NFCA FIRE-RESISTANCE IN BUILDING SEMINAR

NANCI TIMMINS, CHIEF FIRE AND LIFE SAFETY OFFICER
OSHPD/FDD
OSHPD
A BRIEF HISTORY
BUILDING DEPARTMENT FOR HEALTHCARE FACILITIES IN CA
FEBRUARY 9, 1971

Sylmar Earthquake 6.5
1973 – OFFICE OF ARCHITECTURE AND CONSTRUCTION (OAC), DEPARTMENT OF GENERAL SERVICES BEGAN REVIEW AND INSPECTION OF THE STRUCTURAL SYSTEMS OF HOSPITAL BUILDINGS.
OSHPD ESTABLISHED

1978 – DEPARTMENT OF HEALTH DIVIDED INTO SEVERAL DEPARTMENTS INCLUDING OSHPD.
LOCAL AUTHORITY REVIEW

• 1983 – LOCAL BUILDING DEPARTMENT REVIEW OF HOSPITALS, PSYCHIATRIC HOSPITALS, SKILLED NURSING FACILITIES AND INTERMEDIATE CARE FACILITIES PREEMPTED.

• THERE ARE 478 CITIES AND 58 COUNTIES IN THE STATE OF CALIFORNIA.
OCTOBER 17, 1989

Loma Prieta 6.9
CONSOLIDATION

- REVIEW OF HOSPITALS, SKILLED NURSING FACILITIES AND INTERMEDIATE CARE FACILITIES CONSOLIDATED UNDER ONE AGENCY; OSHPD.

- STRUCTURAL SAFETY (OSA) AND FIRE LIFE SAFETY (SFM) REVIEWS BECOME PART OF OSHPD FDD REVIEW.

JANUARY 1, 1992
JANUARY 17, 1994

Northridge 6.7
SB1953

- 1995 – BY JANUARY 1, 2008, HOSPITAL BUILDINGS THAT POSE RISKS TO LIFE SAFETY REQUIRED TO BE USED FOR NON-ACUTE PURPOSES. BY JANUARY 1, 2030, ALL HOSPITAL BUILDINGS THAT ARE NOT IN SUBSTANTIAL COMPLIANCE WITH SEISMIC STANDARDS REQUIRED TO BE DEMOLISHED, REPLACED OR CHANGED TO A NON-HOSPITAL USE.
2016 CALIFORNIA BUILDING & ADMINISTRATIVE CODES
OSHPD JURISDICTION

• CAC 7-103. JURISDICTION. THE FOLLOWING ARE WITHIN THE JURISDICTION OF OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT:

  • (A) FOR DEVELOPMENT OF REGULATIONS IN THE CALIFORNIA BUILDING STANDARDS CODE AND ENFORCEMENT THEREOF.

• HOSPITAL BUILDINGS

• SKILLED NURSING FACILITIES

• INTERMEDIATE CARE FACILITIES
7-115. PREPARATION OF CONSTRUCTION DOCUMENTS AND REPORTS.

(A) ALL CONSTRUCTION DOCUMENTS OR REPORTS, EXCEPT AS PROVIDED IN (C) BELOW, SHALL BE PREPARED UNDER THE GENERAL RESPONSIBLE CHARGE OF AN ARCHITECT OR ENGINEER OF RECORD. PRIOR TO SUBMITTAL TO THE OFFICE, THE ARCHITECT OR ENGINEER OF RECORD FOR A PROJECT SHALL SIGN EVERY SHEET OF THE DRAWINGS, AND THE TITLE SHEET, COVER SHEET OR SIGNATURE SHEET OF SPECIFICATIONS AND REPORTS. A NOTATION MAY BE PROVIDED ON THE DRAWINGS INDICATING THE ARCHITECT’S OR ENGINEER’S ROLE IN PREPARING AND REVIEWING THE DOCUMENTS. PLANS/DRAWINGS SUBMITTED TO THE OFFICE SHALL NOT EXCEED THE SIZE AND WEIGHT DESCRIBED IN SECTION 7-113 (A) (2).
107.3 EXAMINATION OF DOCUMENTS. THE BUILDING OFFICIAL SHALL EXAMINE OR CAUSE TO BE EXAMINED THE ACCOMPANYING SUBMITTAL DOCUMENTS AND SHALL ASCERTAIN BY SUCH EXAMINATIONS WHETHER THE CONSTRUCTION INDICATED AND DESCRIBED IS IN ACCORDANCE WITH THE REQUIREMENTS OF THIS CODE AND OTHER PERTINENT LAWS OR ORDINANCES.
110. INSPECTIONS.

110.1 GENERAL. CONSTRUCTION OR WORK FOR WHICH A PERMIT IS REQUIRED SHALL BE SUBJECT TO INSPECTION BY THE BUILDING OFFICIAL AND ALL SUCH CONSTRUCTION OR WORK SHALL REMAIN ACCESSIBLE AND EXPOSED FOR INSPECTION PURPOSES UNTIL APPROVED.
110. INSPECTIONS.

110.1 GENERAL. APPROVAL AS A RESULT OF AN INSPECTION SHALL NOT BE CONSTRUED TO BE AN APPROVAL OF A VIOLATION OF THE PROVISIONS OF THIS CODE OR OF OTHER ORDINANCES OF THE JURISDICTION. INSPECTIONS PRESUMING TO GIVE AUTHORITY TO VIOLATE OR CANCEL THE PROVISIONS OF THIS CODE OR OF OTHER ORDINANCES OF THE JURISDICTION SHALL NOT BE VALID. IT SHALL BE THE DUTY OF THE OWNER OR OWNER’S AUTHORIZED AGENT TO CAUSE THE WORK TO REMAIN ACCESSIBLE AND EXPOSED FOR INSPECTION PURPOSES. NEITHER THE BUILDING OFFICIAL NOR THE JURISDICTION SHALL BE LIABLE FOR EXPENSE ENTAILED IN THE REMOVAL OR REPLACEMENT OF ANY MATERIAL REQUIRED TO ALLOW INSPECTION.
• 110. INSPECTIONS.
  • 110.2 PRELIMINARY INSPECTION. BEFORE ISSUING A PERMIT, THE BUILDING OFFICIAL IS AUTHORIZED TO EXAMINE OR CAUSE TO BE EXAMINED BUILDINGS, STRUCTURES AND SITES FOR WHICH AN APPLICATION HAS BEEN FILED.
CALIFORNIA BUILDING CODE, PART 2, TITLE 24 (CCR)

• 110. INSPECTIONS.
  • 110.3 REQUIRED INSPECTIONS.
    110.3.2 FOOTING AND FOUNDATION
    110.3.2 CONCRETE SLAB AND UNDER-FLOOR
    110.3.3 LOWEST FLOOR ELEVATION
    110.3.4 FRAME
    110.3.5 LATH AND GYPSUM BOARD
    110.3.6 FIRE- AND SMOKE-RESISTANT PENETRATIONS
    110.3.7 ENERGY EFFICIENCY INSPECTIONS
110. INSPECTIONS.

110.3 REQUIRED INSPECTIONS.

10.3.8 OTHER INSPECTIONS. In addition to the inspections specified in sections 110.3.1 through 110.3.7, the building official is authorized to make or require other inspections of any construction work to ascertain compliance with the provisions of this code and other laws that are enforced by the Department of Building Safety.

110.3.9 SPECIAL INSPECTIONS. For special inspections, see Chapters 17/17A.

110.3.10 FINAL INSPECTION. The final inspection shall be made after all work required by the building permit is completed.
110. INSPECTIONS.

110.4 INSPECTION AGENCIES. THE BUILDING OFFICIAL IS AUTHORIZED TO ACCEPT REPORTS OF APPROVED INSPECTION AGENCIES, PROVIDED SUCH AGENCIES SATISFY THE REQUIREMENTS AS TO QUALIFICATIONS AND RELIABILITY.

THERE IS MUCH MORE REGARDING APPROVED INSPECTION AGENCIES IN SECTIONS 1703.1 & 1703A.1.
• 110. INSPECTIONS.

• 110.5 INSPECTION REQUESTS. IT SHALL BE THE DUTY OF THE HOLDER OF THE BUILDING PERMIT OR THEIR DUTY AUTHORIZED AGENT TO NOTIFY THE BUILDING OFFICIAL WHEN WORK IS READY FOR INSPECTION.

• IT SHALL BE THE DUTY OF THE PERMIT HOLDER TO PROVIDE ACCESS TO AND MEANS FOR INSPECTIONS OF SUCH WORK THAT ARE REQUIRED BY THIS CODE.

More Ground Rules
110. INSPECTIONS.

110.6 APPROVAL REQUIRED. WORK SHALL NOT BE DONE BEYOND THE POINT INDICATED IN EACH SUCCESSIVE INSPECTION WITHOUT FIRST OBTAINING THE APPROVAL OF THE BUILDING OFFICIAL.

THE BUILDING OFFICIAL, UPON NOTIFICATION, SHALL MAKE THE REQUESTED INSPECTIONS AND SHALL EITHER INDICATE THE PORTION OF THE CONSTRUCTION THAT IS SATISFACTORY AS COMPLETED, OR NOTIFY THE PERMIT HOLDER OR HIS OR HER AGENT WHEREIN THE SAME FAILS TO COMPLY WITH THIS CODE.

ANY PORTIONS THAT DO NOT COMPLY SHALL BE CORRECTED AND SUCH PORTION SHALL NOT BE COVERED OR CONCEALED UNTIL AUTHORIZED BY THE BUILDING OFFICIAL.
(D) The architect and/or engineer in responsible charge of the work shall prepare and administer a testing, inspection and observation program which shall be submitted to the office for approval prior to the issuance of the building permit.

(E) The testing program shall identify materials and tests to be performed on the project. The firm(s) and/or individual(s) to perform each of the required tests shall also be identified. The testing program shall include, at a minimum, those tests required by applicable sections of the California Building Standards Code.
• **7-141 Administration of Construction.**

  (G) The inspection program shall also identify all special inspections to be performed on the project and the individual(s) to perform the inspections. The special inspections shall include, at a minimum, those special inspections required by applicable sections of the California Building Standards Code.

