Codes and Standards

updates and discussions related to codes and standards

his article is the conclusion of a twopart series which discusses special inspection provisions for wood construction found in Chapter 17 of the International Building Code (IBC). Although the IBC is in use or adopted in 50 states, the District of Columbia, Guam, Northern Marianas Islands, New York City, the U.S. Virgin Islands, and Puerto Rico, each state and jurisdiction may not adopt the same edition of the code and/or make amendments to the code. Included are examples of special inspection provisions from California, Washington, and Wisconsin based on the 2012 IBC. The previous article (Part 1, STRUCTURE, January 2016) provided an overview of the special inspection provisions for wood construction found in the 2015 IBC.

State of California

Prior to adopting the IBC as a model code, the

Special Inspections for Wood Construction

Part 2

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2001 *California Building Code* (CBC) used the 1997 *Uniform Building Code* as a model code. Special inspection for wood construction was only required for prefabricated structural elements and not for seismic and

wind force resisting systems and components. However, structural observation was required for buildings in seismic zones 3 and 4. It wasn't until the 2007 CBC that California transitioned to the 2006 IBC as the model code. The 2007 CBC was the first edition that included provisions for special inspection of seismic and wind force resisting systems and components.

California Agencies, Boards, Commissions and Departments

Although this article is based on the 2015 IBC, California has yet to adopt the 2015 IBC as its model code and is in the process of developing California Amendments, which will eventually become the 2016 CBC. The CBC is part of the California Code of Regulations, Title 24, also referred to as the California Building Standards *Code,* and is published in its entirety every three years by order of the California legislature. The California legislature delegated authority to various state agencies, boards, commissions and departments to create building regulations to implement the state's statutes. A city, county, or city and county may establish more restrictive building standards reasonably necessary because of local climatic, geological, or topographical conditions. The current 2013 CBC and California Residential Code (CRC) use the 2012 IBC and 2012 International Residential Code (IRC) as its model codes.

Chapter 17, Structural Tests and Special Inspections, includes amendments from adopting



Special inspection provisions for construction are found in Chapter 17 of the International Building Code (IBC).

state agencies, including: California Building Standards Commission (State owned buildings, including University and State College buildings and all buildings not otherwise regulated by other state agencies), Department of Housing and Community Development (HCD) 1 & 2 (hotels, motels, apartments, dwellings and permanent buildings within mobile home parks), and Office of Statewide Health Planning and Development (OSHPD) 2 & 3 (skilled nursing facilities & clinics). Chapter 17, Structural Tests and Special Inspections, also includes amendments from adopting state agencies, including: Division of the State Architect-Structural Safety (public schools), Division of the State Architect-Structural Safety/ Community Colleges (community colleges) and OSHPD 1 & 4 (acute-care hospitals and correctional treatment centers). However, there are no significant California Amendments for wood in Chapter 17A.

Significant California Amendments to IBC Chapter 17

What follows are several significant amendments to IBC Chapter 17:

OSHPD 2: 1704.2.3 Statement of Special Inspection provision requires special inspections for conventional light-frame construction of Section 2308. HCD 1: 1704.2.4 Report requirements references provisions for the construction and inspection of factory-built housing.

OSHPD 2: 1705.5.3 Manufactured trusses and assemblies expands the scope of inspection for manufactured trusses and assemblies, and does not limit this to trusses with a clear span greater than or equal to 60 feet. Continuous inspection and a report are required for lumber species, grades, and moisture content; type of glue, temperature, and gluing procedure; type of metal members and metal plate connectors; and workmanship.



City of Los Angeles

The City of Los Angeles (COLA), *Los Angeles Municipal Code* (LAMC) Sixth Edition, Chapter IX Building Regulations, Article 1 Buildings, is the *Los Angeles Building Code* (LABC). The LABC adopts by reference portions of the 2013 CBC and 2012 IBC and is amended by *Ordinance Number 182850*.

COLA Special Inspection

Significant amendments in the LABC, including 91.1704.2 Special Inspections, require a Registered Deputy Inspector (RDI) rather than just an approved agency as stated in the CBC. In addition, the RDI shall demonstrate competence to the satisfaction of the Superintendent of Building rather than to the building official. Per Division 2 Definitions and Abbreviations of the LABC, the Superintendent of Building is the General Manager of the Department of Building and Safety of the City of Los Angeles or a duly authorized representative. COLA has a certification/license requirement for RDIs as required by the Chapter for structural wood. Additional sections provide extensive requirements beyond the ICB or CBC; however, there are no specific changes related to the inspection process.

