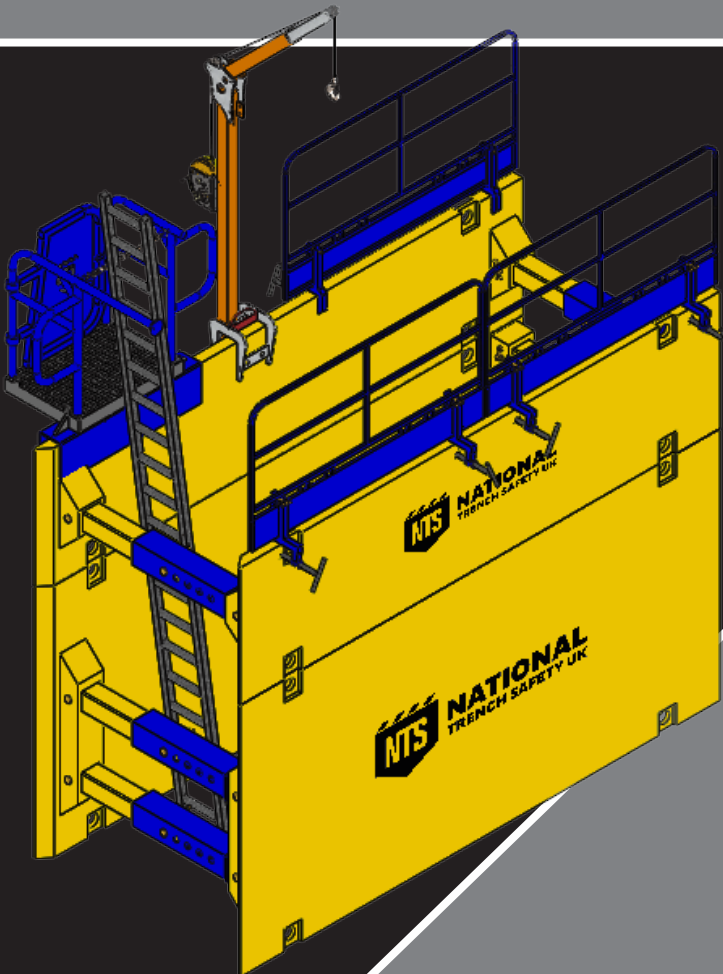




////  
NATIONAL TRENCH SAFETY UK

# DRAG BOX SYSTEM USER GUIDE



# DRAG BOX SYSTEM USER GUIDE

## Health & Safety



- **Improper assembly, installation and/or removal may cause serious injury or death.**
- **Ensure that the NTS Drag Box is used in accordance with this user guide.**
- **This User Guide is to be read & understood prior to assembly, installation.**
- **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 trench support system in any way other than that described in this user guide, use in any other 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

REV 3.0: JUNE 2024

NTS (UK), UNIT 28 MOOR LANE TRADING ESTATE, MOXON WAY, LEEDS, LS25 6ES. 03332 076 007

The information contained within this guide remains the property of NTS (UK) and is not to be altered or reproduced without written permission. NTS (UK) reserves the right to change any data without giving prior notice. Once printed - uncontrolled.

## Table of Contents

<b>1.</b>	<b>General Guidance Notes.....</b>	<b>4</b>
1.1.	Lifting & Transportation .....	4
1.2.	Measures to reduce hazards.....	4
1.3.	Personnel .....	5
1.4.	Maintenance and repair.....	5
1.5.	Small Plant, Tools, and Lifting Chains .....	5
1.6.	Access & Egress and Edge Protection .....	5
1.7.	During Installation Works .....	5
1.8.	After Installation Works.....	5
1.9.	Return of Equipment Off-Hire .....	5
1.10.	Transportation.....	6
1.11.	Stacking Arrangement.....	6
<b>2.</b>	<b>System Drawing .....</b>	<b>7</b>
<b>3.</b>	<b>Technical Parameters .....</b>	<b>8</b>
3.1.	Lightweight Drag Box .....	8
3.2.	SBH Drag Box .....	8
3.3.	Strut Ranges .....	9
3.4.	Panels .....	11
3.5.	Spacer .....	11
3.6.	Accessories .....	11
<b>4.</b>	<b>Assembly Instructions .....</b>	<b>12</b>
4.1.	Drag Box Assembly .....	12
<b>5.</b>	<b>Installation Instructions .....</b>	<b>14</b>
5.1.	Installation of Base Boxes .....	14
5.2.	Installation of Top Boxes.....	15
5.3.	Isometric Drawing .....	16
5.4.	End Closure Panels .....	16
5.5.	Before Entering the Trench.....	17
5.6.	Entering the Supported Trench.....	17
5.7.	Working Method .....	18
5.8.	Dismantling .....	19
5.9.	Precautions During Use and Maintenance .....	19
<b>6.</b>	<b>User Guidance .....</b>	<b>20</b>

# 1. General Guidance Notes

Ensure observance of the permissible max stress limits. The front parts should be sloped, appropriate to ground conditions.

The following sets of rules and regulations in their current versions are to be observed:

- **Regulations of the BG Technical Committee for Civil Engineering**
- **DIN 4124 Excavations and Trenches**
- **DIN EN 13331 Part 1 & 2 Trench Lining Systems**
- **Rules for Occupational Health and Safety**
- **Accident prevention regulations / Occupational health and safety regulations**

Follow the instructions in this manual during installation.

**This guide is to be used as a supplementary document to the Contractor's RAMS. All site operations are the responsibility of the Contractor, and this guide is intended as guidance for use with the Drag Box System ONLY and should be used in conjunction with any/all design documentation & drawings provided by NTS UK and any site assistance NTS UK have provided.**

## 1.1. Lifting & Transportation

The shoring unit is to be slung only by means of the dedicated lifting rings & openings or accessories.

