AUSTRALASIAN RAILWAY ASSOCIATION

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AUSTRALASIAN RAILWAY ASSOCIATION SUBMISSSION

TO THE PRODUCTIVITY COMMISSION ISSUES PAPER FOR THE INQUIRY INTO THE NATIONAL TRANSPORT REGULATORY REFORMS

28 JUNE 2019

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CONTENTS

Tables

Figures

Boxes

EXECUTIVE SUMMARY

The Australasian Railway Association (ARA) is a not-for-profit member-based association that represents rail throughout Australia and New Zealand. Our members include rail operators, track owners and managers, manufacturers, construction companies and other firms contributing to the rail sector.

We thank the Productivity Commission (the Commission) for the opportunity to respond to its issues paper on National Transport Regulatory Reforms, and look forward to further engagement on this important set of reforms.

The rail industry has a strong track record of safe operations and a strong commercial incentive to promote a safer working environment. Industry has continued to invest in, and deliver, safer rail services with rail accidents and incidents continuing to trend down. In this environment, the current co-regulatory approach which facilitates the development of risk-based approaches to rail safety is a suitable model.

The promise of national rail safety regulatory reform was built on a more efficient and effective regulator and better, more consistent laws and regulatory processes across jurisdictions. This is outlined in a series of regulatory impact statements prepared between 2008 and 2012.

The reforms have undoubtably led to some improvements in the regulatory regime. In particular, members report that the national accreditation scheme has reduced compliance costs and changes to the accreditation processes for major projects has been beneficial.

However, true national reform has not yet been delivered. The national regulator commenced in 2013 but it was not until July 2017 that the last state devolved all or some responsibility to the Office of the National Rail Safety Regulator (ONRSR). Furthermore, jurisdictional differences remain that have not been able to be resolved. These differences have thwarted the achievement of the full benefits of national reform.

In some states, prescriptive regulations remain which increase compliance costs and regulatory burden with no proven increase in safety. Work undertaken by the ARA provides evidence that state prescriptions relating to train driver working hours also create significant productivity losses. These productivity losses impact the rail freight sector's ability to compete with heavy vehicles.

The Productivity Commission can play an important role in identifying how differences can best be resolved. In the ARA's view, for the full benefits of the Rail Safety National Law (RSNL) to be achieved, governments must give renewed emphasis to national consistency of approach, through structural reform to devolve appropriate power to the national regulator to enable the regulator to focus its effort on key risks.

The ARA also questions whether the ATSB is achieving its objectives to facilitate safety improvements in rail. The ATSB's function is to improve safety by reviewing incidents broadly, on a 'no fault' basis, to identify all contributing factors to accidents. But from a rail industry perspective, it is not clear that its investigative and reporting processes are effectively supporting the achievement of its objectives.

Improving the efficiency and effectiveness of rail safety regulation will improve the overall efficiency and productivity of the freight industry and the transportation system more generally which is of critical importance in Australia. We strongly encourage the Productivity Commission to look at issues where rail safety regulation is creating inefficiencies or unduly affecting modal competition. Excessive burdens imposed on the rail industry drives more freight to travel by road. Not only does this impact on the

efficiency of the freight industry, given the higher prevalence of road accidents it also reduces safety for the entire community.

Box 1: Summary of key rail industry findings and recommendations

- Prescriptive approaches to managing rail safety impose unnecessary compliance costs on industry. Moreover, it prevents rail operators from improving the efficiency of their operations with no detriment to safety.
- The only effective way to manage rail safety risks is to focus on an individual Rail Transport Operator's (RTO) context. This requires a nationally consistent, non-prescriptive and co-regulatory approach.
- ONRSR has led to some benefits. However, further benefits, including productivity benefits, could be generated by the regulator placing greater focus on improving safety through proactive action. This would include: sharing knowledge of trends in accidents and incidents; conducting research, collecting and publishing information relating to emerging rail safety risks; and assessing the effectiveness of existing regulations and ONRSR activities in order to identify where regulatory action is best focussed.
- The remaining inconsistencies in rail safety regulation arising from state-based derogations reduce the benefits of the national reform. The ARA strongly encourages the Commission to take the opportunity to further promote resolution of these differences, particularly in relation to fatigue and drug and alcohol variations.
- ONRSR's inability to resolve jurisdictional differences suggests it may not have been devolved sufficient responsibility from the States, Territories and Commonwealth to efficiently and effectively achieve its objectives. The Commission should further consider the governance arrangements around the role, objectives and independence of ONRSR, and its relationships with the Governments, and with RISSB.
- ARA is not convinced that the ATSB is effectively fulfilling its mandate to prevent the occurrence of future accidents and incidents, particularly given the lack of timeliness around its reporting.
- Opportunities exist to address excessive regulatory burdens imposed on rail which are reducing its competitive position and distorting transportation choices, which is driving more freight to travel by road even where this is inefficient. In addition to removing the variances in fatigue and drug and alcohol management, the following aspects of the rail safety regulatory regime should be further reformed to ensure rail is not unduly burdened:
  - rail safety worker definition
  - cost recovery from tourist and heritage operators
  - interface agreements.

1 THE ARA

The Australasian Railway Association (ARA) is a not-for-profit member-based association that represents rail throughout Australia and New Zealand. Our members include rail operators, track owners and managers, manufacturers, construction companies and other firms contributing to the rail sector. We contribute to the development of industry and government policies in an effort to ensure Australia's passenger and freight transport systems are well represented and will continue to provide improved services for Australia's growing population.

The ARA thanks the Commission for the opportunity to provide this submission to its issues paper as part of the Inquiry into the National Transport Regulatory Reforms.

This submission has been developed in consultation with ARA members. For further information regarding this submission, please contact Emma Woods, General Manager Passenger and Corporate Services via ewoods@ara.net.au or 02 6270 4507 or Duncan Sheppard, General Manager Freight and Contractors via dsheppard@ara.net.au or 02 6270 4531.

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- Arc Infrastructure
- Australian Rail Track Corporation
- Aurizon
- Downer
- Department of Planning, Transport and Infrastructure, South Australia
- FMGL
- Genesee and Wyoming
- Gold Coast Light Rail
- John Holland Group
- Knorr Bremse
- Laing O'Rourke
- Manildra Group
- Metro Trains Melbourne
- Pacific National
- Port of Melbourne
- Public Transport Authority of Western Australia
- Progress Rail
- Queensland Rail
- Rio Tinto
- Roy Hill
- Sydney Metro
- Sydney Trains
- NSW TrainLink
- TasRail
- Transport for NSW
- V/Line
- Yarra Trams

2 CONTEXT FOR THIS REVIEW

2.1 Establishing a national regulatory system

In 2009, the States, Territories and Commonwealth agreed to establish national systems for heavy vehicles, rail safety and commercial vessel safety that were aimed at improving safety and reducing costs and regulatory burden for Australian transport companies.

The 2011, an Inter-Governmental Agreement (IGA) saw the parties agree to commit to work cooperatively to create the national rail safety regulator system, including by making any changes to Commonwealth, State and Territory laws and administrative arrangements that were necessary to facilitate this.

The objectives and outcomes of the rail safety IGA were to be achieved by:

- the introduction of *Rail Safety National Law (South Australia) Act 2012* (RSNL) for the safety regulation of Australian rail operations;
- the establishment of the independent, national Office of the National Rail Safety Regulator (ONRSR) to administer the RSNL and maintain, monitor and enforce rail operators' application of and compliance with, appropriate safety standards; and
- an expansion of the role of the ATSB to cover rail safety investigations nationally.

2.2 The anticipated benefits of reform

As the Commission identifies in its issues paper, investigation of the long run benefits of the adoption of a national regulatory framework requires close examination of the implementation and operation of the reforms. A key question underpinning this work is 'have the reforms achieved the objectives set out in the IGAs of 2011?'

From a rail perspective, the expected benefits of the reform were highlighted in the regulatory impact statements on national laws and regulations prepared by the National Transport Commission (NTC) in 2009 and 2011.

