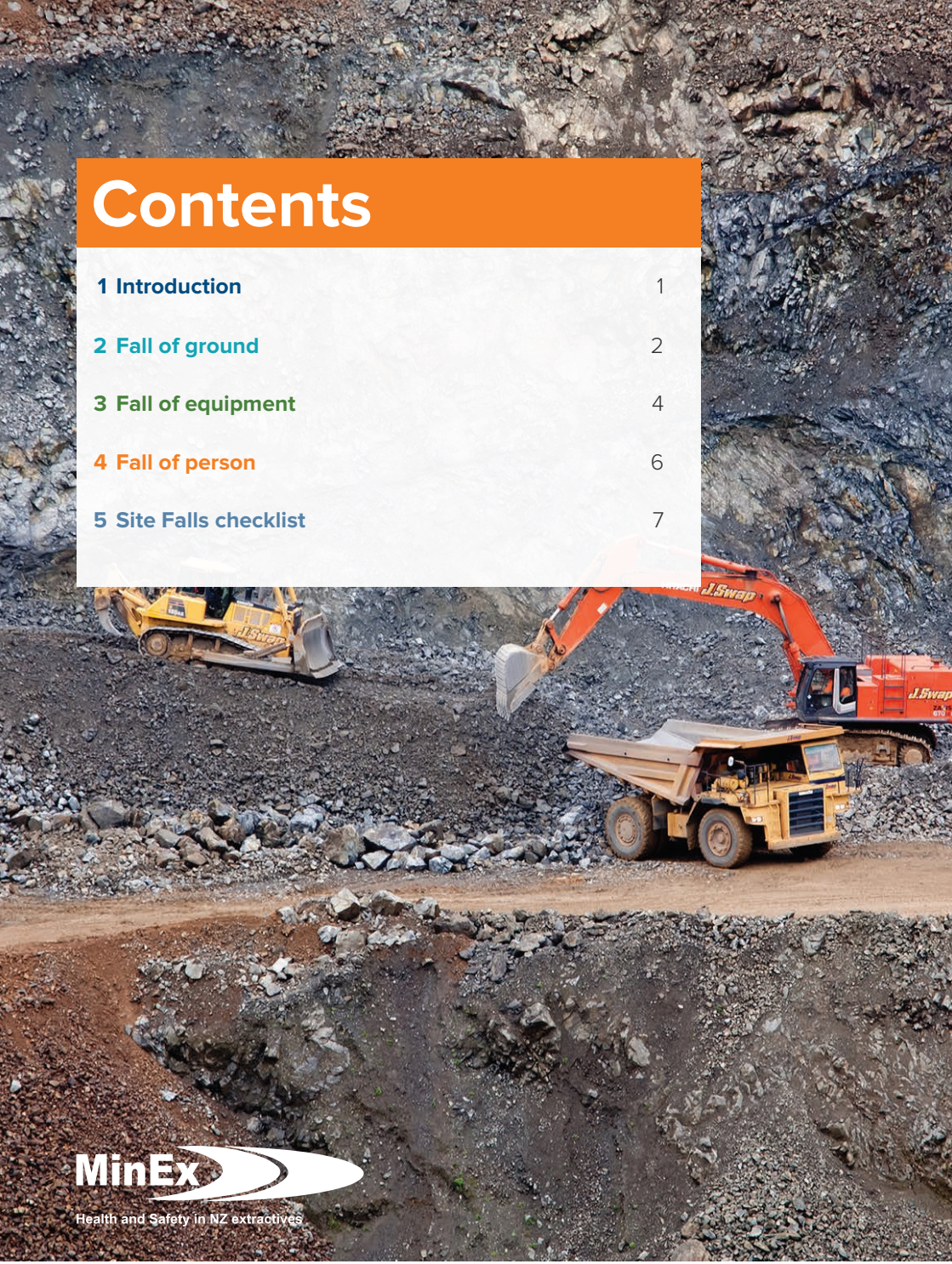
Fall hazards in mines and quarries

MinEx

Health and Safety in NZ extractives

Contents



MinEx

Health and Safety in NZ extractives

1 Introduction

Falls; include people falling or objects falling on people, is one of the 4 fatal hazards that result in 80% of fatalities in the extractives sector, both in New Zealand and internationally. Falls top the list ahead of collisions, entanglement, and pressure release.

