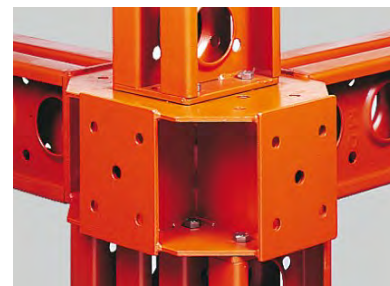


SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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Technical Data Sheets Metric Specification



Global Data (Excluding USA, Australia & New Zealand)
Brickyard Road, Aldridge, Walsall WS9 8BW, UK.













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Ref	Description	Weight	Page
AFX11200	Alform Beam 1200mm	6.76 kg	47
AFX11500	Alform Beam 1500mm	8.46 kg	47
AFX11800	Alform Beam 1800mm	10.15 kg	47
AFX12100	Alform Beam 2100mm	11.85 kg	47
AFX12400	Alform Beam 2400mm	13.54 kg	47
AFX12700	Alform Beam 2700mm	15.24 kg	47
AFX13000	Alform Beam 3000mm	16.93 kg	47
AFX13600	Alform Beam 3600mm	20.32 kg	47
AFX14200	Alform Beam 4200mm	23.71 kg	47
AFX14800	Alform Beam 4800mm	27.10 kg	47
AFX15400	Alform Beam 5400mm	30.49 kg	47
AFX16000	Alform Beam 6000mm	33.88 kg	47
AFX16600	Alform Beam 6600mm	37.27 kg	47
AFX17200	Alform Beam 7200mm	40.67 kg	47
AFX20003	Alform Clamp Plate	0.09 kg	79
AFX20012	Superslim Clamp Assembly	0.30 kg	60,106
AFX20015	Alform Superslim Clamp Plate	0.16 kg	106
AFX20022	M12 Uni-fix Bolt	0.06 kg	106
AGU20120	M24 Anchor Plate 100x100x110	1.23 kg	66,67,68
ALX10001	Universal Clamp	0.75 kg	107
ALX10002	Flange to Flange Wedge Clamp	0.51 kg	107
ASX10056	Alshor Superslim Clamp	0.72 kg	108
BNA11202	M12 Nyloc Nut gr8 BZP	0.02 kg	109
BNU10050	Prop Brace Pin M24/M20	0.43 kg	53
BNU10054	Metric Waling Bolt 117 x 117	0.30 kg	103
BNU10055	Metric Waling Bolt 176 x 127	0.42 kg	103
BNU11001	M10 Hexagon Nut gr8 BZP	0.08 kg	81
BNU12001	M12 Hexagon Nut gr8 BZP	0.01 kg	80,106,109
BNU12002	M12 Round Washer	0.01 kg	80,109
BNU16001	M16 Hexagon Nut gr8 BZP	0.03 kg	19,20,23,25,26,31,53,79,83,84,103,104,106,109
BNU16002	M16 Round Washer BZP	0.01 kg	23,80,106,109
BNU16003	M16 Nyloc Nut gr8 BZP	0.03 kg	109
BNU16007	M16 x 40 Set Pin gr 8.8 ZP	0.09 kg	19,23,25,53,79,83,84,109
BNU16008	M16 x 40 C/Snk Set Pin gr 8.8 ZP	0.05 kg	32,83,104,109
BNU16009	M16x60 Bolt gr8.8 BZP	0.11 kg	25,109
BNU16013	M16 x 110 Bolt gr8.8 BZP	0.20 kg	19,20,106,109
BNU20001	M20 Hexagon Nut gr8.8 ZP	0.06 kg	10,26,75,76,82,83,90,97,98,109
BNU20002	M20 Nyloc Nut gr8.8 BZP	0.06 kg	72,73,109
BNU20003	M20 Round Washer BZP	0.03 kg	76,98
BNU20015	M20 x 100 Bolt gr8.8 BZP	0.32 kg	10,72,73,90
BNU24001	M24 Hexagon Nut gr 8.8 ZP	0.06 kg	39,50,51,54,109
BNU24002	M24 Round Washer BZP	0.07 kg	109
BNU24004	M24 x 60 gr8.8 Bolt BZP	0.37 kg	109
BNX10005	M10 x 20 Set Pin gr8.8 BZP	0.03 kg	82
BNX10007	M10 x 35 Set Pin gr8.8 BZP Csk	0.04 kg	72,73,81
BNX12001	Bolt M12x40 C/sk Plate gr8.8	0.05 kg	80,109
BNX12002	M12 x 30 Set Pin gr8.8 BZP	0.04 kg	79,109
BNX12009	M12 x 25 Set Pin gr8.8 BZP	0.04 kg	79,109
BNX16007	M16 x 220 Bolt gr8.8 BZP	0.38 kg	105
BNX20011	Washer - Plate 150x150x6 22mm	1.10 kg	38
BNX20014	50x50x6x18mm Plate Washer	0.12 kg	103
BNX20020	Washer - Chanel 150x75 18mm	0.66 kg	26,105
BNX20021	Washer - Chanel 150x75 22mm	0.66 kg	26

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Item Code Rapid Reference.....continued

Ref	Description	Weight	Page
BNX20027	M20 x 45 Set Pin gr8.8 BZP Csk	0.17 kg	82
BNX20030	M20 x 90 Bolt gr8.8 BZP	0.28 kg	10,75,83,97,109
BNX20100	Megashor Pin High Yield	0.41 kg	54,109
BNX24001	M24 x 45 Set Pin gr8.8 BZP	0.26 kg	64,109
BNX24002	M24 x 110 Bolt gr8.8 BZP	0.48 kg	39,50,51,54,109
BTU10009	Rapid Bar Tie Turnbuckle	2.07 kg	86
BTU10015	Paraslim Wing Nut 'O' Ring	0.01 kg	31
BTU10020	Hi-Load Bearing Plate	1.20 kg	61
BTU20001	Twin 15mm Rapid Tie Anchor	0.57 kg	34,40
BTX10001	Knock On Wing Nut	0.32 kg	27,31
BTX10002	Rapid Tie Connector 20mm	0.79 kg	30
BTX10004	Waler Plate - Heavy Duty	1.76 kg	28
BTX10005	Nut – Hexagon 20mm Bar	0.40 kg	30
BTX10006	Knock On Nut – Hi Load	0.47 kg	30
BTX10008	Plastic Cone – Hi Load 26 Dia	0.01 kg	30
BTX10009	Plas Tube – Hi Load 26/30 x 2m	0.92 kg	30
BTX10011	Connector Ribbed - Waterbar	0.54 kg	27
BTX10014	Waler Plate – Light 55kN	1.13 kg	27
BTX10017	Nut – Hexagon 50mm	0.16 kg	27,30,90
BTX10018	Plas Cone 10mm	0.01 kg	27
BTX10019	Plas Tube 2m	0.45 kg	27
BTX10021	Waler Plate – Standard	1.35 kg	27,76,98
BTX10029	Waler Plate – Hi Load	6.84 kg	30
BTX10030	Rapid Tie Bar Forkend	1.31 kg	86
BTX10033	Rapid Tie Bar Cast Heavy Duty Waler Plate	1.63 kg	29
BTX10600	Bar Tie 15mm x 6.0m	8.80 kg	27
BTX20015	Bar Tie per Cut 15mm	-	27
BTX20020	Bar Tie per Cut 20mm	-	30
BTX30015	Bar Tie per m 15mm	1.40 kg	27
BTX40600	Bar Tie 20mm x 6m	14.8 kg	30
FAU10142	Propbolt 24R-50	0.48 kg	32,33
GTX10001	GTX to Soldier Clamp Mk 1A	0.80 kg	60,108
HTU10014	Waler Plate – Angle 3/4"	1.32 kg	28
HTX10013	Extractor Key Arm	3.60 kg	66
HTX10015	Extractor Key Head M24	0.34 kg	66
HTX24140	Anchor Screw M24 x 140mm	0.88 kg	66
HTX24200	Anchor Screw M24 x 200mm	1.11 kg	66
HTX24280	Anchor Screw M24 x 280mm	1.45 kg	66
MNX10076	M10 Nyloc Nut	0.05 kg	72,73
PSU20001	Paraslim Safetie Bearing	1.71 kg	31
PSX10007	Paraslim Turnbuckle Forkend	2.62 kg	72
PSX10008	Paraslim Tilt Plate	2.30 kg	72,73,74
PSX10009	Paraslim Tube Inner	2.10 kg	72,73,74
PSX10010	Paraslim Tube Outer	2.34 kg	72,73,74
PSX10011	Webtie Tensioning Fork	1.02 kg	75
PSX10012	Webtie Delta Loop 250mm	0.68 kg	75
PSX10014	Webtie Edge Protector	0.01 kg	75
PSX10028	Webtie Hot Knife Tool 110v	6.0 kg	76
PSX10029	Webtie Hot Knife Blade	0.001 kg	76
PSX10032	Paraslim Undercarriage Assembly	10.7 kg	72
PSX10035	Paraslim Tilt Plate Bearing Pad	0.12 kg	72,73
RCX10009	Rapidclimb M24 Cone	1.62 kg	66,67,68

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Item Code Rapid Reference.....continued

Ref	Description	Weight	Page
RCX10020	Rapidclimb Cone Retainer	0.12 kg	67
RCX10021	Rapidclimb Cone Retainer Key	0.05 kg	67
RCX10031	Rapidclimb Extractor Key	0.45 kg	67
RPX10005	B Clamp – Tube to Panel	0.66 kg	105
RPX10008	G Clamp – Tube Type M16	0.60 kg	105
RSX10001	Rapidshor U-Plate 8thk x 220mm wide	5.72 kg	80
RSX10003	Rapidshor Brace U Head 182mm wide	8.47 kg	80
RSX10008	Rapidshor U-Plate 8thk x 182mm wide	5.26 kg	80
SFU10014	2" Half Coupler 18mm Dia Hole	0.51 kg	104
SFX10002	Coupler - 90 deg 2" x 2"	1.35 kg	88,91
SFX10003	Coupler - Swivel 2" x 2"	1.48 kg	88
SFX10004	Coupler - Fixed 2 3/8" x 2"	1.41 kg	88,91
SFX10005	Coupler - Swivel 2 3/8" x 2"	1.90 kg	88
SSM00001	Superslim Single Sided Corner 540mm x 540mm	31.3 kg	34,38
SSM00007	Superslim Fixed Strut Adaptor	12.0 kg	34,39
SSM00008	Superslim Fixed Strut 2896mm	35.0 kg	34,39
SSM00071	Superslim Lower Giro Unit	7.91 kg	60
SSM00072	Superslim Upper Giro Unit	12.17 kg	60
SSM10540	Superslim Single Sided Beam 540mm	28.2 kg	34,38
SSM11260	Superslim Soldier 1260mm	27.2 kg	9
SSU10003	Superslim 90 Degree Corner	8.69 kg	23
SSU10004	Superslim Prop Pivot Tube	1.81 kg	53,83,98
SSU10005	Superslim 45 Deg Corner	6.26 kg	23
SSU10007	Superslim Prop Jack (LH)	13.6 kg	50,80
SSU10008	Superslim Prop Jack (RH)	13.7 kg	50,80
SSU10010	Superslim Joint Stiffener	1.44 kg	19,20
SSU10011	Superslim R Clip 5 x 100mm	0.03 kg	54,98,109
SSU10012	Superslim Prop Spade End Link	3.06 kg	53
SSU10013	Superslim Prop Tube End Link	2.81 kg	54
SSU10016	Superslim Turnbuckle 914-1160	8.42 kg	22,32
SSU10017	Superslim Waling Clamp Plate	0.40 kg	103,106
SSU10019	Superslim Corner Pivot	7.32 kg	83
SSU10023	Superslim Rocking Head 36mm	4.35 kg	82
SSU10024	Superslim Tube Clamp	1.33 kg	91,104
SSU10025	Superslim Adjustable Base 365-515	19.0 kg	78,80
SSU10026	Superslim Adjustable Head 440-590mm	24.6 kg	79
SSU10028	Superslim Pivot Cleat Set	8.46 kg	24,32
SSU10029	Rocking Head Washer M10	0.02 kg	72,73,81,82
SSU10030	Superslim Klik-Klak Wall Bracket	6.63 kg	64
SSU10031	Superslim Access Bracket	8.56 kg	25,26
SSU10032	Superslim Lifting Plate 15kN	3.19 kg	34,97
SSU10033	Superslim Plumbing Foot	11.4 kg	22,32
SSU10034	Superslim Tilt Plate	4.89 kg	50
SSU10035	Superslim Soldier 360mm H/Shoe	11.7 kg	63,64
SSU10036	Superslim Anchor Plate 15mm	7.30 kg	32
SSU10037	Superslim Klik Klak Latch	3.95 kg	64
SSU10038	Superslim Prop Connector 100KN	6.82 kg	52
SSU10041	Superslim Prop Torque Handle	6.19 kg	55
SSU10042	Superslim Prop Torque Socket	2.17 kg	55

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Item Code Rapid Reference.....continued

Ref	Description	Weight	Page
SSU10044	Klik-Klak Wall Pocket	1.64 kg	65
SSU10045	Superslim Soldier - 360mm O/E	11.7 kg	10
SSU20006	Multislim 6 Way Connector	24.9 kg	84,85
SSU20066	6 Way Double Connector	42.0 kg	84,85
SSX10037	Superslim Pivot Corner 20mm	4.27 kg	83
SSX10039	Porthole Bearing 20.8mm Dia Hole	1.22 kg	30,90,98
SSX10040	Superslim End Plate 10mm	2.90 kg	9
SSX10041	Superslim Prop Support Plate	6.02 kg	82
SSX10042	Super Slim Form Support Plate	5.29 kg	25,97,98
SSX10043	Superslim Neoprene Pad	0.29 kg	81
SSX10046	Superslim 19mm Pin & R Clip	0.29 kg	10,22,39,51,52,60,64,72,74,83,86,97,100,109
SSX10048	Superslim Safety Latch	1.39 kg	69
SSX10051	Superslim Short Prop Tube End Link	1.70 kg	54
SSX10052	Spreader Beam Adaptor Assembly	19.4 kg	99
SSX10061	Superslim O/E M24 Cone Bobbin	0.51 kg	63,66,68
SSX10062	Superslim Cast 100kN Tilt Plate	5.00 kg	51
SSU10032	Superslim Lifting Plate Assembly 20kN	4.97 kg	34,97
SSX10090	Superslim Soldier 90mm	7.30 kg	9
SSX11800	Superslim Soldier 180mm	8.70 kg	9
SSX10360	Superslim Soldier 360mm	12.0 kg	9
SSX10540	Superslim Soldier 540mm	15.2 kg	9
SSX10720	Superslim Soldier 720mm	18.7 kg	9
SSX10900	Superslim Soldier 900mm	22.0 kg	9
SSX11800	Superslim Soldier 1800mm	38.8 kg	9
SSX12700	Superslim Soldier 2700mm	55.4 kg	9
SSX13600	Superslim Soldier 3600mm	72.2 kg	9
SSX90043	Superslim Universal Soldier Jack	4.86 kg	22
TRX10016	Allthread Rod – M16 per metre gr8.8	1.00 kg	26
TRX10020	Allthread Rod – M20 per metre gr8.8	2.10 kg	26,76
TRX20000	Allthread Rod per cut	-	26,76
TUX80060	Scaffold Tube 0.6m (4mm)	2.62 kg	88
TUX80150	Scaffold Tube 1.5m (4mm)	6.55 kg	88
TUX80210	Scaffold Tube 2.1m (4mm)	9.17 kg	88
TUX80300	Scaffold Tube 3.0m (4mm)	13.1 kg	88
TUX80360	Scaffold Tube 3.6m (4mm)	15.7 kg	88
TUX80480	Scaffold Tube 4.8m (4mm)	21.0 kg	88
TUX80540	Scaffold Tube 5.4m (4mm)	23.6 kg	88
TUX80640	Scaffold Tube 6.4m (4mm)	28.0 kg	88

SUPERSLIM SOLDIER

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Introduction

The Superslim Soldier is the definitive modular structural support system. Robust, easily assembled and having an unrivalled and growing range of accessories, the Superslim Soldier can be used in numerous temporary works applications such as wall formwork, static or travelling gantries, vertical and raking shores, spanning beams and trusses, façade retention, bridge cantilever edge & deck supports and safety screens for use in hi-rise construction.

Superslim and European Standards.

The majority of the Superslim components were designed before the conception of the EN design standards. Extensive use was made of BS449 backed up by load testing carried out by Birmingham University and in RMD Kwikform labs. Subsequent to the introduction of European Standards we have re-examined the main load-bearing components in the Superslim range using EC3 including the recommendation of EN 12812 to use a partial material factor of 1.1. Where appropriate technical data has been adjusted to suit the output of these calculations and in some instances further load testing in accordance with applicable EN standards has been carried out at University premises to justify published capacities.

To facilitate design using established permissible load methods in accordance with BS5975, 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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SUPERSLIM SOLDIERS

European Data

Date: 17/03/2020

Issue : SS02

Sheet 8

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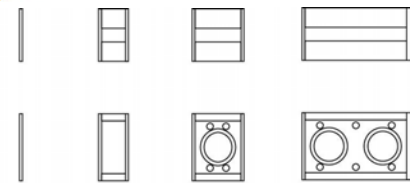
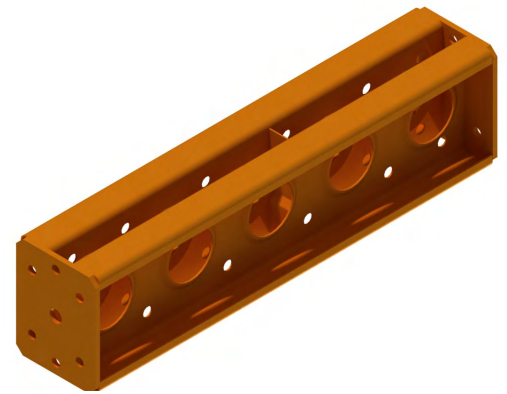
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

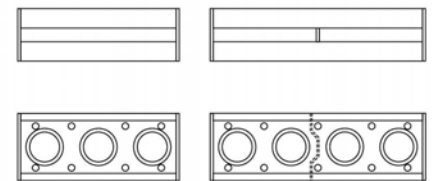


Superslim Soldier Shafts

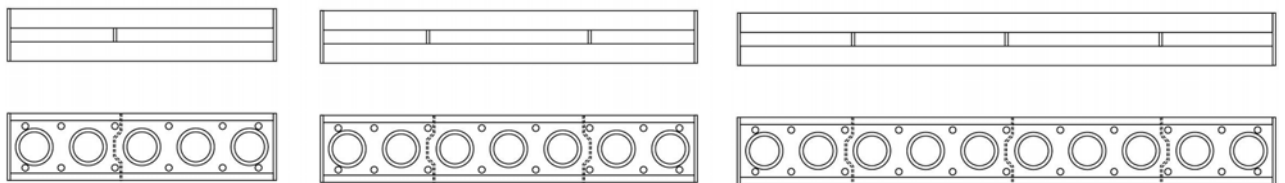
Code	Description	Weight
SSX13600	Superslim Soldier 3600mm	72.2 kg
SSX12700	Superslim Soldier 2700mm	55.4 kg
SSX11800	Superslim Soldier 1800mm	38.8 kg
SSM11260	Superslim Soldier 1260mm	27.2 kg
SSX10900	Superslim Soldier 900mm	22.0 kg
SSX10720	Superslim Soldier 720mm	18.7 kg
SSX10540	Superslim Soldier 540mm	15.2 kg
SSX10360	Superslim Soldier 360mm	12.0 kg
SSX10180	Superslim Soldier 180mm	8.7 kg
SSX10090	Superslim Soldier 90mm	7.3 kg
SSX10040	Superslim End Plate 10mm	2.9 kg



10mm 90mm 180mm 360mm



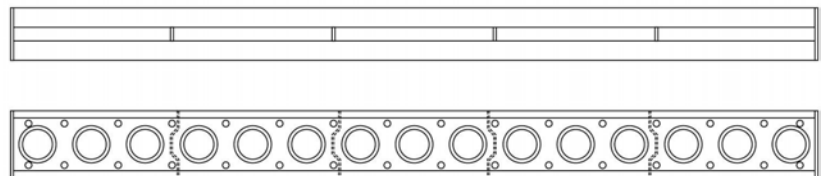
540mm 720mm



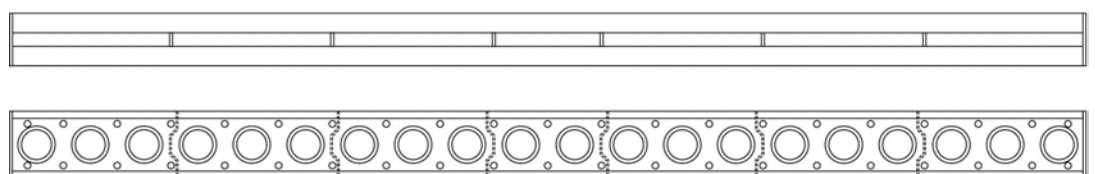
900mm

1260mm

1800mm



2700mm



3600mm

Hot dip galvanized Superslim Soldiers are also available on request.

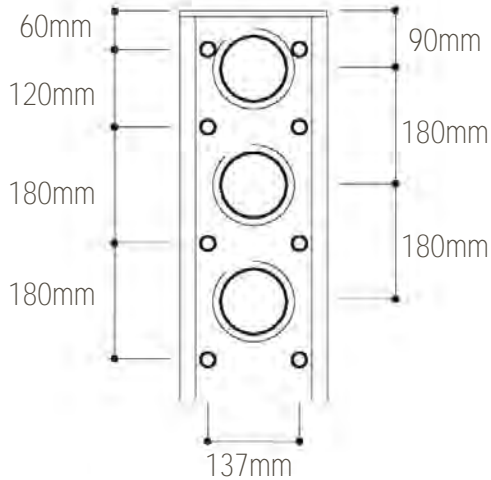
Note! The positions of stiffener plates and 21Ø holes in hire fleet soldiers may vary. Soldiers shown are post 1994 version. If the position of the stiffeners and/or 21Ø holes is critical to the design then please specify 'As New Pattern Soldiers'

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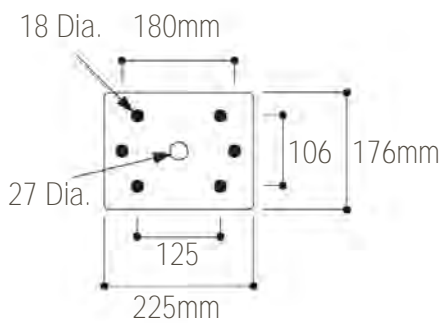


Punchings and Geometry

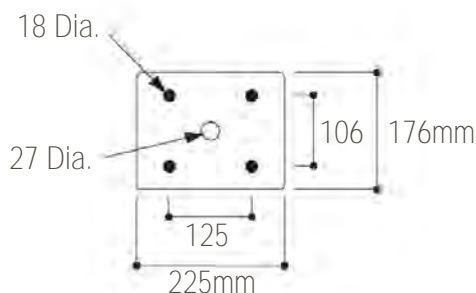


- 100mm dia porthole max bearing in hole pair 65kN
- 21mm dia max bearing in hole pair when used with:-
 - M20 x 90 Bolt/Nut gr 8.8 (BNX20030+BNU20001) = 45kN
 - M20 x 100 Bolt/Nut gr 8.8 (BNU20015+BNU20001) = 58.8kN
 - Superslim 19mm Pin & R-clip (SSX10046) = 46kN

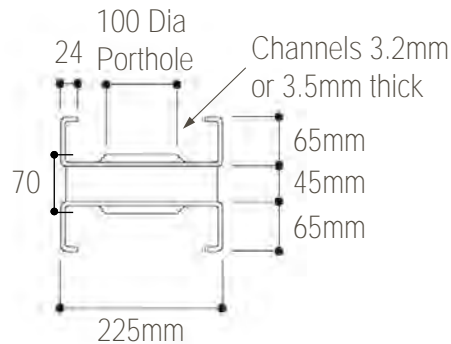
*It is possible to increase the allowable bearing loads in the 21mm Superslim web holes up to 90kN by placing M20 bright washers concentric to the holes within the channel pressing and welding them to the webs of the section.



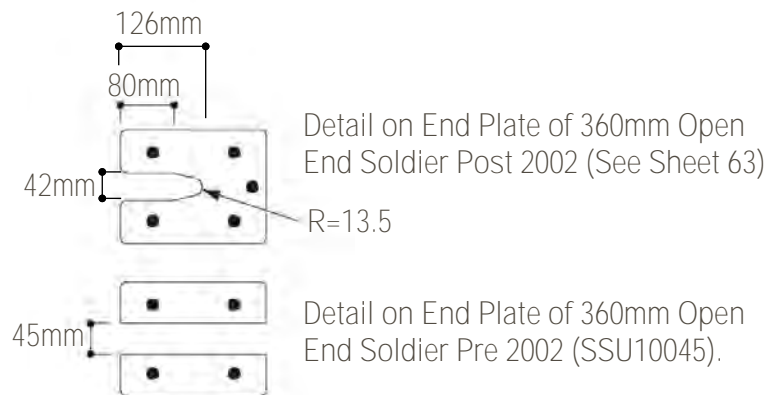
Detail on End Plate
10mm thick - Post 1994 version



Detail on End Plate 8mm thick
Pre 1994 version



Typical Section



Detail on End Plate of 360mm Open
End Soldier Post 2002 (See Sheet 63)

Detail on End Plate of 360mm Open
End Soldier Pre 2002 (SSU10045).

Note: The arrangement of holes in the end plates of hire fleet soldiers vary. If using soldiers bolted to Megashor **please specify '7 hole end plate soldiers'**.

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Section Properties

Soldier Characteristics

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
GA xx	17350 kN
Vmax y (parallel to webs)	88kN min*
M max x	40 kNm
M max y	6.24 kNm
Mean Self weight for Analysis	0.235 kN/m run**

* limited by the value at the 100mm diameter porthole.

** Self weight varies depending on makeup / length - see sheet 9.

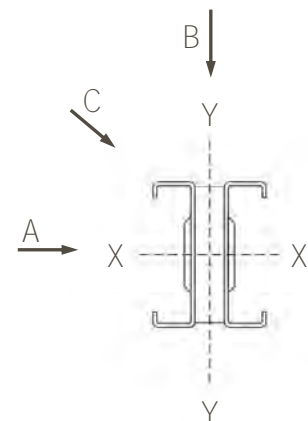


Bolted Joint Characteristics in X-X Axis - see sheet 19 for location of bolts

Number of Bolts	Maximum Moment	Maximum Shear	Maximum Tension
2 M16 gr 8.8 Bolts	9kNm	76kN	90kN
4 M16 gr8.8 Bolts	12kNm	88kN*	100kN
6 M16 gr 8.8 Bolts	18kNm	88kN*	140kN
6 M16 gr 8.8 Bolts & Joint Stiffeners	24kNm	88kN*	150kN

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



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Beams with Compression Flanges Restrained

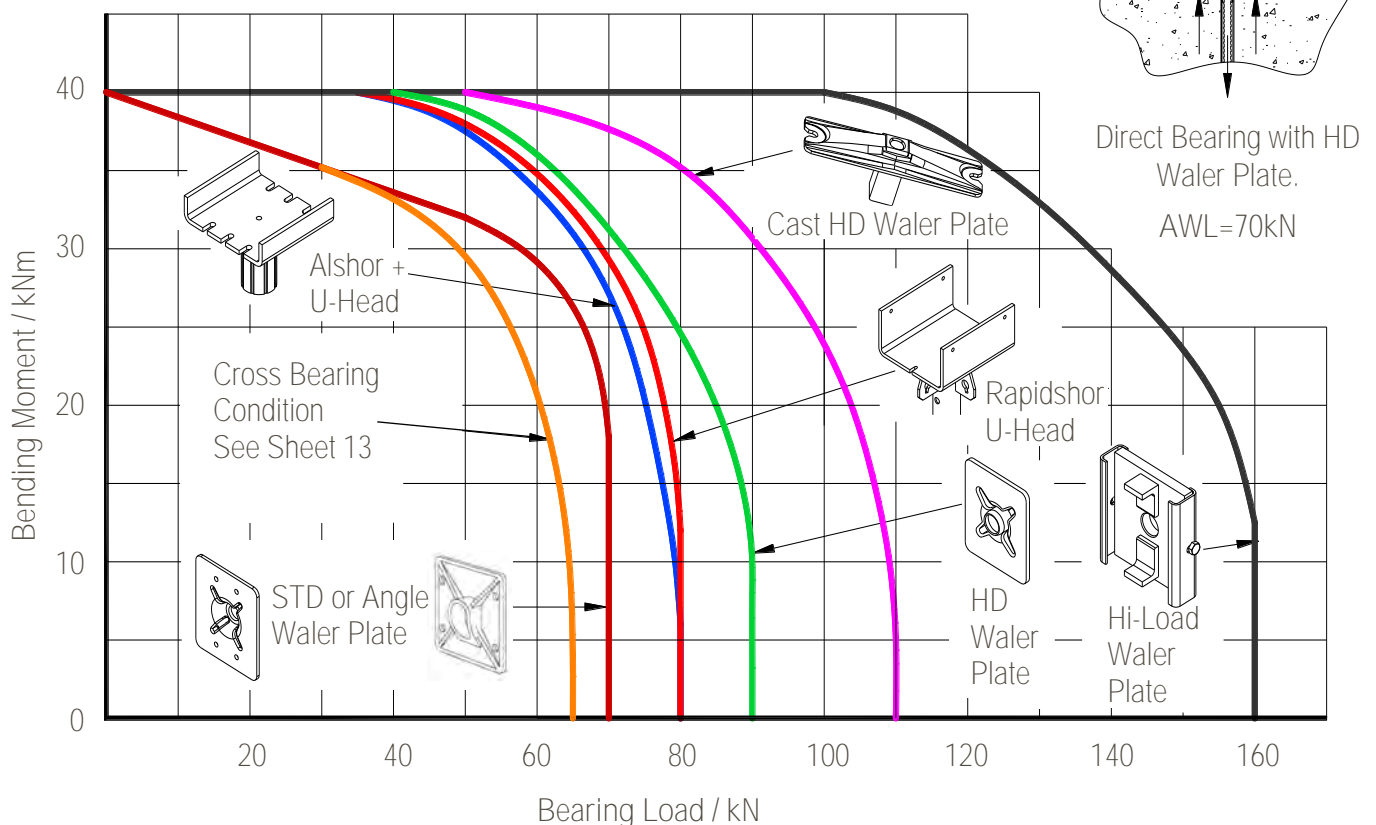
The Superslim Soldier is a lightweight member and it is not generally appropriate to use established design codes for beam analysis. Performance of the unit has been derived from a combination of calculation and extensive load testing. Due to the presence of various web perforations, performance is affected by both shear stiffness and the bending stiffness of the member. Analysis of beam deflection is complex, for deflection calculation by simplistic analysis, reduced EI value of 3200kNm² gives good correlation with the more rigorous analysis.

When used as a beam it is important that the soldier is restrained laterally at load points and supports. On a shutter this lateral restraint is provided by the face contact material, backing members and specified connections between the components acting as a stiff diaphragm to restrain the connected flange of the Superslim. Integral intermittent welded web stiffeners in the Superslim transfer this lateral restraint to the unconnected flanges. When used as an isolated beam it is normal to provide lateral restraint using scaffold tubes coupled to the flanges of the soldier. When lateral restraint is not provided refer to sheet 14 for Allowable Working Loads.

When bending in the weak axis, the soldier should be treated as two individual channel members, each with a moment of resistance of 3.12kNm. Individual loads act on the single channel and transfer the forces through the welded stiffeners to the other channel.

Combined Loading

Performance under conditions of combined bending, bearing and shear loading can be checked using the graph below and figure right for a range of connecting accessories and conditions.



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

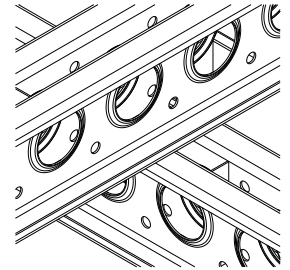


Cross Bearing Conditions

Cross bearing is the least favourable load case for Superslim Soldiers and exists under the following conditions:

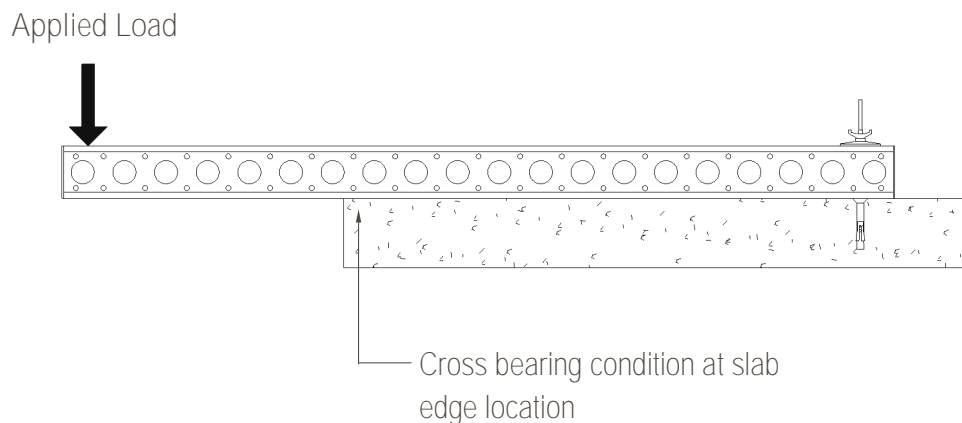
Crossing Superslim Soldiers

This condition occurs in wall formwork applications where the primary beams run vertically and a horizontal Superslim is added to the rear of the primary beams to pick up tie positions that do not line up with the vertical soldiers.



Cantilevering Superslim Soldiers

When Superslim Soldiers are used as cantilevers beams to support a load beyond a slab edge, the reaction between the Superslim and the slab edge is considered a cross bearing condition. For short cantilevers it may be possible to incorporate a bolted Soldier joint at this bearing location in which case the Superslim end plates act as load bearing stiffeners. In this case bearing need not be considered and the allowable working load is governed only by the bending moment capacity of the bolted joint.

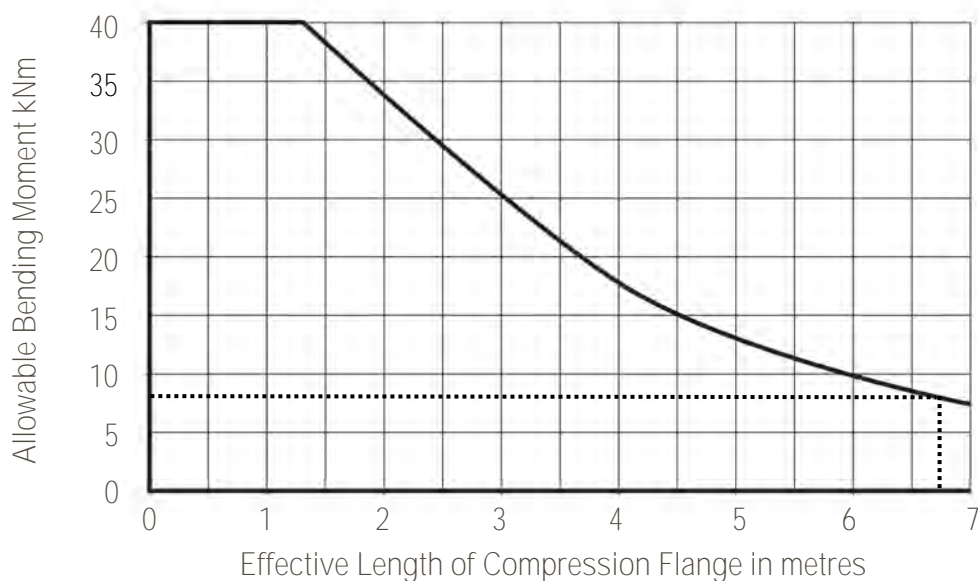


SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

Beams with Compression Flanges Unrestrained

The failure mode for long spanning beams without compression flange restraint tends to be by buckling sideways of the compression flanges, a phenomenon known as lateral torsional buckling. During the design of standard steel sections the permissible bending stress is de-rated from the maximum for the material to ensure that failure of this nature does not occur. Superslim Soldiers can also be susceptible to this kind of failure. The complex section is made up of twin channels welded together in a manner that makes them act in a partially composite manner. A mathematical study has been combined with load testing to produce the graph below.



Effective Length of Compression Flange

BS 5975 Annex K.3 may be used to determine the effective length of the compression flanges, e.g. an individual Super Slim soldier cantilevers 0.9m past a Rapidshor U Head.

Determine the maximum point load that may be carried on the top flange at the unrestrained tip.

From BS 5975 table K.3 the soldier is continuous with lateral restraint only. The effective length of the compression flange (in this case the lower flange) is $7.5 * 0.9\text{m} = 6.75\text{m}$.

From the graph above the maximum allowable bending moment at 6.75m effective length = 8.0kNm.

Hence maximum point load at tip = $8.0\text{kNm} / 0.9\text{m} = 8.89\text{kN}$.

For more detailed information on the behaviour of Superslim Soldiers and further examples refer to the Appendix.

SUPERSLIM SOLDIER

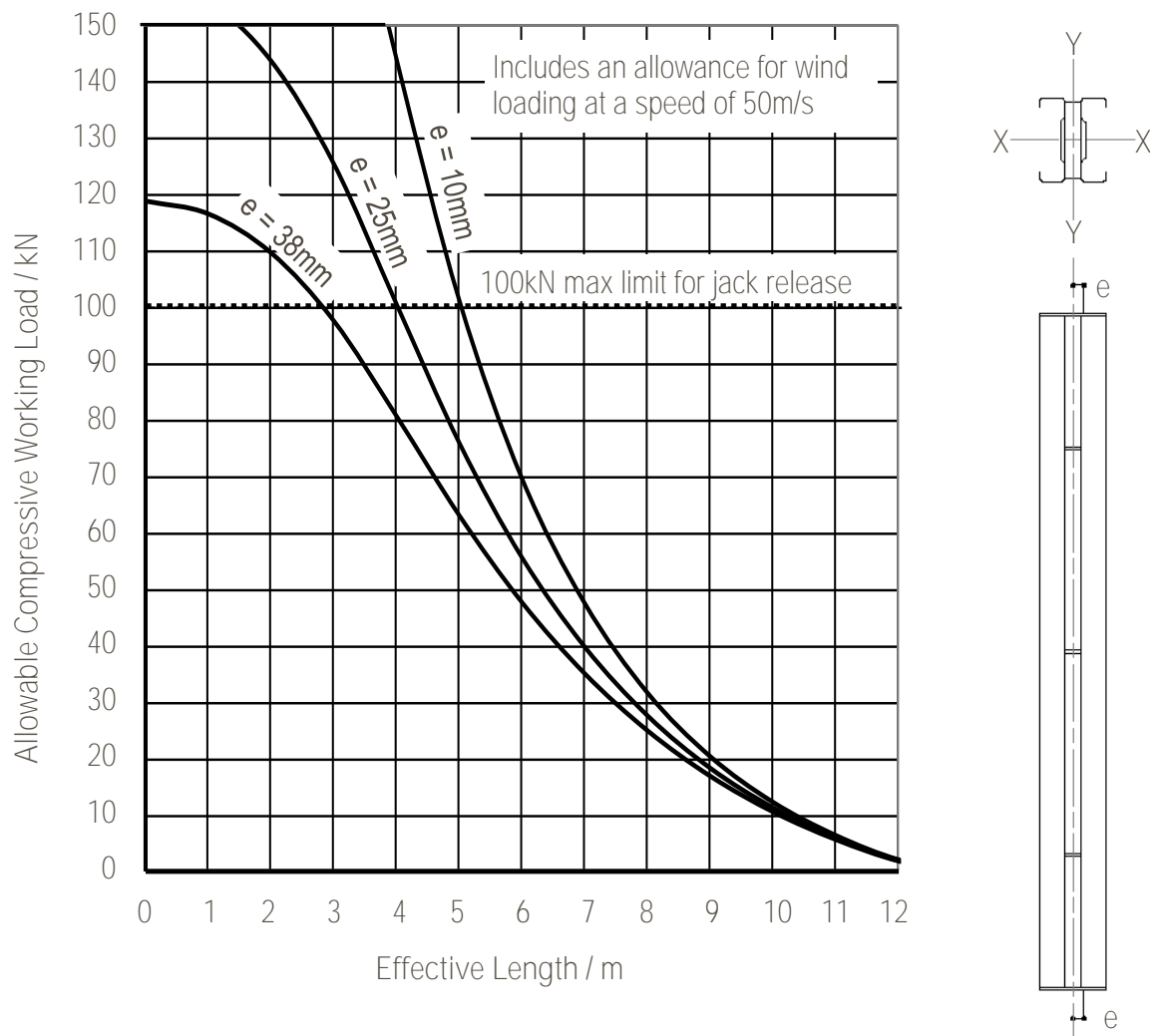
MODULAR STRUCTURAL SYSTEM

Vertical Struts – Buckling About the Y Axis

The Superslim Soldier has different loading characteristics about its two axes due to its asymmetric shape. The arrangement of the strut when erected may also dictate the method of bracing to obtain the required capacity. The lateral stability of the strut in each direction requires consideration, and graphs of safe load capacity against effective strut length are given below. The effective length of a strut is defined in BS 5975 table K1.

When using the rocking head the load is axial in one plane, but dependant upon site accuracy for the degree of eccentricity in the other plane. In the following graphs the permissible loads are given allowing for eccentricity due to assembly tolerance and a load eccentricity of 10mm, 25mm and 38mm.

A load restriction of 100kN is placed on the soldier when the load is to be released through the Slimshor jack. Where the load is not to be released through jacks, the maximum allowable load can be increased to 150kN.

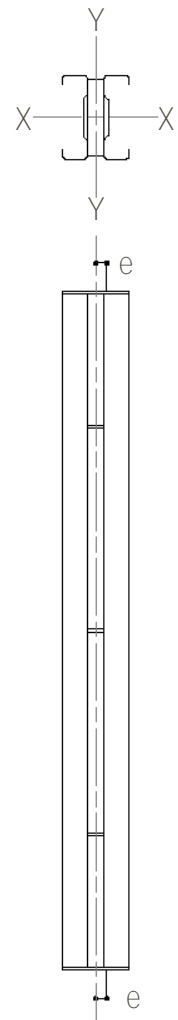
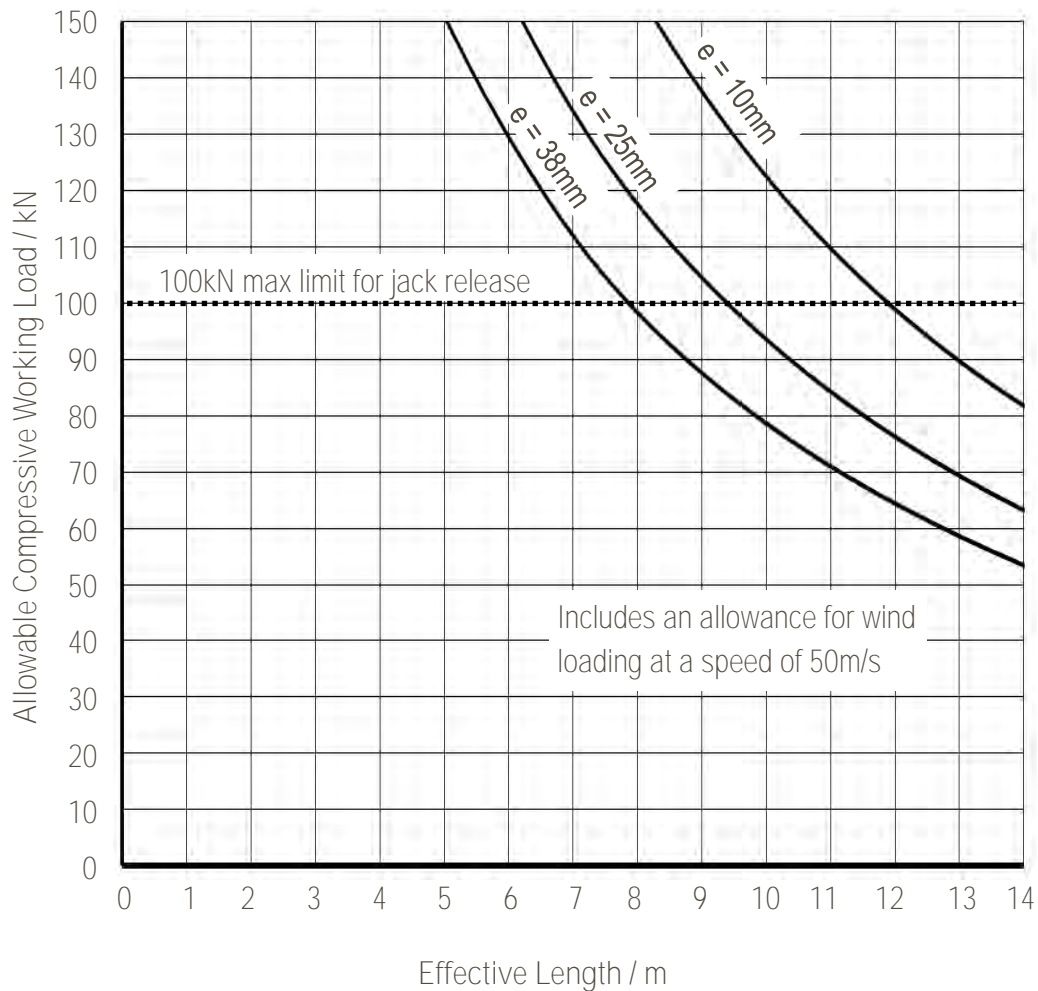


SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Vertical Struts – Buckling About the X Axis



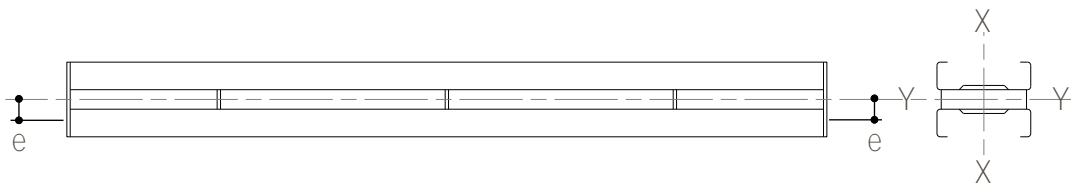
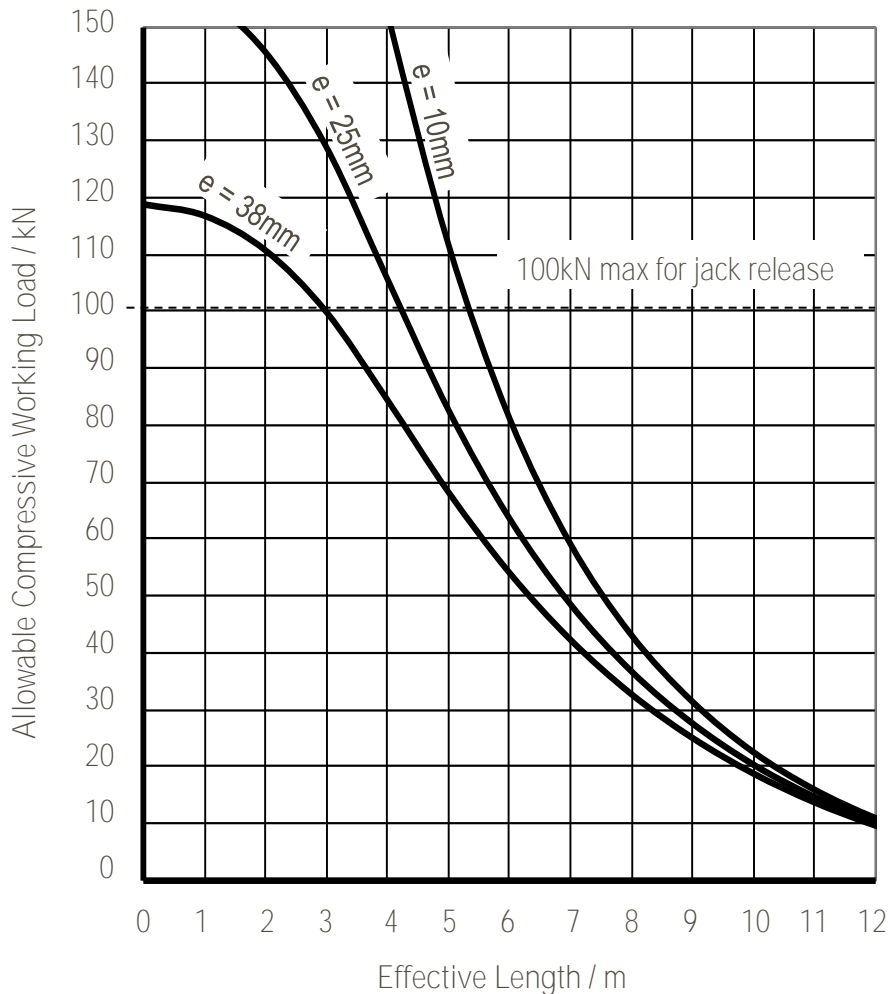
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Horizontal Shores – Buckling About the Y Axis

The notes relating to vertical members in compression also apply to horizontal members in compression. An additional allowance for the self weight of the horizontal shore has been included. Wind load has been excluded for the orientation shown. When shores have intermediate vertical restraints, buckling about the x axis may be the limiting factor.



