

SIMPLE TO ASSEMBLE, HIGHLY VERSATILE, MODULAR HYDRAULIC BRACING SYSTEM COMPRISING INTERCHANGEABLE HYDRAULIC RAM ASSEMBLIES AND VARIOUS LENGTH WALER EXTENSION BARS. DESIGNED TO BE USED WITH STEEL TRENCH SHEETS OR SHEET PILES TO BRACE MEDIUM TO LARGE SIZED COFFERDAMS (IN A WIDE VARIETY OF SHAPES) AND LARGER TRENCHES FOR THE SAFE INSTALLATION OF LARGE UNDERGROUND STRUCTURES, DEEPER DRIVE / THRUST PITS OR BASEMENTS.

Extension bars can additionally be used without the ram assemblies as waler rails for trenches or cantilevered walls. The 254 UC system is ideally suited for cofferdam sizes ranging from 2.6m to 13.6m and is normally assembled and installed within the excavation using either excavators or cranes. Any size of excavation can be braced using this system in conjunction with intermediate bracing struts. Fully compatible with the MGF 200 and 300 Series Bracing Strut systems.

Fabricated from grade S460 UC steel sections the extensions are quickly assembled into brace legs using simple pin and retaining clip / bolt and nut assemblies. Each leg contains a double acting hydraulic ram assembly providing 1000mm of stroke and the legs are joined together at corners to form frames via a simple pin and retaining clip assembly. Connecting the rams (via hydraulic hoses) to an MGF hydraulic pump unit containing hydraulic shoring fluid allows the leg lengths to be quickly and easily adjusted to suit the excavation dimensions. Once the frames are fully assembled and located at the correct line and level, the rams are pre-loaded against the trench sheets using the hydraulic pump. Pre-loading of the legs ensures the frame cannot slip and minimises the extent of potential ground movements. Self sealing quick release valves and mechanical isolation valves ensure that the ram pressure cannot be accidentally released once installed. Handling and restraining points are provided on each leg to assist assembly / removal and to allow the brace / waler to be supported off MGF restraining chains attached to the trench sheets by hooks.

MGF can supply the systems with a full range of suitable handling and restraining chains, Edgesafe edge protection panels, Laddersafe access platforms and GRP or wooden pole ladders, Davitsafe retrieval / fall arrest systems, 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. Hydraulic brace is very 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. When assembling on site ensure that all pins and retaining clips are in place and secured and all bolts are installed and fully tightened with a minimum two threads visible beyond the nut.
2. Installation is normally carried out by lowering either the assembled frame or individual legs (dependant upon lifting capacity of excavator / crane) to the correct installation level and once the frame is fully assembled pre-loading each leg in turn to ensure that the frame is pressed firmly against the trench sheets and cannot slip. Max pre-load pressure of 100Bar (1500psi) must not be exceeded.
3. Restraining chains are hung off the trench sheets and attached to the legs to assist assembly / removal of the frame and ensure vertical support is provided at all times. All the supplied restraining chains should be installed (min. 2 per leg) and adjusted to ensure an even vertical load distribution. Restraining chains should never be used for lifting nor solely relied upon to suspend loads above personnel.
4. Ensure all hydraulic ram isolation valves are closed and all corner pins in place and secured using the retaining clips provided prior to commencing works.
5. Individual brace legs should be visually inspected for damage, excessive deflection or loss of ram pressure prior to entering the excavation.
6. Legs should always be installed square and plumb to the excavation walls ensuring contact with all the inward facing trench sheet pans. If this is not possible any gaps must be securely packed by using hardwood wedges prior to final pre-loading of the hydraulic rams.
7. Safe access / egress, edge protection (for personnel) and barrier protection (for plant) should always be considered.
8. Prior to removal of systems all hydraulic rams must be released and retracted to avoid the need for excessive extraction forces and to avoid damaging corner joints.
9. No matter how much care is taken during the installation and removal of hydraulic bracing systems some ground movement will occur in the areas immediately surrounding the excavation. Great care must be taken when specifying these systems for use adjacent to existing structures and services.

