

Jurisdictional Inspections, Structural Observation, and Special Inspections

By John A. Dal Pino, S.E.

Jurisdictional Inspections, Structural Observation, and Special Inspections are intended to ensure that projects are completed according to the approved construction documents and the relevant building code and standards to protect public safety. But since there are three or perhaps more entities involved in this process with some overlap (picture a Venn diagram), teamwork and clear communication are required. Even then, there are chances that some deficient items might slip through undetected. The contractor is ultimately responsible for the construction in accordance with the approved plans and specifications. Still, if this does not occur, the structural engineer will almost certainly be involved in the fallout. Therefore, structural engineers have a vested interest in understanding the process and what they need to do as the professionals of record to protect themselves and the public.

There are obviously state, regional, and local differences regarding practices and enforcement. While this article attempts to provide a uniform treatment of the subject, it might not apply in all circumstances, places, and times. This article focuses on buildings in California. A future article is planned to address bridges.

Jurisdictional Inspections

The Authority Having Jurisdiction (AHJ), the federal government, a state government, a county, a city, or some special government agency, issues the permits for a specific project. For the sake of this article, let's call this entity the *Building Department*. Several permits may be issued on any given project covering various items such as stormwater discharge, air quality, the building itself, etc. However, let's focus on the *building permit* and assume that this permit covers all aspects of the building construction.

In theory, the Building Department inspects the construction of all buildings within its jurisdiction. Typically, the responsible building inspector stops at a project to ensure the approved plans are on site and the work appears to be going according to those documents. But saying that the building inspector is truly inspecting, as most people understand the term, is inaccurate. There is really no practical way in a given workday that the building inspector has enough time to actually inspect all of the work on projects being performed in their geographic area of responsibility.

On larger projects with more experienced engineers and contractors, the building inspector is more apt to leave the majority of the observing to the structural engineer of record (SEOR) and inspecting to the Special Inspectors (more on them later). Even when the building inspector is called in for an inspection, say before a concrete pour is to be made, the intent of the jurisdiction's inspection is to observe whether the work looks more or less correct rather than to spot every minor deviation from the drawings. In fairness, how could the inspector ever be expected to know a project as well as the structural engineer who designed it and the special inspectors who are on-site every day?



Inspection of concrete flat work.

The jurisdiction's inspectors often take a more active role on smaller commercial projects and are often quite involved in residential projects. There seems to be a presumption that the contractors involved in those projects are less experienced and that there is a higher probability that the work may not be correct. One would assume that this is based on the jurisdiction's past project experience and is a prudent course to take. In addition to the review based on the approved construction documents at the job site, the inspector typically reviews any changes to the approved design documented in RFIs issued by the structural. Some inspectors want to see the RFIs before the work is undertaken, while others settle for seeing the RFIs at some point, so long as the SEOR eventually stamps the documents.

In some areas of the country and on certain types of projects (for example, California hospitals), the Building Department has a far larger staff and budget for detailed inspections. Under those instances, they exert far more influence on the quality and completeness of the completed project. The SEOR must understand and expect this higher level of scrutiny. There is likely to be additional paperwork involved in processing design changes resulting from RFIs and getting details approved that correct deficiencies in the actual construction. On smaller projects discussed above, the Building Department may accept a change documented with nothing more than a sketch stamped by the SEOR. Still, the Building Department is more likely to require a detailed submittal package containing revised drawings and calculations that undergo more than a cursory review on these special projects. This additional review can result in delays in construction and extra costs if the structural engineering firm is not staffed to provide an immediate response.

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Regardless of whether the project is large or small, or of a special nature, the building department inspector may have sovereign immunity (derived from British common law doctrine and based on the idea that the King could do no wrong) and is not legally responsible even if the construction is not in compliance with the building code. That responsibility falls mainly on the contractor and, to some degree, on the owner and the SEOR.

Structural Observation

The Building Department requires that construction is in accordance with the provisions of the relevant codes and standards. The building code (for this discussion, assume the *California Building Code*, Chapter 17) describes what must be observed during construction by the SEOR or the designated observer (if it is not the SEOR). Before adopting ASCE 7, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, as a national standard document, structural observation requirements were contained in the model building codes (the *Uniform*

Building Code in California) and then adopted by the individual states. Today, the requirements in each state may still be different. In addition, cities, counties, and other special agencies may have additional requirements.

Structural observation is typically required for the main elements of the wind or seismic force-resisting systems for certain buildings posing a greater risk to the public. In California, the SEOR can also require that structural observation be performed. However, it is up to the building owner to decide whether to employ the SEOR or hire a qualified third party.

Structural observation should not be confused with *inspection*. Structural observation is a serious professional responsibility for the SEOR (or the designated observer). However, the effort expended is based on the concept that it is the contractor's responsibility to construct the project according to the drawings and the SEOR is only acting in an oversight role. The structural observer visits the site to observe the construction progress and informs the contractor about deviations from the drawings. *Inspection*, by definition, implies a more detailed review. This is discussed later in the article.

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Inspection of shear wall reinforcing.

In practice, the structural observer typically visits the site at important stages of construction to observe the work and note issues that need to be corrected. They should walk the site with the contractor to discuss the issues that need to be addressed and develop a resolution together. They usually document the site visit in a report issued to the owner and the contractor. Best practices dictate that the issues are tracked in a log until all items have been corrected. The importance of the site visit log becomes more apparent when preparing the close-out letter, as discussed below.

