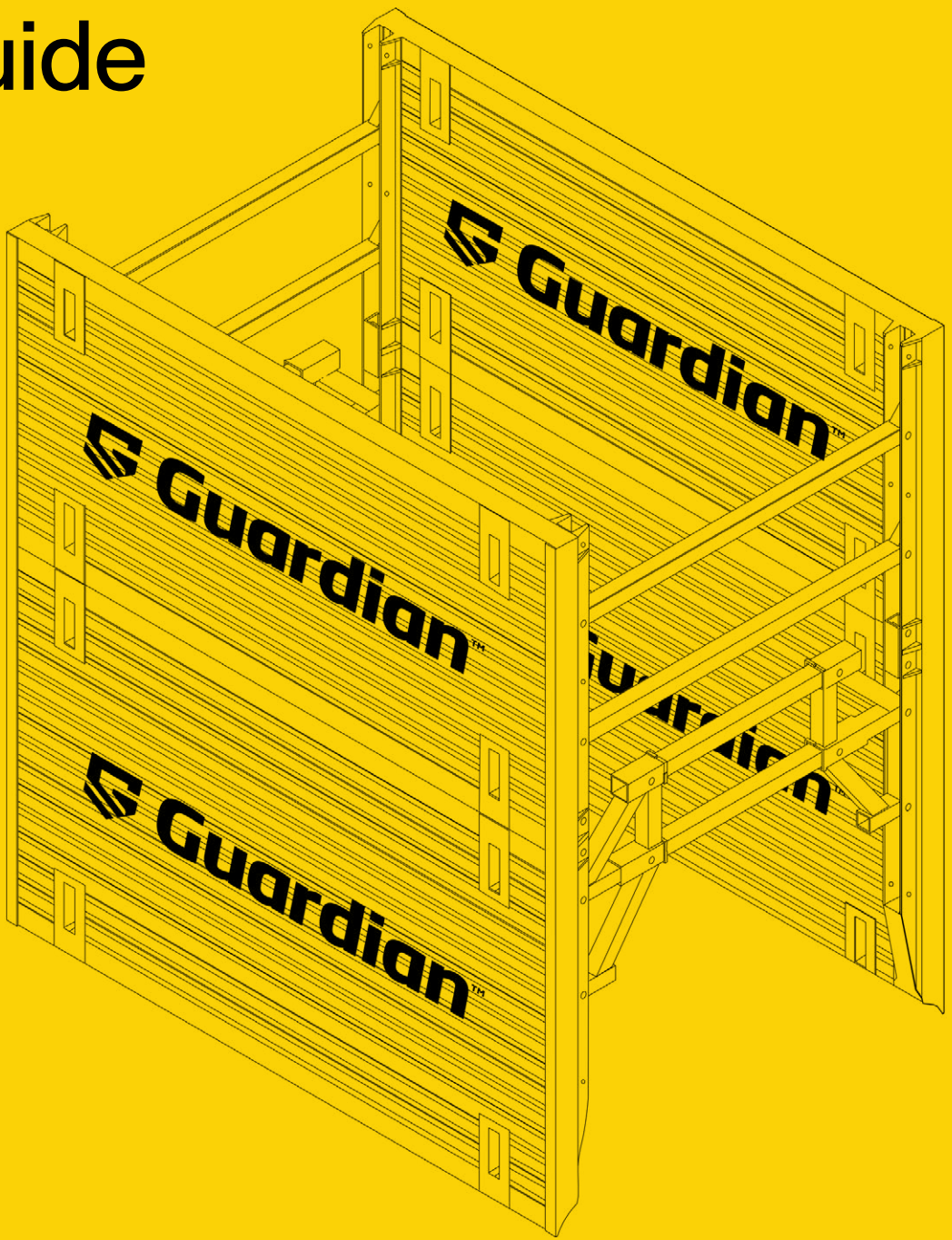
Guardian™

Trench Shield User Guide



GUARDIANCIVIL.CO.NZ

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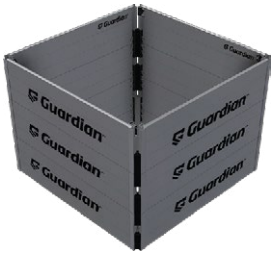
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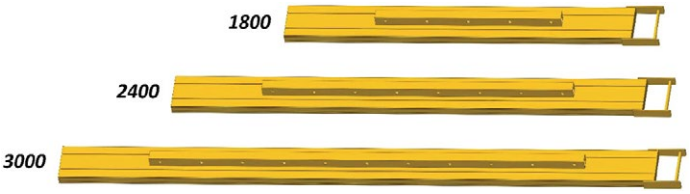
Disclaimer: It is solely the responsibility of the user, contractor or engineer to ensure that all Guardian products are installed and utilized according to industry standards, best practices, and applicable codes. Guardian is not liable for the performance, installation, or suitability of the products for any project. Any errors, omissions, or defects resulting from improper installation or use are the sole responsibility of the contractor or engineer, and Guardian is not liable for any resulting damages or issues.

Manual Soldier Sets

Guardian aluminium soldier sets, with adjustable struts, are light weight & easy to handle.



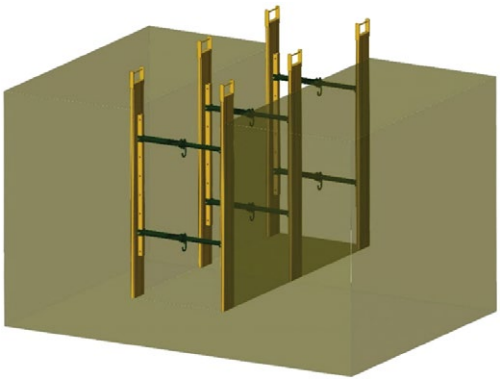
Soldiers are 200mm wide by 45mm thick and come in 3 different lengths at 1.8m, 2.4m or 3.0m long. They are made out of structural grade aluminium extrusions



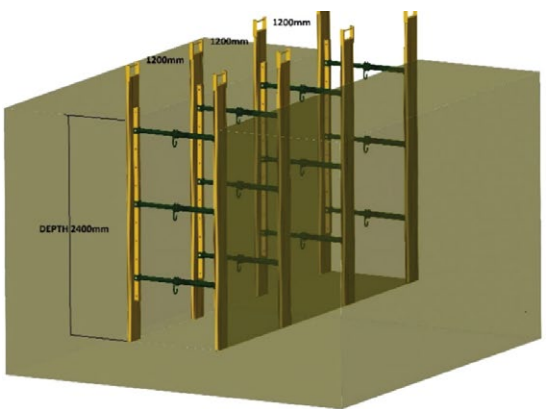
Adjustable acrow struts come in 3 different sizes; 0.6 to 0.9m, 1.0m to 1.8m or 1.5m to 2.5m long

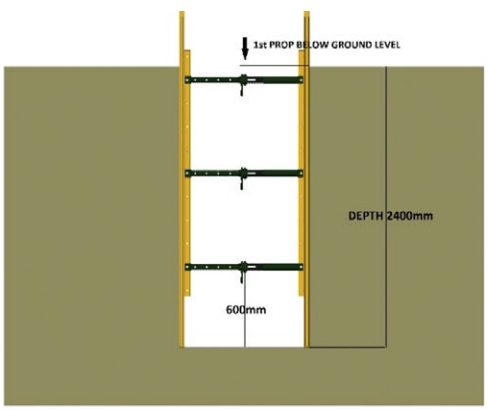


For the 1.8m and 2.4m long panels, each soldier set needs 2 struts, with the bottom strut being 600mm from the bottom of the panel and the top strut below ground surface



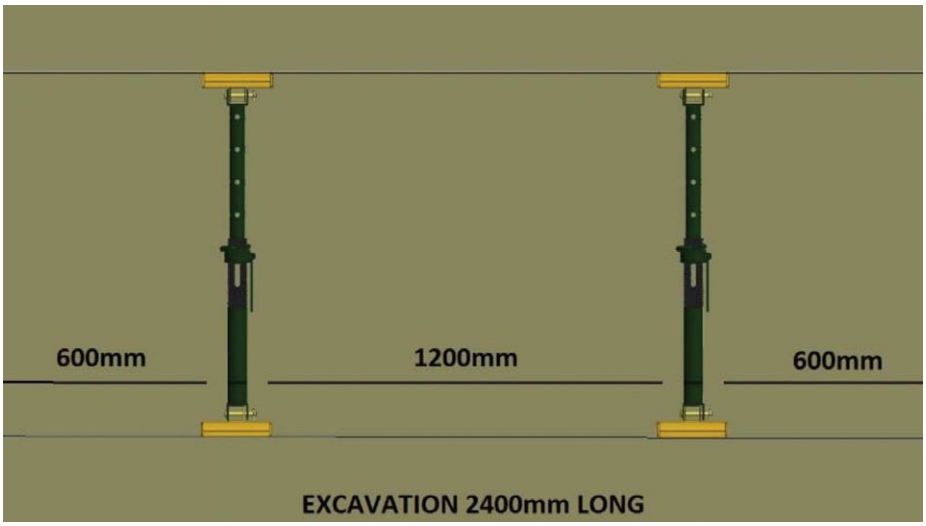
The 3.0m long soldier sets require 3 struts, with the top and bottom struts positioned the same as the 1.8m and 2.4m sets. The third strut needs to be positioned in between the top and bottom struts. Each soldier panel comes complete with a lifting handle at the top.





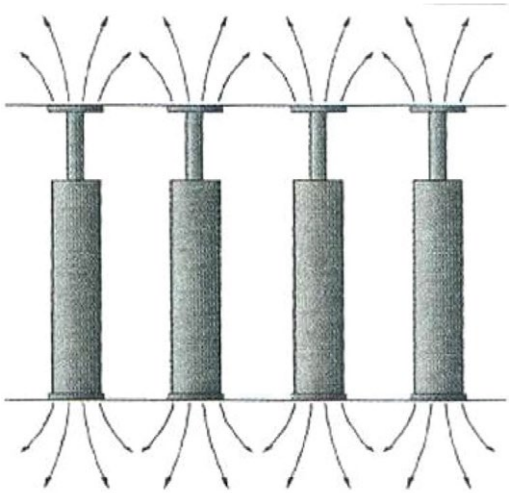
Manual Soldier Sets

Guardian soldier sets can be spaced a maximum of 1.50m apart, however we recommend a maximum of 1.2m apart. An excavation 2.4m long would require 2 sets with the first set being placed 600mm from the end of the excavation and the second set 1.2m along, leaving 600mm to the other end of the excavation. The formula is: LENGTH (m) ÷ 1.2 ≈ SETS REQUIRED.



The faces of the excavation shall be straight and near vertical. The soldiers must bear on firm soil and solid fill. Trenches shall be kept dry and free from water and seepage at all times. Manual soldier sets are a ground support system, and with the acrow struts, can carry earth pressure to 20kN per set. The manual soldier sets can also double up as walers on an excavation that required close sheeting in wet or sandy areas. Thrust pressure arches from each soldier fan out through the trench walls and interlock with adjacent arches of adjacent soldiers, as per the diagram.

Pressure Arches



Remember

Under the timber shoring regulations, timber has to be F8 hardwood minimum size 150mm X 38mm with no more than 3 months of age for soldier set or close sheeting work. You can choose to incorporate Form Ply / Fin Form 19 or 20mm thick in conjunction with the Soldier Sets. The aluminium plank is 7 times stiffer and 8 times stronger than hardwood. Manual soldier sets are a light weight easy to use system, easy to transport & easy to store.

Tabulated Data
Hydraulic Vertical Shores
Revised June 1, 1999

Copyright, U.S.A.,Griswold Machine \& Eng., Inc., 1998 594 West Highway
M-60, Union City, MI 49094
(800) 248-2054 Fax: (517) 741-7483

CAUTION

EXCAVATION PROCEDURES

MAY CAUSE INJURY OR DEATH!

A COMPETENT PERSON WHO SATISFIES THE DEFINITION AND INTENT OF THE 1926 CONSTRUCTION STANDARD SUBPART P EXCAVATIONS SHALL: ENSURE THAT ALL EMPLOYEES ARE WORKING IN SAFE CONDITIONS AND THAT ALL EMPLOYEES HAVE BEEN TRAINED IN CORRECT EXCAVATION PROCEDURES AND THE PROPER USE OF THE PROTECTIVE EQUIPMENT CHOSEN.

EXCAVATIONS AND PROTECTIVE EQUIPMENT SHALL BE INSPECTED A MINIMUM OF ONCE EACH WORKING DAY AND WHENEVER THERE IS A CHANGE IN THE SOIL CONDITIONS AND/OR OTHER CHANGES SUCH AS AN INCREASE OR DECREASE IN WATER OR VIBRATIONS.

EMPLOYEES SHALL NOT BE ALLOWED TO ENTER AN EXCAVATION THAT IS NOT PROPERLY SHORED, SHIELDED, OR SLOPED.

EMPLOYEES SHALL ALWAYS ENTER, WORK, AND EXIT WITHIN THE SHORED, SHIELDED, OR SLOPED AREAS OF THE EXCAVATION AND/OR TRENCH.

ALL LIFTING AND PULLING EQUIPMENT, INCLUDING CABLES, SLINGS, CHAINS, SHACKLES AND SAFETY HOOKS SHALL BE INSPECTED FOR DAMAGE OR DEFECTS PRIOR TO USE AND SHALL BE EVALUATED FOR SUITABILITY AND CAPACITY.

THIS GME TABULATED DATA PROVIDES A GENERAL SET OF GUIDELINES TO ASSIST THE COMPETENT PERSON IN THE SELECTION OF A PROTECTIVE SYSTEM FOR EMPLOYEE SAFETY. THE RESPONSIBILITY FOR JOB SITE SAFETY AND THE PROPER SELECTION, INSTALLATION AND REMOVAL OF THE SHORING EQUIPMENT BELONGS TO THE COMPETENT PERSON DESIGNATED FOR THAT JOBSITE. THIS TABULATED DATA IS NOT INTENDED TO BE USED AS A JOB SPECIFIC EXCAVATION/ TRENCHING SAFETY PLAN, BUT SHALL BE USED BY THE COMPETENT PERSON. TABULATED DATA IS INTENDED AS A SUPPLEMENT TO HIS/HER TRAINING, EXPERIENCE AND KNOWLEDGE OF SAFE PROCEDURES, JOB SITE CONDITIONS AND SOIL TYPES. TABULATED DATA IS INTENDED TO ASSIST HIM IN THE SELECTION OF AN APPROPRIATE PROTECTIVE SYSTEM FOR EMPLOYEE SAFETY.

Refer to the installation procedures for typical installation figures.

The sides or faces of the excavation must be near vertical to allow proper installation of the Hydraulic Shores. The sides of the Hydraulic Shore shall bear continuously and firmly against approved sheeting. The sheeting shall bear against the soil or a solid and stable filler in order to adequately distribute the loads to and from the cylinder struts. DO NOT butt rails back-to-back to span a wider excavation.

Hydraulic Vertical Shores

GENERAL:

1. This data has been prepared by a Registered Professional Engineer as required by the OSHA standard 29 CRF, Part 1926, Subpart P, Excavations.
2. This data is to be used by the "competent person" for the proper use and placement of GME Hydraulic Shores.
3. The term "Hydraulic Shore" refers to both GME Vertical Shores and Vertical End Shores unless otherwise noted.
4. "Competent person" is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
5. When there is a discrepancy concerning the use of protective systems between this tabulated data and the OSHA standard, this data shall take precedence. Any topic not covered by this data shall be governed by the OSHA standard.
6. GME shall not be liable for damage or injury resulting from improper use of the Hydraulic Shores. Improper use of or modifications to the Hydraulic Shores, or use of components not specifically authorized by GME without the written consent of GME shall void this data and all manufacturers warranty.

SPECIFICATIONS FOR USE OF GME HYDRAULIC SHORES

1. All personnel involved with the use of GME Hydraulic Shores shall be trained in the proper use and installation procedures and other applicable safety requirements.
2. GME Hydraulic Shores shall be used only in soil conditions indicated in this data.
3. Refer to the installation procedures for typical installation figures.
4. The sides or faces of the excavation must be near vertical to allow proper installation of the Hydraulic Shores. The sides of the Hydraulic Shore shall bear continuously and firmly against approved sheeting. The sheeting shall bear against the soil or a solid and stable filler in order to adequately distribute the loads to and from the cylinder struts. DO NOT butt rails back-to back span a wider excavation.
5. Hydraulic Shores may be used vertically, horizontally, or diagonally, as long as all other requirements of this data are satisfied.
6. If a Hydraulic Shore is positioned on a joint between two pieces of sheeting, the shore shall split the seam equally.
7. The hydraulic cylinders shall be pumped to a minimum of 750 psi when a Hydraulic Shore is used. If the pressure drops below the initial pressure, check for leaks, repair any found, and re-pressurize the system. If the initial pressure still can't be maintained because the soil is too soft, another protective system will be required.
8. An approved shoring system shall consist of a minimum of two Hydraulic Shores, spaced in accordance with this data, and the safe working area shall be between two consecutive shores.
9. In excavations that are 1.83m deep or less, only one Hydraulic Shore is required in a vertical plane.
10. The following materials, or an approved equal, shall be used for sheeting with the Hydraulic Shore:
    a. Two sheets of 3/4" thick CDX Plywood placed back to back
    b. 11/8" thick CDX Plywood
    c. 3/4"thick 14 Ply Arctic White Birch (Finland Form)
    d. 3/4" thick HDO - American Plywood Association, high density overlay exterior
    e. 3/4" thick Plyform - American Plywood Association B-B Class I Exterior
    f. 3/4" thick Combi Exterior Plywood
    g. 3/4" Omni Form
    h. Steel Plate 1/2" minimum thickness
11. When Hydraulic Shores are used in conjunction with Waler Systems or Hydraulic Shields, the maximum horizontal spacing between the ends of each unit shall be 609.6mm.

ADDITIONAL SPECIFICATIONS FOR USE OF GME VERTICAL END SHORES

The Vertical End Shore will support loads across the end of a trench by placing an approved sheeting against the Vertical End Shore's struts. The sheeting shall be secured in place by utilizing a GME End Panel Bracket or by backfilling against the sheeting at least 2/3" of its height.

Hydraulic Vertical Shores

In addition to the approved sheeting listed for the Hydraulic Shore, the following materials may be used for end loading:
1. GME Aluminium Sheeting
2. 2x6, 2x8, 2x10 or 2x12 Hardwood sheeting or equivalent

The MAXIMUM WIDTH of a Vertical End Shore is 2.41m

SOIL CLASSIFICATION

3. See the OSHA regulations for descriptions of Type A and B soils.
4. Type C-60 soil is a soft cohesive or moist granular soil that is not flowing or submerged. This soil can be cut vertically and will stand long enough to safely install the protective system

DESIGN CRITERIA AND LIMITATIONS

5. The tables include the effect of a three foot high spoil pile within a horizontal distance from the face of the excavation equal to the excavation's depth. Hydraulic Shores are not designed to support heavier surcharge loads, such as those imposed by building foundations. If Hydraulic Shores are used near building foundations, those foundations may need to be underpinned to prevent excessive settlement.
6. Hydraulic Shore struts are not designed to support vertical loads and shall not be used to provide access or egress to the trench.
7. This data is valid for Hydraulic Shores in structurally sound condition. Any significant damage will void this data, and all manufacturers warranty. The damaged Hydraulic Shores shall not be used.
8. The competent person shall monitor the excavation and adjacent areas daily, after every rainstorm, and after every event that might threaten the stability of the excavation.
9. The excavation must be kept free of water while using the Hydraulic Shores. Surface water shall be diverted away from the excavation, and water must be pumped out of the excavation bottom. The competent person shall monitor the excavationin these conditions to prevent the water from generating excessive lateral pressure on the Hydraulic Shore and to check for decreased soil stability.

NOTES FOR TABULATED DATA

10. The top cylinder of the Hydraulic Shore shall be no less than 304.8mm and no more than 609.6mm below the top of the trench.
11. The lowest cylinder of a Hydraulic Shore shall be no more than 1.22m above the bottom of the excavation.
12. If sheeting is required, the sheeting shall extend from the top of the excavation to a maximum of 0.61m off the bottom of the excavation. Some soils may require that the sheeting be extended to the full depth of the excavation. (Maximum horizontal gap between sheets not to exceed 24")
13. NOTE: In some applications, sheeting may not be required, but it may be desired to prevent random sloughing or raveling of the soil.
14. When an Oversleeve is required, the Oversleeve shall be a structural steel tube (TS 3 1/2 x 3 1/2 x 3/16) and shall extend the full collapsed length of the cylinder. The Oversleeve is only applicable to a Vertical Shore.

Hydraulic Vertical Shores

Hydraulic Shores - Type “A” Soils

Depth of Excavation	Maximum Vertical Spacing of Struts	Maximum Horizontal Spacing of Struts	Excavation Width	Oversleeve Required	Sheeting Required
0 m - 4.57 m	1.22 m	2.44 m	0 m - 2.44 m*	No	No
			2.44m - 3.66 m*	No	
			3.66m - 4.57 m*	Yes	

Hydraulic Shores - Type “B” Soils

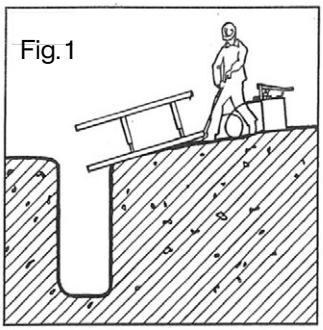
Depth of Excavation	Maximum Vertical Spacing of Struts	Maximum Horizontal Spacing of Struts	Excavation Width	Oversleeve Required	Sheeting Required
0 m - 4.57 m	1.22 m	2.44 m	0 m - 2.44 m*	No	No
			2.44 m - 3.66 m*	No	
			3.66m - 4.57 m*	Yes	

Hydraulic Shores - Type “C60” Soils

Depth of Excavation	Maximum Vertical Spacing of Struts	Maximum Horizontal Spacing of Struts	Excavation Width	Oversleeve Required	Sheeting Required
0 m - 4.57 m	1.22 m	1.83 m	0 m - 2.44 m*	No	No
			2.44 m - 3.66 m*	No	
			3.66m - 4.57 m*	Yes	

Hydraulic Vertical Shores

VERTICAL SHORES INSTALLATION



STEP ONE

Place the shore at the lip of the trench with approximately 12“ overhanging the edge in the upright and open position. (See Fig. 1). Place the pump bucket alongside of the shore.

STEP TWO

Open the 1 / 4 turn valve on the pump bucket and connect the quick disconnect fitting on the hose from the pump bucket to the male fitting on the shore. Close the 1/4 turn valve on the pump bucket.

STEP THREE

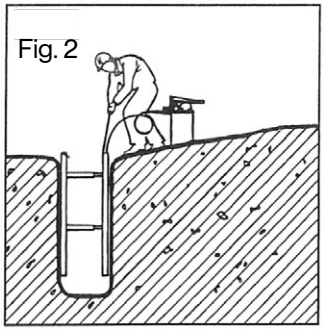
Place the release tool through the handle of the bottom rail with the hook in position to catch the handle when the shore is lowered into the trench.

STEP FOUR

Grab the handle on the top rail and pull toward you causing the shore to collapse.

STEP FIVE

Lower the shore into the trench allowing the hook to support the weight.

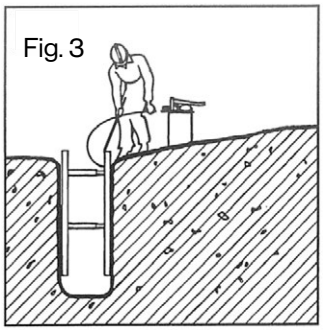


STEP SIX

Release the handle of the top rail allowing the shore to completely unfold into an open and locked position. (See Fig. 2)

STEP SEVEN

Hold the shore at the proper height. Start pumping the handle of the pump bucket until you have reached a minimum of 750 psi on the gauge.