There have been 8 fatalities in the New Zealand extractives sector between 2010 and 2018, with 5 of these resulting from falls.

Research from Australia, which covered extractives industry fatalities from 16 countries world-wide, identified that 34% of fatalities are a result of falls, with objects falling on people being the dominant cause.

Working at height (on plant or benches), working near or under unstable ground, working under suspended loads or where work is being conducted above you, all present risks of being injured or killed in a fall event.

The intent of this booklet is to provide you with ways to recognise and manage hazards, and reduce risks associated with worker exposure to fall hazards in mines and quarries.

2 Fall of ground

When mine/quarry faces are exposed, relaxation of the rock occurs which may lead to loose material falling or rolling from the face.

The likelihood of rockfall and slope/batter instability increases when there is weak rock, bedding, joints, structures, blast damage, vehicle vibrations, crest loss, adverse weather (rainfall, wind) or inadequate design.

Consider all those tasks where workers may be exposed to the hazards of ground instability, for example; digging/excavating, grading, water cart, drilling, loading shots, unplanned service of equipment, surveying, sampling and installing/moving pumps.

You need to monitor any changes in the condition of benches and faces, identifying such things as rocks on berms, roads and the floor, cracks in faces, crest loss and changes in water flow.

Controls for fall of ground

Regular workplace inspections should be conducted and recorded so that potential "hot spots" of wall movement or instability can be identified. Remove overhangs, loose material and other face hazards by blasting, scaling or cleaning faces.

Ensure bench and stockpile heights are no higher than the reach of your excavator or loader. This will enable scaling of faces, cleaning of loose material from the crest and/or pulling down stockpiles where the material is "hanging up".

Always ensure that you use the most appropriate type and size of equipment.

Where possible, decrease bench heights and overall slope height and angle to reduce the chance of rockfall.

Where instability is identified in faces or stockpiles, place an adequate catch bund near the toe and establish an adequate stand-off distance/ exclusion zone to keep people away from the toe and risk of rockfall. Also, establish exclusion zones around crushing and screening plant where there is a risk of rocks falling from plant and conveyors.

Establish procedures for safe entry to the pit following weather events or blasting.

3 Fall of equipment

Equipment falling, particularly during plant maintenance activities, potentially exposes workers to the hazard of being struck by moving/falling/unrestrained plant and equipment. Such movement of equipment can occur during:

- The use of cranes and lifting equipment
- Slinging and movement of loads
- Pick and carry (uneven ground, slopes, swinging loads)
- Jibbing into and around plant
- Unintended movement of plant or parts of plant as it is disassembled or assembled
- Machinery that is suspended under its own power (only relying on the hydraulic system)

If not regularly inspected and maintained, plant and equipment can wear, rust or deteriorate to a point where it fails and/or falls.

Controls for fall of equipment

Fall hazards such as unsecured tools, screens etc., where plant and equipment can fall from height should be identified in risk assessments.

Ensure adequate and effective controls are in place to ensure no one is exposed to the fall hazards identified.

Regular workplace inspections should be conducted to identify plant and equipment that may be unstable, faulty or in poor repair which can result in exposure of workers if these items fall.

Where equipment is elevated and crush or entrapment hazards exist, plant must be isolated and fit for purpose chocking and lifting equipment used.

Ensure lifting procedures are checked to ensure that no one is in the fall zone of a lift when the lift is made.

Adequate and effective exclusion zones must be established to protect workers from the potential fall of plant and equipment.

Ensure high risk tasks such as lifting, working at heights, working near unstable faces etc. are adequately supervised.

4 Fall of person

There may be areas of fixed plant and equipment where personnel are required to traverse and work without appropriate access and/or work platforms (e.g. stairs and ladder ways, handrails and kick boards). Fall hazards also exist where workers are required to work outside of or lean out over the platforms and handrails.

Many falls of person incidents occur when accessing plant particularly where there are no walkways or platforms or where personnel don't normally go (e.g. drive motors on conveyors).

Climbing onto mobile equipment to clean windscreens, adjust mirrors, or conduct minor maintenance are often working at height tasks and need to be appropriately controlled to ensure workers are not exposed to the risk of falling.

