Rave Reviews For AISC Serviceability Seminar

Both engineers and architects are giving AISC's new 49-city Seminar Series, "Design Steel for Serviceability," rave reviews. Some have even gone so far as to call it "AISC's best seminar yet."

The powerful sessions cover five important topics: frame layout options & strength design; roof ponding; floor elevation & levelness; control of lateral drift; and control of floor vibrations.

The seminar series has a CEU value of 0.55 (5.5 PDH). Registration is $120 ($90 for AISC members). The registration fee includes a wide range of handouts.

Please note that all MSC subscribers will automatically receive a registration form six weeks prior to the seminar scheduled in their area.

For more information, call 630/369-3772, fax 630/369-3773 or point your favorite web browser to: http://www.aisc.org

1997-98 Seminar Series Schedule

1997

Sept. 17 .....Dallas
Sept. 18 .....Oklahoma City
Sept. 24 .....Sacramento
Sept. 25 .....San Francisco
Oct. 8 .....Chicago
Oct. 15 .....Philadelphia
Oct. 16 .....Edison, NJ
Oct. 21 .....Detroit
Oct. 23 .....Indianapolis
Oct. 28.....Raleigh
Oct. 30 .....Birmingham
Nov. 5 .....Portland, OR
Nov. 6.....Seattle
Nov. 12 .....New Orleans
Nov. 13.....Houston
Nov. 18 .....Meriden, CT
Nov. 19 .....New York City
Nov. 25.....Atlanta
Dec. 2 .....Memphis
Dec. 4 .....Nashville
Dec. 11 .....Salt Lake City

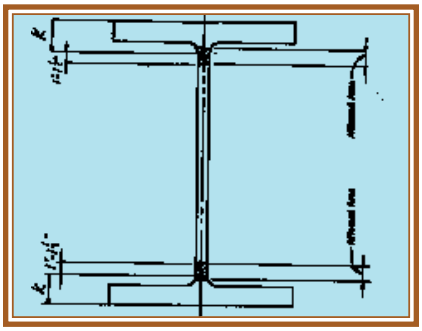
1998

Jan. 14.....Los Angeles
Jan. 15.....Los Angeles-East
Jan. 21 .....Columbus, OH
Jan. 22.....Cleveland
Jan. 27 .....Jacksonville
Jan. 29 .....Tampa
Feb. 4 .....Boston
Feb. 5 .....Portland, ME
Feb. 11 .....Albuquerque
Feb. 12 .....Phoenix
Feb. 18 .....Pittsburgh
March 3 .....Kansas City
March 5 .....Denver

AISC Initiates Research Into "k" Area Cracking

During 1996 there had been reports to the American Institute of Steel Construction indicating the potential for crack initiation at, or near, connections in the "k" area of wide flange rotary straightened members.

The "k" area is the region extending from approximately the mid point of the radius of the fillet into the web approximately 1" to 1½" beyond the point of tangency between the fillet and web as shown in the figure. Most of the incidents occurred at highly restrained joints with welds in this area.



To gather further information, the AISC Board of Directors established the Research Subcommittee on Shape Material and Design with the mission to: "Assess specifics related to shape material/design issues, and to recommend and oversee any necessary research."

The Subcommittee members are: William F. Baker, Skidmore, Owings & Merrill; John M. Barsom, U.S. Steel Group;Reidar Bjorhovde, University of Pittsburgh; Jacques Cattan, American Institute of Steel Construction; Roger E. Ferch, Herrick Corporation; John W. Fisher, Lehigh University; Theodore V. Galambos, University of Minnesota; Mark V. Holland, Paxton & Vierling Steel Company; Nestor R. Iwankiw, American Institute of Steel Construction; Dean C. Krouse, Bethlehem Steel Corporation; James O. Malley, Degenkolb Engineers; William A. Milek, Consultant; Duane K. Miller, The Lincoln Electric Company; Thomas M. Murray, Virginia Tech.; Shankar R. Nair, Teng & Associates; Ronald W. Shaw, Cives Steel Company, Chairman; Donald R. Sherman, University of Wisconsin-Milwaukee; Ted Temple, Chaparral Steel Company; William A. Thornton, Cives Steel Company; and Ted W. Winneberger, W&W Steel Company

