

JJI-JOIST TECHNICAL BULLETIN

SUBJECT: **JJI-Joist to Steel Beam
Connection**
Sheet 1 of 7

Bulletin Number:
25 Revision A

Date Issued:
11.09.02

Introduction

Steel beams are commonly found being used as lintels, down-stand or up-stand beams. They are also found within the floor zone as a beam to support I-Joists in situations where the span required is greater than that achieved by the I-Joist or where masonry is required to be supported independently from the floor system. Where steel I-Beams are used in the floor zone they must often be incorporated in to the JJI-Joist floor system. This requires a fixing detail between the steel beam and the JJI-Joist.

This technical bulletin gives details of various methods of forming the JJI-Joist to steel beam connection using either Face Fix Hangers, Masonry hangers or Top Fix hangers. The connection detail used depends on several contributing factors such as steel beam depth and level, JJI-Joist depth and whether three courses (or equivalent) of masonry is built-up on top of the steel beam. It should be noted that the majority of steel beams used in floors are usually "I" section or "C" section as shown in Figure 1

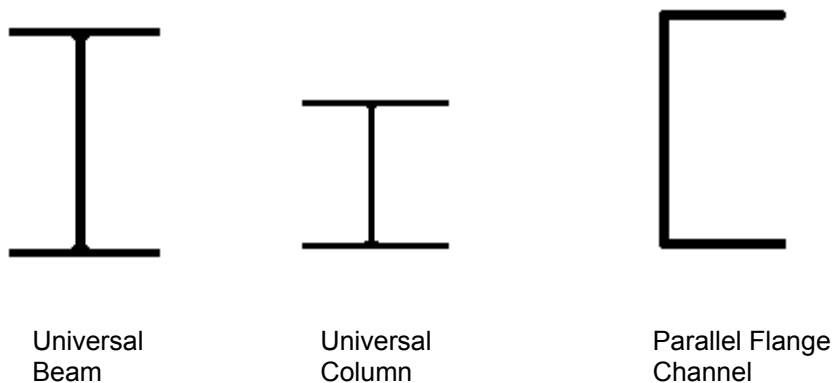


Figure 1. Typical steel beam sections

This bulletin presents various construction situations incorporating steel beams and gives details of how the connection between the JJI-Joist and steel beam should be made.

Sheets 2 to 5 show the following construction situations:

- Steel beam in floor zone. Steel beam deeper than JJI-Joist
- Steel beam in floor zone. JJI-Joist deeper than steel beam
- Masonry hanger to steel beam connection, no blockwork above
- Masonry hanger to steel beam connection, blockwork above
- Steel beam in floor zone. JJI-Joist both deeper and shallower than the depth of the steel beam and spreader plate
- Top of steel beam not level with JJI-Joist

Sheets 6 and 7 show thumbnail illustrations of various construction details to help identify which of the foregoing details to use for a particular situation

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Steel Beam in Floor Zone. Steel Beam Deeper than JJI-Joist

Where the steel beam is deeper than the JJI-Joist (Figure 2) then the web area has to be filled with a good fitting piece of kiln dried solid timber. A face fix hanger should be used, fitted flush with the timber packer with all the available nail holes filled in order to achieve the hangers full safe working load.

It is the responsibility of the Building Designer to detail the connection of the timber packer to steel beam. The JJI-Joist designer should advise the Building Designer of the load to be carried from the JJI-Joists.

Version 2.4 of FloorMaster has an option available in the software that allows the user to select a steel section size and incorporate it in to the floor design. However, the hanger specified will appear as "undefined", therefore each case is unique and must be referred to James Jones & Sons Ltd, Timber Systems Division, Engineering Department (JJ&S TSD ED).