- **Lifting tackle must be suitable for the weight to be transported.**
- **For safety reasons, you must only use load hooks equipped with hook locks.**
- **Ensure the observation of the permissible traction limits.**
- **Transportation is to be carried out close to the ground and unnecessary swinging motions are to be avoided.**
- **Standing in the swivel range of the lifting device or under suspended loads is prohibited.**
- **Look out for overhead wires.**
- **The machine operator and banksman must maintain eye contact.**

**ALL LIFTING, HANDLING & TRANSPORTATION OPERATIONS FALL UNDER THE RESPONSIBILITY OF THE CONTRACTOR & THEIR RAMS. THE ABOVE POINTS ARE TO AID THE USER IN THE SAFE LIFTING & TRANSPORTATION OF THE SYSTEM. ALL LIFTING TRANSPORTATION OPERATIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR.**

## 1.2. Measures to reduce hazards

- **The construction site must be adequately secured and signposted.**
- **If necessary, the adjacent flow of traffic is to be ensured using additional security personnel.**
- **Personnel must wear protective work clothing (helmet / safety shoes / gloves).**
- **Possible instabilities as a result of wind load must be taken into consideration during assembly or installation.**
- **Set the shoring units flat on a solid surface.**
- **In the case of sloping, pay special attention to stable storage of pre-assembled building components.**

### 1.3. Personnel

---

The Management of Health and Safety at Work Regulations require that personnel deployed are suitably trained, experienced, and supervised by a competent person. All lifting operations are to be controlled by an appointed person.

The main activities associated with Drag Box use are:

- **Unloading and loading the delivery vehicle.**
- **Bolting up and pinning components together.**
- **Slinging and lifting the Drag Box into position.**

### 1.4. Maintenance and repair

---

- **Shoring units should always be checked for functionality before use.**
- **Keep all nuts and bolts tight and ensure all pins are correctly fitted with 'R' Clips, where required.**
- **Defective or deformed units must not be used.**
- **You can repair slight damage yourself after consulting with NTS. Alternatively, you can take advantage of our service at our depots, if required.**
- **Only use original replacement parts by NTS for repairs**

### 1.5. Small Plant, Tools, and Lifting Chains

---

Lifting chains of suitable lifting capacity, hook size, leg length and current certification should be used. A small lump hammer may be required to tap pins and 'R' clips into position.

### 1.6. Access & Egress and Edge Protection

---

Install the edge protection as soon as possible before entry into the excavation. A competent person should inspect the means of access and egress regularly.

### 1.7. During Installation Works

---

Lifting chains of suitable lifting capacity, hook size, leg length and current certification should be used. A small lump hammer may be required to tap pins and 'R' clips into position.

### 1.8. After Installation Works

---

Each excavation and Drag Box must be inspected daily before personnel begin work.

### 1.9. Return of Equipment Off-Hire

---

Clients should ensure that on removal, the equipment is returned clean and assembled as supplied.

## 1.10. Transportation

Ensure all equipment is loaded to the satisfaction of the vehicle driver and is securely restrained to the vehicle bed.

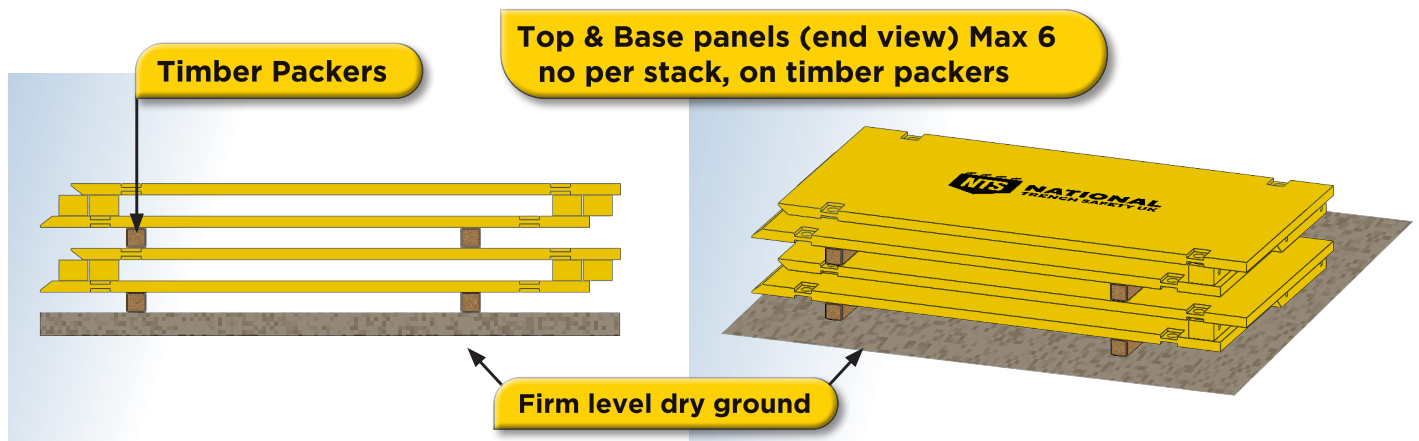
(Min. 3 straps per stack is recommended).

## 1.11. Stacking Arrangement

In dismantled form, panels should be stacked as shown with suitable timber dunnage. (Max. 4 panels per stack).

Ensure panels are stacked directly above one another and all panels in a stack are in the same orientation.

Do NOT stagger or offset the panels within a stack. Long struts should be stored on suitable timber dunnage. Small components should be stored in skips / bins.

