MITEK®

MANUFACTURING DETAILS

This information is only for accredited MiTek Fabricators throughout New Zealand
This issue supersedes all previous issues

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INTRODUCTION

This issue supersedes all previous issues of FLITCH BEAM Manufacturing Details.

The important points to note are summarised below.

1. The typical nail pattern is 2 rows of nails at 300mm centres on both faces, staggered.

2. Clusters of nails are required at support locations (beam ends) and heavy point loads (from girder truss and other beams).

3. Dimensions have been included in the diagrams to make this clear.

4. Hilti tool - use DX 460 for single shot pin or DX 460 MX72 for magazine with 10 pins.

5. Ramset tool – use Spitfire P370 for magazine with 10 pins.

6. Timber pieces must be clamped tightly to steel plate before firing pins.

7. FLITCH BEAMS must rest on a solid bed while pins are being fired. They must not be allowed to move or rock.

8. Minimum edge distance of pin to steel plate is 25mm.

9. For timber other than Radiata Pine (eg. Douglas Fir), fix beam ends with anti split GNQ plates before firing pins.

10. The tools used for firing pins shall be operated, maintained and serviced regularly in accordance with the manufacturer's specifications.

EQUIPMENT

Both Ramset and Hilti manufactured tools are suitable for driving the pins into GANG-NAIL FLITCH BEAMS.

The Hilti DX460 is an indirect acting tool and uses a piston to drive the pin. The driving force can be controlled both through the charge used and a power setting dial that controls the force on the piston. In addition the Hilti tool is available with both a single shot pin attachment and a 10 shot pin magazine.

The Ramset J208 is a direct acting tool. It uses a single shot pin with the penetration depth controlled by the charge used and a washer. The Ramset Spitfire P370 is an indirect acting tool (piston driven) with a magazine for 10 pins.

PINS

Note that only pins with a hardened tip should be used. Substituted pins must not be used, as they may not have a hardened tip. Substitute pins may not drive completely into the steel, deforming within the timber. This deformation is usually not visible (see Figure 1 and 2).

In Figure 2 the pin heads are buried in the timber and appear to be fixed correctly, however the pin itself has buckled and there is inadequate penetration into the steel.

Table 1: Hilti Pins

Hilti Single Pins for Hilti DX460 Tool					
Steel Thickness	**Timber Thickness**	**Pin**	**Pin Length**	**Charge**	**Power Setting**
6, 8 or 10 mm	35 mm	X-ALH 47 P8*	47 mm	Black	3**
6, 8 or 10 mm	40 mm	X-ALH 52 P8*	52 mm	Black	3**
6, 8 or 10 mm	45 mm	X-ALH 57 P8*	57 mm	Black	3**

* R16mm washer recommended.

Hilti Magazine Pins for Hilti DX460 MX72 Tool					
Steel Thickness	**Timber Thickness**	**Pin**	**Pin Length**	**Charge**	**Power Setting**
6 or 8 mm	35 mm	X-U 47 MX	47 mm	Black	3**
6 or 8 mm	40 mm	X-U 52 MX	52 mm	Black	3**
6 or 8 mm	45 mm	X-U 57 MX	57 mm	Black	3**

** Start with Power Setting at 3 and adjust up or down to suit individual FLITCH BEAMS.

Table 2: Ramset Pins

Ramset Single Pins for J208 Tool				
Steel Thickness	**Timber Thickness**	**Pin**	**Pin Length**	**Charge**
6, 8 or 10 mm	35 mm	HD865*	65 mm	Red
6, 8 or 10 mm	40 mm	HD865*	65 mm	Red
6, 8 or 10 mm	45 mm	HD865*	65 mm	Red

* RD16 washer required.

Ramset Magazine Pins for Spitfire P370 Tool				
Steel Thickness	**Timber Thickness**	**Pin**	**Pin Length**	**Charge**
6 or 8 mm	35 mm	SC9-40	40 mm	Red
6 or 8 mm	40 mm	SC9-50	50 mm	Red
6 or 8 mm	45 mm	SC9-50	50 mm	Red

ASSEMBLY

The manufacturer's specifications for the assembly and use of the tools must be strictly followed, including all safety instructions.

Both timber pieces need to be clamped flat against the steel plate to get a consistent joint. Clamping is essential to eliminate the gap between steel and timber. The FLITCH BEAMS must be placed on a solid bed during firing of pins to achieve good pin penetration. The FLITCH BEAMS must not be allowed to move or rock.

