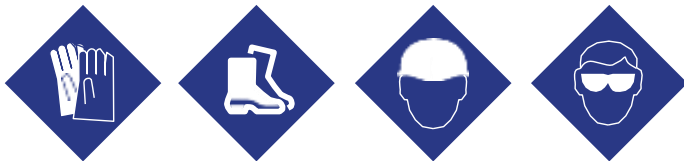


Hydraulic Bracing System

Hazard and Risk Assessments

Before using this equipment, the job you are doing must be assessed for foreseeable hazards and risks and appropriate measures to eliminate, control or reduce those risks must be taken before you commence work.

Suggested PPE (Personal Protective Equipment):



Protective Gloves

Protective Footwear

Hard Hat

Eye Wear

Note: PPE must be suited to the risks and person(s) using the equipment.

Safety Instructions:

- Operating Instructions** – Before using this equipment ensure you have read the 'Operating Instructions' and taken note of the 'Hazards and Risks' detailed on this instruction sheet and taken all necessary steps to prevent injury.
- Personal Protective Equipment** – Use appropriate personal protective equipment for the job.
- Installation Advice** – The safe use and application of this equipment must be in accordance with AS3610, the Occupational Health and Safety Act, approved Codes of Practice and any other regulatory requirements. Consultation with a qualified engineer is advised.
- Excavator Lifting Capacity** – Always ensure excavator/crane lifting capacity is sufficient to lift equipment, allowing for soil friction/suction loads.
- Lifting Chains** – Ensure lifting equipment has sufficient capacity.

HAZARD: Risk of Structural Collapse and Crushing

... Incorrectly installed or rated shoring systems may cause structural collapse.

... Consultation with a qualified engineer is advised.

Introduction

The Shore Hire Series 200 Hydraulic Bracing System is a strong modular hydraulic bracing frame that can be configured to satisfy multi-sided excavations when used in conjunction with trench sheets or sheet piles for perimeter support. Typical applications include large tank installation, interceptor chambers, pump stations, storm water pits, gross pollutant traps, boring pits and lift wells.

This document provides basic information for users of the Hydraulic Bracing System to assist them in their preparation of a safe system of work on site. If more details are required, contact Shore Hire.

Design

No information on design is included in this booklet. Clients are strongly advised to ensure that a competent engineer is employed to provide a suitable design for excavation schemes requiring the use of Hydraulic Bracing System products.

Shore Hire can on request, provide information on the strength capacities of Hydraulic Bracing System products for clients undertaking their own designs.

Frame Dimensions

This booklet gives information for frame dimensions for each of the Hydraulic Bracing System products used separately.

Hydraulic Adjustment

The Hydraulic Bracing System incorporates a hydraulic system of adjustment which is designed to extend or retract the frame under conditions of no or low loading: e.g. As when first installed or as they become redundant after backfilling the excavation.

Once the frame has sustained significant ground loads, hydraulic extension or retraction of the frames is inadvisable and therefore methods of working should avoid the need for frame adjustment/removal whilst the walings are heavily loaded.

General Guidance Notes

1. Safe System of Work and Method Statement

Assuming that the location, plan size and depth of an excavation, together with an arrangement of sheets and frames has already been determined, the Workplace Health and Safety Act requires that a safe system of work is adopted to carry out the work on site.

These guidance notes are intended to draw the client's attention to practical aspects of Hydraulic Bracing System installation, which need to be considered for a safe system of work.

In particular, the client's attention is drawn to the lengths and weights of the frame members and the need for planning the lifting operations involved.

All major components of the Hydraulic Bracing System are fitted with lifting lugs for safe slinging. Two methods of constructing a typical excavation using Hydraulic Bracing System are noted in this booklet.

2. Manpower

It is recommended that personnel deployed are suitably trained and experienced and supervised by a competent person.

The main activities associated with Powerbrace installation are:

- Unloading the delivery vehicle.
- Bolting up and pinning steelwork together to form walings or struts of the required length.
- Slinging and lifting walings into the excavation and connecting the corners to form frames.

General Guidance Notes Continued...

- d) Connecting the pump to each waling in turn, pressurising the frames and fitting hanging chains.
- e) Slinging and lifting bracing struts into position and fixing them between walings.
- f) Installation of trench sheets/piling.

