Discussion

Design of Steel Bearing Plates

Paper presented by RUSSELL S. FLING (April 1970 issue)

Discussion by **ANAND B. GOGATE**

Mr. Fling has provided an excellent example of how to calculate the plate thickness for plates continuous on three edges and loaded uniformly.

The discusser, however, disagrees with his conclusion that the AISC formula may indicate a smaller plate thickness than what might be termed the "adequate thickness."

The reasons for disagreement are as follows:

1. The author has neglected the effects of the "all important" anchor bolts that are provided for fastening plates to the supporting medium. The favorable presence of anchor bolts makes the yield pattern entirely different from the over simplified one used by the author.

2. For the standard two anchor bolt base plate detail, the actual pressure under the base plate is far from uniform. It has been shown that the conventional base plate detail provides sufficient restraint to justify a C_m factor of 0.85 for designing steel beam-columns. (See *Commentary on the AISC Specification*, 1963, Sect. 1.8.)

3. The refinement in any structural analysis is only as good as the mathematical modelling of the actualities. The author has been overly concerned about adequate thickness for bearing plates, but has not given any consideration to the favorable effect of the anchor bolts.

Finally, the discusser has not found a single case of distress due to inadequate plate thickness obtained by the use of the AISC formula. This perhaps is due to the favorable effect of the anchor bolts. However, as long as the method of fastening base plates does not change, the discusser feels that the AISC formula is quite adequate.

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Discussion by **RUSSELL S. FLING**

With reference to Mr. Gogate's discussion, it is difficult to visualize how the presence of anchor bolts could have a "favorable" effect on the thickness of steel base plates. Even if there were some favorable effect it is doubtful if any beneficial use could be made of it, considering the wide variance in specified size and location of anchor bolts and the questionable precision of their installation.

The stated assumption of uniform bearing pressure under the base plate is commonly made. Does the discusser have a better suggestion? Although axial load only was assumed, the procedure outlined in the paper will be only slightly conservative for a column base plate transmitting a small bending moment to the foundation if the maximum pressure due to both axial load and moment is used. It is doubtful if base plates designed to transfer a large moment to the foundation would fall within the scope of the minimum base plate dimensions discussed in the paper. Unless the discusser has made a *systematic* examination of at least a few base plates which are thinner than computed by the procedures recommended in the paper, the statement that he has not found a single case of distress is insignificant. If the discusser has made such a search, he should tabulate the results.

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