

Guideline

Asset Management

Document reference number: A389849

Version No.	Approved by	Publication date
1.0	Chief Executive	November 2014
1.1	Format review	5 July 2016

Guideline changes to version 1.1

- > Format review

Copyright information

© Office of the National Rail Safety Regulator 2016

This material may be reproduced in whole or in part, provided the meaning is unchanged and the source is acknowledged.

Level 1, 75 Hindmarsh Square, ADELAIDE SA 5000

PO Box 3461, Rundle Mall, ADELAIDE SA 5000

Phone: 08 8406 1500

Fax: 08 8406 1501

E: contact@onrsr.com.au

W: www.onrsr.com.au

Table of contents

Foreword	5
1. Asset management regulatory requirements	7
1.1 Definitions (see also s.4 of the RSNL)	8
1.2 What does the Law say about safety of assets?	9
1.2.1 Principles of shared responsibility, accountability	9
1.2.2 Rail Transport Operators and others undertaking railway operations.....	9
1.2.3 Designers, Manufacturers, Suppliers.....	9
1.3 Duty of officers to exercise due diligence	10
1.4 Asset management is part of the safety management system	10
2. What does the ONRSR expect?	11
2.1 The key focus for the ONRSR.....	11
2.2 Balancing safety and commercial needs.....	11
2.2.1 The importance of scalability	11
2.3 Asset management across the life-cycle.....	11
2.4 Developing a policy and processes.....	12
2.4.1 Asset management policy (Schedule 1.21).....	12
2.4.2 Strategic asset management plan	13
2.4.3 The ONRSR's expectations.....	14
2.5 The exploratory and concept phases	14
2.5.1 The ONRSR's expectations.....	14
2.6 Design and delivery	14
2.6.1 Configuration management (Schedule 1.7)	14
2.6.2 Asset design risk management (Schedule 1.16).....	15
2.6.3 Asset system engineering management (Schedule 1.19).....	15
2.6.1 The ONRSR's expectations.....	16
2.7 Asset implementation phase (Schedule 1.16 and 1.19)	16

2.7.1	The ONRSR's expectations.....	17
2.8	Asset utilisation phase	17
2.8.1	Asset operation and maintenance documentation (Schedule 1.19)	17
2.8.2	Asset configuration (Schedule 1.7).....	17
2.8.1	Asset operation and maintenance (Schedule 1.19 and 1.20).....	18
2.8.2	Monitoring asset performance (Schedule 1.20 and 1.22).....	19
2.8.3	Failure management and corrective action (Schedule 1.11).....	19
2.8.4	Asset security and emergency management (Schedule 1.25 and 1.26)	20
2.8.5	Asset interface management (Schedule 1.19 and 1.22)	20
2.8.6	The ONRSR's expectations.....	21
2.9	Managing changes to safety critical assets (Schedule 1.12).....	21
2.9.1	The ONRSR's expectations.....	21
2.10	On-going staff training (Schedule 1.15 and 1.24).....	22
2.10.1	The ONRSR's expectations.....	22
2.11	Asset retirement phase (Schedule 1.16).....	22
2.11.1	Renewal.....	22
2.11.2	Disposal	22
2.11.3	The ONRSR's expectations.....	23
2.12	Auditing (Schedule 1.10).....	23
2.12.1	The ONRSR's expectations.....	23
3.	Asset management ready reckoner.....	24
3.1	A systematic approach to safe asset management.....	24
3.2	Appropriate documentation of asset management processes.....	24
3.3	Effective monitoring of asset performance	25
3.4	Management of any changes to safety critical assets	25
	Appendix: The road to improvement	26

Foreword

The Office of the National Rail Safety Regulator (the ONRSR) has prepared this guideline to promote the ongoing safety of rail infrastructure and rolling stock assets. It:

- > provides guidance to duty holders about their duties and related obligations under the Rail Safety National Law (RSNL) as they apply to asset management;
- > explains the expectations of the ONRSR when assessing a duty holder's compliance with these obligations; and
- > provides a scalable approach to implementing systems for the safe management of assets throughout their lifecycle.

It is up to individual rail transport operators to determine the extent to which they apply the provisions of this guideline.

Scope and limitations

The scope of this guideline is focused on the lifecycle asset management requirements of Schedule 1 of the RSNL National Regulations 2012 (the 'regulations').

The guideline therefore does not go into detail on processes needed to create other elements that may be required by Schedule 1, such as:

- > a safety management system (clauses 4, 8, 9, 10, 16, 24, 28, and 29);
- > document control and information management (clause 7);
- > training requirements or plans (clause 15);
- > a human factor integration plan (HFIP) (clauses 17, 27, 28, and 29);
- > a security management plan or equivalent (clause 25); or
- > an emergency management plan or equivalent (clause 26).

Nor does it detail the supporting evidence required to document compliance with any of these elements of an SMS.

NB. References to 'Schedule 1' in this document relate to Schedule 1 of the regulations.

Further information

To avoid repeating guidance from other ONRSR documents, this guideline should be read in conjunction with the following publications:

- > [ONRSR Regulatory Approach](#)
- > [Compliance & Enforcement Policy](#)
- > [Safety Improvement Policy](#)
- > [Meaning of duty to ensure safety so far as is reasonably practicable guideline](#)
- > [Preparation of a Rail Safety Management System guideline](#)
- > [Effective control and management of railway operations guideline](#)

Chapter outline

- Chapter 1** explains the legislative basis for the asset management advice provided in this guideline.
- Chapter 2** explains the expectations of the ONRSR in relation to the safe management of assets.
- Chapter 3** provides a ready-reckoner of the ONRSR's requirements.
- Appendix** provides guidance on structuring an integrated, scalable asset management system that might be used by operators (using context, leadership, planning, resources, operations, performance evaluation, and improvement).

This guideline is not intended to provide a detailed manual on how to manage assets. The reader may want to refer to other tools and standards such as ISO 55000 series or PAS 55 to further their knowledge on this topic.

For analysis techniques that may assist in managing asset risk, refer to the iESM, international Engineering Safety Management Handbook or ISO 31010:2009 – Risk management – Risk assessment techniques.

