

National Rail Industry Advisory Forum (NRIAF)

Practical guidance for conducting health and safety assessments toward meeting SFAIRP obligations in the Railways Act

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1. Objective

The objective of this guidance is to provide industry with a possible means of conducting health and safety assessments in support of demonstrating the 'so far as is reasonably practicable' 'SFAIRP' requirement outlined in the Railways Act 2005 ("the Railways Act"). This is intended to improve safety while promoting greater consistency in the application of health and safety risk management.

2. Applicability

This guidance is intended for those who undertake health and safety risk assessments as part of their obligations under the Railways Act. This guidance is written with both licenced and non-licenced participants, as defined in the Railways Act and Railways Regulations 2019, in mind.

This guidance is voluntary, non-binding, and is not of a legislative nature. This guidance is not intended to create additional obligations on rail participants who may decide to show compliance with the requirements using other means.

3. Extent of consultation

This guidance has been developed in consultation with the National Rail Industry Advisory Forum members. Evidence of consultation is available from railregulation@nzta.govt.nz.

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5. Summary of amendments

From time to time, this guidance may be amended. The current amendment state is as follows:

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6. Legal considerations

This guidance is provided as a tool to assist duty-holders for undertaking safety risk assessments and their SFAIRP obligations as set forth in the Railways Act 2005. It is important to note that adherence to this guidance does not ensure that legal duties have been met, as these may only be determined following an incident or investigation, and ultimately by the court. Rail Participants should seek independent legal advice as to their legal duties as there is always a level of uncertainty when assessing whether a duty has been fulfilled beforehand, and rail participants will need to adapt any guidance to their organisation's specific needs. Judgement of compliance to the Railways Act can only be determined in the context of post-incident investigation by the courts.

It is important to note that while this guidance focuses on the duty to ensure the safety of others 'so far as is reasonably practicable' as defined by the Railways Act, parties may also have other legal responsibilities and duties under other laws such as the Health and Safety at Work Act 2015. The assessment and management of health and safety risks should take into account all relevant legal responsibilities and duties, and parties should be aware that following this guidance does not necessarily ensure compliance with other legal requirements.

The assessment of whether a risk has been eliminated or minimised SFAIRP is a specialist area which has legal and financial implications and so it is important that those leading health and safety risk assessments have a clear understanding of the legal requirements, health and safety risk management concepts, and the ability to apply them in practice within the rail participants organisation and context.

The options and approaches outlined in this guidance are not prescriptive and should be adapted to fit the specific needs of each duty-holder and rail participant. As such, duty-holders should exercise their own judgement when assessing and managing health and safety risks, taking into account the specific circumstances of their operations and what they understand to be best practices.

A health and safety assessment is not an end in itself but a tool to aid in determining what can be done to ensure the health and safety of persons so far as is reasonably practicable (SFAIRP). The ultimate goal of the health and safety assessment is to ensure that the risks are being managed appropriately so that the health and safety of all parties involved is protected.

Additionally, it is the railway participants' responsibility to decide when and why a health and safety risk assessment is needed to assist them meeting their obligations under the Railways Act.

7. Reasonably practicable

The goal of the health and safety assessment and the subsequent implementation of safety controls is to ensure *so far as is reasonably practicable* that none of the rail participants activities causes or are reasonably likely to cause death or serious injury to persons or damage to property.

Section 5 of the Railways Act states that *reasonably practicable* means that which is, or was, at a particular time, reasonably able to be done in relation to ensuring health and safety or the protection of property, taking into account and weighing up all relevant matters, including—

- a) the likelihood of the hazard or the risk concerned occurring; and
- b) the degree of harm or damage that might result from the hazard or risk; and
- c) what the person concerned knows, or ought reasonably to know, about—
 - i. the hazard or risk; and
 - ii. ways of eliminating or minimising the risk; and
- d) the availability and suitability of ways to eliminate or minimise the risk; and
- e) after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.

8. Who should lead health and safety assessments

It is the responsibility of the rail participant to determine who is competent to undertake safety risk assessments and to ensure that the individuals assigned to carry out these assessments have the necessary knowledge, skills and experience to do so. This includes being familiar with the context of the assessment, the chosen methods of assessment, and understanding the interfaces between the system under assessment and other related systems, as well as being able to identify and engage with relevant stakeholders.

