



## Crane Association of New Zealand Position Paper

### Excavators / Earth Moving Machinery Used as Cranes

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Author: Crane Association of New Zealand

CANZ PP-003-T

Date: 26 February 2018

## Document Control

<b>File Name</b>	CANZ-PP-003-T-Excavator-Ver1.1.docx	
<b>Document Location</b>	CANZ Position Papers-Technical Papers	
<b>Document Status</b>	Review issue	
<b>Version Number</b>	Version 1.1	
<b>Issue Date</b>	01-06-2016	
<b>Assigned Responsibilities</b>	Author	CEO, Crane Association of New Zealand (Inc.)
	Reviewer	Technical Committee
	Reviewer	Scott McLeod
	Owner / Approver	Council, Crane Association of New Zealand (Inc.)
<b>Next Review Date</b>	June 2017	

## Record of Amendments

Version	Date Issued	Summary of Changes
1.0 DRAFT	01-06-2016	Draft Issue
1.1 Review	12-11-2017	Review Issue

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## 1. Crane Association Position

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It is the position of the Crane Association of New Zealand (Inc.) that:

For safety and risk control reasons, all lifting activities shall be performed by cranes (operated by qualified and competent crane drivers) that have suitable lifting capacity for the task.

If excavators are to be used in a similar manner to a crane, to control and prevent accidents, lifting activities and procedures shall be planned before the work started, and a lift plan shall be prepared. Relevant Standards and industrial work safe guidance notes shall be followed.

## 2. Background

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Excavators are earth-moving equipment, the major parts are a boom, stick, bucket and cab on a rotating platform. Excavators are used in many ways on site including digging of trenches, holes or foundations, and material handling.

With the development of technology and machine design, capabilities of hydraulic excavators fitted with hydraulic-powered attachments such as a breaker, a grapple or an auger have expanded beyond excavation tasks. Many excavators feature a quick coupler for simplified attachment mounting which increases the machine's utilization on the job site <sup>1</sup>.

On construction sites, excavators may be used for lifting freely suspended loads as a "secondary function associated with the normal applications of the equipment (e.g., lifting and moving pipes, unloading construction equipment, manoeuvring accessories associated with the equipment).

In their standard form, excavators are not presently equipped with crane-type instrumentation and are therefore limited in their lifting capacities. Using excavators as cranes is a high-risk activity because lifting is not the primary design function of these machines.

Excavator operators are often not familiar with operation outside their primary design function. The lack of relevant skills and knowledge in setting up the machine for lifting activities and not understanding the proper use of lifting gear can cause serious safety issues.

## 3. Comparison of Lifting Safety between Cranes and Excavators

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### 3.1. Cranes

Cranes are purposely designed for load lifting and load placement applications. When performing lifting tasks, cranes must be designed in accordance with acceptable engineering principles and relevant technical standards, to ensure the crane is without significant risk to health and safety.

Every crane carries a detailed crane load chart at all times. The load chart is the most important resource for ensuring crane safety and for determining the lifting capacity of a particular crane. The load chart includes all notes and warnings, and how to calculate or determine the crane's actual net capacity in each configuration. The load chart provides guidance to crane operators on any deductions that may need to be made.

Cranes also have limiting and indicating devices. The purpose of limiting devices is to stop a specific crane motion before the operation moves out of the crane's design limits. Indicating devices are used to visually and/or audibly warn the crane operator that the crane may be approaching its set limits. These devices indicate load, working radius and other pertinent operational factors. Motion indicators and limiters display the operational conditions of the crane relative to its rated capacity limitations. They assist the crane operator to stay within the load chart and rated capacity limit of the crane. All safety devices are checked and verified by competent inspectors periodically through the prescribed crane maintenance and inspection program.