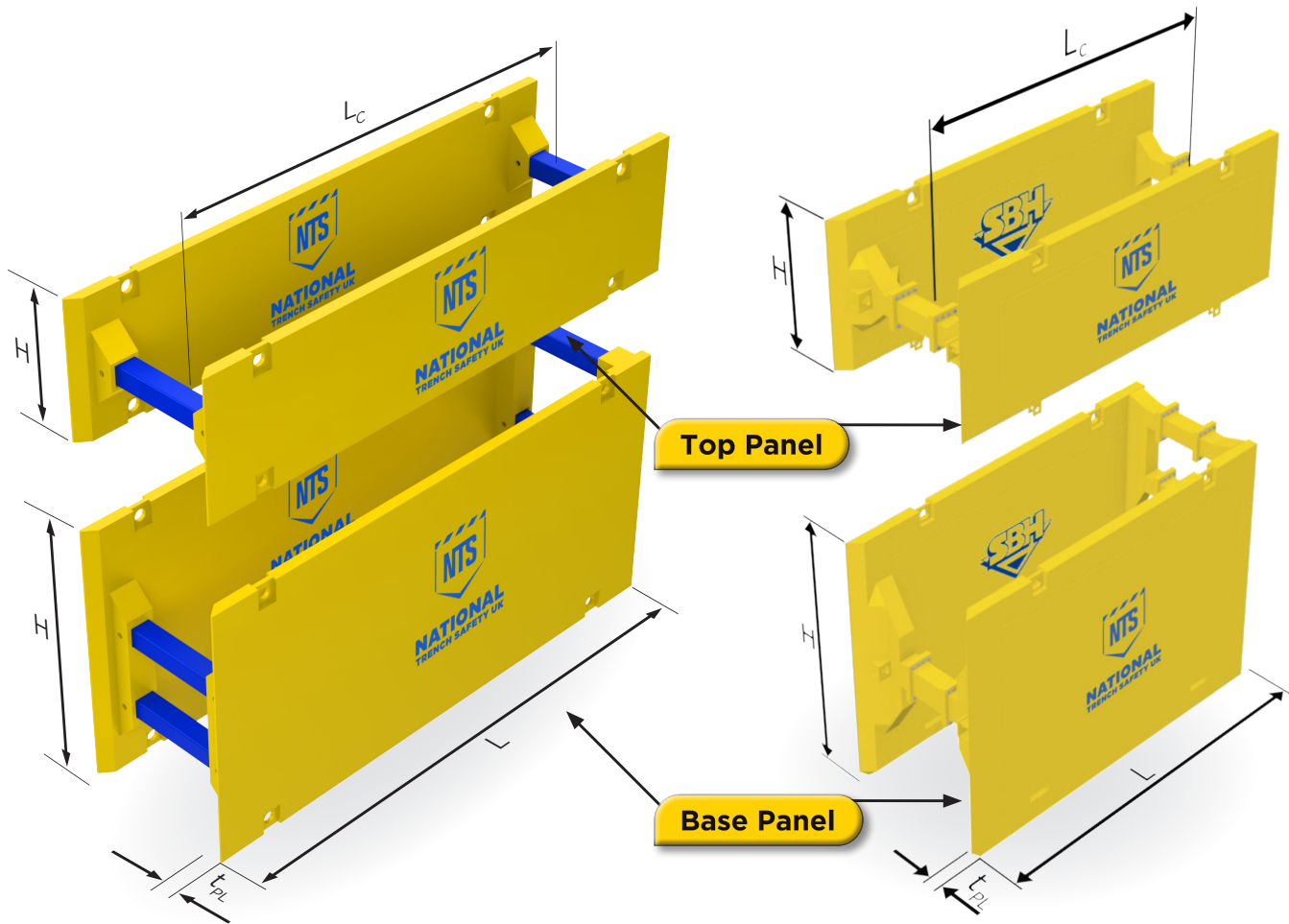


## 2. System Drawing

- H panel height
- $t_{PL}$  panel thickness
- $h_c$  strut clearance height
- L panel length
- $L_c$  clearance between struts

**Lightweight Drag Box**

**SBH Drag Box**



### 3. Technical Parameters

#### 3.1 Lightweight Drag Box

 PANELS  $T_{PL} = 90MM$ 

MAX DEPTH UP TO 4.0M

PANEL LENGTH - L (m)	PANEL HEIGHT - H (m)	PIPE CLEARANCE $L_c$ (m)	PIPE CLEARANCE $H_c$ (m)	MAX. PERM. EARTH PRESSURE (kN/m <sup>2</sup> )	WEIGHT PER BOX (kg)
4.0	2.0	3.01	1.4	20.0	2210
	1.0				1090
4.1	2.0	3.56	1.00	20.0	2290
	1.0				1398
5.1	2.0	4.56		20.0	2530
	1.0				1550

#### 3.2 SBH Drag Box

 PANELS  $T_{PL} = \text{VARIOUS}$ 

MAX DEPTH UP TO 4.8m

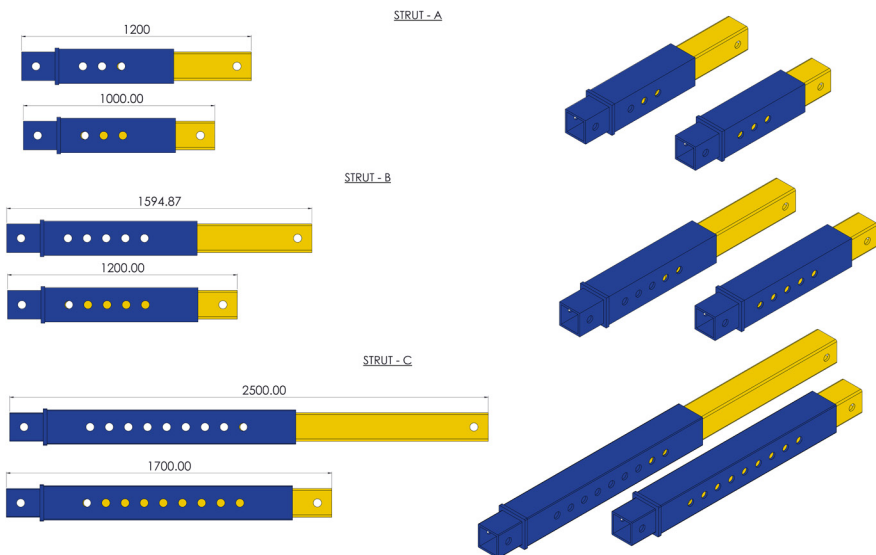
PANEL LENGTH - L (m)	PANEL HEIGHT - H (m)	PIPE CLEARANCE $L_c$ (m)	PIPE CLEARANCE $H_c$ (m)	MAX. PERM. EARTH PRESSURE (kN/m <sup>2</sup> )	WEIGHT PER BOX (kg)
4.0	3.0	3.22	1.82	32.5	3430
5.0	2.4	4.1	1.495	32.5	3680
	1.0 - 1.5				
5.0	3.0	4.22	1.82	32.5	4030
7.0	2.4	6.1	1.495	20.0	4980
	1.5				2950
7.1	2.4	6.56	1.4		5330
	1.40				3070