1. Asset management regulatory requirements

The introduction of the Rail Safety National Law (RSNL) saw the formalisation and streamlining of pre-existing asset management requirements operating in each Australian state and territory.

These are intended to ensure the ongoing safety and longevity of rail infrastructure and rolling stock and, by extension, to protect all users of Australian rail systems.

The legislation specifies certain duties and obligations for officers, operators, and other relevant parties concerning the ongoing management and safety of rail infrastructure and rolling stock assets, which are outlined in the diagram below and described further in this chapter.

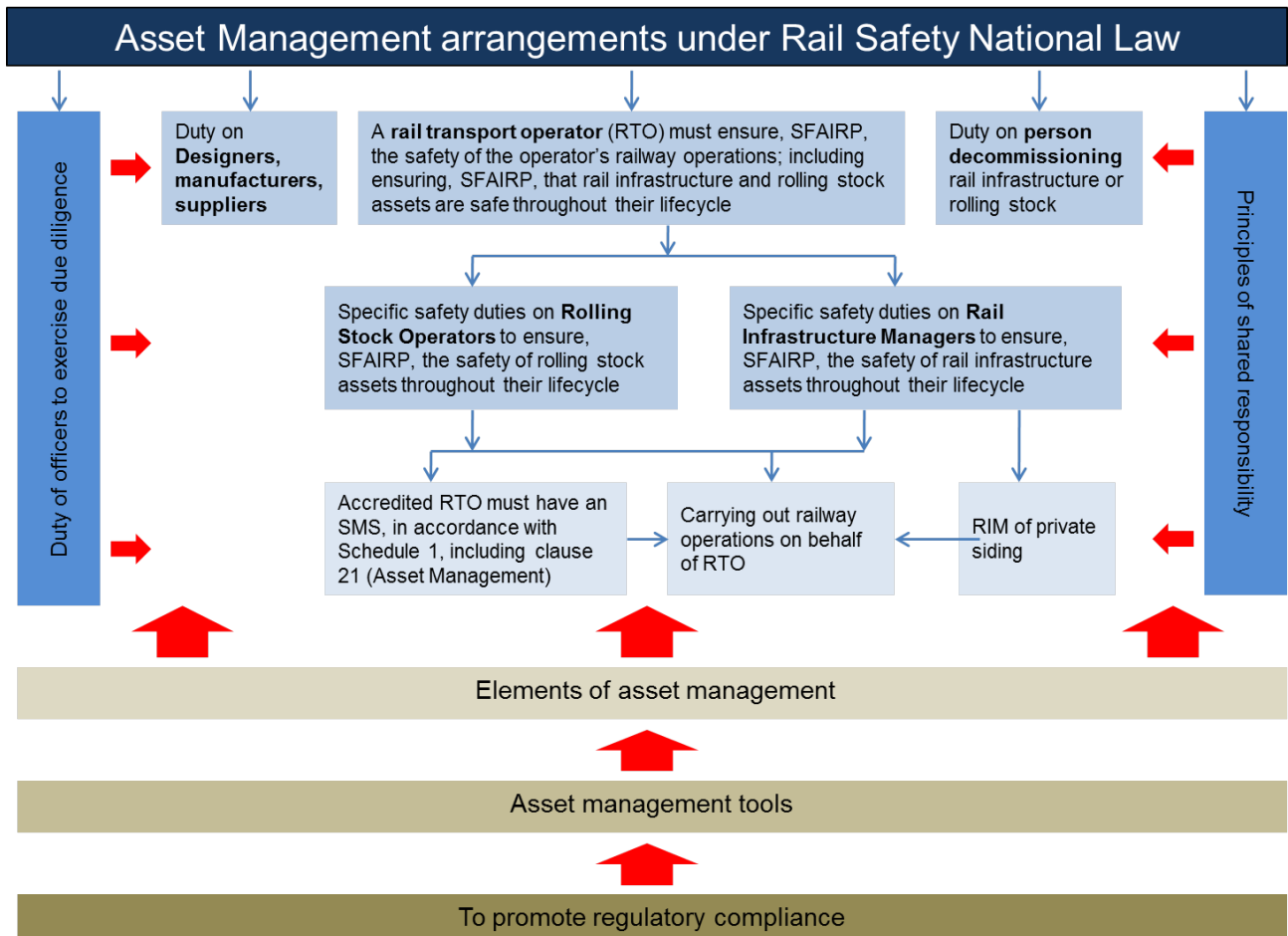


Figure 1 Key requirements of the Rail Safety National Law

1.1 Definitions (see also s.4 of the RSNL)

Asset management system	The approach used by an organisation to ensure that physical assets remain safe, fit-for-purpose, and commercially viable from design and construction, throughout its life-cycle, to decommissioning.
Duty holder	A person who has a duty under the RSNL Part 3 Division 3.
Management system	A set of interrelated or interacting elements of an organisation to establish policies and objectives, and the processes to achieve those objectives (ISO 9000).
Rail infrastructure	<p>The facilities that are necessary to enable a railway to operate, including:</p> <ul style="list-style-type: none">> railway tracks and associated track structures;> service roads, signalling systems, communications systems, rolling stock control systems, train control systems, and data management systems;> notices and signs;> electrical power supply and electric traction systems;> associated buildings, workshops, depots, and yards; and> plant, machinery, and equipment. <p>A rail infrastructure manager (RIM) has effective control and management of the rail infrastructure, whether or not they own it or have a statutory or contractual right to use it.</p>
Rail transport operator (RTO)	A rail infrastructure manager or rolling stock operator, or a person or organisation which is both.
Railway operations	<p>These include:</p> <ul style="list-style-type: none">> the construction of a railway, railway tracks, and associated railway track structures;> the construction of rolling stock;> the management, commissioning, maintenance, repair, modification, installation, operation, or decommissioning of rail infrastructure; and> the commissioning, use, modification, maintenance, repair, or decommissioning of rolling stock.
Rolling stock	<p>A vehicle that operates on, or uses, a railway. It includes a locomotive, carriage, rail car, rail motor, light rail vehicle, train, tram, light inspection vehicle, self-propelled infrastructure maintenance vehicle, trolley, wagon, or monorail vehicle.</p> <p>It does not include a vehicle designed to operate both on and off a railway when it is not operating on a railway.</p> <p>A rolling stock operator (RSO) has effective control and management of the operation or movement of rolling stock on rail infrastructure for a railway, but does not include a person who drives the rolling stock, or controls the network or network signals.</p>
SFAIRP	'so far as is reasonably practical'. In relation to a duty to ensure safety it means that it was reasonably able to be done, taking into account and weighing up all relevant matters (see s.47 of the RSNL and the ONRSR's Meaning of duty to ensure safety so far as is reasonably practicable guideline).

