Description

Simple to assemble, heavy duty, modular bracing strut systems designed primarily to be used as cross struts with the MGF 305/406 UC hydraulic bracing system on major excavations. The system can also be used to prop reinforced concrete piles and capping beams forming the walls of major basements structures. Each strut comprises hydraulic ram assemblies together with various length strut extension bars. The system can support loads of up to 2500kN and span up to 30.0m unsupported. Components are extremely heavy and are normally assembled on site prior to being lifted into place and installed within the excavation using large cranes. A variety of end bearings are available allowing the struts to be used at a range of angles.

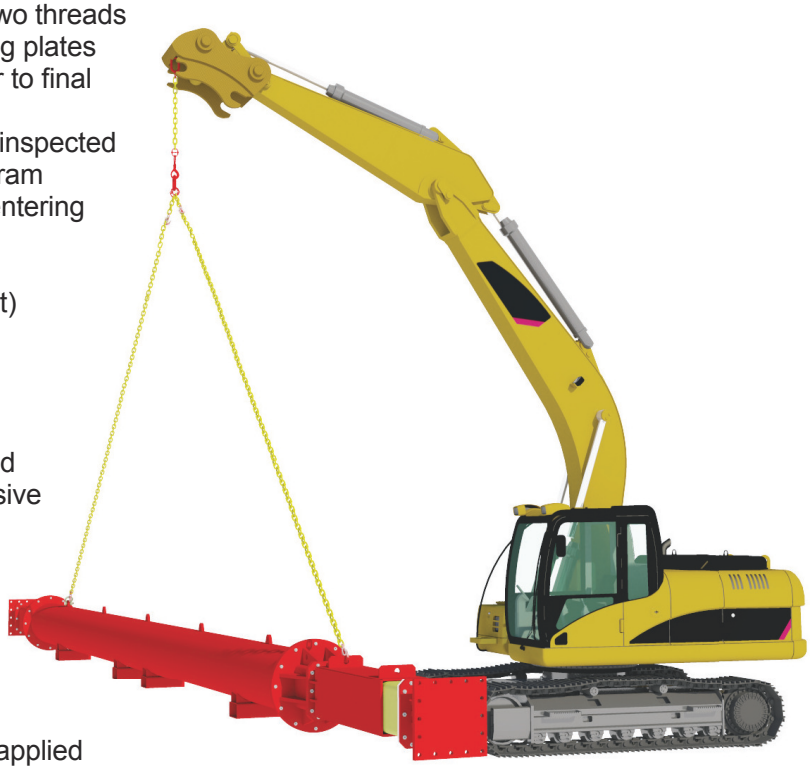
Fabricated from API grade X70 610x12.5 hollow circular steel section, and S355 grade 660x20/25 CHS, the extensions are quickly assembled into the required strut lengths using circular flanged plates c/w bolt, nut and washer assemblies. Final length adjustment is provided by a double acting hydraulic ram providing up to 800mm of stroke. Once located at the correct line and level the struts are pre-loaded (or tightened) against the faces to be supported using a hydraulic pump on the ram. Pre-loading of the legs ensures the strut cannot slip, takes up any slack or hogging in the system and minimises the extent of potential ground movements. Handling points are provided at regular intervals on each leg to assist assembly / removal.

MGF can supply the systems with a full range of suitable handling chains, hydraulic pump installation kits (including bio-degradable shoring fluid and hydraulic hoses) and confined spaces regime equipment.

Manufactured and designed in accordance with BS EN 14653:2005 PARTS 1 and 2 Manually operated Shoring Systems for Groundwork Support and BS 5975 (2008) Code of Practice for Temporary Works Procedures and the Permissible Stress Design of Falsework.

