Groundforce Shorco
Excavation Support

User Guide

# Trench Box Equipment


## Important Notes

All excavation work must be thoroughly planned before work commences on site to identify hazards and assess risk.

These instructions form guidance for the typical installation of Trench Box Equipment. Non-standard applications should be approved by a suitably qualified engineer.

Ensure all personnel engaged in installation operations are properly briefed and adequately supervised by a competent person.

All hires for this equipment will usually be accompanied by a general arrangement or scheme specific drawing. This must be read in conjunction with these instructions.

A Trench Box video animation showing a typical installation method is available to watch now on our YouTube channel.

This user guide is available to download as a pdf from the Groundforce Technical Library.

**IF IN ANY DOUBT SEEK FURTHER ADVICE:**
**ON FREEPHONE - 0800 000 345**

ISOQAR REGISTERED
UKAS MANAGEMENT SYSTEMS
0026
Certification Number 14419
ISO 9001 • ISO14001 • ISO45001

| Rev | Date | Comments | Initial |
|---|---|---|---|
| 2.4 | 21/09/23 | Additional guidance provided on page 5 for safe handling / fitting of struts. | DSW |

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# SAFETY

## Common Symbols and Meanings

| PERSONAL PROTECTIVE EQUIPMENT (PPE) | |
|---|---|
|  | Use eye protection |
|  | Use hearing protection |
|  | Wear protective gloves |
|  | Wear head protection |
|  | Wear protective footwear |

| WARNING SYMBOLS | |
|---|---|
|  | General warning |
|  | Crushing of hands |

## Introduction

Trench boxes are generally the first choice for the rapid shoring of trench runs due to the speed and simplicity of installation. They are generally suitable for use in trenches up to 5m wide x 6m deep in reasonable ground conditions. They are not recommended in unmanaged, waterlogged ground and can be used in multiples to continuously support a length of trench.

Groundforce offer four trench box sizes using incremental and fully adjustable strut types: The 'Multi' and 'Premier' type of strut are heavy duty incrementally adjustable telescopic struts whereas the 'spindle' type uses the more traditional screw thread method of adjustment. Top extension boxes can be added to increase the height of a base box.

**See note and YouTube link on page 5 for the recommended alternative assembly method when using the larger Premier Boxes and Multi Mega Boxes**

### Equipment Specification

| Specification | Trench Box Type | | | |
|---|---|---|---|---|
| | Mini Trench Box | Standard Trench Box | Mega Trench Box | Premier Trench Box |
| **Typical Box Weight (kg)*** | 1340 (base) 762 (top) | 2248 (base) 1370 (top) | 3236 (base) 1850 (top) | 3346 (base) 1270 (top) |
| **Plate Length (m)** | 3.0 | 3.5 | 5.0 | 3.5 |
| **Plate Height (m)** | 2.0 (base) 1.0 (top) | 2.6 (base) 1.35 (top) | 2.6 (base) 1.35 (top) | 3.9 (base) 1.35 (top) |
| **Plate Thickness (mm)** | 60 | 107 | 127 | 105 |
| **Weight of Plate (kg)** | 580 (base) 316 (top) | 1042 (base) 616 (top) | 1545 (base) 920 (top) | 1600 (base) 630 (top) |
| **Maximum Trench Depth (m)**** | 4.0 | 5.3 | 5.3 | 6.6 |
| **Internal width (mm)** | 510 - 4310 | 510 - 4310 | 530 - 4644 | 560 - 4650 |
| **External width (mm)** | 650 - 4450 | 730 - 4530 | 790 - 4900 | 760 - 4860 |
| **Clearance below strut (mm)** | 1190 | 1440 | 1400 | 2455 |
| **Clearance between struts (mm)** | 2500 | 3000 | 4525 | 2930 |

***Typical: Box weights will vary depending on trench width etc.
****Maximum depth is based on one base and two top extensions being connected.