It is also important to have competent people conducting safety risk assessments because they need to have the knowledge, skills, and experience necessary to accurately identify and evaluate potential hazards and risks to health and safety, as well as the ability to recommend and implement appropriate controls to mitigate those risks. A health and safety risk assessment conducted by a competent person tends to be more thorough and comprehensive, resulting in a more effective and efficient health and safety risk management.

9. Deciding the approach

Health and safety risks can be either assessed on a quantitative and qualitative basis or can include a combination of both quantitative and qualitative methodologies.

The *qualitative* approach to risk assessment involves making judgements about the potential risks and the effectiveness of the controls to eliminate or mitigate those risks. This approach typically relies on expert judgement and may not involve any numerical calculations.

The *quantitative* approach involves quantifying risk into numerical measures and comparing the cost of a control measure to a quantified harm that could result from the risk, or by comparing the cost of a control measure to a quantified reduction in risk that it would achieve. Numerical calculations are typically used to determine which controls are grossly disproportionate to the risk.

Both approaches have their own advantages and limitations. The qualitative approach may be more flexible, allowing for consideration of a wider range of factors, but it may be more difficult to prove and justify. The quantitative approach may provide a more solid foundation, but it may be more complex and require more data to reach a conclusion.

Care should be taken to ensure that the proposed quantitative methodology is appropriate for the circumstances, the underlying assumptions and mechanic of the methodology are well understood, so as to ensure that the assessment outcomes are not artificial or arbitrary. It is important that the assessor is aware of the context and the right people to engage with in the risk assessment process.

It is up to the rail participant to decide whether to use a qualitative or quantitative approach in their health and safety risk assessment, based on the specific circumstances and context of their operations and the intended scope of that assessment. The rationale on the choice of approach should be documented as part of the health and safety risk assessment.

10. Scope and context

In order to ensure a comprehensive and accurate safety risk assessment, it is important to establish the scope, context, and criteria of the organisation and the boundaries of the system under assessment and assumptions associated with the health and safety risk assessment [3]. The system under assessment refers to the specific rail activity or operations being evaluated during the safety risk assessment.

The aim of the health and safety assessment is to identify and assess the health and safety risks associated with a particular rail activity, and to identify and evaluate the effectiveness of controls that are already in place and identify and evaluate those controls that could also be put in place to eliminate or mitigate those risks toward improving safety.

The intended scope, boundaries, interfaces, and assumptions of the system under assessment should be documented, and it is important to consult with workers, their representatives, and subject matter experts throughout the health and safety assessment process.

11. Identification of hazards

The first major step in undertaking a health and safety risk assessment is identifying the hazards that arise from the rail activity and context. The approach will depend on the specific circumstances, and a combination of techniques might be considered to gain a comprehensive view of the hazards. Some common approaches used in hazard identification include:

- Walkthrough analysis: This involves walking through the work area and observing the operations to identify potential hazards.
- Job hazard analysis (JHA): This involves evaluating the hazards associated with specific jobs or tasks within the railway related activity.
- Task analysis: This involves breaking down the activity into its component tasks and evaluating the hazards associated with each task.
- Failure mode and effects analysis (FMEA): This involves identifying potential failures in equipment or processes and identifying the potential hazard that arise with each failure.
- Hazard and operability (HAZOP) analysis: This is a systematic, structured approach to identifying the deviations from intended design and operation of a system and evaluating the potential hazards that can arise.
- Brainstorming: This involves bringing together a group of people with relevant expertise to identify potential hazards through discussion and idea generation.
- Root cause analysis (RCA): This involves identifying the underlying causes of a problem or hazard in order to prevent similar incidents from occurring in the future.
- Incident investigation: This involves analysing the cause of a past incident to identify potential hazards and prevent similar incidents from occurring in the future.

The choice in approach will depend on the specific circumstances and requirements of health and safety risk assessment, the nature and context of the railway activity and the system boundaries.

It is important to consult with workers, their representatives, and subject matter experts in the relevant area to support the hazard identification process.