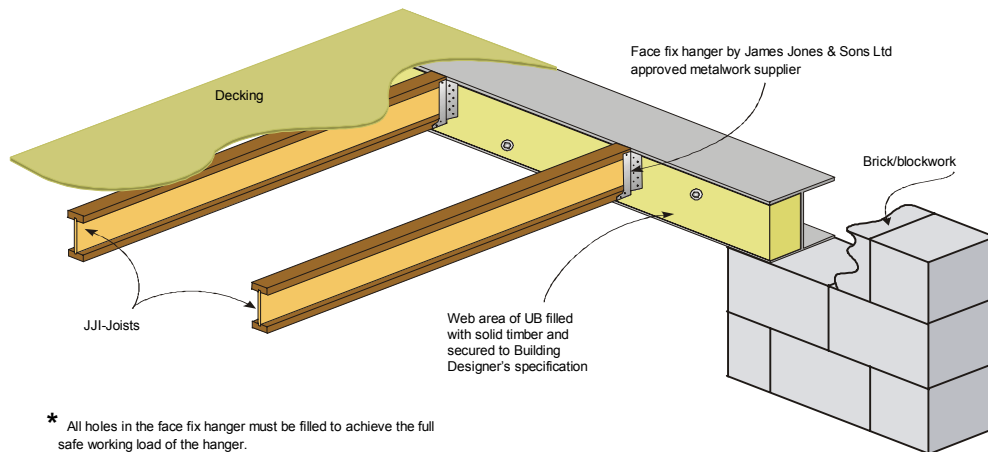


Figure 2. JJI-Joist to Steel beam connection using Face Fix Hangers

Steel Beam in Floor Zone. JJI-Joist Deeper than Steel I-Beam

Where the construction is as shown in Figures 3 and 4 and the JJI-Joist is deeper than the steel I-Beam then a masonry hanger may be used. Doing so avoids the need for a timber packing piece to fill the web of the steel beam. However, part of the JJI-Joist must project below the bottom flange of the steel I-Beam in order for the back of the hanger to rest against the edge of the steel beam flange. As indicated in Figure 6 the maximum allowable projection below the bottom flange of the steel I-Beam is equal to 30% of the depth of the JJI-Joist

e.g. a 300mm deep JJI-Joist can have a maximum of 90mm of Joist below the bottom flange of the steel beam.

Alternatively, in some instances a face fix hanger may be used. Consultation with James Jones & Sons Ltd, Timber Systems Division, Engineering Department (JJ&S TSD ED) is required in every case in order to establish the hanger's safe working load with the reduced nailing.

If the JJI-Joist is shallower than the steel beam see Figure 6b.

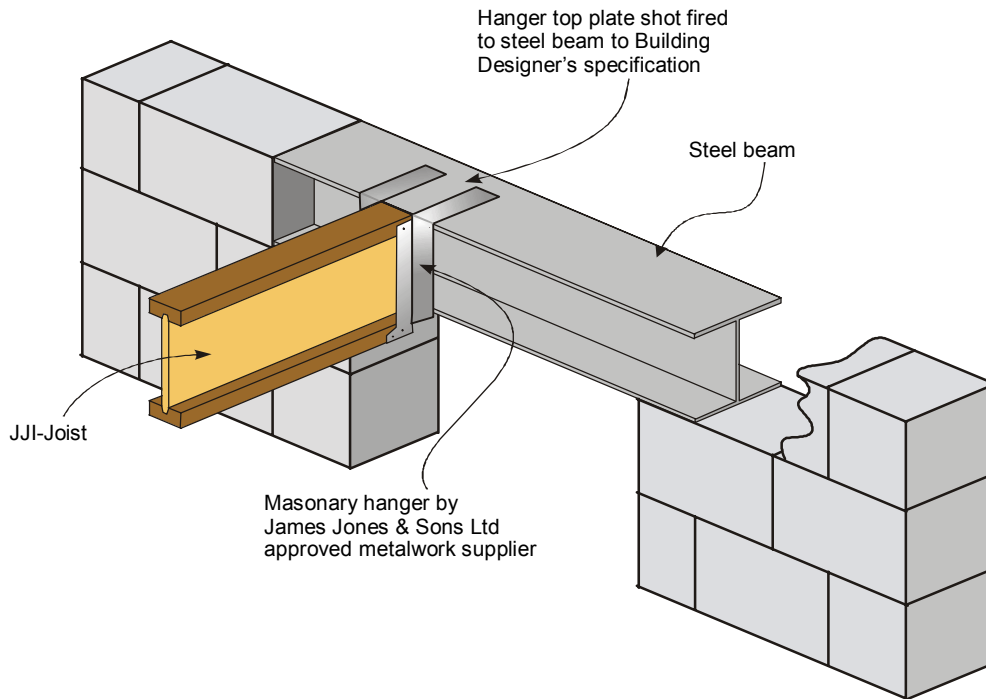


Figure 3. Masonry hanger to steel I-Beam connection (no blockwork above)