The 2009 statement indicated that, compared with a status quo of maintaining state-based regulators, benefits could be expected in the form of improved safety and reduced compliance costs. These benefits were highlighted as accruing to business, government and other stakeholders and are illustrated in **Table 1**.

Table 1: Overview of reform benefits

BENEFITS TO INDUSTRY	BENEFITS TO GOVERNMENT / REGULATOR
• Improvements for industry operators currently holding more than one accreditation, arising from interacting with staff of a single regulator. • Reduced regulatory burden for industry generally, arising from greater certainty as reforms are completed. • High-quality regulatory environment for industry, due to concentration of resources into a single regulator. • More information and data	• Increased capacity of regulators through a critical mass in one organisation. • Efficiency gains provided by a single regulator to reforms and operations, through increased percentage of field staff and information-sharing. • Better targeted resourcing for rail safety across Australia. • Improved career path for regulatory staff. • Unified and streamlined data collection. • Single national perspective on rail safety issues. • Recognised independent specialist body and potential 'safety champion'. • Improved potential to learn from international best practice. • Culture and attitude will become uniform to match legislation.

Source: NTC 2009

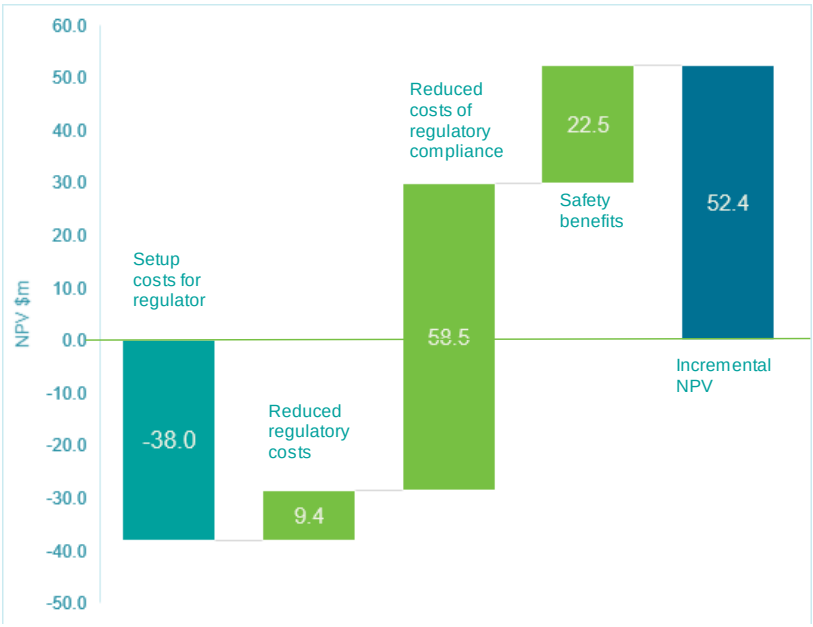
For other stakeholder groups, including workers, passengers and other rail customers, benefits were expected from better safety, possible efficiency dividends and potential cost savings for customers.

Not all of these benefits were amenable to quantification. Of those that were, the "medium" benefits case indicated a positive net present value (NPV) from reform of $52 million – as highlighted in **Figure 1**, which also identifies the dollar benefits of various components of the reform.

This figure shows that a reduction in regulatory compliance costs for industry was the main anticipated benefits of the reform. This was envisaged as coming from:

- a reduction in the duplication of compliance activities arising from no longer interacting with multiple regulators and complying with multiple sets of jurisdictional based regulations; and
- greater certainty for industry around what is required to comply under a single national law.

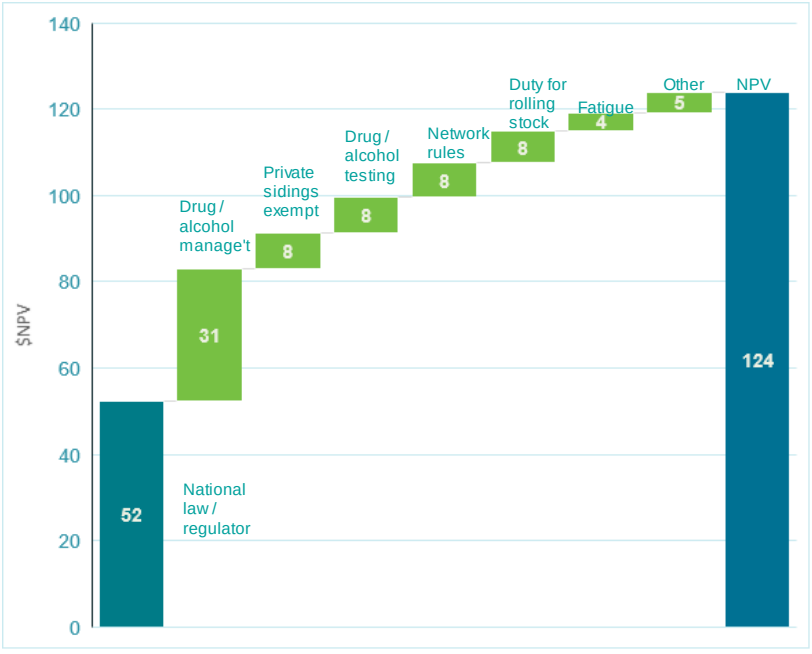
Figure 1: 2009 predicted reform benefits, compared to base case state regulator



Source: NTC 2009

Further specific amendments to the national law addressed in the 2011 NTC regulatory impact statement were to add additional benefits to those identified above.[1] This is highlighted in **Figure 2**: 2011 predicted reform benefits, compared to base case national law and regulator

Figure 2: 2011 predicted reform benefits, compared to base case national law and regulator



Source: NTC 2009

[1] The status quo in the 2011 regulatory impact statement analysis reverted to the existing national law and national regulator, meaning the benefits measured were improvements to the proposed framework.

The further amendments were to provide benefits from consistent approaches to drug and alcohol, and fatigue. These benefits, while not large in dollar terms, provided an evidence-based foundation for proceeding with national regulation and a national regulator. It is worth reiterating that these regulatory impact statements did not quantify all the anticipated benefits of the reform. In particular, it was anticipated that national consistency would enable some changes to be made to industry operations (i.e. scheduling) as a result of national consistency. And that this would improve the efficiency of rail operation leading to lower transport costs and an improvement in the efficiency of the economy.

Discussions with ARA members have confirmed that it will undoubtedly be difficult for the Commission to differentiate between changes to rail safety that are attributable to the new regulatory structure and those attributable to other factors. For example, operators continue to invest in new and safer technologies as detailed in box 2 below. Moreover, jurisdictions did not all immediately move to the national regime. The last remaining jurisdiction, Queensland (QLD), was only incorporated into the national regime from 2017.[2] Nonetheless, important first steps to setting a new course to maximise the benefits from national regulation are to: (i) identify the problems that regulatory reforms should have addressed; and (ii) examine whether these have in fact been successfully addressed in the reform. In the ARA's view, there have been several missed opportunities in the reform process to date and therefore a number of further reform opportunities exist.

[2] Victoria still regulates light rail and tourism and hospitality rail operators under Victorian legislation and subject to the oversight of Transport Safety Victoria. In March 2018 the Victorian Government announced a policy decision to move all rail transport operators currently accredited under local/Victorian rail legislation will transition to national legislation, regulated by ONRSR. See https://transportsafety.vic.gov.au/rail-safety/newsroom/directors-update-transition-to-national-regulator.

