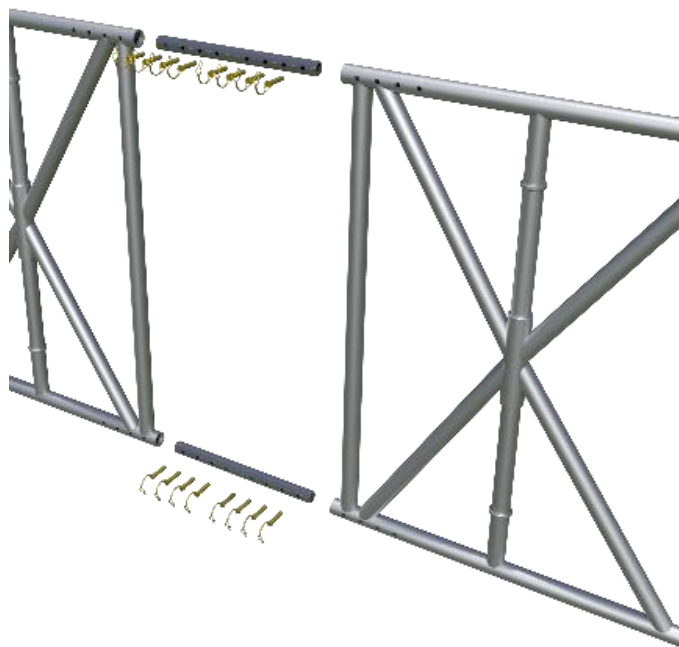


YOUNGMAN

Lattice Beam User Guide

LW/06.19



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Introduction

This user guide has been prepared in accordance with the guidance set out within BS EN12810-01:2003 clause 8, the NASC Code of Practice and is only applicable to Generation UK lattice beams other applications such as temporary roof systems are outside the scope of this guide and should be designed by a competent engineer.

Safety Information

Scaffold erectors must wear a harness for beams erected or dismantled more than 4m above ground.

Also adhere to all Health and Safety regulations and the requirements of the latest NASC SG04 guidance.

Please ensure the following:

- Foundations are capable of resisting all increased design loads.
- Building materials on platforms do not overload the scaffold. All materials should be placed near to supports as possible.
- All lattice beams have adequate lateral restraints to the compression chord. This can be achieved using tube and fittings in accordance with BS EN12811, EN39 & EN74.
- Platform units or boards are secured against lifting.
- All gaps between platform units or boards are not exceeding 25mm.
- All platforms are free from triphazards.
- All working areas are as level as possible.
- Access and working areas have side protection, a minimum of double guardrails and toe boards in addition to any cladding.
- Lattice beam installations comply with engineer's drawings, also ensure the designer has checked and certified them prior to use.
- Lateral stability is provided by ties to the adjacent building or structure. Further ensure the building or structure can support the intended loads.
- A rigid vertical plane of scaffold by adequately plan and cross bracing lattice beams.
- All connections between beams and spigots are secured and can be easily monitored against accidental disconnection.
- A competent person carries out an inspection of the scaffold before use and report issued and filed.
- Ties are not removed without supervision. When a tie has to be removed first fix alternative ties and seek designers advice on where bracing should be added before use.

General Description of a Lattice Beam

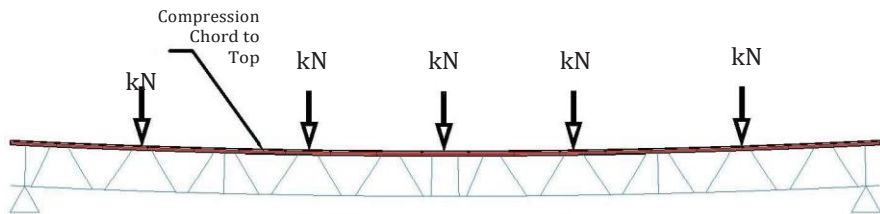
Aluminium Lattice beams consist of top and bottom chords separated by vertical uprights. Lattice members are tubular sections positioned at angles to the chords to allow forces to pass from top chord to bottom chord. Beams work to their capacity when held in place (restrained) along the full length of the compression chord. This fully restrained condition is NOT normal in scaffolding applications; therefore they will tend to buckle between the lateral restraints (lacing) to the compression chord.

Lateral restraints (lacing) are normally tube and fitting members running at 90 degrees to the direction of the beams. As the gap between lacing increases, the capacity of the beam reduces.