  (H) The observation program shall identify each design professional that must, through personal knowledge as defined in section 7-151, verify that the work is in compliance with the approved construction documents.
• **7-141 ADMINISTRATION OF CONSTRUCTION.**

(1) The design professionals, contractor or owner/builder and the inspector(s) of record shall verify that the work is in compliance with the approved construction documents in accordance with the requirements for personal knowledge as it applies to each participant. The program shall give specific intervals or project milestones at which such reporting is to occur for each affected participant. Each required observation report shall be documented by a verified compliance report form prepared by each participant and submitted to the office.
7-141 ADMINISTRATION OF CONSTRUCTION.

(J) THE TESTING, INSPECTION AND OBSERVATION PROGRAM SHALL INCLUDE SAMPLES OF TEST AND INSPECTION REPORTS AND PROVIDE TIME LIMITS FOR THE SUBMISSION OF REPORTS.

(K) ALL COMPLETED TEST AND INSPECTION REPORTS SHALL BE SUBMITTED TO THE INSPECTOR OF RECORD, THE OWNER AND THE ARCHITECT OR ENGINEER IN RESPONSIBLE CHARGE BY THE AUTHOR OF THE REPORT.
• SECTION 7-141, ADMINISTRATION OF CONSTRUCTION

• ARCHITECT AND/OR ENGINEER IN RESPONSIBLE CHARGE SHALL PREPARE A TESTING, INSPECTION AND OBSERVATION PROGRAM WHICH SHALL BE SUBMITTED TO THE OFFICE FOR APPROVAL PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.
TIO BASICS

Prepared by architect and/or engineer in responsible charge

Required for every project

Required prior to issuance of building permit
THREE COMPONENTS OF PROGRAM:

• TESTING
• INSPECTION
• OBSERVATION
THE TESTING PROGRAM SHALL:

• IDENTIFY ALL MATERIALS & TESTS TO BE PERFORMED

• IDENTIFY FIRMS AND/OR INDIVIDUALS PERFORMING TESTS

• INCLUDE AS A MINIMUM, ALL TESTS REQUIRED BY THE CALIFORNIA BUILDING STANDARDS CODE
THE INSPECTION PROGRAM SHALL:

- INCLUDE AN INSPECTOR OF RECORD APPLICATION FOR EACH INSPECTOR OF RECORD
- WHEN MORE THAN ONE IOR, A DOCUMENT DEFINING RESPONSIBILITY OF EACH IOR
- IDENTIFY ALL SPECIAL INSPECTIONS
- IDENTIFY INDIVIDUALS PERFORMING SPECIAL INSPECTIONS
- INCLUDE AS A MINIMUM, ALL SPECIAL INSPECTIONS REQUIRED BY THE CALIFORNIA BUILDING STANDARDS CODE
TESTING & INSPECTION

- DOCUMENTATION OF TESTS AND INSPECTIONS:
- TESTS AND SPECIAL INSPECTIONS REQUIRE A REPORT, CERTIFICATION OR AFFIDAVIT ACCEPTABLE TO THE OFFICE.
THE OBSERVATION PROGRAM SHALL:

• INCLUDE, IN ADDITION TO THE CONTRACTOR OR OWNER/BUILDER AND IOR, THE IDENTITY OF EACH PROFESSIONAL WHO MUST VERIFY THROUGH THEIR OBSERVATION THAT WORK IS COMPLETED IN COMPLIANCE WITH PLANS & SPECIFICATIONS.

• INCLUDE A SCHEDULE OF WHEN OBSERVATION OF WORK SHALL OCCUR USING INTERVALS OR MILESTONES
OBSERVATION

• DOCUMENTATION OF OBSERVATIONS:
  • OBSERVATIONS REQUIRE A VERIFIED COMPLIANCE REPORT
• THE T10 PROGRAM SHALL:
  • INCLUDE SAMPLES OF TEST AND INSPECTION REPORTS
  • PRESCRIBE TIME LIMITS FOR THE COMPLETION AND SUBMITTAL OF TEST AND INSPECTION REPORTS
TIO FORMS

• IT IS ANTICIPATED THAT MOST PROJECT APPLICATIONS WILL INCLUDE A FORM DOWNLOADED FROM THE OSHPD WEB SITE.

• THE FORMS ARE AVAILABLE FOR THE APPLICABLE EDITION OF THE CBC FOR OSDHPD 1 OR OSHPD 2 PROJECTS.
The forms included on the OSHPD web site contain a comprehensive list of required tests and special inspections.

The preparer of the TIO is responsible for the performance of all tests and special inspections required by Code and any additional tests and special inspections that may be necessary.
**INSTRUCTIONS FOR COMPLETION OF TIO FORM**

**SECTION B**

<table>
<thead>
<tr>
<th>Item #</th>
<th>Required</th>
<th>Description</th>
<th>FDD Accepts</th>
<th>Completed by Applicant</th>
<th>IOR Verifies</th>
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<td>BF1</td>
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<td>Soil fill</td>
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<td>BF2</td>
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<td>BF4</td>
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<td>Computation test</td>
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<td>Soil and rock anchors</td>
<td>CBC 1811A</td>
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<td>Deep foundation elements</td>
<td>CBC 1011A.3.3.1, 1011A.3.1.5.1, 1011A.3.3.1</td>
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<td>BF8</td>
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<td>Tie back anchors</td>
<td>CBC 1811A</td>
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**NOTE:** Approved agencies, inspectors, and all agencies in the TIO program shall be notified, evaluated by the FDD and approved of TIO prior to proceeding with the specified work.
INSTRUCTIONS FOR COMPLETION OF TIO FORM

Most appropriate FDD field staff designated in OSHPD/FDD use column
INSTRUCTIONS FOR COMPLETION OF TIO FORM

• **SECTION C**
  • **SPECIAL INSPECTIONS - DOCUMENTATION/CERTIFICATION REQUIRED**
  • DESCRIPTION OF REQUIRED SPECIAL INSPECTIONS
  • NAME OF INDIVIDUAL RESPONSIBLE FOR INSPECTION
  • THE RESPONSIBLE FIRM OR INDIVIDUAL MUST BE SUBMITTED PRIOR TO PERFORMING THE WORK REQUIRING THE TEST.
  • LOCATION FOR IOR TO INITIAL & DATE WHEN INSPECTIONS ARE COMPLETED
  • LOCATION FOR FDD TO CONFIRM ACCEPTANCE
INSTRUCTIONS FOR COMPLETION OF TIO FORM

<table>
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<tr>
<th>PLUMBING INSPECTIONS</th>
<th>RESPONSIBLE INDIVIDUAL</th>
<th>*TBD</th>
<th>IOR</th>
<th>OSHPD/FDD USE</th>
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<td>Sprayed fire-resistant materials</td>
<td>CBC 1705A 14</td>
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<td>Spray-applied fireproofing</td>
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<td>Mastic and intumescent fire-resistant coatings</td>
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<td>In accordance with AWCI 12-B</td>
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<td>Penetration Firestop</td>
<td>CBC 1705A 17-1</td>
<td>Firestop systems that are tested and listed</td>
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<td>Fire-resistant joint systems</td>
<td>CBC 1705A 17-2</td>
<td>Fire-resistant joint systems that are tested and listed</td>
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<td>Smoke control systems</td>
<td>CBC 609.10-8 &amp; CBC 1705A.16</td>
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<td>Ductwork and operation</td>
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<td>Standpipe system piping</td>
<td>NFPA 14-2013 § 4.4.2</td>
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<td>Other special inspections</td>
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<td>CBC 1705A 19</td>
<td>EIFS applications</td>
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<td>Water-repellent barrier coating</td>
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<td>ASTM E2170 Barrier coating when installed as a sheathing substitute</td>
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INSTRUCTIONS FOR COMPLETION OF TIO FORM

RESPONSIBLE APPROVED AGENCY OR INDIVIDUAL – This column is completed by the DPOR prior to commencing the relevant portion of the fabrication/construction.

Commentary:
When special inspection is required, identify the special inspection agency responsible to carry out the special inspection. For some special inspections it may also be advisable to identify the specific individual within the agency who will be performing the special inspections. For large projects where more than one agency will share responsibility for special inspection of a particular aspect of work additional rows may be added to assign responsibility for specific aspects of the work to specific agencies. The DPOR is responsible for evaluating and approving the experience, qualifications and independence of the individual assigned to each special inspection in accordance with California Administrative Code (CAC) Section 7-141(f) and California Building Code (CBC) Section 1701A.4 and 1704A.2.1 (Sections 1703.1 and 1704.2.1 for OSHPD 2 projects).
For most special inspections the qualified individual shall be provided by an approved agency employed by the hospital governing board or authority in accordance with California Administrative Code (CAC) Sections 7-141 and 7-144 as well as CBC Section 1704A.2 (Section 1704.2 for OSHPD 2 projects). Some special inspections may be performed by the IOR or a designated specialist when approved by OSHPD.
INSTRUCTIONS FOR COMPLETION OF TIO FORM

• EACH FORM CONTAINS A COMPREHENSIVE LIST OF TESTS AND SPECIAL INSPECTIONS REQUIRED BY THE CALIFORNIA BUILDING STANDARDS CODE.

