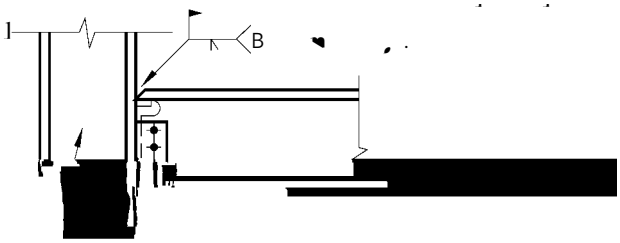
Make your non-seismic moment connections better with these helpful tips.

# CHOOSING THE MOMENT




**WHEN IT COMES TO SELECTING** a lateral force resisting system for steel buildings, designers can select from a dizzying array of systems. A common—but often misunderstood—selection is the humble moment connection. With our *Manuals* bookmarked at Part 12—*Design of Fully Restrained Moment Connections*, we chatted with a few AISC-member, AISC-certified fabricators to gain some insight into three moment connection configurations commonly used in $R = 3$ construction.

An important takeaway from our fabricator discussions is that all three configurations make sense in a variety of situations, so the selection of connection configuration is largely dependent on shop and field costs—variables that are different with every project and every steel fabricator and erector.

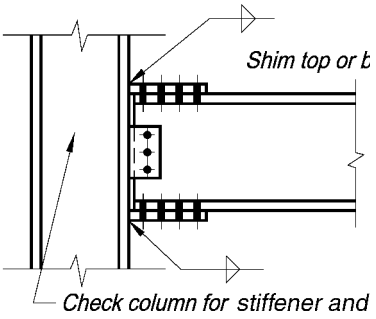
Some of their tips may strike you as common sense, but they apply to all moment connections and bear repeating. For example:

- Always consider erection safety, constructability, and tolerances when designing moment connections.
- Consider shop welding short cantilevers to minimize field welding and the need for shoring during erection.
- For economy, detail stiffener plates only when they are required. Don't require stiffener plates (also known as continuity plates) when they are not needed—and if they are required, consider ¾-depth continuity plates for one-sided moment connections, a provision planned for the next edition of the AISC *Specification*.
- Do give extra thought to sloped and skewed connections. Angles can affect detailing and constructability, and sharper angles can affect the structural behavior of the moment connection.
- If you're working with moment connections in seismic construction (when R > 3), both AISC 341, *Seismic Provisions for Structural Steel Buildings*, and AISC 358, *Prequalified Moment Connections for Special and Intermediate Steel Moment Frames for Seismic* Seismic

ment

In a directly welded flange moment connection, the bea flanges are welded to the column flanges in the field using C groove welds (see Figure 1a).

**Ryan Curtis** (rbcurtis@leoadaly.com)
**Keith Grubb** (grubb@aisc.org)

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The load path for ange forces in this connection is straightforward: beam ange forces are transmitted to the column through complete-joint-penetration (CJP) groove welds. This connection type can be used to connect to strong- and weak-axis column orientations. In the strong axis connection, the beam anges are directly welded to the column anges, and the column should be checked for stiffener and doubler plate requirements per Section J10 of the AISC *Speci cation*. In the weak-axis con guration, the beam anges are welded to stiffeners tted between the column anges. These stiffeners must be detailed such that the welded ange connection is made beyond the face of the column ange tips. Also, it's necessary to detail the web connection to locate the bolts outside the column anges to provide clearance for bolt installation. Figure 1b (previous page) illustrates the weak-axis con guration for this connection.

Fabricator tips for directly welded ange connections:

- Don't specify that weld access holes be lled with weld material: it creates regions of undesirable triaxial stresses. If weld access holes need to be concealed for appearance reasons, mastic materials (e.g. auto-body ller) are probably a better choice.
- Allow backing bars to be left in place when possible.
- Provide short slots for bolts in web to aid in erection alignment.
- Provide actual forces to avoid developing unnecessary extra capacity.
- For strong-axis moment connections, consider increasing the column size to eliminate the need for stiffeners or doublers.

### Flange-Plated Connections

Flange-plated moment connections generally consist of top and bottom plates shop-welded to the column anges. In the eld, the beam slips between the top and bottom plates, and the beam's anges are then either welded or bolted to the ange plates. These connections are usually detailed so any gap between ange plates and the beam anges can be shimmed when the beam is erected. The ange forces in this connection are transferred into the top and bottom plates via weld material or bolts; the forces then transfer to the supporting member (the column ange) through welds.

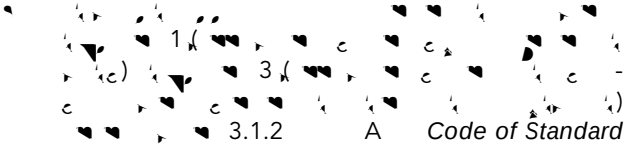
Like the directly welded ange connection, this connection can be used for both strong- and weak-axis column connection (see Figure 2 for schematics of these con gurations). And like the directly welded ange connection, column- ange-tilt tolerances can affect both the bolted and welded ange plate versions:

- The welded ange plate version can accommodate adjustability if enough weld shelf dimension is provided—in other words, if the ange plate details allow for a slight skew with respect to the column anges.
- The bolted ange plate version accommodates some adjustability if oversized bolt holes are detailed in the ange plates.

Fabricator tips for ange-plated connections:

- Try to eliminate overhead welds in the eld. For example, make the top ange plate narrower than the beam ange and the bottom ange plate wider than the beam ange. Refer to the recommended minimum shelf dimensions as shown in Figure 3.
- Don't forget to detail for deck bearing around the top ange plates. Unlike the directly welded ange connection, deck may not lie at on top of the ange plates, especially of the ange plates are bolted.

**A Word about the *C de i S a da d P ac ce***



3.1.2 A *Code of Standard*