

RAPIDSHOR

80kN STEEL SHORING SYSTEM

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KWIKFORM

Technical Data Sheets

Metric Specification

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Introduction

Rapidshor is RMD Kwikform's premier steel falsework/shoring system; it is safe, robust and easy to use with an impressive 80kN allowable leg load. Tapered slots in circular nodal disks on the standards provide a unique ability to tackle the shoring for skewed bridge decks. The system has established an excellent pedigree having been used on thousands of structures Worldwide.

Health and Safety

Designers should make themselves familiar with the contents of Equipment Guidance Notes UIX10202-Rapidshor Falsework and Application Risk Assessment UIX20200-Falsework. These documents are available to customers via hyperlinks embedded in PDF scheme drawings. Residual risks pertaining to design issues are marked in this document with the symbol  and, if relevant to the scheme being prepared, should be highlighted on the RMDK scheme drawing.

Design to EN Standards

The RMD Kwikform Rapidshor System has been verified in accordance with EN12812:2008 Falsework Performance Requirements and General Design, with manufacturing procedures certified in accordance with BS EN ISO 9001: Quality Management Systems.

To facilitate a simplified scheme design using established permissible load methods, load performance data in this document is displayed as an 'Allowable Working Load'. Should Limit State Design be required, the Design Resistance may be obtained by multiplying the Allowable Working Load values by 1.5.



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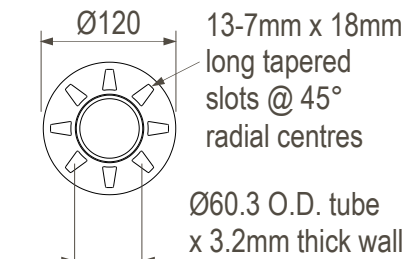
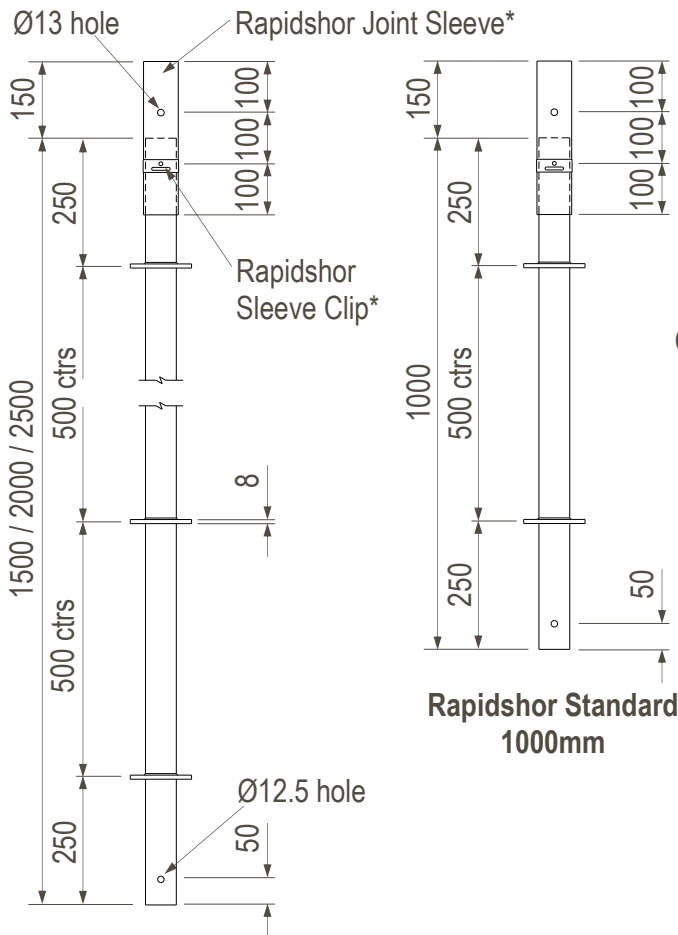
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Rapidshor Standards

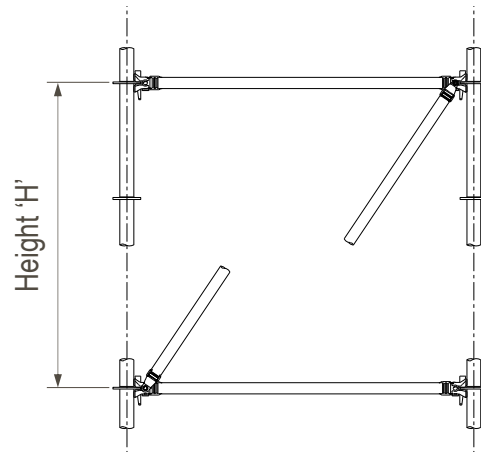
Comprising a 60.3mm O.D. x 3.2mm thick wall hot-dipped galvanised steel tube with circular slotted nodal disks at 500mm vertical centres, Rapidshor Standards are supplied complete with an integral Joint Sleeve facilitating the fastest possible assembly time. Open Ended Standards are also available for use at the top and/or bottom of the shoring structure.

Maximum Allowable Working Load = 80kN but varies depending on vertical ledger spacing, jack extension and top lateral restraint, see sheets 45-48

Note: When the shoring is constructed from more than one Standard in height, the joint in the Standards can be placed anywhere in the height - providing there is no more than one joint located between a pair of adjacent Ledgers.



Enlarged Section
Cross Sectional Area = 574mm²



Maximum Allowable Load

For H = 1500mm AWL = 80kN

For H = 2000mm AWL = 60kN

Rapidshor Standards 1500mm-2500mm

* absent on open ended variants

Code	Description	Weight
RSX12500	Rapidshor Standard 2500mm	14.9 kg
RSX12000	Rapidshor Standard 2000mm	12.3 kg
RSX11500	Rapidshor Standard 1500mm	9.57 kg
RSX11000	Rapidshor Standard 1000mm	6.88 kg

Code	Description	Weight
RSX43000	Rapidshor Standard OE 3000mm	16.1 kg
RSX42500	Rapidshor Standard OE 2500mm	13.4 kg
RSX42000	Rapidshor Standard OE 2000mm	10.7 kg
RSX41500	Rapidshor Standard OE 1500mm	8.04 kg
RSX41000	Rapidshor Standard OE 1000mm	5.36 kg

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Rapidshor Standard OE 675mm (RSU40675) weight 3.04kg

Used with Rapidshor Jack 25-540mm (RSX10004) or Rapidshor Short Jack 340mm (RSU10340) in shoring applications with low propping heights.

Note: This Standard does not have $\text{Ø}12.5$ holes to permit connection using Rapidshor Sleeve Clips.

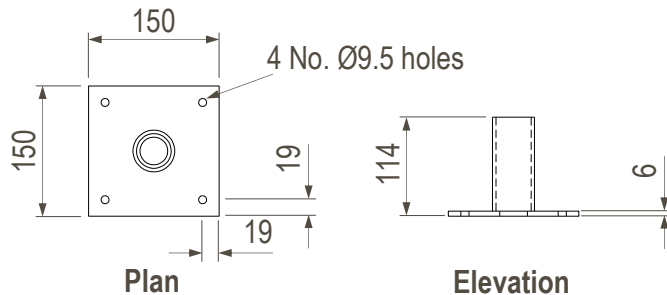


Rapidshor Standard
OE 675mm

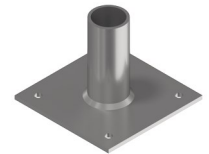


Socket Base 114mm (KPX20004) weight 1.51kg

For use with Rapidshor Standard OE 675mm (RSU40675) in shoring applications with low propping heights.



Allowable working load 25kN when based on timber sole boards, 80kN on a concrete foundation. If higher loads are required on timber sleepers, place a 150x150x12mm Plate Washer (BNX20006) under to spread the load.



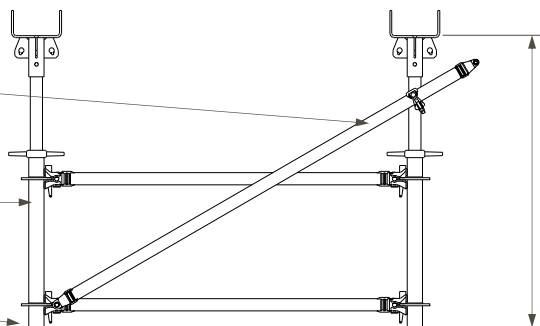
Low Height Shoring

Bracing to low height shoring should be made using standard braces as shown or tube & fittings as Adjustable Jack Braces will not pass over the 500mm ledger lift height when using end connections.

Rapidshor Brace
pinned to Ledger &
coupled to Jack with
2"x2" Swivel Coupler

Rapidshor Standard
OE 675mm

Socket Base 114mm



Height to underside of Primary using 25-540mm
Jack = 1083 min. - 1394 max.*

Height to underside of Primary using 340mm
Jack = 883 min. - 1194 max.*

* min-max dimensions do not include 12mm Plate Washer.

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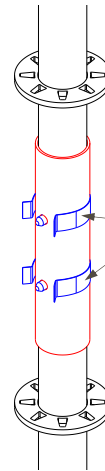
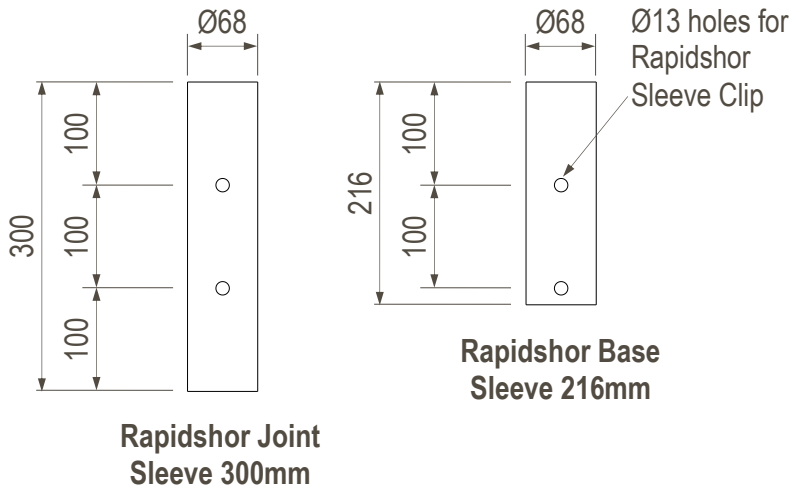
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Rapidshor Sleeves

An external sleeve used at the joints between Open Ended Standards in the leg makeup and fixed to standards using Rapidshor Sleeve Clips.

Note: The base sleeve is shorter to avoid the brace lugs when using a fixed head or base.

AWL = 25kN tension



Only one Rapidshor Sleeve Clip needs to be connected to the Joint Sleeve for general falsework applications. For applications where tension is expected two Rapidshor Sleeve Clips should be used to secure both Standards to the Joint Sleeve.



For lifting or other applications where the presence of the joining pins is critical, 2 No. M12x100 bolts gr8.8 & M12 Nyloc Nuts gr8.8 (BNM12000 + BNA11202) should be used instead of Omega clips.

Code	Description	Weight
RSX10005	Rapidshor Joint Sleeve 300mm	1.53 kg
RSX10010	Rapidshor Base Sleeve 216mm	1.14 kg

Rapidshor Sleeve Clip (RSX10009) weight 0.09kg

Used in conjunction with the Rapidshor Joint Sleeve 300mm (RSX10005) to join Standards end to end and/or with the Rapidshor Base Sleeve 216mm (RSX10010) to join a Standard directly to a fixed head or base.

AWL = 25kN in double shear



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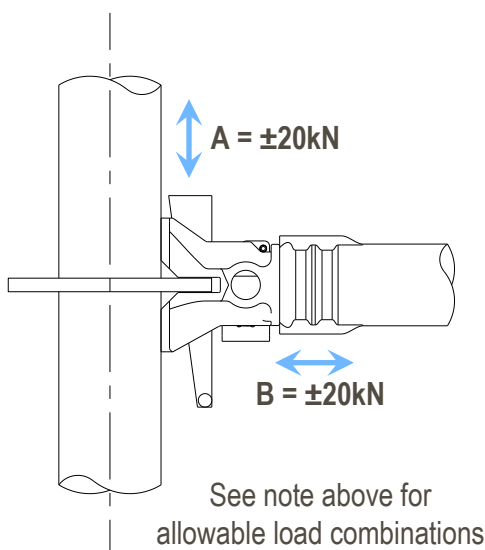
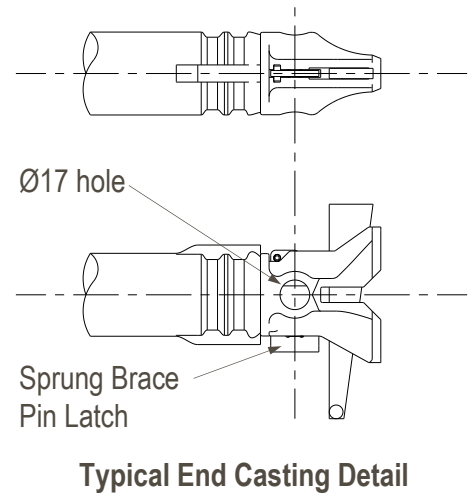
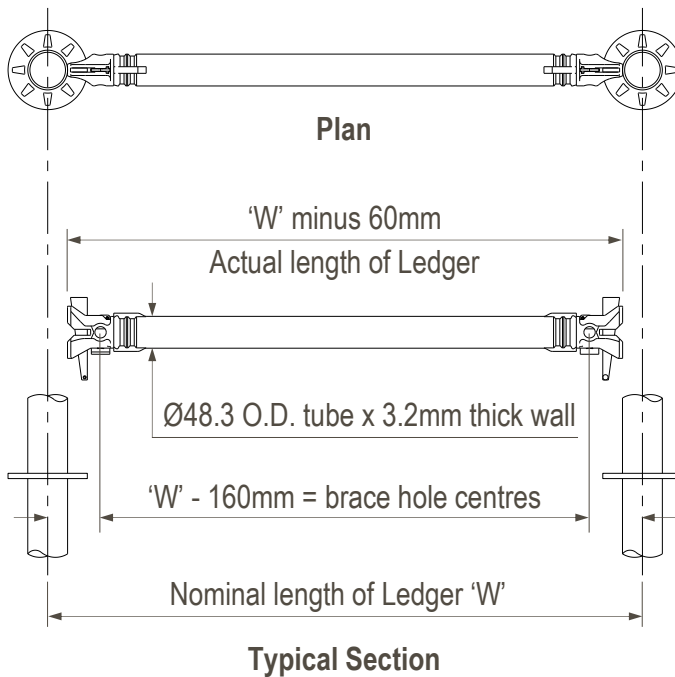
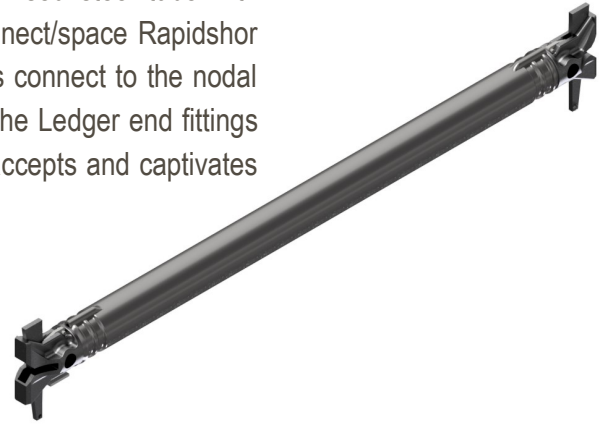
Rapidshor Ledgers

Comprising a 48.3mm O.D. x 3.2mm thick wall hot-dipped galvanised steel tube with captive cast steel end fittings, Rapidshor Ledgers are used to connect/space Rapidshor Standards apart and carry horizontal loads to the braces. Ledgers connect to the nodal disks on the Standards with a single captive lay-back wedge and the Ledger end fittings contain a close tolerance hole with an integral spring latch which accepts and captivates the Rapidshor Brace end fitting.

Max allowable bending moment 1.1kNm for all lengths over 1200mm, 0.86kNm for 900mm and shorter

Joint Loads: The combination of A+B (shown below) $\leq 20\text{kN}$

Max vertical load on any nodal disk = 40kN



Code	Description	Weight
RSX23000	Rapidshor Ledger 3000mm	10.1 kg
RSX22400	Rapidshor Ledger 2400mm	8.35 kg
RSX21800	Rapidshor Ledger 1800mm	6.59 kg
RSX21500	Rapidshor Ledger 1500mm	5.71 kg
RSX21200	Rapidshor Ledger 1200mm	4.83 kg
RSX20900	Rapidshor Ledger 900mm	3.96 kg
RSX20600	Rapidshor Ledger 600mm	3.08 kg
RSX20300	Rapidshor Ledger 300mm	2.20 kg

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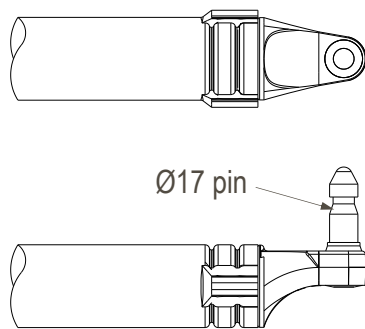
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Rapidshor Fixed Braces

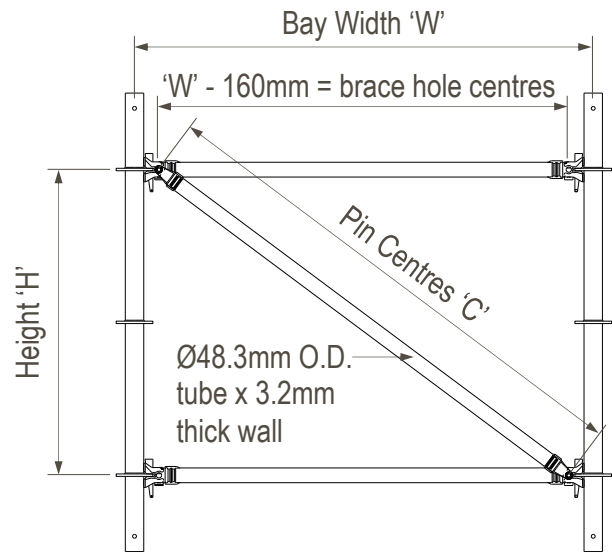
Comprising a 48.3mm O.D. hot-dipped galvanised steel tube with forged or cast steel end fittings that snap quickly into the Rapidshor Ledger ends, Rapidshor Fixed Braces are used to brace the main body of the shoring system.

Note: The pins on these braces will only fit into the 17mm dia holes in the ends of Rapidshor Ledgers. They will not fit directly to a fixed head or base.

For Allowable Working Loads see sheet 14



Typical End Fitting Detail



Code	Description (H x W)	Pin Centres (C)	End Colour	Weight
RSX31009	Rapidshor Brace 1000 x 900mm	1244mm	Self	4.84 kg
RSX31012	Rapidshor Brace 1000 x 1200mm	1443mm	Purple	5.43 kg
RSX31015	Rapidshor Brace 1000 x 1500mm *	1672mm	Blue	6.11 kg
RSX31018	Rapidshor Brace 1000 x 1800mm	1921mm	Red	7.98 kg
RSX31024	Rapidshor Brace 1000 x 2400mm	2453mm	White	9.88 kg
RSX31015	Rapidshor Brace 1500 x 900mm *	1672mm	Blue	6.11 kg
RSX31512	Rapidshor Brace 1500 x 1200mm	1825mm	Pink	6.55 kg
RSX31515	Rapidshor Brace 1500 x 1500mm	2011mm	Orange	8.31 kg
RSX31518	Rapidshor Brace 1500 x 1800mm	2223mm	Green	9.06 kg
RSX31524	Rapidshor Brace 1500 x 2400mm	2696mm	Brown	12.9 kg
RSX31530	Rapidshor Brace 1500 x 3000mm **	3212mm	Light Brown	15.4 kg
RSX32012	Rapidshor Brace 2000 x 1200mm	2254mm	Blue-Green	9.17 kg
RSX32015	Rapidshor Brace 2000 x 1500mm	2407mm	Yellow	7.51 kg
RSX32018	Rapidshor Brace 2000 x 1800mm	2586mm	Black	12.4 kg
RSX32024	Rapidshor Brace 2000 x 2400mm	3003mm	Bright Red	14.2 kg
RSX32030	Rapidshor Brace 2000 x 3000mm **	3474mm	Dark Brown	16.3 kg

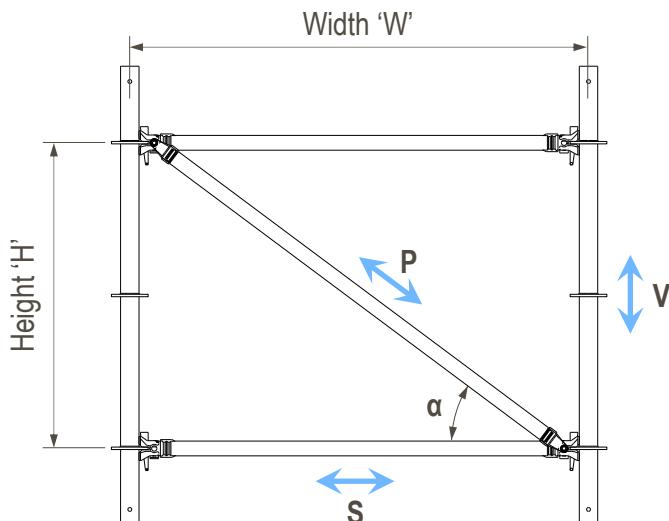
* These braces are the same item

** These braces are limited stock (for use with Alstair only)

Rapidshor Fixed Braces - Allowable Working Loads

Compression data is based on second order buckling analysis with a load eccentricity of 30mm plus L/500 initial bow imperfection in accordance with EN1993-1-1: Eurocode 3: Design of Steel Structures.