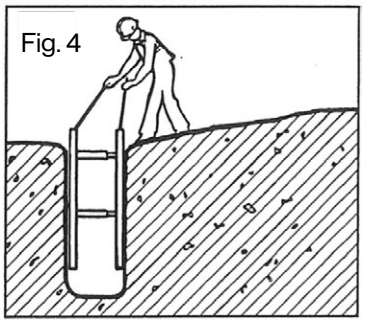


STEP EIGHT

Disconnect the hose from the shore by positioning the release tool flange behind the collar of the quick disconnect fitting using the hook as a pivot point. (See Fig. 3) Pull the tool toward yourself causing the hose to release from the shore. This completes the installation procedure.

STEP ONE

Begin removal by placing release tool through handle of shore. (See Fig. 4) Turn tool so that hook will catch handle when pressure is released. Position cupped end of release tool over the male fitting.



STEP TWO

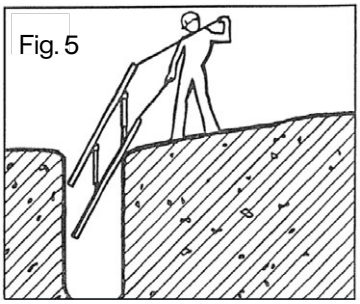
Place the removal hook through the other handle of the shore.

STEP THREE

Begin to push the handle of the release tool away from you using the handle as a leverage point. At the same time that you push the release tool start pulling the removal hook back toward yourself. CAUTION: This will cause a small amount of fluid. to be released from the fitting on the shore. Care should be taken to avoid being sprayed by the fluid. Also, the release of pressure could cause unstable ground to begin to move. Care should be used to release the pressure in small amounts.

STEP FOUR

Remove the shore from the trench by pulling on the removal hook causing the shore to collapse and using the release tool to assist in pulling the shore from the trench. (See Fig. 5) The shore is now ready to be used for its next application.



Hydraulic Vertical Shores

Typical Installations for Vertical Shoring

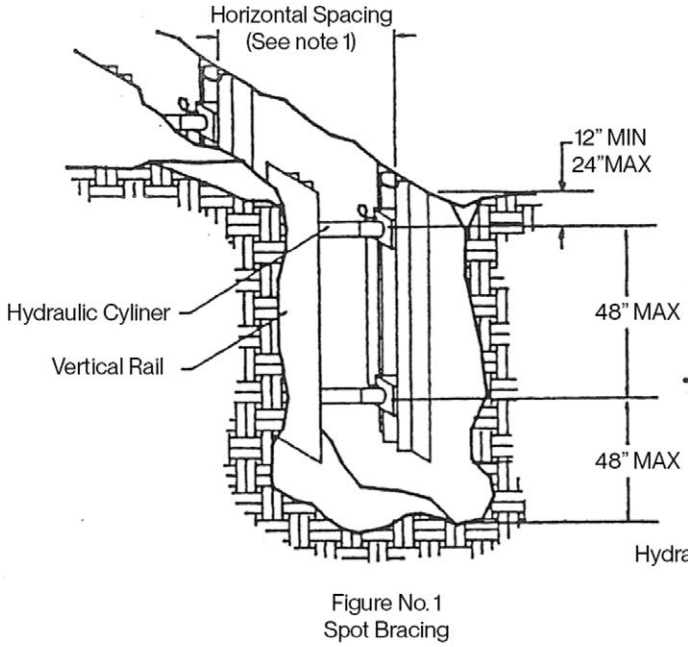


Figure No. 1
Spot Bracing

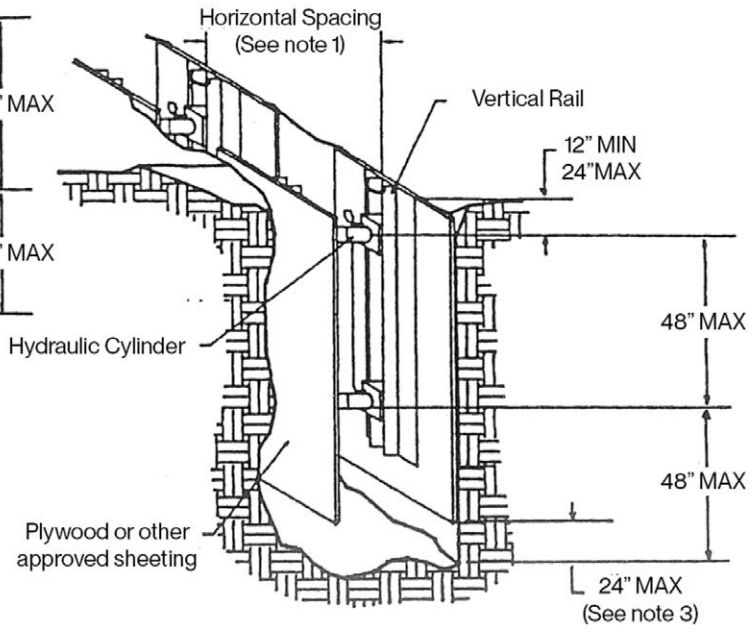


Figure No. 2
Shores with Sheeting
(See note 2)

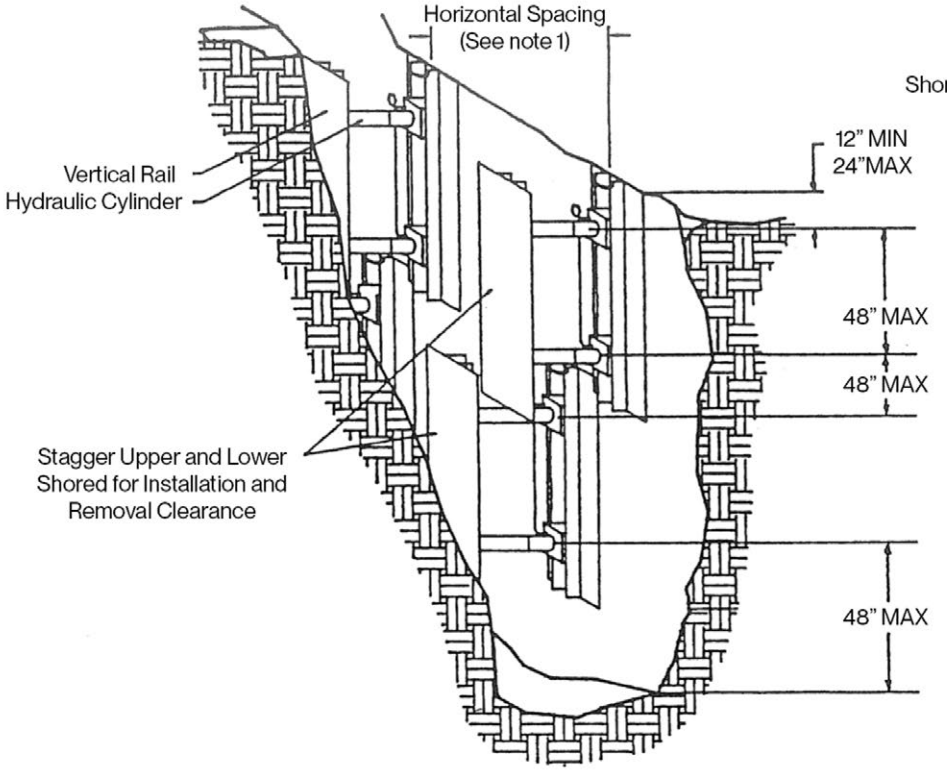
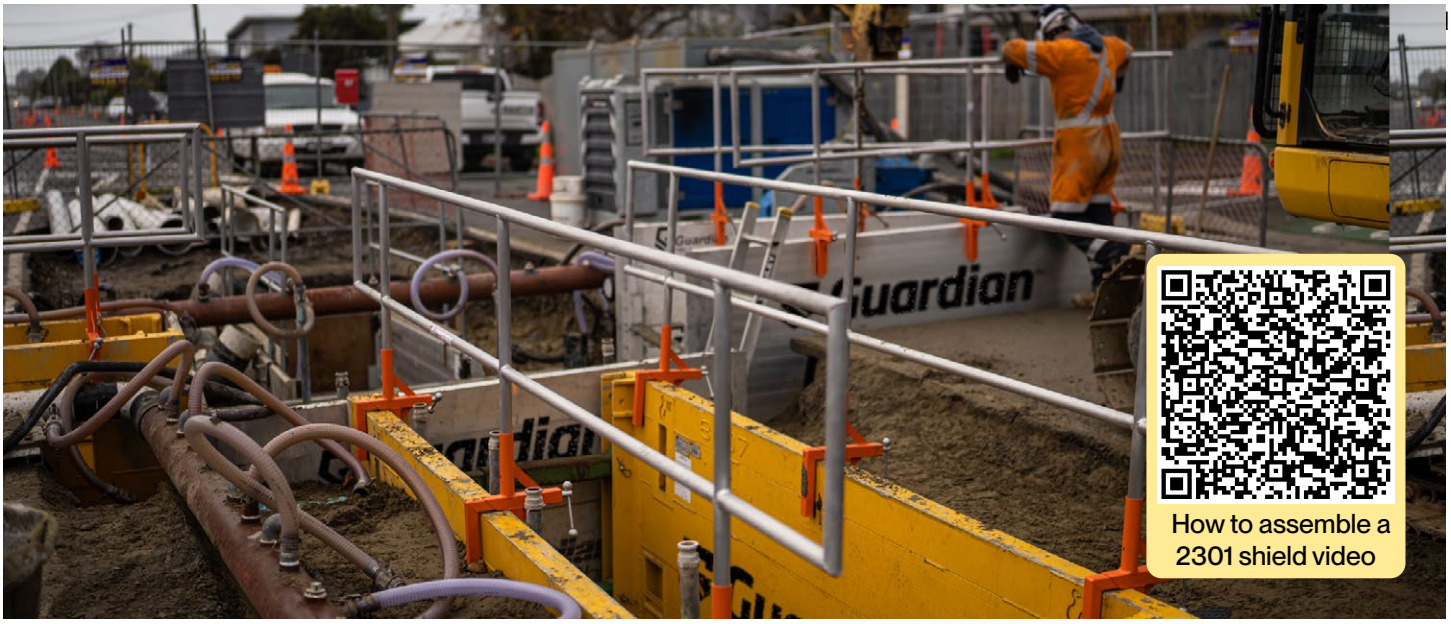


Figure No. 3



Standard Trench Shields

1. Introduction

This booklet is intended to provide basic information for users of the Guardian Aluminium Trench Shield and to draw the clients attention to the practical aspects of handling, assembly, installation and use which need to be considered in compiling method statements for a safe system of work. In particular, the clients attention is drawn to the size and weights of the Aluminium Trench Shield components and the need for planning the lifting operations involved.

The Aluminium Trench Shield is intended for use in trenches for which the excavation is being undertaken with small excavators which do not have the lifting capacity to work with standard, heavier, trench box systems. All major components of the Aluminium Trench Shield system have handling and lifting points for safe slinging.

It is assumed that clients are familiar with general safe practices applicable to trenching and excavation work. Users should ensure that the length and selected width of the box is sufficient for the work to be carried out. The Aluminium Trench Shield is intended to act as a shield to provide a safe working area for operatives working in the trench. In all ground conditions these are certified to 20kPa using 4 struts. 1 extra strut increases the rating to 30 kPa and 2 extra struts increases the rating to 50 kPa. See struts chart on the Standard Guardian panels.

The Standard Guardian trench shield was designed so it could be inverted for small shafts, by the provision of additional struts locations.

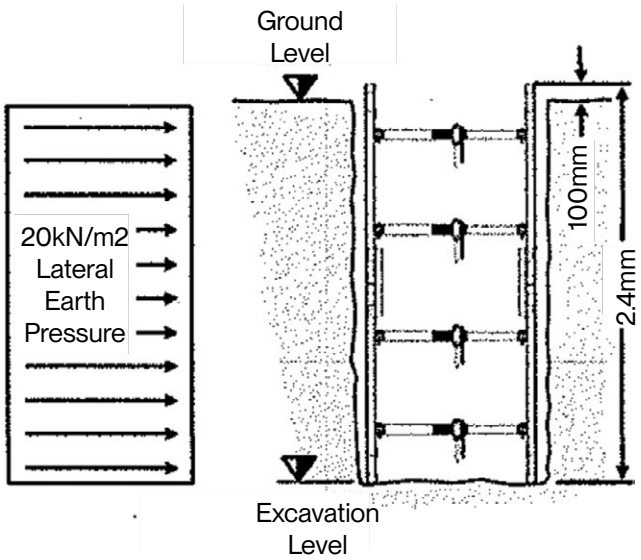
If required to close off an open end of either Standard Guardian configuration or the shaft set up, you can either install.

2. Design

In the event of trench wall instability the Aluminium Trench Shield System is designed to carry a uniform lateral earth pressure of 20kN/m2 . Contact Guardian if further assistance is required.

Users are advised to check that their excavation arrangement will not impose greater working pressures than these.

Conditions which will increase the likelihood of trench wall instability and lateral earth pressure include:

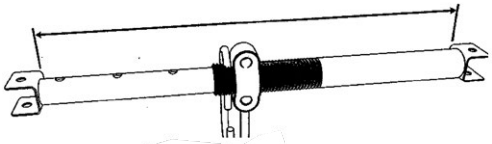


Standard Trench Shields

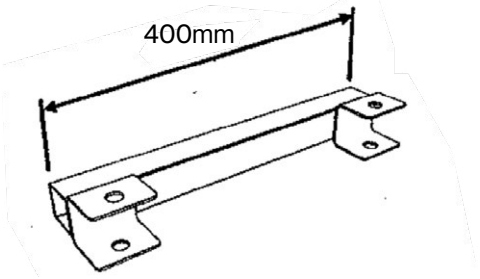
3. Trench

Users should note that settlement of the reinstated ground and ground next to the Aluminium Trench Shield is likely to occur after backfilling.

Adjustable struts

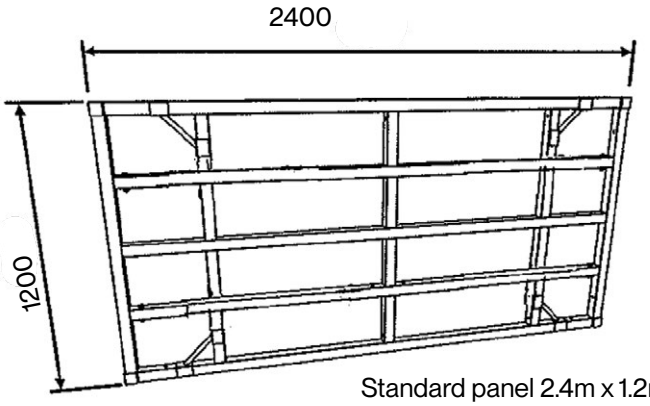


Sizes:
0.6m-0.9m
1m – 1.8m
1.5m - 2.5m
Or other sizes on request

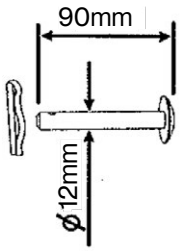


Vertical Joiner

4. Component Identification and Dimensions

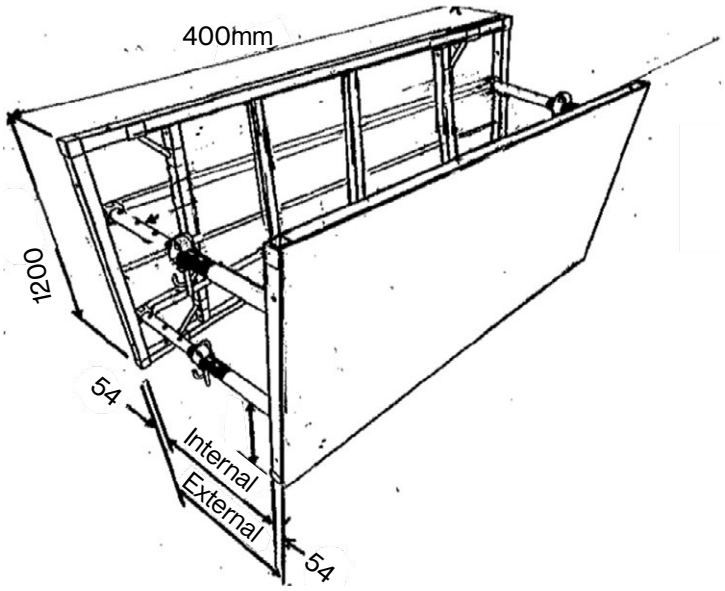


Standard panel 2.4m x 1.2m



Pin and 'R' Clip

5. Dimensions and Weights of Aluminium Trench Shields

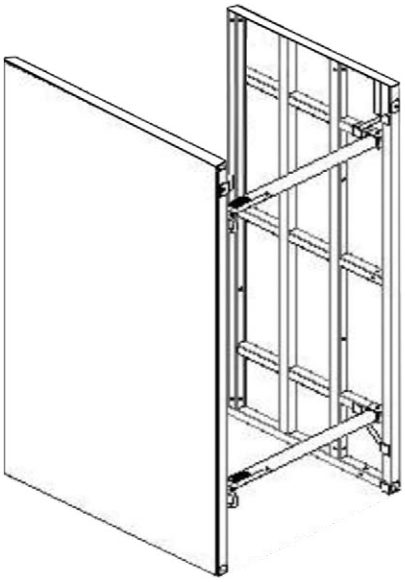


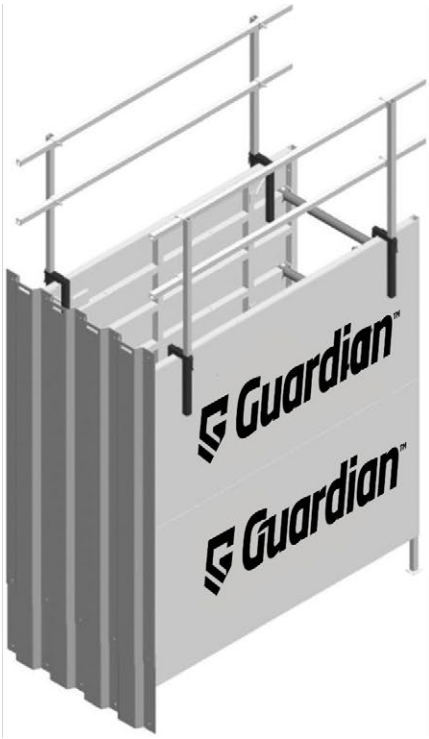
Panel Dimensions and Weights:
- 2.4m x 1.2m 55kg

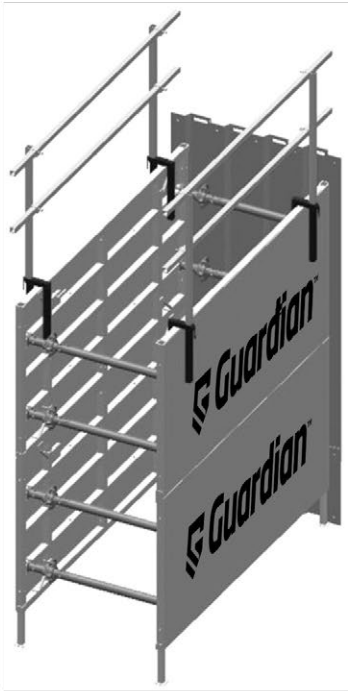
Always allow for sufficient clearance for the excavator bucket to work comfortably within the internal width of the side panels when selecting a shield width.

Standard Trench Shields

2.4 x 1.2M Shield Set stacked vertically for shoring a small shaft

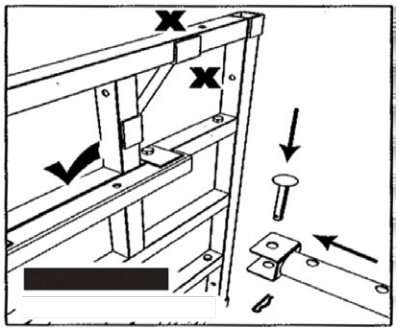




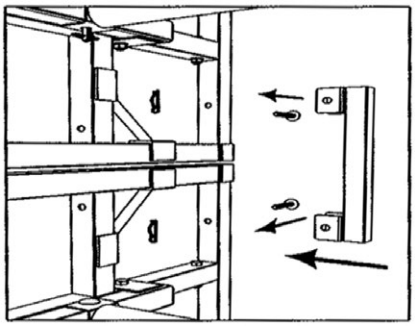


Using End Panels to shut off open end

6. Component Connection Details. All connections are via the 12mm diameter by 90mm long pin and secured with 'R' clip.



5.1. Strut Connection Detail. Struts are pinned to the panel via outer holes in horizontal section of frame. There are several strut locations within the shield. The shield can be used vertically for small shafts



5.2. Extension connector (Vertical Joiner) is pinned via holes in the vertical section of frame at each end of the panel.

Standard Trench Shields

7. Off loading and Site Handling of the Aluminum Trench Shield

6.1. Manpower. The Health and Safety Legislation requires that personnel deployed are suitably trained, experienced and supervised by a competent person. The main activities associated with Aluminium Trench Shield installation are :

6.1.1. Unloading the delivery vehicle.
6.1.2. Pinning the components together.
6.1.3. Lifting the assembled shield into and out of the trench.

6.2. Plant for Lifting. A suitable appliance is required for off-loading and assembly. The machine lifting capacity and clearance under the lifting point should be checked against the sizes and weights of the box components and against the assembly / dismantling stages.

WARNING: If an excavator is being used for lifting operations Lifting Chains should be used.

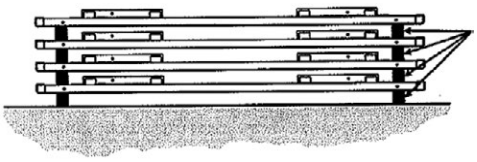
6.3. Lifting Chains. Lifting Chains need to be of suitable length and capacity complete with current certification. Typically for Aluminium Trench Shield a set of 4 leg 8mm chains with 4m leg length complete with safety hooks and shortening clutches is required.

6.4. Edge Protection, Access and Hard Standing Areas include:

6.4.1. Suitable area to off-load the truck and assemble the Aluminium Trench Shield
6.4.2.Suitable hard standing for the machine to operate to lift the shield into the trench.
6.4.3.Suitable access equipment (ladder or staging) for connection / removal of lifting chains.
6.4.2.Edge protection, ladders and possibly other provisions to provide safe access into and out of the trench

8. Stacking, Handling and Transportation

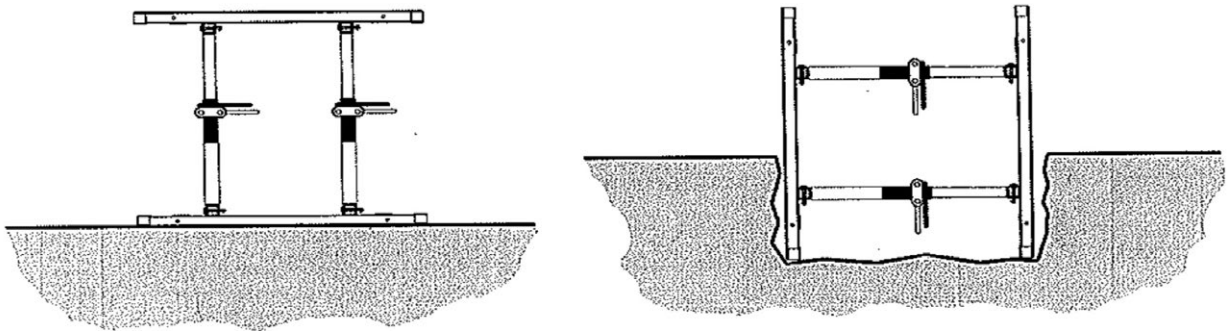
8.1 In dismantled form and in transit: Aluminium Trench Shield panels and struts should be stacked as shown with suitable timber dunnage. (Max 4 panels per stack). Adjustable Strut components and pins etc should be stored in skips / bins. During transportation stacks should be securely restrained to the vehicle bed.



Suitable timber dunnage

Note:Diagram shows 2.4m long panels

8.2 Site Storage: If not in use, separate Aluminium Trench Shields from each other. Shields should be stored on their side or temporarily dug in when not in use (see below). Uneven or sloping ground and / or wind loading can result in inadequate stability if left upright.

