

Earthmoving equipment used as a crane

June 2017

Summary

This guidance note provides information for employers and contractors on the selection and safe use of earthmoving equipment such as excavators, backhoes and front-end loaders, to lift and transport freely suspended loads.

Background

Powered earthmoving equipment is often used to perform work in a similar manner to a mobile crane. The equipment is used to lift, move and position loads that are freely suspended by slings attached to purpose designed lifting points or quickhitch on the earthmoving equipment. Examples of loads lifted by earthmoving equipment are pipes, bundles of steel, concrete kibbles, spoil buckets, portable toilets and trench shields.

AS 1418.8 – *Cranes, hoists and winches – Special purpose appliances* provides guidance on the use of earthmoving equipment to lift freely suspended loads. In 2008 it was amended to include stricter requirements on the fitting of controlled lowering devices, commonly called 'hose burst protection valves' or 'burst protection' and on the location of lifting lugs to prevent loss of load which may result in death or injury.

Hydraulic hose burst protection is required for all excavators and equipment with a rated lifting capacity of more than one tonne at maximum boom radius.

Applications not suitable for earthmoving equipment

As a general rule, earthmoving equipment is less suitable than most common types of cranes for precision lifting and placement applications. Precision lifting and placement requires the plant to operate at creep speed (also called 'inching') and to support the load without drift while connections are being made. Due to inherent 'hydraulic drift' characteristics, earthmoving equipment should not be used for precision lifting and placement.

The erection of structural steel or tilt-up concrete panels, and multi-crane lifting (dual lifts) are examples of applications where earthmoving equipment should not be used.

Selection of earthmoving equipment

Consistent with the requirements of AS 1418.8 and AS 4772 - *Earth-moving machinery - Quickhitches for excavators and backhoe loaders*, WorkSafe recommends adopting the following guidelines to determine whether a particular item of earthmoving equipment is suitable for lifting a freely suspended load:

Rated capacity

Earthmoving equipment must only lift loads that are within its rated capacity (the mass of the lifted load and the lifting attachments at maximum lift point radius).

When using earthmoving equipment:

- only use attachments identified on the load chart
- ensure that a load chart is mounted inside the operator's cabin. The load chart should include:
 - manufacturer's name
 - date of manufacture
 - plant model identification and serial number
 - location of lifting points and their corresponding rated capacity
 - the maximum load that may be lifted corresponding to the position of each lifting point and the boom configuration
 - where applicable, a statement that stabilisers are required to be in place prior to lifting any load
 - a notice that controlled lowering devices (ie hose burst protection valves) are fitted.
 - ensure the rated capacity/working load limit (WLL) is permanently displayed in a prominent position near the lifting point.

Hose burst protection valves

To reduce the risk of a boom or dipper arm collapse on earthmoving equipment with a rated capacity greater than one tonne, hose burst protection valves should be fitted on critical hydraulic cylinders. The valves should meet the requirements of rated capacity as outlined in AS 1418.8 section 5.4.3.

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The table, right, summarises what WorkSafe expects.

Lifting points

Unless a designated lifting point is fitted elsewhere, loads should only be suspended from the manufacturer's designated lift point on the boom or the quickhitch if fitted.

In addition:

- a lifting point should form a closed eye and be arranged so accidental unhooking of the load cannot occur or the sling cannot become detached from the lifting point or load, and that slings will hang clear of the boom and/or boom attachment
- lifting points must not be attached to quickhitch buckets designed for excavators, front-end loaders or backhoes
- a lift point should only be fitted to pinned front-end loader buckets that have been designed to accommodate one.

To determine how equipment achieves its rated lifting capacity see AS1418.8.

Quickhitches

Quickhitches should comply with AS 4772. This standard requires that:

- in addition to its primary retention system, all quickhitches be fitted with an additional safety system which ensures retention of the attachment to the quickhitch in the event the primary system fails. The additional safety system should be:
 - positively and mechanically locked in an engaged position
 - intentionally disengaged for the attachment to be disconnected
- quickhitches only be used to support attachments for which they have been specifically designed

- quickhitches be maintained in proper working order and marked with the model and serial number, manufacturer's name, quickhitch weight and maximum rated capacity, as well as the capacity of each lifting point.

