

## More information about



# Trench shields and road plates

Information for employers on working safely with trench shields, road plates and associated equipment.

September 2014

## Background

Trench shields (also referred to as trench boxes) are commonly used during trenching works to protect workers from being engulfed by a ground collapse. Trench shields come in a variety of shapes and sizes and generally consist of steel or aluminium panels. The panels are held apart by struts at both ends and secured in position by pins and clips, or welded.

Road plates are used to temporarily cover an excavation, eg while ongoing excavation work is being conducted on a roadway. Road plates generally consist of thick sheets of steel.

Trench shields and road plates are often lifted, lowered, extracted and moved around a worksite using earthmoving equipment. If a suspended load isn't controlled there may be a risk of the load falling from height, or swinging unexpectedly. This may result in the load striking persons or other plant, placing those in the immediate vicinity at risk of injury.

Other risks when working in and around trenches include falls from height, materials falling into the trench and the collapse of the trench.

## Your duties

Employers must, so far as reasonably practicable, provide and maintain a working environment that is safe and without risks to health. This includes:

- providing and maintaining safe plant (eg machinery and equipment) and safe systems of work (such as systems to prevent falls from heights)
- making arrangements for the safe use, handling, storage and transport of plant
- maintaining the workplace in a safe condition (eg ensuring excavations are covered or secured when not in use)
- making sure workers are provided with necessary information, instruction, training or supervision to enable them to perform their work safely.

There are also specific duties in the *Occupational Health and Safety Regulations 2007* (OHS Regulations) that need to be complied with, including the duty to prepare a safe work method statement (SWMS) for certain work.

This information sheet provides guidance on:

- when a safe work method statement must be prepared
- selecting a trench shield or road plate
- things to consider to ensure the safe handling of trench shields and road plates
- fall protection measures.

## Safe work method statements (SWMS)

Work in and around trenches and with trench shields or road plates will generally be high risk construction work (HRCW), as the construction work will usually involve at least one of the following:

- a trench or shaft where the excavated depth is more than 1.5 metres
- a risk of a person falling more than two metres
- a workplace where there is movement of powered mobile plant
- a workplace that is on or adjacent to roadways or railways used by road or rail traffic.

SWMS are mandatory for HRCW where there is a risk to the health or safety of any person arising from the work. Employers must not perform this HRCW unless a SWMS is prepared before the work commences and the work is performed in accordance with the SWMS. The SWMS identifies work that is HRCW, states the hazards and risks associated with the work and documents how the risks will be controlled. The SWMS must be reviewed if site conditions change or if risk control measures are not adequately controlling the risks to safety, and revised as necessary.

Employers must stop the work if it is not being done in accordance with the SWMS.

## Selection and assembly of trench shields and road plates

When selecting the correct trench shield or road plate for a job it is important to consider the conditions of the environment in which the equipment is to be used, including:

- the nature of the soil, including type, moisture content and water table (ie the level below which the ground is saturated with water)
- ground stability and any anticipated ground vibration
- the expected ground pressures (including location of spoil pile and equipment to be used)
- size of the trench or excavation (depth/width/length)
- any space constraints
- existence or proximity of underground services
- type of road or traffic near the site
- the system of work to be used with the equipment.

A suitably competent person should consider all relevant factors and any safety information provided by the manufacturer before selecting the trench shield or road plate.

Trench shields and road plates should have designated lifting points and be permanently and legibly marked with their total weight. Trench shields should also be marked with component designation, name of manufacturer, date of manufacture and serial number.

### Assembly of trench shields

Trench shields often need to be assembled and dismantled on site. If the process is not undertaken correctly the trench shield components may become unstable and collapse, placing workers at risk of being struck by falling objects. Prior to undertaking assembly or dismantling activities, a safe system of work should be developed in accordance with the manufacturer's instructions.

## Safe handling of trench shields and road plates

Loads, such as trench shields and road plates, must be controlled at all times while being lifted or suspended.

### Lifting or slinging practices

When slinging a load ensure workers:

- use appropriate slings, eg slings made of chain or wire rope that are capable of absorbing the weight of the load. Synthetic slings should not be used due to the significant risk of damage and failure in this operating environment
- use earthmoving or other lifting equipment appropriately rated for the load to be lifted
- only attach loads to the designated lifting points on earthmoving or lifting equipment
- connect earthmoving or lifting equipment to both

- the purpose designed lifting point on the mobile plant and the load in a manner that requires a deliberate action to release the connection, eg a self-locking hook or hook with latch. Connections that rely on gravity alone (ie open hooks) should not be used as they can dislodge due to the movement of the lifting equipment or load
- use tag lines when necessary, to help maintain control of the suspended load.

Ensure workers hold a high-risk work licence for dogging or rigging if they are required to:

- exercise judgment on the load's mass and centre of gravity, or on the selection of slings or sling attachment points when slinging the load
- direct the operator in the movement of the load, including if the load is partly or fully out of the view of the operator.