Code	Panel Size			Axial AWL		Bay Shear 'S' AWL			Induced Vertical	
	Width 'W' mm	Height 'H' mm	Pin Centres mm	Comp kN	Tension kN	Comp kN	Tension kN	Reversed Pair kN	Comp kN	Tension kN
RSX31009	900	1000	1244	14.9	16.25	8.86	9.67	17.72	11.98	13.06
RSX31015		1500	1673	12.9	16.25	5.71	7.19	11.42	11.57	14.57
RSX31012	1200	1000	1443	14.0	16.25	10.09	11.71	20.18	9.70	11.26
RSX31512		1500	1825	12.1	16.25	6.89	9.26	13.78	9.94	13.35
RSX32012		2000	2254	12.1	16.25	5.58	7.50	11.16	10.74	14.42
RSX31015	1500	1000	1672	12.9	16.25	10.34	13.02	20.68	7.71	9.72
RSX31515		1500	2011	13.5	16.25	8.99	10.83	17.98	10.07	12.12
RSX32015		2000	2407	9.6	16.25	5.34	9.04	10.68	7.98	13.50
RSX31018	1800	1000	1921	13.9	16.25	11.87	13.87	23.74	7.24	8.46
RSX31518		1500	2223	12.4	16.25	9.15	11.99	18.3	8.37	10.97
RSX32018		2000	2586	12.8	16.25	8.12	10.30	16.24	9.90	12.57
RSX31024	2400	1000	2453	13.5	16.25	12.33	14.84	24.66	5.50	6.63
RSX31524		1500	2696	12.2	16.25	10.14	13.50	20.28	6.79	9.04
RSX32024		2000	3003	10.8	16.25	8.06	12.12	16.12	7.19	10.82
RSX31530	3000	1000	3011	10.7	16.25	10.09	15.32	20.18	3.55	5.40
RSX31530		1500	3212	9.9	16.25	8.75	14.37	17.5	4.62	7.59
RSX32030		2000	3474	9.0	16.25	7.38	13.32	14.76	7.38	9.31



Allowable Axial Load P (kN) = Specified above
 Induced Vertical Load V (kN) = P sin α
 Bay Shear S (kN) = P cos α

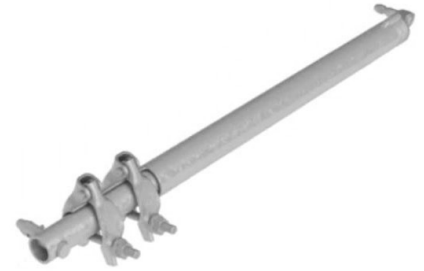
RAPIDSHOR

80kN STEEL SHORING SYSTEM

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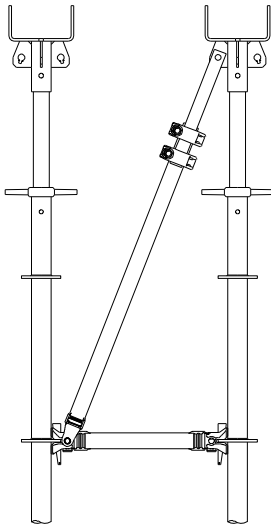
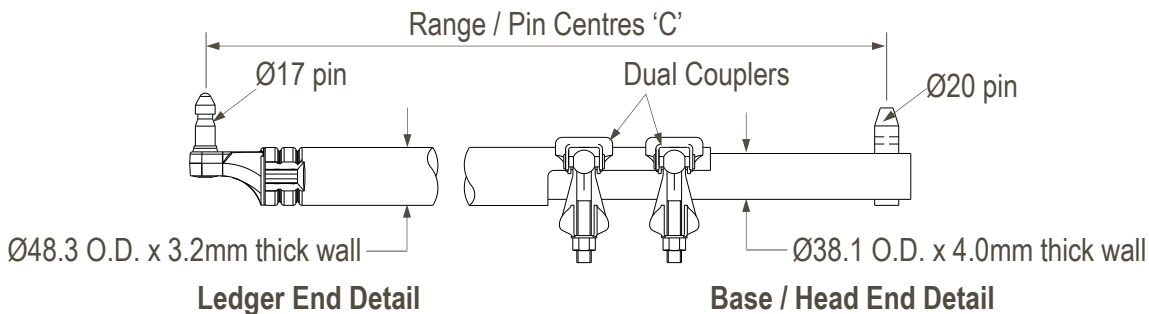
Rapidshor Adjustable Braces

A galvanised telescopic unit, secured to length using twin integral couplers and used where required to brace base and head jacks. The outer tube incorporates the same end fitting as the fixed end braces and connects to the ledger ends. The inner incorporates a key-pin that engages with the key-hole lugs on the U-Head or Base Plate. Engage the key-pin into the head/base unit first and rotate the brace until the connection with the Ledger end can be made.



AWL = 6.25kN in tension, use graph on page 16 for compressive loads

Tighten dual couplers to a torque of 55Nm (40lbf)



IMPORTANT!

Adjustable Jack Braces should not be used in 600mm wide bays when the ledger is at 2nd nodal disk position (750mm from end of the Standard) and the head / base jack extension exceeds 400mm.

In this situation not only are the braces becoming ineffective as a result of their steep angle, but the brace angle approaches that of the key hole slot in the Head/Base and there is a risk of accidental disengagement of components.

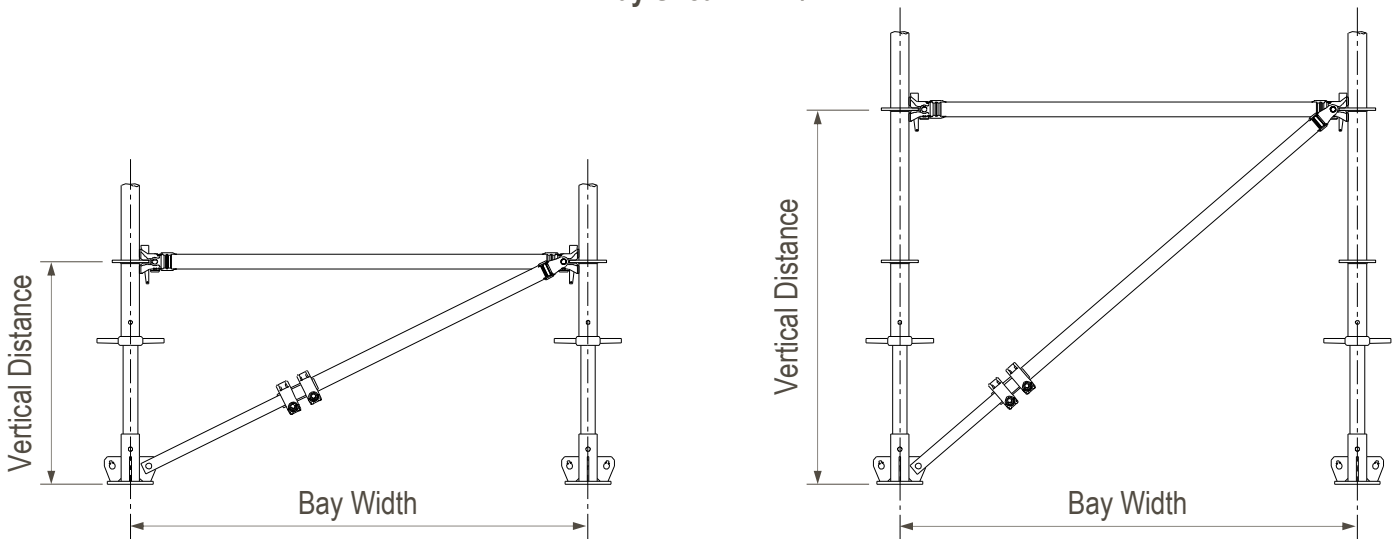
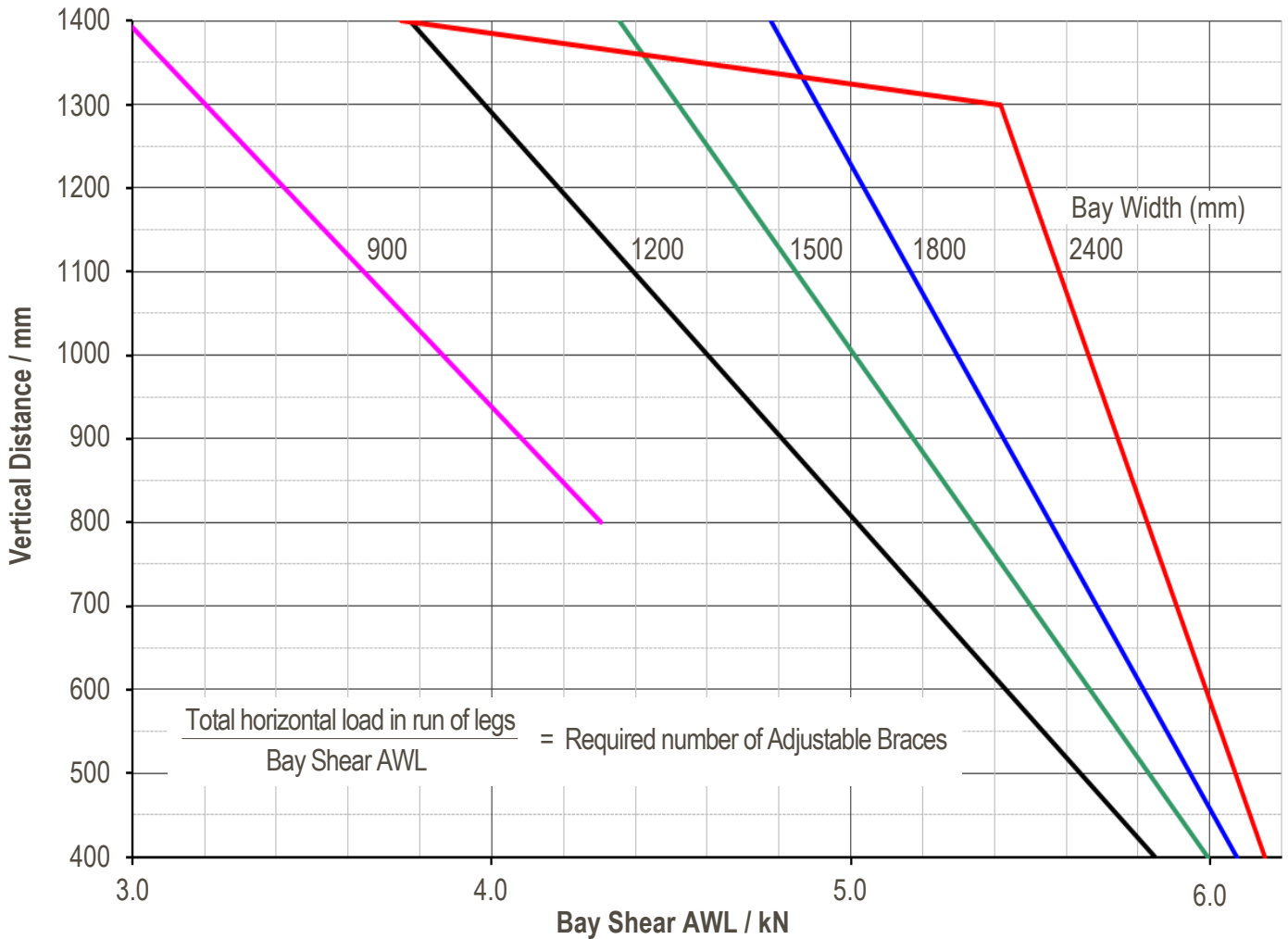
Code	Description	Range / Pin Centres (C)	Weight
RSX30001	Rapidshor Brace - Long Adjustable	1530 - 2660 mm	11.4 kg
RSX30002	Rapidshor Brace - Short Adjustable	1085 - 1770 mm	8.09 kg
RSX30003	Rapidshor Brace - Super Short Adjustable	840 - 1280 mm	6.42 kg

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Rapidshor Adjustable Braces - Allowable Working Loads

The Bay Shear AWL is used to determine the number of Rapidshor Adjustable Braces required for a run of falsework legs. The diagrams below show two possible base jack bracing configurations. This chart also applies to similar configurations of head jack bracing.



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80kN STEEL SHORING SYSTEM

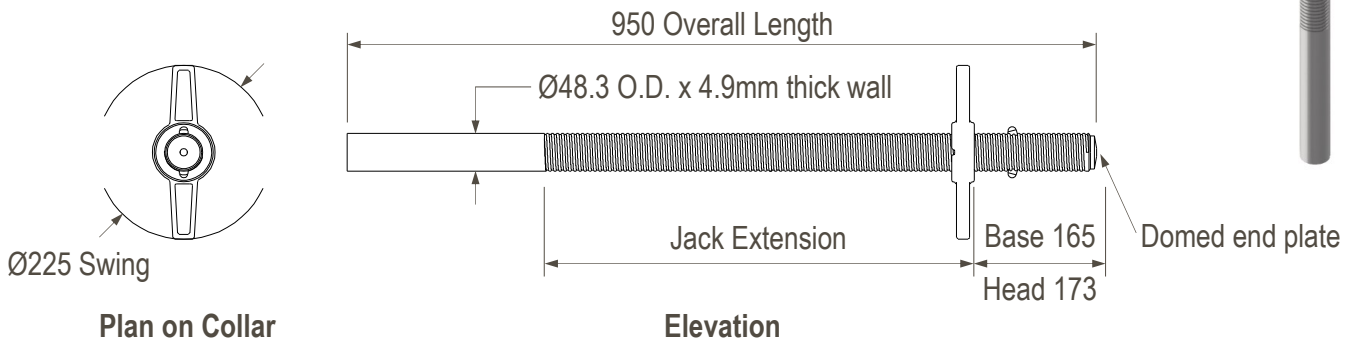
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Rapidshor Jack 25-540mm (RSX10004) weight 5.56kg

A hollow universal jack containing captive spring buttons facilitating connection to all Rapidshor Heads and Bases and preventing the unit from rotating during adjustment.

Note: Captive spring buttons do not provide sufficient fixity for crane handled applications - see sheet 57 for guidance on crane handling Rapidshor .

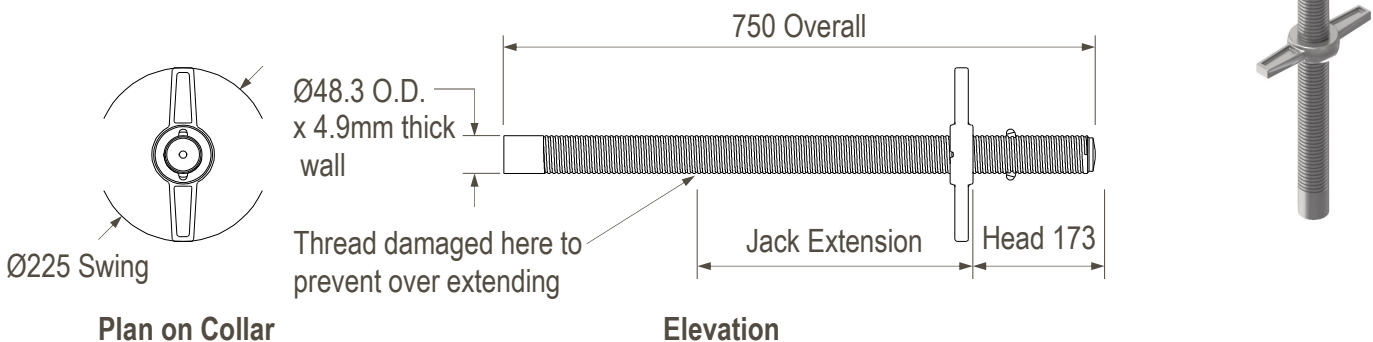
AWL = 80kN



Rapidshor Short Jack 340mm (RSU10340) weight 5.03kg

A cut down hollow universal jack used with 675mm Standards and Socket Bases in restricted propping height applications - see sheet 10 for details.

AWL = 80kN



RAPIDSHOR

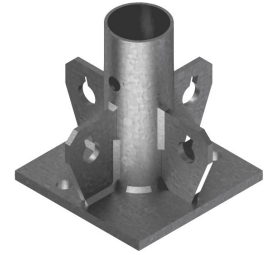
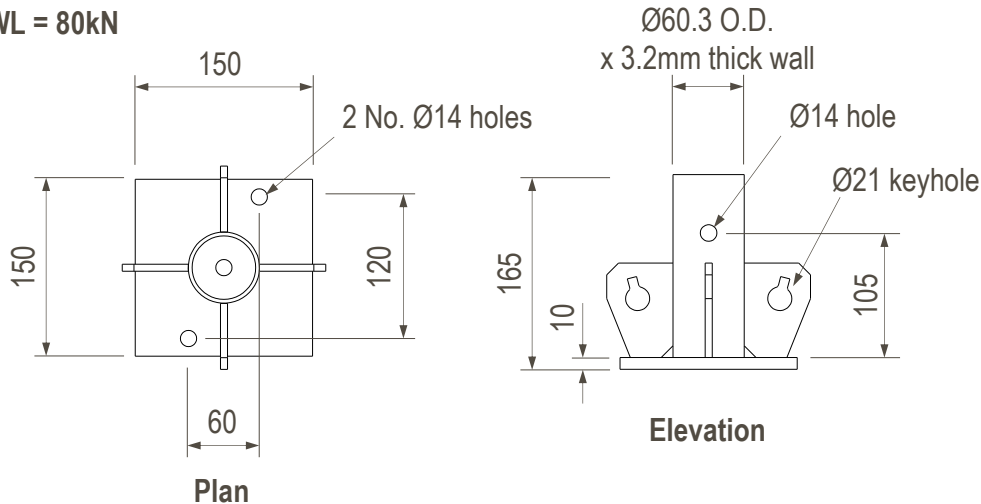
80kN STEEL SHORING SYSTEM

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Rapidshor Base 165mm (RSX10002) weight 3.09kg

Used as either a fixed base with the Base Sleeve 216mm, or an adjustable base when used with a Rapidshor Jack. When used with a Rapidshor Jack, the Rapidshor Base can rotate up to 2.5 deg in any direction.

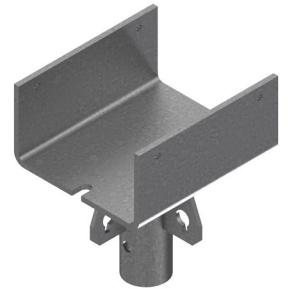
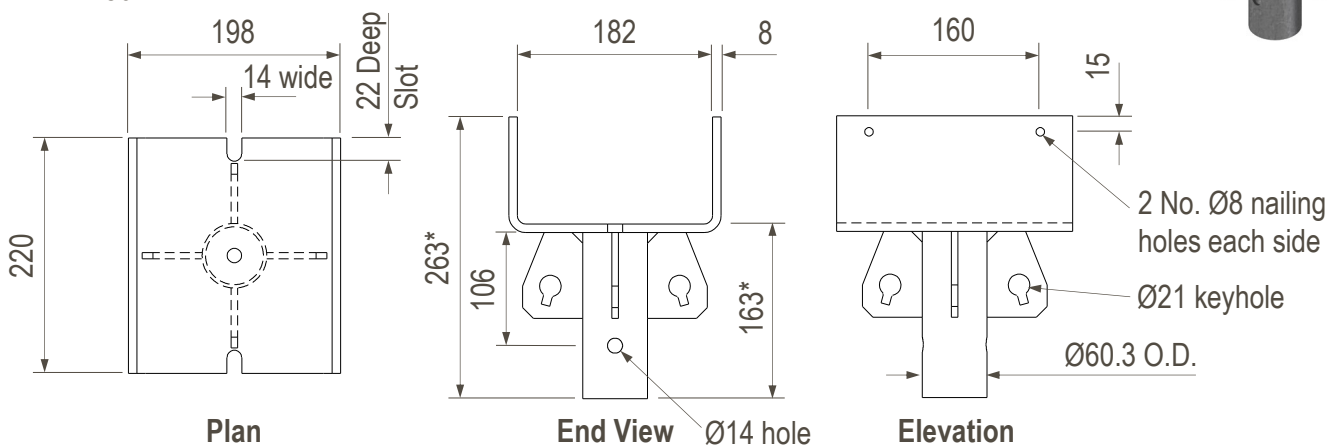
AWL = 80kN



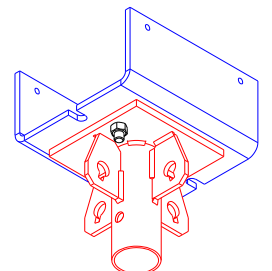
Rapidshor Brace U-Head 182mm Wide (RSX10003) weight 8.47kg

Used as either a fixed head with the Base Sleeve 216mm, or an adjustable head when used with a Rapidshor Jack. When used with a Rapidshor Jack, the Rapidshor head can rotate up to 2.5 deg in any direction.

AWL = 80kN



Note: There is a variant of this U-Head in the Fleet with the same item code made from a Rapidshor Base 165mm bolted to a Rapidshor U-Plate 8 thk x 182mm Wide - see sheet 20. For this head the dimensions marked thus * should read 173mm & 273mm respectively. Care should be taken not to mix these head units on schemes which have no head jacks.



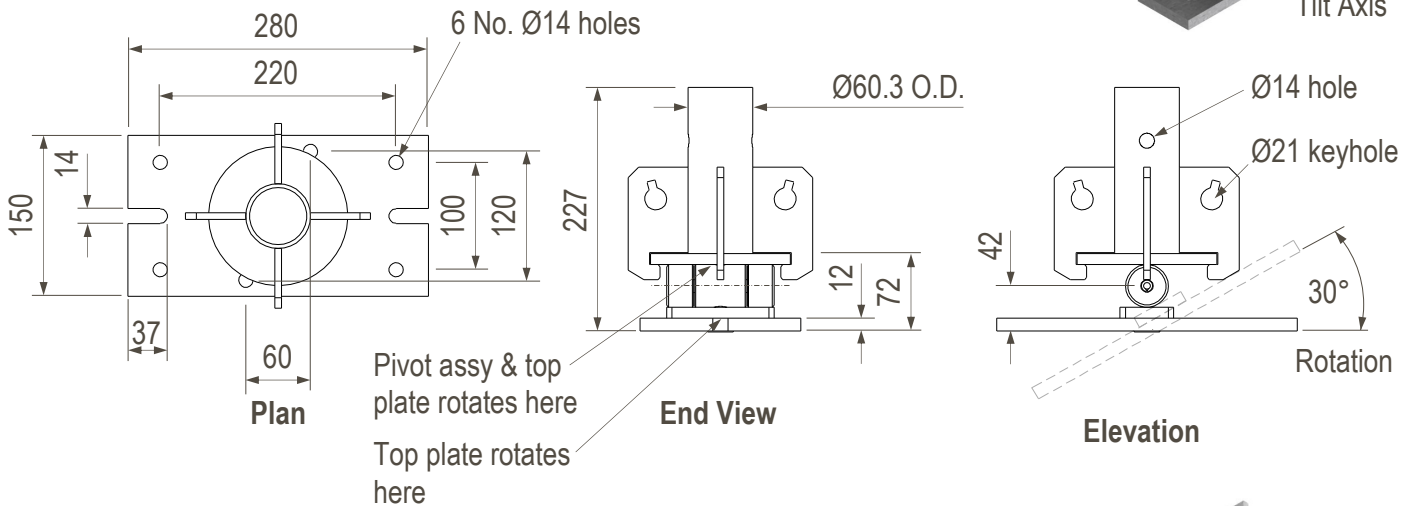
RAPIDSHOR

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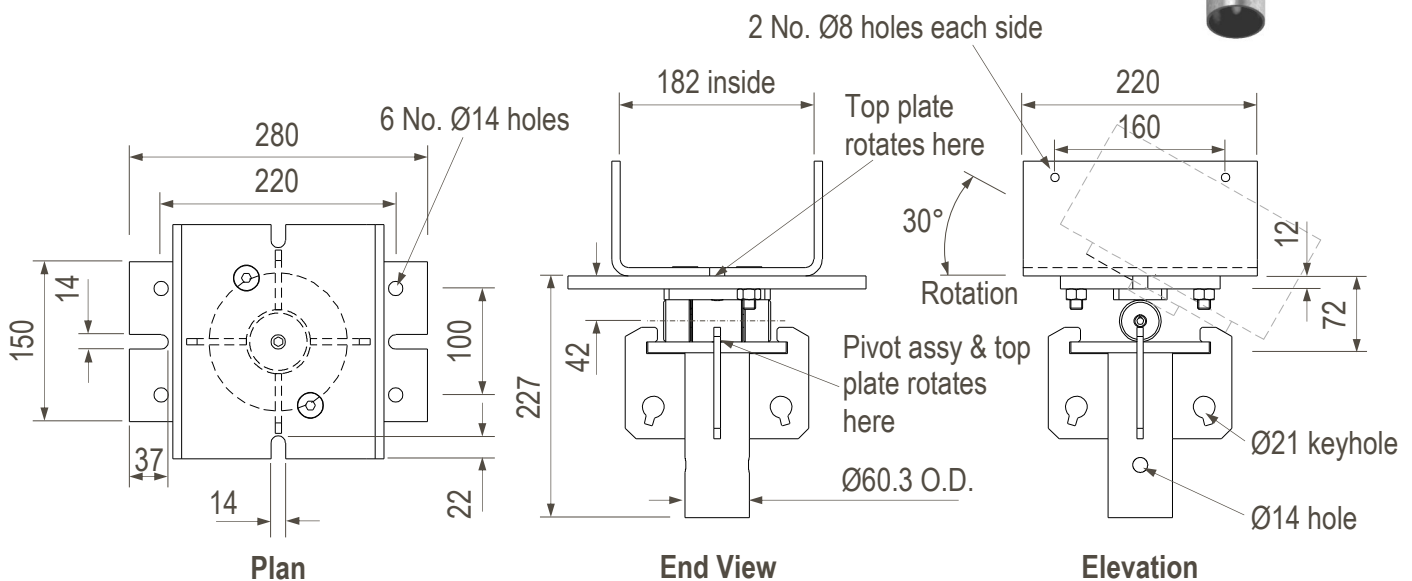
Rapidshor Tilt Base (RSX10006) weight 7.68kg

Normally used with a Rapidshor Jack, but can be used with a Base Sleeve 216mm to make a fixed tilt base if required. Rotates up to 30 deg using the tilt axis and 2.5 deg in any other direction. Ensure that the tilt axis is placed perpendicular to the line of the greatest slope.



