PROCEDURE

LIFT AND LOAD SAFETY

1. Introduction

The purpose of this procedure is to ensure lift and load activities can be carried out in a manner that ensures:

- safety of our people, plant and equipment; and,
- meets or exceeds all relevant standards, codes and legislative requirements.

2. Scope

This procedure applies to all people undertaking lifting and loading operations under Contact control.

Guidance is provided on:

- identification of factors that may affect safe lifting operations;
- management and inspection of lifting equipment;
- development of Lifting Plans to better manage safe lifting operations;
- competencies required for those involved

This procedure does not apply to:

- maritime-related lifts, such as from barges or the wharf
- manual lifting (this is covered in the Lifting Limits and Manual Handling Guideline)
- helicopter lifting activities (these are subject to business-specific procedures)
- simple lifting operations by use of forks (these are covered in the relevant WorkSafe NZ Codes of Practices, and Standard Operating Procedures), except where a hook attachment is being used.

3. References

Legislation

Health and Safety at Work Act 2015

Approved Codes of Practice & Guidelines

- Approved Code of Practice for Cranes (ACOP Cranes)
- Approved Code of Practice for Load Lifting Rigging
- Fork-Lift Truck Operations Safety Code
- Crane Association of New Zealand (Inc) 'Crane Safety Manual for Cranes Operations & Dogman'
- Pressure Equipment, Cranes, and Passenger Ropeways Regulations (PECPR).

Note: To access the latest version please refer to:

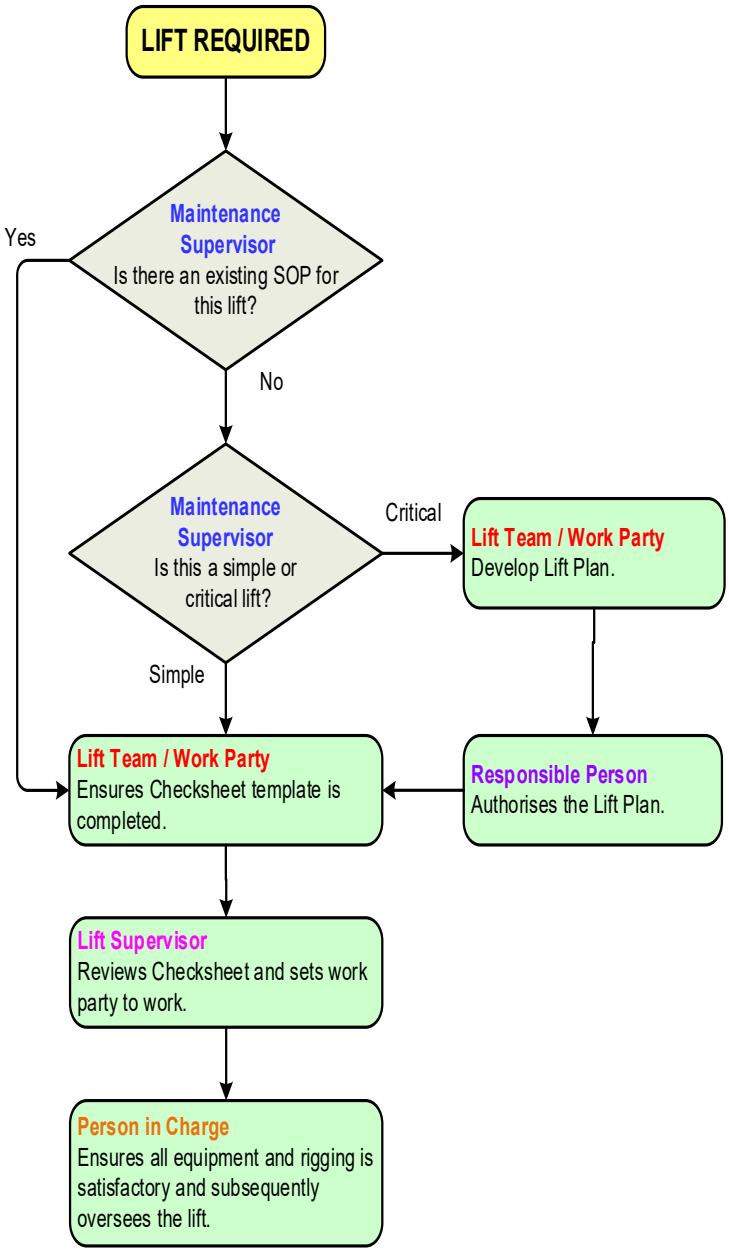
Appendix B - External Guidance and Reference Publications

4. Lift Clasification

Lifting operations are assessed in the planning stage and classified as either Simple or Critical, if it is unclear the type of lift **MUST** be determined by a “Responsible Person” as defined in Section *.

