

If you've ever asked yourself "Why?" about something related to structural steel design or construction, send your questions or comments to solutions@aisc.org for you!

As you stated, the bottom row of bolts on the right side of the connection should be neglected relative to the transfer of the reaction. However, all of the bolts will participate in transferring shear. Other approaches are possible and contract-specific requirements could be imposed, but the comments above reflect what I understand to be common practice.

Eccentricity at Axially Loaded Beam-End Connections

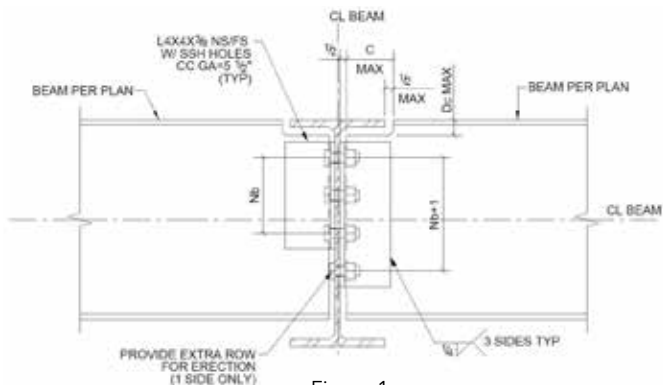


Figure 1

Shop-welded, field-bolted beam-to-beam double-angle connections must transfer both axial and shear end reactions. In Figure 1 the beams are non-composite and the entire axial force must be transferred through the connections. The connections will be designed assuming that only the top three rows of bolts, which are common to both connections, will transfer the axial force.

Does the eccentricity of the axial load from the beam centerline to the centerline of the bolt group need to be considered in the design of the connection? Does an eccentricity need to be considered when evaluating the coped section?

Axially loaded double-angle connections are typically designed without considering an eccentric moment. The rotational stiffness of the connections is typically much lower than the stiffness of the beam. Therefore, the beam will carry almost all of the moment due to the eccentricity, and it is common to assume that the beam resists the entire moment. It is also a good idea to use the maximum number of bolt rows that will fit into the web when resisting axial end reactions, as this will tend to minimize whatever eccentricity does exist.

Because floor systems are usually modeled with the beam elements at the same elevation, the eccentricity between the axial load and the beam centroid is often neglected.

I would analyze the coped section assuming analyze this design sometimes neglected based on engineering judgment.