1.2 What does the Law say about safety of assets?

The RSNL prescribes overarching safety duties for those whose activities might affect rail safety.

1.2.1 Principles of shared responsibility, accountability

The RSNL makes it clear that rail safety is the shared responsibility of everyone who has a role at any point of an asset's lifecycle.

Each party has a duty to work with others to ensure that everything reasonably practicable is done to ensure the safety of assets throughout their lifecycle (s.50).

However, the degree to which a person is accountable for rail safety is dependent on the nature of the risk their activities might pose to rail safety.

Thus, the management of risks associated with railway operations is predominantly the responsibility of the person best able to control them.

1.2.2 Rail Transport Operators and others undertaking railway operations

Rail transport operators (RTO) are required to ensure, so far as is reasonably practicable (SFAIRP), the safety of their railway operations (s.52(1)).

This means that rail infrastructure managers (RIM), rolling stock operators (RSO), and any organisation or contractor undertaking railway operations must ensure, SFAIRP, that:

- > rail infrastructure and/or rolling stock assets are designed, constructed, and maintained to appropriate standards that ensure safety; and
- > activities undertaken across the life-cycle of rail infrastructure and rolling stock assets are performed in a way that ensures the ongoing safety of railway operations.

In addition:

- > **accredited RTOs** must comply with the requirements of Schedule 1 of the RSNL National Regulations in relation to the development and implementation of a safety management system (SMS);
- > **contractors** and suppliers to a RTO must comply with the accredited operator's SMS to the extent that it applies to their activities and relevant equipment. It is the RTO's responsibility to ensure that contractors remain compliant; and
- > the **RIM of a private siding** should adopt a systematic approach to ensure the safety of their operations. However, due to the limited scope and nature of operations or private sidings, the RSNL allows an exemption from accreditation and prescribes fewer requirements for safety management. As a result they are not required to develop an SMS or an asset management strategy.

1.2.3 Designers, Manufacturers, Suppliers

Designers, manufacturers, and suppliers must ensure that rail infrastructure or rolling stock assets are safe for their intended purpose.

They must also provide adequate information as to their safe use (s.53) to help RTOs maintain safety, including:

- > details about the use for which the asset was designed, commissioned, manufactured, supplied, installed, or erected;
- > the results of any testing or examination of the asset; and
- > any conditions necessary to ensure, SFAIRP, that the asset is safe if used as intended.

A person who decommissions rail infrastructure or rolling stock must ensure, SFAIRP, that the decommissioning is carried out safely and that appropriate testing and examination has been carried out to comply with the duty (s.53(3)).

1.3 Duty of officers to exercise due diligence¹

If an organisation has a duty or obligation under the RSNL, an 'officer' of that organisation must exercise due diligence to ensure that it complies (s.55).

1.4 Asset management is part of the safety management system

Consideration of the performance, safety, and integrity of infrastructure or rolling stock is essential if the safety of railway operations is to be maintained.

Accordingly, s.99 of the RSNL requires RTOs to have a documented SMS to cover their railway operations, including tasks or activities that are contracted out, in a form approved by the Regulator.

Schedule 1 of the regulations gives effect to s.99 and to regulations 16 and 17, by outlining the required contents of an SMS, including 1.21, which stipulates that there must be:

An asset management policy and processes that address all phases of the asset life cycle of the rail infrastructure or rolling stock operations.

Therefore, the SMS must identify, and comprehensively and systematically assess, any safety risk to railway operations and assets, including a level of detail that is:

- > appropriate for the scope, nature, and safety risks of their operations, and
- > sufficient to meet the organisation's general safety duty.

As part of this process, the roles, responsibilities, and accountabilities of all personnel (including contractors) charged with maintaining safety and performing each of the activities prescribed by the plan should be clearly documented.

This includes the competent person who has primary responsibility and accountability for asset management.

¹ The form and detail of requirements for officers of a duty holder organisation are different in Victoria (see the *Rail Safety National Law Application Act 2013 (Victoria)* section 49).

In determining whether an officer of a body corporate failed to exercise due diligence, a Victorian court may have regard to:

- a) what the officer knew, or ought reasonably to have known, about the commission of an offence by the body corporate;
- b) whether or not the officer was in a position to influence the body corporate in relation to the commission of the offence; and
- c) what steps the officer took, or could reasonably have taken, to prevent the commission of the offence by the body corporate.

2. What does the ONRSR expect?

2.1 The key focus for the ONRSR

In carrying out its function to enforce the regulations, the ONRSR will specifically examine an organisation's AM and safety management systems, policies, and procedures to ensure they include:

- > a systematic approach to safe asset management;
- > appropriate documentation of asset management processes;
- > effective monitoring of asset performance (including trending against life expectancy to determine timing for renewals); and
- > management of any changes to safety critical assets.

As AM is part of the SMS, the ONRSR will review such strategies against the whole of Schedule 1 of the regulations, not just clause 21.

2.2 Balancing safety and commercial needs

The ONRSR recognises that RTOs operate within a demanding environment that carries its own commercial realities.

This may result in the need to maximise and even stretch the output of assets to meet competing business objectives and to get the most value from, and safety of, infrastructure and rolling stock.

This allows the RTO to strike the right balance between asset maintenance, renewal, and operational activity in order to maintain asset integrity, enhance performance, and minimise down-time.

2.2.1 The importance of scalability

Any activities carried out by an RTO in relation to its SMS or AM system need to be scalable to suit the specific nature of that organisation.

The Regulator understands that strategies will, by necessity, be appropriate to the risks and needs of each individual RTO and does not expect to see all possible tools and methodologies listed in this guide being used in every AM system.

For example, a major metropolitan railway operator might reasonably be expected to have a robust and complete AM system, while a heritage operator might only require a very basic approach to asset management.