• TESTS AND SPECIAL INSPECTIONS INCLUDE:
  • STRUCTURAL TESTS & SPECIAL INSPECTIONS
  • ELECTRICAL TESTS
  • MECHANICAL TESTS & SPECIAL INSPECTIONS
  • PLUMBING TESTS & SPECIAL INSPECTIONS
  • FIRE PROTECTION TESTS & SPECIAL INSPECTIONS
INSTRUCTIONS FOR COMPLETION OF TIO FORM

• SECTION D
  • CONSTRUCTION OBSERVATION AND REPORTING- VERIFIED COMPLIANCE REPORT REQUIRED
    • REFERENCE NO. FOR COORDINATION WITH VERIFIED COMPLIANCE REPORTS
    • REQUIRED CONSTRUCTION OBSERVATION MILESTONE OR INTERVAL
**INSTRUCTIONS FOR COMPLETION OF TIO FORM**

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<table>
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<th>Ref. No.</th>
<th>GEOR</th>
<th>AOR</th>
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<th>MEOR</th>
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**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT**

**Facilities Development Division**

2026 West El Camino Ave Suite 6-341 – San Mateo, California 94403

355 S. Grand Avenue, Suite 1500 – Los Angeles, California 90071

Phone (650) 440-8500 FAX (916) 324-9188

(213) 897-0116

**Testing, Inspection and Observation Program**

2016 California Building Standards Code – OSHPD 1

**CONSTRUCTION VERIFICATION**

**VERIFIED CONSTRUCTION INSPECTION AND OBSERVATION REPORTING**

**VERIFIED COMPLIANCE REPORT REQUIRED AS INDICATED**

(See "PERSONAL KNOWLEDGE" as defined in California Administrative Code, Section 1-131)
INSTRUCTIONS FOR COMPLETION OF TIO FORM

MILESTONE EXAMPLES

- Construction Preparation
- Site Work
- Foundation
- Masonry
- Steel
- Wood
- Roofing
- Fire Rated Const.

- Above ceiling components
- Architectural Elements
- Equip. Anchorage
- Fire Protection Systems
- Misc. Systems
- Plumbing Systems
- Mechanical Systems
- Electrical Systems
- Substantial Completion
INSTRUCTIONS FOR COMPLETION OF TIO FORM

INTERVAL EXAMPLES:

- CALENDAR FREQUENCY
  - WEEKLY
  - MONTHLY
  - BIMONTHLY
  - QUARTERLY
  - SEMIANNUALLY
  - ANNUALLY
INSTRUCTIONS FOR COMPLETION OF TIO FORM

• **VERIFIED COMPLIANCE REPORT REQUIRED:**

• **EACH BOX MARKED WITH A CHECK MARK OR “X” INDICATES A REPORT IS REQUIRED FROM:**
  
  • GEOTECHNICAL ENGINEER (GEOR)
  • ARCHITECT (AOR)
  • STRUCTURAL ENGINEER (SEOR)
  • MECHANICAL ENGINEER (MEOR)
  • ELECTRICAL ENGINEER (EEOR)
  • CONTRACTOR (CONT)
  • SPECIAL INSPECTOR (SP INSPI)
  • INSPECTOR OF RECORD (IOR)
INSTRUCTIONS FOR COMPLETION OF TIO FORM

• FOR OSHPD USE ONLY COLUMN:
  • FDD FIELD ADVISORY STAFF WILL CONFIRM THE COMPLETION OF ALL OBSERVATIONS AND THE PREPARATION AND SUBMITTAL OF ALL VERIFIED COMPLIANCE REPORTS
# Instructions for Completion of TIQ Form

**SECTION D**

**CONSTRUCTION VERIFICATION**

<table>
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<th>Facility #</th>
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**Verified Construction Inspection and Observation**

**Verified Compliance Report Required as Indicated**
(Form OSHA Form 123)

*See "PERSONAL KNOWLEDGE" as defined in California Administrative Code, Section 7-151*

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<thead>
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<th>Reference</th>
<th>Project Milestone or Interval</th>
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**Designated by preparer and verified for adequacy by FDD**

**Verified Compliance Report number**

**Required preparers indicated by a check mark in the appropriate box**

**Office confirmation of the completion of observations and the submission of verified compliance reports**

### Examples

- **Reference**: Document number or identifier
- **Project Milestone or Interval**: Specific project phase or milestone
- **Designated by**: Preparer responsible for the completion and verification
- **Verified Compliance Report number**: Unique identifier
- **Required preparers**: Check mark indicates preparers
- **Office confirmation**: Verification status

---

### Example Table Entry

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<tr>
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<td>Project Milestone 1</td>
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### Notes

- Ensure all required preparers are indicated.
- Verify that the compliance report number is correct.
- Confirm with office that observations have been completed and reports submitted.

---

**FOR OSHA USE ONLY**

[Form OSHA Form 123]

*California Administrative Code, Section 7-151*
- SECTION G

- SECTION G PROVIDES A LOCATION FOR THE PREPARER OF THE PROGRAM TO INDICATE THEY HAVE ATTACHED SAMPLES OF TEST AND INSPECTION REPORTS AND A LOCATION FOR THEM TO INDICATE THE TIME LIMIT FOR SUBMISSION OF REPORTS. THESE ARE REQUIRED COMPONENTS OF A TIO PROGRAM.

INSTRUCTIONS FOR COMPLETION OF TIO FORM
INSTRUCTIONS FOR COMPLETION OF TIO FORM

• SECTION G

• PRIOR TO ISSUING A BUILDING PERMIT, FIRMS AND INDIVIDUALS PERFORMING TESTS, INSPECTIONS AND OBSERVATIONS ARE EVALUATED FOR QUALIFICATIONS BY THE CONSTRUCTION COMPLIANCE SECTION. AN FDD SIGNATURE ON THE PERMIT APPROVAL LINE IN SECTION G CONFIRMS THAT FIRMS AND INDIVIDUALS HAVE BEEN DESIGNATED AND ARE ACCEPTABLE.
INSTRUCTIONS FOR COMPLETION OF TIO FORM

SECTION G

BUILDING PERMIT APPROVAL

NOTE: For testing, inspection and observation Program instructions, visit our website: http://oshpd.ca.gov/FDDPlan_Review/TIO.html

Samples of Test and Inspection Reports are: (NOT required for tests performed by laboratories approved through OPAA Program)

Attached

To be provided following determination of the responsible firm(s) or individual(s). Samples shall be submitted to and approved by the Office, prior to proceeding with the work that requires tests or special inspections.

Not applicable Project has no required tests or special inspections.

Required test and inspection reports shall be prepared and submitted to OSHPD/FDD within ___ days of the completion of all tests and inspections. If not designated, all reports shall be submitted to the Office within 16 calendar days.

In addition to the preprinted tests and special inspections, this program includes additional tests and special inspections as indicated:

- Other Tests
- Other Special Inspections
- Not Applicable

Verification that approved test and inspection agencies are objective, competent and independent as required by the CBC 2016 Section 1703A.1.15.

- Certification of independence and acceptance of test and inspection agencies by Registered Design Professional (RDP) in responsible charge in accordance with the CAC Section 7.141.
- Testing agency qualification for approval of testing agencies through OPAA program.
- Inspection agency qualification for approval.

This program has been prepared and submitted for an OSHPD I project. OSHPD I projects include all construction and remodel projects for general acute care hospitals and acute psychiatric hospitals. OSHPD II projects also include construction and remodel of skilled nursing facilities and/or intermediate care facilities except those of single-story, Type V, wood or light steel-frame construction.

Submitted by:

Preparers printed name and signature

Architect/Engineer of Record (Print Name) Professional License 

Architect/Engineer of Record (Signature) Date

FOR OSHPD USE ONLY

OSHPD TIEO Program Approval:

Name: 

Comments:

FDD Approval after firms and individuals evaluated
• 7-151. VERIFIED COMPLIANCE REPORTS.

(F) VERIFIED COMPLIANCE REPORTS SHALL BE SUBMITTED TO THE OFFICE AT THE INTERVALS OR STAGES OF THE WORK AS STATED IN THE APPROVED TESTING, INSPECTION AND OBSERVATION PROGRAM. IN NO CASE SHALL THE SUBMITTAL OF VERIFIED COMPLIANCE REPORTS BE LESS THAN:

1. ONE COPY PREPARED AND SIGNED BY EACH REQUIRED PARTICIPANT OR DISCIPLINE AT THE COMPLETION OF THE WORK.

2. ONE COPY PREPARED AND SIGNED BY ANY PARTICIPANT OR DISCIPLINE AT ANY TIME A SPECIAL VERIFIED COMPLIANCE REPORT IS REQUIRED BY THE OFFICE.
INSTRUCTIONS FOR COMPLETION OF TIO FORM

- 7-151. VERIFIED COMPLIANCE REPORTS.

(G) THE ARCHITECT OR ENGINEER IN RESPONSIBLE CHARGE OF THE WORK SHALL BE RESPONSIBLE FOR ENSURING ALL REQUIRED VERIFIED COMPLIANCE REPORTS ARE SUBMITTED TO THE OFFICE.
VERIFIED COMPLIANCE REPORT

INSTRUCTIONS

Submitted when:

- Intervals or stages of work identified in the approved TIO program are completed
- Anytime a special report is required by the office
- And always at the completion of a project
VERIFIED COMPLIANCE REPORT INSTRUCTIONS

• ALL FINAL VERIFIED COMPLIANCE REPORTS MUST BE SUBMITTED TO THE OSHPD FDD OFFICE RESPONSIBLE FOR THE MONITORING OF PROJECT CONSTRUCTION.
VERIFIED COMPLIANCE REPORT INSTRUCTIONS
Verify Compliance Report Instructions

Report prepared and submitted by a design professional, contractor, IOR or special inspector.
SPECIAL INSPECTIONS AND TESTS

CHAPTER 17A
### California Building Code – Matrix Adoption Table

**CHAPTER 17 – Special Inspections and Tests**

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

<table>
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<th>Adopting agency</th>
<th>BSC</th>
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<th>SFM</th>
<th>HCD 1</th>
<th>HCD 2</th>
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<th>DSA AC</th>
<th>DSA SS</th>
<th>DSA SS/CC</th>
<th>OSHPD 1</th>
<th>OSHPD 2</th>
<th>OSHPD 3</th>
<th>OSHPD 4</th>
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**Chapter / Section**

- 1701.1.1
- 1701.1.2
- 1701.1.3
- 1703.4
- 1704.2, Exception 5
- 1704.2, Exceptions 3 & 4
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- 1704.2.3 Exception
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CALIFORNIA BUILDING CODE – MATRIX ADOPTION TABLE

CHAPTER 17A – SPECIAL INSPECTIONS AND TESTS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user. See Chapter 1 for state agency authority and building applications.)