Rapidshor Tilt Head 182mm Wide (RSX10007) weight 13.1kg

Normally used with a Rapidshor Jack, but can be used with a Base Sleeve 216mm to make a fixed tilt head if required. Rotates up to 30 deg using the tilt axis and 2.5 deg in any other direction. Ensure that the tilt axis is placed perpendicular to the line of the greatest slope.



RAPIDSHOR

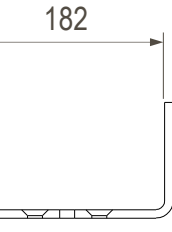
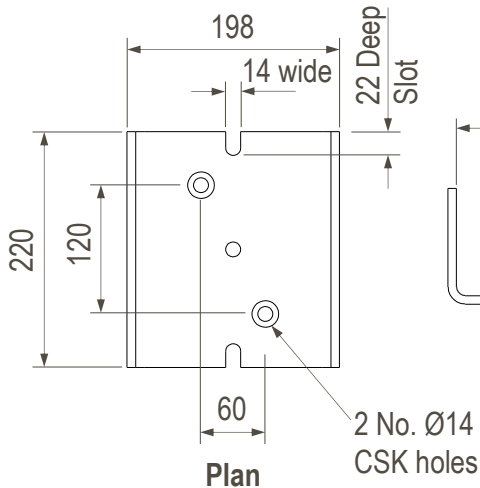
80kN STEEL SHORING SYSTEM

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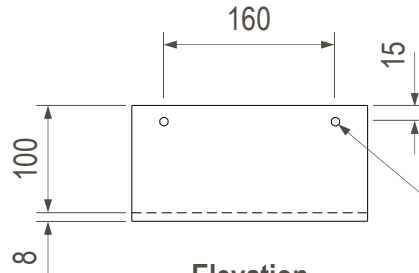
Rapidshor U-Plate 8 thk x 182mm Wide (RSX10008) weight 5.26kg

Bolts to Rapidshor Base 165mm to make a Rapidshor Brace U-Head 182mm Wide (RSX10003).

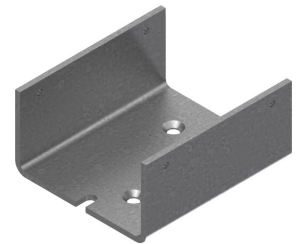
AWL = 80kN



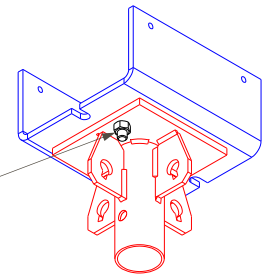
End View



Elevation



2 No. Ø8 nailing holes each side

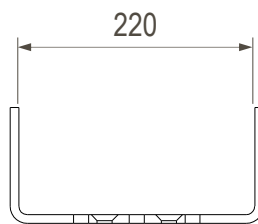
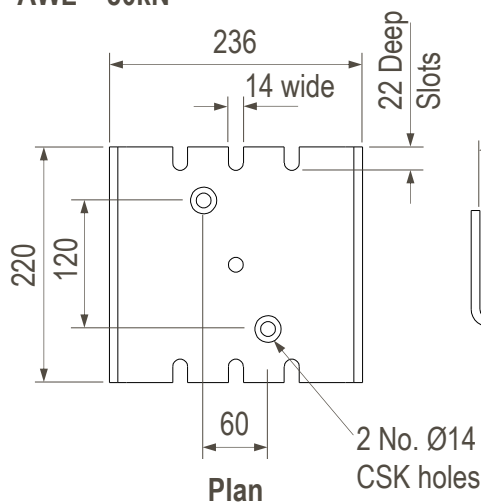


Secure Rapidshor Base to U-Plate using 2 No. M12x40 Bolts gr 8.8 BZP CSK & M12 Hexagon Nuts gr.8 BZP (BNX12001 + BNU12001)

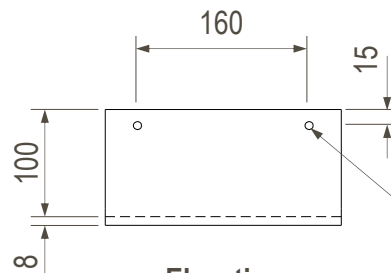
Rapidshor U-Plate 8 thk x 220mm Wide (RSX10001) weight 5.72kg

Bolts to Rapidshor bases to make a wide head where lapped or double Albeams are required. Refer to sheet 56 for guidance on lapped primary beams.

AWL = 80kN



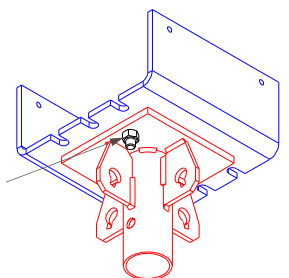
End View



Elevation



2 No. Ø8 nailing holes each side



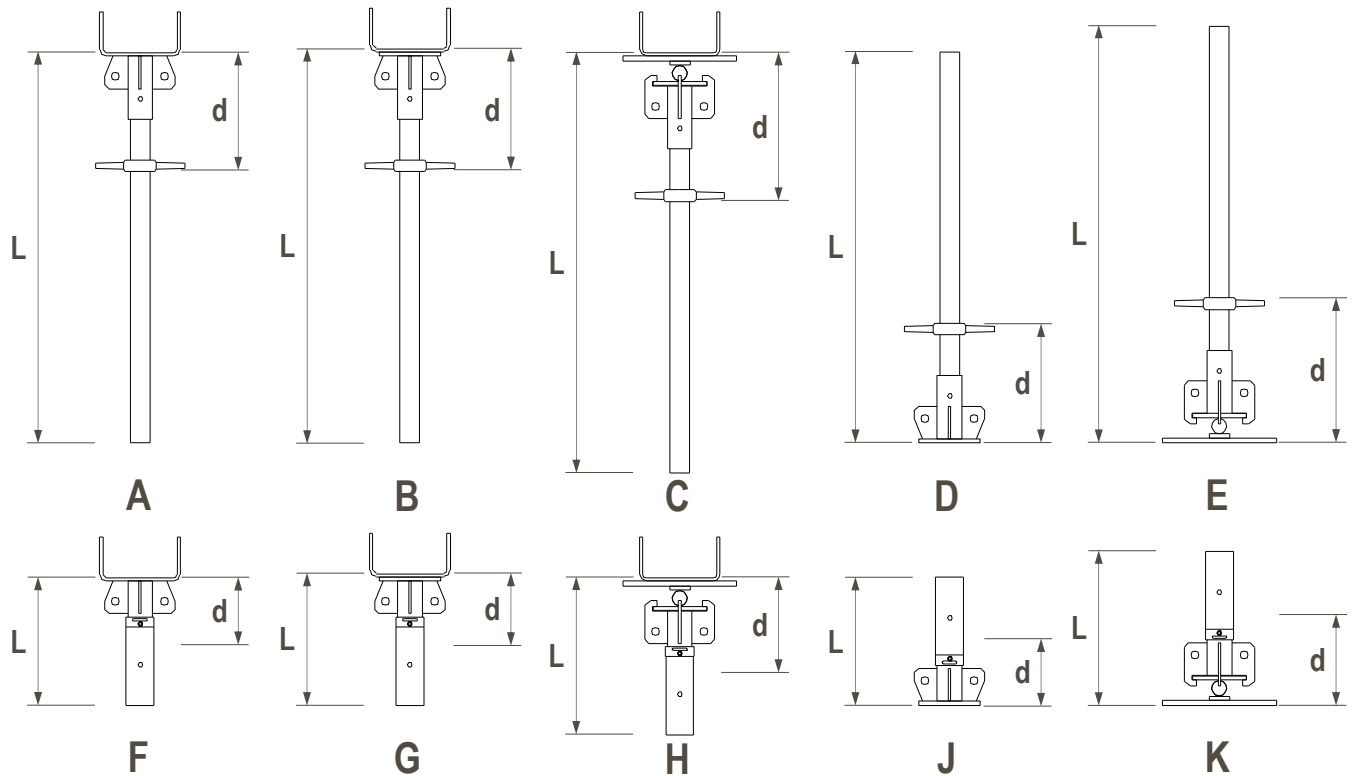
Secure Rapidshor Base to U-Plate using 2 No. M12x40 Bolts gr 8.8 BZP CSK & M12 Hexagon Nuts gr.8 BZP (BNX12001 + BNU12001)

RAPIDSHOR

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Base and Head Dimensions



Ref	Codes	Description	O/A Length 'L'	Max Load*	Open Dim 'd' max	Closed Dim 'd' min
A	RSX10003 & RSX10004	Rapidshor Brace U-Head 8 thk x 182mm Wide & Rapidshor Jack 25-540mm	958 mm	80kN	703mm	188 mm
B	RSX10003 & RSX10004	Rapidshor Base 165mm, 8mm U-Plate x 182 Wide & Rapidshor Jack 25-540mm	968 mm	80kN	713 mm	198 mm
C	RSX10007 & RSX10004	Rapidshor Tilt Head 182mm Wide & Rapidshor Jack 25-540mm	1030 mm	80kN	775 mm	260 mm
D	RSX10002 & RSX10004	Rapidshor Base 165mm & Rapidshor Jack 25-540mm	960 mm	80kN	705 mm	190 mm
E	RSX10006 & RSX10004	Rapidshor Tilt Base & Rapidshor Jack 25-540mm	1022 mm	80kN	767 mm	252 mm
F	RSX10003 & RSX10010	Rapidshor Brace U-Head 8 thk x 182mm Wide & Rapidshor Base Sleeve 216mm	313 mm	80kN	163 mm	163 mm
G	RSX10003 & RSX10010	Rapidshor Base 165mm, 8mm U-Plate x 182 Wide & Rapidshor Base Sleeve 216mm	323 mm	80kN	173 mm	173 mm
H	RSX10007 & RSX10010	Rapidshor Tilt Head 182mm Wide & Rapidshor Base Sleeve 216mm	384 mm	80kN	235 mm	235 mm
J	RSX10002 & RSX10010	Rapidshor Base 165mm & Rapidshor Base Sleeve 216mm	315 mm	80kN	165 mm	165 mm
K	RSX10006 & RSX10010	Rapidshor Tilt Base & Rapidshor Base Sleeve 216mm	376 mm	80kN	227 mm	227 mm

Stated dimensions are 'fully open' & 'fully closed'. They do not include for any additional striking.

* Load capacity of the whole structure depends on a combination of factors - refer to sheets 47-50

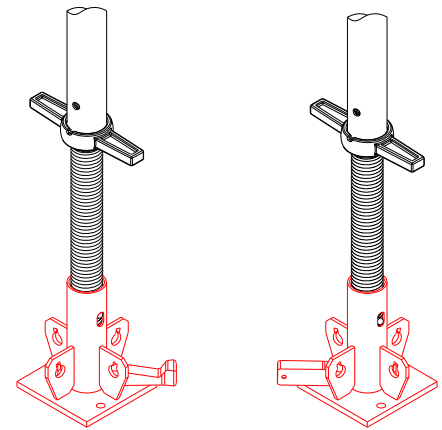
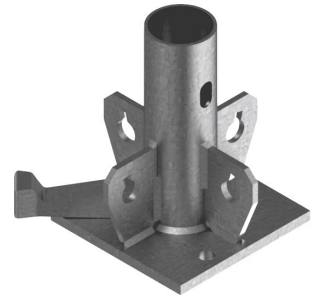
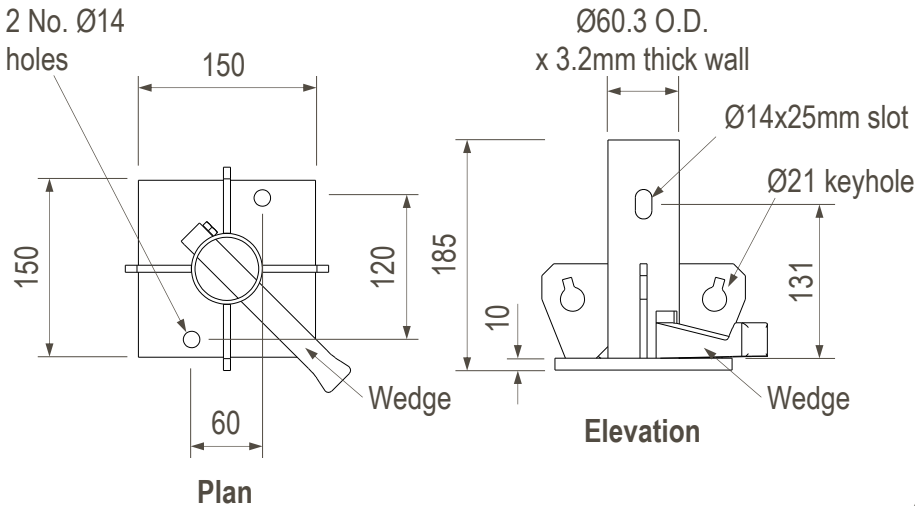
RAPIDSHOR

80kN STEEL SHORING SYSTEM

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Rapidshor Wedge Base (RSM10041) weight 5.50kg

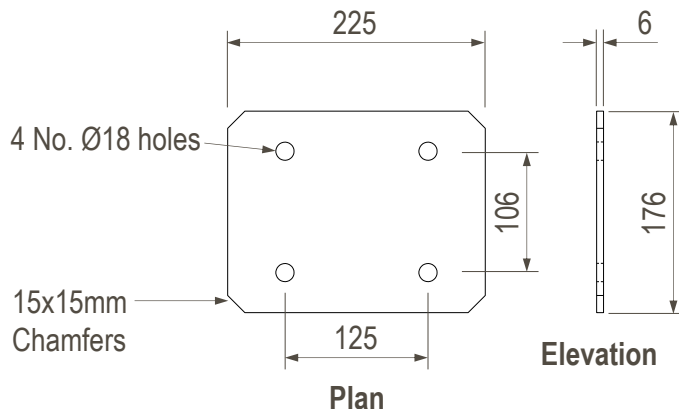
Used with the Rapidshor Jack 25-540mm (RSX10004) to quickly release the load from the Rapidshor Standard prior to winding down the jack collar. Load release is achieved by hitting the wedge with a sledgehammer which enables the leg to drop by 10mm. **AWL = 80kN**



The release of load is sudden and may be complete. This unit should not be specified in applications where incremental striking is required as total removal of load will likely result in overloading of un-struck areas of shoring.

Superslim Neoprene Pad 6mm (SSX10043) weight 0.29kg

Placed between a Rapidshor Tilt Head and Superslim primary beam to prevent the components sliding past each other for soffit angles between 5 and 20 degrees. (30 degrees with attention given to surface preparation)



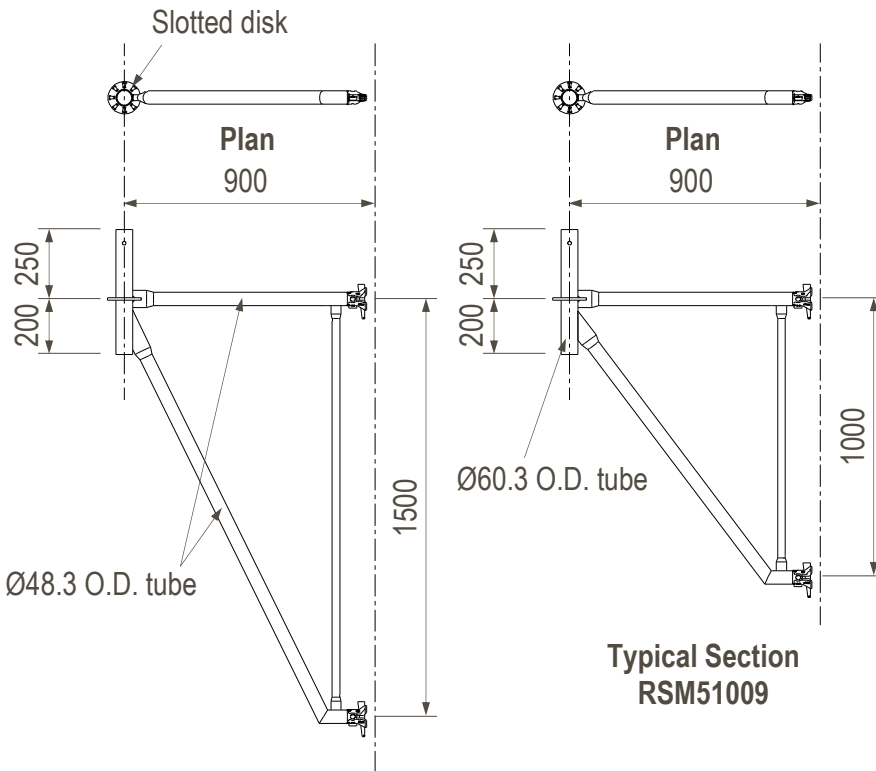
For guidance on designing sloping formwork/falsework refer to RMD Kwikform TI Sheet 03/10 - Sloping Formwork.

RAPIDSHOR

80kN STEEL SHORING SYSTEM

Rapidshor Fixed Cantilever Brackets

Used when a light duty support is required beyond the edge(s) of the main falsework / shoring structure. The cantilever end of the bracket is fitted with a 60.3 O.D. tube that accepts either a Rapidshor Jack or a Rapidshor Joint Sleeve and Sleeve Clip.



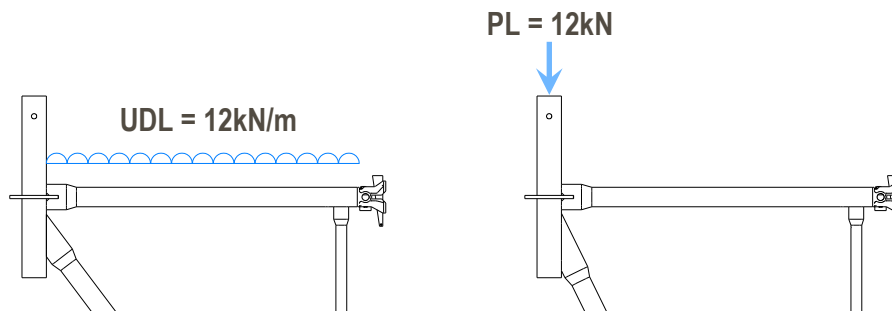
The spacing of the Rapidshor Ledgers in the connected falsework/shoring must match the height of the Cantilever Bracket so as not to induce a bending moment in the Rapidshor Standards

Typical Section
RSM51509

Typical Section
RSM51009

Code	Description	Weight
RSM51509	Rapidshor Fixed Cantilever Bracket 1500x900	15.9 kg
RSM51009	Rapidshor Fixed Cantilever Bracket 1000x900	13.4 kg

The Allowable Working Loads are shown below. These loads should not be combined (i.e. use either a UDL across the horizontal member or a point load at the vertical member).



Note: Always connect Cantilever Brackets to others (or to a Rapidshor Ledger Wall Connector) using a Rapidshor Ledger. Assess plan bracing requirements on a case by case basis.

RAPIDSHOR

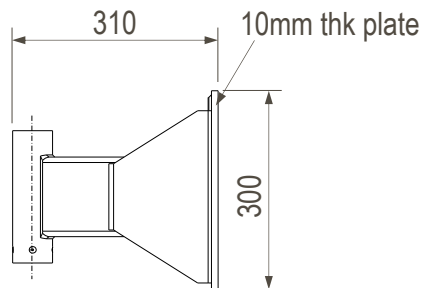
80kN STEEL SHORING SYSTEM

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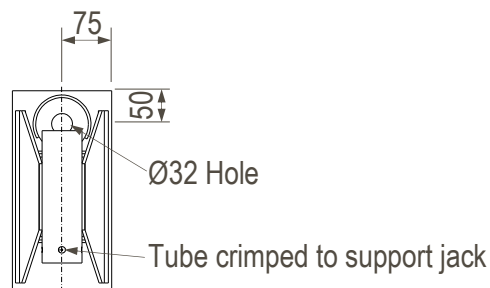
Rapidshor Shear Wall Bracket (RSX10025) weight 9.90kg

Used in conjunction with a Rapidshor Jack 25-540mm (RSX10004) and Rapidshor Brace U-Head 182mm (RSX10003) predominantly in culvert roof construction or where it is not possible to sit a falsework leg at ground level adjacent to a wall or column. (See below for application details).

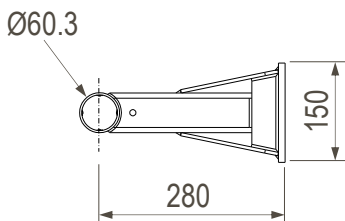
Max AWL = 80kN plus 2.5% lateral load to match the performance of the un-braced Rapidshor Jack when the Ascent Anchor Cone is surrounded by 40N/mm² concrete.