2.3 Asset management across the life-cycle

To create an AM policy and processes, an organisation should consider the life-cycle and operational use of their assets and their performance requirements at each stage.

This is an iterative process that allows the operator to identify issues that might need to be addressed.

Various asset or systems life-cycle models have been published which may provide guidance for this purpose, such as the diagram below, which is in accordance with ISO/IEC 15288.



Figure 2: Asset life-cycle phases of ISO/IEC 15288-2008

For the purpose of this guideline, the ONRSR has taken a life-cycle approach to explaining its expectations that is similar to, but not the same as, the one shown above.

However, the RTO should choose the approach that is most appropriate for managing their organisation’s assets and identifying the needs and risks arising from their operations.

2.4 Developing a policy and processes

A systematic approach to managing risk allows an operator to identify, eliminate, or reduce risk across the lifecycle of the asset.

A clearly documented AM system allows an organisation to provide assurance about the safety of their rail infrastructure and rolling stock.

Clause 21 of Schedule 1, states that effective asset management includes both an *asset management policy* and *processes*, some of which are also requirements of the SMS.

One way of describing these processes might be through the development of a strategic asset management plan.

These are described below.

2.4.1 Asset management policy (Schedule 1.21)

The Asset Management Policy should:

- > clearly set out the organisation’s broad asset management objectives and measures for success;

- > demonstrate senior management commitment to the principles and process;
- > outline a risk-based approach to asset management, which:
 - shows how asset-related risks are identified and addressed throughout the organisation; and
 - ensures alignment of the RTO's safety management and asset management strategies;
- > provide a framework for developing and implementing the AM strategy, consistent with any organisational constraints;
- > assign responsibilities for the AM system and its outcomes, and for the establishment and improvement of the strategic asset management plan (SAMP), to individual positions; and
- > communicate to the organisation and other stakeholders the importance of disciplined asset management practices to ensuring the safety of railway operations;

This should be part of, or consistent with, the rest of the safety management system.

2.4.2 Strategic asset management plan

Operators must be able to demonstrate that they have a coordinated approach to asset management.

A Strategic Asset Management Plan (SAMP)² is one possible way of outlining the processes that give effect to the policy and demonstrating such an approach.

It clearly identifies and documents a long term view of asset management and the processes and controls required to meet safety, statutory and organisation obligations.

It outlines a coordinated approach to support the safety objectives, and:

- > describes the operating context;
- > identifies safety critical systems and their key performance objectives;
- > describes how risks are managed in the operation, maintenance, modification, extension, or renewal of assets;
- > aligns the objectives and processes of the asset management and safety management systems;
- > establishes the standards and processes used in maintaining asset integrity; and
- > outlines the responsibilities and accountabilities of duty holders in relation to the SAMP.

If an organisation is developing a SAMP, it should:

- > adopt a life-cycle risk assessment approach to identify safety critical assets and develop the plan;
- > identify key internal and external stakeholders and their specific needs and concerns;
- > detail the operator's asset systems, asset portfolio, and criteria for identifying what is included;
- > employ existing organisational management systems, where appropriate, in risk management activities;
- > identify performance and safety requirements and the controls or processes needed to deliver them;
- > understand trending of asset performance and assess risks towards the end of the asset's design life; and
- > conduct a regular management review of the SAMP and its activities to ensure it is meeting its objectives, address any gaps, and identify appropriate improvements.

All operators must have an up-to-date asset management policy and processes, as part of their SMS, which is appropriate to their size and risk profile.

² For more information, see clause 3.3.2 of ISO 55000: Asset Management – Overview, principles, and terminology.

If no SAMP is being developed, then the issues listed above should still be addressed by the RTO's SMS.

2.4.3 The ONRSR's expectations

Keeping the scalability of the operator in mind (see 2.2.1), the ONRSR will look for:

- > an **asset management policy** that outlines: objectives; a framework for implementing the asset management system; the organisation's risk assessment approach to assets; and the broad responsibilities of relevant stakeholders; and
- > a description of asset management processes, including: the operating context; evidence of the consideration of each asset's life-cycle; how safety critical systems are identified, maintained, modified, extended, and renewed; how the safety and asset management systems are aligned and/or integrated; and the specific roles, responsibilities, and accountabilities of duty holders. This might be achieved through the use of an SAMP.

2.5 The exploratory and concept phases

The RTO should establish processes to:

- > determine requirements for any new and/or modified assets and consult on them with relevant stakeholders (Schedule 1.12);
- > manage the risks associated with implementing such changes, in line with the SMS (Schedule 1.16); and
- > manage the risks associated with asset procurement and contract management (Schedule 1.18).

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > safety requirements and risks are identified and managed in line with the SMS;
- > if an original equipment manufacturer (OEM) is still in operation, safety critical items are sourced from them. In most cases, however, items will be like-for-like replacements, tested by competent people; and
- > safety information and specifications should be drawn from historical data sources and reviewed, or obtained from the OEM if it is still operating. This information should be used as a starting point for developing a plan, recognising that current use will differ markedly from the original design intent.

2.5.1 The ONRSR's expectations

Keeping the scalability of the operator in mind (see 2.2.1), the ONRSR will look for:

- > documentary evidence of processes and consultation to determine asset requirements, and of risk management strategies in relation to the procuring and implementing the new or modified assets.

2.6 Design and delivery

2.6.1 Configuration management (Schedule 1.7)

Having established an AM policy and the associated asset management strategy, the RTO should document all relevant processes and information relating to the design and delivery of the proposed asset in their SMS.

This can be coordinated through the use of configuration management processes (or a configuration management system (CMS)).

These outline the technical and organisational activities that establish and maintain control of the asset throughout its life-cycle.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > if an original equipment manufacturer (OEM) is still in operation, safety critical items should be sourced from them. In most cases, however, items will be like-for-like replacements, tested by competent people; and
- > safety information and specifications should be drawn from historical data sources and reviewed, or obtained from the OEM if it is still operating. This information should be used as a starting point for developing a plan, recognising that current use will differ markedly from the original design intent.

2.6.2 Asset design risk management (Schedule 1.16)

The RTO should establish and document a process to manage the risks associated with the design and delivery of the asset solution.

