

Meet the Experts at MSC's Online Chats



Bobbi Marsteller and Keith Mueller of the Steel Solutions Center hosted an on-line chat with the structural steel community on August 21, 2001. The following is an edited transcript of the questions and answers from that chat. If you have a question for the Steel Solutions Center, email them at solutions@aisc.org, or call 312.670.2400.



Bobbi Marsteller
Director, Steel
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Keith Mueller
Senior Engineer

Q • What color is the new AISC manual (3rd Edition LRFD Manual of Steel Construction) cover going to be?

A • Penn State Blue! The third edition LRFD Manual will be released on November 15, 2001.

Q • How is ASD handled in the new LRFD manual?

A • ASD is not treated in the 3rd Edition LRFD Manual. However, a new Unified Specification is currently in development that will bring the two together. It is anticipated that the new Specification will be published in 2005.

Q • Will ASD be brought "up to date" in the new combined specification with LRFD?

A • The answer is yes and no. For a complete update on the Unified Specification, please see the September 2001 issue of *Modern Steel Construction*

(it can be read online at www.modern-steel.com).

Q • What's been holding up the latest edition of the Detailing Manual and when will it be available?

A • The Detailing Manual has been off-course for some time now. The graphics have been a problem in terms of getting them all prepared. It was a lot more work than our volunteer committee had anticipated. We're getting there slowly and surely. It should be ready next year, however.

Q • How different will the new Detailing Manual be from the old red-covered one?

A • It has been totally reorganized into sections that reflect the actual flow of detailing a project. It is also more focused on steel detailing, as opposed to the previous version that was more of a connection design reference with some detailing information in it.

Q • Are all modules of the Detailing (training) CD-ROM set available now?

A • Yes, the Detailing CD-ROM is complete and more than 200 copies have been sold. You can order your copy online at www.aisc.org/publications.html. A free demo is available by emailing melnick@blacksquirrel.net.

Q • How can a fabricator get more involved in design-build parking structures?

A • Fabricators can get more involved in design-build by identifying jobs within their means that could go design-build, and meeting with structural engineers and contractors to discuss pursuing these projects together. AISC has information available on design-build and also offers a seminar on the topic. For more information, contact John Cross at cross@aisc.org.

Q • Where can I get more information about structural steel framing systems for multi-story residential buildings?

A • AISC has a number of publications on steel framing solutions for multi-story residential buildings, including staggered trusses, girder-slab systems and many others. AISC also conducts presentations and workshops on the topic. You can find a great deal of information on the topic on our website at www.aisc.org/solutions.html, or you can contact Steve Angell at an-gell@aisc.org for further information.

Q • Who is producing castellated beams now?

A • One manufacturer of these beams is SMI Steel (the "Smart-beam"). You can visit their website at www.smi-steelproducts.com.

Q • How do I get a subscription to *Engineering Journal*? I have gone through the online subscription form twice within the last three months and haven't heard from anybody. Is there a phone number I can call instead?

A • We apologize for any inconvenience. Anytime you need to reach AISC, please call 312.670.2400. In addition, for *Engineering Journal* or Modern Steel Construction subscriptions, you can email kingston@aisc.org.

Q • I've been using the FEMA code for seismic design and trying to hybridize the old AISC detailing with the ductility requirements of FEMA. One big gap I have is trying to assure that the required rotations can be accommodated. Is there an AISC source/method to determine the rotational capacity of connections?

A • Old approaches to ensuring ductility may not be adequate.

The FEMA recommendations are now working their way through the consensus process in the AISC Committee on Specifications. Your best approach right now is to follow what is in the AISC Seismic Provisions. Most jurisdictions now have a chain of code-referencing that gets you there anyway.

Q • I've been trying to satisfy both FEMA and AISC Seismic criteria but I hit a wall when it comes to proving rotational capacity. I try to stick to what appear to be standard West Coast connection designs (I'm on the east coast myself). I believe that I'm providing adequate connections but I can't prove it short of testing mockups, something my budgets certainly don't allow. Will AISC address this in the future? If so, when?

A • Yes, we've got an effort started up on that. It will start with what has been assembled in FEMA 350 and extend from there. One thing you might consider, when possible, is to design with $R = 3$. That eliminates the need to meet the requirements in the AISC Seismic Provisions, assuming the code permits the use of $R = 3$.

Q • Where can I find hole gages for wide flange shapes?

A • This information will be making a comeback in the 3rd Edition LRFD, available November 15, 2001.

