

# Full-Scale Structural and Nonstructural Building System Performance during Earthquakes & Post-Earthquake Fire

A Joint Venture between Academe, Industry and Government

## *NCSs – Specific Larger Systems*

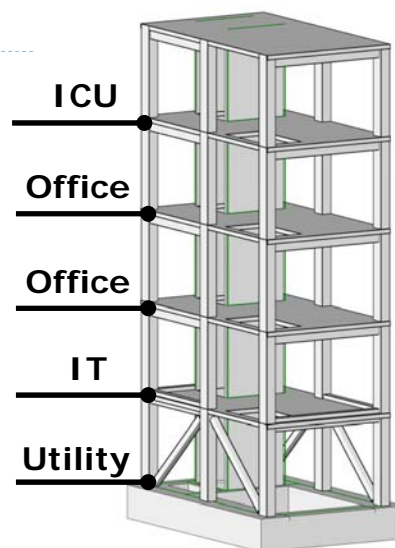
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Research Director, Hilti & Professor, UCSD



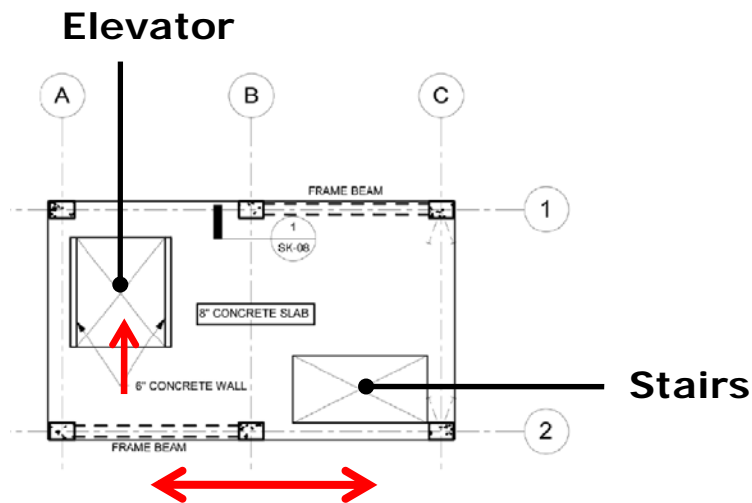
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## Occupancy

- ▶ Intensive Care Unit (ICU)
  - Upper Floor
- ▶ Two floors office occupancy
- ▶ One floor with raised computer floors
  - ▶ IT servers, computer equipment
- ▶ One floor utility space
  - ▶ Emergency generator, boiler, motor control systems, etc.



## Largest Openings in Building

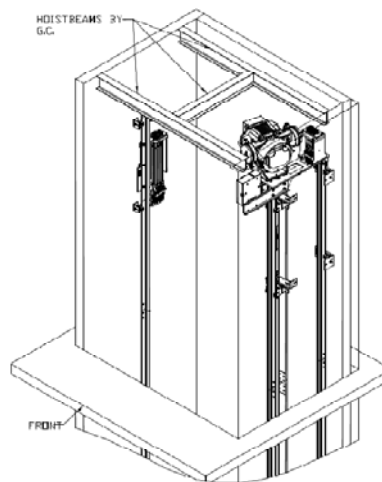


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## Full-scale Elevator

- ▶ Schindler Corporation
- ▶ 3500lb capacity, 56' travel distance, supports 5 landings
- ▶ Designed to seismic zone 4 requirements
- ▶ 6'-11" x 8'-8" clear hoistway opening in building skin
- ▶ Counterweight & guiderails anchored vertically to a concrete wall

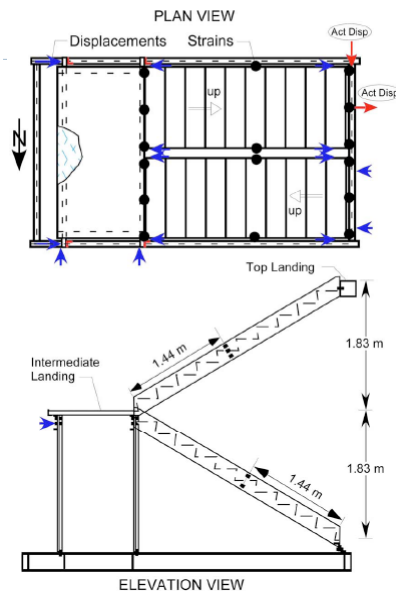


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## Stairs

- ▶ Mix of prefabricated and cast-in-place stairs
- ▶ Prefabricated metal stairs by Pacific Stair & in collaboration with Prof Chris Higgins (OSU)
- ▶ Higgins (2009) full scale tests at OSU on same system with ends loaded with hydraulic actuators

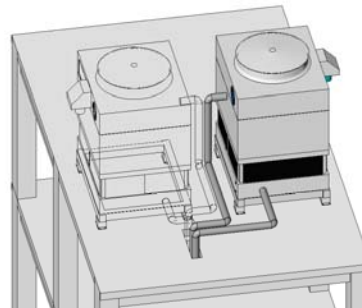
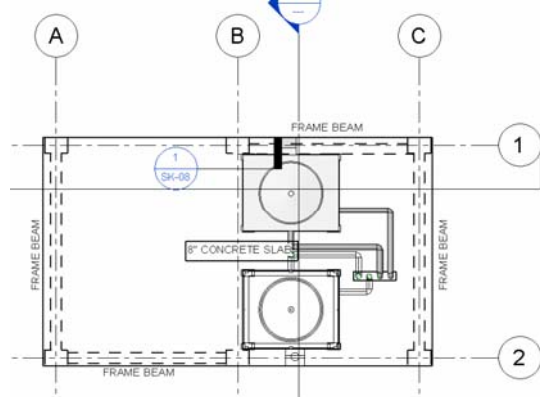


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## Pair of Roof Mounted Open Cooling Tower

- ▶ Baltimore Aircoil Corporation
- ▶ One isolated, the other not, placed side-by-side on roof
- ▶ 6230lb operating weight



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## What systems we have

Item	Supplier	Status
Access floors	Tate access floors	Shop drawings (SD) needed
Anchorage (anchors, shot pins)	Hilti	SD needed
Ceilings	Armstrong	SD needed
Chiller units	Baltimore Aircoil	Preliminary SD provided 02/2010
Electrical control equip & power distribution	Schneider Electric	SD needed
Elevator	Schindler	Preliminary SD provided 11/2009
Fire alarm system	SimplexGrinnel/Tyco	SD needed
Fire damper systems	Ruskin	SD needed
Fire sprinkler system	NFSA	SD needed
Hospital ICU	CSSC	Pending review of CSSC board
Isolation systems and restraints	Mason	SD needed
Passive fire resistance (firestop)	Hilti	SD needed
Stairs	Pacific Stairs	SD needed
Access Floors	Tate	Preliminary concepts sent/SD needed

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## Key larger systems still required

- ▶ Façade or other building skin
- ▶ Partition walls (pending: SSMA, Georgia-Pacific)
- ▶ HVAC (pending)
- ▶ ICU equipment (pending input from CSSC)

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