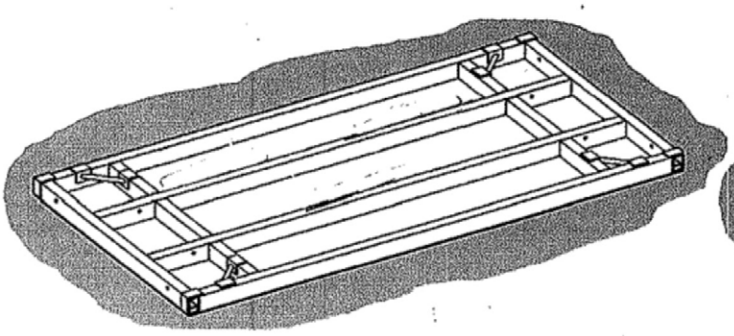


Lie aluminium trench shields on their sides or temporarily dug in 0.5m

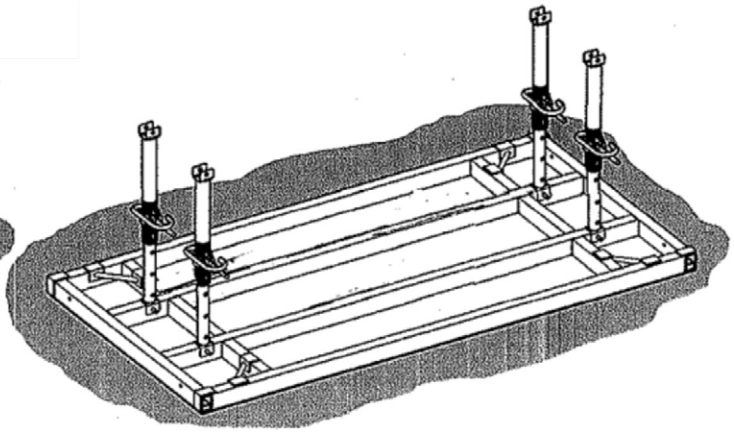
Standard Trench Shields

9. Site Assembly of Aluminium Trench Shields (dismantling is reverse procedure)

Note: Images shown are for the 2.4m long panels

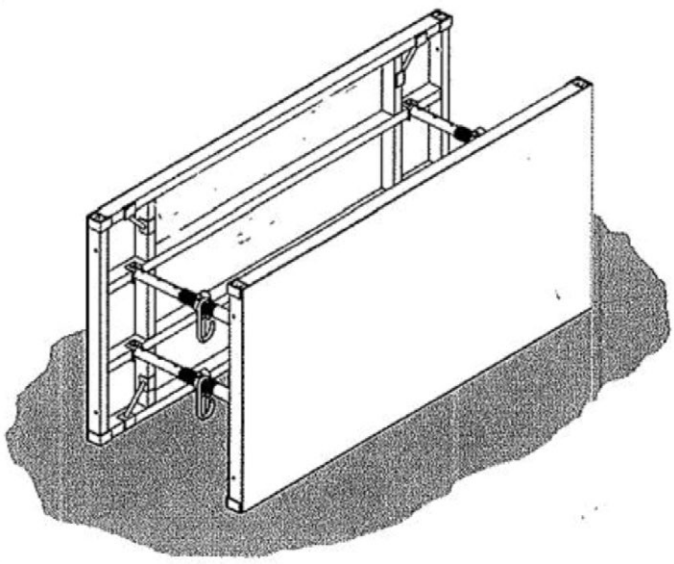


9.1. Lie the first panel flat on the ground side up



9.2. Pin 4 Struts into the panel using the pins and 'R' clips

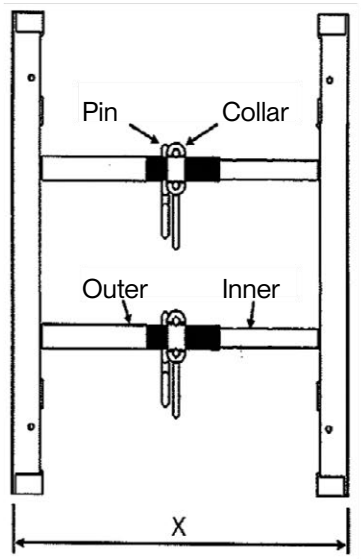
9.3. Lift the second panel onto the other and pin to the struts. Once secured lift the unit upright using the chain sling.

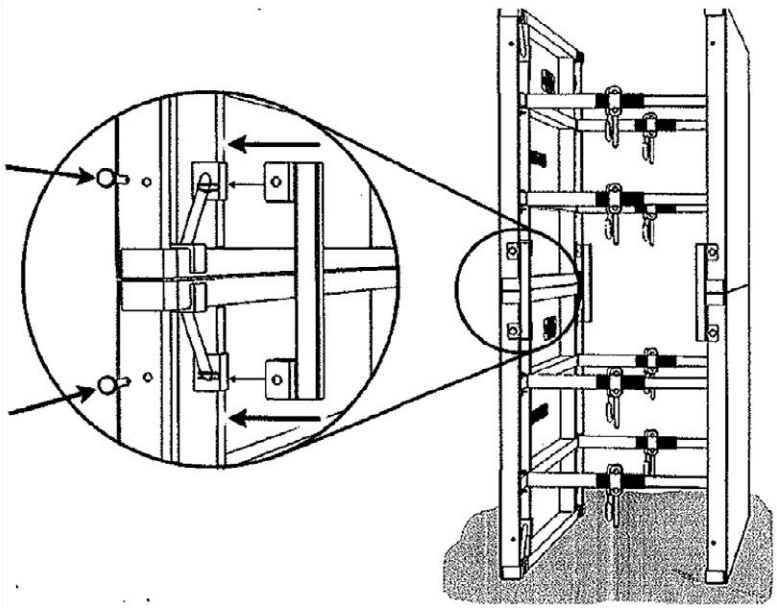


Standard Trench Shields

10. Installation of Aluminium Trench Shield. Side View.

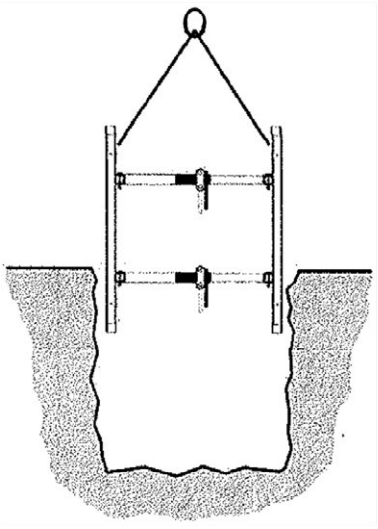
Note: Images shown are for the 2.4m long panels

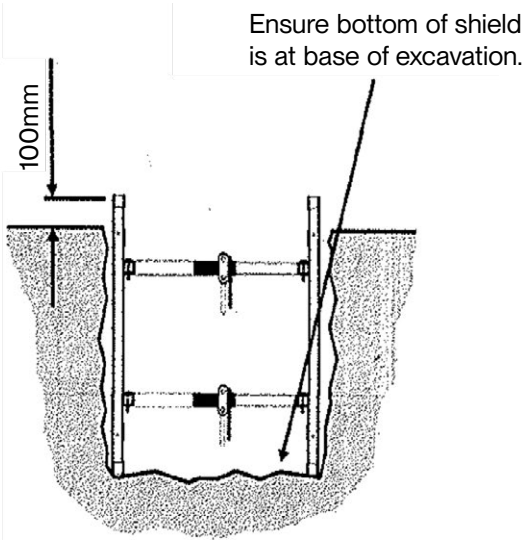




10.1. Set the struts to give the required shield Width (x). The strut length is changed by Relocating the pin for coarse adjustment and by Screwing the collar in and out for fine adjustment. Ensure that the inner is always a minimum of 100mm inside the strut outer.

10.2. If the trench depth requires multiple shields they can be connected on top of each other (to a maximum of three shields). Assemble each shield as set out in section 9 and set the width as per previous shield and connected using 4 extension joiners.





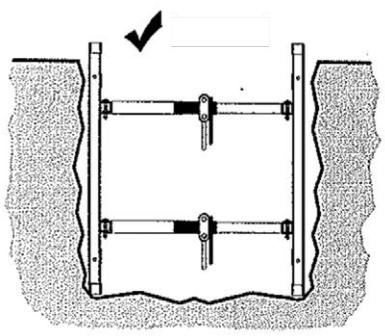
10.3. Once the trench is dug to the required width and depth, lift the shield(s) using the four leg chain sling attached to the four lifting points at the top of the upper-most pair of panels. DO NOT lift the shield with the chain sling attached to the struts.

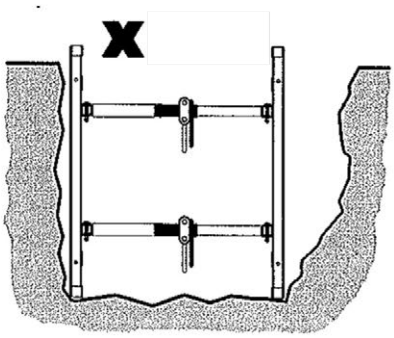
10.5. Once the shield is in place remove the four leg chain sling. If the base of the shield is not on the bottom of the excavation, GENTLY push down with the machine on each panel to make sure the shield is safely in place, and will not suddenly slide down into the excavation. Ensure the struts are horizontal and at right angles to the panels before entering the trench. DO NOT use any unsupported part of the trench for access. Leave the top of the shield 100mm above the surrounding ground .

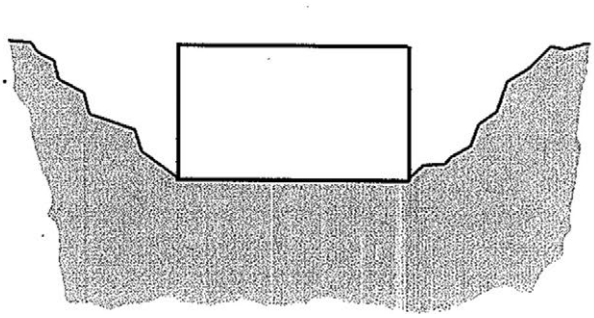
Standard Trench Shields

11. Before Entering the Trench

Note: Images shown are for the 2.4m long panels







11.1. Ensure there are NO large voids between the panels and the trench sides as this may allow the shield to sway sideways. The trench should be dug slightly wider than the external shield access.

11.2. Always maintain a safe batter of the unsupported parts of the trench in front of and behind the shield.

12. Entering the Supported Excavation

- DO Use a ladder to enter the working space between the struts of the shield.
- DO wear a safety helmet to minimise the risk of head injury.
- DO ensure that the excavator operator is aware of your intentions.
- DO NOT climb up or down the struts.
- DO NOT use any unsupported part of the trench for access.
- DO NOT move the shield when personnel are inside it

13. Extraction of Aluminium Trench Shield

To extract the shield from the trench, attach the chain sling as for installation (using the four topmost lifting points on the shield) and lift the shield vertically out of the trench.

If the shield is tight in the trench, place the lifting chains on the two lifting lugs at one end of the shield. Lift this end of the shield slightly and then reposition the chains to the other end of the shield and lift slightly. Continue to swap the chains from one end of the shield to the other, lifting slightly each time until the shield is loose in the trench and can then be removed in the normal fashion using all four legs of the sling on the top four lifting points.

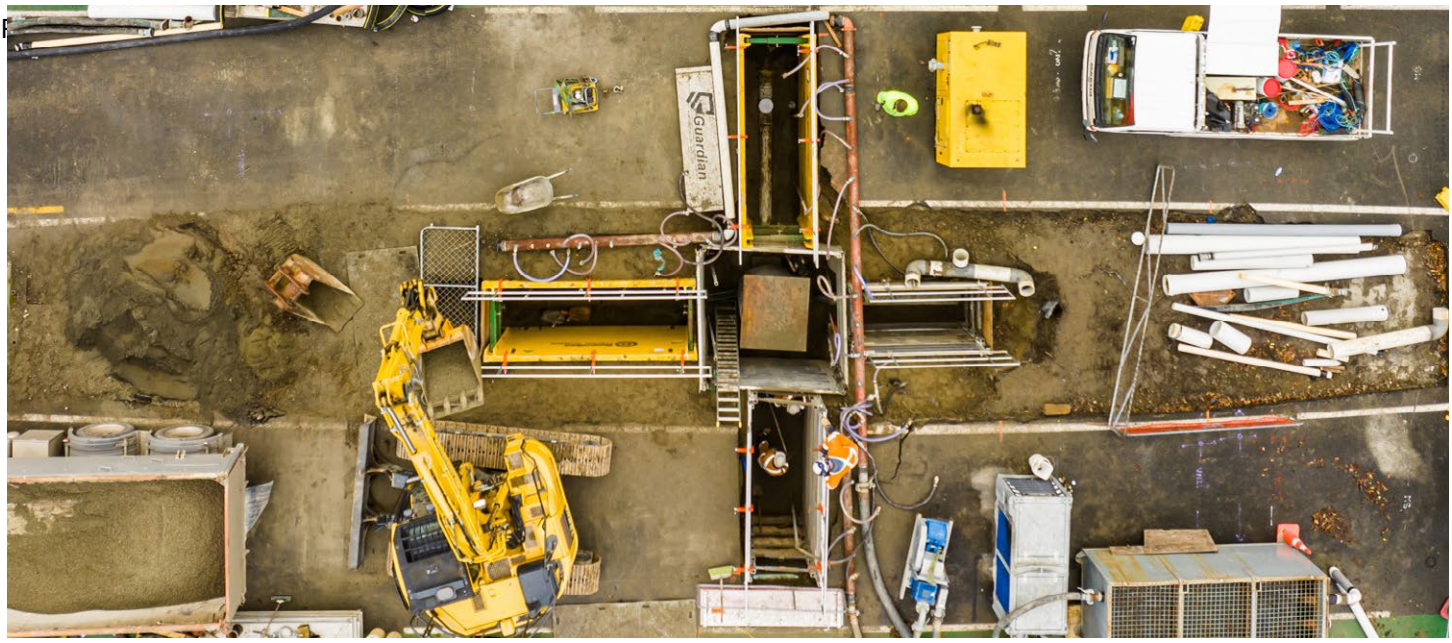
Alternatively wind in the struts to loosen the shield in the trench before removing using the top four lifting points.

14. Precautions During Use and Maintenance

- Regularly check that all pins are in place and ‘R’ clips fitted.
- Avoid laterally loading the struts - either by hanging or propping from them or accidentally striking them with site plant.
- Damaged struts should not be used.

15. General

Since our policy is one of continual improvement, components may vary in detail from descriptions given in this publication.



Large Trench Shields

1. Introduction

This booklet is intended to provide basic information for users of the Guardian Aluminium Trench Box System and to draw the client's attention to the practical aspects of Trench Box assembly and installation which need to be considered in compiling method statements. In particular, the client's attention is drawn to the size and weights of the Trench Box components and the need for planning the lifting operations involved. All panels of the Trench Box System have lifting points for safe slinging when the box is assembled and standing on its cutting edges. Lifting operations during box assembly require slinging techniques as detailed in sections 9 and 10.

It is assumed that clients are familiar with general safe practices applicable to this type of work. The Aluminium Trench Box is a trench support system for support of trenches and is not intended for other purposes.

Excavation pressure should not exceed the safe working capacity of the shoring box. All kPa ratings are listed on compliance plates.

To identify which shield you are using by wall thickness.

Super 90mm, Super Size 150mm & Super Size Plus 150mm (red Ends) & City Box 56mm. Check panel compliance plate for the Working Load Limit of shield you are using.

Trench boxes should NOT be used in seawater applications without prior consultation with Guardian.

2. Design

The Aluminium Trench Box system is for normal trenching operations. Methods of estimating lateral earth pressure vary. Typical working pressures that the Trench Box can sustain are as shown on the compliance plate on each panel, and should satisfy most situations. Contact Guardian if further assistance is required. Users are advised to check that their excavation arrangement will not impose greater working pressures than these. Conditions which are likely to increase the lateral earth pressure include:

- Close proximity of structures.
- Excavated or construction materials adjacent to the trench.
- Close proximity of site roads.
- Close proximity of railways

3. Trench Reinstatement

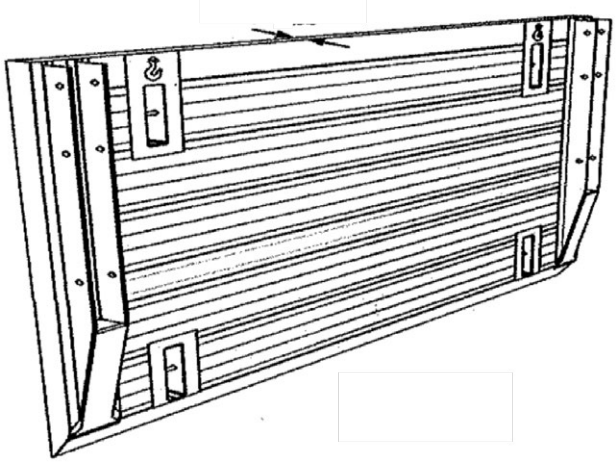
Users should note that some settlement of the reinstated ground and ground adjacent to the trench is likely to occur after backfilling.

How to Assemble a Large Trench Shield Video

Large Trench Shields

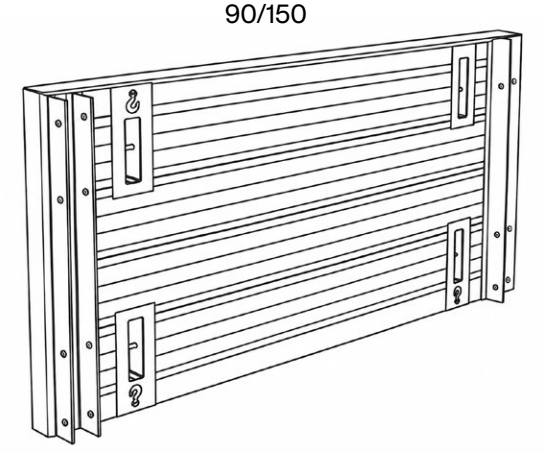
4. Component Identification and Dimensions

90/150

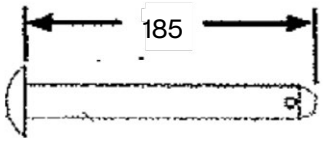


Base Panel

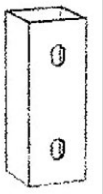
90/150



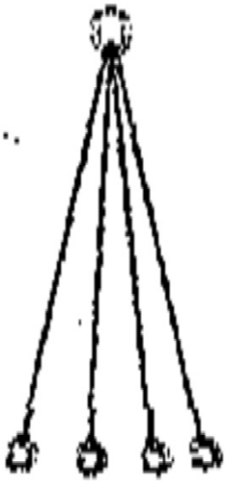
Extension Panel



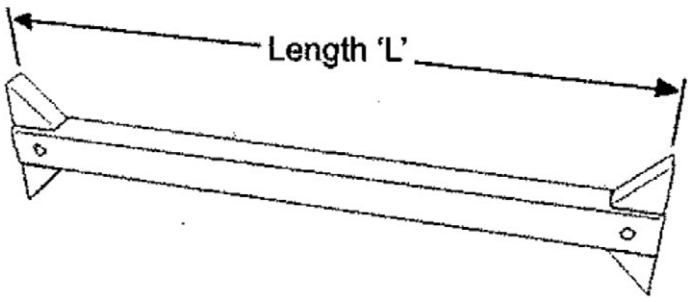
Pin for Strut



Vertical joiner

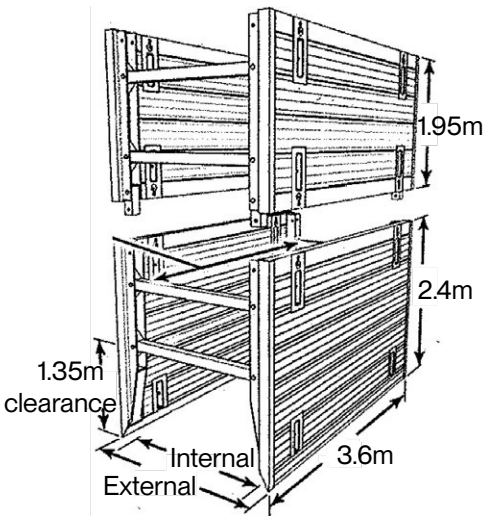


Chain Sling



Struts come in various sizes

- Rigid: 0.8m,1.0m, 1.2m, 1.5m, 1.8m, 2.0m, 2.4m, 3.0m and 3.5m
- Adjustable: 0.8-1.2m, 1.2-2.0m and 1.4-2.4m.



5. Dimensions and Weights of Aluminium Trench Boxes

Shields come in various sizes from 3.6m – 7.2m long
There are 2 panel thicknesses as well.
Super Guardian 90mm thick
Super Deep Guardian are 150mm thick
See compliance plate on each shield for weights

Large Trench Shields

6. Connection Details

The strut is connected to panel using 20mm dia pin x 175mm long and secured with 'R' clip. (see section 9 for base box assembly details)

The extension box is connected to the base box using vertical extension joiners/connectors, one at each corner. Each connector is pinned to extension panel and adjacent base panel using 2 x 20mm x 175mm long pin and secured with 'R' clips. (see section 10 for extension box assembly details)

7. Off Loading and Site Handling of Aluminium Trench Boxes

7.1 Manpower: The health and safety regulations require that personnel deployed are suitably trained, experienced and supervised by a competent person.

7.2 Plant for lifting: A suitable appliance is required for off-loading and assembly. The machine lifting capacity and clearance under the lifting point should be checked against the sizes and weights of the box components and against the assembly/dismantling stages.

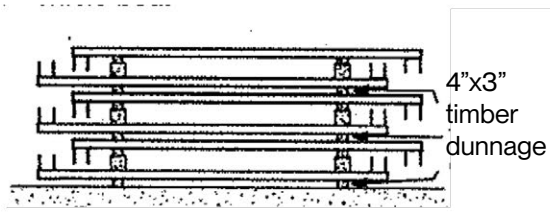
7.3 Lifting chains: Lifting chains of suitable length and capacity complete with current certification are required. Typically for aluminium trench boxes a set of 4 leg 12mm chains with 4m leg length complete with safety hooks and shortening clutches is adequate.

7.4 Edge protection, ladders and possibly other provisions to provide safe access into and out of the trench. (Edge protection and ladder access platforms can be supplied by Guardian).

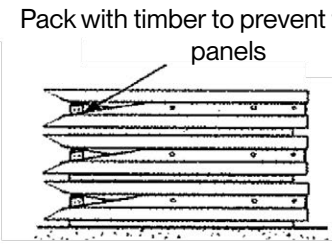
7.5 Return of equipment off-hire clients should ensure that on removal, the equipment is returned in sections as supplied.

8. Stacking, Handling and Transportation

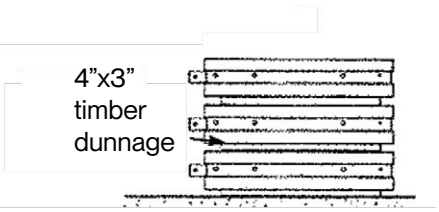
8.1. In dismantled form and in transit base and extension panels should be stacked nested as shown with suitable timber dunnage. (Max 6 panels per stack). Strut components and pins etc should be stored in skips/bins. During transportation stacks should be securely restrained to the vehicle bed.



Base & Extension Panels Max 6 No. per stack with timber packs



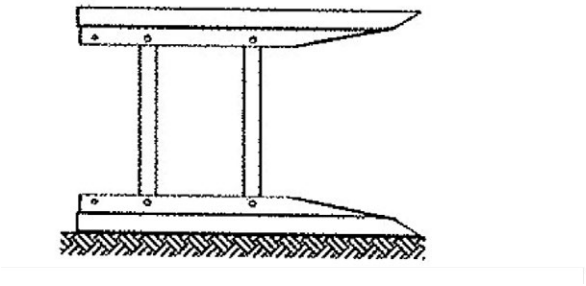
Base Panels (End view)



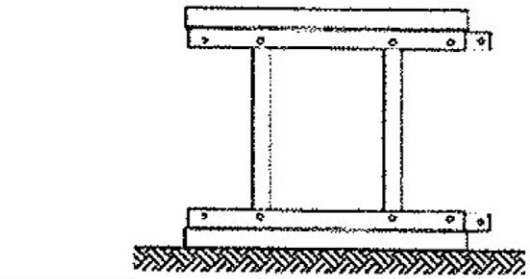
Extension Panels (End view)

Large Trench Shields

8.2 Site Storage
Important: When assembled boxes are not in use, base boxes should always be separated from extension boxes. Due to the light weight of base and extension boxes, they should always be stored laid on their side when not in use to protect them from being blown over.



