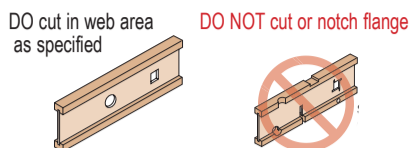
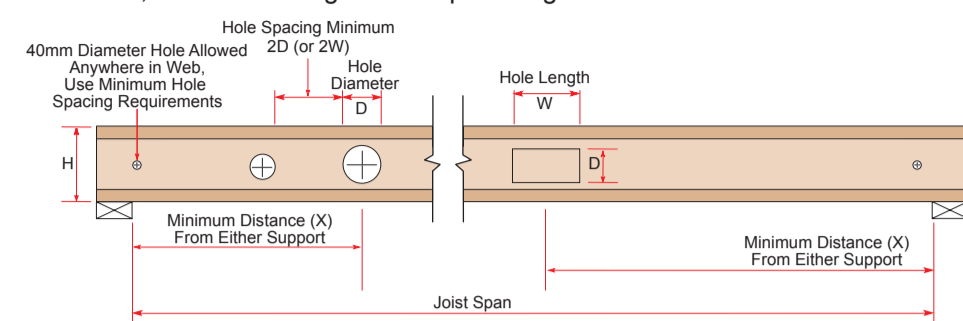


BCI® Joists – Hole Locations and Sizing

BCI® Joists are manufactured with 38mm round prestamped knockouts in the web at approx. 305mm centres for ventilation, electrical wiring or small plumbing.



- NOTES:**
- Table assumes joists are uniformly loaded by floor loading of 1.5 kN/m² imposed load and 0.75 kN/m² dead load, with the worst case joist spacing of 600mm.
 - For joists resisting large point loads (e.g. trimming joists), or for a more accurate evaluation of the effect of holes, refer to the design equations opposite.
 - The length-height ratio for rectangular holes must be between 0.5 and 2.0.
 - Spacing between hole centrelines must be at least three times the greatest dimension of either hole.
 - A 40mm circular hole may be cut anywhere in the joist web.
 - With the exception of holes less than 40mm in diameter, the distance between a hole centreline and the end of the joist must exceed 200mm or twice the greatest dimension of the hole, whichever is the greater.
 - **CUT ALL HOLES CAREFULLY. DO NOT OVERCUT OR CUT THE FLANGES.**

MINIMUM DISTANCE (X) FROM CENTRELINE OF HOLE TO ANY END SUPPORT (m)

BCI® Joist Depth (mm)	Joist Span (m)	CIRCULAR HOLES Hole Diameter [D] (mm)						RECTANGULAR HOLES Hole Height [D] x Length [W] (mm)								
		75	100	125	150	175	200	250	100 x 100	125 x 125	150 x 150	175 x 175	200 x 200	250 x 250		
220	3.0	0.16	0.16	0.21				0.40	0.86							
	3.5	0.16	0.16	0.45				0.65	1.11							
	4.0	0.16	0.36	0.70				0.90	1.36							
	4.5	0.28	0.61	0.95				1.15	1.61							
	5.0	0.53	0.86	1.12				1.40	1.86							
241	3.5	0.16	0.16	0.27	0.58			0.54	1.03	0.96	1.18					
	4.0	0.16	0.21	0.52	0.83			0.79	1.28	1.21	1.43					
	4.5	0.16	0.46	0.77	1.08			1.04	1.53	1.46	1.68					
	5.0	0.40	0.71	1.02	1.33			1.29	1.78	1.71	1.93					
	5.5	0.16	0.16	0.21	0.26	0.43	0.73	0.34	0.95	0.74	1.10	1.24	1.14	1.38		
302	4.5	0.16	0.16	0.21	0.38	0.68	0.98	0.59	1.20	0.99	1.35	1.49	1.39	1.63		
	5.0	0.16	0.16	0.33	0.63	0.93	1.23	0.84	1.45	1.24	1.60	1.74	1.64	1.88		
	5.5	0.16	0.28	0.58	0.88	1.18	1.48	1.09	1.70	1.49	1.85	1.99	1.89	2.13		
	4.5	0.16	0.16	0.21	0.26	0.31	0.54	0.39	1.05	0.74	1.17	1.30	1.10	1.42	1.45	
	5.0	0.16	0.16	0.21	0.26	0.31	0.54	0.64	1.30	0.99	1.42	1.55	1.35	1.67	1.70	
356	5.5	0.16	0.16	0.24	0.51	0.78	1.04	0.89	1.55	1.24	1.67	1.80	1.60	1.92	2.07	
	6.0	0.16	0.22	0.49	0.76	1.03	1.29	1.14	1.80	1.49	1.92	2.05	1.85	2.17	2.32	
	5.0	0.16	0.16	0.21	0.26	0.31	0.36	0.68	1.16	0.95	1.51	1.68	1.22	0.89	1.35	1.27
	5.5	0.16	0.16	0.21	0.26	0.31	0.36	0.93	1.38	1.20	1.76	1.33	1.47	1.14	1.60	1.52
	6.0	0.16	0.16	0.21	0.26	0.32	0.61	1.18	1.63	1.45	1.01	1.58	1.72	1.39	1.85	1.77
406	6.5	0.16	0.16	0.21	0.29	0.57	0.86	1.43	0.88	1.70	1.26	1.83	1.97	1.64	2.10	2.02
	6.5	0.16	0.16	0.21	0.29	0.57	0.86	1.43	0.88	1.70	1.26	1.83	1.97	1.64	2.10	2.02