Controls for fall of person

Fall hazards such as trip hazards and areas where workers can fall from height should be identified in risk assessments.

Suitable working platforms should be used to conduct work at heights.

Regular workplace inspections should be conducted to identify work areas where there are fall hazards and what, if any, exposure workers have to these hazards.

Ensure suitable fall prevention equipment is available and maintained. Fall prevention equipment such as harnesses should be used with appropriate anchoring devices and workers trained in the use of such equipment.

No one should conduct work from a ladder. Ladders should be fixed and only used to climb up to and descend from a work area.

5 Site Falls checklist

The following Site Falls Checklist will assist in identifying and managing fall hazards:

Item/activity	Comments/Observations
What areas have been identified where persons can fall from height or be affected by something falling from height (e.g. benches, off a piece of fixed plant, ladder ways, walkways, platforms, mobile equipment)	
What specific controls does the site have in place to manage these hazards/risks	
What fall incidents have occurred in the last 12 months on site and what has been done to control or address these	
How are personnel made aware generally of the existence of these hazards and associated controls (induction)	
How are personnel made aware of the task specific controls necessary to prevent falls	
How does the site ensure the effectiveness of these controls	
How often are inspections and audits carried out	

Item/activity	Comments/Observations
Benches/Ramps • How well is the access to the benches/ ramps identified and controlled • What activities would require personnel to work at or near the edge of a bench (e.g. mark-up, drilling, charging, cleaning, batters or catch berms) • What are the site rules that govern or control activity near the edge of a bench or the toe of a wall (e.g. when is fall prevention/arrest required, exclusion zones, bunding and barricades, restricted access) • How is the risk of equipment falling off a ramp managed and controlled	
Off an Item of Fixed Plant • Do all the areas of fixed plant and equipment where personnel are required to traverse and work, have appropriate access provisions and work platforms (e.g. stairs and ladder ways, handrails and kick boards) • What process is in place to inspect and maintain these • Are there any areas where personnel are required to work outside of, or lean out over the platforms and handrails • How is the risk of a person falling managed in these circumstances	
Mobile Equipment • What provisions does the site have to ensure that personnel can access and egress mobile equipment • Is there any work (inspection or maintenance) that requires personnel to climb on and over mobile equipment • How is risk of personnel falling in these circumstances managed	

Item/activity	Comments/Observations
Working at Height Check Prompts • What activities does the site have that are considered to be working at height • What specific procedures or process does the site have where personnel are required to work at height • What fall prevention equipment does the site have and where is this kept • If required for a particular task, how do employees access working at height equipment • How is this equipment inspected and tested • What training do workers have in the use of this equipment • Where working at height is undertaken, what specific checks or inspections are carried out to ensure compliance with, and effectiveness of the sites controls	
Maintaining Plant and Equipment • When plant maintenance is undertaken, how is the hazard of personnel being struck by moving/ falling/unrestrained plant and equipment controlled - Use of cranes and lifting equipment ◦ Slinging and movement of loads ◦ Pick and carry (uneven ground, slopes, swinging loads) ◦ Jibbing into and around plant - Unintended movement of plant or parts of plant as it is disassembled or assembled - Accessing plant particularly where there are no walkways or platforms or where personnel don't normally go (drive motors on conveyors)	

Useful Resources:

Best practice guidelines for working at height in New Zealand
https://worksafe.govt.nz/topic-and-industry/working-at-height/working-at-height-in-nz/
April 2012

Best practice guidelines for working on roofs
https://www.sitesafe.org.nz/globalassets/guides-and-resources/best-practice-guides/best_practice_guidelines_for_working_on_roofsnz.pdf
June 2012

Best practice guidelines – Mobile Elevating Work Platforms
https://www.sitesafe.org.nz/globalassets/guides-and-resources/best-practice-guides/mewp.pdf
August 2014

Guideline Management Crushing and Screening
http://www.minex.org.nz/assets/Uploads/Guideline-Management-Crushing-and-Screening-Feb10-1.pdf
February 2010

http://www.minex.org.nz/regulations-and-guidelines/regulations-and-guidelines/

MinEx
Health and Safety in NZ extractives

www.minex.org.nz