



# 2009 IBC

## Special Inspections

### Understanding and Developing a Special Inspection Program

Based on the 2009 *International Building Code*<sup>®</sup> (IBC<sup>®</sup>)

# Course Description



This seminar presents the basic procedures required when starting up a special inspection program. The program formation process is described in a step-by-step fashion.

Also presented are the advantages of a special inspection program, pitfalls, commonly asked questions, and ways to monitor progress.

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# Goal



Participants will be able to successfully implement a special inspection program.

# Objectives



Upon completion, participants will be better able to:

1. Define a special inspection and its purpose.
2. Describe the benefits of a special inspection program.

# Objectives



Upon completion, participants will be better able to (*continued*):

3. Identify key stakeholders involved in the formation, administration and monitoring process.
4. Apply information on program formation when developing their own programs.

# Target Audience



- Architects
- Accessibility inspectors
- Building inspectors
- Building officials
- Contractors
- Engineers
- Plans examiners

# Overview



## Topics presented include:

- Introduction to special inspections.
- Structural tests and special inspections.
- Work requiring special inspections.
- Special inspections for seismic activity and wind.
- Designing a special inspection program.
- Becoming a special inspector.



# Module 1

# The Basics

# Three-tier Inspection Process



**(3) Structural Observation by  
Registered Design  
Professional (Section 1710)**

**(2) Inspection by Qualified Special  
Inspector (Section 1704)**

**(1) Inspection by Building Official (Section 110)**

# What are Special Inspections?



- Monitoring of materials and workmanship critical to the integrity of the building structure as dictated by the architect/engineer of record or building official.
- Review of the work to ensure that the approved plans and specifications are being followed and in compliance with relevant codes and ordinances.

# Quality Assurance and Quality Control



**Quality Assurance:** Administrative and procedural requirements to assure that construction is in compliance with the contract documents

**Quality Control:** Measures that ensure that certain critical structural or fire and life safety design features are incorporated into construction of the building structure.

# Why Conduct Special Inspections?



- High amount of structural failures causing incredible losses of money and human lives.



*2<sup>nd</sup> floor collapse  
(Building not  
occupied during  
earthquake)*

*Kaiser-Permanente Medical Center, Northridge, 1994*

- August 1982: Subcommittee examines structural failure causes.

# Why Conduct Special Inspections?



- Model code organizations develop special inspection provisions.
- Special inspections have saved lives and financial losses.

# Why Conduct Special Inspections?



Special inspections allow for:

- Prompt responses to contractor's field questions.
- Expediting corrective measures to address contractor errors.
  - Ideally, immediate correction/no written report.

# Why Conduct Special Inspections?



Special inspections allow for:

- Helping build and maintain team communication and working relationships with the contractor.
- Minimizing misinterpretation of the intent of the structural design, building code or ordinance.

# Who Benefits?



## Public

- Receive a better product.

## Owners

- Construction continues with appropriate inspections.

## Contractor

- Can schedule inspections when building department is closed.

# Who Benefits?



## Building Departments

- Efficiently communicate required corrections or owner-directed changes before they are built into the structure.
- Meet intent of Code—Life Safety. (IBC Section 101.3)

# Major Players



- Building Official/Department
- Special Inspector
- Contractor/Builder
- Approved Agencies
- Registered Design Professional

# Roles and Responsibilities Building Official/Department



- Review special inspection work with owner, registered design professional, contractor.
- Review project documents and special inspection work with special inspector.
- Monitor/audit special inspection activities.

# Roles and Responsibilities Building Official/Department



- Review special inspection reports.
- Perform regular inspections at job site.
- Issue final acceptance/certificate of occupancy.
- Ultimate responsibility for Public Safety.

# Roles and Responsibilities Special Inspector



- Review construction documents.
- Attend preconstruction meeting.
- Establish communication system.
- Signify presence at job site.
- Observe all work requiring special inspections.
  - Continuous.
  - Periodic.

# Roles and Responsibilities Special Inspector



- Perform or observe required field testing.
- Identify nonconforming work.
- Report nonconforming work.
- Provide periodic inspection reports.
- Provide final inspection report.

# Roles and Responsibilities Agents of Special Inspector



- Review construction documents.
- Attend preconstruction meeting.
- Establish communication system.
- Signify presence at job site.
- Observe all work requiring special inspections.

# Roles and Responsibilities Agents of Special Inspector



- Identify nonconforming work.
- Report nonconforming work.
- Provide periodic inspection reports.
- Provide final inspection report.

# Roles and Responsibilities Contractor/Builder



- Cooperate with special inspectors, building officials and the registered design professional.
- Attend preconstruction meeting.
- Coordinate special inspector activities.

# Roles and Responsibilities Registered Design Professional



- Identify special inspection requirements.
- Coordinate special inspection activities.
- Takes part in submittal of documents.
- Preconstruction meeting chair.
- Outlines duties of the special inspector.

# Roles and Responsibilities Registered Design Professional



- Make periodic site visits.
- Specify tests and testing procedures (Quality Assurance).
- Documents plan revisions to building official.
- Designate “Alternative” registered design professional.

# Roles and Responsibilities

## Owner



The **owner** or the **registered design professional** in responsible charge (designated as owner's agent) employs the special inspector(s) to inspect the work identified as requiring special inspection.  
(IBC Section 1704.1)



# **Module 2**

## **Designing a Special Inspection Program**

### ***(Step-by-step)***

# Important



- It is important to note that these methods to setting up a special inspections program are not required by the Code, however...
- The steps and methods indicated are recommendations meant to develop a program that satisfies the intent of the Code.
- Each individual building department must elect the methods that are most effective and beneficial for its own situation in administering and enforcing the special inspection provisions of the 2009 IBC.

# Group Effort



Establishing and maintaining a successful special inspection program requires a strong group effort from everyone involved.

# Staffing



- In order for a program to be effective, both office and field personnel are needed.
- This team effort helps ensure that approvals are documented with the listing agencies and their personnel.

# Efficiency



Special inspections must be performed by personnel who have a **detailed understanding** of the construction sequence and code compliance issues.

# Responsibilities



## Owner

- Hires and pays for the special inspection agency.

## Owner's Agent

- Coordinates inspections as the project progresses.

## Contractor

- Schedules the special inspection agency.

# Responsibilities



The special inspection agency and the special inspector ensure that all inspections are conducted as shown on the approved plans and in accordance with Code requirements.

# Ensuring Competence



- Formation “team” develops eligibility criteria, requirements and procedures.
- Building department **may require** special inspectors to obtain and maintain **national certification**. (ICC Inspection Certification is most recognized form of certification.)

# Ensuring Competence



- A level of demonstrated experience may be required to obtain approval.
- Special inspection agencies and the inspectors must be audited by the building department inspections division.

# Approval Criteria



- Set by building official/department.
- Minimum experience, education and/or certification requirements are set.

# Approval Criteria



- Special inspection agency submits an approval request with the appropriate supporting documentation (resume, certifications, diplomas, etc.).
- These qualifying documents are compared to the minimum standards.

# In a Nutshell



There are many forms, applications, guidelines and procedures that must be created, copied and/or used when creating a special inspection program.

This is all done by the special inspection program formation team.

# Preconstruction Meeting



## Preconstruction conference:

- Required prior to the start of any major project.
- Initiated by the General Contractor.
- Useful in achieving cooperation among all parties involved.
- First line of project communication.

# Preconstruction Meeting



Participants are provided with:

- An outline of all required actions and documentation, including responsibilities of each participant.
- Issues that may pose a challenge to the special inspection or building process should also be addressed.

# Who Attends



- Engineer of record.
- Architect of record.
- Project superintendent.
- Building department.
- Fire department.
- Sanitation district.

# Who Attends



- Public works.
- Regional flood control.
- Water District.
- Any utility company involved, e.g., Electric Power, Natural Gas.
- Representatives of all subcontractors and materials suppliers.

# In General



- The building department and building official bear most of the responsibility for accepting the special inspection procedures, guidelines and paperwork.
- Once special inspection procedures have been created and established, it is up to the other parties involved to adhere to and use them.

# Section Focus



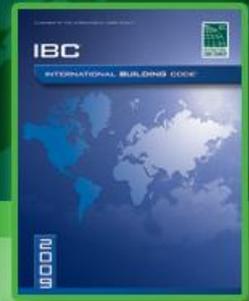
The majority of the rest of this section focuses on developing a special inspections program and is devoted to setting up the necessary procedures, guidelines, and paperwork that make the entire process as effective and efficient as possible.

# Seven Steps to a Special Inspection Program



1. Establish qualification and quality manual requirements for special inspection agencies.
2. Review and approve inspection agencies.
3. Prescribe report requirements and given to agencies.
4. Set up procedure for issuing special inspection agreements to inspection agencies.

# Seven Steps to a Special Inspection Program



5. Develop a report review procedure.
6. Implement the program.
7. Verify the special inspector's work history.

# NOTE



There are model forms for each step contained in the appendix of your manual. Since these forms serve as good references, we will discuss the paperwork in each step in an overview fashion. Only sections of great importance will be discussed in greater detail.

# Step 1: Establish Agency Qualifications and Quality Assurance Manual Requirements



- Establish **qualifications** and the **quality assurance manual** requirements for special inspection agencies.
- Quality Assurance (QA) is a plan of quality control developed by the design professional prior to the beginning of work.
- IBC Section 1704 (Tables) is a form of minimum requirements for a QA plan.

# Keep in Mind



This section contains:

- Suggestions on what should be included in the paperwork that establishes qualifications and quality manual requirements.
- Individual building departments will choose the criteria that best suit their needs.

# Quality Assurance Manual Guidelines Form



- Purpose Statement
- Agency Organization
- Agency History
- Charts and Functions
- Technical Services
- Restrictions
- Competence

# Quality Assurance Manual Guidelines Form



- Responsibilities and consequences
- Material resources of agency
- Quality assurance plans
- Agency approval guidelines
- Procedure

# Purpose Statement



## Provide information

- For receiving and approving listings and preparing the Quality Assurance Manual.

