Use of High-Strength Concrete in Tall Buildings

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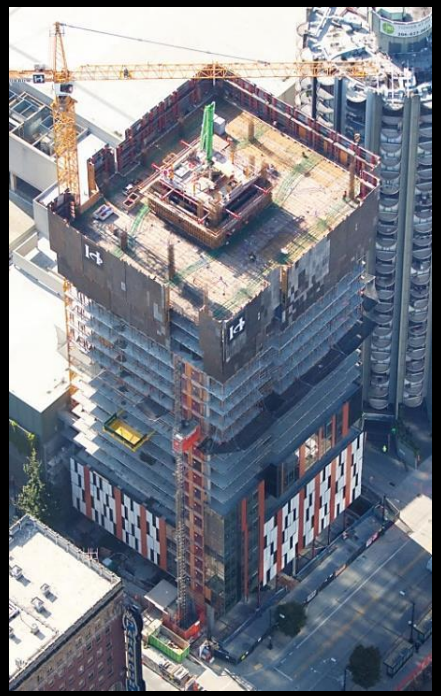
Premiere on Pine

SEATTLE, WASHINGTON

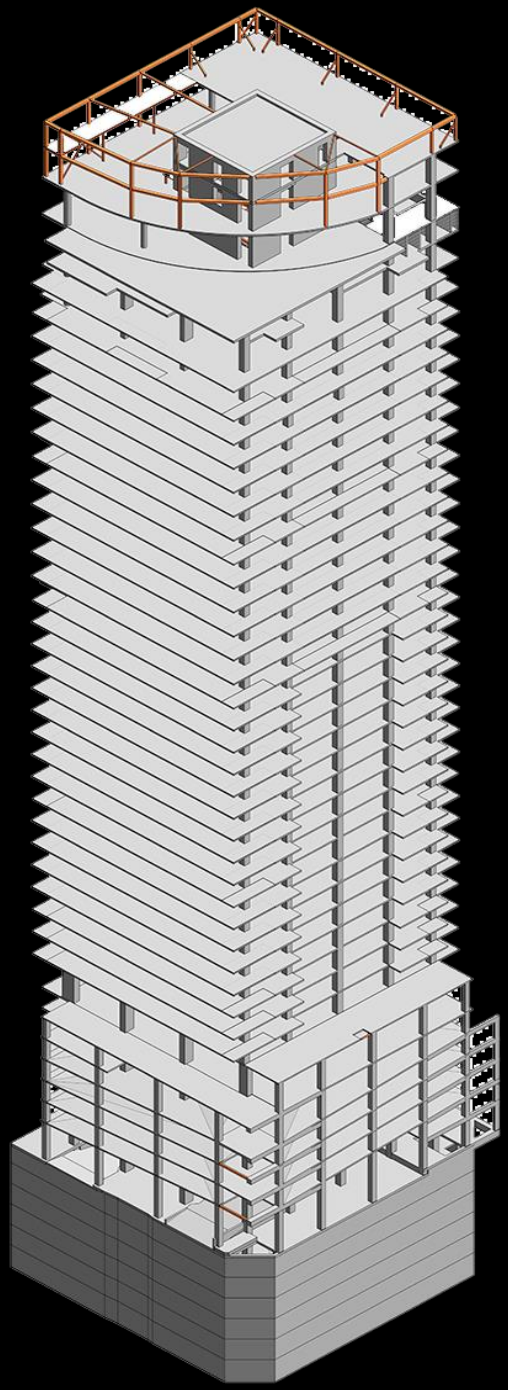
Premiere on Pine

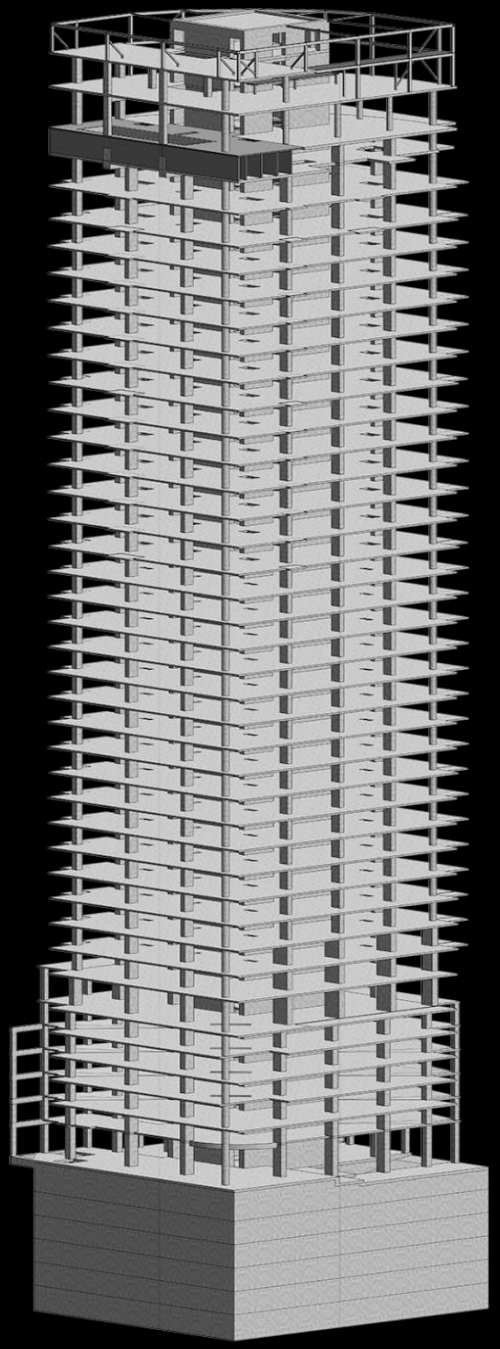
- 440 foot structure
- 490,000 square feet
- 42-story residential tower with 386 units
- Four levels of parking above grade, with five levels below
- Opened in November 2014
- Targeting LEED Silver certification