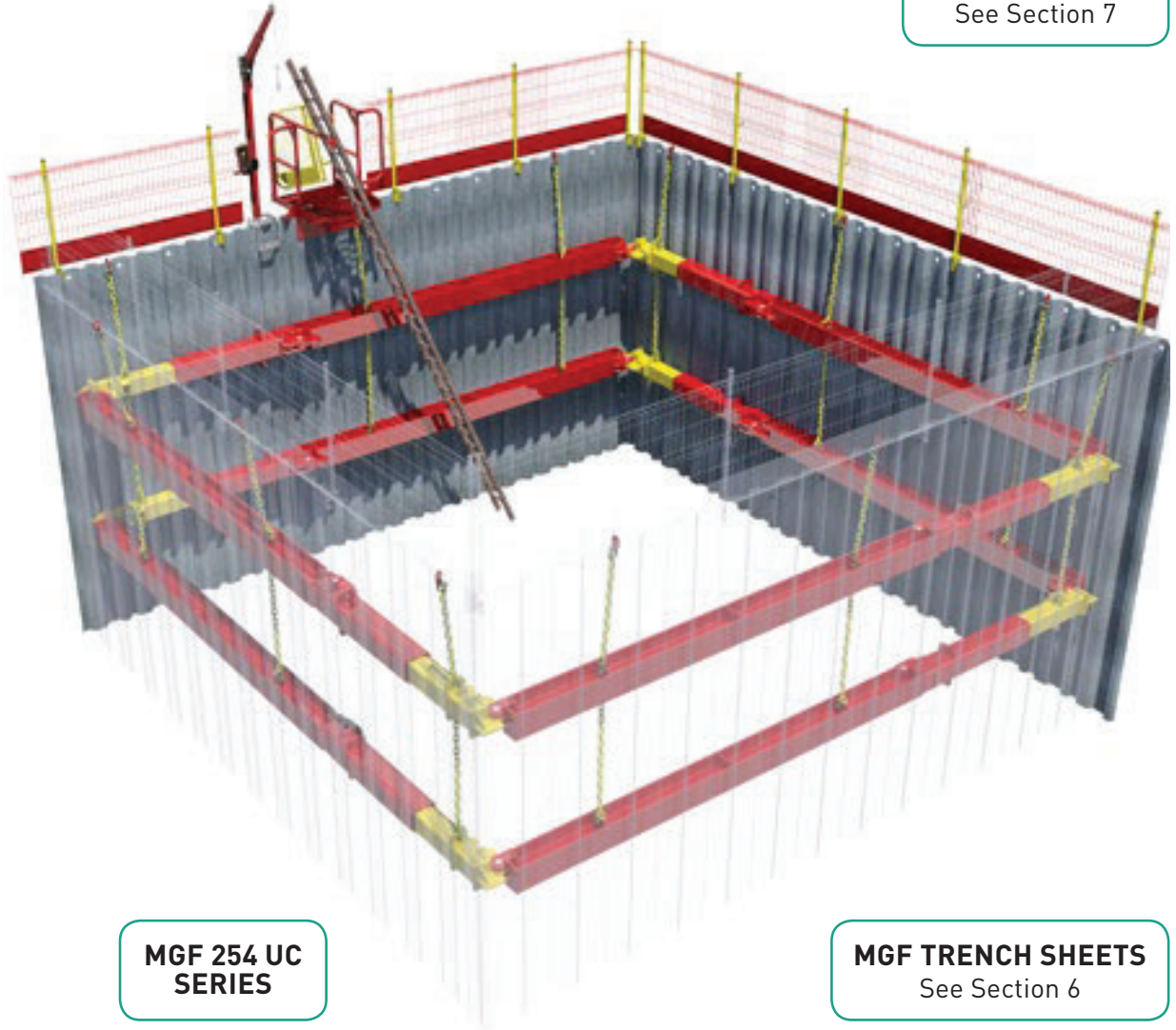


MGF POLE LADDER

MGF LADDERSAFE
See Section 7

MGF DAVITSAFE
See Section 7

MGF EDGESAFE
See Section 7

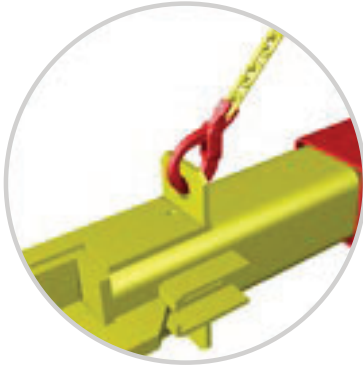


**MGF 254 UC
SERIES**

MGF TRENCH SHEETS
See Section 6

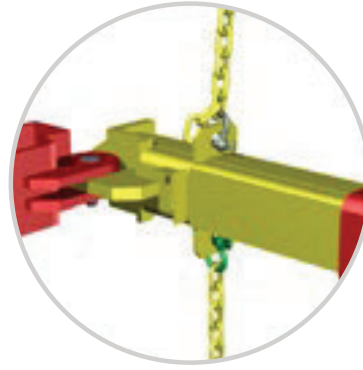
**FOR SAFE SYSTEM OF WORKS
GUIDANCE FOR MGF 254 UC BRACE:**

mgf.ltd.uk/installation-guidance



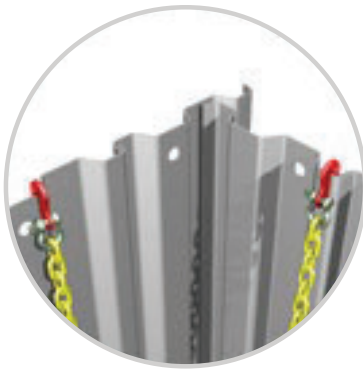
**HANDLING POINT
WLL = 6.0T**

Brace legs and frames are lifted and handled by attaching MGF lifting chains to the handling / restraining points as shown.



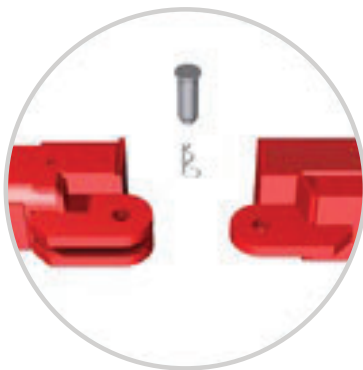
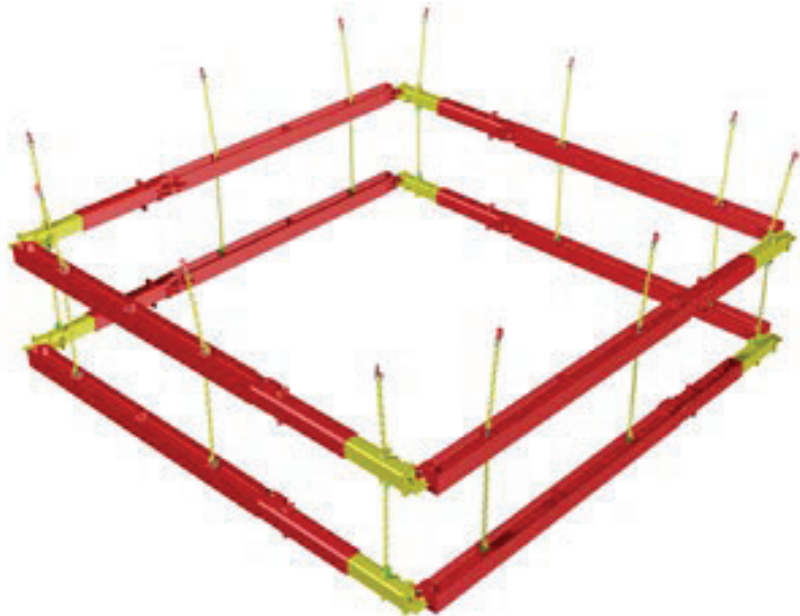
**STANDARD DUTY RESTRAINING CHAIN
CONNECTION DETAIL**

