Technical Note
Supporting Steelwork | August 2024

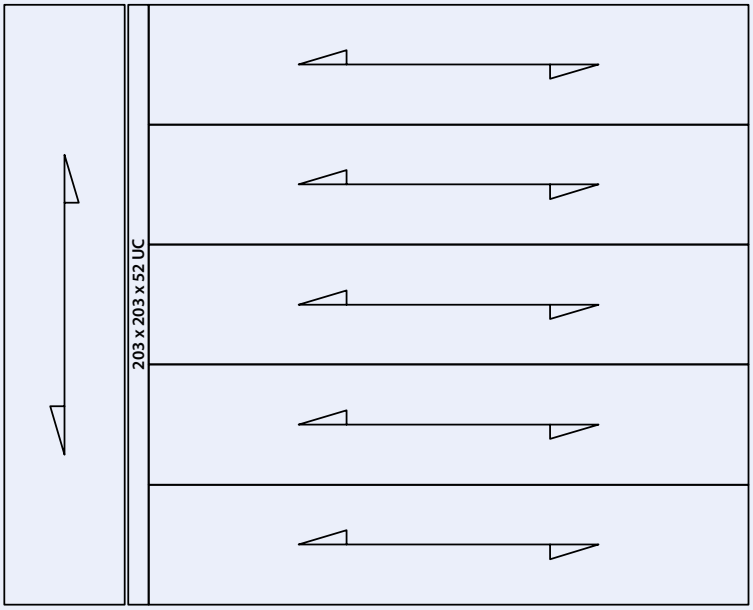


Figure 1
Plan drawing of typical common installation detail

The Precast Flooring Federation's Code of Practice for the Safe Installation of Precast Elements covers the installation of Hollowcore flooring onto steelwork in sections 4.2.2 and 4.5. This guidance note offers additional advice and examples for this operation.

One of the common installation details it to sit hollowcore slabs onto a steel angle which is welded to the web of a beam with slabs parallel to span on the adjacent as shown in figures 1 and 2.

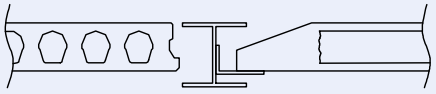


Figure 2
Plan drawing of typical common installation detail

The main issue to address with this detail is to provide restraint to the steel beam to prevent it from rotating whilst the hollowcore units are placed and whilst the concrete infill (not shown) between the beam and hollowcore unit is cast and cured.

Figure 3 shows another example of a steel beam with a projecting bottom plate that projects beyond the supporting masonry. Unless propped there is no means provided to prevent the steel beam from rotating once the units are placed on the extended plate.

One option is to provide temporary props which need to be placed under the bearing angle and not under the centre of the main beam as this does not prevent rotation. See figure 4 for examples.