Camber can be achieved through using the natural crook in the timber or through jigging. The recommended camber is span/600 at mid-span between supports, eg 5000mm span beam requires 5000/600 = 8.3mm camber. Please note that due to the physical dimensions of timber and steel plate, the maximum achievable camber is only 5mm for FB20M, FB25M and FB30M. The fabricator may choose to build no camber into the timber sides, and allow for on site packing to achieve an acceptable finish. No camber is required for cantilever beams.

Pin heads shall be driven 0 to 5 mm below the surface of the timber.

Figure 1. Correct penetration of pins

Figure 2. Poor penetration of pins

Hilti Assembly

The pin must penetrate the steel and the point of the pin shall be visible on the far side by 1 to 6mm (Figure 1). Set the dial for power setting at 3 and adjust up or down to suit individual FLITCH BEAMS.

Ramset Assembly

For the J208 tool, the pins must penetrate and project at least 6mm from the other side of the steel. The control of the driving force is done through varying the charge. Washers must be used to prevent overdriving and to get consistent results.

For the Spitfire P370 tool, the drive pins must penetrate and project at least 6mm from the other side of the thinner steel plate (6mm plate). For 8mm thick steel plates, pins may penetrate the steel up to the stepped shoulder.

STORAGE AND HANDLING

Consideration for the storage and handling of GANG-NAIL FLITCH BEAMS is the same as for trusses in general. However, particular care is required to ensure the beams stay dry by avoiding exposure to wet weather. The beams shall be marked to identify the right way up and for special load bearing points if any.

Care should be taken when moving the product around the yard and to site. It is best, if at all possible, to keep the FLITCH BEAM in the upright, vertical position after manufacture. This decreases the chance of the nails being subjected to withdrawal loads and subsequent gaps appearing between the timber and steel members.

Care should also be taken on site during installation of the product. Avoid dropping or damaging the beam before it is installed.

DETAILS:

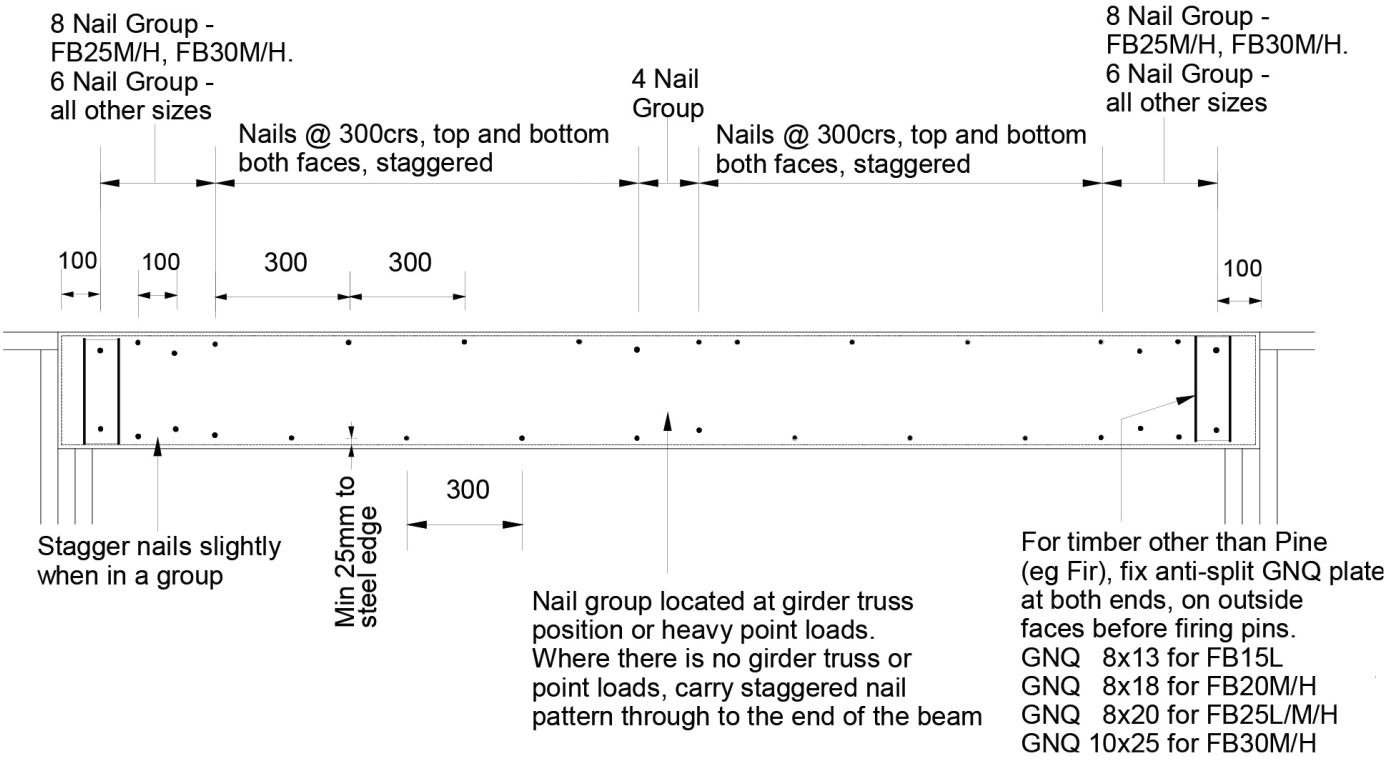


Figure 3. Typical Nailing Details for Simply Supported Beams (Both Faces)

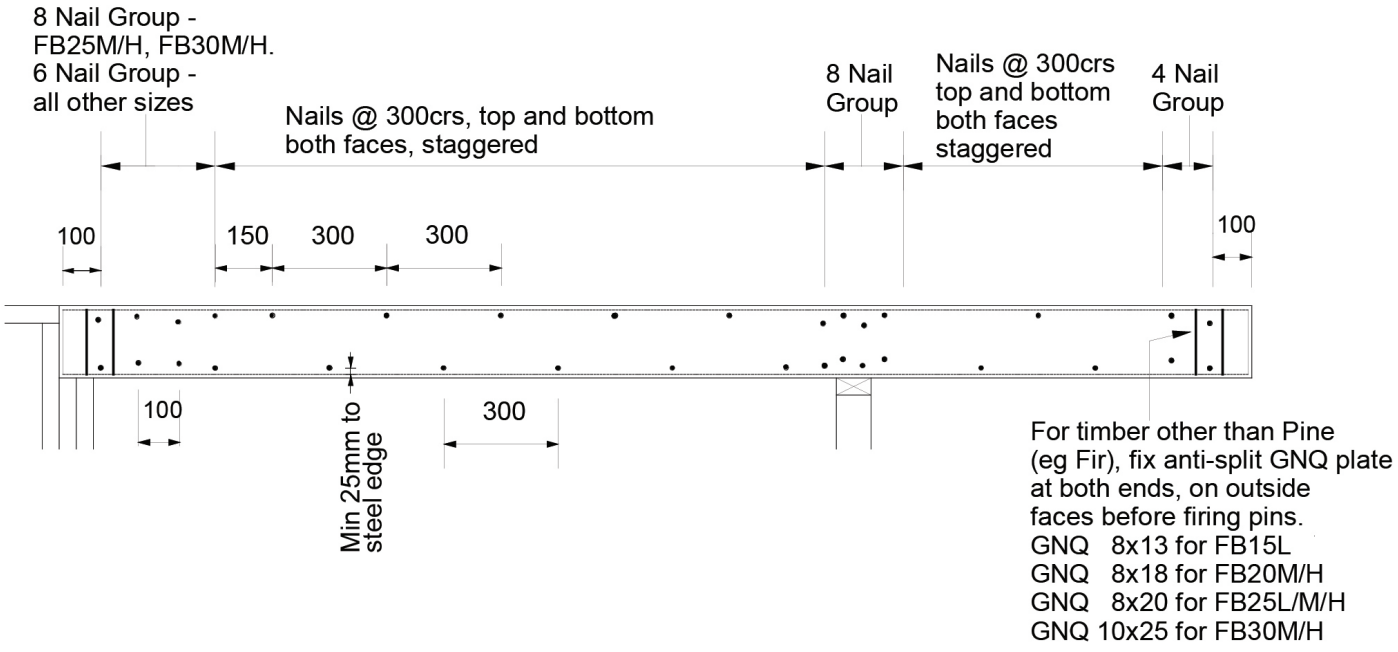


Figure 4. Typical Nailing Details for Cantilevered Beams (Both Faces)