- Design equation to calculate shear strength of a BCI® Joist with a CIRCULAR hole in its web**
- $$V_{d,circ} = 0.75 V_{d,full-section} (1 - D/H)$$
- where $V_{d,circ}$ = Shear strength of BCI® Joist with a circular hole
 $V_{d,full-section}$ = Shear strength of same size BCI® Joist without any holes (see p. 10 of UK Tech Guide)
 D = Diameter of hole
 H = Depth of BCI® Joist
- Design equation to calculate shear strength of a BCI® Joist with a RECTANGULAR hole in its web**
- $$V_{d,rect} = 0.5 V_{d,full-section} (1 - D/H) (D/W)^{0.5}$$
- where $V_{d,rect}$ = Shear strength of BCI® Joist with a rectangular hole
 $V_{d,full-section}$ = Shear strength of same size BCI® Joist without any holes (see p. 10 of UK Tech Guide)
 D = Depth of hole
 W = Length of hole
 H = Depth of BCI® Joist

Holes and Notches in VERSA-LAM® and VERSA-LAM® Rim

Holes and notches in VERSA-LAM® and VERSA-LAM® Rim should be formed in accordance with the guidelines given for solid timber members in The Building Regulations Approved Document, "Timber Intermediate Floors for Dwellings," as shown below. The diagrams below are intended for use with VERSA-LAM® members that support mainly uniform load. Where the load is not uniform or large isolated point loads exist, contact Boise Cascade Engineered Wood Products Engineering for guidance.

Holes/notches that can be formed in VERSA-LAM® without recourse to structural calculation

For members that are pre-dominantly uniformly loaded (i.e. by a series of point loads of essentially equal magnitude and spacing), the holes or notches shown in figures 1a-1c can be formed without recourse to structural calculation.

