



Complete Director's guide to machine safety risk

Introduction

As a director, it is your responsibility to ensure that your staff are not only informed and competent but can also demonstrate that knowledge and competency.

Due diligence in a health and safety capacity is not just a matter of running assessments and handing them to your staff. The biggest risk a director can take is assuming that their senior staff or manager knows it all – because they may not.

It is a director's responsibility to verify that their in-house engineering team (and their contractors) have the expertise to both inform and calculate company risk factors.

To ignore this responsibility is to risk both your personal and company liability.

This document provides a framework for identifying the 'right' questions about machine safety risk in the workplace and instigating a successful safety management programme.

Machine safety practices will be shaped by the company's culture and leadership. It is critical that you lead health and safety from the top, not the bottom, and that you achieve effective officer due diligence.

WorkSafe New Zealand stipulates that employers are required to do "all that is reasonably practicable" to eliminate or reduce the risk of injury to their employees. This involves:

- exercising care by implementing necessary preventive measures
- identifying the hazards and risks relating to the place of work
- establishing measures appropriate to the situation



The Health and Safety at Work Act 2015 requires officers conducting a business or undertaking (PCBU) to exercise due diligence to ensure that the business or undertaking complies with its health and safety duties.

Due diligence requires business decisions that will ensure workplace health and safety considerations are integrated seamlessly into the company's business model.

The goal of this document is to assist directors in auditing their health and safety systems. Some of your systems may already be strong while others may need work.

Part One: What makes a successful health and safety system?



Mitigating your machine safety risk begins with a risk assessment and ends with an action plan, implemented by your staff or contractors and monitored and validated by our team.

Machine safety improvements cannot be completed as part of 'business as usual' activity.

Too often, clients who complete a risk assessment become overwhelmed by the amount of work that needs to be done. That's why planning and prioritisation are crucial in delivering a doable action plan.

If you leave this step to your own engineering or Health and Safety team, they may struggle to understand where to begin their improvements and, as a result, end up leaving things as they are.

In other cases, committing to improvements without creating a scope and specification pack for contractors can mean that a company commits significant time and resources to a safety project, only to remain noncompliant or have to redo the work a few years later.

To be effective, risk solutions must be properly planned, prioritised, designed, and implemented.

This checklist will help you ask the right questions of your team to identify gaps in your knowledge and risk profile.



What does a 'good' health and safety machine risk programme look like?



A successful health and safety system involves:

- Managers committed to making the programme work ✓
- Employees involved in the programme ✓
- A system to identify and control hazards ✓
- Compliance with WorkSafe New Zealand regulations ✓
- Ongoing training on safe work practice ✓
- Mutual respect, caring, and open communication in a climate conducive to safety ✓

THE ESSENTIAL COMPONENTS OF MEASURING HEALTH AND SAFETY PERFORMANCE ARE:

1 Active monitoring (before things go wrong).

A director must carry out routine inspections and checks to ensure standards are being maintained. They need to ask their team: Are our machine safety objectives and standards being achieved? Are they effective?

2 Reactive monitoring (after things go wrong).

This includes investigating injuries, mishaps, and near misses and identifying in each case why performance was substandard.

WorkSafe New Zealand has identified a number of trends where employers have been prosecuted for injuries and fatalities to staff and contractors through using machinery.

WorkSafe New Zealand places responsibilities on duty holders to take all practicable steps to make sure machinery in the workplace is designed safely and is adequately guarded to reduce the risk of injuries or harm. This includes machinery and plant designers, manufacturers, suppliers, installers and operators, employers and owners of machinery.



Part Two:

Questions for directors



Do you know the machine safety risks across your business?

The difference between a great business and an average business is a plan. If you know the machine safety risks across your workplace, you will be able to refer to the right documents and understand:

- The hazards of any given machine
- The likelihood of harm
- Any required controls that should be/are in place

Do you know which risks are significant and/or have residual risks that are not fully controlled, from an equipment or engineering standpoint?

The completion of a risk assessment should be followed by an improvement plan.