3. Plant and Lifting

A suitable appliance is required for off-loading and installation. For off-loading there needs to be sufficient clearance under the main hook to allow lifting with a safe angle between the lifting points. If the walings/struts are to be lifted into the excavation then the appliance should be located a safe distance from the edge of the excavation and the lifts and radii checked against the safe lifting capacities of the appliance.

In this booklet it is assumed that the frames will be lifted into the excavation one leg at a time and assembled in the excavation.

4. Small Plant, Tools and Lifting Chains

Essential equipment required is:

- a) Sledgehammers for making pinned connections.
- b) Podgers/spanners for making bolted connections.
- c) Lifting chains of suitable length and capacity. The walings and struts have lifting lugs to take hooks.
- d) Suitable spanners/sockets for nuts, bolts and washers.

5. Access and Hard Standing Areas

These include:

- a) Suitable area to off-load the truck and assemble the walings and cross braces.
- b) Suitable hard standing for the lifting appliance to operate from if it is intended to lift the walings/struts into the excavation.
- c) Ladders and possibly other provisions to provide safe access into the excavation to install hanging chains and connect pump hoses.

6. During Excavation Works on Site

If Shore Hire have designed the sheeting and frame arrangement for the excavation they will have used ground data provided by the client.

If during the installation, the dimensions or layout alters from the original design, Shore Hire and or a design engineer should be consulted immediately.

If during an excavation it is noted that the actual ground conditions and/or ground water levels differ from those provided at design stage it is advisable to have the design rechecked by a qualified engineer.

7. After Excavation Works are Completed

Plan for edge protection to be installed as early as possible. Regularly inspect the excavation for signs of excessive movements of sheets or walings. Inspect the hydraulic walings for signs of fluid leakage.

8. Return of Equipment on Hire

Clients should ensure that on removal, the equipment is off hired and returned clean and in lengths as supplied.

Stacking and Handling

Suitable firm level dry areas should be made available on site for the stacking and pre-assembly work. Suitable lifting equipment of adequate capacity should be provided for off-loading, pre-assembly work, installation and dismantling.

Slinging should always be carried out by suitably experienced and competent personnel.

Timber packers are required for stacking and storing equipment on site.

Assembly and Site Connections

The hydraulic legs in the Hydraulic Bracing System are usually made to the correct length range prior to delivery, so that only the corners need to be connected. In all cases this is by using pins and spring retention clips supplied. The lugs at the corner connections are a close fit so it is only possible to assemble them with the frames level. Placing the Hydraulic Bracing System legs on timber will make it easier to align.

Accessories

Hanging Chains: All legs are supplied with hanging chains.

Lifting Chains: Normally 2 or 4 leg chain slings, c/w hooks and chain shorteners.

Installation Kit

- Double Acting Pump and Hose Extensions
- Hydraulic Equipment
- Refer to 'General Guidance' notes – Point 4.

Use of Hanging Chains

Hanging chains are provided as a back-up support arrangement in the unlikely event of hydraulic failure of one of the Hydraulic Bracing System legs.

They are not intended as a means of suspension to be relied upon during installation or removal of the frames.

Always ensure all the hanging chains are fitted and that as much slack as possible is removed with the chain shorteners. Users must ensure that frames are securely supported by means other than the hanging chains prior to depressurising the frames, and that all personnel are out of any danger zone.

Use of Pump and Hydraulic Fluid

It is important to maintain an adequate level of fluid in the tank to avoid pumping air into the rams. The fluid level in the pump should be checked after each ram has been pressurised.

Only shoring fluid supplied by Shore Hire should be used with the Hydraulic Bracing System.

The pump is normally supplied with a full tank of pre-mixed fluid.

Extra shoring fluid can be supplied in 4L containers, it should be poured into the pump and mixed with water until the fluid is visible at the top of the sight gauge. Protective gloves and safety eye wear should always be worn when handling shoring fluid.