A workshop was conducted on January 8-9, 1997 to systematically review concerns that had been raised. Almost one hundred engineers attended this meeting. One of the results was that an AISC Advisory Statement dated Jan. 9, 1997 was immediately released (see the February 1997 issue of *Modern Steel Construction* and AISC Home Page at www.aisc.org) to alert users to several observations and considerations related to the k-area of wide-flange shapes. Subsequently, several meetings of the Subcommittee were held with excellent participation and input from all members. The general conclusion of these discussions is that wide flange shapes, as manufactured and processed with today's technology, warrant expanded evaluation of their physical properties. Consequently, the subcommittee has recommended the following four areas for expanded research:

1. Characterization of Cyclic Inelastic Strain Behavior on Properties of A572 Gr50 and A913 Rolled Sections. This research program is intended to establish the cyclic stress-strain behavior of A36 and A 572, Gr. 50 rolled sections manufactured in the 1960-75 era and A572, Gr. 50 (enhanced) and A913 rolled sections manufactured today.

2. Load Tests on "k" Area of Rotary-Straightened Column Sections to Determine Effects on Service Performance. These experiments are intended to assess whether and how the material property variations in the "k" area affects the ability of rotary straightened column sections to transmit loads in service.

3. Reassessment of Design Criteria and New Alternatives For Column Transverse Stiffeners (Continuity Plates) and Web Doubler Plates. This research program is intended to develop new ideas and modifications to existing details that would improve their performance.

4. Updating Standard Shape Material Properties Database for Design And Reliability. The objective of this research is to determine the entire stress strain characterization of steel wide-flange sections based on new material data.

The Subcommittee is currently pursuing the implementation of this proposed research and is continuing to examine other issues brought to its attention. Further progress reports, articles, and/or design criteria will be

published as new data becomes available. For more information on AISC's research efforts, contact Jacques Cattan, AISC Staff Engineer-Structures at 312/670-5430 (email:cattan@aiscmail.com).

New Certification Program For Erectors

Nature abhors a vacuum. So when AISC and the National Erector's Association (NEA) saw a need for a way to encourage the quality of steel erection, clarify what should be expected from erectors and emphasize coordination between erectors, fabricators and engineers they began investigating creating an Erector Certification program. Adding further impetus was a series of meetings, testimony to the Steel Erection Negotiated Rulemaking Advisory Committee (SENRAC) and discussions with engineers. AISC and the NEA asked the Steel Erector's Association of America to join in a task group to develop a certification program for steel erectors. The Erector Certification Program is intended to be philosophically similar to the certification program AISC has operated for fabricators for more than 20 years.

AISC hired Fred Haas, a well-known expert on erection, to guide the development effort. Haas has a long track record of managing successful erection and fabrication operations and is a registered structural engineer in the state of Illinois. According to Haas "The mission is to provide a consistent measure of confidence in the organization and systems used by erectors. Many erectors do fine work, but we have also seen a need for some improved methods in the industry. The standard we are writing will be achievable by any company with the desire to obtain it, but we intend to include some requirements that are not met now by many erectors. There seems to be an increase in interest in the construction industry by litigators. One way we can prevent an increase in litigation is to emphasize sound erection practices."

"The erector Certification Task Group writing the program is made up of erectors, so they understand the need for contractors to be able to work the best way they can but they also see some areas that could improve the performance and reputation of the industry, such as planning the job." Haas added.

"The erector Certification Program will offer a system-based evaluation using annual randomly selected site visits and a review of quality systems," explained Tom Schlafly, AISC's Director of Certification and Fabrication Operations. The auditors will observe erectors working on a site, but it is not an inspection. The auditor looks for evidence that the company has the ability to perform the work, rather than assurance of performance on a specific site. There are systems audits and product audits. In order to keep the program within the reach of many erectors and builders as possible, we use the system approach where we see that a system is in place and it is up to the erector to use his systems to perform as required." One emphasis of the program is to encourage coordination between designers, general contractors, fabricators and erectors.