This should include hazard safety analysis to identify areas most at risk of failure, reviewed against the operator's risk register.

The risk management process is part of the organisation's SMS, for which an operator must develop systems and procedures for complying with risk management obligations under s.46 of the RSNL.

For larger RTOs, this should be achieved by identifying safety critical systems and establishing key performance objectives through the use of appropriate risk identification techniques, such as:

- > reliability, availability, maintainability & safety (RAMS) analysis of the design of assets³; and
- > failure modes, effects and criticality analysis (FMECA) and/or reliability centred maintenance (RCM) to manage risks during the design phase and to support establishing a maintenance plan.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > hazard analyses are conducted and signed off by a competent person;
- > safety information and specifications are obtained from suppliers and reviewed, or existing maintenance practices on similar assets adapted; and
- > they have considered whether to use tools such as FMECA, or to review historical failure information, in order to manage safety risks during design and to establish maintenance plans or manage any deviation from common practice.

2.6.3 Asset system engineering management (Schedule 1.19)

It is important for an RTO to demonstrate how they capture and maintain system and safety requirements for their assets, and how these will be verified, validated, and tracked.

These requirements should be managed against the specific standards and processes used for the design, maintenance, and operation of rail infrastructure and rolling stock, as identified by the operator.⁴

These will be important for asset management purposes and will be of interest to the ONRSR.

The RTO should ensure that:

³ If design is done by a 3rd party, the accredited operator still has responsibility to communicate key safety performance criteria to the designers to ensure that the asset is fit for purpose.

⁴ If design and supply is from a 3rd party, it is still the accredited operator's responsibility to demonstrate safety assurance or compliance and show that the asset is fit for purpose.

- > safety critical systems are designed to functional specifications;
- > there is a validation and commissioning test plan to confirm that the asset is fit for purpose and safe to operate and maintain; and
- > operation and maintenance documentation has been prepared, which outlines processes for updating, reviewing, and maintaining assets.

RTOs should demonstrate that they use appropriate systems engineering processes and safety assurance processes (e.g. EN50126/8/9 for complex systems) in their design and procurement approach.

This might be achieved through the creation of a systems engineering management plan (SEMP), which would specify the procedure to identify and record stakeholders, system requirements, and safety needs.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > if an original equipment manufacturer (OEM) is still in operation, safety critical items should be sourced from them. In most cases, however, items will be like-for-like replacements, tested by competent people; and
- > safety information and specifications should be drawn from historical data sources and reviewed, or obtained from the OEM if it is still operating. This information should be used as a starting point for developing a plan, recognising that current use will differ markedly from the original design intent.

2.6.1 The ONRSR's expectations

Keeping the scalability of the operator in mind (see 2.2.1), the ONRSR will look for:

- > processes for designing and delivering assets;
- > processes for managing risks in the design and delivery phase;
- > evidence of the tools used for assuring safety and reliability
- > details of the standards or other safety information relied upon for the design and maintenance of the asset and any tests used to confirm compliance; and
- > the existence of a manual, or similar, that includes the processes for operating and maintaining assets and for managing risks in the operation and maintenance phase.

2.7 Asset implementation phase (Schedule 1.16 and 1.19)

In order to ensure the successful and safe implementation of the asset, the RTO should establish processes to manage the risks associated with its construction, testing, and commissioning, in line with the processes of the SMS.

It should also implement a process to manage:

- > the testing, verification, and validation of system and safety requirements of the asset, which might be achieved by way of a Testing and Commissioning Management Plan or equivalent; and
- > the operational readiness of the asset, which could be achieved with an operational readiness checklist.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > testing and verification are carried out against a management plan that has been informed by historical data or OEM safety specifications and developed to meet current usage patterns.

2.7.1 The ONRSR's expectations

Keeping the scalability of the operator in mind (see 2.2.1), the ONRSR will look for:

- > evidence of safety risk management, testing, and validation processes covering construction and commissioning of the asset and its operational readiness.

2.8 Asset utilisation phase

2.8.1 Asset operation and maintenance documentation (Schedule 1.19)

The RTO should develop an asset operation and maintenance documentation that outlines the processes it uses to update, review, and maintain their assets.

It should describe the scope of the operations and, where applicable, the risk management strategies they have in place to cover all relevant activities.

This document should:

- > ensure that the asset is operated and maintained in accordance with the asset design;
- > identify and incorporate all safety related conditions, which specify how the use of the asset might be restricted, and the conditions that are in place for its use; and
- > specify the ongoing checks to be carried out.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > manuals are provided where available, or documentation developed, that:
 - ensures assets are operated and maintained in accordance with design;
 - identifies safety related conditions; and
 - specifies ongoing checks; and
- > equipment is only operated and maintained by competent personnel.

2.8.2 Asset configuration (Schedule 1.7)

The process for configuring the design and delivery of the proposed asset (described in 2.6.1) should be extended to cover the whole of its life-cycle.

This should be done by:

- > establishing and maintaining records of all assets through the creation of an asset register. This should contain information such as the unique identification of the assets, their location, any maintenance carried out, , etc.;
- > managing documents and information about the assets in accordance with the organisation's SMS; and
- > determining the criticality of assets, based on the results of a safety risk assessment. Safety critical assets should be identified within the asset register.

The operator should show how asset information is developed, maintained, and integrated within their risk register.

The requirement for a risk register should be appropriate for the size and scope of the organisation.

For example, a major operator would almost certainly have a software system to maintain asset records, while tourism and heritage operators could maintain their asset and risk register in a spreadsheet.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > asset records are maintained in a system that is appropriate to the size and nature of the operation.

2.8.1 Asset operation and maintenance (Schedule 1.19 and 1.20)

An RTO should monitor ongoing compliance with their nominated standards and processes in order to ensure that their railway operations continue to be safe and perform efficiently.

To this end, the organisation should establish processes to ensure that:

- > assets are operated and maintained in accordance with the relevant manuals;
- > the condition of the assets are monitored;
- > equipment needed to test or inspect assets is appropriately controlled, calibrated, and maintained;
- > any risks associated with operating and maintaining the assets are being managed in accordance with:
 - the RTO's SMS and AM strategy risk management processes; and
 - all workplace health and safety (WHS) laws; and
- > spare parts are available for maintenance, especially for the safety critical assets. This might be achieved by determining spare part needs for the assets based on the asset criticality, as identified through the use of reliability centred maintenance (RCM).