There are 2 types of chains used, the top frame will use shackle to hook type, while lower frames will use shackle to shackle type. Individual chain links selected to ensure all restraining chains are evenly loaded.



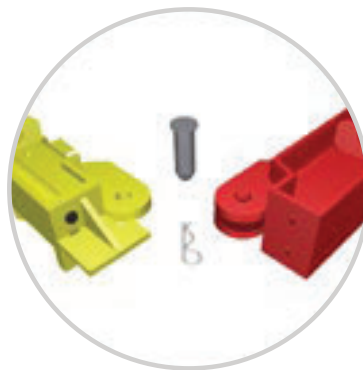
**STANDARD DUTY
CHAIN TO SHEET
CONNECTION DETAIL**

The hook fits over the sheet.



LEG CONNECTION DETAIL

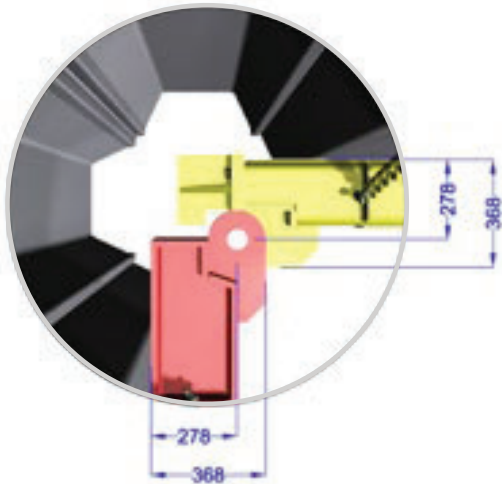
Brace legs are connected to each other using a 254 UC connection pin and r-clip detail and 2 No. grade 8.8 M24 bolts c/w nuts and washers.



CORNER CONNECTION DETAIL

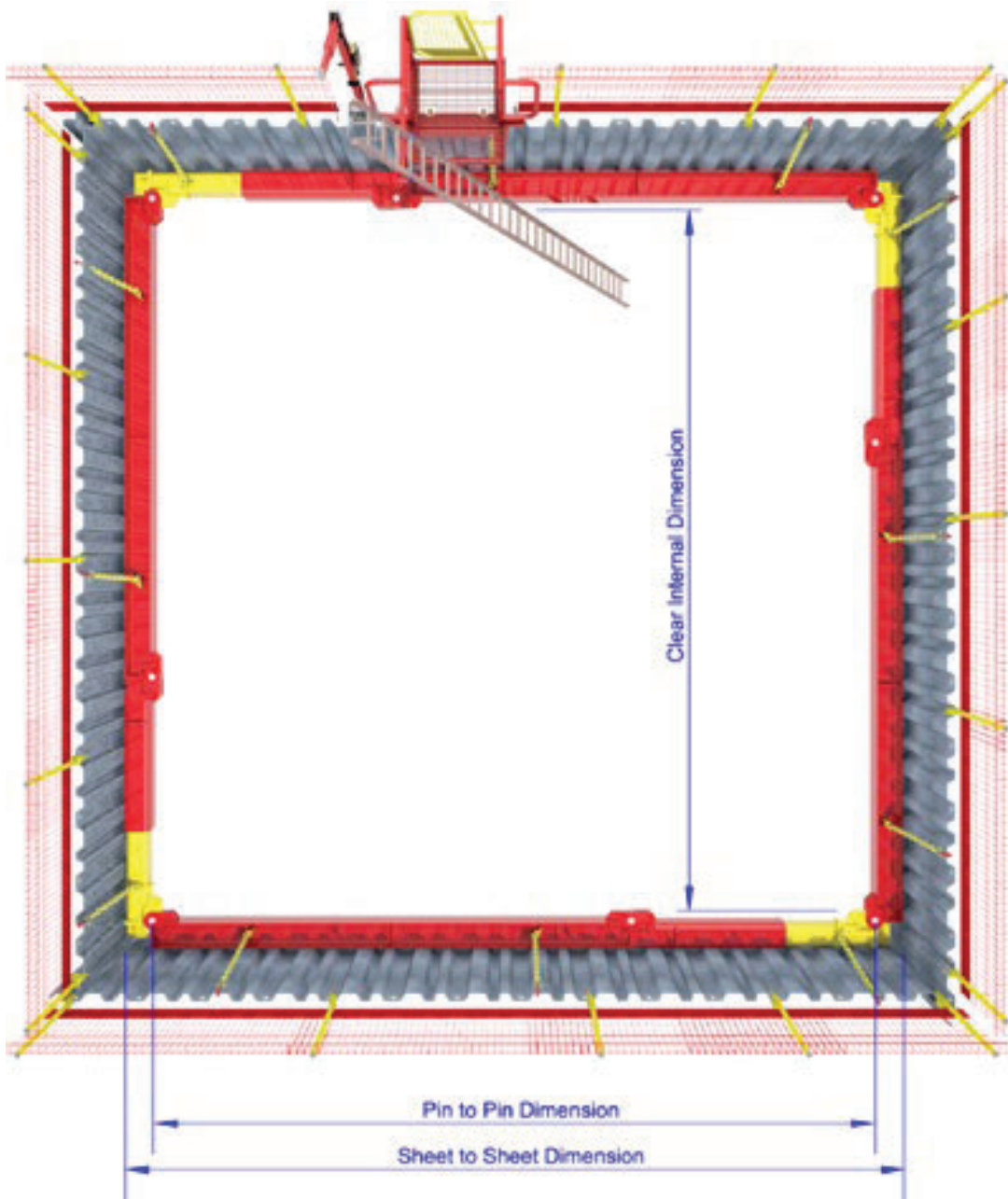
Leg corners are connected to each other using the 254 UC connection pin and r-clip detail. To fill corner void a corner bracket is attached to ram assembly.