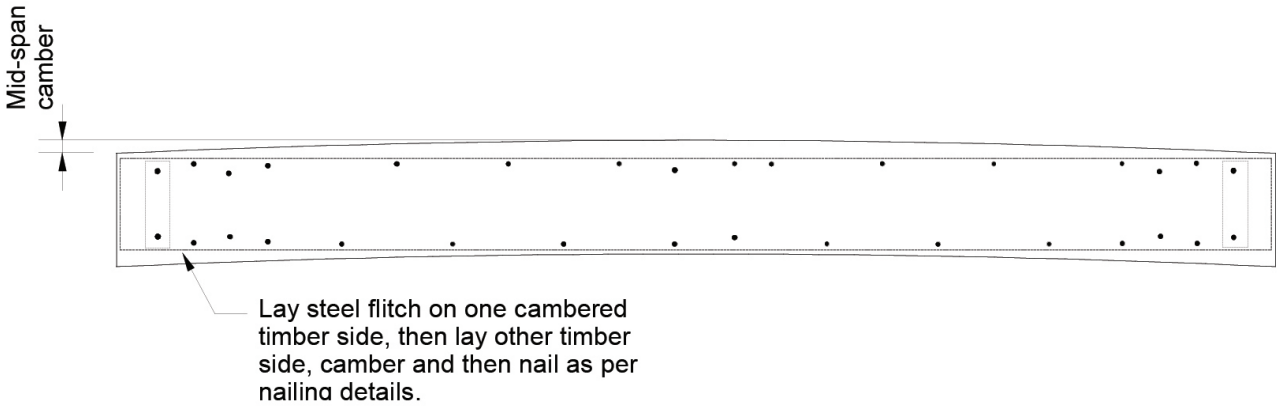


Figure 5. Camber Using Natural Crook

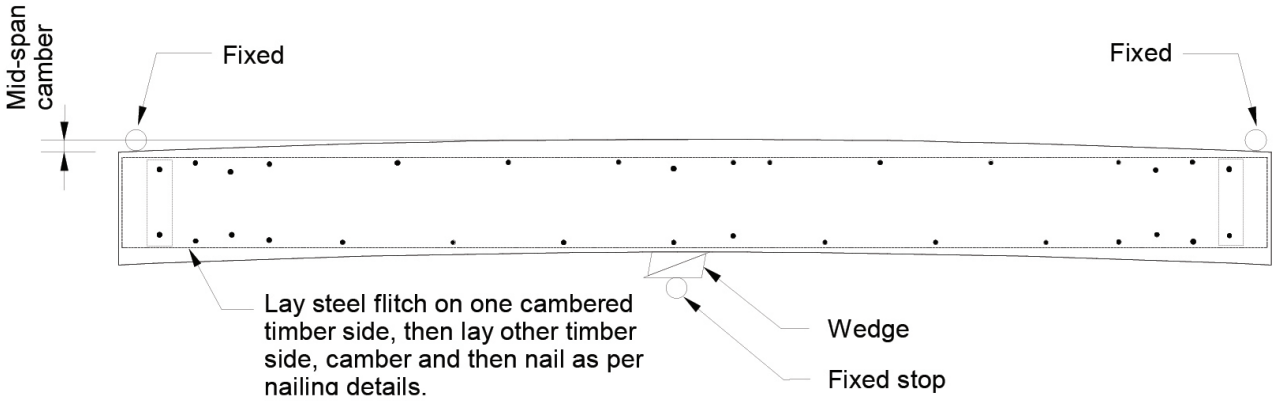


Figure 6. Camber by Jigging

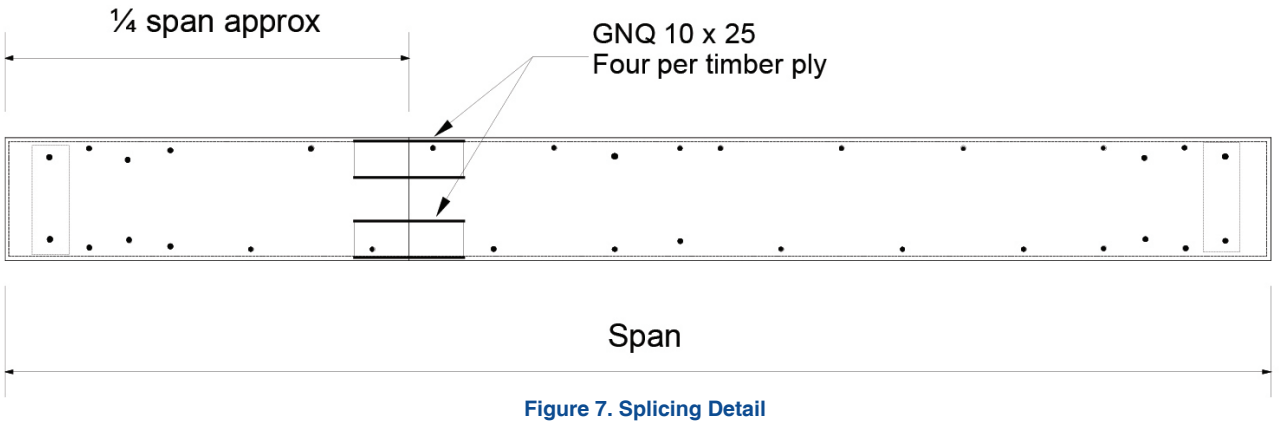
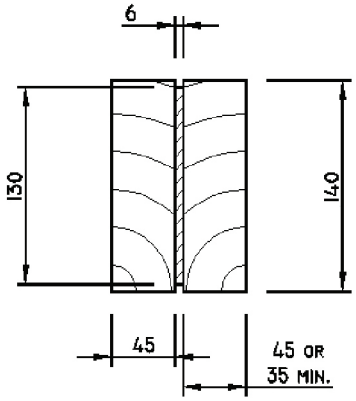


