

3D Frame Analysis using SAP2000

- D.L = 20 lb/ft, L.L = 60lb/ft,
- Fy = 60 ksi, fc' = 4ksi
- B1 = 18" x 12",
- C1 = 12" x 12",

Steps:

- Unit = Kft-F
- New model= grid,
 - x = 4,
 - y = 1,
 - z = 4
 - Edit
 - x = 0, 20,35,40,
 - y = 0
 - Z = 0, 2,18, 23.

Draw > draw frame & draw the frame.

- Option Preferences
 - Concrete ACI-2003

- Define > material,
 - concrete,
 - Modify,
 - fy= fys=60ksi,
 - f'c= 4ksi.

- Define > frame sections.
 - Add rectangular sections,
 - Name= B1,
 - Depth= 18",
 - width =12",
 - Reinforcement, click beam button clear cover top=Bottom=2.5"

- Define > frame section.
 - Add rectangular section,
 - Name= C1,
 - Depth=12",
 - width =12",
 - Reinforcement, click column button, clear cover= 2.5, click design button.

- Define > load cases,
 - Add line load.

- Define > add default combo, check concrete.
 - Cover to uses check boxes.

- Select beams.

Assign > frame

- Frame sections.
- Select B1.
- Select columns.

- Assign > frame
 - Frame section,
 - Select C1

- Select Beams.

- Assign > frame load

- Distributed,
 - Load case = dead,
 - select= gravity projected direction.
 - Wu = 0.02k/ft.
- Select > get previous select.
- Assign > frame load >
 - Distributed. Load case = live,
 - select gravity projected direction.
 - Wu = 0.06 K/ft.
- Select extreme left column.
- Assign > frame loads > point.
 - Direction = x,
 - select relative radio button.
 - X= 0.5,
 - Load= 10k.
- Select extreme left support.
- Assign > Joint
 - Restrained,
 - Select fixed support.
- Select middle support & select roller support.
- Select > Get Previous selection.
- Assign > Joint
 - Load case,
 - Y= -30.
- Analyze > Analysis case.
 - x-z plane.
- Analyze > Run analysis.
 - Select model.
 - Click “DO NOT RUN” button,
 - “RUN NOW , button.
- Display > deformed shape;
 - select UDCON2.
- Display > show forces/stress

- frame,
 - select UDCON2
- Select F22,
 - Uncheck full,
 - Check show values.
- Display > show forces > stress
 - Frame,
 - Select M22 > Joints
 - Select UDCON2.
- Design > concrete frame design > select design combo.
 - Select UDCON1, UDCON2.
- Design > concrete frame design
 - Start design check.
- Design > concrete frame design
 - Verify all members posed.
- Design > concrete frame design > display design info.
- Select longitudinal reinforcement.
- For beams, select max, upper & lower value, and for column, select max. Value. Do calculation and find No. of Bars.