12. Likelihood

When conducting a health and safety assessment, the likelihood of a hazard occurring should be documented along with its potential causes and incident pathway. To estimate likelihood, consider the history of the hazard, comparable events within and outside of the organisation, worker input, and the foresight of experienced personnel and it is important to consult with workers, their representatives, and subject matter experts in the relevant area to determine the likelihood associated with the identified hazards. It may also be beneficial to identify different likelihoods and potential harms for a single hazard if multiple outcomes are possible.¹

13. Degree of harm or damage

The health and safety assessment should document the potential consequences of the *hazard or the hazardous event* occurring. This will normally involve some form of consequence analysis. Consequence analysis requires a detailed knowledge of the operations, hazards that arise, potential outcomes, and previous accidents and so it is important to consult with workers, their representatives, and subject matter experts in the relevant area to determine the consequences that can arise from the identified hazards. It may also be appropriate to establish different degrees of harm for one type of hazard or hazardous event.²

14. What is known about the hazard or risk

The health and safety assessment should document what is known or ought to be reasonably known about the hazard or risk:

- How the hazards and risks arise including causal factors,
- Historical data related to the hazards or risks related to the system, from within the organisation, industry, national and international statistics where the context is similar,
- The nature of the operations including operating tempo, asset condition, current capacity and planned future capacity and outputs, to ascertain the levels and duration of current and future exposure to hazards and risks by those that interact with the system including operators, workers, passengers, cleaners, maintainers, and the public,
- The workers understanding and perceptions of the hazards and risks, noting any divergence in opinion with risk estimates and historical data. If workers are represented by a health and safety rep, engagement to assess the risk must involve that representative.

¹ For example, when conducting a health and safety assessment for a rail yard, one potential hazard is the risk of a derailment. To document the likelihood of this hazard occurring, the health and safety assessment team should consider the following: The known history of derailments in the rail yard, including any past incidents and their causes; Comparable derailment events that have occurred in similar rail yards both within and outside the organisation; Input from workers who operate in the rail yard, as they may have insight into potential hazards and risk factors; The foresight of experienced personnel who can provide insight into likelihoods when using industry standards and best practices. If multiple outcomes are possible, such as a minor or a major derailment, it may be beneficial to identify different likelihoods and potential harms for the derailment hazard.

² For example: when conducting a health and safety assessment for a rail yard, the potential consequences of hazards such as equipment failure should be evaluated using a consequence analysis, taking into account potential outcomes and previous accidents. Different degrees of harm may also be identified for different types of equipment failures, type of cargo being transported and the number of trains involved.

- Technical expert opinion, where relevant.
- The health and safety assessment should document the above including references and consultation undertaken.

15. What is known about the ways to manage the hazard or risk

The health and safety assessment should document what is known and ought to be reasonably known about the ways of eliminating and minimising the hazard or risk:

- Identify the current controls within the system, and their place in the hierarchy of controls,
- Identify the codes of practice, standards, guidelines that are in place to guide and control operations and work,
- Identify industry-recognised good practice.

The health and safety assessment should also document all known possible *additional control measures* for eliminating or minimising the hazard or risk, and their place in the hierarchy of controls, including:

- Controls used in limited parts of the system which may have broader applicability,
- Broad exploration of control used to control the same hazards and risks by others in similar contexts,
- Exploring alteration of the way work is done so that higher order controls can replace lower order controls,³
- Exploring current and emerging technology including timelines for maturity,⁴
- Advice and recommendations from authorities and/or bodies such as Waka Kotahi, WorkSafe, FENZ, etc,
- Controls identified during consultation with interfacing rail participants.

³ For example, future system upgrades, or introduction of systems to mitigate human error.

⁴ For example, some technology might be under trial, or not mature for a New Zealand marketplace, though some estimation for when it may become suitable should be recorded.

16. Assessing the availability and suitability of the ways to eliminate or minimise the risk

The health and safety assessment should then assess the *availability* of the identified ways to eliminate or minimise the risk. This should include current availability and potential future availability if they were to be programmed for future implementation or strategic plan. It is important to document the rationale where controls are considered 'not-available'.⁵

The health and safety assessment then assesses the *suitability* of the identified ways to eliminate or minimise the risk. This should include discussion on the practicality of the control including whether it could introduce new risks, or shift risks between lifecycle phases, or between users.⁶

It is important to document the rationale where controls are considered 'not-suitable'. When making decisions about how to eliminate or minimise risk, workers and their and their health and safety representatives need to be given a genuine opportunity to participate and engage in the process.

17. Assessment of costs

Cost is a relevant matter that should only be taken into account after assessing the extent of the risk and the available ways to eliminate or minimise the risk.

For practicality, where controls have been determined as not available and not suitable there is no need to consider their cost. When considering costs, the rail participant might consider the indirect costs of implementing and maintain the controls, not just their direct cost or the cost of acquisition. This helps ensure the chosen solutions are effective and sustainable in the long run.