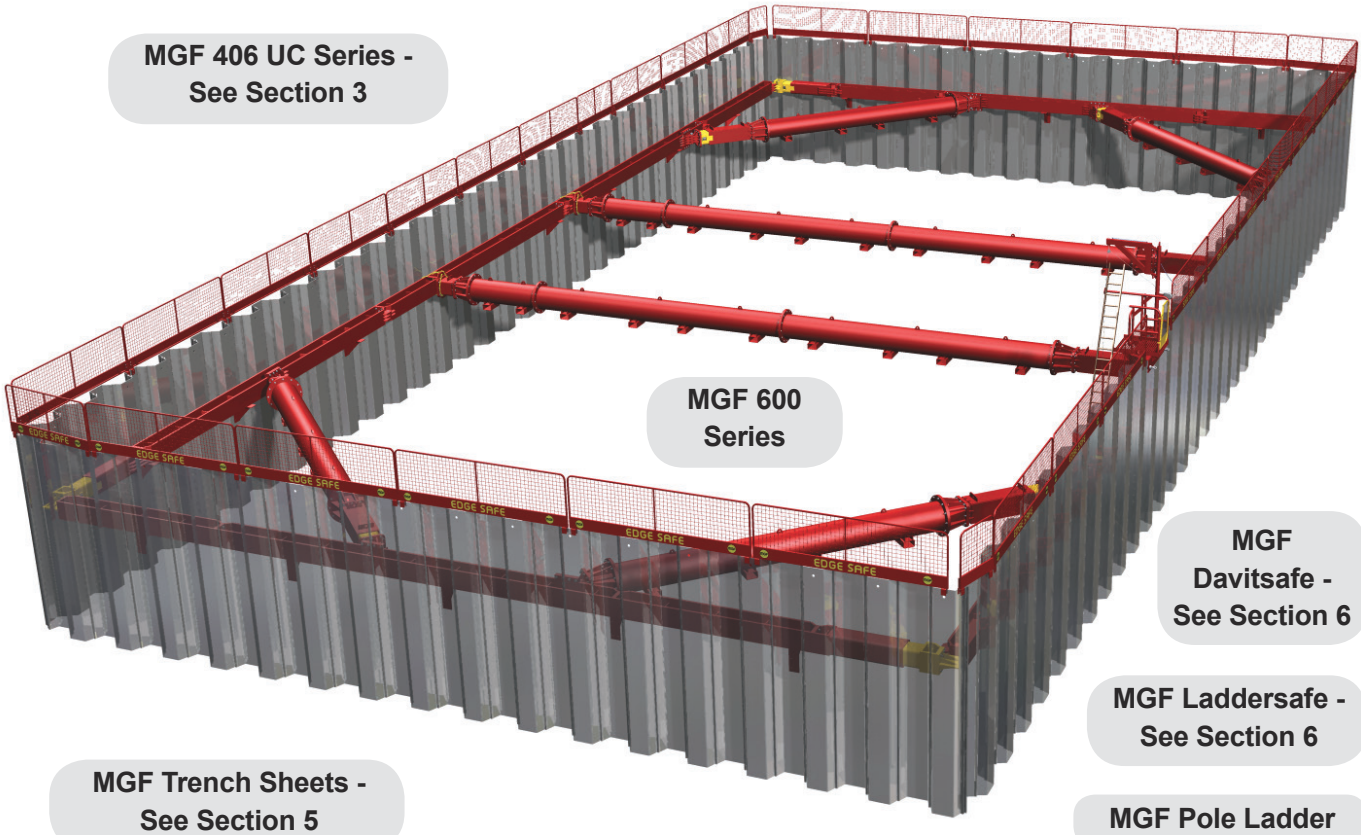
Product Notes

1. Strut systems are heavy and should only be assembled, installed and removed by competent persons in accordance with a site specific detailed design & installation sequence and MGF installation guidelines.
2. Installation is normally carried out by assembling the complete strut and then lowering into place (subject to crane / excavator capacity). Struts are normally long and unbalanced (due to the weight of ram/jack unit) and great care must be taken in preparing the lift / maintaining lift angle (tag lines strongly recommended). On the ram assembly max pre-load pressure of 100Bar (1500psi) must not be exceeded unless design states otherwise.
3. Additional restraining chains or support brackets are normally provided to the brace at intermediate strut locations to carry the additional strut weight.
4. Ensure struts are fully pre-loaded or tightened, end fixings fully packed, all hydraulic ram isolation valves are closed prior to releasing strut from lifting chains and commencing works. When assembling on site ensure that all pins and retaining clips are in place and secured and all flange plate bolts are installed and fully tightened / torqued with a minimum two threads visible beyond the nut. Any gaps in bearing plates must be securely packed using grout prior to final pre-loading of the hydraulic rams.
5. Individual components should be visually inspected for damage, excessive deflection, loss of ram pressure or loose locking collars prior to entering the excavation.
6. Safe access/egress, edge protection (for personnel) and barrier protection (for plant) should always be considered.
7. Prior to removal of systems the complete weight of the strut must be independently supported. Once this is accomplished the hydraulic rams (or struts) must be released and retracted to avoid the need for excessive extraction forces.
8. When installing struts at angles great care must be taken to ensure that the angles match the design, all shear stops are in place and all elements are supported/packed and capable of transmitting loads effectively. On large unsupported spans the pre-load must be applied prior to removing vertical support to minimise sagging.



MGF Edgesafe - See Section 6

MGF 406 UC Series - See Section 3



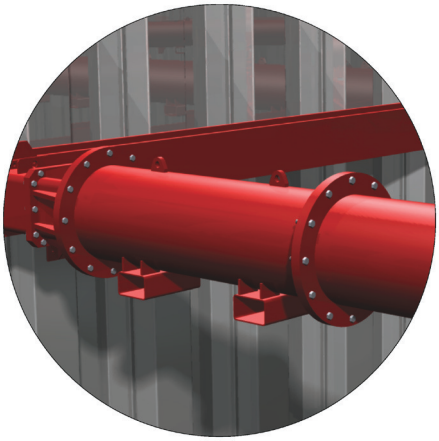
MGF 600 Series

MGF Davitsafe - See Section 6

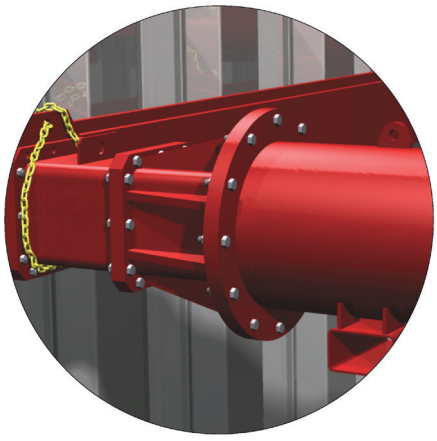
MGF Laddersafe - See Section 6

MGF Trench Sheets - See Section 5

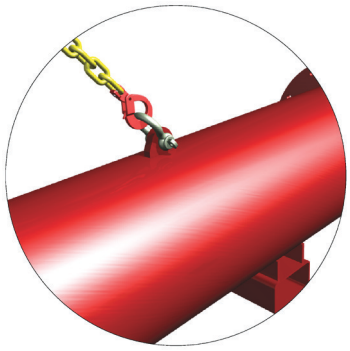
MGF Pole Ladder



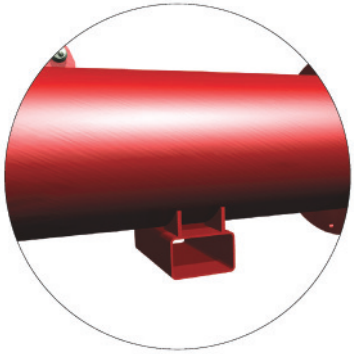
Strut Flange Connection Detail
600 Series Struts and Extensions are connected to each other via a flange plate (Φ850x30mm) using 12 No. grade 8.8 M24 bolts c/w nuts and washers (recommended min. torque 400Nm).



Transition Flange Connection Detail
The transition adaptor is connected to the hydraulic strut or 400 series extension via a square flange plate (520x520x30mm) and connects to 600 Series via a circular end plate(Φ850x30mm) both connections using 12 No. grade 8.8 M24 bolts c/w nuts and washers (recommended min. torque 400Nm).



Handling Points
WLL = 12.0t
Strut assemblies are lifted and handled by attaching MGF lifting chains to the handling/restraining points as shown.
Assemblies can also be handled using a fork lift on the pockets on the underside of the extensions.