## Strut Compatibility

There are two basic types of box strut that are compatible with the Trench Box range:

- Incrementally Adjustable Struts
- Fully Adjustable Spindle Struts, **for shorter widths only (see table below)**

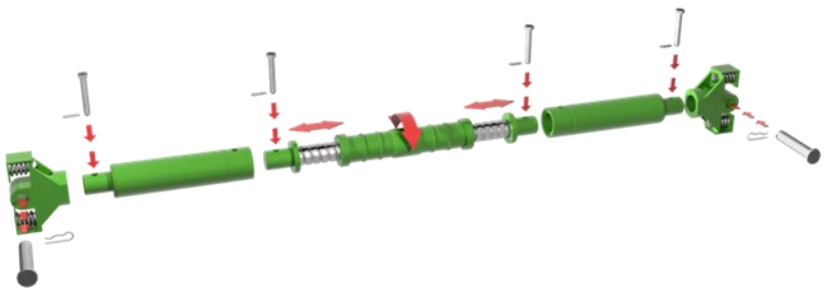
| Trench Box Type | Compatible Struts | |
|---|---|---|
| | Incrementally Adjustable Struts (m) | Fully Adjustable Spindle Struts (m) |
| **Mini Trench Box** | **Multi Box Range**<br>Internal Width: 0.530 - 3.370<br>External Width: 0.650 - 3.490 | Internal Width: 0.560 - 4.330<br>External Width: 0.680 - 4.450 |
| **Standard Trench Box** | **Multi Box Range**<br>Internal Width: 0.510 - 3.350<br>External Width: 0.730 - 3.570 | Internal Width: 0.540 - 4.310<br>External Width: 0.760 - 4.530 |
| **Mega Trench Box** | **Premier Range**<br>Internal Width: 1.005 - 4.644<br>External Width:1.310 - 4.900 | Internal Width: 0.530 - 1.005<br>External Width: 0.790 - 1.310 |
| **Premier Trench Box** | **Premier Range**<br>Internal Width: 1.005 - 4.650<br>External Width: 1.260 - 4.860 | Internal Width: 0.540 - 2.600<br>External Width: 0.750 - 2.800 |

For more detailed technical information on struts used in Trench Box systems, including load capacities and size/ weight ranges etc, please refer to the Groundforce Technical file.

# Box Struts

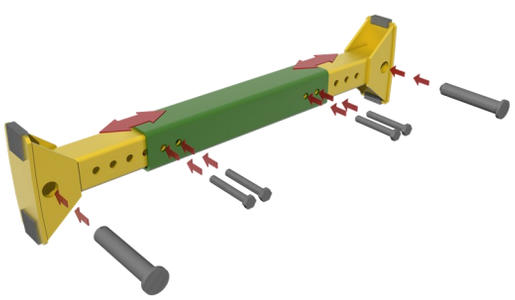
## Spindle Type (Fully Adjustable)

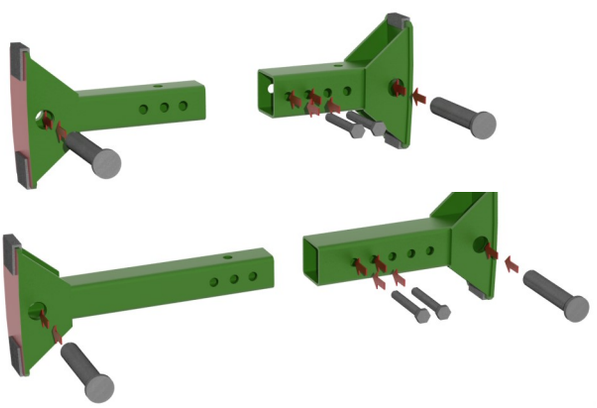
This is a fully adjustable strut, traditionally known as a spindle due to its relative slender profile. It comprises an adjustable left and right handed screw threaded section (four sizes are available) a series of fixed length “plug in” extension pieces and a pair of spring spindle holders located at each end to form the connection to the box panels. The latter allows a degree of strut articulation to facilitate a typical dig and push installation sequence.