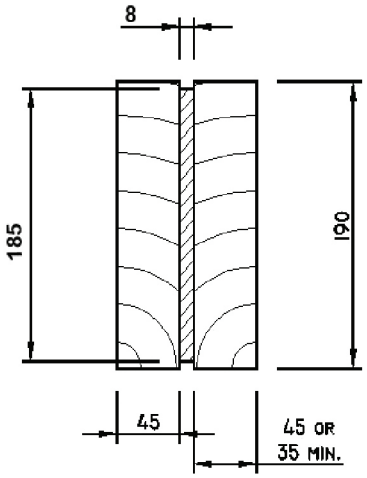
Figure 7. Splicing Detail

NOTES:

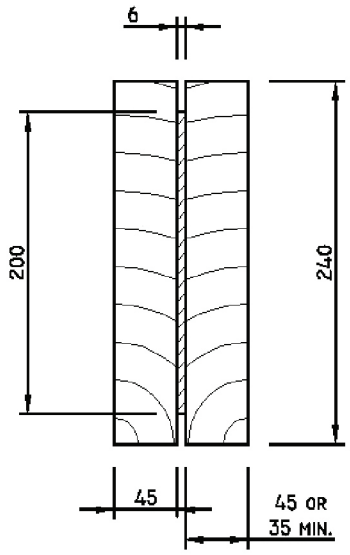
- **The recommended camber is span/600 at midspan between supports eg. 5000 span beam requires 5000/600 = 8.3mm camber. But note that FB20M, FB25M and FB30M can only have max. 5mm camber.**
- **No camber is required for cantilever beams.**
- **The fabricator may choose to build no camber into the timber sides, and allow for on site packing to provide an acceptable finish.**



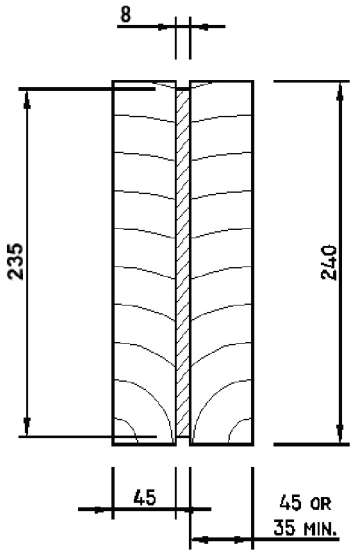
FB15L



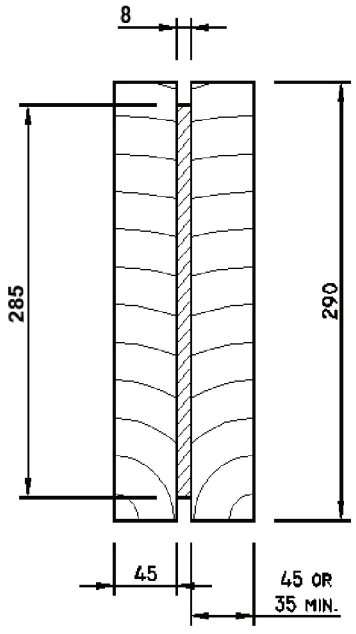
FB20M



FB25L



FB25M



FB30M

NOTE:
Timber side plates minimum overall thickness of 80mm (i.e. 35mm + 45mm).

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