Box 2: RTO Investment in technologies to improve safety

As noted above, RTO's have a vested interest in continuing to invest in safety. In addition to improving operating policies and procedures, RTO's invest in array of technologies to improve the safety of staff, assets and operations. Technologies that RTO's have invested in to improve safety include but are not limited to:

- **AS 7502 Road Rail Vehicle Standard:** RTOs, RIMs and contractors comply with the technologies required by the Road-Rail Vehicle standard.
- **Asset Protection Systems:** are utilised to monitor and detect hot bearings and/or wheels, detect dragging equipment, broken rails etc to conduct proactive maintenance.
- **Automatic Train Protection (ATP):** is installed is varied levels, on train fleets, Hi-Rail vehicles and Track machines to enforce Limits of Authority and Speeds. This prevents signals passed at danger (SPADs).
- **Automated Condition Monitoring:** is utilised as a predictive maintenance method for rollingstock and infrastructure, monitoring wheels, brakes, bearings, wheel impact etc.
- **Electronic Track Working:** is an electronic safe working app jointly developed with John Holland, Transport for NSW an 4Tel to improve the process of issuing safe working authorities electronically as well as providing authority holders real-time information to aid in the planning and requesting of safe working authorities. The result has been an improvement in the effectiveness of risk controls related to track worker safety as well as an improvement in the correct application of safe working rules out on the network.
- **Electronic Warning Detection Systems**: are installed on track machines to improve the management of collision risk between track machines by providing proximity warnings to the operators of machines travelling and working during maintenance activities. The technology has resulted in a significant reduction in collision events.
- **PDOC System:** detects partially dumped ore cars which could lead to a derailment if undetected.
- **Runaway Train Prevention:** a remote air dump facility operated by Train Control can dump the air in any train remotely, applying the brakes remotely to stop a runaway train.
- **Ultrasonic Rail Inspection:** Rail inspections were traditionally conducted by sight. Ultrasonic rail inspections detect rail defects by using different methods to detect defects that may not be visible to the eye.

Other technologies are continually being explored and trialled in the industry's continued efforts to improve safety.

Sources: John Holland Group, Transport for NSW, 4Tel, Fortescue Metals Group

2.3 Good regulatory practice

Two elements of the NTC regulatory impact statement provide important context for the review of the national rail safety reforms.[3]

The first element is the overall regulatory objective, which the ARA endorses. The NTC suggested that (i) positive safety outcomes are paramount in any system of safety regulation; and that (ii), good regulation theory indicates regulation needs to be as efficient and effective as possible, provide certainty for industry and eliminate unnecessary regulatory compliance burdens.

The second element is the principles described for rail safety regulation. These were described as follows:

- **Transparency**: regulator(s) should have clear processes and methods in place to facilitate free flow of information on safety matters within the regulatory body and beyond.
- **Independence**: regulator(s) should be independent of Ministers, funding bodies, operators, policy setters and investigators.
- **Relationship with Ministers responsible for rail safety**: regulator(s) will maintain a relationship with each Minister responsible for rail.
- **Ministerial capacity to refer**: a minister can ask the regulator(s) to investigate particular concerns in the jurisdiction, but cannot direct the regulator in those investigations or influence the outcome of those investigations.
- **Consistency of operation**: regulator(s) should provide a consistent framework for regulation across jurisdictions, based on the national model rail safety Bill.
- **Responsiveness**: regulator(s) should provide an acceptable level of responsiveness to safety concerns, regardless of location of incidents or concerns.
- **Best regulatory practices**: regulator(s) should adopt modern regulatory approaches and good practice regulation. It should be neither 'gold plated' nor should it lead to a lowest common denominator approach to rail safety.
- **Risk-based regulation**: the activities of the regulator(s) should be concentrated on the areas of the highest identified risk, which may change over time.
- **Sufficient capacity and expertise**: regulator(s) should be sufficiently staffed and skilled so that safety is not compromised due to staff or expertise shortages.
- **Safety**: maintain and improve safety outcomes on Australia's railways.
- **Efficiency**: minimise red tape, duplication and inefficient practices.

In this submission, the ARA will highlight certain areas in which these principles have not been met (e.g. inconsistent regulations across jurisdictions which maintain red tape, duplication and inefficient practices), or could benefit from further clarification (e.g. whether the regulator's ability to implement best regulatory practice could be enhanced by greater independence).

ARA members are of the view that the principles of rail safety regulation have been met to varying degrees; either achieved, partially achieved or yet to be achieved.

[3] NTC 2009, Section 4.

ACHIEVED	PARTIALLY ACHIEVED	NOT YET ACHIEVED
Transparency: regulator(s) should have clear processes and methods in place to facilitate free flow of information on safety matters within the regulatory body and beyond.	**Best regulatory practices**: regulator(s) should adopt modern regulatory approaches and good practice regulation. It should be neither 'gold plated' nor should it lead to a lowest common denominator approach to rail safety.	**Independence**: regulator(s) should be independent of Ministers, funding bodies, operators, policy setters and investigators.
Relationship with Ministers responsible for rail safety: regulator(s) will maintain a relationship with each Minister responsible for rail.	**Risk-based regulation**: the activities of the regulator(s) should be concentrated on the areas of the highest identified risk, which may change over time.	**Consistency of operation**: regulator(s) should provide a consistent framework for regulation across jurisdictions, based on the national model rail safety Bill.
Ministerial capacity to refer: a minister can ask the regulator(s) to investigate particular concerns in the jurisdiction, but cannot direct the regulator in those investigations or influence the outcome of those investigations.	**Sufficient capacity and expertise**: regulator(s) should be sufficiently staffed and skilled so that safety is not compromised due to staff or expertise shortages.	**Efficiency**: minimise red tape, duplication and inefficient practices
Responsiveness: regulator(s) should provide an acceptable level of responsiveness to safety concerns, regardless of location of incidents or concerns.	**Safety**: maintain and improve safety outcomes on Australia's railways	

3 SAFETY IS GOOD BUSINESS

3.1 Efficient and effective management of rail safety is in a rail operator's best interest

ARA and its members are acutely aware that rail accidents are costly. In addition to any resulting operator asset losses and lost productivity, rail accidents affect workers and their families and are costly for customers or passengers.

Enhanced safety is strongly linked to better improved productivity outcomes. Safer, more efficient work practices combined with new technologies deliver productivity benefits and improved environmental sustainability and safety outcomes.

The rail industry has a strong commercial incentive to promote a safer working environment and industry continues to invest in and deliver safer rail services. The reason for this is that many of the costs associated with rail accidents are borne directly or indirectly by the operator because of a number of factors:

- First, operators have an incentive to reduce personnel injuries in order to manage labour-related costs and associated impacts on productivity and output.
- Second, operators commonly bear the costs associated with any damaged assets, lost freight or resulting delays (for passengers or freight) directly. This is particularly true in heavy haulage where accidents and derailments may directly affect an RTO's downstream operations. More broadly, operators typically bear these costs indirectly through contractual liability under legal arrangements (for example, regulating damages to the environment or to public health and safety) and the insurance costs associated with these. For example, passenger RTOs are commonly required to meet KPI's related to timeliness and reliability in their franchise contracts with Government. Failure to deliver against these KPIs typically results in financial penalties being applied.
- Third, accidents can reduce passenger or customer confidence in the reliability of the railways which can cause a switch to alternative modes of transport which ultimately affects future revenue.

The Commission has previously found that there is significant internalisation of rail externalities (including accident costs) through legal liability and various other means.[4] Operators take these wider costs into account when assessing the benefits that arise from a reduction in safety risks, and therefore are likely to invest at levels close to, or at, the socially-optimal level of safety risk management effort.

Nationally, most operators already self-impose various operationally-specific, safety related limits and constraints on their rail safety workers. However, this is achieved through company policies rather than regulation. This provides operators with flexibility and the discretion to accept alternate arrangements when they are safely justified through a detailed risk assessment in line with an RTO's risk management plan and safety management system.

Essentially, industry is at the forefront of safety related innovations and typically takes the lead on technological improvements because what is good for safety is good for business. Examples of this are contained in box 3.

[4] Productivity Commission (2006), Road and Rail Freight Infrastructure Pricing, Inquiry Report

In this context, it is very difficult to say what impact national transport regulatory reforms have had on rail safety outcomes. This is because, as the Commission notes, it is challenging to separate out impact of regulatory change from more general technological improvements and broader changes to how risk is treated within organisations. In any case, the story is positive. The level of incidents and accidents has fallen steadily over time and rail remains around eight times safer than road on a kilometres travelled basis.[5]

[5] Deloitte Access Economics, *Value of Rail – The Contribution of Rail in Australia* (2017)

Box 3: Rail proactively investing in technology to improve safety

Aurizon's investment in asset condition monitoring

From 2015 Aurizon began introducing rollingstock condition monitoring technology within its network. The technology collects, and analyses, imagery and data collected using trackside monitoring structures. In the course of its normal operation, as rollingstock travels through specific points on the Network, the length of each train is scanned and the condition of key components (such as wheels and brake systems) are analysed.