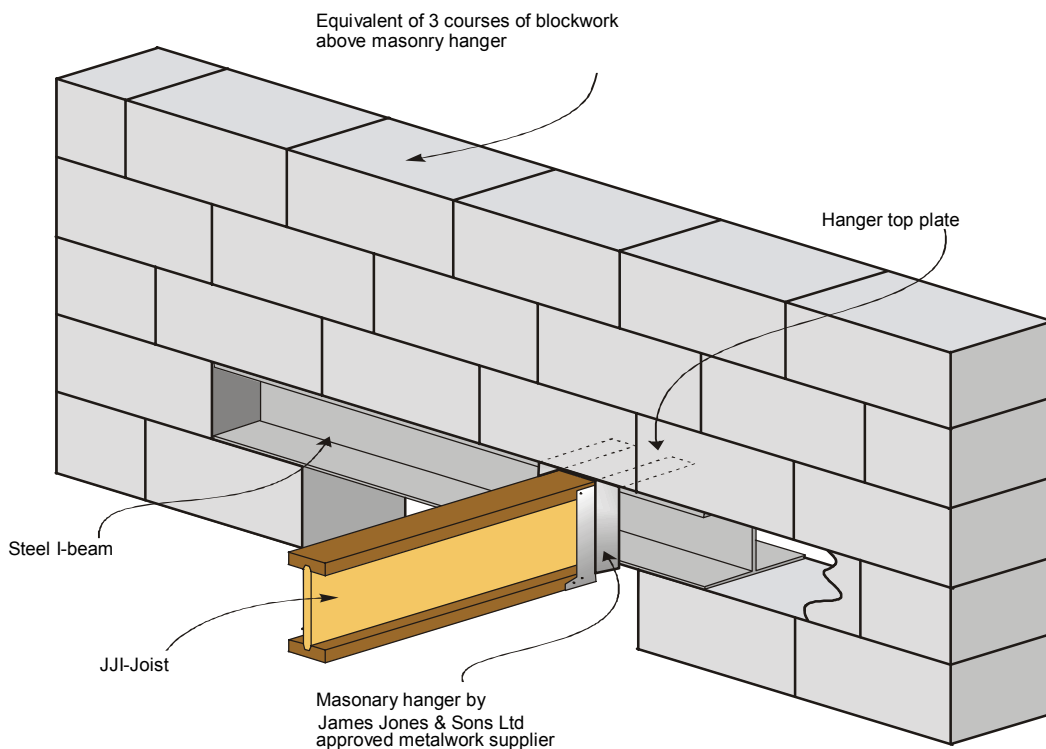


Figure 4. Masonry Hanger to Steel I-Beam Connection (blockwork built-up above steel I-Beam)

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Steel Beam in Floor Zone. JJI-Joist deeper/shallower than Steel I-Beam, Steel Spreader Plate Fixed to Steel Beam

Where the construction is as shown in Figure 5, the steel beam has a steel spreader plate fixed to the top flange to provide a bearing for the masonry above. In this case a kiln dried solid timber packing piece is required within the web area of the steel beam to support the back plate of the hanger and to prevent it from rotating inwards. This packing piece should be cut 3mm proud of the flange of the steel beam to account for any shrinkage of the timber and fixed to the Building Designer's detail. The packer is non-load bearing and is only required to prevent the hanger from rotating.

Alternatively, in some instances a face fix hanger may be used (see figure 2 and accompanying notes). Consultation with JJ&S TSD ED is required in every case in order to establish the face fix hanger's safe working load with the reduced nailing.

