

Quality Assurance for Seismic Resisting Systems

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US Army Corps
of Engineers

Quality Assurance for Seismic Resisting Systems

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**
- **S_s, 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:**
 - **Bldgs <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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