	0.00	0.00	3034.52	-2.65	-121.95	0.00	000000
158	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.55	-4.17	-117.99	0.00	000000
159	0.00	0.00	-3035.00	-0.05	0.00	0.00	
	0.00	0.00	3034.64	4.14	-100.29	0.00	000000
160	0.00	0.00	-3035.00	0.00	0.00	0.00	
	0.00	0.00	3034.68	11.02	-86.66	0.00	000000

FOR LOADING - 2
APPLIED JOINT EQUIVALENT LOADS

JOINT	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
1	0.00000E+00	0.00000E+00	-2.50000E+02	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	0.00000E+00	-2.50000E+02	0.00000E+00	0.00000E+00	0.00000E+00
3	0.00000E+00	0.00000E+00	-2.50000E+02	0.00000E+00	0.00000E+00	0.00000E+00
4	0.00000E+00	0.00000E+00	-2.50000E+02	0.00000E+00	0.00000E+00	0.00000E+00
5	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
6	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
7	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
8	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00

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APPLIED JOINT EQUIVALENT LOADS

JOINT	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
115	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
116	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
117	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
118	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
119	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
120	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
121	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
122	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
123	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
124	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
125	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
126	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
127	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
128	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
129	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
130	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
131	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
132	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
133	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
134	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
135	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
136	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
137	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
138	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
139	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
140	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
141	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
142	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
143	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
144	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
145	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
146	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
147	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
148	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
149	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
150	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
151	0.00000E+00	0.00000E+00	-1.00000E+03	0.00000E+00	0.00000E+00	0.00000E+00
152	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
153	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
154	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
155	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
156	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
157	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
158	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
159	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00
160	0.00000E+00	0.00000E+00	-5.00000E+02	0.00000E+00	0.00000E+00	0.00000E+00

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 2
 LOADTYPE NONE TITLE LIVE LOAD

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***TOTAL APPLIED LOAD (NEWT MMS) SUMMARY (LOADING 2)
 SUMMATION FORCE-X = 0.00
 SUMMATION FORCE-Y = 0.00
 SUMMATION FORCE-Z = -135000.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
 MX= -303749991.73 MY= 506249987.18 MZ= 0.00

***TOTAL REACTION LOAD(NEWT MMS) SUMMARY (LOADING 2)
 SUMMATION FORCE-X = 0.00
 SUMMATION FORCE-Y = 0.00
 SUMMATION FORCE-Z = 135000.08

SUMMATION OF MOMENTS AROUND THE ORIGIN-
 MX= 303750200.03 MY= -506250574.89 MZ= 0.00

MAXIMUM DISPLACEMENTS (CM /RADIANS) (LOADING 2)
 MAXIMUMS AT NODE
 X = 0.00000E+00 0
 Y = 0.00000E+00 0
 Z = -2.40399E-01 77
 RX= 3.95899E-04 91
 RY= -7.88430E-04 128
 RZ= 0.00000E+00 0

EXTERNAL AND INTERNAL JOINT LOAD SUMMARY (NEWT MMS)-

JT	EXT FX/ INT FX	EXT FY/ INT FY	EXT FZ/ INT FZ	EXT MX/ INT MX	EXT MY/ INT MY	EXT MZ/ INT MZ	
							SUPPORT=1
1	0.00E+00 0.00E+00	0.00E+00 0.00E+00	-2.50E+02 -3.35E+04	0.000E+00 -1.910E+07	0.000E+00 3.915E+07	0.000E+00 0.000E+00	111111
2	0.00E+00 0.00E+00	0.00E+00 0.00E+00	-2.50E+02 -3.35E+04	0.000E+00 1.910E+07	0.000E+00 3.915E+07	0.000E+00 0.000E+00	111111
3	0.00E+00 0.00E+00	0.00E+00 0.00E+00	-2.50E+02 -3.35E+04	0.000E+00 1.910E+07	0.000E+00 -3.915E+07	0.000E+00 0.000E+00	111111
4	0.00E+00 0.00E+00	0.00E+00 0.00E+00	-2.50E+02 -3.35E+04	0.000E+00 -1.910E+07	0.000E+00 -3.915E+07	0.000E+00 0.000E+00	111111
12	0.00 0.00	0.00 0.00	-500.00 500.00	0.00 0.17	0.00 -0.22	0.00 0.00	000000
13	0.00 0.00	0.00 0.00	-1000.00 1000.00	0.00 0.29	0.00 -0.01	0.00 0.00	000000
14	0.00 0.00	0.00 0.00	-500.00 500.00	0.00 -1.04	0.00 0.39	0.00 0.00	000000
15	0.00 0.00	0.00 0.00	-1000.00 999.99	0.00 -2.27	0.00 0.09	0.00 0.00	000000
16	0.00 0.00	0.00 0.00	-500.00 500.00	0.00 -1.94	0.00 0.78	0.00 0.00	000000
17	0.00 0.00	0.00 0.00	-1000.00 999.99	0.00 -4.68	0.00 0.10	0.00 0.00	000000
18	0.00 0.00	0.00 0.00	-500.00 500.01	0.00 0.26	0.00 -1.52	0.00 0.00	000000

