Discussion

Are Tier Building Column Splices Designed?

Paper presented by HENRY J. STETINA (October, 1968, issue)

Discussion by **THURSTON KLAYTON**

FOR COLUMN SHAFTS subjected to wind moment, Mr. Stetina states that the maximum bending stress $f = M/S$, where M is the wind moment and S is the section modulus. Since a column web is not usually spliced and thus unable to transmit tension, the bending stress obtained by the use of the formula would not be accurate in those cases where flange tension exists. It is proposed that the formula $f = M/Ad$ be used to find the bending stress, where A is the area of one flange, and d is the distance between flange centroids.

Concerning proper splicing for columns, this writer offers the following comments: Allowable tolerances in the straightness of rolled shapes necessitate plumbing the steel frame during the erection process; this plumbing of the steel often "opens up" the faying surfaces at the column splice with subsequent overloading of the contact surfaces and finally bringing the building out of plumb.

A solidly designed splice will give the designer assurance that the column will perform in accordance with the design intent. It may be that the wisest choice in a column splice lies somewhere between the AISC Specification as a lower bound and a 100 per cent splice as an upper bound.

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Discussion by **HENRY J. STETINA**

Mr. Klayton's proposal to use area moment instead of the column's section modulus for determining bending stresses merits consideration even if the difference in result is not significant. Area moment is consistent with the analyses used for determining moment capacity of the splice plates.

In his second paragraph Mr. Klayton states that the opening of the joint due to slight out-of-squareness and plumbing operations results in overloading of contact areas. To be concerned with theoretical calculated overstresses in such restricted areas is to improperly use calculated stress as an index of acceptability of workmanship. Localized yielding will take place until adequate contact is achieved and the strength of the actual joint will be the same as a perfectly fitted joint.

His comment that the resulting eccentricity will pull the finished structure out of plumb would only be true in a completely unbraced structure without any collateral architectural material, in which the openings of the joints are systematically in the same direction. Logically, the openings in the joints will be randomly oriented or even opposing each other; thus the net effect will be for the structure to remain plumb when completed.

The AISC Specification provisions, Section 1.15.8, recognize that the primary function of splice material in joints finished to bear is to hold the parts in alignment. In the case of standard column splices, years of satisfactory service in innumerable buildings assures solid performance.

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