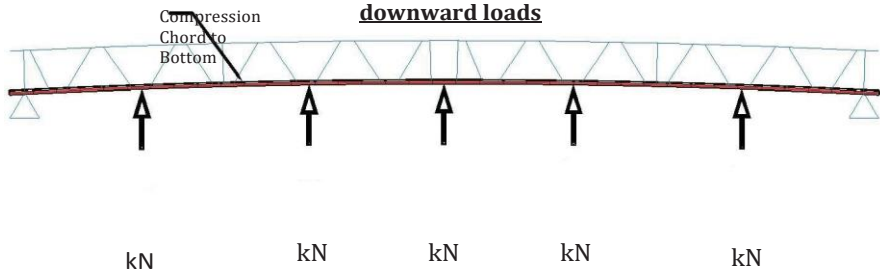
Beam Support Conditions (Showing compression chords)

Simply supported beam arrangement

Beams spanning between two supports with load also acting between supports. For loads acting downwards the top chord will be in compression. For loads acting upwards (wind) the bottom chord will be in compression.



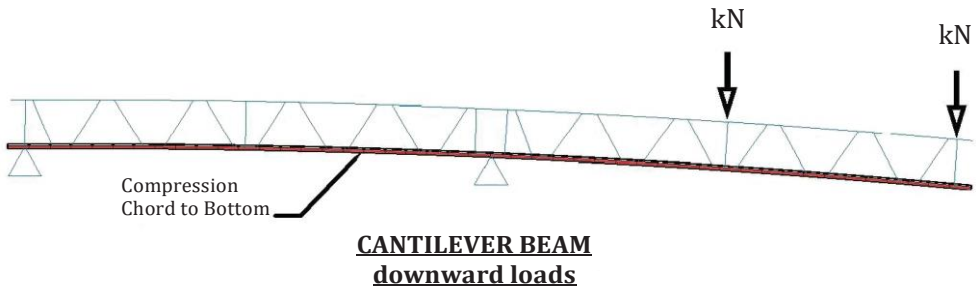
SIMPLY SUPPORTED
BEAM
downward loads



SIMPLY SUPPORTED
BEAM
upward loads (wind)

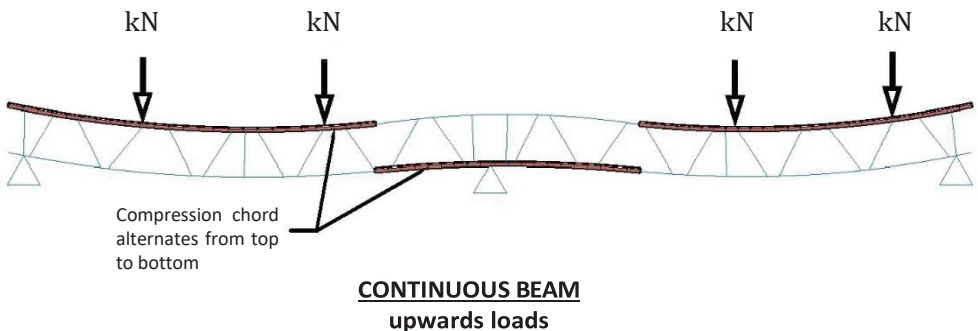
Cantilevering beam arrangement

Beam spanning beyond a minimum of two supports, with loading acting outside of supports. For loads acting downwards the bottom chord will be in compression. For loads acting upwards the top chord will be in compression.



Continuous beam arrangement

Beams spanning over a minimum of three supports with loads acting upwards or downwards on the spans. The compression chord will vary along the length of the beam.



Beam Lacing & Bracing

Important note:

It is important to lace and brace (restrain) the compression chord at the correct centres to achieve the loading values stated for our beams. Incorrect installation of lacing & bracing will reduce beam capacity. This may result in collapse.

Lacing is required to every bay of beams with plan and cross bracing normally to every 5th bay.

Plan bracing is required to the compression chord fixed at lacing tube positions along the beams.

Compression chord lacing is normally achieved by using tube & fittings coupled at 90 degrees to beam direction (from compression chord to compression chord). Beam capacities vary according to the spacing of this lacing. (For the required spacing refer to technical information sheet).

Tension chord lacing is required to half of the amount of compression chord lacing. This is positioned at every other compression chord lacing position.

Cross bracing is required from the tension chord to the compression chord in alternate directions at the tension chord lacing positions along the beams. Cross bracing is also required at supports and beam end positions. See figure 1 (page 11) (typical 5No. bay arrangement).

Where the compression chord varies along the length of the beam (continuous beam arrangements), then compression chord lacing & plan bracing will be required to both top and bottom chords.