This monitoring technology enables early detection of asset faults, so that these can be managed appropriately. This technology reduces risk of derailment by enabling a greater risk-based process for managing and maintaining above rail assets.

The new technology has also allowed Aurizon to automate many of the rollingstock inspection and assessment tasks currently performed manually in depots. This has reduced the need to pull a train out of service for maintenance reducing asset downtime and increasing productivity.

Source: Aurizon

Speno investment to improve rail worker safety

Speno Rail Maintenance Australia has developed a technical solution that removes rail safety workers from inside the rail corridor when conducting rail inspections which significantly decreases workers' risk.

Speno has designed, manufactured and developed the Hi Speed Ultrasonic Testing Rail Bound Machine to confirm, size and classify internal fatigue rail defects when conducting high speed rail inspections. This new technology not only has the ability to detect internal rail defects; it also can confirm the size and classify the rail defect automatically and without stopping the vehicle after it is detected by the on-board system.

Most importantly, this new technology eliminates the risk posed to 'hand testers' of being struck by rail vehicles, as the testing is undertaken remotely using this new technology.

Source: Speno Rail

Laing O'Rourke's toolbox spotter

Laing O'Rourke has developed a 'Toolbox Spotter' which helps eliminate the risk of 'blind spots' in and around the rail corridor, particularly when people and plant work closely together in the rail environment.

The Toolbox Spotter is a proactive awareness tool that that enables early detection of and prevention of unwanted plant, people or interactions in high risk areas. It involves cameras being mounted on machines which identify objects programmed in to it and sends warnings to appropriate staff members. This technology reduces fatalities, serious injuries and other property incidents. To further enhance the safety of personnel working around plant an additional technical item in the form of a "Halo" has been created which illuminates the area protected by the Toolbox Spotter.

Source: Laing O'Rourke

3.2 Co-regulation is appropriate

The commercial incentives for RTOs to effectively and efficiently manage safety is the main reason the RSNL adopted a co-regulatory approach. It was believed that a co-regulatory approach which facilitates the development of risk-based approaches to safety would enable operational efficiencies to be achieved while not compromising safety. In the ARA's view, this remains a suitable model in the rail operating environment.

Co-regulation places responsibilities and obligations on RTOs to manage their risk. Practically, this means that while the regulator can query and test specific aspects of an operator's Safety Management System, it no longer has to approve it. Instead, the onus for risk management is squarely on the organisation.

This has enabled regulatory processes and, in turn, risk management actions to become more timely. By way of example, under the preceding Western Australian (WA) regulatory regime it used to take up to 3 months to receive approval on a notification of change, while now the regulator has only 28 days to request further information regarding a notification of change.

3.3 An overly prescriptive approach can be costly

The RSNL intentionally embedded a risk-based approach to managing rail safety. The RNSL provides a framework for ensuring RTOs have strong processes and procedures in place for managing safety risks through the accreditation process.

The reason for this is that rail operations are diverse. An RTO may be operating rolling stock or a below rail network or even constructing new track. This means rail safety workers carry out a variety of work in various contexts. They may be driving a freight train or working on metropolitan track. This makes it difficult to establish a single set of common prescriptive regulations that are applicable and appropriate in all circumstances.

In this context, co-regulatory, less prescriptive approaches are less costly and more effective because they seek to shift the burden of risk management from the regulator to operators, who are best placed to control these risks. Where rail operations are diverse, a regulator will rarely be in the best position to understand the range of risks affecting an operator, and how best to manage them[6]. This is because information is incomplete and asymmetric, meaning the information necessary to make the best decision most commonly sits with the operator.

There is also the risk that prescription can lock in a risk management approach or restrict innovation, particularly where specific risk mitigation actions are prescribed, or where standards are based on an existing set of technologies or measures. For example, prescribed shift lengths for train drivers in New South Wales (NSW) and Queensland (QLD) vary depending on whether there are one or two drivers present. The presence of another person is essentially presumed to be the only mechanism for controlling the risk of a fatigue related accident or incident. However, new technologies such as Automatic Train Protection systems —which continually check actual train speed against that permitted and that activate emergency stopping in certain circumstances — can also prevent accidents and incidents caused by fatigue. So can other technologies for monitoring drivers. The potential cost savings from use of these technologies and innovations is lost when regulations require or prescribe additional mitigation measures.

[6] Frontier Economics (2012) *Economic assessment of options for the further regulation of hours of work and rest of rail safety workers*, Prepared for the NTC

Prescriptive limits risk shifting the focus away from a risk-based approach to safety. Instead, prescribed limits and requirements risk increasingly being viewed as ‘safe’ and accepted practice sanctioned by government. This is dangerous where regulations do not have due regard to the risk environment or consider the impact of any prescriptive requirement in isolation.

Unsurprisingly the specific details and understanding around the safety risks inherent in an RTO’s operations sit primarily with the RTO and not the regulator. Therefore, management of these risk should as well.

In addition, a prescriptive or “one size fits all” approach could easily be operationally restrictive for low risk operators and achieve limited safety benefit. This could mean scarce resources are diverted to administrative compliance activities, rather than improving safety outcomes. There is also an opportunity cost associated with this unnecessary compliance burden from a productivity perspective, as resources could have been better focussed on achieving improved operational efficiencies, particularly with regard to the movement of freight. For example, a multi-jurisdictional operator running a train from Brisbane, through NSW and onto Melbourne will need to comply with three different approaches to train driver hours. Some specific examples are contained in section 4 which looks at areas where some states have chosen to maintain overly-prescriptive approaches, contrary to recommendations from ONRSR. This is why industry perceives large costs associated with prescriptive approaches, and why industry favours a co-regulatory approach.

The only effective way to manage rail safety risks is to focus on the individual RTO’s context. Non prescriptive regulation better meets the objectives of the rail safety reform by streamlining regulatory arrangements and reducing the compliance burden and costs to industry. Additionally, it enables operators to take a holistic view of their operations and better consider factors affecting the safety of operations.

4 THE EFFECTIVENESS OF THE REGULATOR

4.1 A single national regulator has delivered benefits

ARA members have indicated that the creation of ONRSR has led to some notable benefits:

- The consolidated national accreditation process is considered likely to have reduced regulatory burden for multi-jurisdictional operators.
- ONRSR national works program and recent adoption of an "Account Manager" model, where RTOs are managed from a single state office, has also improved regulatory consistency and minimised administrative burdens.
    - By way of example, Aurizon noted that its national operations are predominantly managed in QLD and having a single regulatory point of contact has resolved some issues regarding the duplication of compliance activities across its operations. Under the new model, Aurizon's engineering team, based in QLD, can organise compliance inspection across jurisdictions with their single regulatory counterpart also based in QLD.
- The major project accreditation process and ONRSR's Major Project Guidelines, including the requirement for an independent safety assessor, is likely to have improved safety outcomes associated with major projects.
- Some ARA members in smaller jurisdictions also consider that the pooling of regulatory resources has enabled local offices to access greater expertise sitting elsewhere within ONRSR, which has improved the regulator's effectiveness. However, in some cases, ARA members are of the view that regulatory staff now appear to be less familiar with local operational nuances.

4.2 Further opportunities for improvement are available

It is perhaps not surprising that ARA members have identified areas in which regulatory performance could be improved. Industry emphasises that further benefits, including productivity benefits, could be generated by the regulator placing greater focus on improving safety through proactive action. This includes through:

- sharing knowledge of trends in accidents and incidents across jurisdictions
- promoting positive technological innovations in the rail industry which help achieve improved safety and productivity improvements
- by conducting research, collecting and publishing information relating to emerging rail safety risks
- by assessing the effectiveness of existing regulations and ONRSR activities in order to identify where regulatory action is best focussed
- education and training on rail safety and the regulatory regime itself

In ARA members' view, such educational activities could drive further safety improvements. This is because railway accidents and incidents are relatively infrequent. This means ONRSR may actually become aware of emerging, common risks that would be beneficial information to ARA members.