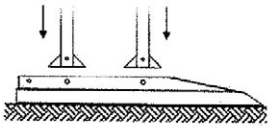
Lie base boxes on their side when not in use.



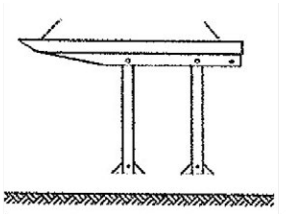
Lie extension boxes on their side when not in use.

9. Typical Site Assembly of Base Box (Dismantling is reverse procedure)

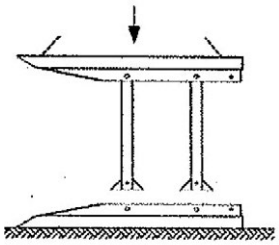
9.1. Lie both base panels flat on the ground with strut connector points facing upwards. Pin 4 struts into position using 20mm dia pins and 'R' clips. Each strut should be lifted in turn using a choke hitch around one of the strut ends.



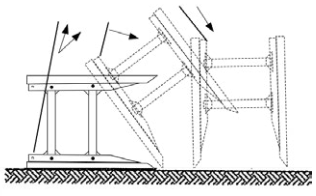
9.2. Re-sling this panel with the struts hanging downwards.
(Use all 4 legs of the lifting chain).

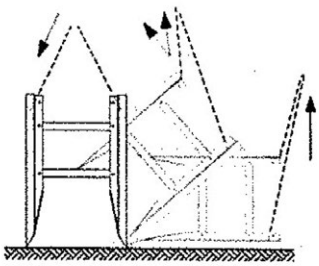


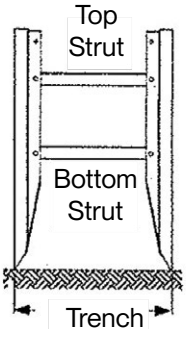
9.3. Complete assembly of the base box on its side by pinning the struts to the lower panel using Pins & 'R' clips. Do not release the weight of the top panel until all of the pins and clips are in place



9.4. Carefully turn this base panel over using 2 legs of the four leg sling





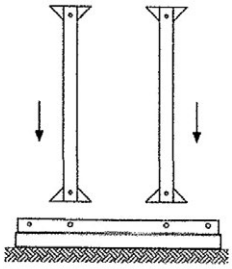


9.5. Attach 2 chains of sling to UPPER lifting points on UPPER MOST panel and 2 chains to UPPER lifting points on LOWER panel as shown. Stand box on its cutting edges with great care to avoid damaging the struts. It is important that the weights and radius are well within the lifting capacity of the machine to allow for impact and lurching effects as the box is turned upright. The completed base box can now be lifted on 4 chain legs. See Section 8 for guidance on safe storage.

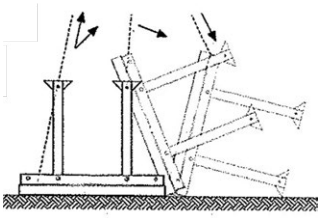
Large Trench Shields

10. Site Assembly of Extension Box (Dismantling is reverse procedure)

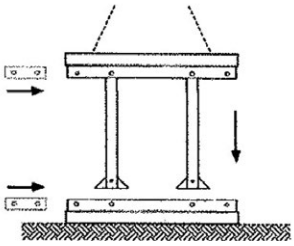
10.1. Lie both extension panels flat on the ground with flanges pointing upwards. Pin 4 Struts into position using 20mm dia pins and 'R' clips. Each strut should be lifted in turn using a choke hitch around one of the strut ends.



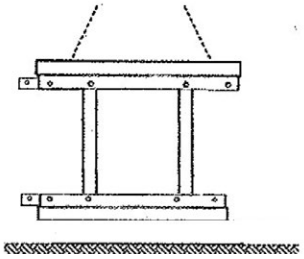
10.2. Carefully turn this extension panel over using 2 legs of the four leg sling.



10.3 Using all 4 legs of the lifting chain, re-sling this panel with the struts hanging downwards.

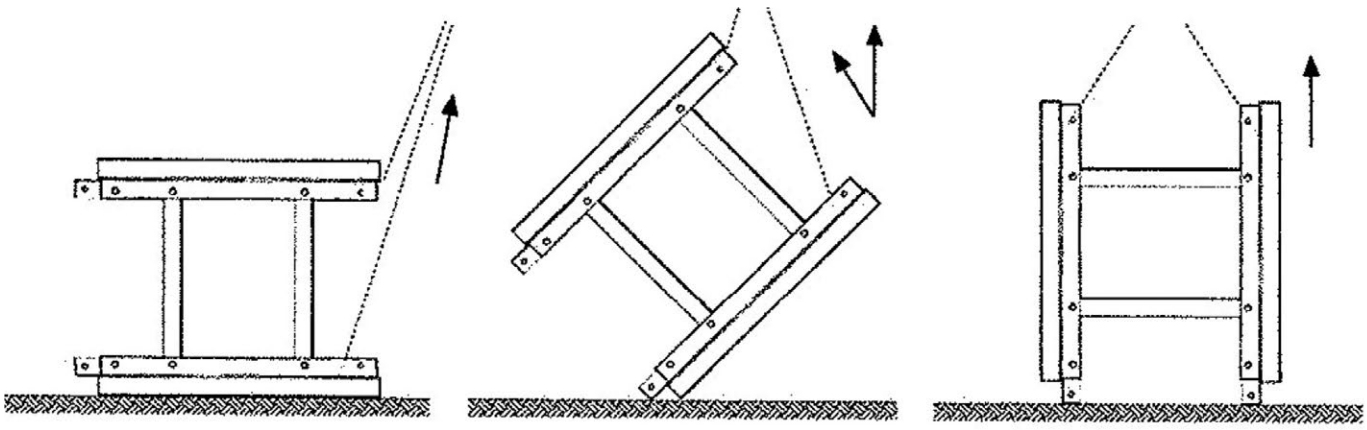


10.4. Complete assembly of the extension box on its side by pinning the struts to the lower panel using pins and 'R' clips. Do not release the weight of the extension panel until all of the pins and clips are in place. Pin 4. extension joiners/ connectors to the base of the finished extension box assembly (1 per corner) using pins.



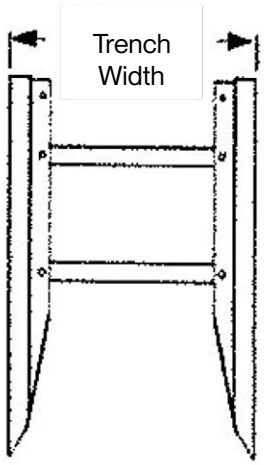
10.5. Attach 2 chains of sling to UPPER lifting points on UPPERMOST panel and 2 chains to UPPER lifting points on LOWER panel as shown below. Stand the box upright taking great care to avoid damaging the struts and extension connectors.

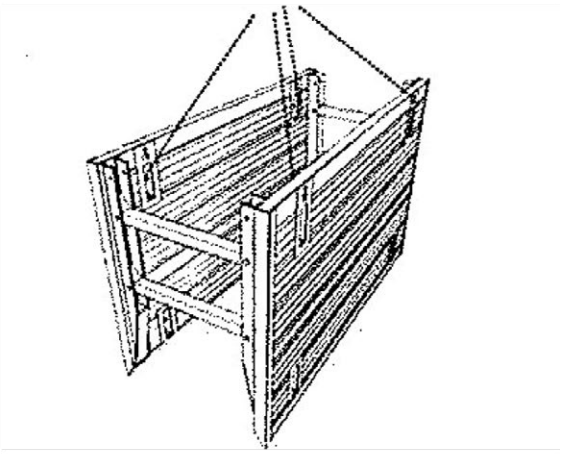
10.6. It is important that the weights and the radius are well within the lifting capacity of the machine to allow for impact and lurching effects as the box is turned upright. The completed extension box can now be lifted on 4 chain legs. The extension box is now ready to mount onto the base box. See Section 8.2 for guidance on safe storage.



Large Trench Shields

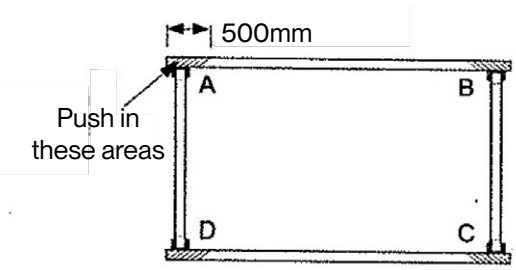
11. Installation of Base Boxes

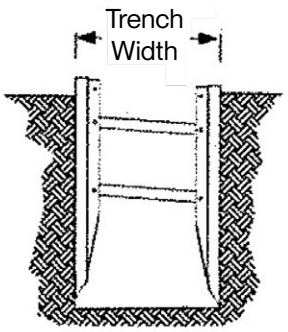




11.1. After following the assembly procedure check all pins and safety clips are in place.

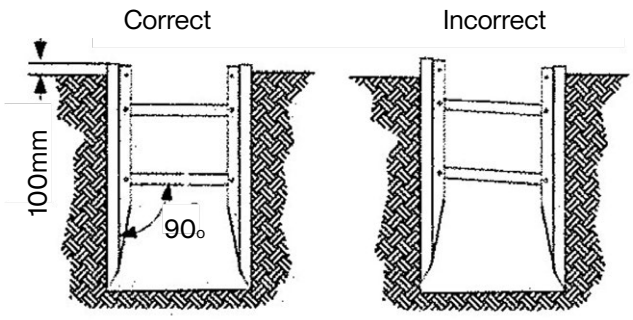
11.2. Lift the box using the 4 leg chain sling attached to the lifting points at the top of each panel.





11.3. Dig the trench to correct width and as close to full depth as reasonably practicable. Using the 4 leg chain sling place the box in the trench. If full depth is not achieved prior to placement, the trench box can be installed to correct depth by digging between the box panels, and CAREFULLY pushing down on the ends of the panels. When pushing the box panels down, always push down on each panel in sequence and never diagonally across corners i.e. push A & B followed by C & D and never A & C or B & D. Always dig below the panels before pushing down. Push only on the end 500mm of each panel and never in the middle.

11.4. Rotation about the pinned strut ends is limited. Great care must be taken not to push too far on the panel corners during the 'dig and push' operation (11.3) so as not to cause damage to the struts or panels.

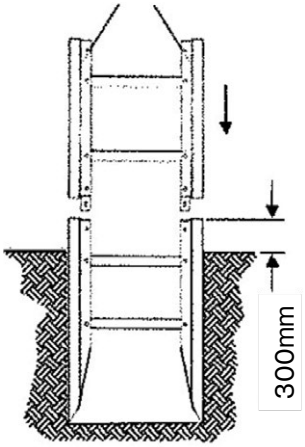


11.5. When the box is installed to full depth, ensure that the struts are horizontal and at right angles to the panels before entering the trench. DO NOT use any unsupported part of the trench for access. Leave the top of the box 300mm min. above the surrounding ground level.

Large Trench Shields

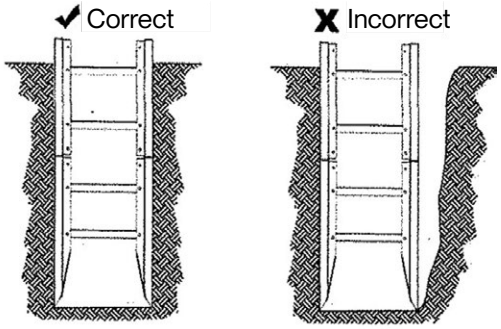
12. Installation of Extension Boxes

12.1. Install Base box as per section 11 leaving the top of the box 300mm above surrounding ground level.
12.2. Use 4 leg chain to sling the extension box (complete with extension connectors) into position over the base box.
12.3. Fit one side of the extension box to the base box first to ensure correct alignment. Ensure the extension connectors on the extension panel enter the slots in the base panel end post. Pin with 1 per corner.
12.4. Repeat for second extension panel to complete base box and extension box assembly.
12.5. Carefully continue the 'dig and push' process (11.3) until full depth has been reached. Leave the top of the box 100mm min. above the top of the surrounding ground level. BE AWARE of ground conditions before stacking more than 2 extension boxes on base box unit.

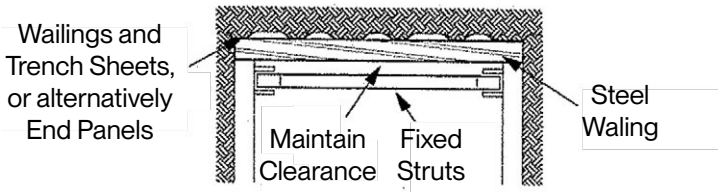


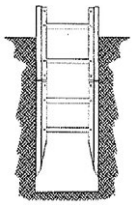
13. Installation of Extension Boxes

13.1. General. Ensure that there are no voids between the box panel and the trench sides as this may cause the box to move sideways. AS GOOD PRACTICE it is recommended for the trench to be no more than 150mm wider than the shield. If wider then place some spoil in the area between shield and trench wall.



13.2. End closures. When stopping off the end of the trench, steel walers should be used to support the sheets off the end of the panels. Never use the struts as supports for the trench sheets. Guardian can also supply End Panels to close off the end of the trench.





DO NOT leave the base of the box "flying above the excavations level

13.3. Entering the Supported Excavation

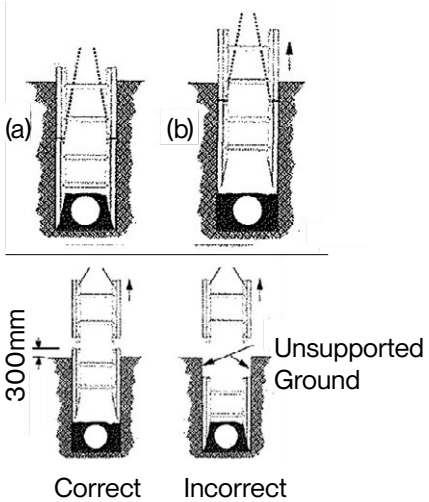
13.3.1.Use a ladder to enter the working space between the struts of the trench box. DO NOT climb up or down the struts.
13.3.2.DO NOT use any unsupported part of the trench for access.
13.3.3.DO NOT move the box when personnel are inside it.
13.3.4.Wear a safety helmet to minimise the risk of injury.

14. Extraction of Aluminium Trench Boxes

NOTE: No person should be in the trench during extraction.

14.1. After initial backfilling (a) and compaction, liftthe base box complete with extension box (if fitted) from the trench using the 4 leg chain attached to the upper lifting points on the two base panels (b). Continue back-filling as removal of the box proceeds.

14.2. Alternatively if the extension box is to be removed from the base box, lift as per 14.1, until the base box is approx. 300mm above ground level. Remove 4 corner connecting pins, re-sling and lift the extension box off the base. Continue backfilling as removal of the base box proceeds. DO NOT remove the extension box before the top of the base box is above ground level.



The ILUO Method

Four-sided shoring is assembled in four steps: I, L, U, O. Each step builds on the last. Work through them in order.

Start by removing all panels from the transport vehicle using the designated lifting points. Lay them flat on a stable surface, strut channel facing up. Fit the corner brackets into the channels and secure each one with the correct pins.

STEP I

STAND THE FIRST PANEL

1. Attach lifting chains to the top two integrated lift points.
2. Lift the panel upright and set it down on its knife edge or base.
3. Stabilise the panel by leaning it against a spoil pile, or hold it steady with the excavator bucket placed gently against the top.



SAFETY

Never stand in front of or behind a panel. All work at this step must be done from the side. Keep everyone clear of the fall zone.

STEP L

STAND THE SECOND PANEL

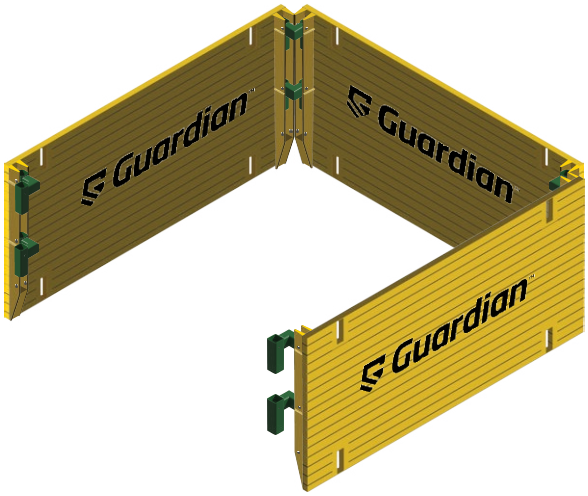
1. Bring in the second machine and attach a fresh set of lifting chains to the top two lift points of the next panel.
2. Lift the second panel upright and bring it to meet the first pane
3. Secure the corner bracket pins.
4. Fit the R-clips then remove both sets of lifting chains. The L is now self-supporting — one machine is all you need from here.



STEP U

ADD THE THIRD PANEL

1. Lift the second panel upright and bring it to meet the first panel.
2. Stand the panel upright using the samemethod as before.
3. Keep the lifting chains attached until the panel is fully pinned. Fit R-clips, then remove chains.

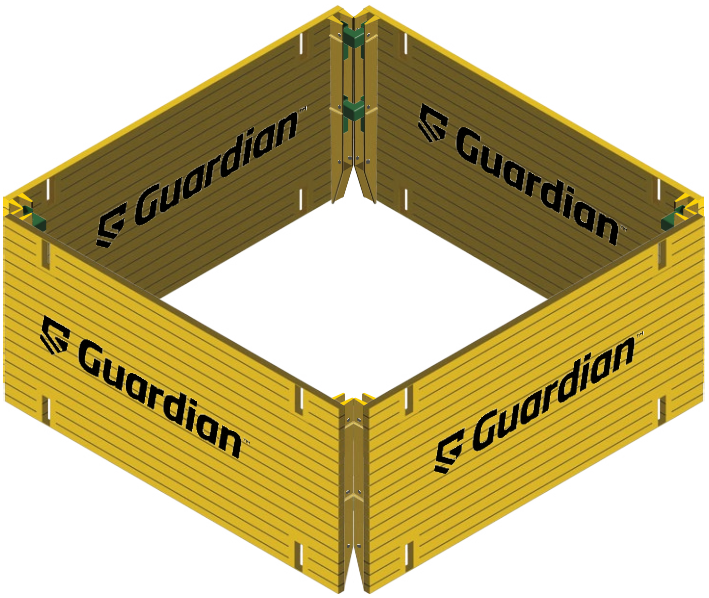


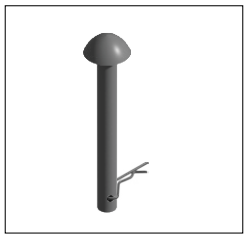
Large Trench Shields

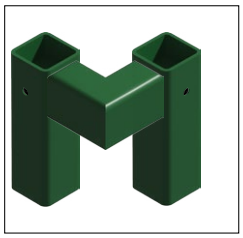
STEP O

CLOSE THE BOX

1. Fit the last two corner brackets into the fourth panel and secure with pins and R-clips.
2. Stand the panel upright using the same method as before.
3. Bring it across to close the box. Line up the corner brackets with the channels in the adjoining panels. Small adjustments to the other panels may be needed to get the spacing right.
4. Insert the pins and secure with R-clips. The four-sided assembly is complete.





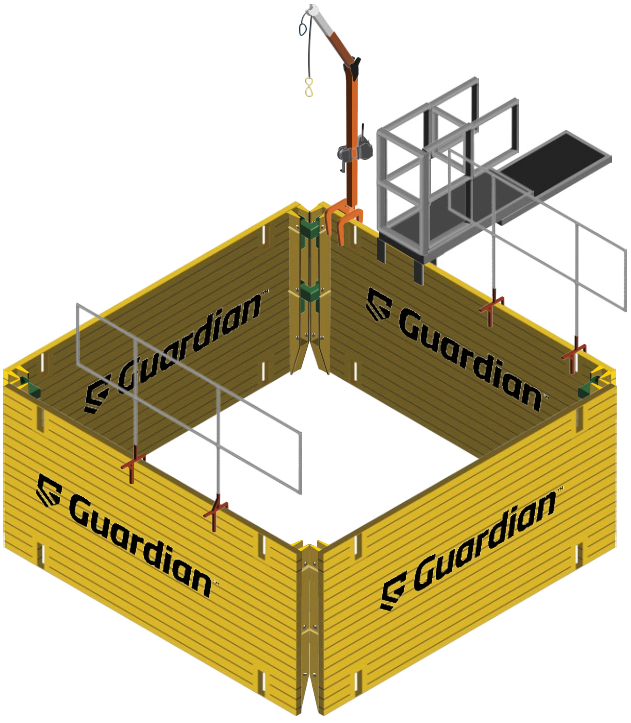


Installing into the Trench

1. Connect lifting chains to the two opposing panels and lift the complete assembly.
2. Lower the assembly into the trench.

Tip:

If using the dig and push method to bring the assembly to depth: always excavate as close as possible to the underside of each panel. Push each corner down in turn — no more than 100 mm per side relative to the opposing side. Even, gradual movement keeps the assembly square and safe.



Manhole Boxes

1. Introduction

This booklet is intended to provide basic information for users of the Guardian Aluminium Manhole Box 2m x 2m, 2.4m x 2.4m and 3.0m x 3.0m and to draw the client's attention to the practical aspects of Manhole Box assembly and installation which need to be considered in compiling method statements. In particular, the client's attention is drawn to the size and weights of the Aluminium Manhole Box components and the need for planning the lifting operations involved. The Aluminium Manhole Box panels have lifting points for safe slinging when the box is assembled. Lifting operations during box assembly require slinging techniques as detailed in sections 9 and 10.

It is assumed that clients are familiar with general safe practices applicable to this type of work. Aluminium Manhole Boxes should NOT be used in seawater applications without prior consultation with Guardian.

2. Design

Methods of estimating lateral earth pressure vary. Typical working pressures that the Aluminium Manhole Box can sustain are as shown below and should satisfy most situations. Contact Guardian if further assistance is required. Users are advised to check that their excavation arrangement will not impose greater working pressures than these.

Conditions which are likely to increase the lateral earth pressure include:

- Close proximity of structures.
- Excavated or construction materials adjacent to the trench.
- Close proximity of site roads.
- Close proximity of railways.

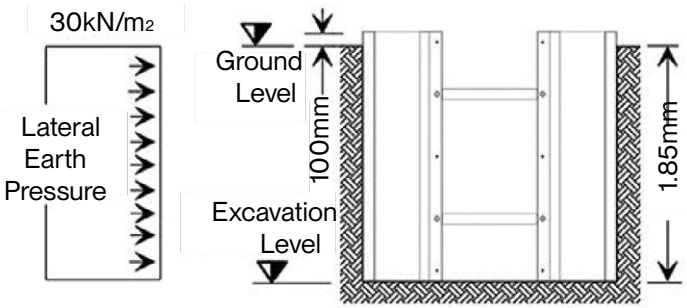
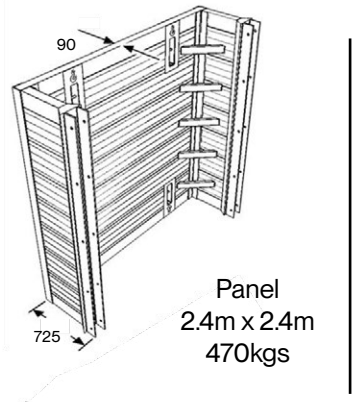


Diagram is for 2m x 2m manhole box

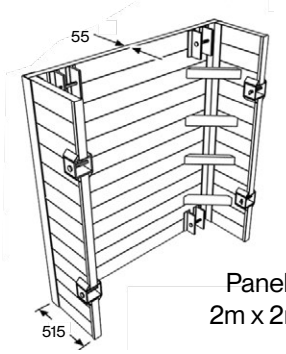
3. Trench Reinstatement

Users should note that some settlement of the reinstated ground and ground adjacent to the trench is likely to occur after backfilling.

