the issues of placing overhead doors in hard walls. The DASMA's web site (www.dasma.com) is a valuable resource to the specifiers of overhead doors. Data Sheet #251 states that jambs made of roll-formed channels "will rotate under wind load and the door curtain can be blown out of the guides."

In addition to wind loading, the framing around overhead doors must be able to support the weight of the door when it is raised plus the weight of siding and other wall materials. For coiling doors, the weight will hang eccentrically from the jambs, which will transfer the reactions to the eave strut—or a horizontal member of structural steel spanning between the columns.

10.4.2 Recommended Design Details

We recommend that a conceptual design for framing around overhead doors be done by the specifying engineers. The metal building manufacturer, based on the jamb reactions and door weight provided by the door supplier, can determine the actual framing sizes. For critical applications, the whole system can be designed by the specifier, and perhaps excluded from the scope of the building manufacturer's design.

One possible framing system is shown in Fig. 10.6. This design uses hollow structural steel (HSS) members, i.e., tubes, which have excellent torsional properties and are uniquely qualified to resist horizontal loading applied from any direction.

10.4.3 Manufacturers' Alternatives to Tubular Framing

Some manufacturers dislike using structural tubes, because the tubes fall outside their usual repertoire of built-up plates, wide-flange, and channel sections. These manufacturers might propose a framing system made of hot-rolled channel jambs framing into the bottom of the eave strut at the top and braced laterally by the wall girts (Fig. 10.7). The eave strut would be laterally braced to prevent its torsional failure under wind load (Fig. 10.8). We should mention here that, unlike tubes and pipes

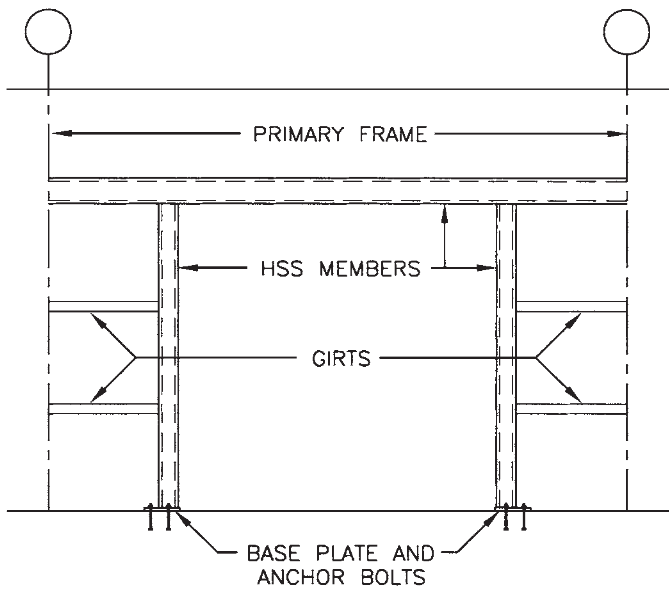

FIGURE 10.6 Suggested framing at large overhead doors.

that have "closed" sections, C- and Z-shaped light-gage members have "open" sections with poor torsional resistance.

Note that the eave strut bracing of Fig. 10.8 is accomplished by means of cold-formed channel pieces, similar to our recommended purlin bracing design discussed in Chap. 5. If this detail must be used, we recommend that the purlin bracing continue behind the eave strut bracing, to distribute the load to as many purlins as possible. Another common but less effective method of bracing the eave strut at the jambs consists of a piece of angle extending to the next purlin—and without any purlin bracing behind that. Obviously, a single purlin bent in the weak direction is not likely to provide lateral bracing for the eave strut.

10.4.4 Specify the Framing in Contract Documents

Regardless of the detail used, it is important to require the builder to provide *some* framing around doors. The MBMA *Common Industry Practices* considers such framing an accessory and states that it will be supplied only if expressly required. The door itself is not included in the system either and needs to be specified separately; it should be designed for at least the same wind loading as the building walls.

Despite our preference for the tubular door jamb and head sections, any of the rationally designed framing around overhead doors is preferable to a situation where the issue receives no engineering attention at all. Leaving the design to the field workers can result in disastrous consequences. Consider the overhead door jambs of Fig. 10.9: these are supported at the top only by what's left of the girts that were cut to install the jambs.

10.5 SUPPORTS FOR ROOFTOP HVAC EQUIPMENT

10.5.1 Rooftop Equipment

Rooftop-mounted or suspended HVAC equipment may include anything from small fans and unit heaters to large air-handling units. While mechanical equipment is not a part of metal building systems

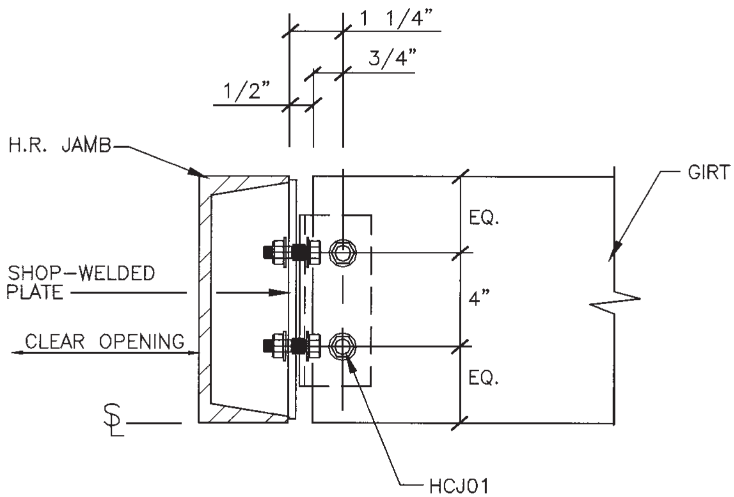

FIGURE 10.7 Hot-rolled channel jamb attached to wall girts. [Manufacturer suggests using (4) 1/2-in ASTM A307 bolts.] (*Nucor Building Systems.*)