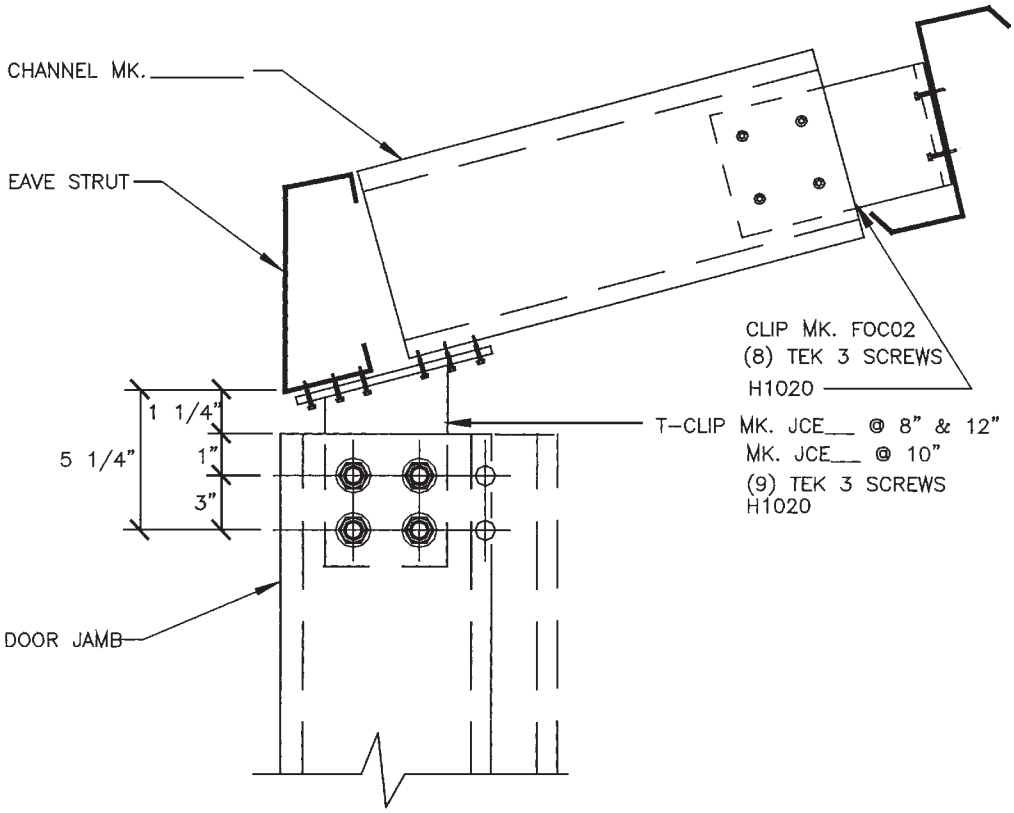


**FIGURE 10.8** Connection of door jamb to braced eave strut. [Manufacturer suggests using (4) $^{1}/_{2}$-in ASTM A307 bolts.] (*Nucor Building Systems.*)

and is not provided by building manufacturers, equipment supports need to be integrated with the roof structure. Unless specifically addressed in the contract documents, responsibility for these supports tends to fall through the cracks.

To be sure, the design profession has well realized that equipment does not belong on metal roofs at all: Equipment restricts movement of roofing panels and invites leaks through the penetrations. Many roofs have been ruined by careless equipment installation and maintenance. Unfortunately, there are few economic alternatives to the rooftop location. Mechanical penthouses, common in high-rise construction, are a rarity among pre-engineered buildings. It seems that roof-mounted HVAC equipment will continue to detract from appearance and function of metal roofs for years to come.

There are two basic methods of supporting rooftop equipment: a continuous curb and an elevated steel frame on legs. A properly designed and installed curb with sheet flashing may be less prone to leakage than discrete penetrations at frame legs.

### 10.5.2 Metal Roof Curbs

Roof curbs are custom manufactured to the specific roofing profiles and fit nicely in the panel corrugations (Fig. 10.10). Curbs for standing-seam roofs may consist of two pieces: a light flashing curb premounted on a base panel of the same thickness and configuration as the roofing, and a heavier

**FIGURE 10.9** These overhead door jambs are not supported at the top by anything other than the girts—which were cut to allow for the jamb installation.

(such as 10-gage) unit support frame connected directly to roof purlins. The two parts move independently; any difference in their movement is absorbed by the flashing.

Butler Manufacturing Co.[4] recommends that the two-part design be used for the equipment weight of 2000 to 4000 lb. For lighter equipment, a single-piece curb typically made of 14-gage steel may be adequate. The manufacturer suggests that the curb assembly be made by a specialized curb supplier. Still, many specifiers include the curbs in a scope of work for the metal building manufacturer to increase the chances for better fit and coordination.

Despite its sophistication, even this curb system may be vulnerable to leaks if it is simply laid on top of the roofing and depends solely on the sealant in between. For best results the curb and the roofing should be installed at the same time, allowing the curb sheet to be placed under the upslope roof panel and over the downslope panel, so that water does not run into the joint. In addition, Buchinger[5] recommends that the curb's base sheet be large enough to provide at least 1 ft of space between the end of an upslope panel and the closest edge of the curb or its cricket to avoid water backup at that critical spot.

The curb must be supported on all four sides by purlins or additional framing pieces. The actual details depend on the manufacturer, the type of the metal roofing, and the load. Two sample details are shown on Figs. 10.11 and 10.12. With either detail, if the opening must interrupt a purlin, a properly designed header and a doubled-up purlin (or heavier framing) on each side is needed.