



Mines Safety Bulletin No. 143

Subject: Use of an excavator bucket as a lifting point

Date: 12 May 2017

Background

Some mining operations are permitting excavator operators to pick up and relocate equipment using the ground engagement tool (GET) or bucket tooth of an excavator. In these instances, the site's risk assessment process has found the lifting practice to be acceptable although a competent person has not assessed the suitability of using the bucket teeth as a lifting point.



A bucket tooth loaded with a wire rope sling (left) and a soft sling (right).

An excavator GET or bucket tooth is typically attached to the body of the excavator bucket with an adaptor piece. The adaptor piece is welded or pinned to the bucket body and the bucket tooth tip is commonly attached to the adaptor using connecting pin(s).

Bucket tooth tips and adaptors are typically made from hardened material for wear resistance. Depending on the fabrication technique (casting or forged), this material may be brittle and suddenly fail, especially if shock loading occurs (e.g. lifting).



A. Examples of a bucket tooth tip (left) and adaptor pieces. B. A fully assembled bucket.

Bucket teeth are not normally designated or engineered by the manufacturer for lifting. They are designed for soil loading during earth moving operations, where they may be subjected to high stress loading and potential damage, which can reduce their strength.

Summary of hazard

The use of unrated lifting points on an excavator has the potential to expose workers to harm by the:

- sudden failure of a bucket tooth or sling, which can lead to

- loss of control of the lifted load
- a failed bucket tooth becoming a projectile hazard to surrounding workers, including the excavator operator
- instability of the excavator if the lifted load exceeds the excavator's tipping load.

Contributory factors

- Inadequate visual inspection of bucket teeth for damage during earth moving operations (due to position of potential damage, location of bucket and operating environment).
- Damage to the sling through excessive:
 - bending due to the bucket tooth dimensions not meeting the recommended bending radius of the sling
 - wear on the fibres of the sling from abrasive surface of the bucket tooth (i.e. no wear protection).
- Irregular inspection of slings for damage.

Actions required

Principal and other employers at a mining operation are reminded of the requirements of regulation 6.2 of the Mines Safety and Inspection Regulations 1995 for plant to be maintained and operated in a safe manner. The following actions are recommended if intending to use an excavator bucket as a lifting point.

- Use only designated lifting points on the bucket unless the GET assembly is assessed and rated as a lifting point by a competent person.

Note: The designated lifting point should follow the design and testing requirements set out in section 5 of Australian Standard AS 1418.8 Cranes, hoists and winches – Special purpose appliances.

- Adequately and regularly inspect slings for damage in accordance with manufacturer's recommendations and relevant Australian standards.

Note: Consider use of protective sleeves on slings if a GET assembly is to be used as a lifting point.

- Conduct practical tests to assess the competency of excavator operators to undertake lifting operations.
- Confirm an excavator is safe to use for lifting operations in accordance with the relevant standards, including AS 1418.8, or sound engineering principles. This includes:
 - determining rated capacity
 - inspection and testing
 - engineering controls (e.g. controlled lowering device).

Further information

- Standards Australia, www.standards.org.au

AS 1418.8 Cranes, hoists and winches – Special purpose appliances

AS 2550.1 Cranes, hoists and winches – Safe use – General requirements

AS 1353.2 Flat synthetic-webbing slings – Care and use

AS 1666.2 Wire-rope slings – Care and use

- Safe Work Australia, Crane guidance material,
www.safeworkaustralia.gov.au/collection/cranes-guidance-material

Using other powered mobile plant as a crane – information sheet

This Mines Safety Bulletin was approved for release by the State Mining Engineer on 12 May 2017