Note! The allowable working load for horizontal applications is shown as greater than for vertical applications due to the inclusion of wind loads in the vertical application graph (the effects of which exceed the effect of self weight in the horizontal orientation graph). If vertical plane wind loads are expected when designing struts with this orientation refer to RMD Kwikform for revised data.

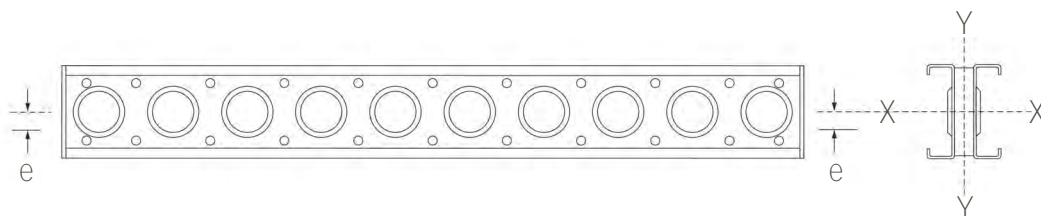
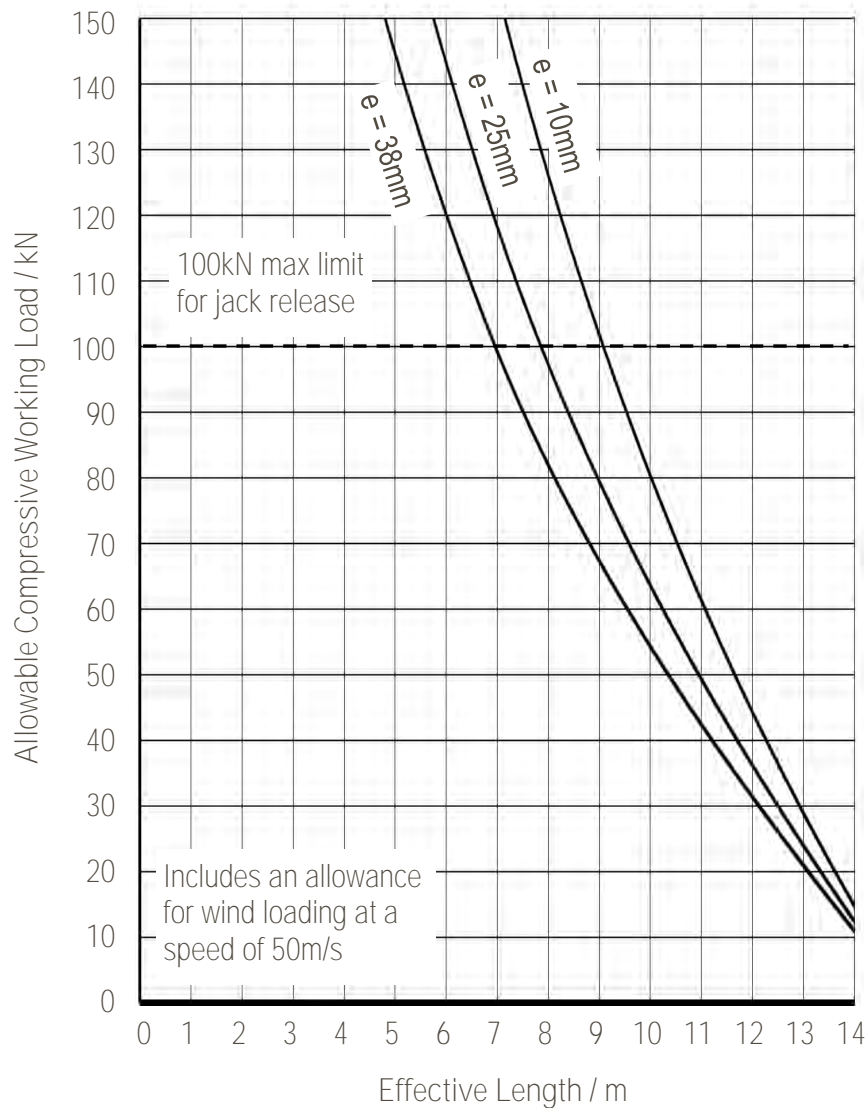
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Horizontal Shores – Buckling About the X Axis

This graph assumes that the strut is effectively restrained against buckling in the Y axis by adequate intermediate lateral restraint.



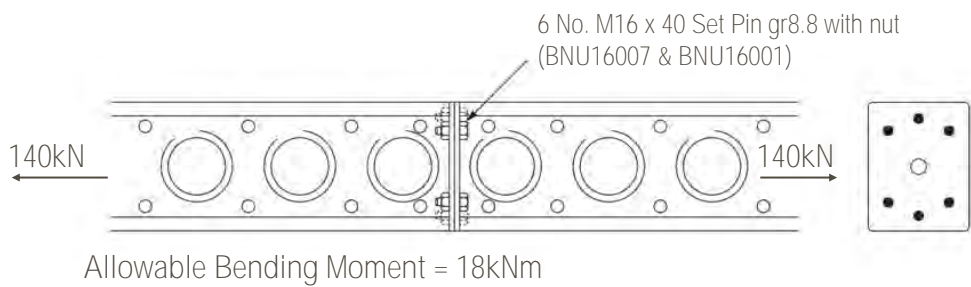
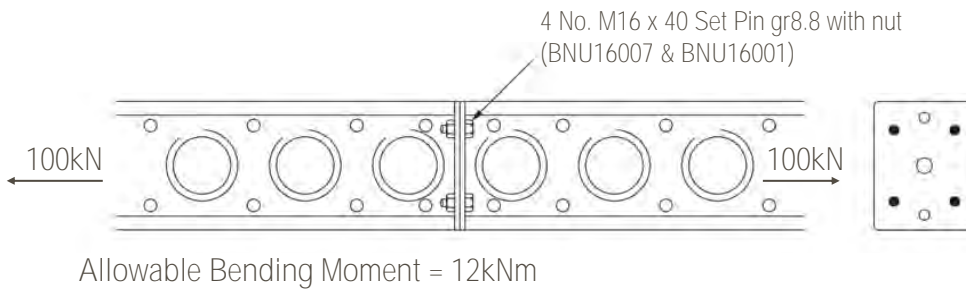
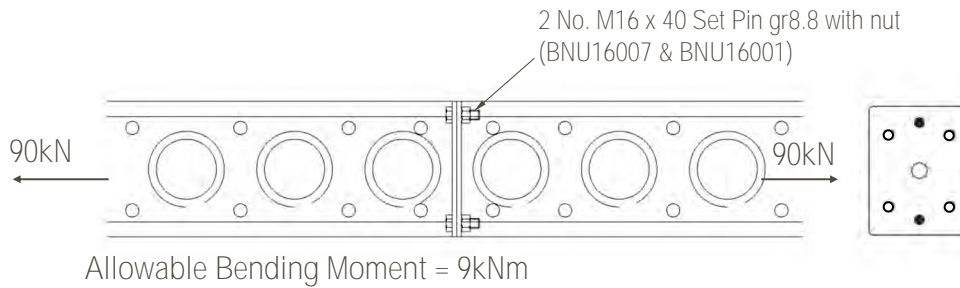
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

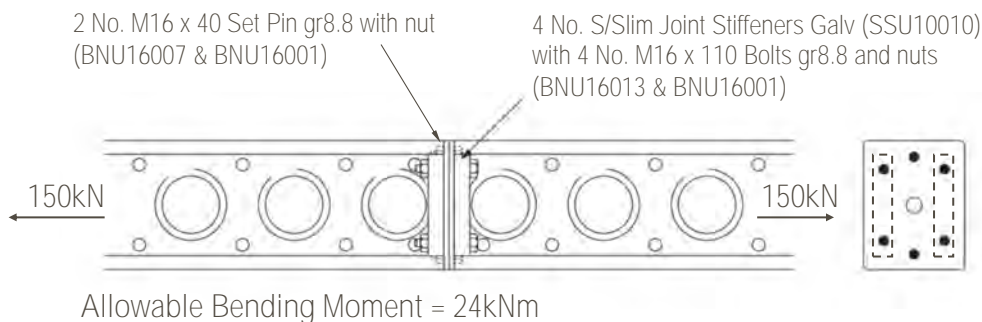


Bolted Joints

Various arrangements and capacities of bolted joints are available:



Using Joint Stiffeners



Combined Stresses - Tension & Bending must satisfy:-

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

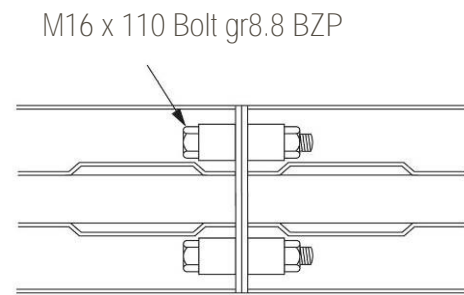
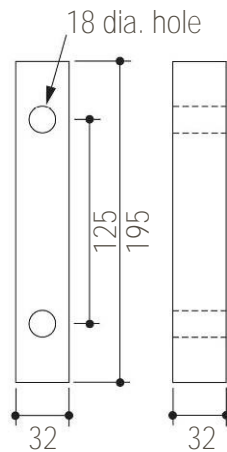
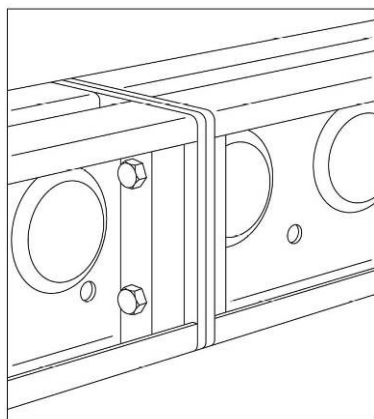
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Superslim Joint Stiffeners

Used to Enhance the load bearing characteristics of a Soldier joint.
See sheet 19 for allowable working loads.



Code	Description	Weight
SSU10010	Superslim Joint Stiffener	1.44 kg
BNU16013	M16x110 Bolt gr8.8 BZP	0.20 kg
BNU16001	M16 Nut gr8 BZP	0.03 kg

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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WALL FORMWORK

European Data

Date: 17/03/2020

Issue : SS02

Sheet 21

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SUPERSLIM SOLDIER

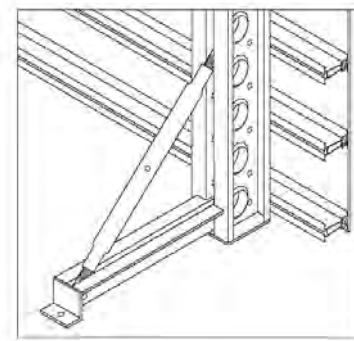
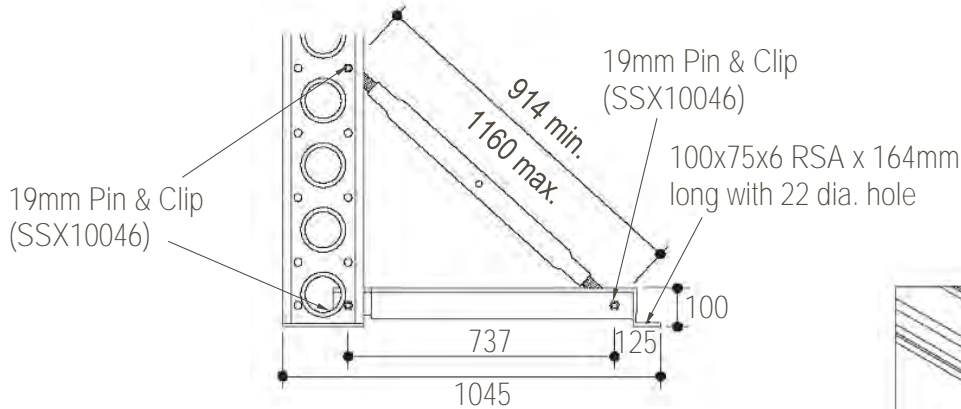
MODULAR STRUCTURAL SYSTEM

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Superslim Turnbuckle & Superslim Plumbing Foot

Used in single sided base formwork applications.

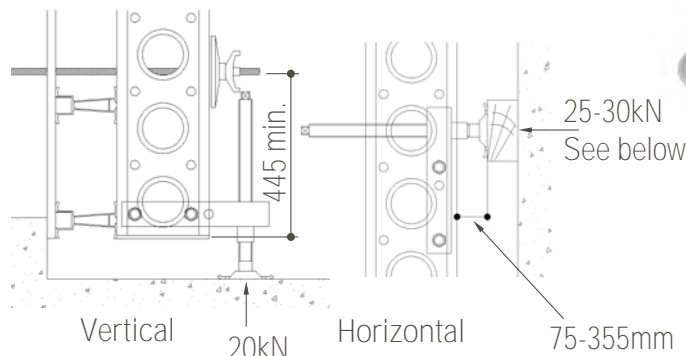
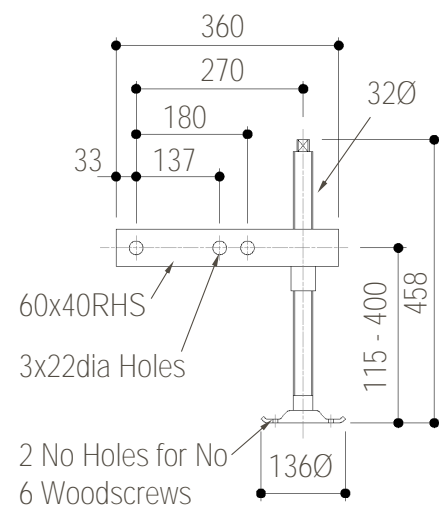
Allowable Working Load in the Turnbuckle $\pm 45\text{kN}$



Code	Description	Weight
SSU10016	Superslim Turnbuckle 914-1160	8.42 kg
SSU10033	Superslim Plumbing Foot	11.4 kg
SSX10046	Superslim 19mm Pin & R Clip	0.29kg

Superslim Universal Soldier Jack (SSX90043) Weight 4.86kg

Used in both Horizontal and Vertical applications as illustrated below, with a working range of 115mm closed to 400mm fully open. The Universal Jack arm is connected to the Soldier with 2 No Superslim 19mm Pin & "R" clips.



AWL 20kN Vertically – Fully Open
 AWL 25kN Horizontally – Fully Open
 AWL 30kN @ 170mm from back of Soldier

Note: When used for levelling of Formwork, there is insufficient space to install a Bar Tie Waler Plate & Nut between the jack stem & Soldier. Checks should be carried out based on the tie position shown in the vertical application above to ensure there will not be unacceptable grout loss / deflection at the kicker.

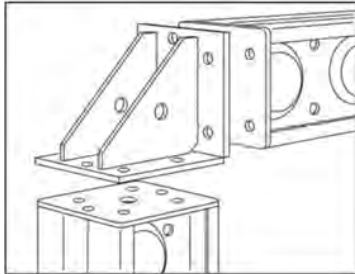
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



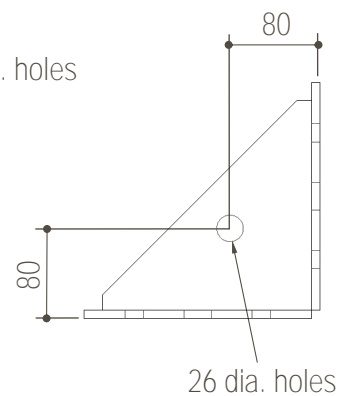
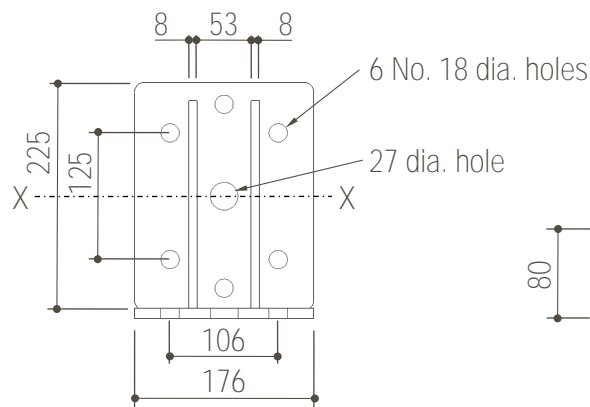
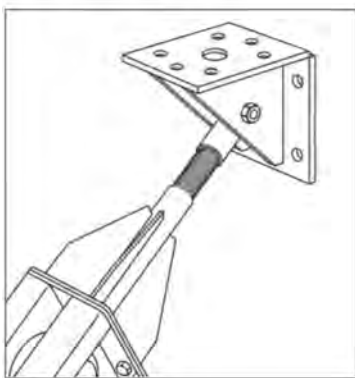
Superslim 90 Degree Corner (SSU10003) weight 8.69kg

Used to connect Soldiers at right angles and/or enable connection of a Push Pull Prop.



Maximum allowable load transmitted via a bolt passing through the two 26 dia. holes = $\pm 100\text{kN}$.

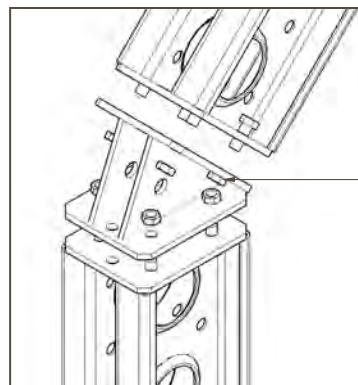
Maximum allowable bending moment transferred through a soldier end plate about xx axis of the soldier = 12kNm



Superslim 45 Deg Corner (SSU10005) Weight 6.26kg

Connects Soldiers at 45 degrees using 8 No. M16 x 40 Set Pin gr8.8 and 4 No. M16 Nut gr8 BZP and 2 No. M16 Round Washer BZP (BNU16007, BNU16001 + BNU16002).

Maximum allowable bending moment = 12kNm



Note: Nuts closest to corner are supplied pre-welded to end plates.

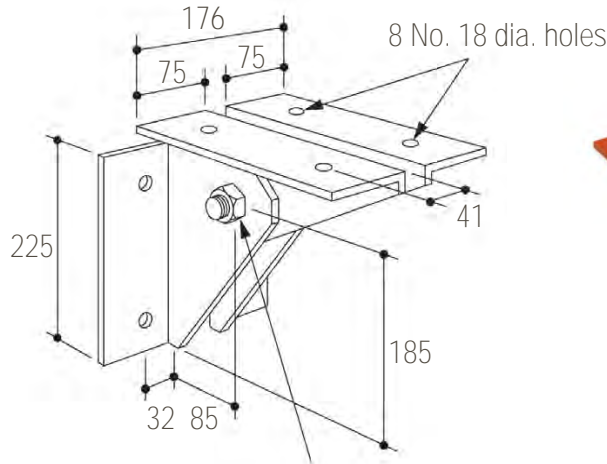
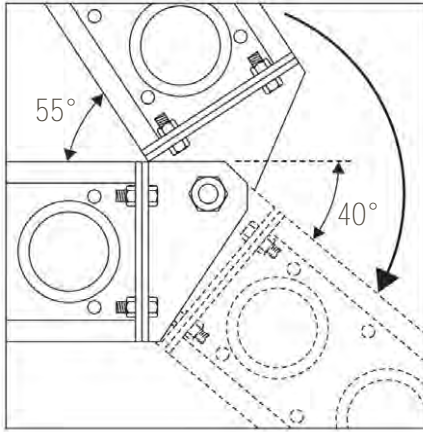
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Superslim Pivot Cleat Set (SSU10028) Weight 8.46kg

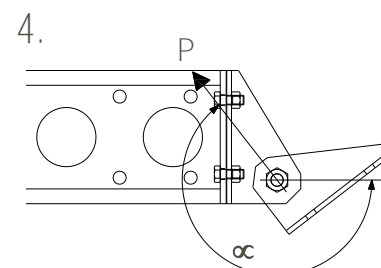
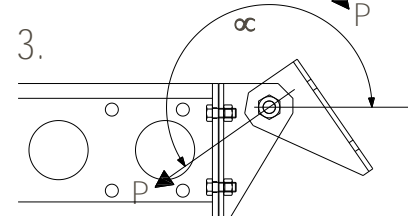
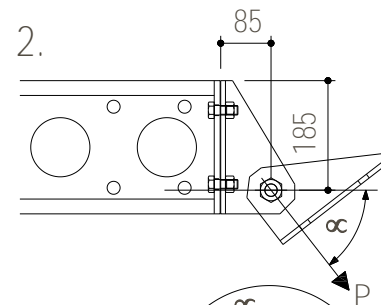
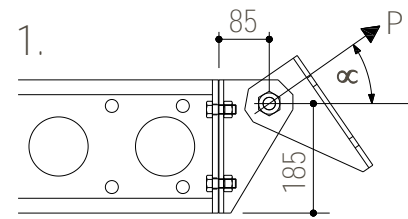
Used as a hinged connector for Soldiers.



Captive M24 x 110 gr8.8 Bolt with M24 Hex Nut gr8 BZP

The table below gives the allowable loads which may be applied to the Pivot Cleat Set at the angle and direction shown in the diagrams.

Angle α Degrees	Allowable Load P (kN)	Angle Degrees	Allowable Load P (kN)
0	59	290	73
10	66	300	63
20	77	310	57
25	85	320	55
30	97	330	53
32-275	100	340	53
280	88	350	55
285	79	360	59



Note:

In figures 1 & 3 (shown right) the Pivot Cleat set is installed with the hinge closest to the top flange of the soldier. For these cases the angle α should be read anti-clockwise around the M24x110 Bolt.

In figures 2 & 4 the Pivot Cleat set is installed with the hinge closest to the bottom flange of the soldier. For these cases the angle α should be read clockwise around the M24x110 Bolt.

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

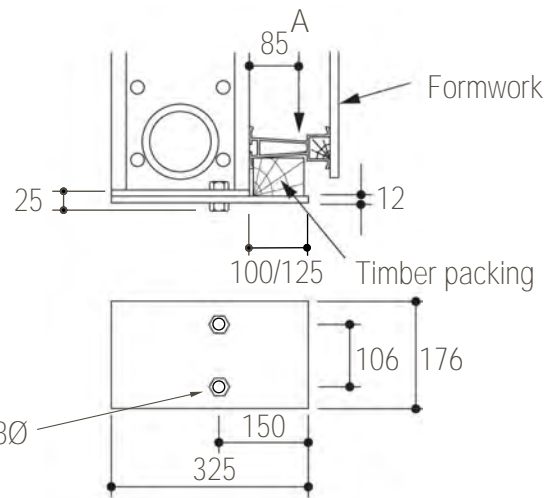
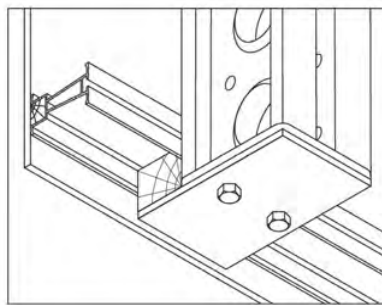
Superslim Form Support Plate

Used to support the formwork at the base of the Soldiers. Two cantilever lengths are possible by turning the plate around. Note! Support plates should be fitted to soldier used for lifting.



Allowable Working Load on Arrow 'A' = 10kN for a single plate connected by 2 No. M16 x 40 Set Pins and Nuts

Or 20kN for two plates connected with 2 No M16x60 Bolts & Nuts

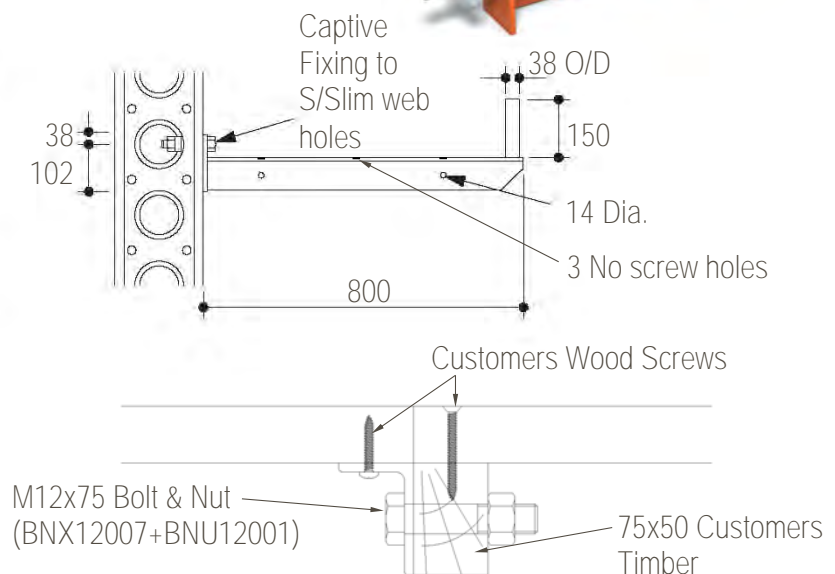
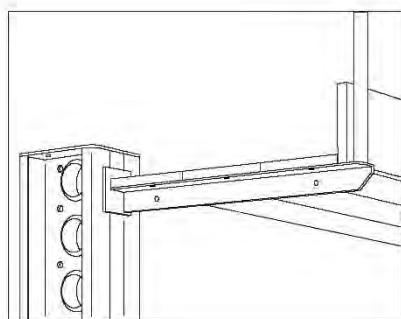


Code	Description	Weight
SSX10042	Superslim Form Support Plate	5.29 kg
BNU16001	M16 Nut gr8 BZP	0.03 kg
BNU16007	M16x40 Set Pin gr8.8 BZP	0.09 kg
BNU16009	M16x60 Bolt gr8.8 BZP	0.11 kg

Superslim Access Bracket (SSU10031) weight 8.56kg

Used to support a three board wide access platform. Has integral spigot to accept standard scaffold tube for tube guardrails or Ultraguard mesh barrier.

Allowable load on the bracket 3.2 kN UDL



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MODULAR STRUCTURAL SYSTEM

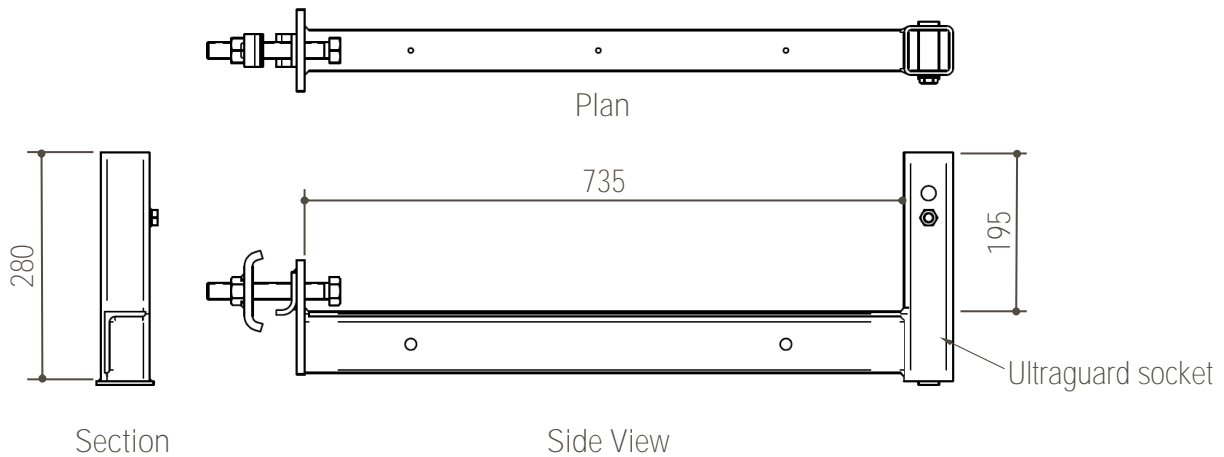
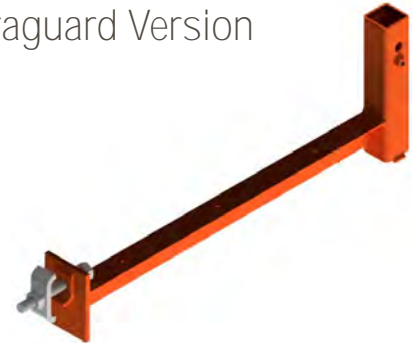


Superslim Access Bracket (SSU10031) weight 8.56kg - Ultraguard Version

Used to support a three board wide access platform. Has integral socket to accept standard scaffold tube or Ultraguard guardrails for Ultraguard mesh barrier.

Allowable load on the bracket 3.2 kN UDL

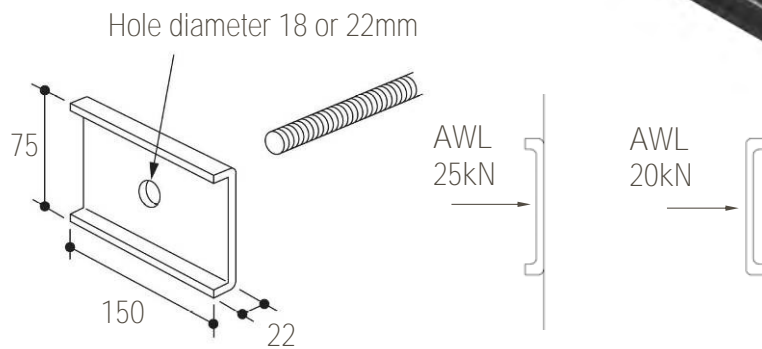
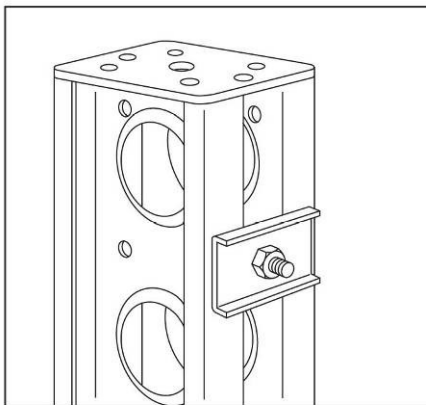
Note: this rectified bracket has the same code as the original Superslim Access Bracket therefore the specific type will need specifying in a text line on material take-offs.



Channel Washers

6mm thick washers used as a light duty waler plate with Super Slim and Rapid Bar Tie or allthread rod.

For AWL see sketch below right.



RMDK All Thread Rod is grade 8.8 and has a bright zinc plated finish.

AWL for Grade 8.8 M16 All Thread Rod is 70kN in formwork use and 45kN for other applications.

AWL for grade 8.8 M20 All Thread Rod is 108kN in formwork use and 70kN for other applications.

Code	Description	Weight
BNX20020	Washer - Channel 150x75 18mm	0.66 kg
BNX20021	Washer - Channel 150x75 22mm	0.66 kg
TRX10016	Allthread Rod - M16 per metre gr8.8	1.00 kg
TRX10020	Allthread Rod - M20 per metre gr8.8	2.10 kg
TRX20000	All Thread Rod per cut	-
BNU16001	M16 Hex Nut gr8 BZP	0.03 kg
BNU20001	M20 Hex Nut gr8 BZP	0.06 kg

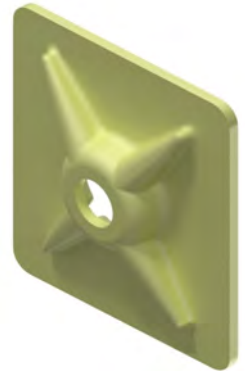
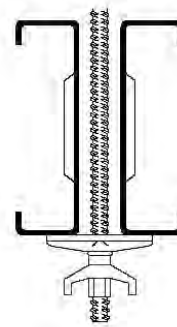
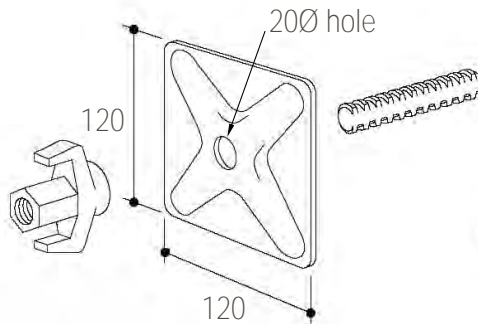
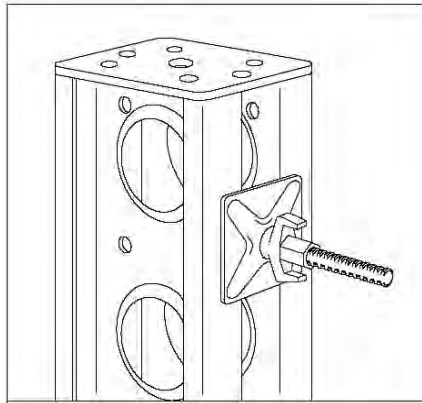
SUPERSLIM SOLDIER

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Water Plate – Light 55kN

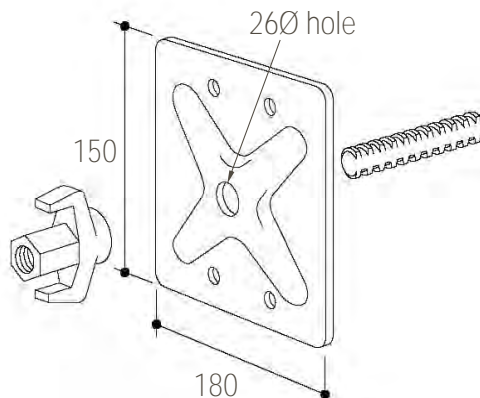
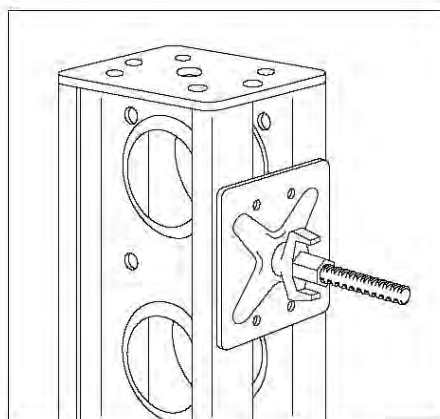
Used with 15mm diameter Rapid Bar Tie and accessories.
Allowable Tie Load with Superslim = 55kN with maximum co-incident bending moment of 30kNm



Code	Description	Weight
BTX10014	Water Plate - Light 55kN	1.13 kg
BTX10001	Knock on Wing Nut	0.32 kg
BTX10600	Rapid Bar Tie 15mm x 6.00m	8.80 kg
BTX30015	Bar Tie per m 15mm	1.50 kg
BTX20015	Bar Tie per cut 15mm	-
BTX10011	Connector Ribbed - Water Bar	0.54 kg
BTX10017	Nut - Hexagon 50mm	0.16 kg
BTX10018	Plastic Cone 10mm	0.01 kg
BTX10019	Plas Tube 2m	0.45 kg

Water Plate – Standard (BTX10021) weight 1.35kg

Used with 15mm diameter Rapid Bar Tie and accessories.
Max allowable tie load = 70kN but depends on co-incident Superslim bending moment (refer to sheet 12).
AWL = 50kN when used with timber (bearing limits).



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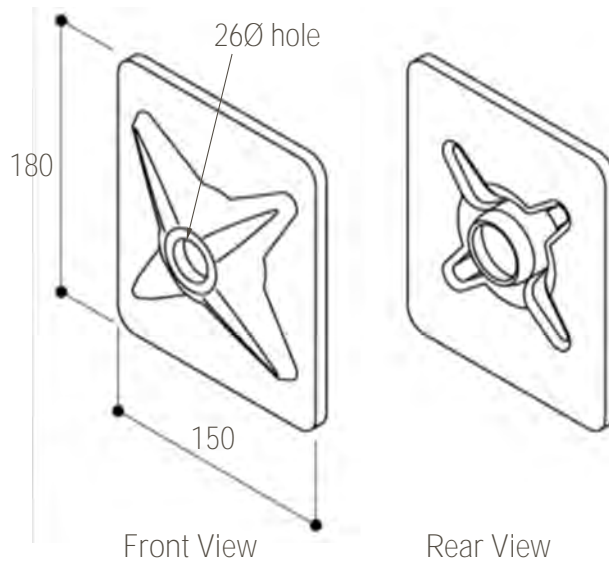
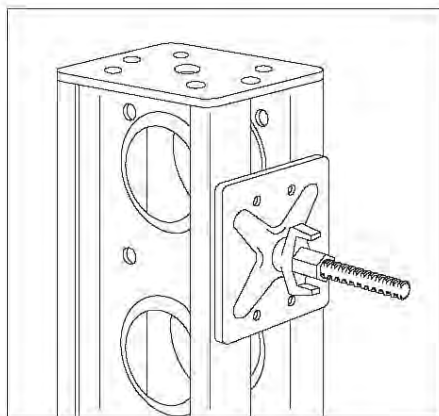
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Waler Plate – Heavy Duty (BTX10004) weight 1.76kg

Used with 15mm diameter Rapid Bar Tie and accessories.

Maximum allowable tie load with Superslim Soldiers 90kN but varies according to co-incident bending moment (refer to sheet 12).

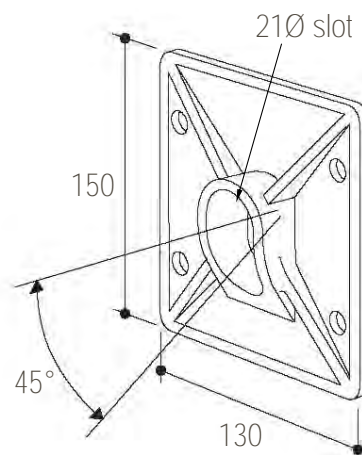
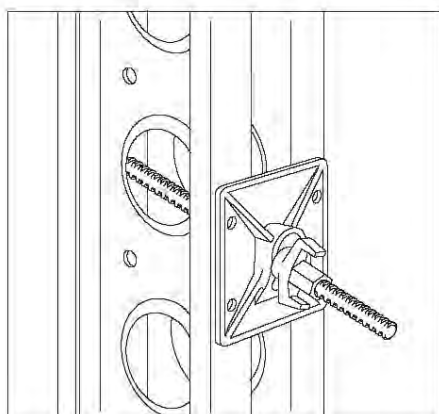
110kN max when used with special steel channels.



Waler Plate – Angle 3/4" (HTU10014) weight 1.32kg

Used with 15mm diameter Rapid Bar Tie and accessories where the tie is not perpendicular to the Soldier.

Allowable Tie Load is 70kN but depends on co-incident Superslim bending moment (refer to sheet 12).



For tie angles over 6 degrees provide a stop to prevent the Angle Waler Plate sliding along the Soldier. A neoprene pad can be added between components to prevent sliding for angles up to 20°

Note: Angle Waler Plates are not weldable.

SUPERSLIM SOLDIER

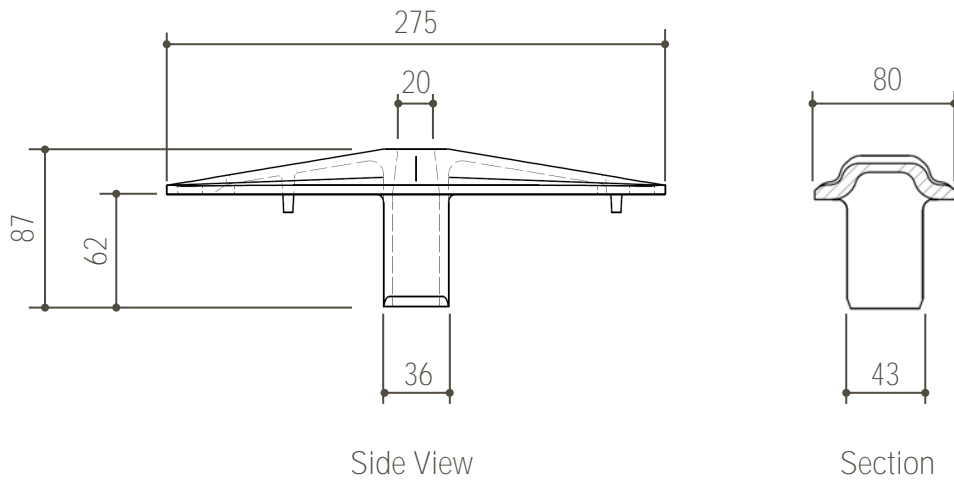
MODULAR STRUCTURAL SYSTEM



Rapid Tie Bar Cast Heavy Duty Water Plate (BTX10033) weight 1.63kg

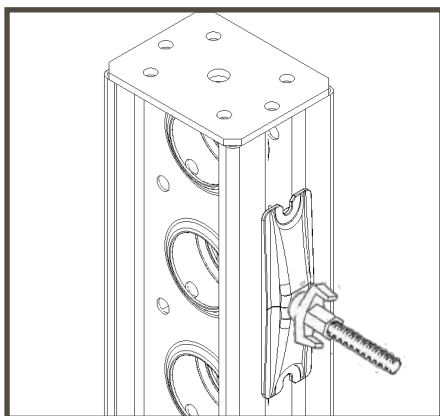
Used with 15mm diameter Rapid Bar Tie and accessories.

Maximum allowable tie load with Superslim Soldiers 110kN but varies according to co-incident bending moment (refer to sheet 12).

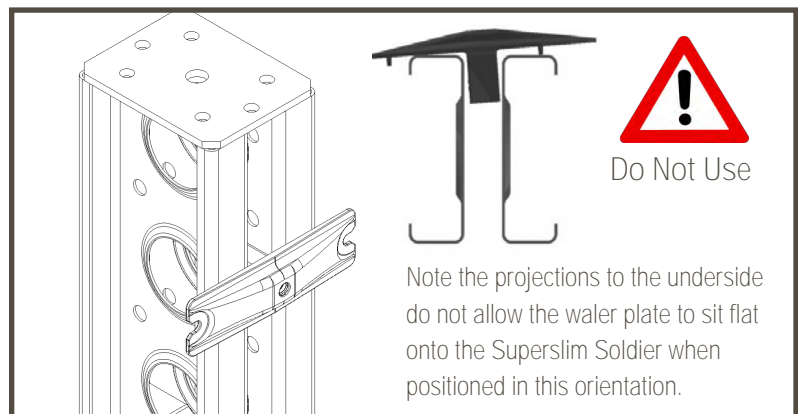


Side View

Section



Cast Water Plate Correctly
Positioned on the Superslim
Soldier



Cast Water Plate Incorrectly
Positioned on the Superslim
Soldier

The Cast Water Plate can be captivated to the Superslim Soldier using Alshor Superslim Clamps - see sheet 108.

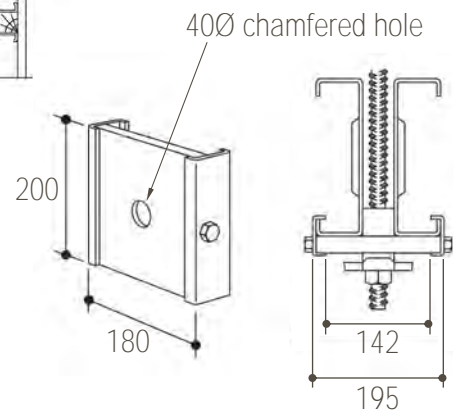
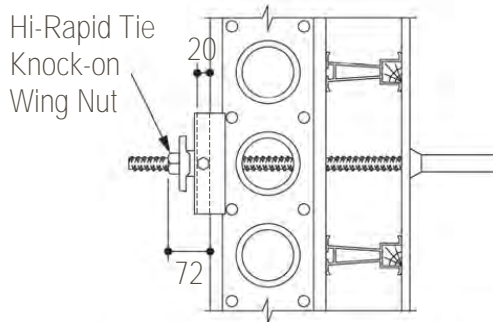
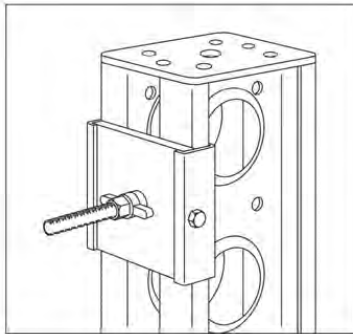
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

Waler Plate – Hi Load

Used with 20mm diameter Rapid Bar Tie and accessories.

Max allowable tie load 160kN but depends on co-incident bending moment (refer to sheet 12).

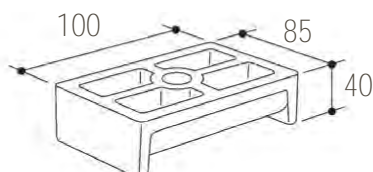
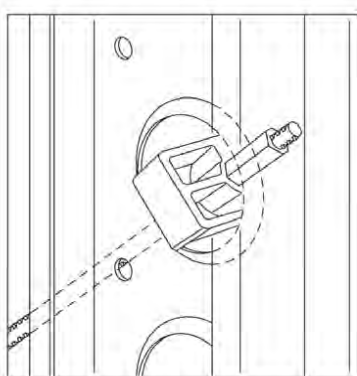


Code	Description	Weight
BTX10029	Waler Plate - Hi Load	6.84 kg
BTX10006	Knock on Nut - Hi Load	0.47 kg
BTX40600	Rapid Bar Tie 20mm x 6.00m	14.8 kg
BTX20020	Bar Tie per cut 20mm	-
BTX10002	Connector 20mm - Rapid Tie	0.79 kg
BTX10005	Nut - Hexagon 20mm Bar	0.40 kg
BTX10008	Plastic Cone - Hi Load 26 Dia.	0.01 kg
BTX10009	Plastic Tube - Hi Load 26/30 x 2m	0.92 kg

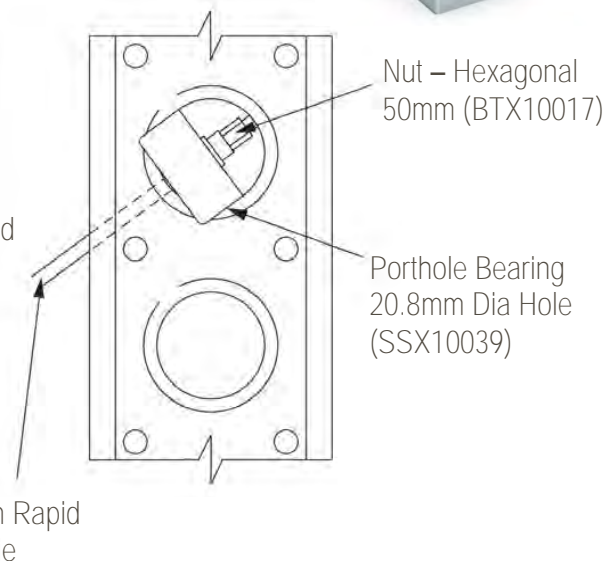
Porthole Bearing 20.8mm Dia Hole (SSX10039) weight 1.22kg

Enables connection of a tie rod to a Porthole at any angle.

Allowable Working Load 65kN tension



Note: M20 Allthread Rod but not 20 Ø Rapid Bar Tie may also be used



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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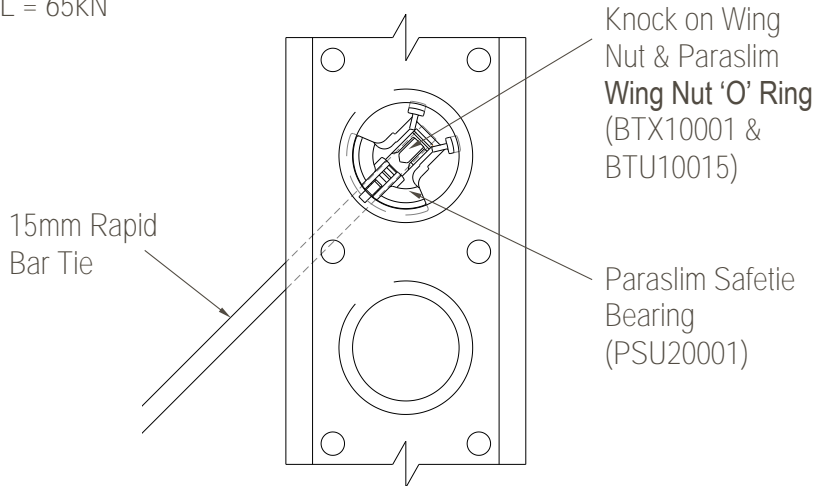
Paraslim Safetie Bearing (PSU20001) weight 1.71kg

A fully rotating, securely captivated bearing used to anchor one end of a Rapid Bar Tie into the porthole of a Superslim Soldier.

The unit also internally captivates the assembly of a Knock on Wing Nut and Paraslim Wing Nut 'O' Ring; see below.

Note that the Rapid Bar Tie must be inserted fully into the Wing Nut for the stated allowable working load and that the Bar Tie can not pass right through the bearing. Tie bar insertion can be verified through the 12mm diameter hole in the bearing and is made easier if the end of the tie bar is painted before insertion.

AWL = 65kN



Knock On Wing Nut (BTX10001) weight 0.32kg

Retained in Paraslim Safetie Bearing (PSU20001) using the Paraslim Wing Nut 'O' Ring (BTU10015).

AWL = 110kN



Paraslim Wing Nut 'O' Ring (BTU10015) weight 0.01kg

Used for retaining the Knock On Wing Nut (BTX10001) in the Paraslim Safetie Bearing (PSU20001).