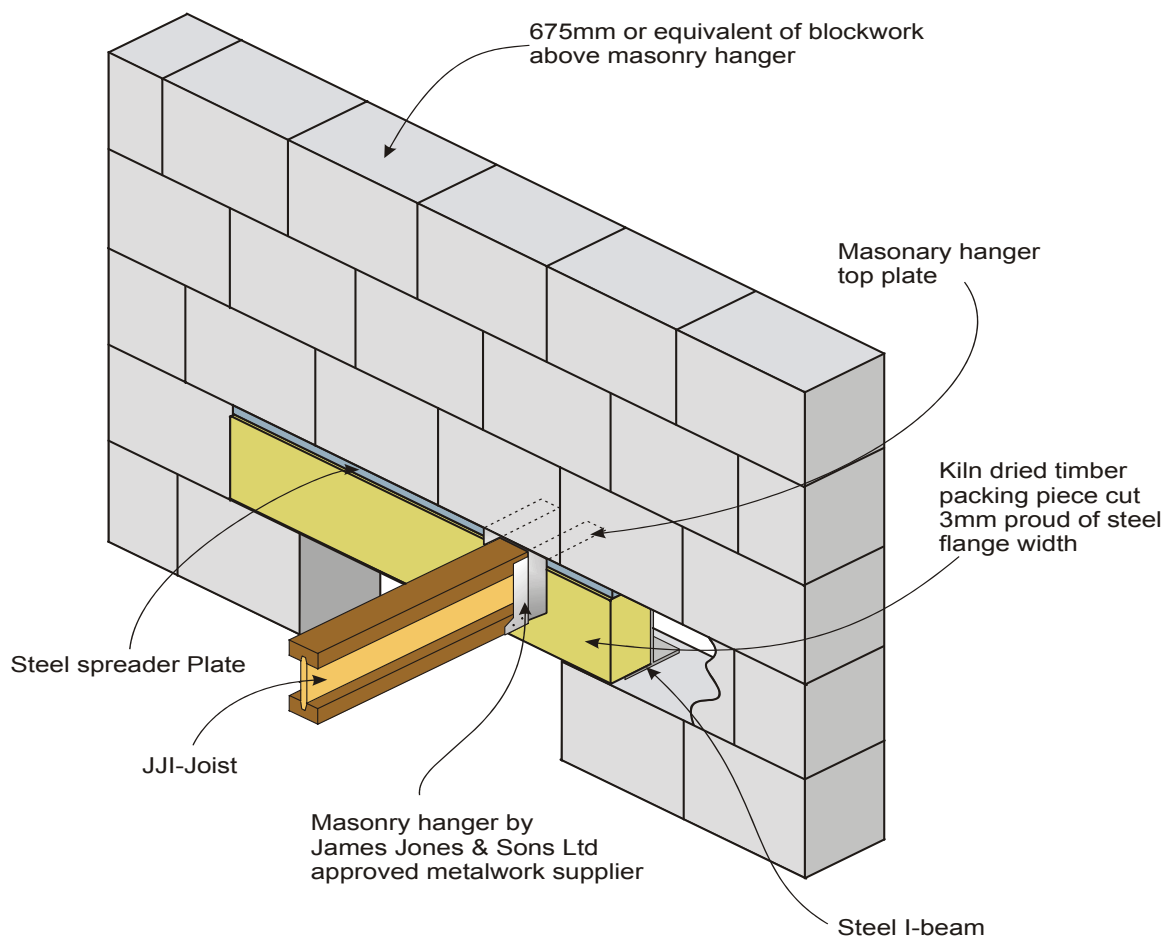


Figure 5. Masonry hanger to Steel Beam connection (steel beam with Spreader Plate)

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Steel Beam in Floor Zone. Top of Steel Beam not Level with Top of JJI-Joist