254 UC CONNECTION DETAILS

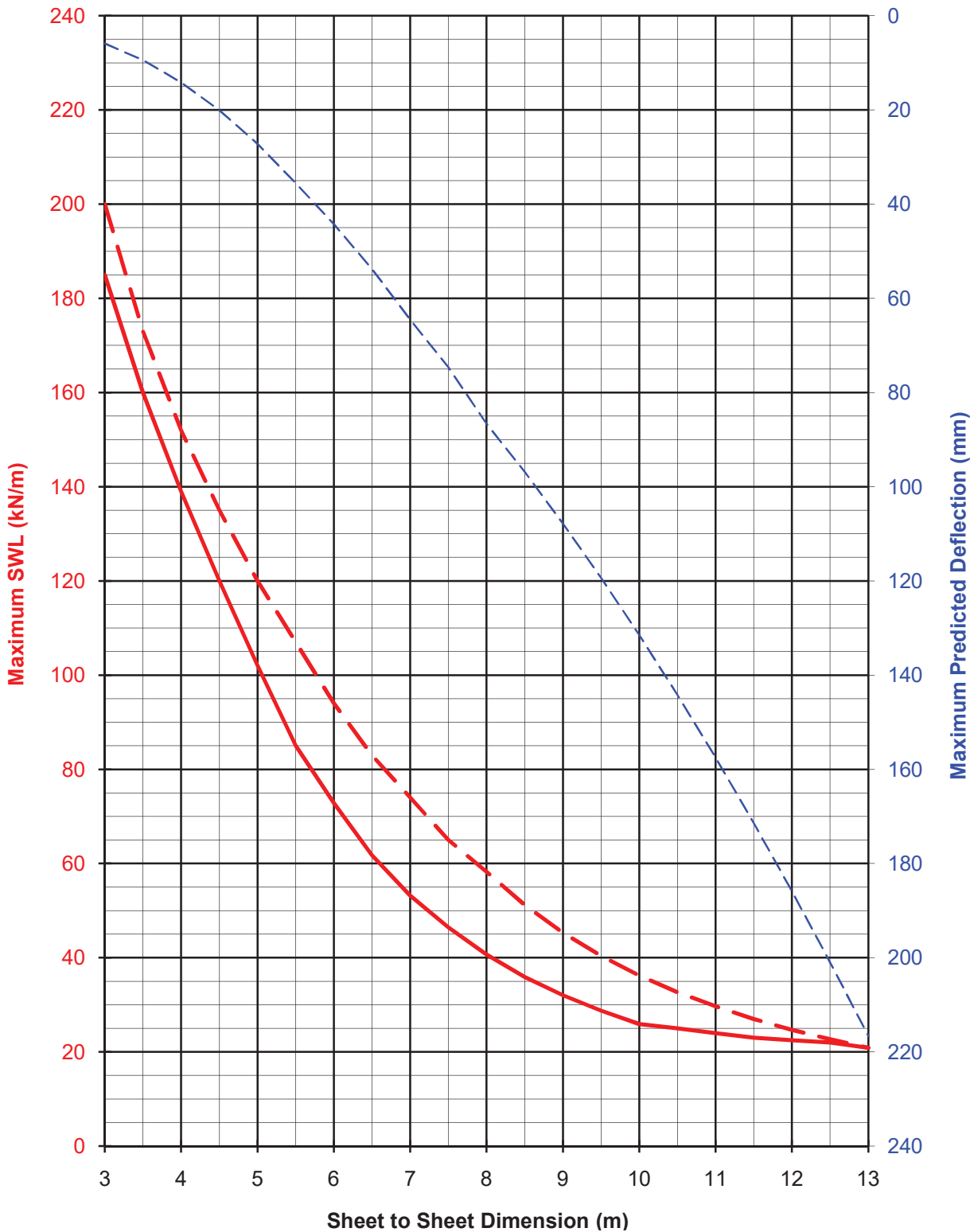


Legs are normally installed at 90° to each other. However, subject to confirmation by a competent design Engineer, angles of between 75° and 135° can be achieved (>90° corner bracket requires removing).