Figure 1a - Elevation on member - Notches on top edge

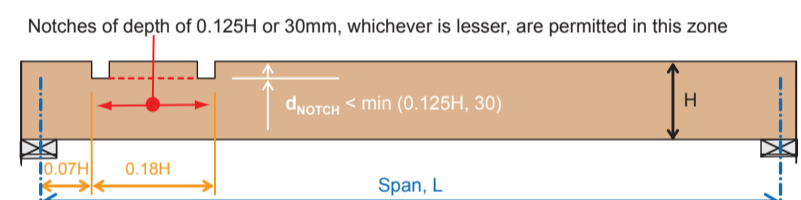


Figure 1b - Elevation on member - Holes on centreline

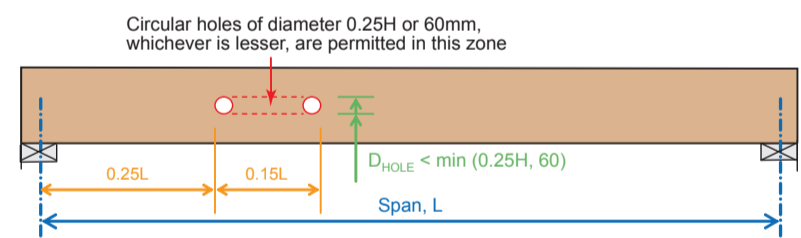
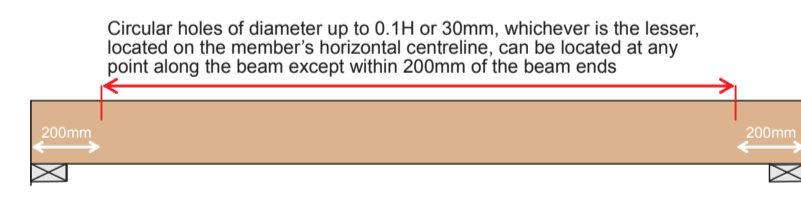


Figure 1c - Elevation on member - Small holes in centreline



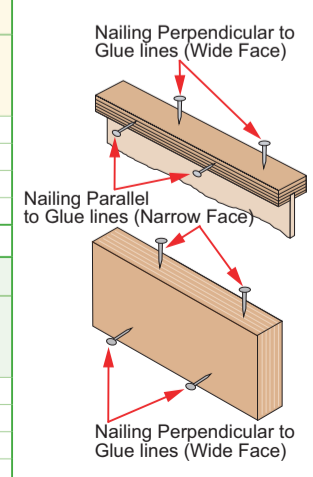
Minimum spacing between holes/notches = max(3d_{NOTCH}, 3D_{HOLE}, 100mm)

Allowable Nail Spacing

Nailed joints in BCI® and VERSA-LAM® should be designed using the permissible nail values given in BS 5268-2: 2002 for C27 timber. Nails should be spaced in accordance with the following tables:

Nailing to Narrow Face (Parallel to Glue Lines)				
Nail Diameter (mm)	End Distance (mm)	Edge Distance (mm)	Along Face - Parallel to Grain (mm)	Across Face - Perpendicular to Grain (mm)
3.0	60	15	60	15
3.35	67	17	67	17
3.75	75	19	75	19
4.0	80	20	80	20

Nailing to Wide Face (Perpendicular to Glue Lines)				
Nail Diameter (mm)	End Distance (mm)	Edge Distance (mm)	Along Face - Parallel to Grain (mm)	Across Face - Perpendicular to Grain (mm)
3.0	48	15	48	24
3.35	54	17	54	27
3.75	60	19	60	30
4.0	64	20	64	32

