

# Double Acting Manhole Brace User Information



(29/11/17)

## **Preamble**

**Excavations requiring double acting manhole brace should be subject to a Temporary Works Design.**

A Double Acting Manhole Brace comprises of 4 individual “legs” which are assembled on site to form either a square or a rectangular frame. It is known as Double Acting as the legs can be extended or retracted by means of a pump.

Double Acting Manhole Brace are designed for the ground pressures detailed in the Loading Diagram. If in doubt about the generated ground pressure in the excavation consult a qualified soil engineer.

Double Acting Manhole Brace are intended to be used in conjunction with trench sheets or piles. The position of the Manhole Brace in the excavation is critical and must be determined by a Temporary Works Design to prevent collapse, taking account of the type of soil, presence of water or surcharge etc.

## **Unloading (Method to be determined by Risk Assessment on Site)**

### **Disassembled.**

#### 1)By forklift/telehandler

Ensure the forklift/telehandler has sufficient capacity and adequate fork length to lift the equipment safely. (See capacity table).

Ensure that each lift occurs at the centre of gravity of the manhole brace leg. Lift only one item at a time. When lifting the manhole brace leg position the forks in the centre underside of the beam.

#### 2)By crane/excavator

Ensure the crane/excavator has sufficient capacity and adequate chains to lift the equipment safely. (See capacity table). Use good slinging practice at all times.

Ensure the chain(s) are connected to the two lifting points on the manhole brace leg. Lift only one manhole brace leg at a time.

## **Assembly.**

- 1) Assembly must take place on firm and level ground free of other hazards such as traffic or falling debris.
- 2) Place the first manhole brace leg on battens so that the valve housing is vertical and the lifting points are clear of the ground.
- 3) Using an excavator lift the second brace leg into position and insert the smaller beam into the larger one at right angles and pin it, attaching an “R” clip to prevent removal.
- 4) Repeat steps 2) and 3) until closed frame is formed.
- 5) Back off the lock off valves by two turns and attach two hoses to each leg.
- 6) Attach the male and female hoses to their respective manifold blocks. The manifold blocks are then attached to the pump.
- 7) The manhole brace is now ready for installation.

## **Storage/Stacking (To be determined by Risk Assessment on Site)**

Manhole braces frames articulate to allow easy installation this may cause them to fall over when stored or stacked. Therefore never stack manhole brace frames or individual arms by standing them on their edge or by leaning them against a structure. Manhole brace frames may be stacked on top of each other if they are on level ground with battens between each frame. Never stack manhole brace frames more 2 high. If the ground is not level then they should be disassembled for storage. In all cases risk assessment should be undertaken to ensure site safety.

## **How to install a Double Acting Manhole Brace (to be determined by Risk Assessment on Site)**

### **Installation 1 – Dig and Push.**

- 1) Dig the excavation to the required width and length by approximately 1.0m deep or as determined by the Temporary Works Design.
- 2) Place trench sheets in each corner and drive in.
- 3) Place the manhole brace into the excavation, ensuring it is level and then pressurise the frame to 1000 PSI. Close the lock off valves and de-pressurise the hoses, then remove them.
- 4) Attach the manhole brace to the trench sheets by means of the hanging chains.
- 5) Place and drive the remaining trench sheets into position
- 6) Drive the trench sheets below the level of the manhole brace by approximately 500mm and excavate approximately 300mm below the level of the manhole brace (never excavate below the level of the trench sheets).
- 7) If the Temporary Works Design necessitates further manhole brace frames they are installed by lowering manhole brace through the in situ manhole brace and repeating steps 3) and 4), and attaching it to the in situ manhole brace by means of hanging chains.
- 8) Fit wedges to any gaps between the sheets or piles and the manhole brace frame.
- 9) Excavate to formation allowing for any toe in on the sheets.
- 10) It is good practice to “blind” the base with a concrete pad.

### **Installation 2 – Pre-Driven Sheets.**

- 1) Using a vibratory hammer drive the sheets or piles to formation level.
- 2) Excavate to the first brace position as determined by the Temporary Works Design.
- 3) Place the manhole brace into the excavation, ensuring it is level and then pressurise the frame to 1000 PSI. Close the lock off valves and de-pressurise the hoses, then remove them.
- 4) Attach the manhole brace to the trench sheets by means of the hanging chains.
- 5) If the Temporary Works Design necessitates further manhole brace frames they are installed by lowering manhole brace through the in situ manhole brace and repeating steps 3) and 4), and attaching it to the in situ manhole brace by means of hanging chains.
- 6) Fit wedges to any gaps between the trench sheets or piles and the manhole brace frame.
- 7) Excavate to formation allowing for any toe in on the sheets.
- 8) It is good practice to “blind” the base with a concrete pad.

### **Extraction (to be determined by Risk Assessment on Site).**

- 1) Before removing the manhole brace frame the excavation must be secured by “toeing in” the sheets, backfilling and compacting or by a concrete blinding or by another method approved by the Temporary Works Design.
- 2) Attach the lifting chain to the lifting points on the lowest manhole brace. Attach the hoses connected to the pump to the quick release fittings then loosen the lock off valves. This allows the manhole brace to de-pressurise.
- 3) The manhole brace frame can be retracted by pumping in the legs, when the manhole brace is approximately 150mm smaller than the frame above it, it can then be lifted through the frame above. Then back fill and compact.
- 4) Repeat operations 2) and 3) for each frame in turn
- 5) When all the frames have been removed and the backfilling completed remove the trench sheets..

### **DO:**

1. Ensure you read this User Information
2. Ensure you use the correct lifting equipment and have a Lift Plan
3. Ensure the frames are installed in accordance with this User Information and Temporary Works Design.
4. Ensure all equipment is inspected prior to use for damage
5. Ensure all pins are secured with R Clips
6. Ensure the lock off valves are open before attempting to extend the brace legs.
7. Ensure quick release couplers are clean and well seated
8. Ensure hydraulic rams are holding pressure before closing lock off valves and removing hoses.
9. Ensure you use all the hanging chains supplied and only connect them to the designated points.

### **DON'T**

1. Enter the excavation until the brace arms are holding pressure and the excavation is declared safe.
2. Over tighten the lock off valves.

3. Use the hanging chains for lifting.
4. Attempt to remove the frame from the excavation without de-pressurising the brace arms.
5. De-pressurise the brace without the frame being securely supported.

**Capacity Table**

Heavy Duty Brace Arm Type A (2m – 3m)	225 kg each approx.
Heavy Duty Brace Arm Type B (3m – 4m)	278 kg each approx.
Heavy Duty Brace Arm Type C (4m -5m)	331 kg each approx.
Heavy Duty Brace Arm Type D (5m – 6m)	383 kg each approx.
Heavy Duty Brace Arm Type E (6m – 7m)	505 kg each approx.

**Example**

2m x 2m Frame - 4no Type A Brace Arms @ 225 kg each	=	900 kg per frame approx.
6m x 4m Frame - 2no Type D Brace Arms @ 383 kg each 2no Type B Brace Arms @ 278 kg each	=	1322 kg per frame approx.