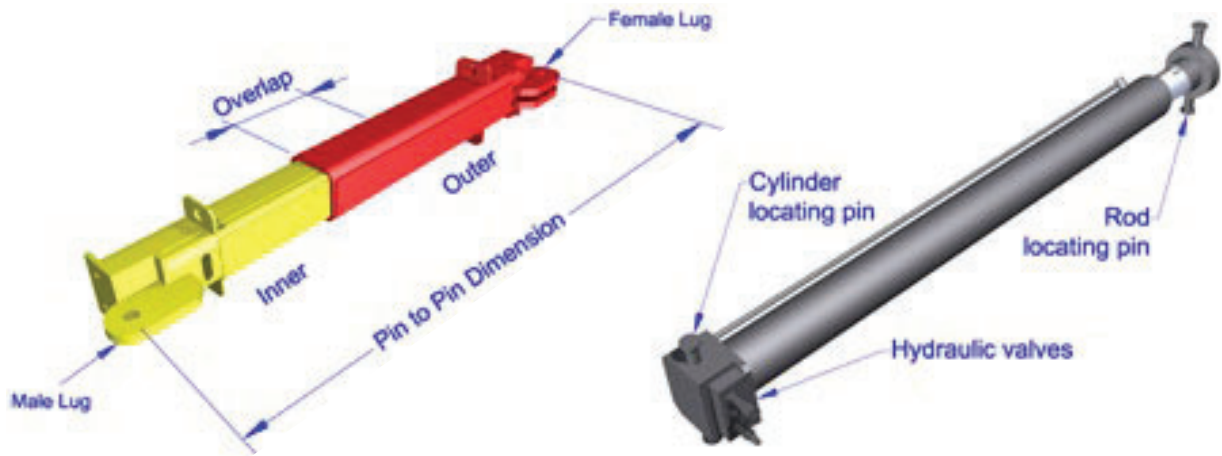
Corners should always be packed out using hardwood wedges against the sheets prior to final pre-load to ensure even load distribution and avoid introducing excessive bending in the brace legs (especially ram assembly).



SAFE WORKING LOAD FOR MGF 254 UC (kN/m)

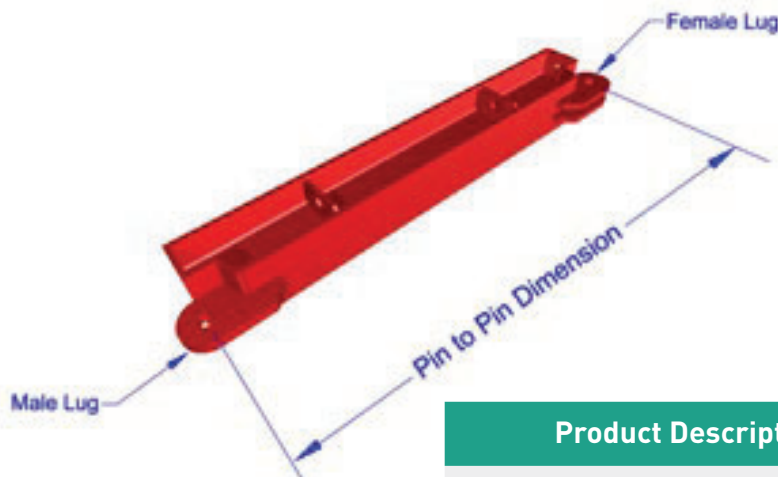


- Recommended SWL
- - - Max SWL available subject to MGF Design Services checks



254 UC hydraulic ram assembly comprises inner and outer sleeved steel box sections housing a double acting (DA) hydraulic ram to provide up to 1005mm of leg adjustment.

Ram Assembly	Product ID	Pin to Pin Dimension		Weight
		Min.	Max.	
		(mm)	(mm)	(kg)
300kN 254 UC Ram	8.202	2012	3017	508



254 UC extension bars range in length from 0.6m to 10.0m and are connected to each other via a 2:1 female / male lug using a $\Phi 50$ mm pin and 2 No. grade 8.8 M24 bolts c/w nuts and washers.

		Product Description	Weight
			(kg)
Product ID	8.206	254 UC 0.6m Extension	123
	8.210	254 UC 1.0m Extension	176
	8.220	254 UC 2.0m Extension	290
	8.230	254 UC 3.0m Extension	403
	8.240	254 UC 4.0m Extension	510
	8.250	254 UC 5.0m Extension	617
	8.260	254 UC 6.0m Extension	731
	8.270	254 UC 7.0m Extension	838
	8.280	254 UC 8.0m Extension	951
	8.290	254 UC 9.0m Extension	1058
8.299	254 UC 10.0m Extension	1171	

300kN DOUBLE ACTING HYDRAULIC CYLINDER



		Double Acting
Hydraulic Cylinder	Material	Steel
	Bore	100mm
	Max. Working Pressure	380 Bar (5500 psi)
	Test Pressure	380 Bar (5500 psi)
	Approx. Working Stroke	1000mm
	Axial SWL	300kN
	Min. FOS (by test)	2
	Working Temp Range	-20°C* to +50°C
	Approx. Pre-Load	75kN
	Approx. Pre-Load Pressure	100 Bar (1500 psi)
Locating Pins	Φ18 and Φ22mm	



* Winter mix required for shoring fluid at low temps.

Shoring fluid is pumped into the full bore side of the piston through the 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 female QRV. Retraction is a reverse of extension. Ensure isolation valve is closed to maintain pre-load pressure and before release / connection of QRVs.