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

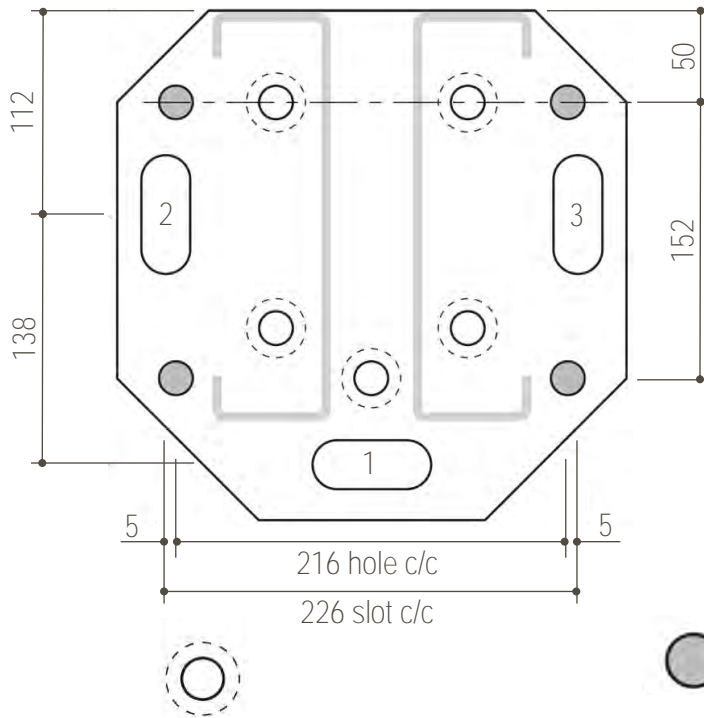


Superslim Anchor Plate 15mm (SSU10036) weight 7.30kg

Used for anchoring the ends of Soldiers to concrete or masonry.



Overall plate size
280 x 280 x 15 thick



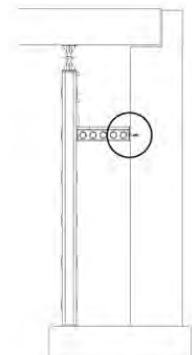
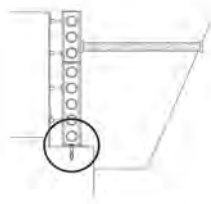
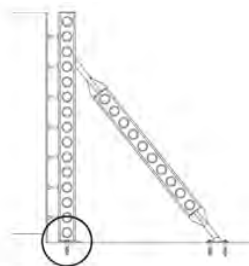
5 holes 18 dia. Countersunk to suit M16 x 40 Set Pin gr8.8 BZP Csk and M16 Nut gr8 BZP (BNU16008 + BNU16001) for bolting to ends of Superslim Soldier

4 holes 18 dia. for M16 anchors (*but not M16 Screwbolt which requires a 19Ø hole*).

3 slots 27 dia. x 65 long for RMD Kwikform Propbolt 24R-50 (FAU10142).

Applications include:

- Single sided formwork.
- Base formwork with or without turnbuckle and plumbing foot (SSU10016 + SSU10033).
- Battered formwork in combination with pivot cleat set (SSU10028).
- Connecting Megashor props to abutment walls.
- Base plates in façade retention schemes (use stacked in pairs for increased capacity).



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Anchor Plate Design Data

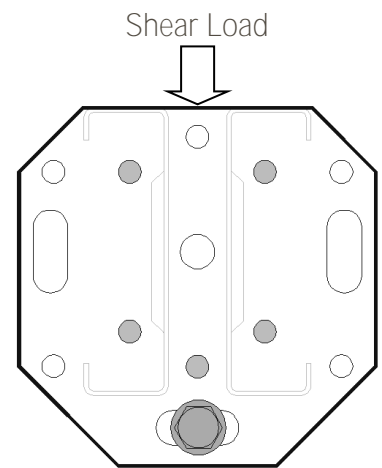
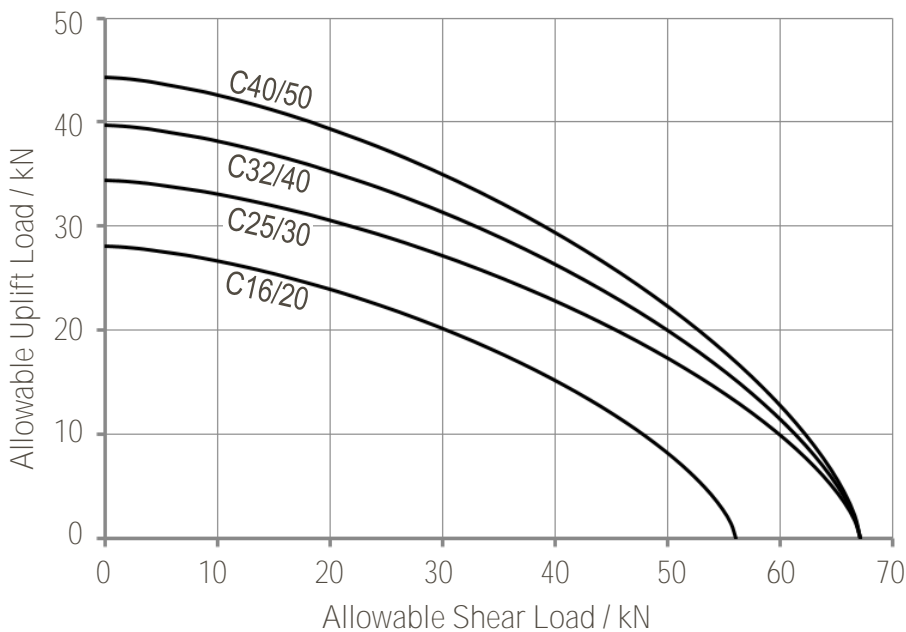
Allowable Working Loads with RMD Kwikform Propbolt 24-R50 (Code FAU10142)

Commonly Propbolt 24-50 is used singly or in pairs to secure the Superslim Anchor Plate to a concrete foundation. The base of the Anchor Plate is 15mm thick and, when used in pairs the anchors are at 226mm centres which means that there is an interaction zone between the anchors due to their proximity.

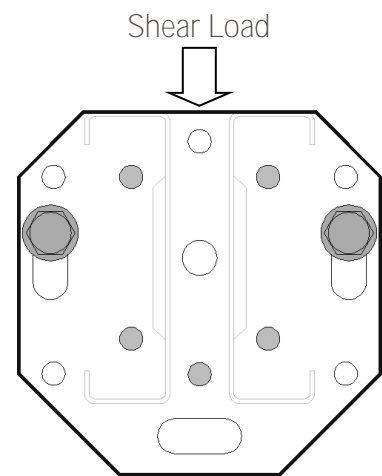
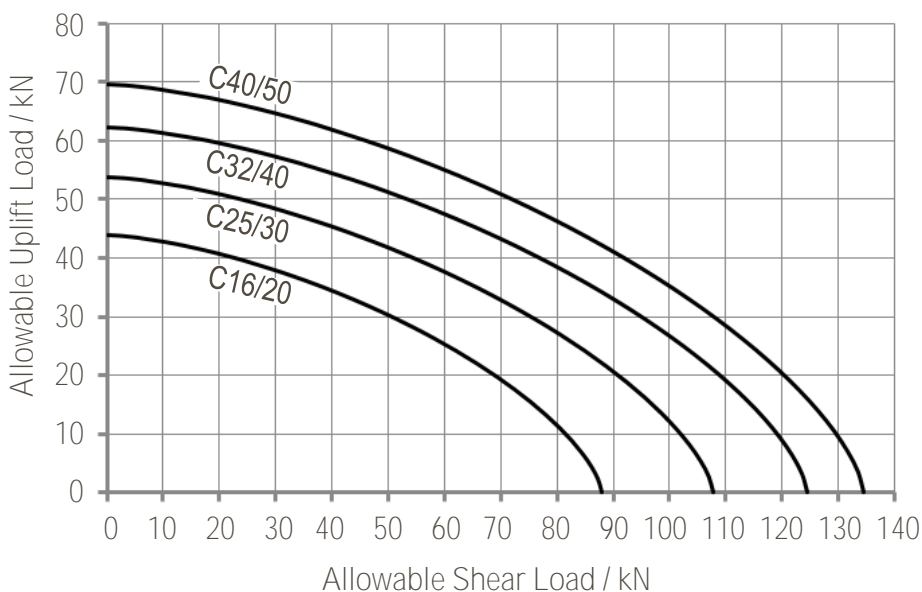
The anchor plate is bolted to the underside of an assembled form before being placed. To allow for assembly and slab tolerances, a packed gap of 10mm is assumed between the plate and the foundation.

To aid quick checking of allowable loads in the anchor plate when using this configuration the graphs below may be used.

Un-Cracked Concrete



Single Anchor in Front Slot



Twin Anchors in Side Slots

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MODULAR STRUCTURAL SYSTEM

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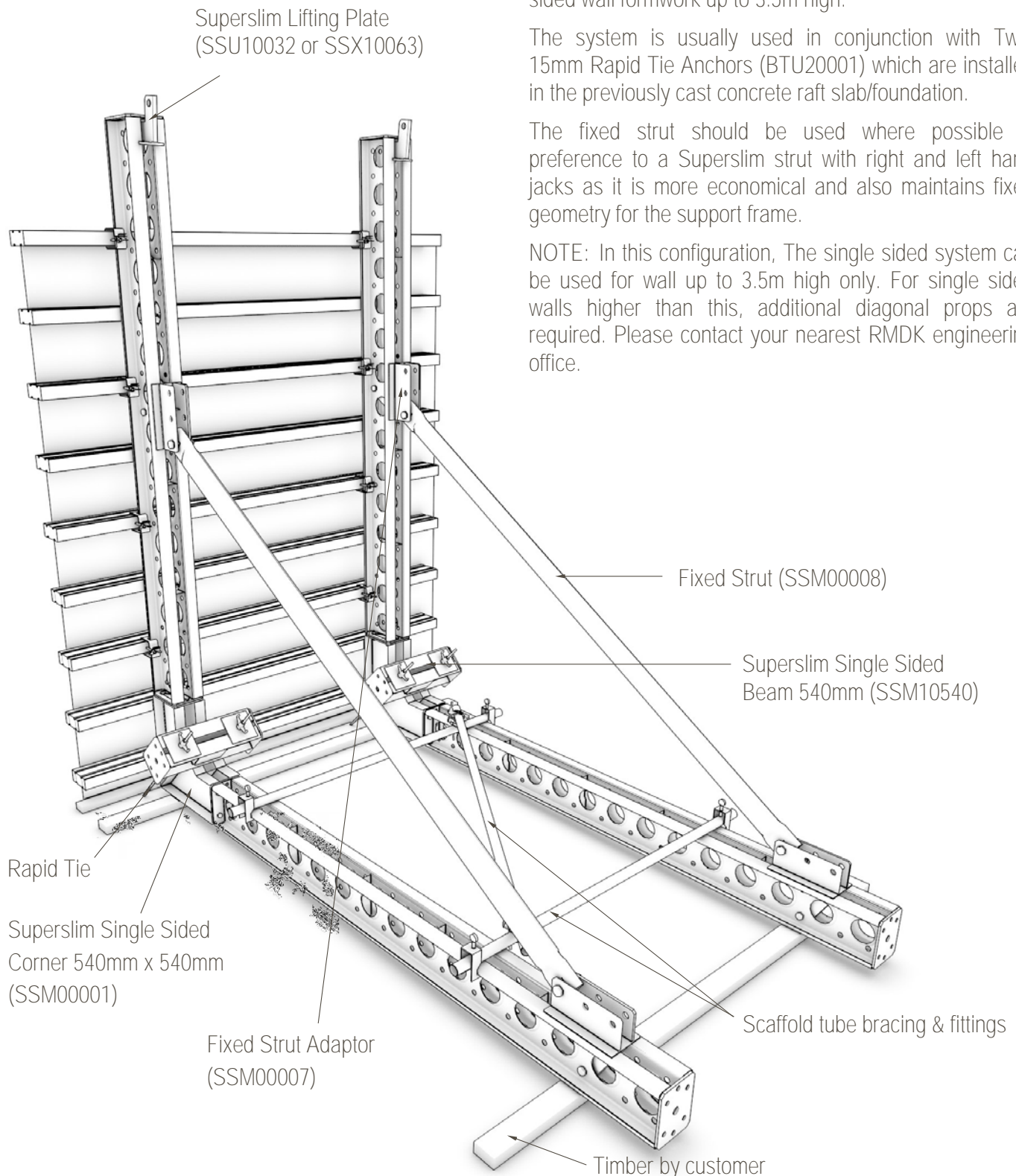
Formwork Single Sided Frame Applications

Enables Superslim frames to be used to support single sided wall formwork up to 3.5m high.

The system is usually used in conjunction with Twin 15mm Rapid Tie Anchors (BTU20001) which are installed in the previously cast concrete raft slab/foundation.

The fixed strut should be used where possible in preference to a Superslim strut with right and left hand jacks as it is more economical and also maintains fixed geometry for the support frame.

NOTE: In this configuration, The single sided system can be used for wall up to 3.5m high only. For single sided walls higher than this, additional diagonal props are required. Please contact your nearest RMDK engineering office.

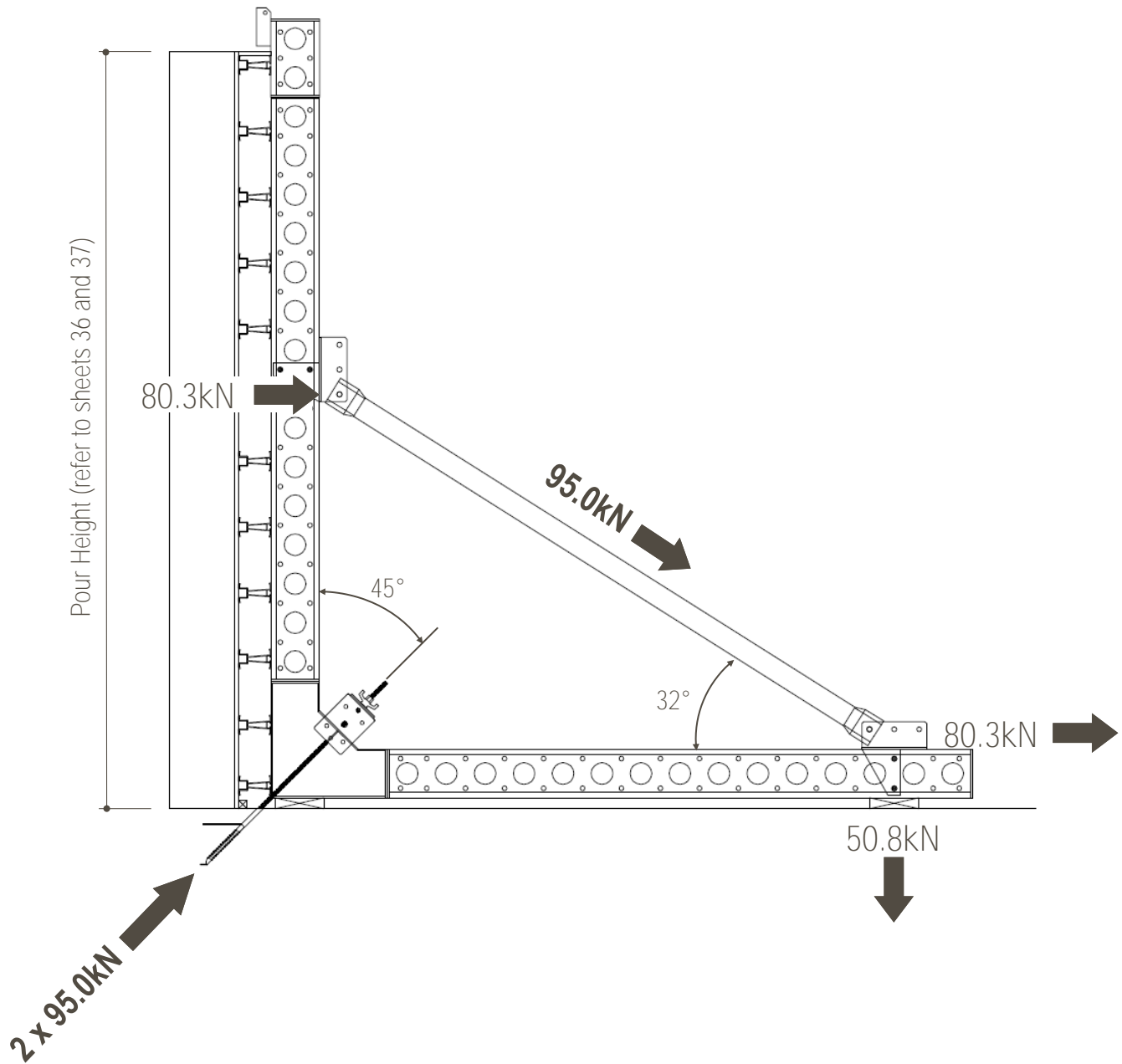


SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Maximum Allowable Working Loads in Single Sided Frame



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MODULAR STRUCTURAL SYSTEM



Ideal Frame Spacings - Pour Height - 2.75m

Uniformly Distributed Load to GTX or Alform secondary beam
Douglas Fir 19mm Plywood (Parallel to face grain 3 or more span)

Shutter Length, mm	Concrete Pressure: 50.0 kN/m ² Secondary spacings : 305mm	Concrete Pressure: 45.0 kN/m ² Secondary spacings : 348mm	Concrete Pressure: 40.0 kN/m ² Secondary spacings : 390mm
6000			
5400			
4800			
4200			
3600			
3300			
3000			
2700			
2400			

Ideal Frame Spacings - Pour Height - 3.00m

Uniformly Distributed Load to GTX or Alform secondary beam
Douglas Fir 19mm Plywood (Parallel to face grain 3 or more span)

Shutter Length, mm	Concrete Pressure: 50.0 kN/m ² Secondary spacings : 305mm	Concrete Pressure: 45.0 kN/m ² Secondary spacings : 348mm	Concrete Pressure: 40.0 kN/m ² Secondary spacings : 390mm
6000			
5400			
4800			
4200			
3600			
3300			
3000			
2700			
2400			

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Ideal Frame Spacings - Pour Height - 3.25m

Uniformly Distributed Load to GTX or Alform secondary beam
Douglas Fir 19mm Plywood (Parallel to face grain 3 or more span)

Shutter Length, mm	Concrete Pressure: 50.0 kN/m ² Secondary spacings : 305mm	Concrete Pressure: 45.0 kN/m ² Secondary spacings : 348mm	Concrete Pressure: 40.0 kN/m ² Secondary spacings : 390mm
6000			
5400			
4800			
4200			
3600			
3300			
3000			
2700			
2400			

Ideal Frame Spacings - Pour Height - 3.50m

Uniformly Distributed Load to GTX or Alform secondary beam
Douglas Fir 19mm Plywood (Parallel to face grain 3 or more span)

Shutter Length, mm	Concrete Pressure: 50.0 kN/m ² Secondary spacings : 305mm	Concrete Pressure: 45.0 kN/m ² Secondary spacings : 348mm	Concrete Pressure: 40.0 kN/m ² Secondary spacings : 390mm
5400			
4800			
4200			
3600			
3300			
3000			
2700			
2400			
2100			

SUPERSLIM SOLDIER

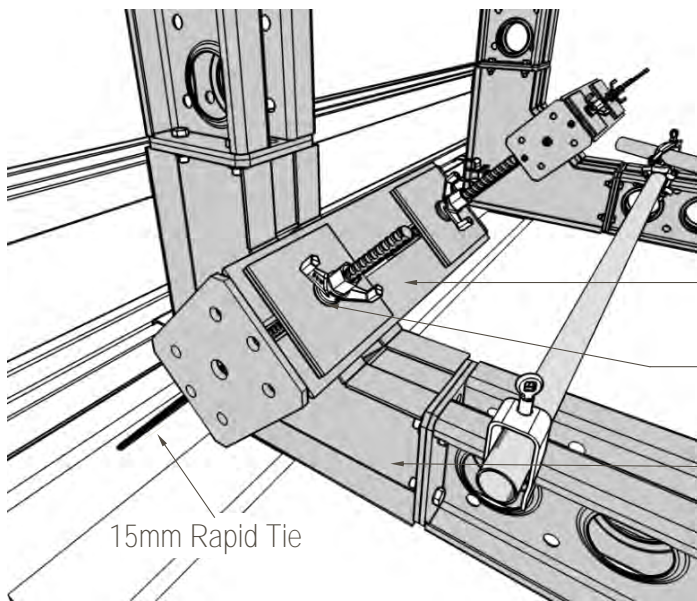
MODULAR STRUCTURAL SYSTEM

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Superslim Single Sided Corner 540mm x 540mm (SSM00001) weight 31.3kg

Used to connect horizontal and vertical Superslim Soldiers at right angles to form part of the triangulated frame.

Max permissible tie load using Twin 15mm Rapid Tie Anchors = 95kN x 2 ties



Superslim Single Sided Beam 540mm

15mm Rapid Tie, 2 No 150 x 150 x 6 x 22mm Plate Washers & Rapid Tie Wing Nut.

Superslim Single Sided Corner 540mm x 540mm

15mm Rapid Tie

Note: Do not use Heavy Duty Waler Plates with the Superslim Single Sided Beam 540mm as there is insufficient space between the channels to accommodate the boss on the back of the plate.

Always use 2 No 150 x 150 x 6 x 22mm Plate Washers (BNX20011) per tie position.

Superslim Single Sided Beam 540mm (SSM10540) weight 28.2kg

Used to tie down Superslim frames to the previously cast concrete at 45 deg to the horizontal with two diagonal Rapid Ties at each Superslim frame location.

The holes in the end plates are configured such that a Superslim Soldier can be bolted to the end if required.



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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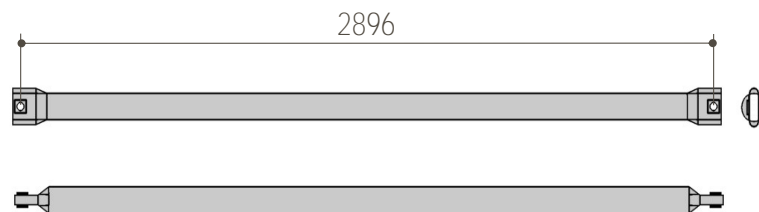
Superslim Fixed Strut Adaptor (SSM00007) weight 12.0kg

Connected to the horizontal and vertical soldiers using 2 No. Superslim 19mm Pin & R Clip (SSX10046).



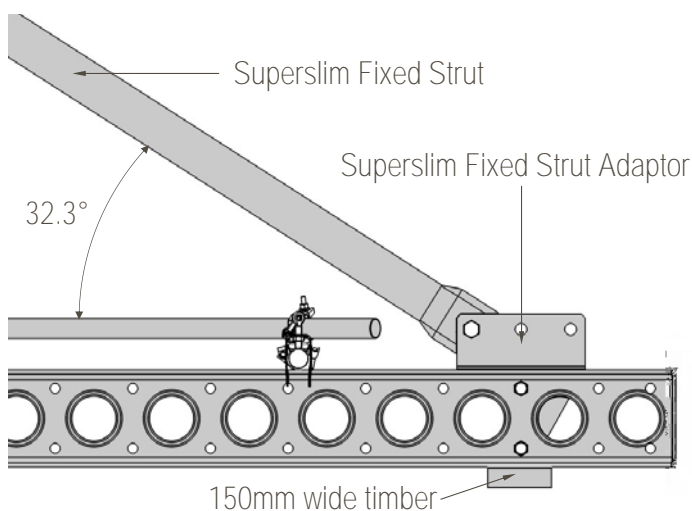
Superslim Fixed Strut 2896mm (SSM00008) weight 35.0kg

Connected to the Fixed Strut Adaptors in the horizontal and vertical soldiers to form the triangular support frame. Connection between Fixed Strut and Fixed Strut Adaptor using 1 No. M24x110 bolt & nut (BNX24002 & BNU24001).

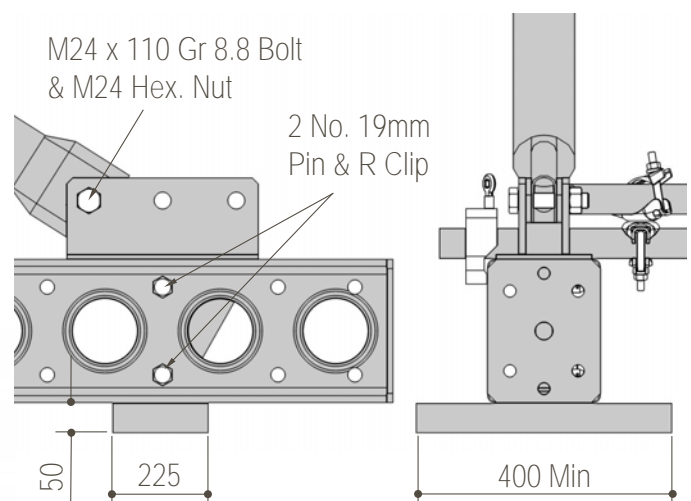


AWL = 95kN (compression at 32.3 deg to horizontal) limited by the connection between the Fixed Strut Adaptor and the Superslim Member.

Connections



Timber Packs Below Fixed Strut Adaptor



Note: The timber beneath the Fixed Strut Adaptor should be placed directly under the bolts / pins on the horizontal Superslim Soldier.

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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Twin 15mm Rapid Tie Anchor (BTU20001) weight 0.57kg

Fabricated from a pair of steel sleeves incorporating a rolled Rapid Tie Bar Tie thread joined at 300mm centres.

Tie the anchor via the integral jig securely to the top mat of steel reinforcing bars to set at the required 45° angle.

The pvc tubes extend the anchors through the cover concrete. These can be shortened so that the plastic tube terminates at slab level if a power float finish is specified and are closed during concreting using the plastic caps supplied.

Once the anchor has been used the plastic tubes can be removed and the anchor holes made good using pourable cementitious grout.

PVC caps ensure that no contact between the internal thread and the concrete. Should a power floated finish be required a recessed plug can be fitted instead of the PVC caps.



Maximum Allowable Working Loads in Standard DW15 Twin Anchor

Max Load - 2 x 85kN (17Nmm² Concrete)

Max Load - 2 x 95kN (30Nmm² Concrete)

For use in concrete no less than 250mm thick.

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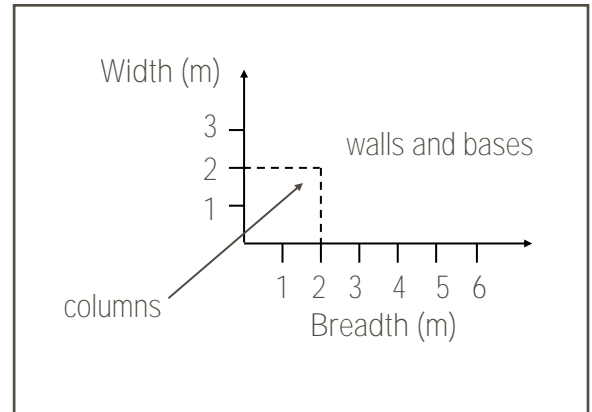
MODULAR STRUCTURAL SYSTEM

Formwork Applications – Concrete Pressure Data

This data is applicable to concrete placed in vertical, parallel-sided formwork and to compaction by internal vibration. Pressures for conditions other than those described, are given in CIRIA Report 108. Lateral pressures are at their greatest when there is continuous vertical concrete placing with constant vibration. These conditions are only applicable to columns, and a separate table is provided. For simplicity, a column is defined as a section where both plan dimensions are less than 2m. Other sections are called walls and bases. These designations are shown alongside.

The charts below and on the following page can be used for concrete containing combinations of cements and admixtures as specified in each table. Caution is required because admixtures are classified by function at a stipulated dosage. Overdosing may well change the effect of an admixture. For example, a multiple dose of a normal water reducer may result in retardation. In this circumstance the table referring to concrete with a retarder should be used.

A major change from existing practice is the recommendation that superplasticised concrete should be included within the general grouping, and that it does not necessarily require design pressure equal to the fluid head.



Guidance on Concrete Groupings with Coefficient C_2

Group	Concrete	CIRIA R108	
		C_2	Group
A	(i) Concretes without admixture CEM I, SRPC, IIA with metakaolin, or IIA with silica fume	0.30	1
	(ii) Concretes with any admixture except with retarding properties CEM I, SRPC, IIA with metakaolin, or IIA with silica fume	0.30	2
B	(iii) Concretes with admixtures that retard CEM I, SRPC, IIA with metakaolin, or IIA with silica fume	0.45	3
	(iv) Concretes without admixture IIIA, IIA, IIB	0.45	4
	(v) Concretes with any admixture except with retarding properties IIIA, IIA, IIB	0.45	5
	(vi) Self-compacting concretes with any admixture except with retarding properties All cements except IIIB, IVB	0.45	–
C	(vii) Concretes with admixtures that retard IIIA, IIA, IIB (see Note 2)	0.60	6
	(viii) Concrete with or without admixtures IIIB, IVB (see Note 2)	0.60	7
	(ix) Self-compacting concrete with retarding properties All cements	0.60	–
	(x) Self-compacting concrete with any admixture except with retarding properties IIIB, IVB (see Note 2)	0.60	–

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Concrete Pressures Based on Ciria Report 108

Values have not been rounded

Design Pressures Pmax (kN/m ²)			Walls and Bases A wall or base is a section where at least one of the plan dimensions is greater than 2m							Columns A column is a section where both plan dimensions are less than 2m					
Concrete Group	Conc. Temp (°C)	Form Height (m)	Rate of rise (m/hr)							Form Height (m)	Rate of rise (m/hr)				
			0.5	1	1.5	2	3	5	10		2	4	6	10	15
Group A	5	2	42.7	47.0	50.0	50.0	50.0	50.0	50.0	3	73.7	75.0	75.0	75.0	75.0
		3	51.1	56.2	60.0	63.1	68.1	75.0	75.0	4	83.2	97.0	100.0	100.0	100.0
		4	57.7	63.2	67.3	70.8	76.5	85.2	99.2	6	96.4	113.2	125.5	143.3	150.0
		6	68.4	74.3	78.8	82.6	88.8	98.7	116.2	10	114.9	133.3	147.3	169.1	190.4
		10	84.9	91.1	95.9	99.9	106.7	117.3	136.7	15	132.1	151.4	166.0	189.2	212.1
	10	2	34.0	39.4	43.3	46.4	50.0	50.0	50.0	3	66.5	75.0	75.0	75.0	75.0
		3	39.5	45.3	49.8	53.5	59.5	68.5	75.0	4	72.7	89.4	100.0	100.0	100.0
		4	43.8	49.9	54.6	58.5	65.0	75.0	92.2	6	81.4	99.9	113.8	134.7	150.0
		6	50.8	57.2	62.0	66.1	73.0	83.8	103.3	10	93.4	113.0	128.0	151.6	174.7
		10	61.5	68.1	73.2	77.5	84.6	96.0	116.7	15	104.6	124.8	140.2	164.6	188.8
	15	2	29.2	35.1	39.5	43.1	48.5	50.0	50.0	3	62.5	75.0	75.0	75.0	75.0
		3	33.0	39.3	44.1	48.1	54.7	64.7	75.0	4	66.9	85.1	97.6	100.0	100.0
		4	36.0	42.5	47.5	51.6	58.5	69.3	88.3	6	73.0	92.5	107.3	129.9	149.7
		6	40.9	47.6	52.7	57.0	64.2	75.5	96.1	10	81.4	101.8	117.3	141.8	165.9
		10	48.5	55.3	60.6	65.0	72.4	84.1	105.5	15	89.3	110.0	125.9	151.0	175.9
	20	2	26.2	32.5	37.2	41.1	47.2	50.0	50.0	3	60.1	75.0	75.0	75.0	75.0
		3	29.0	35.6	40.6	44.8	51.7	62.5	75.0	4	63.3	82.5	96.1	100.0	100.0
		4	31.3	38.0	43.1	47.4	54.6	65.9	85.9	6	67.8	88.0	103.3	127.0	148.5
		6	34.9	41.8	47.0	51.4	58.8	70.5	91.7	10	74.1	94.8	110.7	135.8	160.6
		10	40.5	47.5	52.8	57.3	64.9	76.8	98.7	15	79.9	101.0	117.1	142.6	168.0
Group B	5	2	50.0	50.0	50.0	50.0	50.0	50.0	50.0	3	75.0	75.0	75.0	75.0	75.0
		3	67.7	71.8	74.7	75.0	75.0	75.0	75.0	4	98.3	100.0	100.0	100.0	100.0
		4	77.7	82.3	85.7	88.5	93.1	99.8	100.0	6	118.1	132.3	142.3	150.0	150.0
		6	93.7	98.9	102.9	106.2	111.6	120.0	134.8	10	145.8	162.5	175.0	194.4	212.9
		10	118.5	124.2	128.6	132.2	138.4	148.0	165.5	15	171.7	189.5	203.1	224.5	245.5
	10	2	42.2	46.6	49.6	50.0	50.0	50.0	50.0	3	73.3	75.0	75.0	75.0	75.0
		3	50.3	55.5	59.4	62.5	67.6	74.8	75.0	4	82.6	96.6	100.0	100.0	100.0
		4	56.8	62.4	66.5	70.0	75.8	84.5	98.8	6	95.5	112.4	124.7	142.8	150.0
		6	67.3	73.2	77.7	81.5	87.9	97.7	115.4	10	113.6	132.1	146.1	168.0	189.4
		10	83.4	89.7	94.5	98.6	105.3	116.0	135.5	15	130.4	149.7	164.4	187.7	210.6
	15	2	34.9	40.2	44.0	47.0	50.0	50.0	50.0	3	67.3	75.0	75.0	75.0	75.0
		3	40.7	46.5	50.8	54.5	60.4	69.2	75.0	4	73.8	90.2	100.0	100.0	100.0
		4	45.2	51.3	55.9	59.8	66.1	76.1	92.9	6	82.9	101.3	115.0	135.6	150.0
		6	52.6	58.9	63.8	67.8	74.6	85.3	104.6	10	95.6	115.1	130.0	153.4	176.3
		10	63.9	70.5	75.6	79.8	86.9	98.2	118.7	15	107.5	127.6	142.9	167.2	191.2
	20	2	30.5	36.3	40.5	44.0	49.1	50.0	50.0	3	63.6	75.0	75.0	75.0	75.0
		3	34.7	40.9	45.6	49.5	56.0	65.7	75.0	4	68.5	86.3	98.3	100.0	100.0
		4	38.1	44.5	49.4	53.4	60.2	70.8	89.4	6	75.2	94.5	109.0	131.2	150.0
		6	43.6	50.2	55.2	59.4	66.5	77.7	98.0	10	84.6	104.8	120.2	144.4	168.3
		10	52.0	58.8	63.9	68.3	75.6	87.2	108.5	15	93.4	114.0	129.7	154.6	179.3
Group C	5	2	50.0	50.0	50.0	50.0	50.0	50.0	50.0	3	75.0	75.0	75.0	75.0	75.0
		3	75.0	75.0	75.0	75.0	75.0	75.0	75.0	4	100.0	100.0	100.0	100.0	100.0
		4	97.7	100.0	100.0	100.0	100.0	100.0	100.0	6	139.8	150.0	150.0	150.0	150.0
		6	119.1	123.6	126.9	129.8	134.4	141.4	150.0	10	176.8	191.6	202.7	219.7	235.5
		10	152.1	157.2	161.2	164.5	170.1	178.7	194.3	15	211.2	227.7	240.2	259.8	278.9
	10	2	50.0	50.0	50.0	50.0	50.0	50.0	50.0	3	75.0	75.0	75.0	75.0	75.0
		3	61.2	65.7	68.9	71.6	75.0	75.0	75.0	4	92.4	100.0	100.0	100.0	100.0
		4	69.9	74.8	78.5	81.6	86.6	94.1	100.0	6	109.7	124.8	135.7	150.0	150.0
		6	83.8	89.3	93.5	96.9	102.7	111.7	127.5	10	133.8	151.1	164.2	184.5	204.1
		10	105.3	111.3	115.8	119.6	126.0	136.0	154.3	15	156.2	174.6	188.6	210.7	232.4
	15	2	40.7	45.2	48.4	50.0	50.0	50.0	50.0	3	72.0	75.0	75.0	75.0	75.0
		3	48.3	53.6	57.6	60.8	66.1	73.6	75.0	4	80.8	95.2	100.0	100.0	100.0
		4	54.4	60.0	64.3	67.9	73.8	82.8	97.6	6	92.9	110.0	122.7	141.3	150.0
		6	64.2	70.2	74.8	78.7	85.1	95.1	113.1	10	109.8	128.5	142.7	165.0	186.6
		10	79.3	85.7	90.5	94.6	101.5	112.3	132.0	15	125.6	145.1	159.9	183.4	206.6
	20	2	34.7	40.0	43.8	46.8	50.0	50.0	50.0	3	67.1	75.0	75.0	75.0	75.0
		3	40.4	46.2	50.6	54.2	60.2	69.0	75.0	4	73.6	90.0	100.0	100.0	100.0
		4	44.9	51.0	55.6	59.5	65.9	75.8	92.8	6	82.6	101.0	114.7	135.4	150.0
		6	52.2	58.5	63.4	67.5	74.3	85.0	104.3	10	95.1	114.7	129.6	153.0	175.9
		10	63.4	70.0	75.1	79.3	86.4	97.7	118.3	15	106.9	127.0	142.3	166.6	190.7

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

Formwork – Applications with Timber Walings

The illustrations on the following pages for case numbers 1 to 7, show combinations of Superslim Soldiers for **different heights of formwork for use with customer's own walings**. The table at the bottom of each arrangement gives the maximum horizontal spacing of the Soldier when using RMDK Rapid Bar Ties and Concrete Design Pressure. The safe working load of the Rapid Tie is limited to 90kN when used with the HD Waler Plates on Superslim Soldiers, but can be increased to 160kN if used with the Hi-load Waler Plate. The Tie Rod vertical spacing has been calculated to give the most economical use for the Soldier and Tie Rod. It is possible to vary the vertical position of the Tie Rods, for example to suit features of the wall, and your nearest RMD Kwikform Regional Technical Office would be pleased to analyse your proposals.

To assist the designer in the selection of the face material and the choice of timber waling, table WT1 lists the allowable span of several common basic timber section sizes. In compiling the table it has been assumed that softwood constructional timber of Strength Class C24 will be used and the more conservative size assumed as **planed all round**. The structural properties are taken from Table 6 of "Formwork A Guide to Good Practice" published by the Concrete Society. In compiling table WT1, it has also been assumed that the waling is continuous over four Soldiers (i.e. Three spans) and that there is a one third of the span cantilever at each end (Appendix B – Part 2 Loading Case 37 from Formwork Guide). The limiting criteria for Shear Load on the timber waling is calculated assuming the width of support at a Soldier is 125mm. The bending moment criteria are calculated using the centre to centre span of the waling from Soldier to Soldier.

The weight of a form made up using timber walings, 19mm plywood and Superslim Soldiers is approximately 65kgs per square metre of face. The centres of the Soldiers and the spacing of the walings will affect the weight and care should be taken in using this approximation.

To use the information given below, firstly choose the design concrete pressure. Knowing the height of wall and likely number of Tie Rods, select the appropriate case from 1 to 7. Having selected the permissible centres of the Soldiers now check the timber waling permissible spans using table WT1 below.

Table WT1

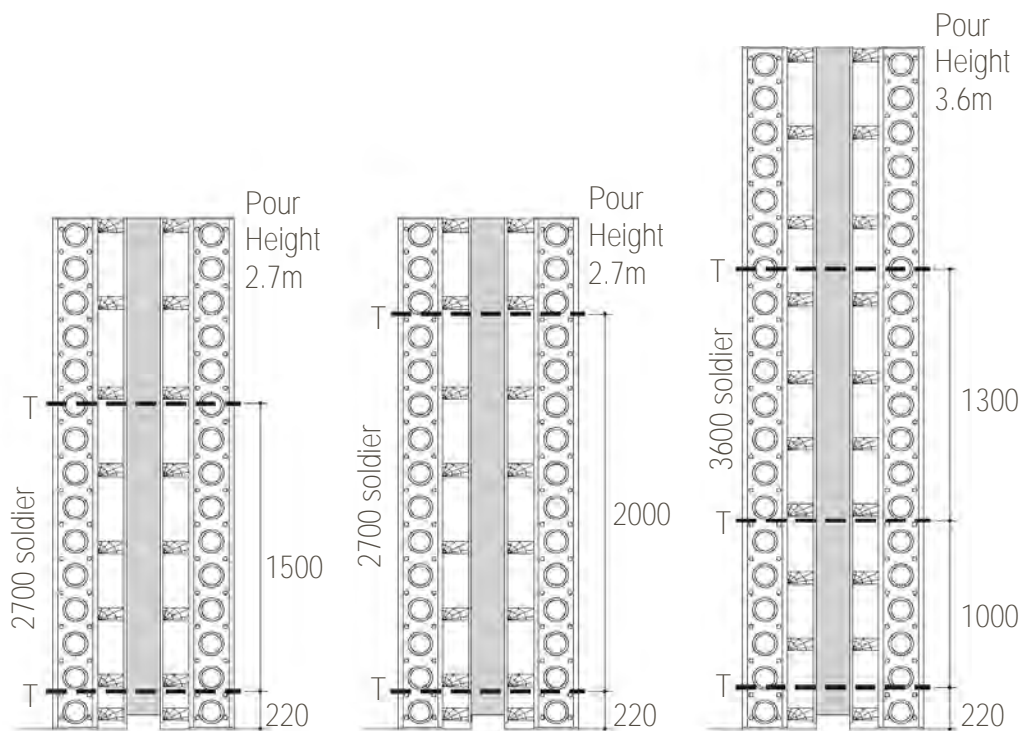
Table of Permissible spans of C24 Continuous Walings					
Concrete Pressure (kN/m ²)	Face Contact Material Span (mm)	Basic sizes			
		50 x 100	75 x 100	50 x 150	75 x 150
40	348	795	1040	1135	1515
40	305	895	1110	1275	1620
50	348	665	930	930	1355
50	305	740	990	1045	1450
50	271	815	1050	1160	1535
60	305	635	905	890	1300
60	271	705	960	985	1400
60	244	765	1010	1085	1590
70	271	620	885	865	1255
70	244	675	930	945	1365
70	222	730	980	1025	1435
80	271	555	790	770	1115
80	244	605	865	840	1225
80	222	655	920	915	1335

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Alternative Soldier
make up is a 2700
plus a 900 at top



Concrete Pressure kN/m ²	15mm Rapid Bar Tie.
50	2200
60	2180
70	2180
	Permissible spacing (mm) on plan of Superslim Soldiers

Case Study 1

Concrete Pressure kN/m ²	15mm Rapid Bar Tie.
50	1840
60	1750
70	1750
	Permissible spacing (mm) on plan of Superslim Soldiers

Case Study 2

Concrete Pressure kN/m ²	15mm Rapid Bar Tie.
50	1490
60	1350
70	1310
80	1300
	Permissible spacing (mm) on plan of Superslim Soldiers

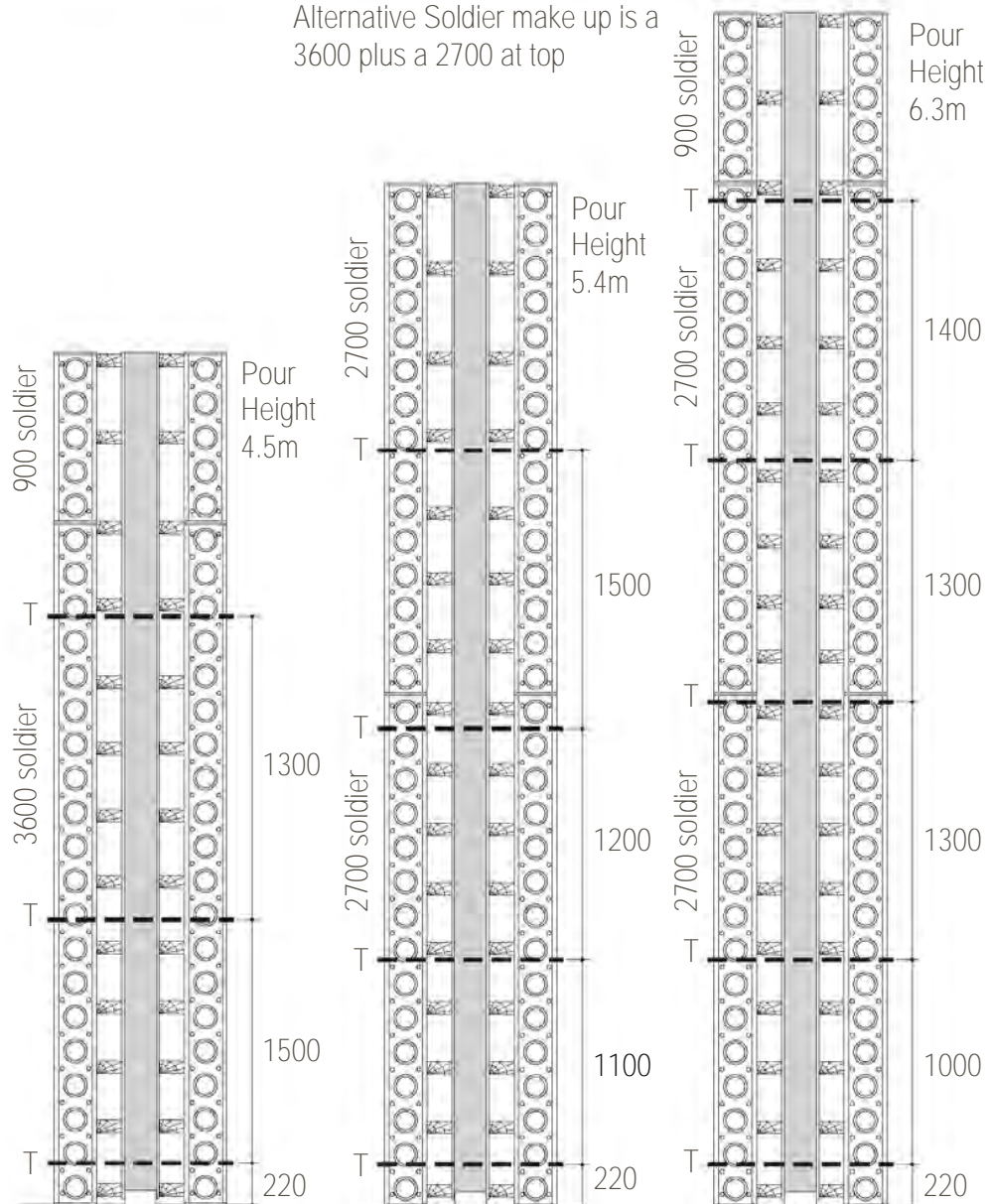
Case Study 3

Note: The permissible soldier spacings shown here may be limited by the timber walings used

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

Alternative Soldier make up is a 3600 plus a 2700 at top



Concrete Pressure kN/m ²	15mm Rapid Bar Tie.
50	1220
60	1030
70	930
80	880
100	860
	Permissible spacing (mm) on plan of Superslim Soldiers

Case Study 4

Concrete Pressure kN/m ²	15mm Rapid Bar Tie.
50	1320
60	1130
70	1020
80	890
100	760
	Permissible spacing (mm) on plan of Superslim Soldiers

Case Study 5

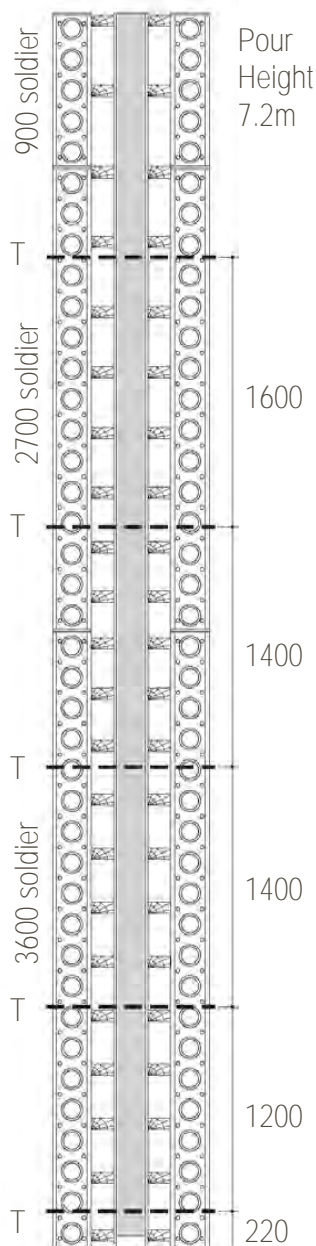
Concrete Pressure kN/m ²	15mm Rapid Bar Tie.
50	1310
60	1090
70	930
80	830
100	700
	Permissible spacing (mm) on plan of Superslim Soldiers

Case Study 6

Note: The permissible soldier spacings shown here may be limited by the timber walings used

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Concrete Pressure kN/m ²	15mm Rapid Bar Tie.
50	1180
60	1000
70	880
80	710
100	620
	Permissible spacing (mm) on plan of Superslim Soldiers

Case Study 7

Note: The permissible soldier spacings shown here may be limited by the timber walings used

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

R·M·D
KWIKFORM

Formwork – Applications with Alform Walings

The RMD Kwikform Alform walings combines high strength with low weight and in conjunction with Superslim Soldiers and RMD tie rods gives an inexpensive forming system for use with customers own Selection of face contact material. The Superslim Soldiers are spaced generally at 1800mm centres MAX and tie rod centres are optimised to suit the anticipated concrete pressure.