Simple	A lift that is familiar to all the lift team, is undertaken on a regular basis and does not qualify as a ‘critical’ lift. Simple lifts require: • the lift team is trained and deemed competent in the use of specific lifting equipment and able to complete the entire operation • all personnel involved are familiar with the hazard ID and lift procedure • the load being lifted has a known weight or weight can be estimated with reasonable accuracy and is well within the lifting capacity of the crane • the centre of gravity is known or easily determined, or lifting points already exist on the equipment. - if being lifted out of balance there is no risk of damage to load or plant.
Critical	Critical lifts have greater risks and require greater level of control. Sites may choose to develop standard operating procedures (SOPs) for routine critical lifts on site. These would replace the need for a lift plan. These include lifts: • taking the load over operating or safety critical equipment • undertaken by the lift team infrequently • of bridge beams, tilt-up panels, involving submerged loads • for the erection of tower cranes • without the use of fully extended outriggers • where the centre of gravity is unknown or could change • in the vicinity of powerlines where there is a risk of entering an electrical exclusion zone • for cross hauling (two cranes to manoeuvring a load in different directions) • made when the load weight is 80% or more of the rated capacity of the crane • made with more than one crane • involving non-routine or technically difficult rigging arrangements • where the crane operator believes the lift should be critical • greater than 50 tonnes • where the lift, removal and turning operation requires a detailed supplementary procedure, i.e. turbine casings and rotors and generator rotors • where special equipment is designated or fabricated specifically for the task • where the load is not visible to the lifting device operator for the duration of the lift. • where people are being lifted in a crane lifted platform (commonly known as ‘man-cage’), attached directly to a crane’s hook. • being conducted in the vicinity of live conductors where Minimum Approach Distances (MAD) would apply. (4 metres)

5. Process for Lifting and Load Safety



6. Contact Owned Lift Equipment

Design

Lifting devices, equipment and accessories **MUST** be fit for purpose. They **Must** be designed and certified in accordance with Pressure Equipment, Cranes, and Passenger Ropeways (PECPR) regulations and any applicable New Zealand Standards.

Marking and registration

Procedures **MUST** be established for marking and/or registering all equipment used for lifting and loading.

Equipment used for lifting and loading **MUST** be clearly and permanently marked with its Safe Working Load (SWL) or Working Load Limit (WLL) by stamping, or where this is impracticable or not recommended, by other suitable means.

All equipment used for lifting and loading **MUST** be marked with a visual indication of whether the item is within its current inspection period.

Inspection and maintenance

Procedures **MUST** be established for inspecting and maintaining all equipment used for lifting and loading, based on the manufacturer's recommendations and the PECPR.

Lifting equipment **MUST** be removed from service if it:

- is not displaying the current marking code
- shows any defects, such as excessive wear, cuts, corrosion or abrasions
- has come to the end of its recommended life span according to the marked expiry date and relevant New Zealand standard.

Lifting equipment register

Each Contact project, site or facility **MUST** have a lifting equipment register that details information on equipment including (where applicable):

- it's unique identifier
- date of purchase
- safety limits
- inspection frequency and dates
- maintenance history.

The register may be maintained by a third party.

An example of a lifting equipment register is located in Appendix C.

Note: Where contractors are supplying their own lift equipment it **MUST** meet the same standards as Contact equipment and evidence of registers and routine inspections provided.

7. Roles & Responsibilities

Authorisations

Role	Responsibilities
Site Manager (or equivalent)	To designate the responsible person(s) on site
Responsible Person GEN - Asset Manager and / or person(s) designated by Site Manager	Reviews and ensures the Lift Plan is correctly completed by competent people and approves: • lift plans • SOP's (that include critical lifts) Note: Approval means ensuring documentation is correctly completed by competent people.
Lift Supervisor GEN - Nominated Supervisor (when working within the Generation Safety Rules) Lift Supervisor	Reviews Checksheet prior to setting Lift Team / Work Party to work.

Lift Team / Work Party

A lift team may comprise of one or more people, but the necessary competencies required **MUST** be present for the lift.

