Special inspections as originally intended

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SPECIFICATIONS

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As required under the *International Building Code* (*IBC*), special inspections are designed to be a proactive method of enhancing public safety by ensuring buildings are constructed in accordance with design documents, specifications, and approved shop drawings.[1]

Special inspection requirements were introduced as a result of numerous high-profile structural failures that occurred throughout the United States during the late 1970s and early 1980s. These included:

- 1973 collapse of the Skyline Plaza, a 26-story reinforced concrete residential tower (Fairfax, Virginia);
- sudden roof collapse of the Rosemont Horizon Arena (Chicago, Illinois) in 1979; and
- suspended pedestrian walkway collapse at the Hyatt Regency Hotel (Kansas City, Missouri) in 1981.

The fatalities and injuries resulting from catastrophic structural failures such as these drew national attention, highlighting a need for more stringent building regulations that would help prevent future tragedies.

Congress gets involved

In 1982, the U.S. House of Representatives tasked the Committee on Science and Technology with studying the underlying contributing factors to these structural failures. In 1984, the Investigations and Oversight Subcommittee, chaired by Al Gore, presented a report of the findings in House Report 98-621, *Structural Failures in Public Facilities*.

While the subcommittee identified more than 20 contributing elements to structural failures, the report emphasized six factors determined to be of "critical importance in causing (and conversely, preventing) structural failures." Recommendations to address the six critical factors included a call for improved organization and communications during the construction process, including the development of a written document defining the organizational responsibilities for each project, as well as onsite inspection by the structural engineer of record (SER) during the construction of principal structural components.

The subcommittee noted:

For various reasons, the structural engineer of record or the designee is often not present on the jobsite during the construction of principal structural components. The absence of the structural engineer has permitted onsite flaws and changes to go unnoticed and uncorrected.

It was also noted this situation "has been consistently cited in cases in which structural failures have occurred." The subcommittee went on to recommend provisions be "written into the building codes and adopted in public forum which make the onsite presence of the structural engineer mandatory during the construction of structural components."

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Building codes react
In response to the subcommittee's recommendations, the 1988 supplement to the 1987 edition of the Building Officials and Code Administrators International (BOCA) *National Building Code* addressed improved building safety by including a new section, titled "Special Inspections." The requirements outlined address three specific areas:

- adequacy of construction material;
- fabrication; and
- installation techniques.

Special inspection requirements have been expanded over the years to include new structural components and were carried forward into the 2000 and all subsequent editions of the *IBC* to date.

Where are special inspections defined in *IBC*?
Special inspections are mandated and defined in *IBC* Chapter 17. Specifically, Section 1704 identifies the required special inspections, and subdivides the requirements by material, such as soil, concrete, masonry, or steel. Additionally, Sections 1706 through 1708 provide specific wind and seismic triggers for other inspections related to the lateral force resisting systems of buildings. Sections 1711 through 1715 list requirements for determining design strengths of materials, alternative test procedures, and load testing.

While various *IBC* editions have been adopted in all 50 states, as well as the District of Columbia, not all states have a mandated uniform statewide building code. However, as of February 2015, all states including the U.S. territories have adopted uniform statewide building codes based on the 2003 or newer editions of the *IBC* in some manner.

While several states and localities have limited the requirements of Chapter 17 to be applicable only to state or local municipally funded projects, these are the minority. Some form of special inspections is required by the building code on commercial facilities in nearly every state. If one is unsure whether special inspections are required in a specific project location, it is recommended a copy of the uniform statewide or local building code be obtained, as well as a review of amendments to the adopted edition of the nationally recognized building code, such as the *IBC*.

When are special inspections required?
Special inspections are required for building components identified in *IBC* when the design of these components is required to be performed by a professional engineer or architect. Inspection items

include fabricators for pre-engineered structural components, fabrication process for prefabricated wood products, as well as for materials such as:

- concrete;
- masonry;
- structural steel;
- high-load wood diaphragms;
- soils;
- deep foundation systems;
- sprayed fire-resistant materials;
- mastic and intumescent fire-resistant coatings;
- exterior insulation and finish systems (EIFS);
- smoke-control systems; and
- any special cases as determined by the building official.

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Where are special inspections defined in construction documents?
IBC Section 1704.1.1 mandates a Statement of Special Inspections is required to be completed by the registered design professional in responsible charge and submitted to the building official for approval. The registered design professional in responsible charge for the structural systems should be the SER.

IBC Section 1705 outlines the requirements for the "Statement of Special Inspections," which identifies the materials, systems, components, and work required to have special inspections or testing, and delineates the type and extent of special inspections and testing required.

While some design professionals place the Statement of Special Inspections on one of the sheets within the construction documents, others generate a separate document, as is mandated by some jurisdictions. In addition to the statement the requirements are often listed within the structural general notes on the construction drawings themselves. Examples of this include such statements as:

Special Inspections shall be required for cast-in-place concrete materials and installation as per the *IBC*.

or:

Special Inspections shall be required for the cold-formed steel framing materials, welding, and structural details as identified in the Schedule of Special Inspections.

For jobs with a project manual with specifications, special inspection and testing requirements are generally also delineated in Part 3–Execution of the structural specification sections, such as concrete, masonry, steel, and fabricated wood trusses.

Key concepts
Registered design professionals should consider the following details concerning special inspections:

- paid for by the owner, *IBC* Section 1704.1 states owners or their agents shall employ an approved agency to perform special inspections, removing any appearance of a conflict of interest with the general contractor paying for inspections of their work;
- special inspections may only be performed by qualified special inspectors approved by the building official;
- special inspection contracts with the owner will be hourly with an estimated budget since the inspector has no control over the quality of the work, or the means and methods used by the general contractor in the installation of the work;
- special inspections are not a substitute for the general contractor's quality control (QC) programs;
- special inspections are also not a substitute for quality assurance (QA) and quality inspections performed by the jurisdiction;
- when done correctly, special inspections add QA to the project's structural and life-safety components; and
- it is often acceptable to combine Statements of Special Inspections from all disciplines into one all-encompassing Statement of Special Inspections and Schedule of Special Inspections.

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In the next edition of this two-part series, this author will delve into choosing a special inspector, adding value to a project, and what it really means to be "installed in accordance."

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Endnotes:

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