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Adopt entire chapter as amended (amended sections listed below)

Adopt only those sections that are listed below

Chapter / Section

The state agency does not adopt sections identified with the following symbol: †

The Office of the State Fire Marshal’s adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.
• **1701A.3 SPECIAL INSPECTIONS AND TESTS. [OSHPD 1 AND 4] IN ADDITION TO THE INSPECTOR(S) OF RECORD REQUIRED BY THE CALIFORNIA ADMINISTRATIVE CODE (CCR, TITLE 24, PART 1), SECTION 7-144, THE OWNER SHALL EMPLOY ONE OR MORE APPROVED AGENCIES TO PROVIDE SPECIAL INSPECTIONS AND TESTS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED UNDER CHAPTERS 17A, 18A, 19A, 20, 21A, 22A, 23, 25, 34A, AND NOTED IN THE TEST, INSPECTION, AND OBSERVATION (TIO) PROGRAM REQUIRED BY SECTIONS 7-141, 7-145 AND 7-149, OF THE CALIFORNIA ADMINISTRATIVE CODE. TEST, INSPECTION AND OBSERVATION (TIO) PROGRAM SHALL SATISFY REQUIREMENTS OF SECTION 1704A.**
SPECIAL INSPECTIONS AND TESTS

• **1703.4.1 APPROVED AGENCY.** AN APPROVED AGENCY SHALL PROVIDE ALL INFORMATION AS NECESSARY FOR THE BUILDING OFFICIAL TO DETERMINE THAT THE AGENCY MEETS THE APPLICABLE REQUIREMENTS SPECIFIED IN SECTIONS 1703.4.1.1 THROUGH 1703.4.1.3.

• **1703.4.1.1 INDEPENDENCE.** AN APPROVED AGENCY SHALL BE OBJECTIVE, COMPETENT AND INDEPENDENT FROM THE CONTRACTOR RESPONSIBLE FOR THE WORK BEING INSPECTED. THE AGENCY SHALL ALSO DISCLOSE TO THE BUILDING OFFICIAL AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE POSSIBLE CONFLICTS OF INTEREST SO THAT OBJECTIVITY CAN BE CONFIRMED.

• **1703.4.1.2 EQUIPMENT.** AN APPROVED AGENCY SHALL HAVE ADEQUATE EQUIPMENT TO PERFORM REQUIRED TESTS. THE EQUIPMENT SHALL BE PERIODICALLY CALIBRATED.

• **1703.4.1.3 PERSONNEL.** AN APPROVED AGENCY SHALL EMPLOY EXPERIENCED PERSONNEL EDUCATED IN CONDUCTING, SUPERVISING AND EVALUATING TESTS AND SPECIAL INSPECTIONS.
SPECIAL INSPECTIONS AND TESTS

• **APPROVED AGENCY.**

• **AN ESTABLISHED AND RECOGNIZED AGENCY THAT IS REGULARLY ENGAGED IN CONDUCTING TESTS OR FURNISHING INSPECTION SERVICES, WHERE SUCH AGENCY HAS BEEN APPROVED BY THE BUILDING OFFICIAL.**

• [HCD 1 & HCD 2] “APPROVED AGENCY” SHALL MEAN “LISTING AGENCY” AND “TESTING AGENCY.”

• [DSA-SS, DSA-SS/CCI] THIS TERM IS SYNONYMOUS WITH “LABORATORY OF RECORD” AS REFERENCED IN SECTION 4-335 OF THE CALIFORNIA ADMINISTRATIVE CODE.
SPECIAL INSPECTIONS AND TESTS

1703.42 WRITTEN APPROVAL. Any material, appliance, equipment, system or method of construction meeting the requirements of this code shall be approved in writing after satisfactory completion of the required tests and submission of required test reports.

1703.43 RECORD OF APPROVAL. For any material, appliance, equipment, system or method of construction that has been approved, a record of such approval, including the conditions and limitations of the approval, shall be kept on file in the building official’s office and shall be available for public review at appropriate times.
SPECIAL INSPECTIONS AND TESTS

• 1703.4 PERFORMANCE. SPECIFIC INFORMATION CONSISTING OF TEST REPORTS CONDUCTED BY AN APPROVED AGENCY IN ACCORDANCE WITH THE APPROPRIATE REFERENCED STANDARDS, OR OTHER SUCH INFORMATION AS NECESSARY, SHALL BE PROVIDED FOR THE BUILDING OFFICIAL TO DETERMINE THAT THE PRODUCT, MATERIAL OR ASSEMBLY MEETS THE APPLICABLE CODE REQUIREMENTS.

• [OSHPD 1 & 4] TESTS PERFORMED BY AN INDEPENDENT APPROVED TESTING AGENCY/LABORATORY HAVING ACCREDITATION TO THE INTERNATIONAL STANDARDS ORGANIZATION (ISO) ACCREDITATION STANDARD 17025 OR UNDER THE RESPONSIBLE CHARGE OF A COMPETENT APPROVED INDEPENDENT REGISTERED DESIGN PROFESSIONAL SHALL BE DEEMED TO COMPLY WITH REQUIREMENTS OF THIS SECTION. TEST REPORTS FOR STRUCTURAL TESTS SHALL BE REVIEWED AND ACCEPTED BY AN INDEPENDENT CALIFORNIA LICENSED STRUCTURAL ENGINEER.
• **1703.44.1 RESEARCH AND INVESTIGATION.** SUFFICIENT TECHNICAL DATA SHALL BE SUBMITTED TO THE BUILDING OFFICIAL TO SUBSTANTIATE THE PROPOSED USE OF ANY PRODUCT, MATERIAL OR ASSEMBLY. IF IT IS DETERMINED THAT THE EVIDENCE SUBMITTED IS SATISFACTORY PROOF OF PERFORMANCE FOR THE USE INTENDED, THE BUILDING OFFICIAL SHALL APPROVE THE USE OF THE PRODUCT, MATERIAL OR ASSEMBLY SUBJECT TO THE REQUIREMENTS OF THIS CODE. THE COSTS, REPORTS AND INVESTIGATIONS REQUIRED UNDER THESE PROVISIONS SHALL BE PAID BY THE OWNER OR THE OWNER’S AUTHORIZED AGENT.

• **1703.44.2 RESEARCH REPORTS.** SUPPORTING DATA, WHERE NECESSARY TO ASSIST IN THE APPROVAL OF PRODUCTS, MATERIALS OR ASSEMBLIES NOT SPECIFICALLY PROVIDED FOR IN THIS CODE, SHALL CONSIST OF VALID RESEARCH REPORTS FROM APPROVED SOURCES.
SECTION 1704/A SPECIAL INSPECTIONS AND TESTS, CONTRACTOR RESPONSIBILITY AND STRUCTURAL OBSERVATION

• 1704/A.1 GENERAL. SPECIAL INSPECTIONS AND TESTS, STATEMENTS OF SPECIAL INSPECTIONS, RESPONSIBILITIES OF CONTRACTORS, SUBMITTALS TO THE BUILDING OFFICIAL AND STRUCTURAL OBSERVATIONS SHALL MEET THE APPLICABLE REQUIREMENTS OF THIS SECTION.

• 1704/A.2 SPECIAL INSPECTIONS AND TESTS. WHERE APPLICATION IS MADE TO THE BUILDING OFFICIAL FOR CONSTRUCTION AS SPECIFIED IN SECTION 105, THE OWNER SHALL EMPLOY ONE OR MORE APPROVED AGENCIES TO PROVIDE SPECIAL INSPECTIONS AND TESTS DURING CONSTRUCTION ON THE TYPES OF WORK SPECIFIED IN SECTION 1705/A AND IDENTIFY THE APPROVED AGENCIES TO THE BUILDING OFFICIAL. THESE SPECIAL INSPECTIONS AND TESTS ARE IN ADDITION TO THE INSPECTIONS BY THE BUILDING OFFICIAL THAT ARE IDENTIFIED IN SECTION 110.
Special Inspections and Tests

- An inspection agency having accreditation to the International Standards Organization (ISO) accreditation standard 17020 shall be deemed to comply with the requirements for an approved inspection agency.

- The inspectors shall act under the direction of the architect or structural engineer or both, and be responsible to the owner. Where the California Administrative Code (CAC) section 7-115 (A) 2 permits construction documents to be prepared under the responsible charge of a mechanical, electrical or civil engineer, inspectors shall be permitted to work under the direction of engineer in appropriate branch as permitted therein.

Exceptions:

- Special inspections and tests are not required for construction of a minor nature or as warranted by conditions in the jurisdiction as approved by the building official.

- DSA-SS, DSA-SS/CCI reference to section 105 and section 110 shall be to the California Administrative Code instead.
SPECIAL INSPECTIONS AND TESTS

1704/2.1 SPECIAL INSPECTOR QUALIFICATIONS. PRIOR TO THE START OF THE CONSTRUCTION, THE APPROVED AGENCIES SHALL PROVIDE WRITTEN DOCUMENTATION TO THE BUILDING OFFICIAL DEMONSTRATING THE COMPETENCE AND RELEVANT EXPERIENCE OR TRAINING OF THE SPECIAL INSPECTORS WHO WILL PERFORM THE SPECIAL INSPECTIONS AND TESTS DURING CONSTRUCTION. EXPERIENCE OR TRAINING SHALL BE CONSIDERED RELEVANT WHERE THE DOCUMENTED EXPERIENCE OR TRAINING IS RELATED IN COMPLEXITY TO THE SAME TYPE OF SPECIAL INSPECTION OR TESTING ACTIVITIES FOR PROJECTS OF SIMILAR COMPLEXITY AND MATERIAL QUALITIES. THESE QUALIFICATIONS ARE IN ADDITION TO QUALIFICATIONS SPECIFIED IN OTHER SECTIONS OF THIS CODE.

THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND ENGINEERS OF RECORD INVOLVED IN THE DESIGN OF THE PROJECT ARE PERMITTED TO ACT AS THE APPROVED AGENCY AND THEIR PERSONNEL ARE PERMITTED TO ACT AS SPECIAL INSPECTORS FOR THE WORK DESIGNED BY THEM, PROVIDED THEY QUALIFY AS SPECIAL INSPECTORS.
SPECIAL INSPECTIONS AND TESTS

• **1704.2.2 ACCESS FOR SPECIAL INSPECTION.** The construction or work for which special inspection or testing is required shall remain accessible and exposed for special inspection or testing purposes until completion of the required special inspections or tests.

• **1704.2.3 STATEMENT OF SPECIAL INSPECTIONS.** The *applicant* shall submit a statement of special inspections prepared by the registered design professional in general responsible charge in accordance with Section 107.1 as a condition for construction documents review. This statement shall be in accordance with Section 1704.3.
SPECIAL INSPECTIONS AND TESTS

• **1704.A2.4 REPORT REQUIREMENT.** THE INSPECTOR(S) OF RECORD AND APPROVED AGENCIES SHALL KEEP RECORDS OF INSPECTIONS. THE INSPECTOR OF RECORD AND APPROVED AGENCY SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AS REQUIRED BY THE CALIFORNIA ADMINISTRATIVE CODE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS AS REQUIRED BY THE CALIFORNIA ADMINISTRATIVE CODE AND THIS CODE. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE PRIOR TO THE COMPLETION OF THAT PHASE OF THE WORK. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS AND TESTS, AND CORRECTION OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS OR TESTS, SHALL BE SUBMITTED AT A POINT IN TIME AGREED UPON PRIOR TO THE START OF WORK BY THE OWNER OR THE OWNER’S AUTHORIZED AGENT TO THE BUILDING OFFICIAL.
• **1704A.3 Statement of special inspections.** Where special inspections or tests are required by Section 1705A, the registered design professional in responsible charge shall prepare a statement of special inspections in accordance with Section 1704A.3.1 for submittal by the applicant in accordance with Section 1704A.2.3.

• **Exception:** 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.
SPECIAL INSPECTIONS AND TESTS

1704.43.1 CONTENT OF STATEMENT OF SPECIAL INSPECTIONS. THE STATEMENT OF SPECIAL INSPECTIONS SHALL IDENTIFY THE FOLLOWING:

1. THE MATERIALS, SYSTEMS, COMPONENTS AND WORK REQUIRED TO HAVE SPECIAL INSPECTIONS OR TESTS BY THE BUILDING OFFICIAL OR BY THE REGISTERED DESIGN PROFESSIONAL RESPONSIBLE FOR EACH PORTION OF THE WORK.

2. THE TYPE AND EXTENT OF EACH SPECIAL INSPECTION.

3. THE TYPE AND EXTENT OF EACH TEST.

4. ADDITIONAL REQUIREMENTS FOR SPECIAL INSPECTIONS OR TESTS FOR SEISMIC OR WIND RESISTANCE AS SPECIFIED IN SECTIONS 1705A.11, 1705A.12 AND 1705A.13.

5. FOR EACH TYPE OF SPECIAL INSPECTION, IDENTIFICATION AS TO WHETHER IT WILL BE CONTINUOUS SPECIAL INSPECTION, PERIODIC SPECIAL INSPECTION OR PERFORMED IN ACCORDANCE WITH THE NOTATION USED IN THE REFERENCED STANDARD WHERE THE INSPECTIONS ARE DEFINED.
HEATED STEEL OVER CHARRED WOOD...WHY WE PROTECT STEEL
SECTION 1705. REQUIRED SPECIAL INSPECTIONS AND TESTS

1705.1 General. Special inspections and tests of elements and nonstructural components of buildings and structures shall meet the applicable requirements of this section.

1705.1.1 Special cases. Special inspections and tests shall be required for proposed work that is, in the opinion of the building official, unusual in its nature, such as, but not limited to, the following examples:

1. Construction materials and systems that are alternatives to materials and systems prescribed by this code.
2. Unusual design applications of materials described in this code.
3. Materials and systems required to be installed in accordance with additional manufacturer’s instructions that prescribe requirements not contained in this code or in standards referenced by this code.
SPECIAL INSPECTIONS AND TESTS

- **[BF] 1705A.14 SPRAYED FIRE-RESISTANT MATERIALS.** Special inspections and tests of sprayed fire-resistant materials applied to floor, roof and wall assemblies and structural members shall be performed in accordance with Sections 1705A.14.1 through 1705A.14.6. Special inspections shall be based on the fire-resistance design as designated in the approved construction documents. The tests set forth in this section shall be based on samplings from specific floor, roof and wall assemblies and structural members. Special inspections and tests shall be performed after the rough installation of electrical, automatic sprinkler, mechanical and plumbing systems and suspension systems for ceilings, where applicable.
SPECIAL INSPECTIONS AND TESTS

- IBFI 1705/A14.1  PHYSICAL AND VISUAL TESTS. THE SPECIAL INSPECTIONS AND TESTS SHALL INCLUDE THE FOLLOWING TO DEMONSTRATE COMPLIANCE WITH THE LISTING AND THE FIRE-RESISTANCE RATING:

1. Condition of substrates.
2. Thickness of application.
3. Density in pounds per cubic foot (kg/m3).
5. Condition of finished application.
SPECIAL INSPECTIONS AND TESTS

1. [BF] 1705.414.2 Structural member surface conditions. The surfaces shall be prepared in accordance with the approved fire-resistance design and the written instructions of approved manufacturers. The prepared surface of structural members to be sprayed shall be inspected by the special inspector before the application of the sprayed fire-resistant material.

2. [BF] 1705.414.3 Application. The substrate shall have a minimum ambient temperature before and after application as specified in the written instructions of approved manufacturers. The area for application shall be ventilated during and after application as required by the written instructions of approved manufacturers.
SPECIAL INSPECTIONS AND TESTS

- **1705.A14.4 THICKNESS.** No more than 10 percent of the thickness measurements of the sprayed fire resistant materials applied to floor, roof and wall assemblies and structural members shall be less than the thickness required by the approved fire-resistance design, but in no case less than the minimum allowable thickness required by section 1705.A14.4.1.

- **1705.A14.4.1 MINIMUM ALLOWABLE THICKNESS.** For design thicknesses 1 inch (25mm) or greater, the minimum allowable individual thickness shall be the design thickness minus 1/4 inch (6.4 mm). For design thicknesses less than 1 inch (25 mm), the minimum allowable individual thickness shall be the design thickness minus 25 percent. Thickness shall be determined in accordance with ASTM E605. Samples of the sprayed fire-resistant materials shall be selected in accordance with sections 1705.A14.4.2 and 1705.A14.4.3.
SPECIAL INSPECTIONS AND TESTS

- **BF 1705.A14.4.2 Floor, Roof and Wall Assemblies.** The thickness of the sprayed fire-resistant material applied to floor, roof and wall assemblies shall be determined in accordance with ASTM E605, making not less than four measurements for each 1,000 square feet (93 m²) of the sprayed area, or portion thereof, in each story.

- **BF 1705.A14.4.3 Cellular Decks.** Thickness measurements shall be selected from a square area, 12 inches by 12 inches (305 mm by 305 mm) in size. A minimum of four measurements shall be made, located symmetrically within the square area.

- **BF 1705.A14.4.4 Fluted Decks.** Thickness measurements shall be selected from a square area, 12 inches by 12 inches (305 mm by 305 mm) in size. A minimum of four measurements shall be made, located symmetrically within the square area, including one each of the following: valley, crest and sides. The average of the measurements shall be reported.

- **BF 1705.A14.4.5 Structural Members.** The thickness of the sprayed fire-resistant material applied to structural members shall be determined in accordance with ASTM E605. Thickness testing shall be performed on not less than 25 percent of the structural members on each floor.
SPECIAL INSPECTIONS AND TESTS

• **BF1 1705.4.1.4.6 BEAMS AND GIRDERS.** At beams and girders, thickness measurements shall be made at nine locations around the beam or girder at each end of a 12-inch (305 mm) length.

• **BF1 1705.4.1.4.7 JOISTS AND TRUSSES.** At joists and trusses, thickness measurements shall be made at seven locations around the joist or truss at each end of a 12-inch (305 mm) length.

• **BF1 1705.4.1.4.8 WIDE-FLANGED COLUMNS.** At wide-flanged columns, thickness measurements shall be made at 12 locations around the column at each end of a 12-inch (305 mm) length.

• **BF1 1705.4.1.4.9 HOLLOW STRUCTURAL SECTION AND PIPE COLUMNS.** At hollow structural section and pipe columns, thickness measurements shall be made at a minimum of four locations around the column at each end of a 12-inch (305 mm) length.
SPECIAL INSPECTIONS AND TESTS

- BF1705 A 14.5 density. The density of the sprayed fire-resistant material shall not be less than the density specified in the approved fire-resistance design. Density of the sprayed fire-resistant material shall be determined in accordance with ASTM E605. The test samples for determining the density of the sprayed fire-resistant materials shall be selected as follows:

  - From each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m²) or portion thereof of the sprayed area in each story.

  - From beams, girders, trusses and columns at the rate of not less than one sample for each type of structural member for each 2,500 square feet (232 m²) of floor area or portion thereof in each story.
• **[BF] 1705.14.6.1 FLOOR, ROOF AND WALL ASSEMBLIES.** The test samples for determining the cohesive/adhesive bond strength of the sprayed fire-resistant materials shall be selected from each floor, roof and wall assembly at the rate of not less than one sample for every 2,500 square feet (232 m²) of the sprayed area, or portion thereof, in each story.

• **[BF] 1705.14.6.2 STRUCTURAL MEMBERS.** The test samples for determining the cohesive/adhesive bond strength of the sprayed fire-resistant materials shall be selected from beams, girders, trusses, columns and other structural members at the rate of not less than one sample for each type of structural member for each 2,500 square feet (232 m²) of floor area or portion thereof in each story.