Side Elevation

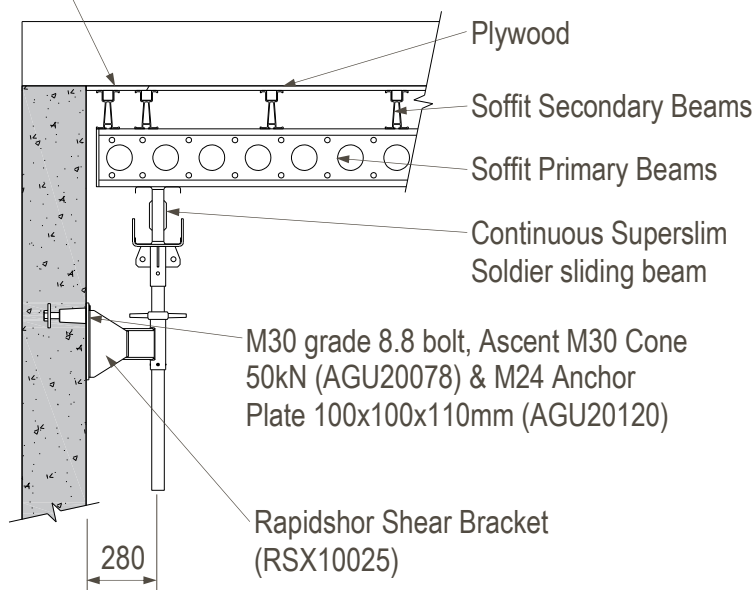


Front Elevation



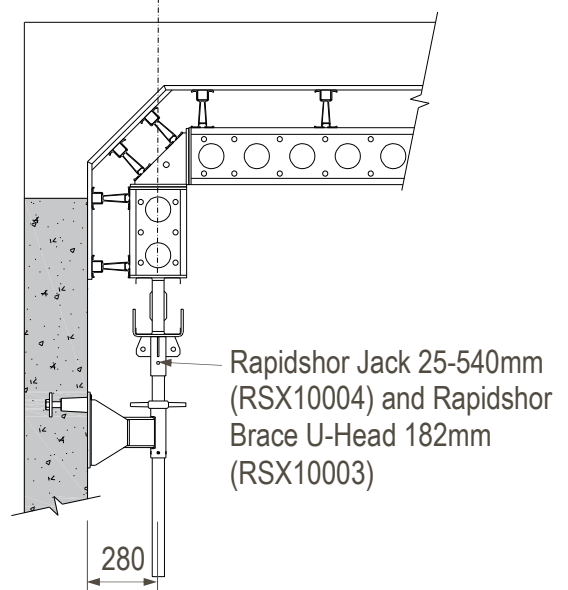
Plan

Stripping piece



Application Type 1

Vertical Soldier



Application Type 2

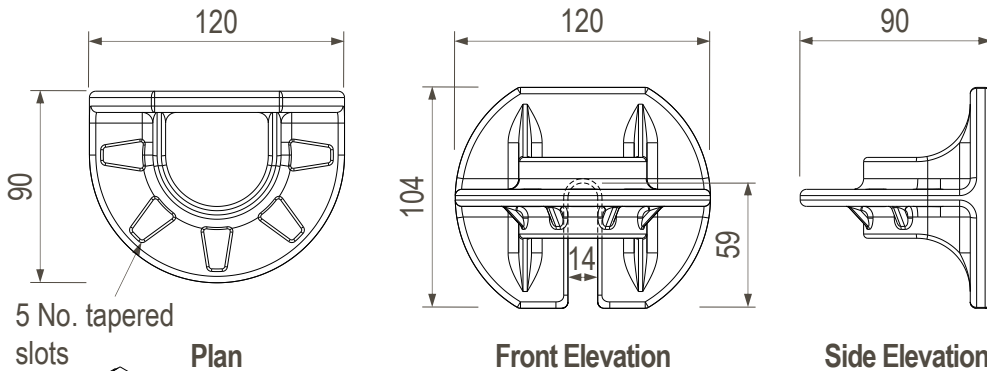
RAPIDSHOR

80kN STEEL SHORING SYSTEM

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Rapidshor Ledger Wall Connector (RSX10026) weight 1.31kg

Use to provide an attachment point to a concrete or steel structure for a Rapidshor Ledger. Secure with a single Excalibur Screwbolt 12x100 (FAU10051) or similar for attachment to concrete or M12 grade 8.8 bolt with a washer under the head to a steel structure. **AWL = 10kN** in any direction (AWL of fixing may limit).

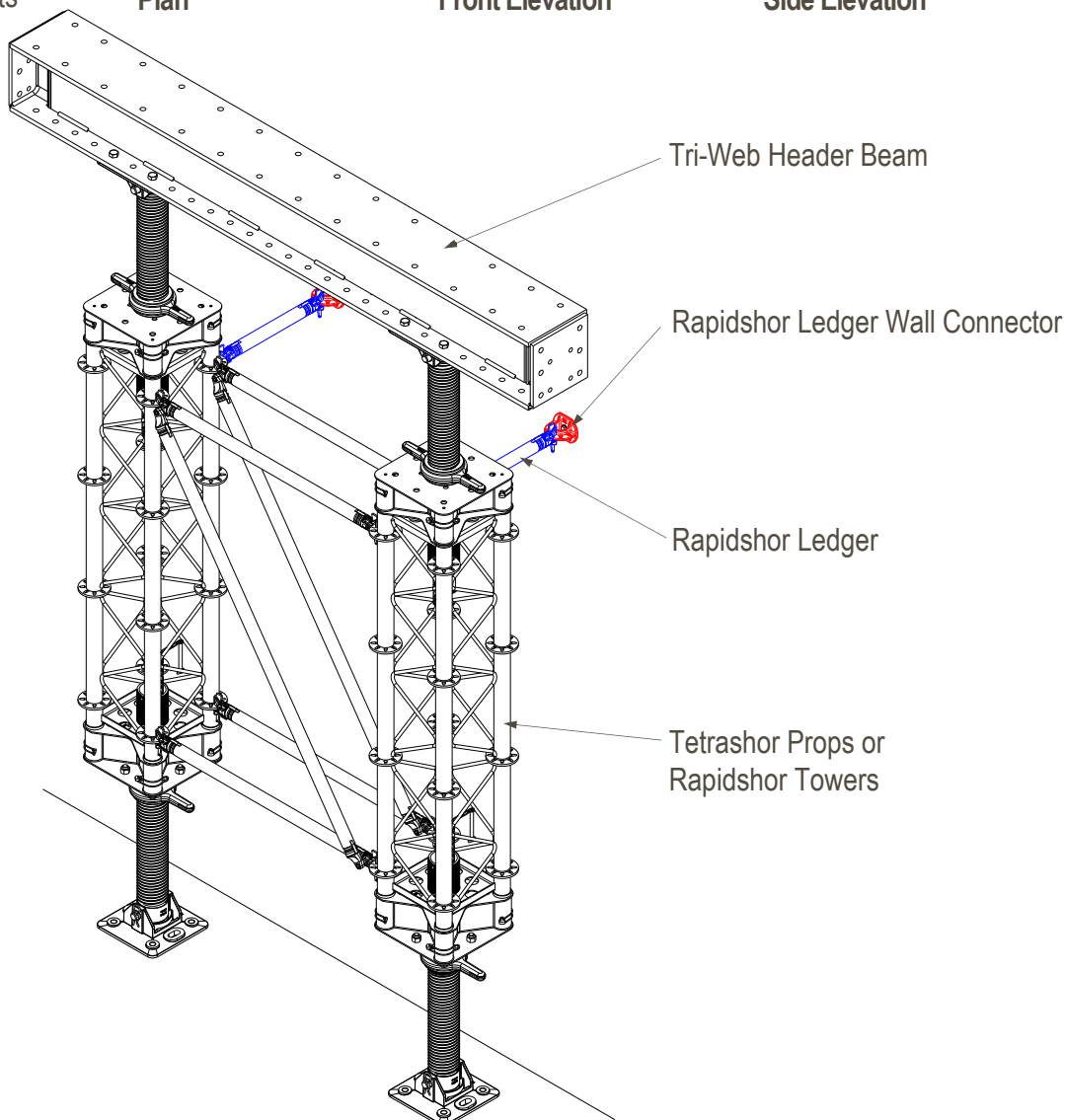


5 No. tapered slots

Plan

Front Elevation

Side Elevation



RAPIDSHOR

80kN STEEL SHORING SYSTEM

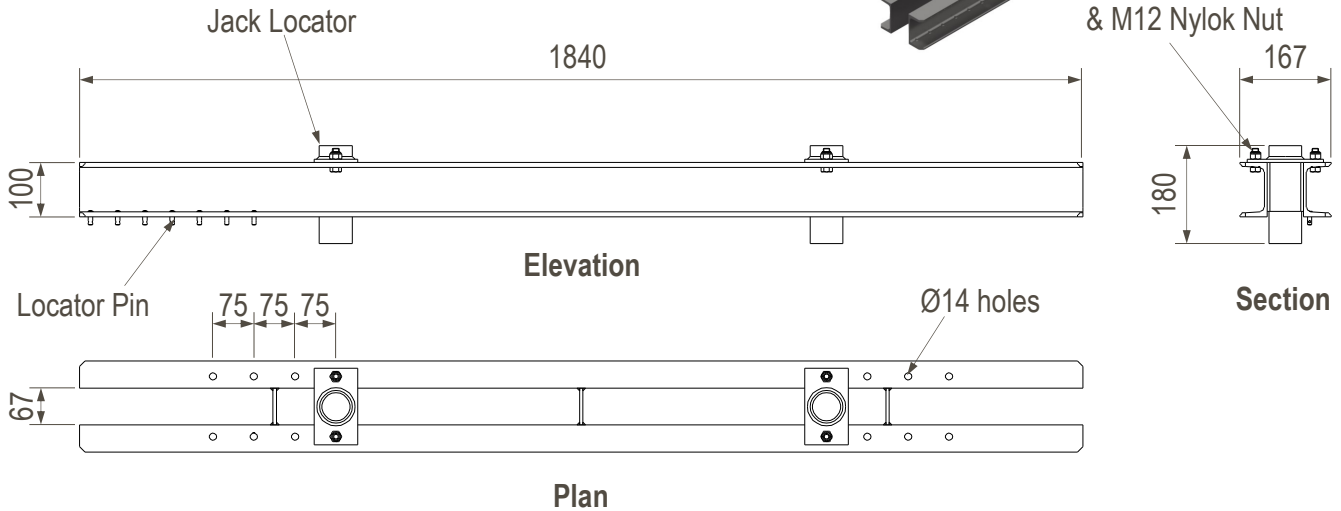
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Drop Beam Support (RSX10020) weight 34.6kg

Fabricated from twin parallel flanged steel channels with 60.3mm O.D Jack Locators bolted onto the flanges, the Dropbeam Support provides a simple and economic way of constructing drop-beam members without the need for additional Rapidshor Standards.

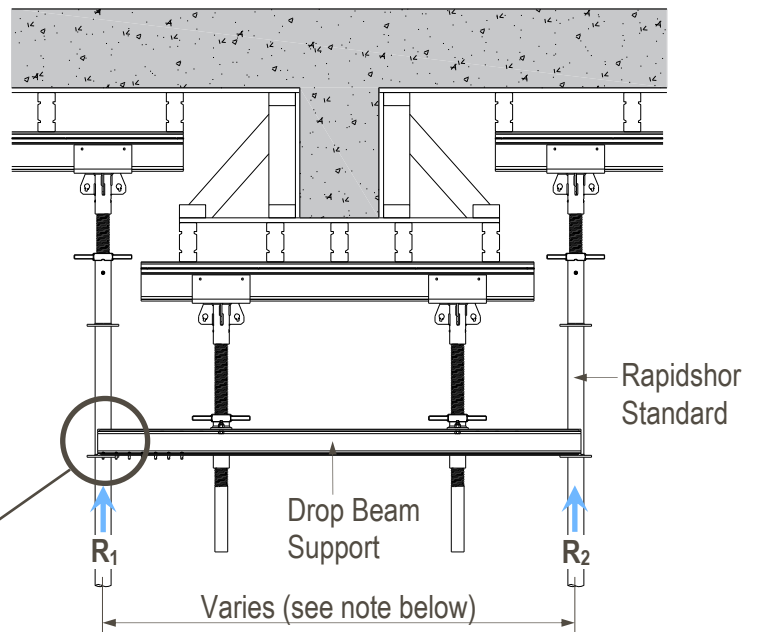


M12x35 Bolts gr8.8 BZP
& M12 Nylok Nut



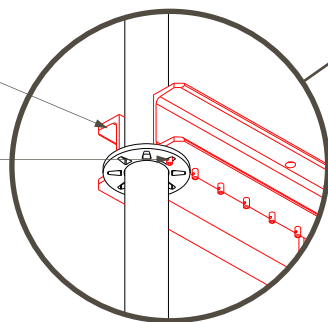
Maximum AWL at each support = 30kN

Section Properties (Twin Channel)	
Area	21.2 cm ²
I _{xx}	347 cm ⁴
I _{yy}	587 cm ⁴
Z _{xx}	69.4 cm ³
Z _{yy}	70.3 cm ³
EI _{xx}	729 kNm ²
Depth	100 mm
Width	50 mm
Web Thickness	4.2 mm
Flange Thickness	6.7mm
Root Radius	8 mm
Mean Self weight for Analysis	0.16 kN/m run*



Drop Beam Support

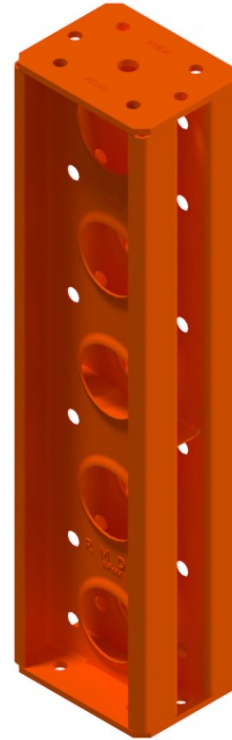
Drop Beam Support Locator Pin engaged in nodal disk on Rapidshor Standard



If the Drop Beam Support is to be fixed onto nodal disks other than the topmost then the minimum spacing between standards is 1550mm c/c, with 5mm tolerance, due to stiffener positions. If the unit can be lowered horizontally onto the topmost disks then the minimum spacing is 1200mm c/c, with 10mm tolerance.

Superslim Soldiers

Used as the primary beam in falsework applications.

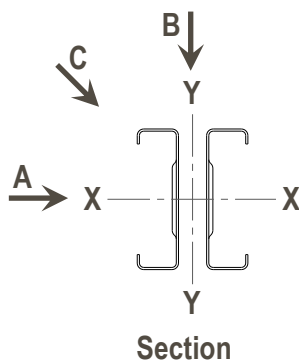


Superslim Soldier Properties	
Area: Gross	26.06 cm ²
Area: Nett	19.64 cm ²
I xx	1916 cm ⁴
I yy	658 cm ⁴
r xx	9.69 cm
r yy	5.70 cm
Z xx	161 cm ³
Z yy	61 cm ³
EI xx	4020 kNm ²
EI yy	300 kNm ²
GAxx	17350 kN
M max x	40 kNm
M max y	6.24 kNm
Max Joint Moment (4 M16 bolts)	12 kNm
Max Joint Moment (6 M16 bolts)	18 kNm
Max Joint Moment (stiffeners see sheet 29)	20 kNm
Max Joint Tension (4 M16 bolts)	100 kN
Max Joint Tension (6 M16 bolts)	140 kN
Max Joint Tension (4 M16 bolts and stiffeners)	150 kN
Mean compressive yield stress	370 N/mm ²
Mean Self weight for Analysis	0.235 kN/m run*

* Self weight varies depending on makeup / length - see below right

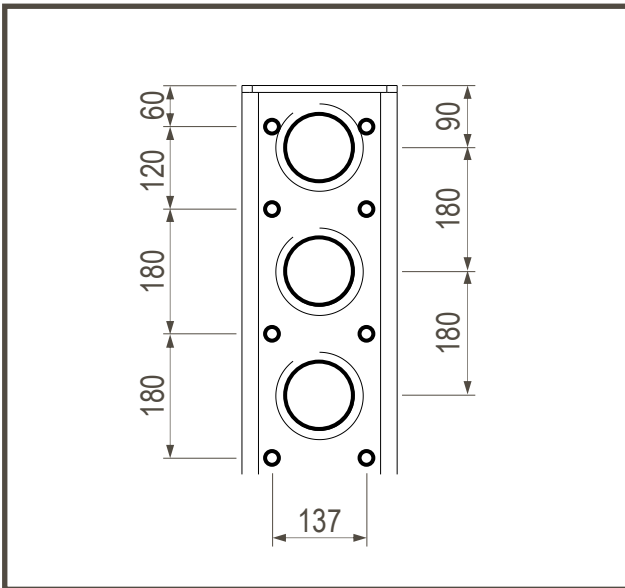
Effective area (Ae) for wind calculation purposes

Direction A	0.177 m ² /m
Direction B	0.130 m ² /m
Direction C	0.286 m ² /m



Code	Description	Weight
SSX13600	Superslim Soldier 3600mm	72.2 kg
SSX12700	Superslim Soldier 2700mm	55.4 kg
SSX11800	Superslim Soldier 1800mm	38.8 kg
SSX10900	Superslim Soldier 900mm	22.0 kg
SSX10720	Superslim Soldier 720mm	18.7 kg
SSX10540	Superslim Soldier 540mm	15.2 kg
SSX10360	Superslim Soldier 360mm	12.0 kg
SSU10035	Superslim Soldier 360mm H/Shoe	11.7 kg
SSU10045	Superslim Soldier 360mm O/E	11.5 kg
SSX10090	Superslim Soldier 90mm	7.3 kg
SSX10040	Superslim End Plate 10mm	2.9 kg

Punchings and Geometry

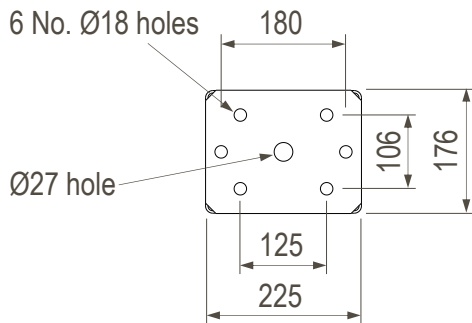


Key:

- 100mm dia porthole max bearing in hole pair 65kN
- 21mm dia max bearing in hole pair when used with:
 - M20 x 90 Bolt/Nut gr 8.8 (BNX20030+BNU20001) = 45kN
 - M20 x 100 Bolt/Nut gr 8.8 (BNU20015+BNU20001) = 59kN
 - Superslim 19mm Pin & R-clip (SSX10046) = 47kN

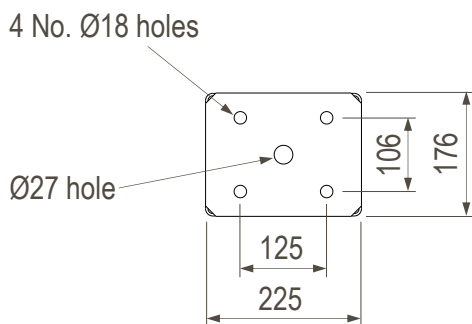
The allowable bearing load in this hole may be increased to 100kN by reinforcing the hole, refer to Head Technical Office for details.

Note: The arrangement of holes in the end plates of hire fleet soldiers vary - see below. If post 1997 version soldiers are required please specify '7 hole end plate soldiers'.



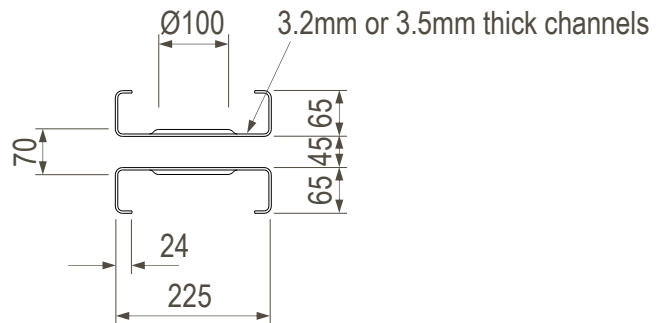
Detail on End Plate

10mm thick - Post 1994 version

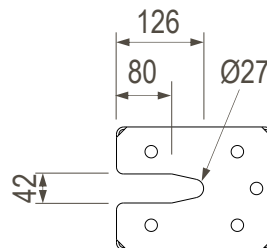


Detail on End Plate

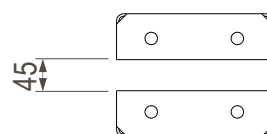
8mm thick - Pre 1994 version



Typical Section

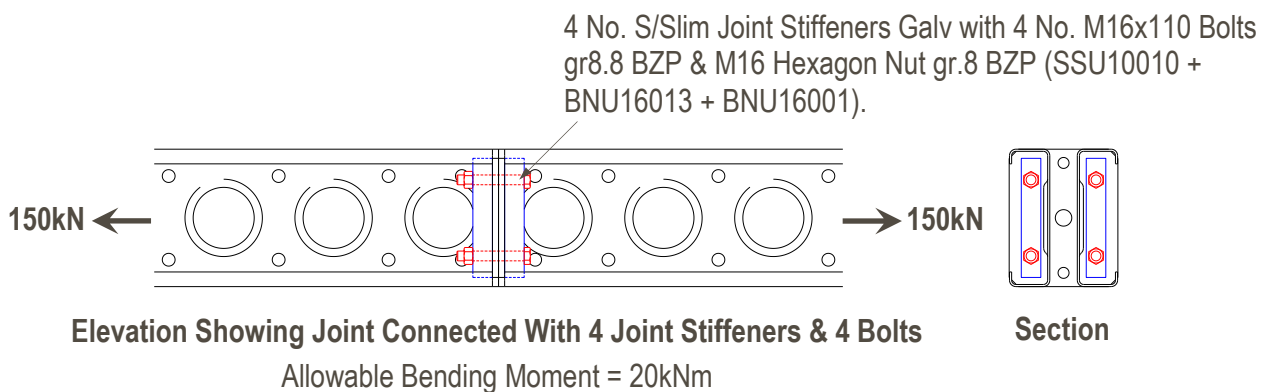
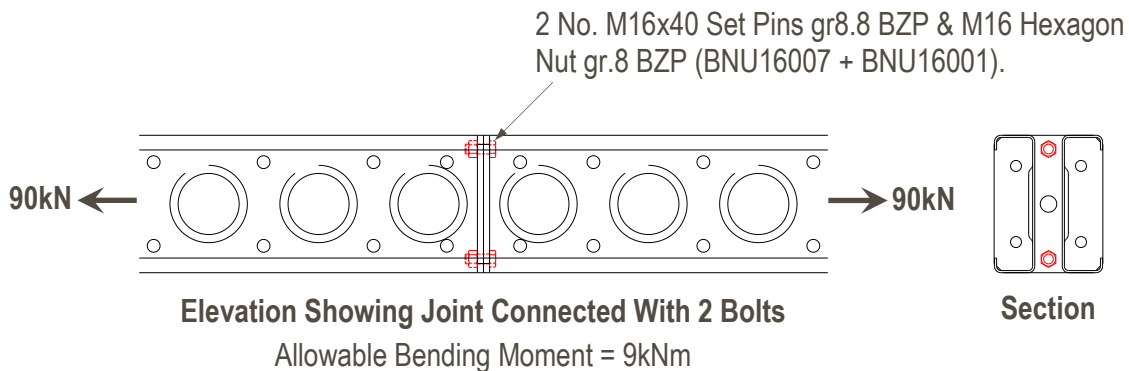
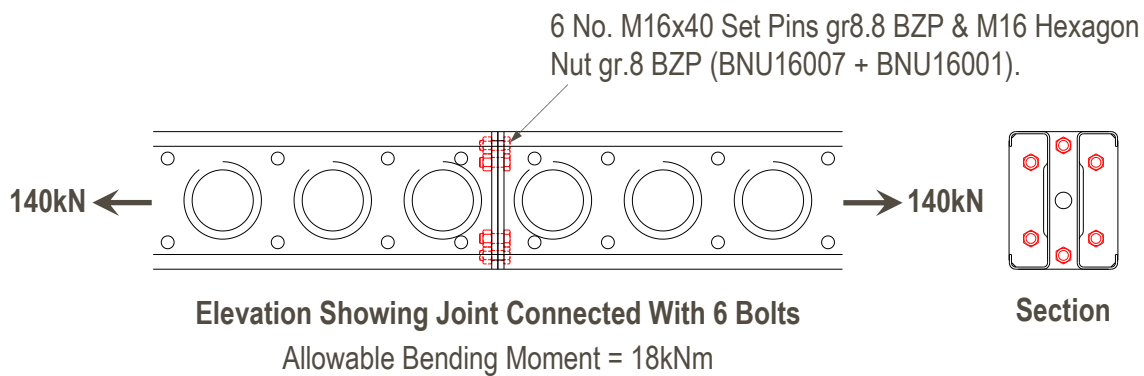
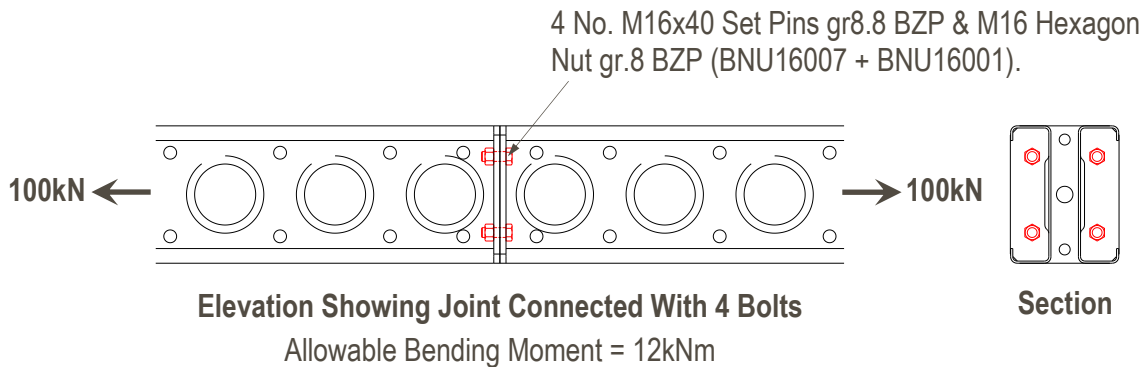


Detail on End Plate
360mm Open End Soldier (Horseshoe)
(SSU10035)



Detail on End Plate
360mm Open End Soldier
(SSU10045)

Bolted Joints - Allowable Working Loads



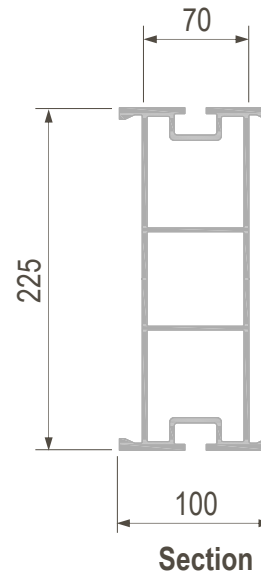
Combined Stresses - Tension & Bending must satisfy the following:

$$\frac{\text{Actual Tensile Load}}{\text{Allowable Tensile Load}} + \frac{\text{Actual Bending Moment}}{\text{Allowable Bending Moment}} \leq 1$$

Albeam

Used as primary beams in falsework applications.

