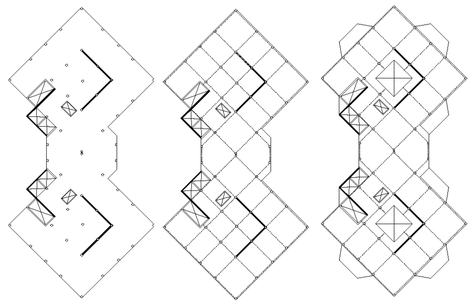
IPRO 315—Design of a Large Scale Structure

Building Features

- Staggered towers at 13, 14, 17 floors
- Large atriums
- Balconies
- Green roof
- Heavy mech. equipment

Structural Floor Plans

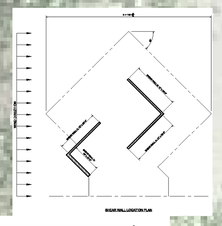


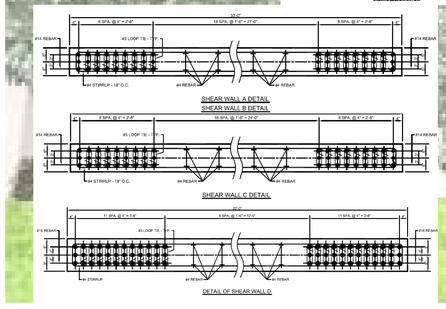
BASEMENT FLOOR PLAN | 1ST FLOOR PLAN | 2ND TO 13TH FLOOR PLAN

14TH FLOOR PLAN | 15TH TO 17TH FLOOR PLAN

Lateral Load Resisting System

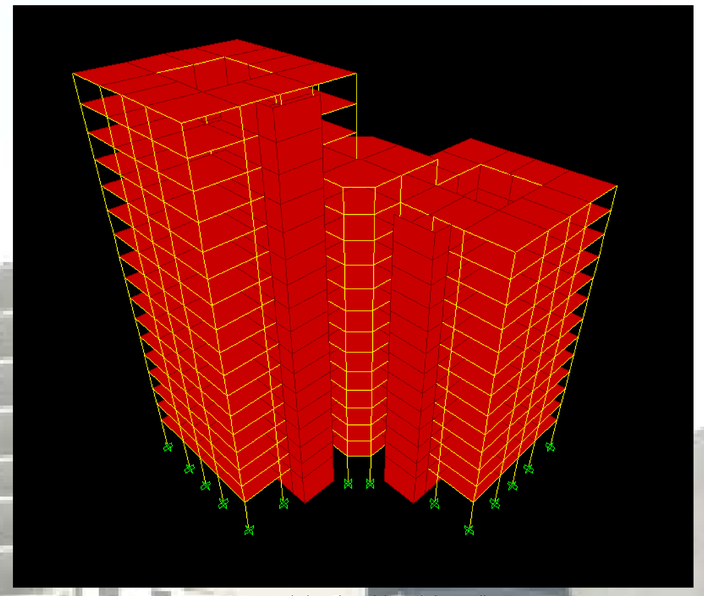
- Locations: stairwells, elevator shafts, atrium walls
- Placed to minimize torque
- Non-load-bearing walls
- Integrated columns at atrium



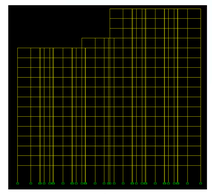


SHEAR WALL A DETAIL | SHEAR WALL B DETAIL | SHEAR WALL C DETAIL | DETAIL OF SHEAR WALL D

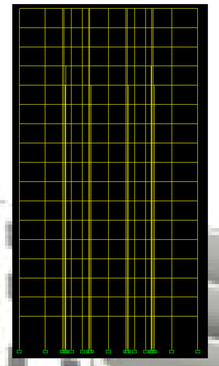
STRUCTURAL DESIGN



3-D View including Floor Slabs and Shearwalls



West Elevation



South Elevation

Structural System

Materials and Limitations

- For sustainability, use precast concrete wherever possible
- Building design determined by architects of IPRO 335

Features

- Gravity Load Bearing System
  - Precast concrete beams, hollow-core floor slabs
  - Cast-in-place concrete cantilever beams, columns, balconies
- Lateral Load Resisting System
  - Cast-in-place concrete shearwalls

Choosing Structural System

- Fit within the architectural plans provided by IPRO 335
- Considering material and labor efficiency
- Structural soundness

Gravity Load Bearing System

Floor Slabs

Hollowcore Precast Slabs

- Used throughout interior except at atriums
- Selected prefabricated Spancrete slab

Cast-in-Place Cantilever Slabs

- Used in atrium and balcony cantilevers
- Poured simultaneously with columns

Beams

Precast Beams

- Used for all simple-span beams
- To be prefabricated by outside manufacturer

Typical Beam Section

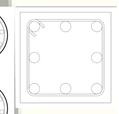
Cast-in-Place Beams

- Used to account for moment connections at atrium connection
- Poured simultaneously with columns

Columns

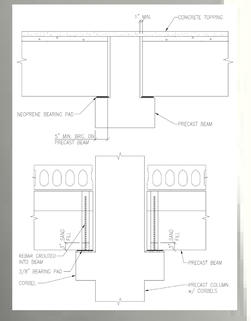
- Double circular center column at lobby
- Square columns elsewhere

Center Column Section



Typical Column Section

Connection Details



CONCLUSIONS

- Successfully created a structural system to fit the IPRO 335 building
- Learned about coordination and communication among disciplines