Certification programs like the AISC Erector Certification continue to provide benefits after the initial evaluation. Each year, as a participant continues in the program, the company's systems and procedures improve from periodic review and upgrading in preparation of annual evaluations. During annual reviews the auditors bring news of current issues and specification changes to a company generating improvement through communication of ideas.

AISC was a logical administrator for the program because no one erector association represents the entire industry, " Haas explained. "Also I believe it is critical that fabrication and erection go hand-in-hand. We also have an advisory Committee that includes design engineers, representatives from major steel erection associations, general contractors and others"

Currently, plans are for two categories of certification: Certified Erectors and Certified Complex Erectors. The Certified Erector Category covers such project types as: small public service and institutional buildings; shopping centers; light manufacturing plants; miscellaneous and ornamental iron works; warehouses; low-rise beam and column erections; light truss structures; simple non-continuous bridges; and buildings up to 10 stories. The Complex Erector Category covers everything in the Certified Erector Category plus: large public and institutional buildings; heavy manufacturing plants; bunkers and bins; major bridges; and buildings more than ten stories high.

If successful, the program will be both a marketing and an educational tool for erectors. As a marketing tool, it's a good method for erectors to show their commitment to quality and standards. As an educational tool, it should be useful to help an erector upgrade their current procedures. "If an erector follows the procedures we outline, the savings will exceed the costs of certification," Haas claimed. "And while there will be a cost for this certification, it will be substantially less than in other industries using ISO 9000 certification."

Fabricators and erectors should see almost immediate benefits, according to Robert G. Abramson, CEO of AISC-member Interstate Iron Works, which is both a fabricator and erector, and Chairman of AISC's Committee on Certification, Fabricating Operations and Safety. "It gives me the ability to pre-screen the erectors I use on projects to help alleviate any potential problems," he explained. "It should also help elevate the professionalism in our industry. And finally, it should help fabricators and erectors to work more closely together—and earlier on a project—to plan connections, bracing, scheduling and equipment needs."

Trial audits of several erectors were conducted in May. "We hope to do the first real audit by the end of the third quarter of this year," Schlafly said. The Quality Auditing Company of Bristol, VA, the same group that handles the auditing tasks of AISC's fabricator program, though auditors specifically qualified for erection work, will perform the actual audits.

Presentations on the new program have been made at meetings of structural engineers, erectors, fabricators and general contractors, with positive response from all groups, Haas said.

For more information on the program, contact the AISC Quality Certification at 312/670-5435 (email: qualcert@aiscmail.com).

Bridge Erection In Just Two Minutes, 16 Seconds

It took the team of University of Florida (UF) engineering students just 2 minutes and 16 seconds to build an 80 lb., 19'-long steel bridge capable of supporting a Mazda Miata with only 1/8" deflection in the center. That feat helped them take first place in this year's National Student Steel Bridge Competition.

The competition, sponsored by AISC was held at California State Polytechnic University in Pomona and included 39 teams from schools across the country. Co-sponsors include the American Society of Civil Engineers (ASCE), the American Iron and Steel Institute (AISI), the National Steel Bridge Alliance (NSBA) and the James F. Lincoln Arc Welding Foundation.

Students designed and shop fabricated the scale model bridges, then met in competition to erect their bridges and have them tested. Bridges were judged on construction speed, stiffness, efficiency, economy, lightness and aesthetics.

According to Marc Hoit, faculty advisor to the winning UF design team and associate professor of civil engineering at UF, the contest is important because it provides students with a real-world experience and hands-on knowledge of how to design and build a bridge.

"They had to do exactly what they would have had to do in the real world," Hoit said. "As civil engineers they may have to design a bridge, make it efficient enough for someone to build it economically and then trucks will have to drive over it." As an added educational benefit, the students not only experienced the design end, but also had to roll up their sleeves and build the bridge. As a result, these future structural engineers should have a better understanding for the necessity to consider constructability in their designs.