## Describes agency responsibilities

- For Quality Assurance Inspection and/or testing agencies.

## Each agency seeking approval

- Should submit a Quality Control Manual to the building department for review and acceptance.

# Agency Organization



## Description of the organization

- Complete legal name and address.

## Names and positions

- Principal owners, officers, and directors.

Agency's managerial structure and principal personnel.

## All major divisions or departments

- Locations and primary functions.

# Agency Organization

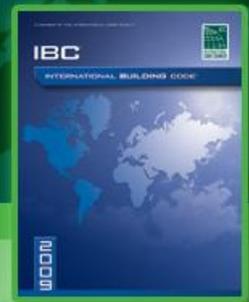


- All branch offices of the agency, and the principal officers and directors of those offices shall be included when approval is sought for those offices.
- External organizations, organizational components and their functions, which are utilized for significant supporting technical services, shall be included.

# Organization History

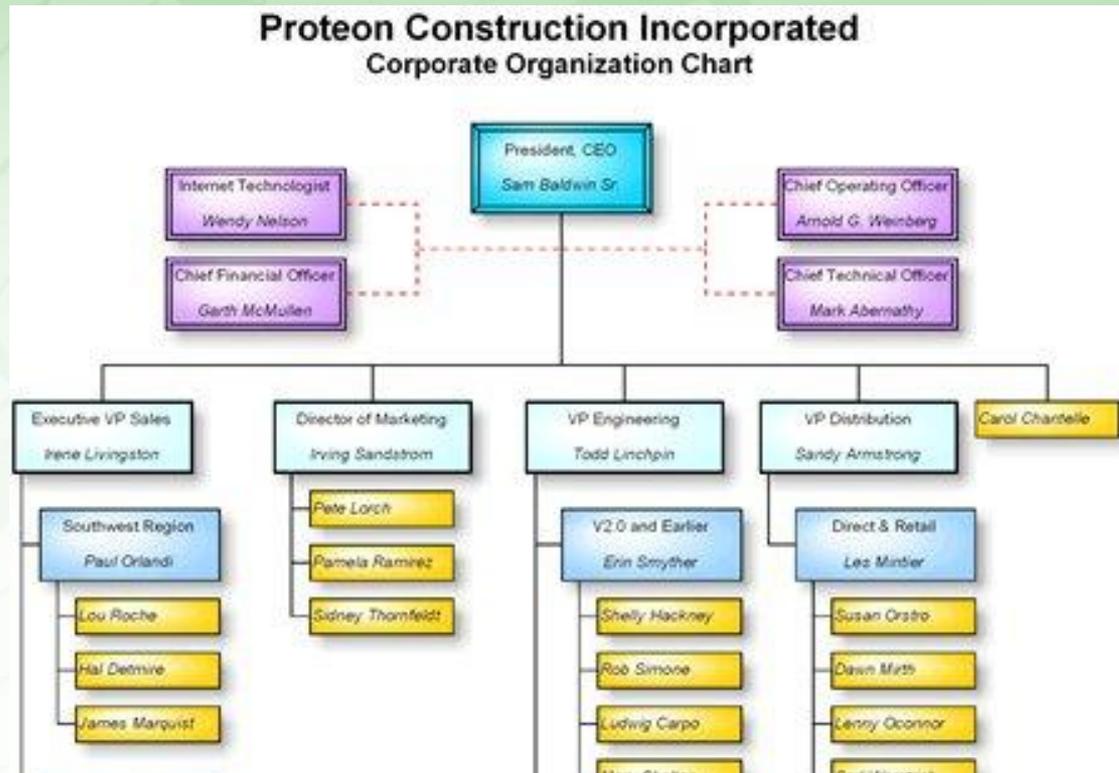


A brief history of the agency and a general description of the types of users of the organization's services shall be provided.



# Charts and Functions

The agency's organizational structure, operational departments, supports departments and services shall be included.



# Technical Services



A list of all proposed:

- Special Inspection, engineering, and testing services that the agency may wish to provide.

Each inspection and/or testing service must:

- Be related to specific testing and sampling procedures and/or inspection criteria.

# Restrictions



- Any restrictions placed on inspectors or agencies should be noted.
- These restrictions should include any area in which special stipulations are placed on agencies or inspectors.

# Agency Approval Guidelines



This form should include:

- Purpose.
- Scope.
- Abbreviations and acronyms.
- Definitions.

# Agency Approval Guidelines



This form should include (*continued*):

- References.
- Responsibilities.
- Procedures.
- Records.
- Attachments.

# Procedure



Should include the format in which approval requests are to take and the required experience needed from personnel wishing to inspect.

# Procedure



Some examples are as follows:

- Reinforced concrete.
- Structural steel.
- Smoke control systems.
- Special moment-resisting concrete frames.



## Inspector Qualification Guideline Sample

- 7.1 Reinforced concrete: *[JURISDICTION]* Administrative Code *[CODE]*. Special Inspection Item *[#]*. Current *[CERTIFICATIONS, CREDENTIALS]* and ACI Grade I or ACIU Grade II. In addition, documented experience according to one of the following:
- a. Inspector: Two-years experience
  - b. Graduate engineer: One-year experience
  - c.\* Professional engineer: One-year experience

*(See Workbook Appendix A)*

# Step 2: Evaluate and Approve Inspection Agencies and Special Inspectors



Reviewing of and subsequent approval or rejection of inspectors.

Three main forms.

- See Workbook Appendix B to review sample forms.
- If all requirements are satisfactorily met, the agency can be approved.

# Step 3: Prescribe Report Requirements and Give to Agencies



- In order to monitor special inspections and to ensure that they are being done properly and in accordance to design documents, frequent reports are required.
- This entails describing the reports to be submitted and the criteria that determine if a report is acceptable and properly formatted.

# Report Requirements Form



All information concerning the format of reports and what is considered acceptable or not acceptable should be described in the following sections:

- Reports
  - Daily Report.
  - Weekly Report.
  - Discrepancy Notice.
  - Correction Report.
- Final Report
  - Special Inspection Final Report Form.

# Don't Forget



The model forms in the Workbook, Appendix C of your manual serve as great guides.

- See Appendix C to review sample forms.

# Step 4: Issue Special Inspection Agreements



## Set up the procedure

- Issuing special inspection agreements to inspection agencies.
- Formal document stating that the owner or owner's agent has hired an agency to perform the stated special inspections.
- This document should include the terms of the agreement and clarify what the agency is expected to do.

# An Example



On this **[DATE]** the **[JURISDICTION]** County Building Department acting through the **[NAME]** as the owner or owner's agent for the construction and/or alteration of a structure/building known as **[NAME/ ADDRESS OF BUILDING]** for work described as **[TYPE OF BUILDING]** with inspection or testing services being performed by **[AGENCY]** an approved quality assurance/testing agency in the County of **[COUNTY NAME]** State of **[STATE NAME]**, agree to the following:

See Workbook *Appendix D* to review sample forms.

# Special Inspection Agreement



States the following:

- Areas needing special inspection have been identified.
- Owner or owner's agent is responsible for hiring the special inspector and fund all testing.

# Special Inspection Agreement



- The building official shall determine when special inspection or testing services are to commence and terminate based on the scope and progress of work.
- No testing services will be performed by the building official or building department.

# Addendum to Special Inspection Agreement



- The areas that are to be inspected by the agency are detailed in the addendum to the special inspection agreement.
- This section also defines the stipulations that must be met prior to final inspection.

# Addendum to Special Inspection Agreement



- Outlines all of the special inspections that are to be performed.
- When and where special inspections are to be completed are specified in the addendum as well as any pertinent description of the inspections to be done.

# For Example



16. STRUCTURAL STEEL: Fabrication and erection of structural steel members and assemblies.

Location:

*(See Workbook Appendix D)*

# Step 5: Develop a Report Review Procedure



In order to ensure that special inspections are being performed as required and performed in a satisfactory manner, it is necessary to perform audits and to review the reports that are submitted.

# Forms Involved



- Statement of Audits.
- Technical guidelines quality assurance inspection / testing agency project audits.
- Field Operations Audits.
- Field Testing Audits.

# Audits



## All parties involved

- Should be made aware that random audits will occur during construction.

## Notifying provides several benefits

- Maintain a high level of quality.
- Parties more compliant since the audit will not be a total surprise.
- Auditing process is a quality control measure and NOT a sign of lack of trust.

# Quality Assurance Inspection Testing Agency Project Audits



The technical guidelines quality assurance inspection/testing agency project audits form serves as the documentation of the audit and review process.

# Quality Assurance Inspection Testing Agency Project Audits



Form should include:

- Special Inspection Verification
- Verification Objectives
- Special Inspection Standards
- Inspector/ Inspection Responsibilities
- Verification Procedure
- Report of Verification Findings
- See Workbook Appendix E to review sample forms.

# For Example



Item No.	Item Reviewed	Yes	No
15.	When unsatisfactory test results are obtained for materials which have been utilized in construction; has the engineer of record and the special inspector approved such action?	_____	_____

# Verification Checklist



These questions reflect the expectations of the special inspector and/or agency.

# Field Operations Audits



## Audits of field operations:

- Verify that inspectors are following the guidelines that have been stipulated by the jurisdiction.

## Includes:

- Reports as well as anything else that might demonstrate compliance or noncompliance by inspectors.

# For Example



Do all daily reports use a proper method of identifying the locations of the areas inspected, i.e., grid line numbers, letters, written description?

Do the reports also reference the section and details that graphically show the items being inspected?

# Field Testing Audits



- Forms are used to evaluate testing technician performance in the field.
- Contains a series of questions for each test that is being audited that can be used to verify the quality of work being performed by the testing technician.

# For Example



## Sampling Fresh Concrete

- Has the time between first and final portions of sample been 15 minutes or less?
- Portion samples remixed with a shovel to uniform consistency?

# Step 6: Verify Special Inspector's Work History



In this step, all of the job tasks that are to be performed by special inspectors are listed.