Premiere on Pine

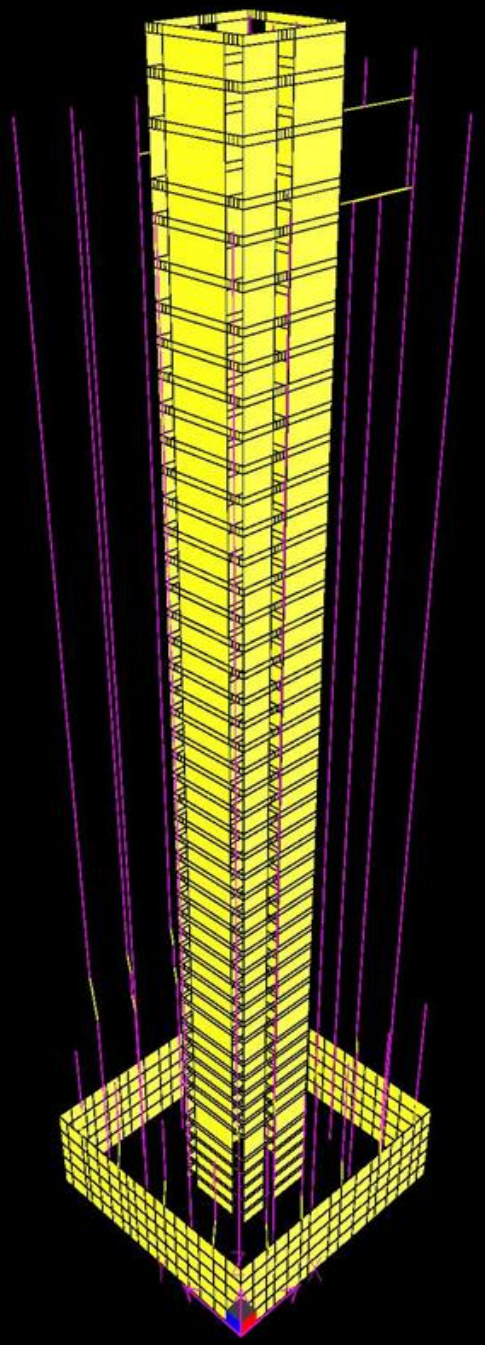
- 7 ½" post-tensioned flat plates
- Highly efficient core-wall seismic system
- Column sizes are constant from ground to top
- Formwork productivity was maximized

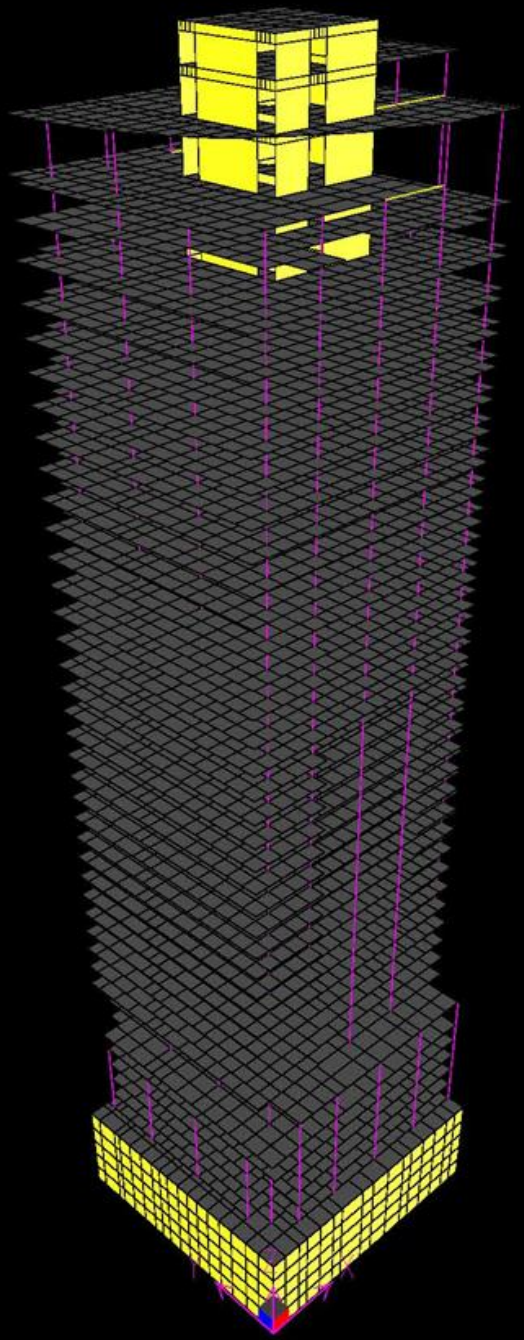




Buildings Above 240' in High Seismic Regions

- Seismic restrictions triggered at 240'
- Ductile frames or dual systems (ductile frames/shear walls) are mandated by code above 240'
- Alternatively, shear walls can be used if ductile behavior is proven through performance based analysis
  – peer review required