PUMP UNITS

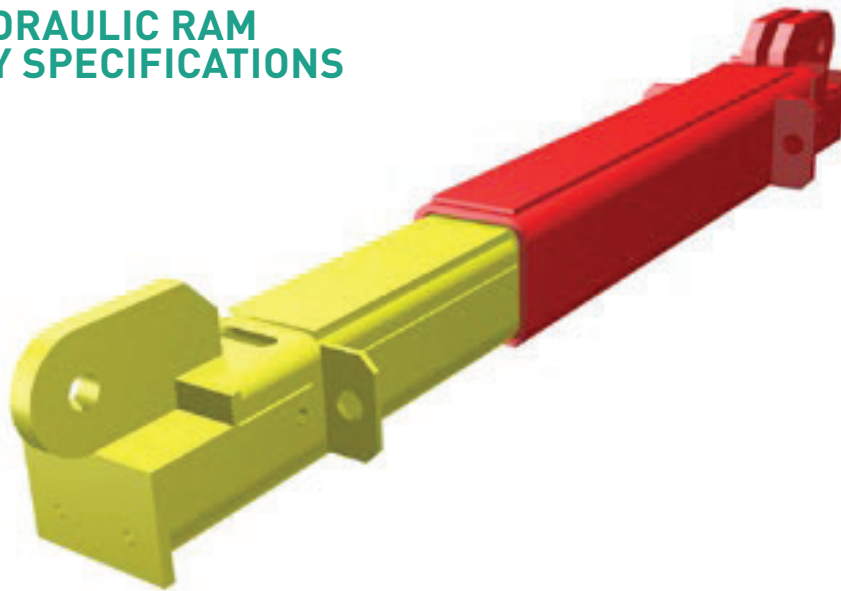


The pumps are used to extend and retract the 254 UC double acting hydraulic rams. The pumps contain bio-degradable Houghto Safe SF25 shoring fluid. During the Summer months the shoring fluid is diluted with water at a ratio of 3 parts water to 1 part Houghto Safe SF25. In the Winter the mix ratio is 1:1. Maximum recommended installation pressure 1500 psi (100 Bar). There are 2 types of pumps available, a manually operated bucket pump and a motorised petrol pump.



		Bucket Pump	Petrol Motorised Pump
Component	Product ID	1.603 (DA)	8.4007
	Fluid Capacity (L)	20	70
	Shoring Fluid	Houghto Safe SF25	Houghto Safe SF25
	Working Pressure (psi)	0-1500	0-1500

300kN HYDRAULIC RAM ASSEMBLY SPECIFICATIONS



		Inner Section	Outer Section
Hydraulic Ram	Specification	200x200x12.5 SHS (+ 2 No. 180x6 thk. stiffening plates)	250x250x16 SHS (+ 2 No. 220x10 thk. stiffening plates)
	Material Grade	S355	S355
	Unit Mass	72.3kg/m	115.0kg/m
	Axial SWL	300kN	300kN
	Moment SWL	203kNm	406kNm

254 UC EXTENSION BAR SPECIFICATIONS



Extension Bar	Specification	254x254x107UC
	Material Grade	S460
	Unit Mass	107kg/m
	Axial SWL	300kN
	Moment SWL	406kNm
	Joint Moment SWL	320kNm

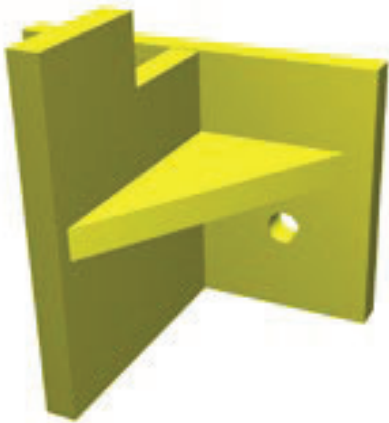


254 UC ANCILLARIES



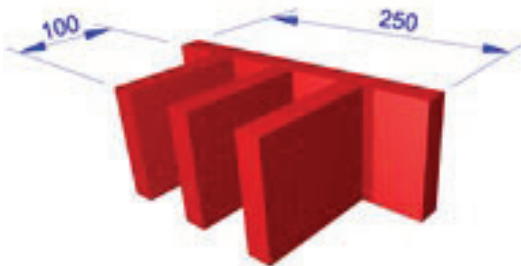
254 UC WALER CONNECTION PIN

Component	Pin	Ø50mm bar, 150mm long
	Material Grade	708M40 (EN19A)
	Shear SWL	600kN
	Weight	3kg



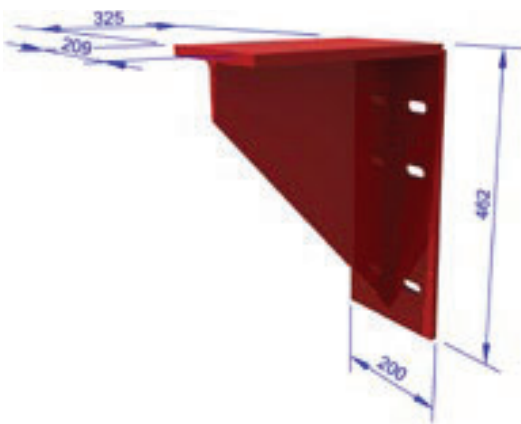
254 UC WALER SYSTEM CORNER BRACKET

Component	Weight	16kg
	Material	S275
	Bolting Details	2 No. grade 8.8 M20 set screws