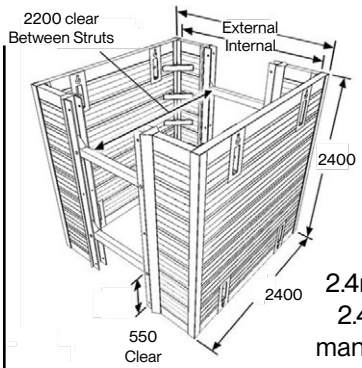
4. Component Identification and Dimensions for 2m x 2m and 2.4m x 2.4m boxes is shown below, but the 3.0m x 3.0m x 90mm is also available in the same design as the 2.4m x 2.4m box.



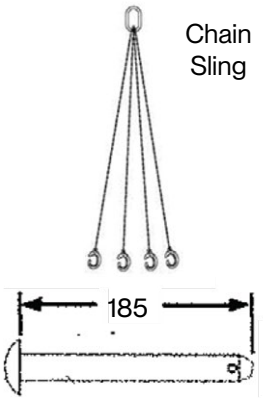
Panel 2.4m x 2.4m 470kgs

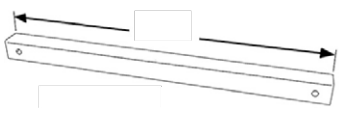


Panel 2m x 2m

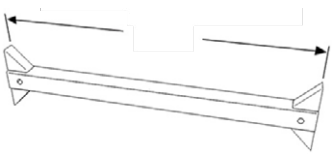


2.4m x 2.4m manhole box





Fixed Strut 0.8m also available



Struts come in various sizes ▪ Rigid: 0.8m,1.0m, 1.2m, 1.5m, 1.8m,2.0m, 2.4m, 3.0m and 3.5m

▪ Adjustable: 0.8-1.2m, 1.2 - 2.0m and 1.4-2.4m" and adjustable.

Manhole Boxes

5. Precautions During Use and Maintenance

5.1. Regularly check that all pins and 'R' clips are fitted correctly.
5.2. Avoid laterally loading the fixed struts – either by hanging or propping from them or by accidentally striking them. Damaged struts should not be used.

6. References: Trenching Code of Practice 1988

7. General

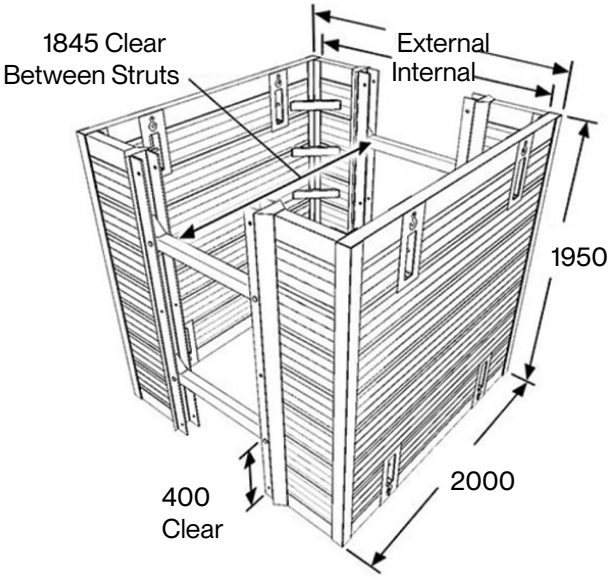
Since our policy is one of continual improvement, components may vary in detail from the descriptions given in this publication

8. Dimensions and weights of Aluminium Manhole Boxes

Panel Type	Panel Length (m)	Panel Height (m)	Safe Working Load (kPa)	Panel Thickness mm	Uder Strut Clearance mm	Unit Weight Incl. 1000mm Struts (kg)
Unit	2	2	30	56	560	560
Unit	2.4	2.4	70	90	1150	1000
Unit	3.0	3.0	50	90	1150	1155

9. Connection Details

The fixed strut is connected to the manhole panel using the pin and secured with 'R' clip. See section 9 for box assembly details.



Dimensions of 2m x 2m manhole box

10. Off Loading and Site Handling of Aluminium Manhole Boxes

101. Manpower: The health and safety legislation requires that personnel deployed are suitably trained, experienced and supervised by a competent person. The main activities associated with aluminium trench shield installation are :

- Unloading the delivery vehicle.
- Pinning the components together.
- Lifting the assembled shield into and out of the trench.

10.2. Connection Details

A suitable appliance is required for off-loading and assembly. The machine lifting capacity and clearance under the lifting point should be checked against the sizes and weights of the box components and against the assembly / dismantling stages.

Warning: If an excavator is being used for lifting operations lifting chains should be used.

10.3. Lifting Chains

Lifting chains of suitable length and capacity complete with current certification are required. Typically for aluminium trench shield a set of 4 leg 7mm chains with 4m leg length complete with safety hooks and shortening clutches is adequate.

10.4.Edge protection, access and hard standing areas

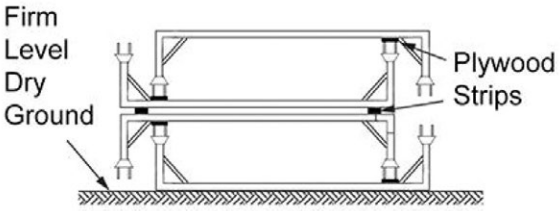
These include:

10.4.1. Suitable area to off-load the truck and assemble the Manhole Box.
10.4.2. Suitable hard standing for the machine to operate to lift the shield into the trench.
10.4.3. Suitable access equipment (ladder or staging) for connection / removal of lifting chains.
10.4.4. Edge protection, ladders and possibly other provisions to provide safe access into and out of the trench

Manhole Boxes

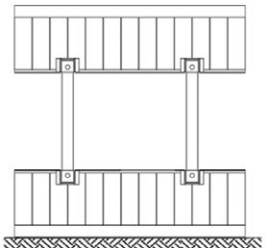
11. Stacking, Handling and Transportation

11.1. In dismantled form and in transit
Manhole panels should be stacked as shown with suitable timber dunnage. (Max 4 panels per stack). Struts and pins etc should be stored in skips / bins. During transportation stacks should be securely Restrained to the vehicle bed.



11.2. Site storage
Important due to their light weight, boxes should be stored on their side when not in use to prevent them from being blown over.

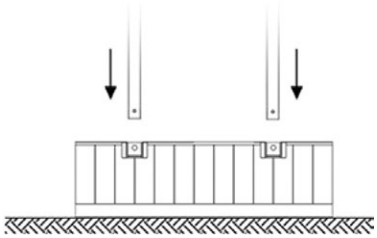
Lie base boxes on their side



12. Site Assembly of Aluminium Manhole Boxes (dismantling is reverse procedure)

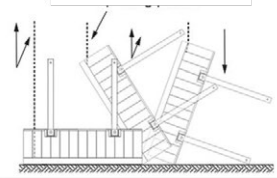
NOTE: It is important that the struts are fully retracted at all stages to maintain full range of strut adjustment

12.1. Lie first base panel flat on the ground with the wings pointing upwards. Pin fixed struts into position using the pins and 'R' clips. Each strut should be lifted in turn using a choke hitch

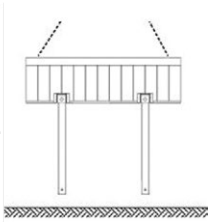


12.2. Carefully turn this panel over using 2 legs of the 4 leg sling, Re-sling this panel with the struts hanging downwards (Use all 4 legs of the lifting chain). Hold the panel on the lifting chains.
Important: Before lifting panels, ensure pins at lifting points are securely fastened with 'R' clips

Attach hooks to top lifting points



Max weight 250kg approx.

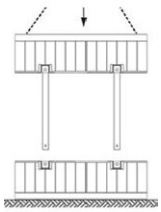


Attach chain legs to lifting points

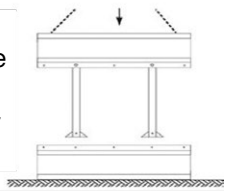
12.3. Complete the assembly of the Manhole box on its side by pinning the struts to the lower panel using the pins and securing with 'R' clips. Do not release the weight of the top panel until all of the pins and clips are in place.

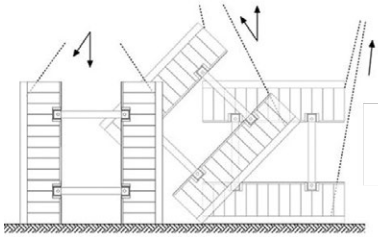
Remove 4 leg sling.

12.4. Attach 2 chains of the 4 leg sling to the UPPER lifting points of uppermost panel and 2 chains to the UPPER lifting points of the lowermost panel. Stand the box upright with great care to avoid damaging the struts. It is important to ensure the weights and radius are well within the lifting capacity of the machine to allow for impact and lurching effects as the box is turned upright. The completed base box can now be lifted on 4 chain legs. See section 8 for guidance on safe storage.



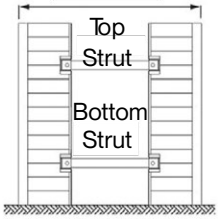
- A crane may be required to assemble boxes.
- Suitable access may be required to move chains.





Max weight 432kg approx.

Trench Width

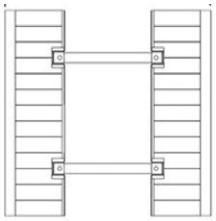


Manhole Boxes

13. Installation of Aluminium Manhole Box

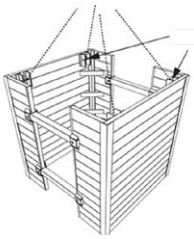
13.1. After following the assembly procedure shown in section 9, check all pins and 'R' clips are securely in place.

Box width



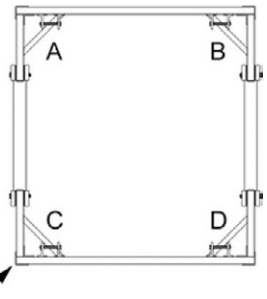
13.2. Lift the box using the 4 leg chain sling attached to the lifting points at the top of each Manhole box panel.

Important Ensure pins at lifting points are securely fastened with 'R' clip



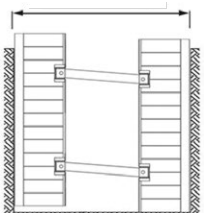
13.3. Dig the Manhole to the correct width and as close to full depth as reasonably practicable. Using the 4 leg chain sling place the box in the excavation. If full depth is not achieved prior to placement, the manhole box can be installed to correct depth by digging between the box panels and CAREFULLY pushing down on the ends of the panels. Always dig below the panels before pushing down. Push only on the corners of each panel and never in the middle.

When pushing the box panels down, always push down on each panel in the sequence shown and never diagonally across corners. i.e push A then B followed by C then D, and not A then C or B then D.



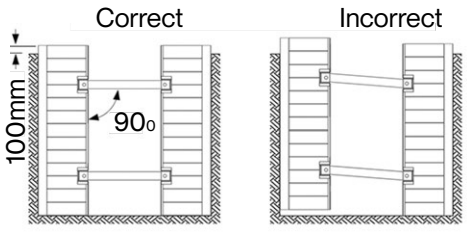
Push Corner

13.4. Rotation about pined strut end is limited. Great car must be taken not to push too far on the panel corners during the 'dig and push' operation (10.3) so as not to cause damage to struts or panels



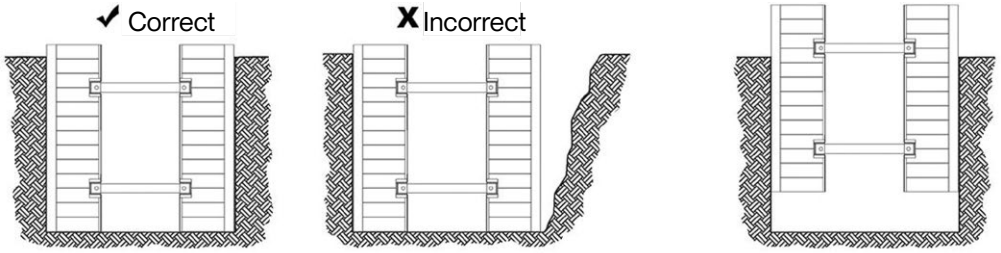
13.5. When the required excavation level is reached and the box sunk to full depth, ensure the struts are horizontal and at right angles to the panels before entering the excavation.

DO NOT use any unsupported part of the excavation for access. Leave the top of the box 100mm min. above the surrounding ground level.



14. Before Entering the Manhole Excavation

14.1. General



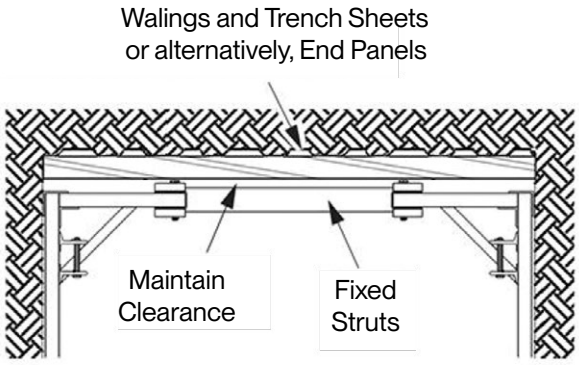
Ensure that there are no voids between the box panel and the trench sides as this may cause the box to move sideways.

DO NOT leave the base of the box 'flying' above the excavation level.

Manhole Boxes

14.2. End Closures When stopping off the end of the trench, steel walers should be used to support the sheets supported off the projections at the end of the panel wings. Never use the struts as supports for the trench sheets. Guardian can supply End Panels to close off the end of the trench.

Important; End panels will rest on the strut securing pins. The pins should therefore be oriented with the 'R' clip on the inside of the box.



15. Entering the Supported Excavation

15.1. Use a ladder to enter the working space between the struts of the Manhole Box.
DO NOT climb up or down the struts.
15.2. DO NOT use panel corner braces as a means of access.
15.3. DO NOT use any unsupported part of the trench for access.
15.4. DO NOT move the box when personnel are inside it.
15.5. Wear a safety helmet to minimise risk of injury.
15.6. Ensure that the excavator operator is aware of your intentions

16. Extraction of Manhole Boxes

Due to the consolidation of the ground against the panels, it is usually more difficult to extract Manhole boxes than to insert them.

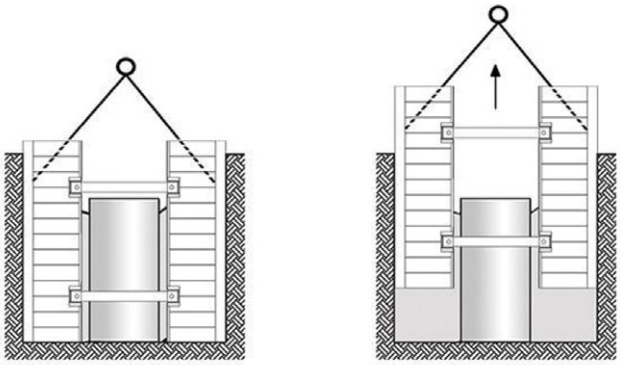
Methods for extracting are as follows, remembering that all lifting must be done at the points provided.

NOTE: No personnel should be inside the Manhole Box whilst extraction is in progress.

After initial backfilling and compaction, lift the box from the manhole using the 4 leg chain attached to all upper lifting points of the panels. Continue backfilling as removal of the box proceeds.

17. Precautions During Use and Maintenance

17.1. Regularly check all pins are in place and 'R' clips are fitted.
17.2. Avoid laterally loading the struts – either by hanging or propping from them or by accidentally striking them with site plant. Damaged struts should not be used.



18. General

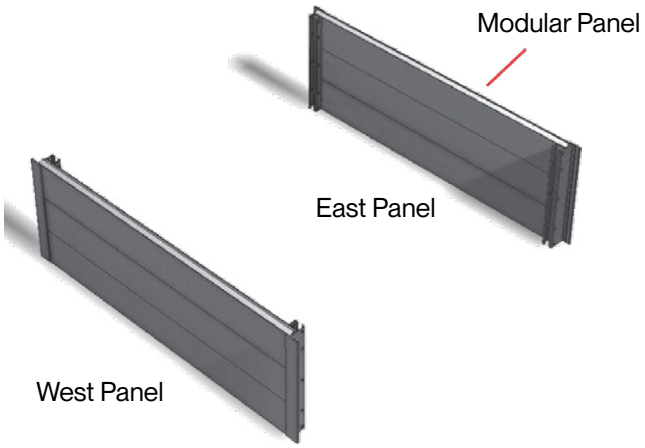
Since our policy is one of continual improvement, components may vary in detail from the descriptions given in the publication.

Modular Trench Shoring System

3-Sided Modular Box Assembly

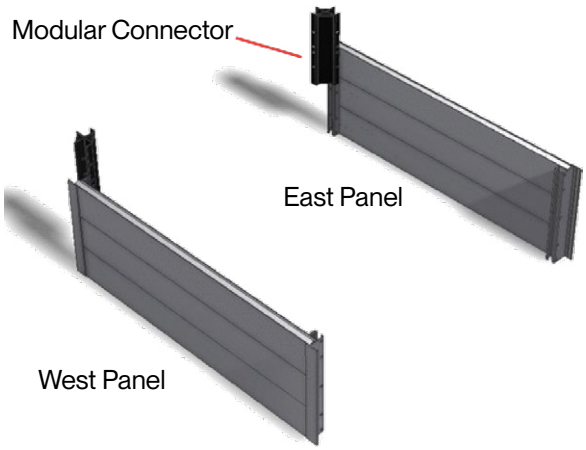
Step 1:

On a flat work surface, place the east and west panels at the approximate desired width.



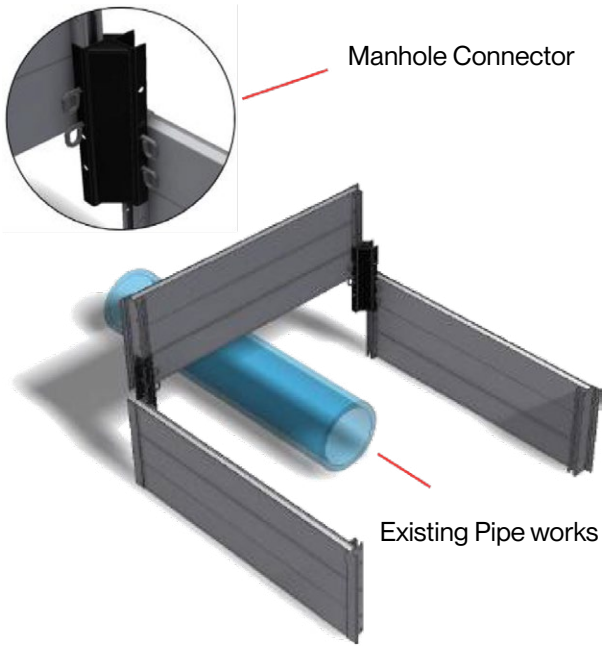
Step 2:

Install the steel manhole connectors on the north end of the panels and secure them using the exclusive locking pins (note that the pins require no keepers)



Step 3:

With the manhole connectors in place, install the north (end panel) Note that the panel can be installed 600mm off the bottom allowing the System to straddle existing pipe works.



Step 4:

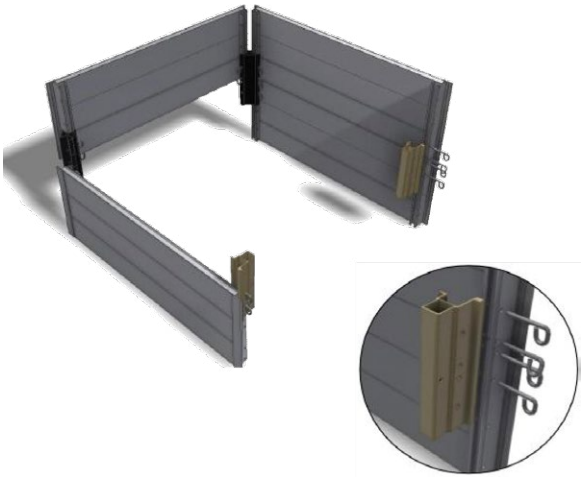
Install the next east or west panels. Note that the panels may be Installed by “walking” the panels into place. Eliminating the need to guide the panel through a taller corner connector.



Modular Trench Shoring System

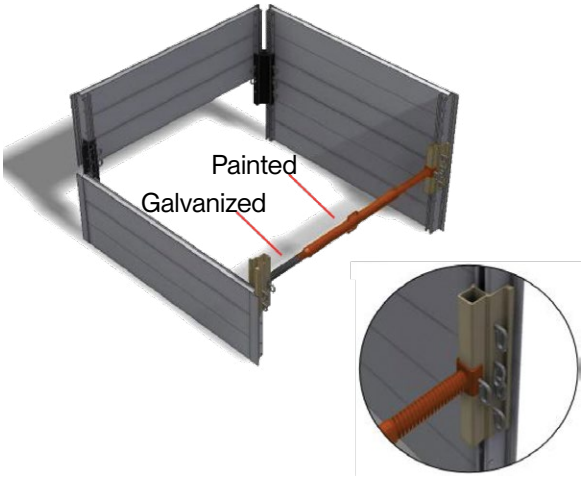
Step 5:

On the south end, install 2 panel connectors (1 on each east and west panels.)



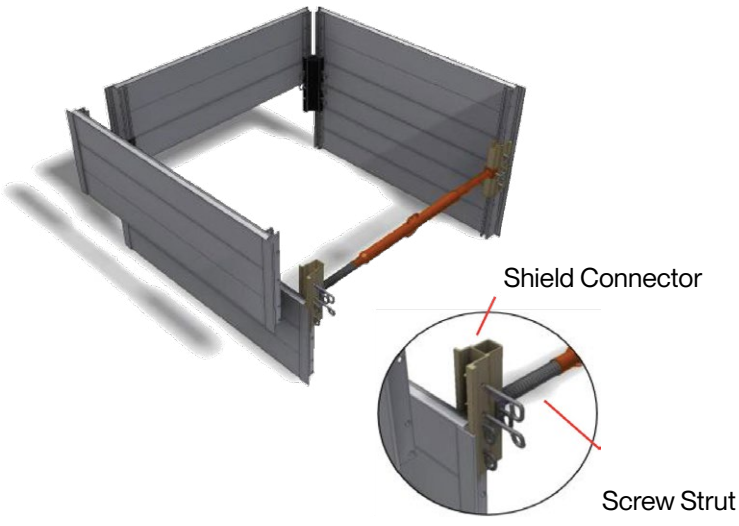
Step 6:

With the panel connectors in place, install the appropriate strut (Note that the each strut comes with one galvanized end and one painted end.) Make sure to match up ends when using Multiple struts. The paint code is an indication of direction the strut will adjust.



Step 7:

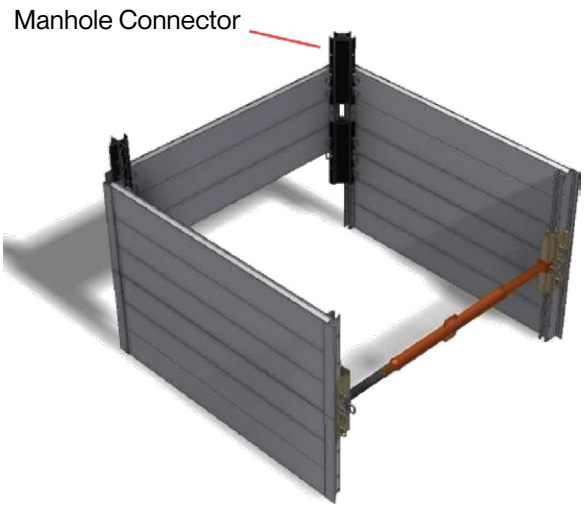
On the south end, install 2 panel connectors (1 on each east and west panels.)



Step 8:

With the panel connectors in place, install the appropriate strut.