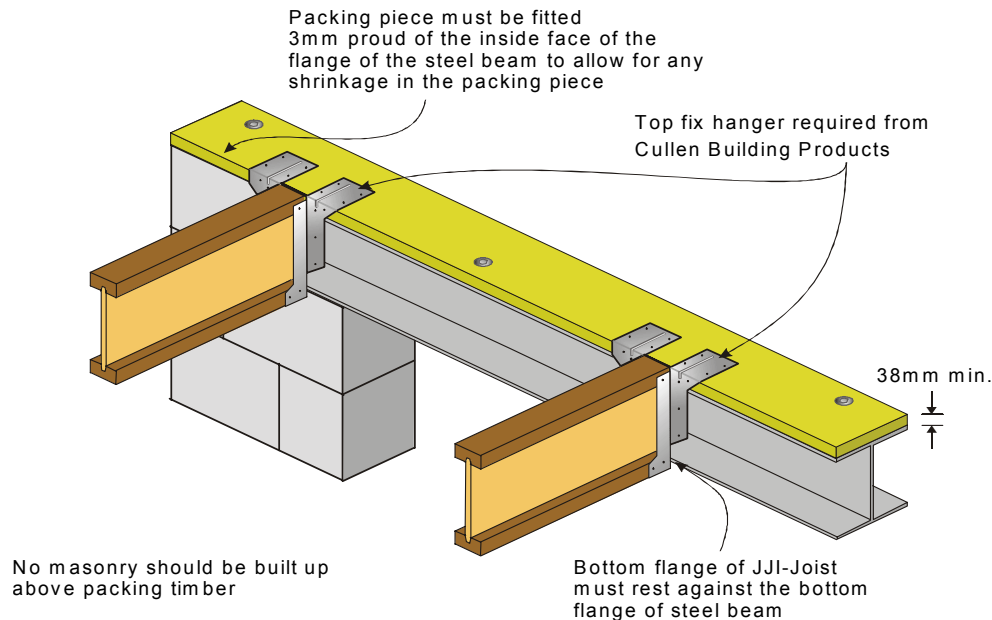


Figure 7. JJI-Joist to steel I-Beam connection with timber packing piece

In circumstances where the top of the steel beam is not level with that of the JJI-Joist a packing piece of timber may be used as shown in Figure 7. The packing piece of timber should be kiln dried and be 3mm wider than the steel flange to allow for any shrinkage with a minimum thickness of 38mm and should be fixed to the steel beam to the Building Designer's specification. Part of the JJI-Joist must project below the bottom flange of the steel beam with no more than the equivalent of 30% of the JJI-Joists depth hanging below the level of the bottom of the steel beam (see Figure 6a). A TFI hanger, as contained in Cullen Building Products "JJI-Joist Connector" brochure, can be used for safe working loads up to 4.2kN in this application. For loads exceeding this, a consultation is required with JJ&S TSD ED or a member of the Cullen Building Products design team to establish a 'special' hanger specification.

Where this fixing detail is used, in no circumstances should masonry be built up above the timber packing piece.

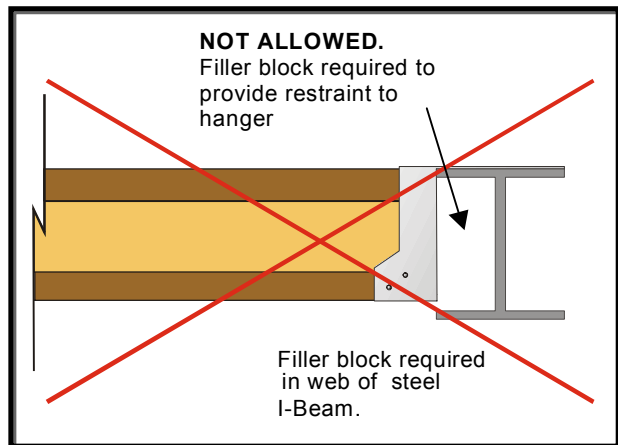
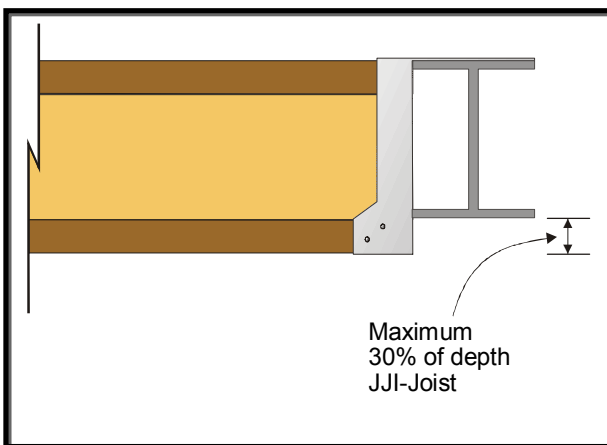
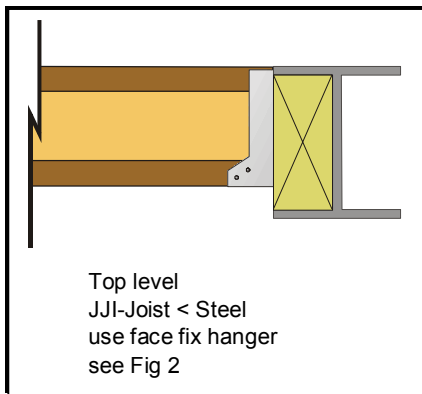
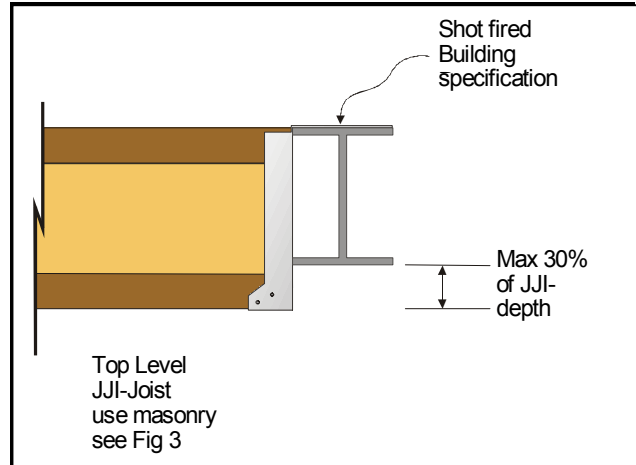
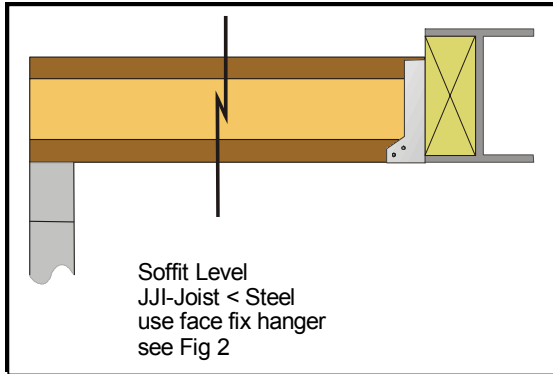