254 UC SHEAR STOP

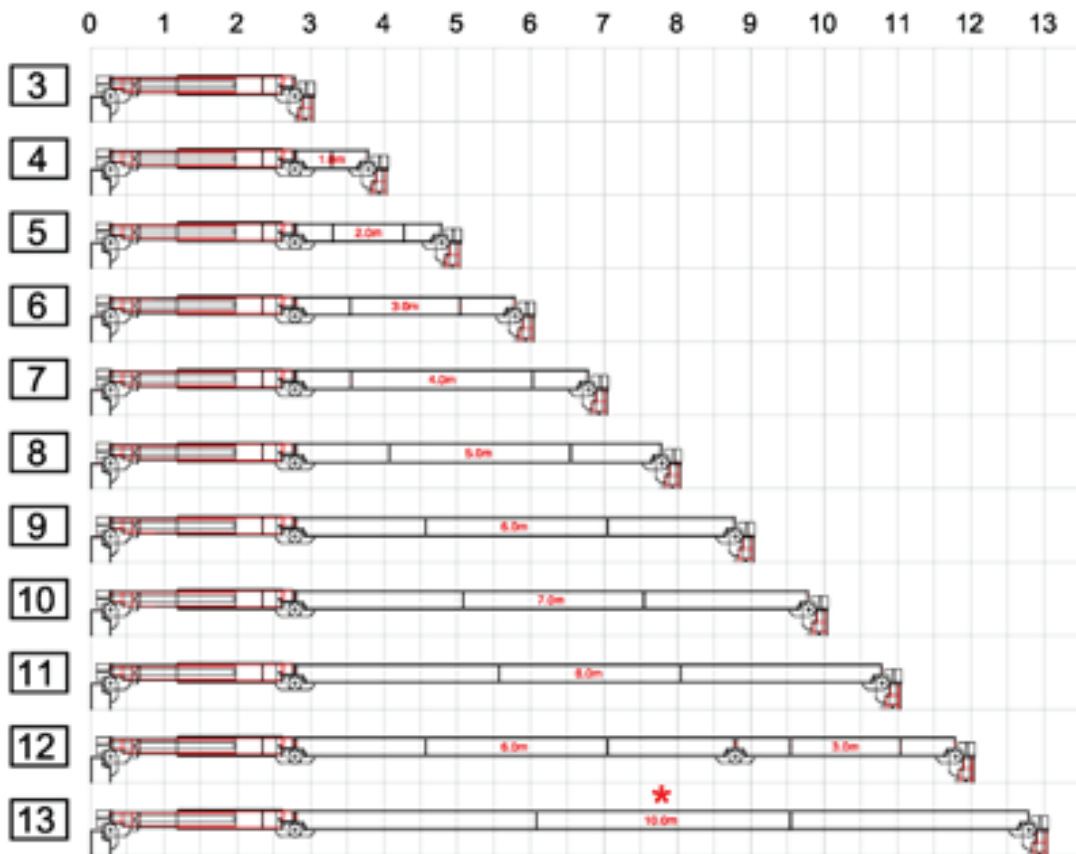
Component	Weight	10kg
	Material	90x20 flat, S275
	Weld Details	10mm single run fillet weld. No weld on bearing face
	Shear SWL	600kN



254 UC STEEL SUPPORT BRACKET

Component	Product ID	8.3003
	Weight	23kg
	Material	533x210x92 UB, S355
	Weld Details	8mm single run fillet weld. No weld on bearing face
	SWL	30kN
	Hole Details	6 No. Ø18 holes min. 100mm c/c

254 UC RECOMMENDED BRACE EXTENSION COMBINATIONS



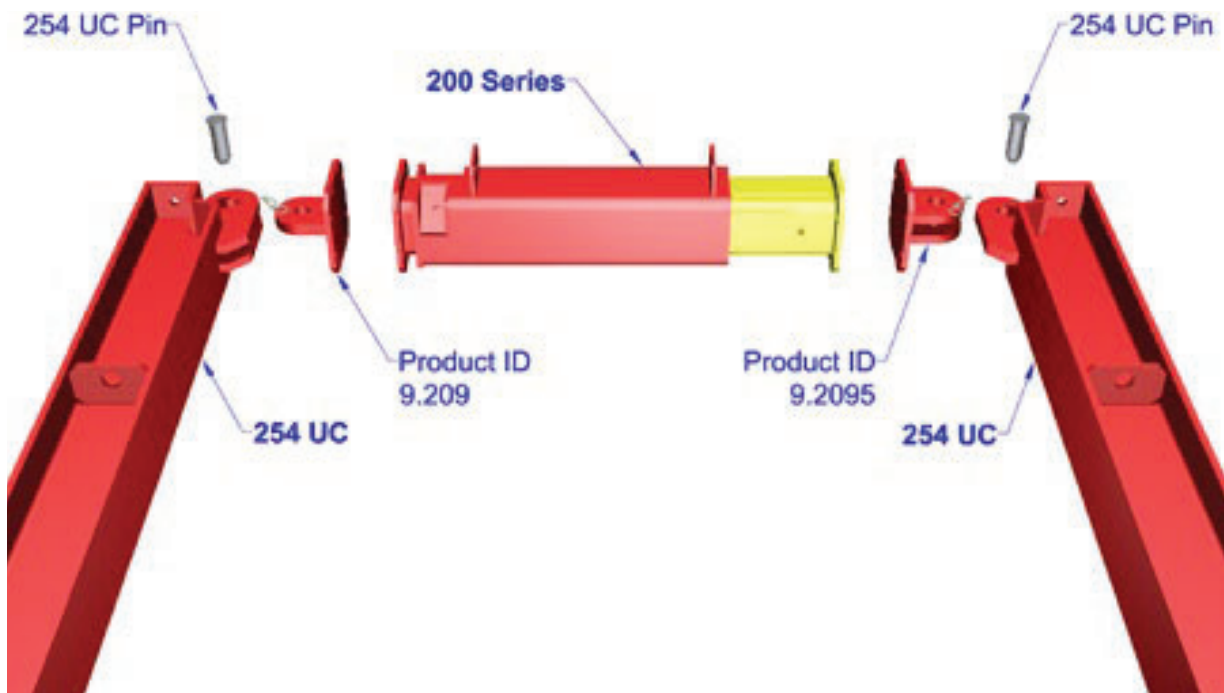
N.B. Single 0.6m extensions should be added to these combinations for intermediate dimensions. The ram assemblies are shown at mid-stroke, so each length can vary by 500mm in either direction.

