

## TOPIC 12 – FUTURE VERTICAL EXPANSION

**1. GENERAL:** When the approved scope of a project includes provisions for future expansion, design the structural, mechanical, and electrical systems in accordance with the following guidelines. Indicate future equipment and floors on the design development and construction drawings by broken or dotted lines.

### 2. ARCHITECTURAL AND STRUCTURAL

a. Design columns, bearing walls, and foundations for future loads. Design details to facilitate splicing future columns. In preparing design analyses, use live load reductions permissible for future gross areas.

b. Design columns for the more critical of the two possible interacting future load conditions (combinations of bending moment and axial load).

c. Base wind and seismic analyses on gross projected future configuration and mass of building.

d. If the planned future expansion includes additional stories intended to align with an existing floor, depress the roof slab 50 mm (2 in.) minimum below the existing finished floor to receive a future leveling topping for the future functional floor.

e. Provide removable floor slabs, wall panels, etc., for future openings for stairways and elevator and other shafts.

f. For record purposes, note structural design assumptions on contract drawings. Indicate future column loads and also gross loads used in designing original structures on column schedules.

### 3. PLUMBING AND SANITARY

a. Size main interior cold water, hot water, waste, fire sprinkler, medical laboratory, and dental gases, and fuel gas lines to serve future loads.

b. Size underground water, fuel, gas, and oxygen service lines, and storm and sanitary sewers serving the building to serve future loads.

c. Size selected equipment, such as hot water generators, air compressors, and vacuum pumps for original loads in accordance with plumbing design manuals. Indicate locations for future equipment on schematic drawings.



#### 4. HEATING AND AIR CONDITIONING

- a. Size main chilled water and condenser water lines for future loads.
- b. Design chillers and chilled water pumps for original loads in accordance with HVAC design manuals. Indicate locations for future chillers and chilled water pumps on design development and construction drawings.
- c. Provide pipe fittings and valves for connections to future chillers, pumps, and accessories.
- d. Size cooling towers to match originally installed chillers. Indicate locations for future cooling towers on design development and construction drawings.
- e. Provide sufficient capacity for engineering control center panels to accommodate controls for future equipment.
- f. Size main steam and condensate return lines for future loads. Use diversity factors applicable to future conditions.
- g. Size boilers for original plus known future loads in accordance with the Steam Generation Design Manual. Indicate locations for future boilers and related equipment on design development and construction drawings. Size fuel, condensate and feedwater piping system, and condensate storage tanks for probable future maximum design-day demands. Size deaerating feed water heaters for future loads. (Do not size pumps and control valves for future; add additional capacity later.)
- h. Size natural draft stacks for future loads.

#### 5. ELECTRICAL

- a. To serve future expansion, allow space in main electrical rooms for addition of future equipment for following systems:
  - (1) Secondary power distribution system.
  - (2) Essential electrical system.
  - (3) Local fire alarm system.
  - (4) Telephone system.
  - (5) Other communication systems.



b. Where feeder raceways cannot be readily installed in the future, install empty raceway in original design.

## **6. ELEVATORS, DUMBWAITERS, AND TRANSPORT SYSTEMS**

a. Locate elevators, dumbwaiters, and transport systems, requiring future vertical and horizontal expansion, to serve functions and activities in original building and proposed future expansion.

b. Select types of vertical and horizontal transport designs on the basis of the kind and volume of original and projected future traffic.

c. Analyze traffic during preliminary design stage to determine the economic feasibility of originally installing vertical and horizontal transport systems having future additional capacity. If that is not feasible, provide spaces for future hoistways. Provide future hoistway space with knockout floor slabs to allow that floor space be utilized until the future expansion takes place.

d. When the designed equipment is overhead traction type, design the machine room area and the machine beams to be removable. This facilitates machine room relocation and extensions of hoistways.

e. When the designed equipment is hydraulic and designed for future vertical expansion, structure the hoistway for future electric traction elevator.