Asset maintenance⁵ planning by an RTO should:

- > address competency, capacity, and resource requirements;
- > provide for information management and record keeping needs;
- > deliver detailed plans that have been established through a risk-based process; and
- > ensure calibration of the tools and equipment that will be used for maintenance.

For larger RTOs, this should specifically include:

- > a Technical Maintenance Plan (TMP) which is controlled by the office of a chief engineer or another technical authority; and
- > work instructions developed from and audited against the TMP.

Planning should be documented and controlled in a computer maintenance management system, or by using a simpler equivalent if the RTO is a tourism or heritage operator.

The RTO should have processes in place to ensure that:

- > maintenance is delivered to schedule;
- > work instructions is available for all safety critical activities;
- > all tasks are signed-off for compliance;
- > documentation about maintenance carried out is controlled; and
- > competency based training is available on all safety critical systems.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > operations and maintenance documents are kept up to date;
- > all safety critical assets are documented;

⁵ If maintenance is contracted to a 3rd party, it is the accredited operator's responsibility to specify and monitor that the performance of the asset complies with the operator's established standards.

- > controlled work instructions are carried out to schedule and performed by competent people; and
- > safety critical tasks are checked and signed-off by competent people, and all documents controlled.

2.8.2 Monitoring asset performance (Schedule 1.20 and 1.22)

Once processes are in place to manage the risk associated with safety critical assets, the operator should monitor asset performance against these risks and its own expectations.

RTOs should demonstrate that they:

- > understand the performance of their safety critical assets by identifying what needs to be monitored, measured, and reported;
- > establish and record the method and frequency of monitoring, measurement, analysis, and evaluation of the performance of safety critical assets;
- > monitor trending performance against the predicted strategic life of an asset;
- > report on performance issues based on the level of safety risk and escalate high-risk performance issues so that they are adequately addressed;
- > establish channels to communicate any results (this can use the communications strategies already in place for the SMS);
- > improve the conformance of safety critical assets with nominated standards by:
 - reviewing operational and maintenance controls, and assessing the risk of assets not meeting the predetermined standards;
 - identifying the root cause(s) of safety performance issues; and
 - identifying actions that might be needed for recovery to safe operating conditions;
- > improve the SMS continuously by identifying potential risks and taking corrective action; and
- > document where opportunities have been taken to reduce or eliminate risk and how this was achieved.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > evidence that performance against safety objectives is being monitored.

2.8.3 Failure management and corrective action (Schedule 1.11)

An RTO should have processes for identifying any faults or failures that might occur with their assets and ensuring the appropriate corrective actions are carried out.

These should be in line with the provisions and maintenance programs outlined in the organisation's SMS and should:

- > ensure appropriate recording of failures and the resultant corrective actions;
- > address safety critical failures;
- > ensure the appropriate reporting of notifiable occurrences, as per the requirements of existing the ONRSR guidelines; and
- > coordinate unscheduled repairs for safety related assets.

The RTO should:

- > document the failure management process;
- > use appropriate analysis techniques for safety critical features, such as Root Cause Analysis (RCA);
- > implement failure recording, which may include fault codes, failure mode, effect, criticality and corrective action;

- > develop procedures to manage common repair activities; and
- > introduce a feedback process for the engineering or technical teams to review and improve systems and minimise the risk of future failures.

This could be achieved through the use of fault reporting, analysis, and corrective actions (FRACAS), which:

- > records faults that were detected and recorded during testing and commissioning, as well as any that occurred during operation or maintenance; and
- > manages the subsequent corrective actions taken to address them.

As a minimum, tourism and heritage operators, should document all faults and corrective actions and require a technically competent person to check any unscheduled repairs.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > all faults and corrective actions are documented;
- > any unscheduled repairs are checked by a technically competent person; and
- > failures of assets are reviewed regularly.

2.8.4 Asset security and emergency management (Schedule 1.25 and 1.26)

An RTO should have processes in place to manage any security or emergency issues that might arise during the operation or maintenance of the asset.

These security and emergency management processes should comply with arrangements in place in the organisation's SMS.

2.8.5 Asset interface management (Schedule 1.19 and 1.22)

The RTO should establish processes to manage any interface risks that might occur during the operation and maintenance of its assets.

These should cover interfaces between assets and between operators.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > interface risks are identified and controls managed.

2.8.6 The ONRSR's expectations

Keeping the scalability of the operator in mind (see 2.2.1), the ONRSR will look for:

- > evidence of ongoing compliance with the RTO's nominated standards and processes, and management of identified risks;
- > asset maintenance plans and procedures;
- > evidence of identifying and eliminating safety risks;
- > evidence of reporting and managing any performance issues and corrective actions;
- > evidence of the use of trending performance against the predicted strategic life of an asset for tracking performance and planning for renewals;
- > processes for identifying faults and failures and undertaking corrective action; and
- > evidence of the consideration of asset management in SMS provisions for: security and emergency management, notifiable occurrences, and interface management.

2.9 Managing changes to safety critical assets (Schedule 1.12)

In situations where an operator might seek to change the configuration baseline of safety critical assets, they should implement a change management process to ensure the effective management of safety risks.

RTOs should establish configuration baselines for all safety critical assets, including associated software, whether they are embedded in existing systems or stand-alone programs.

If an operator is changing the configuration baseline of safety critical assets, they should, where possible:

- > manage the risks arising from changes to these assets;
- > track serial and model numbers;
- > validate functional requirements against specifications and controls;
- > control the release of configuration items; and
- > ensure that the status of any assets under configuration management is up to date.

Changes to established baselines, operating conditions, or the maintenance schedule of safety critical assets must not in any way diminish the safety of the operating railway.

Management of any changes in place to operational or maintenance processes for safety critical assets should comply with Schedule 1.12 of regulations.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > changes to safety critical assets are managed in compliance with Schedule 1.12.

2.9.1 The ONRSR's expectations

Keeping the scalability of the operator in mind (see 2.2.1), the ONRSR will look for:

- > evidence of the configuration management of assets through their life-cycle; and
- > evidence of change management processes to deal with baseline reconfigurations.