• **[BF] 1705.14.6.3 PRIMER, PAINT AND ENCAPSULANT BOND TESTS.** Bond tests to qualify a primer, paint or encapsulant shall be conducted when the sprayed fire-resistant material is applied to a primed, painted or encapsulated surface for which acceptable bond-strength performance between these coatings and the fire-resistant material has not been determined. A bonding agent approved by the SFRM manufacturer shall be applied to a primed, painted or encapsulated surface where the bond strengths are found to be less than required values.
SPECIAL INSPECTIONS AND TESTS

• **1705.15 MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS.** SPECIAL INSPECTIONS AND TESTS FOR MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS APPLIED TO STRUCTURAL ELEMENTS AND DECKS SHALL BE PERFORMED IN ACCORDANCE WITH AWCI 12-B. SPECIAL INSPECTIONS AND TESTS SHALL BE BASED ON THE FIRE-RESISTANCE DESIGN AS DESIGNATED IN THE APPROVED CONSTRUCTION DOCUMENTS.

1705.16 EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS). SPECIAL INSPECTIONS SHALL BE REQUIRED FOR ALL EIFS APPLICATIONS.

**EXCEPTIONS:**

• SPECIAL INSPECTIONS SHALL NOT BE REQUIRED FOR EIFS APPLICATIONS INSTALLED OVER A WATER-RESISTIVE BARRIER WITH A MEANS OF DRAINING MOISTURE TO THE EXTERIOR.

• SPECIAL INSPECTIONS SHALL NOT BE REQUIRED FOR EIFS APPLICATIONS INSTALLED OVER MASONRY OR CONCRETE WALLS.

• **1705.16.1 WATER-RESISTIVE BARRIER COATING.** A WATER- RESISTIVE BARRIER COATING COMPLYING WITH ASTM E2570 REQUIRES SPECIAL INSPECTION OF THE WATER-RESISTIVE BARRIER COATING WHEN INSTALLED OVER A SHEATHING SUBSTRATE.
SECTION 1707A ALTERNATIVE TEST PROCEDURE

• 1707A.1 GENERAL. IN THE ABSENCE OF APPROVED RULES OR OTHER APPROVED STANDARDS, THE BUILDING OFFICIAL SHALL MAKE, OR CAUSE TO BE MADE, THE NECESSARY TESTS AND INVESTIGATIONS; OR THE BUILDING OFFICIAL SHALL ACCEPT DULY AUTHENTICATED REPORTS FROM APPROVED AGENCIES IN RESPECT TO THE QUALITY AND MANNER OF USE OF NEW MATERIALS OR ASSEMBLIES AS PROVIDED FOR IN SECTION 104.11. THE COST OF ALL TESTS AND OTHER INVESTIGATIONS REQUIRED UNDER THE PROVISIONS OF THIS CODE SHALL BE BORNE BY THE OWNER OR THE OWNER’S AUTHORIZED AGENT.
FIRE AND SMOKE PROTECTION FEATURES

CHAPTER 7
MULTIPLE USE FIRE ASSEMBLIES

SECTION 702
MULTIPLE USE FIRE ASSEMBLIES

- 702.1 MULTIPLE USE FIRE ASSEMBLIES. FIRE ASSEMBLIES THAT SERVE MULTIPLE PURPOSES IN A BUILDING SHALL COMPLY WITH ALL OF THE REQUIREMENTS THAT ARE APPLICABLE FOR EACH OF THE INDIVIDUAL FIRE ASSEMBLIES.
MULTIPLE USE FIRE ASSEMBLIES

• MULTIPLE USES:
  • CORRIDOR WALL + OCCUPANCY SEPARATION
  • OCCUPANCY SEPARATION + SMOKE BARRIER
  • EXIT ENCLOSURE + OCCUPANCY SEPARATION
  • CORRIDOR WALL + INCIDENTAL USE

• MUST COMPLY WITH THE MOST RESTRICTIVE REQUIREMENTS OF EACH FIRE ASSEMBLY
FIRE RESISTANCE RATINGS & FIRE TESTS

703.3 METHODS FOR DETERMINING FIRE RESISTANCE. THE APPLICATION OF ANY OF THE METHODS LISTED IN THIS SECTION SHALL BE BASED ON THE FIRE EXPOSURE AND ACCEPTANCE CRITERIA SPECIFIED IN ASTM E 119 OR UL 263. THE REQUIRED FIRE RESISTANCE OF A BUILDING ELEMENT SHALL BE PERMITTED TO BE ESTABLISHED BY ANY OF THE FOLLOWING METHODS OR PROCEDURES:

1. FIRE-RESISTANCE DESIGNS DOCUMENTED IN APPROVED SOURCES.
2. PRESCRIPTIVE DESIGNS OF FIRE-RESISTANCE-RATED BUILDING ELEMENTS AS PRESCRIBED IN SECTION 721.
3. CALCULATIONS IN ACCORDANCE WITH SECTION 722.
4. ENGINEERING ANALYSIS BASED ON A COMPARISON OF BUILDING ELEMENT DESIGNS HAVING FIRE-RESISTANCE RATINGS AS DETERMINED BY THE TEST PROCEDURES SET FORTH IN ASTM E119 OR UL 263.
5. ALTERNATIVE PROTECTION METHODS AS ALLOWED BY SECTION 104.11.
6. FIRE-RESISTANCE DESIGNS CERTIFIED BY AN APPROVED AGENCY.
FIRE RESISTANCE RATINGS & FIRE TESTS

OSHPD CAN ENGINEERING JUDGMENTS
7-104 ALTERNATE METHOD OF COMPLIANCE. The provisions of the California Building Standards Code (CBSC) are not intended to prevent the use of any alternate method of compliance not specifically prescribed by the CBSC, provided written approval for such alternate method has been granted by the office. Alternate methods include alternate means of protection, alternate method of compliance, alternative system, designs required by regulations to be specifically approved by the enforcing agency, and program flexibility. A written request shall be submitted to the office with an alternate method of compliance form provided by the office and supporting documentation as necessary to assist the office in its review.
• **7-104 ALTERNATE METHOD OF COMPLIANCE CONTINUED.** The written request shall include substantiating evidence in support of the alternate. If the request is submitted prior to the submittal of construction documents, an application for plan review form must also be submitted with a fee pursuant to Section 7-133 (A) 3. A request approved by the office shall be limited to the specific request and shall not be construed as establishing a precedent for any future requests.

• The provisions of the following sections must also be met: Section 104.11 and Section 1224.2, California Building Code; Article 90.4, California Electrical Code; Section 105.0, California Mechanical Code; Section 301.4, California Plumbing Code; and Section 1.11.2.4, California Fire Code.

• **CASE BY CASE BASIS ONLY.**
CBC 703.3

ALTERNATE METHOD OF COMPLIANCE

USE OSHPD FORM: OSH-FD-126 WHERE ALTERNATE METHOD OF CODE COMPLIANCE IS BEING REQUESTED

PRE-APPROVED DETAILS

PIN 51
OSHPD Pre-Approved Details
https://oshpd.ca.gov/construction-finance/preapproval-programs/

ENGINEERING JUDGEMENT

CAN 2-703.3

WHERE PROJECT CONDITIONS REQUIRE A VARIATION TO THE TESTED DETAILS, AN “ENGINEERING JUDGEMENT” MAY NEED TO BE MADE BY A QUALIFIED REPRESENTATIVE OF THE MANUFACTURER, A REGISTERED PROFESSIONAL ENGINEER, FIRE PROTECTION ENGINEER OR AN APPROVED INDEPENDENT TESTING AGENCY, AND SHOULD BE INCORPORATED INTO THE APPROVED DRAWINGS.
• **703.4 AUTOMATIC SPRINKLERS.** Under the prescriptive fire resistance requirements of the *California Building Code*, the fire-resistance rating of a building element, component or assembly shall be established without the use of automatic sprinklers or any other fire suppression system being incorporated as part of the assembly tested in accordance with the fire exposure, procedures, and acceptance criteria specified in ASTM E 119 or UL 263. **However,** this section shall not prohibit or limit the duties and powers of the building official allowed by sections 104.10 and 104.11 and 1.8.7, as applicable.
FIRE RESISTANCE RATINGS & FIRE TESTS

- AUTOMATIC SPRINKLERS.

- FIRE SPRINKLERS USED AS AN EQUIVALENT TO A FIRE RESISTANCE RATING OR BUILDING ELEMENT MUST BE PROCESSED AS AN ALTERNATE MATERIALS, DESIGN OR METHODS ON A CASE BY CASE BASIS.

- 104.10: MODIFICATIONS (OSHPD)

- 104.11: ALTERNATE MEANS (OSHPD)

- 1.11.2.4: REQUEST FOR ALTERNATE MEANS OF PROTECTION (SFM)
FIRE-RESISTANCE RATING OF STRUCTURAL MEMBERS

SECTION 704

EXCEPTION: FIRE BARRIERS, FIRE PARTITIONS, SMOKE BARRIERS AND HORIZONTAL ASSEMBLIES AS PROVIDED IN SECTIONS 707.5, 708.4, 709.4 AND 711.4, RESPECTIVELY.
CBC 704.1

‘...SHALL BE NOT LESS THAN THE RATINGS REQUIRED FOR THE FIRE-RESISTANCE-RATED ASSEMBLIES SUPPORTED BY THE STRUCTURAL MEMBERS.’
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

1½ in. min thickness

Width

W14 × 228 or larger

Smaller than W14 × 228

2½ in. min thickness

Steel columns—4-hour, spray-on protection
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

• 704.2 COLUMN PROTECTION. WHERE COLUMNS ARE REQUIRED TO HAVE PROTECTION TO ACHIEVE A FIRE-RESISTANCE RATING, THE ENTIRE COLUMN SHALL BE PROVIDED INDIVIDUAL ENCASEMENT PROTECTION BY PROTECTING IT ON ALL SIDES FOR THE FULL COLUMN HEIGHT, INCLUDING CONNECTIONS TO OTHER STRUCTURAL MEMBERS, WITH MATERIALS HAVING THE REQUIRED FIRE-RESISTANCE RATING. WHERE THE COLUMN EXTENDS THROUGH A CEILING, THE ENCASEMENT PROTECTION SHALL BE CONTINUOUS FROM THE TOP OF THE FOUNDATION OR FLOOR/CEILING ASSEMBLY BELOW THROUGH THE CEILING SPACE TO THE TOP OF THE COLUMN.