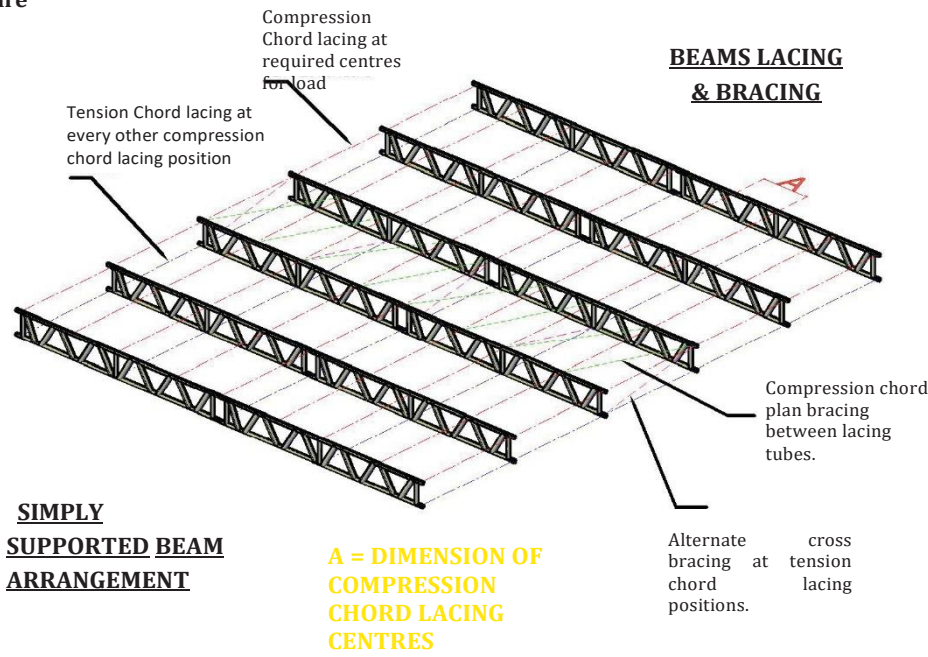
Lacing and bracing to beams will create stability for scaffolding to be built off. This does not apply to roofing systems which require specialist bracing frames fitted to manufactures specification.

Typical 5 No. bay beam arrangement

The beam layout, lacing and bracing arrangement indicated below is for beams with a simply supported spans and vertical loads (applied downwards between supports).

For dimension 'A' refer to technical information sheets. (Lateral Restraints)

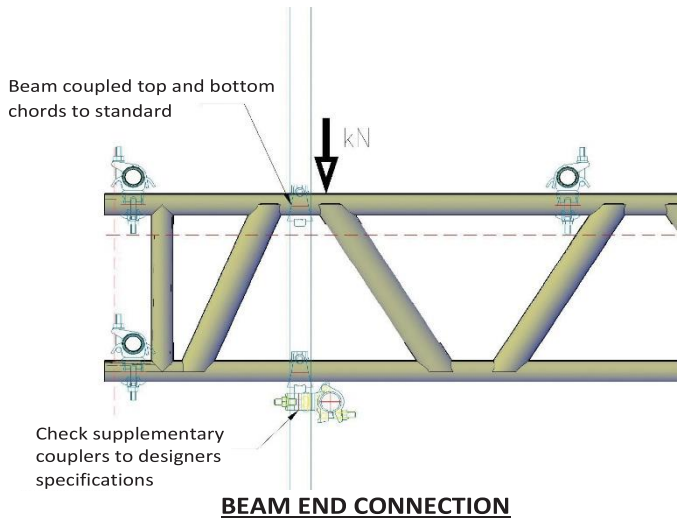
Figure 1



Beam End Connections

At ends of beams loads are often very high, where beams are supported by standards they should be coupled to top and bottom chords with any supplementary/check couplers secured in accordance with the design engineers drawing prior to use.

Figure 2



Support and loading positions should be at node points (see preferred coupling positions) along beams. If this cannot be achieved then refer to chord strengthening notes below.

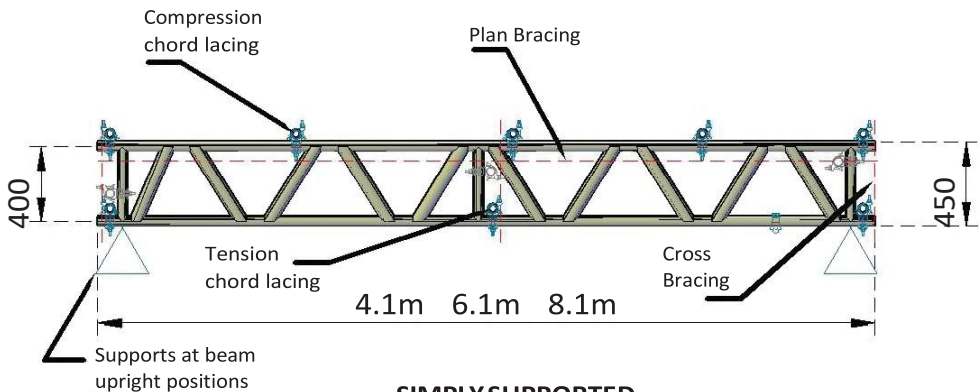
Beam bracing must be installed and checked in accordance with the design engineers' drawings, by a competent scaffold engineer or designer prior to use.