Method of Pumping a Frame to Size/Pressurising the Frame

1. Connect both hoses to pump.
2. Position the pump lever to the required position (Out/Extend or In/Retract).
3. Ensure that safety lock-off valve on the ram is open by turning anti-clockwise by hand no more than 2 turns.
4. Pump with pump-lever to extend to required size. If the ram does not move, refer to fault finding overleaf. If necessary the frame can be pressurised by continuing to pump. The pump will develop a pressure of 1500 p.s.i. before cutting out.
5. Close lock-off valve on ram – hand pressure is sufficient.
6. Move extend/retract lever on pump from side to center to return to neutral. This relieves pressure on the couplers and allows easy removal and replacement of the hoses (ensure lock off valve on ram is closed first).
7. Remove hoses from ram and join male and female couplers together. Keep out of dirt at all times.

Fault Finding

In the event of the frames not extending or retracting when pumped, check the following points:

1. Pump is adequately filled with fluid.
2. Pump lever is in the correct position for required operation, (check lever is not in neutral/center position).
3. Both hoses are connected – double check connections to the couplers on the ram.
4. Safety lock-off valve on ram is open (rotated anti-clockwise – maximum 2 turns).
5. Frame is not heavily loaded.

If the ram still does not move, there may be air in the system which may be indicated by the ram springing back, and this must be purged as follows:

1. To Purge Pump:

Disconnect hoses from ram and connect hose ends together. Pump for several strokes until fluid can be heard returning to the tank. Repeat with pump lever in opposite position.

2. To Purge Ram:

Connect hoses, and pump ram to full extension. Reverse lever and pump until fully closed. Repeat until there is no sign of ram springing back.

If the ram still does not function properly refer to your nearest Shore Hire depot.

Do's and Don'ts

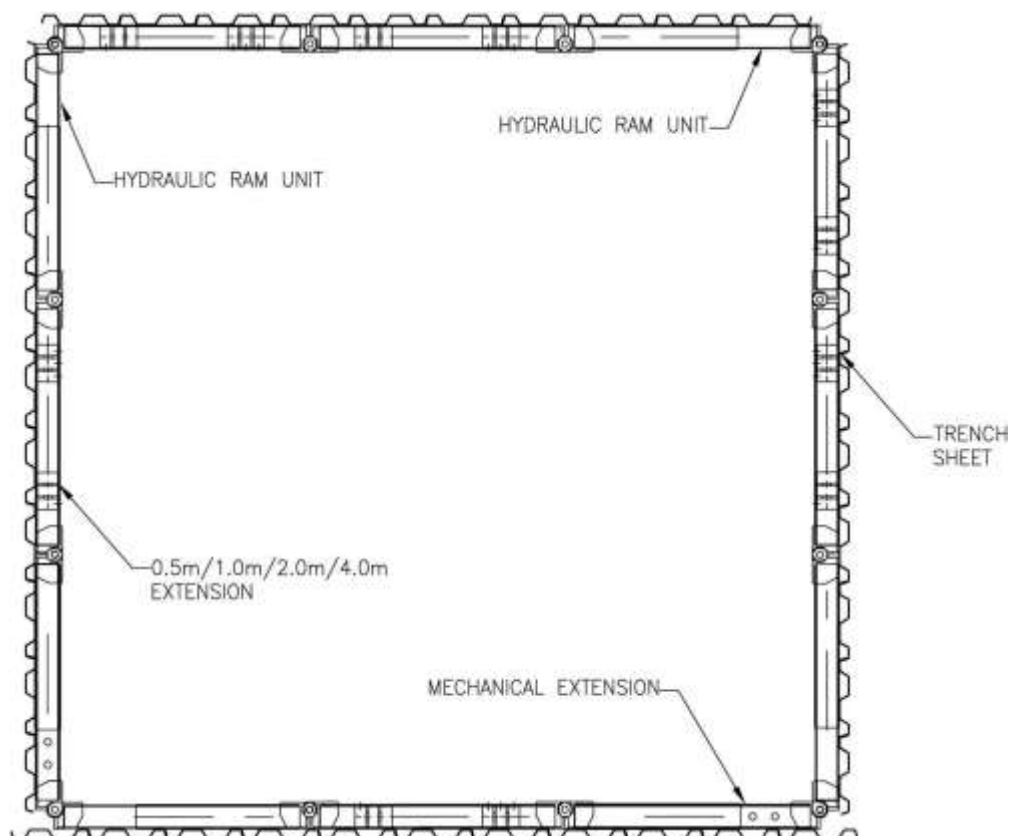
- DO... ensure that all lock-off valves are open prior to pumping.
- DO... ensure that pressure is being held in the rams before closing the lock-off valves.
- DO... use hanging chains between each frame as well as to the top of the sheets.
- DO... install frames as level as possible.
- DO... release the pump pressure after closing the lock-off valves (by hand) to ease removal of the hoses.
- DO... keep the couplers dirt free by clipping male and female ends together after use.
- DO NOT... enter the excavation until the pressure is held in the rams.
- DO NOT... lift a frame until the pressure has been released.
- DO NOT... over-pressurise the system as this can result in damage to the ram or frame.
- DO NOT... attempt to disconnect a hose until the lock-off valve has been fully closed, and pressure has been released at the pump.
- DO NOT... pressurise a frame with a large gap between the frame and the trench sheet. A wedge packer must be inserted to fill the gap.
- DO NOT... release ram pressure by depressing or striking the coupler nipple.

