

# **SE University by SE Solutions, LLC**

by Brian Quinn, P.E. and Lisa Willard, P.E.

SERP – Research & Create Processes & Perform Internal Reviews

Sample of Items to Review

## **GENERAL CRITERIA**

**Self – weight:** what options have been selected & how are loads defined?

**Roof Live / Snow Load:** Using Snow or Roof Live Load?

**Live Load Reduction:** is Live Load Reduction being used?

### **Stability / 2<sup>nd</sup> Order Effects**

- describe how 2<sup>nd</sup> Order Effects being accounted for? P-Big Delta & P-Little-Delta.
- What was the impact on the loads/drift due to stability effects? (approx. % increase?)

### **Foundation System to be Used & Why?**

- Spread Footings? Soil Bearing Capacity?
- Other foundation systems? (piles, drilled piers, etc.)

## **CODES**

- Building Code?
- Steel Design Code?
- Concrete Design Code?
- Masonry Design Code?
- Timber Design Code?

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## LOADS

**GRAVITY; Print out diagrams (maps) of gravity loads used; surface/area, line, point, self weight.**

- Any unusual gravity loads to consider? (special file storage, etc.)
- How is self weight being accounted for?

**LATERAL; automatically generated by software? Criteria Used?**

- Wind Criteria? Wind Loads Each Level?
- Seismic Criteria? Seismic Loads Each Level?
  - How was the mass generated?
- Quick hand verification performed to determine if “in the ballpark”?
- How is Lateral Load Distributed?
  - Rigid Diaphragm Action?
    - What about Drag Struts & Axial Forces in Beams? (be careful as axial forces in beams often = 0 using rigid diaphragms)
    - Frame Shears? Sketch/print diagram showing forces in each frame at each level
    - How would you have distributed lateral force if doing “2d” frame analysis? Compare
  - “Flexible” Diaphragms?
    - How accounted for? Describe...
  - No Diaphragm? Nodal Loads used?
    - Describe how you came up with the distribution of lateral loads
- Deflected shapes under lateral loads reviewed?

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## **SERVICEABILITY**

### **Deflections**

- LATERAL criteria? façade materials used & tolerances for movements?
  - h/? any special drift requirements?
- GRAVITY (vertical) deflection criteria?
  - Floors:
  - Roofs
  - Spandrel (perimeter) beams?
    - Façade material and tolerance for vertical deflection?
    - Considered Sequence of concrete floor being poured vs. when façade installed?

### **Vibration**

- Any special vibration requirements?
- How checked? Methods?

### **Any Other Serviceability Issues to Consider?**

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## DESIGN

- Reviewed Design Criteria & Printed?
- Hand Calc. for a joist, beam, girder, column, foundation to confirm accurate?
- Reviewed floor plans “at a glance” to confirm “reasonable” & “constructable” designs?
  - Reasonable sizes?
  - Reasonable cambers?
    - i.e. NO W12x19’s spanning 28’ with 2-1/2” of camber (as an example)
  - Reasonable Reactions?
  - No W24’s framing to W16’s?
- Perimeter Columns – thought about all conditions maybe not fully accounted for in software?
  - “localized” wind effects?
  - How is cladding attached? Precast hung on exterior creating eccentricity?
- Member Unbraced Lengths?
  - How are members braced?
    - Does decking brace members? Precomposite vs. Postcomposite?
    - If cantilevers or negative moments, is bottom flange braced anywhere?
- Drag Strut Beams or Beams in Braced Frames / Moment Frames
  - Rigid diaphragms being used? What about axial force – considered?

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## **CONNECTIONS**

What is approach to Connection Design on this Project?

### **Gravity Members**

- If using RAM Steel, do you have “connection tables” set up for simplicity?

### **Lateral Members**

- Supplying loads to Steel fabricator?
- Designed by EOR?
- Checked for Doublers / Stiffeners? (automated in RAM Frame)