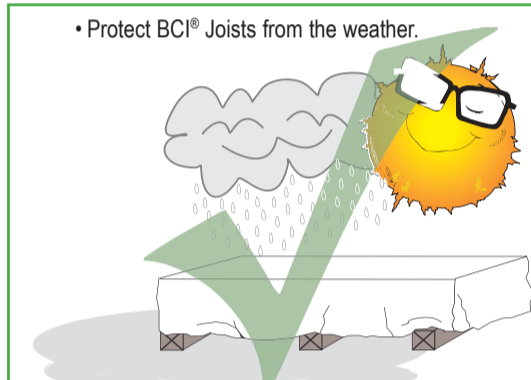


WARNING The following Uses Are Not Allowed

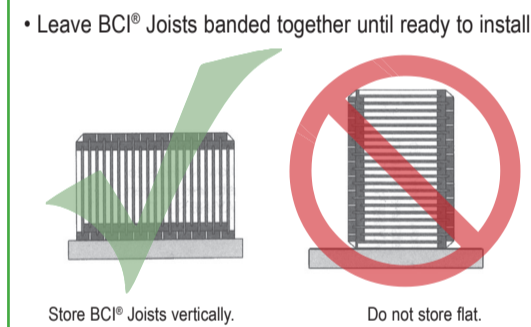
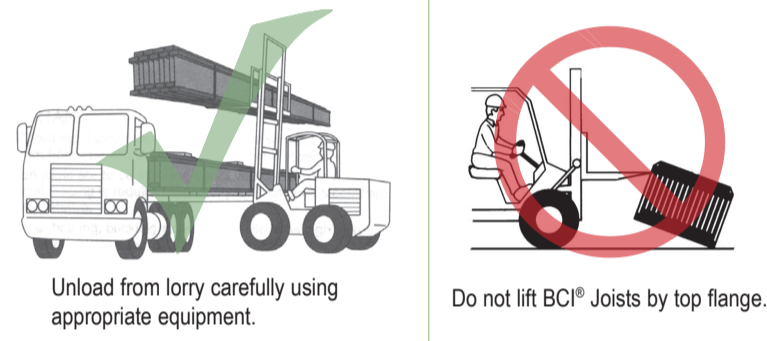
- DO NOT** cut notches or holes that are not in accordance with this Technical Guide.
- DO NOT** cut beyond inside edge of bearing.
- DO NOT** support joist on web.
- DO NOT** cut holes too close to supports or to each other.
- DO NOT** nail closer than 38mm from end of joist.
- DO NOT** cut or notch flange.
- DO NOT** walk on joist until proper bracing is in place.
- DO NOT** install tongue of floor sheathing flush with VERSA-LAM®. Trim tongue flush with rim.
- DO NOT** hammer on web unless removing knockout holes.
- DO NOT** load joist beyond design capacity.
- DO NOT** stack building materials on unbraced joists.
- DO NOT** hammer on flange.

Helpful Hints

Site Storage



Site Handling



Lifetime Guaranteed Quality and Performance

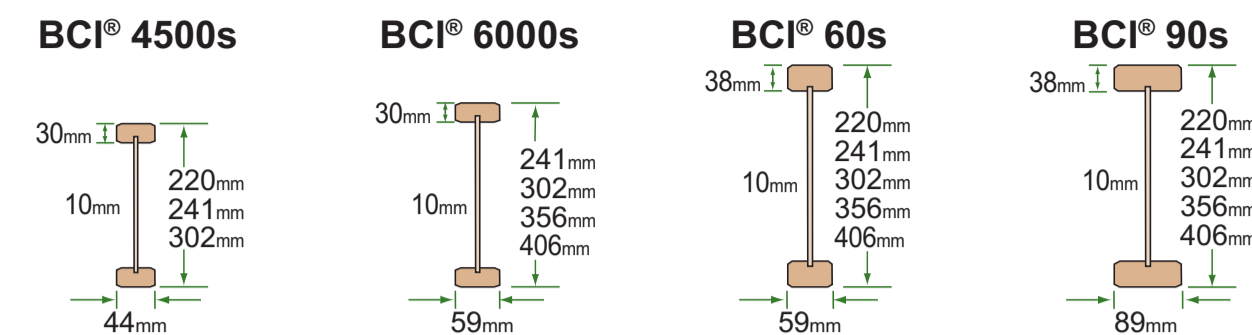
Boise Cascade warrants its BCI® Joist, VERSA-LAM®, and ALLJOIST® products to comply with our specifications, to be free from defects in material and workmanship, and to meet or exceed our performance specifications for the normal and expected life of the structure when correctly stored, installed and used according to our Installation Guide.

Contractors should be aware of their health and safety responsibilities under the Construction (Design & Management) Regulations 2007

Correct Fixings on Hangers

- Toe nailing causes squeaks and improper hanger installations. Do not toe nail joists prior to installing either top flange or face mount hangers.**
- Hanger Over-Spread**: If the hanger is over-spread, it can raise the joist above the header and may cause uneven surfaces and squeaky floors.
- Hanger Not Plumb**: A hanger "kicked out" from the header can cause uneven surfaces and squeaky floors.
- No Web Stiffener Results in Rotation**: Hanger side flange is below the joist top flange. No web stiffener results in rotation, unless restrained by other means.
- Nail at Wrong Angle**
- Nail Too Long**
- No Web Stiffener Installed**: Hanger side flange supports joist top flange.
- Web Stiffener Required**: Hanger side flange should be at least 60% of joist depth or potential joist rotation must be addressed.
- Rotation Resistance**: If non-sloved hanger side flange is less than 60% of joist depth, attach staggered framing anchors above the hanger.
- Correct Nailing**

