Structural Specifications

updates and discussions on structural specifications

The Lost Specifications Section

Cold-Formed Metal Framing

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Cold-formed metal framing often falls into the no man's land of specifications writing. Since structural engineers are not in the habit of writing section 054000, and most architects are not really qualified to do so, cold-formed metal framing specifications are often forgotten or ignored.

For clarity purposes, the cold-formed metal framing section *Scope of Work* typically includes exterior non-load-bearing framing, load-bearing wall framing, floor joist framing, roof rafter framing, ceiling joist framing, and soffit framing. Admittedly, many projects do not require much cold-formed metal framing, but some municipalities are now requiring screening of roof top equipment in their building codes. Consequently, the inclusion of exterior non-load-bearing framing is becoming a requirement because screening structures are commonly composed of cold-formed metal framing supporting metal wall panels.

Why should structural engineers write cold-formed metal framing specifications? Stated simply, the components of these framing systems need to be engineered. Metal wall panel manufacturers will design only the wall panels to sustain wind loads and deflection, not the supporting structure. Wall panel manufacturers' design services stop at the clips, rails, or other system used to attach the panels to the various substrates. At a mechanical penthouse screen wall, the substrate is cold-formed metal framing. The cold-formed metal framing must be designed to accommodate the wind loads and deflection, just like the rest of the building, and the members transfer loads to the building structure.

Cold-formed metal framing components are also used in other applications. Many buildings, both one-story commercial and high-rise, include soffits requiring the services of a structural engineer to design supporting framing for wind uplift requirements that vary with the project location. False mansard roofs and parapets, although often framed with wood, can also be framed with cold-formed metal. Many architects will design these components with steel when the primary structure is framed with steel.

One of the most important reasons why the structural engineers should specify cold-formed metal framing is because of the additional selections that need to be made in order to produce a proper specification. Not many architects have the specialized knowledge required to select the grades of steel, the minimum base metal thicknesses, or the correct flange widths.

Structural engineers would ultimately benefit by taking ownership of the cold-formed steel framing section right from the beginning of a project. Reviewing and marking up work done by the architect or another specifier can require more time and expense than originating the work from the start.

Specifying cold-formed metal framing needs to begin with the basics in order to create clear, complete, concise, and correct documents. Coordination items include the following:

1) What version of MasterFormat (or another guideline) is to be used?
2) Is the project attempting to attain LEED certification?
3) What is the format for the specifications?
4) Is the terminology consistent between the specifications and the drawings?

MasterFormat, produced by the Construction Specifications Institute, is the numbering system used in the construction industry to organize specifications, cost estimating documents, product data, and even architectural libraries. Most new project specifications are written to comply with the 2004 version, though occasionally the 1995 version must be used. An easy way to tell the difference is the length of the section number: the 2004 version uses six digits, while the 1995 version used only five.

Many projects try to obtain LEED certification. In such cases, ask for the working or in-progress LEED Scorecard prior to editing specifications. If LEED is even considered at the beginning of the project, the draft scorecard will exist. Keep the applicable LEED requirements in the design development specifications until it is known for certain that a project will *not* seek LEED certification. Once the LEED requirements – including submittals, recycled materials, and regional materials, to name a few – have been deleted from a specifications section, it is inefficient to go back and re-insert those items should the Owner decide at the last minute to go for LEED certification after all.

Specifications format is a coordination issue that is often overlooked. Since structural specifications are not stand-alone documents, a good way to become a favored engineer by the architectural specifier is to request, and then follow, the format that will be used for the rest of the project manual. This will include the font, header and footer requirements, margins, and any watermarks. Formatting the specifications at the beginning of a project, similar to using the correct title block, is simply good practice.

Since structural engineers are in the habit of producing both the specifications and the drawings, it should be relatively easy to ensure consistent terminology. However, if a project is being publically

bid, the use of proprietary product names on the drawings does not easily allow for other manufacturers to bid. Changing the term to its non-proprietary version allows the specifications to determine the manufacturers that will be allowed to bid. If help is needed for a correct non-proprietary term, contact the project's architectural specifier.

Coordination items for cold-formed metal framing specifications sections include the following:

1) How many manufacturers really need to be listed?
2) Is the deflection limit required by the structure the same as that required by the final finish material?
3) What are the finish requirements, galvanized or shop primed?

Take the time to edit the number of manufacturers, if there is a preference. Keeping the number of preferred manufacturers to three or five will keep the project quality level up. If ten or more manufacturers are allowed in the spec, it is not likely that all 10 manufacturers have the same quality level for all their products. If there is no manufacturer preference, then delete the entire paragraph. The end result will be a shorter section and fewer requests for information from contractors trying to find comparable products from all of the manufacturers listed.

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Deflection limits need to be coordinated with the architect. Structurally, a project may be just fine with a horizontal deflection limit of L/360, but if the cold-formed metal framing is supporting a rigid rain screen wall system comprised of brick and mortar, this may not be stiff enough to prevent cracking of the finish materials. In theory, by the time the system is engineered, the final wall material finish is determined. In reality, value engineering enters the picture, the entire exterior wall assembly may re-designed by the architect to cut costs, and the selected deflection limit could no longer be appropriate.

Shop priming or galvanizing requirements also need to be coordinated with the architect. Galvanizing may need to be increased to a heavier coating depending on the project requirements. For instance, a natatorium should have a thicker coating of galvanizing than a classroom. In the case of architecturally exposed structural steel (AESS), the shop primers need to be coordinated with the final finish coat. Shop primers also need to be coordinated with any fireproofing that might be applied. Finish requirements for the steel may also include the expectations for the welds, which are more stringent for AESS than for a piece of concealed structural steel.

Finding the lost section for cold-formed metal framing and coordinating with the architect allows the structural engineer to contribute to overall project quality. The end result will be fewer requests for information, fewer change orders related to such requests, and fewer headaches – a benefit for all.▪

Look for additional Structural Specifications columns pertaining to concrete and masonry in future issues of STRUCTURE®.