General

Components may vary in detail from the descriptions given in this publication.

HYDRAULIC BRACING SYSTEM COMPONENTS

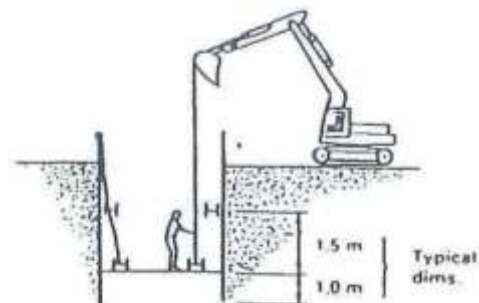
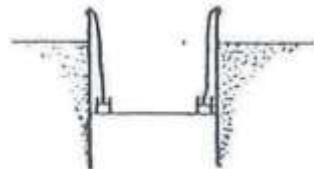
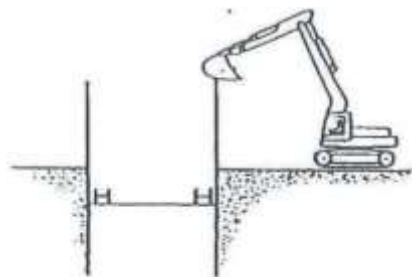
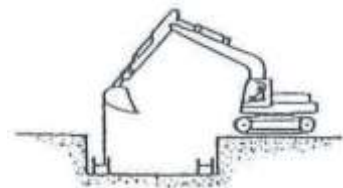
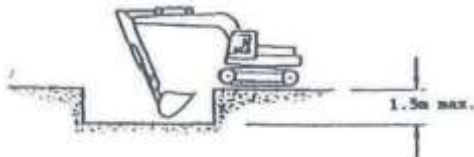
Description	Min	Max	Weight	Section (mm)
Hydraulic Ram	2000	3200	420kg	240x215
Mechanical Ext	1900	2900	285kg	240x215
500 Beam			138kg	220x200
1000 Beam			179kg	220x200
2000 Beam			277kg	220x200
4000 Beam			505kg	220x200



Frame Sizes Can Be Made Up to Suit Varying Applications

Typical Sequence of Sheet and Frame Installation and Removal

Method 1—Dig and Push Method: Installation of 2 frames by excavator placing one leg at a time.



1. Fully excavate to first frame level, (maximum 1.5m). Ensure excavation is safe and free-standing.

2. Place each leg in excavation on timber packers and assemble the frame. Connect hydraulics and pump frame out to correct dimensions, and install corner pins. Leave enough space for sheets to be installed. Remove hydraulic hoses.

3. Using the frame and excavated face as a guide, place sheets and drive with excavator bucket as far as possible. A pushing/driving cap may be required.

4. Connect hanging chains.
5. Connect hydraulics and individually pressurise all frame ram units, close lock-off valves and remove hydraulic hoses.