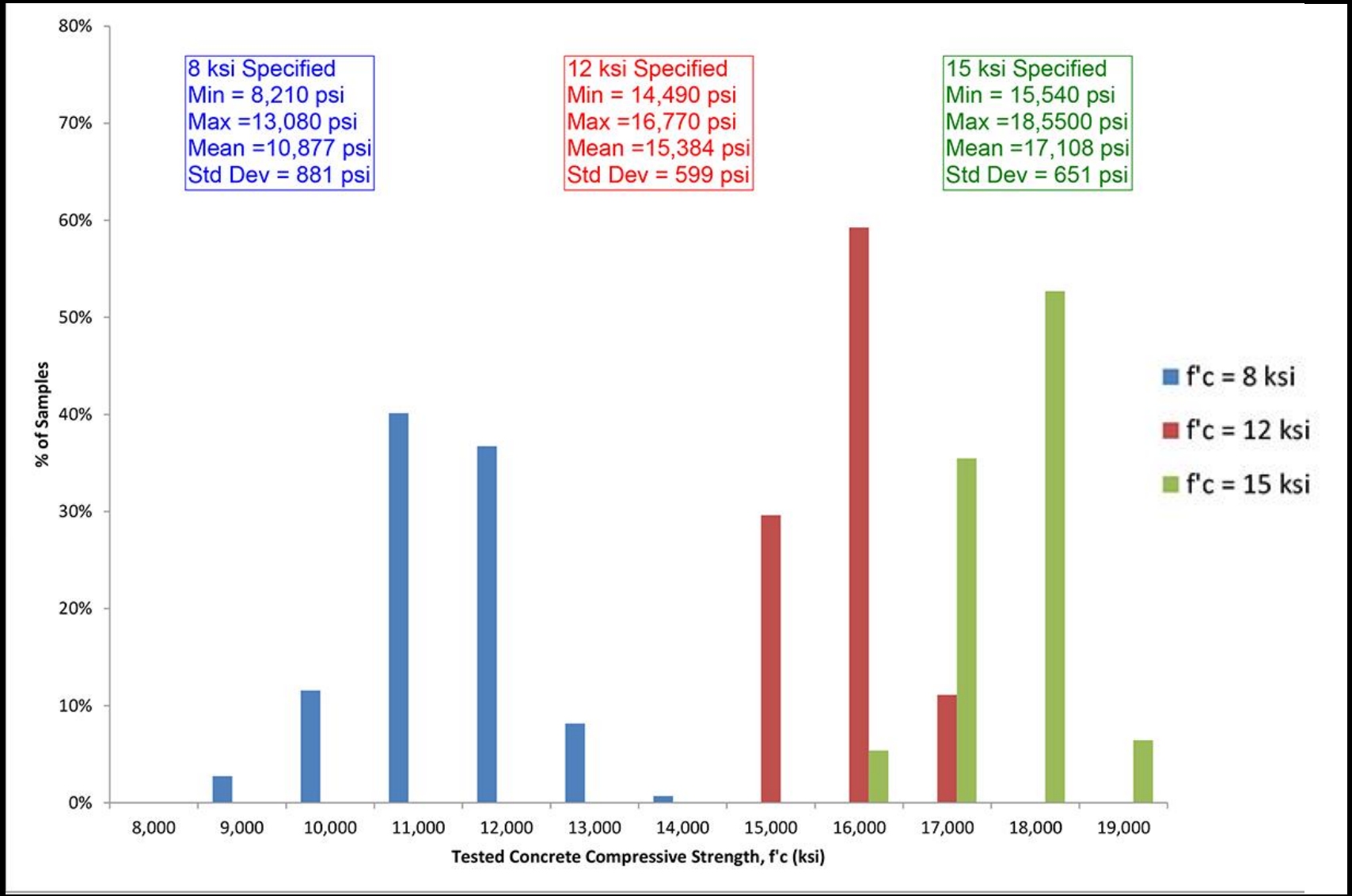




15,000 PSI Column Concrete

- Believed to be the strongest concrete ever specified in Seattle
- Allows shear walls and columns to be smaller than typical towers this size
- Smaller shear walls and columns mean larger floor plates and more real estate inside the building