## Multi Box struts (Incrementally Adjustable)

This family of struts comprises inner and outer telescopic steel box sections incorporating end rockers with a series of pin location holes along the length to provide an incremental length adjustment firmly secured in position using double pins. The end rockers allow a degree of strut articulation to facilitate a typical dig and push installation sequence. A pair of standard rockers combine with a central oversleeve to increase their length and range of adjustment.

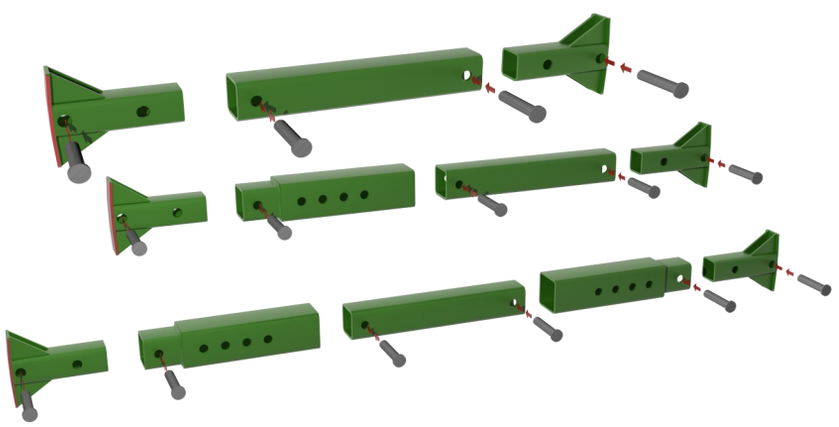




Mini and narrow rockers (shown above) only require a single pin adjustment facility and accommodate Manhole Boxes in narrower trenches. They incorporate a standard rocker but no central oversleeve.

## Premier Multi-Box (Fixed / Incrementally Adjustable)

Premier Multi-Box struts are a stronger version of the Multi-Box strut and are available both as fixed or incrementally adjustable. Heavy duty end rocker units are linked together by a series of fixed length over sleeves, whilst the incrementally adjustable strut incorporates an adjustable oversleeve unit. The rockers allow a degree of strut articulation. All struts components are connected together using a 40mm dia pin.



## Typical Assembly Instructions

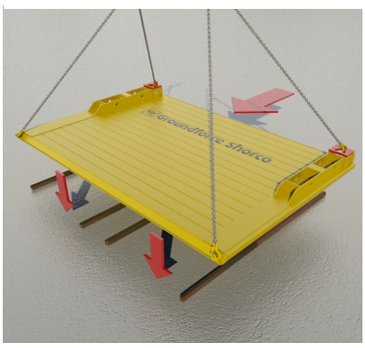
**Note**: Identify all components and ensure certified lifting equipment is available for the task. Use only designated lifting or handling points for chain attachment. Yellow handling points are designed for manoeuvring equipment into position and red lifting points are specifically designed for lifting equipment clear of the ground.

**Safety Notes**

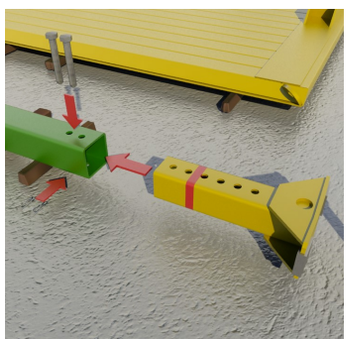
Maintain a means of safe access at all stages for the provision of contractor risk assessments The end-user has a responsibility under LOLER to ensure that all lifting equipment is suitable and fit for use including appropriate and valid certification. (See separate Groundforce Chain Sling user guide) Avoid the trapping of fingers at all stages of work

**For Incrementally Adjustable Struts**: Adjust the pre-assembled Struts / Rockers to the required width by sliding the appropriate Outer Sleeve(s) and securing with 20mm Ref 3 Pins.