# Job Tasks



The job tasks are classified by the type of work being done, such as:

- Concrete.
- Masonry.
- Steel and welding.
- Any other work requiring special inspection.

# For Example



## VII. Masonry Grouting and Capping

- 1. Grout spaces:** Verify that spaces are correctly sized and clean, cleanouts are closed after inspection and grout barriers are in place before grouting.
- 2. Dry packing:** Verify proper application of dry packing.

See Workbook Appendix F to review sample forms.

# Step 7: Implement the Program



What has been done?

1. Establish
  - Qualification and quality manual requirements for special inspection agencies.
2. Review and approve
  - Inspection agencies.
3. Prescribe report requirements
  - Give them to agencies.

# Step 7: Implement the Program



What has been done? (*continued*)

4. Set up the procedure for
  - Issuing special inspection agreements to inspection agencies.
5. Develop
  - Report review procedure.
6. Verify
  - Special inspector's work.

# Finished!



At this final step, the building should be complete and all inspections and reports are finished.



# **Module 3**

# **Structural Tests and**

# **Special Inspections**

# **(IBC Chapter 17)**

# Structure of Chapter 17



Chapter 17 covers structural tests and special inspections:

- Section 1702 – Definitions
- Section 1703 – Approvals
- Section 1704 – Special Inspections
- Section 1705 – Statement of Special Inspections
- Section 1706 – Special Inspections for Wind Requirements
- Section 1707 – Special Inspections for Seismic Resistance

# Structure of Chapter 17



Chapter 17 covers structural tests and special inspections: *(continued)*

- Section 1708 – Structural Testing for Seismic Resistance
- Section 1709 – Contractor Responsibility
- Section 1710 – Structural Observations
- Section 1711 – Design Strengths of Materials
- Section 1712 – Alternative Test Procedure

# Structure of Chapter 17



Chapter 17 covers structural tests and special inspections: (*continued*)

- Section 1713 – Test Safe Load
- Section 1714 – In-situ Load Tests
- Section 1715 – Preconstruction Load Tests
- Section 1716 – Material and Test Standards

# Section 1702

## Definitions



- Approved Agency
- Approved Fabricator
- Certificate of Compliance
- Inspection Certificate
- Mark
- Main Wind-force-resisting System
- Special Inspection
- Continuous Special Inspection
- Periodic Special Inspection
- Structural Observation

# Approved Agency Requirements



- **Independency** – No conflict of interest.
- **Equipment** – Adequate to perform required tests.
- **Personnel** – Experienced/educated in conducting, supervising and evaluating tests and inspections.

# Section 1704

## Special Inspections



- Performed in addition to that performed by jurisdiction building inspector.
- Special inspector to be employed/paid by the owner or registered design professional—NOT the contractor!  
(IBC Section 1704.1)

# Key Aspects of Special Inspections



- Applies principally to “structural framing” system of the building.
- Special inspector is to be qualified and demonstrate qualifications for the type of construction requiring special inspection by the building official.

# Section 1704.1.1

## Statement of Special Inspections



The applicant shall submit a statement of *special inspections* prepared by the *registered design professional in responsible charge* in accordance with Section 107.1 as a condition for issuance. This statement shall be in accordance with Section 1705.

# Section 1704.1.1

## Statement of Special Inspections



Statement of special inspections **not** required for wood structures designed in accordance with certain conventional practices:

### Exceptions:

1. A statement of *special inspections* is not required for structures designed and constructed in accordance with the conventional construction provisions of Section 2308.
2. The statement of *special inspections* is permitted to be prepared by a qualified person *approved* by the *building official* for construction not designed by a *registered design professional*.

# Registered Design Professional



## Responsibilities (IBC Section 1705.1):

- Part of the submittal documents.
- Designates special inspection work.
- Names individuals/firms to perform special inspections.
- Outlines the duties of the special inspector.

# Building Official



## Responsibilities:

The building official gives or denies the final approval of the special inspection program.

# Section 1704.1.2 Reports



- Keep records of inspections.
- Furnish reports to building official, registered design professional.
- Indicate work inspected.
- Note discrepancies.

# Special Inspector



## Requirements:

- Review structural details and perform inspections to verify compliance with approved construction documents.
- Keep accurate records of inspections.
- Furnish inspection reports to the building official and registered design professional.

# Special Inspector



## Requirements: *(continued)*

- Notify the contractor of observed discrepancies needing corrections.
- Notify the building official and registered design professional of **UNCORRECTED** discrepancies.
- Submit a final inspection report to building official and registered design professional.

# Section 1704.2

## Inspection of Fabricators



- Special inspection is not limited to the work performed on the construction project. There may be requirements to special inspect work that is performed at the fabricators shop.
- For structural load-bearing members and assemblies, offsite work performed for project requires inspection.

# Remember



Special inspection is **REQUIRED** for shop-fabricated items when:

- Members are structural load-bearing.
- Assemblies are structural load-bearing.

# Exception



Fabricator has an approved independent inspections or quality control agency to conduct periodic in-plant inspections that ensure conformance with the agency's approved quality control program.

# Section 1704.2.2

## Fabricator Approval



Fabricator approval is to be based on an approved special inspection agency review of:

- Written procedural and quality control manuals.
- Periodic auditing of fabrication practices.

# Definition of Approved Fabricator



An established and qualified person, firm or corporation approved by the building official pursuant to Chapter 17 of this code.

# Definition of Fabricated Item



Structural, load-bearing or lateral load-resisting assemblies consisting of materials assembled prior to installation in a building or structure or subjected to operations such as heat treatment, thermal cutting, cold working or reforming after manufacture and prior to installation in a building or structure. Materials produced in accordance with standard specifications referenced by this code, such as rolled structural steel shapes, steel-reinforcing bars, masonry units and wood structural panels, or in accordance with a standard, listed in Chapter 35, which provides requirements for quality control done under the supervision of a third-party quality control agency shall not be considered “fabricated items.”



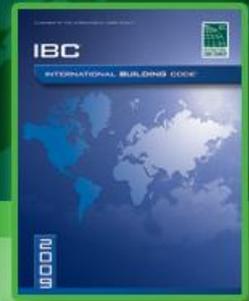
- Fabricated items do NOT include materials produced in accordance with “Referenced Standards.” (IBC Chapter 35)
- Special Inspection is not required for work performed by an approved fabricator.

# Required Conditions



- Approved Special Inspection agency is to notify the building official of any change in workmanship and quality control.
- Fabricator to submit “Certificate of Compliance” to the building official at the completion of shop-fabricated items.

# Required Conditions



Special inspections are **NOT** required for:

- Minor work when approved by the building official (IBC Section 1704.1).
- Construction not required to be designed by a registered design professional (IBC Section 1704.1).
- Occupancies constructed in accordance with the IRC.
- Work performed by an “approved fabricator.” (IBC Section 1704.2.2)

# Section 1704



- TYPES OF WORK REQUIRING SPECIAL INSPECTION



# Work Requiring Special Inspection Overview



Section 1704.3	Steel Construction
Section 1704.4	Concrete Construction
Section 1704.5	Masonry Construction
Section 1704.6	Wood Construction
Section 1704.7	Soils
Section 1704.8	Driven Deep Foundations
Section 1704.9	Cast-in-place Deep Foundations
Section 1704.10	Helical Pile Foundations

# Work Requiring Special Inspection Overview



- Section 1704.11 Vertical Masonry Foundation Elements
- Section 1704.12 Sprayed-fire-resistant Materials
- Section 1704.13 Mastic and Intumescent Fire-resistant Coatings
- Section 1704.14 Exterior Insulation and Finish Systems (EIFS)
- Section 1704.15 Special Cases
- Section 1704.16 Smoke Control

# Section 1704.3

## Steel Construction



- Discusses the types of work requiring special inspections in regards to steel construction.
- Has been divided into several subsections concerning welding and bolting.

# Section 1704.3.1

## Verifying Welding Compliance



Special inspections are required for steel construction in order to verify welding compliance with:

- AWS D1.1.
- AWS D1.3.
- See Table 1704.3 for other referenced standards.

# Exceptions



The steel fabrication process is performed without welding, thermal cutting or heating operation. The fabricator is to submit a detailed procedure for material control (material specification, grade and mill test reports).

# Exceptions



Periodic special inspection (while work is in progress) is permitted for welding under the following conditions:

- Single pass fillet welds  $\leq 5/16$  in.
- Floor and roof decks.
- Welded studs.
- Welded sheet steel.
- Stair and railings.

# Exceptions



Welding done in an approved fabricator shop is also exempt from special inspection (See “Exception,” IBC Section 1704.2.1.)

# Inspector Requirements



The following criteria are required for the approval of special inspectors with respect to welding:

- Welding inspectors are to be certified.
- AWS D1.1 to be the basis for welding inspector qualification.

# Welding Processes



- SMAW - Shielded Metal Arc Welding
- FCAW - Flux Cored Arc Welding
- GMAW - Gas Metal Arc Welding
- SAW - Submerged Arc Welding

**GMAW except Short Circuiting Transfer Method**

# QUALIFICATION



- Welding personnel
- Welding procedures



# Welder Qualifications



- Welder
- Welding Operator
- Tack Welder

# Qualification Responsibility

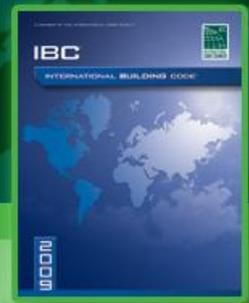


- Each manufacturer or contractor shall be responsible for the qualification of welders, welding operators and tack welders, whether the qualification is conducted by the manufacturer, contractor, or an independent testing agency

# Welder Qualification Records



- Records of the test results shall be kept by the manufacturer or contractor and shall be available to those authorized to examine them



# Nondestructive Testing

- A program for this testing shall be established by the SER and as shown on plans and specifications

# Nondestructive Test Methods



- VT Visual
- PT Penetrant
- MT Magnetic Particle
- UT Ultrasonic
- RT Radiographic
- ET Eddy Current
- AET Acoustic Emission

# Section 1704.3.2

## Details Compliance



Special inspections are required for steel construction in order to verify compliance with framing and connection details on construction documents, except for the noted exceptions.