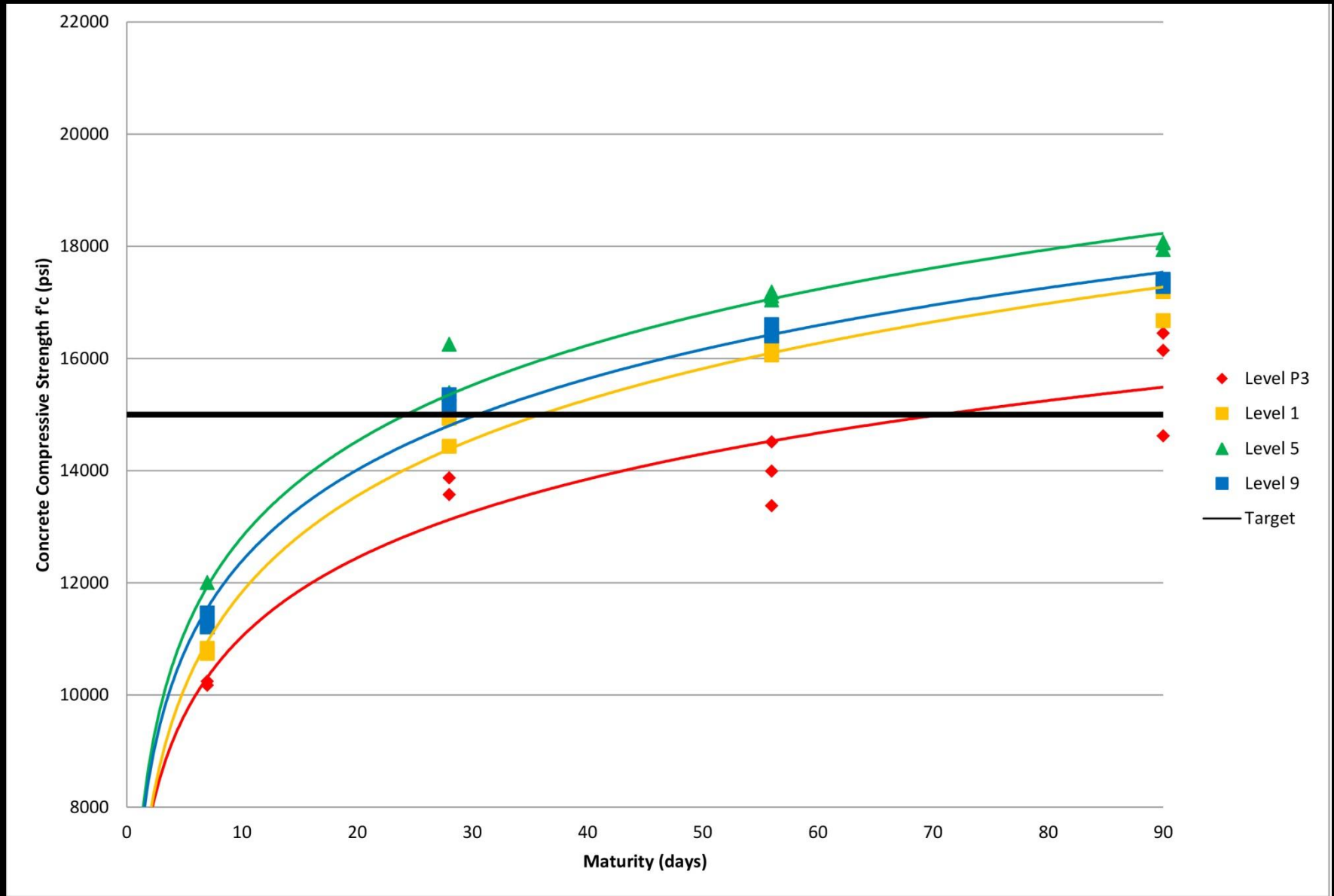
Tested Concrete Compressive Strength



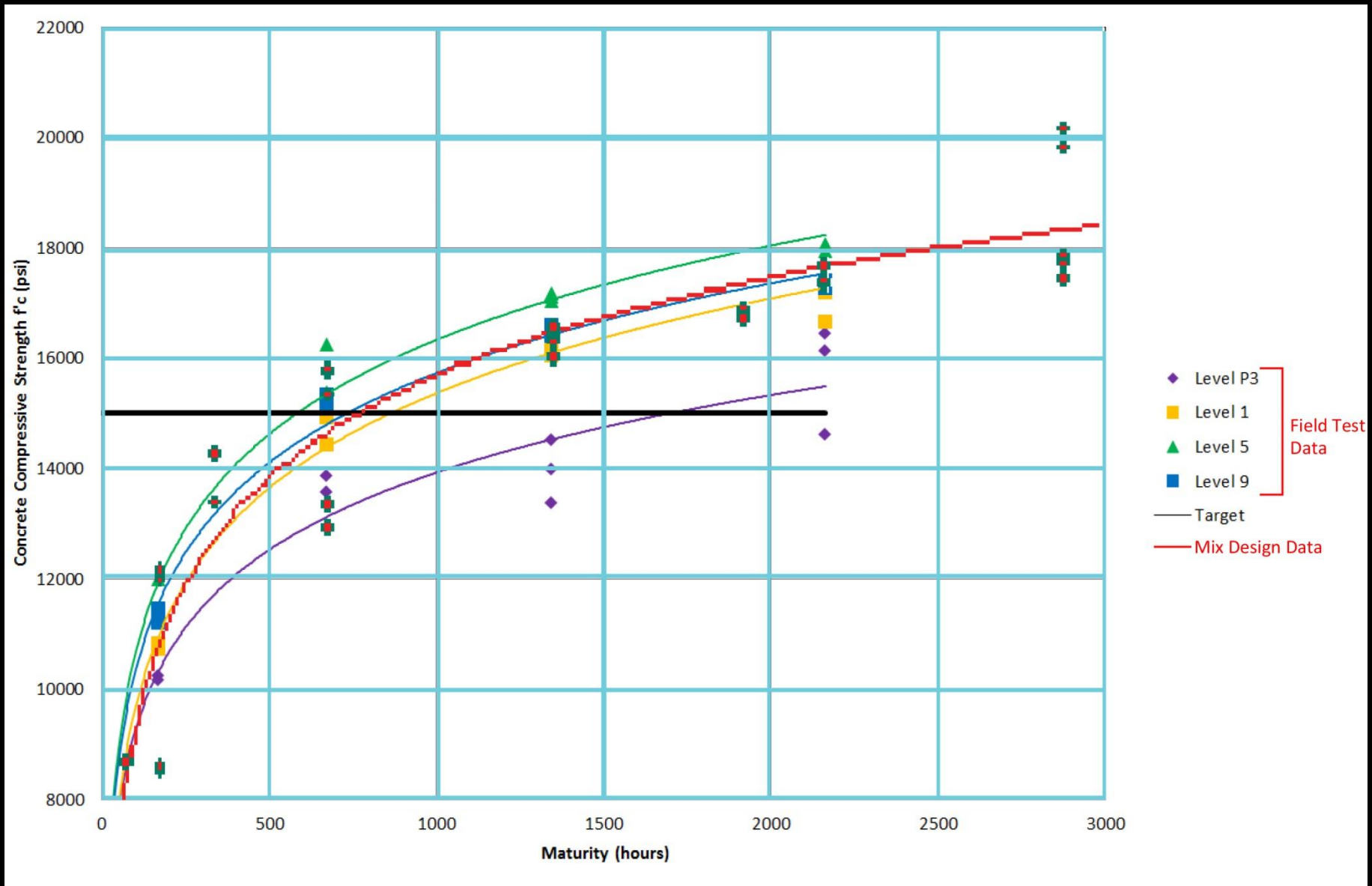
Mix Design Characteristics

- Cement Type I-II: 775 lb
- Fly Ash : 110 lb
- Silica Fume: 50 lb
- Slag: 140 lb
- Water: 305 lb