When assembling formwork with Alform walings it is recommended that some protection be given to the top walings to avoid build-up of concrete spillage when pouring. Preferably the top waling is a 150mm deep timber or a 150mm strip of plywood laid on top of the uppermost Alform beam. When made up an assembly of Alform formwork with Superslim Soldiers and 19mm plywood weighs approximately 53 kg per square metre per face of formwork. A range of accessories is available to complement the Alform beam, such as Splice Plates, Corner details, Lok Clamps etc. and these are shown in separate data sheets.

The lengths of Alform beam available are shown right:

Max BM = 10kNm

Max Reaction (Intermediate) 75mm Bearing = 55kN

Max Reaction (End) 44mm Bearing = 40kN



Code	Description	Weight
AFX11200	Alform Beam 1200mm	6.76 kg
AFX11500	Alform Beam 1500mm	8.46 kg
AFX11800	Alform Beam 1800mm	10.15 kg
AFX12100	Alform Beam 2100mm	11.85 kg
AFX12400	Alform Beam 2400mm	13.54 kg
AFX12700	Alform Beam 2700mm	15.24 kg
AFX13000	Alform Beam 3000mm	16.93 kg
AFX13600	Alform Beam 3600mm	20.32 kg
AFX14200	Alform Beam 4200mm	23.71 kg
AFX14800	Alform Beam 4800mm	27.10 kg
AFX15400	Alform Beam 5400mm	30.49 kg
AFX16000	Alform Beam 6000mm	33.88 kg
AFX16600	Alform Beam 6600mm	37.27 kg
AFX17200	Alform Beam 7200mm	40.67 kg

RMD Kwikform Plywood

RMD Kwikform Plywood is manufactured from high quality pine veneers bonded together with a cross banded construction with phenolic resin. Sheets are supplied with the face grain parallel to the long edge of the board.

Maximum Alform beam centres are shown below. Please note that data is valid for applications with the face grain perpendicular to the support beams for 3 or more spans and with deflection limited to span/270.



Alform Beam centres/mm	Maximum concrete pressure kN/m ²
407	41
349	59
305	73
271	85
244	99
222	115
203	132

RMDK Plywood Properties (per metre width)

Thickness	18 mm
Bending Stiffness - EI	3.97 kNm ²
Moment of Resistance - M _x (spanning perpendicular to the face grain)	0.439 kNm
Shear Load - qA	8.29 kN

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Formwork – Single Sided Cantilever Applications

When formwork is used on single face applications or where through tie rods are not permitted in the permanent works, the method of restraint of the Formwork requires careful examination for each application. Generally on pours up to about 2.7 metres High a solution is to use inclined props as shown in Fig WS1. The arrangement will require vertical restraint for the uplift forces and a suitable anchorage into the base slab. One solution is to use Anchor Plates SSSU10036 at the base of each soldier with prop bolts fixed into the base to resist the loads due to both horizontal concrete pressure and uplift. For single sided applications over 2.7 metres the single sided frame system may be used, refer to sheet 34. In all applications of single face formwork the concrete pressure should be kept to a minimum.

The use of Soldiers as backing members to cantilever construction in single face, such as on climbing formwork requires particular care. A typical example is shown at figure WS2. The limiting condition is the tip deflection of the Soldier and the arrangements shown below limit the deflection to 5mm. The pour height is limited to approximately 1.5 metres. It is possible to pre-set the top inwards by using the **Soldier Jacks**. It is recommended that the length of 'tail' of the Soldier is similar to that of the pour height. For longer lengths of vertical cantilever refer to the RMD Kwikform Technical Office.

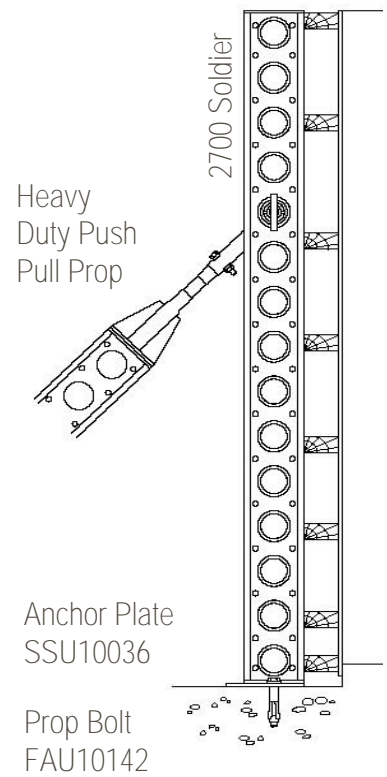


Fig. WS1 Single Faced Wall up to 2.7m High

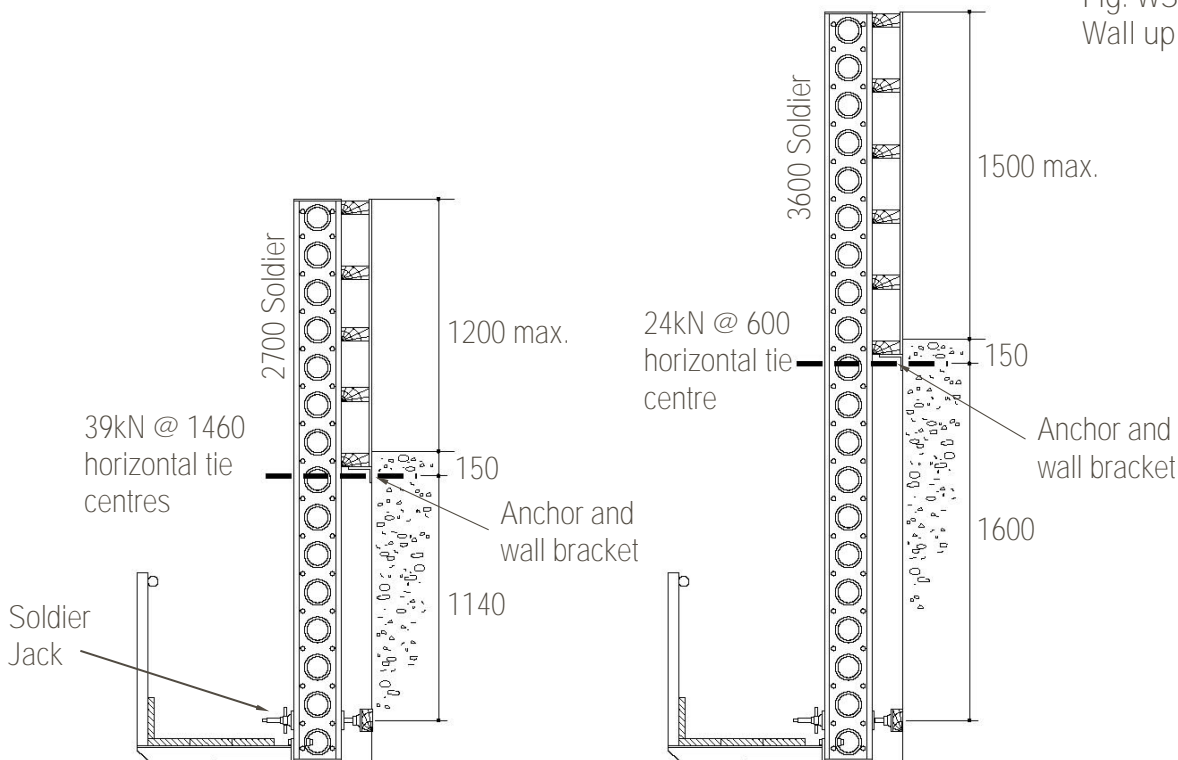


Fig. WS2 Single Faced Climbing Form

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

R·M·D
KWIKFORM



PUSH PULL PROPS

European Data

Date: 17/03/2020

Issue : SS02

Sheet 49

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SUPERSLIM SOLDIER

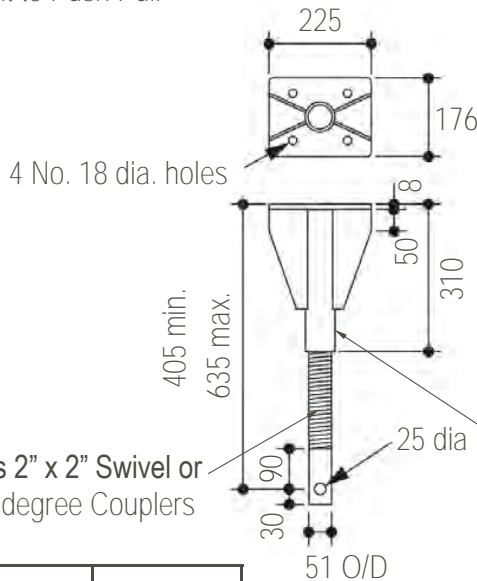
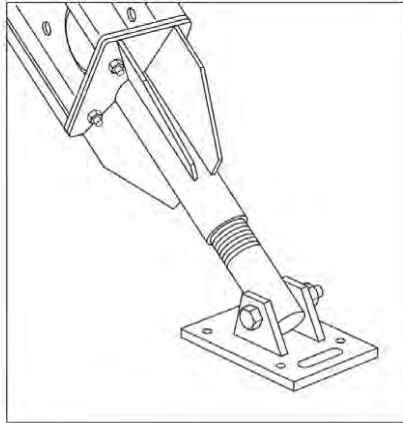
MODULAR STRUCTURAL SYSTEM



Superslim Prop Jacks

Used in pairs to provide length adjustment to Push Pull Props.

Allowable Working Load $\pm 100\text{kN}$



Fits 2" x 2" Swivel or 90 degree Couplers

Fits 2 3/8" x 2" Swivel or Fixed Couplers

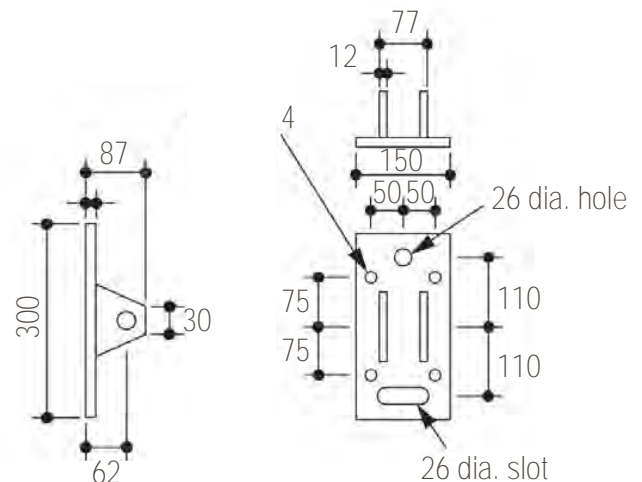
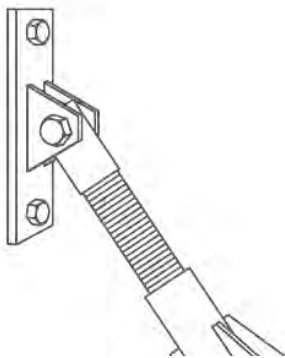
Code	Description	Weight
SSU10007	Superslim Prop Jack L.H. (green)	13.61 kg
SSU10008	Superslim Prop Jack R.H. (orange)	13.68 kg

Superslim Tilt Plate

Used to connect a Push Pull Prop to a plane surface at any angle. Connect to foundation using either the large hole and slot with 2 No. M24 anchors or using the 4 No. smaller holes with M16 anchors.

Allowable Working load Tension = 65kN* at any angle

Allowable Working Load Compression = 90kN* at any angle



Code	Description	Weight
SSU10034	Superslim Tilt Plate	4.89 kg
BNU24001	M24 Hex Nut gr8 BZP	0.06 kg
BNX24002	M24x110 Bolt gr8.8 BZP	0.48 kg

* Unless specific anchor design information has been provided, it is necessary to check the capacity of the anchors/bolts connecting the unit as a separate process.

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

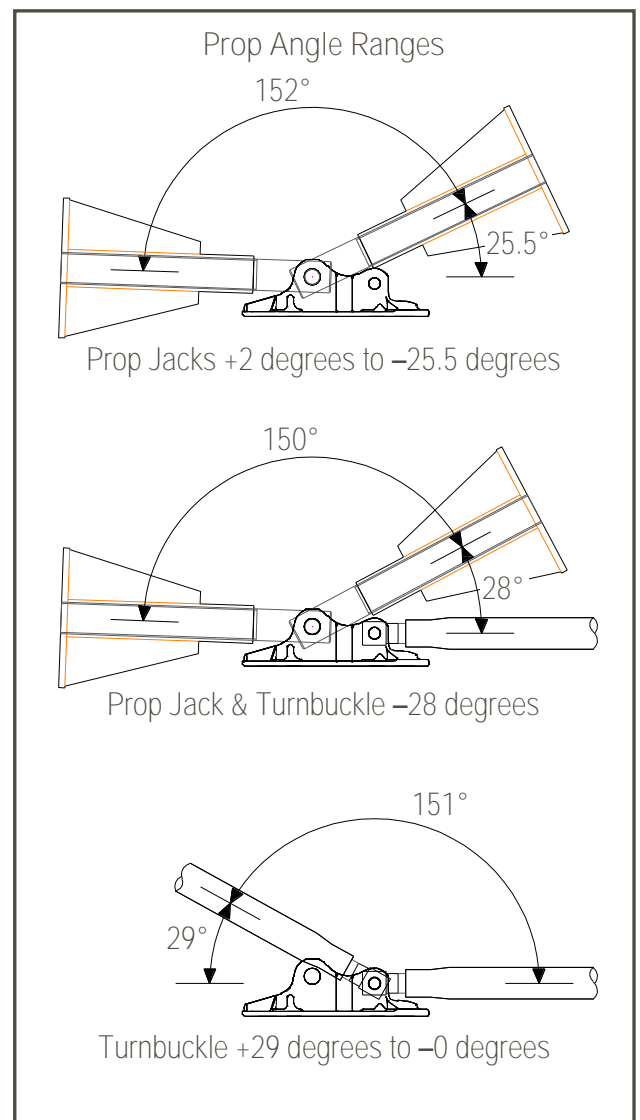
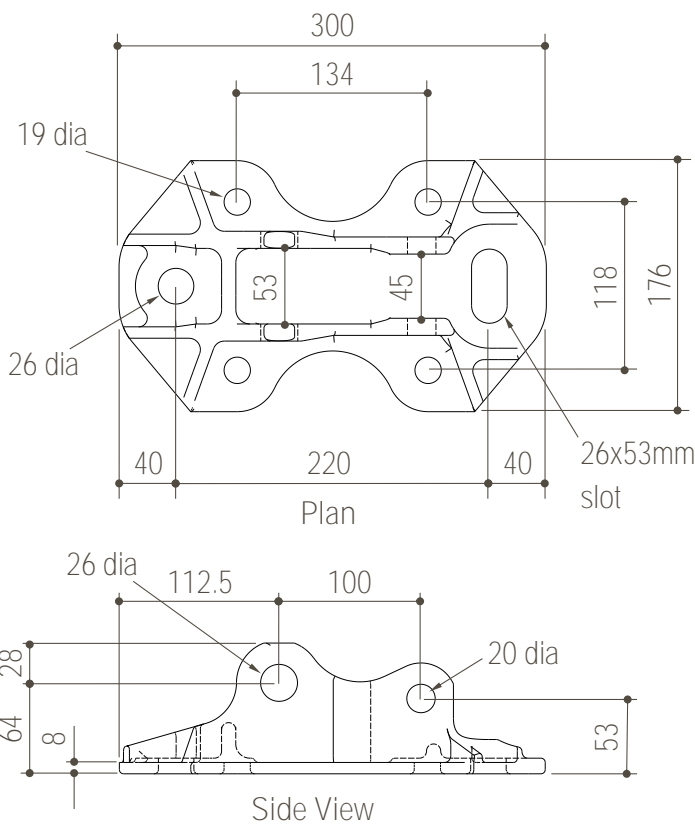


Superslim Cast 100kN Tilt Plate

A higher performance tilt plate used to connect a Push Pull Prop to a plane surface at any angle.

Allowable Working Load when connected to a foundation using the larger hole and slot with 2 M24 anchors, +/-100kN at any angle. When connected to a foundation using the smaller holes and 4 M16 anchors, +/-100kN at any angle*.

AWL with 2 bolts diagonally opposed in smaller holes 50kN.



Code	Description	Weight
SSX10062	Superslim Cast 100kN Tilt Plate	5.00 kg
BNU24001	M24 Hex Nut gr8 BZP	0.06 kg
BNX24002	M24x110 Bolt gr8.8 BZP	0.48 kg
SSX10046	Superslim 19mm Pin & R Clip	0.29 kg

* Unless specific anchor design information has been provided, it is necessary to check the capacity of the anchors/bolts connecting the unit as a separate process.

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

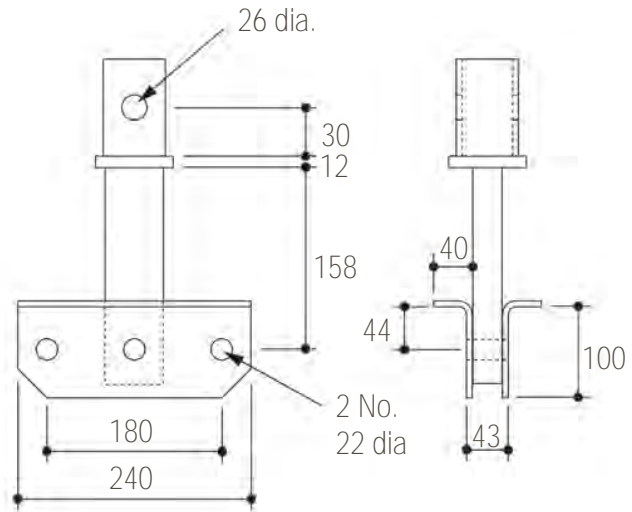
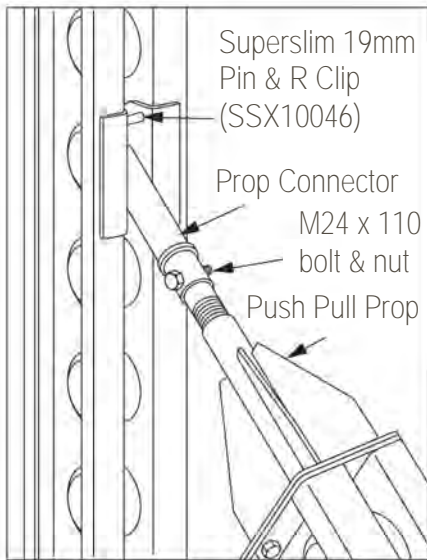


Superslim Prop Connector 100kN (SSU10038) Weight 6.82kg

Used to connect Push Pull Props to Soldiers where a load transfer of more than 65kN is required.

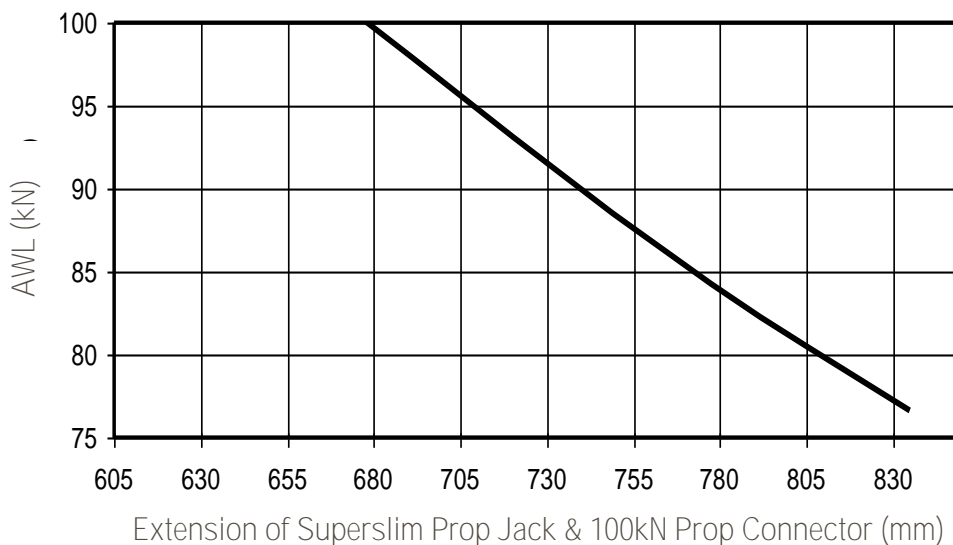


Allowable Working Load \pm 100kN Refer to connector loading graph & soldier capacity graphs.



Note This component enables Push Pull Props to be installed on opposite sides of a Soldier in the same location.

AWL for 100kN Prop Connector



SUPERSLIM SOLDIER

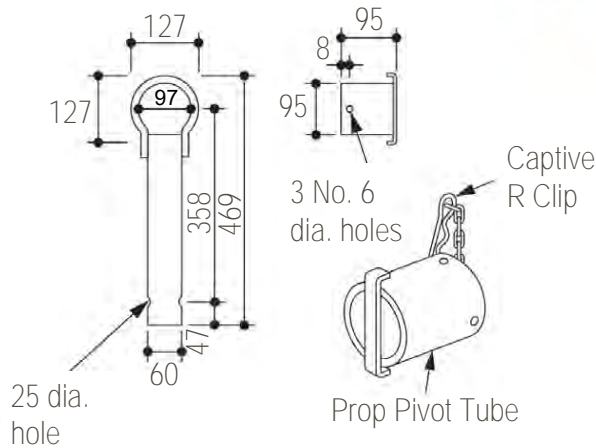
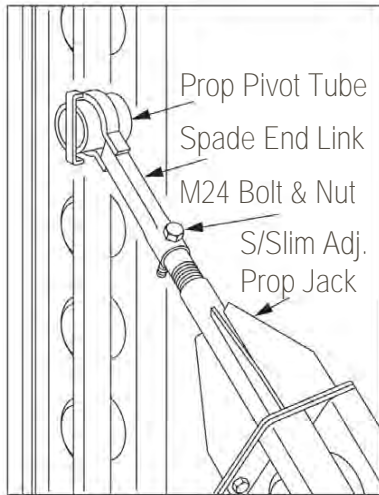
MODULAR STRUCTURAL SYSTEM



Prop Spade End Link & Prop Pivot Tube

Used to attach Push Pull Props to Soldiers. Connection to Soldier using 4 No. M16 x 40 Set Pin gr8.8 BZP & M16 Nut (BNU16007 & BNU16001).

Allowable Working Load $\pm 65\text{kN}$

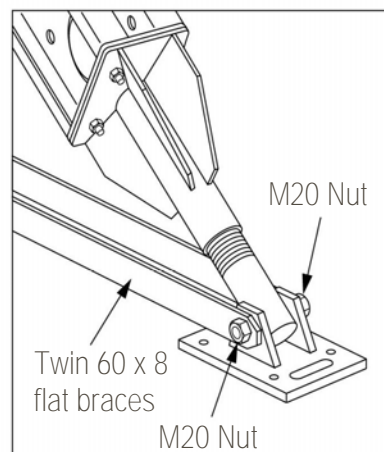
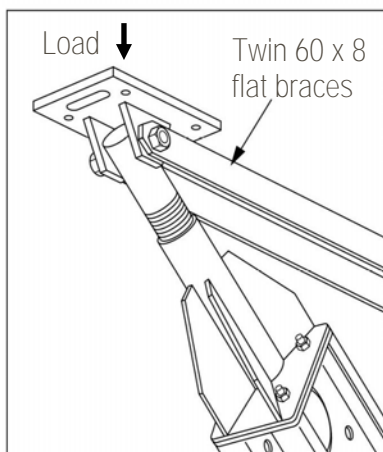
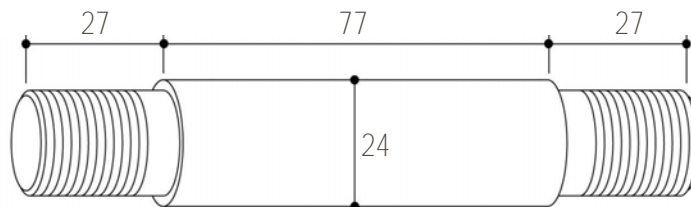


Code	Description	Weight
SSU10012	Superslim Prop Spade End Link	3.06 kg
SSU10004	Superslim Prop Pivot Tube	1.81 kg

Prop Brace Pin – M24/M20 (BNU10050) Weight 0.43kg

Used to connect Push Pull Props and twin 60 x 8 flat braces through the same fastener.

Allowable Working Load in prop $\pm 100\text{kN}$, in flat braces 80kN per pair tension only.



SUPERSLIM SOLDIER

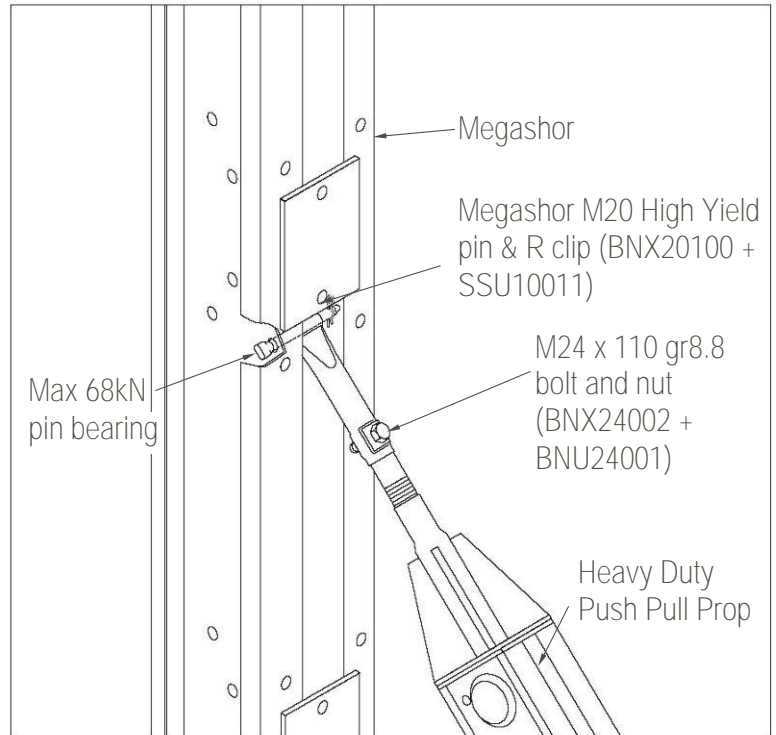
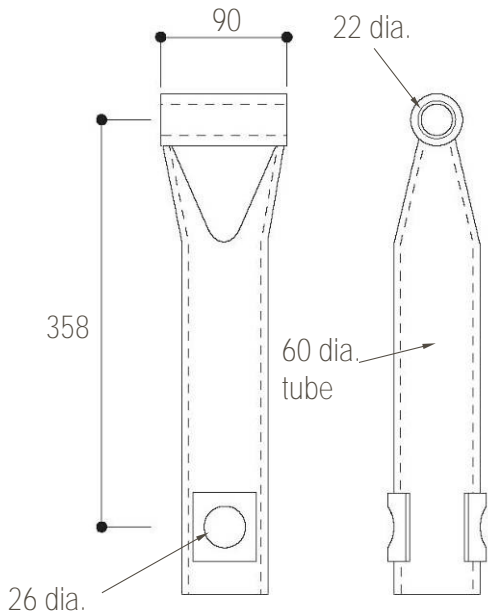
MODULAR STRUCTURAL SYSTEM



Superslim Prop Tube End Link (SSU10013) weight = 2.81kg

Used to connect Super Slim Push Pull Props to Megashor shafts or a pair of steel beam web stiffeners.

For Max allowable working load see graph (below)



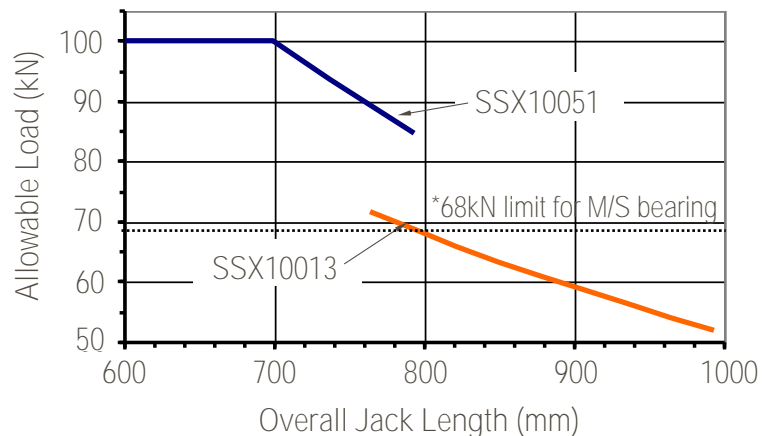
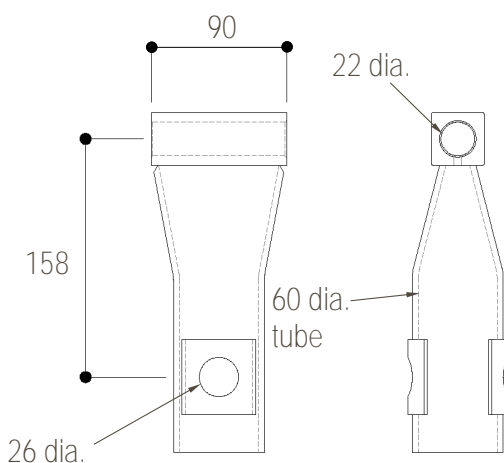
Note: A M20 washer can be welded to the Megashor webs in the channel to enhance the load bearing capacity to 100kN.

Superslim Short Prop Tube End Link (SSX10051) weight = 1.70kg

Used to connect Super Slim Push Pull Props to Megashor shafts when compression loads greater than can be provided by the above item are required. Connection to Megashor leg and s/slim jack as detailed above.

For Max allowable compressive load see graph (right)

Max allowable tension = 100kN



*Note: Capacity of prop tube end link limited by bearing on Megashor to 68kN

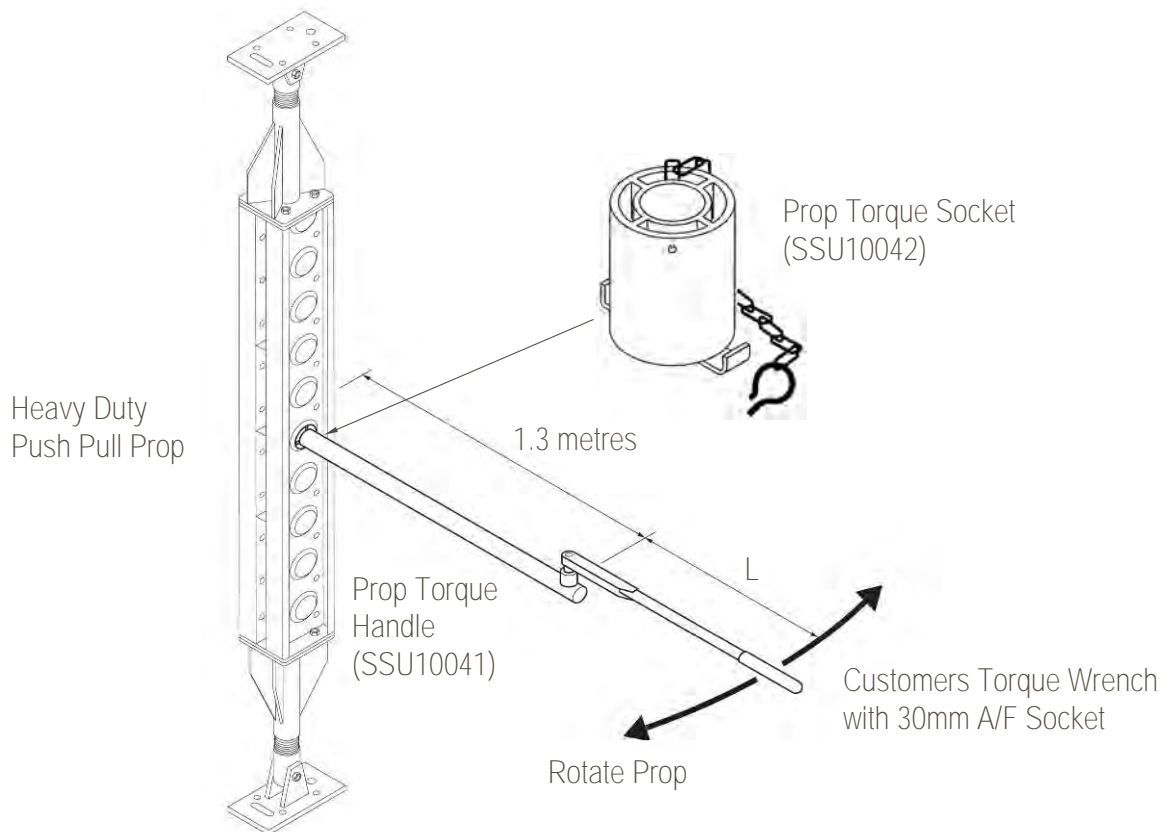
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

Push Pull Props – Load Control

By application of a controlled torque to the Superslim body of a Heavy Duty Push Pull Prop, the load applied by the prop up to the full 100kN capacity can be applied or measured.

Alternatively the axial force in a loaded Push Pull Prop can be measured by determining the torque required to just tighten the prop (Note, further turning will increase the load).



Load in Push Pull Prop = W (kN)

Torque measured on Torque Wrench = Tw (Nm)

Torque applied to Push Pull Prop = Tp (Nm)

$T_p = 9W$

For applying prop load:
$$T_w = T_p \left(\frac{L}{1.3 + L} \right)$$

For measuring prop load:
$$T_p = T_w \left(\frac{1.3 + L}{L} \right)$$

e.g. To apply prop load of 60kN you need to apply a torque to the prop of 540Nm. This can be achieved by applying a 0.7m long torque wrench set to 189Nm to the M20 nut on the Prop Torque Handle.

Note: Prop threads must be fully greased before use to ensure reasonable accuracy.

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Table P1 – Component make up for Push Pull Props with one Spade End and one Tilt Plate

	Length of prop 'L' (mm) (Working Dimensions)		SSX 10090 Sold 90	SSX 10540 Sold 540	SSX 10720 Sold 720	SSX 10900 Sold 900	SSX 11800 Sold 1800	SSX 12700 Sold 2700	SSX 13600 Sold 3600	SSU 10004 Prop Pivot Tube	SSU 10012 Spd End Link	SSU 10007 Prop Jack (LH)	SSU 10008 Jack Prop (RH)	SSU 10034 Tilt Plate	BNX 24002 M24 X 110 Bolt & Nut	BNU 16007 M16 X 40 Set Pin	BNU 16001 M16 Hex Nut	Weight kg
	Min.	Max.																
1	1230	1690	-	-	-	-	-	-	-	1	1	1	1	1	2	4	4	40
2	1410	1870	2	-	-	-	-	-	-	1	1	1	1	1	2	12	12	56
3	1770	2230	-	1	-	-	-	-	-	1	1	1	1	1	2	8	8	56
4	2130	2590	-	-	-	1	-	-	-	1	1	1	1	1	2	8	8	63
5	2490	2950	-	1	1	-	-	-	-	1	1	1	1	1	2	12	12	75
6	2850	3310	-	-	1	1	-	-	-	1	1	1	1	1	2	12	12	82
7	3030	3490	-	-	-	-	1	-	-	1	1	1	1	1	2	8	8	80
8	3390	3850	-	1	1	1	-	-	-	1	1	1	1	1	2	16	16	98
9	3750	4210	-	-	1	-	1	-	-	1	1	1	1	1	2	12	12	99
10	3930	4390	-	-	-	-	-	1	-	1	1	1	1	1	2	8	8	96
11	4290	4750	-	1	1	-	1	-	-	1	1	1	1	1	2	16	16	114
12	4650	5110	-	-	1	-	-	1	-	1	1	1	1	1	2	12	12	115
13	5010	5470	2	-	-	-	-	-	1	1	1	1	1	1	2	16	16	128
14	5370	5830	-	1	-	-	-	-	1	1	1	1	1	1	2	12	12	129
15	5730	6190	-	-	-	1	-	-	1	1	1	1	1	1	2	12	12	135
16	6090	6550	-	1	1	-	-	-	1	1	1	1	1	1	2	16	16	148
17	6450	6910	-	-	1	1	-	-	1	1	1	1	1	1	2	16	16	155
18	6810	7270	-	1	2	-	-	-	1	1	1	1	1	1	2	20	20	167
19	7170	7630	-	-	2	1	-	-	1	1	1	1	1	1	2	20	20	174
20	7530	7990	-	-	-	-	-	1	1	1	1	1	1	1	2	12	12	169
21	7890	8350	-	1	1	-	1	-	1	1	1	1	1	1	2	20	20	187
22	8250	8710	-	-	1	-	-	1	1	1	1	1	1	1	2	16	16	188
23	8430	8890	-	-	-	-	-	-	2	1	1	1	1	1	2	12	12	185
24	8790	9250	-	1	1	-	-	1	1	1	1	1	1	1	2	20	20	204
25	9150	9610	-	-	1	-	-	-	2	1	1	1	1	1	2	16	16	205

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Table P2 – Component make up for Push Pull Props with a Tilt Plate at both ends

	Length of prop 'L' (mm) (Working Dimensions)		SSX 10090	SSX 10720	SSX 10540	SSX 10900	SSX 11800	SSX 12700	SSX 13600	SSU 10004	SSU 10012	SSU 10007	SSU 10008	SSU 10034	BNX 24002	BNU 16007	BNU 16001	Weight kg
	Min.	Max.																
1	934	1394	-	-	-	-	-	-	-	-	-	1	1	2	2	4	4	40
2	1114	1574	2	-	-	-	-	-	-	-	-	1	1	2	2	12	12	56
3	1474	1934	-	-	1	-	-	-	-	-	-	1	1	2	2	8	8	56
4	1834	2294	-	-	-	1	-	-	-	-	-	1	1	2	2	8	8	63
5	2194	2654	-	1	-	-	-	-	-	-	-	1	1	2	2	12	12	75
6	2554	3014	-	1	-	1	-	-	-	-	-	1	1	2	2	12	12	82
7	2734	3194	-	-	-	-	1	-	-	-	-	1	1	2	2	8	8	79
8	3094	3554	-	1	-	-	-	-	-	-	-	1	1	2	2	16	16	97
9	3454	3914	-	1	-	-	1	-	-	-	-	1	1	2	2	12	12	99
10	3634	4094	-	-	-	-	-	1	-	-	-	1	1	2	2	8	8	96
11	3994	4454	-	1	-	-	1	-	-	-	-	1	1	2	2	16	16	114
12	4354	4814	-	1	-	-	-	1	-	-	-	1	1	2	2	12	12	115
13	4714	5174	2	-	-	-	-	-	1	-	-	1	1	2	2	16	16	128
14	5074	5534	-	-	1	-	-	-	1	-	-	1	1	2	2	12	12	128
15	5434	5894	-	-	-	-	-	-	1	-	-	1	1	2	2	12	12	135
16	5794	6254	-	1	-	-	-	-	1	-	-	1	1	2	2	16	16	148
17	6154	6614	-	1	-	1	-	-	1	-	-	1	1	2	2	16	16	154
18	6514	6974	-	2	-	-	-	-	1	-	-	1	1	2	2	20	20	167
19	6874	7334	-	2	-	1	-	-	1	-	-	1	1	2	2	20	20	152
20	7234	7694	-	-	-	-	-	1	-	-	-	1	1	2	2	12	12	169
21	7594	8054	-	1	-	-	1	-	1	-	-	1	1	2	2	20	20	187
22	7954	8414	-	1	-	-	-	1	1	-	-	1	1	2	2	16	16	188
23	8134	8594	-	-	-	-	-	-	2	-	-	1	1	2	2	12	12	185
24	8494	8954	-	1	-	-	-	1	1	-	-	1	1	2	2	20	20	204
25	8854	9314	-	1	-	-	-	-	2	-	-	1	1	2	2	16	16	205

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Table P3 – Component make up for Push Pull Props with a Spade End at both ends

Length of prop 'L' (mm) (Working Dimensions)	SSX 10090		SSX 10540	SSX 10720	SSX 10900	SSX 11800	SSX 12700	SSX 13600	SSU 10004	SSU 10012	SSU 10007	SSU 10008	SSU 10034	BNX 24002	BNU 16007	BNU 16001	Weight kg
	Min.	Max.	Sold 540	Sold 720	Sold 900	Sold 1800	Sold 2700	Sold 3600	Prop Pivot Tube	Spd End Link	Prop Jack (LH)	Jack Prop (RH)	Tilt Plate	M24 X 110 Bolt & Nut	M16 X 40 HT Set Pin	M16 Hex Nut	
1	1526	1986	-	-	-	-	-	-	2	2	1	1	-	2	4	4	30
2	1706	2166	-	-	-	-	-	-	2	2	1	1	-	2	12	12	56
3	2066	2526	1	-	-	-	-	-	2	2	1	1	-	2	8	8	56
4	2426	2886	-	-	1	-	-	-	2	2	1	1	-	2	8	8	63
5	2786	3246	1	1	-	-	-	-	2	2	1	1	-	2	12	12	75
6	3146	3606	-	1	1	-	-	-	2	2	1	1	-	2	12	12	82
7	3326	3786	-	-	-	1	-	-	2	2	1	1	-	2	8	8	79
8	3686	4146	1	1	1	-	-	-	2	2	1	1	-	2	16	16	98
9	4046	4506	-	1	-	1	-	-	2	2	1	1	-	2	12	12	99
10	4226	4686	-	-	-	-	1	-	2	2	1	1	-	2	8	8	96
11	4586	5046	1	1	-	1	-	-	2	2	1	1	-	2	16	16	114
12	4946	5406	-	1	-	-	1	-	2	2	1	1	-	2	12	12	115
13	5306	5766	2	-	-	-	-	1	2	2	1	1	-	2	16	16	128
14	5666	6126	-	-	-	-	-	1	2	2	1	1	-	2	12	12	129
15	6026	6486	1	-	1	-	-	1	2	2	1	1	-	2	12	12	135
16	6386	6846	-	1	-	-	-	1	2	2	1	1	-	2	16	16	148
17	6746	7206	-	1	1	-	-	1	2	2	1	1	-	2	16	16	155
18	7106	7566	1	2	-	-	-	1	2	2	1	1	-	2	20	20	167
19	7466	7926	-	2	1	-	-	1	2	2	1	1	-	2	20	20	152
20	7826	8286	-	-	-	-	1	1	2	2	1	1	-	2	12	12	169
21	8186	8646	1	1	-	1	-	1	2	2	1	1	-	2	20	20	187
22	8546	9006	-	1	-	-	1	1	2	2	1	1	-	2	16	16	188
23	8726	9186	-	-	-	-	-	2	2	2	1	1	-	2	12	12	186
24	9086	9546	-	1	-	-	1	1	2	2	1	1	-	2	20	20	204
25	9446	9906	-	1	-	-	-	2	2	2	1	1	-	2	16	16	205

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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SOFFIT FORMWORK

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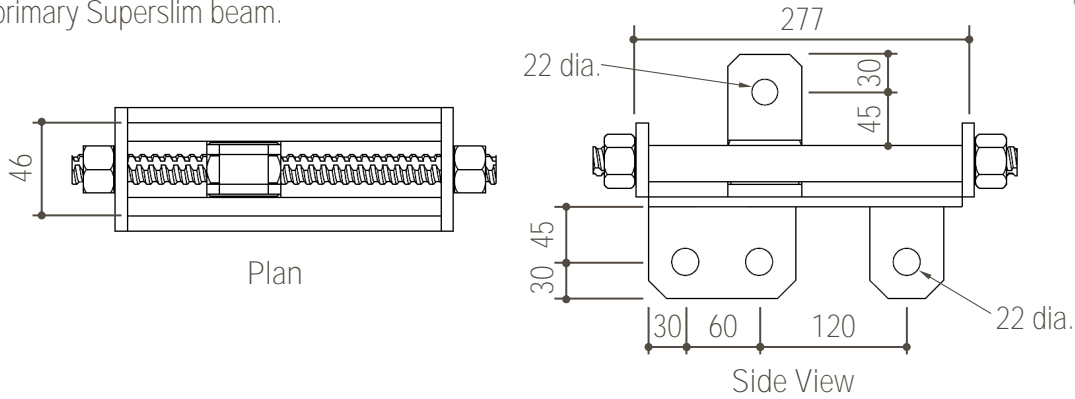
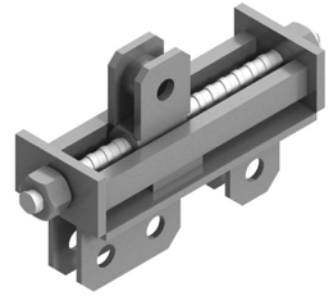
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



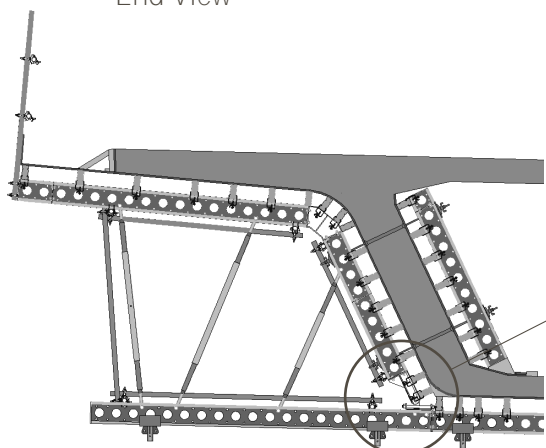
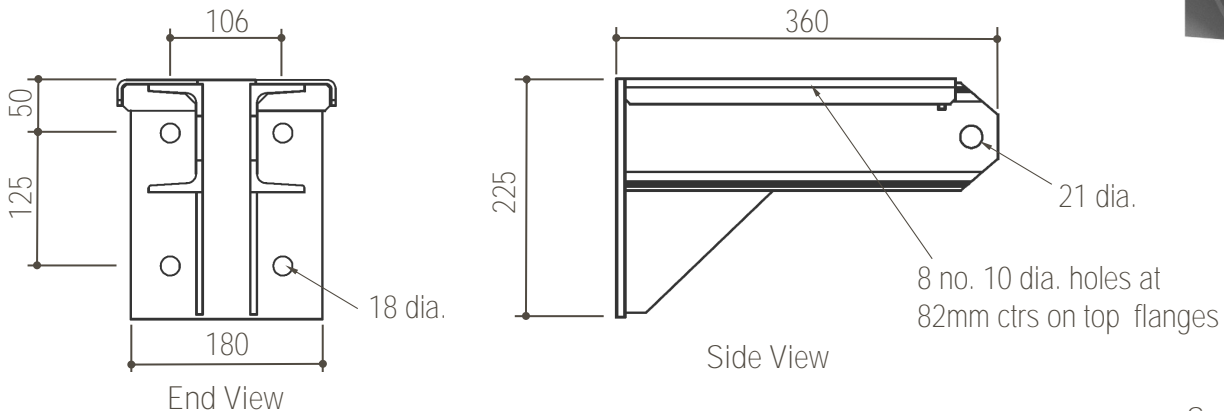
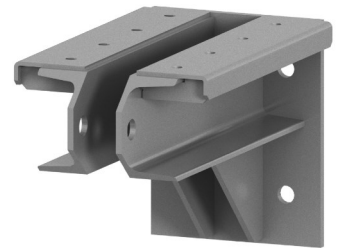
Superslim Lower Giro Unit (SSM00071) weight 7.91kg

Used in conjunction with the Upper Giro Unit (SSM00072) to connect the outer wing form Superslim Soldiers to the primary Superslim beam. Provides up to 195mm of horizontal adjustment of the wing form shutter relative to the preset hole positions in the primary Superslim beam.

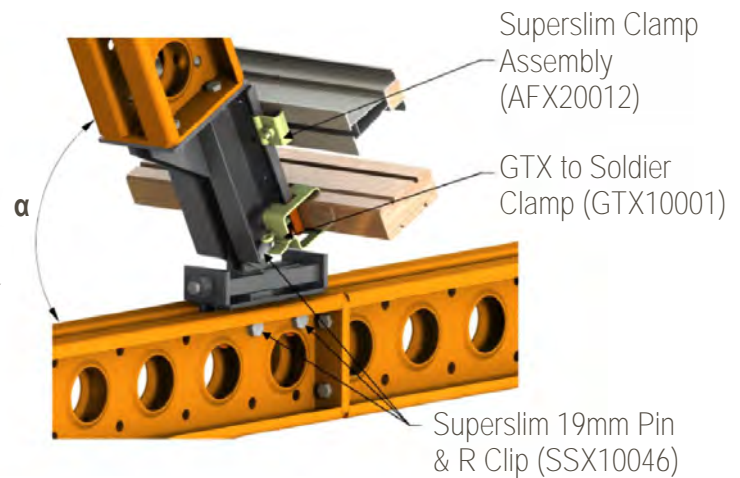


Superslim Upper Giro Unit (SSM00072) weight 12.17kg

Used in conjunction with the Lower Giro Unit (SSM00071) to connect the outer wing form Superslim Soldiers to the primary Superslim beam. The hinge connection allows for varying angles of the wing form with a minimum of 30 degrees.



Typical Wing Form General Arrangement



Connection Detail

Allowable Working Load = 50kN Downwards at any angle (α).
Allowable Working Load = 30kN Upwards at any angle (α).