# Section 1704.3.3

## High-strength Bolts



High-strength bolting requires special inspections to verify proper installation per AISC specifications (AISC 360).

Periodic special inspection is permitted to verify:

- Bolts, nuts and washers are as specified.
- Bolted parts and surface conditions.
- Installation and tightening procedures.

# Bolts Requiring Pretensioning



- Observe preinstallation testing and calibration procedures.
- Verify bolted parts in snug contact.

# High Strength Bolts



**A325**

Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

**A490**

Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength

**A449**

Quench & Tempered Steel Bolts & Studs

# About High-Strength Bolting



- Periodic special inspection is permitted to verify:
  - Bolts, nuts, and washers are as specified
  - Bolted parts and surface conditions
  - Installation and tightening procedures.

# Bolts Requiring Pretensioning



Monitor installation and tightening on a **PERIODIC BASIS** (IBC Section 1704.3.3.2) for:

- Turn-of-nut method **WITH** matchmarking.
- Direct tension indicator method.
- Alternate design fastener (twist-off bolt) method.

# Bolts Requiring Pretensioning



Monitor installation and tightening on **CONTINUOUS BASIS** (IBC Section 1704.3.3.3) for:

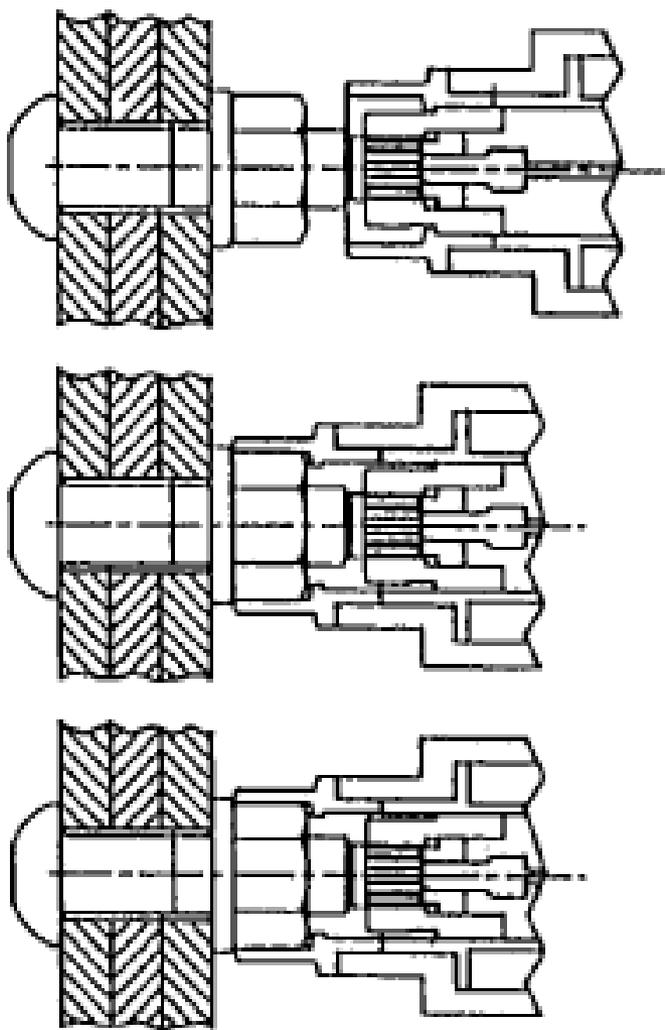
- Calibrated wrench method.
- Turn-of-nut method **WITHOUT** matchmarking.

# Bolts Requiring Snug-tight Condition



- Verify bolted parts are in snug contact.
- Monitor installation and tightening on a periodic basis.

# Tension Control (TC) Bolts

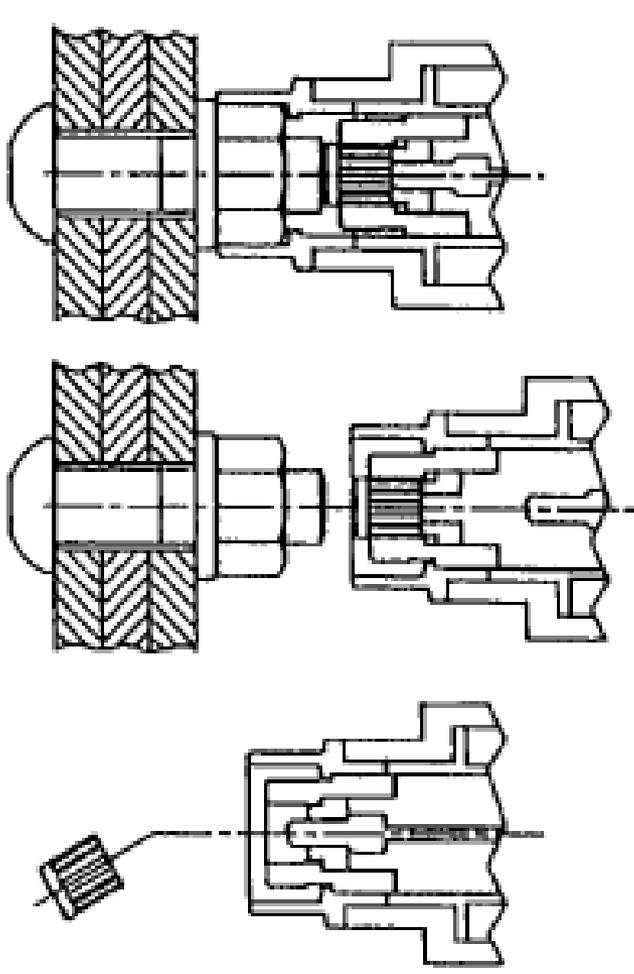
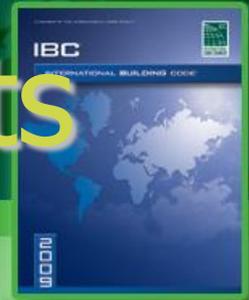


Place bolt thru hole in the joining members.

Attach washer & run up nut finger tight to the working members.

Fit the inner socket firmly over the bolt tip (spline).

# Tension Control (TC) Bolts



Engage the outer socket over the nut by pushing the wrench.

Pull lever switch to on. The outer socket rotates the nut until the torque control groove in the spline shears off, thereby achieving proper bolt tension.

Discharge the severed bolt tip (spline) from the inner socket.

	<b>A325</b>	<b>A490</b>	
<b>Type 1</b>	 lines optional		<p>All bolts must have manufacturer's mark</p> <p>A325 bolts must have "A325"</p> <p>A490 bolts must have "A490"</p> <p>A325 Type 1 bolts - three lines at 120 degrees are optional</p>
<del><b>Type 2</b></del>	 3 @ 60	 6 @ 30	<p>A325 and A490 Type 2 - no longer manufactured, withdrawn from ASTM</p>
<b>Type 3</b>			<p>A325 and A490 Type 3 - underlines required, use for weathering steel applications</p> <p><i>Ref: RCSC Figure C-2.1</i></p>

## A449

**Type 1**



All bolts must have a manufacturer's mark

A449 Type 1 bolts not permitted unless over 1-1/2" diameter

**Type 2**



A449 Type 2 bolts not permitted by AISC

**Grade A**



All bolts must have a manufacturer's mark

**Grade B**



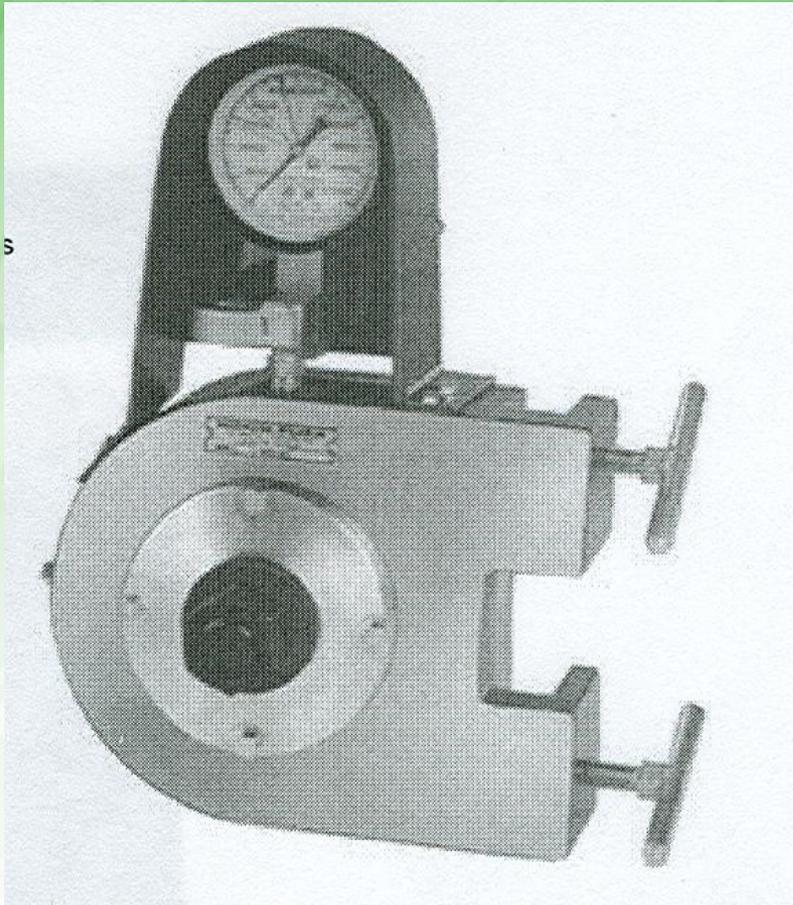
A307 bolts must have "307A" or "307B"







# Tension Measuring Device



Required at job site where slip-critical or direct tension connections are used.

Shall be calibrated annually.