Albeam Properties	
Gross Area	33.06cm ²
Second Moment of area I xx	2131cm ⁴
Flexural Rigidity EI	1468kNm ²
Shear Rigidity GA xx	35110kN
Maximum Bending Moment xx	25kNm
Self Weight	8.4kg/m
220mm - Intermediate Bearing	120kN
200mm - Intermediate Bearing	115kN
170mm - Intermediate Bearing	100kN
110mm - End Bearing	38.5kN



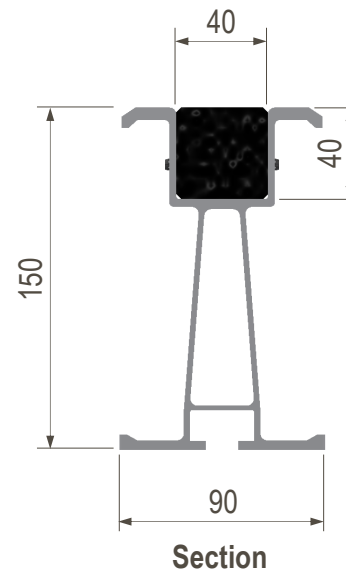
Code	Description	Weight
ABX11800	Albeam 1800mm	15.1 kg
ABX12400	Albeam 2400mm	20.1 kg
ABX12700	Albeam 2700mm	22.7 kg
ABX13000	Albeam 3000mm	25.2 kg
ABX13600	Albeam 3600mm	30.2 kg
ABX14800	Albeam 4800mm	40.3 kg
ABX15400	Albeam 5400mm	45.3 kg
ABX16000	Albeam 6000mm	50.3 kg
ABX17200	Albeam 7200mm	60.4 kg
ABX18400	Albeam 8400mm	70.5 kg
ABX19600	Albeam 9600mm	80.5 kg

Note: Non standard lengths are available on a sale only basis.

Alform Beams

An aluminium beam with recycled plastic insert used as a primary and / or secondary beams in falsework applications. Unique inclined twin webs, together with edge stiffening lips provide great lateral stability and robustness in use. Plywood formwork is simply attached by nail connection to the insert provided in the upper flange, and the bevelled edge to the top flange allows for easy removal of the formwork on completion of use.

Alform Beam Properties	
Gross Area	17.6cm ²
Modulus of Elasticity E	6890kN/cm ²
Second Moment of area I xx	558cm ⁴
Flexural Rigidity EI	385kNm ²
Shear Rigidity GA xx	18489kN
Position of Neutral Axis above base	74.6mm
Section Modulus xx	74.1cm ³
Maximum Bending Moment xx	10kNm
Max Reaction (Intermediate) 75mm bearing	55kN
Max Reaction (End) 44mm bearing	40kN
Self Weight (with recycled plastic insert)	5.66kg/m

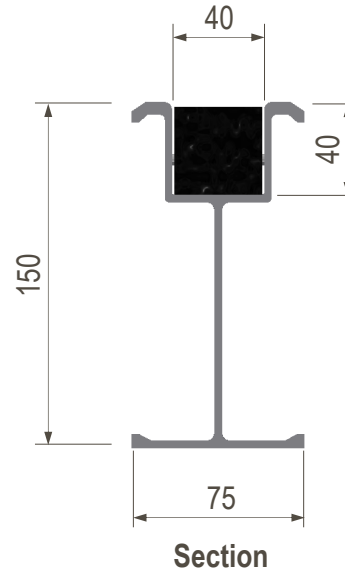


Code	Description	Weight
AFX11200	Alform Beam 1200mm	6.80 kg
AFX11500	Alform Beam 1500mm	8.50 kg
AFX11800	Alform Beam 1800mm	10.1 kg
AFX12100	Alform Beam 2100mm	11.3 kg
AFX12400	Alform Beam 2400mm	13.5 kg
AFX12700	Alform Beam 2700mm	15.2 kg
AFX13000	Alform Beam 3000mm	16.9 kg
AFX13600	Alform Beam 3600mm	20.3 kg
AFX14200	Alform Beam 4200mm	23.7 kg
AFX14800	Alform Beam 4800mm	27.1 kg
AFX15400	Alform Beam 5400mm	30.5 kg
AFX16000	Alform Beam 6000mm	33.9 kg
AFX16600	Alform Beam 6600mm	37.3 kg
AFX17200	Alform Beam 7200mm	40.7 kg

Alsec Beams

A lightweight and economical aluminium beam with recycled plastic insert used as a secondary beam in falsework applications. Plywood formwork is simply attached by nail connection to the insert provided in the upper flange, and the bevelled edge to the top flange allows for easy removal of the formwork on completion of use.

Alsec Beam Properties	
Gross Area	12.47cm ²
Second Moment of area I xx	389cm ⁴
Flexural Rigidity EI	268kNm ²
Shear Rigidity GA xx	12000kN
Maximum Bending Moment xx	7kNm
Max Reaction (Intermediate) 75mm bearing	33kN
Max Reaction (End) 44mm bearing	15kN
Self Weight (with recycled plastic insert)	4.65kg/m



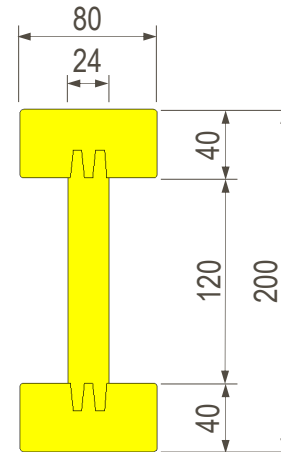
Code	Description	Weight
ALX11200	Alsec Beam 1200mm	5.57 kg
ALX11500	Alsec Beam 1500mm	6.97 kg
ALX11800	Alsec Beam 1800mm	8.36 kg
ALX12100	Alsec Beam 2100mm	9.76 kg
ALX12400	Alsec Beam 2400mm	11.2 kg
ALX12700	Alsec Beam 2700mm	12.6 kg
ALX13000	Alsec Beam 3000mm	14.0 kg
ALX13600	Alsec Beam 3600mm	16.8 kg
ALX14200	Alsec Beam 4200mm	19.5 kg
ALX14800	Alsec Beam 4800mm	22.3 kg
ALX15400	Alsec Beam 5400mm	25.1 kg
ALX16000	Alsec Beam 6000mm	27.9 kg
ALX17200	Alsec Beam 7200mm	33.5 kg

T200 Composite Timber Beams

A composite timber beam used as primary beam and / or for secondary beams in falsework applications.

T200 Composite Beam Properties	
Gross Area	92.8cm ²
Second Moment of Area I _{xx}	4181cm ⁴
Flexural Rigidity EI	420kNm ²
Shear Rigidity GA _{xx}	3014kN
Maximum Bending Moment _{xx}	5.0kNm
Max Shear Load	11kN
Maximum Reaction Load	22kN*
Self Weight	4.70kg/m

*T200 must be supported at least 150mm from the end of the beam for maximum reaction.



Section

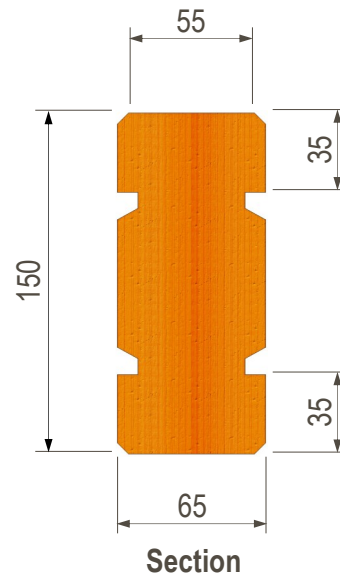
Code	Description	Weight
TBB11800	T200 Beam 1800mm	8.50 kg
TBB12400	T200 Beam 2400mm	11.3 kg
TBB12700	T200 Beam 2700mm	12.7 kg
TBB13000	T200 Beam 3000mm	14.1 kg
TBB13550	T200 Beam 3550mm	16.7 kg
TBB14900	T200 Beam 4800mm	23.0 kg
TBB10001	T200 Beam 6000mm	28.2 kg

GTX Beams

A structural laminated veneer timber beam used as a primary and / or secondary beam in falsework applications. Manufactured using 3mm Radiata Pine veneer, individually graded for stiffness and phenolically bonded for consistent and predictable engineered performance.

GTX Beam Properties	
Gross Area	94cm ²
Flexural Rigidity EI	150kNm ² *
Shear Rigidity GA xx	3932kN
Maximum Bending Moment xx	5.0kNm*
Max Shear Load	25.8kN
Allowable Bearing (on top or bottom faces)	6.6N/mm ²
Self Weight	5.50kg/m

* In climates where the moisture content of the GTX beams is likely to be very low (e.g. Middle East) these values may be enhanced by 20%



Code	Description	Weight
GTX11800	GTX Beam 1800mm	9.90 kg
GTM12100	GTX Beam 2100mm	11.6 kg
GTX12400	GTX Beam 2400mm	13.2 kg
GTM12700	GTX Beam 2700mm	14.9 kg
GTX13000	GTX Beam 3000mm	16.5 kg
GTX13600	GTX Beam 3600mm	19.8 kg
GTX14200	GTX Beam 4200mm	23.1 kg
GTX14800	GTX Beam 4800mm	26.4 kg
GTX15400	GTX Beam 5400mm	29.7 kg
GTX16000	GTX Beam 6000mm	33.0 kg

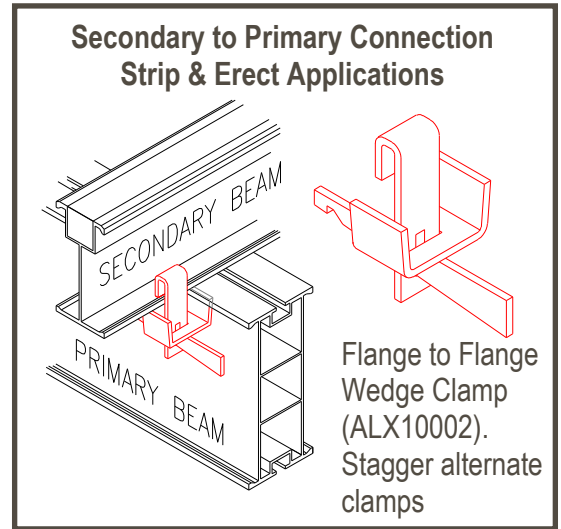
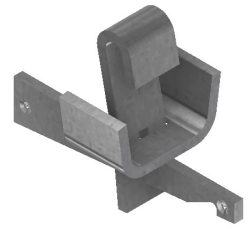
Secondary to Primary Beam Connections

Flange to Flange Wedge Clamp (ALX10002) weight 0.75kg

A fast lightweight and secure clamp used for connection of backing members to primary beams in strip and erect applications for all falsework systems. Connects Albeam, Alform, Alsec and Superslim in any combination.

AWL Tension = 1.6kN

AWL Slip = 0.25kN

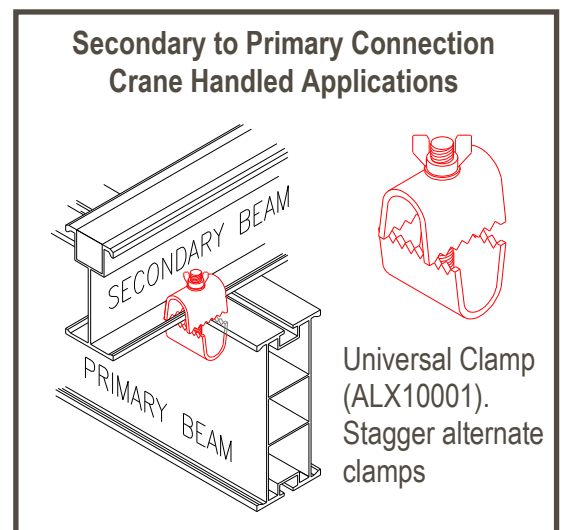
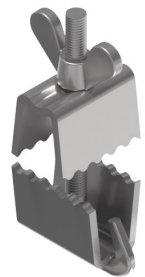


Universal Clamp (ALX10001) weight 0.75kg

A secure serrated clamp used with all falsework systems in heavier crane handled applications. Connects Albeam, Alform, Alsec, Superslim Soldiers and T200 composite timber beams in any combination. Tighten the unit by tapping the wings of the nut with a hammer.

AWL Tension = 2.5kN

AWL Slip = 0.35kN



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GTX Wedge Clamp Assembly (GTX10002) weight 1.09kg

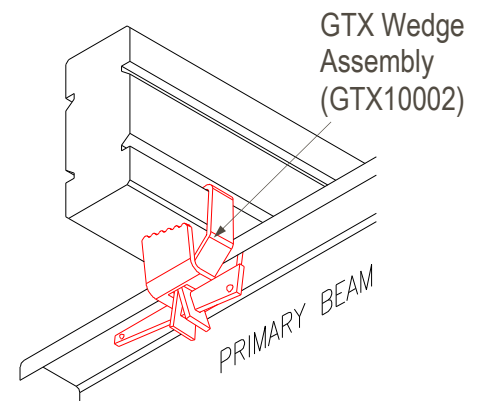
Use to connect Alform / Albeam / T200 / Superslim Soldier primaries to GTX secondaries in strip and erect falsework applications. Use two clamps per intersection, staggered either side of primary beam.

AWL Tension = 1.0kN

AWL Slip = 0.25kN



Secondary to Primary Connection Strip & Erect Applications

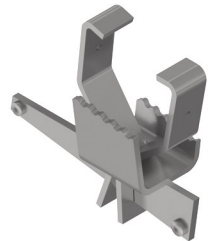


T200 Wedge Clamp (TBX10010) weight 0.89kg

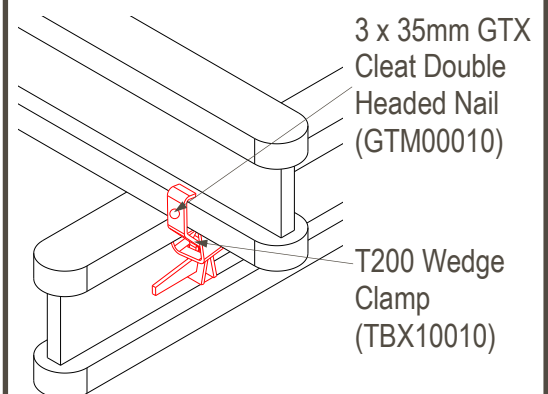
Use to connect T200 primaries to T200 secondaries in strip and erect falsework applications. Use two clamps per intersection, staggered either side of primary beam.

AWL Tension = 1.0kN

AWL Slip = 0.25kN



Secondary to Primary Connection Strip & Erect Applications



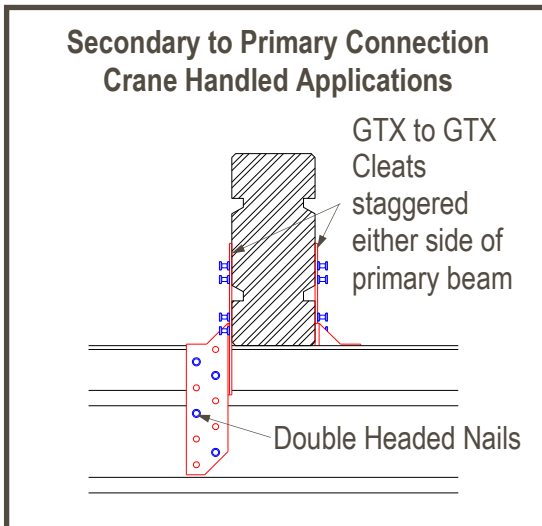
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GTX to GTX Cleat (GTM00005) weight 0.20kg

Connects GTX primary to GTX secondary at right angle, using 8 No. 3 x 35mm Double Headed Nails.



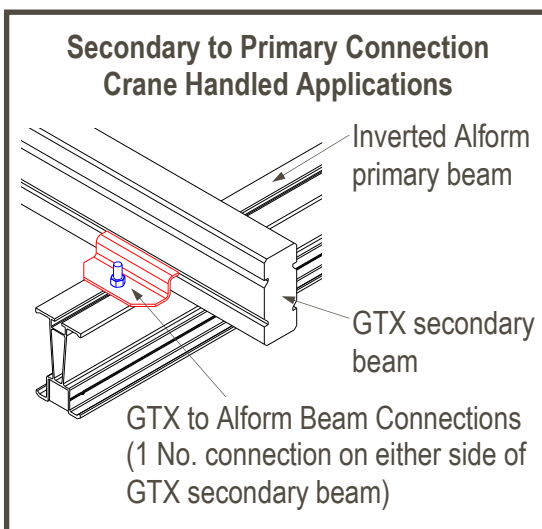
3 x 35mm GTX Cleat Double Headed Nails / kg (GTM00010)

Used to secure GTX Cleats (GTM00005) to GTX primary and GTX secondary beams. Easily removed during dismantling using the additional head. **Supplied per kg (approx. 350 No. per kg).**



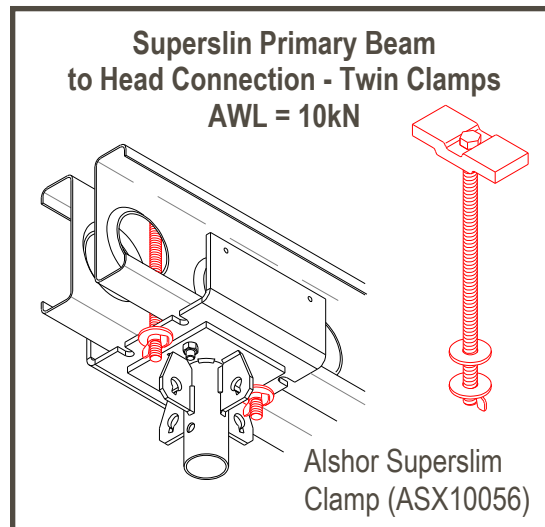
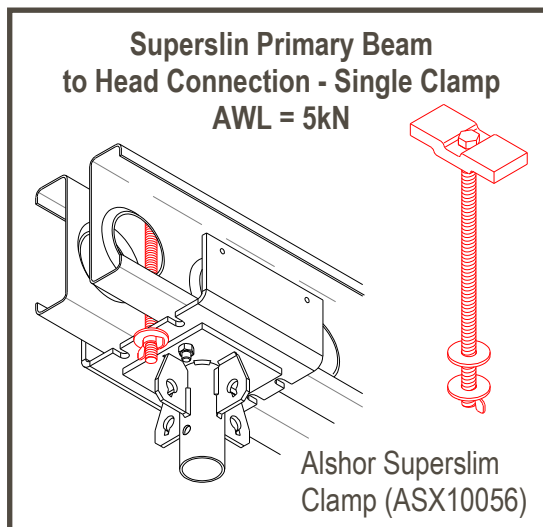
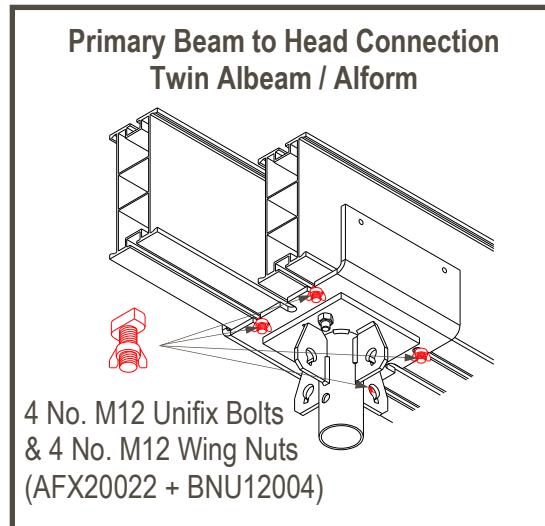
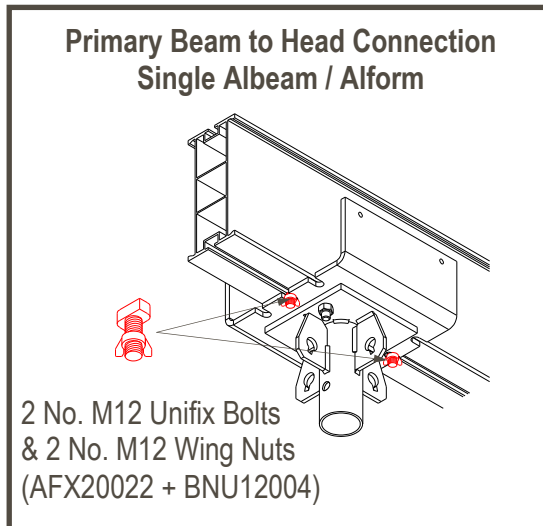
GTX to Alform Beam Connection (GTM00007) weight 0.50kg

Use with M12 Unifix Bolts and M12 Hexagon Nuts gr.8 BZP (AFX20022 + BNU12001) to connect Alform/Albeam Primaries to GTX Secondaries in falsework applications.