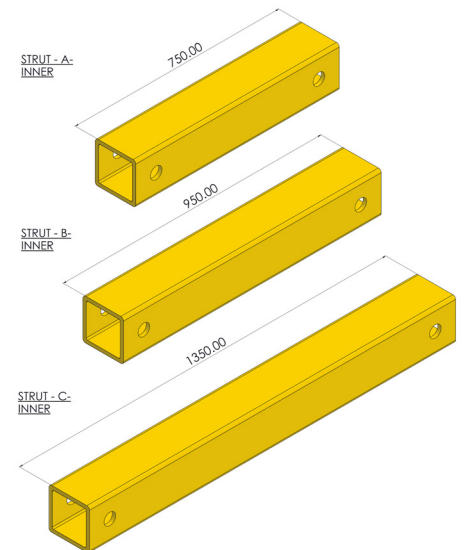
### 3.3 Strut Ranges

	ADJUSTABLE	ADJUSTABLE INNER (mm)	FIXED (mm)
Strut A	1m - 1.2m	750	600
Strut B	1m - 1.6m	950	700
Strut C	1.7m - 2.5m	1350	850
Strut D - Fixed	x	x	900
Strut E - Fixed	x	x	925
Strut F - Fixed	x	x	1050

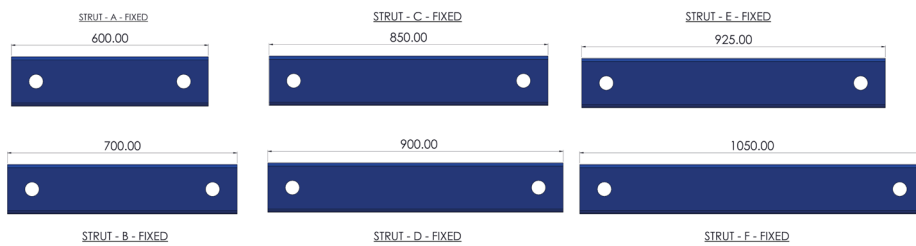
#### Adjustable Struts



#### Adjustable Inner



#### Fixed Struts



### 3.4 Panels

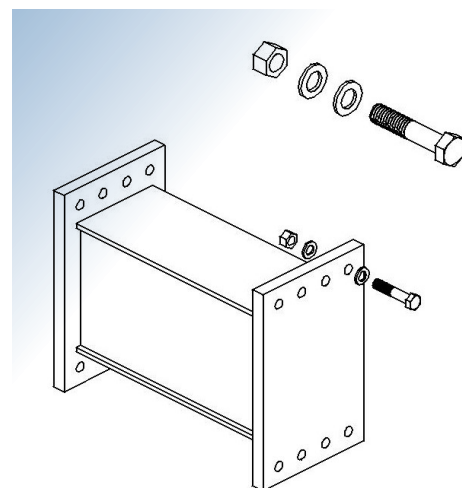
Panel width = 127mm permissible panel moment = 100.2kN/m max side part moment = 62kNm

PANEL LENGTH	PANEL HEIGHT (m)	CLEARANCE LENGTH (m)	CLEARANCE HEIGHT (m)	MAX GROUND kN/m <sup>2</sup>	WEIGHT PER BOX (kg)
4	3	3.22	1.82	32.5	3430
4.5	3	3.72	1.82	28.9	3740
5	3	4.22	1.82	26	4030
5.5	3	4.72	1.82	23.7	4360

### 3.5 Spacer

Permitted tractive force = 353 kN Permissible compression force = 550 kN

SPACER LENGTH (m)	WEIGHT AT FLANGE (kg)		WORKING WIDTH BETWEEN PANELS (m)	TRENCH WIDTH (m)
	290 X 360	290 X 460		
-	-	-	0.9	1.15
0.25	68	86	1.15	1.4
0.5	83	105	1.4	1.65
0.75	100	127	1.65	1.9
1	116	147	1.9	2.15
2	182	230	2.9	3.15

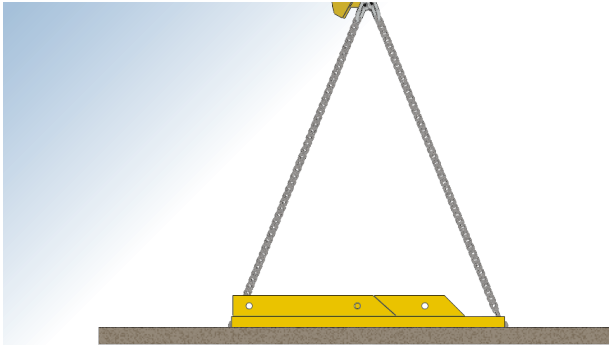


### 3.6 Accessories

Description	For use with	Dimensions (mm)	Weight (kg/piece)
Hex screw	Flange	M20*100	0.38
Washer	Flange	A22	1.0.04

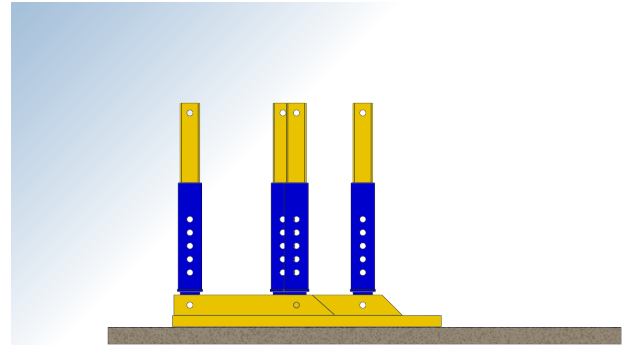
## 4. Assembly Instructions

### 4.1. Drag Box Assembly

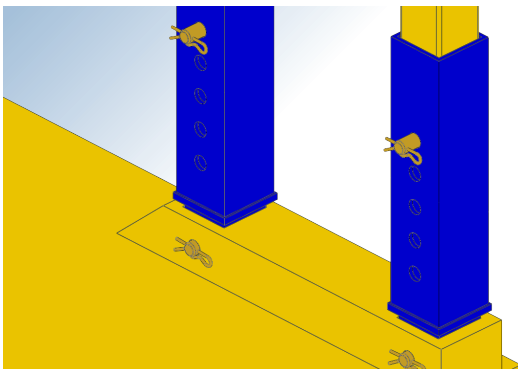


**1** Lay the panel on an even and solid surface with the flange plates pointing upwards.

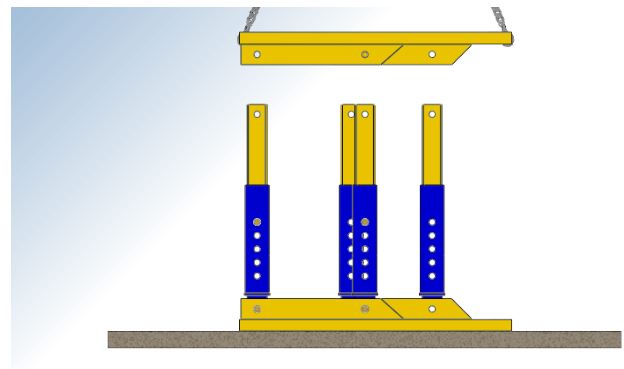
When using spacers, set them onto the flange plates from above and attach them with the fasteners provided.