Device used to confirm:

- Fastener assembly minimum tension requirements.
- Calibration of wrenches.  
(If Applicable)
- Bolting crew understanding of tensioning method.

# Section 1704.4 Concrete Construction Continuous Inspection



- Welding of reinforcing steel.
- Bolts installed in concrete.
- Sampling/testing fresh concrete.
- Concrete/shotcrete placement.
- Prestressing tendon stressing/ grouting.

# Section 1704.4 Concrete Construction Periodic Inspection



- Reinforcing steel/prestressing tendons.
- Concrete mix proportions.
- Concrete curing.
- Precast concrete erection.
- In-situ concrete strength verification.

# Exceptions



Special inspections are **NOT** required for continuous wall footing for buildings three stories or less in height supported on earth or rock where:

- Footings support walls of light-frame construction.
- Footings constructed according to Table 1809.7, or structural design of footing with  $f'_c$  not greater than 2,500 psi.

# SPECIAL INSPECTION CONCRETE WORK “EXCEPTIONS” (Cont’d)



3. Nonstructural concrete slabs supported directly on the ground, including pre-stressed slabs on grade, where the effective prestress in the concrete is less than 150 pounds per inch (1.03 MPa) regardless of the compressive strength specified in the construction documents or used in the footing construction.

# Exceptions (*continued*)



- Nonstructural slabs that are supported directly on the ground.
- Foundation walls constructed according to Table 1807.1.6.2.
- Patios/driveways/sidewalks on grade.

# Section 1704.5 Masonry Construction Definitions



## Essential Facilities

- Buildings of Occupancy Category IV (IBC Table 1604.5)
  - Hospitals
  - Fire and Police Stations
  - Emergency Shelters
  - Communications and Operations Centers
  - Power Generating Stations
  - Air Traffic Control Towers
  - National Defense Buildings
  - Water Storage Facilities/Fire

# Section 1704.5 Masonry Construction Definitions



## Non-essential Facilities

- Buildings of Occupancy Category I, II and III (IBC Table 1604.5)
  - All other buildings.

# Occupancy Categories



Category	Occupancy
I Miscellaneous Structures	<ul style="list-style-type: none"><li>▪ Agricultural Buildings</li><li>▪ Private Garages</li><li>▪ Carports / Sheds</li></ul>
II Standard Occupancy	<ul style="list-style-type: none"><li>▪ Hotels</li><li>▪ Apartments</li><li>▪ Dwellings</li><li>▪ Wholesale / Retail</li><li>▪ Office Buildings</li></ul>

# Occupancy Categories



Category	Occupancy
III Special Occupancy	<ul style="list-style-type: none"><li>▪ Public Assembly</li><li>▪ Schools</li><li>▪ Day-care Centers</li><li>▪ Nurseries</li><li>▪ Nursing Homes</li><li>▪ Jails</li></ul>
IV Essential Facilities	<ul style="list-style-type: none"><li>▪ Hospitals</li><li>▪ Fire / Police Stations</li><li>▪ Emergency Shelters</li></ul>

# Empirically Designed Masonry Limitations



Empirically designed masonry  
(Section 2109.1.1)

Not permitted for (TMS 402, Section 5.1.2):

- Building assigned to Seismic Design Category D, E or F.
- Seismic-force-resisting systems of building assigned to seismic design category B or C.
- Building where design and wind speed exceeds 110 mph.

# Engineered Masonry



Designed in accordance with the following sections of the 2009 IBC:

- SECTION 2107 – Allowable Stress Design
- SECTION 2108 – Strength Design of Masonry

# Work Requiring Inspection



Empirically designed masonry in Occupancy Category IV shall comply with Table 1704.5.1.

- Level 1 Special Inspection (IBC Section 1704.5.1).

Engineered masonry in Occupancy Category I, II or III shall comply with Table 1704.5.1.

- Level 1 Special Inspection (IBC Section 1704.5.2).

# Work Requiring Inspection



Engineered masonry in Occupancy Category IV shall comply with Table 1704.5.3.

- Level 2 Special Inspection (IBC Section 1704.5.3)

# Exceptions



- Empirically designed masonry/glass unit masonry /masonry veneer in Occupancy Category I, II or III.
- Masonry foundation wall constructed according to Tables 1805.5(1), 1805.5(2), 1805.5 (3), 1805.5 (4).
- Masonry fireplaces, masonry heaters or masonry chimneys installed or constructed in accordance with Section 2111, 2112 or 2113, respectively.

# Section 1704.6 Wood Construction Requirements



Special inspection is required for shop fabrication of wood structural elements and assemblies, as well as the construction of “high-load” diaphragms.

# Section 1704.7 Soils



- Soils.
- Special inspections as required by Table 1704.7.

# Inspection Required

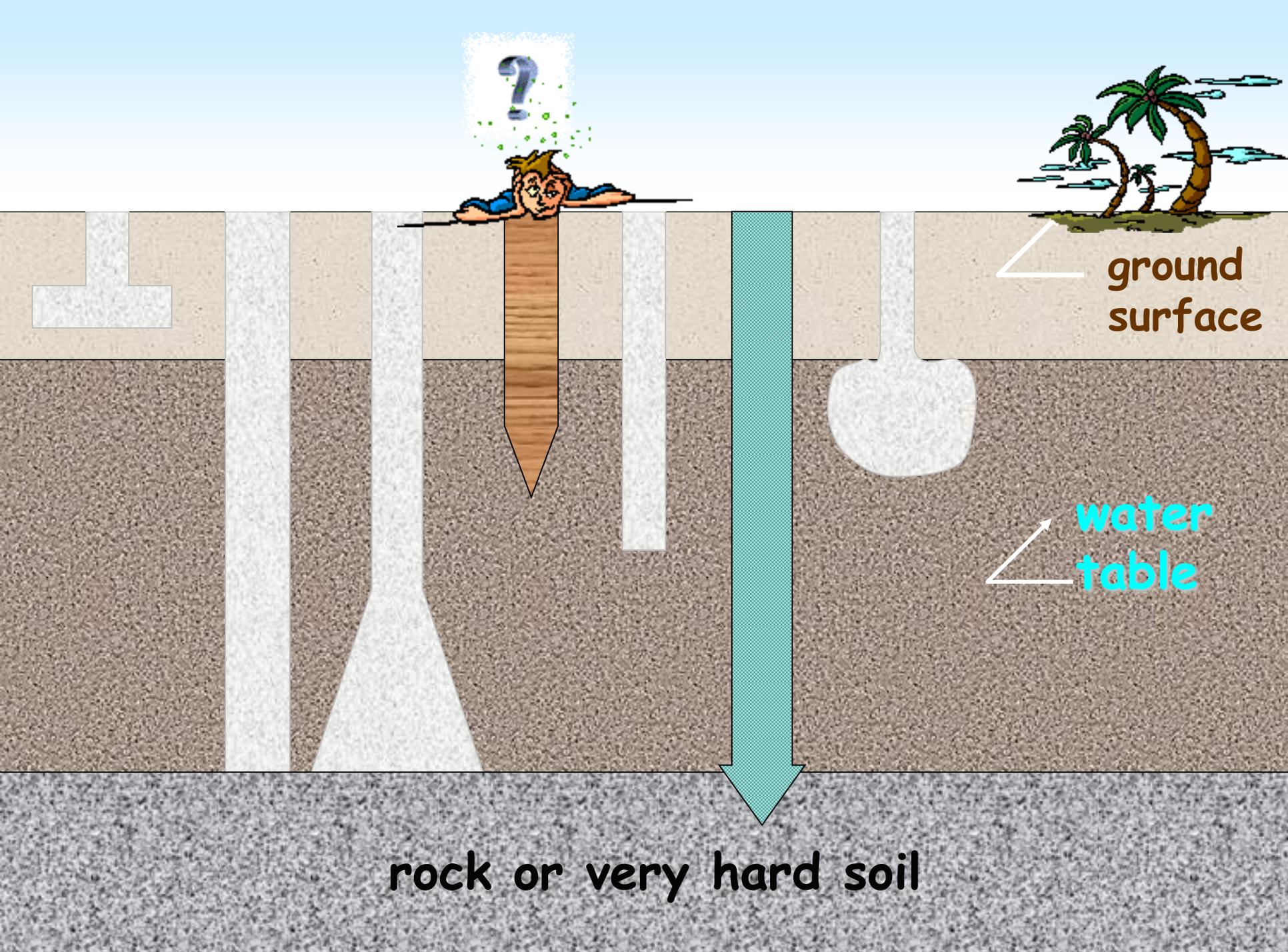


- Site preparation.
- Fill placement.
- In-place density verification.

# Section 1704.8 Driven Deep Foundations—Requirements



Driven deep foundations require special inspections as required by Table 1704.8.



?

ground surface

water table

rock or very hard soil

# 1704.8 Pile Foundations



- Special inspections shall be performed during installation and testing of pile foundations as required by Table 1704.8 The approved soils report, required by Section 1802.2, and the documents prepared by the registered design professional in responsible charge shall be used to determine compliance.

# Section 1704.8

## Required Verification and Inspection of Pile Foundations



<b>Verification and Inspection Task</b>	<b>Continuous During Task Listed</b>	<b>Periodically During Task Listed</b>
Verify pile materials, sizes and lengths comply with the requirements	X	
Determine capacities of test elements and conduct additional load tests, as required.	X	
Observe driving operations and maintain complete and accurate records for each element.	X	

# Table 1704.8 (continued)

## Required Verification and Inspection of Pile Foundations



Verification and Inspection Task	Continuous During Task Listed	Periodically During Task Listed
4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and butt elevations, and damage to foundation element.	X	=
5. For steel elements, perform additional inspections in accordance with Section 1704.3.	=	=
6. For concrete elements and concrete-filled elements, perform additional inspections in accordance with Section 1704.4.	=	=

# Table 1704.8 (continued) Required Verification and Inspection of Pile Foundations



Verification and Inspection Task	Continuous During Task Listed	Periodically During Task Listed
7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.	=	=

# Section 1704.9

## Cast-in-place Deep Foundations



Cast-in-place deep foundations require special inspections as required by Table 1704.9.