** 10.0m 254 UC extension can be replaced with 9.0m and 1.0m 254 UC extensions.*

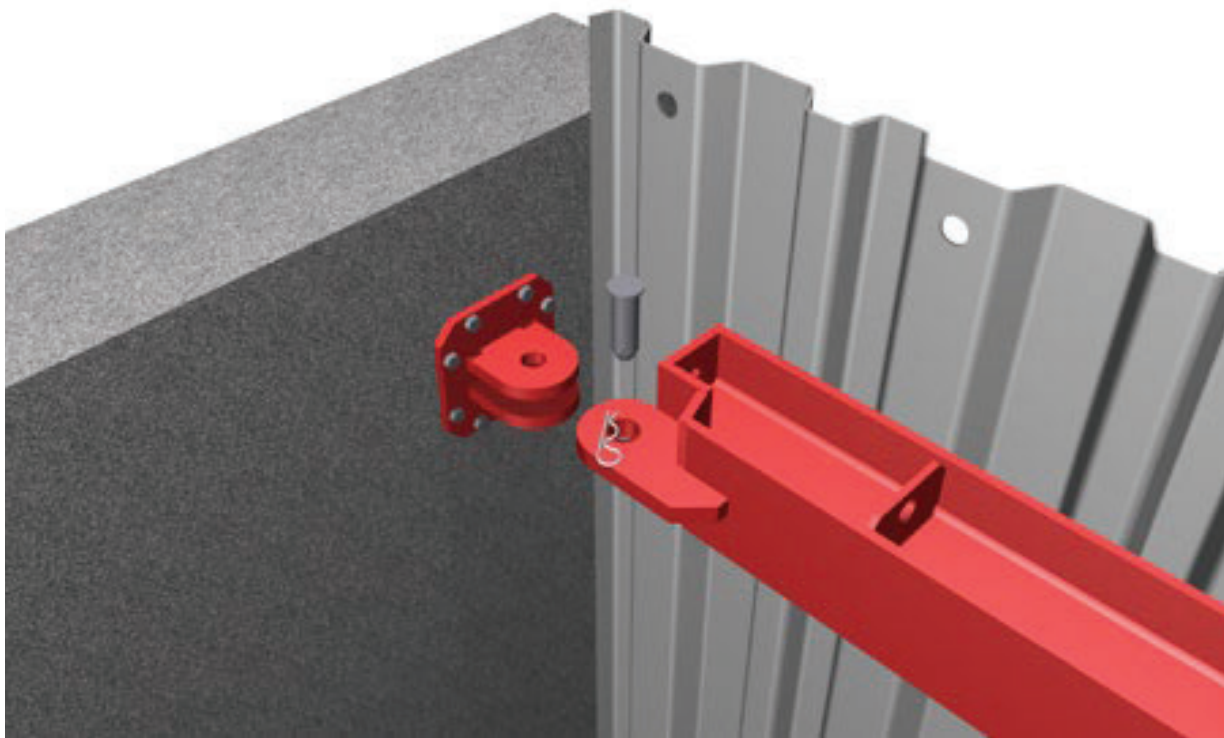
Sheet to Sheet Dimension	Min. Length	Max. Length	Leg Weight
(m)	(mm)	(mm)	(kg)
3	2569	3573	508
4	3569	4573	684
5	4569	5573	798
6	5569	6573	911
7	6569	7573	1018
8	7569	8573	1125
9	8569	9573	1239
10	9569	10573	1346
11	10569	11573	1459
12	11569	12573	1642
13	12569	13573	1679-1742



254 UC 200 SERIES STRUT ADAPTORS



254 UC extension can be utilised with 200 Series Struts to support trenches between 1400mm and 5000mm wide. Adaptor uses 8 No. grade 8.8 M20 bolts c/w nuts and washers.

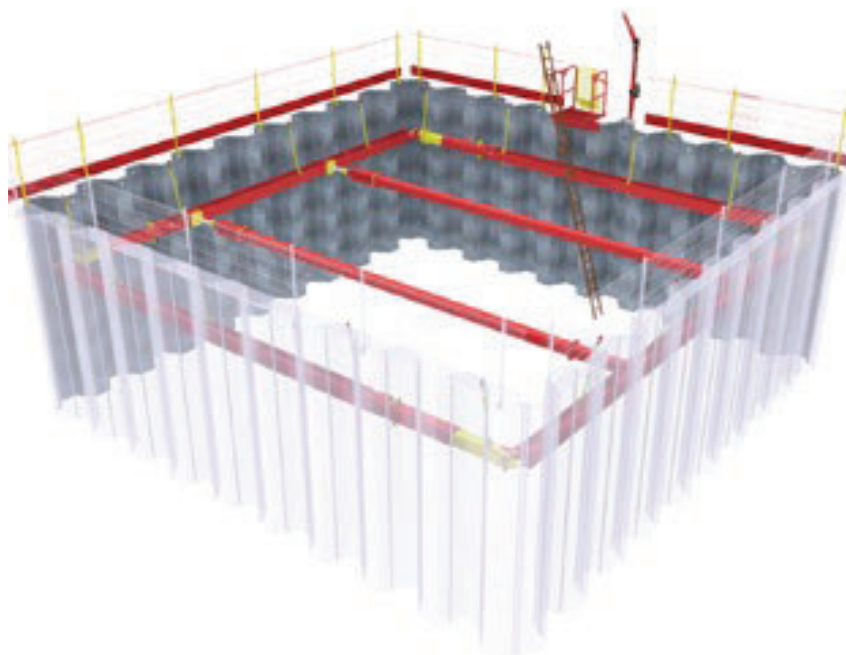


Adaptors can be utilised as RC wall fixing plates (subject to bolt anchorage design).



Octagonal frame designs available for circular excavations.

Typical trench application utilising 200 / 300 Series Struts.



Larger cofferdam designs available utilising intermediate bracing struts.