**2** If several struts are needed to achieve the required working width, then these are fitted to the base in advance and then flange-mounted as described previously.



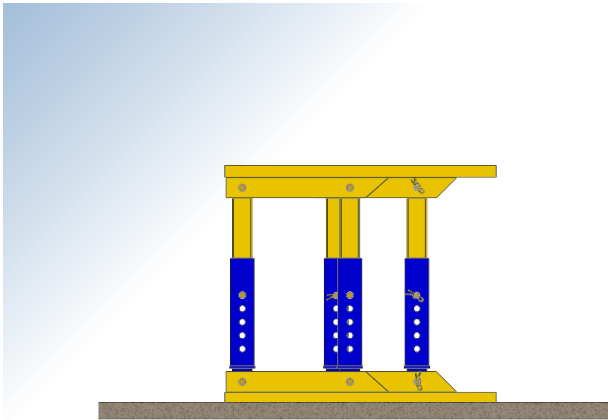
**3** Affix struts to one panel if the trench width is 2.00m or less. If trenches are wider than 2.00m, attach spacers to both panels. Secure struts with pins provided.



**4** Use a 4-leg chain to suspend a distribution plate to the lifting rings in the upper area and swivel it round so that the flanges lie on the ground.

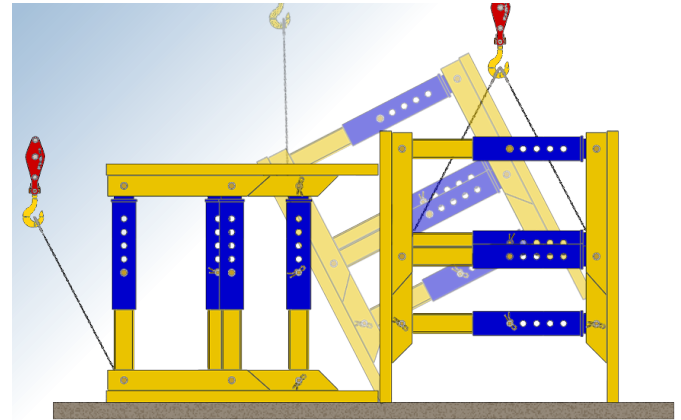
Attach the two free chain strands to the mounting holes and raise them above the plate lying on the ground.

## 4.1. Drag Box Assembly



**5** Aligning the flange plates is effortless, as the distribution plate remains suspended during the assembly processes.

As previously described, the components are pinned together.



**6** Hang the chains on the mounting holes and pull the upper rings to align the completely assembled box (tilt by 90°) until it stands upright.

For further transportation, suspend all four strands on the chain hanger into the upper rings.

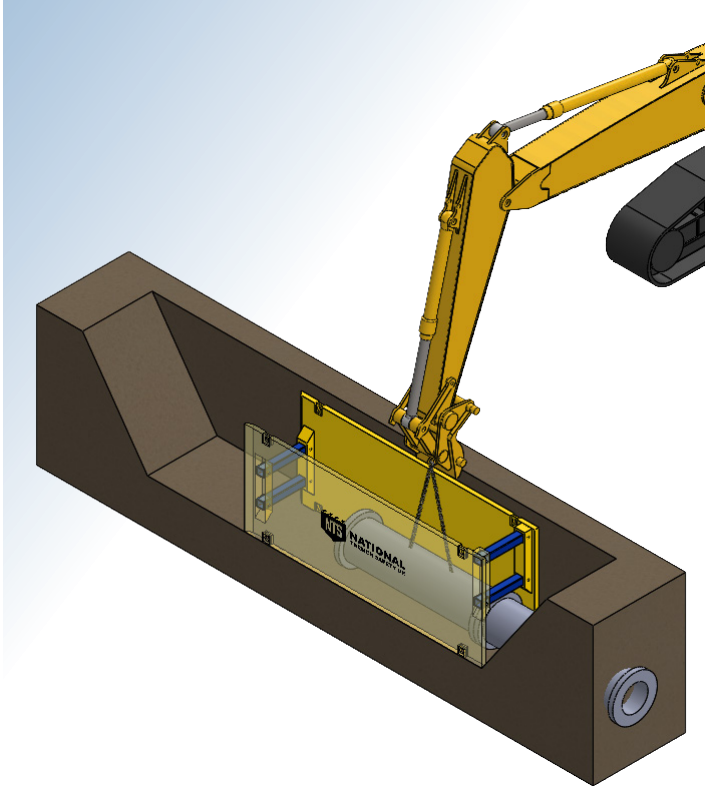
### Permissible tractive forces:

At the individual attachment points, the following tractive forces can be applied:

- per lifting ring in head area = 153 kN
- per lifting ring on the front panel = 229 kN
- per mounting hole = 40 kN

## 5. Installation Instructions

### 5.1. Installation of Base Boxes



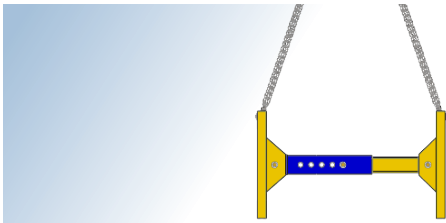
**1** Excavate initial section of trench slightly wider than the external box dimension.

Lift the Drag Box into trench using the four leg chain sling attached to the lifting points at the top of each panel. The Drag Box **must NOT** be pushed down into the trench using a 'dig and drive' method.