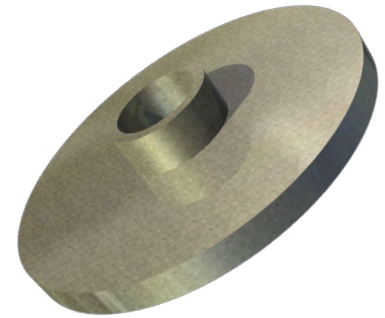
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MODULAR STRUCTURAL SYSTEM

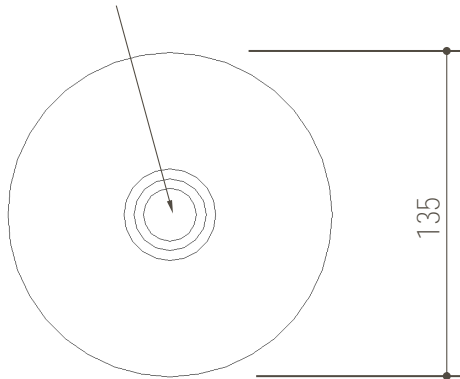


Hi-Load Bearing Plate (BTU10020) weight 1.20kg

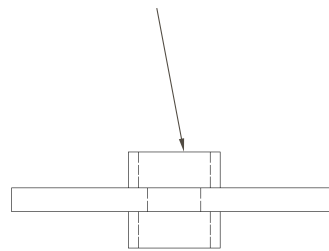
Used to locate and pack apart twin Hi-Load Water Plates in applications of high bearing load between Superslim Soldiers. The central hole also permits passage of tie bars which can be used to secure the assembly.



20 diameter hole

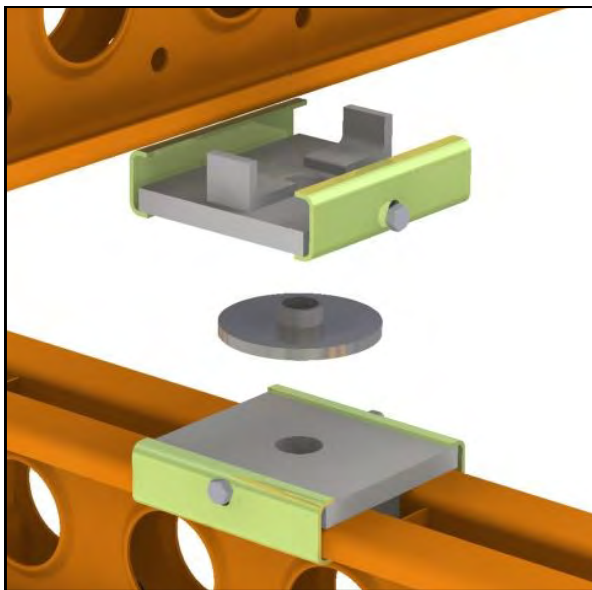


38 diameter tubes locate into 40mm diameter holes in Hi-Load Water Plates

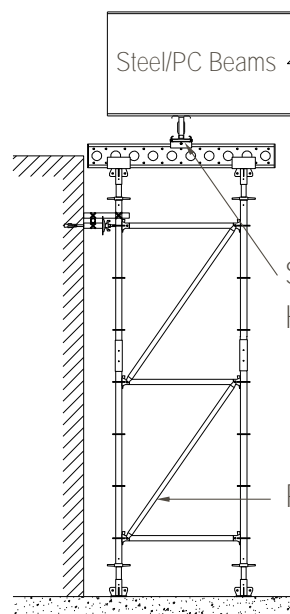


10 thick plate packs apart Hi-Load Water Plates such that integral channels miss each other

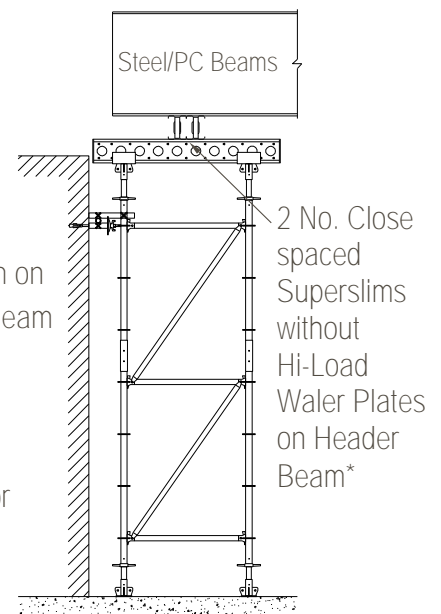
Allowable Working Load 160kN



Connection Between Soldiers in Detail 1



Detail 1



Detail 2 (preferred)

* There will be sufficient elastic take-up due to Superslim flange rotation to assume equal loading of the twin beams.

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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CLIMBING PLATFORMS

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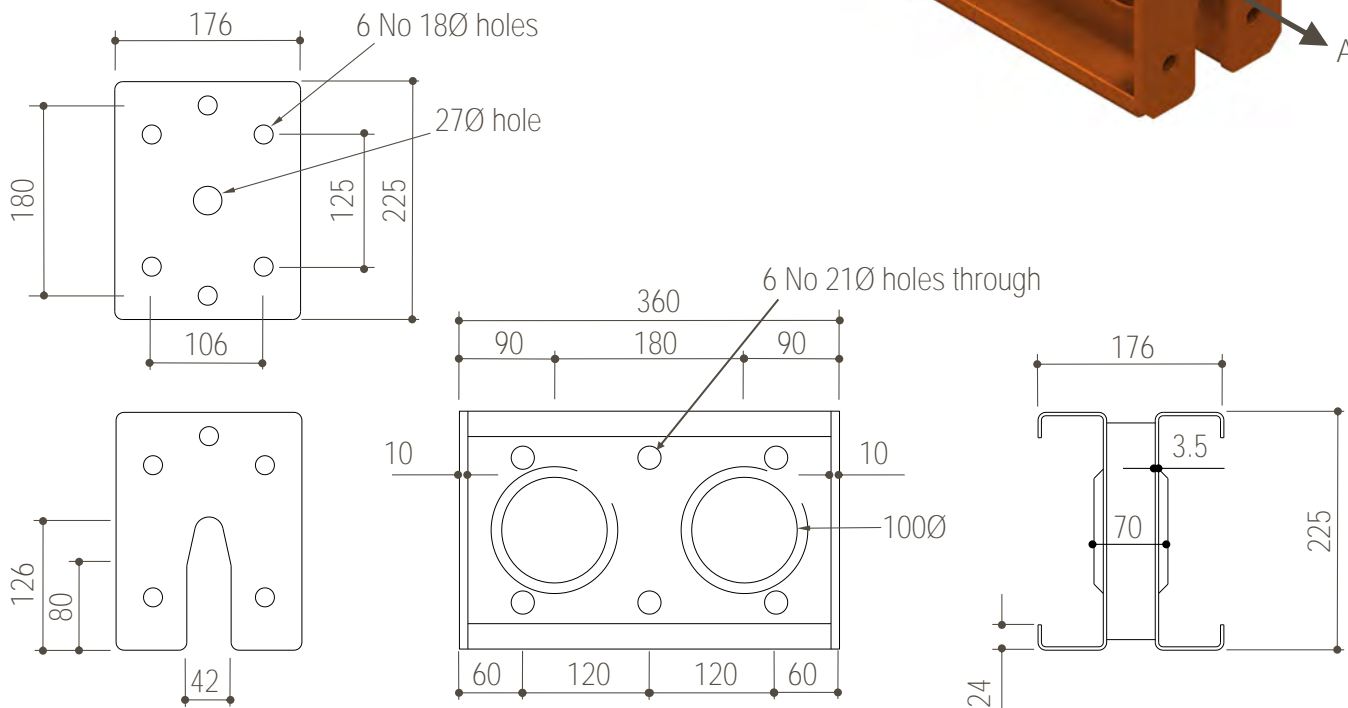
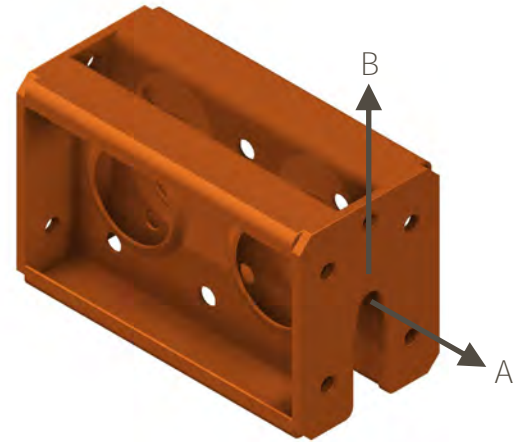
MODULAR STRUCTURAL SYSTEM



Superslim Soldier 360mm H/Shoe (SSU10035) weight 11.7kg

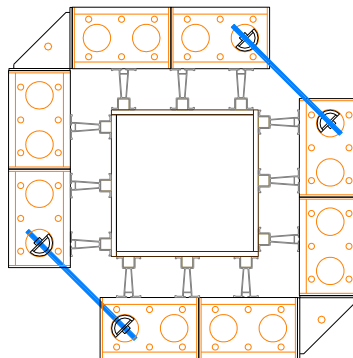
Used as part of the primary beam on the Superslim climbing platform. The open end facilitates location of the platform onto the Superslim O/E M24 Cone Bobbin (SSX10061).

For max loads with Superslim O/E M24 Cone Bobbin see performance graph - sheet 68.



* Note: Tension load capacity does not apply when attaching the Superslim O/E M24 Cone Bobbin to the central 27mm dia. hole of a non-open ended Superslim Soldier.

Can also be used to facilitate the use of Superslim soldier L forms in column formwork applications.



SUPERSLIM SOLDIER

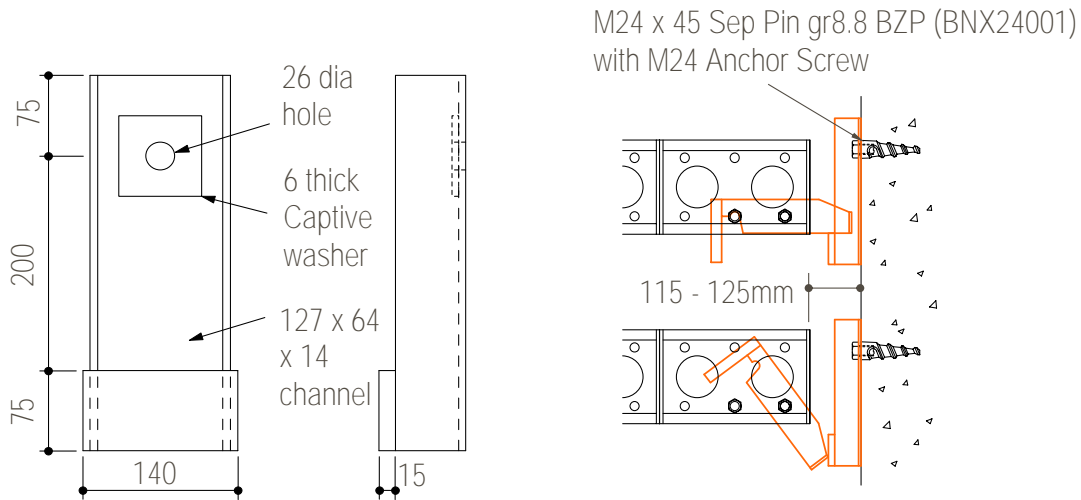
MODULAR STRUCTURAL SYSTEM



Superslim Klik-Klak Wall Bracket (SSU10030) weight 6.63kg

Used wall mounted to support Klik-Klak Latch in applications where the formwork can be removed with each lift or sufficiently retracted to provide clearance.

Allowable Working Load = 25kN



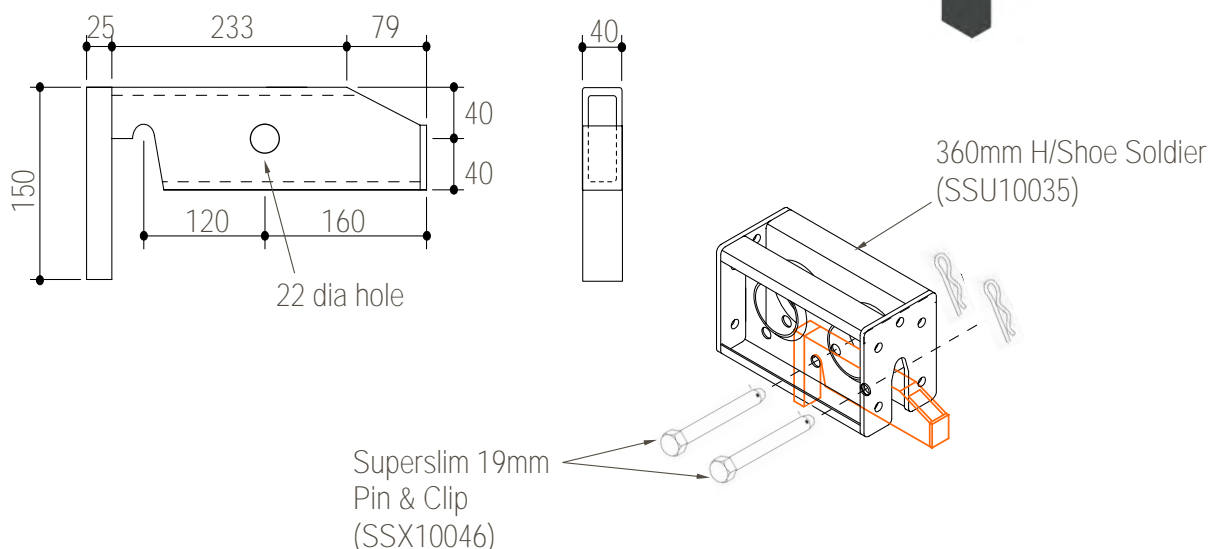
Note: the Superslim soldier length must be between 230 & 250mm shorter than the wall gap to ensure the unit can not become disconnected at one end of the platform during use.

Check adequate bearing of latches after each lift and wedge gaps between the wall and the end of the Superslim tight both ends.

Superslim Klik-Klak Latch (SSU10037) weight 3.95kg

Used in conjunction with Superslim Soldier 360mm H/Shoe (SSU10035) to create crane lifted platform applications.

Allowable Working Load = 25kN



SUPERSLIM SOLDIER

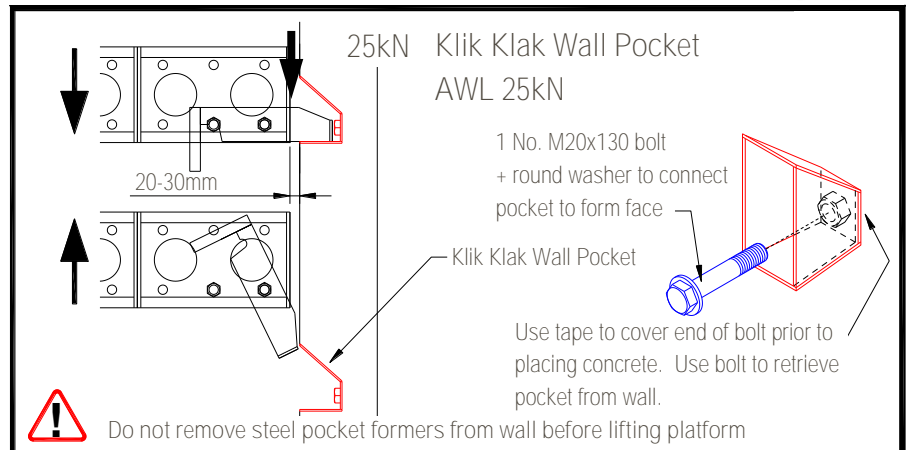
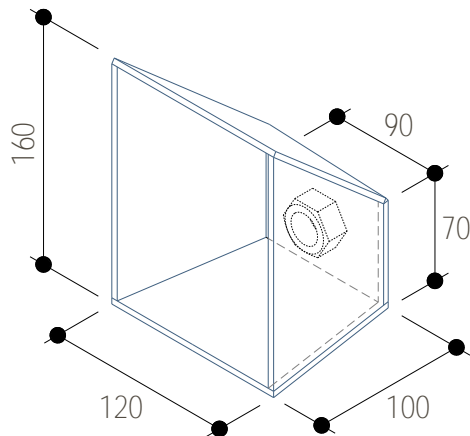
MODULAR STRUCTURAL SYSTEM

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Klik-Klak Wall Pocket (SSU10044) Weight 1.64kg

Used as an alternative to the Klik-Klak Wall Bracket when forms can not be retracted sufficiently to bolt the bracket onto the wall prior to lifting.

Allowable Working Load = 25kN



Note: The Superslim soldier length must be between 40 & 60mm shorter than the wall gap to ensure the unit can not become disconnected at one end of the platform during use.

Check adequate bearing of latches after each lift and wedge gaps between the wall and the end of the Superslim tight both ends to prevent accidental sideways movement of platforms.

SUPERSLIM SOLDIER

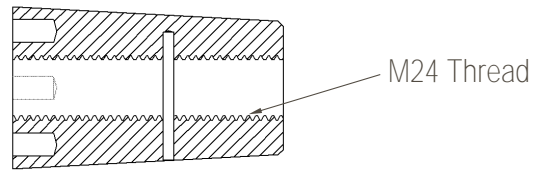
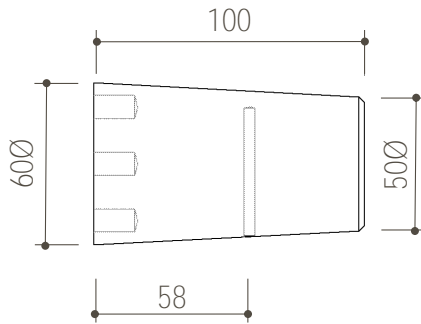
MODULAR STRUCTURAL SYSTEM



Rapidclimb M24Cone (RCX10009) weight 1.62 kg

Cast into the wall together with the M24 Anchor Plate 100x100x110 (AGU20120) to enable connection of the Superslim O/E M24 Cone Bobbin (SSX10061). It is retrieved after use.

Note: Ensure cone surfaces are coated with Anchor Screw Grease to facilitate removal.

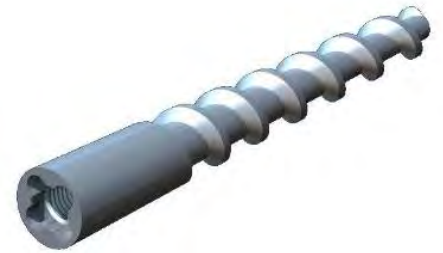
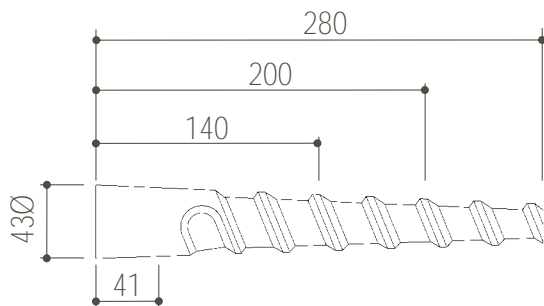


Cross Section Showing Stop Pin

Allowable Working Load = 50kN shear & 80kN tension

M24 Anchor Screws

A fully recoverable alternative to the cone for fixing to the wall.



Code	Description	Weight
HTX24280	Anchor Screw M24 x 280	1.45 kg
HTX24200	Anchor Screw M24 x 200	1.11 kg
HTX24140	Anchor Screw M24 x 140	0.88 kg
HTX10015	Extractor Key Head M24	0.34 kg
HTX10013	Extractor Key Arm	3.60 kg

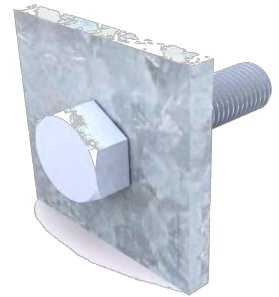
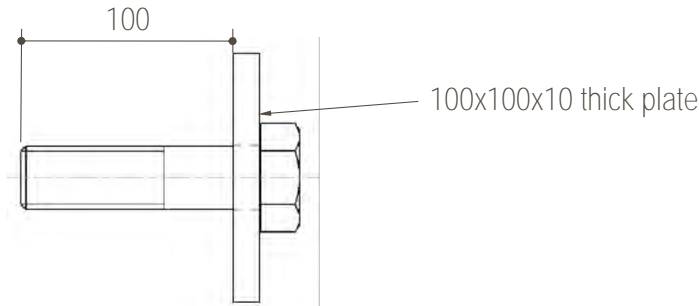
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



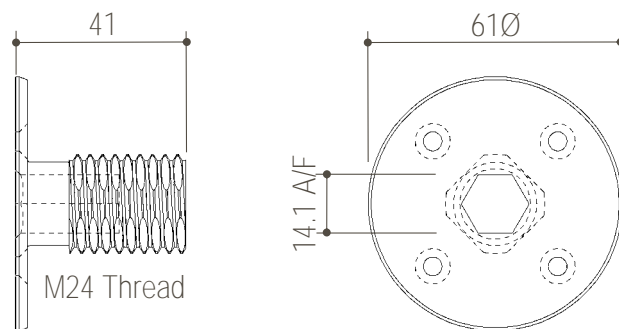
M24 Anchor Plate 100x100x110 (AGU20120) weight 1.23kg

A consumable M24 gr8.8 anchor used with the Rapidclimb M24 Cone (RCX10009).



Rapidclimb Cone Retainer (RCX10020) weight 0.12kg

Used to attach the Rapidclimb M24 Cone or 30kN anchor screw to the shutter prior to pouring. This is nailed to the form face and the anchor is hand tightened onto it.



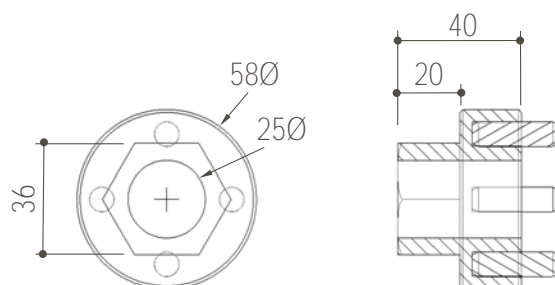
Rapidclimb Cone Retainer Key (RCX10021) weight 0.05kg

A 14A/F key used to extract the Cone Retainer from the Rapidclimb M24 Cone after the pouring process.



Rapidclimb Extractor Key (RCX10031) weight 0.45 kg

Used to remove Rapidclimb M24 Cones to allow re-use. The key can be captivated to the cone using a M24x60 set pin to prevent movement of the key when using a 36AF spanner on the hex head if required.



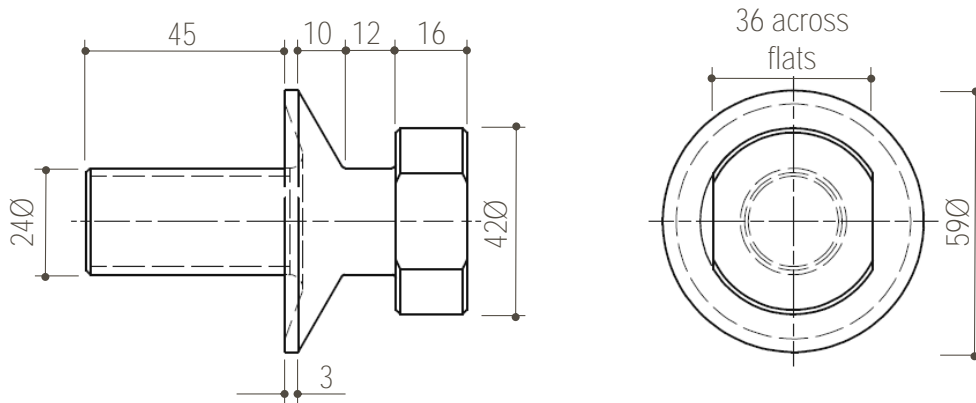
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MODULAR STRUCTURAL SYSTEM

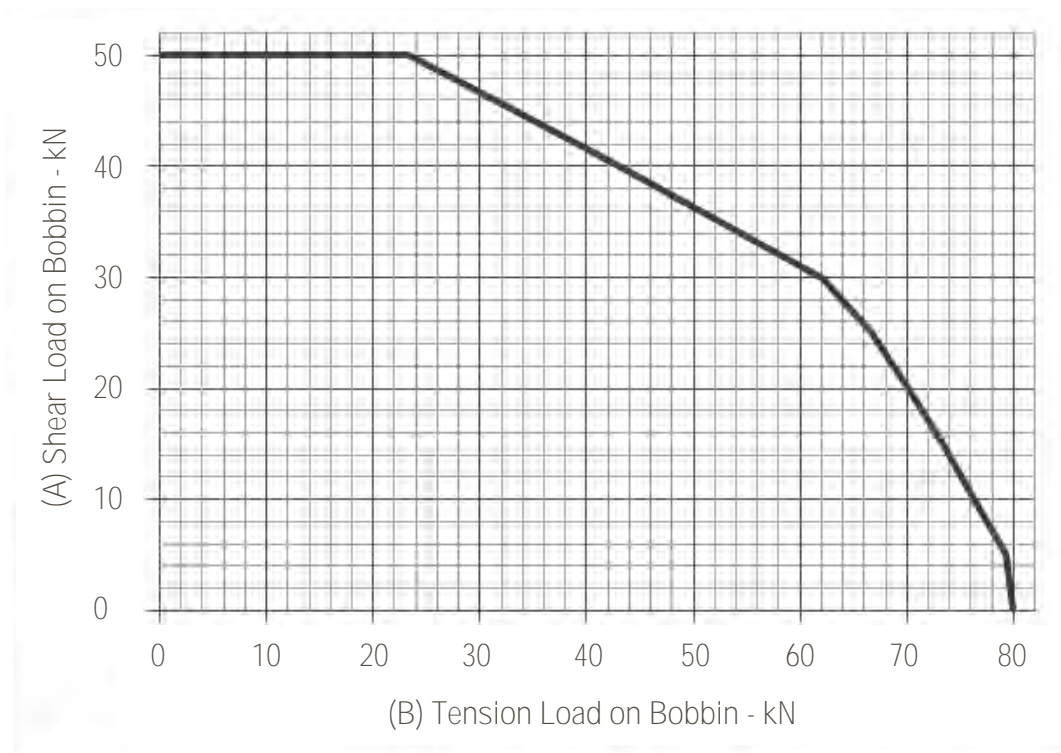


Superslim O/E M24 Cone Bobbin (SSX10061) weight 0.51kg

Used in conjunction with the Rapidclimb M24 Cone (RCX10009) and the M24 Anchor Plate 100x100x110 (AGU20120) to secure the Superslim Support Frame to the wall.



Allowable Working Loads



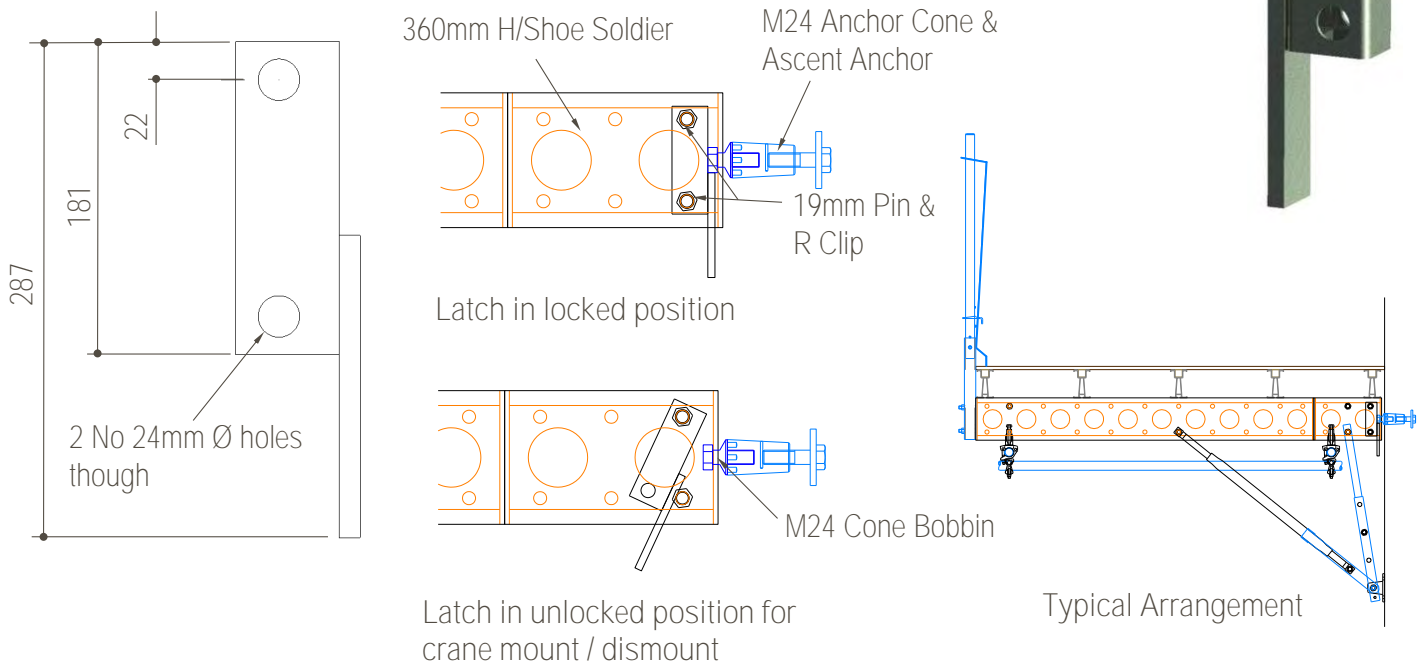
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



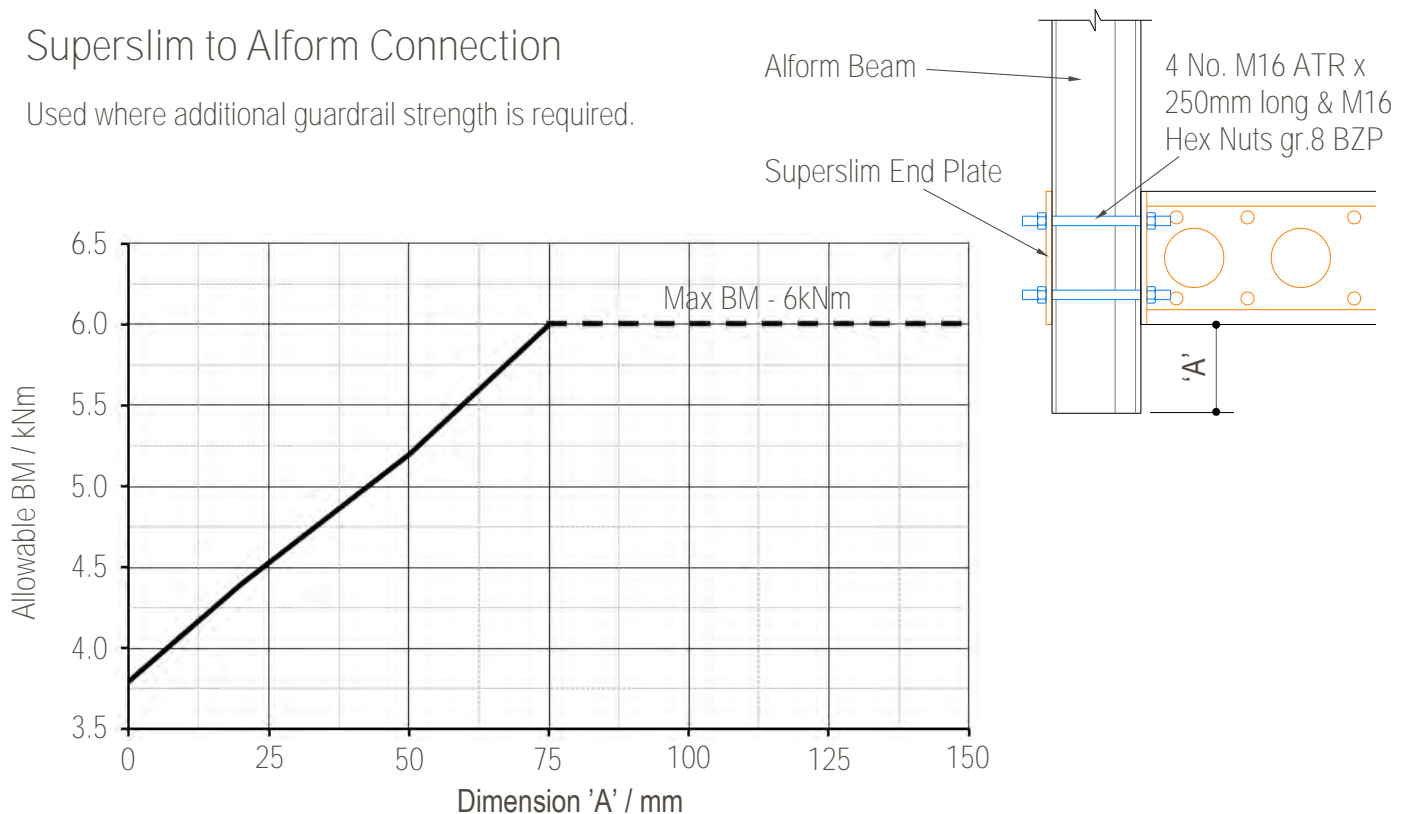
Superslim Safety Latch (SSX10048) Weight 1.39kg

Creates a captivated connection when seating a 360mm H/Shoe Soldier over the Superslim O/E M24 Cone Bobbin, creating simple loading / access platforms etc.



Superslim to Alform Connection

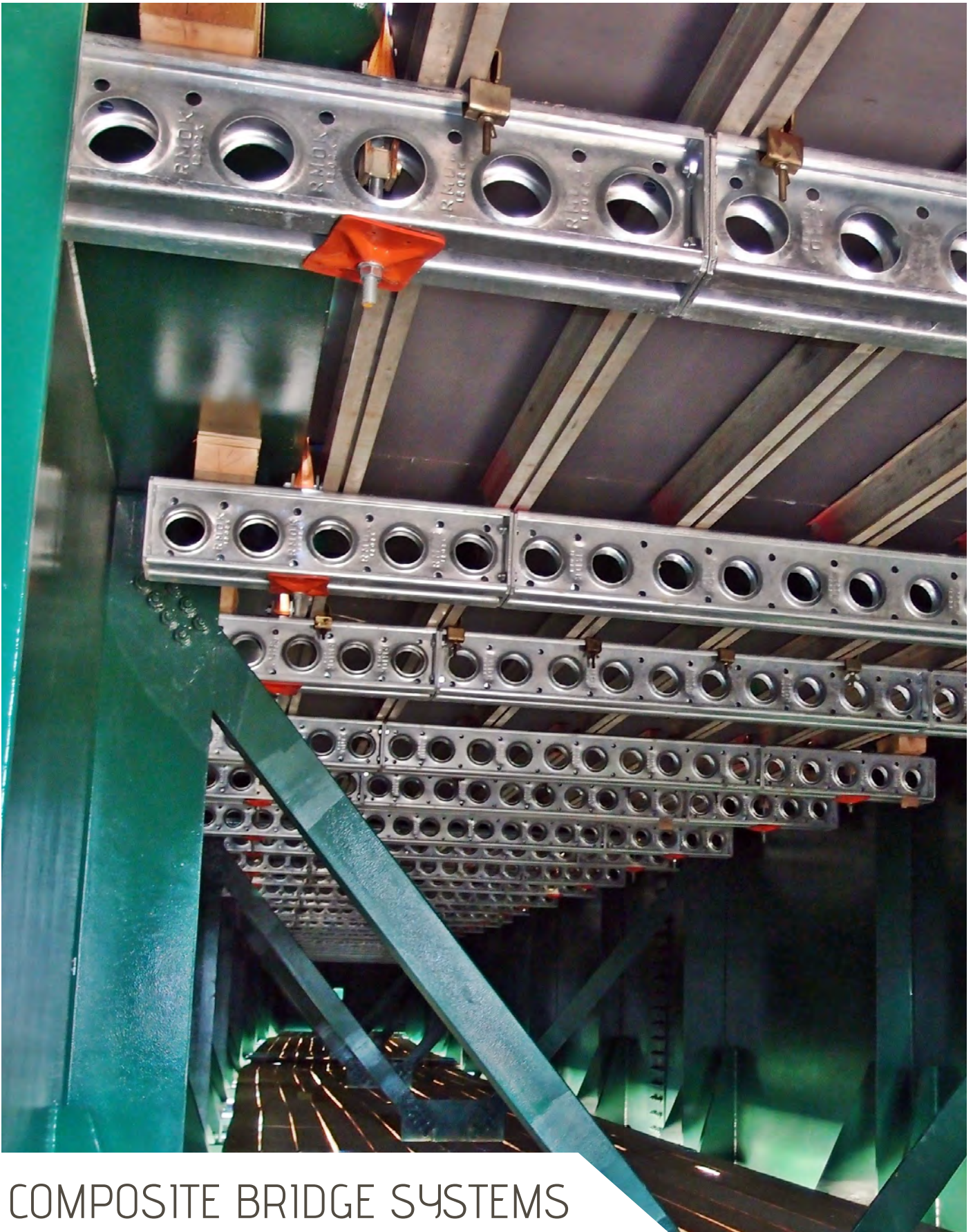
Used where additional guardrail strength is required.



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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COMPOSITE BRIDGE SYSTEMS

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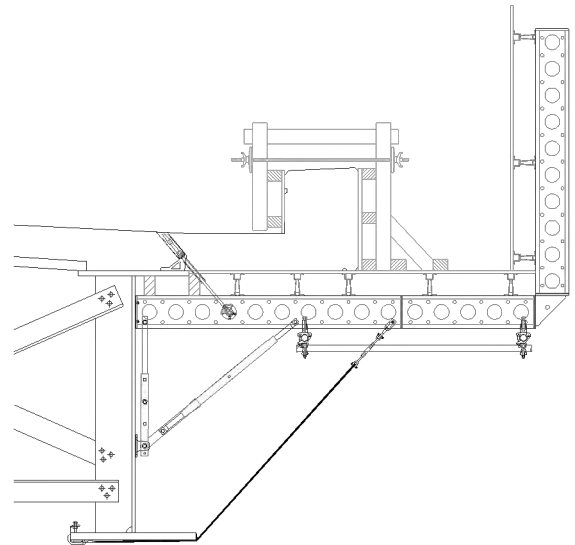
MODULAR STRUCTURAL SYSTEM



Paraslim System for Composite Bridge Deck Cantilever Construction

Paraslim is a modular soffit support system designed to facilitate construction of edge projections, parapets and string courses of composite steel girder and precast concrete bridge decks. It may also be used to construct the capping beams to sheet piles or connect to a previously cast wall to produce a simple access platform for use in low-rise jump formwork applications

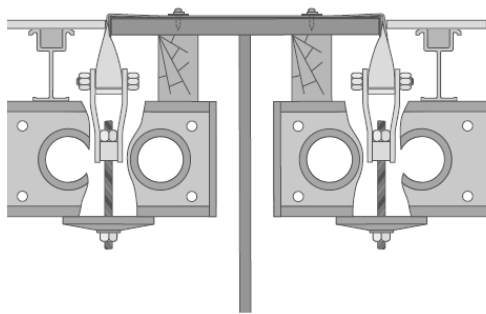
The system is based on a triangular frame consisting of a Superslim top chord with a tubular or Superslim undercarriage. Frames are laced together with tube and fittings to produce a module erected and dismantled by crane. All erection, levelling, use and dismantling can be carried out safely from above deck level thus eliminating the need for special access plant and enhancing safety by reducing work at height. The modules can be provided to site preassembled by RMD Kwikform, thus saving site assembly time and space.



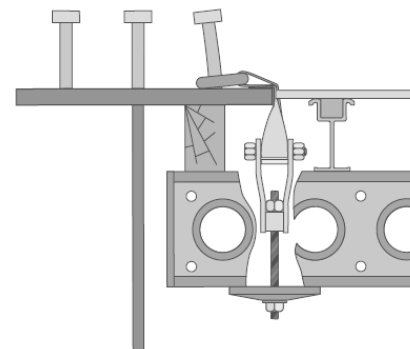
In bridge construction, Paraslim modules are either assembled onto the bridge girders before they are raised into position, in which case they form a full span access platform available for use immediately, or they are craned into position individually alongside the erected bridge beams. Various edge protection options are available ranging from Ultraguard mesh panels to fully hoarded debris shields for use over live road or rail traffic.

Webtie System for Composite Bridge Deck Slab Support

Webtie modular soffit formwork panels increase the speed and efficiency of the construction of reinforced concrete decks in composite bridges, providing an economical and flexible alternative to permanent formwork between the bridge girders. Load tested and certified polyester Webties readily straddle the top flanges of bridge girders or attaches to 19mm, 22mm or 25mm diameter shear connectors to support Superslim Soldier primary beams below an Alform Beam or GTX Beam and plywood soffit. When the deck has been cast and the formwork removed, Webties are severed and sealed at the concrete surface using a hot knife tool.



Webtie Saddle



Webtie Delta

For full details of Paraslim & Webtie equipment refer to Paraslim Safetie Datasheets.

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

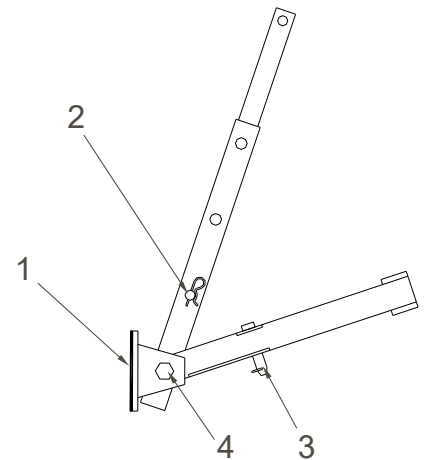


Paraslim Undercarriage Assembly (PSX10032) weight 10.7kg

An assembly of fully galvanised parts used together with a Superslim Turnbuckle and a Superslim Soldier to form a Paraslim Frame.

Incorporates the following features:

1. Paraslim Tilt Plate with integral 6mm thick, polypropylene girder paintwork protection pad.
2. Telescopic Paraslim Inner and Outer Tubes fixed to length with a pin and R-clip for speedy adjustment in 75mm increments
3. Paraslim Turnbuckle Forkend with pin and R-clip for rapid and easy assembly with a Superslim Turnbuckle
4. Bottom node connection with M20x100 bolt and Nyloc nut, discourages unnecessary site disassembly at this location.



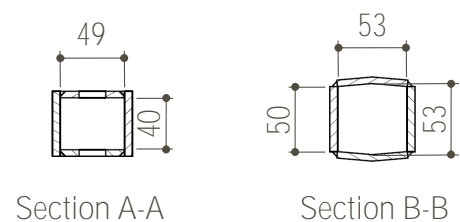
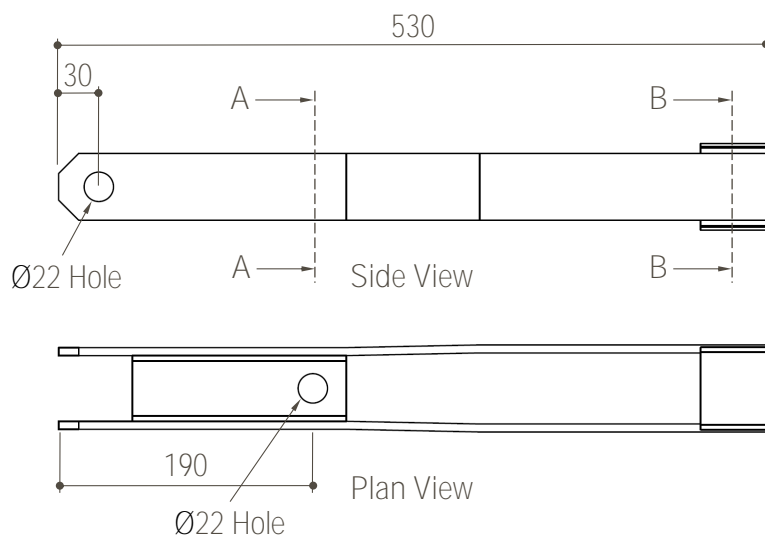
For full details of Paraslim equipment refer to Paraslim Safetie Datasheets.

Code	Description	Weight
PSX10007	Paraslim Turnbuckle Forkend	2.62 kg
PSX10008	Paraslim Tilt Plate	2.30 kg
PSX10009	Paraslim Tube Inner	2.10 kg
PSX10010	Paraslim Tube Outer	2.34 kg
SSX10046	Superslim 19mm Pin & R-clip	0.29 kg
BNU20015	M20x100 Bolt gr8.8 BZP	0.32 kg
BNU20002	M20 Nyloc Nut gr8.8 BZP	0.06 kg
PSX10035	Paraslim Tilt Plate Bearing Pad	0.12 kg
BNX10007	M10x35 Set Pin gr8.8 BZP Csk	0.04 kg
MNX10076	M10 Nyloc Nut	0.05 kg
SSU10029	Rocking Head Washer M10	0.02 kg

Paraslim Turnbuckle Forkend (PSX10007) weight 2.62kg

Connects the Superslim Turnbuckle 914-1160 (SSU10016) to the Paraslim Tilt Plate (PSX10008).

AWL = ± 45 kN



SUPERSLIM SOLDIER

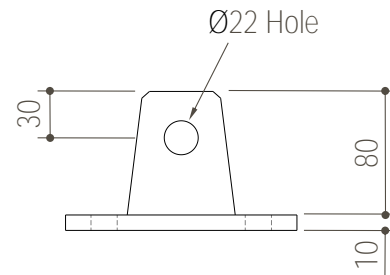
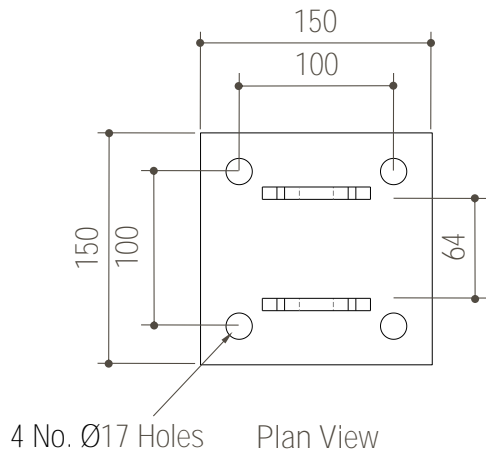
MODULAR STRUCTURAL SYSTEM



Paraslim Tilt Plate (PSX10008) weight 2.30kg

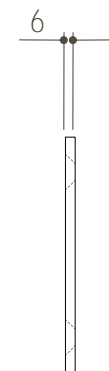
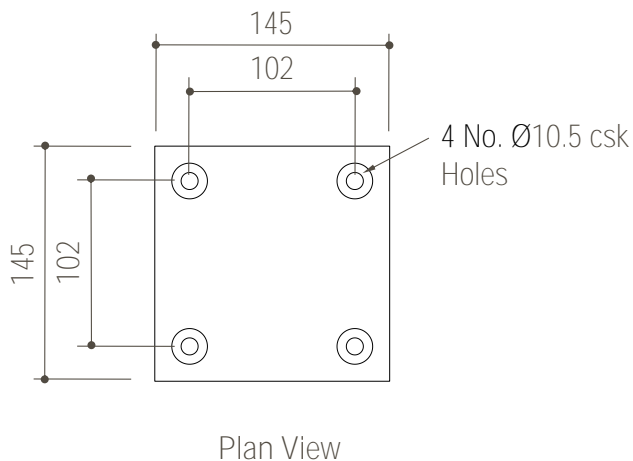
Connects to Paraslim Turnbuckle Forkend (PSX10007) and Paraslim Tube Inner or Outer (PSX10009 or PSX10010) with M20x100 Bolt & Nyloc Nut (BNU20015 + BNU20002).

AWL = ± 40 kN



Paraslim Tilt Plate Bearing Pad (PSX10035) weight 0.12kg

Used for protecting the paintwork on the web of the bridge girder. Bolted to the Paraslim Tilt Plate (PSX10008) with 2 No. M10x35 Csk Set Pins, Rocking Head Washers, & M10 Nyloc Nuts (BNX10007 + SSU10029 + MNX10076).



SUPERSLIM SOLDIER

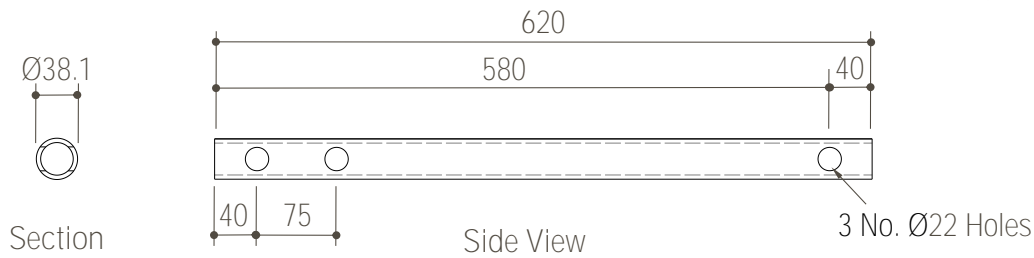
MODULAR STRUCTURAL SYSTEM



Paraslim Tube Inner (PSX10009) weight 2.10kg

Part of a telescopic strut which connects between the Paraslim Tilt Plate (PSX10008) & the horizontal Superslim Soldier with Superslim 19mm Pins & R-Clips (SSX10046). Can be used without the Paraslim Tube Outer to create a shallower undercarriage.