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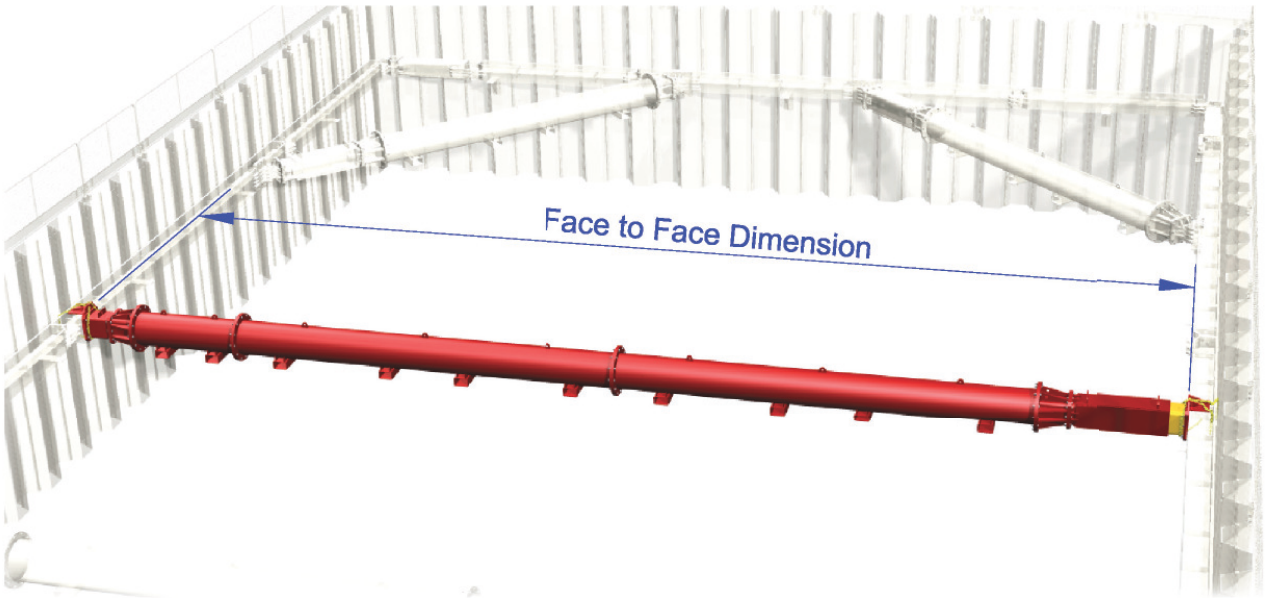
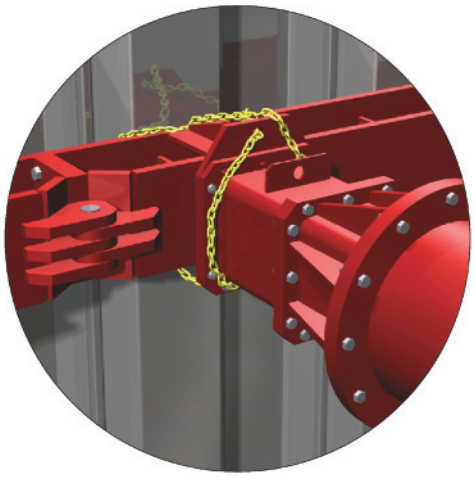
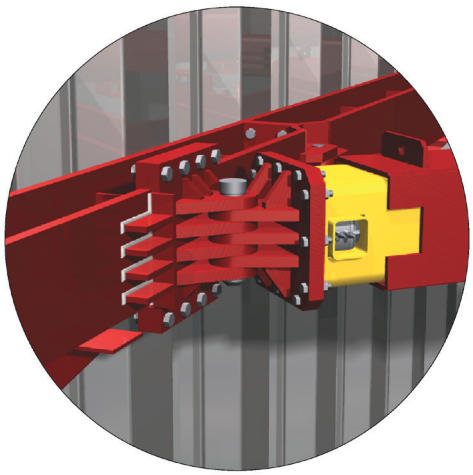
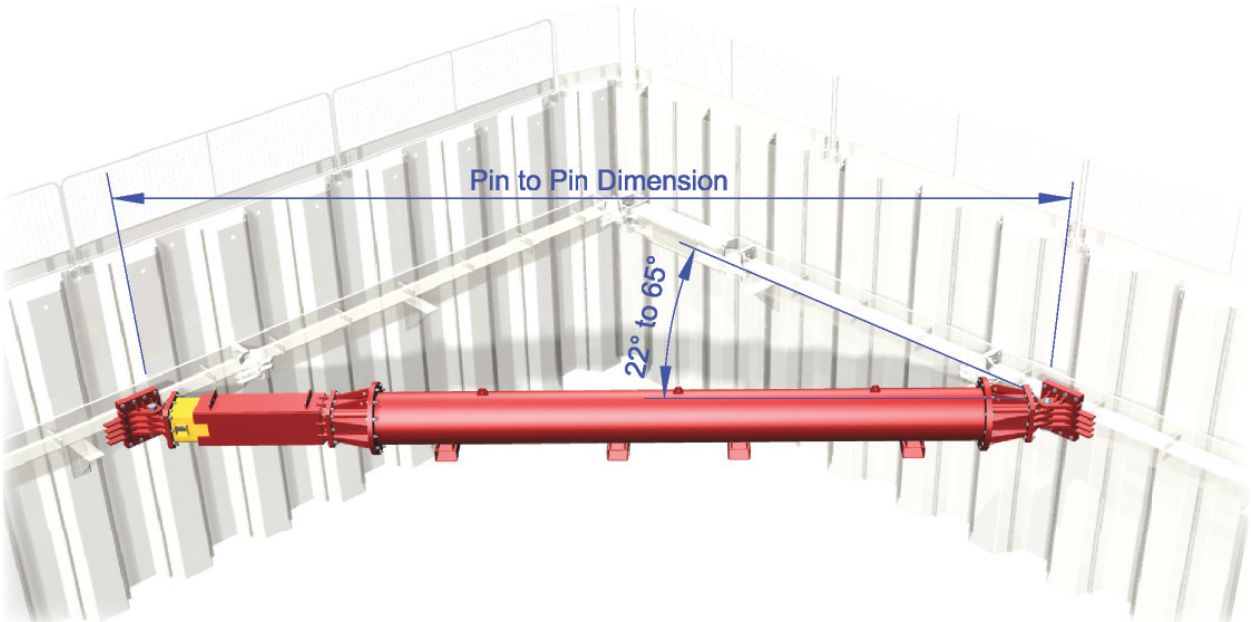