### Earthmoving equipment used as cranes

Employers should ensure that any earthmoving equipment used to lift loads has been designed to perform that function. If using earthmoving equipment with a rated capacity greater than one tonne to lift loads, ensure the equipment is fitted with hydraulic burst protection valves on critical hydraulic cylinders. The rated (lifting) capacity of the equipment should be permanently displayed in a prominent position near the lifting point, and the load chart should be mounted inside the cabin. Loads should only be suspended from the manufacturer's designated lift points on the boom or the quickhitch.

### Inspections

Lifting equipment, trench shields and associated equipment (eg lifting slings) should undergo regular inspection. A competent person should assess equipment for damage or unacceptable wear to ensure the equipment is safe for continued use. Full inspections should be conducted on an annual basis at a minimum, and results of inspections, and maintenance conducted, should be recorded.

Prior to use on site, equipment should be visually inspected for signs of wear or damage. Look for any defects, including damaged lifting points, missing or broken clips and pins, bent struts or broken welds. Workers undertaking the visual inspection should be trained and competent in the inspection criteria. Any equipment that does not meet visual inspection requirements should be withdrawn from service.

## Fall protection

Employers must ensure fall risks are controlled, including the risk of falling into an excavation. A risk assessment should be undertaken to determine what fall protection measures to use to control the risk (in accordance with the hierarchy of controls). If the sides of the trench shield extend out of the ground at least 900mm, this may be sufficient to act as fall protection. Alternatively, most trench shield systems can be fitted with an attachable guardrail system, enabling safe access into the trench. Where possible, guardrailing should be fitted before installing the trench shields.

For deeper trenches where trench shields are stacked or extended, a safe system of work to reduce the risk of a fall may include connecting the shields together before installing in the trench. If there are access or excavator capacity constraints that prevent this, the trench sides should be benched to facilitate safe access. Alternatively, in appropriate ground conditions, the soil may be excavated within the trench shield and then the excavator used to progressively push the sides of the trench shield down into the trench. Additional trench shield or extensions can be added as the depth increases to maintain the fall protection controls. This process is known as the 'dig and push' method.

In some circumstances, eg when digging in rocky ground, it may be difficult to excavate a clean trench to accommodate the shield snugly. This can result in the creation of large voids between the shield and the trench wall, resulting in fall hazards. This additional risk can be controlled by excavating the trench with walls closer to vertical, or pushing trench spoil or initial backfill material into the void area.

If workers are required to enter the excavation, a safe method to enter and exit must be provided. This may include a landing platform and a sufficiently long, secured internal ladder. Additional access equipment may be required to provide safe access to other locations in the trench eg in order to connect or disconnect a sling from a trench shield. Adjustable walkways, temporary platforms and other access equipment fitted with guardrails can provide safe access into, within or over the trench.

#### **Falling material**

Ensure systems are in place to prevent materials from falling or rolling into the trench. Pipes, tools, spoil and other equipment should not be placed close to the edge of the trench. When deciding on the location of a spoil pile, consider the potential height of the pile, the slope of the ground, the type of material it contains and the angle of repose. Trench shields should be installed, or toe boards fitted, so that they extend at least 0.3 metres higher than the bottom of the batter or toe of the spoil pile.

Workers may also be exposed to the risk of material 'slumping' or falling into the trench from the end or leading face of the excavated trench. This risk may be controlled by fitting an end plate across the end of the shield or using over-excavation techniques, eg battering back the leading face of the trench.

## **Emergency procedures**

Develop emergency procedures and an emergency response plan (ERP) to document the likely emergency situations that could occur during excavation works, eg workers becoming trapped within the trench or the trench flooding. The emergency procedures should include the provision of reliable methods of communication.

**Note:** Davit arms are now readily available. These can be fitted to trench shields and may be used in the

event of an emergency. When used in conjunction with a harness system davit arms may be used to rescue a person from within the excavation.

## **Information, instruction, training or supervision**

Employers have a duty to ensure that workers are provided with such information, instruction, training or supervision as is necessary to enable them to perform their work in a way that is safe and without risks to health. This could include information or training on:

- safe systems of work developed to perform high risk tasks
- appropriate rigging / dogging techniques
- inspection of lifting equipment, trench shields and road plates
- working safely in excavations
- prevention of falls
- working around powered mobile plant
- traffic management.

It is recommended that any information, instruction or training provided to workers is recorded.

## **Further Information**

### **Australian Standards**

AS 4744.1: *Steel shoring and trench lining equipment*

AS 3776: *Lifting components for grade T chain slings*

### **Other VWA publications**

A guide to managing safety - *Civil construction – Industry standard*

Compliance code - *Prevention of falls in general construction*

Code of practice - *Plant*

Code of practice – *Safety precautions in trenching operations*

Handbook - *Working safely in the general construction industry*

Guidance Note - *Earthmoving equipment used as a crane*

Checklist - *Trenching and excavation checklist for builders and building trades contractors*

## **Contact Details**

Call us on: **1800 136 089**

Email us at: [info@worksafe.vic.gov.au](mailto:info@worksafe.vic.gov.au)

For more information on occupational health and safety, go to WorkSafe's website: [worksafe.vic.gov.au](http://worksafe.vic.gov.au)

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