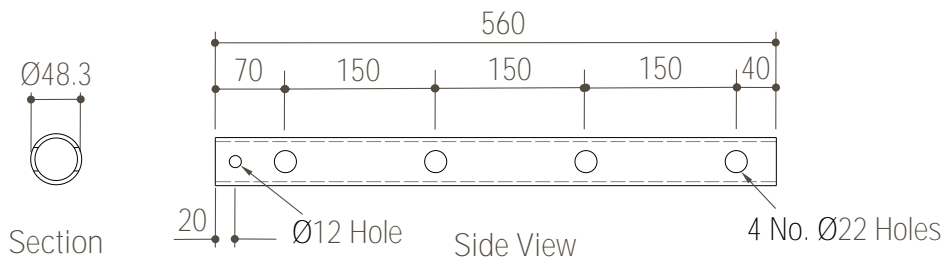
AWL = 40kN Tension Only



Paraslim Tube Outer (PSX10010) weight 2.34kg

Part of a telescopic strut which connects between the Paraslim Tilt Plate (PSX10008) & the horizontal Superslim Soldier with Superslim 19mm Pins & R-clips (SSX10046). When used with the Paraslim Tube Inner, telescopic strut dimensions vary from 465-990mm pin to pin (in 75mm increments).

AWL = 40kN Tension Only



SUPERSLIM SOLDIER

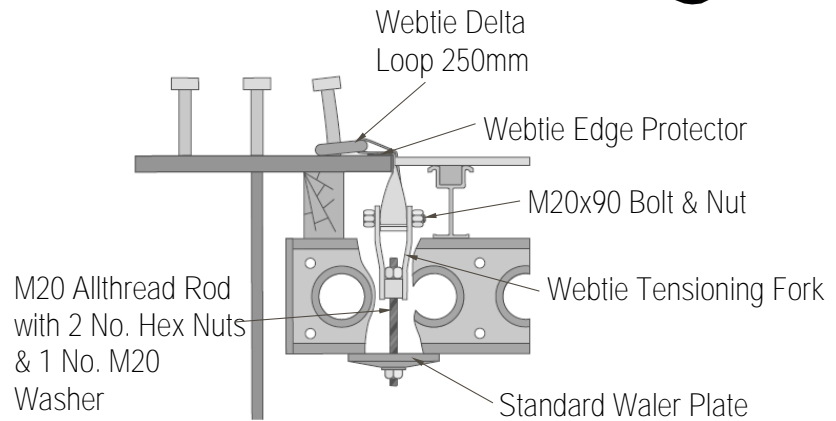
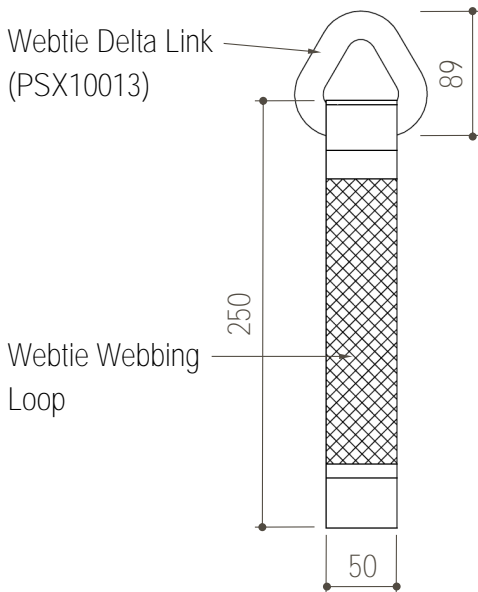
MODULAR STRUCTURAL SYSTEM



Webtie Delta Loop 250mm (PSX10012) weight 0.68kg

Used to suspend Superslim Soldiers in steel girder composite bridge deck soffit formwork, the forged Delta Link slips over a load tested 19,22 or 25mm diameter shear connector and connects to the Webtie Forkend with an M20x90 Bolt gr8.8 BZP & M20 Hex Nut gr 8 BZP (BNX20030 + BNU20001).

AWL = 30kN Tension Only

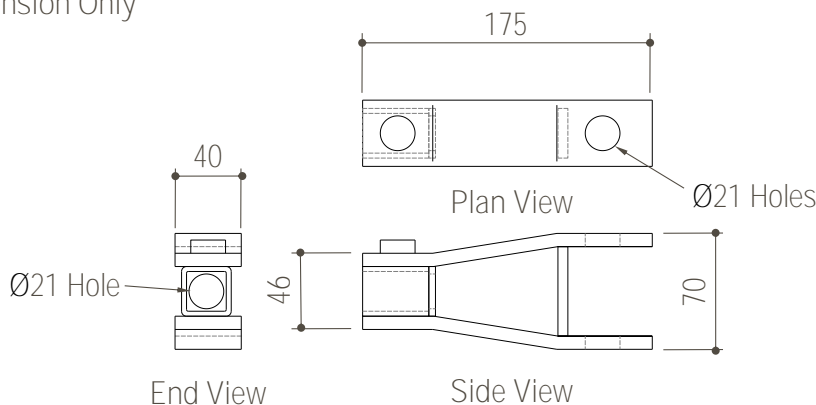


Grease Allthread Rod & torque nut to 120Nm prior to loading formwork.

Webtie Tensioning Fork (PSX10011) weight 1.02kg

Used to connect the Webtie Delta to M20 Allthread Rod via M20x90 Bolt gr8.8 BZP & M20 Hex Nut gr 8 BZP (BNX20030 + BNU20001).

AWL = 30kN Tension Only



Webtie Edge Protector (PSX10014) weight 0.01kg

Used to prevent the edge of the steel girder top flange from cutting the polyester Webtie webbing.



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

R·M·D
KWIKFORM

Webtie Hot Knife Tool 110v

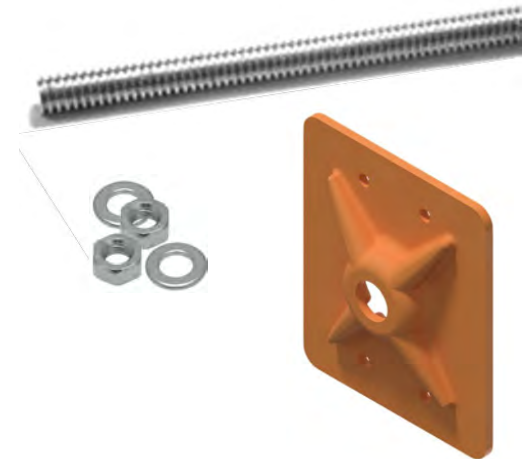
Used to cut the webtie flush with the underside of the deck once the formwork has been struck. The Hot Knife Tool melts the Webtie as it cuts through the Webbing Loop and seals the joint at the face of the concrete at the same time. Spare Blades are available for this tool.



Code	Description	Weight
PSX10028	Webtie Hot Knife Tool 110v	6.0 kg
PSX10029	Webtie Hot Knife Blade	0.001 kg

Allthread Rod, Nuts, Washers & Plates

Code	Description	Weight
TRX10020	Allthread Rod - M20 per m Gd8.8	2.10 kg
TRX20000	Allthread Rod per cut	-
BNU20001	M20 Hex Nut gr8 BZP	0.06 kg
BNU20003	M20 Round Washer BZP	0.03 kg
BTX10021	Waler Plate - Standard	1.35 kg



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

R·M·D
KWIKFORM



SLIMSHOR

European Data

Date: 17/03/2020

Issue : SS02

Sheet 77

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SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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KWIKFORM

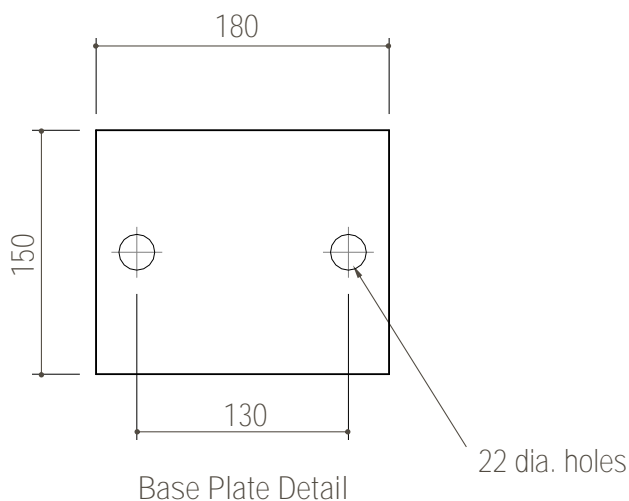
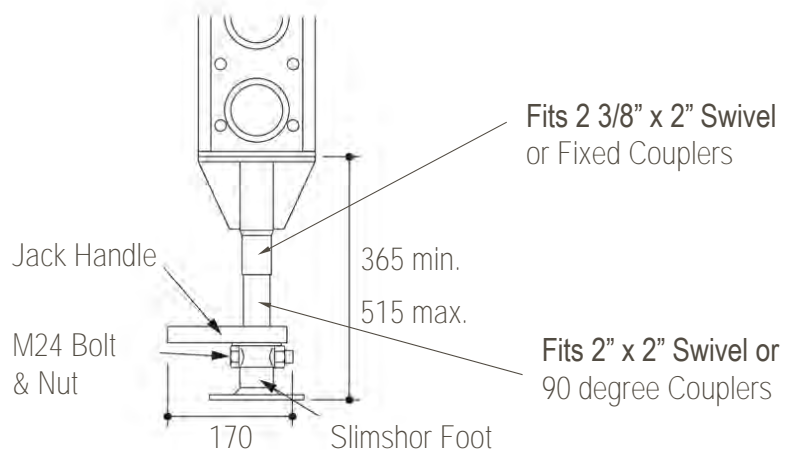
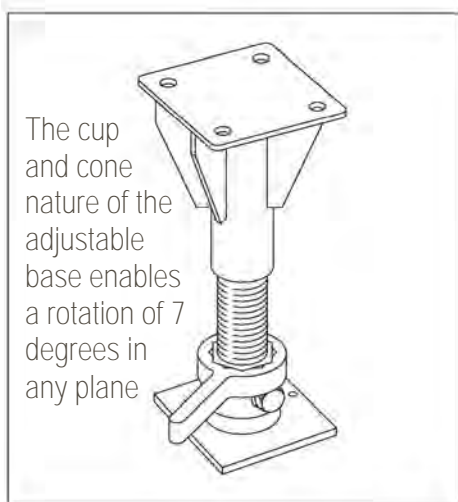
Superslim Adjustable Base 365-515 (SSU10025) weight 19.0kg

Used to provide base adjustment and spread load.

Allowable Working Load 150kN, 100kN if load is to be removed by rotation of the jack handle.

Not to be used in tension.

The maximum load that can be applied by rotating the jack handle is 40kN using a scaffold tube extension when the threads have been well greased.



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

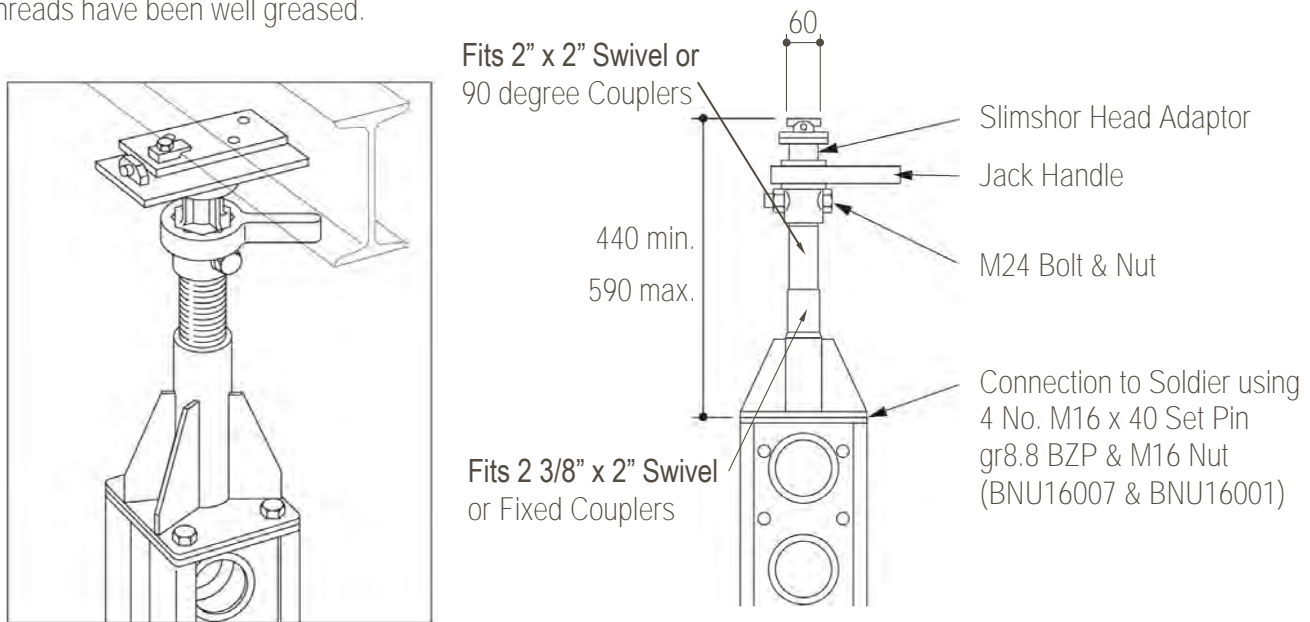


Superslim Adjustable Head 440-590mm (SSU10026) weight 24.6kg

Allowable Working Load 150kN, 100kN if load is to be removed by rotation of the jack handle (subject to design verification of steelwork).

Not to be used in tension.

The maximum load that can be applied by rotating the jack handle is 40kN using a scaffold tube extension when the threads have been well greased.

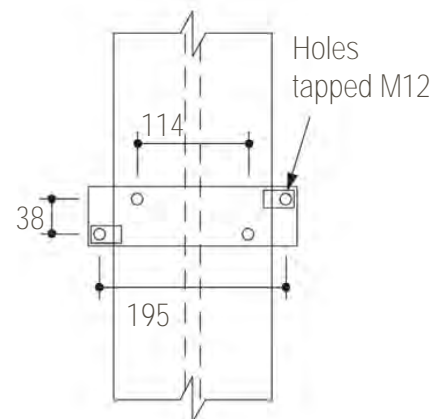


Clamp header beams in place using Clamp plates with M12 set pins. Use M12 x 25 set pins for flanges up to 12mm thick. Use M12 x 30 set pins for flanges between 12 & 20mm thick.

Code	Description	Weight
AFX20003	Clamp Plate	0.09 kg
BNX12009	M12x25 Set Pin gr8.8 BZP	0.04 kg
BNX12002	M12x30 Set Pin gr8.8 BZP	0.04 kg

Clamp plates in 114mm c/c holes for flange widths up to 102mm.
Clamp plates in 195mm c/c holes for flange widths up to 171mm.
The head should be twisted to suit varying beam widths.

Note: When twisted the head is not suitable for sloping applications.



Max beam flange width = 171mm

SUPERSLIM SOLDIER

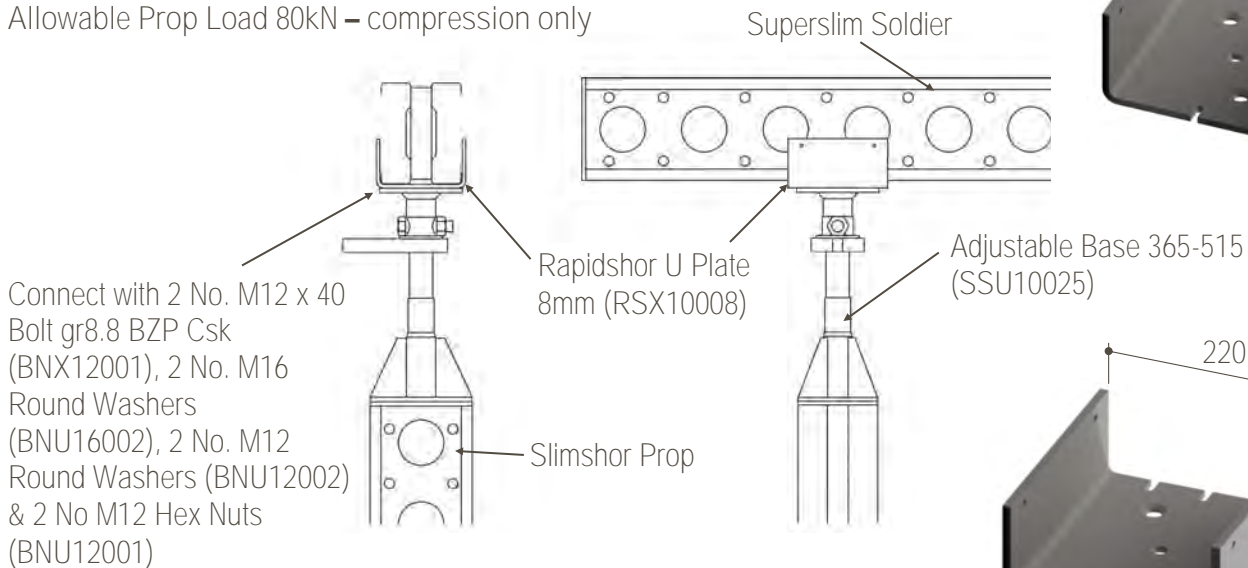
MODULAR STRUCTURAL SYSTEM



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

Used with Slimshor Props to support a Soldier header beam.
For angles > 6 degrees use neoprene pad in U-Plate.

Allowable Prop Load 80kN – compression only

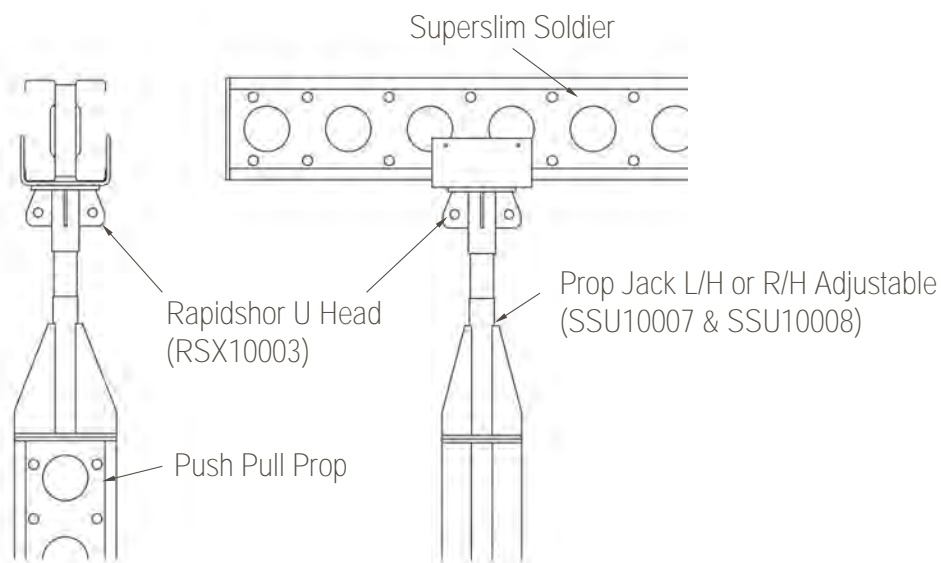


Note: Use Rapidshor U-Plate 8 thk x 220mm wide (RSX10001) with 203 UC Beams.

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

Used with Push Pull Props to support a Soldier header beam.

Allowable Prop Load 80kN – compression only



Note: The body of the Push Pull Prop requires to be rotated to raise or lower the prop, where bracing is required to reduce effective prop length use the Slimshor Prop with the 8mm U Plate.

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Superslim Neoprene Pad 6mm (SSX10043) weight 0.29kg

A hireable black stiff rubber pad in the same pattern as a Superslim End Plate for use as follows:



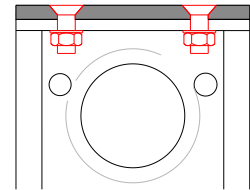
Fixed to the end of a Superslim Soldier in dead shore applications to take up any variations and negate the requirement for a rocking head.

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)

Placed in a bolted joint to provide the small degree of required rotational suspension in machine skate mounted travellers or other structures.

Fixing of Pads

All pads fixed to end plates using 4No. M10x35 CSK Set Pins, M10 Nuts and M10 Special Rocking Head Washers (Codes BNX10007, BNU11001, SSU10029).



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

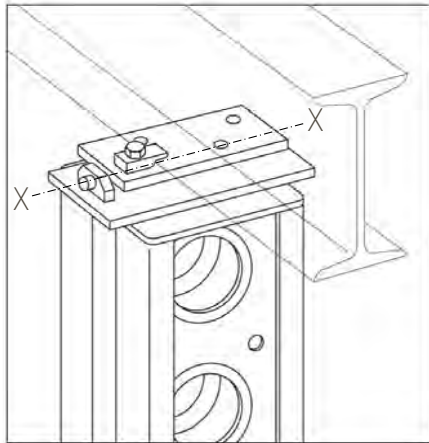


Superslim Rocking Head 36mm

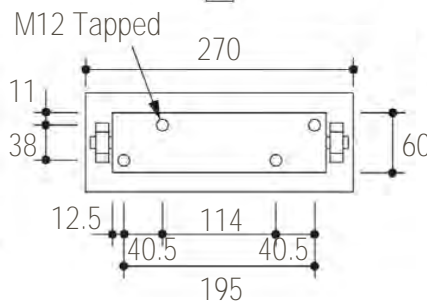
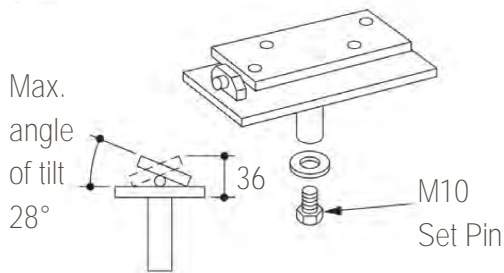
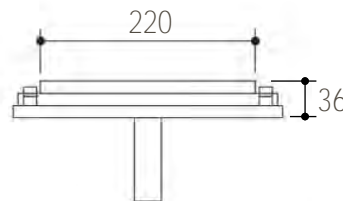
Used to attach header beams onto soldier props. Only to be used in the orientation shown below (i.e. parallel to Superslim X-X axis).

Allowable Working Load 150kN (subject to design verification of steelwork).

Not to be used in tension. For connection to header beams see sheet 77.



Code	Description	Weight
SSU10023	Superslim Rocking Head 36mm	4.35 kg
BNX10005	M10x20 Set Pin gr8.8 BZP	0.03 kg
SSU10029	Rocking Head Washer M10	0.02 kg



Clamp plates in 114mm c/c holes for flange widths up to 102mm.

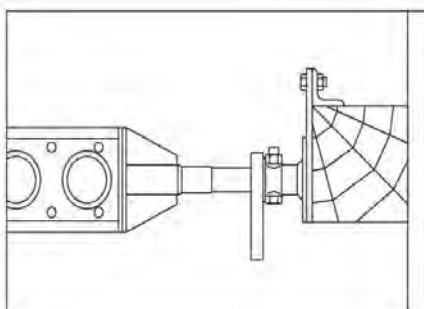
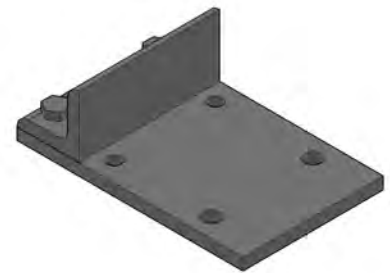
Clamp plates in 195mm c/c holes for flange widths up to 171mm.

The head should be twisted to suit varying beam widths.

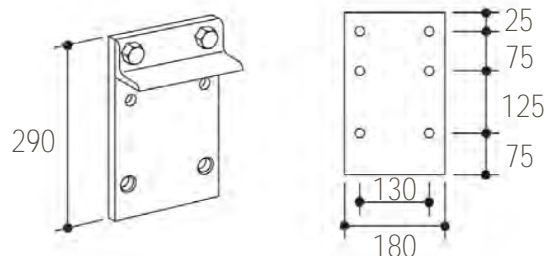
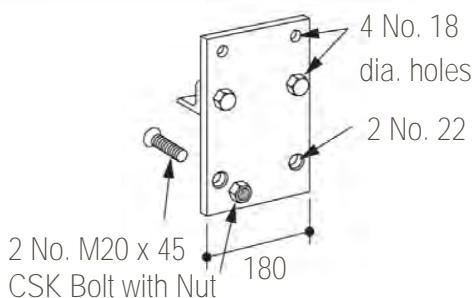
Note: When twisted the head is not suitable for sloping applications.

Superslim Prop Support Plate

Used to support horizontal Slimshor in trench applications.



Code	Description	Weight
SSX10041	Superslim Prop Support Plate	6.02 kg
BNX20027	M20x45 Set Pin gr8.8 BZP CSK	0.17 kg
BNU20001	M20 Hex Nut gr8 BZP	0.06 kg



SUPERSLIM SOLDIER

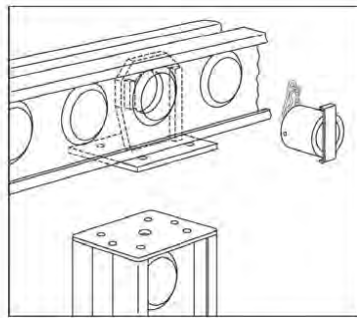
MODULAR STRUCTURAL SYSTEM



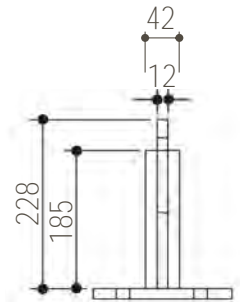
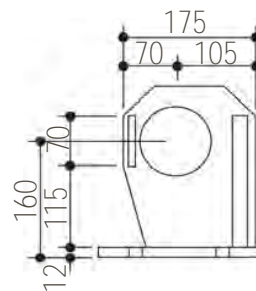
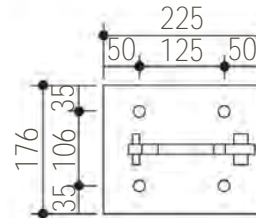
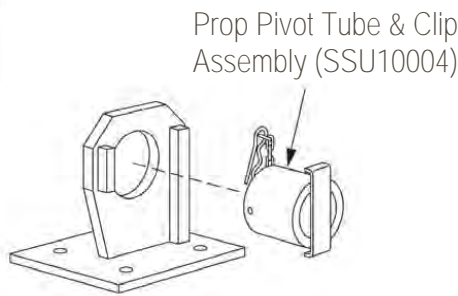
Superslim Corner Pivot (SSU10019) weight 7.32kg

Used to attach Soldiers at right angles and permits limited rotation. Connection to Soldier using 4 No. M16 x 40 Set Pin gr8.8 BZP & M16 Nut (BNU16007 + BNU16001).

Allowable Working Load \pm 65kN



Horizontal Soldier can be tilted up to 15° from the horizontal

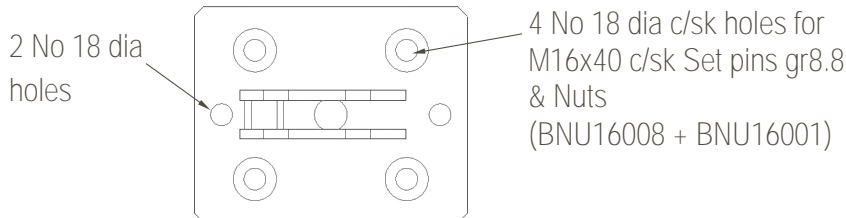
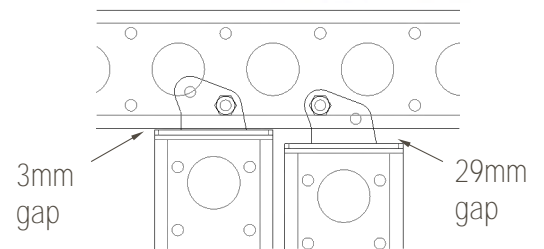
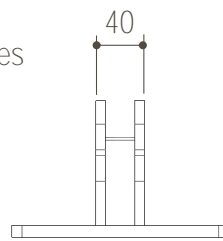
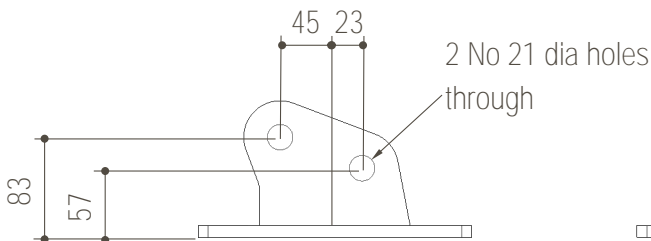


Superslim Pivot Corner 20mm (SSX10037) weight 4.27kg

Used to connect Soldiers perpendicular to each other or allows rotation of connected soldier when used in the second hole position.

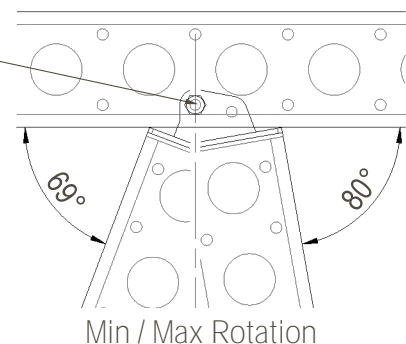
AWL +/-46kN when connected with 19mm Pin & R-Clip.

AWL +/-50kN when connected with M20x100 gr8.8 Bolt & M20 gr8 Hex Nut.



Alternative fixing

Superslim 19mm Pin & R Clip (SSX10046) or M20x90 Bolt gr8.8 BZP & M20 Nut gr8 (BNX20030 + BNU20001)



SUPERSLIM SOLDIER

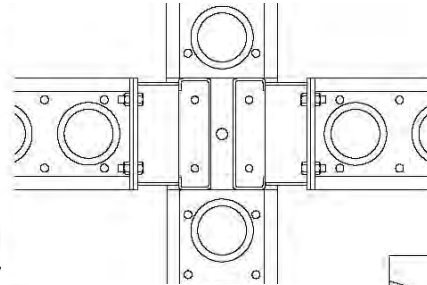
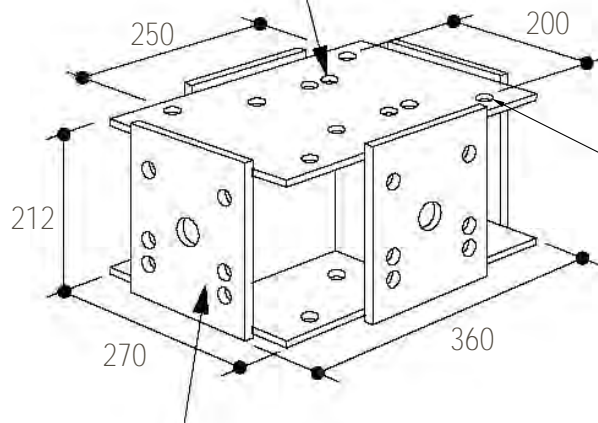
MODULAR STRUCTURAL SYSTEM

Multislim 6-Way Connector (SSU20006) weight 24.9kg

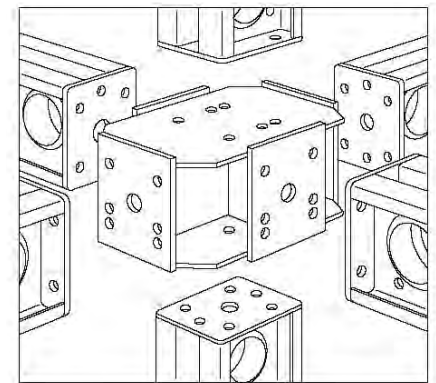
Enables 6 Soldiers to be connected at a node.

For allowable working Load see sheet 85.

Each soldier bolted to connector using 4 No M16x40 Set Pin gr8.8 & M16 Hex Nut (BNU16007 + BNU16001)



4 No 18Ø holes to accept plan bracing.
AWL for plan brace 20kN



225x176x10mm End Plates

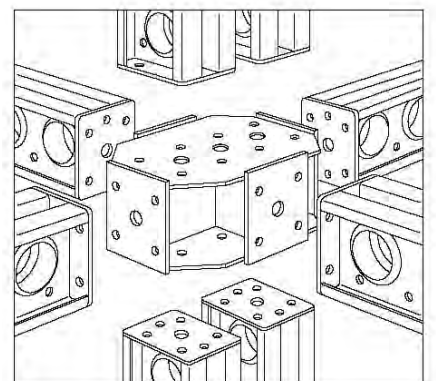
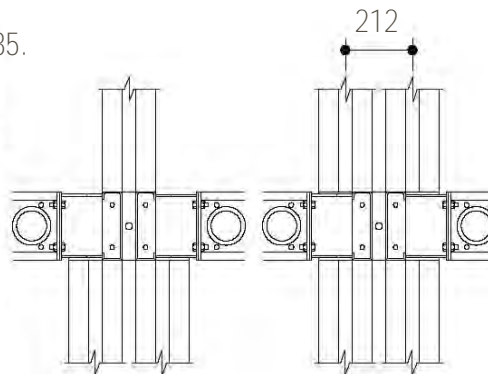
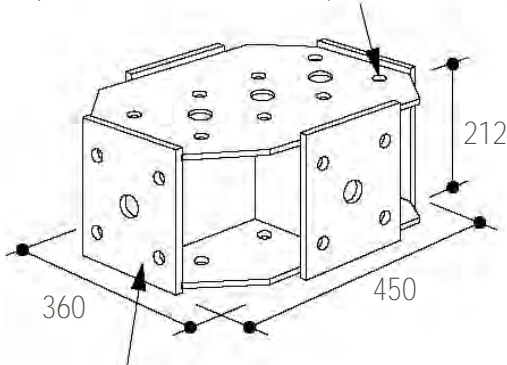
Note: All Plates are drilled to accept either 6 No Superslims or 6 No Minislims at each node.

6-Way Double Connector (SSU20066) weight 42.0kg

Enables 8 Soldiers to be connected at a node.

For allowable working Load see sheet 85.

Each soldier bolted to connector using 4 No M16x40 Set Pin gr8.8 & M16 Hex Nut (BNU16007 + BNU16001)



225x176x10mm End Plates

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

6-Way Connectors in use

The Six Way Connector allows Soldiers to be connected at node, and provides an effective component in making up frame structures with Superslim Soldiers. For particular high concentrations of leg loads a twin 6 Way Connector is also available.

The allowable bending moment at the connector is dependant upon the direction of the axes of the applied load.

Moment about x-x axis (strong way) on sides 7.6kNm

Moment about x-x axis on top or bottom 4.4kNm

Moment about y-y axis on top, bottom or sides 3.6kNm

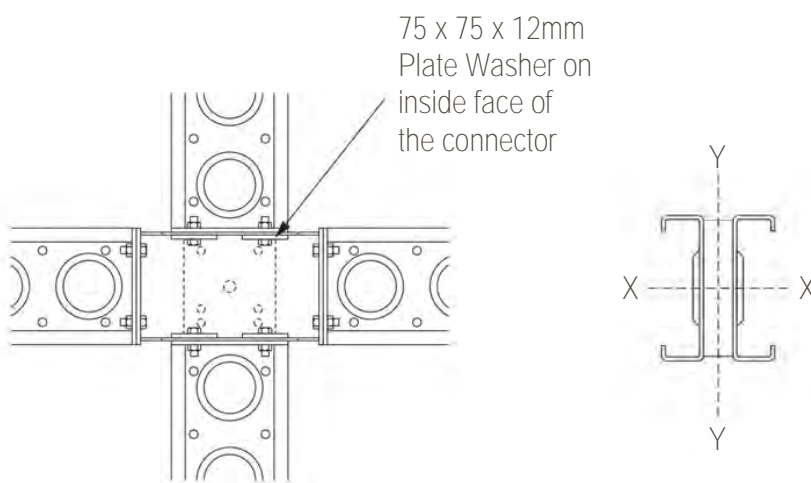
Axial loads in direction of arrow 'A'

SSU20006 150kN Compression

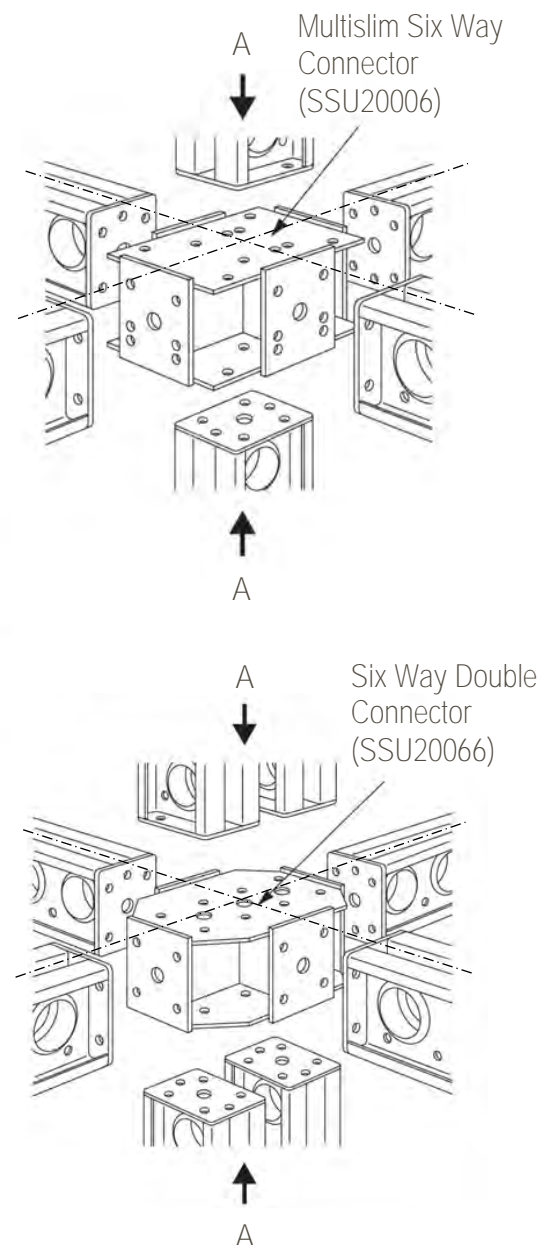
80kN Tension

SSU20066 300kN Compression

160kN Tension



The allowable tensile load on the Superslim 6 Way Connector or Multislim 6 Way Connector can be increased to 100kN by using 75 x 75 x 12mm Plate Washers on the inside of the members as illustrated above.



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

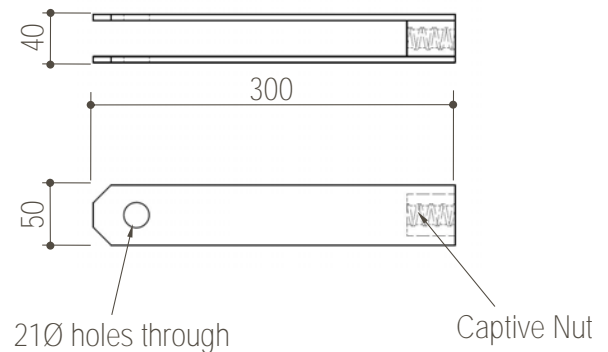
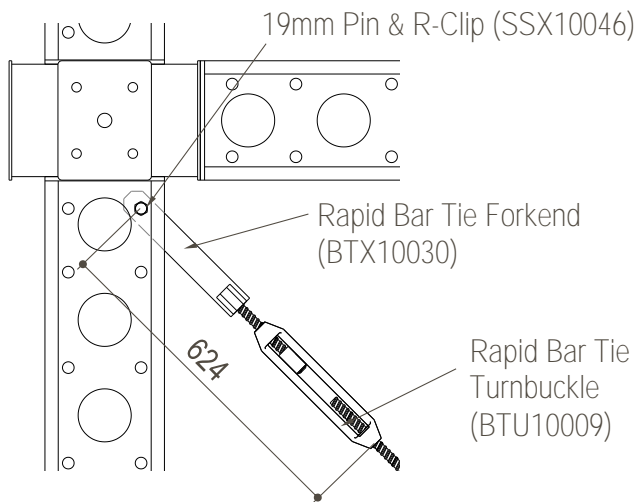


Rapid Bar Tie Forkend (BTX10030) weight 1.31kg

Used in conjunction with the Rapid Bar Tie Turnbuckle (BTU10009) to brace Slimshor Towers. The Rapid Bar Tie Forkend pins into the 21mm dia holes in the Superslim Soldier using a 19mm Pin & R-Clip (SSX10046) and connects to the captive Rapid Tie in the Turnbuckle via a captive Rapid Tie Hexagon Nut.

AWL +/-46kN when connected with 19mm Pin & R-Clip.

AWL +/-50kN when connected with M20x100 gr8.8 Bolt & M20 gr8 Hex Nut.

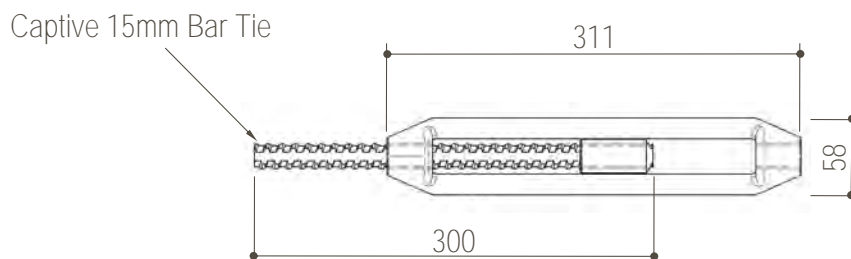


Rapid Bar Tie Turnbuckle (BTU10009) weight 2.07kg

Used in conjunction with the Rapid Bar Tie Forkend (BTX10030) to brace Slimshor Towers. The Rapid Bar Tie Turnbuckle connects to the captive Rapid Tie Hexagon Nut in the Rapid Bar Tie Forkend.

AWL +/-46kN when connected with 19mm Pin & R-Clip.

AWL +/-50kN when connected with M20x100 gr8.8 Bolt & M20 gr8 Hex Nut.

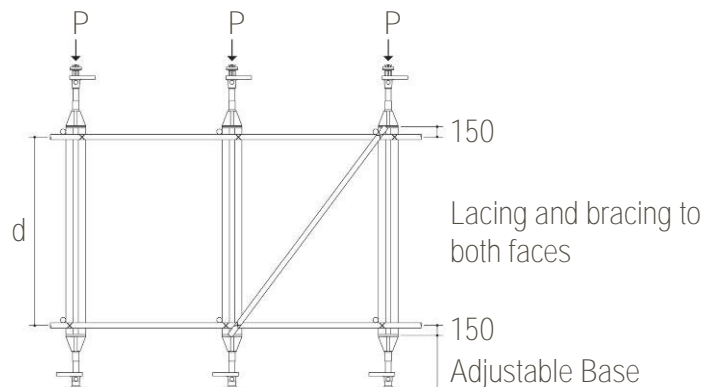


SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

Superslim Propping and Shoring Design

Superslim incorporated in a falsework structure will require design checks in accordance with BS 5975 for lateral and overall stability. Generally the falsework structure will be freestanding and bracing may be required for erection, lateral stability, overall stability or node point stability for the designed strut effective length. Fitting of bracing for one of these reasons will often satisfy the other bracing requirements. See below for a typical falsework arrangement incorporating Superslim.



The vertical dimension (d) between horizontal lacing when using scaffold tube, is a function of the following:-

- (A) Effective strut length from sheets 13 or 14 or to give required working capacity.
- (B) Adequacy of the couplers and tube lacing and bracing to safely transmit the restraint forces.
- (C) Physical limitations on operatives fitting lacing and bracing.
- (D) Sequence and method of erection.

Where the shores are used with existing stable structures, such as in backpropping, then the shores could be inserted without bracing. For larger heights bracing for strut node stabilisation may be needed if the applied load exceeds that stated for length of shore used.

Assembly and Erection

The simplicity of the Superslim Prop with only a few parts makes assembly easy with only four M16 Set Pins per joint. It is suggested that on vertical shores the bolts are placed downwards with the nut underneath. The shores can be assembled on a flat clean surface and then lifted up to position using the lifting plate. Once in position some erection bracing will be necessary to ensure stability during final alignment and setting. If tube and fittings are used for bracing, the tube clamps can be pre-fitted to the soldier sections.

One alternative method of assembly is to erect the shores piece by piece. This method normally requires tube and fittings bracing, with the horizontal lacing fitted below joints between soldier sections. For ease of handling it is suggested that the longer lengths of soldier be at the bottom of the make-up. Diagonal tubes should be fitted as the erection proceeds.

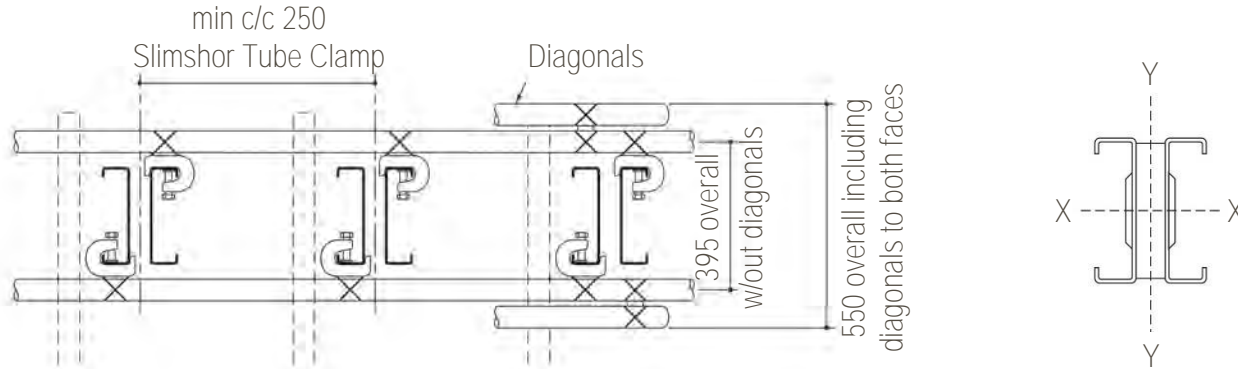
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Superslim Bracing Using Scaffold Tube

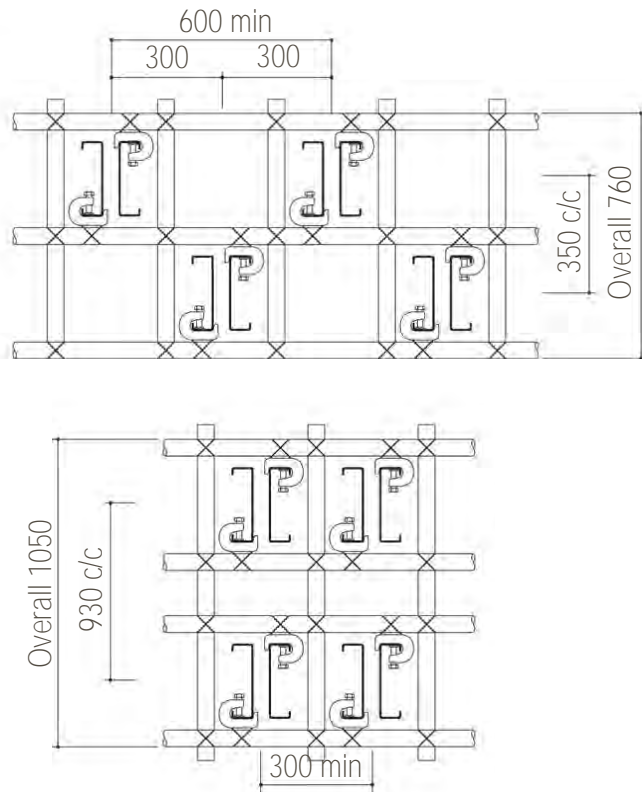
In many applications where bracing to the shores is required, scaffold tube will be used for the Horizontal and diagonal members. The horizontal tubes are connected to the Superslim Props with the Slimshor Tube Clamp.



Plan of a single braced row of Superslim props

When connecting together rows of Superslim Props, it is recommended that twin tubes are used horizontally. The diagonals may be fitted to these tubes with swivel couplers. If clearance requirements demand it, then diagonals can also be attached to the Superslim Props with the Slimshor tube clamp.

The arrangement shown braces the shores about their YY axis. During erection and for overall stability, some restraint about the XX axis may be necessary. This may be done by connecting additional tubes, shown dotted, to suitable points of restraint. The diagrams below show the minimum spacing between groups to give full access to all the fittings.



Code	Description	Weight
TUX80640	Scaffold Tube 6.4m (4mm)	28.0 kg
TUX80540	Scaffold Tube 5.4m (4mm)	23.6 kg
TUX80480	Scaffold Tube 4.8m (4mm)	21.0 kg
TUX80360	Scaffold Tube 3.6m (4mm)	15.7 kg
TUX80300	Scaffold Tube 3.0m (4mm)	13.1 kg
TUX80210	Scaffold Tube 2.1m (4mm)	9.17 kg
TUX80150	Scaffold Tube 1.5m (4mm)	6.55 kg
TUX80060	Scaffold Tube 0.6m (4mm)	2.62 kg
SSU10024	Superslim Tube Clamp	1.33 kg
SFX10002	Coupler—90 deg 2" x 2"	1.35 kg
SFX10003	Coupler—Swivel 2" x 2"	1.48 kg
SFX10004	Coupler—Fixed 2 3/8" x 2"	1.41 kg
SFX10005	Coupler—Swivel 2 3/8" x 2"	1.90 kg

SUPERSLIM SOLDIER

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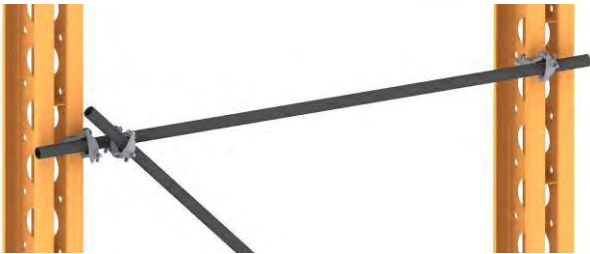
Bracing Using Scaffold Tube continued.....