It is also worth considering the ongoing cost of current controls and whether they can be replaced with more effective controls, for example replacing burdensome administrative controls with engineered solutions that isolate or eliminate the hazard.

It is generally understood that where an otherwise reasonably practicable step or control has been identified, the only justification for not taking that step would be if the cost is grossly disproportionate to the risk reduction achieved by it. Unfortunately, there is little case law on the meaning of "grossly disproportionate" and budgetary constraints or capacity to pay are irrelevant given that the statutory test is objective.

⁵ Rationale for controls that are not available might include that they are not available on the market in New Zealand, or that the technology is unproven. For the most severe risks, it is reasonable to engage with strategic suppliers to see if they can supply certain controls as part of your collective long-term planning. For example this might include the introduction of new technology as part of obsolescence management.

⁶ For example, some potential controls might decrease risk to the public with an increased risk for workers, or vice versa. Careful consideration should be undertaken as to who is best placed to control the hazard or risk, and the considerations for this should be carefully documented.

18. Gross disproportionality via qualitative assessment

If the selected methodology involves qualitative assessment, review the gathered information and perform a judgement about whether the cost of implementing the control is grossly disproportionate to the risk, or alternatively, to the benefit to be obtained by implementing the control. As a general rule, a measure is likely to be considered grossly disproportionate to the cost if the cost is high and the benefit is marginal.

It is important to note that in some cases the cost of eliminating or mitigating the risk may be extremely high and not justifiable for the small benefit. Therefore, it is recommended to consider the options that have been found to be the most effective and least costly, and record the decision made and the reasoning behind it. This decision should be well founded based on the risk and cost analysis, and it should be supported with evidence and documented accordingly.

It is important that this judgement is undertaken in consultation with workers, their representatives, and subject matter experts in the relevant area, and any divergence in opinions should be documented.

19. Gross disproportionality via quantitative assessment

If the selected methodology involves quantitative assessment, establish quantifiable parameters for harm, likelihood, cost, and gross disproportionality.

- 1) The establishment of quantitative figures for likelihood is typically expressed as a decimal between 0 and 1.⁷
- 2) When establishing quantitative figures for the degree of harm select a suitable methodology. For instance, the value of statistical life (VoSL) is used by Waka Kotahi - the New Zealand Transport Agency (NZTA) to value the injury and mortality risk in road transport project business cases.⁸ This value is expressed as a monetary value per life saved.⁹ Consideration including a fraction of the 'value of life saved' for safety benefit of the avoidance of serious injury and lower levels of harm [4]. The harm parameter is typically expressed as 'safety benefit' in terms of dollars.
- 3) When establishing quantitative figures for the degree of damage, replacement or repair costs are appropriate. Consideration might include the costs associated with temporary loss of the asset. This is also typically expressed as 'safety benefit' in terms of dollars.

⁷ Establishing a quantitative value for likelihood might consider frequency of previous events within the organisation or industry or use international statistics under similar context. The establishment of likelihood might also consider kilometres travelled, total aggregate hours, or hours of 'the most exposed worker or passenger' as well as the exposure period over the life of the hazard and the safety control under assessment.

⁸ When selecting the methodology for quantifying harm the rail participant might reflect on the public perception of using VoSL if it is used to justify not implementing a control that is both available and suitable.

⁹ Waka Kotahi has noted that the transport VoSL is used to allocate funding between policy and infrastructure options and should not be used in other policy settings or risk domains without adjustment. One practical way to consider alternate contexts is through careful establishment of the grossly disproportionate factor used in quantitative calculations.

- 4) Establish the cost of the controls that are available and suitable. When considering costs, the rail participant might consider the indirect costs of implementing and maintain the controls, not just their direct cost. Costs of controls are normally expressed in dollars.¹⁰
- 5) Establish the gross disproportionality factors. The factor is typically expressed as an integer. The gross-disproportionality factor should consider the risk appetite of the railway participant, the views of workers and their representatives, the importance of safety in the rail industry, and the perceptions of the public. Two examples found in other railway guidance document include:
 - a) A factor of 3 for risks to workers and equipment, 2 for low consequence risks to public and passengers, 10 for high consequence risks to public and passengers [5].¹¹
 - b) A factor of 2 or less will generally be considered proportionate, 10 or greater will generally be considered grossly disproportionate, and between 2 and 10 will require specific consideration and justification [4].
- 6) Calculate whether the cost of the control being assessed is "grossly disproportionate" to safety benefit. This can be achieved by multiplying the safety benefit of the control, the likelihood, and the grossly disproportionate factor, and then determining whether this number is bigger or smaller than the cost of the control.

