



NATIONAL
TRENCH SAFETY UK

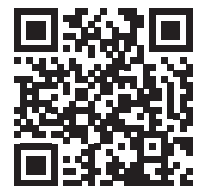
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NATIONAL TRENCH SAFETY UK

WALERS & RAMS USER GUIDE





WALERS & RAMS USER GUIDE

Health & Safety



- **Improper assembly, installation and/or removal may cause serious injury or death.**
- **Ensure that the NTS Walers & Rams is used in accordance with this user guide.**
- **This User Guide is to be read & understood prior to assembly, install & removal.**
- **Ensure all persons engaged with the assembly, installation & removal of the system are suitably qualified.**
- **DO NOT allow a void between the panel and the ground.**
- **NEVER allow anyone inside the excavation during installation or removal.**
- **Non-compliance with this user guide may cause serious injury or death.**

Prior to any use, this user guide must be read carefully and understood by all those involved with the assembly, handling, installation, and removal of the excavation support system. This installation guide is to be followed during all stages of assembly, installation & removal.

NTS UK are not liable for the use of the excavation support system in any way other than that described in this user guide, use in this way may cause serious injury or death.

Any use of the excavation support system not detailed in this user guide must be highlighted by a specific design & site-specific instructions by NTS UK, use of the system outside the scope of this guide without the above is not valid.

PERSONAL PROTECTION EQUIPMENT (PPE)	
	WEAR SUITABLE PROTECTIVE GLOVES
	WEAR SUITABLE HEAD PROTECTION
	WEAR SUITABLE PROTECTIVE FOOTWEAR
	USE SUITABLE EYE PROTECTION
	USE SUITABLE HEARING PROTECTION

HAZARDS	
	GENERAL CAUTION/WARNING (E.G. DEEP EXCAVATION)
	RISK OF CRUSHED HANDS

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1. Introduction

National Trench Safety UK Hydraulic Trench Walers, used in conjunction with proprietary steel trench sheeting, are designed for the shoring of trenches, subject to the maximum safe working load not being exceeded.

N.B. This user information assumes that the user has some degree of experience in the use of proprietary ground shoring equipment and is familiar with relevant safe working practices.

1.1. Specification

EXCAVATION RANGES - ALUMINIUM WALER				
HYDRAULIC STRUT TYPE	HYDRAULIC RANGE (m)		EXCAVATION RANGE (Sheet to Sheet) (m)	
TYPE A	0.53	0.83	0.54	0.84
TYPE B	0.78	1.30	0.79	1.32
TYPE B1	1.29	1.82	1.31	1.74
TYPE B2	1.79	2.32	1.81	2.34
TYPE C	1.26	2.01	1.76	2.02
TYPE C1	1.93	2.71	1.94	2.72
TYPE C2	2.65	3.40	2.66	3.41

EXCAVATION RANGES - STEEL WALER				
HYDRAULIC STRUT TYPE	HYDRAULIC RANGE (m)		EXCAVATION RANGE (Sheet to Sheet) (m)	
TYPE A	0.53	0.83	0.83	1.13
TYPE B	0.78	1.30	1.08	1.61
TYPE B1	1.29	1.82	1.59	2.12
TYPE B2	1.79	2.32	2.09	2.62
TYPE C	1.26	2.01	1.56	2.31
TYPE C1	1.93	2.71	2.23	3.01
TYPE C2	2.65	3.40	2.95	3.70

1.1. Handling

NTS Hydraulic Trench Walers should only be lifted with a suitable 4-leg lifting chain.

N.B. DO NOT under any circumstances attempt to lift the frames with the hanging chains supplied as they are only designed to act as a safety back-up support in the unlikely event of a hydraulic ram failing.

2. Assembly of Frames

The only site connection to be made is between the ram and the rail. This is made by using the 15mm Dia steel pins and spring “R” clips supplied (See Fig 3. & Fig 4. on page 5)

1.1. Frame Adjustment

NTS Hydraulic Walers incorporate a single- acting hydraulic ram which allows full hydraulic adjustment of the frame. The rams are extended by using the hydraulic hand pump and hoses/2 way bridle supplied (see “RAM EXTENSION” on page 3).

1.2. Installation

N.B. There are various recognized methods of trench sheet and hydraulic trench waler installation. The method employed will vary depending on the ground conditions encountered and equipment used but wherever possible, the trench sheets should be pre-driven.