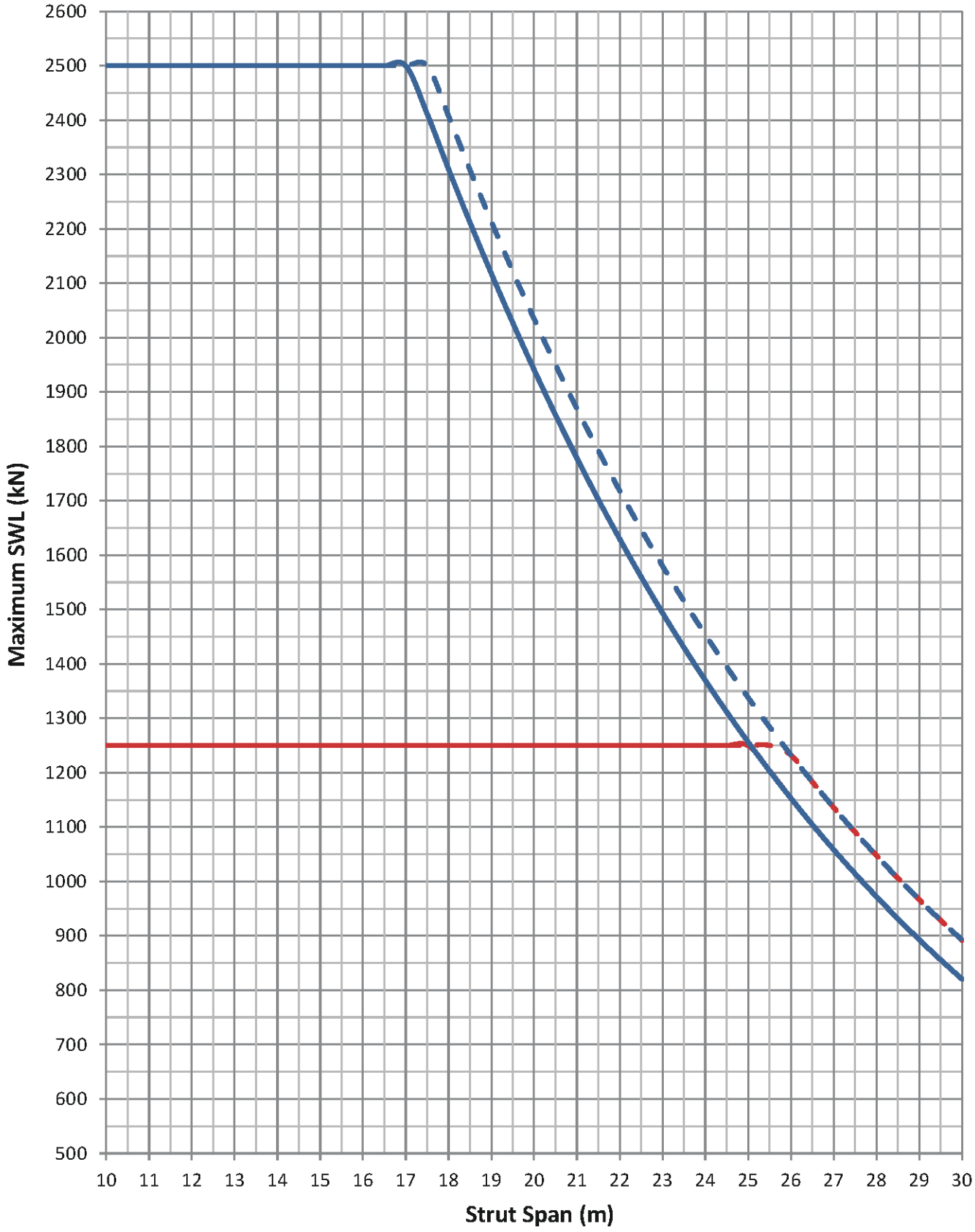
Cleat End Bearing Detail
The end cleat is bolted to the strut or extension/transition using 9 No. grade 8.8 M24 countersunk bolts c/w nuts and washers. The cleat then sits on the UC section. When using this end detail MGF recommend that restraining chains are used to prevent the strut being dislodged if struck accidently.



Swivel End Bearing Detail
Swivels can be anchored directly to concrete or clamped to the UC Brace System using 2 No. swivel clamps as detailed on page 4.5.12.



Safe Working Load for MGF 600 Series (kN)



Curves include allowance for self weight deflection, eccentricity and fabrication tolerances.

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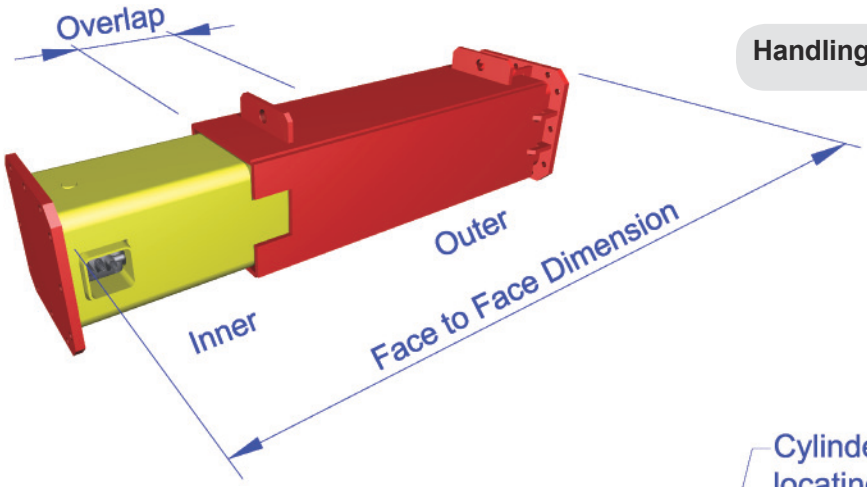
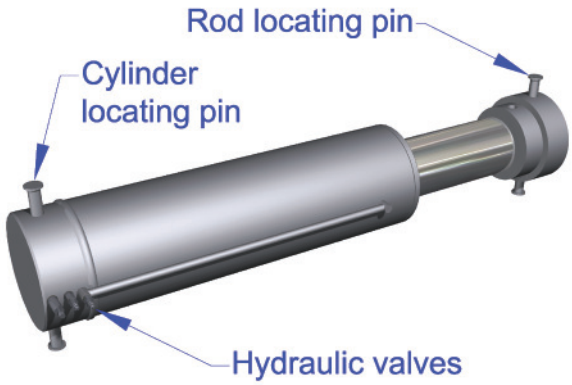
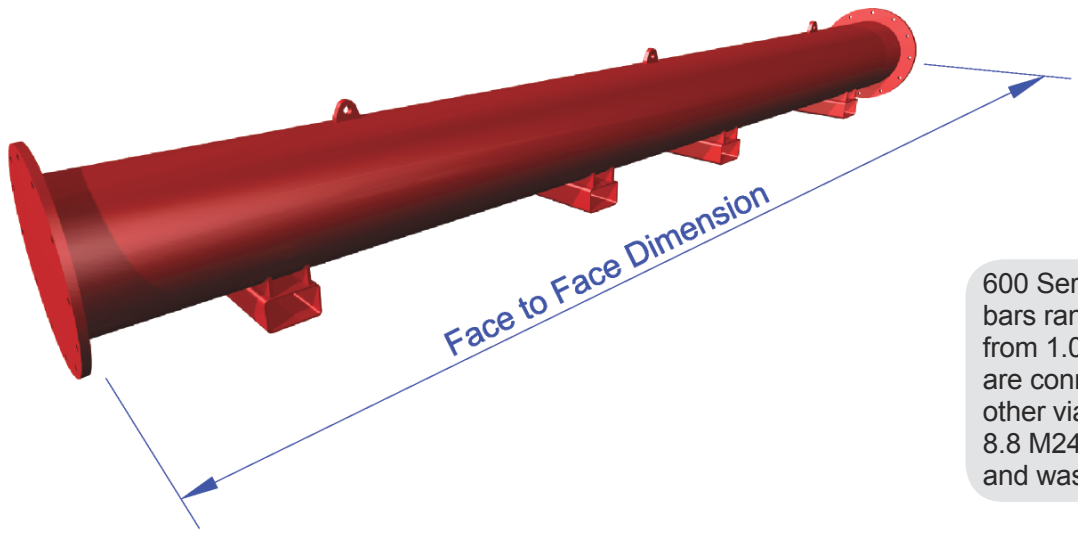


Handling Point WLL = 8t

1250kN and 2500kN hydraulic strut assembly comprises inner and outer sleeved steel box sections housing a double acting (DA) hydraulic ram to provide up to 800mm of leg adjustment.



Product Description	Product ID	Face to Face Dimension (mm)		Weight (kg)
		Min.	Max.	
1250kN Hydraulic Strut	8.400	1476	2276	1047
2500kN Hydraulic Strut	8.500	1685	2485	1716



600 Series extension bars range in length from 1.0m to 11.5m and are connected to each other via 12 No. grade 8.8 M24 bolts c/w nuts and washers.