Q • Just being nit-picky, but what happened to the angle hole gages that seem to have disappeared from the 2nd Ed. LRFD Manual (at least I haven't found them; they came right after the angle properties in the 9th Ed. "Green" book).

A • They can be found on page 9-13 of the 2nd Ed. LRFD Manual.

Q • For a 25-story steel framed office building project in Chicago, how soon can fabricated structural steel be available on site once a fabricator has been awarded the project, assuming the project has been started by the GC and the foundations are underway.

A • Depending on the fabricator, you can get the first batch of steel delivered to the site in as little as 12 weeks.

Q • I'm concerned about galvanized cope cracking. What can I do?

A • Although there has been research in this area, there still are some unanswered questions as to why it occurs. AISC is conducting a research project on extended shear-tabs to avoid coping altogether. This information will be made available early in 2002.

Q • How many tons of steel are in the Empire State Building?

A • There are about 60,000 tons of steel in the Empire State Building.

Q • What is a good estimate for cost of steel framing fabricated and installed in the Midwest on a per pound basis?

A • A per pound basis is not a very good way to quantify. In-place steel can range anywhere from \$0.60/pound on up, but you may triple that if you make it difficult to fabricate.

Q • \$0.60/pound? Is that for the Midwest only? I usually use \$1.50/pound on the East Coast.

A • As I mentioned before, per-pound estimating is not a good way to estimate! The details that are specified make a huge difference in

cost. The \$1.50/pound you mentioned falls within the range I gave.

Q • Why is per-pound not a good way, and what is your recommended approach? Don't most details tend to be typical anyways?

A • Per-pound estimating is problematic because it assumes that steel costs are proportional to the number of pounds of steel in the structure. This is not true (and really never has been). People use it because it is easy, even if it can be very inaccurate. Today, economical structures are designed to minimize fabrication costs, rather than minimizing steel weight. In fact, while labor costs for detailing, fabricating and erecting steel have increased with inflation, the material cost of steel today is about the same as it was more than 20 years ago.

Q • What about bridges? Can they be estimated "per pound"?

A • On bridge structures, especially simple span structures, costs can be relatively accurate on a "per pound" basis within a limited range.

Q • Is the new Steel Dynamics mill in Indiana still on schedule? When will they be making and rolling steel?

A • The word on the street is that Steel Dynamics is slated to be on-line by the end of 2002.

Q • I have had difficulty in the past with A&E standards of practice with government client reviewers. For private projects in my locale it is common to provide connection loads and connection detailing. Given very tight budget constraints on government work, what is an appropriate level of detailing on construction documents?

A • This is an issue that is hard to address. It varies regionally. Perhaps it is more owner preference. I think the job will be more economical if the details are clearly spelled out in the design documents.

Q • Anybody know approximately what it costs to camber a steel beam?

A • I've heard \$15 for a typical beam (up to 1.5" or so). However, inducing camber or sweep in a beam is a function of the section modulus and the capacity of the mechanical cambering machine. It depends on who does it and how it's done. It's always good to get the fabricator involved early to suggest the best methodology to achieve the desired results.

Q • Is there a good "universal" source for curvature limitations of steel beams or is it strictly fabricator specific?

A • You can go to the *Manual* (2nd Ed. LRFD, Chapter 9) to get bend radii limitations for plates. The same limitations can be extrapolated to beams if you convert it to curvature though a beam will hardly ever be curved to the same extent that a bent plate is. You may want to discuss your question with a fabricator or a specialized company that does "bending" of beams, both the "easy" and "hard" way. A listing of companies specializing in this work will appear in the October 2001 issue of *Modern Steel Construction*. Also, there will be an on-line chat about bending on December 4th.

Q • I need a clear understanding of what is expected (required) of the design engineer if I go the way of passing design onto the contractor.

A • The AISC Code of Standard Practice lists the kind of information that is essential for a connection designer to do the work. You can

download the new Code at www.aisc.org/code.html.

Q • Several of my recent projects have been long-span steel truss structures where I spell out specific camber requirements for different load conditions encountered during erection. However, the loads are dramatically affected by erection sequence. Unless I interfere with the contractor's ability to choose his own means and methods, I have difficulty in producing the end results that I want. To date, I have been fortunate in having contractor's that work with me, but I may not be so fortunate in the future. Any recommendations?