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19	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.03	0.73	-0.43	0.00	000000
20	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	500.00	2.20	-0.61	0.00	000000
21	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	6.25	-0.06	0.00	000000
22	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.99	3.15	0.33	0.00	000000
27	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	0.33	0.02	0.00	000000
28	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	-2.55	0.03	0.00	000000
29	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	-5.31	-0.02	0.00	000000
30	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.03	1.01	-0.17	0.00	000000
31	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	7.81	-0.05	0.00	000000
32	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.98	4.03	0.16	0.00	000000
37	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	0.34	0.03	0.00	000000
38	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	-2.65	0.01	0.00	000000
39	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	-5.52	-0.06	0.00	000000
40	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.03	1.16	-0.07	0.00	000000
41	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	8.64	-0.04	0.00	000000
42	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.98	4.49	0.10	0.00	000000
43	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.97	-0.05	7.83	0.00	000000
44	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.98	-1.84	3.84	0.00	000000
45	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.97	-0.03	7.88	0.00	000000
46	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.97	-0.01	7.87	0.00	000000
47	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.97	0.34	7.89	0.00	000000
48	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.96	-2.64	7.85	0.00	000000
49	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.96	-5.54	7.81	0.00	000000

50	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	1.30	7.85	0.00	000000
51	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.97	9.14	7.81	0.00	000000
52	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.96	6.59	3.90	0.00	000000
53	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.06	0.04	2.93	0.00	000000
54	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	500.03	3.30	1.50	0.00	000000

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55	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.06	0.01	2.97	0.00	000000
56	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.06	-0.01	2.97	0.00	000000
57	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.06	0.33	3.00	0.00	000000
58	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.05	-2.62	2.97	0.00	000000
59	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.05	-5.53	2.93	0.00	000000
60	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.09	1.35	2.96	0.00	000000
61	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.06	9.29	2.93	0.00	000000
62	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	500.01	1.60	1.53	0.00	000000
63	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	0.05	-8.94	0.00	000000
64	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.99	-0.76	-4.43	0.00	000000
65	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	0.05	-8.99	0.00	000000
66	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	0.04	-8.98	0.00	000000
67	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	0.35	-8.94	0.00	000000
68	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.98	-2.62	-8.96	0.00	000000
69	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.98	-5.55	-9.00	0.00	000000
70	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.02	1.36	-8.99	0.00	000000
71	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	9.41	-8.94	0.00	000000
72	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.97	5.74	-4.41	0.00	000000
73	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	-0.01	-4.13	0.00	000000
74	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.99	-0.73	-2.10	0.00	000000
75	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	0.00	-4.14	0.00	000000
76	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	0.00	-4.14	0.00	000000
77	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	0.33	-4.12	0.00	000000

78	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.98	-2.60	-4.13	0.00	000000
79	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.98	-5.51	-4.15	0.00	000000
80	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.02	1.43	-4.15	0.00	000000
81	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	9.52	-4.12	0.00	000000
82	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.97	5.75	-2.10	0.00	000000

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83	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	-0.05	-3.08	0.00	000000
84	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	500.01	0.82	-1.53	0.00	000000
85	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	-0.05	-3.09	0.00	000000
86	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	-0.04	-3.09	0.00	000000
87	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	0.32	-3.09	0.00	000000
88	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	-2.58	-3.08	0.00	000000
89	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	-5.47	-3.08	0.00	000000
90	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.05	1.48	-3.09	0.00	000000
91	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	9.57	-3.08	0.00	000000
92	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.99	4.19	-1.53	0.00	000000
93	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	-0.05	-8.94	0.00	000000
94	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	500.01	0.76	-4.43	0.00	000000
95	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	-0.05	-8.99	0.00	000000
96	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	-0.04	-8.98	0.00	000000
97	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	0.32	-8.97	0.00	000000
98	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	-2.59	-8.95	0.00	000000
99	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	-5.48	-8.95	0.00	000000
100	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.05	1.46	-8.98	0.00	000000
101	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.01	9.51	-8.95	0.00	000000
102	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.99	4.22	-4.45	0.00	000000
103	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.88	-0.04	19.77	0.00	000000
104	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.94	-7.24	9.87	0.00	000000
105	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.88	0.03	19.94	0.00	000000