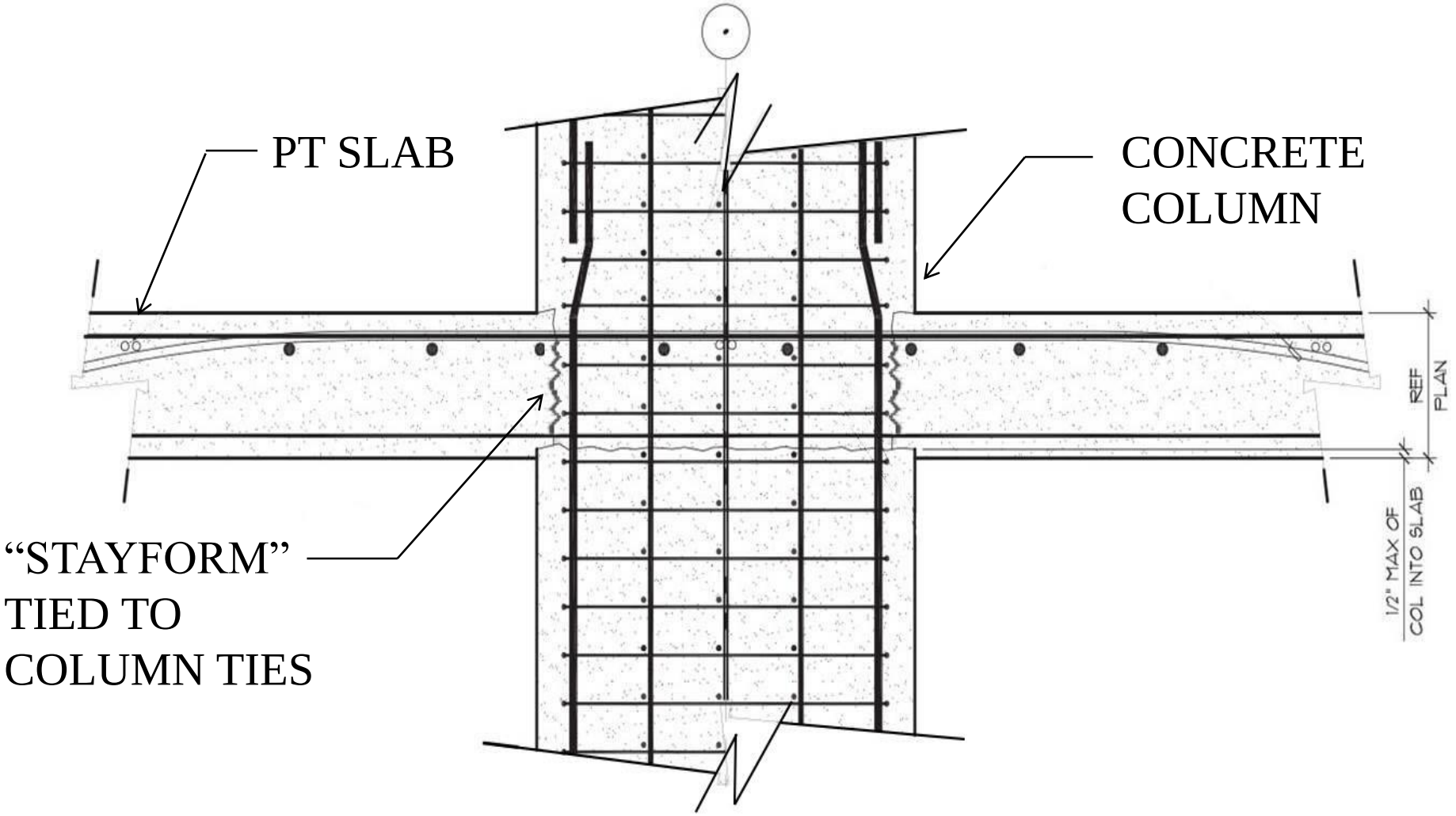
15 ksi Concrete Column Test Data



15 ksi Concrete Column Test Data



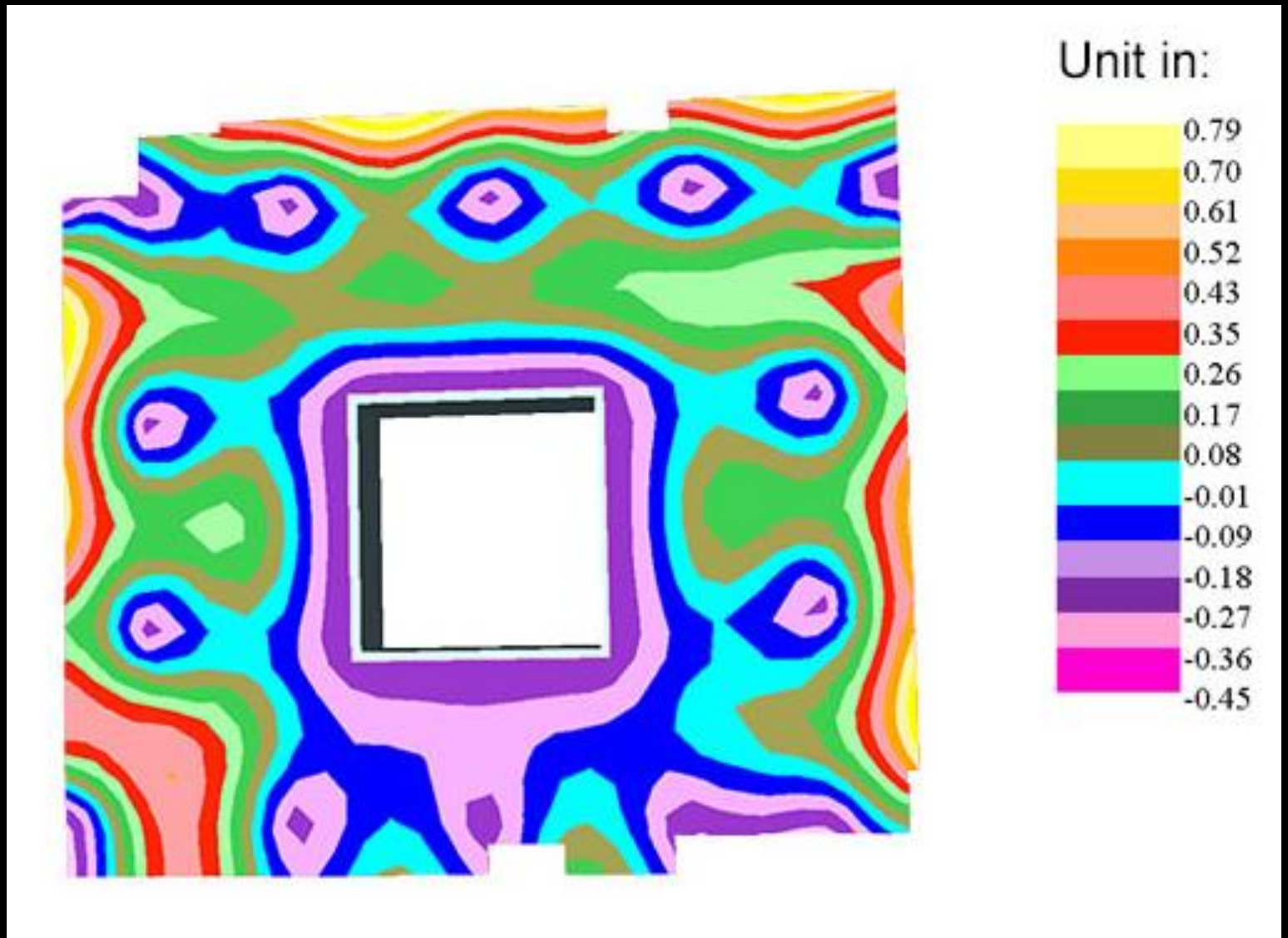
Column Concrete Placement at Slab



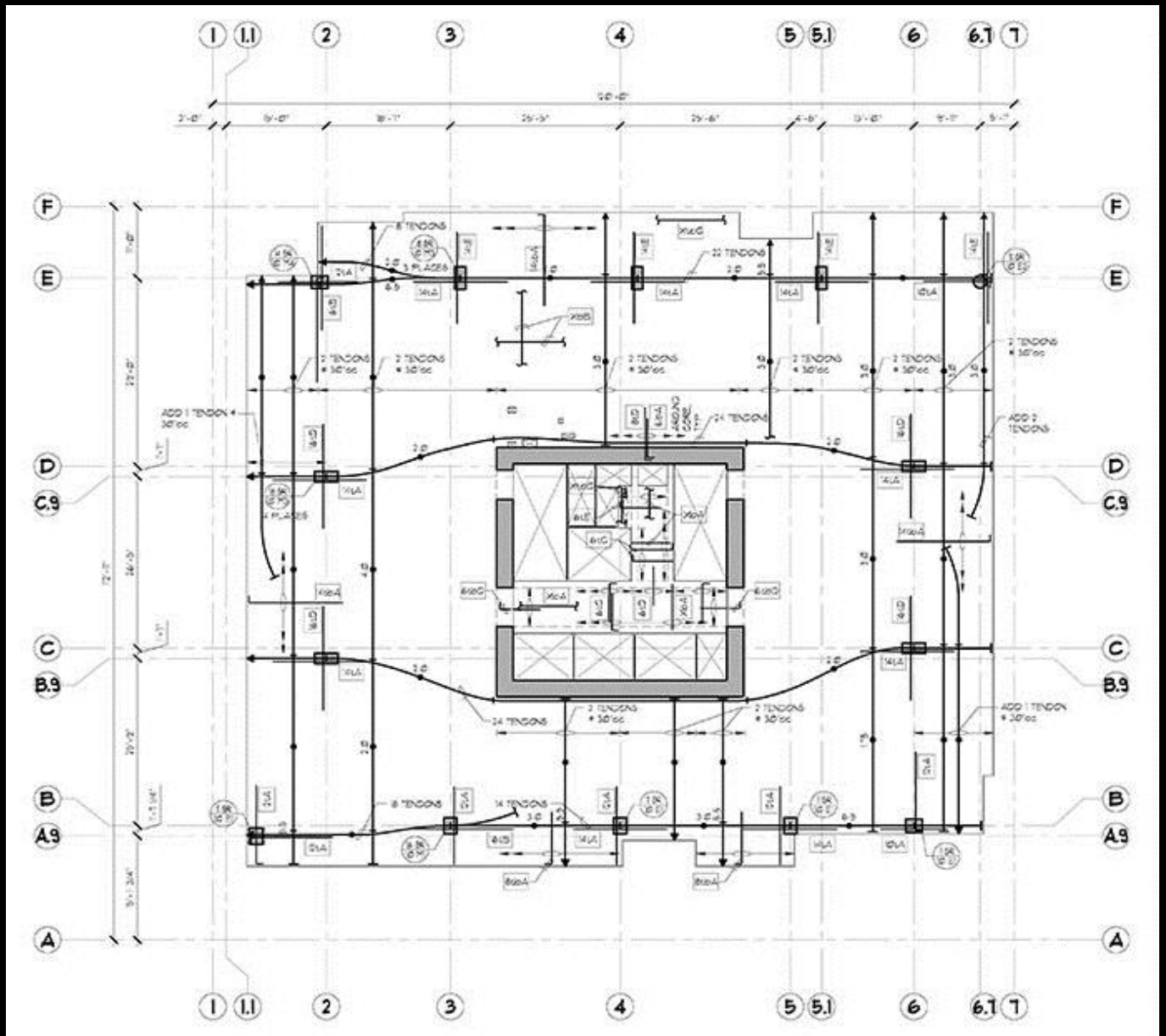
Post-Tensioning Advantages

- Thinner slabs & Shallower beams
- Longer spans & Fewer columns
- Reduced floor to floor height
- Better control of deflection & cracking
- Smaller columns & foundations
- Reduced seismic loads