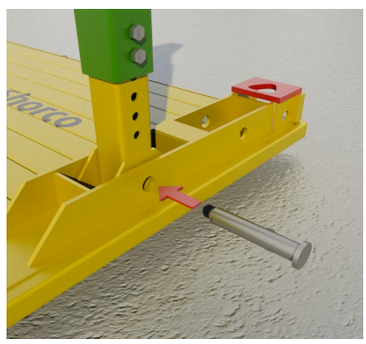
**For Fully Adjustable Struts (Spindles)**: Slide the Spindles onto the Spring Spindle Holders and secure using 20mm Ref 3 Pins. In a similar manner, secure up to 3 Pipe Extensions to the Spindle; secure with 20mm Ref 3 Pins.



Position the first plate on firm level ground and orientate with the strut sockets facing upwards.

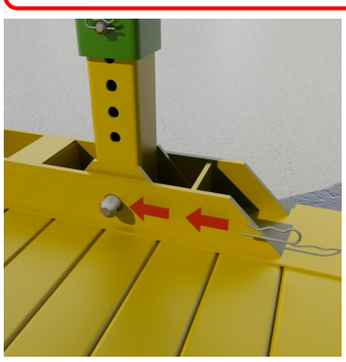


Adjust the assembled strut, if necessary, to suit the excavation width and secure using 2No. Pins and 'R' Clips per Rocker (4 per strut). **Note: Struts must only be adjusted while horizontally orientated.**



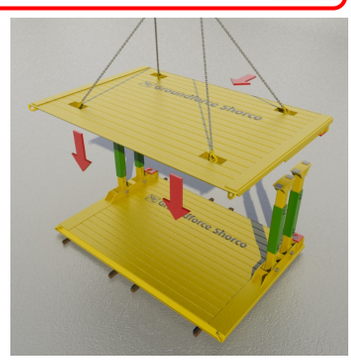
After adjusting the struts to the required width, Fit a strut into the strut rocker housing **(See safety note below)** Insert a pin and 'R' clip. Fit the pin from the outside as shown.

**Safety Note: Only use certified lifting slings and lifting equipment when fitting the struts. Do not remove the slings until the strut is securely fitted into the rocker housing.**

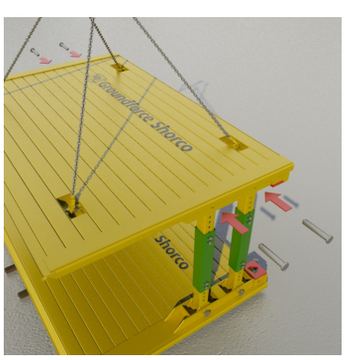


Fit an 'R' clip through the pin on the inside

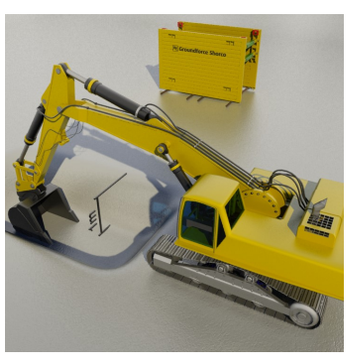
Repeat for all four struts



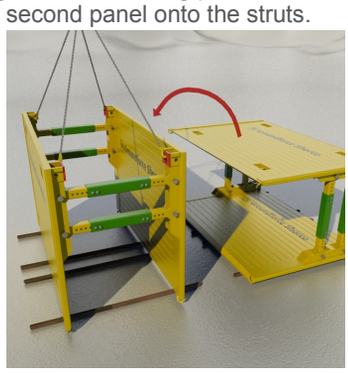
Using the four handling points, lower the second panel onto the struts.



Position the second plate so that the inner panel is facing downwards. Align the **Strut Rockers/Spindle Holders** on the suspended plate with the **Rockers/ Spindle/Holders** on the static plate.



Excavate a nominal one metre deep guide trench.