Where tube and fittings are used to lace and brace Superslim structures the following details shall be used. Checks should be made to ensure that couplers fixing ledger tubes to the Superslim have the required slip capacity along the Superslim. Options A,C and E use single clamps to connect ledger tubes to the Superslim. Options B and D use twin clamps. Option C uses twice as many lacing tubes as option B.

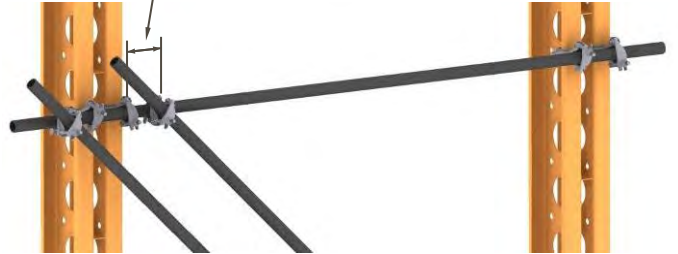


Important in ALL cases!
Swivel coupler should be positioned max 160mm from adjacent Slimshor Tube Clamp

A



B



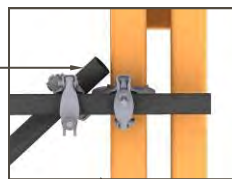
C



D



Note! This tube will have to be accurately cut to length to enable the 160mm dimension to be satisfied.



Note! 2nd tube coupler is greater than 160mm from adjacent Slimshor tube clamp.

E



F



Non preferred arrangement

Do not use this arrangement

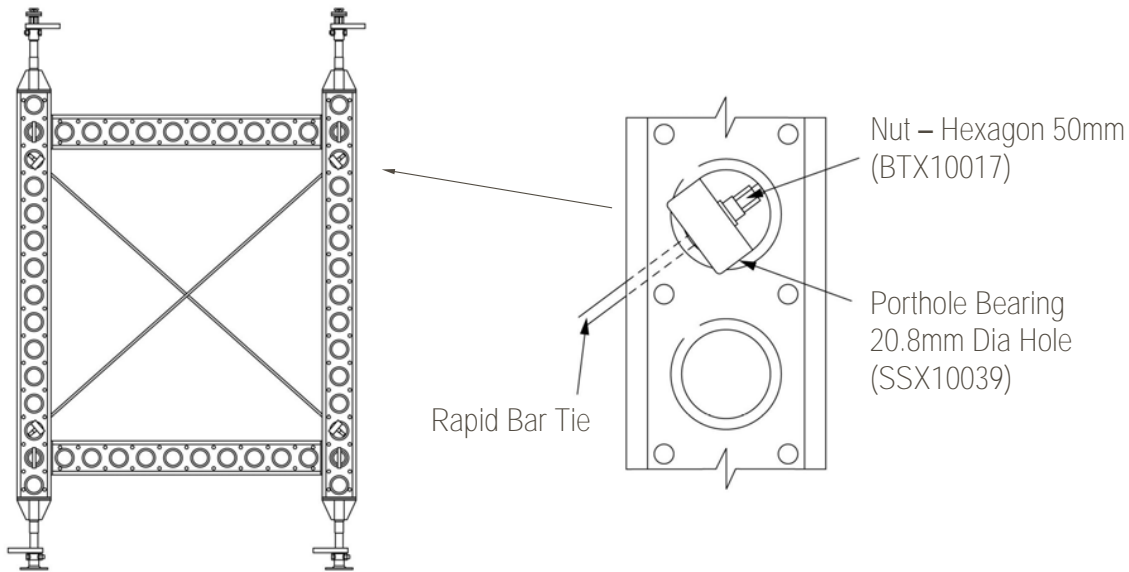
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Superslim Bracing Using Rapid Bar Tie

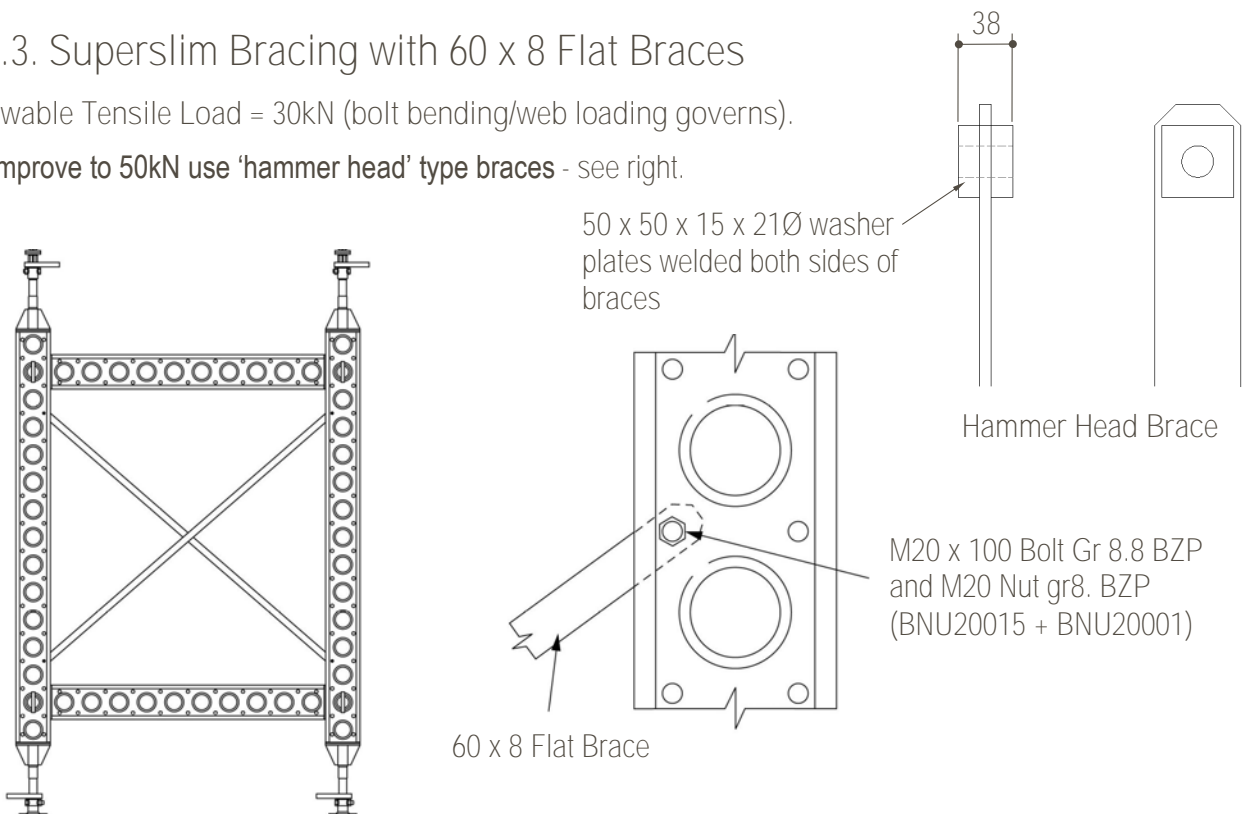
One alternative method of bracing Superslim is to use crossed diagonal tension rods, usually 15mm Rapid Bar Tie with connectors. The tie connects directly to the Porthole bearing which fits into the 100mm diameter hole in the webs of the Soldier. This arrangement only provides tension restraint between shores and suitable members to act as struts are needed to complete the structure. The tension force in the Rapid Bar Tie when used in this situation is limited to 65kN.



2.1.3. Superslim Bracing with 60 x 8 Flat Braces

Allowable Tensile Load = 30kN (bolt bending/web loading governs).

To improve to 50kN use 'hammer head' type braces - see right.



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Superslim Jack Bracing

The Superslim Adjustable Base and Adjustable Head will safely transmit a horizontal force of 2.5kN or 2½ % of a maximum axial force of 100kN. If the horizontal force to be transmitted is greater than this, then jack bracing will be needed. The table below shows the allowable horizontal force compared to jack extension for both Head and Base. When jack bracing is required, usually a tube is attached to the threaded part of the jack and diagonals fitted to it. See below Typical Arrangement of Jack Bracing.

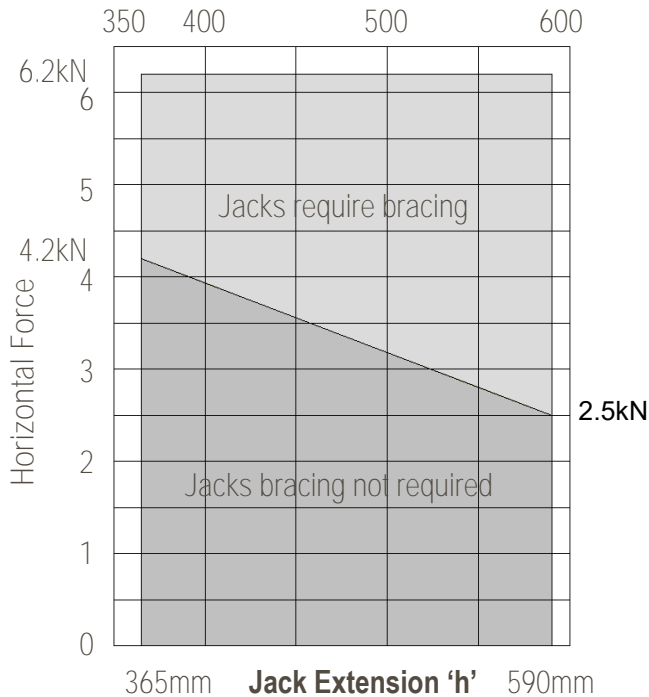
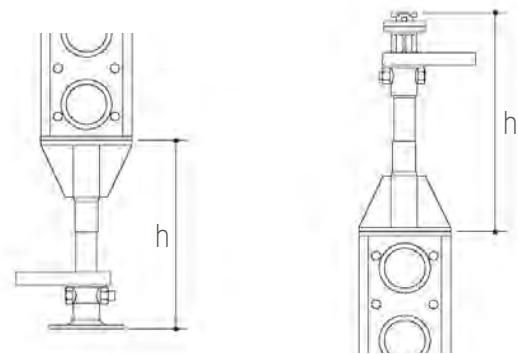
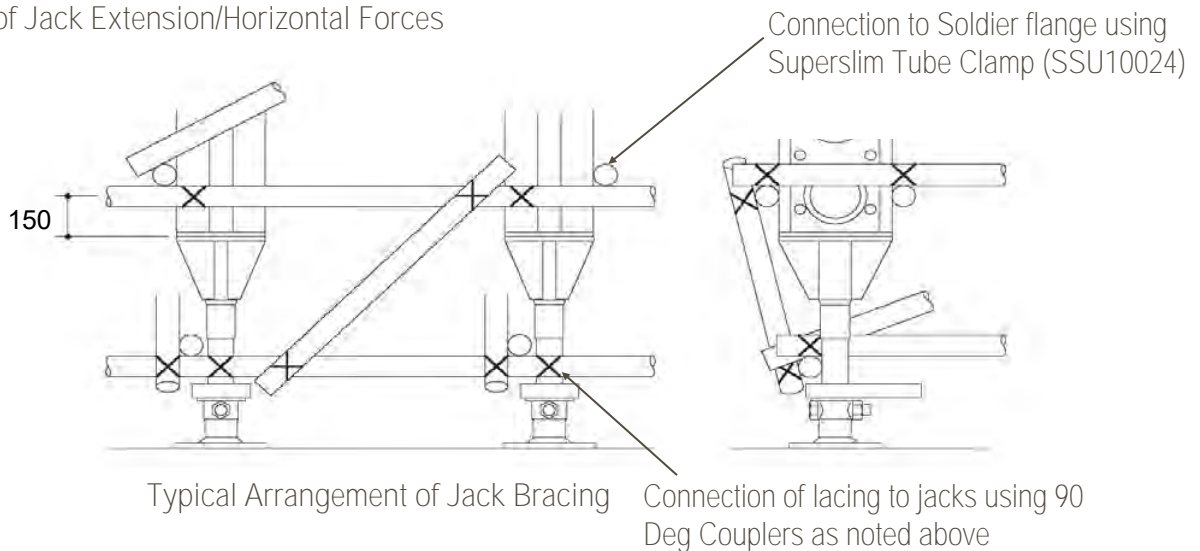


Table of Jack Extension/Horizontal Forces



Note: when jack bracing is required and Dim "h" = 435 - 515 for Base Jacks or 510 - 590 for Adj Rocking Heads, connections using 2"x2" 90 deg couplers (SFX10002) to Jack thread are required. For dimensions less than these, 2"x2.3/8" 90 deg couplers (SFX10004) should be connected to the jack stem.



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Table S1 – Component make up for Slimshor Prop with an Adjustable Head and an Adjustable Base

	Length of prop 'L' (mm) (Working Dimensions)		SSX 10090	SSX 10540	SSX 10720	SSX 10900	SSX 11800	SSX 12700	SSX 13600	SSU 10025	SSU 10026	BNU 16007	BNU 16001	Weight kg
	Min.	Max.												
1	805	1105	-	-	-	-	-	-	-	1	1	4	4	39.5
2	1075	1375	3	-	-	-	-	-	-	1	1	16	16	62.9
3	1345	1645	-	1	-	-	-	-	-	1	1	8	8	55.2
4	1525	1825	-	-	1	-	-	-	-	1	1	8	8	58.7
5	1705	2005	-	-	-	1	-	-	-	1	1	8	8	61.9
6	1795	2095	1	-	-	1	-	-	-	1	1	12	12	69.7
7	2065	2365	-	1	1	-	-	-	-	1	1	12	12	74.4
8	2245	2545	-	-	2	-	-	-	-	1	1	12	12	77.9
9	2425	2725	-	-	1	1	-	-	-	1	1	12	12	81.2
10	2605	2905	-	-	-	2	-	-	-	1	1	12	12	78.7
11	2785	3085	-	2	-	1	-	-	-	1	1	16	16	93.4
12	2965	3265	-	-	3	-	-	-	-	1	1	16	16	97.1
13	3145	3445	-	-	2	1	-	-	-	1	1	16	16	100.4
14	3325	3625	-	-	1	2	-	-	-	1	1	16	16	98.0
15	3505	3805	-	-	-	-	-	1	-	1	1	8	8	95.3
16	3685	3985	-	-	4	-	-	-	-	1	1	20	20	116.3
17	3865	4165	-	-	3	1	-	-	-	1	1	20	20	119.6
18	4045	4345	-	1	-	-	-	1	-	1	1	12	12	111.0
19	4225	4525	-	-	1	-	-	1	-	1	1	12	12	114.4
20	4405	4705	-	-	-	-	-	-	1	1	1	8	8	112.1
21	4585	4885	-	2	-	-	-	1	-	1	1	16	16	126.8
22	4765	5065	-	1	1	-	-	1	-	1	1	16	16	130.3
23	4945	5245	-	1	-	-	-	-	1	1	1	12	12	127.8
24	5125	5425	-	-	1	-	-	-	1	1	1	12	12	131.3
25	5305	5605	-	-	-	1	-	-	1	1	1	12	12	134.6
26	5485	5785	-	2	-	-	-	-	1	1	1	16	16	143.6
27	5665	5965	-	1	1	-	-	-	1	1	1	16	16	147.1
28	5845	6145	-	-	2	-	-	-	1	1	1	16	16	150.6
29	6025	6325	-	-	1	1	-	-	1	1	1	16	16	153.8
30	6205	6505	-	-	-	-	-	2	-	1	1	12	12	151.2
31	6385	6685	-	1	2	-	-	-	1	1	1	20	20	166.3
32	6565	6865	-	1	1	1	-	-	1	1	1	20	20	169.5
33	6745	7045	-	1	-	-	-	2	-	1	1	16	16	166.9

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Table S2 – Component make up with a Slimshor Prop an Adjustable Base and a Fixed Rocking Head

Length of prop 'L' (mm) (Working Dimensions)	Dimensions		SSX 10090 Sold 90	SSX 10540 Sold 540	SSX 10720 Sold 720	SSX 10900 Sold 900	SSX 11800 Sold 1800	SSX 12700 Sold 2700	SSX 13600 Sold 3600	SSU 10025 Adj Base Assy	SSU 10023 Rocking Head	BNX 10005 M10x20 Set Pin	SSU 10029 Rocking Head Washer	BNU 16007 M16 X 40 HT Set Pin	BNU 16001 M16 Hex Nut	Weight kg
	Min.	Max.														
1	491	641	1	-	-	-	-	-	-	1	1	1	1	8	8	32.0
2	581	731	2	-	-	-	-	-	-	1	1	1	1	12	12	39.8
3	671	821	3	-	-	-	-	-	-	1	1	1	1	16	16	47.6
4	761	911	4	-	-	-	-	-	-	1	1	1	1	20	20	55.4
5	851	1001	5	-	-	-	-	-	-	1	1	1	1	24	24	63.2
6	941	1091	-	1	-	-	-	-	-	1	1	1	1	8	8	39.9
7	1031	1181	1	1	-	-	-	-	-	1	1	1	1	12	12	47.7
8	1121	1271	-	-	1	-	-	-	-	1	1	1	1	8	8	43.4
9	1211	1361	1	-	1	-	-	-	-	1	1	1	1	12	12	51.2
10	1301	1451	-	-	-	1	-	-	-	1	1	1	1	8	8	46.6
11	1391	1541	1	-	-	1	-	-	-	1	1	1	1	12	12	54.4
12	1481	1631	-	2	-	-	-	-	-	1	1	1	1	12	12	55.6
13	1571	1721	1	2	-	-	-	-	-	1	1	1	1	16	16	63.4
14	1661	1811	-	1	1	-	-	-	-	1	1	1	1	12	12	59.1
15	1751	1901	1	1	1	-	-	-	-	1	1	1	1	16	16	66.9
16	1841	1991	-	-	2	-	-	-	-	1	1	1	1	12	12	62.9
17	1931	2081	1	-	2	-	-	-	-	1	1	1	1	16	16	70.4
18	2021	2171	-	-	1	1	-	-	-	1	1	1	1	12	12	65.9
19	2111	2261	1	-	1	-	-	-	-	1	1	1	1	16	16	73.7
20	2201	2351	-	-	-	-	1	-	-	1	1	1	1	8	8	69.1
21	2291	2441	1	-	-	-	-	1	-	1	1	1	1	12	12	76.9
22	2381	2531	-	1	2	-	-	-	-	1	1	1	1	16	16	83.3
23	2471	2621	1	1	2	-	-	-	-	1	1	1	1	20	20	86.1
24	2561	2711	-	-	3	-	-	-	-	1	1	1	1	16	16	81.8
25	2651	2801	1	-	3	-	-	-	-	1	1	1	1	20	20	89.6
26	2741	2891	-	1	-	-	1	-	-	1	1	1	1	12	12	84.8
27	2831	2981	1	1	-	-	1	-	-	1	1	1	1	16	16	92.9
28	2921	3071	-	-	1	-	-	-	-	1	1	1	1	12	12	88.3
29	3011	3161	1	-	1	-	-	-	-	1	1	1	1	16	16	96.1
30	3101	3251	-	-	-	-	-	1	-	1	1	1	1	8	8	80.0
31	3191	3341	1	-	-	-	-	1	-	1	1	1	1	12	12	87.8
32	3281	3431	-	2	-	-	1	-	-	1	1	1	1	16	16	100.9
33	3371	3521	1	2	-	-	1	-	-	1	1	1	1	20	24	108.4
34	3461	3611	-	-	3	1	-	-	-	1	1	1	1	20	20	104.3
35	3551	3701	1	-	3	1	-	-	-	1	1	1	1	24	24	112.1
36	3641	3791	-	1	-	-	-	1	-	1	1	1	1	12	12	95.7

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Table S2 – Continued

	Length of prop 'L' (mm) (Working Dimensions)		SSX 10090	SSX 10540	SSX 10720	SSX 10900	SSX 11800	SSX 12700	SSX 13600	SSU 10025	SSU 10023	BNX 10005	SSU 10029	BNU 16007	BNU 16001	Weight kg
	Min.	Max.														
37	3731	3881	1	1	-	-	-	1	-	1	1	1	1	16	16	103.5
38	3821	3971	-	-	1	-	-	1	-	1	1	1	1	12	12	99.2
39	3911	4061	1	-	1	-	-	1	-	1	1	1	1	16	16	107.0
40	4001	4151	-	-	-	-	-	-	1	1	1	1	1	8	8	96.8
41	4091	4241	1	-	-	-	-	-	1	1	1	1	1	12	12	104.6
42	4181	4331	-	2	-	-	-	1	-	1	1	1	1	16	16	111.5
43	4271	4421	1	2	-	-	-	1	-	1	1	1	1	20	20	119.3
44	4361	4511	-	1	1	-	-	1	-	1	1	1	1	16	16	115.0
45	4451	4601	1	1	1	-	-	1	-	1	1	1	1	20	20	122.8
46	4541	4691	-	1	-	-	-	-	1	1	1	1	1	12	12	112.5
47	4631	4781	1	1	-	-	-	-	1	1	1	1	1	16	16	120.3
48	4721	4871	-	-	1	-	-	-	1	1	1	1	1	12	12	116.0
49	4811	4961	1	-	1	-	-	-	1	1	1	1	1	16	16	123.8
50	4901	5051	-	-	-	1	-	-	1	1	1	1	1	12	12	119.3
51	4991	5141	1	-	-	1	-	-	1	1	1	1	1	16	16	127.1
52	5081	5231	-	2	-	-	-	-	1	1	1	1	1	16	16	128.3
53	5171	5321	1	2	-	-	-	-	1	1	1	1	1	20	20	136.1
54	5261	5411	-	1	1	-	-	-	1	1	1	1	1	16	16	131.8
55	5351	5501	1	1	1	-	-	-	1	1	1	1	1	20	20	139.6
56	5441	5591	-	1	-	1	-	-	1	1	1	1	1	16	16	135.0
57	5531	5681	1	1	-	1	-	-	1	1	1	1	1	20	20	142.8
58	5621	5771	-	-	1	-	-	-	1	1	1	1	1	16	16	138.5
59	5711	5861	1	-	1	-	-	-	1	1	1	1	1	20	20	146.3
60	5801	5951	-	-	-	-	-	-	1	1	1	1	1	12	12	135.9
61	5891	6041	1	-	-	-	-	2	-	1	1	1	1	16	16	143.7
62	5981	6131	-	1	2	-	-	2	-	1	1	1	1	20	20	151.0
63	6071	6221	1	1	2	-	-	-	1	1	1	1	1	24	24	158.8
64	6161	6311	-	-	3	-	-	-	1	1	1	1	1	20	20	154.8
65	6251	6401	1	-	3	-	-	-	1	1	1	1	1	24	24	162.3
66	6341	6491	-	1	-	-	-	-	1	1	1	1	1	16	16	151.6
67	6431	6581	1	1	-	-	-	2	-	1	1	1	1	20	20	159.4
68	6521	6671	-	-	1	-	-	2	-	1	1	1	1	16	16	155.1
69	6611	6761	1	-	1	-	-	2	-	1	1	1	1	20	20	162.9
70	6701	6851	-	-	-	-	-	1	-	1	1	1	1	12	12	152.7
71	6791	6941	1	-	-	-	-	1	-	1	1	1	1	16	16	160.5
72	6881	7031	-	2	-	-	-	2	-	1	1	1	1	20	20	167.3

SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

R·M·D
KWIKFORM

Table S3 – Component make up for a Slimshor Prop with an Adjustable Base at each end

	Length of prop 'L' (mm) (Working Dimensions)		SSX 10090	SSX 10540	SSX 10720	SSX 10900	SSX 11800	SSX 12700	SSX 13600	SSU 10018	SSU 10023	BNX 10005	SSU 10029	BNU 16007	BNU 16001	Weight kg
	Min.	Max.														
1	730	1030	-	-	-	-	-	-	-	2	-	-	-	4	4	38.4
2	1000	1300	3	-	-	-	-	-	-	2	-	-	-	16	16	61.8
3	1270	1570	-	1	-	-	-	-	-	2	-	-	-	8	8	54.1
4	1450	1750	-	-	1	-	-	-	-	2	-	-	-	8	8	57.6
5	1630	1930	-	-	-	1	-	-	-	2	-	-	-	8	8	60.9
6	1720	2020	1	-	1	-	-	-	-	2	-	-	-	12	12	68.7
7	1990	2290	-	1	1	-	-	-	-	2	-	-	-	12	12	73.4
8	2170	2470	-	1	-	1	-	-	-	2	-	-	-	12	12	76.6
9	2350	2650	-	-	1	1	-	-	-	2	-	-	-	12	12	80.1
10	2530	2830	-	-	-	-	1	-	-	2	-	-	-	8	12	77.7
11	2710	3010	1	-	2	-	-	-	-	2	-	-	-	16	16	92.6
12	2890	3190	-	-	3	-	-	-	-	2	-	-	-	16	16	96.1
13	3070	3370	-	-	2	1	-	-	-	2	-	-	-	16	16	99.3
14	3250	3550	-	-	1	-	1	-	-	2	-	-	-	12	16	96.9
15	3430	3730	-	-	-	-	-	1	-	2	-	-	-	8	8	94.3
16	3610	3910	-	-	4	-	-	-	-	2	-	-	-	20	20	115.3
17	3790	4090	-	-	3	1	-	-	-	2	-	-	-	20	20	118.6
18	3970	4270	-	1	-	-	-	1	-	2	-	-	-	12	12	110.0
19	4150	4450	-	-	1	-	-	1	-	2	-	-	-	12	12	113.5
20	4330	4630	-	-	-	-	-	-	1	2	-	-	-	8	8	111.1
21	4510	4810	-	2	-	-	-	1	-	2	-	-	-	16	16	125.7
22	4690	4990	-	1	1	-	-	1	-	2	-	-	-	16	16	129.2
23	4870	5170	-	1	-	-	-	-	1	2	-	-	-	12	12	126.8
24	5050	5350	-	-	1	-	-	-	1	2	-	-	-	12	12	130.3
25	5230	5530	-	-	-	1	-	-	1	2	-	-	-	12	12	133.6
26	5410	5710	-	2	-	-	-	-	1	2	-	-	-	16	16	142.5
27	5590	5890	-	1	1	-	-	-	1	2	-	-	-	16	16	146.0
28	5770	6070	-	-	2	-	-	-	1	2	-	-	-	16	16	149.5
29	5950	6250	-	-	1	1	-	-	1	2	-	-	-	16	16	152.8
30	6130	6430	-	-	-	-	-	2	-	2	-	-	-	12	12	150.1
31	6310	6610	-	1	2	-	-	-	1	2	-	-	-	20	20	165.2
32	6490	6790	-	-	3	-	-	-	1	2	-	-	-	20	20	168.7
33	6670	6970	-	1	-	-	-	2	-	2	-	-	-	16	16	165.9
34	6850	7150	-	-	1	-	-	2	-	2	-	-	-	16	16	167.4

SUPERSLIM SOLDIER

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LIFTING ACCESORIES

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Superslim Lifting Plate Assembly 20kN (SSX10063) weight 4.97kg
(F.O.S >3.0)

Used in pairs for lifting formwork panels up to 40kN. Supplied with captive shackle.
Lift vertically to avoid applying side loads to the shackle.

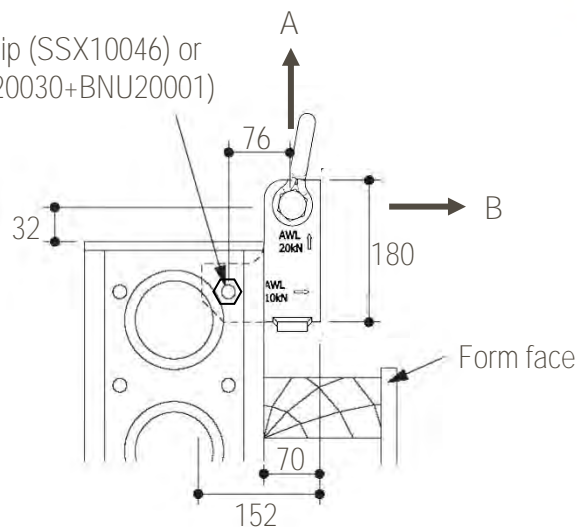
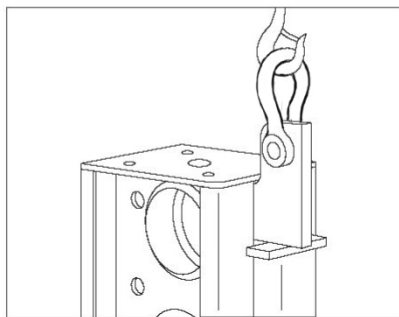
Allowable Working Load on arrow 'A' 20 kN

Allowable Working Load on arrow 'B' 10 kN

Item also exists without shackle as Superslim Lifting Plate 15kN (SSU10032) - stamped for Allowable Working Loads reduced by 25%.



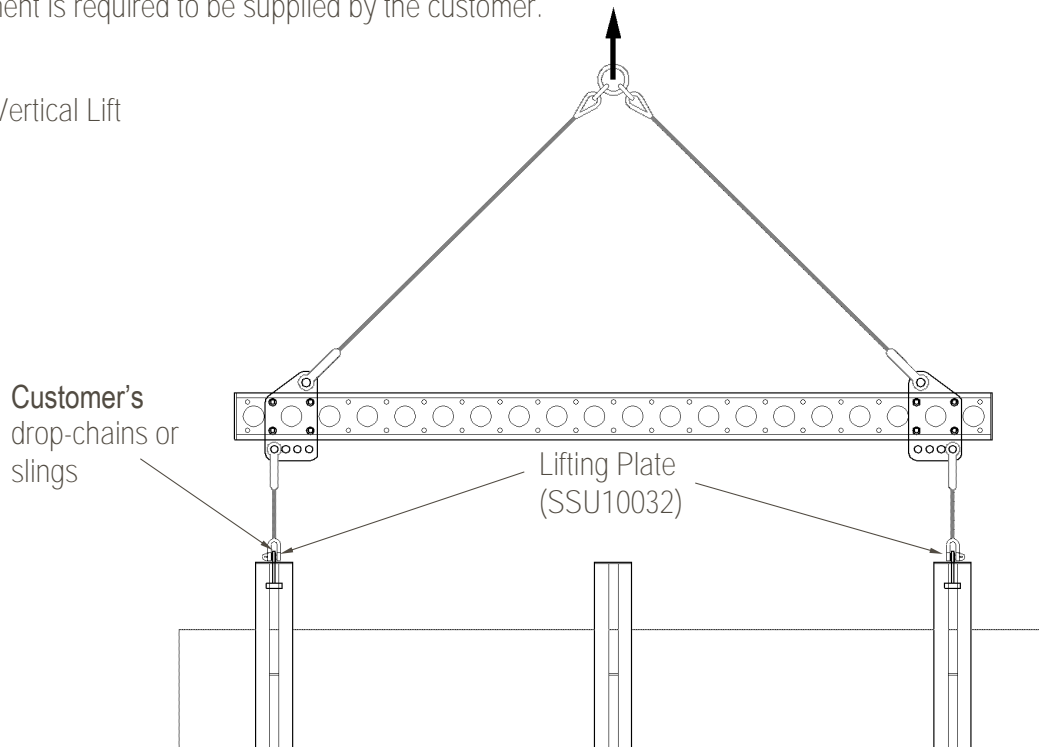
Superslim 19mm Pin & Clip (SSX10046) or
M20x90 Bolt & Nut (BNX20030+BNU20001)



Lifting – Forms up to 4 Tonnes

The Superslim Spreader Beam Assembly is used in combination with a pair of Lifting Plates (SSU10032). Some equipment is required to be supplied by the customer.

Note: Vertical Lift



Superslim Form Support Plate (SSX10042) should be used on the bottoms of soldiers which contain lifting plates.

SUPERSLIM SOLDIER

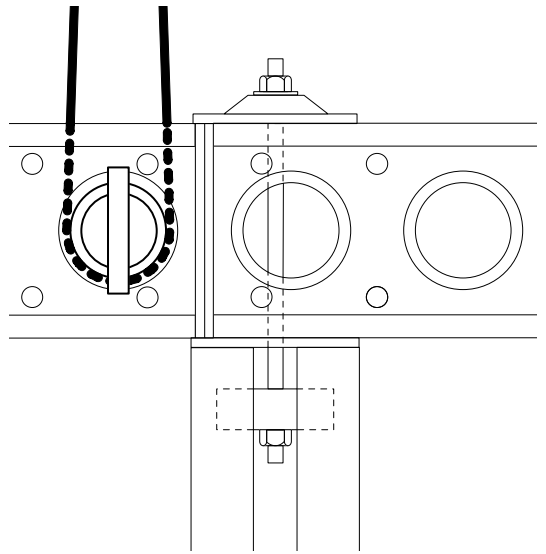
MODULAR STRUCTURAL SYSTEM



Lifting – Forms up to 9 Tonnes

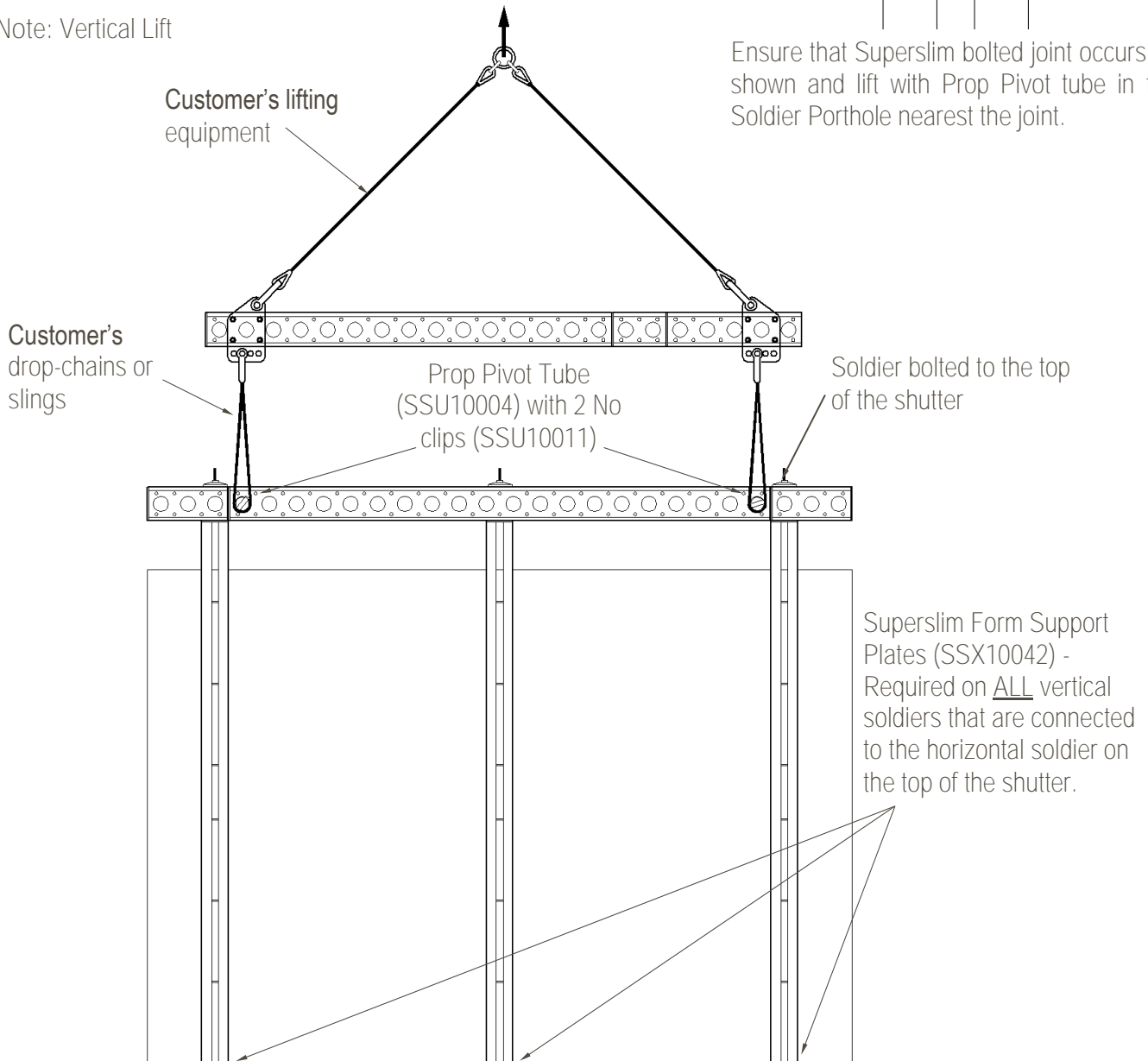
When bolting Soldiers to the top of shutters as shown below remember to check bending moments induced. Some equipment is required to be supplied by the customer.

Connect Superslims with M20 gr8.8 ATR 450mm long, 2 M20 nuts (BNU20001), M20 round washer (BNU20003). Porthole Bearing (SSX10039) and Standard Waler Plate (BTX10021).



Ensure that Superslim bolted joint occurs as shown and lift with Prop Pivot tube in the Soldier Porthole nearest the joint.

Note: Vertical Lift



SUPERSLIM SOLDIER

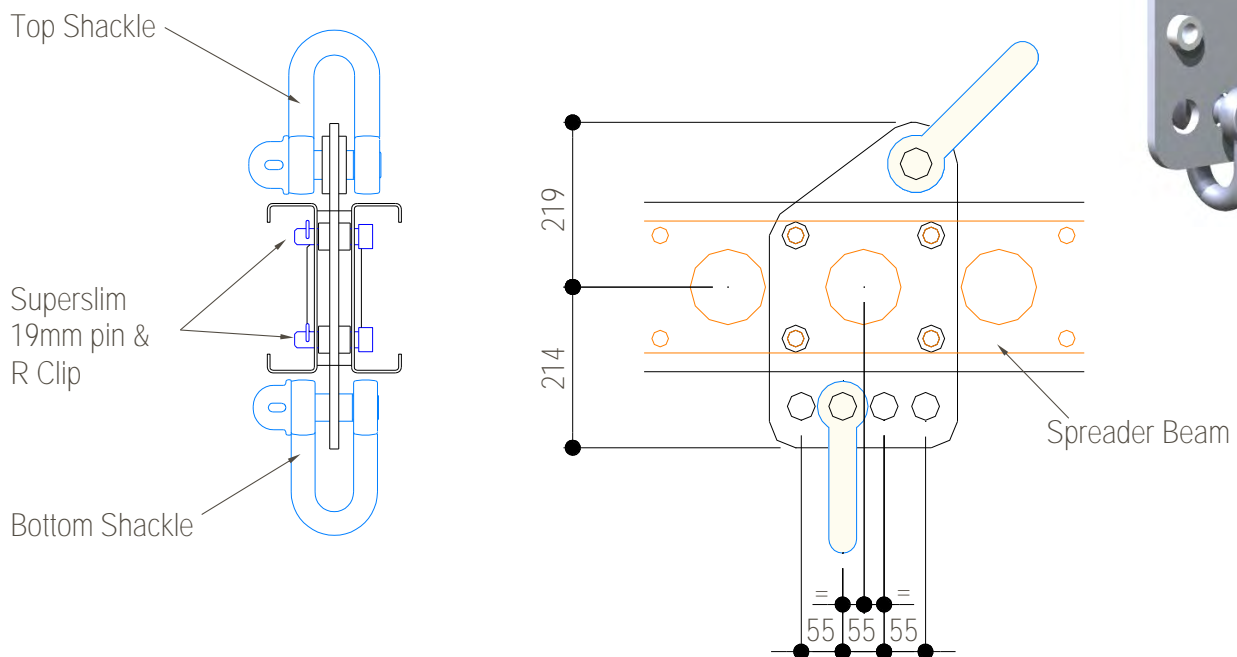
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Lifting - Spreader Beam Adaptor Assembly (SSX10052) weight 19.4kg

Used in pairs with a Superslim Soldier to make an economical spreader beam for lifting loads of up to 9 tonnes. Includes top and bottom shackles ready for connection to customers slings and lifting equipment.

Each Spreader Beam Adaptor Assembly comprises:- 1 No Spreader Beam Adaptor, 4 No Superslim 19mm pin & R Clip & 2 No Shackles



Each spreader beam plate fits into the web of the Soldier and allows for 55mm adjustment in lifting length. The maximum dimension between lifting points on a unit is 3060mm when using a single 3600mm Soldier.

The spreader beam plate has been designed in accordance with The Construction (Lifting Operations) Regulations 1961. Each plate is Individually numbered and tested to twice working load and stamped.

A certificate of testing is available from RMD Kwikform on request.

A table of maximum lifted load related to the internal angle of the slings is given in the graph on sheet 100. The user will need to supply the correct two legged chains or slings.

SUPERSLIM SOLDIER

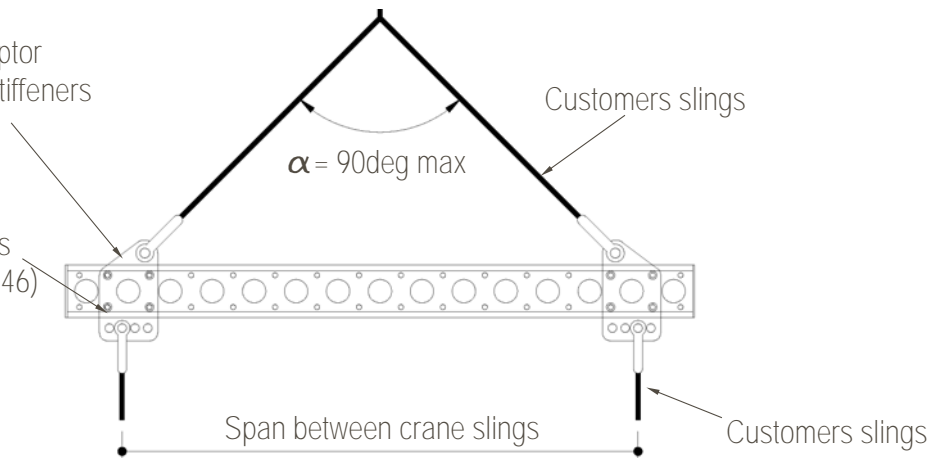
MODULAR STRUCTURAL SYSTEM



Lifting – Spreader Beams

Spreader Beam Adaptor positioned to avoid stiffeners

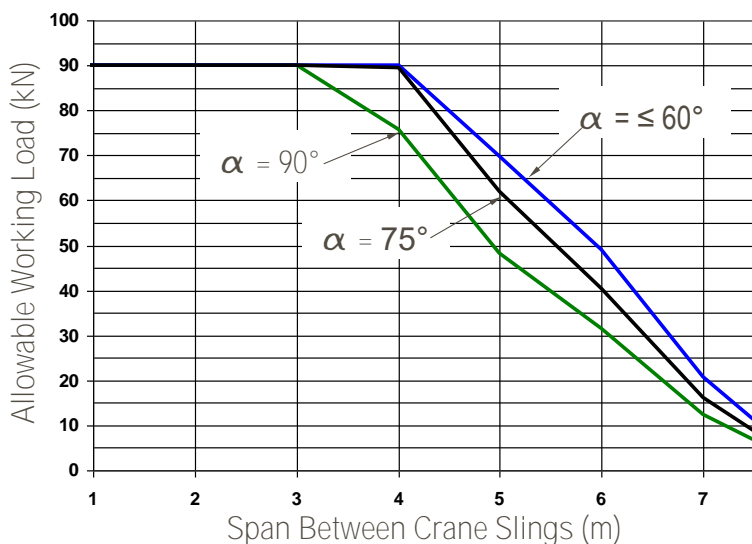
Connect using 4 No Superslim 19mm pins and R clips (SSX10046)



- Use the Spreader Beam Adaptor only in the orientation shown with the row of four holes positioned at the bottom of the unit.
- Ensure that the lower slings are vertical by moving the position of the unit along the Superslim, fine adjustment is afforded by moving the lower shackle between the four hole positions. Never use less than four 19mm pins and clips to connect the unit to the Superslim.
- Where Superslim sections are joined to make longer spreader beams, ensure that soldiers with seven hole end plates are used and connect sections together using 6 No. M16x40 grade 8.8 set pins and nuts torqued to 120Nm. Never use more than three Superslimes in the makeup.
- Do not use with damaged Superslim Soldiers

For further instructions on safe use refer to the Equipment Guidance Notes supplied with the equipment or available on request.

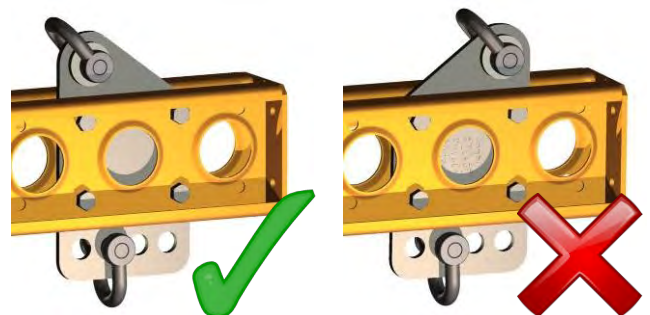
Spreader Beam Load Duty Chart
Minimum global factor of safety = 2.9.



Assembly Orientation

Ensure adaptor plates are orientated as shown below and check Superslim stiffener positions are avoided when detailing.

Note: The unit can not be used in 1800mm Superslimes in the position detailed below.



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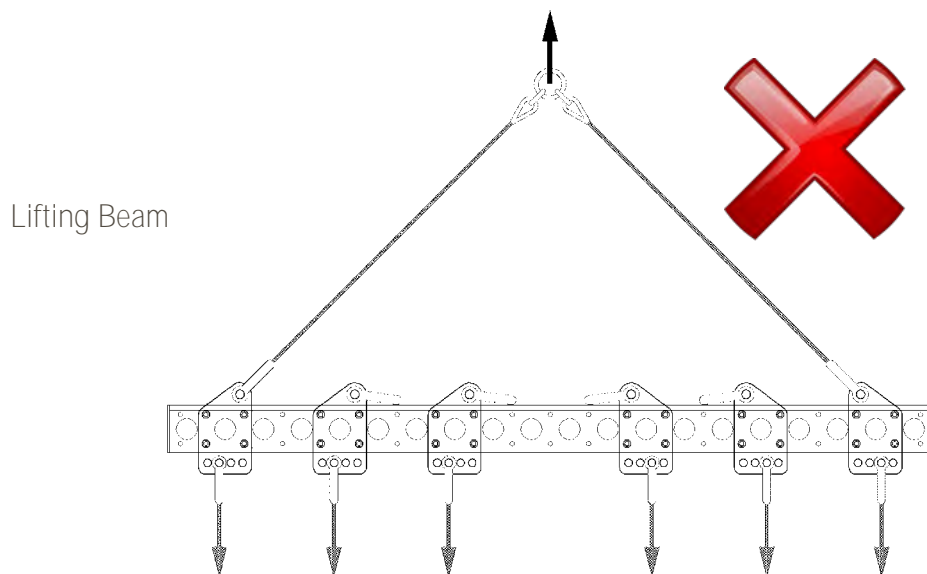
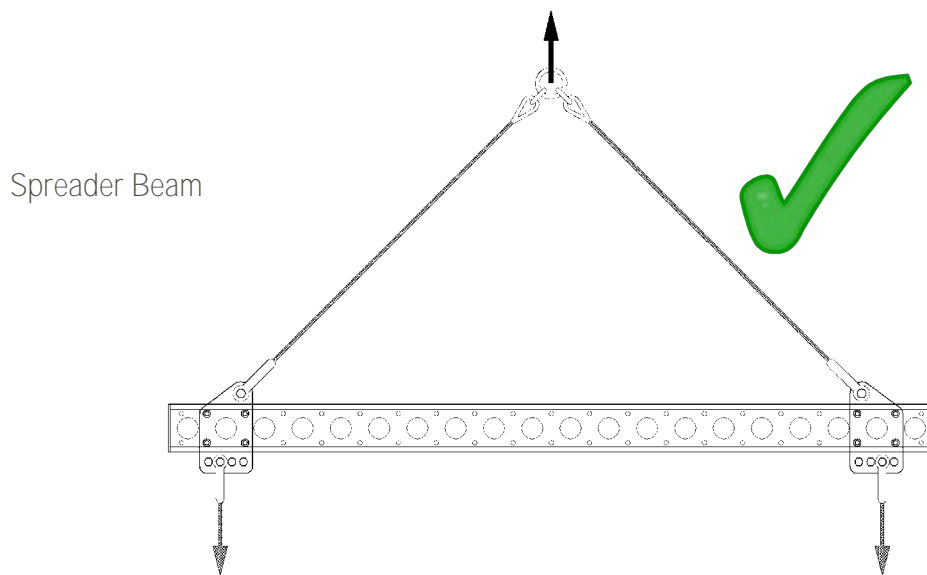
MODULAR STRUCTURAL SYSTEM



Lifting – Spreader Beams continued

Superslim Soldiers can be used as spreader beams by the addition of spreader beam plates and prop pivot tubes.