# Section 1704.9 Pier Foundations

## Required Verification and Inspection of Pier Foundations



Verification and Inspection Task	Continuous During Task Listed	Periodically During Task Listed
1. Observe drilling operations and maintain complete and accurate records for each element.	X	
2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes.	X	

# Section 1704.9 Pier Foundations

## Required Verification and Inspection of Pier Foundations



<b>Verification and Inspection Task</b>	<b>Continuous During Task Listed</b>	<b>Periodically During Task Listed</b>
3. For concrete elements, perform additional inspections in accordance with Section 1704.4.	=	=

# Section 1704.10

## Helical Pile Foundations



Require continuous special inspection.

# Section 1704.11 Vertical Masonry Foundation Elements



Require special inspection in accordance with IBC Section 1704.5.

# Section 1704.12 Sprayed Fire-resistant Materials—Requirements



Inspections are to ensure that the following properties meet the requirements of the code. Methods of determining these properties must be in accordance with ASTM E 605 and ASTM E 736 standards.

- Condition of substrates.
- Thickness.
- Density.
- Bond strength.
- Condition of finished appearance.

# Technical Manual 12-A Third Edition



- Standard Practice for the Testing and Inspection of Field Applied Sprayed Fire-resistive Materials; an Annotated Guide
- The Association of the Wall and Ceiling Industries – International
- [www.awci.org](http://www.awci.org)

# Section 1704.13 Mastic and Intumescent Fire-resistant Coatings



Special inspections for mastic and intumescent fire-resistant coatings applied to structural elements and decks shall be:

- In accordance with AWCI 12-B.
- Based on the fire-resistance design as designated in the approved construction documents.

# Section 1704.14 Exterior Insulation and Finish Systems (EIFS)



Exterior insulation and finish systems (EIFS) require special inspections.

## Exceptions:

- Special Inspection not required when applied over water resistive barrier with a means of draining moisture.
- Special Inspection not required when applied over concrete or masonry walls.

# Section 1704.15

## Special Cases



Special inspection must be performed if the building official determines that it is warranted for a given type of work.

For example:

- Alternative construction materials and systems.
- Unusual design applications.

# Section 1704.16

## Special Inspection for Smoke Control



Special inspection is required of smoke control systems.

### Testing scope

- During erection and prior to closing ductwork.
- Prior to occupancy.

### Qualifications

- Special inspection agencies with expertise.

# Section 1705

## Statement of Special Inspections



- The registered design professional in responsible charge shall prepare a statement of special inspections in accordance with IBC Section 1705.
- Submitted by the permit applicant.
- Also see IBC Section 1704.1.1.

**When in doubt... Test!**

# Why?



- Great number of people and structures residing in areas that are at risk for earthquakes or other seismic activity.
- Inevitable that these at-risk areas will eventually experience some form of seismic activity.

# Why?



Post earthquake damage reports indicate that many cases of severe damage and collapse could have been prevented by better construction practices through improved quality assurance.



# Application



- Buildings assigned to seismic design categories C, D, E or F.
- Seismic-force-resisting systems.
- Designated seismic systems.

# Application



The following additional systems and components in structures assigned to seismic design category C (see IBC Section 1705.3.3):

- Heating, ventilating and air-conditioning (HVAC) ductwork containing hazardous materials and anchorage of such ductwork.
- Piping systems and mechanical units containing flammable, combustible or highly toxic materials.
- Anchorage of electrical equipment used for emergency or standby power systems.

# Application



Selectively applies to other listed architectural, electrical and mechanical components in structures assigned to seismic design category C, D, E or F.

# Exceptions



Light-wood framing and light-gauge-cold formed-steel.

- Framing.
- Short period spectral response acceleration of  $SDS \leq 0.5g$ .
- Structure not exceeding 35 feet in height.

# Exceptions



Reinforced concrete or reinforced masonry structures.

- Short period spectral response acceleration of  $SDS \leq 0.5g$ .
- Structure not exceeding 25 feet in height.

# Exceptions



Detached one- or two-family dwellings not exceeding two stories in height, provided the structure does not have any of the following plan or vertical irregularities in accordance with Section 12.3.2 of ASCE 7:

- Torsional irregularity.
- Nonparallel systems.
- Stiffness irregularity—extreme soft story and soft story.
- Discontinuity in capacity—weak story.

# Section 1705.4

## Wind Resistance



- High winds kill more Americans and destroy more property than any other natural disaster, including earthquakes.
- The most common reason for this tragic loss is inadequate attention to wind-critical details, especially connections, during design, construction and inspection.

# Applications



- Wind Exposure Category B with basic wind speed  $\geq 120$  mph.
- Wind Exposure Categories C or D with basic wind speed  $\geq 110$  mph.

# Section 1609.4

## Wind Exposure Categories



Wind Exposure Category	Description
A	No longer used
B	Exposure B shall apply where the ground surface roughness condition, as defined by Surface Roughness B, prevails in the upwind direction for a distance of at least 2,600 feet or 20 times the height of the building, whichever is greater.

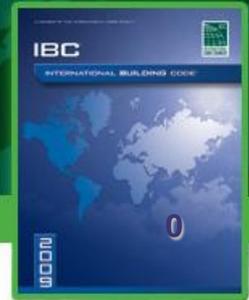
# Section 1609.4

## Wind Exposure Categories



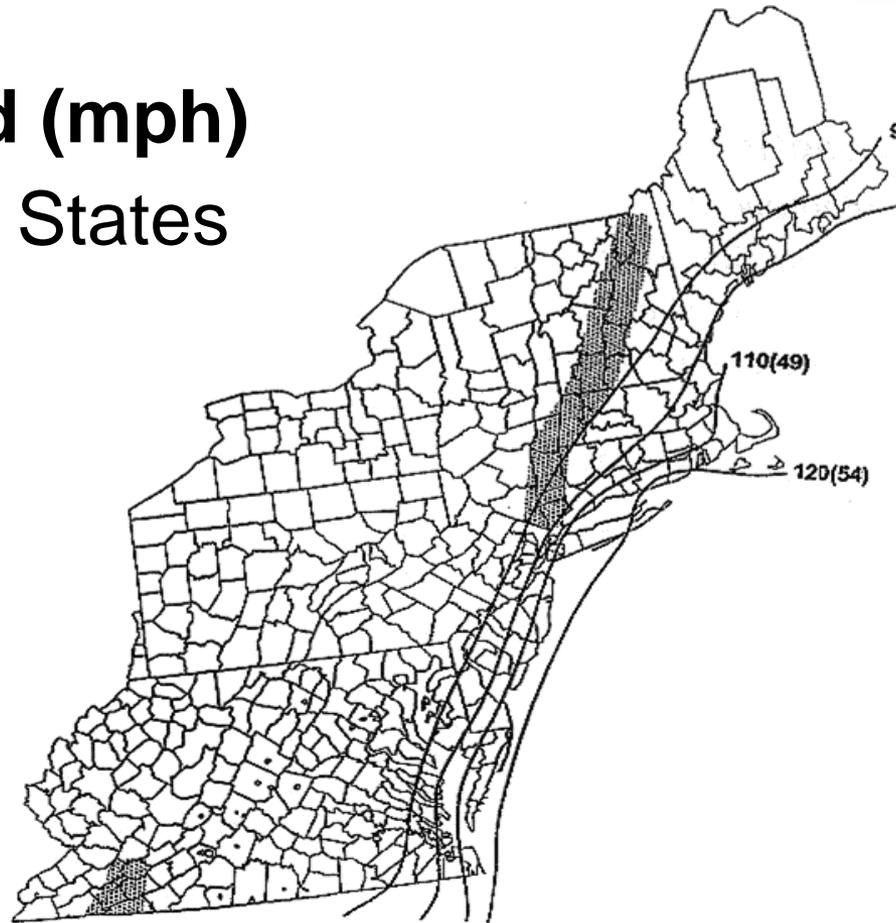
Wind Exposure Category	Description
C	Exposure C shall apply for all cases where Exposures B or D do not apply.
D	Exposure D shall apply where the ground surface roughness, as defined by Surface Roughness D, prevails in the upwind direction for a distance of at least 5,000 feet or 20 times the height of the building, whichever is greater. Exposure D shall extend inland from the shoreline for a distance of 600 feet or 20 times the height of the building, whichever is greater.

