STEEL INTERCHANGE

Steel Interchange is an open forum for *Modern Steel Construction* readers to exchange useful and practical professional ideas and information on all phases of steel building and bridge construction. Opinions and suggestions are welcome on any subject covered in this magazine. If you have a question or problem that your fellow readers might help you to solve, please forward it to *Modern Steel Construction*. At the same time, feel free to respond to any of the questions that you have read here. Please send them to:

Steel Interchange
Modern Steel Construction
One East Wacker Dr., Suite 3100
Chicago, IL 60601-2001

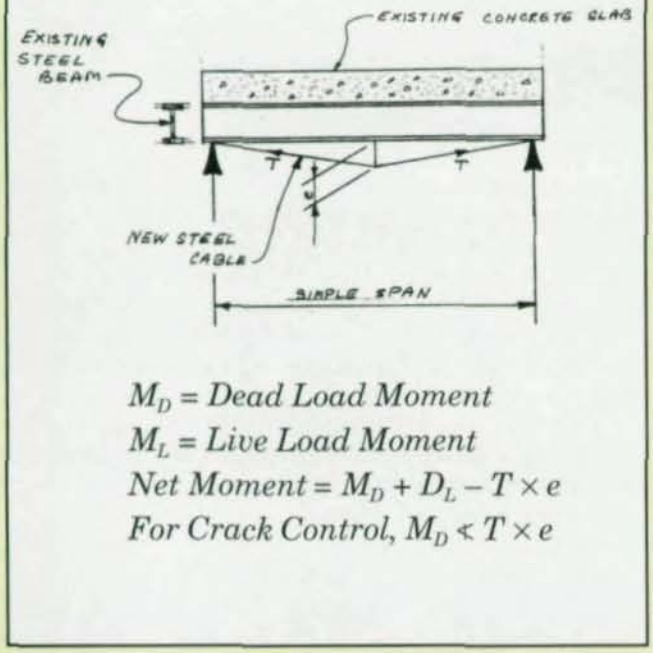
Answers and/or questions should be typewritten and double-spaced. Submittals that have been prepared by word-processing are appreciated on computer diskette (either as a Wordperfect file or in ASCII format).

The opinions expressed in *Steel Interchange* do not necessarily represent an official position of the American Institute of Steel Construction, Inc. and have not been reviewed. It is recognized that the design of structures is within the scope and expertise of a competent licensed structural engineer, architect or other licensed professional for the application of principals to a particular structure.

Information on ordering AISC publications mentioned in this article can be obtained by calling AISC at 312/670-2400 ext. 433.

The following responses from previous Steel Interchange columns have been received:

Can an existing steel beam and concrete slab be made to work together in composite action by adding studs to the steel through cored holes? Are there any special considerations?



It is presumed that the intent here is to enhance the capacity of an existing beam. One option that does not involve composite action is presented in the figure.

A steel cable can be installed to create negative moment in the center of the beam to counteract the positive moment from the gravity loads. The tension in the cable can be developed to counteract the dead load moment. Needless to say, T x e should not exceed MD since that may render the concrete slab susceptible to cracking.

Vijay P. Khasat, P.E.

In a structure that has tubular columns, should weep holes be added at the bottom of the columns in order to drain any water in the column?

Tubular columns which are exposed to the weather, or to temperature change which can cause interior condensation, should have weep holes even if the columns are capped. Water can also enter a column through the ends of slots which are not totally covered by washer.

The consequences of water entering a tubular column are that the column may freeze and burst, or may be subject to hidden corrosion.

If, however, a column is protected from the elements and is not subject to drastic changes of temperature, or an overly humid environment, weep holes may not be necessary. Some engineering judgement is required.

David T. Ricker, P.E.
Payson, AZ

When erecting steel beams on a brick wall, could the non-shrink grout be omitted under a proper bearing plate, if the surface of the brick is smooth, clean of any and all debris and leveled?

In practice, we do not believe the omission of grout under a potentially rough bearing surface (or even a smooth surface) is wise since: (a) unanticipated or unaccounted for torsional strain and translation can result if the bearing surface plane is not normal to the loading plane; (b) the bearing surface and bearing plate (or flange) will have zones of excessive stress if the loading not uniform; (c) a failure can result in one or more of the mechanisms involved in the transfer of load from one member to another since the model calcu-

lations might not match the real loading and boundary conditions. These considerations are amplified when the base surface is non-uniform as in the case of masonry construction (brick or c.m.u.). Without the use of a grouted leveling bed, the edge of the base will also be loaded which can result in a premature shear/tension failure at the edge (popping of the corner). As such, we set back the grouted leveling bed and the bearing plate $^1/_2$ inch to minimize this potential failure mode. We specify shrinkage-compensating (the term, "non-shrink grout" is a misnomer) grout in the 5 to 10 ksi ultimate compression strength range as determined by ASTM C1019 depending on the bearing stresses with a minimum thickness of $^1/_2$ inch.

Stephen K. Crockett, P.E.
David M. Berg Associates, Inc.
Needham, MA

Serviceability is a particular concern for crane systems in industrial buildings but is not clearly covered in the standard code literature. What are deflection limits for crane runway systems?

The following national publications deal expressly with the design concerns of all types of hoisting equipment. Serviceability and defection limits are treated in great detail in these documents:

- American National Standards Institute B30.XX series of standards.
- Crane Manufacturers Association of America Specifications 70 and 71.

Joe S. Garcia, P.E.
Santa Fe, NM

New Questions

Listed below are questions that we would like the readers to answer or discuss.

If you have an answer or suggestion please send it to the Steel Interchange Editor, Modern Steel Construction, One East Wacker Dr., Suite 3100, Chicago, IL 60601-2001.

Questions and responses will be printed in future editions of Steel Interchange. Also, if you have a question or problem that readers might help solve, send these to the Steel Interchange Editor.

The AISC Manual indicates that design strengths tabulated for clevises and turnbuckles are calculated using $\phi = 0.3$ in LRFD (or a factor of safety of 5 in ASD). The Manual indicates that this conservative reduction is used because these devices are most often used for temporary rigging which may be subjected to dynamic and impact loading. When these devices are used in permanent applications and not subject to these considerations, e.g., as part of the permanent bracing system, is it justified to use a of 0.5 in LRFD (or a factor of safety of 3 in ASD)?

What is the most efficient way to enlarge an existing footing, when new loading conditions are applied?

Jake Roth
Roth Metal Works, Inc.
Brooklyn, NY

The bending resistance for square and rectangular sections is doubled when bent about the edge instead of the neutral axis. When is it appropriate to use bending across the edge of the section?

Don A. Finney
Mason & Hanger - Silas Mason Co., Inc.
Amarillo, TX

In addition to the requirement of Section B5, the laterally unsupported length L_b of a box member is based on the ratio M_1 / M_2. What value of M_1 / M_2 should be used in the case of a simply supported beam, where M_1 / M_2 = 0/0, which is mathematically undefined? Note that similar situations occur in the equations for bending coefficients C_b and C_m in the bending and combined axial and bending equations, except that statements are made in the text that cover the case of a simply supported beam.

George R. Lang, Jr., P.E.
Mobil Producing Nigeria, Ultd.
Morgan City, LA

In what instances, if any, and under what criteria can the attachment of grating with mechanical fasteners be used to provide lateral bracing to the compression flange of the members supporting the grating in applications such as walkways and catwalks?

Curt E. Mauler
Wilson & Co.
Wichita, KS