There are no LABC amendments to subsection IBC or CBC subsection 1705.5 Wood Construction of Section 1705 Required Verification and Inspection.

COLA Structural Observation

COLA section 91.1704.5. Structural Observations clarifies that the registered design professional in responsible charge for the structural design may perform structural observations and he/she may delegate responsibility for structural observations to another registered design professional. Also included are requirements for the owner or owner's representative to coordinate a preconstruction meeting with the engineer or architect responsible for the structural design, structural observer, contractor, affected subcontractors, and deputy inspectors. The structural observer is to preside over the meeting. The purpose of the meeting is to identify the major structural elements and connections that affect the vertical and lateral load systems of the structure, and to review scheduling of the required observations.

The LABC exempts one-story wood framed Group R-3 and Group U Occupancies less than 2000 square feet in area from structural observation that are not in Risk Category III or IV, provided the adjacent grade is not steeper than 1 unit vertical in 10 units horizontal (10% sloped), and assigned to Seismic Design Category A through D.

The City of Los Angeles' website contains an extensive library of *Building and Safety Forms* such as Registered Deputy Building Inspectors Certificate of Compliance, Structural Observation Report Form, Architects or Engineers Certificate of Compliance, Deputy Correction Notice, etc for use, as applicable, by the design professional.

State of Washington

The Washington Association of Building Officials (WABO) developed a Special Inspection Registration Program to create a uniform method of determining qualifications of special inspection agencies and special inspectors. The voluntary registration program is designed to provide a means of documenting special inspection and testing qualifications, and competency in various types of work cited in the IBC. The current list of special inspection categories includes:

- Reinforced Concrete (RC)
- Prestressed Concrete (PC)
- Shotcrete (SC)
- Structural Masonry (SM)
- Structural Steel and Bolting (SSB)
- Structural Welding (SW)
- Spray-applied Fire-resistive Materials (FP)
- Lateral Wood (LW)
- Cold-Formed Steel Framing (CF)
- Proprietary Anchors (PA)

For the purposes of this article, the focus will be on the Lateral Wood category.

Development of the Lateral Wood Special Inspection (LWSI) registration program was initiated by WABO a decade ago. The first version employed the special inspection requirements in Chapter 17 of the 2003 IBC. This program was a natural addition to WABO's existing Special Inspection Registration Program (SIRP) which already met other code-mandated needs for special inspections. Since that time, LWSI materials have been updated as new editions of the code are adopted. Washington currently adopts and modifies the 2012 edition of the IBC. Because critical details in the lateral force resisting framing of wood buildings are beyond the normal scope of conventional framing inspections, this program specifically targets critical building components in multi-story wood buildings that must be properly installed to withstand seismic and high-wind events.

The program aids in increasing the uniformity and quality of inspection procedures, and establishes inspector credentials. The developmental committee, consisting of code officials, engineers, and architects,



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provided tools to assist in the facilitation of the program and to outline the responsibilities of the LWSI inspector. Those responsibilities include:

General

- Authority to carry out requirements of the enforcing jurisdiction.
- Notify the jurisdiction about the type of inspection in accordance with jurisdiction requirements.
- Present for continuous inspection during execution of all work for which the special inspector has been engaged.
- Verify that the local jurisdiction inspectors have approved the conditions at the site when required.
- Submit periodic written and verbal progress reports to the local jurisdiction as required.
- Notify the contractor when discrepancies occur.
- Notify the building official of uncorrected discrepancies.
- Verify that structural plan changes are properly documented, and approved by the enforcing jurisdiction.
- Maintain records of work inspected, including discrepancies and actions taken.
- Submit final compliance reports.

Technical

- Identify lateral force resisting systems for conformance, including shear walls, diaphragms, chords, sub-diaphragms, hold-downs, connectors, and drag struts.
- Verify placement of plates, shear walls, diaphragms, squash blocks, hold-downs, strapping, beams, and columns.
- Verify stud spacing, blocking, panel material and orientation, nail size and spacing, anchor bolt spacing, location, strap-size and location, and use of glue.