These activities already fall within ONRSR functions under the RSNL (s. 13) but s. 244 is cited as restricting ONRSR's ability to freely share this sort of information throughout industry.

Industry recognises ONRSR's more recent initiatives to do more in this regard. Of note, industry is particularly supportive of ONRSR providing greater clarity around how it will approach its regulatory task in the "ONRSR Way" [7], which also outlines expectations against which the regulator can be held to account. Industry is also supportive of ONRSR identifying and communicating national safety priorities, the establishment of the ONRSR portal and its National Rail Safety Data Strategy which is looking at ways of streamlining the regulatory task associated with rail safety data reporting to reduce regulatory duplication and minimise regulatory burden.

[7] The ONRSR Way, (2018) Regulating rail safety across Australia

5 NATIONAL CONSISTENCY HAS NOT YET BEEN ACHIEVED

As identified in section 2, the promise of national transport safety regulatory reform was built on a more efficient and effective regulator and more consistent, less prescriptive laws across jurisdictions leading to administrative and compliance cost savings for industry and government. Although significant effort has been devoted by ARA members and ONRSR, a true national reform has not yet been delivered. It has taken significant time for all jurisdictions to devolve responsibility and some specific state legislative inconsistencies remain.

The cost of regulation is affected by these fragmented arrangements. Where requirements vary across jurisdictions, it can increase compliance and administrative costs for interstate operators and regulator enforcement costs.

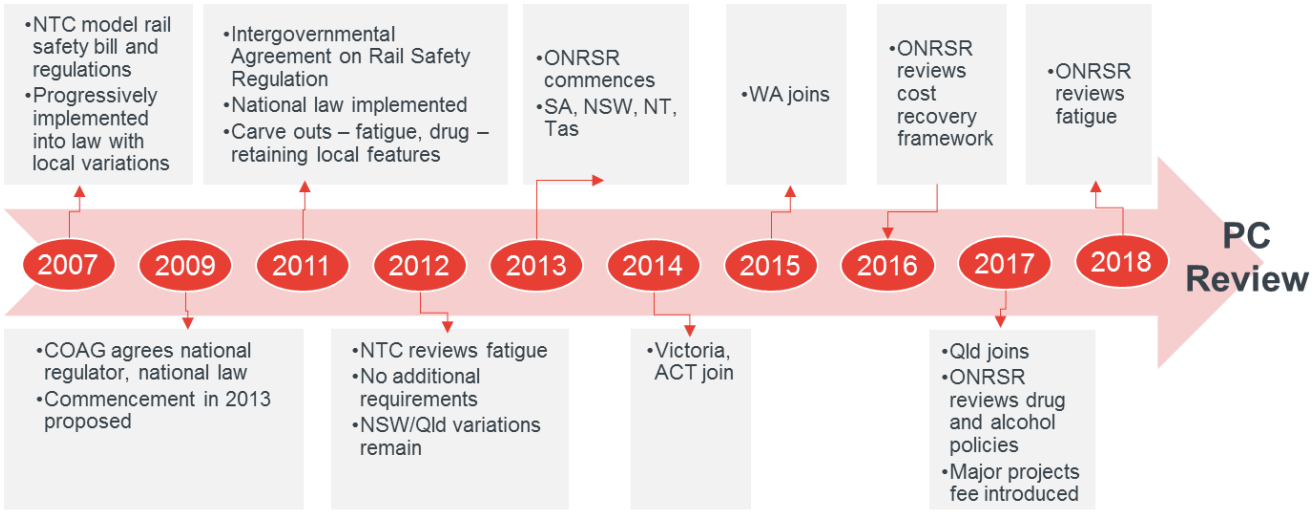
In the ARA's view, the remaining inconsistencies which deviate from a risk based, co-regulatory approach, reduce the purported benefits of the national reform. The ARA strongly encourages the Commission to take the opportunity to further promote resolution of these differences.

5.1 Jurisdictional commitment and implementation of the reforms has been slow

While the national regulator commenced in 2013, it was not until July 2017 that the last jurisdiction devolved responsibility to ONRSR. **Figure 3** below shows the timing of this with WA joining in 2015 and QLD officially devolving responsibility in 2017.

The nature of regulatory interactions experienced by ARA has varied as a result of ONRSR gradually assuming responsibilities across jurisdictions.

Figure 3: Timing of key events in the national rail safety regulation reforms



Source: Frontier Economics

ARA members remain frustrated by WA choosing to "mirror" the RSNL. When WA signed the IGA, it noted that it would adopt the Law through mirror legislation to enable future amendments to be considered by the Western Australian Parliament. All other jurisdictions agreed to pass legislation to adopt the RSNL passed by the South Australian Parliament.

At face value this difference appears inconsequential. However, it has the practical effect of meaning that any minor amendment to the legislation takes 1-2 years to work its way through to WA. During this transitional period inconsistencies are created between states leading to confusion and unnecessary administrative burden for operators – without any identifiable safety benefit. In addition, WA RTOs who engage on regulatory changes must do so regarding an issue that will not affect their business for 1-2 years. This clearly is not an efficient approach to regulatory change.

Box 4: Changes to Reporting Requirements, effective 1 July 2019 (except WA)

As of 1 July 2019, two changes are being made to reporting requirements in all States except WA:

1. All Category A notifiable occurrences and prescribed incidents to be made immediately to ONRSR by calling 1800 430 888 (24 hrs/ 7 days).
2. The introduction of prescribed incidents will take effect, meaning it will be mandatory for rail operators to undertake Drug and Alcohol testing following a prescribed incident, unless ONRSR or the Police have tested.

The ARA, following engagement with industry safety representatives, provided support for the ATSB and ONRSR amendments to come into effect on the same date of 1 July 2019, meaning one change management process for industry rather than two. However, due to the WA Mirror Law, the reporting amendments will not occur for up to two years for operators based in WA. This has created confusion between ONRSR and industry as to how the reporting regime will work for WA RTOs. It also potentially creates an unnecessary duplication of resources if the ATSB is to continue to receive reports of incidents rather than single reporting into ONRSR nationally.

5.2 Remaining areas of inconsistency are thwarting benefits being achieved

Even with the RSNL, some legislative jurisdictional differences remain. Unfortunately, the States and Territories (through the Transport and Infrastructure Council) have been unable to reach agreement on how to resolve these. When the RSNL was passed in May 2012, three key areas were deferred for later decision; namely drug and alcohol management, fatigue management and regulatory cost recovery.

In November 2016, the Ministerial Council was formally advised of the existence of more than 80 derogations to the RSNL.[8] These jurisdictional differences reduce the purported reform benefits, particularly for operators working across state boundaries. The ARA considers that derogations in relation to drug and alcohol management (in NSW) and fatigue (in NSW and QLD) have the most significant productivity impacts for the industry with no detectable safety benefit.

[8] ONRSR, Fatigue Risk Management Review Consultation Paper

For ARA members who are obligated to ensure compliance with multiple rule sets, this:

- increases compliance costs by creating an additional internal management burden created by the need to ensure compliance with the multiple requirements.
- can result in management systems that are compliance focussed rather than risk focussed. At best, this results in inefficiencies and cost impact. At worst, it can reduce risk-control effectiveness and make controls unnecessarily complex.
- removes flexibility, reducing efficiency and productivity.

The ARA considers that removing prescriptive elements in NSW and QLD and establishing a nationally consistent risk-based approach to drug and alcohol and fatigue management will generate cost savings for both industry and government. It will allow RTOs working in NSW and QLD to manage their operations to target identified risks and provide clarity around expectations and approaches. This will ultimately reduce transport costs increasing the competitiveness of key sectors and improving the efficiency of the economy.