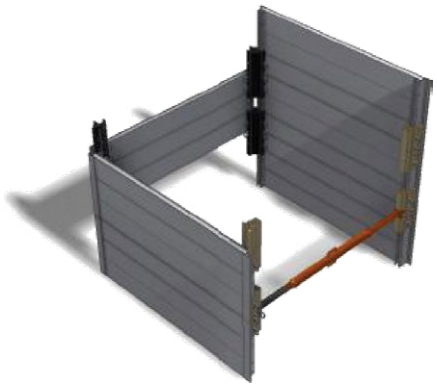
Note that the each strut comes with one unpainted galvanized end and one painted. Make sure to match up ends when using multiple struts. The paint code is an indication of direction the strut will adjust.



Modular Trench Shoring System

Step 9:

On the south end, install 2 panel connectors (1 on each east and west panels.)



Step 10:

With the panel connectors in place, install the appropriate strut. Note that the each strut comes with one unpainted galvanized end and one painted. Make sure to match up ends when using multiple struts. The paint code is an indication of direction the strut will adjust.

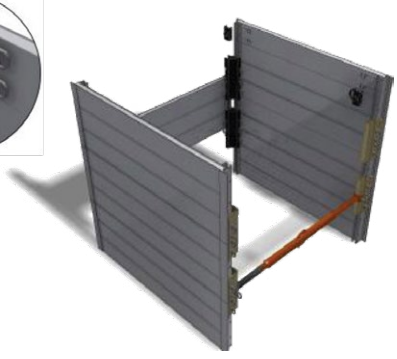


Step 11:

Install the lift eyes to the top of the upper most panels. Secure using the locking pins



Lift eye assembly



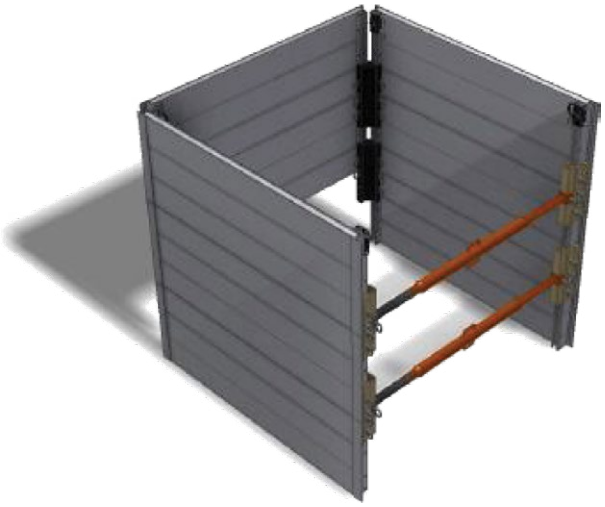
Step 12:

Once all 4 lifting eye assemblies have been secured, install the last panel on the north end and secure to the manhole connector with the locking pins.



Step 13:

Install the last strut at the south end by securing it to both the east and west panel connectors using the locking pin. Make sure that the strut is installed with the same painted or unpainted ends matching with all previously installed struts.



Modular Trench Shoring System

Caution

Excavation procedures may cause injury or death!

A competent person who satisfies the definition and intent of the 1926 construction standard subpart p excavations shall: ensure that all employees are working in safe conditions and that all employees have been trained in correct excavation procedures and the proper use of the protective equipment chosen.

Excavations and protective equipment shall be inspected a minimum of once each working day and whenever there is a change in the soil conditions and/or other changes such as an increase or decrease in water or vibrations.

Employees shall not be allowed to enter an excavation that is not properly shored, shielded, or sloped.

Employees shall always enter, work, and exit within the shored, shielded, or sloped areas of the excavation and/or trench.

All lifting and pulling equipment, including cables, slings, chains, shackles and safety hooks shall be inspected for damage or defects prior to use and shall be evaluated for suitability and capacity.

This GME tabulated data provides a general set of guidelines to assist the competent person in the selection of a protective system for employee safety. The responsibility for job site safety and the proper selection, installation and removal of the shoring equipment belongs to the competent person designated for that jobsite. This tabulated data is not intended to be used as a job specific excavation/trenching safety plan, but shall be used by the competent person. Tabulated data is intended as a supplement to his/her training, experience and knowledge of safe procedures, job site conditions and soil types. Tabulated data is intended to assist him in the selection of an appropriate protective system for employee safety.

Guardian SHIELD SYSTEM TABULATED DATA

GENERAL:

1. This data has been prepared by a Registered Professional Engineer as required by OSHA standard 29 CRF, Part 1926, Subpart P, Excavations.
2. This data is to be used by the “competent person” for the proper use and placement of the Guardian Shield System components.
3. “Competent person” is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
4. When there is a discrepancy concerning the use of protective systems between this tabulated data and the OSHA standard, this data shall take precedence. Any topic not covered by this data shall be governed by the OSHA standard.
5. GME shall not be liable for damage or injury resulting from improper use of the Guardian Shield System. Improper use of or modifications to the structural components not specifically authorized by GME without the written consent of GME shall void this data and all manufacturers’ warranty.

GENERAL:

1. 1. All personnel involved with the use of Guardian Shield System shall be trained in the proper use and installation procedures and other applicable safety requirements.
2. The Guardian Shield System shall be used only in soil conditions indicated in this data.
3. Refer to the installation procedures for typical installation figures.
4. The system shall be installed in a manner to prevent lateral or otherwise hazardous movement.
5. The struts shall not be used to support side loading, nor shall the system be lifted, pulled or moved by the struts. The system shall be installed and extracted by the lifting eyes provided by the manufacturer. Struts are not designed to support vertical loads and shall not be used to provide access or egress to the trench
6. This data is valid for Guardian Shield components in structurally sound condition. Any significant damage will void this data, and all manufacturers’ warranty. The damaged components shall not be used.
7. When the system is used in a three or four-sided assembly, a bottom panel may be left out on one side or on two opposite sides.

Modular Trench Shoring System

SOIL CLASSIFICATION

1. See the OSHA regulations for descriptions of Type A, B, and C soils.
2. Type C-60 soil is a soft cohesive or moist granular soil that is not flowing or submerged. This soil can be cut vertically and will stand long enough to safely install the protective system.

NOTES FOR TABULATED DATE

1. The top strut of the system shall be no more than 609.6mm below the top of the panel elements.
2. The lowest strut of the system shall be no more than 609.6mm above the bottom of the excavation. All additional struts shall be spaced at a maximum of 1219.2mm to the top of the excavation.
3. Shield Connectors shall be pinned at each panel joint and struts shall be connected to the Shield Connectors.
4. Surcharge loads are not included in the maximum depth tables. Surcharge loads are possible due to heavy equipment, vibrations, or soil piles adjacent to the trench. (Adjacent is defined as within a distance equal to the depth of the trench.)
5. If the system is used in a three or four-sided configuration with different sized panels, the maximum depth of the excavation shall not exceed the depth rating of the longer panel as indicated in the maximum depth table.
6. All strut components shall be approved or manufactured by GME.

Lite Shield Maximum Depth Table (1.1)				
	Soil Type			
Item number	A	B	C-60	C-80
2411	15.24m	15.24m	12.19m	9.14m
2412	15.24m	10.06m	9.45m	7.71m
2413	15.24m	9.5m	7.32m	5.49m
2414	10.06m	6.19m	2.27m	3.35m
Maximum Vertical Piple Clearance = 600m				

How to Assemble Modular Trench Shoring System

Ladder Platform and Telescopic Walkway

1. Introduction to system

Our Guardian Ladder Mate Platform and Telescoping Walkway provides multiple users with a safe means of access and egress to and from the ground excavation and allowing users a safe 3-points of contact at all times.
This system features high quality lightweight aluminium extrusions and easy to adjust clamping screws. The Guardian ladder mate platform and telescoping walkway, can be used on all our aluminium shoring panels with minimum thickness of 50mm and up to 200mm.

The product has been tested to AS/NZS5532:2013 and complies with the all relevant Australian standards.

Specification
Capacity: 1 worker at 136kg including all clothing, tools and equipment. Maximum WLL 2.5kN.
1.2. Material & Construction Structure: Extruded Aluminium Hardware: Graded / Galvanized Finish (aluminium): Mill Finish
1.3. Safety Instructions - MUST BE READ PRIOR TO USE

- Prior to use, ensure all operating procedures have been read and understood (if you have difficulty in reading the instructions, have someone read them to you).
- System only to be used by someone who is deemed competent in its use.
- Use appropriate personal protective equipment (PPE) when installing and using /mounting the laddermat and walkway system.
- Work area - All non-operational bystanders are to be kept clear of work area.
- Pinch points - Always wear gloves and beware of pinch points during installation and operation
- Lifting requirements - Ask for assistance when lifting/moving heavy components. Before lifting, take an extra step to position your body close to the load. Remember to keep a straight back, use your leg muscles to take the weight and avoid twisting when lifting or carrying a load.
- Slips, Trips and Falls - Be aware of soft or uneven ground near the excavation site and keep work area clear of excess tools,
- equipment etc.
- This system is only to be installed by competent persons who have an understanding of the dangers associated with excavations and ground collapse hazards (Guidance can be sought from Excavation and Construction Codes of Practice).
- Ensure all workplace OH&S requirements are identified and understood. A risk assessment complete with a site specific
- safe work method procedure must be completed and approved by management prior to work commencing.
- This system requires periodic inspection and maintenance by a competent person The system “MUST NOT” be used if any part of it is overdue for service, inspection or is damaged. It is recommended that a daily visual inspection is carried out by a competent person.
- Visually inspect the system for damage prior to use. The system must not be used if there is any deterioration or deformation
- of any components or the structure to which the system is attached.
- Ensure all fixings, fittings and components are securely attached. Any tightening, adjustment or replacement of components must be carried out by a competent person. .
- This user manual does not in any way replace the need for completion of a recognised height safety training course by a Registered Training Organisation (RTO).
- Do not use the system if medically unfit. A person with muscular, skeletal and physical disorders should consult a physician before using access and egress equipment.

1.4. Site Hazards

Sites have associated with them many hazards which must be considered before using any equipment or performing tasks.

These include but are not limited to:

- Overhead power lines, transformers (both mounted aerially and at ground level), underground power, solar power systems
- (please note that solar panels generate electricity whilst exposed to sun light and wires between the panels and the first isolator cannot be turned off).
- Gas lines (both underground and on the surface)
- Ground collapse hazards (such as sand and uncompacted soils)
- Chemicals
- Plant and machinery
- Traffic (both vehicular and pedestrian)

Guardian Ladder Platform and Walkway

2. Application

Guardian Ladder platform and walkway is designed to provide a means of access and egress to excavations protected by a shoring system. It is equipped with a securing system for a ladder and a telescoping ramp walkway.

There are restrictions and limitations that must be carefully considered in the selection, installation and operation of this equipment.

Serious injury or death may result from failure to consider factors outlined in the following paragraphs.

1.2.1. Limitations
Guardian recommends that any and all persons using this system do not work alone in case of an emergency and/or help is required.

MUST BE READ PRIOR TO USE
- Only to be used by persons with documented proof of training in the use of height safety and confined space training.
- The Guardian ladder platform and walkway is suitable for a single user to be attached at any one time. Check system specifications or contact Guardian for configuration limitations.
- Operators of this system must be connected via an SRL, which will limit any fall to less than 600mm.
- Do not modify any of the system components.

3. General System Requirements

3.1. Mounting Requirements

The system is designed to be mounted on the top edge of a Guardian shoring system (aluminium) which is capable of safely supporting the weight of the system plus all static and dynamic loads that may be applied to the system during use.

There must be enough of the top edge of the shoring structure exposed (min 300mm as per worksafe guidelines) to allow the platform to be secured using the clamp screws. The Shoring Platform also requires that there is enough width between the shoring box struts to allow the access ladder to sit at a suitable angle.

The system must be mounted keeping in mind that during service, the system is expected to transmit a load of approximately 300kg onto the shoring structure.

Note: All installations MUST BE approved by a competent person and used under the supervision of a competent person.

3.2. Connectors

All connectors used to connect components in the system must be compatible with each other to ensure sufficient strength and eliminate the risk of accidental disengagement or rollout during use. Connectors supplied with products designed, manufactured and/or approved by Guardian meet all applicable requirements for connectors.

3.3. Fall Protection

Activities involving working at heights require the use of personal protection equipment (PPE) to protect the worker in the event of a fall. Suitable fall protection must be provided as required by applicable local regulations when using this equipment. Fall protection equipment MUST be selected and installed under the supervision of a Competent Person.

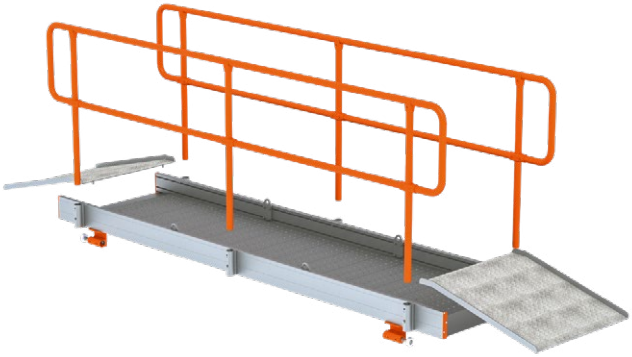
4. System Installation

The system can only be installed by a competent person. As the system is to be installed at an elevated level above an excavation protected by a shoring system, a number of licences and qualifications may be required under site specific requirements, Local, State and Federal law.

The system is only as strong as the structure/shoring box that it is mounted on, therefore it is imperative that the shoring be installed as per the manufacturer's instructions.

Guardian Ladder Platform and Walkway

5. Guardian Ladder platform and walkway - Site set up



Step 1:
Identify the Guardian ladder platform and walkway components
1 x ladder platform
1 x Telescoping Walkway with removable guardrails
1 x Locking bar for walkway

The Guardian ladder platform and walkway also includes:
Clamp screws
1 x Ladder bracket & screws
1 x Gate
1 x Access bar

Step 2:
Inspect the components for wear and damage that may have been sustained either in use or during transport. If any of the components are damaged or deemed unfit for purpose, tag them “Out of Service” and contact your supervisor prior to commencing installation. Re-use the system only if confirmed by a competent person, in writing, that it is safe to do so.

Step 3:
Before mounting the Guardian Ladder platform platform and walkway ensure that the shoring has been installed as per the manufacturer’s instructions and that there is sufficient panel available to mount the platform (approximately 300mm minimum in height).

At this point also check that the soil around the shoring box is stable (look for fissures, cracks, signs of water, services or previous excavations) and make an assessment of the potential for ground collapse.

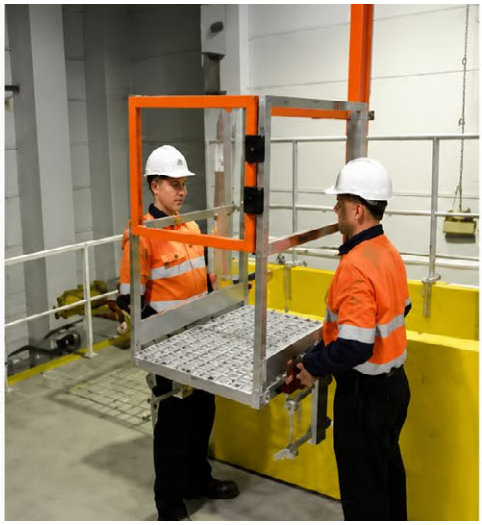
Note: Never walk between an excavated area and a shoring wall without first checking that it is safe to do so.

If there is any doubt as to whether it is safe to proceed, seek the guidance of a suitably qualified person or from local Excavation Work Codes of Practice or equivalent, if available.

Select a suitable location on the shoring panel that will allow the access ladder to run at an appropriate angle from the ladder bracket to the base of the excavation (as per industry guidelines, an angle of 4:1 is preferred).

Mount the Guardian ladder platform to shoring box (this is a 2 person lift or use a crane, Hiab or suitably rated excavator approved for lifting). Once the platform is sitting on top of the shoring, tighten the clamp screws to 65Nm or as deemed tight enough by a competent person using the integral handles provided (never use a cheater bar, rattle gun or socket and bar).



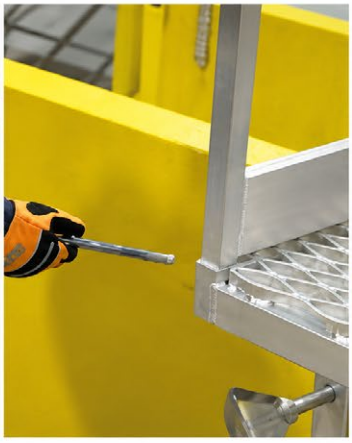


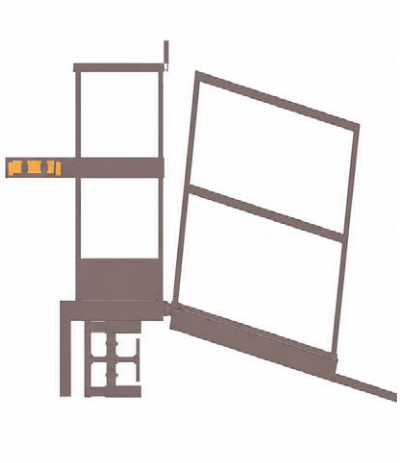


Guardian Ladder Platform and Walkway

Step 5:

Now carry the walkway to the platform with the aid of a second person and attach it to the pivot points located on the Guardian Ladder platform and walkway. The walkway is connected to the platform using the locking bar. The locking bar is inserted through the pivot points on the platform and walkway from the opposite side to the securing clip. When fitting the walkway, keep fingers clear of crush and pinch points



Step 6:
If the guardrails were not already fitted to the walkway, they can now be installed by sliding the railing uprights into the receiver tubes located on either side of the walkway.

Step 7:
The walkway is fitted with a pull out telescoping extension piece which allows the walkway to come into contact with the natural ground level (or top of the excavated area) minimising the walkway angle. Adjust the length of the extension section until the desired angle is achieved (steep angles must be avoided to minimize the risk of slip injuries).

Now a suitable ladder can be attached to the platform. The installer must be wearing a full body harness and be connected to the anchor point via a davit arm approved to Australian standard AS/N2S5532:2013

For deep excavations where long extension ladders are used, a mobile crane, Hiab or an excavator approved for lifting may be required to lower the ladder into position.

Once the ladder has been lowered into the excavation and the angle is correct, install the ladder securing bracket and the clamp screws. Ensure that the ladder bracket is in the correct orientation.

The ladder should protrude 1 metre above the ladder bracket so that it can be safely accessed when climbing down and safely alighted from (this is not always possible so length of protrusion must be deemed acceptable by competent person, when climbing out of the excavation (except when the ladder is connected to the leading edge of the platform)








6. Fall Clearances

Before commencing work, ensure there are adequate fall clearances and that all obstructions have been removed where possible. To work out whether there is enough distance available, you should take into account. the following ladder platform and telescopic walkway instructions on page 39.

Guardian Ladder Platform and Walkway

7. Platform System/Usage

7.1.Before using the system, fit a full body harness and ensure that the harness is fitted as per the manufacturer's instructions. Never use a harness that is not adjusted correctly as it does not give adequate support in the event of a fall.
7.2.Check the walkway and the ladder access platform surfaces to ensure they do not have built-up dirt/debris or appear wet and slippery.
7.3.When walking up the walkway ensure that you maintain 3 points of contact by holding on to the guardrails. Open the gate and step onto the platform ensuring that the access bar is closed. The front guard bar is present between the platform and the excavation to warn users of danger from falling while they are attaching their harness to the davit arm.
7.4.Before connecting to the davit arm, disconnect the tag line from the hook and pull the cable down quickly to check that the brake works (the unit should lock with less than 600mm of cable travel).
7.5.Connect the SRL's hook to the Dorsal Dee ring of the harness. If you cannot see that the attachment has been donen correctly, have another worker confirm that the hook is in the correct location and closed properly.
7.6.Open the access bar by lifting it up. When closing the access bar, lower it slowly into its keeper and do not let it drop as it may swing uncontrollably and cause an injury.
7.7.Step forward towards the ladder and grip the ladder stile with your hand (if the ladder is on your right side, grip the stile with your left hand and vice versa if the ladder is on the left side). Now maintaining 3 points of contact, step onto the ladder (ensure that the first rung stepped onto is either level with the platform or a maximum of 1 rung down).
7.8.Close the access bar.
7.9.When descending the ladder, maintain 3 points of contact until you reach the bottom of the excavation. You can now disconnect from the SRL. Once disconnected, ensure that you do not let go of the rope line and allow the SRL to recoil unrestrained as this will cause damage to the internals of the SRL. Connect a tag line to the hook of the SRL and allow the cable to retract slowly. Tie the tag line to the ladder to minimise any trip hazard in the excavation. When there is more than one person accessing the excavation, the tag line should be taken down each time with them to ensure the SRL is recoiled properly as described above.
7.10.When you are ready to climb the ladder, untie the tag line from the ladder base and slowly pull down on the tag line until you have the SRL's hook firmly grasped.
7.11.Repeat the initial SRL test by quickly pulling down on the cable to check that the SRL is locking correctly.
7.12.Connect the SRL to the Dorsal Dee on your harness and climb the ladder maintaining 3 points of contact.
7.13.Before stepping onto the platform from ladder, open the platform access bar and grasp the front upright on the platform with the hand closest to the platform.
7.14.Now climb to a level on the ladder from where you can comfortably step on to the platform. Generally, it is recommended that you step from a rung that is level with the platform or no more than one rung lower.
7.15.When you have both feet on the platform, close the access bar and check that it is latched correctly. Now you can disconnect the SRL, reconnect the tagline and let the rope retract slowly (never allow the rope on an SRL to retract uncontrolled as you may damage the SRL). Pass the loose end of the tag line down the excavation to other workers in order to retrieve the SRL hook. Repeat the process as required.
7.16.Open the gate on the Ladder platform and slowly walk forwards and down the platform walkway, while maintaining 3 points of contact.








8. Inspection

The system must be inspected by a competent person before each use and periodically on a scheduled basis. (this can be covered in daily site checks) Any problems must be reported immediately to the site supervisor and the equipment tagged "Out of Service" to prevent further use until it has been repaired

Ladder Platform and Telescopic Walkway

8.1. Daily Inspection Procedure

- Inspect the system and all accessories for physical damage, bent parts etc. that may have been caused by an excavator or other plant on the job site. Check also for loose or missing hardware and missing or illegible labels. Replacement labels and accessories for all Guardian products are available from your equipment supplier.
- Check that the walkway is in place, the locking bar inserted correctly and the securing clip is on the end of the Locking bar for walkway.
- Check that the clamping screws are tight and that the Ladder platform is sitting correctly (level and the underside of the platform is touching the top of the shoring).
- Check that the gate is operating correctly.
- Ensure that the locking bar is intact.
- Check that the davit is in place.
- Check the SRL's operation by pulling out a short length of cable and sharply pulling down to check the brake locks.
- Wearing a safety harness and connected to the Davit SRL, check that the ladder is in the correct position, the ladder angle is correct, the ladder protrudes from the structure at least 1 metre (except when the ladder is secured to the leading edge of the platform or deemed acceptable by competent person) and that the ladder bracket is in place with the securing bolts tightened.

8.2. An annual inspection must be conducted by a competent person. This inspection must be recorded. This can be covered on site or when delivered to site by competent persons.

9. Maintenance

9.1. Cleaning and Lubrication, the system has been designed with appropriate clearances allowing them to be assembled and adjusted without the need for lubricants. The system must be clean and free of surface contaminants to work correctly.

Depending on the site conditions, the Ladder platform and walkway may need to be periodically cleaned to remove any built up dirt and debris that may have accumulated. Use a solution of warm water and mild detergent to clean the system. Do not use solvents or other cleaners to clean the unit, as this may result in damage the surface finish.