Using the red lifting points, tilt the box into an upright position. **Note:** all personnel should keep well clear during this manoeuvre.

## Typical Assembly Instructions cont...

**For Incrementally adjustable Struts:** Width adjustment must be made by laying the box on its side, removing the upper plate, adjusting the pin settings equally on all struts and reassembling the top plate. **This operation must not be done with the box stood upright.** See **'Installation Procedures'** for instructions on fitting a Top Plate.

## Assembly notes on Premier Boxes and 5.0m Mega Boxes

Due to the size and weight of Premier Boxes and Mega Boxes, it is recommended that these boxes are assembled by attaching the second plate from above with the struts facing 'downwards'. this eliminates the need for ladders and the risks involved with working at height.

For these two heavier boxes, lay the first plate on the ground and fit the struts so they are pointing upwards. Then lay the second plate on the ground with the strut housings uppermost. Elevate and rotate the first plate with the struts attached so they are pointing down. Then fit the struts to the second plate. [This installation method is available to watch now on our YouTube channel.]

## Typical Installation Procedures

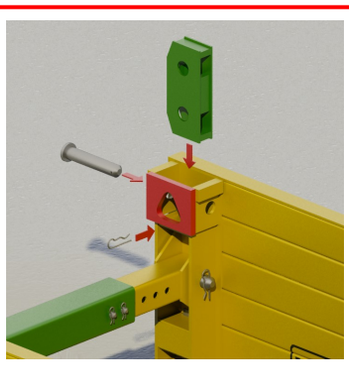
Lower the assembled box into the guide trench.

Remove soil from within the base of the excavation.

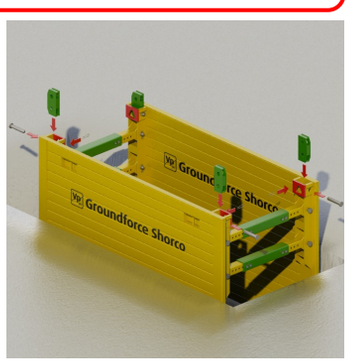

Push down on each corner of the box using the excavator bucket.

**Safety Note:** Always maintain a safe point of access for stage inspections or contractor risk assessments.
This may be necessary for the inspection of pins and 'R' clips


Continue to dig and push in sequence until a 950mm upstand is left to provide a safety barrier.

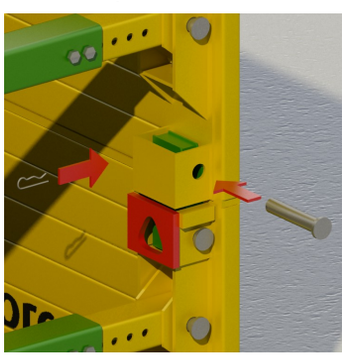


Insert the panel connector cassette and secure with a pin and 'R' clip.

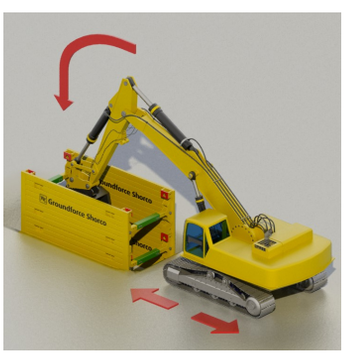


Repeat for all four corners

Prepare to fit the top box by raising it over the base box.



Secure the top box cassettes with a pin and 'R' clip.



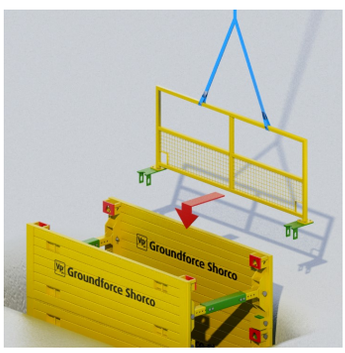
Continue with the excavation.