2.10 On-going staff training (Schedule 1.15 and 1.24)

The RTO should establish a program of on-going training and induction for relevant staff.

In particular, this should cover relevant information on how to:

- > assess and manage risks in relation to the asset;
- > operate the asset safely;
- > use any inbuilt safeguards the asset might have;
- > maintain the asset, and to what standards;
- > manage any changes or modifications to the asset; and
- > identify and report on any faults and failures of the asset or system.

This training should be in line with the RTO's other training responsibilities under their SMS and should ensure employees and contractors are competent to perform the tasks required of them.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > employees and contractors are appropriately trained and meet accepted competency standards.

Keeping the scalability of the operator in mind (see 2.2.1), the ONRSR will look for:

- > details of the training processes to ensure that relevant employees and contractors are appropriately competent to operate and maintain assets.

2.10.1 The ONRSR's expectations

2.11 Asset retirement phase (Schedule 1.16)

Where assets are likely to be renewed, decommissioned, or disposed of, the RTO should establish and document processes to manage any risks associated with such activities.

These processes are only relevant to organisations that are carrying out such activities or are likely to do so (e.g. a tourism or heritage operator that will not be replacing its rolling stock need not have such processes in place).

2.11.1 Renewal

For the renewal of an asset that is approaching its end of life, an RTO should ensure that the replacement asset meets established safety performance criteria.

As part of this process, all hazard safety analyses should be reviewed and signed off by a competent officer.

An RTO should understand the condition of their assets and, if they are deteriorating, respond accordingly by replacing or maintaining them.

A validation and commissioning test plan should be established to confirm that the new asset is fit-for-purpose and safe to operate and maintain.

If a tourism or heritage operator is extending the life of an existing asset, they should seek appropriate safety information, such as historical data, to ensure that it remains safe to use.

Monitoring of trending against expected performance should be carried out as described in 2.8.3.

2.11.2 Disposal

When disposing of any rail infrastructure or rolling stock, RTOs should appropriately manage the risks of taking the asset out of service.

These asset disposal strategies should be articulated in the operator's SMS.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- *any renewal and disposal strategies are articulated in the operator's asset management procedures.*

2.11.3 The ONRSR's expectations

Keeping the scalability of the operator in mind (see 2.2.1), the ONRSR will look for:

- > evidence of processes to manage risks associated with the renewal, decommissioning, or disposal of assets, as appropriate to the scale and nature of the organisation; and
- > safety criteria or information relevant to the ongoing operation and management of the asset, as appropriate to the scale and nature of the organisation.

2.12 Auditing (Schedule 1.10)

RTOs should establish processes for auditing their SMS (and, by extension, their AM system) to ensure ongoing compliance.

The process, frequency, required competencies, and independence needed for such an audit should be clearly stated in the SMS.

While tourism and heritage operators should have processes that are scalable to their operations, as a minimum they should ensure that:

- > evidence is available of the processes in place for auditing compliance against the provisions of the SMS.

2.12.1 The ONRSR's expectations

Keeping the scalability of the operator in mind (see 2.2.1), the ONRSR will look for:

- > evidence of the processes in place for auditing compliance against the provisions of the SMS and AM system.

3. Asset management ready reckoner

Following is a ready reckoner of the key issues that the ONRSR will be seeking in an RTO's asset management system, as outlined in section 2.1, above, keeping in mind the scalability of the organisation (2.2.1).

3.1 A systematic approach to safe asset management

<i>Asset management policy</i>	
An Asset Management Policy, including: <ul style="list-style-type: none"> > objectives of the policy; > a framework for implementing the asset management system; > the organisation's risk assessment approach to assets; and > the broad responsibilities of relevant stakeholders. 	Schedule 1.21 Schedule 1.5
A description of asset management processes, including: <ul style="list-style-type: none"> > the operating context; > evidence of the consideration of each asset's life-cycle; > how safety critical systems are identified, maintained, modified, extended, and renewed; > how the safety and asset management systems are aligned and/or integrated; and > the specific roles, responsibilities, and accountabilities of duty holders. This might be achieved through the use of an SAMP.	Schedule 1.21 Schedule 1.5
<i>Exploratory and concept phase</i>	
Evidence of processes and consultation to determine asset requirements.	Schedule 1.12
Evidence of risk management strategies in relation to the procuring and implementing the new or modified assets.	Schedule 1.16 Schedule 1.18 Schedule 1.19
<i>On-going staff training</i>	
Details of the training processes in place to ensure that relevant employees and contractors are appropriately competent to operate and maintain assets.	Schedule 1.15

3.2 Appropriate documentation of asset management processes

<i>Asset design and delivery</i>	
Documentation of all relevant processes for designing and delivering assets.	Schedule 1.7
Processes for managing risks in the design and delivery phase.	Schedule 1.16
Evidence of the tools used for ensuring safety and reliability.	Schedule 1.16
Details of the standards or other safety information relied upon for the design and maintenance of the asset and any tests used to confirm compliance.	Schedule 1.19
The existence of a manual, or similar, that includes the processes for operating and maintaining assets and for managing risks in the operation and maintenance phase.	Schedule 1.19

3.3 Effective monitoring of asset performance

Asset implementation	
Evidence of safety risk management, testing, and validation processes covering construction and commissioning of the asset and its operational readiness.	Schedule 1.16 Schedule 1.19
Asset utilisation	
Evidence of ongoing compliance with the RTO's nominated standards and processes, and management of identified risks.	Schedule 1.20
Asset maintenance plans and procedures.	Schedule 1.19 Schedule 1.20
Evidence of the activities of the operator in relation to identifying and eliminating risks.	Schedule 1.20
Evidence of the processes used to report on and manage any performance issues and corrective actions.	Schedule 1.11
Evidence of the use of trending performance against the predicted strategic life of an asset for tracking performance and planning for renewals.	Schedule 1.18 Schedule 1.19
Processes for identifying faults and failures and undertaking corrective action.	Schedule 1.11
Evidence of the consideration of asset management in SMS provisions for: security and emergency management, notifiable occurrences, and interface management.	Schedule 1.11 Schedule 1.19 Schedule 1.25 Schedule 1.26 Schedule 1.23 Schedule 1.22
Asset retirement	
Evidence of processes to manage risks associated with the renewal, decommissioning, or disposal of assets, as appropriate to the scale and nature of the organisation.	Schedule 1.16
Safety criteria or information relevant to the ongoing operation and management of the asset, as appropriate to the scale and nature of the organisation.	Schedule 1.16
Auditing	
Evidence of the processes in place for auditing compliance against the provisions of the SMS and AM system.	Schedule 1.10

3.4 Management of any changes to safety critical assets

Managing changes to safety critical assets	
Evidence of the configuration management of assets through their life-cycle.	Schedule 1.7
Evidence of any change management processes in place to deal with baseline reconfigurations.	Schedule 1.12

Please note that this is not an exhaustive list and that the scalability of each of these measures to what may be appropriate for different organisations will be a consideration.