Product Description	Product ID	Weight (kg)
600 Series 1.0m Extension	9.601	480
600 Series 3.0m Extension	9.603	880
600 Series 4.0m Extension	9.604	1125
600 Series 7.0m Extension	9.607	1680
600 Series 11.5m Extension	9.608	2520

Hydraulic Ram	Inner Section	Outer Section
Specification	350x350x16 SHS (+ 8 No. 100x6 thk. stiffening plates)	400x400x16 SHS
Material Grade	S355	S355
Unit Mass	166kg/m	191kg/m
Axial SWL	1250kN	1250kN
Moment SWL	277kNm	277kNm

Hydraulic Ram	Inner Section	Outer Section
Specification	400x400x16 SHS	450x450x20 SHS
Material Grade	S355	S355
Unit Mass	191kg/m	275kg/m
Axial SWL	2500kN	2500kN
Moment SWL	277kNm	277kNm

Extension Bar	600 Series
Specification	610x12.5 CHS
Material Grade	X70
Unit Mass	184kg/m
Axial SWL	2500kN
Moment SWL	1418kNm

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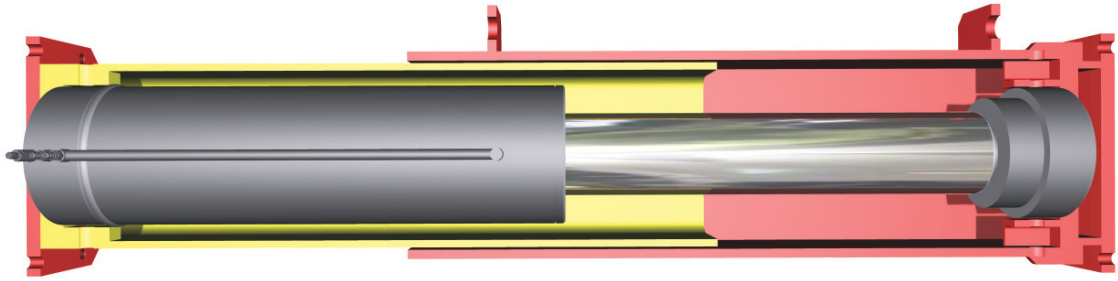
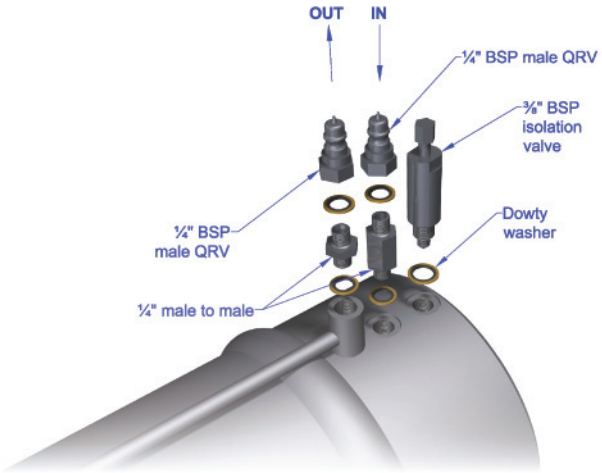
1250kN and 2500kN Double Acting Hydraulic Ram Assembly



Hydraulic Cylinder	1250kN Double Acting	2500kN Double Acting
Material	Steel	Steel
Bore	200mm	250mm
Max .Working Pressure	400 Bar (6000 psi)	500 Bar (7250 psi)
Test Pressure	400 Bar (6000 psi)	500 Bar (7250 psi)
Approx. Working Stroke	800mm	800mm
Axial SWL	1250kN	2500kN
Min. FOS (by test)	2	2
Working Temp Range	-50ºC to +50ºC	-50ºC to +50ºC
Approx. Pre-Load	300kN	500kN
Locating Pins	Φ30	Φ30



Shoring fluid is pumped into the full bore side of the piston through the central male quick release valve (QRV) to extend the ram. At the same time fluid from the return side of the piston is returned to the pump via the outer male QRV. Retraction is a reverse of extension.
Ensure isolation valve is closed to maintain pre-load pressure and before release/connection of QRV's.

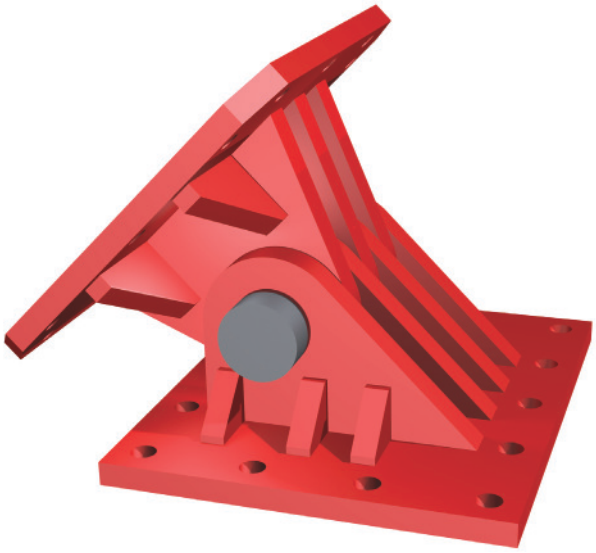
Motorised Pump Units

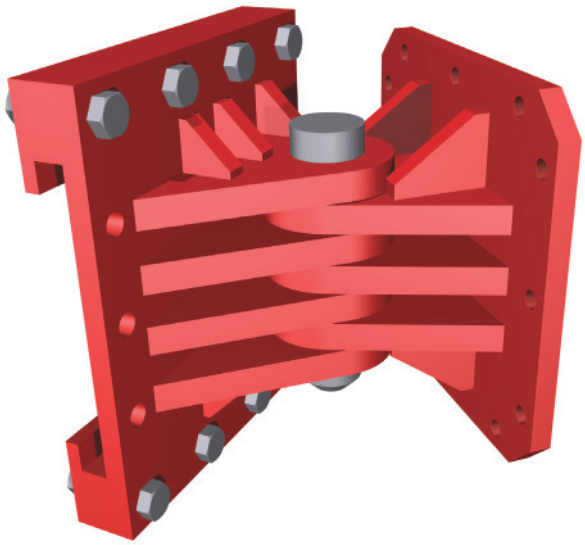
The motorised pumps are used to extend and retract the 600 Series double acting hydraulic rams.
The pumps contain neat bio-degradable Houghto Safe SF25 shoring fluid.
Maximum recommended installation pressure 1500 psi (100 Bar).
MGF supply 2 different types of motorised pump, electric and diesel.