Below is a typical method of installation:

1. Excavate to the position of the top frame (approximately 1m below ground level)
2. Install the top frame ensuring it is laid level.
3. Connect both hydraulic hoses from the 2-way bridle to both rams and then the remaining hose from the 2-way bridle to the hydraulic pump. With the tool supplied, open the lock-off valve and pump out the rams until the desired size is reached.
4. Place trench sheets in each corner and drive as far as possible.
5. Ensure that all rams are pressurized to the correct pressure (1500 PSI max.) and with the tool supplied, close the lock-off valves and remove the hydraulic hoses.
6. Attach hanging chains to both rails and connect to the top of the trench sheets. Ensure the frame is adequately always supported.
7. Place the remaining trench sheets and drive as far as possible.
8. Continue to excavate to the position of the second frame, all the time driving the sheets, ensuring that a suitable “toe in” on the trench sheets is always maintained.
9. Repeat steps 2-6 for the second frame.
10. Once the second frame (and it is assumed the final frame) is installed, continue to excavate to formation level, driving the sheets as necessary.

N.B. ALSO SEE FURTHER GUIDELINES ON PAGE 12

3. Removal of Frames

1. Ensure the frame is securely supported from below and the hanging chains are in position.
2. Connect the hydraulic hoses from the pump to the rams, as per "INSTALLATION- Step 3" and pressurize the system to 1500 PSI max by operating the pump.
3. With the tool supplied, open the lock-off valve (max 2 turns anti clockwise) and carefully release the pressure in the rams by moving the control valve lever on the pump backwards.
4. Remove hanging chains and lift the frame from the excavation.

1.1. Hydraulic Ram/Pump Operation

Only shoring fluid should be used with Hydraulic Trench Walers. It is important to maintain an adequate level of shoring fluid in the pump so the fluid level should be checked regularly. The pump is normally supplied with a full tank of pre-mixed fluid but if neat fluid is supplied separately (in 5 liter containers), it should be carefully poured into the pump and diluted with clean water according to the following ratios:-

Above 0 C ----- 1 part shoring fluid to 4 parts water

0 C to - 10 C ----- 1 part shoring fluid to 2 parts water

-10 C and below ----- Neat shoring fluid only

1.2. Ram Extension

1. Ensure that all hydraulic couplers on the rams, pump and hoses are totally clean and serviceable.
2. To EXTEND the rams, connect one of the hydraulic hoses from the 2-way bridle to the "DELIVERY" coupler on the pump (see Fig.2.) and the other two hoses from the 2-way bridle to the couplers on the rams.
3. Open the lock-off valves on the rams (max. 2 turns anti-clockwise).
4. Set the control valve lever on the pump to the closed position (i.e.. forwards- see fig 2.) Manually operate the pump to extend the rams to the required size and pressurize to 1500 PSI max N.B DO NOT overextend the rams otherwise damage could occur- look out for the warning tape on the ram inner.
5. Close the lock-off valve by turning fully clockwise with the tool provided but DO NOT overtighten.
6. Relieve any residual pressure in the hoses by opening the control valve on the pump (i.e.. pull lever backwards- see Fig.2) and disconnect hoses.

1.2. Ram Retraction

1. To RETRACT the rams, connect the hydraulic hoses from the pump to the rams (as per REMOVAL OF FRAMES- Step 2). and pressurize the system to 1500 PSI max. by operating the pump.
2. With the tool supplied, open the lock-off valve (max 2 turns anticlockwise) and carefully release the pressure in the rams by moving the control valve lever on the pump backwards.

4. Points To Watch

1.1. Over Extension of Rams

The rams are marked with a red warning tape to show when the extension is at its maximum. If this position is passed, fluid will be discharged from a small safety vent, and it will not be possible to achieve the working pressure. To retract the ram into its correct working range, release all pressure at the pump and close the rams down by hand. If the strut supplied has not achieved the required dimension, then the packers or an extra strut extension must be added.

1.2. Air in the System

Occasionally air may get into the system causing either springiness in the ram or a lack of prime in the pump. If this occurs the following steps should be taken:

- To restore prime to the pump, disconnect the handle from the piston rod by undoing the wing nuts and removing the pin, open the pump valve, fold the handle over the front of the pump and manually work the piston rod up and down as fast as possible. When prime is restored, a considerable increase in resistance will be felt. The handle can now be reconnected and normal pumping continued.

To ensure that the ram is air free:

- **PURGE AIR FROM THE HOSES:** Either connect the hose end to the male coupler on the bucket top, if it is of that type or depress the nipple in the hose end and in both cases pump until fluid flows freely through the hose. Then:
- **PURGE AIR FROM THE RAM:** Attach the purged hose to the ram and fully extend. Stand the ram on end with the valve block at the top. Release the pressure at the pump valve and push the ram closed. All air should now be purged.