Primary Beam to Rapidshor Head Connections

The details shown below can be used to connect primary beams to Rapidshor Heads where a positive connection is required.



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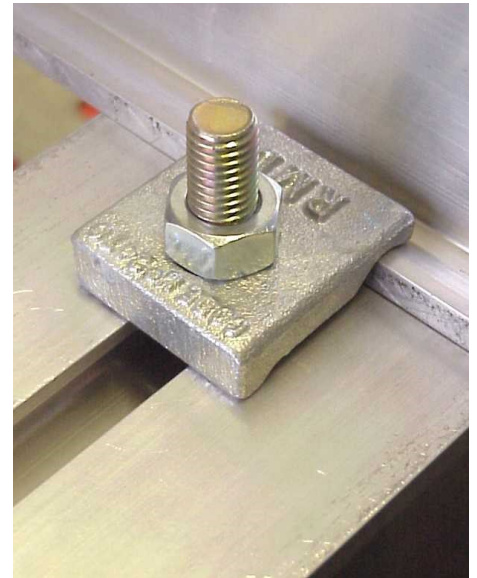
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Underslung Clamp

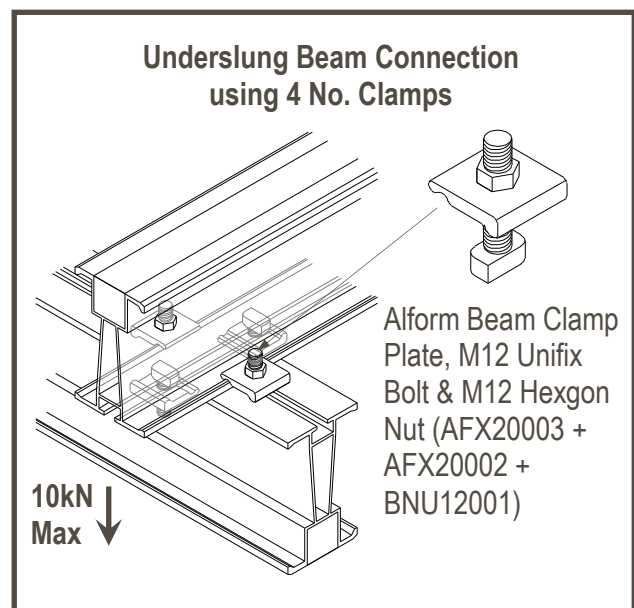
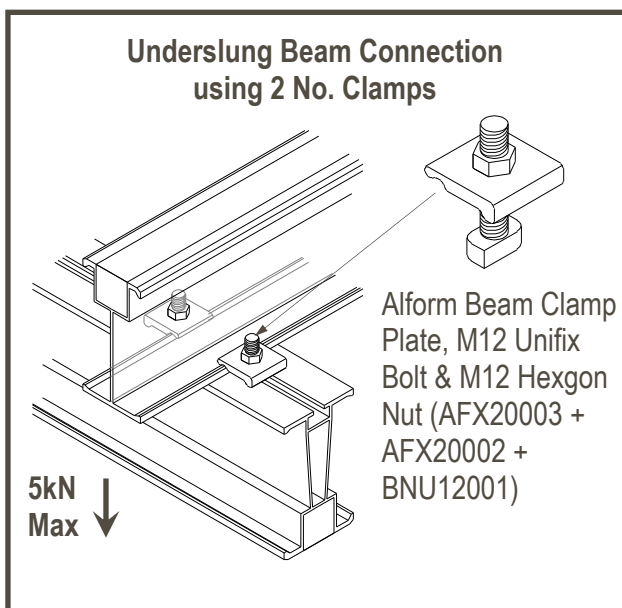
A secure clamp supplied in three parts used to connect underslung aluminium beams where a known load capacity for the connection is required. Note that one of the connected beams must be either an Alform or an Albeam. When four clamps are used both beams must be an Alform or an Albeam.

AWL with 2 clamps = 5kN

AWL with 4 clamps = 10kN



Code	Description	Weight
AFX20003	Alform Clamp Plate	0.09 kg
AFX20022	M12 Unifix Bolt	0.06 kg
BNU12001	M12 Hex Nut Plated	0.01 kg



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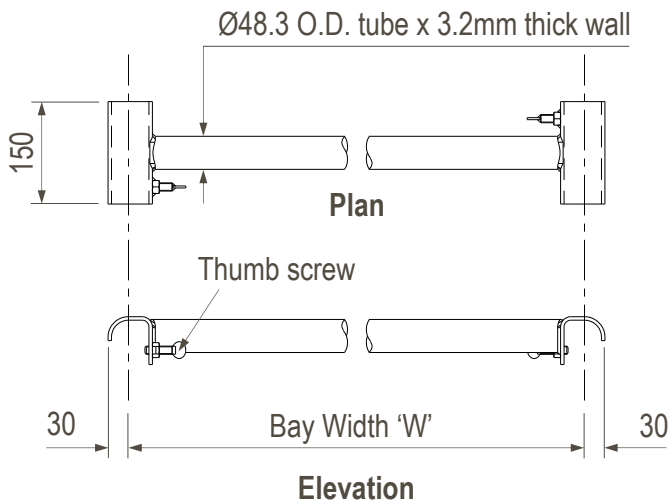
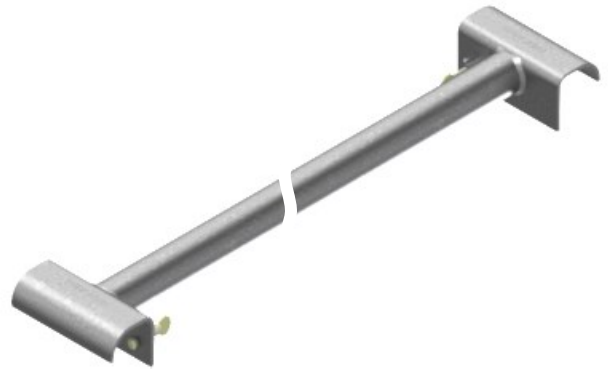
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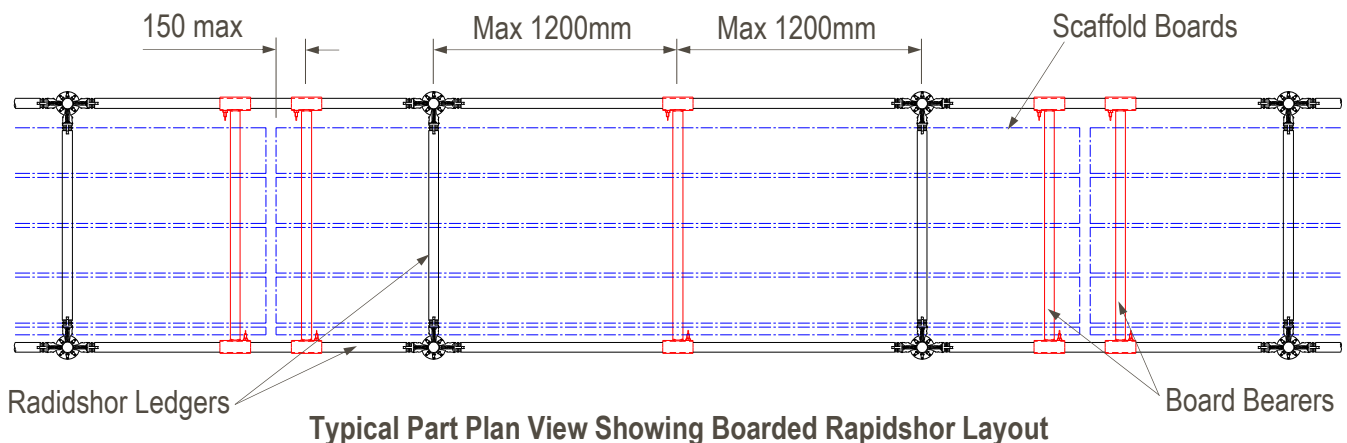
Board Bearers

Used to provide intermediate support to scaffold boards in access applications. AWL 1.5kN/m² when used with standard RMDK scaffold boards supported at 1200mm maximum centres.

Note: Boards can be supported either by Rapidshor Ledgers or Board Bearers. Do not cantilever scaffold boards more than 150mm beyond their last support. Take appropriate precautions to secure boards against wind uplift.



Code	Description	Weight
ASX62400	Alshor Plus Board Bearer 2400mm	10.1 kg
ASX61800	Alshor Plus Board Bearer 1800mm	7.97 kg
ASX61200	Alshor Plus Board Bearer 1200mm	5.84 kg



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Rapidshor Access Stairs

Used to provide access to one or more boarded levels within a Rapidshor structure or as an independent stair tower for other construction projects.

AWL = 2.5kN/m²

Stair units are designed to be assembled within a 1500x2400mm Rapidshor tower.

Notes: The scaffolding supporting the access stairs shall be erected using the same procedure as that described in the assembly sequence.

It is important that:-

1. The foundations are of a suitable nature to satisfactory support the loads implied by the scaffolding without settlement.
2. The scaffolding tower shall be erected square, plumb / level and braced on all four faces prior to installing any stair units.
3. The scaffolding tower shall be tied into a suitable supporting structure at appropriate positions at all times.



These stairs are not suitable for use by the General Public.

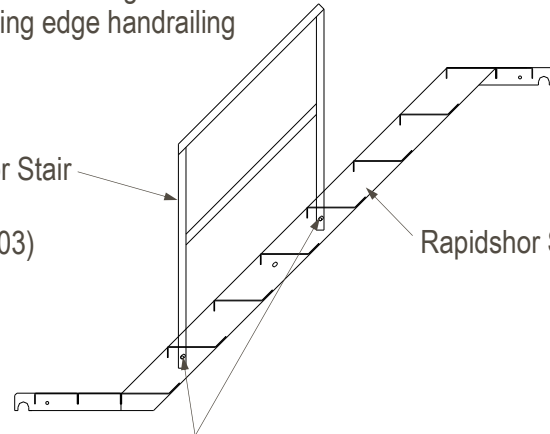


Stair Units fitted within a 1500x2400mm
Rapidshor tower
(Bracing omitted for clarity)

Scaffold tube & fittings used to form leading edge handrailing

Rapidshor Stair Handrail (RSX70003)

Rapidshor Stair Unit



Connect Stair Handrail to Stair Unit using 2 No. M12x100 Set Pins gr8.8 BZP, 2 No. M12 Hex Nuts gr.8 BZP & 4 No. M12 Round Washers (BNU12017 + BNU12001 + BNU12002)

Code	Description	Weight
RSX70003	Rapidshor Stair Handrail	11.0 kg
RSX70006	Rapidshor Stair Unit	70.0 kg
BNX12007	M12x100 Set Pin gr8.8 BZP	0.01 kg
BNU12001	M12 Nut g8.8 BZP	0.01 kg
BNU12002	M12 Round Washer	0.01 kg

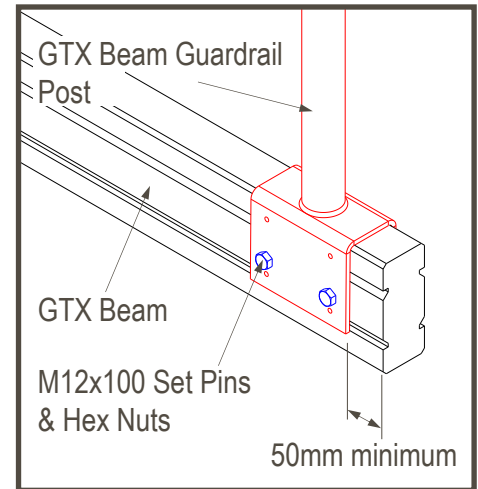
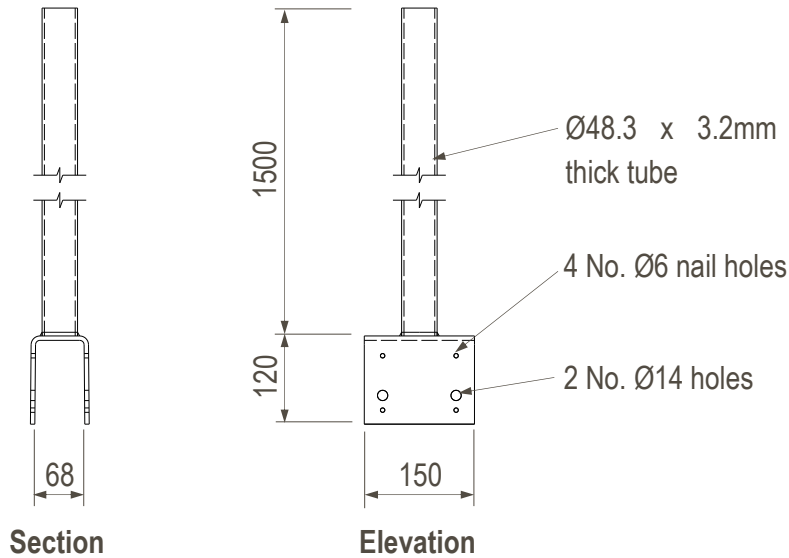
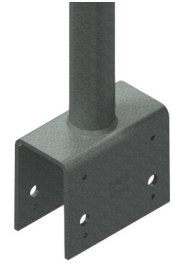
RAPIDSHOR

80kN STEEL SHORING SYSTEM

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KWIKFORM

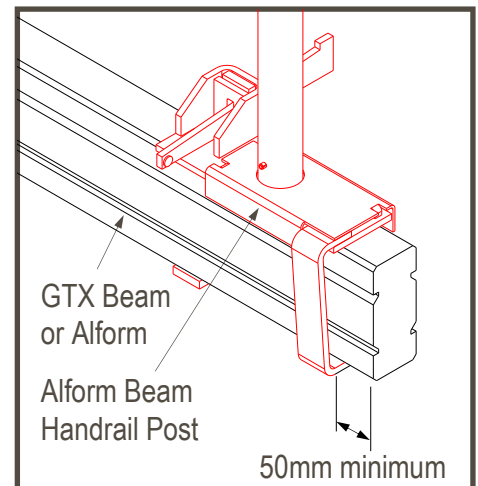
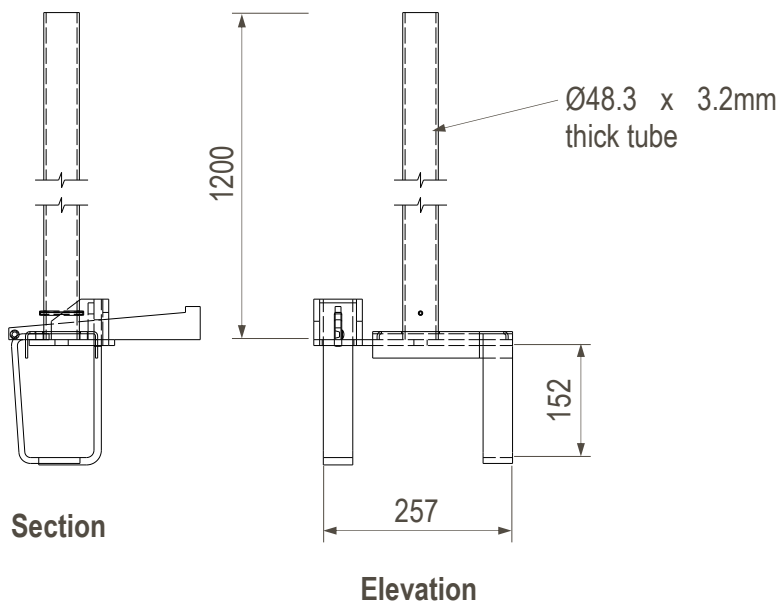
GTX Beam Guardrail Post (GTM00004) Weight 8.50kg

Connect to end of GTX beam using 2 No. M12x100 Set Pins gr8.8 BZP & M12 Hexagon Nuts gr.8 BZP (BNU12017 + BNU12001) to provide a 1.5m high vertical handrail post.



Alform Beam Handrail Post (AFM90025) Weight 9.90kg

Connect to end of GTX or Alform beam using its captive wedge to provide a 1.2m high vertical handrail post.



RAPIDSHOR

80kN STEEL SHORING SYSTEM

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Ultraguard Edge Protection

Used for providing edge protection to the formwork at the wet deck level and for exposed leading edges at the supporting slab level. For details of mounting on all types of soffit beams refer to Ultraguard Technical Data Sheets



Note: Ultraguard Barrier provides edge protection for operatives in accordance with EN13374:2004 Class A

Code	Description	Weight
SAX10001	Ultraguard Slab Socket Base	1.65 kg
SAX10002	Ultraguard Slab Edge Clamp	8.80 kg
SAX10003	Ultraguard Steel Beam Clamp 914mm	17.5 kg
SAX10005	Ultraguard Alu Beam Bracket	4.17 kg
SAX10012	Ultraguard Soldier Socket	4.74 kg
SAX10015	Ultraguard Ext Alu Beam Bracket	5.50 kg
SAX10017	Ultraguard Shear Stud Socket	3.18 kg
SAX10018	Ultraguard Wall Bracket	2.56 kg
SAX11200	Ultraguard Post 1.2m	5.51 kg
SAX12550	Ultraguard Barrier 2550mm	17.3 kg
SAX13150	Ultraguard Barrier 3150mm	25.0 kg

Scaffold Tube & Fittings

Used for providing access within the main body of the falsework and/or for providing additional lacing & bracing where system components will not fit.

Code	Description	Weight
TUX80060	Scaffold Tube 0.6m (4mm)	2.62 kg
TUX80150	Scaffold Tube 1.5m (4mm)	6.55 kg
TUX80210	Scaffold Tube 2.1m (4mm)	9.17 kg
TUX80300	Scaffold Tube 3.0m (4mm)	13.1 kg
TUX80360	Scaffold Tube 3.6m (4mm)	15.7 kg
TUX80480	Scaffold Tube 4.8m (4mm)	21.0 kg
TUX80540	Scaffold Tube 5.4m (4mm)	23.6 kg
TUX80640	Scaffold Tube 6.4m (4mm)	28.0 kg
SFX10002	Coupler 90 Deg 2"x2"	1.35 kg
SFX10003	Coupler Swivel 2"x2"	1.48 kg
SFX10004	Coupler Fixed 2 3/8"x2"	1.41 kg
SFX10005	Coupler Swivel 2 3/8"x2"	1.90 kg
SFX20240	Scaffold Board 2.4m - No. 2	11.0 kg
SFX20300	Scaffold Board 3.0m - No. 3	14.0 kg
SFX20395	Scaffold Board 3.95m	17.7 kg
SFX10026	Toe Board Clip	0.19 kg

RAPIDSHOR

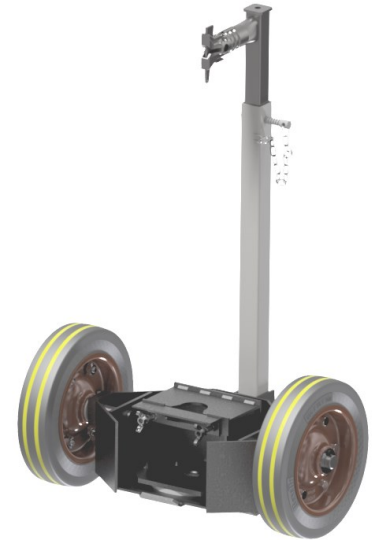
80kN STEEL SHORING SYSTEM

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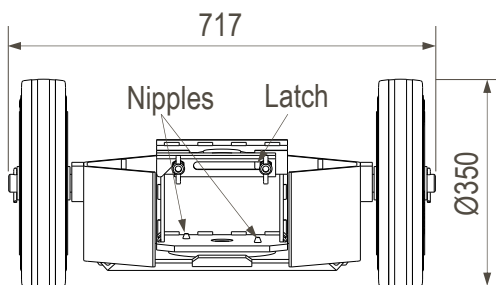
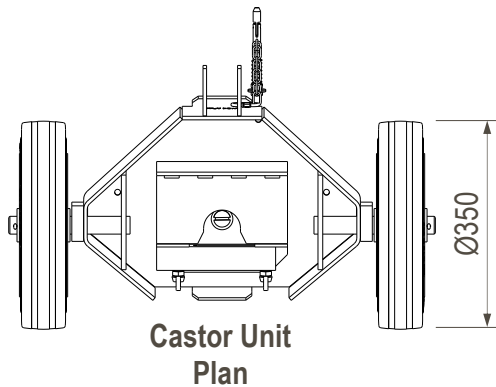
Rapidshor Castor Unit

Used to transport Rapidshor tables. The Castor Unit slips over and positively locates onto the bottom of the Rapidshor Jack. When tables are designed for moving using this product the minimum base jack extension should be 270mm. The Castor Unit has solid tyres, pneumatic tyres are available for special applications - refer to RMD Kwikform Technical Office.