	Electric Pump	Diesel Pump
Rating	110V, 6.5kVA	8kW
Product ID	8.4001 / 8.4003	8.4006
Capacity	120 / 190 litres	100 litres
Shoring Fluid	Houghto Safe SF25B	Houghto Safe SF25B
Installation Pressure	0-1500 psi	0-1500 psi

2500kN Type A Swivel Assembly

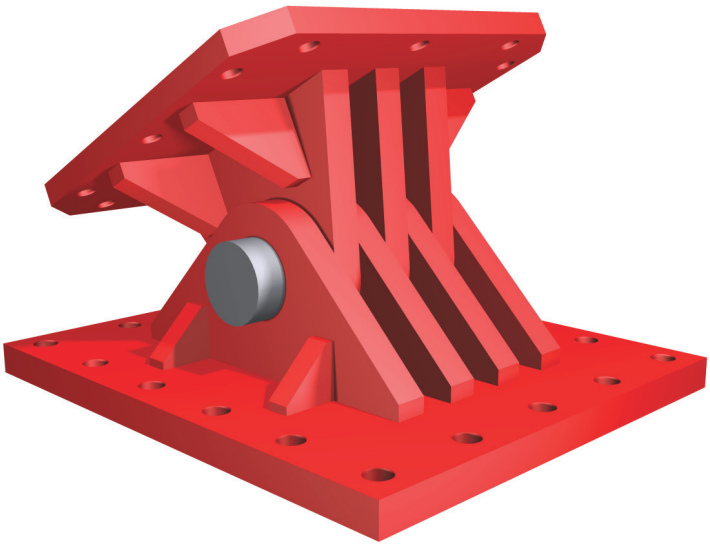
These swivels can be connected directly to concrete structures or the 406 UC Brace Systems by bolting on the associated clamp assemblies detailed on page 4.4.12.

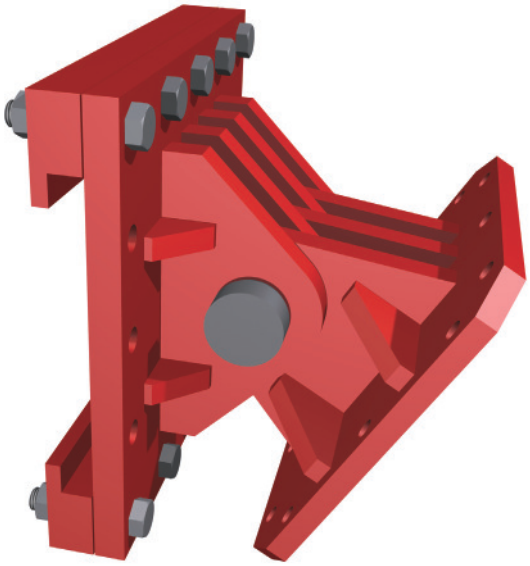




400 Series Swivel	Type A	Type B
Product ID	9.704	9.310
Weight	264kg	320kg
Knee Brace/Cross Strut Operating Range	22°- 65°	65°- 90°
Axial SWL	2500kN	2500kN
Swivel Base Plate	500 x 600 x 30mm thk. (S355)	600 x 600 x 30mm thk. (S355)
Base Plate Hole Details	14 No. Φ32 holes	16 No. Φ32 holes
Pin Detail	Φ90 (817M40/EN24T)	Φ90 (817M40/EN24T)

2500kN Type B Swivel Assembly





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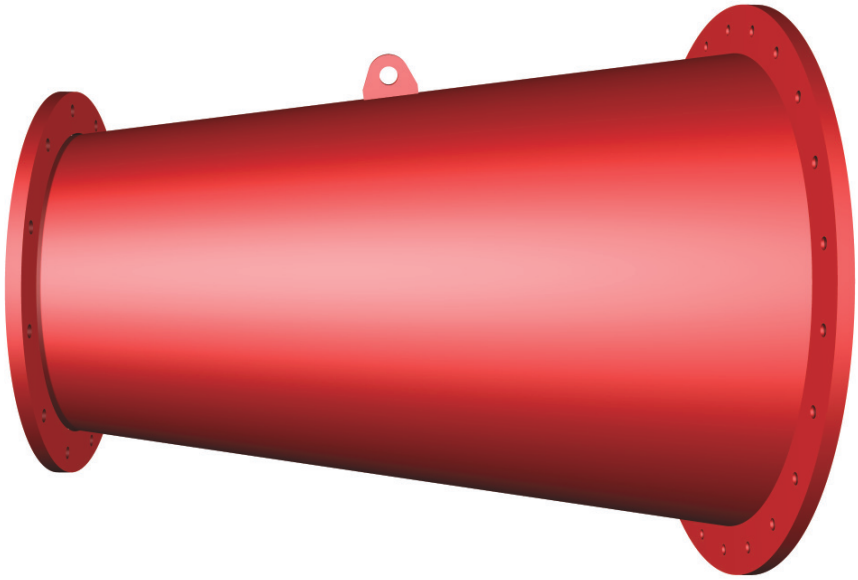
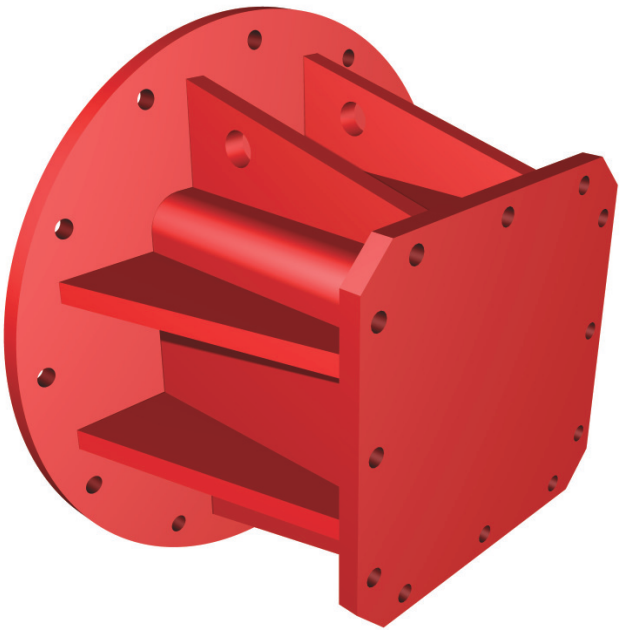
600 Series Adaptors