All secondary plan, (to enable loads to pass into a permanent structure via ties) ledger and face bracing (to take loads down to the ground) must also be checked by a competent scaffold engineer or designer prior to use.

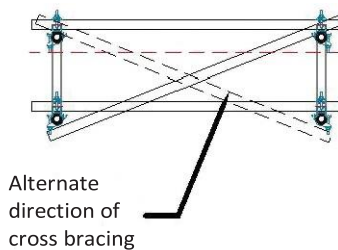
Preferred coupling positions

It is preferred for all lacing or bracing couplers to be fixed at points along top and bottom chords. Coupling to uprights should be avoided (as uprights may have thinner wall thickness) See diagram below.

Figure 3



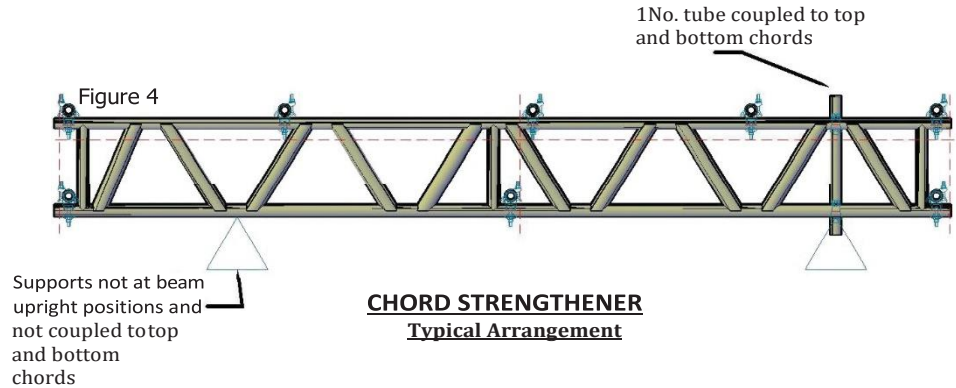
SIMPLY SUPPORTED
450 R Beam Arrangement showing
preferred fixing positions



SECTION THROUGH

Chord Strengthening

Where supports (standards) cannot be coupled to top and bottom chords e.g. if the beam is not adjacent to standard and supported by primary beams then chord strengthening may be required. If a beam must be supported at a weak point along the chord, then firstly look at turning the beam upside down. If this creates a weak point at a support elsewhere along the beam then local strengthening to the chord will be required. (For details of strengthening positions, refer to technical informationsheet).

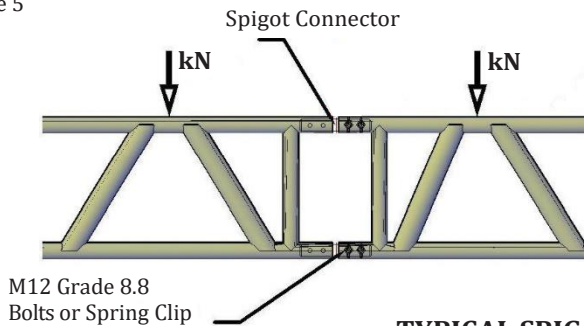


Spigot Connections

Spigot connectors can be inserted at the ends of beams to join two beams together; this will extend the overall beam length. The spigot forms a joint to the top and bottom chords of two separate beams. Spigot connector must be secured in place correctly using M12 Grade 8.8 bolts or spring pins to either end of the spigot (for the quantity of fixings refer to technical information sheet). Regular inspections of the bolts must be performed to ensure they have not worked loose (due to beam deflection).

The allowable tension force in the spigot is high enough to withstand the full design load in the beam chords to pass through the joint safely.

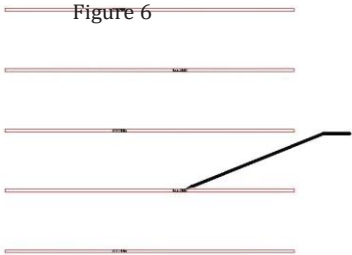
Figure 5



TYPICAL SPIGOT CONNECTION

It is recommended to avoid vertical point loads at spigot joint locations. See figure 5 above

When several bays of multiple beams (spigot jointed) are laced together it is also recommended to use two different lengths of beam to allow the spigot joints to be staggered, thus varying the point of maximum deflection and bending. See figure 6 below.



Staggered spigot joints by using two different sized beams

STAGGERED SPIGOT CONNECTION