# IBC Figure 1609



100

## Basic Wind Speed (mph) Northeast United States

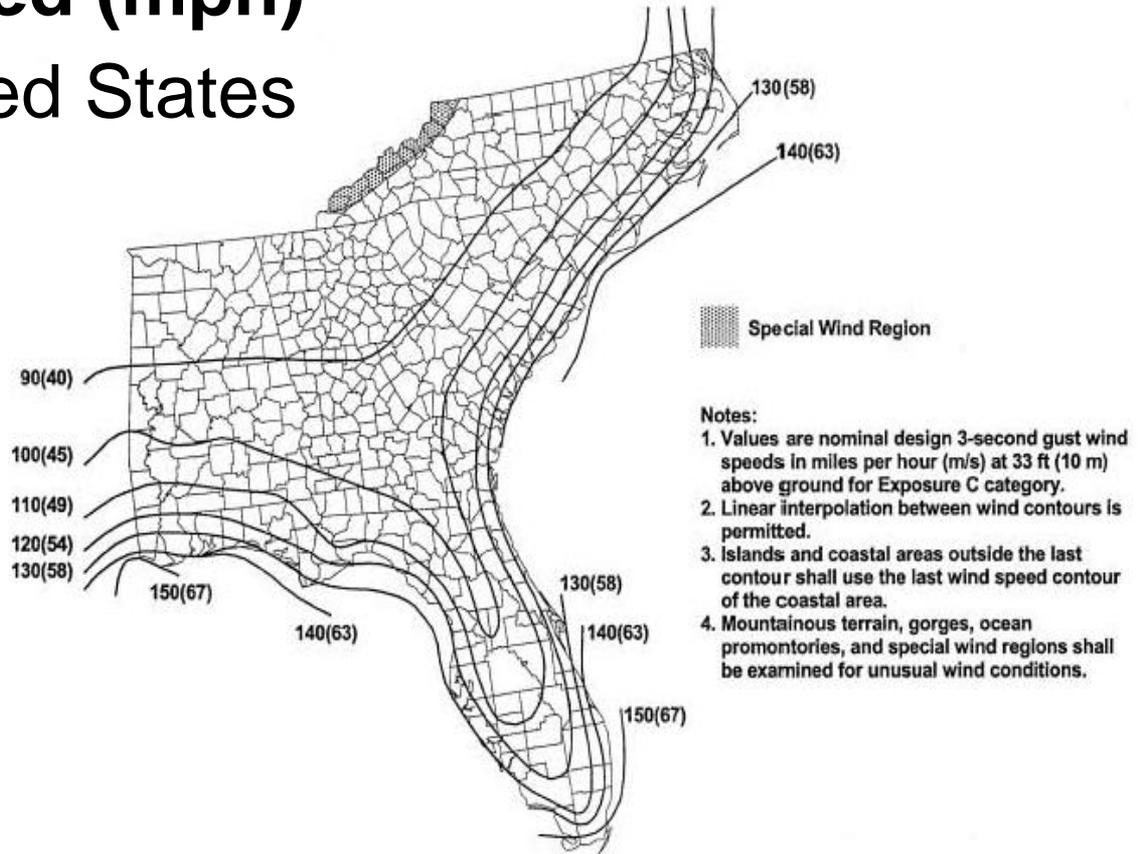


# IBC Figure 1609



100

## Basic Wind Speed (mph) Southeast United States



# Included in the Plan



Remember...The quality assurance plan must specify how and when all applicable reports will be distributed.

# Section 1706 Special Inspections for Wind Requirements



## Structural Wood

- Continuous special inspection during gluing operations.
- Periodic special inspection during nailing, bolting, anchoring or other fastening.
- Exception-Special inspection not required when fastener spacing is more than 4 inches.

# Section 1706 Special Inspections for Wind Requirements



## Cold-formed steel light frame construction

- Periodic special inspection during welding operations, screw attachment, bolting, anchoring.
- Exception-Special inspection not required if sheathing is gypsum board or fiberboard or wood attachment fasteners are spaced more than 4 inches.

# Section 1707 Special Inspections for Seismic Resistance



IBC Section 1707 requires special inspection for seismic resistance.

Concrete, masonry, and steel have specific periodic and continuous special inspection requirements as detailed in their appropriate tables.

# Special Inspection



- Structural welding according to AISC 341.
- Continuous during any field gluing operations for structural wood of the seismic-force-resisting systems.

# Special Inspection



- Continuous during nailing, bolting, anchoring and other fastening of components of seismic-force-resisting system of wood structures (drag struts, braces, and hold downs).
- Periodic during welding, screw attachment, bolting, anchoring and other fastening of components (struts, braces and hold-downs) of cold-formed steel framing.

# Section 1707.5

## Storage Racks and Access Floors



- Periodic special inspection.
- Seismic Design Category D, E, or F.
- Greater than 8 feet high.

# Section 1707.6

## Architectural Components



Periodic special inspection for exterior cladding, nonload-bearing walls, interior and exterior veneer in SDC D, E or F.

### **Exception:**

Special inspection not required when cladding is less than 30 feet in height, or cladding is less than 5 psf, or interior non load bearing walls are less than 15 psf.

# Periodic Special Inspections



In buildings assigned to seismic design categories C, D, E and F.

- Anchorage of electrical equipment for emergency standby power systems.
- Installation of piping systems (and associated mechanical units) intended to carry flammable, combustible, or highly toxic contents.

# Periodic Special Inspections



- Installation of HVAC ductwork intended to contain hazardous materials.
- During the installation of vibration isolation systems in structures assigned to seismic design category C, D, E or F where the construction documents require a nominal clearance of 0.25 inches or less between the equipment support frame and restraint.

# Section 1708 Structural Testing for Seismic Resistance



- Structural testing for seismic resistance applies to buildings assigned to seismic design categories C, D, E or F.
- Depending on the seismic design category, special testing is required for seismic-force-resisting systems and designated seismic systems.

# Section 1708.2

## Concrete Reinforcement



- Certified mill test reports are to be provided for reinforcement used in concrete elements assigned to seismic design categories C, D, E and F.
- Reinforcement must comply with the seismic requirements of ACI 318, Chapter 21.
- Where A615 is to be welded, “weldability” is to be determined by chemical tests.

# Section 1708.3 Structural Steel Testing Requirements



Structural steel testing is to conform to AISC 341.

# Section 1708.4 Seismic Certification of Nonstructural Components



Seismic certification of nonstructural equipment.

- Registered design professional (RDP) shall state seismic certification requirements for nonstructural components.
- Manufacturer to submit test certificate for components to RDP and building official for approval.

# Section 1709

## Contractor Responsibility



Prior to beginning work, a written “Contractor’s Statement of Responsibility” must be submitted to the building official and owner.

- Acknowledgement of the awareness contained in the statement of special inspections.

# Section 1710

## Structural Observations



- Structural observations are needed to ensure that the structural system is constructed in general conformance with the construction documents.
- This reduces the number of structural errors and inadequacies which allows for a higher level of reliability and safety.

# IMPORTANT!



Structural observation **DOES NOT**  
waive inspection required by Section  
1704

# Structural Observation Requirements



- Performed by a Registered Design Professional.
- Provided for structures assigned to seismic design categories D, E or F, under specific conditions.
- Provided for structures with design wind speed greater than 110 mph, under specific conditions.
- Applies to buildings of Occupancy Category III or IV.
- Applies to buildings greater than 75 feet tall.
- (Applies to all buildings greater than 2 stories above grade plane in Seismic Design Category E.

# Section 1711

## Design Strengths of Materials



Design strengths and permissible stresses of structural material are to conform to specification and design methods referenced in the IBC.

Materials not specifically provided for in the code (new materials) are to be tested for acceptance.

# Section 1712

## Alternative Test Procedure



In the absence of approved rules, building official may require tests to verify compliance with intent of code.

# Section 1713

## Test Safe Load



When proposed construction cannot be designed using approved engineering methods or material does not comply with applicable standards, testing is to be done as prescribed by preconstruction load tests.

# Section 1714

## In-situ Load Tests



Where reasonable doubt exists as to the stability or load-carrying capacity of a completed building, the building official may require an engineering assessment, either by structural analysis or in-situ load test, or both.

# Section 1715

## Preconstruction Load Tests



Provides another method of determining equivalence with the recognized standards of Chapter 35.

# Not Referenced by the Code



For proposed construction using materials and construction methods not covered by material and/or design standards that are referenced by the code, the test procedure or IBC Section 1715.3 must be used.

# Section 1716

## Materials and Test Standards



This section focuses on joist hangers.

Vertical load carrying capacity is determined by the procedures set forth in ASTM D1761.

Torsional moment capacity is determined using the same ASTM Standard.

Stability and anchorage of clay roof tiles is also detailed in this section.



# Module 4

## Becoming a Special Inspector

# Special Inspector Certifications



- Reinforced Concrete
- Prestressed Concrete
- Structural Masonry
- Structural Steel and Welding
- Spray-Applied Fireproofing

# Reinforced Concrete ICC Certification



## Level 1

Pass the RCSI Codes & Standards Exam and receive a  
“Certificate of Completion”

## Level 2

Possess ACI Field Technician Grade 1 “Reinforced Concrete  
Special Inspector Associate”

## Level 3

Consideration of Education and Experience

# Prestressed Concrete ICC Certification



## Step 1

Participation by PCI & PTI

## Step 2

Possess ICC Reinforced Concrete Certification

## Step 3

Pass PCSI Codes and Standards Exam

# Other Certifications



Individuals seeking certification for spray-applied fireproofing, structural masonry or structural steel and welding need only to pass the applicable Codes and Standards Exam.



ICC INTERNATIONAL  
CODE COUNCIL®

People Helping People Build a Safer World™

# CHECK YOUR KNOWLEDGE

# CHECK YOUR KNOWLEDGE



- This person identifies the areas of construction that will require special inspection.
  - A. Contractor
  - B. Building Official
  - C. Special Inspector
  - D. Registered Design Professional

# CHECK YOUR KNOWLEDGE



- This person identifies the areas of construction that will require special inspection.
  - A. Contractor
  - B. Building Official
  - C. Special Inspector
  - D. Registered Design Professional**

# CHECK YOUR KNOWLEDGE



- Which of the following people is expected to review special inspection reports?
  - A. Registered design professional.
  - B. Building Official.
  - C. Contractor,
  - D. Special inspector.

# CHECK YOUR KNOWLEDGE



- Which of the following people is expected to review special inspection reports?
  - A. Registered design professional.
  - B. Building Official.**
  - C. Contractor,
  - D. Special inspector.

# CHECK YOUR KNOWLEDGE



- During the special inspection program, who is responsible for scheduling special inspections?
  - A. Contractor.
  - B. Owner.
  - C. Special inspector or agent.
  - D. Building Official.

# CHECK YOUR KNOWLEDGE



- During the special inspection program, who is responsible for scheduling special inspections?
  - A. Contractor.**
  - B. Owner.
  - C. Special inspector or agent.
  - D. Building Official.

# CHECK YOUR KNOWLEDGE



- The third step in developing a special inspection program is to:
  - A. Review and approve inspection agencies.
  - B. Prescribe report requirements and give them to agencies.
  - C. Set up the procedure for issuing special inspection agreements to inspection agencies.
  - D. Develop a report review procedure.

# CHECK YOUR KNOWLEDGE



- The third step in developing a special inspection program is to:
  - A. Review and approve inspection agencies.
  - B. Prescribe report requirements and give them to agencies.**
  - C. Set up the procedure for issuing special inspection agreements to inspection agencies.
  - D. Develop a report review procedure.