TOWER SLABS - SERVICE DEFLECTION



TOWER PLAN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2
3
4
5
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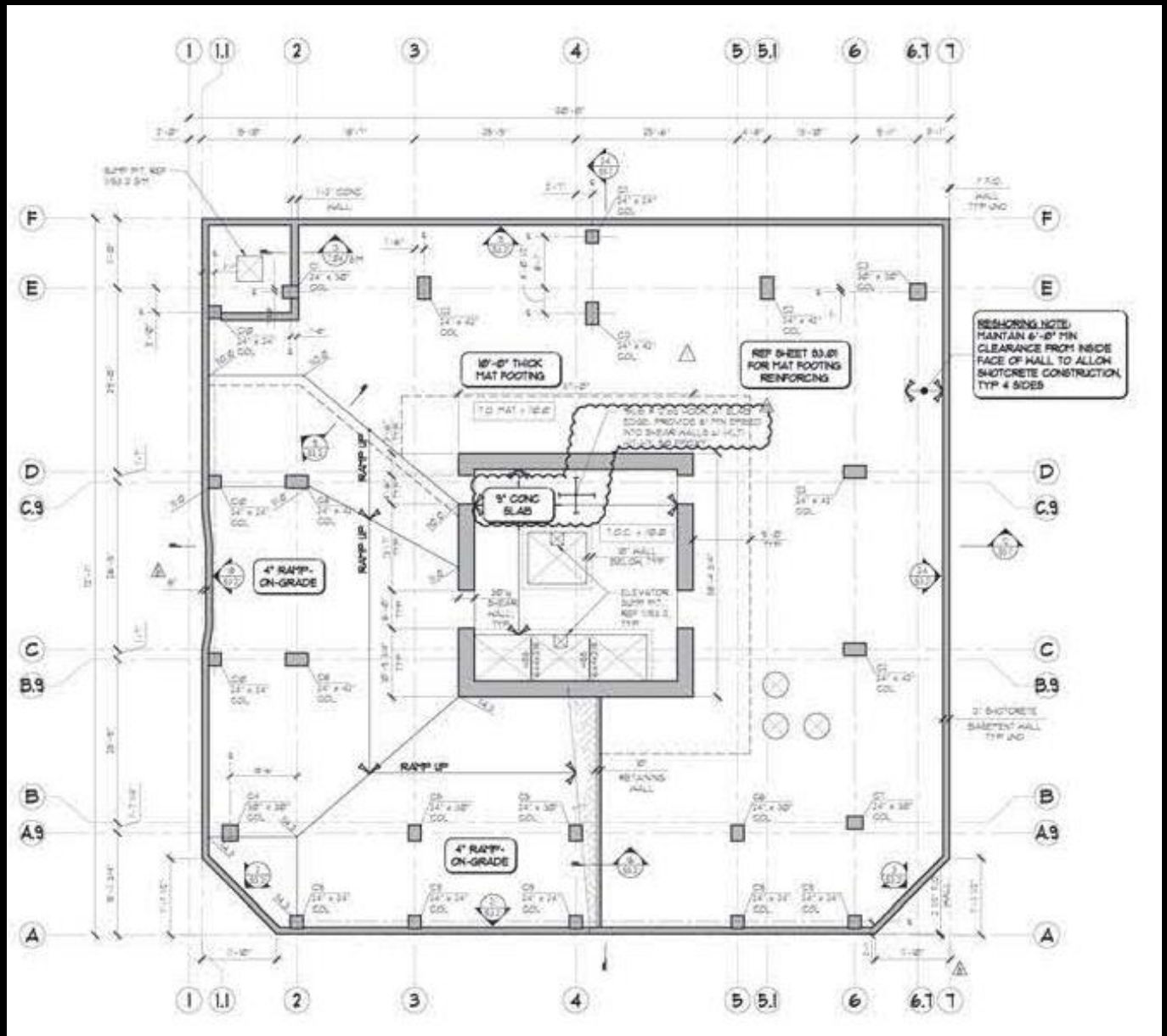
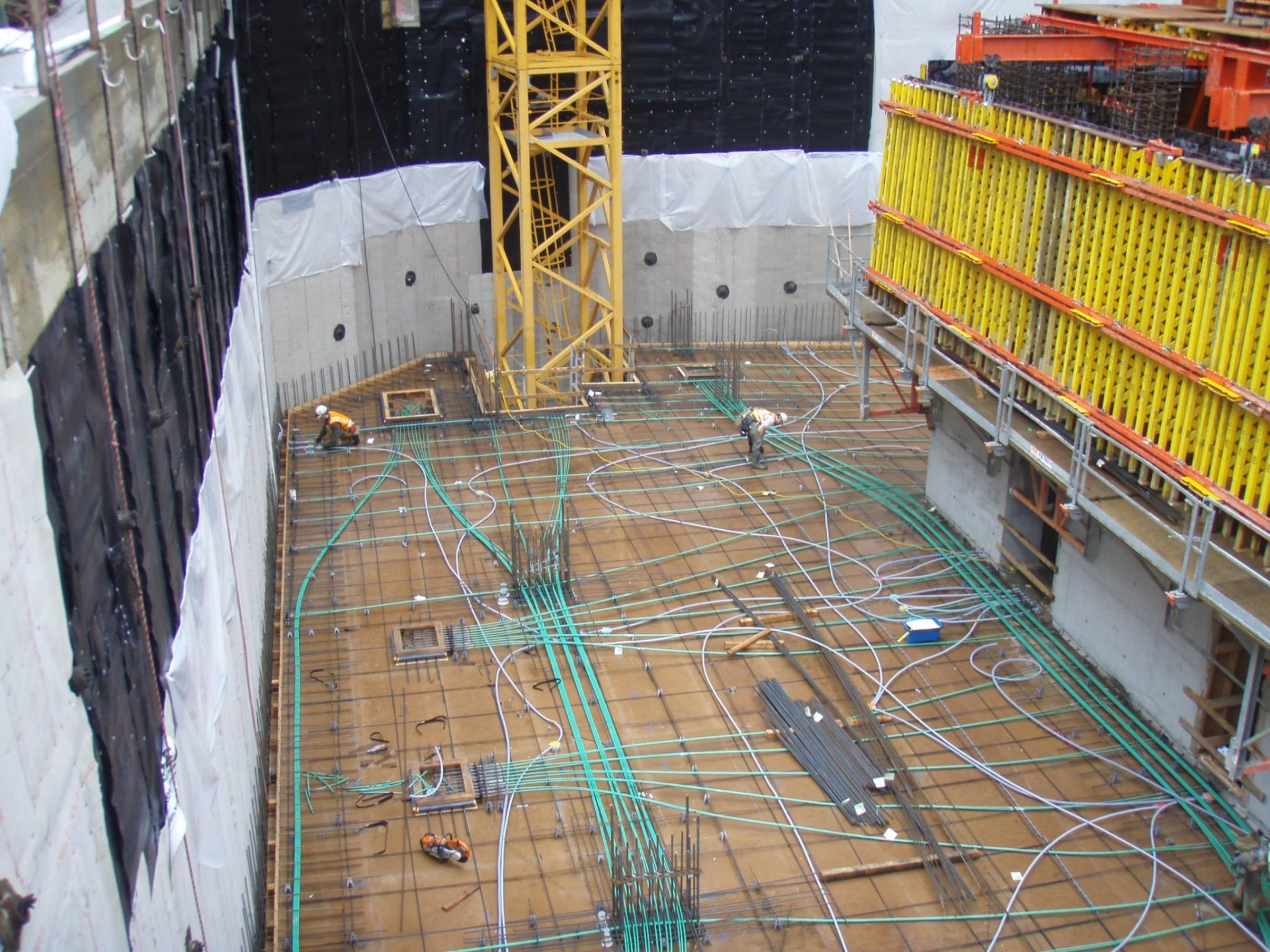
7
F
E
D
C.9
C
B.9
B
A.9
A
ADD 1 TENDON
ADD 2 TENDONS
24 TENDONS
22 TENDONS
8 TENDONS
14 TENDONS
4 PLACES

