Quality Assurance for Seismic Resisting Systems

2005 Infrastructure Systems Conference

Track 14, Session 14C
Wednesday 3 August 2005

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Presentation Outline

- Purpose
- Criteria Overview
- IBC Requirements
- UFC 3-310-04 Requirements
- Specification 01492
- Future directions
- Q & A
Purpose

- New Criteria (UFC)
- "Construction’s Job", "Not Applicable"
- Criteria confusion
- Circular references
- Roles & Responsibilities not clear
  - Owner
  - Building Official
  - Registered Professional
Criteria Overview

- UFC 1-200-01 (Gen. Bldg. Req.)
- UFC 3-310-01 (Structural Load Data)
- UFC 3-310-04 (Draft Seismic Design)
- IBC 2003
- ASCE 7-02
- UFGS 01492
UFC 1-200-01

- “Design: General Building Requirements”
- 20 June 2005 (supercedes 31 July 2002)
- Rescinds TI-809-04
- Directs UFC 3-310-01 for site data and bldg category
- Directs IBC 2003 for Seismic
- Tests and Inspections per IBC Chapter 17 as modified by UFC 3-310-04.
UFC 3-310-01

- “Structural Load Data”
- 25 May 2005
- Ss, S1 values for CONUS/OCONUS installations
- New SUG IV and Occupancy Category V
IBC 2003, Chap. 17

- **Section 1705** “Quality Assurance for Seismic Resistance”
- **Section 1707** “Special Inspections for Seismic Resistance”
- **Section 1708** “Structural Testing for Seismic Resistance”
IBC 1705, (Quality Assurance)

• QA Plan required for SDC C, D, E, F.
• Exception for
  – light-framed wood/steel
  – Reinforced masonry <25’, Sds<0.5g
  – Detached family dwelling
• QA Plan prepared by registered design professional.
IBC 1705, (Quality Assurance)

- QA Plan shall identify:
  - Seismic systems
  - Special Inspections
  - Type and frequency of testing
  - Type and frequency of inspections
  - Distribution of testing and insp reports
  - Structural observations and reports
IBC 1705, (Quality Assurance)

- Contractor shall acknowledge:
  - Requirements of QA Plan
  - Conformance to construction documents
  - Procedures for control within Contractor’s organization, the method and frequency of reporting, and distribution of reports.
  - Identification and qualifications of persons
IBC 1707 (Special Inspections)

- **Continuous:** “Full time observation of work... by an approved special inspector who is present in the area where work is to be performed.

- **Periodic:** “Part-time or intermittent observation of work... by an approved special inspector who is present in the area where work has been or is being performed.”
IBC 1707 (Special Inspections)

- Owner (or Agent) shall employ 1 or more special inspectors
- Special Inspector: “qualified person...for inspection of the particular type of construction requiring inspection”.
- UFC 3-300-10N: QC Specialist for NAVFAC projects
- Corps projects: Con-Rep, RE
- Contractor hires independent inspector
IBC 1707 (Special Inspections)

- Required for: SDC C, D, E, F
- **Steel**: Cont. Insp. of welding >5/16”.
- **Wood**: Cont. Insp. of gluing operations, Periodic Insp. of fastening components.
- **Cold-Formed**: Periodic Insp. of welding and fasteners.
- **Storage Racks**: Periodic Insp. of anchorage to floors.
IBC 1707 (Special Inspections)

- Architectural Components (SDC D, E, F)
- Periodic inspection of fastening of:
  - Exterior cladding
  - Interior & Exterior non-bearing walls
  - Interior & Exterior veneer
- Exceptions:
  - Buildings <30’ height
  - Cladding/veneer <5psf
  - Non-bearing walls <15psf
IBC 1707 (Special Inspections)

- Mech/Elec Components (SDC C, D, E, F)
- Periodic inspection of fastening of:
  - Emergency power systems
  - Piping carrying hazardous materials
  - HVAC carrying hazardous materials
- Equipment shall be labeled and tested
  - Shaking table
  - 3D shock tests
  - Rigorous analysis
IBC 1708 (Testing)

Masonry:

- **Non-essential facility**
  - Certificates of compliance used in construction.
  - Verification of f’m

- **Essential facility (SUG III, IV)**
  - Certificates of compliance used in construction.
  - Verification of f’m
  - Verification of mortar and grout materials
IBC 1708 (Testing)

- Reinforcing Steel: Certified mill test reports for steel used in:
  - Reinforced Concrete frames
  - Boundary elements of special reinforced concrete
  - Reinforced masonry shear walls

(For SDC C, D, E, F)
IBC 1708 (Testing)

- Structural Steel: as req’d by AISC 341.
- Mech/Elec Equipment
  - Test or analyze equipment and anchorage.
  - Submit certificate to design professional

(For SDC C, D, E, F)
UFC 3-310-04 (draft)

- “Seismic Design for Buildings”
- 24 June 2005 (draft)
- Modifications to IBC 2003, Chap 17
- Added Definitions for Personnel Roles
- Incorporates SUG IV
- Added Walk-thru inspections for SUG III, & IV
UFC 3-310-04 (draft)

- **Building Official**: Shall be designated by the Contracting Officer.
- **Owner**: Shall be designated by the Contracting Officer.
- **Registered Design Professional**: PE or SE

Who: Corps, DPW, Base CE, ACSIM?
When: Designate before or after contract?
UFC 3-310-04, (draft)

- Walk-thru inspections req’d for SUG III & IV with SDC D, E, or F.
- Conducted by registered professionals prior to commissioning.
- Report of seismic vulnerabilities.
- Facility manager will implement mitigation recommendations.
Section 01492

- “Special Inspection for Seismic-Resisting Systems”
- Currently references TI-809-04, FEMA 302
- Special Inspector employed by Contractor
- No definition of Owner, PE, Building Official
- QA Plan developed by Contractor
- Periodic Inspection at least 25% of total time.
- Includes extra items from ASCE 7
- Excludes items from IBC
Future Directions

- Review draft UFC (3-310-04).
  - Improve definitions for personnel.
- Update Spec 01492
  - Incorporate IBC & UFC
  - Master Spec
- Communities of practice (CoP).
  - Structural & Construction
Questions?

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