



Universal Specifications

A Step in the Right Direction

By Drew Dudley, P.E.

Inefficiencies exist in the design-bid-build delivery of typical commercial construction projects. There is a solution that requires little additional effort by the design team. The object is to provide bids that are more accurate, create less haggling over change orders, generate a better relationship between the contractor and the design team, and ultimately lead to a less costly project. For brevity, this article focuses on an example project and follows the path of a contractor with respect to reinforced concrete scope. Before diving into the example project, an overview of the typical design and construction process for a design-bid-build commercial project is presented.

An Overview

An owner typically engages an architect in developing the schematic design for the building. Once the program and general massing of the building are agreed upon, the architect or owner engages a structural, MEP, and civil engineer, and begins progressing towards the construction documents. The design team prepares drawings and specifications, or specs, which collectively constitute the construction documents, to communicate their design with the potential contractor. The drawings typically include general notes, floor plans, sections, and details. Specs typically include administrative, product, quality assurance, submittal, and execution requirements. Before submission of the construction documents, the architect collects the relevant specs from each sub-consultant and compiles them into a project specification, which even on relatively small projects can easily reach thousands of pages.

The creation of a spec for a project typically begins with a master spec that is created and maintained either by the design firm or by a national source such as MasterSpec, CSI Manu-Spec, or SpecText. These specs generally follow the Construction Specifications Institute's (CSI) MasterFormat standard which is an indexing system for organizing construction data, particularly specifications. The master spec will generally contain every material, product, and scenario that could pertain to the subject of the spec. On a typical project, as much as 50% of the master spec could be irrelevant to the project at hand. The national sources typically include features that assist in refining the spec for the project. However,

some manual editing is typically required. For example, the structural reinforced concrete spec (03 30 00 CSI MasterFormat) includes everything from standards for cementitious materials, reinforcement, hot and cold weather concrete, and welding of reinforcement. Items such as the cementitious and reinforcement standards usually apply to any project; however, items such as welding of reinforcement only apply to a small number of projects. Prudent designers edit the master spec until it is tailored for the project; this includes adding any special requirements as well as removing any portion that does not apply to the project. Unfortunately, standard practice in the industry is for the spec book to be bloated with numerous items that do not pertain to the project since it is less effort for the designer to leave superfluous items in the spec.

Once the construction documents are substantially complete, they are typically issued as a "Bid Set" when the project is to be delivered via the conventional design-bid-build arrangement. At this point, the general contractors who wish to bid on the project have a few weeks to compile bids from their sub-contractors. Due to the short bid period, the general and sub-contractors rely heavily on the drawings and largely ignore the spec book.

After the contract has been awarded and construction begins, the general contractor issues submittals, as required by the specifications, such as shop drawings, product data, and calculation packages with the intent to show the design team how they plan to construct the building and that this plan adheres to the construction documents. The design team reviews the submittals to assess whether they are in general conformance with the construction documents. If items are found to be non-compliant, the design team indicates the non-compliant items to be corrected in the subsequent "For Construction" submittals. Alternatively, if the items are more severe, the design team requires the contractor to correct the non-compliant items and resubmit their plan for an additional review.

Correction of non-compliant items is rarely a no-cost affair. If the non-compliant issue is derived from the specifications and is outside normal practice, then it is likely a cost that the contractor is not willing to absorb. Especially if the issue results from a conflict between the drawings and specifications, wherein the design team defaulted to the standard note: "If

conflicting requirements exist in the construction documents then the most stringent application shall apply." Regardless of whether the contractor absorbs this cost or issues a change order, the relationship between the design and construction teams will likely be strained moving forward.