- Always maintain a safe batter of the unsupported parts of the trench in front of and behind the box.
- Fill any large voids on outside of panels so that the box cannot be pushed sideways by any soil movement.
- Ensure the box is installed vertically.
- Allow for at least 100mm of projection of top of box above ground level to prevent debris rolling into the excavation.
- Do NOT leave the base of the box 'flying' above the excavation level. Place the shoring box into the trench that has already been excavated to the final depth.

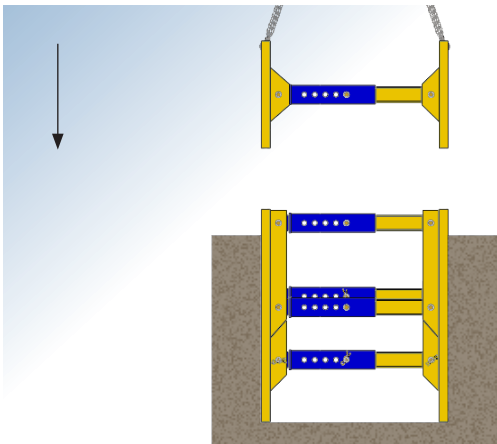
If a bucket mounted lifting eye is not attached, the bucket **MUST** be removed when moving the drag box.

## 5.2. Installation of Top Boxes

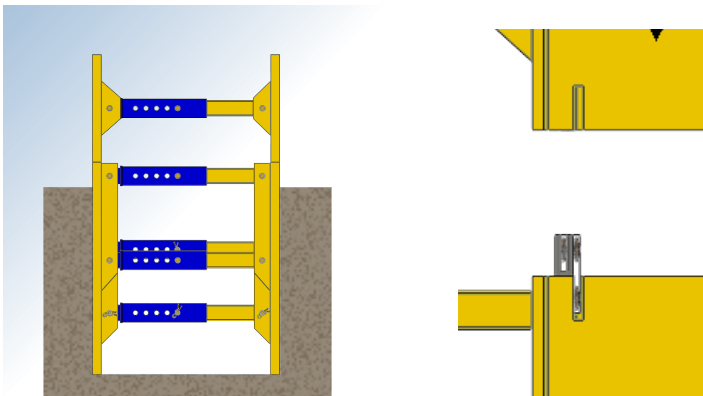


**1** The base box should be stood in its normal upright mode in a partly dug trench approximately 1000mm deep.

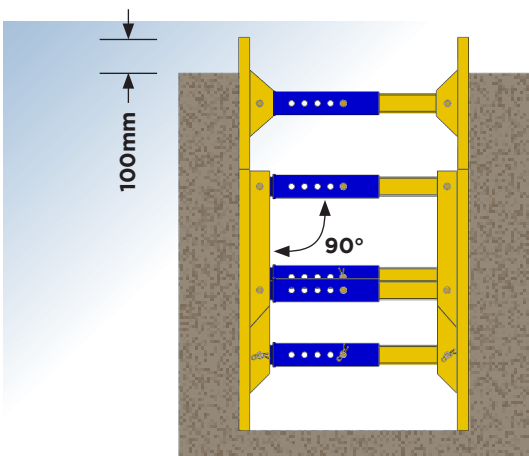
The extension box, assembled as the same procedure in Section 4.1, can be lowered onto the base using the lifting points.



**2** Align the top box and lower into position over the Base Box. Ensure connectors locate in top panel end posts.



**3** Attach the top box to the base box using box connectors and  $\varnothing 20 \times 150$  mm pins & 'R' clips.



**4** Lift the full assembly from the trench, excavate to the full depth and lift the assembled box back into the trench.

**DO NOT use any unsupported part of the excavation for access. Leave the extension 100mm minimum above the surrounding ground level.**

