

The Hidden Cost of Copy and Paste

Part 1

By Jason McCool, P.E.

Delegated design of steel connections and stairs for various steel fabricators has occupied most of my last ten years at the structural engineering firm I represent. I have seen contract documents from structural engineers and architects from all over the country, from sole proprietors working out of their houses to some of the most well-known design firms with a worldwide presence. With that said, I am often asked by exasperated fabricators or freelance detailers about contract documents that just do not make any sense to them. Sometimes, I am even offered work because the contract documents are so confusing that the fabricator mistakenly thinks design is being delegated to them. Thus, I sometimes serve as an interpreter first before serving as an engineer, followed by a stint as an unofficial defense attorney of our profession when the cause of the confusion becomes apparent.

What is that cause? Typical details and boilerplate specifications. Of course, reinventing the wheel on each new job is a good way to lose money, so it is beneficial to reuse as many details and notes as possible. Once you invest time getting a good detail drawn and annotated, you naturally will want to use it as a standard. That often requires making it generic enough that it can be applied to a variety of similar conditions. Unfortunately, those conditions sometimes are not as similar as we would like to imagine.

With that in mind, here are the first three of ten obstacles I have encountered using other engineers' design documents while working on behalf of steel fabricators over the last ten years:

Inapplicable details. Do not add details that are not applicable anywhere on your project, especially if you have not added the details that actually do apply. For instance, is your client's new project in Bismarck, North Dakota, very similar to their previous one in Hayward, California? Unless you intend to give local fabricators heart attacks, do not copy connection details from a building in Seismic Design Category (SDC) E to a project in SDC A. Another instance of this issue is where copied details reference delegated design when the design is not being delegated on the current project. The result has often been a frantic email from a fabricator asking for a quote on connection design for a project bidding on the day they came across a delegated design reference buried in a detail somewhere. *Good housekeeping benefits everyone.*

Contradictory specifications. Some cases are simply amusing, like a steel stair specification requiring the stairs on a project in Arkansas to be stamped by a California-licensed structural engineer. Others can raise serious questions and cause unnecessary delays. Do not assume that a caveat like "in the event of discrepancies between drawings and specs, the drawings shall govern" clears up the confusion caused by not reading through your own specs thoroughly. This is especially true if you made the Inapplicable Details mistake above. The specs are still binding on the fabricator, so if you copy a spec referencing Architecturally Exposed Structural Steel (AESS) Category 4 to your typical egress stair, the fabricator can rightly say you specified "show-case elements" and price accordingly. I have received plenty of specs that looked like nobody on the design team bothered reading them. *Specs should not be an afterthought.*



Outdated references. Unfortunately, drawings are often like houses: they accumulate junk and need a good spring cleaning every year. In the last few years, I have personally seen general notes referencing the 1979 welding code, the 1997 building code, and the 7th and 8th editions of the American Institute of Steel Construction's (AISC) *Steel Construction Manual* (that is the 1970 and 1980 manuals for the younger engineers reading this). My first thought when I see references like that in a set of drawings is, "If something so obviously wrong that would take a few seconds to fix was left that way, what else was overlooked?" Now, in case you think those are just obvious gaffes to pass over, one engineer friend called me asking for advice as he was being ordered by an Engineer of Record (EOR) to redesign and resubmit his steel joist calcs based on the AISC's 9th edition steel manual (from 1989) as shown on the EOR's drawings. AISC 360-10 was the steel design standard adopted by reference by that state's building code at the time. Some design programs are not set up to switch back and forth between different editions of standards. And newer editions of references tend to have more research and testing behind them, allowing capacities to increase in later editions or new limit states to be imposed as deficiencies are discovered.

The flip side is that if you specify "latest edition" of some code or standard just to avoid having to update references in your drawings but have not familiarized yourself with it yet, be prepared for RFIs or back charges from those who have read it more closely. A prime example is AISC's *Code of Standard Practice* (COSP, 303-16). The 2016 edition added requirements that the EOR shall provide a bidding quantity for reinforcement of framing at connections (e.g., column web doublers, etc.) if the EOR is not fully designing that reinforcement and is delegating the connection design to the fabricator. See COSP section 3.1.2(2)(b) and its *Commentary*. I was involved in a project where the structural drawings referred to the "latest edition" of the COSP (2016) but simply had the note "web plates/stiffeners etc. as req'd by design." In this case, the EOR, by his own reference to the latest edition, should have provided an approximate tonnage of reinforcing for competing fabricators to bid fairly but did not. *References matter.*

These might seem relatively minor compared to errors like undersizing a beam, but they can still cause questions and delays. In the next installment, I will look at 4 more issues to watch out for. ■



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