Care needs to be taking when establishing figures of gross disproportionality. There is no legal precedent in New Zealand for using quantitative factors in quantitative safety risk assessments, and there is no assurance any court will adopt figures of gross disproportionality even if certain figures and interpretations are widely used in practice. If a rail participant wishes to adopt this approach, the methodology and its justification needs to be carefully set out in the risk assessment. The establishment of figures or interpretations for gross disproportionality should be reached in consultation with workers and their representatives.

¹⁰ From a practical standpoint, controls should not be lumped together as one total cost, but assessed from most effective to least effective. It is also worth considering the ongoing cost of current controls and whether they can be replaced with more effective controls as replacing existing burdensome controls might improve safety while also being cost effective.

¹¹ This approach considers that workers are more likely have the knowledge of the risk, that workers knowingly engage with the risks, have the skills to navigate that risk, and that workers have a voice within their organisation that allows them to re-negotiate their engagement with that risk including ability to choose to not interact with that risk if they deem it unsafe. This approach also considers that the public are heavily reliant on the rail participant for their safety often with little or no understanding of the risks they are exposed to, that the public have limited choice in the level of risk they accept such that the choice is often reduced to whether they travel or not and recognises this is not always an available choice for those who are most vulnerable or have no alternative option. This approach also accommodates the greater uncertainty associated with high-consequence risks.

One New Zealand case suggested that where there is a "high risk of death" that 'no cost would be considered disproportionate' [1], [2].

20. Reporting

Prepare a short report that documents the process, the information gathered, who was consulted, the judgement, and any the recommendations. It is also important to document any uncertainty, bias, assumptions, and known limitations with the health and safety risk assessment.

21. Evaluation

Periodically review and evaluate the judgement. The rail participant might choose to review or develop new risk assessments after an accident, when specific risks or concerns are raised, when there are changes to operations or ways of working, or periodically, such as annually or bi-annually.

This would help to ensure that the rail participant is aware of all potential hazards and has adequate controls in place to mitigate them over time, and also helps the organisation to continuously improve their safety performance.

22. Further considerations

The following paragraphs are offered as additional considerations in the undertaking of health and safety risk assessments:

- a. The rail participant might choose to develop and maintain baseline risk assessments for their health and safety risks to reflect the nature of their operations and context. This would require help the rail participant to proactively identify and address potential hazards and risks before they result in an incident or accident and ensure that their risk management efforts are aligned with their overall safety objectives.
- b. The rail participant might recognise that risk assessments are an ongoing process not a one-time event. Continually monitoring and reviewing the health and safety risks and controls will help to ensure that risks are being effectively managed and that the health and safety of all parties involved is protected.
- c. The rail participant might choose to document the process used and the justification of the decisions. This might include an explanation of the controls selected and rejected, who was consulted, and the reasoning behind the decision. This can help in monitoring and reviewing the effectiveness of the controls in place and making any necessary adjustments.
- d. The rail participant might choose to consider any relevant codes of practice, standards, and guidelines that are in place to guide and control operations and work. This can assist in understanding best practices and industry standards, and maintain awareness of new or updated practices, standards, and guidelines.
- e. The rail participant might choose to document engagement with workers and their representatives to gather their perceptions of the risks, their ideas for how work can be made safer, and feedback on the effectiveness of existing safety controls.
- f. The rail participant might choose to include a review and update process to ensure the controls and safety measures are effective, taking into account new information and changes in the industry. This can assist in supporting a comprehensive understanding of the hazards and risks, and to ensure that the workers are engaged and invested in the safety of their work environment.