RMD Kwikform Superslim Soldiers cannot be used as lifting beams, unless the assembly is tested by an Independent lifting equipment test house. The difference is shown below.



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CLIPS, CLAMPS & FASTENERS

European Data

Date: 17/03/2020

Issue : SS02

Sheet 102

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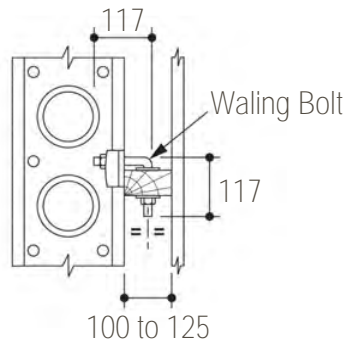
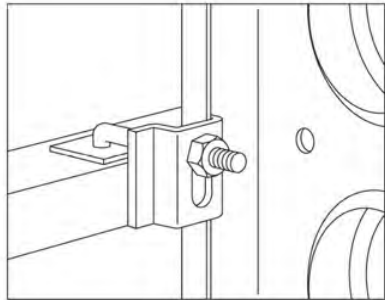
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Timber Waling Clamp Short

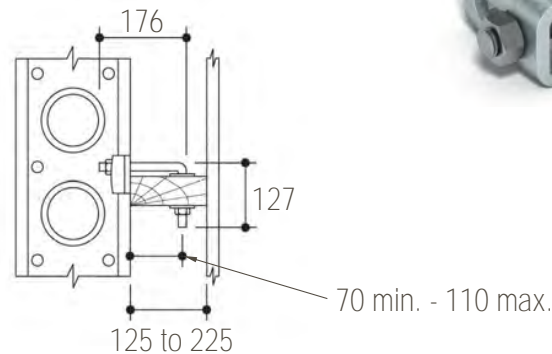
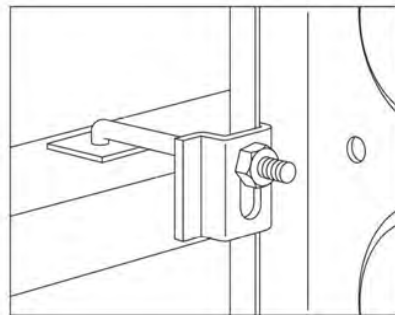
Used to fix timber walings to Soldiers. (18mm dia. hole required in timbers).
1 No. fixing required per metre of Soldier fixed on alternative sides of the Superslim.



Code	No.	Description	Weight
BNU10054	1	Metric Waling Bolt 117x117	0.30 kg
SSU10017	1	Waling Clamp Plate Zinc Plated	0.40 kg
BNX20014	2	Washer - Plate 50x50x6x18mm	0.12 kg
BNU16001	2	M16 Hex Nut gr8 BZP	0.03kg

Timber Waling Clamp Long

Used to fix timber walings to Soldiers. (18mm dia. hole required in timbers).
1 No. fixing required per metre of Soldier fixed on alternative sides of the Superslim.



Code	No.	Description	Weight
BNU10055	1	Metric Waling Bolt 176x127	0.42 kg
SSU10017	1	Waling Clamp Plate Zinc Plated	0.40 kg
BNX20014	2	Washer - Plate 50x50x6x18mm	0.12 kg
BNU16001	2	M16 Hex Nut gr8 BZP	0.03kg

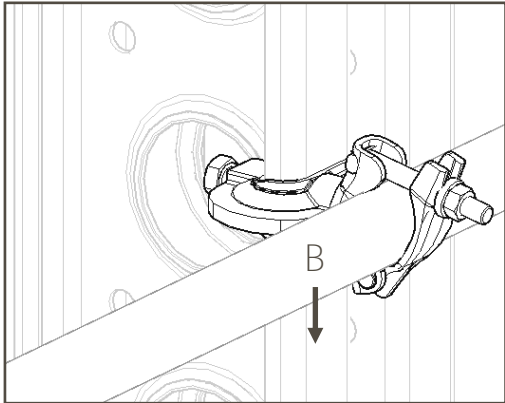
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM



Slimshor Tube Clamp (SSU10024) weight 1.33kg

Used to connect scaffold tube to Soldiers at any angle.



'A' Allowable Working Load = 6.1kN

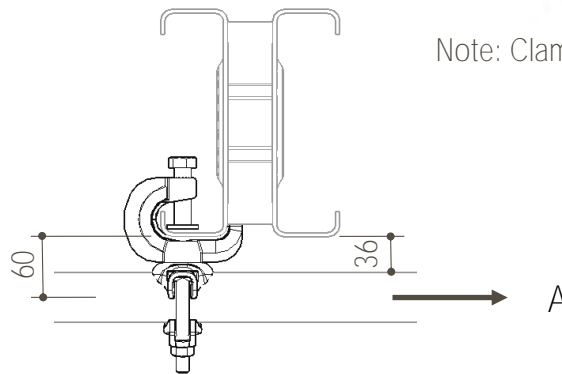
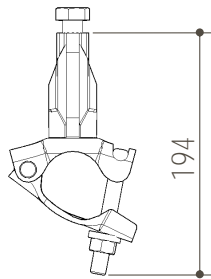
(slip of tube through coupler)

'B' Allowable Working Load = 4.0kN

(slip of coupler along soldier)



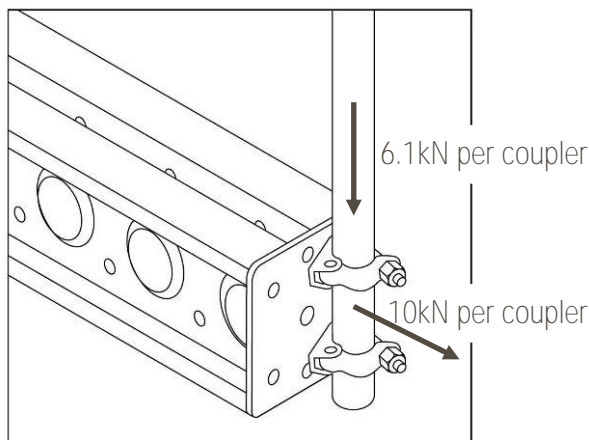
Note: Clamp is a swivel fitting.



Half Coupler

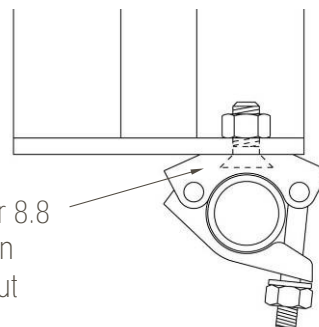
Used in pairs to connect scaffold tubes to the end plates of Soldiers. e.g. to create handrail posts etc.

Allowable Working Load per coupler 6.1kN slip along tube 10kN direct tension



Code	Description	Weight
SFU10014	2" Half Coupler 18mm Dia Hole	0.51 kg
BNU16001	M16 Nut gr8 BZP	0.03 kg
BNU16008	M16x40 St Pin gr8.8 BZP CSK	0.05 kg

M16 x 40 gr 8.8
CSK Set Pin
and M16 Nut



SUPERSLIM SOLDIER

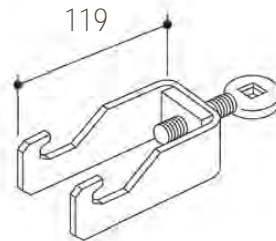
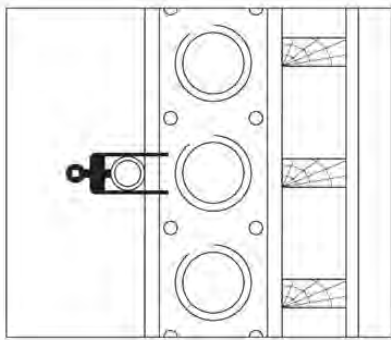
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'B' Clamp - Tube to Panel (RPX10005) weight 0.66kg

Used to connect scaffold tube to Soldiers at right angles.

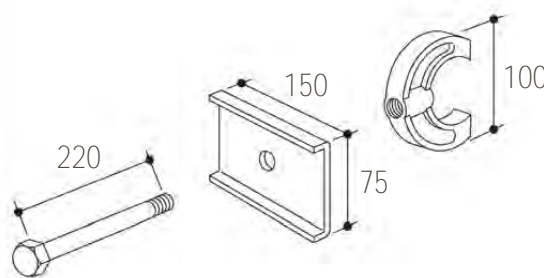
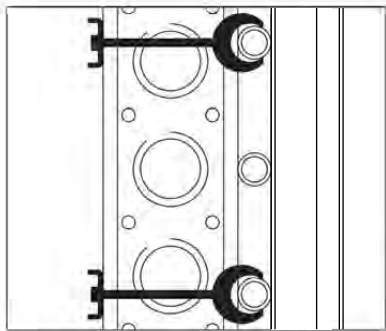
When pairs of 'B' clamps are used on a tube to soldier connection an allowable working load of 3.25kN may be used in any direction.



'G' Clamp, Channel Washer and Bolt

Used to connect tube to Soldiers without projection above the top of the tube.

Allowable Working Load for the tube pulling out of the clamp is 20kN



Note! 'G' clamps should be slid along the tube to approx required location before the tube is attached to the formwork panel.

Code	Description	Weight
BNX16007	M16x220 Bolt gr8.8 BZP	0.38 kg
BNX20020	Washer - Channel 150x75 18mm	0.66 kg
RPX10008	'G' Clamp - Tube Type M16	0.60 kg

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MODULAR STRUCTURAL SYSTEM

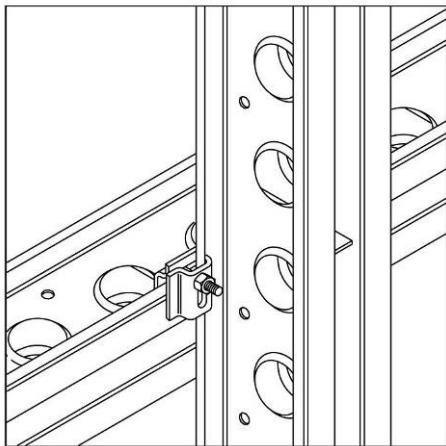
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Waling Clamp Plate

Used to connect horizontal Soldiers to vertical Soldiers. Note: 2 No. clamped connections required per intersection - diagonally opposed.

AWL 1.5kN per pair of connections in slip (when tightened with a hand tool)

Note - check soldier to soldier bearing is not exceeded (see sheet 12).



1 No. connection comprises of:

Code	No.	Description	Weight
SSU10017	2	Waling Clamp Plate Zinc Plated	0.40 kg
BNU16002	2	M16 Round Washer BZP	0.10 kg
BNU16013	1	M16x110 Bolt gr8.8 BZP	0.20 kg
BNU16001	1	M16 Hex Nut gr8 BZP	0.03kg

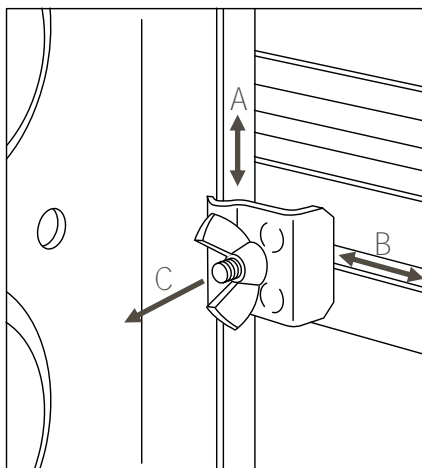
Clamp Assembly - Superslim

Used to connect Alform beams or Albeams to Soldiers. Clamp is available as individual components or as an assembly.

Note: If connection is subject to vibration it is recommended to use a M12 Nyloc Nut with the individual components.



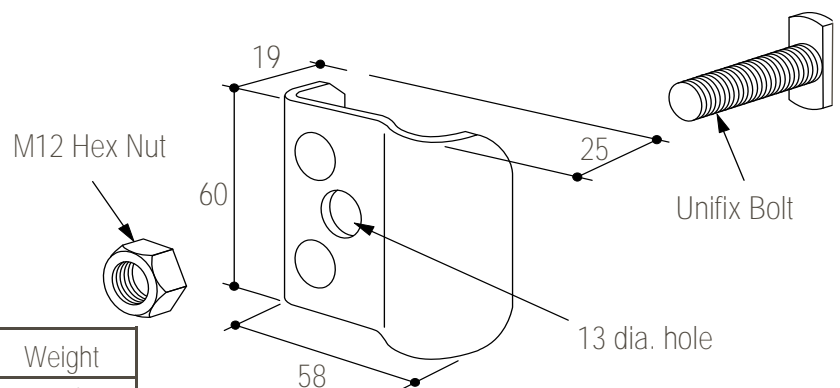
Superslim Clamp Assembly
(Sally Clamp)



AWL Slip along arrow A = 1.0kN

AWL Slip along arrow B = 0.75kN

AWL Tension along arrow C = 1.5kN



Code	Description	Weight
AFX20015	Superslim Clamp	0.16 kg
BNU12001	M12 Hex Nut gr8 BZP	0.01 kg
AFX20022	Bolt M12 Unifix	0.06 kg
AFX20012	Superslim Clamp Assembly	0.30 kg

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MODULAR STRUCTURAL SYSTEM

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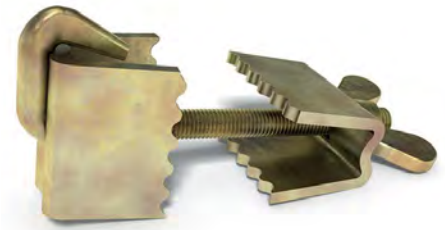
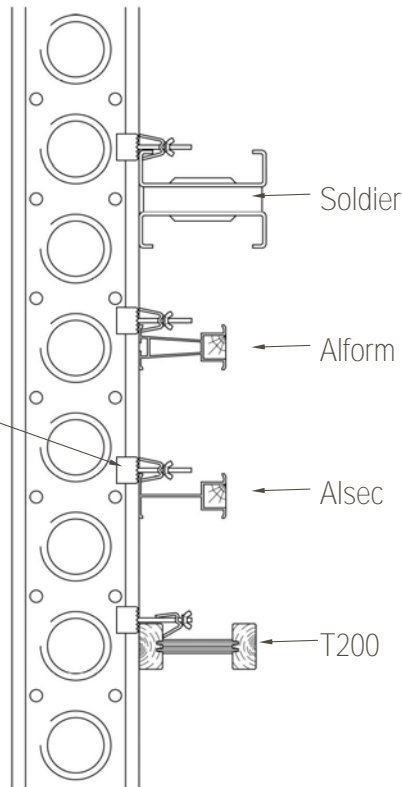
Universal Clamp (ALX10001) weight 0.75kg

A light duty clamp with many uses. Note: The clamp is to be fixed hand tight plus 1/4 turn.

AWL Tension = 2.5kN per clamp

AWL Slip = 0.35kN per clamp

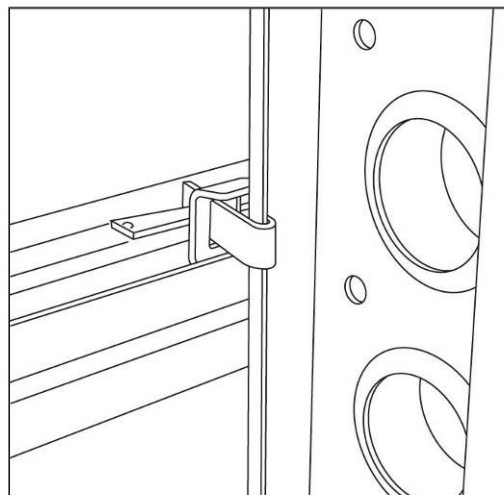
Universal Clamp
(ALX10001) Stagger
Alternate Clamps



Flange to Flange Wedge Clamp (ALX10002) Weight 0.51kg

A wedge fixed clamp that enables aluminium beams to be clamped to Soldiers at 90 degrees in static soffit applications.

AWL Slip = 1kN per pair of clamps



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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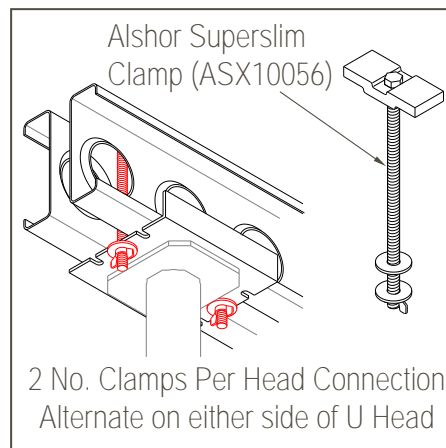
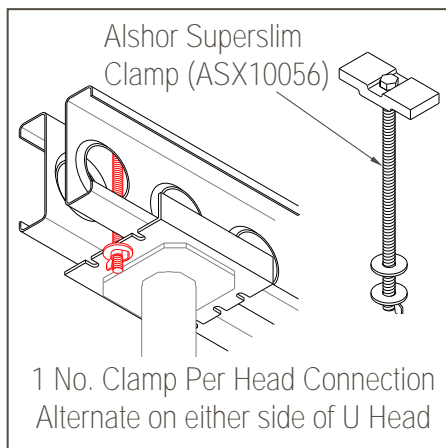
Alshor Superslim Clamp (ASX10056) weight 0.72kg

The Alshor Superslim Clamp is used to connect a Superslim primary beam to an Alshor U Head or Rapidshor U Head / U Plate. The item is supplied as an assembly and can not be taken apart.

A single Alshor Superslim Clamp should be used in standard applications increasing to two if high tension loads are expected during table lifting operations.

AWL using 1 no. clamp = 5.0kN

AWL using 2 no. clamps = 10.0kN

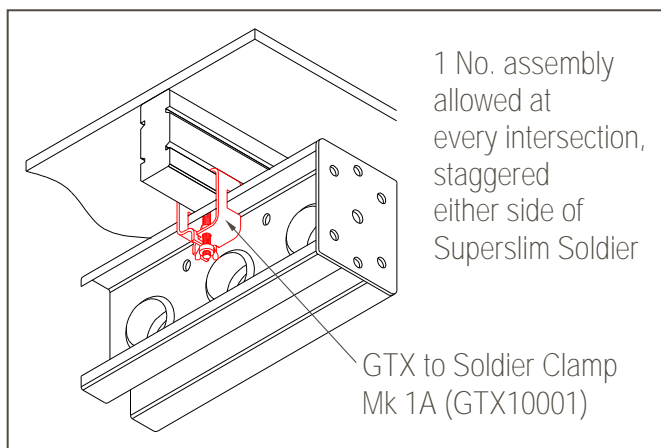
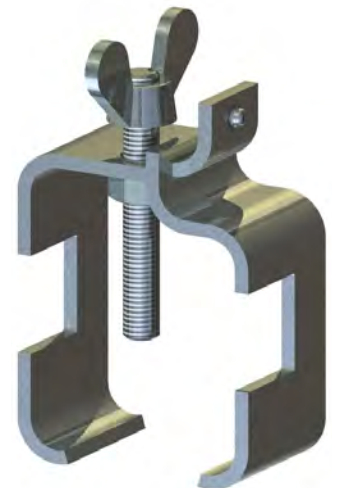


GTX to Soldier Clamp Mk 1A (GTX10001) weight 0.80kg

Used to connect GTX beams to Superslims on wall formwork or crane handled soffit schemes.

AWL Tension = 2.0kN

AWL Slip along GTX = 1.0kN



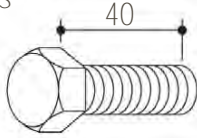
SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

Nuts, Bolts and Set Pins

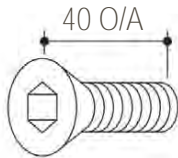
M16 x 40mm H.T. Set Pin

For general use to connect the end plates of Soldiers and accessories



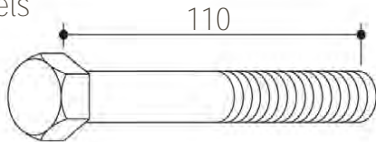
M16 x 40 HT CSK Set Pin ZP

For use with Half Couplers and Anchor Plates



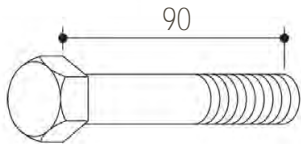
M16 x 110 8.8 Bolt Plated

For use with Joint Stiffeners and Ultraguard Soldier Sockets



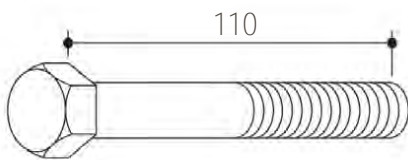
M20 x 90mm Bolt

For use with Turnbuckle & Wind Tie instead of a Superslim 19mm Pin & R Clip



M24 x 110mm Bolt

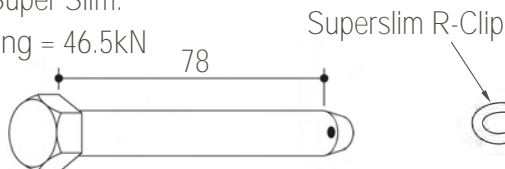
For use with Tilt Plates and Push Pull Props



Superslim 19mm Pin & R Clip Assembly

Used instead of a bolt for connection to the 21mm dia holes in a Super Slim.

AWL Bearing = 46.5kN



Code	Description	Weight
BNX12009	M12x25 Set Pin gr8.8 BZP	0.04 kg
BNX12002	M12x30 Set Pin gr8.8 BZP	0.04 kg
BNX12001	M12x40 Bolt gr8.8 BZP CSK	0.05 kg
BNU12001	M12 Hex Nut gr8 BZP	0.01 kg
BNA11202	M12 Nyloc Nut gr8 BZP	0.02 kg
BNU12002	M12 Round Washer BZP	0.01 kg
BNU16007	M16x40 Set Pin - gr 8.8 BZP	0.09 kg
BNU16013	M16x110 Bolt - gr 8.8 BZP	0.20 kg
BNU16008	M16x40 Set Pin gr8.8 BZP CSK	0.05 kg
BNU16009	M16x60 Bolt gr8.8 BZP	0.11 kg
BNU16001	M16 Hex Nut gr 8 BZP	0.03 kg
BNU16003	M16 Nyloc Nut gr8 BZP	0.03 kg
BNU16002	M16 Round Washer BZP	0.10 kg
BNU20001	M20 Hex Nut gr 8 BZP	0.06 kg
BNU20002	M20 Nyloc Nut gr8 BZP	0.06 kg
BNX20030	M20x90 Bolt - gr 8.8 BZP	0.28 kg
BNU24004	M24x60 gr 8.8 Bolt BZP	0.37 kg
BNU24002	M24 Round Washer BZP	0.07 kg
BNX24001	M24x45 Set Pin gr8.8 BZP	0.26 kg
BNX24002	M24x110Bolt gr8.8 BZP	0.48 kg
BNU24001	M24 Hex Nut gr 8 BZP	0.06 kg
SSX10046	Superslim 19mm Pin & R Clip	0.29 kg
BNX20100	M20 High Yield Pin	0.41 kg
SSU10011	Superslim R Clip 5x100mm	0.03 kg

Thread run-out max:

M12 - 4mm, M16 - 5mm, M20 - 6mm, M24 - 7mm

Bolt thread length:

2d+6 < 125mm, 2d+12 > 125mm < 200mm, 2d+25 > 200mm

Hex Nuts Grade 8.8 & Nyloc Nuts

M12



10mm

M16



13mm

M20



16mm

M24



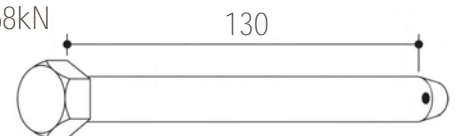
19mm

(depth of nuts)

M20 High Yield Pin

Used with a Superslim R Clip to secure a Tube End Link to a Soldier.

AWL Bearing = 68kN



SUPERSLIM SOLDIER

MODULAR STRUCTURAL SYSTEM

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APPENDIX

European Data

Date: 17/03/2020

Issue : SS02

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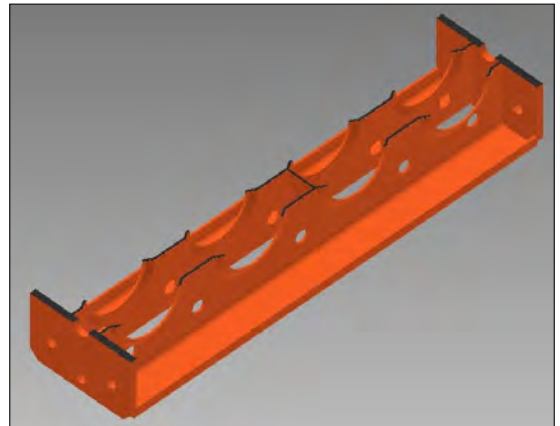
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SUPERSLIM SOLDIER

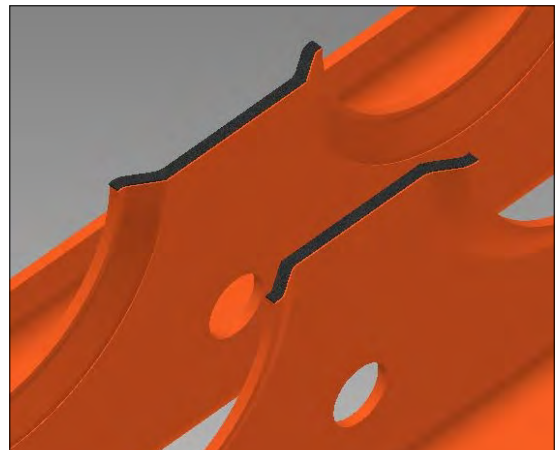
MODULAR STRUCTURAL SYSTEM

Appendix

Superslim Soldiers are lightweight members made from a pair of 3.5mm thick grade Q345 or S355 folded steel lipped channels with the lips acting to stiffen and strengthen the flanges. At intervals along the beam, welded web stiffener plates connect the two channels together and both improve torsion resistance of the composite beam and force a certain degree of composite action between the channels in their weak axes. The channels are further connected together at the ends by 10mm thick welded end plates with holes enabling units to be bolted end to end. The gap between the twin channels provides a convenient location for ties to pass through the beam in almost any location.



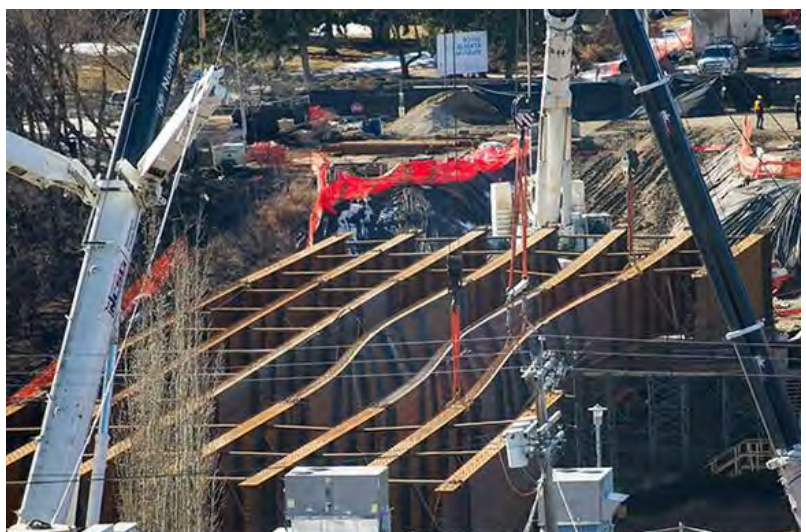
100mm diameter 'portholes' perforate both webs at 180mm intervals and lighten the beam. The raised lip around the perimeter of the portholes is a detail borrowed originally from aircraft construction and stiffens the webs when a Superslim is subject to shear, bearing or axial compressive loads. These portholes, as well as the smaller 21mm diameter holes in the web and end plate holes, enable the connection of an unrivalled range of accessories which combine to help keep the Superslim product system as the industry benchmark for the versatile construction of modular structures.



Behaviour as a Beam

The strength and stiffness of a Superslim is very much less when considered about the 'weaker' axis perpendicular to the plane of the webs than the other 'stronger' axis despite the presence of the twin channels and integral web stiffeners, this means that lateral torsional buckling (LTB) needs to be considered during the design of Superslim beams. LTB can occur when an unrestrained compression flange in a beam subjected to bending becomes unstable resulting in unwanted sideways movement of the compression flange, twisting of the beam about its central axis and possibly total failure of the beam at a bending moment significantly lower than the maximum allowable bending moment for the fully restrained section. For a brief video concerning LTB click on [this link](#).

Lateral torsional buckling of bridge girders under self weight only during assembly due to lack of K bracing.



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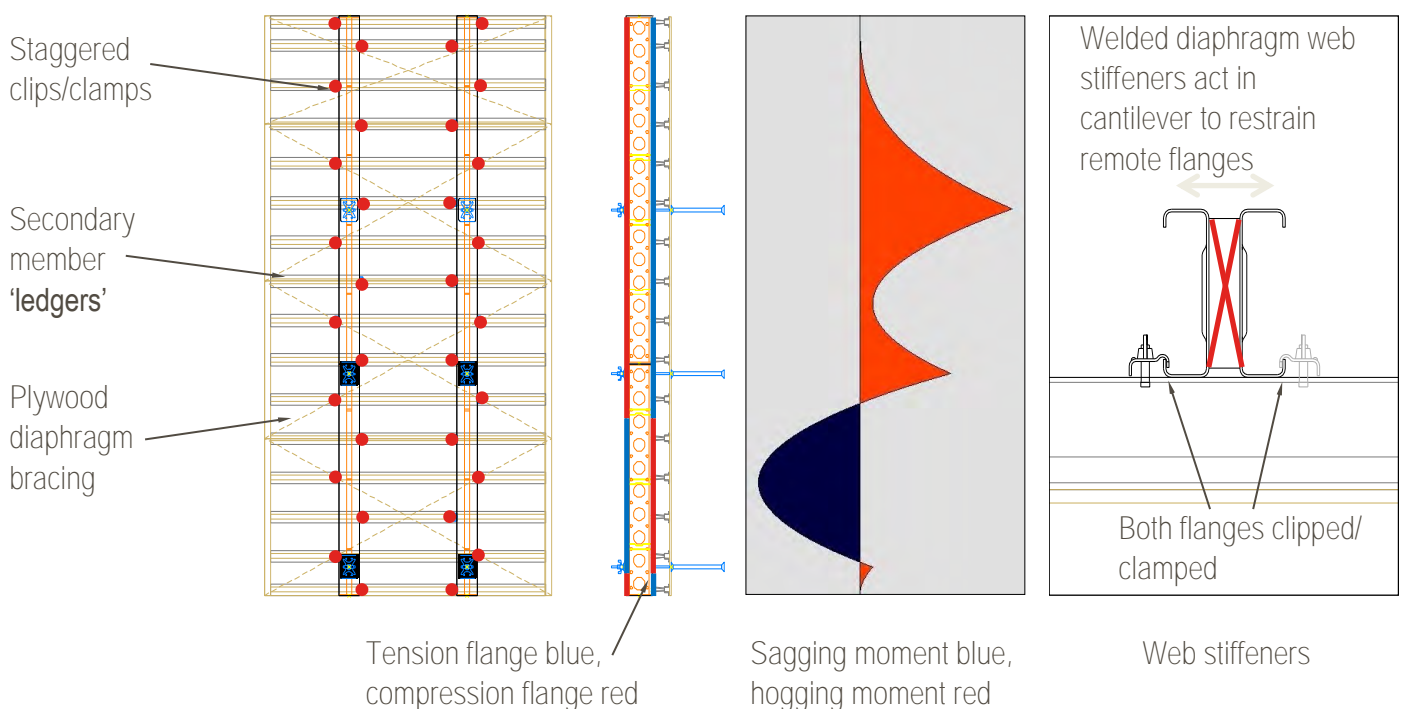


Fully Restrained Beam Design

The Superslim was first developed for use as a formwork 'soldier' for use in formwork panels assembled by the user from individual components to form a structural 'grillage'. The concrete pressure is applied to plywood or composite face sheeting spanning between, supported by and fixed to originally timber and more usually now aluminium 'secondary' beams; in some markets these are called 'backing members'. These in turn span between and are supported by Superslim 'primary beams' or soldiers which act to span between formwork ties that connect to the opposite form face thus balancing the concrete pressure loads. The loads are transferred between the Superslim and the formwork ties by one of various 'waler plates' which create bearing loads in the Superslim beam additional to the bending moments and shear. Soffit formwork constructed using Superslim soldiers as primary beams act in the same manner except the ties and waler plates are replaced by falsework U-heads.

In these applications the flanges of the Superslim in contact with the secondary beams are connected at each intersection using one of a variety of proprietary clips or clamps. Clips/clamps along the length of the Superslim are staggered so that every other clip is fitted to one of the Superslim channels and the remainder are fitted to the other channel. This relatively frequent connection to both channels prevents the Superslim from twisting about its axis and prevents the flange in connection with the secondary beams from moving sideways.

The intermittent diaphragm stiffeners now act as cantilevers and effectively provide lateral restraint to the flanges not connected to the secondary beams. The multiple restraint created in this manner, together with the bracing 'diaphragm action' of the form face sheeting and its fixings to the secondary beams, fully restrains both flanges of the Superslim beam regardless of whether the beam experiences sagging bending moments (between the ties) or hogging moments (near/at the tie locations).



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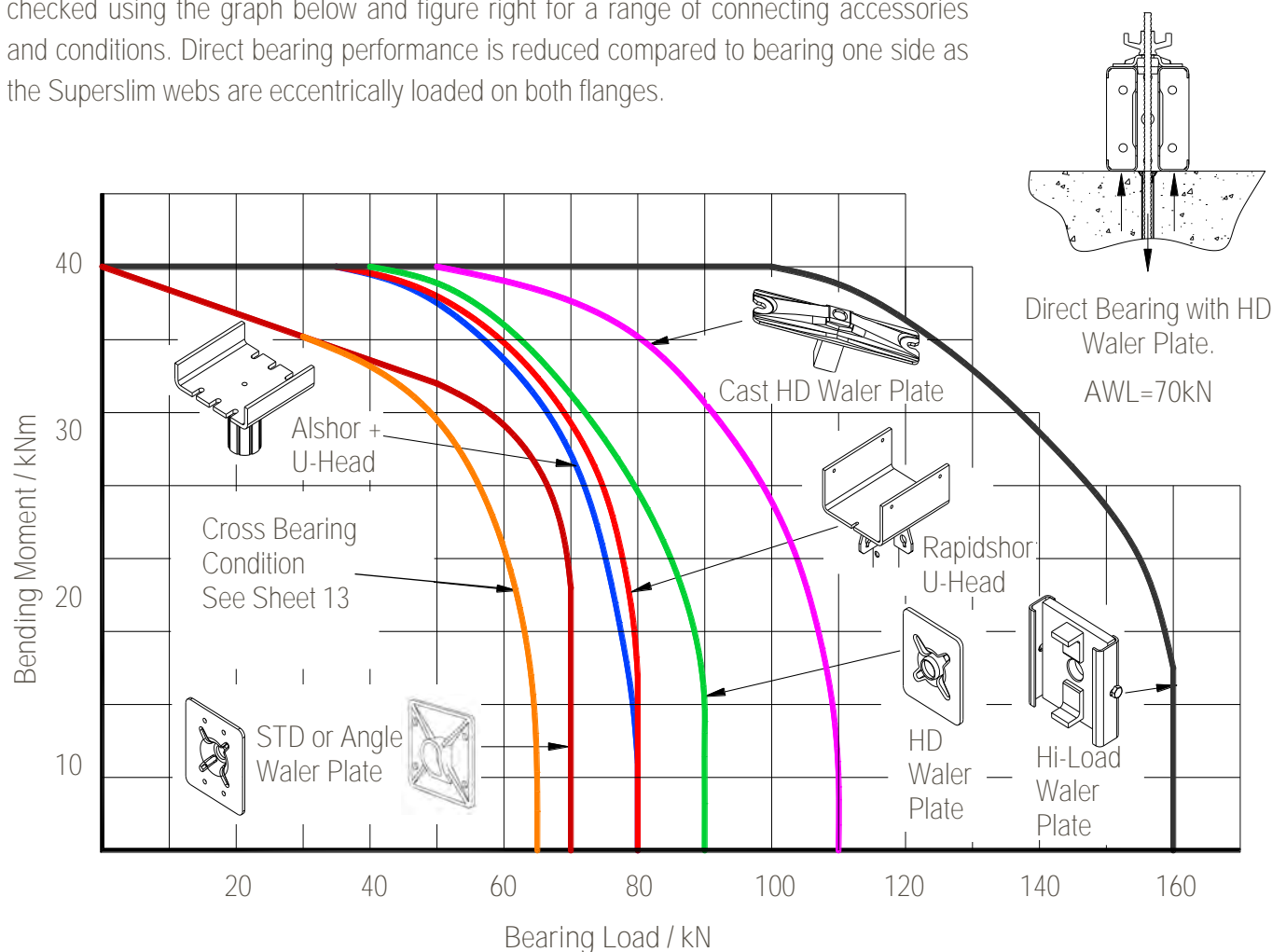
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Combined Loading

At the tie locations, the Superslim soldier is subjected to a combination of bending, shear and bearing stresses and this most onerous combination of loading will usually govern the design of the beam. Safe performance envelopes of tie load and bending moment have been determined by extensive load testing. To facilitate design, shear and bearing stresses have been combined into a single variable - 'bearing load'. This enables a single graph to contain performance envelopes covering the behaviour of the Superslim beam used in conjunction with multiple accessories such as Rapidshor and Alshor U-heads in falsework construction. Also included is the least favourable case when two Superslim beams are crossed and bear on each other. In this mode, the two webs of both soldiers act like knife edges and bearing is transferred though only four small areas of contact.

The Adequacy of the Superslim beam between the ties/supports also needs to be checked as part of the design. In formwork applications the reactions from the Alforms/timbers are comparatively low and can be ignored. As a result checks are restricted to bending moment and deflection of the Superslim beam section and bending moment at any joints between individual Superslim beams where the allowable bending moment capacity is reduced and varies depending on how many bolts are used to secure the connection. Where high concentrated loads are present mid span, these need to be taken into account during the design process.

Performance under conditions of combined bending, bearing and shear loading can be checked using the graph below and figure right for a range of connecting accessories and conditions. Direct bearing performance is reduced compared to bearing one side as the Superslim webs are eccentrically loaded on both flanges.



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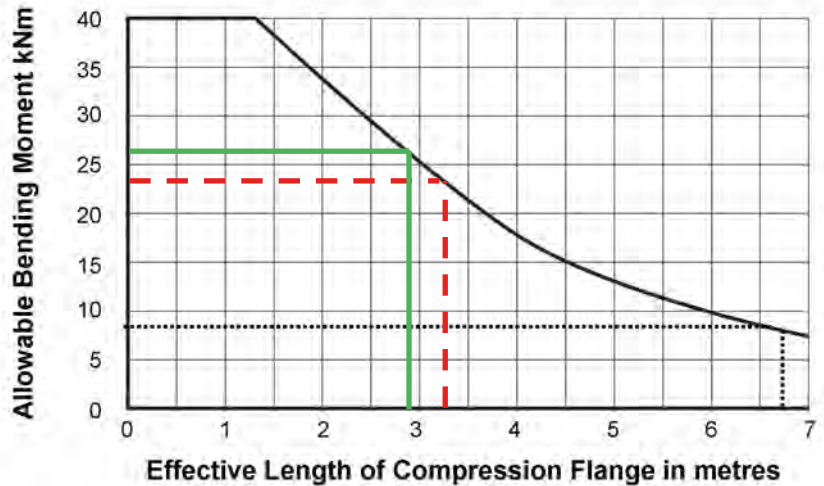
Design of Beams without Lateral Restraint

For applications other than standard formwork, the Superslim will likely be less well restrained. The important thing to determine here is the 'effective length of the compression flange'. To which the allowable bending moment is related using the graph below.

The effective length of the compression flange depends on three factors:

- Whether the load is de-stabilising or not—see below for definition
- The degree of lateral and torsional (twisting) restraint at the supports
- For cantilevers the lateral and torsional restraint at the tip

The destabilising load condition is unusual and applies when the load is applied to the top flange and both the top flange and the load are free to move sideways.



Effective lengths for compression flanges of various beam arrangements are shown in the table right (BS5975).

Example an Individual Superslim Soldier is used to support an un-braced Rapidshor base jack loaded to 53kN over a 2m void in a slab. What conditions are needed to safely achieve this? Base jack extension is 500mm.

The long un-braced base jack is quite flexible laterally so it could be argued that the load is de-stabilising.

At the supports torsional restraint is by dead bearing on the ends so effective length of the compression flange is $1.4L+2D = 3.25m$. Allowable bending moment is 22.5kNm.

Applied bending moment = $WL/4 = 26.5kNm > 22.5kNm$ does not satisfy.

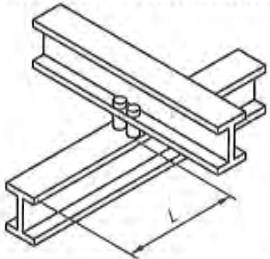
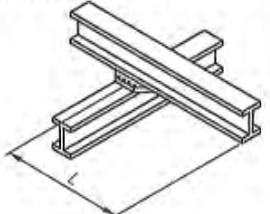
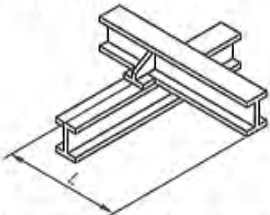
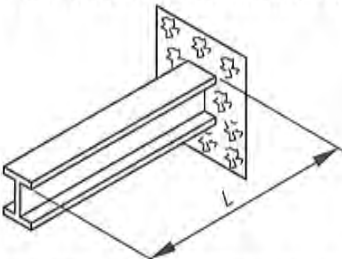
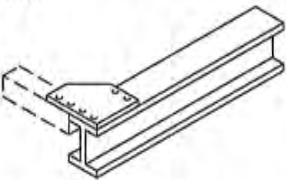
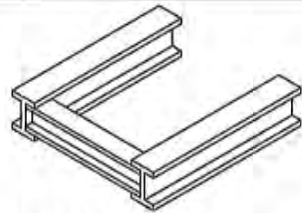
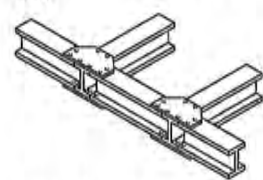
If the base jack extension were short or a jack brace is added perpendicular to the Superslim the load is not de-stabilising. Effective length is $1.2L+2D = 2.85m$. Allowable bending moment = 27kNm $> 26.5kNm$ —satisfies.

Conditions of restraints at supports		Loading Conditions*	
		Normal	Destabilizing
Beam restrained against torsion at supports	Compression flange fully restrained against rotation in plan at the supports	0.70L	0.85L
	Compression flange partially restrained against rotation in plan at the supports	0.875L	1.05L
	Compression flange not restrained against rotation in plan at the supports	1.0L	1.2L
Torsional restraint at support given:	Only by positive connection of bottom flange to the support	1.0L+2D	1.2L+2D
	Only by dead bearing of bottom flange to the support	1.2L+2D	1.4L+2D

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Effective Length of Compression Flanges for Cantilevers

Restraint conditions		Loading conditions	
At support	At tip	Normal	Destabilizing ^{A)}
 <p>Continuous with lateral support</p>	Free	3.0L	7.5L
	Laterally restrained on top flange only	2.7L	7.5L
	Torsionally restrained only	2.4L	4.5L
	Laterally and torsionally restrained	2.1L	3.6L
 <p>Continuous with partial torsional restraint</p>	Free	2.0L	5.0L
	Laterally restrained on top flange only	1.8L	5.0L
	Torsionally restrained only	1.6L	3.0L
	Laterally and torsionally restrained	1.4L	2.4L
 <p>Continuous with lateral and torsional restraint</p>	Free	1.0L	2.5L
	Laterally restrained on top flange only	0.9L	2.5L
	Torsionally restrained only	0.8L	1.5L
	Laterally and torsionally restrained	0.7L	1.2L
 <p>Built-in laterally and torsionally</p>	Free	0.8L	1.4L
	Laterally restrained on top flange only	0.7L	1.4L
	Torsionally restrained only	0.6L	0.6L
	Laterally and torsionally restrained	0.5L	0.5L
 <p>Braced laterally in at least one bay</p>	 <p>Torsional restraint</p>	 <p>Braced laterally in at least one bay</p>	
Top flange restraint		Lateral and torsional restraint	

NOTE *L* is the projecting length of the cantilever.

^{A)} The destabilizing loading condition exists when the load is applied on the top flange and both the load and the flange are free to move laterally.

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Design of Lateral Restraint Bracing for Beams

This topic is not the main focus of this data sheet but the information taken from BS5975 is reproduced here for convenience.

K.6 Effective lateral restraint

NOTE For the purposes of this subclause, the term girder is considered to include beams, lattice girders, plate girders and trusses.

K.6.1 General

Any restraint system providing lateral stability to a girder should effectively limit lateral movement of restrained points relative to the supports.

To ensure that the restraint provided is adequate, a compression flange restraint force H_c acting normal to the girder, is considered in the design. Restraint to a group of girders can be provided by bracing one or more pairs of girders to provide the flange restraint force. Alternatively, the groups or a single girder can be linked at restraint points to an external support that is sufficiently rigid to resist the flange restraint force.

The magnitude of the compression flange restraint force is as follows:

- for up to three girders linked together: $H_c = 0.025 \times$ sum of maximum force in the compression flanges;
- for four or more girders linked together: $H_c = 0.025 \times$ sum of the three largest maximum forces in the compression flanges.

The force H_c should be divided equally between the number of points where the girders are restrained. Where a group of girders are braced internally, the restraint force is considered not to give rise to any resultant reaction on the supports.

Where, however, the restraint is by an external support, a part of the total flange restraint force is resisted by the girder supports. Combinations of the two methods are possible, but require individual consideration.

K.6.2 Girder restraint bracing design

Where two or more girders are effectively connected together at a line of node points with bracing, the bracing should be designed to provide the compression flange restraint force H_c , distributed as shown in Figure K.2, in addition to any other forces that may be applied. The application of the restraint force is shown in Figure K.2 with the force shown in the form of applied external forces to permit the design of the bracing. This gives a notional end reaction in the linking member AD and WX of H_c/n , where n is the number of internal node points, but because the bracing system is a closed circuit, this reaction is not transmitted to the supports. The two braced girders AW and DX may provide lateral restraints to other linked girders in the group effectively connected at the node points as shown in Figure K.2.

K.6.3 Girder restraint from external points

Where a girder, or group of girders, is linked to adequate external restraint points, the links and their connections should be designed to provide the relevant value of the compression flange restraint force, H_c , distributed as shown in Figure K.3, in addition to any other external forces that may be applied. The application of the restraint forces is shown in Figure K.3.

The flange force, H_c/n , should be restrained by the girder supports. The girder supports at each will have to provide this restraint force as an applied external force in addition to other applied and stability forces at the supports.

Figure K.2 Girder restraint (1) – Plan view

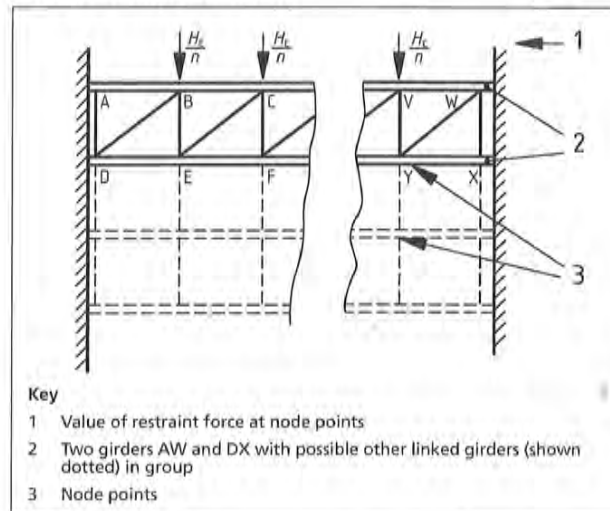
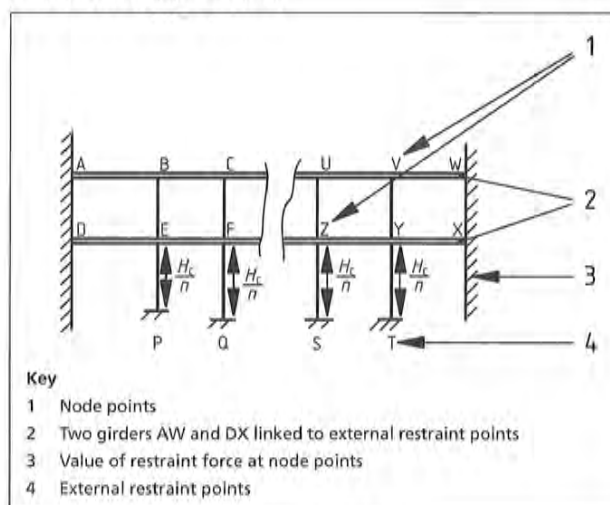


Figure K.3 Girder restraint (2) – Plan view



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