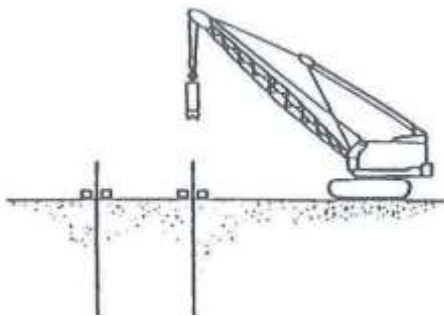
6. Dig through to next frame position while continuing to push sheets down past this level.
7. Reposition hanging chains as necessary.
8. Place legs of second frame in excavation and assemble (safe working must be maintained).
9. Attach hanging chains between first and second frames.
10. Connect hydraulics and individually pressurise all lower frame ram units, close lock-off valves and remove hydraulic hoses.
11. Carry out No's 6 – 10 if additional frame sets are required.

12. Push sheets down to give "toe-in" required and complete dig.
13. Check system for leaks or damage.

NOTE: This method requires operatives working in the excavation and the contractor must ensure safe working conditions at all times.

Typical Sequence of Sheet and Frame Installation and Removal

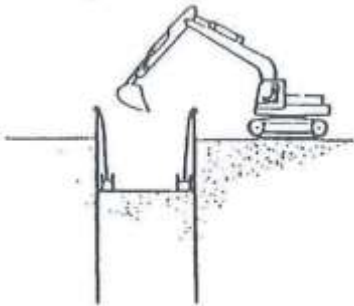
Method 2– Driving Sheets or Slit Trench Method: Installation of 2 frames



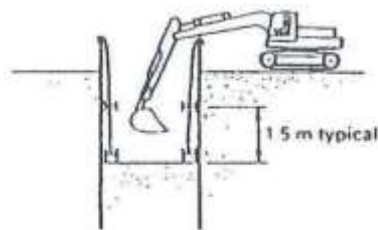
1. Excavate slit trench to excavation dimension and backfill, then push sheets into slit trench using driving cap.

OR

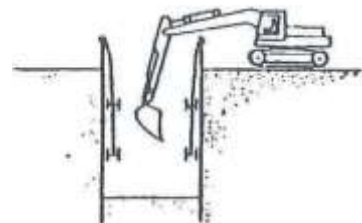
Fully drive sheets/piling using a piling guide. Remove piling guide.



2. Excavate to first frame level, maximum 1.5m.
3. Place each leg in excavation on timber packers and assemble the frame.
4. Connect hanging chains.
5. Connect hydraulics and individually pressurise all ram units, close lock-off valves and remove hydraulic hoses.



6. Dig through to next frame position.
7. Place legs of second frame in excavation and assemble (safe working must be maintained - refer to dimensions shown).
8. Attach hanging chains between first and second frames.
9. Connect hydraulics and individually pressurise all lower frame ram units, close lock-off valves and remove hydraulic hoses.
10. Carry out No's 7 – 9 if additional frame sets are required.



11. Complete excavation.
12. Check system for leaks or damage.

NOTE: This method requires operatives working in the excavation and the contractor must ensure safe working conditions at all times.

Removal of Frames

Backfill to the underside of the lowest frame and carry out any compaction required. Ensure frame is securely packed or supported from below. Connect hydraulics and individually open lock-off valves (max. 2 turns) and fully retract all lower frame ram units. Remove hanging chains. Remove corner pins (if removing the frame one leg at a time), attach lifting sling to lifting eyes and lift each leg one at a time from excavation. Follow the above procedure for the upper frame.

When the frames have been removed and the excavation backfilled, the sheets can be removed, one at a time using the trench sheet extractor or piling machine.

SCAN ME FOR TECH DATA



RISK ASSESSMENT (1= HIGH RISK, 5 = LOW RISK)

Risk(Ranking)	Description	Control
1	Installing hydraulic bracing systems in shifting ground could cause personal injury.	Always ensure persons entering the excavation during installation are protected. Carry out assembly outside of excavation.
1	Overloading the stated capacity of the hydraulic shoring system could cause possible collapse of the system.	Strictly follow the engineers advice/design. Do not overload the capacity of the hydraulic shoring system.
2	Installing hydraulic shoring systems without following operating instructions may cause systems to fail or cause injury.	Adhere to engineering design to ensure shoring systems are only installed in the correct manner.
3	Cuts and grazes may occur from improper handling procedure.	Observe safety procedures, always wear protection.
3	Dropping units trapping feet and hands, mishandling.	Follow safety procedures and operating instructions.