- g. The rail participant might choose to suspend assessment of the 'likelihood' of the risk while determining 'what is known and ought to be reasonably known about the ways of eliminating and minimising the hazard or risk'. Practical experience suggests that stakeholders tend to avoid full exploration of controls and are biased toward rejecting engineering controls if they believe the risk to be remote or improbable. Participants perceptions of likelihood have the most impact on the assessment of controls, and these perceptions can be based on their own personal experiences rather than objective assessment of historical rates or assessment of future risks. Perceptions can also be distorted risks being highly undesirable which are inadvertently given equivalence to low probability. By simply establishing that the risk is 'credible' or by focusing only on the consequence, experience suggests more genuine engagement in the exploration of controls, and a broader range of more effective options are then considered.
- h. The rail participant ought to follow the hierarchy of controls, starting with 'higher order controls' being those most effective at eliminating the hazard and working down through the hierarchy to the lower order controls being those least effective controls. The health and safety assessment should only consider the use of administrative controls and personal protective equipment as a last resort, after all other controls have been exhausted or deemed not feasible. This approach ensures that the most effective controls are implemented first and that resources are not wasted on less effective controls.
- i. The rail participant might also recognise the burden, inefficiencies and weaknesses with lower order controls that might be able to be substituted with more effective higher order engineering and elimination controls. Practical experience suggests that when assessing the effectiveness of the controls risk reduction while also considering the direct and indirect costs, the assessment might reveal the higher order controls have greater merit.
- j. The rail participant ought to recognise that the capacity to pay for safety controls is no justification avoiding their implementation. While it may be more challenging for a participant to implement certain controls if they have limited financial resources, it is still their responsibility to ensure the health and safety risks are eliminated and minimised so far as is reasonably practicable. Where controls are identified as available and suitable and the cost to implement the control is not grossly disproportionate to the benefit, the participant should either seek additional funding or revise their operational context to eliminate and minimise health and safety risks so far as is reasonably practicable.
- k. The rail participant might choose to recognise that limited time should not be used as an excuse to avoid implementing safety controls. Additional time and funding can be sought by those higher in the organisation, and temporary safety and operational controls can be implemented while the identified safety controls are procured for future implementation. While awaiting the implementation of the control, the participant might choose to revise their operational context to eliminate and minimise health and safety risks so far as is reasonably practicable.
- l. The rail participant might choose to use risk scoring to prioritise effort however remember that a low score on the risk matrix does not eliminate the need to demonstrate the risk has been eliminated or minimised SFAIRP.
- m. The rail participant should review and update safety risk assessments periodically, when operations change, and when the costs of controls in the marketplace changes. Regular review also helps to ensure that risks are being effectively managed.

- n. The rail participant might choose to consider the specific context of the operation, including any unique or temporary activities, and any unique hazards or risks associated with their operations or temporary activities. This helps to ensure that all health and safety risks are considered and addressed appropriately.
- o. The rail participant might choose to consider undertaking health and safety risk assessments at the enterprise level of the organisation using the organisation's major categories of safety risks, in order to inform company standards and policies. This helps to ensure that the major categories of health and safety risks are effectively managed across the organisation in a consistent manner.
- p. The rail participant should avoid the use of or mention of the term 'ALARP' as this has a different meaning and approach than SFAIRP for evaluating risks. This helps to ensure that the company is using the correct terminology and approach when evaluating risks and managing risk.
- q. The rail participant might choose to also consider including all harm, such as health effects, including minor harm and chronic and acute illness, when evaluating risks to support obligations under the Health and Safety At Work Act 2015. This helps to ensure that all potential harm is considered and addressed in health and safety assessments.
- r. The rail participant might consider having a person or persons responsible for implementing controls and ensuring that risks are effectively managed and mitigated. This helps to ensure that there is accountability and clear responsibility for the management of health and safety risks in the organisation, and that necessary actions are taken to control and mitigate risks.
- s. The rail participant might consider having a change management process that recognises that health and safety risk assessments need to be revisited and updated as necessary when changes occur in the workplace or to the operations. This helps to ensure that health and safety risks are continually monitored and managed, and that the risk assessments remain relevant and up-to-date with any changes in the work environment or activities.

23. Development

This guideline was developed by the National Rail Industry Advisory Forum Safe Systems workstream. It has been provided in good faith and with no warranty whatsoever. Comments and suggestions are welcome. This guideline was originally adapted from the Major Hazard Facility Industry working group SFAIRP guideline, the RISSB guidance on SFAIRP, the KiwiRail SFAIRP guideline and the City Rail Link SFAIRP method. References and bibliography are provided below.