## Typical Installation Procedures cont...

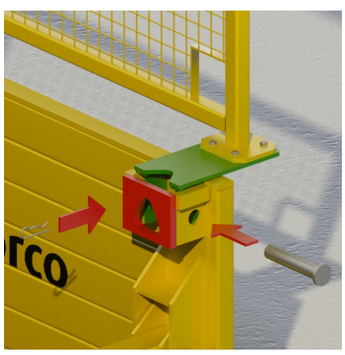
Continue the dig / push process until the required excavation depth is reached.

**Note:**
To avoid strut damage **DO NOT** exceed 150mm push between corners.


Maintain a minimum 950mm safety barrier; either by leaving an upstand as shown above or by introducing edge protection.



Edge protection barriers are fitted by using a sling and lowering onto the top panels from above.



Use a pin and 'R' clip to locate and secure into the lifting eye recesses of the upper panels.

Excavate to the required depth. Push separately on the green bracket at each corner, avoiding damage to the handrail system.

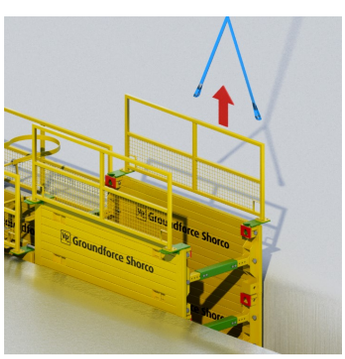
**Note:** As an alternative to Handrails, 'EdgeSafe Edge' may also be supplied to provide edge protection. The EdgeSafe User Guide and Quick Start User Guide are available to download as a pdf from the Groundforce Technical Library.

A video showing LadderSafe systems is available to watch now on our YouTube channel.

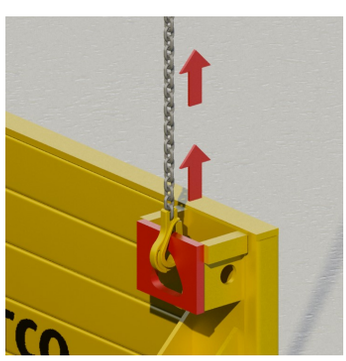
An EdgeSafe video with related SiteSafe solutions is available to watch now on our YouTube channel.

## Extraction

Using a single heavy duty chain attached to each corner of the box, lift by no more than 150mm each time. **Note:** access the lifting point through the opening in the handrail panel.



Once a minimum 950mm up stand has been achieved, un-pin and remove the handrails from the box.

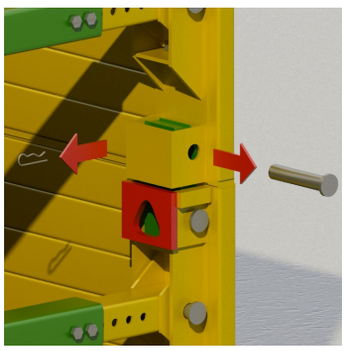


Re-attach the single leg chain and continue to shuffle the box out of the trench in 150mm stages.

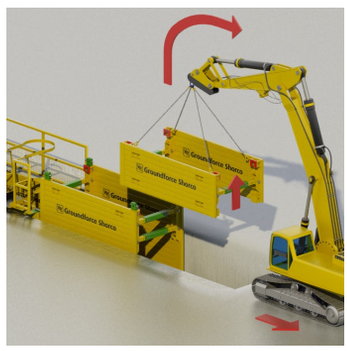
**Notes:** Using two or four lifting points may be possible where suction pressure on the boxes is not excessive. **Do not damage the chain by allowing it to snatch.**

## Extraction Cont...

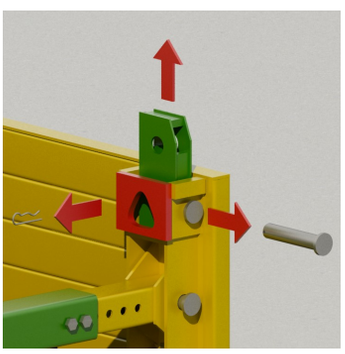

Once the **lower box** is 950mm above ground level, the upper box can be removed.