This plan should describe which machinery requires engineering improvements, the specific details of the improvements, and when they will be made.

Are you receiving sufficient information about machine safety and risks?

Your Health and Safety officers should be reporting on the most significant machine risks.

They should present a plan that details:

- Which machinery requires a risk assessment or risk assessment review
- What the improvement plan is, what has been completed and when outstanding improvements will be made.



Part Three: Questions to ask your Health and Safety team

Your Health and Safety team are responsible for facilitating the completion of machine risk assessments and ensuring that up-to-date information on the risk status of machines is available. Your team should be able to report on what your machine safety risks are for each machine and be able to suggest the required improvement works.

Potential issues

Task size and complexity are such that there is insufficient time or expertise to stay on top of all machine risk assessment obligations.

Best practice

Have a workable, suitably resourced plan to complete the risk assessment and improvement programme.

Have you conducted an independent risk assessment of your machinery?

A third-party independent risk assessment is critical to providing an objective evaluation of your equipment and how you use it.

The consultant should be a machine safety specialist with the knowledge and expertise to undertake a comprehensive assessment. While this person doesn't necessarily have to be from outside your organisation, it is unlikely that you will have staff on site who are both independent and suitably competent.

Did the assessment systematically evaluate all equipment?

A generic assessment may fail to document and evaluate specific issues on certain pieces of machinery. For example, only a qualified specialist will be able to examine whether the transmission guard or nip-point guard on one conveyor is of a suitable standard for the similar but different second conveyor. Your assessments should also avoid a generic conclusion of 'fixed guards in place.'

The assessment should also cover ergonomic hazards (including lifting and handling), visual display and control device locations.

Was the assessment performed by someone competent and experienced?

The consultant who carries out your risk assessment should be adequately qualified in mechanical engineering safety and fully understand machine properties and characteristics. Their specific machine safety experience should mean that they:

- **Understand control systems** and how interlocks on a machine may affect its safety
- **Have comprehensive knowledge of Health and Safety management** and how safe systems of work may be applied to minimise risk
- **Understand how an operator may use or misuse** your equipment
- **Appreciate the human factors** associated with the machine

What were your risk assessor's qualifications? Are they a Certified Machinery Safety Expert?

General Risk and Workplace Managements Regulations detail specific duties related to risk assessment. Your consultant must have the right engineering qualifications and a professional level of knowledge and skills. The Machine safety qualifications required for specific safety standards are CMSE® – Certified Machinery Safety Expert (TÜV NORD) certifications.

Does the principal assessor have specific machine safety experience?

Machine safety comprises a substantial body of knowledge that takes time to master. Machine safeguarding solutions require considered design and must be acceptable to end users. The best designs come from an iterative design management process based on experience.

A risk assessment should be carried out by someone who has comprehensive experience in knowing how the findings could or should be implemented.

Can you be certain that the assessment was reliable and specific?

The assessment must be specific, measurable, and actionable. It should easily lead into an improvement plan rather than simply provide a description of the current situation.

The assessment should also provide specific solutions for improvement. For example, rather than stating 'fit a guard,' it should describe the type of guard to be fitted (e.g., interlocked or fixed).

Finally, the assessment should not simply justify the use of standard operating procedures or training to control risks. Instead, it should explain how to apply engineering/isolating control measures.

Do you have a risk assessment schedule? How long ago was the last assessment done?

An organisation should know exactly what machines they have, whether a risk assessment has been carried out, when the last assessment was done, and when the next will be required.

Machines with higher risks should be reviewed more frequently. Risk assessments should also be reviewed when changes occur – for example, changes to process, changes to the organisation, or after accidents.

As long as your risk assessment meets all of these requirements, your schedule can look however you want.

How were the results presented? Was the information usable for decision-making?

Risk information for multiple machines or sites should be presented in a management information report that includes an overview and/or collection of information, allowing users to drill down to the details.

How were the results of the risk assessment processed?

Risk assessment results are best converted into a SMART improvement plan. Organisations shouldn't just work on their highest risk. They should also focus on 'low-hanging fruit' – quick-win risks where change is simple but still significant.