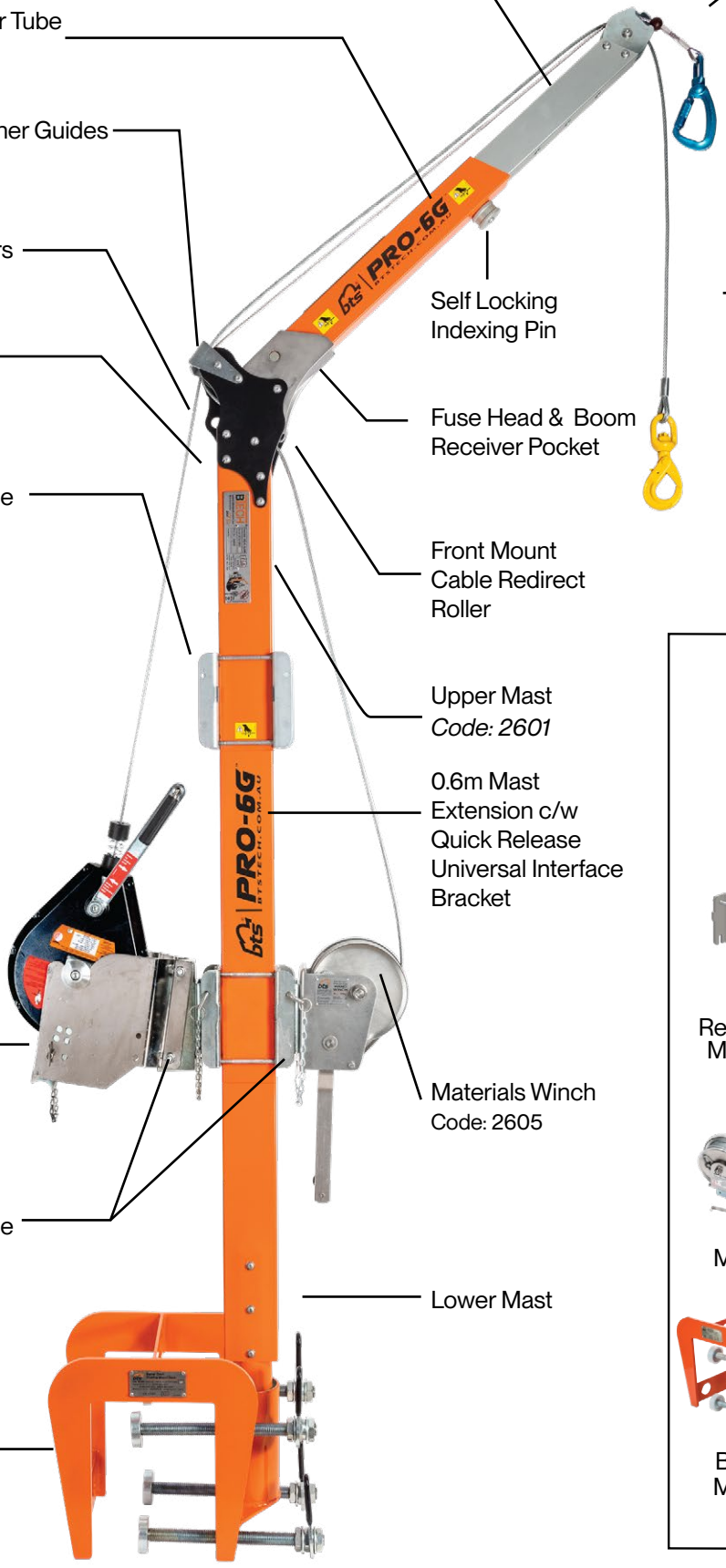
10. Certifications

All products comply to relevant Australian Standards including AS1657 and relevant Codes of Practice. Products are also certified by a RPEQ for use within QLD.





Davit Arm



5 Position Boom Extension Tube

Davit Boom Outer Tube
Code: 2601

Rear Cable Retainer Guides

Rear Cable Rollers

Secondary Anchor Point

Quick Release Universal Interface Bracket

Winch / Rescue Recovery Winch mount bracket
Code: 2604

Quick Release Universal Interface Bracket

Barrel Mount
Code:2602

Head Pulleys

Triple Action Karabiner Safety Hook

Materials Winch Cable

Self Locking Indexing Pin

Fuse Head & Boom Receiver Pocket

6mm Grade 80 Eye Swivel Self Locking Hook

Front Mount Cable Redirect Roller

Upper Mast
Code: 2601

0.6m Mast Extension c/w Quick Release Universal Interface Bracket

Materials Winch
Code: 2605

Lower Mast

Each Kit Contains the Following



Heavy Duty Storage Bag



Rescue Recovery Winch Mount Bracket



Rescue Recovery Winch



Materials Winch



Lower mast



Upper mast



Barrel Mount



Davit boom



0.6m mast extension

1.3 Site Hazards

Sites have associated with them many hazards which must be considered before using any equipment or performing tasks.

These include but are not limited to:

- Overhead power lines, transformers, underground power and solar power systems
- Gas lines (both underground and surface)
- Ground collapse hazards
- Chemicals
- Plant and machinery
- Traffic – both vehicle and pedestrian

NOTE: Failure to follow all safety, installation, usage and maintenance instructions may result in serious injury or death.

2. Application

The Kit is designed to be used in various applications at ground excavation sites.

2.1 Fall Protection

The PRO-6G Davit is designed to be used with the Barrel Davit mount to provide an engineered supporting structure for Personal Fall Arrest Systems (PFAS).

2.2 Work Positioning

The Davit may be equipped with a material Winch or a Type 3 HRA Fall Arrest Recovery device to be used for the suspension of a worker at an elevated position for the performance of a task. The worker must wear a harness and if suspended in a work seat, a secondary personal fall arrest system must be used.

2.3 Rescue

The PRO-6G Davit Arm, base and winch may be used, employed as part of a system meeting the requirements of Australian Codes of Practice for the rescue of a fallen worker/s, BS EN 1496:2006 for the rescue of a fallen worker.

2.4 Confined Space Entry/Retrieval and Rescue

The PRO-6G Davit Arm, base and winch, may be used as part of a system to facilitate access to and egress from a confined space as well as non-entry rescue in the event of an emergency. When used with approved BTS mounting base and winch, the PRO-6G Davit System meets the requirements of Safe Work Australia, Confined Spaces Code of practice, EN795 & CEN/TS16415:2013, for use as a confined space entry/retrieval and rescue device.

2.5 Fall Protection While Climbing

In situations permanently installed personal fall arrest system, the PRO-6G Davit and man rated winch can be used to guard against falling while climbing a ladder or other structure. The man rated winch line can be used as an extendable anchorage connector that moves up and down with the climber. An energy absorbing lanyard installed between the man rated winch line and the dorsal D-ring on the climber's full body harness absorbs fall energy and reduces the arresting forces in the event of a fall in line with current codes of practice. The man rated winch must be operated so as to continuously eliminate any slack in the man rated winch line as the climber moves up and down (length as requested). The man rated winch operator must be specifically instructed in such use of this equipment. All such installations must be designed, installed and used under the supervision of a competent person. There are restrictions and limitations that must be carefully considered in the selection, installation and operation of this equipment.

2.6 Limitations

BTS recommends that any and all persons using this equipment do not work alone in case of an emergency and/or help is required.

1. Introduction to System Applications

The 2600 Davit Shoring Kit is designed to be mounted on a shoring/trench (steel or aluminium) panels to provide reliable operation in various applications at trenches and ground excavations. The Kit includes:

1 x Davit Shoring Kit
1 x Steel Adjustable Barrel Davit Mount
1 x Inertia Reel 24m
1 x HRA Winch mount bracket

The product has been tested to AS/NZS5532:2013, AS/NZS1891.4, ANSI Z359.18:2017 and OSHA 1926.140; 1926.502 requirements, EN795 & CEN/TS16415:2013, CSA Z259.15:2022 and complies with the Basic Health & Safety requirements of New PPE Regulation (EU) 2016/425



1.1 Specification

Working Load Limit: 1 person weighing a maximum of 136kg including all clothing, tools and equipment connected to the HRA / Winch. The operator of the winch needs to be connected to the secondary anchor point on the mast using a type 3 SRL.

1.2 Safety Instructions prior to use

- Prior to using the equipment, please ensure all operating procedures have been read and understood.
- The Kit is only to be installed and used by a competent person who has been trained in safe use of the system and associated equipment and has an understanding of the dangers associated with excavations and ground collapse hazards (Guidance can be sought from Excavation and Construction Codes of Practice).
- Use appropriate personal protective equipment (PPE) during installation, operation and maintenance of the equipment.
- All non-operational bystanders are to be kept clear of work areas.
- Always wear gloves and beware of pinch points during installation and operation.
- Ask for assistance when lifting/moving heavy components. Before lifting, position body close to the load and keep back straight and knees slightly bent.
- Be aware of soft or uneven ground near the excavation site and keep work area clear of excess tools and equipment to prevent slips, trips or falls.
- Ensure all workplace OH&S requirements are identified and understood. A risk assessment complete with site specific safe work method procedure must be completed and approved by management prior to commencing the work.
- A rescue plan must be devised and be ready to be implemented prior to usage of the Kit.
- This product requires periodic inspection and maintenance by a competent person as per section 7 of this manual. The system must not be used if any part of it is overdue for service, inspection or damaged.
- Only an approved full body harness, certified to country/state or territory applicable standards and regulations, is to be used with this Kit.
- The system is designed to be used for Limited Free Fall Arrest and requires that BTS Self Retracting Lifelines (SRLs) and HRA fall Arrest Recovery Device be used. HRAs & SRLs selected for use with this system must have a Maximum Arrest Force (MAF) rating of 4kN or less.
- The PRO-6G Davit is only to be used with a compatible Davit base, capable of withstanding forces indicated in Mounting and Anchorage Strength requirements described in section 3.
- Visually inspect the product for damage prior to use. The system must not be used if there is any deterioration or deformation of any component or the structure to which the system is attached. If the Davit mast shows signs of overload or fall, immediately tag the system “Out of Service” and do not use until it has been fully inspected and re certified by a competent person.
- Persons with muscular, skeletal and physical disorders should consult a physician before using Personal Fall Protection Equipment. Increasing age or lowered physical activity may reduce a person’s ability to use this equipment.
- This user manual does not in any way replace the need for completion of a recognised height safety training course

3. General System Requirements

- The maximum loads that could be transmitted in service from the anchor device to the structure is 4kNm in a downward direction of the jib
- The maximum value of deflection of the anchor device is 95mm and displacement of the anchor point that can occur in service is 10mm

3.1 Mounting Requirements

Structure selected for the installation of the Davit base must be capable of supporting a minimum of 10,000N.m moment and 22.2kN vertical load or must be approved by a Competent person so as to an appropriate safety factor for the given application(s) specified in applicable regulations.

3.2 Anchorage Strength

The PRO-6G Davit Arm is designed to be set up or installed and used on a supporting surface (anchorage) capable of providing sufficient anchorage strength to support all applied loads with an acceptable margin of safety. The standards governing different situations specify various minimum requirements depending on the application, the work being performed and other factors. However, at no time shall the anchorage provide any less than the greater of:
2:1 safety factor on the maximum arrest force (MAF) rating of any fall arrest system being used.
4:1 safety factor on personnel working loads applied to the system, as defined in the specific codes of practice & standards.

All installations MUST BE carried out under the supervision of a Competent Person.

3.3 Connectors

All connectors used to connect components in the system must be compatible with each other to ensure sufficient strength and eliminate the risk of accidental disengagement or rollout during use. Connectors supplied with products designed, manufactured and/or approved by BTS meet all applicable requirements for connectors (refer to AS/NZS1891.1, AS/NZS1891.3 and EN 362:2004). Any connectors not supplied by BTS MUST BE selected and approved by a competent person.

3.4 Full Body Harness

Use only a full body harness designed, tested and approved for fall arrest (refer to AS/NZS1891.1 or EN361:2002 or equivalent to country/ state or territory standards/ directive or regulations) when connecting a person to this system. Warning: Body belts or straps MUST NOT be used, as they do not provide adequate restraint / support to the body and may cause serious injury or death in the event of a fall.



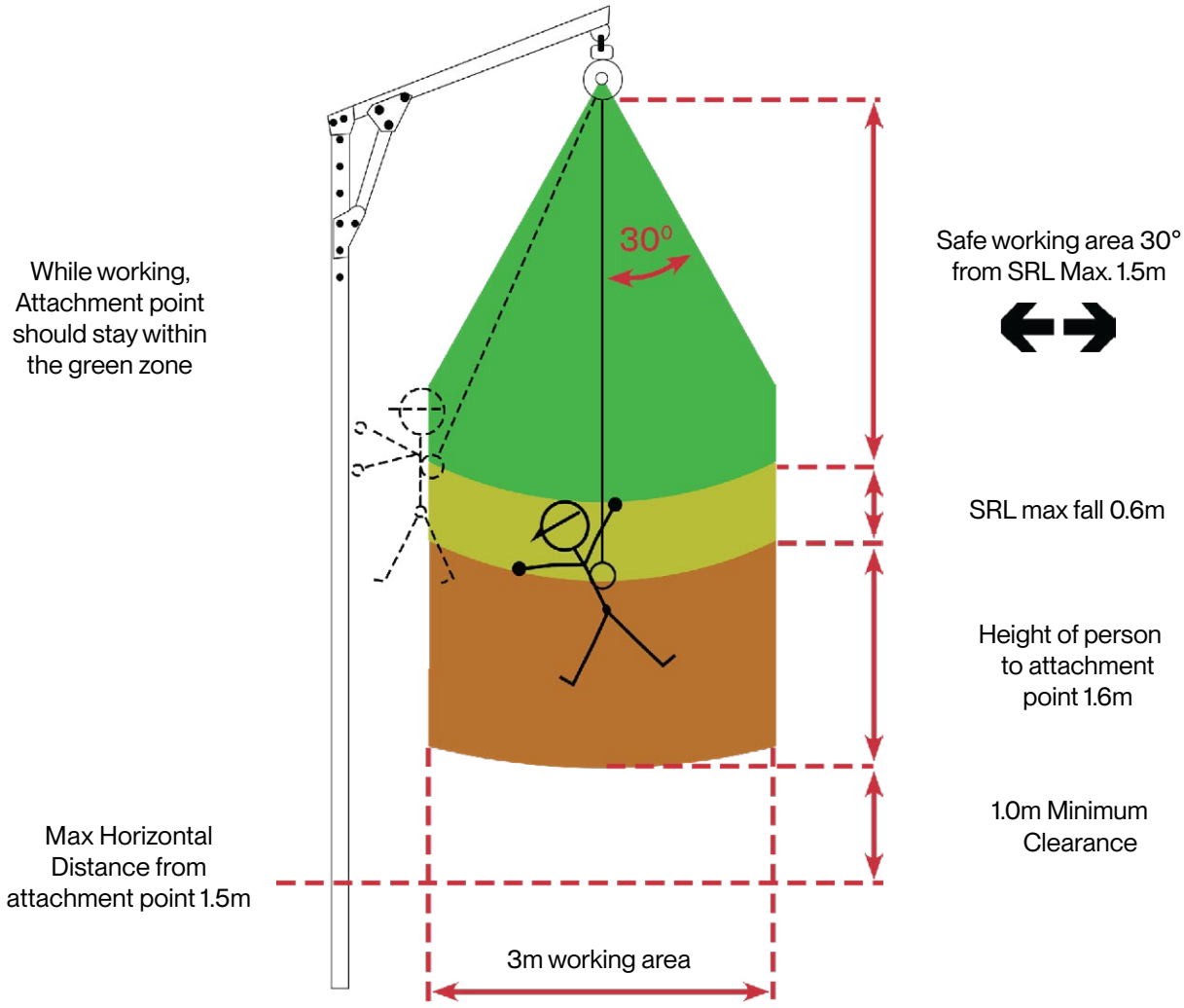


3.5 Fall Protection

Activities involving working at heights require the use of Personal Protection Equipment (PPE) to protect the worker in the event of a fall. Suitable fall protection must be provided as required by applicable local regulations when using this equipment. Fall protection equipment MUST be selected and installed under the supervision of a Competent Person.

Must Read Prior to Use

- Only to be used by persons with documented proof of training in the use of height safety and fall protection systems.
- The 2600 Davit Shoring Kit is suitable for a single user to be attached at any one time. Check system specifications or contact BTS for configuration limitations. Operator of the winch or Type 3 HRA is to be connected to the secondary anchor point on the mast.
- Users of this system must be connected via an HRA/SRL (compliant to AS/NZS1891.3, EN360:2002), which will limit any fall to less than 600mm. The system must be set up so that the user will not be offset by more than 30 degrees from vertical.
- Do not modify any of the system components.
- System only to be used for personal fall protection equipment and not for lifting equipment/material.



4. System Installation

The system can only be installed by a trained/competent person that has fully read and understood this manual. As the system is to be installed at an elevated level, on the edge of an excavation protected by a shoring system, a number of licences and qualifications may be required under site specific requirements, Local, State and Federal law. The system is only as strong as the structure/shoring box that it is mounted on; therefore, it is imperative that the shoring be installed as per the manufacturer's instructions.

- Please note that Installation records need to be kept and maintained by the user for future installations and inspections.
- This record must include information such as details of the installer, the address and location of installation, product identification and procedures and/or product or tools used for the installation. This document must be signed off by the installer. For further details, please refer to AS/NZS1891.4 Section 9.10 or Annex A.2 of EN795:2012
- Inspect the components for wear and damage that may have been sustained either in use or during transport. If any of the components are damaged or deemed unfit for purpose, tag them "Out of Service" and contact your supervisor prior to commencing installation.
- Before mounting the B-TRENCHSAFE PRO-6G Davit Shoring Kit, ensure that the shoring has been installed as per the manufacturer's instructions. At this point check also that the soil around the shoring box is stable (look for fissures, cracks, signs of water, services or previous excavations) and make an assessment of the potential for ground collapse. If there is any doubt as to whether it is safe to proceed, seek the guidance of a suitably qualified person.

Note: Person installing the product may require to be connected to a separate fall arrest device if exposed to fall hazards.

1. Install the Barrel Mount over an approved supporting structure. Tighten the clamp screws to 65N.m or as deemed tight enough by a competent person using the integral handles provided. Do not use larger tools or any kind of an extension on these handles.

2. Install the Davit into the Barrel Mount base.

3. Adjust the offset of the davit as required by turning & pulling the self indexing pin knob, sliding the Boom extension tube to the required position and then releasing the knob to lock boom extension in any of 5 positions. Install the Winch and/ or SRL as per Winch/SRL's operator manual provided.

Quick Setup Guide

Davit Assembly With No Mast Extension

What does a Pro-6G Davit Arm include?



Install the Barrel Mount over an approved supporting structure. As per instructions (point 1) above

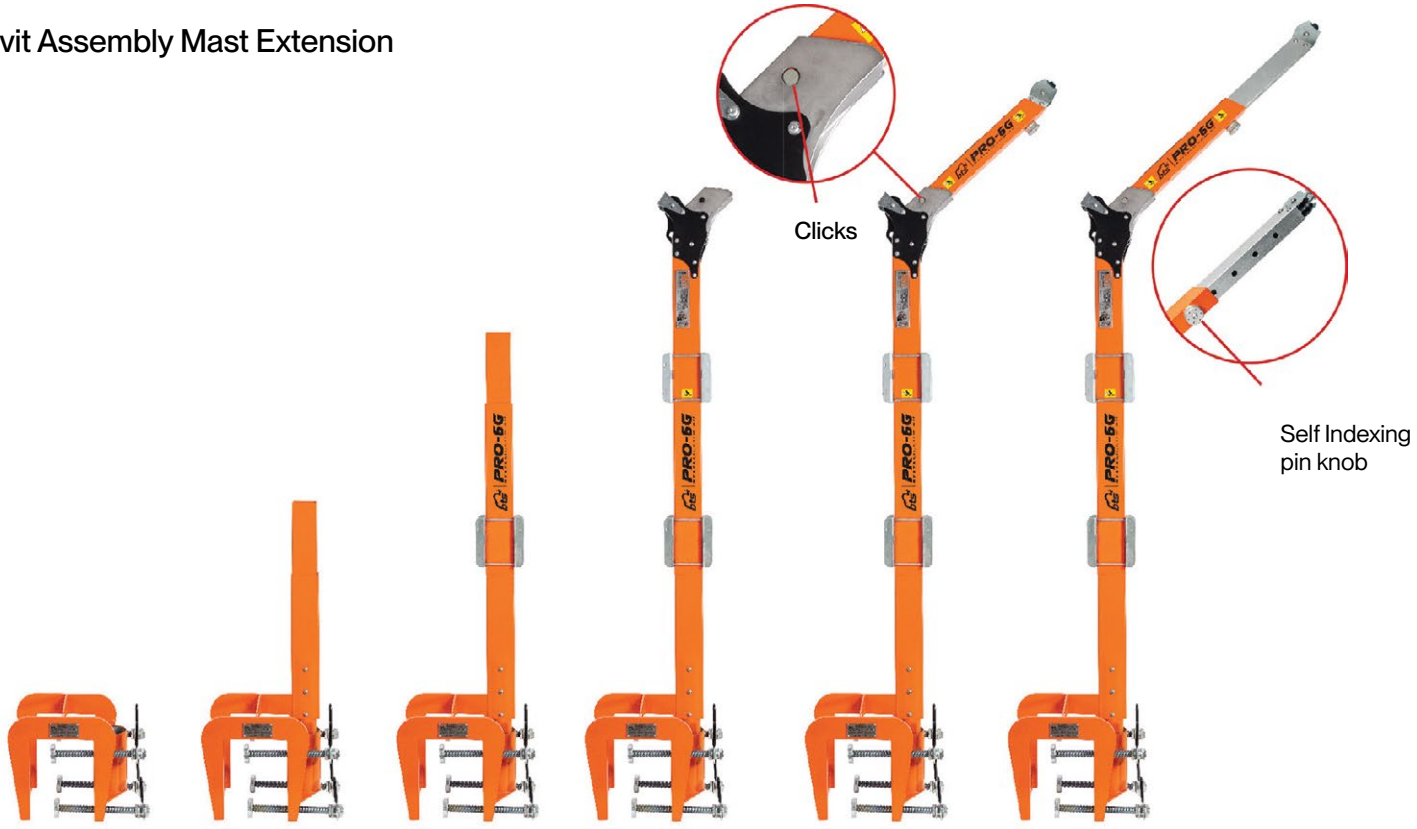
Install the Lower Mast into the barrel mount.

Install the Upper Mast into the barrel mount.

Install the Davit Boom into the Upper Mast. Ensure Clicks engage on both sides.

Adjust Davit Boom length by rotating & pulling the self indexing pin knob & sliding the boom to the desired position (5 Positions).

Davit Assembly Mast Extension



Install the Barrel Mount over an approved supporting structure. As per instructions (point 1) above

Install the Lower Mast into the barrel mount.

Install the Mast Extension into the Lower Mast.

Install the Upper Mast into the Mast Extension.

Install the Davit Boom into the Upper Mast. Ensure Clicks engage on both sides.

Adjust Davit Boom length by rotating & pulling the self indexing pin knob & sliding the boom to the desired position (5 Positions).

Quick Setup Guide

Mounting the Recovery Wench



Install the Rescue Recovery Winch Bracket onto the fixed Quick release bracket located on the boom side of the davit. Ensure the bracket engages with the bar on the bottom of the bracket on the Davit.



Lift Bracket up, line up top holes & insert locking pin.



Remove Rescue Recovery Winch locking pin from Bracket and allow to hang.



Install Rescue Recovery Winch into bracket, Ensure bracket is located correctly on both sides of Rescue Recovery Winch and rescue handle is on right hand side facing pit.

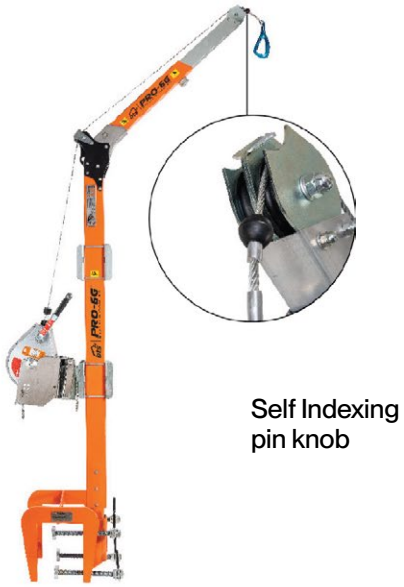
Mounting the Recovery Wench



Line up hole in Rescue Recovery Winch hanger and Rescue Recovery Winch Davit Bracket and replace locking pin



Release enough cable to reach the bottom of the davit boom, then feed the cable through the guides and over the left or right rear cable roller, then continue to the boom tip cable guides and onto the roller as shown above.