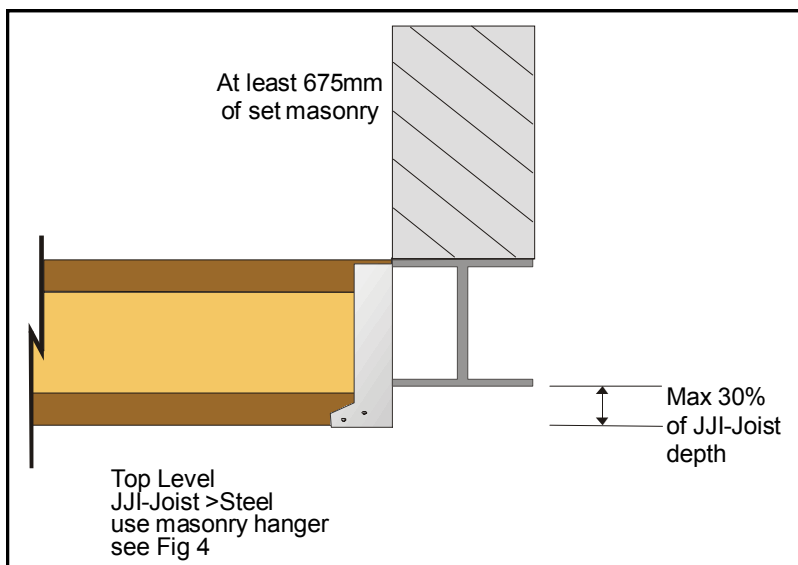
Figure 6a. Correct JJI-Joist to steel UB connection Figure 6b. Incorrect JJI-Joist to steel UB connection