1000/600 Series Transition

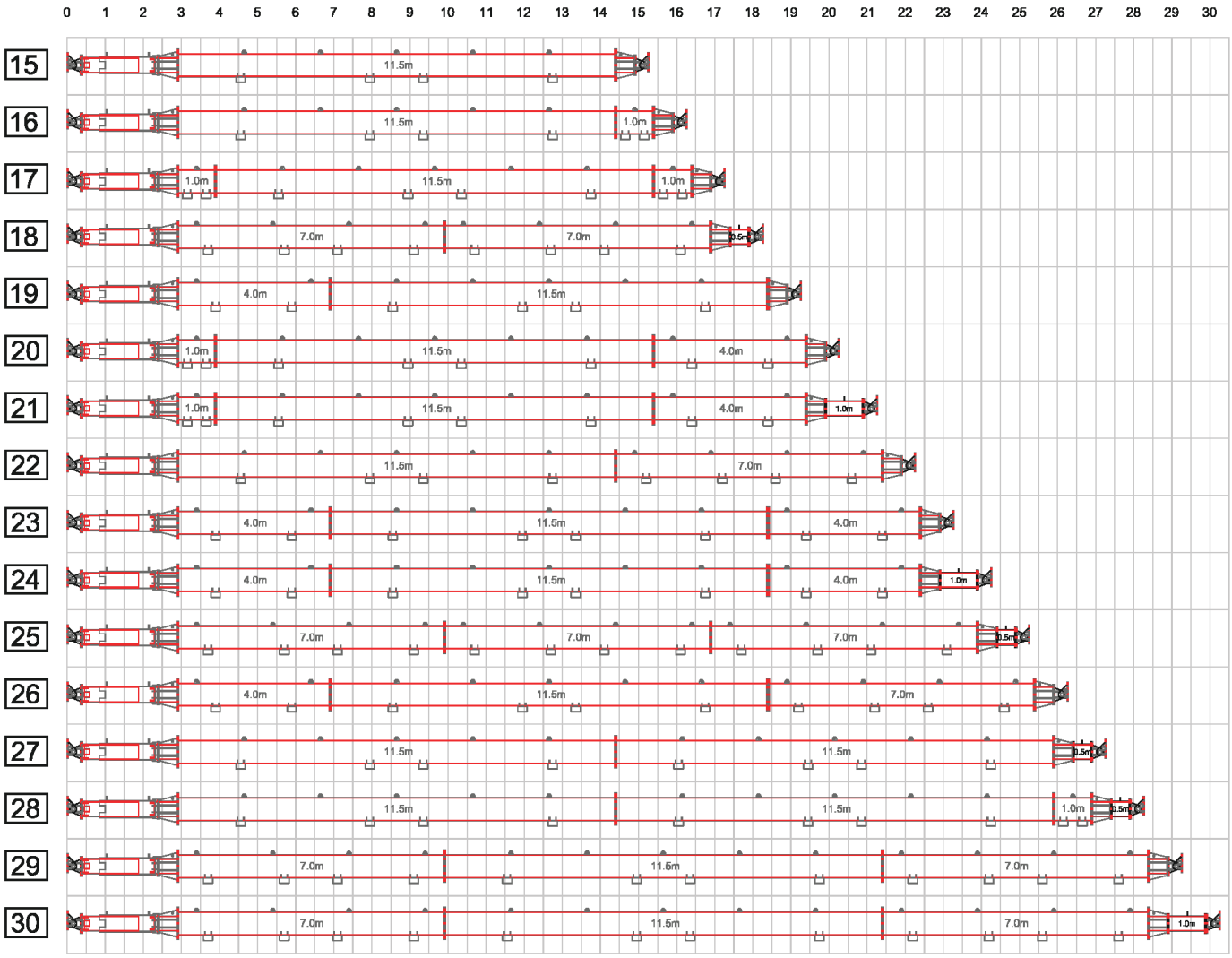


Transition	1000/600	600/400
Product ID	9.800	9.604
Weight	475kg	352kg
Material	14.6 thk. tube, X65	400x400x16 SHS, S355
Bolting Details	12/24 No. grade 8.8 M24 bolts c/w nuts and washers	12 No. grade 8.8 M24 bolts c/w nuts and washers
Strut Adaptor SWL	2500kN	2500kN
Axial SWL	2500kN	2500kN
Moment SWL	1125kNm	396kNm
Joint Moment SWL	396/1125 kNm	277/396 kNm

600/400 Series Transition



600 Series Recommended Extension Combinations



N.B *Single 0.5m 400 Series extensions should be added to these combinations for intermediate dimensions.*
The strut assemblies are shown at mid-stroke, so each length can vary by up to 400mm in either direction.
Individual 7m pieces can be exchanged for a 3m and 4m.
Additional compatible extensions are available (660 diameter / 1000 Series). Contact MGF Design department for details.

The above strut combinations use the 600 Series Extensions (610 tube).

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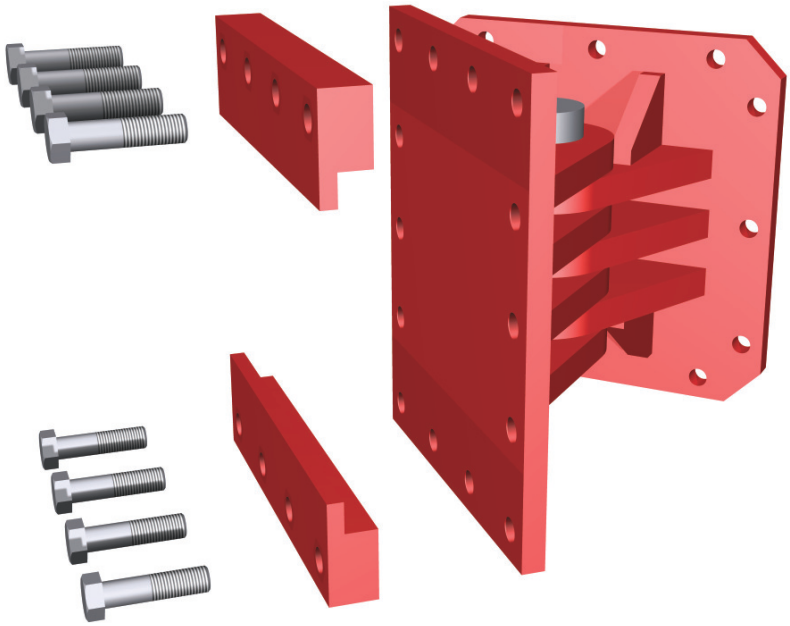
Face to Face Dimension (m)	2500kN Hydraulic		
	Min. Length (mm)	Max. Length (mm)	Leg Weight (kg)
15	14875	15675	5580
16	15875	16675	6060
17	16875	17675	6540
18	17875	18675	6634
19	18875	19675	6705
20	19875	20675	7185
21	20875	21675	7495
22	21875	22675	7260
23	22875	23675	7830
24	23875	24675	8140
25	24875	25675	8314
26	25875	26675	8385
27	26875	27675	8314
28	27875	28675	8794
29	28875	29675	8940
30	29875	30675	9250