Appendix: The road to improvement

As noted earlier, asset management is an iterative process wherein an RTO continuously considers issues affecting their assets and develops strategies to manage any risks arising from them.

The body of this document has articulated the obligations of duty holders under the RSNL and the ONRSR's expectations of RTO asset management strategies.

This appendix provides a basic structure that might point any organisation developing an asset management strategy towards some useful approaches.

These can be used to enhance asset management practice, but are not themselves necessarily required by the regulations.

This section has a structure consistent with a typical integrated management system and is separated into the following elements:

- > Context;
- > Leadership;
- > Planning;
- > Resources;
- > Operation;
- > Performance evaluation; and
- > Improvement.

A1 Context

When establishing the context of your asset management policy, processes, and/or system, you should consider the following questions:

- > What does your organisation do?
- > What are you trying to achieve?
- > What are the internal and external environments in which you operate?
- > What regulatory requirements do you need to meet in the operation and maintenance of your railway system?
- > What rail infrastructure or rolling stock assets do you have?
- > What roles do your assets and the management of those assets have in the operation of a safe railway?
- > What are the relationships and/or interfaces between the organisation and other persons and/or organisations who have a shared responsibility for safety?

A2 Leadership

It is important to recognise that leadership is not just a matter of hierarchy, but of responsibility for action.

It is important for executive management to:

- > take ownership of asset management;
- > influence the organisation towards improving AM practices for safer outcomes;
- > set the standards and principles needed to comply with regulatory requirements; and
- > drive a safety focused culture.

However, it is equally important for any decision-maker within the organisation to take responsibility for identifying ways that they may improve on their asset management and to report faults or risks as they arise.

A3 Planning

In order to implement AM policy and processes within your organisation, you will need to establish specific plans to address safety risk across the life-cycle of your assets.

Your organisation may already have a range of objectives for its rail infrastructure and rolling stock assets that relate to service delivery and financial performance.

In setting objectives for safety, you need to undertake risk assessments of your operations to identify areas where improvement might be required.

This should include an assessment of the current state of rail infrastructure and rolling stock assets and related systems and processes.

The assessment should be compared to the requirements of the RSNL to consider what strategies might be needed and how changes over time may impact upon safety.

A4 Support

Having established the organisation's safety objectives, you need to take reasonable steps to ensure that it has:

- > available for use, and uses, appropriate resources and processes to eliminate or minimise risks to safety;
- > appropriate processes for receiving, considering, and responding in a timely way, to information about incidents and risks associated with rail infrastructure and rolling stock across the life-cycle of the assets.

Supporting resources refers to all necessary assistance, equipment, and aids that might be needed by an organisation (including the competence, capability, and capacity of employees and contractors) to implement and maintain asset management activities effectively.

A5 Operation

Implementation of an AM strategy during operation is an ongoing and iterative approach.

It needs to resolve conflicts between what is planned and what is reasonably practicable, through a process of operational planning and control.

You should establish strategies to support the effective delivery of your activities by outlining:

- > roles and responsibilities of all employees and contractors;
- > competency standards to ensure they can carry out the work safely;
- > operational procedures;
- > resource allocation methodologies;
- > processes to identify emerging risks; and
- > mitigation strategies to minimise the impact of risks on established safety objectives.

Failure management and maintenance records are critical in the operational phase to establish a known safe baseline.

These should be supported by a disciplined change management process to ensure the ongoing effectiveness of operational activities and to avoid any diminution of the established safety baseline.

A6 Performance evaluation

To ensure that the safety of your operating railway does not diminish over time, you should regularly review the performance of your safety critical assets against established targets or standards.

Any identified failures or non-conformances should be analysed with standard tools to determine root causes and appropriate corrective actions.

A periodic review of the organisation's asset management policy and processes at planned intervals is recommended, to ensure it continues to be suitable, adequate, and effective to the needs of the operator.

This should include any subordinate asset maintenance plans.

All levels of management should monitor and review the organisation's asset performance on a regular basis to ensure it is operating to identified standards.

If an asset fails to perform to standard, you should ensure that processes are in place to allow you to understand the root cause of the failure and to put corrective actions in place in order to mitigate any risks posed to safety.

A7 Improvement

Once the organisation has taken steps to review the performance of the AM processes and systems and identified areas where corrective action is required or improvements may be made, it needs to take action.

A8 The asset management dialogue

For organisations seeking a new accreditation or preparing a new SMS, this guideline provides an opportunity for operators and the Regulator to begin a dialogue about how to prepare their asset management systems in line with Schedule 1.21.

A8.1 RTOs seeking accreditation

When an RTO is seeking accreditation they submit their safety management system to the Regulator for review and approval.

This opens up a conversation about their level of compliance with Schedule 1 and the appropriateness of the Regulator's expectations to their scale of operation.

The ONRSR expects that this discussion will cover asset management as an essential part of the operator's SMS.

Based on the size and scale of the RTO, the Regulator and operator can identify what might need to be included.

A8.2 RTOs with an SMS that has already been accredited

If an RTO already has an accredited SMS, the guideline provides them with an opportunity to review their system to determine whether they are sufficiently covered with respect to asset management.

This allows them to seek the advice of the Regulator and to discuss options for improving their compliance and coverage.

The ONRSR sees benefits in providing guidance and assistance to operators who are seeking advice on how they might be able to improve the safety of their systems and reliability of their assets.