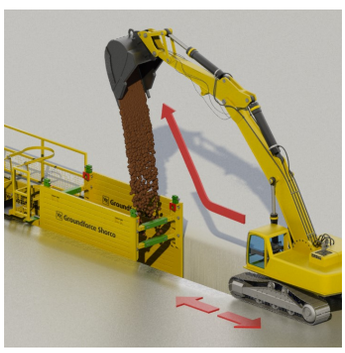
Remove the pins and 'R' clips to release the top box.



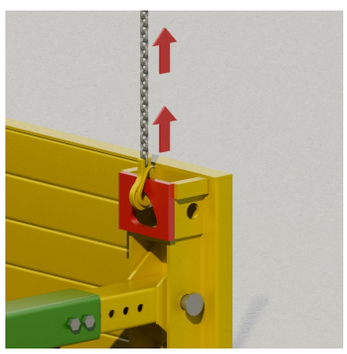
Attach a four leg lifting chain to the lifting points and lift the top box and set carefully to one side.



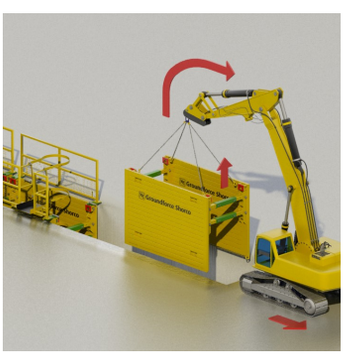
Unpin and remove the cassettes.



Continue to backfill and compact in stages.



**7.** Using a single heavy duty chain, attach to each corner of the box and lift by no more than 150mm each time. **Do not snatch the chain**



Attach a four leg chain to the lifting points and lift clear of the excavation.

Fill in the remaining excavation.

**Notes:** Panels should be stored flat to avoid tipping over. Boxes should be disassembled and cleaned before collection. Do not lose any pins or clips etc.

| Do | Do Not |
|---|---|
| ✓ Inspect all components at the start of every shift | X Use more than 4 No. Strut Components on spindle struts (i.e. 1 No. spindle and 3 No. pipe extensions) |
| ✓ Assess weights correctly and use adequate and appropriately certified lifting equipment | X Exit the box into an unsupported area |
| ✓ Ensure hooks engage fully into lifting points prior to lifting | X Use the struts to support trench sheets across the ends of the box |
| ✓ Toe-out base boxes by 50mm | X Attempt to temporarily or otherwise balance struts on the ground in an upright position unsupported |
| ✓ Ensure all pins & clips are correctly fitted | X Adjust the struts without laying the box down and removing the top plate |
| ✓ Use four panel connectors for upper box attachment | X Push plates down by more that 100mm at a time |
| ✓ Use only lifting or handling points for chain attachment | X Snatch the chain whilst extracting the box |
| ✓ Provide support over the full height of the dig | X Use handling points for lifting or pulling |
| ✓ Provide edge protection | X Climb on the struts – always use a secured ladder |
| ✓ Push the plates at the corner positions only | X Hang/store materials on the struts |
| ✓ Keep personnel clear of excavator slewing zone | X Excessively force the box into the ground |
| ✓ Always use a banksman | X Permit personnel in the box during installation |
| ✓ Locate any underground services before excavating | X Accidentally strike the struts |
| ✓ Lay the box flat before dismantling | X Drag the box by any means |
| ✓ Store assembled boxes on firm, level ground only or lay flat on their sides | X Use more than two top boxes unless approved in writing by Groundforce |
| ✓ Use a secured ladder to enter or exit a box | X Store/stack plates more than 6 plates high |
| ✓ Always work from a safe area to avoid the risk of falls from height | X Fly the boxes above the base of the excavation unless approved by a competent person |
| ✓ Take care to avoid trapping fingers | X Enter an unsupported trench |