FOUNDATION PLAN




PACER
STEEL


NOW

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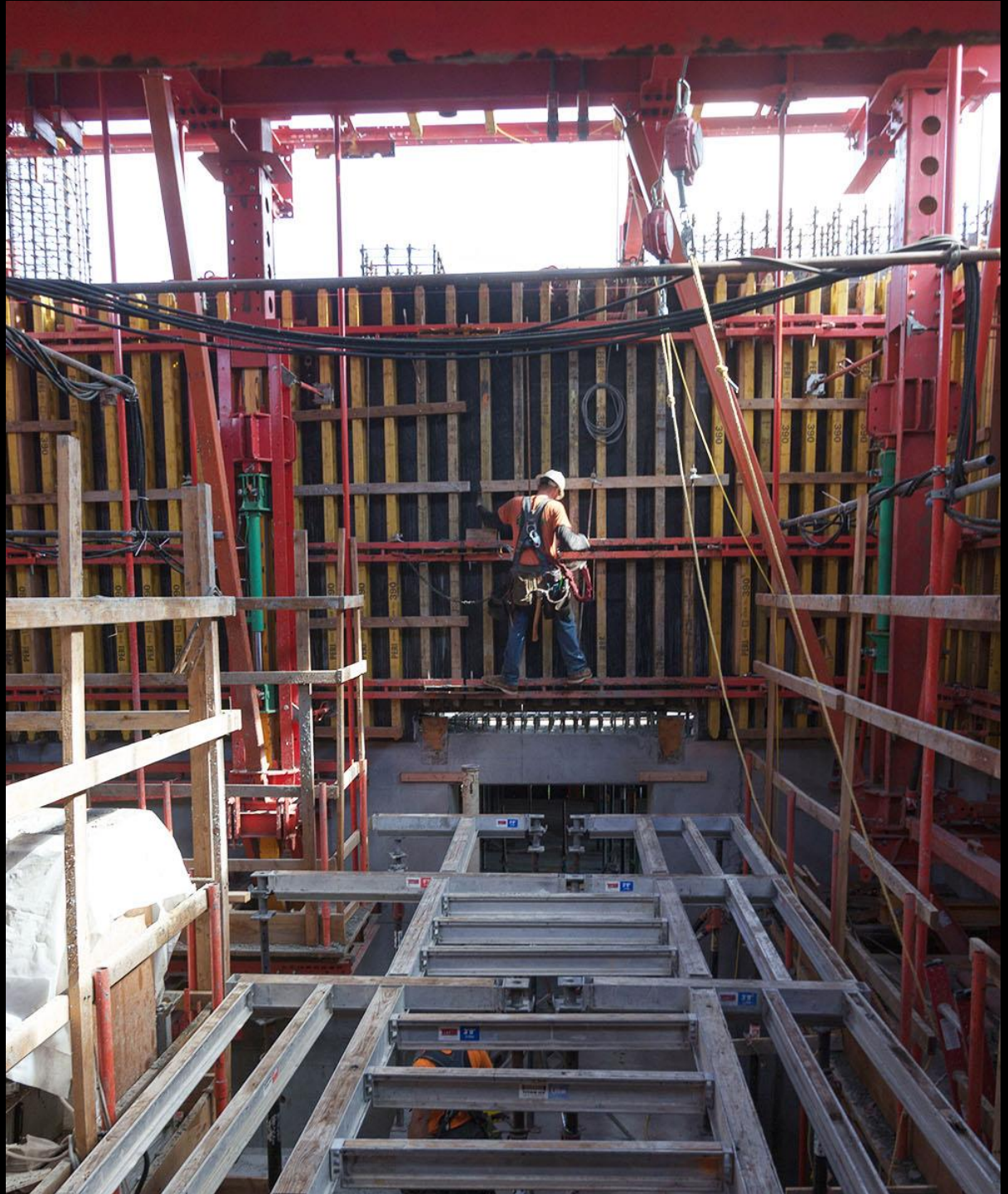

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