A • I suggest involving a fabricator early in the process. Talk about the details and what will result in lower costs for the type of work to be fabricated. The costs are in the details since that is where the labor is.

Q • Has the k distance changed for WT shapes?

A • Since WT shapes are cut directly from wide flange shapes, the k and k_1 distances may have changed. AISC issued an advisory on the new k , k_1 and T dimensions for wide flange shapes available as a free download from www.aisc.org.

Q • Many steel fabricators have W-shapes with the old k distance and for W8x31 bolted connections in the web we have a problem with new k distance...when do you think the old k distance values will not be used anymore?

A • The 3rd Edition LRFD *Manual* incorporates the new k , k_1 and T distances, which will become available in November 2001. This, combined with the free AISC Advisory available at www.aisc.org containing the latest

dimensions, addresses the issue quite well. The new AISC Shapes Database v.3.0 also incorporates the new dimensions.

Q • I know the Steel Shape Producers Council (SSPC) has changed their name earlier this year. What is the new name?

A • The SSPC has changed its name to the Technical Committee on Structural Shapes (TCSS). The SSPC (Structural Shape Producers Council) no longer exists because the mills have joined AISC as active members.

Q • What's the price difference between weathering steel (such as ASTM A588) and common carbon steel (such as ASTM A992)?

A • Structural steel pricing (FOB the mill) is available for review on both Nucor-Yamato Steel Co.'s website www.nucor-yamato.com and TXI-Chaparral Steel's website www.chaparralsteel.com. In general, structural steel is priced based on section size. However, ASTM A36 is no longer the base price and in most cases ASTM A36 costs more than grade 50 (ASTM A992). "Weathering steel" (ASTM A588, ASTM A709 Grade 50W) has an extra of \$3.00-\$3.50/cwt (hundredweight = 100 lb.) depending on section footweight.

Q • Is it appropriate to specify ASTM A992 steel if using the ASD specification for design?

A • ASD is aging, so it doesn't recognize or incorporate new developments in the last fifteen or so years. But given that ASTM A992 is referenced in the LRFD *Specification*, you should be able to use it without anyone objecting.

Q • I have been doing a lot of HSS steel design for the last two years and even level 2 certified fabricators are often stymied by the

difficult elliptical copes and the various welds and testing required. Has there been thought given to a separate certification for HSS fabrication?

A • Not to date. Do you use any of the pipe cutting layout software or template-making systems that now exist? They make the process a lot more feasible.

Q • I'm doing a retrofit of a 1930s steel structure. Do you know where I can find properties of the structural steel members?

A • Check out *Iron and Steel Beams 1873-1952* (1953), a tabular compilation of the properties of wrought iron and steel beam and column shapes produced in the United States through the year 1952. Also provided is a summary of historical unit stresses recommended by early manufacturers, ASTM tensile and yield strength requirements, and the working stress recommendations of AISC during the period covered. The 142-page book costs \$40 (\$60 for non-AISC-members). You can purchase it (M003) by calling 800.644.2400 or visit AISC's online bookstore at www.aisc.org.

Q • I use that book fairly often and find it very confusing. What is the difference between "American Standard" and "WF" shapes? And why do there seem to be so many designations for what seems to be the same section?

A • "American Standard" shapes have narrower tapered flanges. Wide flanges have wider, thicker flanges that do not taper. Incidentally, a new edition of *Iron and Steel Beams* is expected to be out by year-end.

Q • Aside from putting big, bold notes on the contract drawings that say: "This is really tougher than it looks" what should I do?

A • I have seen the engineer require a written fabrication procedure to be submitted with the shop drawings for connections of items that are beyond the normal fabrication realm.

Q • When steel is galvanized, what does the note to "seal weld" refer to and is it necessary?

A • "Seal weld" means just that, your welders need to weld the cracks, gaps, spaces, or areas where two plates meet. This is because air or moisture can get in those areas, and when the structure gets dipped in the galvanizing kettle (which is very hot) it can expand and deform that area of the structure, or even explode and send hot zinc everywhere. That is why proper venting is important, so the molten zinc can flow, and not trap an air pocket. The other reason is that if there isn't air or moisture in those cracks, there could be later, and corrosion (rust) may develop and leak out of that crack. For more information on seal welding of galvanized members, contact the American Galvanizers Association (visit their website at www.galvanizeit.org). They have some good publications on this. Their website also lists the kettle sizes of each of their members. For more information on galvanizing, view our galvanizing online chat posted at www.aisc.org/chat.html.