What changes were made after the last risk assessment?

Machine safety management is as important as any other risk management activity. Comprehensive recordkeeping, monitoring, and auditing of the process should be integral to your business operations.

Machine safety risk management is a process of continual improvement. Significant improvement works – as required by many New Zealand organisations – can take years to fully implement. For this reason, an organisation should systematically monitor the completion of improvement works to ensure they are not abandoned to competing priorities.



Part Four:

Project management

After your risk assessment, create an implementation plan.

A risk assessment will often highlight hundreds of risks to the workers who operate your machines. Devise a plan to manage these risks as efficiently as possible, minimising disruption to your business while your workplace becomes compliant and safe.

An action plan should provide a detailed framework for contractors to carry out remedial works. While contractors may do good work, without such a plan, they will often prioritise incorrectly or implement ineffective solutions that aren't up to code. This may only be picked up on when the project is validated, resulting in expensive rework to meet the AS/NZS 4024.1502 validation standard.

The ideal process is to:

- Assess the priority of risks and develop an implementation strategy
- Prioritise the improvements to be implemented first
- Identify and act on the 'easy fixes' in parallel with the greatest risks
- Make work packs for contractors with specific descriptions of the improvements required to meet standards

Questions to ask your engineering team

Your engineering team is responsible for procuring, maintaining, and modifying your equipment. They should have systematic processes for completing, or facilitating the completion of, remedial engineering works to required standards. A solid understanding of machine safety requirements is essential to ensuring that any engineering works are done right the first time.

Potential issues

- Insufficient personnel resources to oversee contractors or make significant headway on the improvement plan
- Local contractors may have insufficient knowledge to complete the work to code

Best practice

- Have a suitably resourced improvement plan that recognises the competency and skills required
- Design management and validation processes



Do you have a timeline of how your organisation will work around business as usual?

Most employers underestimate the time or resources required to fully implement improvements. A realistic improvement plan aligns an appropriate time frame to the available resources.

At the same time, the plan should allow for smaller tasks ('quick wins') to be addressed in a timely and cost-efficient manner.

Many 'middling' risks – such as transmission hazards – may not be at the top of the risk register but still represent a serious hazard and potential fine of \$300K. Some of these may require only a \$500 fix.

If significant engineering work and a shutdown are required, project management is essential:

- Determine whether we are behind schedule/we are on track with...
- Confirm risk reduction remedial works completed and verified to standard
- Schedule future reviews/assessments over the next quarter/year

How can you tell whether your contractors are capable of completing remedial works to code?

Contractors should be able to demonstrate work they have completed relative to machine safety. This may be supported by formal machine safety qualifications for functional safety aspects, e.g., interlocked guards TUV Certification or something similar is recommended.

Do your electrical and engineering contractors have a copy of the code of standards?

Contractors should have:

- A copy of the entire AS/NZS 4024:2014 series (900 pages)
- AS/NZS 60204
- Access to AS Series 3000 standards (e.g., AS/NZS 4024.3610 or AS 4024.3410)
- Access to International and European standards (e.g., IEC, ISO, EN)

The highest qualification for safety-control engineering is the CMSE® – Certified Machinery Safety Expert (TÜV NORD).

BEST PRACTICE PROCEDURES FOR IMPLEMENTING IMPROVEMENTS ARE AS FOLLOWS:

- 1 Decide who will do the work.**
- 2 Appreciate the amount of work involved** and apply appropriate resources to the job, i.e., the right number of people with the right qualifications. If you assign someone a task and give them just 10% of their time to complete it, they are unlikely to make significant progress.
- 3 Assign adequate resources** from a financial standpoint so improvement works can be done to standard.
- 4 Allow sufficient time** to complete the improvements, according to resource availability.



Have you created a work pack explaining how to do an improvement to code?

Even with competent contractors, a clear scope of works and specification for what is to be done is essential. This should be based on stakeholder feedback, e.g., operators, cleaners et al., but also aligned to relevant machine safety requirements. This helps ensure that the implemented solution is not only compliant but also the right solution.