AWL = 800kg per Castor Unit



Code	Description	Weight
RSM10040	Rapidshor Castor unit	52.0 kg
RSM10039	Rapidshor Handle - Castor unit	8.51 kg

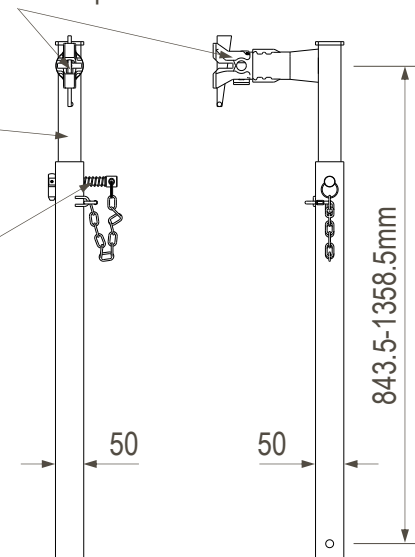
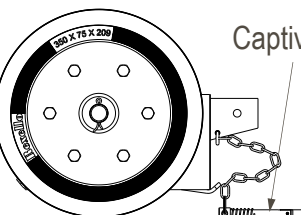


Ledger End Casting connects to Rapishor Standard slotted disks to lock the Castor Unit square to the Rapidshor table

Telescopic handle 'inner'

Captive Pin

Captive Pin

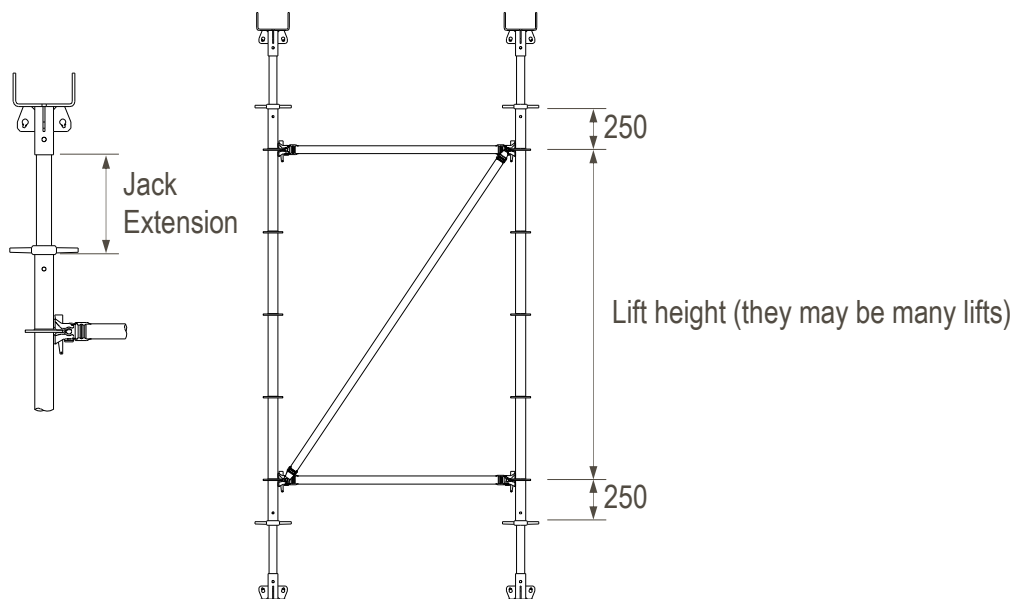
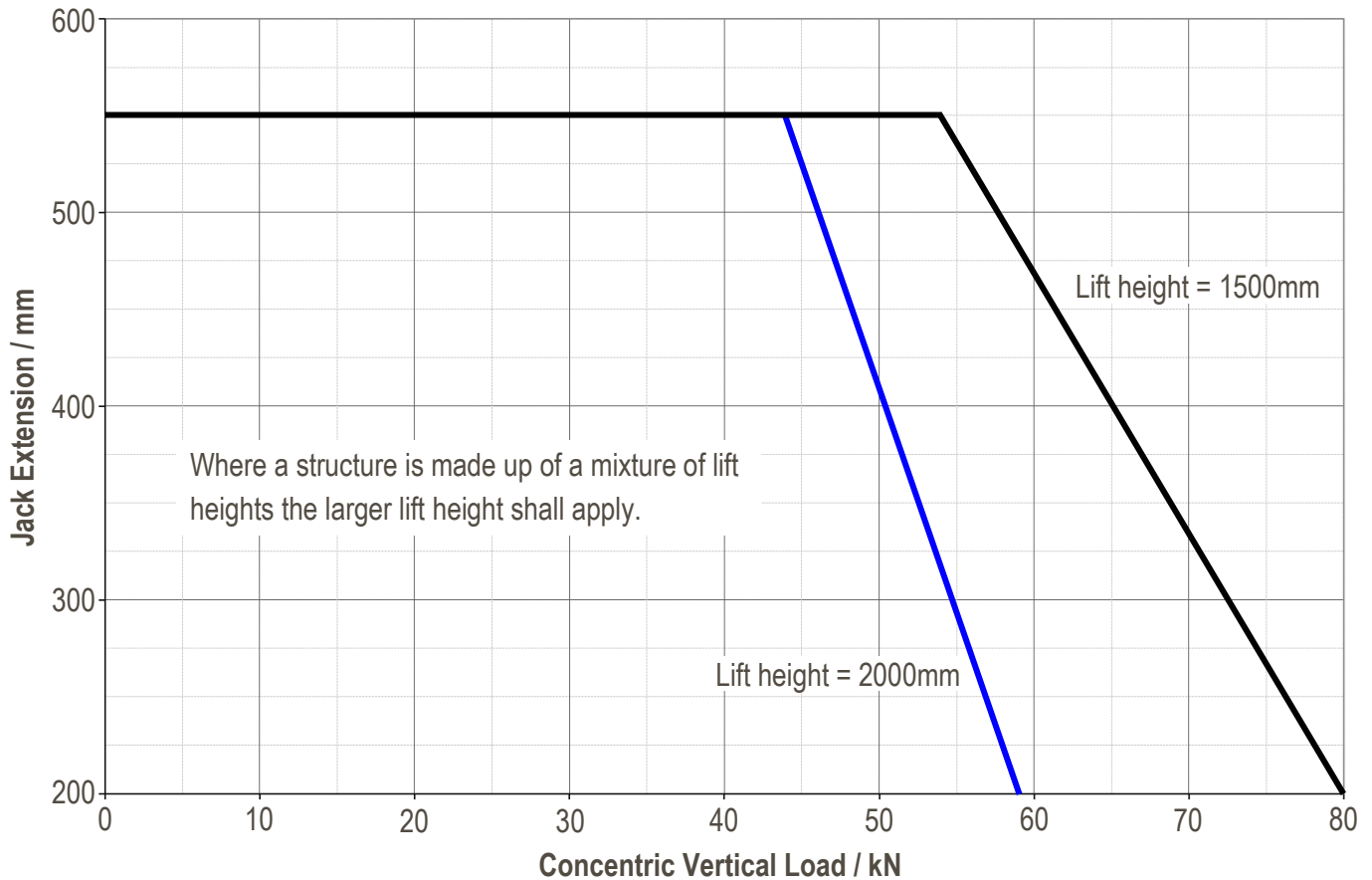


Notes:

1. Ensure the running surface is relatively flat & clear of obstructions to enable smooth running and even loading.
2. Ensure that the jack baseplate locates over the Castor nipples & that the latch is around the jack before moving.
3. Extend the handles not being used for steering and secure to the Rapidshor Standard slotted disks.
4. Take appropriate measures to avoid tables running away on slopes or running beyond slab edges.
5. Do not allow personnel to ride on Castor Units.

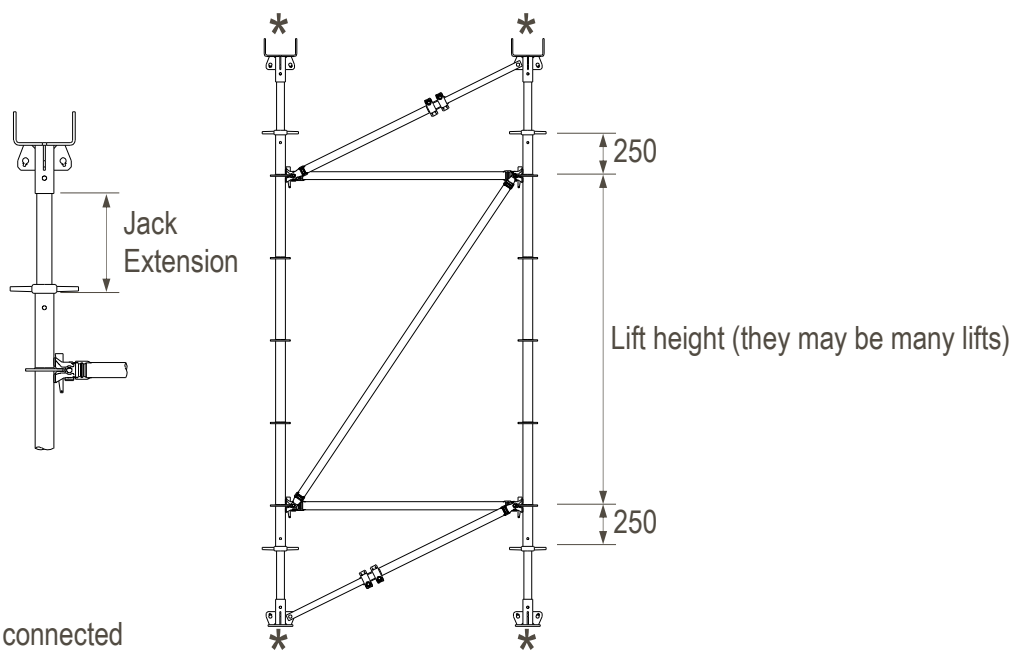
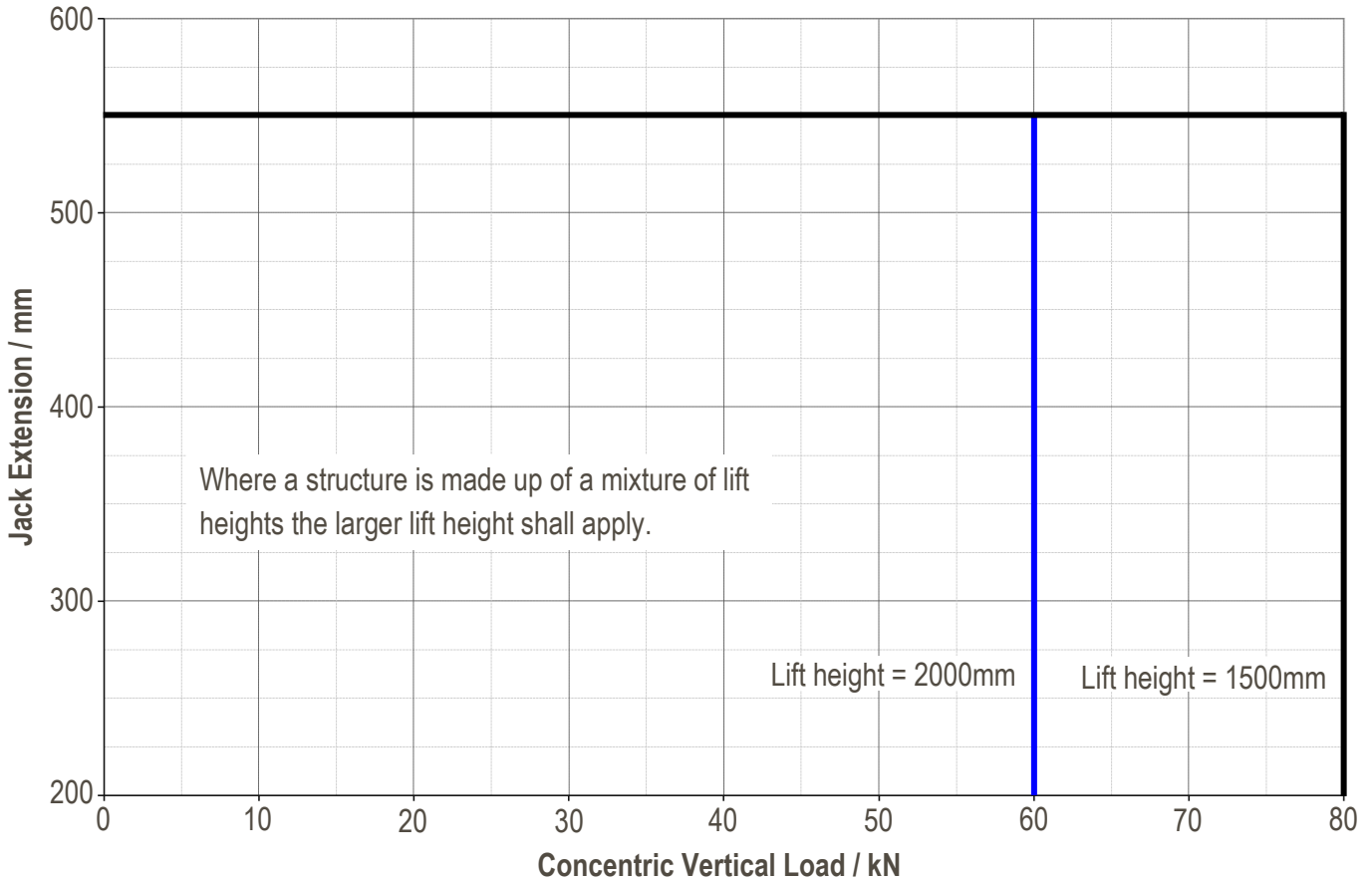
Freestanding Condition with Un-Braced Jacks

Use the chart below to determine the AWL of Rapidshor base and head jacks for a given jack extension depending upon whether the body of the falsework is comprised of 1500mm or 2000mm lift heights. A lateral load equivalent to 2.5% of the vertical load has been allowed for.



Freestanding Condition with Braced Jacks

Use the chart below to determine the AWL of Rapidshor base and / or head jacks for a given jack extension depending upon whether the body of the falsework is comprised of 1500mm or 2000mm lift heights. A lateral load equivalent to 2.5% of the vertical load has been allowed for.

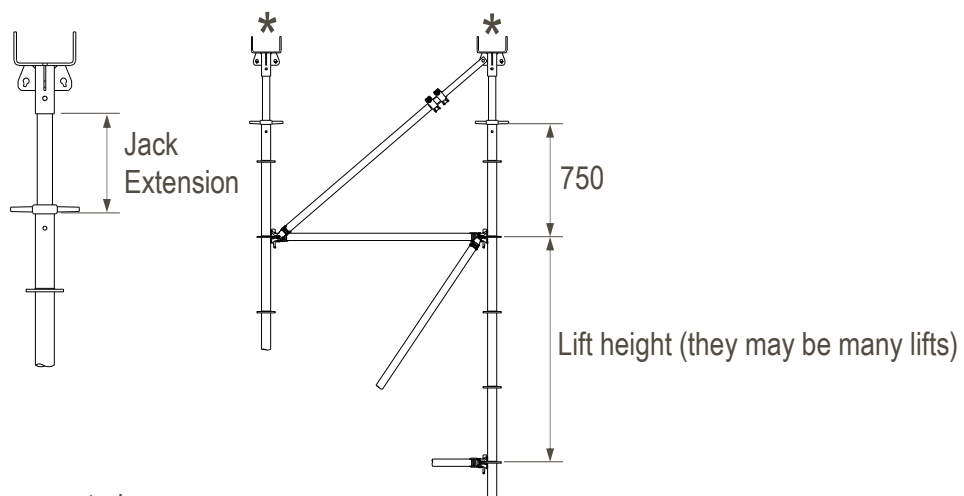
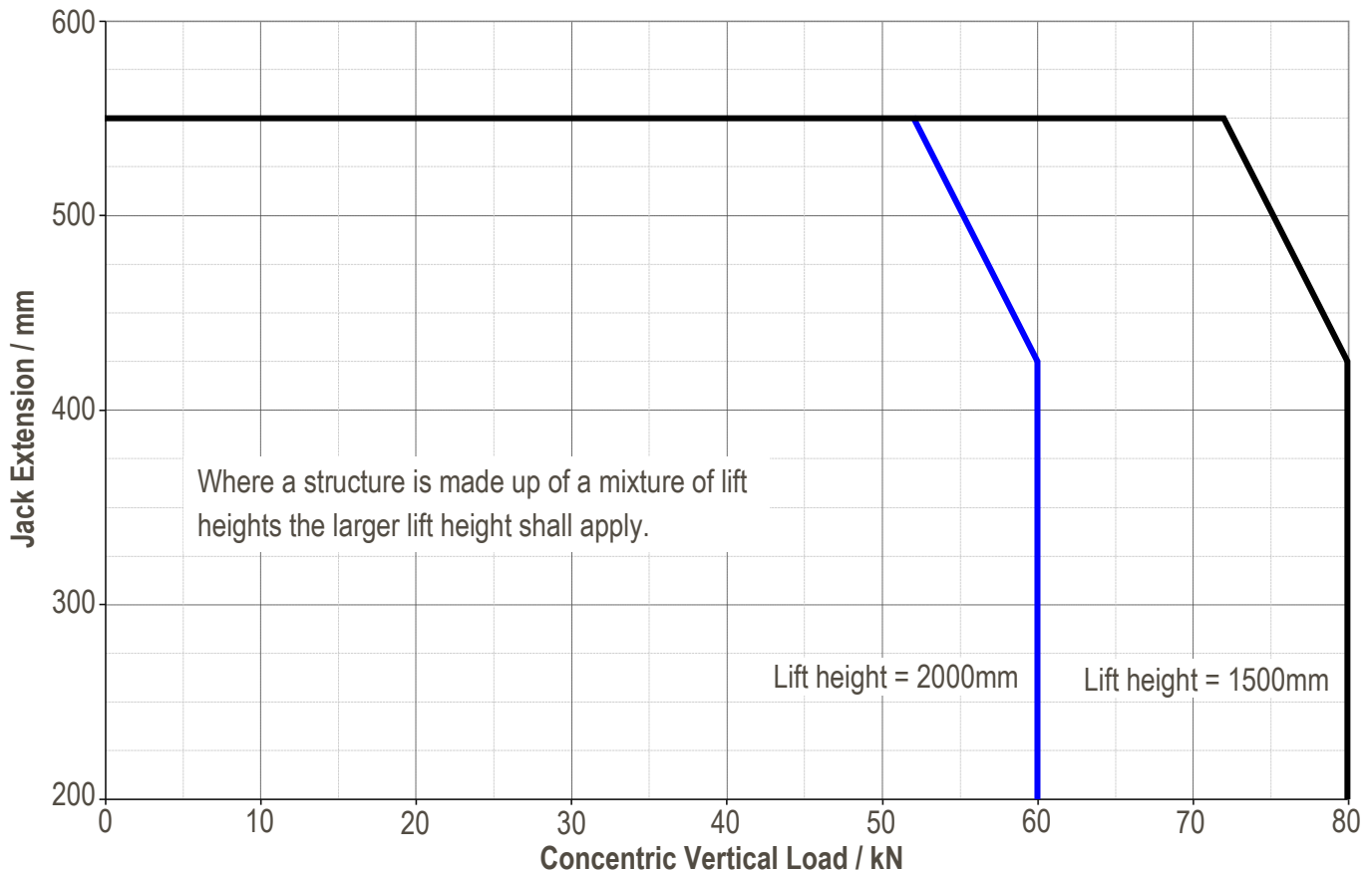


* Jacks to be adequately connected for continuity of lateral support

Freestanding Condition with Braced Jacks

Use the chart below to determine the AWL of Rapidshor head jacks for a given jack extension with the top Ledger positioned 750mm from the end of the Standard depending upon whether the body of the falsework is comprised of 1500mm or 2000mm lift heights. A lateral load equivalent to 2.5% of the vertical load has been allowed for.

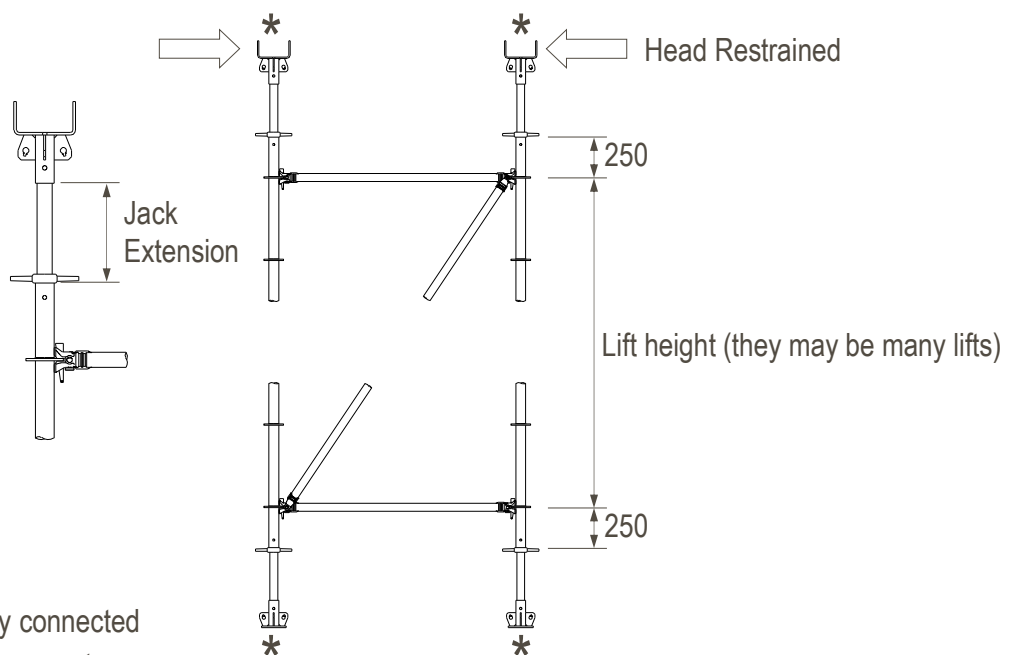
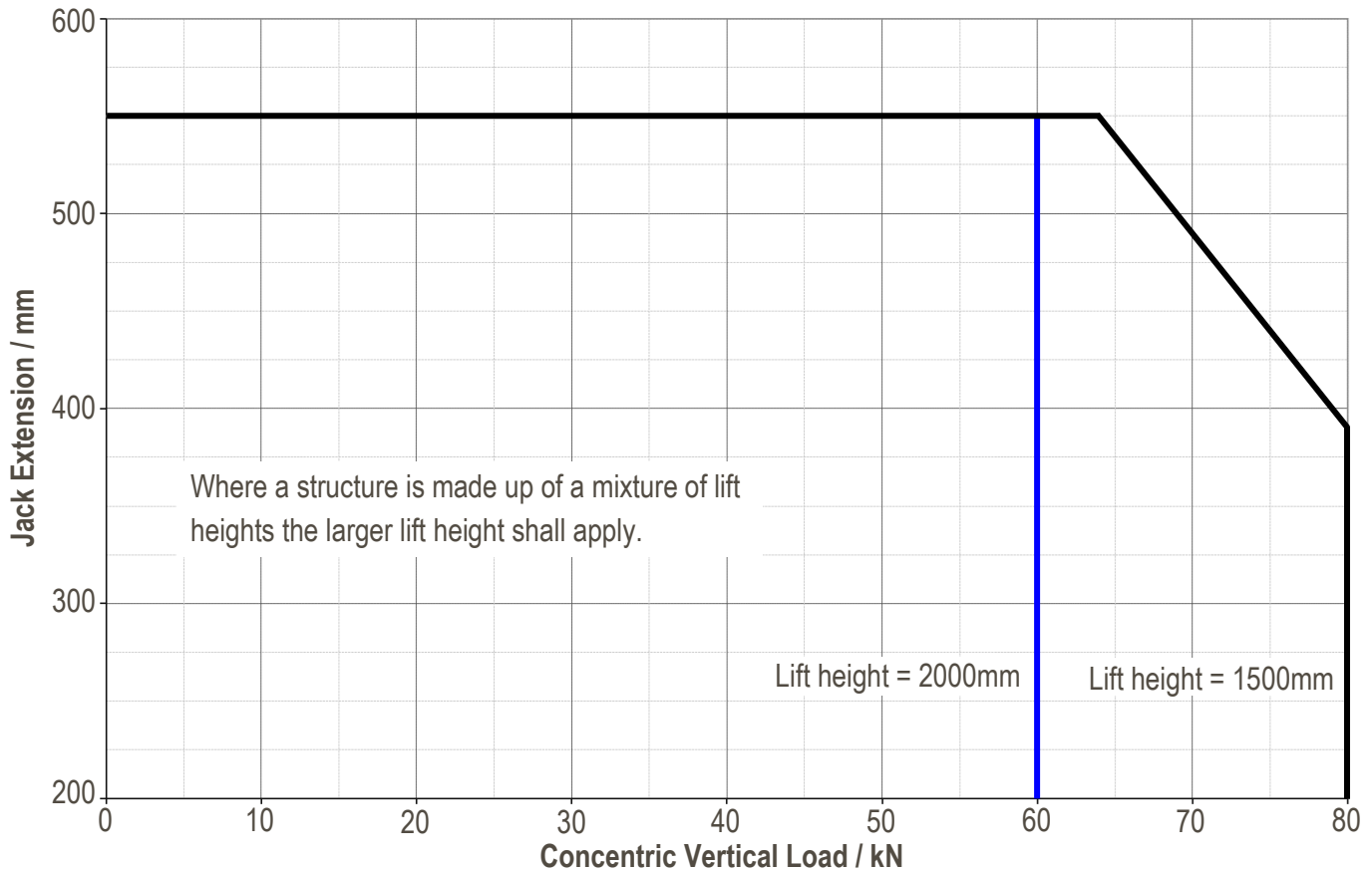
Note: This chart applies to head condition only. Not recommended for base condition.