While not the purpose of the site visit, if any unsafe construction practices are observed, the observer should notify the contractor immediately since the contractor is solely responsible for site safety. If the SEOR is the structural observer, the site visit also offers the SEOR the final opportunity to observe design aspects that may not have been addressed adequately in the project drawings and make (ideally only modest) design changes. It is rare for drawings to be perfectly clear and to contain no errors or omissions. Making design changes during construction may embarrass the SEOR and have cost implications for the owner. Still, the changes are likely to head off larger problems and more costly corrections later when the building does not perform as the owner expected. Some structural engineers believe that the less they see, the better off they are in terms of liability, but most engineers would argue differently.

Structural observation would be a nearly impossible effort if the major elements of the construction were not reviewed in advance

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by the checking of shop drawings (concrete reinforcement, post-tensioned concrete reinforcement, structural steel, steel joists and trusses, wood trusses, suspended MEP loads, etc.) and the review of submittals (concrete mix designs, material certifications, product submittals, etc.). Reviewing these documents before a site visit is an essential first step in the structural observation process and ensures that the right pieces and parts arrive at the site. The actual structural observation can then be focused on whether the elements are assembled properly.

Special Inspections

The building code also lists *special inspections* to be made on particular aspects of the work. In the 1960s and 1970s, several structural failures occurred that were linked to specific inadequacies in the construction. It was believed that a more detailed review of certain procedures, e.g., welding of structural steel, would better ensure public safety. *Special inspections* were born, and the requirements for certain special inspections were added to the building code. The list of inspections has expanded over the years.

As with structural observation, the building code describes what items require special inspection (again assuming the *California Building Code*, Chapter 17). In addition, individual cities, counties, and other special agencies may have additional requirements.

The term *special* is a bit of a misnomer. Many engineers would argue that there is nothing special about them and that *special* was an unfortunate choice of words. Perhaps the word *detailed* or *focused* would have been a better choice. And the use of the word *inspection* could also be questioned since it implies a level of review in excess of observation for something that is ultimately the contractor's responsibility. Would *observation* have been a better choice of words since this is more akin to what is actually done in the field? Would it be more accurate and perhaps more understandable to those involved in the construction industry to call what is actually done in the field as *focused observation*?

Short of a revolution, the industry is probably stuck with the term special inspection. Regardless of the name, the process is an integral part of the overall review process on the owner/SEOR side of the ledger, as opposed to the jurisdictional side. Third-party firms, with the requisite experience and training to do the work properly, usually perform special inspections. Some SEORs have the skills to perform certain special inspections, such as wood shear wall nailing, concrete reinforcement, or concrete placement. Some may even be able to perform the special inspection of welding, high-strength bolting, pile construction, etc. Therefore, there may be a mix of special inspectors, including the SEOR, reviewing the work on any given project.

The owner retains the third-party special inspectors. This benefits the SEOR on a risk management basis as it puts the responsibility for the proper review of certain aspects of the work squarely on the owner's side of the ledger. On some smaller projects, special inspection is not required, and for projects when the contractor is also the owner, the contractor may legally employ the special inspectors. The regulations preventing the contractor (in most cases) from retaining the special inspector are intended to prevent a serious conflict of interest for the special inspector, who is expected to notify their employer (the contractor) that corrections to the work are required. In some locales, contractors have been known to form their own special inspection firms and have hired them on their projects, creating the condition for self-review and a bad situation.

Suppose the SEOR chooses to perform some of the special inspections. In that case, the SEOR must accept that they are expected to

perform those services that most in the profession consider being at a higher level than mere observation, whether that is, in fact, true or not. The SEOR should also consider whether they are elevating the standard of practice for themselves. If they are competent to perform special inspections on the same site visit during which they perform structural observation, are they also at least partially responsible for errors by the contractor that are not observed and corrected?

The special inspection requirements are usually mandated to be placed on the construction drawings and in a separate letter to the Building Department. It is critical that the SEOR meet with the contractor and the special inspectors at the start of construction to review what inspections need to be performed and when. An extremely difficult situation is created for the owner and the SEOR at the time of project close-out if some required special inspections have not been performed and the work is covered up and impossible to observe.

The Close-Out Letter

At the completion of the project, regardless of what the Building Department has done (remember time available and sovereign immunity), most jurisdictions require the SEOR to prepare a close-out letter stating that 1) the project has been constructed in conformance with the construction documents and that 2) it complies with the building code, including changes made during construction. The basis for this statement is the structural observation site visits (this is when the running log plays an important role) and the SEOR's review of the special inspection reports.

The language in the close-out letter must be chosen carefully to avoid overstating what the SEOR has actually done. For example, it is best to add the term "general" before conformance in the first point noted in the above paragraph since some aspects of the project may not comply with the drawings. In the second point above, it is best to rephrase the statement as it *complies with the intent of the building code, including changes made during construction*. This is because the SEOR expects, but cannot guarantee, the building will perform as the building code envisions it should in terms of protecting life safety. If the SEOR designs to the minimum requirements of the building code (the legal standard), there is little room for error in the statements, and they may want to avoid an overly strong statement concerning code compliance. If a less experienced staff engineer prepares the close-out letter, the SEOR should provide coaching on proper wording.

As noted above, it is the contractor's responsibility to construct the building

according to the approved drawings and specifications. The close-out letter has the effect of shifting the legal burden (or at least some of it) back toward the SEOR's side of the ledger. Therefore, the SEOR's best risk mitigation actions are to understand what the SEOR is expected to do, do it well and competently, and insist that everyone involved in the construction process does likewise. And to not rely on the Building Department. ■



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