Design of Water Tank using SAP2000

- Unit = lb-ft.

New Model

- Grid. Cylinder R= 5, θ = 9, z = 5. Along, r = 5.93, θ = 4.5, z = 13. Edit Z last value = 49.
- Draw beams in 2nd storey.

- Edit > Replicate parallel to Z-axis. Z = 13, number = 2.

- Draw edge beam in 1st storey.

- Select beams.

- Edit > replicate parallel to z-axis. Z = 13, No.= 1
- For ring beam.

Define > co-ordinate. t = 0, 11.25, 22.5 360

- Draw one element on one grid line. Select it and replicate. Radial along Z-axis. θ = 11.25, No. 31.

- Select all beams in this storey.

- Select insertion point to center.

- Draw single element of area.

- Select area.

Assign > Area > Local axis, 5.625,

- Select area and replicate 31 No & θ = 11.25

- Tz plane select.

- Draw walls.

- Select walls.

- Edit > auto mesh 1-2 = 2, 1-3 = 10

Define

- Define > joint pattern, hydropath
- Define > load cases. Name = hydro water pressure = type

- Define frame section. Define B15 x 12, C12 x12

- Define > area section. Slab, top slab, wall

- Select beams, assign B 15 x 12

- Select column assign C12 x 12

- Select tank base, assign slab

- Select wall

Assign

- Assign > joint pattern hydropath, C = 1, D = -49

- Select > get previous selection

- Assign > area load > surface pressure, Load = hydro, face = 5. By joint pattern. Name = hydropath. Multipliers = 62.4

- Add to existing load

- Select slab. Assign load= 62.4 lb/ft^2

Analyze

- Analyze > run analysis, model "DO NOT RUN"

- Display > show forces/stresses > hydro. Check it for hoop stress

Design (Design Check & Area of Steel)

- Design > concrete frame design > display design combo. UDCON1, UDCON2

- Design > concrete frame design > start design/check

- Design > concrete frame design > verify all memberance passed

- Design > concrete frame design > display design info

- Select longitudinal reinforcement.
- Design slab, top slab, wall by getting AST1, AST2, beams and columns.