Figure 3
Example of unstable beam

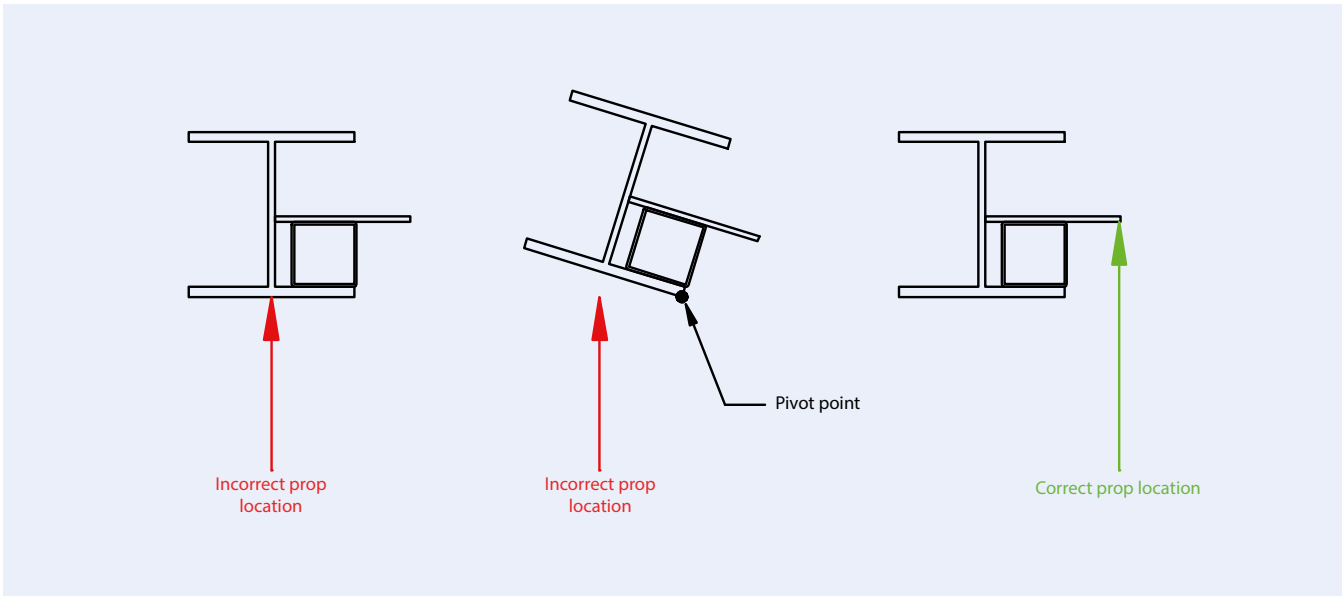


Figure 4
Example of correct and incorrect placement of temporary props

Another option that may also be used in conjunction with temporary props is to use a concrete padstone under the shelf angle / projecting bearing plate providing that the shelf angle extends to the end of the beam as shown in figure 5.

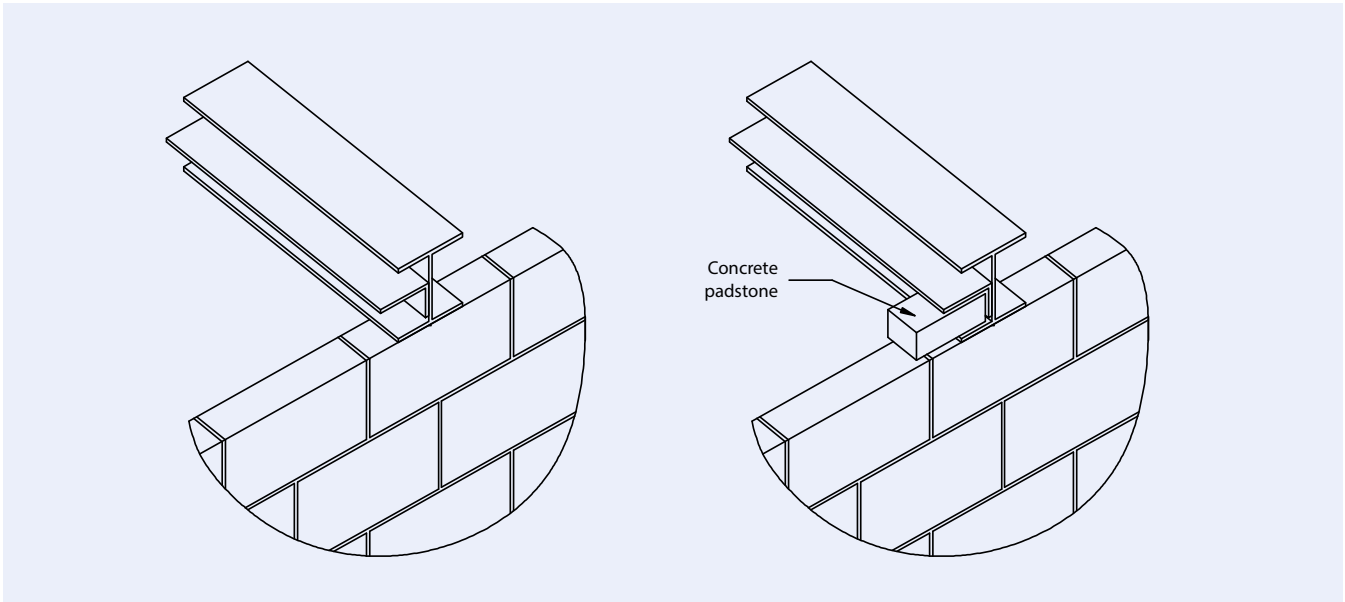


Figure 5
Padstone to prevent rotation of the beam

The above solutions can be used to prevent rotation of the beam, but they will not prevent lateral torsional buckling of the beam which will need to be assessed by the steel designer.