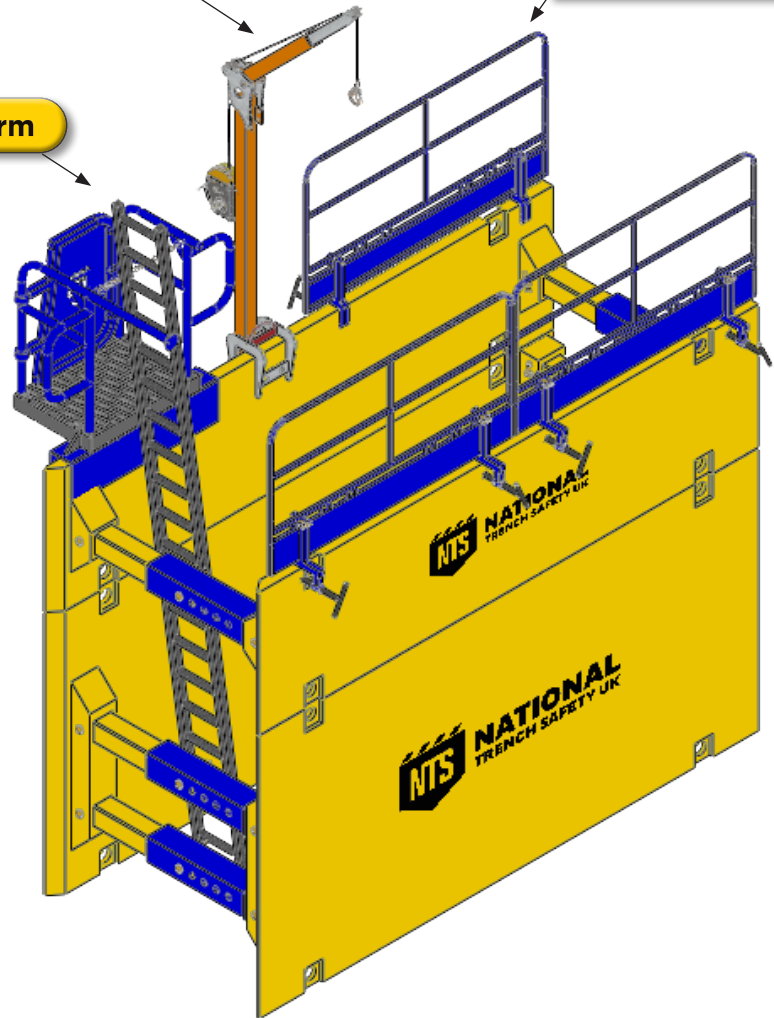
### 5.3. Isometric Drawing

Davit System

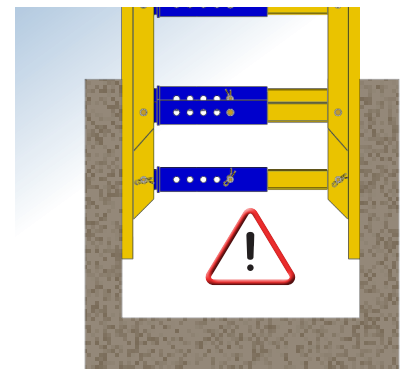
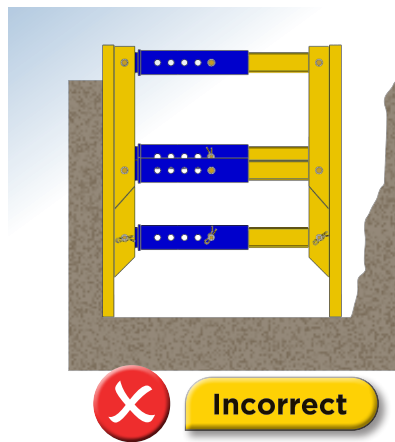
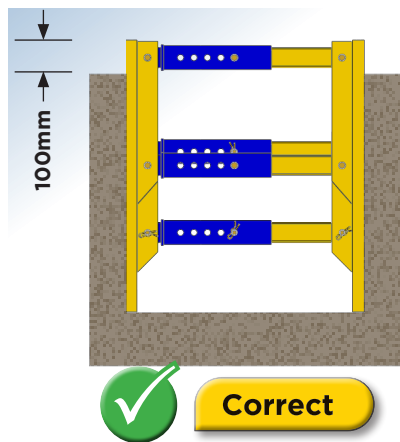
Edge Protection

Ladder Access Platform

**NOTE: DON'T FORGET YOU WILL NEED A LADDER, LADDER ACCESS PLATFORM, DAVIT SYSTEM AND EDGE PROTECTION TO COMPLETE YOUR INSTALLATION.**



## 5.5. Before Entering the Trench



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

**2** **DO NOT** leave the base of the box 'flying' above the trench level.

## 5.6. Entering the Supported Trench

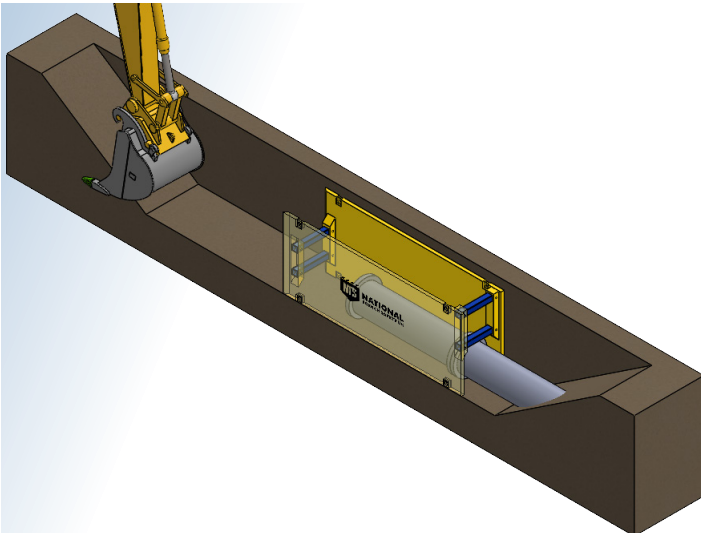
**1** Use a ladder to enter the working space between the struts of the Drag Box.

- **DO NOT** climb up or down the struts.
- **DO NOT** use any unsupported part of the trench for access.
- **DO NOT** move the box when personnel are inside it.
- **Wear a safety helmet to minimise the risk of injury.**
- **Ensure that the excavator operator is aware of your intentions.**

**NOTE: DON'T FORGET** you will need a ladder, ladder access platform and trench protection to complete your installation.

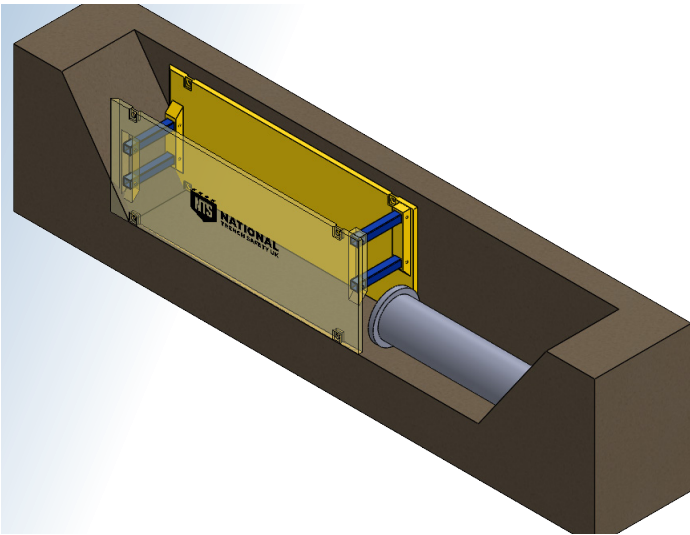


## 5.7. Working Method



**1** Personnel can now enter the working area between the cross struts using a suitable ladder. Never use the unprotected trench area in front of and behind the box!

**2** Pipes must be laid and connected in the area protected by the drag box. Chains must be hung from the front lifting rings and attached to the digger's bucket. Ensure personnel leave the trench before pulling the box further along it. No personnel are permitted to remain in the hazard area. The drag box is then pulled through the excavated trench to the new working position.