106	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.88	0.06	19.94	0.00	000000
107	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.88	0.36	19.87	0.00	000000
108	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.87	-2.65	19.91	0.00	000000
109	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.87	-5.59	19.98	0.00	000000
110	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.91	1.32	19.95	0.00	000000

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111	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.88	9.38	19.77	0.00	000000
112	0.00	-0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.92	12.14	9.83	0.00	000000
113	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.14	0.19	13.93	0.00	000000
114	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	500.07	7.81	6.79	0.00	000000
115	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.14	0.09	13.95	0.00	000000
116	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.14	0.02	13.90	0.00	000000
117	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.14	0.34	13.81	0.00	000000
118	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.13	-2.65	13.85	0.00	000000
119	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.13	-5.57	13.96	0.00	000000
120	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.17	1.19	13.97	0.00	000000
121	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.14	8.90	13.94	0.00	000000
122	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	500.05	-3.06	6.73	0.00	000000
123	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	0.00	-18.74	0.00	000000
124	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	500.00	0.22	-9.13	0.00	000000
125	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	0.00	-19.13	0.00	000000
126	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	0.01	-19.30	0.00	000000
127	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	0.34	-19.41	0.00	000000
128	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	-2.65	-19.38	0.00	000000
129	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.99	-5.53	-19.24	0.00	000000
130	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.03	1.16	-19.06	0.00	000000
131	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.00	8.64	-18.70	0.00	000000
132	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.98	4.26	-9.22	0.00	000000
133	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.86	-0.69	13.50	0.00	000000

134	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.93	-8.25	6.19	0.00	000000
135	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.85	-0.54	15.29	0.00	000000
136	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.85	-0.33	16.57	0.00	000000
137	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.85	0.22	17.21	0.00	000000
138	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.84	-2.44	17.20	0.00	000000

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139	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.84	-4.98	16.59	0.00	000000
140	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.89	1.55	15.46	0.00	000000
141	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	999.86	8.50	13.55	0.00	000000
142	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.92	12.28	6.02	0.00	000000
143	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.20	3.37	4.37	0.00	000000
144	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	500.09	11.78	3.87	0.00	000000
145	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.23	2.36	-1.92	0.00	000000
146	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.26	1.30	-5.86	0.00	000000
147	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.27	0.72	-7.68	0.00	000000
148	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.26	-2.69	-7.77	0.00	000000
149	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.25	-5.98	-5.96	0.00	000000
150	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.26	-1.63	-1.49	0.00	000000
151	0.00	0.00	-1000.00	0.00	0.00	0.00	
	0.00	0.00	1000.20	2.87	4.43	0.00	000000
152	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	500.08	-8.63	3.54	0.00	000000
153	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.90	-1.57	-28.28	0.00	000000
154	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.87	-1.27	-34.24	0.00	000000
155	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.85	-0.77	-38.12	0.00	000000
156	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.85	-0.09	-39.81	0.00	000000
157	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.84	-0.79	-40.42	0.00	000000
158	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.85	-1.17	-38.91	0.00	000000
159	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.88	1.53	-32.73	0.00	000000
160	0.00	0.00	-500.00	0.00	0.00	0.00	
	0.00	0.00	499.90	3.77	-27.67	0.00	000000

***** END OF DATA FROM INTERNAL STORAGE *****

144. LOAD LIST 1 TO 3

145. PERFORM ANALYSIS

146. FINISH

***** END OF THE STAAD.Pro RUN *****

**** DATE= APR 4,2010 TIME= 10: 4:32 ****

 * For questions on STAAD.Pro, please contact *
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 *
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الفصل السابع

مناقشة النتائج

لقد كانت نتائج العزوم باستخدام برنامج (STAAD PRO) في بعض الأماكن أقل من نتائج العزوم بطريقة (ACI COEFFICIENT) وفي مناطق أخرى أكبر، وذلك يعود لادخال احمال الرياح كقوة أفقية في التحليل إضافة الى القوة العمودية المسلطة على المنشأ مما أدى الى تغيير تصرف الكثير من الاجزاء الانشائية وخصوصا في الاعمدة.