Now feed the cable between the guides and over one of the boom tip cable rollers. Ensure that you use the same side roller as on the rear cable roller

Note: The Rescue Recovery Winch is NOT to be used for Lifting or Lowering of materials. It is for personnel recovery only

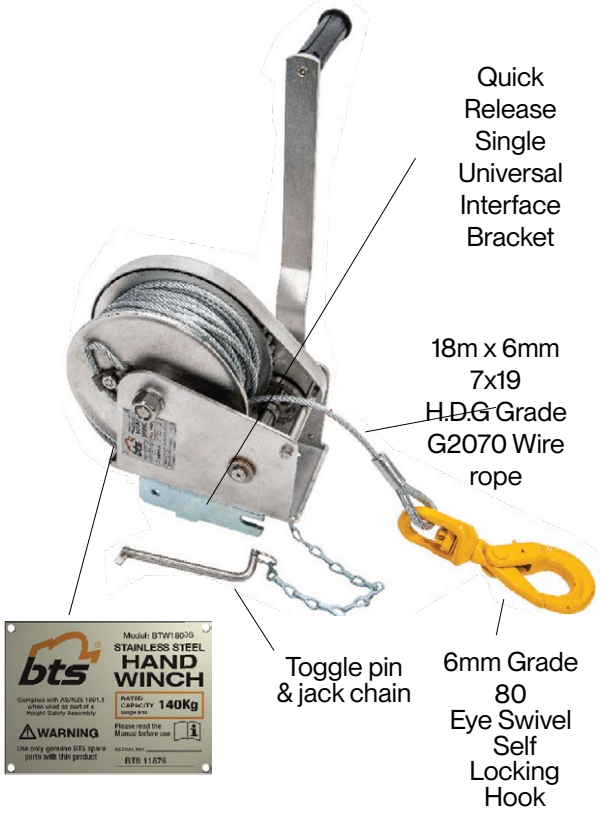
Stainless Steel Hand Brake Winch Assembly

Stainless Steel Load Brake Winches Capacity: 140Kg (Lifting).

Product Features

- Compact design.
- Stainless steel construction Grade 304.
- Automatic breaking system- no free wheeling under load.
- Fully enclosed gear train.
- Suitable for marine environments.
- Minimum handle effort to lift or pull W.L.L (Working Load Limit)
- 18m x 6mm 7x19 H.D.G Grade G2070 Wire rope
- C/w 6mm Grade 80 Eye Swivel Self Locking Hook
- Quick Release Single Universal Interface Bracket c/w toggle pin & jack chain.

STAINLESS STEEL HAND BRAKE WINCH ASSEMBLY		
Part No.		BWT1800
Rated Capacity	Lifting	140kg
Gear Ratio		5:1

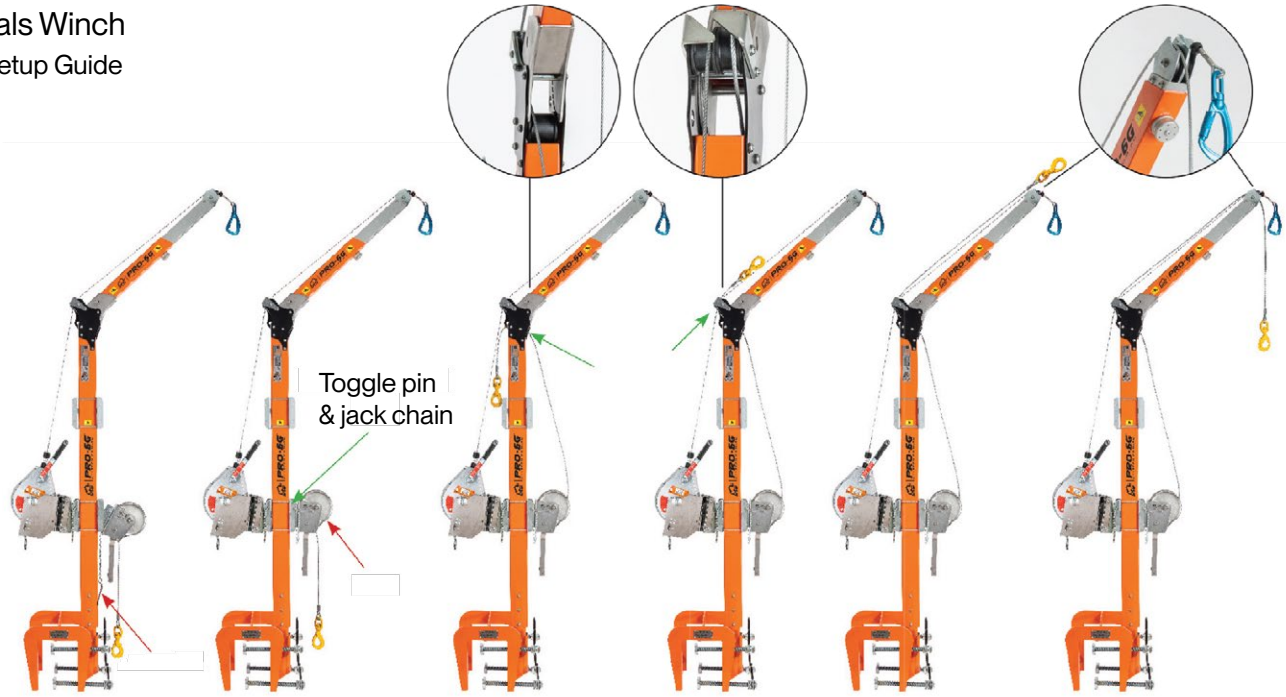


CODE: 2605
COMPLIES WITH AS1418.2

Note: Stainless Steel wire rope can be supplied as an option

Materials Winch

Quick Setup Guide



Install the Materials Winch onto the fixed Quick release bracket located on the inside of the davit. Ensure the bracket engages with the bar on the bottom of the bracket on the Davit.

Lift Winch up, line up top holes & insert locking pin.

Push the Materials Winch hook through the front mount redirect roller opening and locate the cable onto the roller.

Release enough cable to reach the top of the davit boom, then feed the cable through the guides and over the free rear cable roller, then continue to the boom tip cable guides and onto the free roller as shown above.

5. Training

All persons using this equipment must receive appropriate training from their employer on all equipment involved prior to operating. Users must also read and fully understand this manual and any other instruction manual(s) relating to the system being used, or have the instructions fully explained to them before using this equipment.

Additionally, users must be properly trained in the use of any accessories that are to be used with the davit shoring kit, as well as fall protection, confined space safety and any other procedures that are applicable to the work being performed; in compliance with local regulations.

Note: Documented training records should be kept for all users of this equipment.

6. System Usage

Before using the system, ensure that free space beneath the workplace/Davit is calculated to achieve minimum required clearance, so that, in case of a fall, there will be no collision with the ground or other obstacle in the fall path. This includes 1m clearance, limited fall arrest distance of the device used and stretch in the harness.

- Fit a full body harness (compliant to AS/NZS1891.1, EN361:2002 or equivalent country/state or territory applicable standards/ directive/ regulations) and ensure that the harness is fitted as per the manufacturer's instructions. Never use a harness that is not adjusted correctly as it does not provide adequate support in the event of a fall.
- Connect the HRA's/ SRL's hook to the Dorsal Dee ring of the harness, if you cannot see that the connection has been done correctly, have another worker confirm that the hook is in the correct location and closed properly. Please read the operators manual for this item prior to use.
- Using winch to retrieve the personnel from the excavation. Please read Operator's instructions for the Winch provided by its manufacturer.

7. Inspection & Maintenance

The system must be inspected by a competent person before each use and periodically on a scheduled basis. Any problems must be reported immediately to the supervisor and the equipment tagged "Out of Service" to prevent further use until it has been repaired.

7.1 Daily Inspection & Maintenance

- Inspect the system and all accessories for physical damage, bent parts etc. that may have been caused by an excavator or other plant on the job site. Check also for loose or missing hardware and missing or illegible labels (Refer to section 8 for Labels and Markings). Replacement labels and accessories for all BTS products are available from your equipment supplier.
- Inspect the pullies on the Davit to ensure they are clean and rotate freely.
- Inspect the Davit fuse head to check if there are any signs of a fall or overload that might have occurred. Before each use ensure the following:

  -Extend and lock the Boom Extension Tube as described in Section 4.
  -Install a Winch,HRA or SRL on the structure as per the applicable instructions.
  - Pull with your full body weight on the lifeline and make sure there is no movement of the extension tube. If using a HRA or SRL, apply a sharp, steady pull on the lifeline to engage the SRL brakes and then pull on the lifeline to test the system.

- Barrel Mount base must be cleaned and inspected before each use. Check that all four clamping screws on the barrel mount base are secure and that the base is sitting level on top of the shoring.
- If used with a Winch, ensure the Winch bracket is secure to the Davit Post. Use Winch Operation/inspection manual for its inspection and maintenance.
- If used with a HRA a visual inspection and functional test of the HRA fall arrest block must be performed before every use. To do so, attach the fall arrest block to a suitable anchor point: Pull the rope, the ratchets must lock audibly and the device must be locking. Firmly hold the rope and allow it to retract into the fall arrest block in a controlled manner. See the operators manual for further information.

7.2 Annual Inspection & Maintenance

At least annually, the Kit needs to go through a detailed inspection by a competent person following the inspection procedure outlined in Section 7.1 and the results recorded in an Inspection Log (a sample log is provided on page 9).

Note: The Inspection plate on the Davit needs to be marked with the date of inspection and date of next inspection.

7.3 Inspection of IKAR HRA Rescue / Retrieval Handle Wire Seal

The IKAR HRA (Rescue Retrieval Winch) has a Wire seal that prevents the handle from being used as a materials winch. If the seal is broken, it will indicate that a rescue as been performed with this HRA & that an incident report has been filled out and documented in the provided inspection log.



⚠ CAUTION

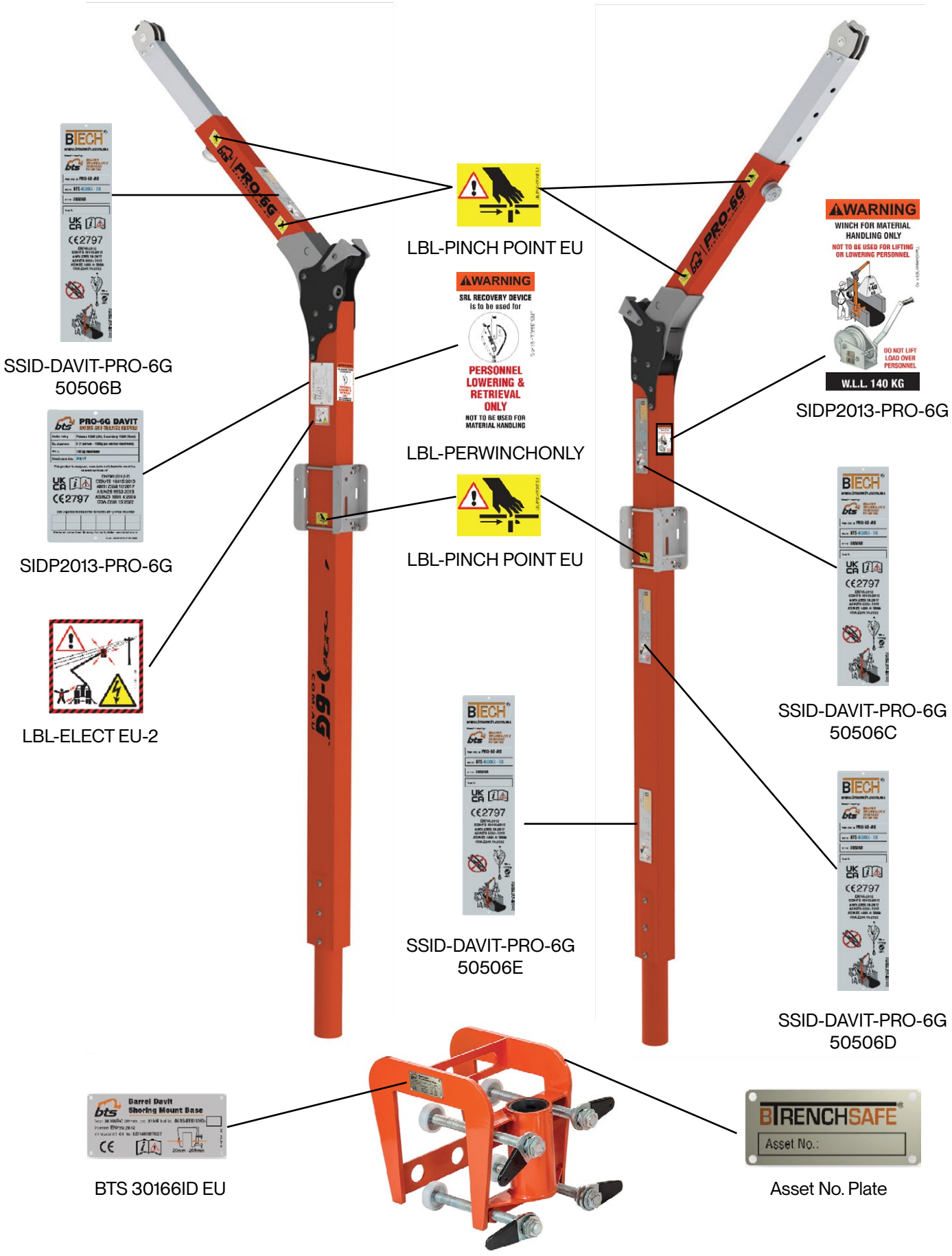
Note: The Rescue Recovery Winch is NOT to be used for Lifting or Lowering of materials. It is for personnel recovery only

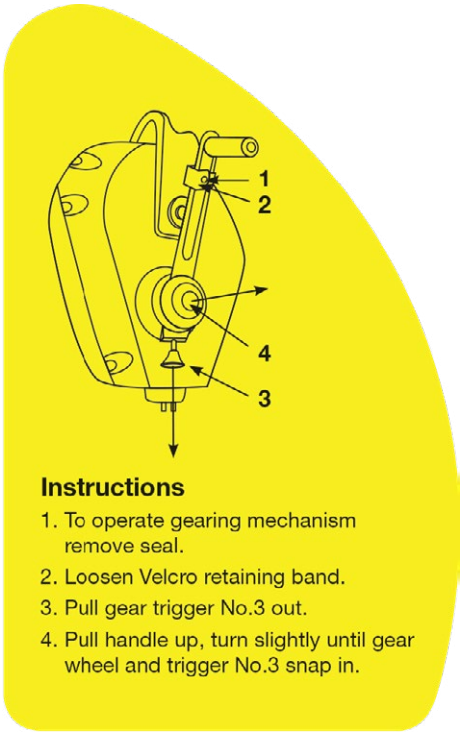
8. Packaging

For transportation or storage, ensure the system is disassembled and stored in the Heavy Duty Storage Bag provided with the kit by BTS.

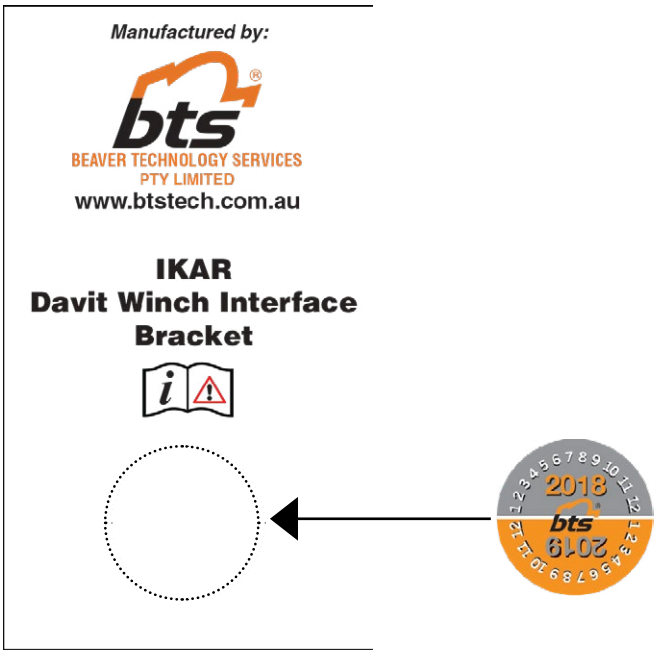


9. Labels & Markings





IKAR Instruction label



IKAR Davit winch interface bracket and service due / Warning read instructions before use label

9.1 Labels & Markings explanation of pictograms used on labels



Users must read and fully understand the information booklet and any other instruction manuals relating to the system being used, or have the instructions fully explained to them before using this equipment. Failure to do so could result in serious or fatal injuries.

Working Load Limit: 1 person weighing a maximum of 136kg including all clothing, tools and equipment connected to the HRA / Winch.

Tear web lanyards shall not be used on the jib.

Self Retracting Lifelines shall have a Maximum Arrest force of 4kN.

The operator of the winch needs to be connected to the secondary anchor point on the mast using a type 3 SRL.



Danger! Beware of overhead power lines that may cause electrocution.



Maximum Weight Load Limit that can be lifted with this equipment is 140kg.



Warning! There is a risk of pinching or crushing in this location. Always wear gloves and beware of pinch points during installation and operation.



Maximum size of wall suitable for mounting on to is 20mm – 205mm

Users must read and fully understand the information booklet and any other instruction manuals relating to the system being used, or have the instructions fully explained to them before using this equipment. Failure to do so could result in serious or fatal injuries.

10. Product Specification

PRO-6G Davit

- PRODUCT CODE: 2601
- Weight: 26kg
- Overall dimension: Height – 2167 / 2792mm & Width – 1110mm

Packaging Dimension (Heavy Duty Carry Bag)

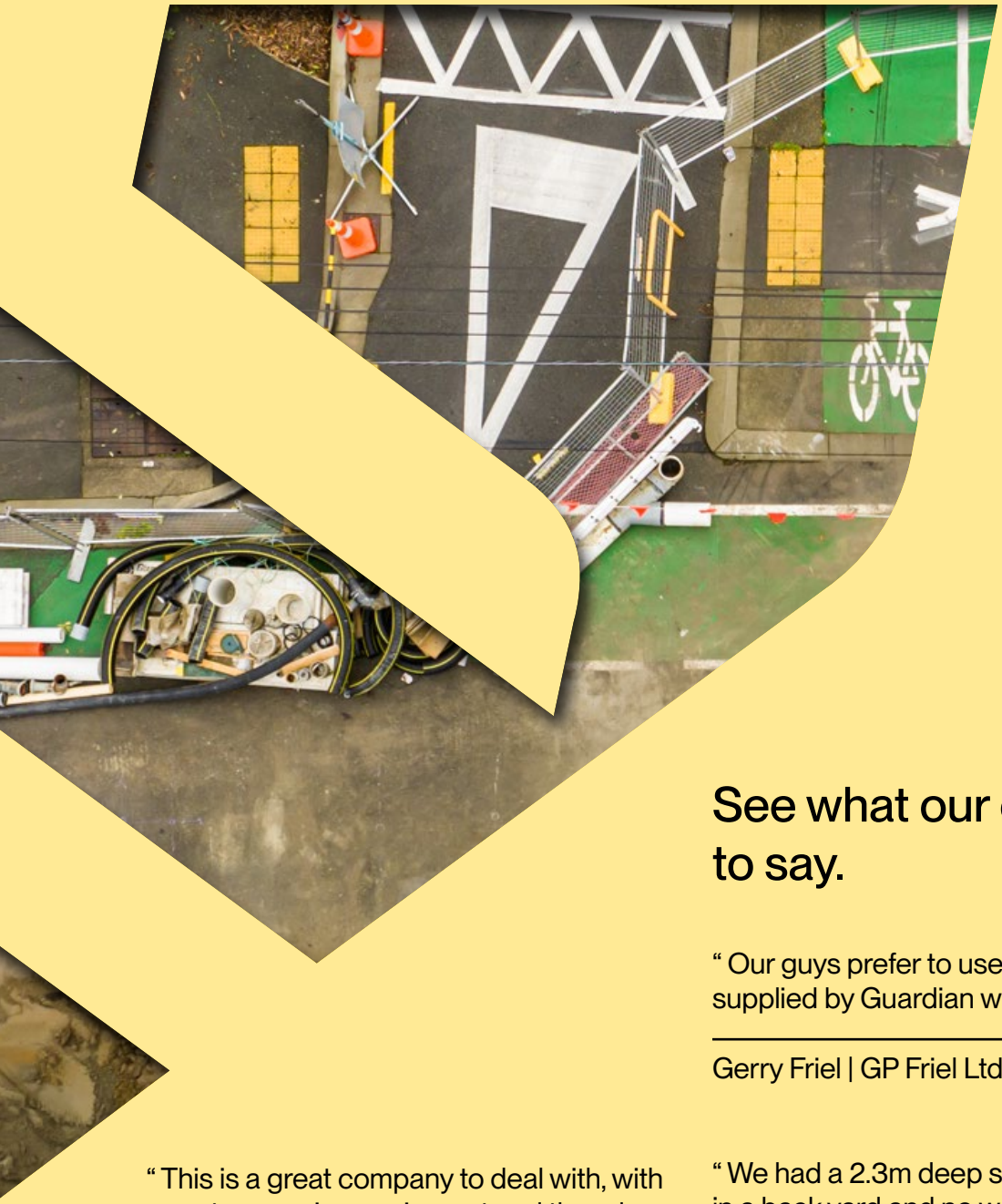
- 300mm x 300mm x 1280mmBTRENCHSAFE® Steel Adjustable Barrel Davit Mount

BTRENCHSAFE Steel Adjustable barrel Davit Mount

- PRODUCT CODE: 2602
- Weight: 25.2kg
- Overall dimension: 376mm x 354mm x 265mm

11. Cleaning

The system must be clean and free of surface contaminants to work correctly. Depending on the site conditions, the Pro-6G Davit system may need to be periodically cleaned to remove any built up dirt and debris that may have accumulated. Use a solution of warm water and mild detergent to clean the system. Do not use solvents or other cleaners to clean the unit, as this may result in damage the surface finish. If the equipment becomes wet, either from being in use or due to cleaning, it should be allowed to dry naturally or wiped down with a cloth. Do not use heat generating equipment to speed up the process of drying.



See what our customers have to say.

“ Our guys prefer to use the lightweight shields supplied by Guardian where possible.

Gerry Friel | GP Friel Ltd

“ This is a great company to deal with, with easy to organise equipment and they do what they say they will on time. The trench soldiers are lightweight so they can be installed by hand and create a safe trench which is easy to work in.”

Gavin Chambers | Mander & Co Ltd

“ First and foremost great service & willing to help when required. Hired a trench shield to save time and making a mess by reducing the trench width across a sports ground. Cheers.”

Brian Foster | MJ Contracting

“ We had a 2.3m deep sewer connection to make in a back yard and no way of hiring shoring in Wellington. Our digger came available early and without much expectation of help.
I contacted Guardian expecting at best buying some kit and putting the digger off to the next available slot they had for our low priority small job. I made contact on Wednesday morning knowing little about shoring a pit and by Friday lunchtime had a pallet delivered to site with a shoring box. Light enough pieces to carry to the excavation and make the hole safe over the weekend and a special hiab to boot to crane it to the ideal spot on a busy site. Magic.”

Matt Cantwell | SMRT Contracting



GUARDIANCIVIL.CO.NZ

CONTACT:

sales@guardiancivil.co.nz
0508 41 41 41

CHRISTCHURCH

2 Edmonton Rd, Hornby,
Christchurch 8042

AUCKLAND

6a Te Apunga Place, Mount
Wellington, Auckland 1060

WELLINGTON HIRE YARD

24E Takapu Road, Grenada North,
Wellington 5028

All Guardian products are engineered and manufactured to comply with applicable industry standards and safety regulations in New Zealand, including those related to excavation support and ground stabilization. However, it is the sole responsibility of the end user to ensure that all equipment is used correctly, safely, and within the limits for which it is designed. By purchasing or using our products, the user acknowledges and accepts full responsibility for ensuring the equipment is used appropriately and in compliance with all applicable regulations and best practices.
Always consult a qualified engineer or competent person before use.