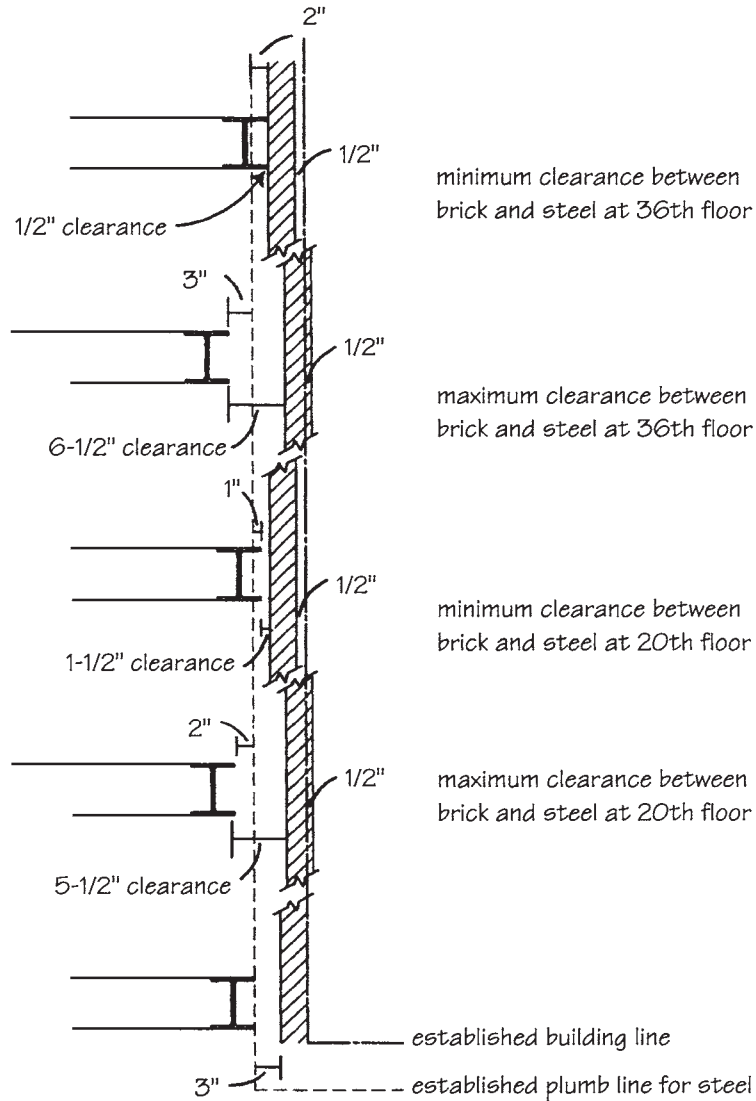


**Figure 15-62** Erection tolerances for steel and concrete structural frames compared to placement tolerances for brick veneer.

the face of structural concrete members so far as to expose the reinforcing steel. Such drastic field alterations can sometimes threaten the safety of the building.

Narrowing or eliminating the open cavity behind the veneer jeopardizes proper wall drainage. When the cavity is wider than planned, longer anchors are required to achieve proper embedment in the mortar joints, and shelf angles may be too short to provide adequate support. Shelf angles that are too long may rotate, causing eccentric loading on the masonry courses below and spalling of the unit faces. Increasing the angle thickness to compensate for rotation will create differential stiffness and deflection conditions at random locations in the facade. To accommodate minor field adjustments, specify:

- Bolted rather than welded connections for steel shelf angles, with slotted holes for field adjustments and wedge inserts at points of attachment to concrete frames (refer to Chapter 10)
- That the contractor provide a variety of anchor lengths as necessary to accommodate construction tolerances and provide minimum  $\frac{5}{8}$ -in. mortar cover on outside wall face and minimum  $1\frac{1}{2}$ -in. embedment in solid masonry units, or minimum  $\frac{1}{2}$ -in. embedment into face shell of hollow units
- Two-piece flashing to accommodate varying cavity widths
- Horseshoe shims that are the full height of the vertical leg of the shelf angle and of plastic or a compatible metal, for shimming the angle up to a maximum of 1 in.



NOTE:

Variations are for frame erection tolerances only and do not include individual member fabrication tolerances or erection tolerances.

**Figure 15-63** Variations between brick veneer and steel structural frame tolerances can be extreme. (Adapted from *Laska, Masonry and Steel Detailing Manual, 1993.*)

**15.5.5 Grout and Reinforcement**

For reinforced masonry, tolerances are allowed for the placement of the steel bars (refer to *Fig. 15-47*) and the size of the grout spaces (refer to *Fig. 15-49*). The most important thing is to assure complete embedment of the steel within the grout so that full strength is developed. To assure that the reinforcement is not displaced during the grouting operation, specify reinforcing bar spacers or special units that hold the steel in place.