Steel Issues

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Provisions Development Items
Building Periods

• Comparison needed of various approaches for establishing building period for design
  – Parameters such as limit-state stiffness (as used in the direct analysis method) and second-order effects

• Assess building performance and drift prediction of various approaches

• Extended study beyond steel systems?
R=3 Systems

• $R = 3$ approach in SDC B and C is only allowed for steel systems
• Can this apply to composite systems?
• Be careful what you ask for...
Low and Moderate Seismic Design

• Current system design and detailing rules primarily developed for SDC D and above
• Systems in SDC A, B and C often default to R=3 design for steel structures
  – Silent on composite
• Reduced requirements along with design modified design rules may result in better performing systems than R=3 and reduced costs of high R factor designs.
  – Reserve Capacity approach (Hines, Fahnestock, et. al.)
SMF Connection Pre-qualifications

- SMF connection pre-qualifications do not specifically address some commonly used conditions
  - Top-of-column conditions (cap plates, e.g.)
  - Sloped and skewed conditions (limits needed for various connections)
Including Steel Diaphragms in New Procedure

• Steel diaphragms are not included in the alternate procedure included in the 2015 Provisions and ASCE 7-16.
  – Lack of specific testing and analysis data to justify various conditions

• Industry research planned to provide basis for developing Rs factors for various steel decked configurations
System Design Parameters For Metal Buildings

- Metal buildings are typically OMF in transverse direction, and either OCBF or R/C wall in longitudinal direction, depending on cladding system
- System doesn’t fit neatly into typical steel system definitions
  - Design often controlled by wind
  - Member buckling/LTB controls inelastic response
- P-695 studies underway to establish more realistic design methodology and design parameters
Columns in Orthogonal Frames

• General system concern for high R factor systems
  – Potential for simultaneous yielding leading to higher column demands than 100/30 approach in ASCE 7
  – AISC 341-16 requires consideration of this without specific guidance since limited research to date