An Example Scenario

Instead of looking only at this process in the abstract, it is beneficial to consider a specific scenario. A \$5M commercial project has just been issued for bid. The construction documents consist of 100 drawing sheets and a 2,000-page (plus) specification (spec) book between the architect, structural, MEP, and civil engineers. The prospective contractors have two-weeks to submit qualifications and bids to the owner before a general contractor is selected. The general contractor sends out the construction documents to a list of sub-contractors for the items he/she will not self-perform. For the reinforced concrete, the estimating department dives into the drawings, assessing quantities, materials, degree of difficulty, and time required, to determine the cost and schedule associated with that scope. They also scan through the spec book to identify items such as the required type of vapor retarder, submittal requirements, and materials testing required. After they compile all their numbers, the contractor submits a bid and, if the bid is low, he/she is awarded the project. As the project kicks off, the contractor receives his concrete mix design submittal from the local ready-mix plant, which he ultimately submits to the design team. After a week or two, the submittal is returned "Revise and Resubmit" with a comment from the structural engineer that expansive hydraulic cement is required for the structural slab in lieu of traditional Portland cement, as indicated in section 2.1 of specification 03 30 00, to control and reduce drying-shrinkage cracks for the architecturally exposed concrete floor. The contractor notifies the ready-mix plant of the requirement, and the plant responds with a \$50,000 change order. In reality, the contractor may have already been aware of this requirement but decided to ignore it with the thought that other contractors may miss it and thus come in with a lower bid, or that there would be a chance to request a substitution once construction kicked off. Regardless, at this point, the contractor has to decide whether to

absorb this cost or issue a change order. The chances of getting a change order approved are slim since the requirement was clearly listed in the specifications; however, the contractor could argue that items of such significant cost implication should have been explicitly noted in the drawings. Regardless of the path taken, the relationship between the contractor and design team is now soured and may have detrimental consequences to the remainder of the project.

A Reasonable Solution

The exact scenario described above is not common on the majority of projects; however, it is not uncommon for cost or schedule sensitive items to be brought to the attention of the contractor after the project has been awarded. Moreover, they usually come from requirements buried somewhere in the spec. A plausible solution to this issue is for owners or authorities having jurisdiction (AHJ) to adopt a universal set of specifications that are to be used on every project within their domain. The design team would still be allowed to modify, add, or delete items from the universal specifications as long as these items are highlighted in some fashion. Once they become familiar with the universal specs, this process would allow contractors to quickly scan through the spec book to identify items that are out of the

ordinary. The additional effort required by the design team to highlight these items would be minimal. Potential benefits include less overhead for the contractor since estimating is now a quicker and more certain process resulting in more accurate bids, less costly surprises during construction, and a better relationship between the construction and design team. Owners in other markets such as universities, K-12 school districts, and State Departments of Transportation (DOT's) have already recognized the benefit that universal specifications provide and require a process similar to the one proposed above. It is understandable that large owners who oversee numerous projects every year are in a better position to create and maintain universal specifications than a small business owner or a real estate developer who may oversee one or two projects every year. Nonetheless, small-scale owners could benefit from their AHJ adopting universal specifications that are tailored for their jurisdiction. The process of creating and maintaining a set of universal specifications would not be foreign to AHJ's which already undertake a similar process when they adopt a version of the *International Building Code* with jurisdiction-specific amendments. Ideally, the AHJ's would engage local developers, contractors, architects, and engineers in the creation and maintenance process so the specs would reflect best practices

in the region. This approach would provide a quasi-construction management at-risk (CMAR) environment in which all parties that have a stake in the project are engaged to balance design, cost, and constructability to find the optimum solution.

Ultimately, the adoption of universal specifications is by no means an all-encompassing remedy for the myriad of difficulties inherent in the commercial building process; however, it is a step in the right direction. There will still be contractors who selectively ignore requirements within the specifications to gain a pricing advantage and subcontractors who provide their bids minutes before the deadline with qualifications and exclusions instead of quoting the project as specified in the construction documents. However, universal specifications with added, deleted, or modified sections that are highlighted will make these types of actions harder to defend and with time become less frequent. ■

Drew Dudley is the owner and manager of Dudley Engineering, LLC, College Station, TX. He is a structural specialist for Texas Task Force 1, an urban search and rescue team affiliated with both the FEMA and Texas Division of Emergency Management systems. Drew is an adjunct professor at the University of Houston College of Architecture.

ADVERTISEMENT—For Advertiser Information, visit www.STRUCTUREmag.org

IMAGINATION

ENABLED BY STEEL

Structural steel shouldn't demand rigid thinking. Create soaring and enduring structures. Achieve stunning architectural visions while answering complex engineering challenges. Improve the cost and performance of your next project.

Get inspired
Elevate your design solutions. Download this free guide.
newmill.com/elevate

NEW MILLENNIUM BUILDING SYSTEMS
Building a better steel experience.

YOUR NATIONWIDE RESOURCE FOR CUSTOM-ENGINEERED STRUCTURAL STEEL BUILDING SYSTEMS