What WorkSafe expects with earthmoving equipment used to lifting freely suspended loads

Equipment	Action
Equipment with rated capacity up to one tonne	<ul style="list-style-type: none"> ▪ Lift up to its rated capacity ▪ No hose burst protection required
Existing Equipment with rated capacity of greater than three one tonne	Fitted with hose burst protection now
New Equipment with rated capacity of greater than one tonne sold with designated lifting points	
Second hand equipment with rated capacity of greater than one tonne sold with designated lifting points at or before time of sale*	
De-rated equipment	Fitted with risk controls to reflect the new rating, including: <ul style="list-style-type: none"> ▪ changing the rated capacity chart ▪ resetting any load limiting device if fitted ▪ changing any decals to specify the new WLL ▪ ensuring all operators of the equipment are instructed and understand the new lifting capacity limit.

**In addition, adequate information must be supplied to the buyer indicating hose burst protection valves have been fitted, and if there are any implications on the rated capacity.*

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Safe systems of work

As part of the operation of earthmoving equipment, systems of work are required to ensure that tasks are done safely and appropriate risk controls are in place. Operation of mobile powered plant on a construction site is classed as high risk construction work which requires the completion of safe work method statements (SWMS). The types of hazards and risks that should be controlled and documented in the SWMS include:

- the choice of equipment for the job (e.g. if there are two 2.5 tonne excavators available and only one is fitted with hose burst protection valves, use the excavator fitted with burst protection)
- whenever suspended loads are lifted near persons, an exclusion zone should be established where possible
- keeping loads low to the ground when transporting
- the use of tag lines to assist operators to guide loads into position (eg the laying of pipes in trenches).

The SWMS must be set out and expressed in a way that is readily accessible and comprehensible to the persons who use it.

Operator competency and training

Employers and contractors must ensure the operator has received specific training and instruction in the use of the equipment for crane work.

The operator must be adequately trained to operate the equipment. One way of achieving this is for the operator to hold an equipment competency card of the appropriate class, such as code LE (excavator), LL (front-end loader) or LB (front-end loader/backhoe). In all instances, the operator must have knowledge of weight of load, capacity of the equipment and access to a load chart.

Where earthmoving equipment is used for lifting freely suspended loads as a secondary function (eg moving pipes, unloading construction equipment, manoeuvring accessories associated with the equipment), the operator requires no additional proof of training. This also applies to the lifting and placement of small structural elements such as culverts or acoustic wall panels, generally weighing less than 400 kg, where the activity does not require precise placement of the elements.

Where a jib attachment is attached to the earthmoving equipment, the operator must also have undergone additional training in the risks associated with crane usage. One method of achieving such training is to undertake non-slewing mobile crane training.

The person slinging the load or directing the operator must hold a WorkSafe licence for dogging or rigging if that person is required to exercise judgment in relation to the mass of the load, the centre of gravity of the load, the selection of slings or sling attachment points, or the load is partially or completely obscured from the operator's view.

Further information

Contact the WorkSafe Victoria Advisory Service on **1800 136 089** or go to **worksafe.vic.gov.au**

***Note:** This guidance has been reviewed and updated for the sole purpose of amending year and regulation references relating to the Occupational Health and Safety Regulations, in line with amendments which came into effect on 18 June 2017. This guidance material has been prepared using the best information available to WorkSafe, and should be used for general use only. Any information about legislative obligations or responsibilities included in this material is only applicable to the circumstances described in the material. You should always check the legislation referred to in this material and make your own judgement about what action you may need to take to ensure you have complied with the law. Accordingly, WorkSafe cannot be held responsible and extends no warranties as to the suitability of the information for your specific circumstances; or actions taken by third parties as a result of information contained in the guidance material.*

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