BCI® Product Profiles

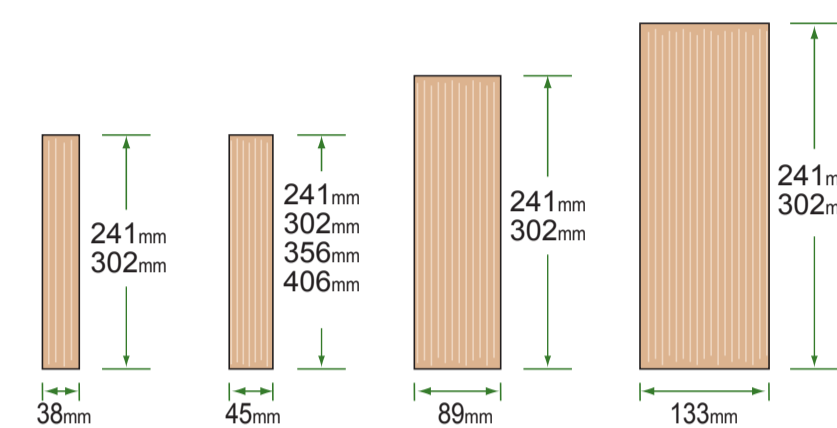


VERSA-LAM® Product Profiles

VERSA-LAM® is one of the strongest and stiffest engineered wood products approved in the UK.

VERSA-LAM® products are excellent as floor and roof framing supports or as lintels for doors, windows and garage doors and columns.

Manufactured with no camber, VERSA-LAM® LVL products provide flatter, quieter floors, and consequently, the builder can expect happier customers with significantly fewer call backs.



For more information about Boise Cascade products and services, please contact:

Crown Timber plc

Crown House • 1 Wilkinson Road • Love Lane Industrial Estate
Cirencester • Gloucestershire • GL7 1WH UNITED KINGDOM