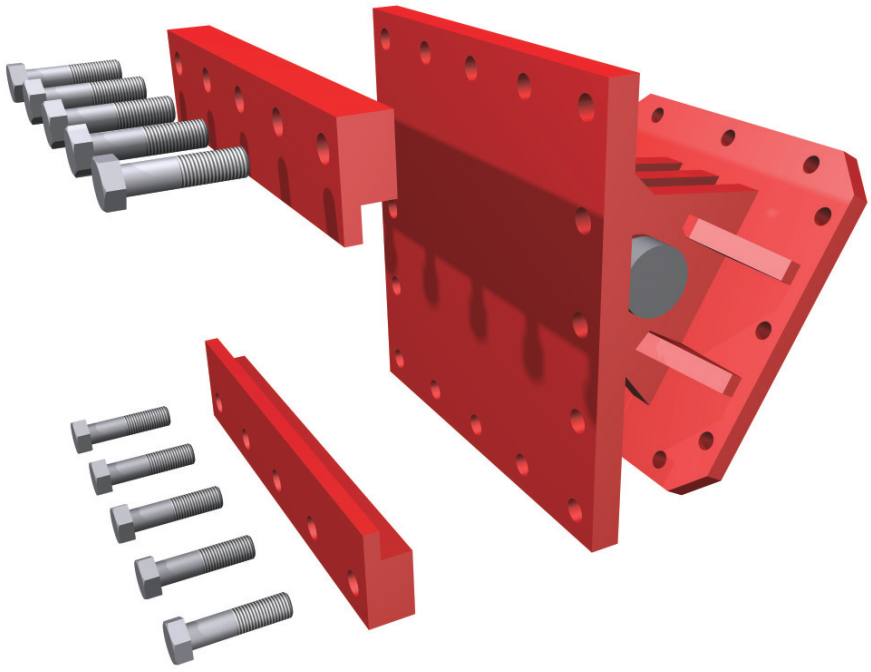
2500kN Swivel Clamping Plates Type A



Swivel Clamp Type A is to be used on 2500kN Swivel Type A, when used on a knee brace connected to 305 UC/406 UC.

Product ID	9.317A	9.317B
Weight	46kg	54kg
Material	30mm & 40mm thk. flat, 500 long, S275	30mm & 40mm flat, 600 long, S275
Bolting Details	8 No. grade 8.8 M30 bolts c/w nuts and washers	10 No. grade 8.8 M30 bolts c/w nuts and washers
Bearing SWL	2500kN	2500kN

2500kN Swivel Clamping Plates Type B



Swivel Clamp Type B is to be used on 2500kN Swivel Type B, when used as a cross strut connected to 305 UC/406 UC.

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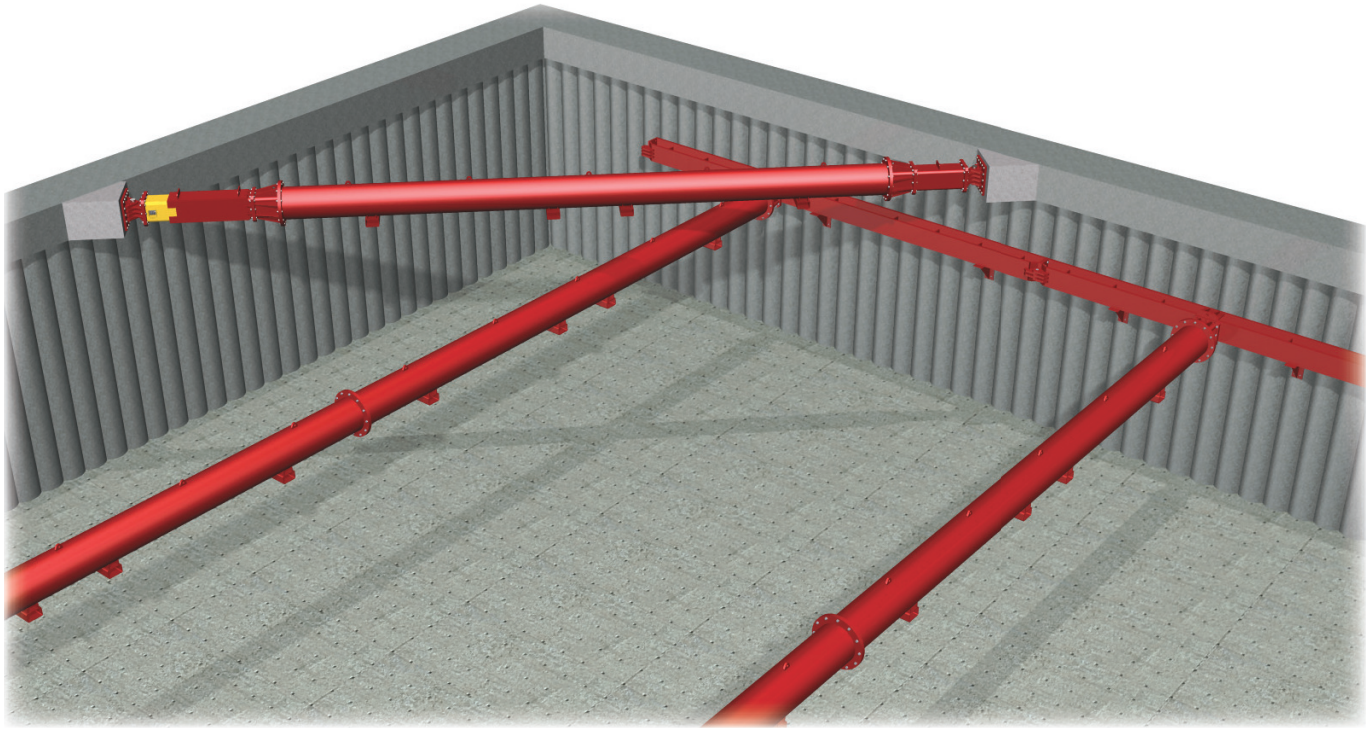
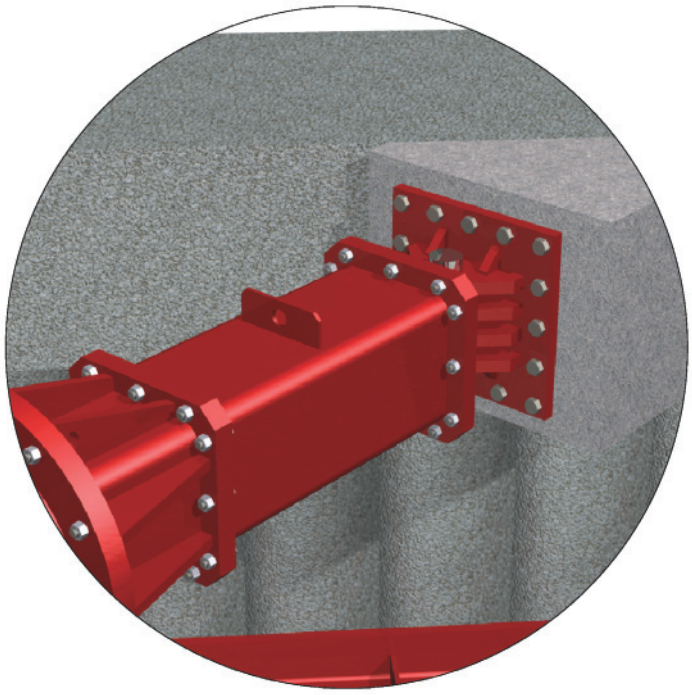


Typical Basement Wall Application



Typical bearing detail on RC corbel.