ROLE	RESPONSIBILITIES / TASKS
Person in Charge (of Lift Team / Work Party) NCP (when working within the Generation Safety Rules) Or Direct Supervisor of Work Party	• develops lift plan • establishing documentation controls • checking competencies • equipment fit for purpose and certification valid where required • gaining approvals • ensures the Lift Plan is documented and suitable for the task • ensures lifting equipment selected is suitable and is checked prior to use, and that all persons involved are competent or under direct supervision • conducts the toolbox talk and ensures everyone understands their respective roles in accordance with the lift plan
Crane / Lifting Device Operator	• competent to operate equipment • assurance of certification and inspection regimes of equipment • hazard identification and control process involvement – in relation to lifting/loading operations • sign off all document controls

ROLE	RESPONSIBILITIES / TASKS
	• assurance of the lifting operation • responsible for the crane operations under his/her control • performs crane inspections with the exception of the initial, quarterly and annual inspections • completes all required crane operation logs, pre-use inspection procedures and checks • ensure the device is within inspection and testing intervals by examination of the periodic re-certification tags and/or documentation • ensure that no required safety devices are defeated.
Rigger	• trained and competent • perform rigging duties to class of licence • assurance of certification and inspection regimes of equipment • hazard identification and control process involvement in relation to lifting/loading operations • sign off all document controls **Cranes** • inspects the lifting equipment before use • may contribute to selecting the lifting equipment to suit the load • is fully aware of the lift plan and connects/disconnects the load **Portable Lifting Equipment** • inspects the lifting equipment, selects the equipment to suit the load, installs the equipment • is fully aware of the lift plan and connects/disconnects the load

ROLE	RESPONSIBILITIES / TASKS
Dogman	• trained and competent • establishing and maintain communications with the Crane / Lifting Device Operator • assurance of certification and inspection regimes of equipment • hazard identification and control process involvement – in relation to lifting/loading operations • sign off all document controls • ensure safety and security of load during operation • ensure safety and security of the lifting site location • coordinate the lifting movements and maintain radio and/or visual communications with crane or lifting device operator and any persons close to the load • **MUST** be solely focused on the load when it's in transition.

8. Training and Competence

All persons before performing lifting or loading activities **MUST**be trained with respect to the following standards.

ROLE	Unit Standards
Crane Operator Overhead cranes cab controlled pendant controlled or remote controlled mobile cranes truck mounted	 3790 3800 (ref: ACOP for Cranes Part 4) Minimum National Cert Level 3 for Critical lifts, Level 2 for Simple lifts. 3795; or, 16617
Dogman **Rigger** cranes portable lifting equipment	Minimum Unit Standard: 3789 <u>Note:</u> For portable controlled cranes unit standard 3800 applies to the rigging component.

Note: Competency should be able to be demonstrated by either:

- frequent performance of the task demonstrating competence (or attestation of such verification purposes); or,
- refresher training.

9. The Lift

Lifting devices, equipment and accessories **MUST** be fit for purpose. They **MUST** be designed and certified in accordance with Pressure Equipment, Cranes, and Passenger Ropeways (PECPR) regulations and any applicable New Zealand Standards.

If the lifting operation is controlled by a permit to work or other safety document please refer to the Documented Control Work directive or the Generation Safety Rules for any additional requirements to those specified in this section.

Sizing of the lifting equipment

One of the most critical factors in planning a lifting operation is to ensure that lifting equipment selected for the job has sufficient lifting capacity and reach to handle the intended load. In the case of a tower, mobile, crawler or truck mounted crane, the lifting capacity is dependent on the load radius of the crane boom. Hence, it is important in the selection of the crane that the distance from the load to the crane is known. The loading and uploading points within the worksite **MUST** be carefully considered in relation to the location of the crane. For lifting operations involving multiple loads of different shapes and sizes, the capacity of the crane should be selected based on the weight of the heaviest load to prevent overloading.

Knowing the weight of the load and the load radius

This is the most important parameter that **MUST** be determined to prevent overloading of the lifting equipment. When the load is part of an assembled item, the weight of each component can be determined from the engineering drawings. Other times, one **MUST** rely on the calculation of the density and volume of the load that is being carried. Special attention is essential when the load comprises different materials. It is safer to be extra careful and estimate a heavier weight than assuming a lighter one. Lifts on objects where there is the potential for significant stiction, like an in-service cooling water screen, **MUST** also be classed as critical lifts unless they are following a standard approved procedure.

If the weight of the load is unknown, the general rule of thumb is not to lift the load as it could lead to overloading and toppling of the lifting equipment. In this case a lift plan **MUST**include an assessment of weight prepared by a competent engineer. Alternatively, the weight may be determined by suspending the load with a device whose rated capacity is at least twice the weight as estimated determined by the Lift Supervisor, solely for the purpose of determining the weight before executing the lift.

Maintaining the centre of gravity (CoG) of the load directly beneath the load-line

During lifting operation, it is critical to maintain the CoG of the load directly beneath the load-line (i.e. the hook). Otherwise when the load is lifted, it will swing towards the CoG and may put people / plant / equipment at risk.

In addition, it may destabilise the crane if the load is being pulled or dragged. Depending on the shape and size of the load, the CoG may or may not be obvious. If in doubt, it is advisable to consult an engineer.