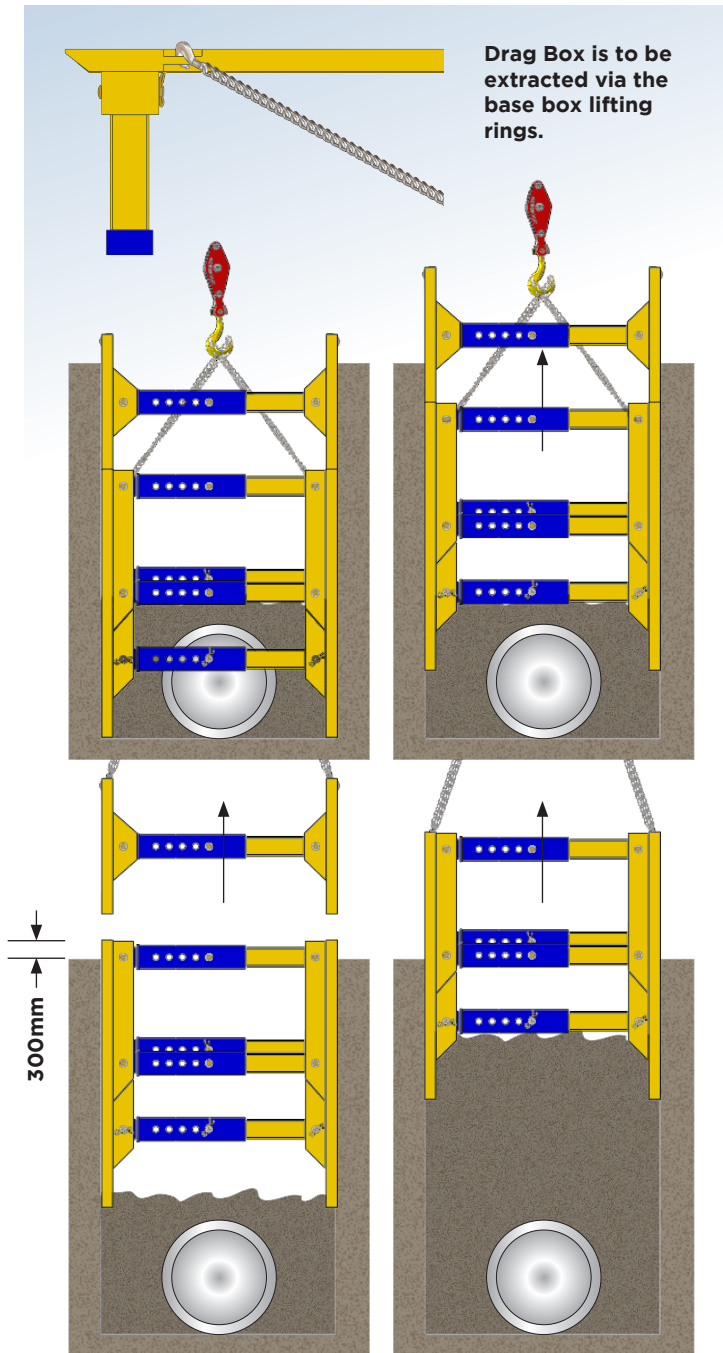
**3** Ensure that the most recently laid pipe is appropriately secured, so that its connection is not released when dragging the box. Refilling must always occur behind the box, taking into consideration the working area's slope. After filling, it must be compacted.

**The area behind the box is unbuilt and must not be entered.**

**4** When filling, no material must be permitted to fall into the working area. Further pipes are then laid in the secured section of the trench, between the shoring units.

**The bucket MUST always be closed, to prevent contact between the chain and the bucket teeth.**

## 5.8. Dismantling



**1** Once the pipe installation is completed, the shoring must be dismantled.

**The complete drag box must be lifted out of the trench.**

**2** Only use the designated lifting rings to raise the shoring components. Pulling the spacers is not permitted.

**We expressly point out that both during installation and dismantling, standing within the danger zone is prohibited.**

**3** To avoid excessive strain on the shoring panels, one-sided pulling operations must be avoided. Lifting tackle must be attached to at least 2 lifting rings per panel.

## 5.9. Precautions During Use and Maintenance

**1** Regularly check all pins are in place and 'R' clips are fitted.

**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.

**CLIENTS SHOULD ENSURE THAT ON REMOVAL, THE EQUIPMENT IS RETURNED CLEAN AND ASSEMBLED AS SUPPLIED.**

## 6. User Guidance

The drag box has been designed for drain construction in open terrain and with stable ground, and only secures a small area for laying the pipes.

Further excavation of soil takes place ahead, and the drag box is pulled through the excavated trench to the new working position. The area behind the box is filled and compacted, while pipe laying occurs in the area.

### Recommended

- In open terrain
- No pipes/cables crossing.
- Outside the area of influence of buildings and physical structures
- Outside the influence of traffic areas and vulnerable transmission infrastructure
- With predominantly stable soils
- With dry ground
- With machine compression from above

### Not suitable

- In road areas
- Where pipes/cables cross
- In the area of influence of buildings and physical structures
- With non-cohesive soils
- With groundwater or water-saturated earth
- If filling and compacting must occur on a shift basis

### Do's and Dont's

- **DO** ensure that all operatives are familiar with the safety and operating instructions.
- **DO** ensure that the excavator is central to the lower front strut when dragging the box.
- **DO** take care not to overstress the boxes (watch for bowing of the panels).
- **DO** check that all nuts and bolts are tight but not over tightened.
- **DO** check all pins and 'R' clips are fitted.
- **DO** follow the basic maintenance instructions.
- **DO** always use a ladder to enter the box.
- **DO** use suitable 4 leg slings and lifting equipment.
- **DO** provide a landing below the top of the box. This will prevent debris rolling down onto personnel inside the box.
- **DO** always maintain a safe batter of the unsupported parts of the trench in front of and behind the Drag Box.
- **DO** store boxes on their side.
- **DO** consult a qualified person if there is any doubt about ground pressures.

- **Do NOT** apply lateral load to the rear struts.
- **Do NOT** apply downward pressure to push the box.
- **Do NOT** drag the box by the rear OR upper struts.
- **Do NOT** move the box with personnel inside.
- **Do NOT** hammer the box with the bucket of the excavator.
- **Do NOT** use lifting lugs for other than loading / unloading or assembly purposes.
- **Do NOT** use damaged struts.
- **Do NOT** use spacer combinations other than those specified by NTS.
- **Do NOT** use unsafe lifting equipment.
- **Do NOT** enter unsupported parts of the excavation.
- **Do NOT** sit astride the box struts.