Material Identification

- Verify wood species and grade, dimensions, sheathing material, and engineered lumber applications.
- Verify fasteners, including nails, staples, screws, and bolts for size, type, grade, and location.
- Verify hardware, including holddowns, straps, ties, rods, nuts, anchors, engineered systems, and prefabricated panel size types and location. Verifying that the hardware specified on the plans has been installed. Reviewing and verifying manufacturer installation procedures.

Workmanship

- Verify the proper use of materials, including appropriate cutting, notching, nailing, and member alignment.
- Verify material condition, including member damage, shipping, handling, weather impacts, and hardware.
- Verify any associated testing that should occur including pullout tests for epoxied anchor bolts.
- Review plans for associated general requirements and details for foundations, connections, beams and

columns, shear walls, and diaphragms. Through this program, local building jurisdictions can easily ascertain and approve credentials of prospective special inspectors. The program also oversees and certifies quality control agencies where inspectors are employed.

State of Wisconsin

Wisconsin has had a state-wide commercial building code since their Safe Place Statutes were first put in place in 1913. The ensuing *Wisconsin Commercial Building Code* (WCBC) was developed and went into effect in 1914. Although the use of model codes was being considered in the late 1970s, it was not until 1998 that the State of Wisconsin began the rulemaking process that would consider the then proposed I-Codes for adoption as the state-wide WCBC.

Early editions of the WCBC aligned the plan review arm of enforcement with a few of the larger cities that had building inspection departments and with the State agency assigned stewardship of the Safe Place Statutes. Inspections were conducted by those larger cities and the State agency staff. State law placed the greatest responsibility for safe places on the owner, and safe construction of those buildings on supervision by architects or engineers. Understanding the limited role that building departments were expected to take in the requirement for providing a safe place, the Administration section of the WCBC included language to reinforce that it is the responsibility of the owner and architect.

By 1976, the WCBC added language to clarify the Wisconsin design professional's responsibility to ensure that all commercial buildings over 50,000 cubic feet total volume were constructed in accordance with the design plans and comply with the WCBC.

The WCBC requirements for a supervising professional cover all aspects of the code. Registered architects and professional engineers functioning as supervising professionals can hire specialists to monitor/inspect special aspects of a project that are deemed critical. The WCBC only included specifics associated with pile foundations and protection of adjoining property (underpinning). At the time the model code provisions associated with Special Inspections were being considered in 1999, it was determined that the methodology in place in Wisconsin corresponded to and in some ways exceeded the provisions for Special Inspection that existed in Chapter 17 of the 2000 *International Building Code*. Accordingly, the entirety of IBC Chapter 17 was removed from state-wide adoption.

Shortly after the first adoption, it was recognized that there were many provisions within Chapter 17 that would be advantageous to users of the code while not conflicting with the state's Supervising Professional methodology. Accordingly, when the 2006 edition of the IBC was adopted in 2008, the important provisions for in-situ load testing and preconstruction load testing were included. Wisconsin currently adopts and modifies the 2009 IBC by only specifying requirements in IBC sections 1711 (Design Strengths of Materials), 1712 (Alternative Test Procedure), 1713 (Test Safe Load), 1714 (In-situ Load Tests), 1715 (Preconstruction Load Tests) and 1716 (Material and Test Standards). The provisions normally associated with special inspections elsewhere in the United States are currently excluded.

Even though the original intent was to allow local municipalities the option to adopt the excluded provisions, the changes made within 2013 Act 270 established the WCBC as a uniform code. Accordingly, the administrative rules that create the WCBC will have to be changed in order to use the Special Inspection program outlined in IBC Chapter 17 or allow programs as implemented in the States of California and Washington. The State of Wisconsin is currently in the middle of their process to evaluate the 2015 edition of the IBC for adoption as the statewide uniform commercial building code.

Conclusion

Each state and jurisdiction can make amendments to the code. Chapter 17 of the IBC dealing with special inspections is not immune from this practice. This article provides perspectives from the states of California, Washington, Wisconsin, and the City of Los Angeles regarding special inspection provisions for wood construction. Structural engineers play an important role in the special inspection process, and all owners and design professionals should be aware of the importance of special inspection in providing a safe, code-compliant building.