Further details on these matters follow.

5.2.1 Drug and alcohol testing requirements

RTOs are obligated under the RSNL to ensure, so far as is reasonably practicable (SFAIRP), that rail safety workers are not on duty, or performing rail safety work, while impaired by alcohol or a drug. To support this, RTOs must prepare and implement a risk-based Drug and Alcohol Management Program (DAMP). DAMPs must include the operator's drug and alcohol policies and procedures, provision of information and education to rail safety workers and details of drug and alcohol testing regimes.

However, for rail safety work conducted in NSW, sub-regulation 28 (2) of the RSNL requires RTOs to implement additional prescribed elements in their DAMP. Notably:

- random preliminary breath or urine testing of not less than 25% of all rail safety workers;
- drug and alcohol testing a rail safety worker reasonably suspected to have been involved in a prescribed incident, within three hours; and
- that the testing must be completed to an evidentiary standard by a person authorised by ONRSR and engaged by the operator.

The ARA strongly questions the value of sub-regulation 28 (2) for two reasons.

First, given the remoteness of some parts of the NSW rail network, implementation of the NSW provisions is not always reasonable or practicable. Conducting testing to an evidentiary standard in remote areas of NSW is particularly challenging. In contrast, the RSNL Regulations (outside NSW) do not prescribe policies, procedures or testing methods; consistent with the broader regulatory intent, it enables operators to choose the most appropriate testing regime to target identified risks.

Second, this inconsistency means some operators are required to comply with two different sets of drug and alcohol requirements. See box 5 for an example. The need to meet both the NSW drug and alcohol requirements and the requirements in all other jurisdictions is an issue that affects 53 of the 186 accredited rail operators in Australia.[9]

[9] ONRSR (2017) Drug and Alcohol Management Review, Consultation Paper, July 2017, p6.

Box 5: Challenges for regional RTOs to comply with NSW drug and alcohol requirements

NSW is a large State. Regional operator NSW TrainLink operates out to Broken Hill, approximately 1100km from its head office in Sydney. Similarly, the extensive Country Regional Network is operated and maintained by John Holland Group as the Rail Infrastructure Manager (RIM).

If a prescribed incident occurs at or near Broken Hill, testing of involved employees within three hours to evidentiary standard is required. This creates many challenges for RTOs and RIMs, as the nearest depot to Broken Hill is at Dubbo, eight hours drive away.

RTOs and RIMs maintain authorised persons available to undertake for cause, post incident or random testing when required. When an authorised person is not available or able to attend the site within the mandated timeframe to undertaking testing, the worker is normally taken to the nearest (testing facility) police station (alcohol only), medical centre (business hours) or hospital to submit to a test. As summarised below, this presents a number of practical challenges for remote operations, and can result in a worker needing to visit two locations to complete drug and alcohol tests:

- Police
    - Only undertake alcohol testing, however, they can detain a worker for the purpose of obtaining a drug test if they believe it is required (post incident - escort to hospital for bloods).
    - Police officers may have difficulty locating the correct forms to use if they have not tested in accordance with RSNL in the past (certificate of testing in accordance with RSNL).
    - Dependent on workload and staffing as to timeliness of testing (may not get done within mandated 3 hours).
- Medical Centre
    - May require an account to be setup (ABN, purchase Order, or Credit card details) before they will undertake the test.
    - Dependent on workload and staffing as to timeliness of testing (may not get done within mandated 3 hours).
- Hospital
    - Can undertake blood tests (using Police blood kit), bloods also used as a confirmatory test if the worker wants to challenge the results of the Breath Analysis conducted at the police station.
    - Can undertake urine testing, but unsure whether this would be a chain of custody test in accordance with the regulations (assuming not) as it will most likely not be conducted by an authorised person.
    - Hospital do not do breath tests.
    - Dependent on workload and staffing as to timeliness of testing (may not test within mandated 3 hours).

In addition, V/Line is required to implement different policies and procedures for drug and alcohol testing for workers who work on the line through to Albury as opposed to the rest of its network and yet the risks being managed do not change when crossing the state boarder.

The NSW specific drug and alcohol requirements add compliance costs and negatively affect productivity for the industry by limiting an RTO's flexibility to manage their drug and alcohol risks according to the scenario being addressed.

ONRSR review unable to resolve variations

In 2017-18, ONRSR conducted a Drug and Alcohol Management Review that identified six recommendations for a nationally consistent approach to drug and alcohol management in the rail industry[10]. The ARA supported each of ONRSR's six recommendations for a nationally consistent approach to drug and alcohol management but not all recommendations were supported by Ministerial Council, resulting in the continuation of NSW variances in relation to drug and alcohol.

Consistent, national adoption of the six ONRSR recommendations would have benefitted almost one third of Australia's rail industry, driven national consistency in the management of drugs and alcohol in Australia's rail industry, reduced regulatory burden and ensured that drug and alcohol policies were based on targeting identified risks rather than meeting mandated targets.

The ARA continues to advocate for the removal of the NSW variations in relation to drug and alcohol management. See attachment A for a briefing note on each of the six recommendations, outlining the ARA's support for each of ONRSR's recommendations.

5.2.2 Fatigue

Inconsistencies remain across jurisdictions in relation to the regulation of hours of work and rest for train drivers.

The RSNL is premised on RTOs demonstrating through the accreditation process that they have the competence and capacity to safely operate a railway, including through a risk-based approach to managing fatigue-related risks. However, additional state specific legislation exists in QLD and NSW which prescribes different "outer limits" of work hours for train drivers in each jurisdiction. This can be summarised as follows:

- maximum shifts lengths depending on the type of train driven (freight or passenger) and whether it is a single manning or two person operation (between 8-12 hour maximums);
- minimum break length between shifts depending on whether taken at or away from the home depot;
- maximum numbers of shifts and hours in any 14 day period;
- requirements in relation to the maximum amount of time allowed between signing on for a shift and reaching the home depot or barracks when travel is involved in getting to the home depot or barracks.

Not only does the ARA consider these state legislative "overrides" to be unnecessary and ineffective, they also undermine the ability of the RNSL to deliver regulatory consistency.

Fatigue is already effectively managed

There is little evidence to suggest that fatigue risks are not being effectively managed by industry. According to ONRSR's discussion paper, fatigue was only deemed a contributing factor in 3.5% of ATSB, OTSI, CITS and TMR rail safety investigations between January 2013 and 1 February 2018[11]. Furthermore, on page 13, ONRSR states: "There have been no statutory notices issued under the RSNL to operators with regards to not meeting the requirements for fatigue risk management."[12]

The industry is not aware of any strong evidence that supports the safety case that prescribed hours of work for train drivers in NSW and QLD is an effective tool to manage fatigue. The NTC's 2012 Regulatory

[10] ONRSR (2017) Drug and Alcohol Management Review, Consultation Paper, July 2017

[11] ONRSR (2018) *Fatigue Risk Management Review Discussion Paper*

[12] Ibid.

Impact Statement on Fatigue Risk Management found no evidence to support prescribing hours of work in the RSNL. In addition, ONRSR's review identified that "there is little to no evidence that a system of prescribed hours for drivers in Australia under the RSNL provides a better safety outcome."[13]

A robust Fatigue Risk Management Plan (FRMP) requires significant expertise and resources to design, implement and monitor. The risk with prescribed hours is that the emphasis on managing fatigue is simplified to focus only on the hours of work or rest. Rather than a simplified or "blanket" approach, a risk-based approach to fatigue is holistic; focuses on all rail safety workers, not just train operating crew, and manages fatigue-related risks by allowing more flexibility in rostering according to the risk profile of each role.

It is important to remember that rail safety workers carry out a variety of work in a variety of contexts. As a result, the only effective way to manage fatigue assessments is on an individual basis. A blanket approach is operationally restrictive, with no evidence that achieves a proven safety benefit. Nationally, most operators already self-impose an outer-limit on all rail safety workers. However, because this is achieved through company policies rather than regulation, it provides operators with flexibility and the discretion to accept alternate arrangements when they are safety-justified through a detailed fatigue risk assessment in line with an RTO's FRMP.