* Jacks to be adequately connected for continuity of lateral support

Top Restrained (Laterally Restrained at the Head)

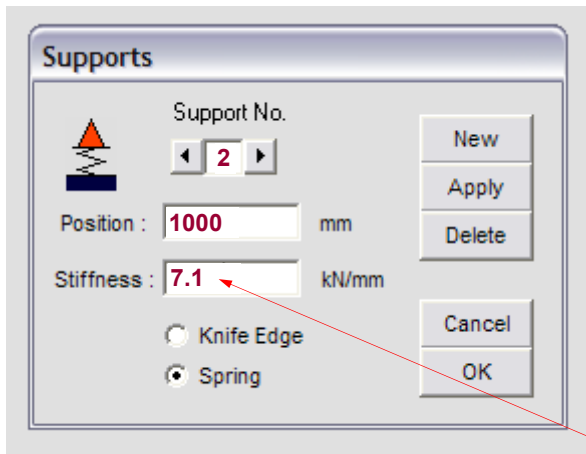
Use the chart below to determine the AWL of Rapidshor base and head jacks for a given jack extension in laterally top restrained applications depending upon whether the body of the falsework is comprised of 1500mm or 2000mm high lift heights.



Reducing Soffit Beam Continuity by Using Spring Supports

For tall falsework with primary beams spanning over several bays, the adverse effects of beam continuity on leg load can be reduced by modelling the beam supports as springs with the stiffness appropriate to the falsework height from the table.

Height (metres)	Axial Stiffness (kN/mm)
1	120
2	60.3
3	40.2
4	30.1
5	24.1
6	20.1
7	17.2
8	15.1
9	13.4
10	12.1
11	11.0
12	10.0
13	9.3
14	8.6
15	8.0
16	7.5
17	7.1
18	6.7
19	6.3
20	6.0
21	5.7
22	5.5
23	5.2
24	5.0
25	4.8
26	4.6
27	4.5
28	4.3
29	4.2
30	4.0



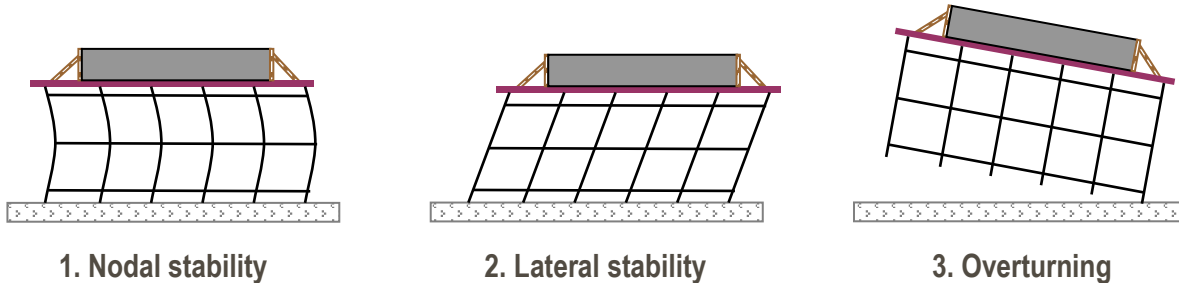
Rapidshor Leg Make-ups

Propping Height	STANDARDS				JACK	BASE	HEAD	JOINT SLEEVE	BASE SLEEVE	SLEEVE CLIP
	RSX42500	RSX42000	RSX41500	RSX41000	RSX10004	RSX10002	RSX10003	RSX10005	RSX10010	RSX10009
Min* - Max	OE2500	OE2000	OE1500	OE1000	25-540	165	173	300	214	-
1385-1875	-	-	-	1	1	1	1	-	1	1
1885-2375	-	-	1	-	1	1	1	-	1	1
1950-2415	-	-	-	1	2	1	1	-	-	-
1950-2915	-	-	1	-	2	1	1	-	-	-
2410-3415	-	1	-	-	2	1	1	-	-	-
2910-3915	1	-	-	-	2	1	1	-	-	-
3410-4415	-	1	-	1	2	1	1	1	-	1
3910-4915	-	1	1	-	2	1	1	1	-	1
4410-5415	1	-	1	-	2	1	1	1	-	1
4910-5915	1	1	-	-	2	1	1	1	-	1
5410-6415	2	-	-	-	2	1	1	1	-	1
5910-6915	1	1	-	1	2	1	1	2	-	2
6410-7415	1	1	1	-	2	1	1	2	-	2
6910-7915	2	-	1	-	2	1	1	2	-	2
7410-8415	2	1	-	-	2	1	1	2	-	2
7910-8915	3	-	-	-	2	1	1	2	-	2
8410-9415	2	1	-	1	2	1	1	3	-	3
8910-9915	2	1	1	-	2	1	1	3	-	3

* This allows for 20mm for striking one jack, all dimensions are in mm.

Bracing and Stability

Rapidshor is designed as a fully braced system with up to three bracing and stability checks required as follows:



For *freestanding* falsework all three checks are required. For *fixed at the head* (laterally top restrained) falsework only check 1 is carried out.

1. Nodal Stability

Nodal stability is provided to restrict the effective length of the standards to prevent them from buckling. Internal ledgers and braces or external restraints can be used.

The force required to restrain a single node point is 2½% of the axial load in the standard acting at right angles to it. Ledgers connect to the standards, collect these loads from them and carry them to the brace positions.

The bracing in each plane and lift of the falsework is designed to resist the sum of the node restraint forces for all standards in the plane. This equates to a design transverse shear force for each lift of 2½% of the sum of the vertical loads in the plane.

The restraint force is a notional load, it is not cumulative in the structure and if internal ledgers and bracing are used no horizontal loads exit the structure.

If only nodal stability is being considered then the Rapidshor can be braced in towers without further component checks being necessary. The effect that braces have on the vertical load in the standards does not need to be considered, see figure 1. Care should be taken to ensure that every node is braced, see figure 2.

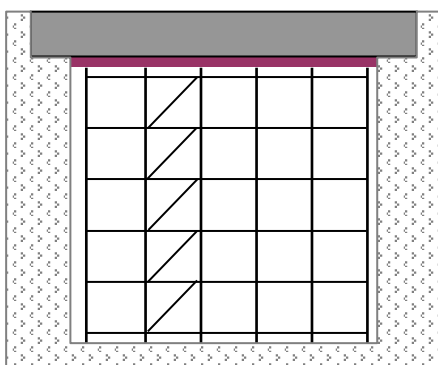


Figure 1

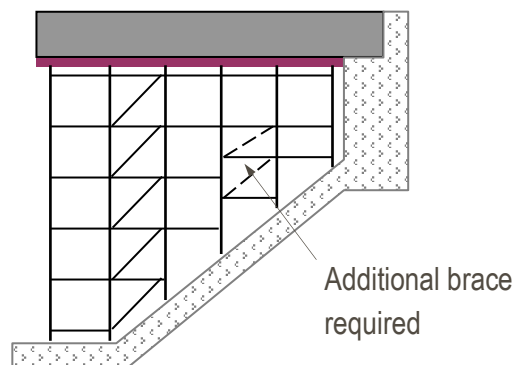


Figure 2

2. Lateral Stability

If the Rapidshor structure is freestanding in the direction being considered then the bracing shall be designed to accommodate the greater of the following:

- $2\frac{1}{2}\%$ of the vertical load applied horizontally at the top of the structure.
- 1% of the vertical load applied horizontally at the top of the structure plus the sum of any other applied horizontal loads such as those due to wind, standards out of plumb by design, concrete pressure due to stop end forms etc. applied at their respective levels.

These are actual loads and the effect that the braces have on the vertical load in the standards must be allowed for. The Rapidshor is designed as a tiered structure with the horizontal forces in each lift being resolved into the braces in that lift and the horizontal and vertical load components transferred into the ledgers and standards being checked. It is not recommended to carry out a frame analysis of the whole structure.

In tall structures or where narrow bays are braced the additional vertical load due to the bracing can be considerable. The effect on standard loads will be reduced if braces extend diagonally over multiple bays, see figure 3.

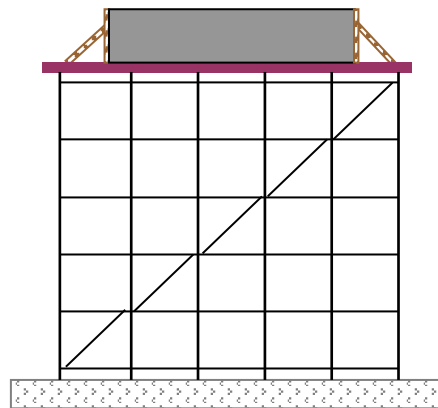


Figure 3

3. Overturning

If the Rapidshor structure is freestanding in the direction being considered it must be checked for overturning as well as lateral stability. The restoring moment caused by the self weight of the structure and any other dead loads that are in position must be greater than or equal to 1.2 times the overturning moment caused by the larger of the two conditions given for lateral stability above. The base width of the structure for the restoring moment should be taken as the widest part that is continually braced, see figure 4.

Overturning stability shall be checked for all stages of construction. Wind loading applied to freshly erected falsework to which there is not yet any applied vertical load is often the worst case.

If the section is braced in towers so that the structure does not act as a single block then overturning will be resisted purely by the individual towers and the additional compression and uplift in the legs will be considerable.

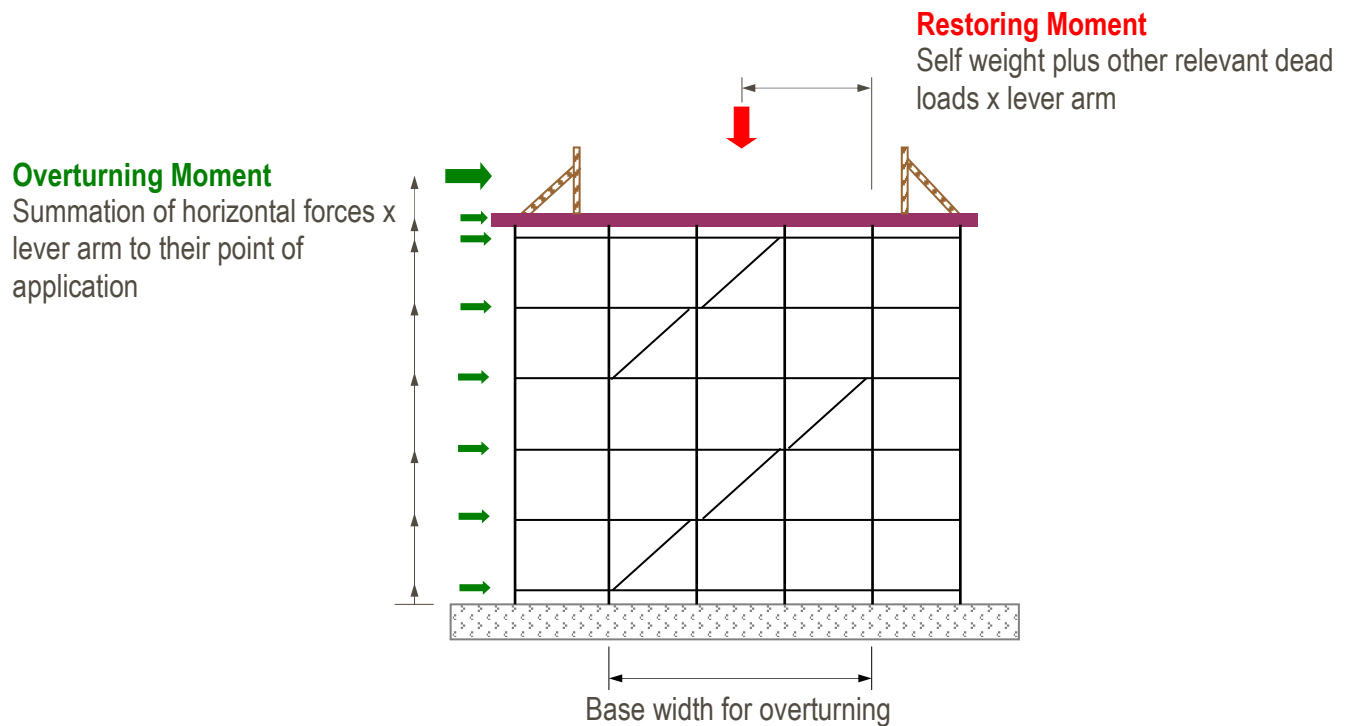


Figure 4

Transfer of Horizontal Loads at Head and Base

In the majority of cases horizontal loads will be transferred between the base/foundation and heads/primary beam by friction. If this is the case care should be taken that where jack braces are used they terminate at a standard carrying enough load to mobilise sufficient friction to transfer the load. If this is not the case the head and/or base jacks should be connected to their neighbours with tube and fittings or to the primary beam/foundation with mechanical fixings designed to transfer the whole load.

Skewing the Falsework Grid

Rapidshor may be detailed with the grid skewed to any angle up to 35 degrees. This feature is useful for falsework to skew bridge decks. Adjacent bays may be skewed to different angles if necessary although this may prove awkward for erectors to lay out on site.

For skew angles up to 22.5 degrees ledgers connect to the standard lug clusters in the normal way with wedges in taper slots at 90 degrees to each other (see Fig.1). For angles between 22.5 and 35 degrees ledger wedges are placed in taper slots adjacent to each other (45 degrees apart - see Fig.2). All ledgers and braces should be placed at a node before tightening the ledger wedges.

Effect on Loads to Standards

The load in the standards for a particular grid and slab thickness will be reduced in comparison to a grid with no skew by the cosine of the skew angle.

i.e. The load area carried by a standard in a 1.8m square grid (ignoring continuity) is:

$$1.8\text{m} \times 1.8\text{m} = 3.24\text{m}^2$$

If the grid is skewed to 24 degrees the load area

is reduced to:

$$1.8 \times 1.8 \times \cos 24^\circ = 2.96\text{m}^2$$

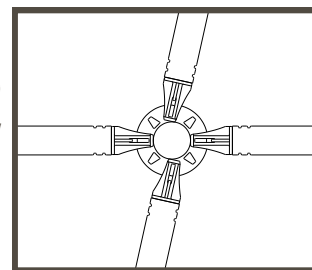


Fig.1 - Up to 22.5°

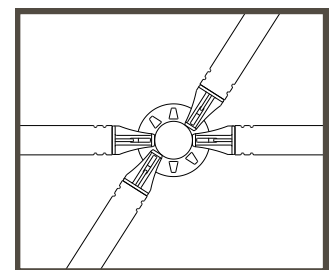


Fig.2 - 22.5° to 35°

Effect on Braces

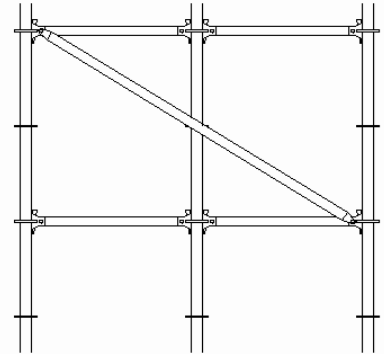
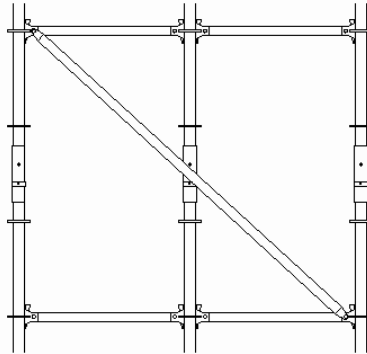
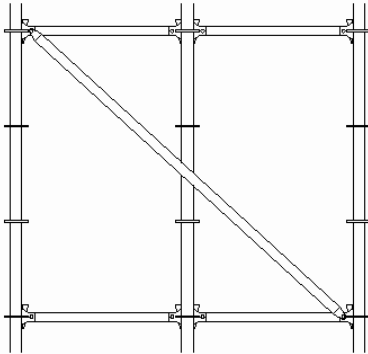
For skew grids the bracing planes to the standards are no longer at right angles to each other. Because of this the safe working loads of the braces in **both** directions should be de-rated by the cosine of the skew angle.

Care should be taken whilst detailing any head or base jack bracing. For skew angles over ten degrees adjustable braces can only be used in one of the grid directions on the standard as the end pin will not mate with the ear plates on the Rapidshor base or head. If braces are required in both directions on a single standard use tube and fittings in one of the grid directions.

For skew angles up to 29 degrees all braces can be connected at a node point in the usual manner. Over 29 degrees skew, one end of braces should be connected to the ledger before the ledger is joined to the standard.

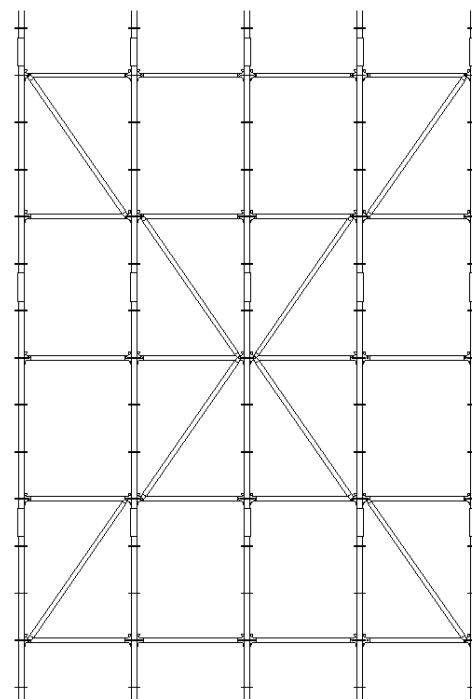
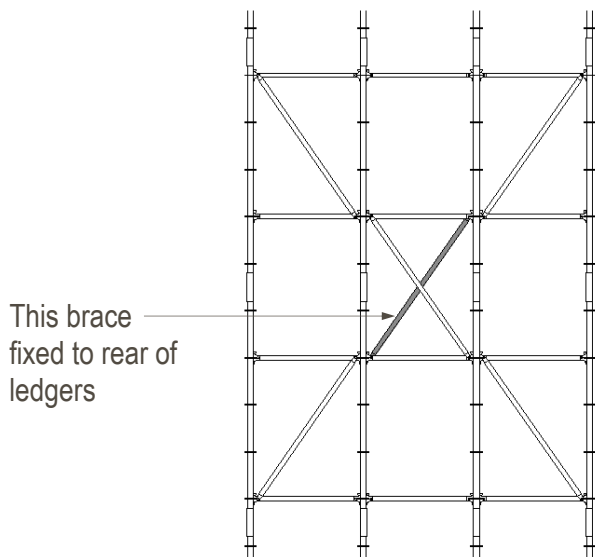
Bracing Over Multiple Bays

Braces can be placed over multiple bays provided they do not foul on the nodal disks or joint sleeves on the inner standards.



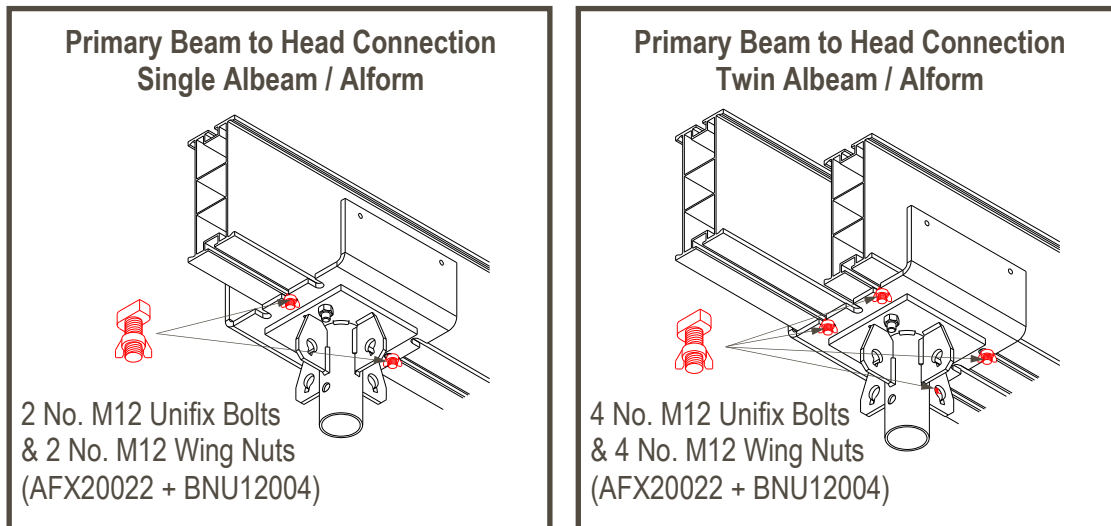
Double and Reversed Bracing

When braces are used in reversed pairs care should be taken to ensure that they cross within a bay and not at a node position as the design of the ledger does not permit 'dog-leg' bracing patterns.



Eccentric Loads

Allowable working loads are given with concentrically applied loads. Ensure that primary beams are secured in the middle of the U-head during assembly and fix in place as detailed.



Where it is not possible to apply loads concentrically (for instance in the case of lapped primary beams) checks shall be carried out to ensure that the structure can carry the combined axial load and bending moments applied using the formula:

$$\frac{F_c}{P_c} + \frac{F_{bc}}{P_{bc}} \leq 1$$

Where F_c is the applied axial load, P_c is the maximum allowable axial load from the graphs on sheets 30-33, F_{bc} is the applied bending moment = ($F_c \times e$, where e is the load eccentricity) and P_{bc} is the moment capacity of the Rapidshor Jack = 1.29kNm

Mobile Falsework Tables

Rapidshor may be used in crane handled table applications. Take the following measures during design and communicate these requirements clearly on the scheme drawing:

Lifting Points

Show the lifting equipment attached around the Rapidshor Standards immediately beneath a node having Rapidshor Ledgers attached. Do not attach the lifting equipment to the soffit formwork or the head jacks. Take care during lifting that the slings do not loosen/lift the wedges in the Ledger end fittings.

Stability

Check the ability of the assembly to span between the lifting points and introduce additional Rapidshor Braces where required. If the lifting equipment consists of inclined chains, check the affect of the compressive forces generated in the Rapidshor ledgers during the lift. Add tube and fitting plan bracing at the base of the structure. Check the rotational stability of the table assembly in flight.

Joints in Standards

Rapidshor Standards are joined using Joint Sleeves secured to the standard with a Rapidshor Sleeve Clip. Where Rapidshor is to be crane handled, ensure two M12x100 bolts and M12 Nyloc Nuts are used at the Joint Sleeve. This operation needs to be done with the progress of erection otherwise the holes in the sleeve and the standard will be unlikely to line up.

Base Jacks

A common way to secure the base jacks into the standards during lifting is to use radial slices cut from a tyre inner tube. These need to be placed over the base lift ledgers during erection and are used to bungee the jack handles to the bottom ledgers prior to crane handling. Alternatively rope can be used.

The Spring Retainer within the Rapidshor Jack is used to join the unit to Rapidshor heads and bases during non-crane handled applications and prevents the jack stem from rotating during the stripping operation. Where Rapidshor falsework or tables are to be crane handled, replace the Spring Retainers in the Rapidshor Base Jacks with M12x80 bolts with Nyloc Nuts. This operation will need to be carried out by the Branch prior to dispatch of the equipment and reversed by the Branch during return as special tools are required.

RAPIDSHOR

80kN STEEL SHORING SYSTEM

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