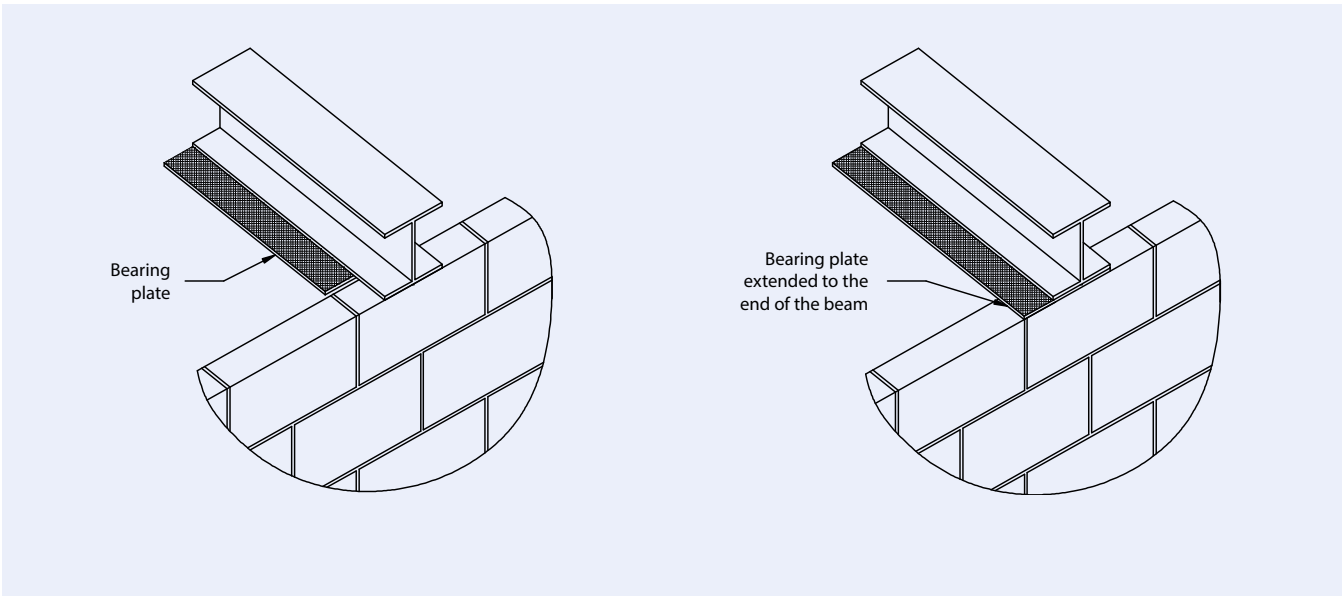
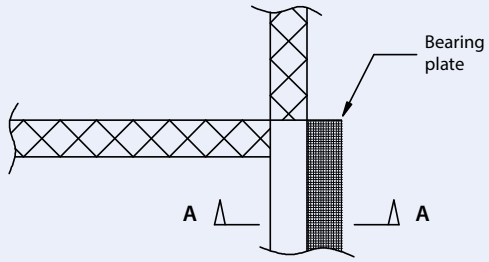


Figure 6
Bottom bearing plate extended to end of the beam

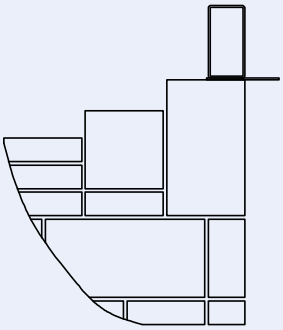
Another common detail is to weld a plate to the bottom flange of a steel beam but this makes the beam unstable. This can be overcome by extending the bottom plate to the end of the beam so that the masonry wall prevents rotation of the beam as shown in figure 6.

Special consideration also needs to be made regarding the condition of the supporting masonry with correct bond details used as this can cause the steelwork to become unstable as shown in figure 7. This example was exacerbated by the bottom plate projecting beyond the line of blockwork with no means to prevent rotation of the steelwork as shown in figure 8. The solution to this was to reposition the steel beam so that the bottom plate lined up with the blockwork as shown in figure 9.

Figure 7
Example of unstable steel beam



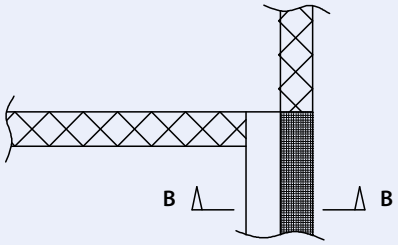
Plan



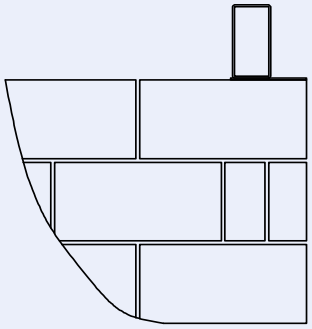
Poor blockwork bonds

Section A-A

Figure 8
Example of poor bonds



Plan



Good blockwork bonds

Section B-B

Figure 9
Example of good bond

Care also needs to be taken where primary steel beams are supported on masonry walls that incorporate openings to ensure that any lintels are adequately designed and propped during the installation. Failure to do so can result in buckling on the lintel as shown in figure 10. Failure to consider the temporary support requirements during installation and thus provide adequate support to steelwork can result in failure of the steel beam as shown in figure 11. In this example the beam was propped but the props were positioned under the centre of the beam not the shelf angle.

Figure 10
Failure of lintel

Figure 11
Failure of supporting steelwork due to inadequate propping detail

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