Crane operators are competent personnel who are trained to operate safely a crane to perform lifting activities. A person who operates a crane must hold a qualification for the type of crane they are operating. Key competencies of crane operators include:

- Carry out all necessary pre-operational checks;
- Prepare a safe operational plan to deal with typical hazards and control the risks arising from those hazards;
- Set-up the crane or hoist;
- Understand and interpret load charts and data plates;
- Operate the crane or hoist under actual or simulated working conditions
- Shut down and secure the crane or hoist
- Respond to hand signals and radio communications for load movement;
- Calculate the safe working loads of slings in various configurations;
- Inspect lifting gear for defects;
- Assess the weight of loads;
- Understand the use of various items of lifting gear;

The qualifications and competency system operating in New Zealand provides employers, employees and the community with an assurance that crane operators have been assessed as having the necessary knowledge and are competent to carry out lifting works in a safe manner.

### 3.2. Excavators

Excavators are specifically designed and manufactured for excavation works. As a general rule, excavators are less suitable than most common types of cranes for precision lifting and placement applications due to their inherent 'hydraulic drift' characteristics. 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.

### 3.3. Exemption <sup>iii</sup>

Items of mobile plant (including earth-moving equipment), not originally designed as a crane, and used for load lifting incidental to their principal function are entirely exempt from the Health and Safety in Employment (Pressure Equipment, Cranes, and Passenger Ropeways) Regulations 1999 2<sup>iv</sup> subject to the following conditions as applicable:

1. Lifting points and equipment used for rigging loads are to be certified by a Chartered Professional Engineer; and
2. In the case of new and used hydraulic excavators with an operating weight of seven tonne or more, the following additional conditions apply:
  - a. the equipment is not to be modified to make it operate as a crane other than the provision of a lifting point; and
  - b. hose burst protection valves are required since the 1st January 2016; and
  - c. operators and ground support personnel are to be adequately trained; and
  - d. operations are to be carried out in accordance with the Approved Code of Practice for Load-Lifting – Rigging<sup>v</sup>; and
  - e. the equipment is to have a loading chart available to operators.

Excavator operators who perform crane works need specific training and instruction in the use of the equipment. In all instances, the operator must have knowledge of assessing the weight of the load and the capacity of the equipment, manufacturer's instructions for site conditions and lifting conditions shall be followed.

The operator of the mobile plant must be able to see the load at all times during the lift. If the load is out of the operator's view at any time, the lifting process must be directed by a dogman. The operator shall also be able to understand and interpret excavator load chart, and respond to hand signals or radio communications for load movement<sup>vi</sup>. (One method of improving excavator operators' competence for performing lifting jobs is to have the operator undertake non-slewing mobile crane training <sup>vii</sup>.)

The Crane Associations position is that all operators conducting lifting of suspended loads should hold and undertake US 3789 as Per Part 4 of the ACOP for Cranes. The Operator should also hold US 20875 or US 17695 for excavators or other appropriate unit standard for the plant to be able to demonstrate competency.



## 4. Further Information

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This Position Paper contains summary information only, and further information is available by contacting the Crane Association of New Zealand (Inc.)

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Contact Details	
Postal Address:	PO Box 12013, Wellington 6144
Physical Address:	21 Fitzherbert Terrace, Thorndon, Wellington
Telephone:	+64 4 473 3558
Email:	info@cranes.org.nz

## 5. Endnotes

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<sup>i</sup> WorkSafe NZ Factsheet – Using quick hitches safely

<sup>ii</sup> OPERC, (2015, November 02) Safety Alert Excavators Used as Cranes ALT-017. Retrieved from OPERC: [http://www.operc.com/SafetyAlert/ALT\\_017-A4.pdf](http://www.operc.com/SafetyAlert/ALT_017-A4.pdf)

<sup>iii</sup> Exemption: <https://gazette.govt.nz/notice/id/2015-go5666>

<sup>iv</sup> Health and Safety in Employment (Pressure Equipment, Cranes, and Passenger Ropeways) Regulations 1999.

<sup>v</sup> Approved Code of Practice Load-Lifting and Rigging 2012

<sup>vi</sup> Approved Code of Practice for Cranes 3<sup>rd</sup> Edition 2009

<sup>vii</sup> Unit Standard 24511