EXCEPTION: COLUMNS THAT MEET THE LIMITATIONS OF SECTION 704.4.1. (LIGHT FRAME CONSTRUCTION)
Column Protection
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

Column Protection

Columns penetrating ceiling must be protected to roof or floor deck above.
FIRE-RESISTANCE RATING
STRUCTURAL MEMBERS

- 704.4 PROTECTION OF SECONDARY MEMBERS. SECONDARY MEMBERS THAT ARE REQUIRED TO HAVE PROTECTION TO ACHIEVE A FIRE-RESISTANCE RATING SHALL BE PROTECTED BY INDIVIDUAL ENCASEMENT PROTECTION.
• 704.4 PROTECTION OF SECONDARY MEMBERS.

  704.4.1 LIGHT-FRAME CONSTRUCTION. STUDS, COLUMNS AND BOUNDARY ELEMENTS THAT ARE INTEGRAL ELEMENTS IN WALLS OF LIGHT-FRAME CONSTRUCTION AND ARE LOCATED ENTIRELY BETWEEN THE TOP AND BOTTOM PLATES OR TRACKS SHALL BE PERMITTED TO HAVE REQUIRED FIRE-RESISTANCE RATINGS PROVIDED BY THE MEMBRANE PROTECTION PROVIDED FOR THE WALL.

  KING STUDS, JACK STUDS AND BOUNDARY ELEMENTS ARE TREATED AS STUDS RATHER THAN AS COLUMNS.
Individual protection is required where column extends above top plate.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

• **704.4 Protection of Secondary Members.**

• **704.4.2 Horizontal Assemblies.** Horizontal assemblies are permitted to be protected with a membrane or ceiling where the membrane or ceiling provides the required fire resistance rating and is installed in accordance with Section 711.

Not so fast! You can do this for some conditions but only if it has been tested! It is important that the structural members located within the assemblies were also in the tested floor/ceiling and roof/ceiling assemblies.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

• **704.5 TRUSS PROTECTION.** The required thickness and construction of fire-resistance-rated assemblies enclosing trusses shall be based on the results of full-scale tests or combinations of tests on truss components or on approved calculations based on such tests that satisfactorily demonstrate that the assembly has the required fire resistance.
FIRE-RESISTANCE RATING
STRUCTURAL MEMBERS

Trusses can be of an almost infinite number of configurations and sizes. By nature, they are typically designed and constructed of different structural components. This leads to the impracticality of such trusses being tested. The code acknowledges this by allowing full-scale tests, tests on the individual components or some form of calculations that demonstrate that the structural elements that form the truss are provided with the requisite protection to attain the fire-resistance rating.
704.6 ATTACHMENTS TO STRUCTURAL MEMBERS. THE EDGES OF LUGS, BRACKETS, RIVETS AND BOLT HEADS ATTACHED TO STRUCTURAL MEMBERS SHALL BE PERMITTED TO EXTEND TO WITHIN 1 INCH OF THE SURFACE OF THE FIRE PROTECTION.
Edges of lugs, brackets, rivets and bolt heads may project to within 1 in. of surface.

Member size

Min thickness

Fill solid—carbonate, lightweight and sand—lightweight aggregate concrete (not made with siliceous aggregate)

Conduits and pipes shall not be embedded in the required fire protection of structural members (Section 704.8)

0.18-in.-diameter wire tie reinforcement spirals around columns at 8 in. max pitch (or equivalent) per Section 721.1.3

For SI: 1 inch = 25.4 mm.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

704.6.1 SECONDARY ATTACHMENTS TO STRUCTURAL MEMBERS. WHERE PRIMARY AND SECONDARY STRUCTURAL STEEL MEMBERS REQUIRE FIRE PROTECTION, SECONDARY ATTACHMENTS TO THOSE STRUCTURAL MEMBERS SHALL BE PROTECTED WITH THE SAME FIRE RESISTIVE MATERIAL AND THICKNESS AS REQUIRED FOR THE STRUCTURAL MEMBER. THE PROTECTION SHALL EXTEND AWAY FROM THE STRUCTURAL MEMBER A DISTANCE OF NOT LESS THAN 12 INCHES, OR SHALL BE APPLIED TO THE ENTIRE LENGTH WHEN THE ATTACHMENT IS LESS THAN 12 INCHES LONG. WHEN AN ATTACHMENT IS HOLLOW AND THE ENDS ARE OPEN, THE FIRE-RESISTIVE MATERIAL AND THICKNESS SHALL BE APPLIED TO BOTH EXTERIOR AND INTERIOR OF THE HOLLOW STEEL ATTACHMENT.
ATTACHMENTS TO STRUCTURAL MEMBERS

704.6.1 Protection of secondary attachments
FIRE-RESISTANCE RATING
STRUCTURAL MEMBERS

- 704.7 REINFORCING. THICKNESS OF PROTECTION FOR CONCRETE OR MASONRY REINFORCEMENT SHALL BE MEASURED TO THE OUTSIDE OF THE REINFORCEMENT EXCEPT THAT STIRRUPS AND SPIRAL REINFORCEMENT TIES ARE PERMITTED TO PROJECT NOT MORE THAN 0.5-INCH INTO THE PROTECTION.
• **704.8 EMBEDMENTS AND ENCLOSURES.** PIPES, WIRES, CONDUITS, DUCTS OR OTHER SERVICE FACILITIES SHALL NOT BE EMBEDDED IN THE REQUIRED FIRE PROTECTIVE COVERING OF A STRUCTURAL MEMBER THAT IS REQUIRED TO BE INDIVIDUALLY ENCASED.
• 704.9 Impact Protection. Where the fire protective covering of a structural member is subject to impact damage from moving vehicles, the handling of merchandise or other activity, the fire protective covering shall be protected by corner guards or by a substantial jacket of metal or other noncombustible material to a height adequate to provide full protection, but not less than 5 feet from the finished floor.

**Exception:** Corner protection is not required on concrete columns in parking garages.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

Required height and thickness of protective cover must provide full protection and extend at least 5 ft above floor.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

704.10 EXTERIOR STRUCTURAL MEMBERS. LOAD-BEARING STRUCTURAL MEMBERS located within the exterior walls or on the outside of a building or structure shall be provided with the highest fire-resistance rating as determined in accordance with the following:

1. AS REQUIRED BY TABLE 601 FOR THE TYPE OF BUILDING ELEMENT BASED ON THE TYPE OF CONSTRUCTION OF THE BUILDING;

2. AS REQUIRED BY TABLE 601 FOR EXTERIOR BEARING WALLS BASED ON THE TYPE OF CONSTRUCTION; AND

3. AS REQUIRED BY TABLE 602 FOR EXTERIOR WALLS BASED ON THE FIRE SEPARATION DISTANCE
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

**GIVEN:** An exterior nonbearing wall in a Type IIIB building housing a Group M occupancy. The wall has a fire separation distance of 15 feet to an interior lot line.

**Determine:** The minimum required fire-resistance rating for structural columns located within the exterior wall.
<table>
<thead>
<tr>
<th>FIRE SEPARATION DISTANCE - X (feet)</th>
<th>TYPE OF CONSTRUCTION</th>
<th>OCCUPANCY GROUP H*, L</th>
<th>OCCUPANCY GROUP F-1, M, S-1f</th>
<th>OCCUPANCY GROUP A, B, E, F-2, I, R*, S-2, Uh</th>
</tr>
</thead>
<tbody>
<tr>
<td>X &lt; 5b</td>
<td>All</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5 ≤ X &lt; 10</td>
<td>IIA</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10 ≤ X &lt; 30</td>
<td>IIA, IIB</td>
<td>2</td>
<td>1</td>
<td>1i</td>
</tr>
<tr>
<td></td>
<td>IIB, VB</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>1</td>
<td>1</td>
<td>1i</td>
</tr>
<tr>
<td>X ≥ 30</td>
<td>All</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm.

a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.

b. See Section 705.1.1 for party walls.

c. Open parking garages complying with Section 406 shall not be required to have a fire-resistance rating.

d. The fire-resistance rating of an exterior wall is determined based upon the fire separation distance of the exterior wall and the story in which the wall is located.

e. For special requirements for Group H occupancies, see Section 415.6.

f. For special requirements for Group S aircraft hangars, see Section 412.4.1.

g. Where Table 705.8 permits non-bearing exterior walls with unlimited area of unprotected openings, the required fire-resistance rating for the exterior walls is 0 hours.

h. For a building containing only a Group U occupancy private garage or carport, the exterior wall shall not be required to have a fire-resistance rating where the fire separation distance is 5 feet (1523) or greater.

i. Group R-3 and Group U occupancies when used as accessory to Group R-3 occupancies, shall not be required to have a fire-resistance rating where the fire separation distance is 5 feet or more, or when equipped throughout with an automatic residential fire sprinkler system installed in accordance with Section 903.3 the fire-resistance rating shall not be required where the fire separation distance is 3 feet or more.
<table>
<thead>
<tr>
<th>BUILDING ELEMENT</th>
<th>TYPE I</th>
<th>TYPE II</th>
<th>TYPE III</th>
<th>TYPE IV</th>
<th>TYPE V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
<td>HT</td>
</tr>
<tr>
<td>Primary structural frame <em>(see Section 202)</em></td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Bearing walls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Interior</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Nonbearing walls and partitions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nonbearing walls and partitions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor construction and associated secondary members <em>(see Section 202)</em></td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Roof construction and associated secondary members <em>(see Section 202)</em></td>
<td>1 1/2</td>
<td>1 1/2</td>
<td>1 1/2</td>
<td>0</td>
<td>1 1/2</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. 1. Except in Group A, E, F-1, H, I, L, M, R-1, R-2, R-2.1 and S-1 occupancies, high-rise buildings, and other applications listed in Section 111 regulated by the Office of the State Fire Marshal, fire protection of primary structural members shall not be required including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant treated wood members shall be allowed to be used for such unprotected members.

c. 2. For Group A, E, I, L, R-1, R-2, and R-2.1 occupancies, high-rise buildings, and other applications listed in Section 111 regulated by the Office of the State Fire Marshal, fire protection of members other than the primary structural frame shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant treated wood members shall be allowed to be used for such unprotected members.

d. 3. One-story portions of Group A and E assembly occupancies the roof-framing system of Type II A or Type III A construction may be of unprotected construction when such roof-framing system is open to the assembly area and does not contain concealed spaces.

e. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.

f. Not less than the fire-resistance rating required by other sections of this code.

g. Not less than the fire-resistance rating based on fire separation distance (see Table 602).

h. Not less than the fire-resistance rating as referenced in Section 704.10.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

**GIVEN:** An exterior nonbearing wall in a Type III B building housing a Group M occupancy. The wall has a fire separation distance of 15 feet to an interior lot line.