Do you have the capacity to carry out 'root cause' investigations following a machine-related incident?

Ascertaining the cause of machine-related incidents/accidents requires the same level of knowledge, skills, and experience it takes to conduct a risk assessment. Your investigation team and process should ensure that your consultant is adequately qualified to provide advice in this area.

Can you ensure that actions identified in incident investigations are effectively implemented?

Findings from investigations into machinery-related incidents/accidents must be included in the risk assessment. All accidents and incidents should prompt a comprehensive review of current and previous machine risk assessments.

Corrective actions from incident/accident investigations must then be incorporated into the improvement plan and monitoring programme.



Part Five: Validation

The final stage of any machine safety programme is independent validation, which requires considerable expertise to understand risk factors and assess that improvements meet WorkSafe New Zealand standards.

The validation process verifies that safety designs have been put in place correctly and meet safety requirements.

Best practice

- Identify that the right conceptual solutions have been specified
- Verify that all solutions have been designed and implemented correctly
- Validate that the new machine is now safe and as intended ('you built the right thing')

Will your remedial works be independently validated?

The greater the risks and/or complexity of the machine, the greater the importance of an independent party to carry out validation. Subject to your organisation's processes and risk tolerance, the most significant machine safety upgrades should be validated by an external party.

Who will be doing the validation?

The key requirement is competency. In the first instance, your contractors should be able to determine whether the right conceptual solution has been implemented. Then, if necessary, a validation of the functional safety elements (safety circuits) may also be required. This is a highly specialised area. TUV certification is highly recommended.

Are risk assessments and risk registers updated following independent validation and completion of any remedial works?

After minimising your machine safety risks, you should update your risk assessment information to reflect the current state. It should reflect residual risks and what must be implemented by the end users or management to keep risks suitably low, e.g., LOTO.

Are the upgraded machine and its remedial works reviewed some time after completion to confirm continued performance to the expected standard and end user expectations?

In some cases, the installed solution may not be ideal. Operators create workarounds to deal with machine configuration issues that the design management process did not address. Modifications may be required to achieve a suitable solution that prevents workarounds, exposing operators to other hazards or risks.



Part Six: Programme Governance



Are stakeholders and workers engaged in the overall programme?

Operators should all be involved in assessment of machinery they use. They should also participate in the design process to ensure the right solutions are implemented. Speak to a variety of people in different roles who have participated in and contributed to the machine safety improvement programme.

What governance programme is there to track progress to plan?

The improvement programme can be a long one, spanning multiple years. This requires staying the course and regularly reviewing progress to plan, adjusting resources where required to ensure that the necessary and intended work is completed to standard and in the necessary timeframe.



How we can help

Free guides

TEG Risk has created a series of useful guides for directors so that you can understand the risks to your business by asking the right questions of your management team.

See our website to download these guides:



The TEG Explainer Guide to LOTO

We explain what an effective LOTO protocol is and why it's crucial to protecting workers from hazardous energy.



The TEG Risk guide to machine safety risk assessments

If you don't know what 'best practice' looks like, how can you know that your team has assessed risks correctly?

This guide covers the factors involved in managing risk in the workplace, highlighting the importance of undergoing a machine risk assessment.

Risk management services

We can undertake a Machine Risk Assessment

A summary machine risk assessment is ideal for reviewing your existing equipment and establishing where your greatest risks lie. Using our MinRisk App and highly skilled engineers, we can assess a large number of machines on site in a short time. Our tools allow us to produce highly informative reports with photo references, standard references, and budget costs. We also provide a variety of management reports that allow your organisation to start planning and prioritising implementation work.

We can establish a Safety Programme management plan

TEG's highly trained team of machine engineers are experienced in mechanical, electrical, and safety engineering. We have the expertise to assess your business needs and create an industry-standard programme for your personnel to establish sustainable machine safety and reliability practices.

Our policies and procedures are shown to increase productivity, compliance, and retention. Long term, this can help reduce the risk of legal disputes resulting from inadequate policies or guidelines.

Contact us to discover how we can help your business.

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