1.3. Do's and Don'ts

DO	DON'T
DO Read this user information guide prior to using the kit.	Do NOT Over pressurise the rams (1500 psi max).
DO Inspect all kit prior to assembly.	Do NOT Over extend the rams (300mm maximum stroke for "A" rams/500mm maximum stroke for "B" and "B1" rams.
DO Ensure all pins & "R" clips are correctly fitted.	Do NOT Over tighten lock-off valves.
DO Ensure all lock-off valves are open prior to extending/retracting rams and that all couplers on rams/hoses are clean.	Do NOT Enter the excavation until the rams are holding pressure.
DO Ensure that all hydraulic rams are holding pressure before closing lock-off valves and removing hoses.	Do NOT Disconnect hoses until the lock-off valve has been closed and pressure has been released at the pump.
DO install the frame level and in accordance with this guide.	Do NOT use the hanging chains for any purpose other than that they are intended for.
DO Only use the lifting points for fixing chains.	Do NOT De-pressurise the rams without the frame being securely supported.
DO only use suitable chain slings for lifting purposes.	Do NOT Attempt to remove a frame without first releasing the pressure in the rams.
DO Attach all hanging chains as supplied.	
DO Relieve any residual pressure in the hoses prior to disconnecting from the rams.	

5. Hose & Ram connection details



6. Lifting and Hanging Operations

1.1. Lifting Chains



All lifting must only be carried out using certified 4-leg chains of adequate capacity. NTS are able to hire out suitable chains. The contractor should carry out a detailed risk assessment and lifting plan before any lifting operations take place.

Notes on chain attachment points:

Most equipment is fitted with both lifting eyes and hanging chain attachment points. When lifting assembled frames into or out of the excavation, only the lifting eyes are to be used for slinging. Restraining points must only be used to attach the hanging chains.

1.2. Hanging Chains



Hanging chains are used to provide vertical restraint to the waler(s) once installed. The upper chains are hooked over the top of the trench sheets using the sheet hook then connected to the frame restraining points by "D" shackles. A minimum of four chains will be required per waler or as indicated on any drawings supplied. Some adjustment in overall length of the chain will be necessary to ensure all support points are level and to remove any slack. Shortening chains to the required length is achieved by inserting the "D" shackle through the appropriate chain link. Additional hanging chains connect lower level frames to the frame above.



WARNING: Hanging chains act as a backup means of support in the unlikely event of a hydraulic failure. It is essential that certified lifting chains are used to take the weight of equipment before de-pressurizing the hydraulic rams.

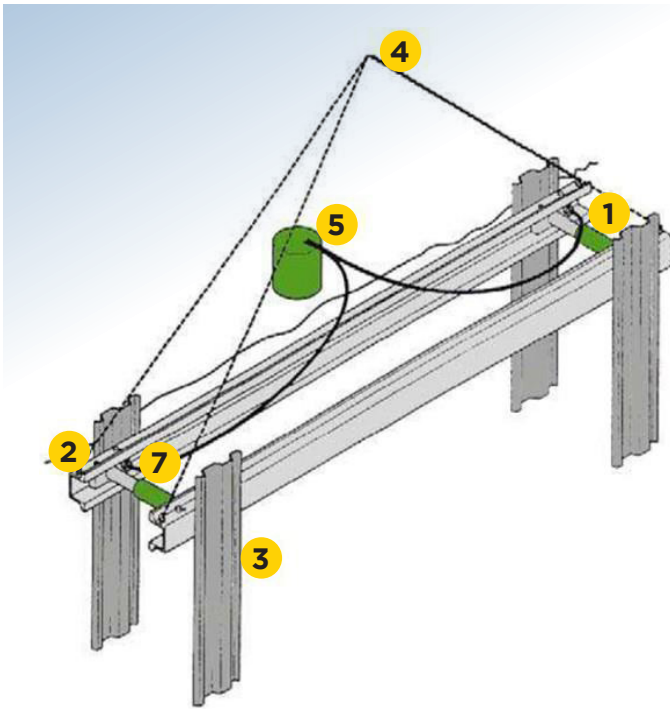
HANGING CHAINS ARE NOT CERTIFIED AND MUST NOT BE USED FOR ANY LIFTING OPERATIONS.