**DETERMINE:** The minimum required fire-resistance rating for structural columns located within the exterior wall.

**SOLUTION:**
- Per Table 601 for structural frame members, a minimum of 0 hours
- Per Table 601 for exterior bearing walls, a minimum of 2 hours
- Per Table 602 for a FSD of 15 feet, a minimum of 1 hour

\[ \therefore \text{The columns shall have a minimum fire-resistance rating of 2 hours} \]
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

• 704.11 Bottom Flange Protection. Fire protection is not required at the bottom flange of lintels, shelf angles and plates, spanning not more than 6 feet 4 inches whether part of the structural frame or not, and from the bottom flange of lintels, shelf angles and plates not part of the structural frame, regardless of span.

Structural frame elements located over an opening in a wall required to be fire-resistance rated, particularly a masonry wall with an exposed steel lintel or angle over the wall opening, are covered by this section.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

• **704.12 SEISMIC ISOLATION SYSTEMS.** FIRE-RESISTANCE RATINGS FOR THE ISOLATION SYSTEM SHALL MEET THE FIRE-RESISTANCE RATING REQUIRED FOR THE COLUMNS, WALLS OR OTHER STRUCTURAL ELEMENTS IN WHICH THE ISOLATION SYSTEM IS INSTALLED IN ACCORDANCE WITH TABLE 601.

• **ISOLATION SYSTEMS REQUIRED TO HAVE A FIRE-RESISTANCE RATING SHALL BE PROTECTED WITH APPROVED MATERIALS OR CONSTRUCTION ASSEMBLIES DESIGNED TO PROVIDE THE SAME DEGREE OF FIRE RESISTANCE AS THE STRUCTURAL ELEMENT IN WHICH IT IS INSTALLED WHEN TESTED IN ACCORDANCE WITH ASTM E 119 OR UL 263 (SEE SECTION 703.2).**
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

- **704.12 SEISMIC ISOLATION SYSTEMS (CONTINUED).** SUCH ISOLATION SYSTEM PROTECTION APPLIED TO ISOLATOR UNITS SHALL BE CAPABLE OF RETARDING THE TRANSFER OF HEAT TO THE ISOLATOR UNIT IN SUCH A MANNER THAT THE REQUIRED GRAVITY LOAD-CARRYING CAPACITY OF THE ISOLATOR UNIT WILL NOT BE IMPAIRED AFTER EXPOSURE TO THE STANDARD TIME-TEMPERATURE CURVE FIRE TEST PRESCRIBED IN ASTM E 119 OR UL 263 FOR A DURATION NOT LESS THAN THAT REQUIRED FOR THE FIRE-RESISTANCE RATING OF THE STRUCTURE ELEMENT IN WHICH IT IS INSTALLED.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

- 704.12 SEISMIC ISOLATION SYSTEMS (CONTINUED). SUCH ISOLATION SYSTEM PROTECTION APPLIED TO ISOLATOR UNITS SHALL BE SUITABLY DESIGNED AND SECURELY INSTALLED SO AS NOT TO DISLodge, LOOSEN, SUSTAIN DAMAGE OR OTHERWISE IMPAIR ITS ABILITY TO ACCOMMODATE THE SEISMIC MOVEMENTS FOR WHICH THE ISOLATOR UNIT IS DESIGNED AND TO MAINTAIN ITS INTEGRITY FOR THE PURPOSE OF PROVIDING THE REQUIRED FIRE-RESISTANCE PROTECTION.
FIRE-RESISTANCE RATING
STRUCTURAL MEMBERS
ELASTOMERIC BEARINGS (LEAD-RUBBER OR HIGH-DAMPENING RUBBER)
• 704.13 SPRAYED FIRE-RESISTANT MATERIALS (SFRM). SPRAYED FIRE-RESISTANT MATERIALS (SFRM) SHALL COMPLY WITH SECTIONS 704.13.1 THROUGH 704.13.5.

• THE INTENT OF THIS CODE SECTION IS TO INCREASE THE IN-PLACE DURABILITY OF SPRAY-APPLIED FIRE-RESISTANT MATERIALS (SFRM).
THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY’S (NIST) INVESTIGATION ON THE WORLD TRADE CENTER TRAGEDY DOCUMENTED THAT THE PROXIMATE CAUSE OF THE ACTUAL COLLAPSE WAS THE ACTION OF A BUILDING CONTENTS FIRE ON LIGHT STEEL MEMBERS IN THE ABSENCE OF SPRAY-APPLIED FIRE-RESISTIVE MATERIAL, WHICH HAD BEEN DISLODGED.
• **704.13.1 Fire-Resistance Rating.** The application of SFRM shall be consistent with the **Fire-Resistance Rating** and the listing, including, but not limited to, minimum thickness and dry density of the applied SFRM, method of application, substrate surface conditions and the use of bonding adhesives, sealants, reinforcing or other materials.
704.13.2 MANUFACTURER’S INSTALLATION INSTRUCTIONS. THE APPLICATION OF SFRM SHALL BE IN ACCORDANCE WITH THE MANUFACTURER’S INSTALLATION INSTRUCTIONS. THE INSTRUCTIONS SHALL INCLUDE, BUT ARE NOT LIMITED TO, SUBSTRATE TEMPERATURES AND SURFACE CONDITIONS AND SFRM HANDLING, STORAGE, MIXING, CONVEYANCE, METHOD OF APPLICATION, CURING AND VENTILATION.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

- 704.13.3 SUBSTRATE CONDITION. THE SFRM SHALL BE APPLIED TO A SUBSTRATE IN COMPLIANCE WITH SECTIONS 704.13.3.1 THROUGH 704.13.3.2.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

• **704.13.3.1 SURFACE CONDITIONS.** Substrates to receive SFRM shall be free of dirt, oil, grease, release agents, loose scale and any other condition that prevents adhesion. The substrates shall also be free of primers, paints and encapsulants other than those fire tested and listed by a nationally recognized testing agency. Primed, painted or encapsulated steel shall be allowed, provided that testing has demonstrated that required adhesion is maintained.
704.13.3.2 Primers, Paints and Encapsulants. Where the SFRM is to be applied over primers, paints or encapsulants other than those specified in the listing, the material shall be field tested in accordance with ASTM E 736. Where testing of the SFRM with primers, paints or encapsulants demonstrates that required adhesion is maintained, SFRM shall be permitted to be applied to primed, painted or encapsulated wide flange steel shapes in accordance with the following conditions:
SFRM CONDITIONS:

1. THE BEAM FLANGE WIDTH DOES NOT EXCEED 12 INCHES;
   OR
2. THE COLUMN FLANGE WIDTH DOES NOT EXCEED 16 INCHES;
   OR
3. THE BEAM OR COLUMN WEB DEPTH DOES NOT EXCEED 16 INCHES.

4. THE AVERAGE AND MINIMUM BOND STRENGTH VALUES SHALL BE DETERMINED BASED ON A MINIMUM OF FIVE BOND TESTS CONDUCTED IN ACCORDANCE WITH ASTM E 736. BOND TESTS CONDUCTED IN ACCORDANCE WITH ASTM E 736 SHALL INDICATE A MINIMUM AVERAGE BOND STRENGTH OF 80 PERCENT AND A MINIMUM INDIVIDUAL BOND STRENGTH OF 50 PERCENT, WHEN COMPARED TO THE BOND STRENGTH OF THE SFRM AS APPLIED TO CLEAN UNCOATED 1/8-INCH THICK STEEL PLATE.
• WHEN THERE IS SOME SORT OF MATERIAL, SUCH AS PAINT OR PRIMER, ON THE STEEL STRUCTURAL MEMBERS WHERE IT IS DESIRED TO INSTALL SFRM, IT IS STILL POSSIBLE TO APPLY THE SFRM TO THE STEEL WITHOUT REMOVING THE MATERIAL.

• HOWEVER, THE CODE SPECIFIES THAT A FIELD TEST IN ACCORDANCE WITH ASTM E 736 BE DONE ON THE SFRM SO APPLIED. THIS ENSURES THAT A BOND STRENGTH IS ACHIEVED AND THAT THE MATERIAL WILL REMAIN IN PLACE.

• NOTE THAT THERE ARE LIMITATIONS ON THE SIZES OF STRUCTURAL MEMBERS THAT CAN UTILIZE THIS FIELD TEST (CONDITIONS 1-3).
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

Beam height: AKA Beam depth or web depth
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

• **704.13.4 TEMPERATURE.** A MINIMUM AMBIENT AND SUBSTRATE TEMPERATURE OF 40°F SHALL BE MAINTAINED DURING AND FOR A MINIMUM OF 24 HOURS AFTER THE APPLICATION OF THE SFRM, UNLESS THE MANUFACTURER’S INSTALLATION INSTRUCTIONS ALLOW OTHERWISE.

THIS SECTION GIVES THE MINIMUM TEMPERATURE FOR THE AIR AND THE MATERIAL ITSELF, WHICH MUST BE MAINTAINED DURING APPLICATION AND FOR 24 HOURS AFTER, UNLESS THE MANUFACTURER’S INSTRUCTIONS ALLOW OTHERWISE.
FIRE-RESISTANCE RATING STRUCTURAL MEMBERS

40°F ?...THIS COULD BE A PROBLEM.
Thank you!