# CHECK YOUR KNOWLEDGE



- The verification checklist is used during which step of developing a special inspection program?
  - A. Develop a report review procedure.
  - B. Verify the special inspector's work history.
  - C. Review and approve inspection agencies.
  - D. Prescribe report requirements and give them to agencies.

# CHECK YOUR KNOWLEDGE



- The verification checklist is used during which step of developing a special inspection program?
  - A. Develop a report review procedure.
  - B. Verify the special inspector's work history.
  - C. Review and approve inspection agencies.
  - D. Prescribe report requirements and give them to agencies.**

# CHECK YOUR KNOWLEDGE



- When it comes to the welding of floor and roof decks, welding studs, welding sheet steel and stairs and railings, which of the following is true?
  - A. Special inspection is not required.
  - B. Continuous special inspection is required.
  - C. Periodic special inspection is required.
  - D. Only requirements of ASW D1.1 must be met.

# CHECK YOUR KNOWLEDGE



- When it comes to the welding of floor and roof decks, welding studs, welding sheet steel and stairs and railings, which of the following is true?
  - A. Special inspection is not required.
  - B. Continuous special inspection is required.**
  - C. Periodic special inspection is required.
  - D. Only requirements of ASW D1.1 must be met.

# CHECK YOUR KNOWLEDGE



- Bolts requiring only snug-tight conditions require special inspection to:
  - A. Verify calibrated wrench method.
  - B. Monitor installation of tightening.
  - C. Monitor turn-of-nut method with matchmaking.
  - D. Monitor turn-of-nut method without matchmaking.

# CHECK YOUR KNOWLEDGE



- Bolts requiring only snug-tight conditions require special inspection to:
  - A. Verify calibrated wrench method.
  - B. Monitor installation of tightening.**
  - C. Monitor turn-of-nut method with matchmaking.
  - D. Monitor turn-of-nut method without matchmaking.

# CHECK YOUR KNOWLEDGE



- Special inspections replace the normal inspections that are performed by the jurisdiction's building inspector.
  - A. True
  - B. False

# CHECK YOUR KNOWLEDGE



- Special inspections replace the normal inspections that are performed by the jurisdiction's building inspector.
  - A. True
  - B. False**

# CHECK YOUR KNOWLEDGE



- Identifications by an approved agency indicating the name of the manufacturers, function and performance characteristics, and indication of performed inspection and evaluation are called:
  - A. Labels.
  - B. Inspection certificate.
  - C. Certificate of compliance.
  - D. Manufacturer's designation.

# CHECK YOUR KNOWLEDGE



- Identifications by an approved agency indicating the name of the manufacturers, function and performance characteristics, and indication of performed inspection and evaluation are called:
  - A. Labels.
  - B. Inspection certificate.
  - C. Certificate of compliance.**
  - D. Manufacturer's designation.

# CHECK YOUR KNOWLEDGE



- With regards to the seismic special inspection statement, this person prepares the statement:
  - A. Registered design professional.
  - B. Special inspector.
  - C. Owner.
  - D. Building Official

# CHECK YOUR KNOWLEDGE



- With regards to the seismic special inspection statement, this person prepares the statement:
  - A. Registered design professional.**
  - B. Special inspector.
  - C. Owner.
  - D. Building Official

# CHECK YOUR KNOWLEDGE



- Special inspections for seismic resistance require that continuous special inspections be performed on which of the following?
  - A. High strength bolts requiring pretensioning.
  - B. Field gluing operations for structural wood elements of the seismic force-resisting systems.
  - C. Nailing, bolting, anchoring and other fastening of components for structural wood.
  - D. Welding, screw attachments, bolting, anchoring and other fastening of components.

# CHECK YOUR KNOWLEDGE



- Special inspections for seismic resistance require that continuous special inspections be performed on which of the following?
  - A. High strength bolts requiring pretensioning.
  - B. Field gluing operations for structural wood elements of the seismic force-resisting systems.**
  - C. Nailing, bolting, anchoring and other fastening of components for structural wood.
  - D. Welding, screw attachments, bolting, anchoring and other fastening of components.

# CHECK YOUR KNOWLEDGE



- Everyone wishing to become ICC certified must pass the PCSI Codes and Standards Exam.
  - A. True
  - B. False

# CHECK YOUR KNOWLEDGE



- Everyone wishing to become ICC certified must pass the PCSI Codes and Standards Exam.
  - A. True
  - B. False**

# Questions?



## Summary and Questions



INTERNATIONAL  
ACCREDITATION SERVICE, INC.

*Leading Accreditors Since 1975*

# About IAS



- **Incorporated as a nonprofit scientific organization**
- **IAS formed to consolidate all ICC accreditation activities**
- **Scope of accreditation includes:**
  - Testing & Calibration laboratories
  - Inspection (Quality Control) Agencies
  - Fabricator Inspection Programs
  - **Special Inspection Agencies**
  - Building Departments
  - Personnel and product certifiers\*
  - Training on conformity assessment standards

\* *Future areas of business*



# INTERNATIONAL ACCREDITATION SERVICE, INC.



- Eight member board of directors (all building officials who are appointed by the ICC Board)
- Accreditation committee
- Technical Advisory Councils (Testing, Inspection, Building Department)
- Staff - Engineers & Lead assessors & Technical Experts



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ACCREDITATION SERVICE, INC.

Leading Accreditors Since 1975

# Worldwide Acceptance



- IAS-accredited laboratories and inspection agencies enjoy worldwide acceptance of their reports because of IAS's Signatory status to the Mutual Recognition Arrangements (MRA) and with the International Laboratory Accreditation Cooperation (ILAC)
- Asia Pacific Laboratory Accreditation Cooperation (APLAC)
- National Cooperation for Laboratory Accreditation (NACLA)
- Inter-American Accreditation Cooperation (IAAC)

# TG-20-92 Special Inspectors General



## 2. ITEMS: REPORT NON-CONFORMING

The special inspector shall bring non-conforming items to the immediate attention of the contractor and note all such items in the daily report.

# TG-20-92

## Special Inspectors General



If any item is not resolved in three working days, or is about to be incorporated in the work, the special inspector shall immediately notify the building department by telephone, fax or in person.

# TG-20-92 Special Inspectors General



**The special inspector shall also notify the engineer or architect, and post a non-compliance report in the project file. One copy of the non-compliance report shall be hand delivered to the contractor.**

# TG-20-92 Special Inspectors General



## 2. REPORT NON-CONFORMING ITEMS (Cont'd)

The special inspector is responsible to immediately notify the Clark County Building Inspectors Division of any structural failure, collapse or condition that in the opinion of the special inspector may possibly lead to a structural failure. Clark County provides for after hours notification of emergency conditions, listed in the Centel telephone book, under Clark County, emergency, after hours number 384-4393.

# TG-23 No. 6



Project Name: \_\_\_\_\_

Address: \_\_\_\_\_

Permit No.(s) \_\_\_\_\_

Date: \_\_\_\_\_

Verification conducted by: \_\_\_\_\_

Special Inspector name: \_\_\_\_\_

# TG-23 No. 6

## VERIFICATION FORMAT



<u>Item No.</u>	<u>Item Reviewed</u>	<u>Yes</u>	<u>No</u>
1.	Are the following fundamental requirements in compliance with Clark County procedures?	_____	_____
2.	Has a building permit been issued?	_____	_____
3.	Have County approved drawings been issued and identified by date for the construction being inspected as shown in the report?	_____	_____
4.	Are all reports in numerical sequence and correctly identified for construction being inspected identified for construction?	_____	_____



The following section contains audit forms to be used in evaluating testing technician performance in the field.

## SLUMP OF PORTLAND CEMENT CONCRETE

1. Was sample of concrete obtained in accordance with C-172?
2. Sample placed on a flat, rigid nonabsorbent surface?
3. Mold smooth and free from projections and dents?
4. Tamping rod 5/8" dia.? .... Hemispherical tip 5/8" rad?
5. Mold dampened before test?
6. Mold filled in three equal volume lifts?
7. Concrete heaped above mold for final layer before rodding?
8. Each layer rodded 25 times?
9. Strokes spiraled from outside toward center?
10. Strokes just penetrating layer below?
11. Struck off by screeding and rolling?
12. Mold raised immediately in 5 +/- secs?
11. Slump measured and recorded to nearest 1/4"?

# Quality Control Inspection/Testing Agency Enforcement / Contract Documentation



- **QAA CORRECTION NOTICE**
  - **Issued to QCA/QCA Inspector**
  - **Describes QCA Discrepancies**
  - **Details Resolution**

# Quality Control Inspection/Testing Agency Enforcement / Contract Documentation



- **QAA Special Inspection Agreement**
  - Outlines Requirements for On-Site Special Inspection and/or Testing Services
  - Outlines Areas of Responsibility for SI and BO
  - Identifies Specific Categories for SI
  - Submittal Requirements for Final QAA Report

# Quality Control Inspection/Testing Agency Enforcement / Contract Documentation



## **Listing of Approved Services**

- **Concrete**
- **Bolts Installed in Concrete**
- **Welding**
- **High Strength Bolting**
- **Structural Masonry**
- **Reinforced Gypsum Concrete**
- **Insulating concrete Fill**
- **Spray-Applied Fireproofing**
- **Piling, Drilled Piers and Caissons**
- **Shotcrete**
- **Special Grading, Excavation and Filling**
- **Smoke Control Systems**
- **Structural Steel**
- **Amusement code Special Cases**
- **Non-destructive Testing**
- **Chemical Testing**
- **Air Balance**
- **Welder Certifications**
- **Verification Audits**
- **Fabricator Manual Preparation**
- **Wood Based Products, Lumber**
- **Construction Plan Review**
- **Soils Reports**
- **Material Testing**
- **Amusement Ride Pre-Submittal**
- **Amusement Ride Construction Inspection and Testing**
- **Amusement Ride Operation and Maintenance Inspection**
- **Amusement Ride Operational Testing and Inspection**

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or

E-mail [amartinez@iccsafe.org](mailto:amartinez@iccsafe.org)