A risk-based approach considers the nature of work being performed (i.e. task complexity, workplace environment, mental/physical workload, ability to take breaks, or rotate to other tasks, time of day), the consequences of fatigue related impairment and potential consequences of error and mitigates these with targeted risk controls. The industry believes that such an approach results in improved safety outcomes.

The inconsistencies between fatigue requirements affect approximately one quarter of all Australian RTOs.[14] These RTOs are obligated to ensure compliance with multiple rule sets. This:

- increases RTO compliance costs by creating an additional internal management burden given the need to ensure compliance with the multiple requirements.
- can result in management systems that are compliance focussed rather than risk focussed. At best this results in inefficiencies and cost impact. At worst it can reduce risk control effectiveness and see controls become unnecessarily complex. In particular prescribed outer limits of work create the risk of becoming the de facto "safe" limit, resulting in the prescribed outer limit of work being defaulted to rather than RTOs implementing a risk-based, holistic approach to manage fatigue. Different rail safety workers and work contexts have different risks to be mitigated because of the nature of work, the control they have over that work, the ability they have to vary workload and the activities undertaken. A limit can in some contexts be unsafe, whereas in others, may be reasonable.
- removes flexibility, negatively impacting efficiency and productivity.

In relation to the last point, the differing requirements prescribed in the RSNL for fatigue risk management directly impact on labour costs, labour availability and an operator's ability to maintain the frequency of rail services. This is particularly evident during unforeseen events that cause network disruptions, for example:

- Any situation in which stopping work could introduce additional safety risk.
- Organised network shutdowns: infrastructure works that require network shutdown are meticulously planned and project managed to minimise the impact on the operating network and the safe return

[13] Ibid.

[14] According to ONRSR, 44 of the 186 accredited RTOs across Australia are accredited to operate across NSW and/or QLD and into other States and are hence impacted by the different requirements to manage fatigue in NSW, QLD and other States (source ONRSR (2018) Fatigue Risk Management Review Discussion Paper)

to full service quickly. However, unforeseen circumstances can impact on project delivery and result in the need for some rail safety worker shifts to extend

- Locomotive breakdowns
- Reactive maintenance: where assessment or correction is required to manage conditions affecting the safety integrity of the railway and maintain the continuation of rail operations
- Unscheduled train service breaks: where train crew have had significant periods on the train at stand still in a non-safety critical environment (e.g. stopped in a passing loop), where the train crew has had ample opportunity to rest / nap; and in consultation with the train crew, the risk assessment process determines the crew will not be affected by fatigue and can continue the journey to a relief point or destination whilst under regular review through consultation with the crew

Experience has proven that with prescribed hours of work for train drivers, the recovery period and ongoing management of rail services is severely disrupted

Quantifying the costs of prescribed hours

To further explore this issue, the ARA, in partnership with the Freight on Rail Group (FORG) commissioned Deloitte Access Economics to quantify the productivity impacts of prescribed outer limits for train drivers. The full report along with our submission to the recent ONRSR review on fatigue management is provided as Attachment B.

The report states that no evidence could be found to justify the safety case for prescribed hours of work for train drivers. Deloitte Access Economics developed four case studies to further explore the key costs created by prescribed outer limits for train drivers; staff costs, road transport costs, and capital costs. Two case studies quantify the current costs borne by Aurizon and Pacific National on part of their networks to comply with outer limits of service for train drivers and two case studies model the costs that could be put onto a Pilbara operator and TasRail if outer limits of service for train drivers were introduced in their respective jurisdictions. The report identifies significant financial costs for operators to comply with the prescribed outer limits for train drivers with no proven safety benefit.

Key productivity and safety costs as a direct result of prescribed outer limits of work for train drivers are outlined in the table below:

Table 2: Case study results – estimated costs of outer limits of service

Operator	Current or potential	Cost category	Value	
Aurizon – Blackwater Rail Corridor*	Current	Staff costs	$283,000	
		Road vehicle operating costs	$221,000	
		Road use externalities	$63,000	
			$567,000	Annually
Pacific National – Goonyella Rail Corridor#	Current	Staff costs	$722,000	
		Road vehicle operating costs	$81,000	
		Road use externalities	$23,000	
			$826,000	Annually
Pilbara iron ore miner	Potential	Capital costs[15]	$10,000,000	One-off cost
		Staff costs[16]	$50,400,000	
		Capital O&M	$300,000	
			$50,700,000	Annually
TasRail	Potential	Capital costs	$7,000,000	One-off cost
		Staff costs	$698,000	Annually

** This case study only applies to part of the network.*
 # This case study only applies to one service on the network, Pacific National services at least 12 mines in the Goonyella System.
Source: Deloitte Access Economics calculations using rail operators' inputs (Deloitte Access Economics, Fatigue management: The impact of outer limits of service in the rail sector, August 2018)

It must be noted that the annual costs identified in the Pacific National and Aurizon case studies are only of a portion of their networks and so the real costs currently borne by both operators to comply with the NSW and QLD variations would actually be much more substantial, with no proven safety benefit. For instance, Pacific National services at least 12 mines in the Goonyella region. The case study only quantifies the impact on one of these mines; German Creek mine to Dalrymple Bay Coal Terminal.

Noting the productivity implications, the ARA strongly advocates for the removal of the NSW and QLD variations. A consistent national approach to fatigue management is appropriate for a national industry.

The ARA's support for seamless regulatory arrangements between jurisdictions is set against the backdrop of different network rules set by the various RIMs. These differing requirements on the various rail networks serve to exacerbate the challenges faced by rail operators who traverse networks owned by separate entities. These rules include, for example, requirements relating to signals, signs and speeds. By way of example, a freight train traveling from country NSW to Port Botany would traverse various rail networks, and in so doing, be subject to differing requirements from the respective RIMs. ARA acknowledges industry has a key role to play in working together to achieve greater standardisation. However, as significant infrastructure investments will be required to achieve standardisation, there is also scope for Governments to play a leadership role in working with industry and ONRSR to achieve a set of network rules that are consistent across networks.

[15] There is significant uncertainty around this figure. The rail operator has advised that the cost would be "in the tens of millions of dollars."

[16] Staff costs in this case study include: base salary, FIFO allowance, superannuation, flight assistance, bonuses, and other special awards.

6 OPPORTUNITIES FOR IMPROVING REGULATORY GOVERNANCE

6.1 Regulatory independence is valuable

The IGA specified that the national regulator would be an independent statutory agency. ONRSR was then established as an independent body corporate under the RSNL.

Independent regulation allows for regulators to make decisions that have limited influence from government and industry. The OECD has noted that the governance arrangements for regulators, including their independence, are critical to their ultimate effectiveness:

> *How a regulator is set up, directed, controlled, resourced and held to account — including the nature of the relationships between the regulatory decision-maker, political actors, the legislature, the executive administration, judicial processes and regulated entities — builds trust in the regulator and is crucial to the overall effectiveness of regulation. Improving governance arrangements can benefit the community by enhancing the effectiveness of regulators and, ultimately, the achievement of important public policy goals.*[17]

ONRSR's core functions are to administer the accreditation regime, which is central to the co-regulatory approach, and to enforce compliance with the law.[18] The regulatory framework is co-regulatory in that governments do not directly prescribe the standards or rules by which railways need to operate. Rather, governments set a performance requirement on railways to operate safely and provide operational flexibility to establish and implement standards, rules and methods of operation necessary to meet the safety performance requirement of their operations.[19]

It is clear that the legislation intends for ONRSR to be independent, such that it is only subject to very limited ministerial direction in the exercise of its functions or powers (section 14 of the RSNL). However, in practice, the inability to achieve national consistency in relation to drug and alcohol and fatigue provisions are an example of flaws in the current system.