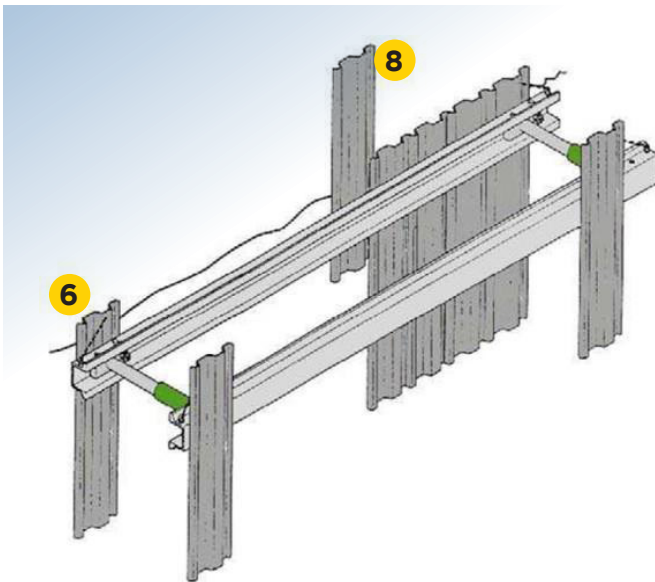
1.3. Do's and Don'ts

DO	DON'T
DO inspect all components at start of every shift.	Do NOT Over tighten lock-off valves.
DO Prepare a lifting plan, assess weights correctly and use appropriately certified lifting equipment during installation and removal.	Do NOT Allow excessive amounts of spoil to collect on top of the waler members.
DO use only designated lifting points for chain attachment.	Do NOT Use excessive force during installation/removal.
DO Provide edge protection or handrail panels.	Do NOT De-pressurise walers components without adequate support (other than provided by the hanging chains) being in place.
DO Attach a minimum of four hanging chains per frame, one in each corner.	Do NOT Drag the waler out of the ground without releasing the pressure.
DO Keep personnel clear of excavator slewing zone.	Do NOT Strike the waler components during excavation.
DO Locate underground services before excavating.	Do NOT Use shoring fluid other than that supplied by NTS.
DO Provide a safe means of access and egress.	
DO Have a "toolbox talk" prior to using the equipment.	

7. Installation Procedures

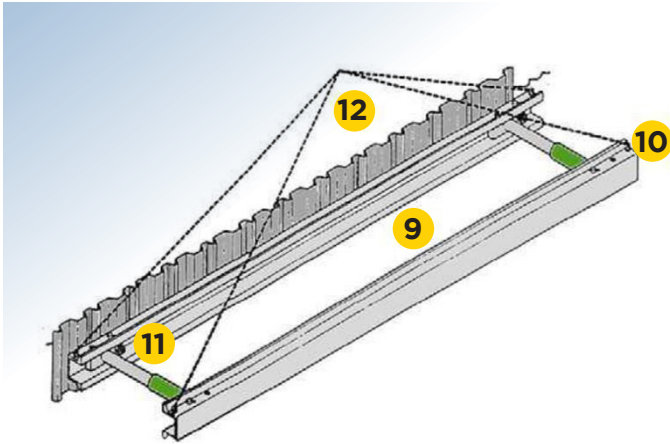


- 1** Place the waler next to the trench and connect hoses to valves on the near side rail ensuring pump valve is open.
- 2** Connect lifting slings to eyebolts.
- 3** Place four sheets in trench, one for each corner of waler frame.
- 4** Position waler in trench with the cylinders aligned between corner trench sheets.
- 5** Close the pump valve, pump out to approximately 1500 psi and check pressure does not drop.



- 6** Attach hanging chains to 4 eye-bolts and secure to top of each trench sheet.
- 7** Place release tool with end behind collar, flick handle towards you and coupling will spring free. Note some models may be fitted with a lock-off valve adjacent to the hydraulic coupling. If this is the case, using the tool provided, close the valve (by turning clockwise) and de-pressurize the delivery hose at the pump before removing the hose by hand.
- 8** Disconnect lifting sling and position further trench sheets behind waler rails as required.

7. Installation Procedures



- 9** Once the pipe is laid, backfill the trench to the underside of the bottom waler.
- 10** Attach lifting sling and disconnect connecting chains from the frame.
- 11** Place release tool over lip of rail and push handle away to release pressure on each cylinder valve. Ensure cylinders retract sufficiently to allow frame to clear sides of excavation.
- 12** Waler frame and trench sheets can now be removed as backfilling proceeds.