24. Definitions & terms

The definitions of the Railways Act apply. The following terms are used in this document and their meaning is provided:

Term	Meaning
Consequence analysis	The process of identifying and evaluating the potential consequences of a hazard in order to determine its overall level of risk.
Degree of harm	The severity of harm or damage that might result from a hazard or risk. Sometimes referred to as Consequence.
Failure	Failure of assets, equipment, people (human error), and system interfaces that are potential sources of hazards and risks that should be considered during a health and safety assessment. Failure of assets and equipment may lead to equipment malfunction, human error can lead to mistakes, and system interfaces refer to the points where different systems or components interact with each other.
Hazard	ISO 31000 defines a hazard is "a source of potential harm or a situation with the potential to cause harm." It can be a physical event, an act of nature, or an act of human or nonhuman origin. [3]
Health and safety assessment	A systematic and structured process of evaluating hazards and risks in order to identify, assess and control potential safety issues.
Likelihood	ISO 31000 defines likelihood as "the probability of a particular event occurring." It is used to determine the chance of a hazard occurring, or the potential chance of a specified consequence occurring. [3]
Normal, degraded, and emergency situations	"Normal" refers to regular or routine operation, "degraded" refers to a state where some aspect of the system or operation is not functioning as intended, and "emergency" refers to a situation that requires an immediate response.
Operational context	Operational context refers to the specific conditions and circumstances in which a particular operation or activity is taking place. This includes factors such as the environment, equipment, procedures, personnel, and organisational culture that may influence the health and safety risks associated with the operation. The operational context helps to provide a clear understanding of the unique hazards and risks that are present in a particular situation, and it is important to consider this context when conducting a safety risk assessment.
Risk	ISO 31000 defines risk as "the effect of uncertainty on objectives." It is the combination of the likelihood of a hazard occurring and the resulting impact. [3]
Reasonably Practicable	<p>The term "reasonably practicable" is defined in the act as meaning that which is, or was, at a particular time, reasonably able to be done in relation to ensuring health and safety, taking into account and weighing up all relevant matters. In particular, the Railways Act requires that rail participants must take all reasonably practicable steps to:</p> <ul style="list-style-type: none"> · Protect the health and safety of workers and other people · Protect the property of workers and other people · Protect the environment. <p>It is important to note that reasonable practicability is a contextual decision-making process that considers the organisation's capabilities, specific circumstances, and industry practices in similar scenarios, while taking into account the risks, cost, and risk reduction benefits.</p>

Term	Meaning
So Far As Is Reasonably Practicable (SFAIRP)	"So Far As Is Reasonably Practicable (SFAIRP) is a legal term that is used in the Railways Act 2005 to describe the extent to which rail participants (such as rail operators and infrastructure managers) are required to take measures to ensure the health and safety of workers and other people who may be affected by their activities.

25. References

- [1] Worksafe New Zealand v Ministry of Social Development. 2008.
- [2] Martin Simmons Air Conditioning Services Ltd v Department of Labour. 2008.
- [3] Technical Committee: ISO/TC 262 Risk management "ISO 31000:2018 Risk management guidelines."
- [4] KiwiRail, "Level Crossing Risk Assessment Guide 2022 (Version 3)." KiwiRail, 2022.
- [5] ONRSR, "Meaning of duty to ensure safety so far as is reasonably practicable - SFAIRP," Office of the National Rail Safety Regulator, 2016

26. Bibliography

- [6] M. A. King, "Differential Safety Liability of Road and Rail", 2016.
- [7] Office of Rail and Road, "Common Safety Method for Risk Evaluation and Assessment - Guidance on the application of Commission Regulation (EU) 402/2013 - September 2018," 2018.
- [8] K. Oldham, C. Cunningham, J. Spinetto, and N. Consulting, "Framework for review and prioritisation of rail safety risks in New Zealand December 2017".
- [9] ONRSR, "Meaning of duty to ensure safety so far as is reasonably practicable - SFAIRP," Office of the National Rail Safety Regulator, 2016.
- [10] C. Peace, "The reasonably practicable test and work health and safety related risk assessments".
- [11] A. J. Rae, "Acceptable residual risk - principles, philosophies and practicalities," in 2nd IET International Conference on System Safety 2007, London, UK, 2007, vol. 2007, pp. 26–31.
- [12] R. Robinson and G. Francis, "SFAIRP vs ALARP," in Rail transport for a vital economy, conference on railway engineering, Adelaide, South Australia, 2014.
- [13] G. Solti, "So Far As Is Reasonably Practicable - Safety risk acceptance" (2021). Available: <https://www.youtube.com/watch?v=RUE8FxtJLE>