12½ MINUTES

with AISC's Engineering & Research Department

DESIGN PROCEDURES FOR EXTENDED SHEAR TAB

Phase I – Shear Tabs without Continuity Plates

Background: AISC sponsored this research project at the University of Wisconsin, Milwaukee beginning in mid-1998 with scheduled completion during the latter half of this year. Drs. D.R. Sherman and A. Ghorbanpoor are co-principal investigators. The work is being performed under the auspices of the AISC Committee on Research and Innovation and a dedicated project Advisory Task Group as part of the STRESS initiative, with Jacques Cattan serving as the cognizant AISC staff.

Status: Four tests were performed to determine the behavior of extended shear tab connections without continuity/auxiliary plates framing into wide-flange column webs and girder webs. Two tests were on 3-bolted connections and the remaining two tests were performed on five-bolted connections. All bolt holes were short slotted and all plates were 3/8" thick except for one 5-bolt connection on a support column that was 1/2 in. thick.

The results of the tests indicated that in general, the capacity of this type of connection is lower than that for the standard connection based on the various governing limit states listed in the AISC Manual. It was also found that with an increase in the depth of the tab plates, i.e., 5-bolt vs. 3-bolt connections, excessive twisting of the beam's end, at the connection, result in a reduced capacity compared with that shown in the AISC manual for the standard connection. To allow for the use of this type of connection, the UWM investigators are working to develop design criteria for this type of connection based on the observed behavior from the tests. There is a significant interest in the use of this connection type due to its ease of fabrication/lower cost. The connection is suitable for a large number of cases where the full shear capacity of the beam does not have to be developed.

The Advisory Task Group approved this phase of the study and suggested additional future tests to evaluate deep extended tab plates. The Task Group also recommended that UWM initiates the Phase II study that includes the extended shear tabs with continuity/auxiliary plates. Fabrication of specimens for the 12 tests required for this Phase II of the study is now underway.

By Donald R. Sherman and Al Ghorbanpoor, University of Wisconsin-Milwaukee

NEW DESIGN GUIDES

Two new Design Guides will be introduced in May at the 1999 North American Steel Construction Conference in Toronto:

John L. Gross, Michael D. Engelhardt, Chia-Ming Uang, Kazuhiko Kasai and Nestor R. Iwankiw have prepared *Design Guide 12 Modification of Existing Steel Welded Moment Frame Connections for Seismic Resistance*. Steel Design Guide Series Twelve provides guidance for the rehabilitation of existing welded steel moment frame buildings to improve their seismic resistance in future earthquakes. Retrofit concepts with reduced beam section (RBS), welded haunch, and bolted bracket modifications resulting from a joint research effort between NIST and AISC are covered.

Design Guide 13 Wide-Flange Column Stiffening at Moment Connections has been prepared by Charles J. Carter. Steel Design Guide Series Thirteen provides for the determination of design strength and stiffness for unreinforced wide-flange columns at locations of strong-axis beam-to-column moment connections. It also covers the design of column stiffening elements, such as transverse stiffeners (also known as continuity plates) and web doubler plates, when the unreinforced column strength and/or stiffness is inadequate. Recommendations for economy are included in both cases.

Submitted by: Charles J. Carter

ASTM PUBLISHES A992 FOR W-SHAPES

To eliminate confusion and facilitate the shift to a better-defined single grade material for wide-flange shapes, AISC proposed the material specification "ASTM A572 grade 50 with special requirements per AISC Technical Bulletin #3, dated March 1997". Recently, ASTM has approved this structural steel as new specification A992. Both A572 Gr. 50 per Bulletin #3 and A992 specify the same shape material with the following main features:

a) maximum yield of 65 ksi
b) maximum yield to tensile strength ratio of 0.85
c) carbon equivalent limits

d) controls on certain residual elements

ASTM A572 grade 50 with special requirements per AISC Technical Bulletin #3, dated March 1997, or equivalently, A992 for W-shapes is currently being phased in as the preferred F_y=50 ksi alternate to both ASTM A36 and A572 grade 50 for wide-flange shapes only.

Note however, that ASTM A992 is still in the process of being included into all national standards, including AWS D1.1 and codes. The next edition of the AISC Specification will include A992 in its list of materials.

Submitted by: Charles J. Carter

Engineering Journal CD-ROM

AISC is pleased to announce that all 35 years of the AISC Engineering Journal (published quarterly) will be available on CD-ROM in May 1999. The 1999 AISC North American Steel Construction Conference will be the home of the introduction of this product to the structural steel design and construction industry. Since this product will include an incredibly large amount of information, very sophisticated searching utilities will be provided to enable users to search articles based upon years and issues of publication, as well as by authors, topics and user-defined key words.

CIMSteel Integration Standards (CIS) Technical Workshops

AISC, together with the Bechtel Corporation, Black and Veatch and Fluor Daniel, will be co-sponsoring two three-day technical workshops. These workshops will provide guidance for any interested software development company involved in the structural steel design and construction industry regarding translator development for CIS. The first AISC EDI technical workshop was scheduled for Feb. 17 through Feb. 19, 1999. Videos of this workshop are available for purchase.

For more information on EDI, contact Steven Hamburg, P.E., at 312/670-5413.

Submitted by: Steven Hamburg

Abe Rokach Leaves AISC

Abraham J. Rokach, Director of Building Design, resigned effective January 29, 1999 to return to private engineering practice in the Chicago area. During his tenure at AISC since 1990, Abe has been responsible for continuing education, preliminary designs, software, and most recently, technical information and the AISC Specifications. We all wish Abe the very best in his new professional endeavors.

A search process is ongoing for a new engineer to bring the Department back to full strength.

Submitted by: Nestor R. Iwankiw

Did You Know?

1. Low Cost, Not Necessarily Low Weight

Many elementary member design examples in texts usually optimize the selected structural size based exclusively on weight. While this is easy to do and illustrates the general approach, the real objective function for efficient design remains the total cost. Structural cost consists essentially of two major components, labor and materials. When the materials cost is dominant, this directly translates to the traditional and simple paradigm of lowest framing weight as most desirable.

However, when the other cost component, labor, is more important relative to materials costs, the total cost now again becomes the actual function to be minimized. Such is the case currently, and for the last several years, in structural steel construction, wherein very competitive shape prices contrast with the prevailing labor rates in the USA. This fact is leading to a change in practices that favors repetition of steel members and details combined with simplicity in details (avoiding stiffeners and/or doublers), even at the expense of extra member weight.

Much has already been written and discussed about this paradigm shift away from lowest weight to lowest cost in structural steel. The 1999 AISC annual seminar series "Essentials of Steel Design Economy" has this as a central theme that will be developed and demonstrated with specific examples. For more information on these seminars, call 630-369-7784.

2. Low-rise building construction is king

It is not surprising that U.S. construction statistics consistently indicate that buildings of 4-5 stories or less account for at least about 80-85% of the total volume, even during boom periods in high-rise. This makes sense given the everyday needs and resources of typical owners, communities, and consumers, but natural fascination with the spectacular taller and unique landmark buildings often can mislead or distort this reality. 4-5 story buildings, or less, are and will continue to be the "bread and butter" segment of construction.

Submitted by: Nestor R. Iwankiw