Among the design requirements for this year's competition was that no single part could be more than 5½' long, 7½" wide or weigh more than 40 lbs. The parts were brought to the site and assembled to span an imaginary 9'-wide river that could not be touched or crossed during the construction. If the students did touch the "water" they were penalized. For example, the UF students were penalized both for stepping once into the "river" and also for dropping a bridge part. Student builders also were restricted to where they could walk and stand while assembling the bridge. Finally, one person could carry only one part at a time, or two could carry three assembled parts.

Second place in the 6th Annual National Competition—which featured the winners of the 20 regional competitions involving more than 200 schools—went to Michigan State University, while California Polytechnic State University (San Luis Obispo) came in third. Other top finishers were the University of New Mexico (construction speed), Louisiana Tech University (economy), Lawrence Technology University (lightness) and Clemson University (aesthetics). UF came in first in both stiffness and efficiency."For a lot of these students, it was the first time they used tools and built something," Hoit explained. "They're used to just working with calculators and computers."

For more information on the Student Steel Bridge Competition, contact Fromy Rosenberg, AISC assistant director of education at 312/670-5408.

CASE Survey: SER Responsibility

Opinions are divided on the impact of the increasingly common practice of dividing the responsibility for a project among one or more structural engineers or firms. The following survey, from the Council of American Structural Engineers (CASE) is designed to gather opinions on this practice.

"It is hoped that a dialogue can be developed to explore the many legal, practice and administrative issues that are associated with this growing practice," explained Steven Schaefer, CASE representative.

"The division of structural responsibility on any project may take many forms," Schaefer said. "In many cases, whether it is pre-engineered metal, glue laminated timber, prestressed precast concrete, post tensioned concrete or prefabricated wood trusses, the structural frame is designed by one engineer while another engineer designs the remainder of the building. Preferably, the Structural Engineer of Record (SER) is responsible for the entire project and will designate the parameters for which the frame manufacturer or supplier must design. The SER reviews submittals by the frame designer to see that the design parameters were met. In this situation all aspects of the structural design are fully coordinated and compatible," Schaefer believes.

"In an increasing number of situations, particularly with design/build projects or where the architect wants to minimize the structural design costs, no one takes responsibility for the total structure. Instead, an engineer on the staff of the frame supplier or hired by them designs the structural frame and the design/build contractor or architect retains another engineer to design the foundation based on the loads provided by the frame designer," Schaefer said. "This was typical for pre-engineered metal buildings where the metal building manufacturer designed the frame but more and more often structural steel fabricators and open web joist suppliers are being required to provide structural frame design under provisions placed in the contract documents by the lead design professional."

"This situation frequently leaves no one in control of the total structure," according to Schaefer. "This problem was noted recently as a concern by some CASE members. Thus, we decided to conduct a survey of the various participants in the project delivery process to see if they have encountered this situation and what problems, if any, they have noticed."

If you wish to participate in the survey, please list your responses to each of the following questions on a separate sheet and fax it to the Council of American Structural Engineers at 202/898-0068. Please respond by October 15th. All individuals responding will be kept in strict confidence.

1. I am a:
- **a.** consulting structural engineer
- **b.** engineer or representative of a steel fabricator
- **c.** engineer or representative of an other type of fabricator or supplier
- **d.** building official
- **e.** staff engineer of an A/E firm
- **f.** other (please describe)

2. Have you seen this split responsibility on projects in your locale? If so, please note the circumstances.

3. If you are involved in this type of project, do you use any disclaimer saying your are not the SER?

4. Is there an SER taking responsibility for the overall structure on these projects?

5. Are all structural provisions of the

building code being adequately satisfied? Are any components or load conditions being overlooked?

6. Do you think building officials are aware of any possible design deficiencies when a split design responsibility system is used?

7. Is the owner really getting the most efficient structure or are the frame designers optimizing the frame at the cost of the structure as a whole?

8. Have you seen problems with serviceability of the structures such as too much lateral deflection of the frame for the wall materials used?

9. Please note any other comments you have on the advantages or problems with this split responsibility design practice.

Also, though not required, providing your name and phone number would be helpful if we would need you to elaborate on any response.