Tel – +44 (0)1285 646000 Fax – +44 (0)1285 646020

Email – boise@crown-timber.co.uk Website – www.crowntimber.co.uk



Simple Framing System®

Installation Guide for Floor & Roof Framing Construction

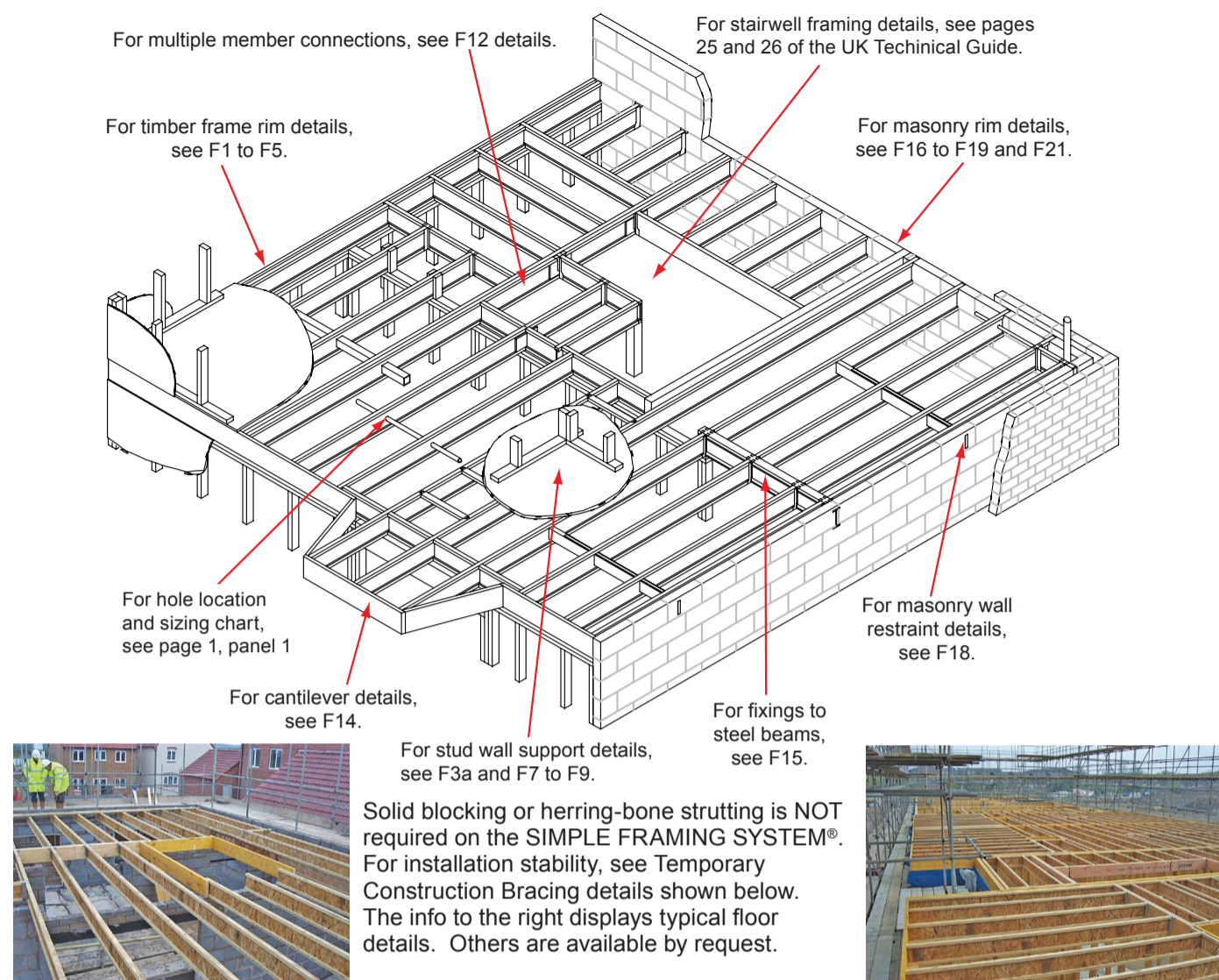
BS5268 PART 2:2002 VERSION

Authorised wholesaler for the Boise Cascade range of products and systems:

Tel – +44 (0)1285 646000
Email – boise@crown-timber.co.uk

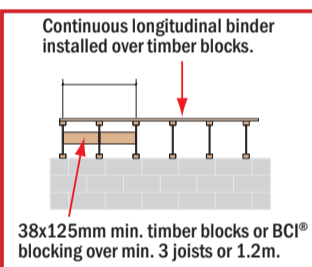


Floor Framing Details

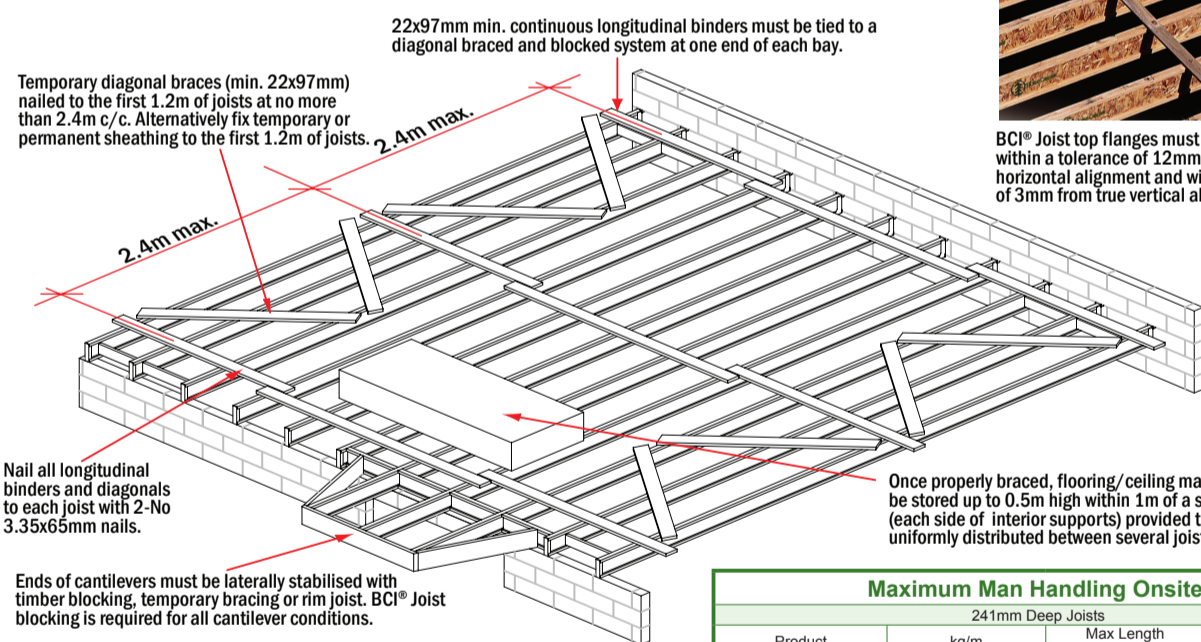


Temporary Construction Bracing

A lateral restraint system must be established at the end of each floor bay to prevent buckling sideways or rollover. This can be done by using temporary braces (shown below) or by fixing sheathing over the first 1.2m of joists and installing timber blocking beneath. All joists in the floor bay must then be connected back to this braced section by way of continuous longitudinal binders prior to allowing workers or placing construction loads on the floor. In long bays, install additional braced sections not greater than 12m apart.



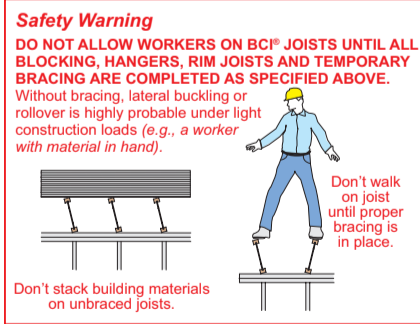
Note: Serious accidents can result from insufficient attention to proper bracing during construction. Accidents can be avoided under normal conditions by following these guidelines.



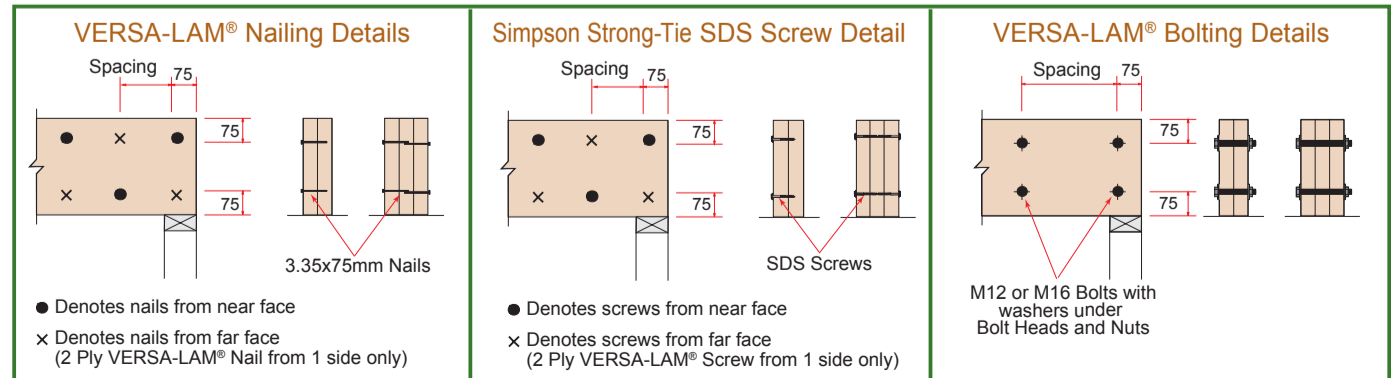
Maximum Man Handling Onsite.

Product	kg/m	241mm Deep Joists	
		Max Length 1 Person	Max Length 2 Person
BCI® 4500s	3.12	8.01	16.02
BCI® 6000s	3.69	9.17	18.35
BCI® 60s	4.23	5.91	11.82
BCI® 90s	5.83	4.29	8.58
VERSA-LAM® 38mm	6.04	4.14	8.28
VERSA-LAM® 45mm	7.16	3.49	6.98
VERSA-LAM® 89mm	14.16	1.77	3.54
VERSA-LAM® 133mm	21.15	1.18	2.36

Product	kg/m	302mm Deep Joists	
		Max Length 1 Person	Max Length 2 Person
BCI® 4500s	3.55	7.04	14.08
BCI® 6000s	4.12	6.08	12.12
BCI® 60s	4.66	5.36	10.72
BCI® 90s	6.26	3.99	7.98
VERSA-LAM® 38mm	7.57	3.30	6.60
VERSA-LAM® 45mm	8.97	2.79	5.58
VERSA-LAM® 89mm	17.74	1.41	2.82
VERSA-LAM® 133mm	26.61	0.95	1.89



Multiple Member Connectors



BCI® Joists – Floor Applications