Lifts in the vicinity of High Voltage Lines and Switchyards

When conducting Lifts in the vicinity of HV Lines and Switchyards they **MUST** be done in accordance with Section 2.905 Mobile Plant and Vehicles in the Vicinity of Live Conductors of Safety Manual – Electricity Industry (SE – EI) Part 1 Minimum Safety Requirements and Part 2 General Safety Guide (Orange Book).

Controls **MUST** be established to ensure the Minimum Approach Distance (MAD) is not encroached. A dedicated safety observer **MUST** be in attendance.

The Development of an SOP in lieu of Lift Plans

Where a standard operating procedure is developed that also includes the safe work methods for undertaking a critical lift it **MUST** include all information required to complete a standard lift plan.

SOP's that include critical lifting components **MUST** be approved by an asset manager / responsible person.

10. APPENDIX A: Glossary

Term	Definition
Critical Lift	Refer section 4.
Cross-hauling	Where two lifting devices are used to manoeuvre a load. Examples include: • using a chainblock to pull a component sideways while it is being lifted by a gantry crane • rolling a turbine casing using two gantry crane hooks or a mobile and a gantry crane.
Lifting device	Any mechanical device capable or raising or lowering a load; e.g. cranes, jacks, winches, gin wheels, etc.
Lifting equipment	Comprised of lifting devices (equipment performing the lifting) and lifting accessories (devices that connect the load to the lifting device and lifted equipment).
Lift plan	Plan detailing how the lifting operations **MUST** be undertaken.
Load carrier	All types of containers, baskets, tanks, skids and frames that are used to transport a load.
Man-cage	A personnel-carrying device, designed to be suspended from a crane, to provide a working area for persons conveyed by and working from the box.
Mobile plant	Plant that is provided with some form of self propulsion, which is under the control of an operator. Examples of powered mobile plant include but are not limited to forklifts, scissor lifts, cherry pickers and mobile cranes.
PECPR	Pressure Equipment, Cranes, and Passenger Ropeways Regulations (PECPR) Regulations 1999
Rigger	A person who assembles controls and tags the temporarily assembled lifting device.
Dogman	Personnel who directs and guides the path of the lifting and lifted equipment.
Simple lift	Refer section 4.
Standard Operating Procedure (SOP)	An approved OEM or site developed procedure.

Term	Definition
Stiction	The static friction that needs to be overcome to enable relative motion of stationary objects in contact. Any solid objects pressing against each other (but not sliding) will require some threshold of force parallel to the surface of contact in order to overcome static cohesion. Stiction is a threshold, not a continuous force.

11. APPENDIX B: External Guidance and Reference Publications

Authority	Title
WorkSafe New Zealand	Pressure Equipment, Cranes and Passenger Ropeways Regulations https://www.worksafe.govt.nz/laws-and-regulations/regulations/hse-pressure-equipment-cranes-and-passenger-ropeways-regs/
	Approved Code of Practice for Cranes https://www.worksafe.govt.nz/topic-and-industry/cranes/
	Approved Code of Practice for Load-Lifting Rigging https://www.worksafe.govt.nz/topic-and-industry/load-lifting-and-rigging/
	Fork-Lift Truck Operators Safety Code https://www.worksafe.govt.nz/topic-and-industry/vehicles-and-mobile-plant/forklifts/forklift-roadshow-presentations/
New Zealand Transport Agency	Official New Zealand Road Code for Heavy Vehicle Drivers https://www.nzta.govt.nz/roadcode/heavy-vehicle-road-code/
	Official Truck Loading Code https://www.nzta.govt.nz/assets/resources/roadcode/truck-loading-code/docs/tlc.pdf
Ministry of Transport	Transporting Dangerous Goods Safely, an Industry Guide (2008) https://www.transport.govt.nz/assets/Uploads/Report/TransportingDangerousGoodsSafely-v2.pdf
Dropped Objects Prevention Scheme	This website is dedicated to providing support, guidance and resources to all industries in the fight against Dropped Objects. http://www.dropsonline.org
Crane Association New Zealand	Crane Safety Manual, and Crane Safety Essentials Information http://www.cranes.org.nz/safety
Australian and New Zealand Standards	http://www.standards.org.nz (access requires purchase or license)
Electricity Industry	Safety Manual – Electricity Industry (SE – EI) Part 1: Minimum Safety Requirements Part 2: General Safety Guide

Authority	Title
	(Orange Book) July 2015 Section 2.905 Mobile Plant and Vehicles in the Vicinity of Live Conductors **Note: This is not currently available on line.**

12. APPENDIX C: Lift & Load Related Documentation

Documentation includes:

- Pre-Lift and Critical lift Checksheets DMS: 10000021766
- Protect @ Contact Essentials, Lift and Load DMS: 10000023831