كذلك كانت نتائج العزوم بطريقة (ACI Coefficient) أكبر بنسبة (10%-20%) من نتائج العزوم بطريقة توزيع العزوم (Moment Distribution) حيث اعتبرت هذه الطريقة في الاونة الاخيرة من أكثر الطرق استخداما في تحليل (Indeterminate Frames) وذلك في كثير من المكاتب الهندسية وحتى في وقتنا الحالي تعتبر طريقة فعالة في ظل غياب الحاسوب.

وقد تم استخراج قيم (ρ_{min} , ρ_{max}) وكذلك قيم (As_{min} , As_{max}) وهي قيم مهمة في عملية التصميم وذلك لضمان عدم تجاوز كمية حديد التسليح الكمية القصوى وبذلك يصبح المقطع (Over Reinforced) وبالتالي فإن الحديد لن يحصل فيه خضوع قبل الفشل وعند زيادة الحمل فإن الانحرافات تكون غير ملحوظة ويحدث الفشل فجأة ولهذا السبب حدد (ACI 318M-08) نسبة حديد التسليح العظمى بـ (ρ_{max}) كنسبة معينة من نسبة حديد التسليح المتوازنة (ρ_b) وذلك لضمان نوع الفشل مطيلي (Ductile) والذي يوفر فترة تحذير مناسبة لمعالجة الموقف.

اما في برنامج (STAAD PRO) فقد قام البرنامج بالتصميم على اساس اخطر حالة تحميل وكانت الحالة التالية:

$$U=1.2D.L+1.6W.L+1.0L.L$$

المصادر:

- .Manual Of STAAD PRO
- .ACI 318M-08
- Design Of *Reinforced concrete* Structures By H.Nilson -13Edition.
- انشاء المباني لزهير ساكو.

وصف البناية وادخال المعلومات الى البرنامج

وصف البناية:

ان المشروع المطلوب تصميمه انشائيا هو عبارة عن بناية كلية طب الفلوجة بمساحة تبلغ (1700) متر مربع حيث تم اعتماد هيكل خرساني من الاعمدة والعتبات والسقوف. والبناية تتكون من ثلاثة طوابق ارضي وطابق اول وطابق ثاني وسطح. تم تحليل وتصميم هذه البناية بالاعتماد على المدونة الامريكية (ACI 318M-08).

نبذة عن البرنامج:

برنامج STAAD pro هو برنامج يقوم بتصميم وتحليل المنشآت الخرسانية والمعدنية وكذلك المنشآت الخشبية والاهنيوم وهو برنامج من تصميم شركة research engineering وهو النسخة المطورة عن برنامج STAAD III الذي استمر تطويره حتى يومنا الحالي الذي اصبح فيه البرنامج من اكثر البرامج انتشارا في العالم والاكثر استخداما في المكاتب الاستشارية والتصاميم الهندسية. كلمة STAAD PRO هي مختصر لكلمة structural analysis and design professional ويقوم البرنامج بتحليلات ستاتيكية و ديناميكية و لمنشآت ذات ثلاثة ابعاد مثل العتبات والجمالونات باستخدام طريقة مصفوفة stiffness matrix method .

ادخال المعلومات الى البرنامج:

- 1- في بداية الامر تم تحديد اجزاء معينة من البناية لغرض القيام بعملية تصميمها. تم ادخال مواقع المفاصل (Joints) للبناية عن طريق نظام الاحداثيات وذلك بكتابة الاحداثيات للمحاور الثلاثة (X,Y,Z) ثم التوصيل بين هذه المفاصل عن طريق الامر (Add Beam) ومن ثم استخدام امر (translational Repeat) لاضافة الطوابق العلوية في محور (Y) او اي محور اخر نرغب فيه.
- 2- بعدها يتم تحديد خواص المقطع حسب نوع المنشأ عن طريق اختيار قائمة (Commands) ثم اختيار (plate thickness) لتحديد سمك السقف و امر (member property) لاختيار لتحديد شكل وابعاد الاجزاء الانشائية وتم تصميم المقاطع على انها مقاطع مستطيلة .