Construction Detail Selector

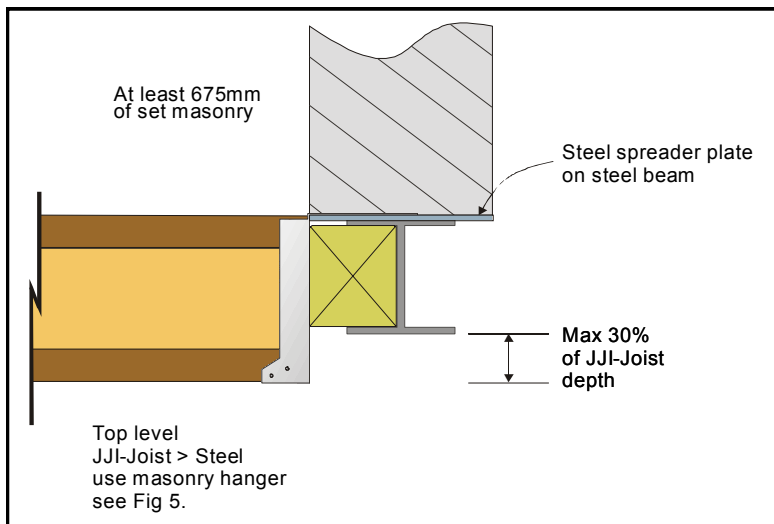
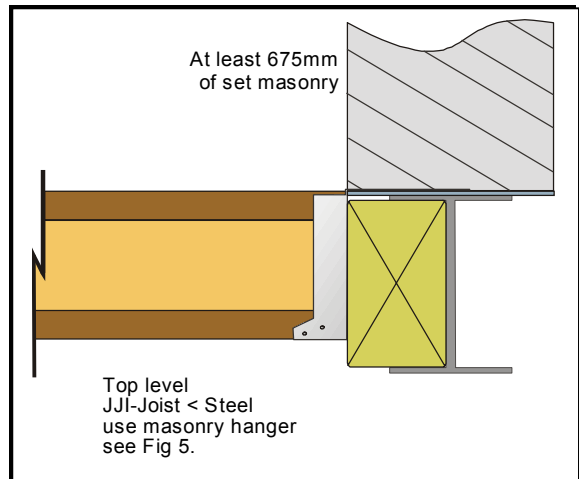
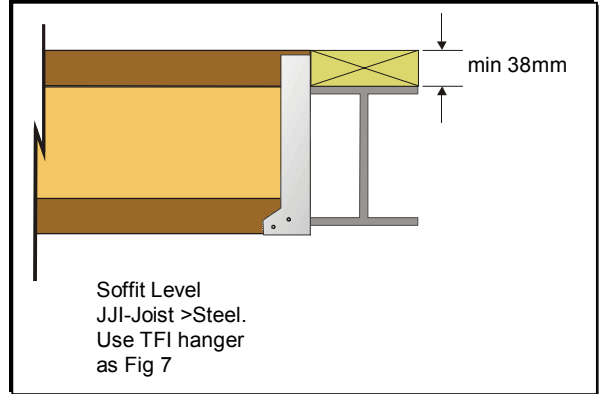
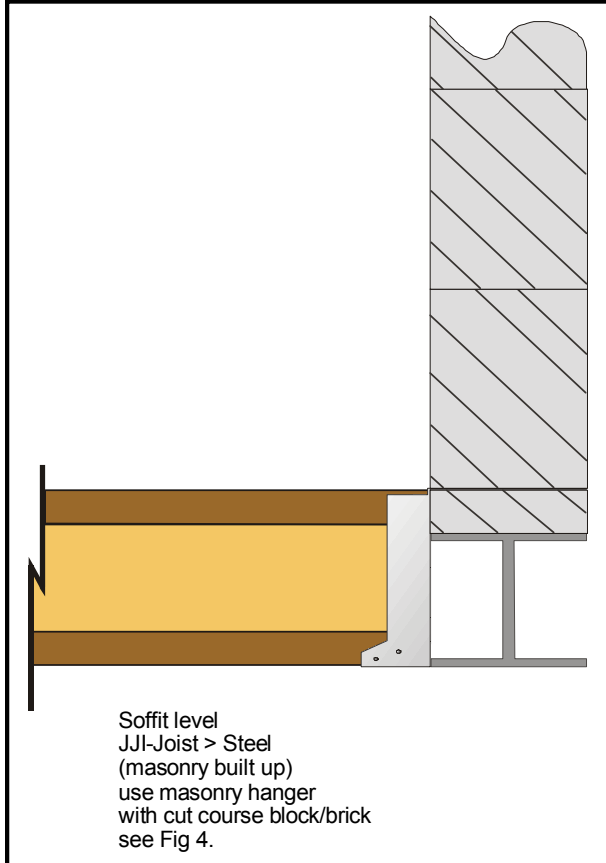
Select the following construction detail that can be most closely identified with the situation in your floor. The associated text will direct you to one of the figures. The figure will offer a hanger solution and a description of the installation procedure.



If none of the connections shown in this Technical Bulletin match your particular situation then please contact James Jones & Sons Ltd, Timber Systems Division, Engineering Dept. IF IN DOUBT ASK.



Construction Situations (continued)



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