17 OECD, *Principles for The Governance of Regulators: Public Consultation Draft*, 21 JUNE 2013 at 5.

18 S. 13(1) of the Rail Safety National Law.

19 The ONRSR way, p. 5.

6.2 Can the regulator achieve its objectives?

Notwithstanding the intent of the law, the ARA has concerns that ONRSR is not provided with sufficient freedom to achieve its legislative objectives to:

> *(a) facilitate the safe operations of rail transport in Australia; and*
>
> *(b) exhibit independence, rigour and excellence in carrying out its regulatory functions; and*
>
> *(c) promote safety and safety improvement as a fundamental objective in the delivery of rail transport in Australia.*

As highlighted elsewhere in this submission, projects relating to developing nationally-consistent approaches to regulation relating to alcohol and drug testing and fatigue have effectively been stymied. In part, this is because legislative change and/or change to regulations ultimately revert to the state and territory ministers. This frustrates national reform and has left some ARA members with a sense that reform efforts are time-consuming and resource-draining exercises that ultimately deliver no beneficial outcome. This comes with real resource costs (see the box below).

Box 6: The costs associated with fatigue and drug / alcohol reforms

As highlighted in this submission, there have been attempts to improve the consistency of the RSNL in regards to fatigue and drug and alcohol across jurisdictions. This has been resource-intensive for industry and ONRSR but has proven largely unsuccessful.

Whilst the industry appreciates the opportunity to work with ONRSR on these important reform opportunities, the lack of support for ONRSR's recommendations at Ministerial Council and lack of substantive change due to Ministerial voting is frustrating, particularly when the process consumes considerable time and resources throughout industry.

Drawing from ARA records, Frontier Economics estimates that the involvement of industry in the fatigue review totalled 176.5 working days where industry representatives contributed to developing submissions and/or directly participated in fatigue workshops. Using a value of time estimate of $996 per day (based on an assume salary of $150k per FTE uplifted by a multiple of 2 to account for any overheads), the value of industry's contributions to the fatigue reform process is estimated to be worth $246,747. It must be highlighted though that this figure does not include the time or cost for travel and accommodation associated with participating in workshops. Nor does it incorporate the costs borne by the regulator associated with undertaking the workshops.

Source: ARA

There are also questions about whether the relationship between the regulator and government is conducive to producing the best safety regulation outcomes. An example of the lack of clarity relates to how ONRSR explains the introduction of its drug and alcohol testing program, which is provided for in the national law (Division 9 of Part 3 of the Act). In its review of drug and alcohol management regulation, ONRSR refers to the Ministerial Council "agreeing" to it undertaking a drug and alcohol testing

program[20], even though such agreement is not required under the national law and should be a result of ONRSR determining that it is an appropriate function.

This degree of direction may be affecting the extent to which the regulator feels able to focus on identifying ineffective regulations and activities.

Further, ONRSR notes that it "is guided by the expectations of the Transport and Infrastructure Council to which it is accountable".[21] While ONRSR may be subject to limited direction under the Act, this suggests that ONRSR may not have been devolved sufficient responsibility from the States, Territories and Commonwealth to efficiently and effectively achieve its objectives.

The ARA recognises that all regulators should operate within the power delegated by legislature. The question is whether the balance is right in rail safety between what is appropriately addressed in legislation and regulations, and what is devolved to an independent regulator for effective, evidence-based and arm's length decision making.

6.3 Remit of ONRSR

A common observation from ARA's freight members in the industry workshops in the development of this submission was the need for ONRSR to broaden its remit to incorporate efficiency and productivity of the rail sector. Many of these operators are directly exposed to the regulatory arrangements of the National Heavy Vehicle Regulator (NHVR). As the Productivity Commission would be aware, the NHVR has a strong productivity mandate, with the NHVR Corporate Plan 2017–2020 outlining how one of the NHVR's key priorities is the improvement and enhancement of industry productivity. As outlined in this submission, there exists a number of opportunities to:

- strengthen the current regulatory arrangements
- achieve national consistency by removing state-based variations
- improve rail safety through proactive action
- further consider the current governance arrangements

Greater focus on these ARA priorities (both individually and collectively) are important steps to achieving enhanced productivity outcomes for the rail industry without adversely affecting safety outcomes.

6.4 The role of standards and RISSB

As the Commission notes, the Rail Industry Safety and Standards Board (RISSB) assists the industry to achieve safety through the setting of standards. The Commission has asked whether the involvement of agencies such as RISSB in setting standards complements or undermine the role of national regulators in meeting safety and productivity objectives.

In the ARA's view, there is a lack of clarity about how RISSB should work in the context of the national regulatory model. The purpose of a standards body producing (non-binding) nationally-consistent standards is said to be to improve risk management and assist rail operators in managing their obligations, and to increase efficiency and productivity. Some uncertainty arises where there is potential for overlap and duplication of roles between RISSB and ONRSR. For example, in relation to fatigue:

[20] ONRSR *Consultation Paper: Drug and Alcohol Management Review*, p. 9.

[21] ONRSR *Statement of Intent*, 2018-21, p. 2.

- Accredited RTOs must have a safety management system which must include a fatigue risk management program to be prepared and implemented by the RTO.[22] The fatigue risk management program must meet the requirements set out in regulation 29 of the National Regulations
- To support RTOs in managing fatigue likelihood impacting on their rail safety risk and complying with the requirements for fatigue risk management under the RSNL, RISSB developed a guideline for its members
- As part of ONRSR's review of fatigue management, it drafted of a Code of Practice which was proposed to be approved by Ministers under the RSNL. The Code would not alter any existing legal requirements under the RSNL and would not be mandatory, but would be referenced in the National Regulations. During the review, ONRSR suggested that an ONRSR Code would enhance the ability of industry to better manage fatigue by adding to the resources already available including the RISSB guidelines. The development of a Code by ONRSR in this instance raised the question of the role of RISSB if ONRSR is to develop similar products

Fatigue has proven a particularly difficult area of regulation, and there is little appetite within industry for greater prescription in regulation. Nonetheless, in the ARA's view, the fatigue example highlights that more could be done to assure the industry that the regulatory framework can operate as a coherent package of elements that appropriately focuses regulatory effort on areas of risk. For example, the value of RISSB may be enhanced if it focused on areas where risks of not meeting minimum standards are highest.

In addition, it should be noted that the Rail diagram in Figure 2 of the Commission's paper, incorrectly classifies RISSB as a developer of 'safety management systems' and 'best practice guidelines'. The RISSB does not develop safety management systems, RTOs do. Further, RISSB does not develop 'best practice' guidelines, but rather uses a baseline of 'good practice'.

6.5 Further review is required

The ARA considers that it would be helpful for the Commission to further consider the governance arrangements around the role, objectives and independence of ONRSR, and its relationships with the States, Territories and Commonwealth, and with RISSB, to ensure that it is best able to deliver on its core objectives and the objectives of national rail safety legislation as a whole.

[22] s116 of the RSNL.

7 IMPROVING THE ATSB'S EFFECTIVENESS

7.1 The ATSB's role

The ATSB is an operationally-independent body and is Australia's prime agency for transport safety investigations. The ATSB's stated function is to improve safety and public confidence in the aviation, marine and rail modes of transport through:

- independent investigation of transport accidents and other safety occurrences;
- safety data recording, analysis and research; and
- fostering safety awareness, knowledge and action.

The ATSB describes its role is to investigate selectively, so it can concentrate ATSB's resources on those investigations considered most likely to enhance rail safety. When the ATSB investigates an accident or incident, investigators will seek to determine its circumstances, identify any safety issues, and encourage relevant safety action. The ATSB states that:

> *The aim of all ATSB investigations is to prevent the occurrence of other accidents and incidents, rather than to assign blame or liability. This approach helps ensure the continued free flow of safety information for the purposes of improving safety in the future.*[23]

7.2 Issues with the ATSB's role

There is broad support from ARA members on the usefulness of a body that conducts "no fault" investigations with a focus on improving future safety. It is also a feature of rail safety regimes in the United Kingdom (RAIB) and the United States (Federal Railroad Administration). This is most beneficial in investigations that have occurred on rail systems where there were complex supply chains; for example, with a separated below rail operator and multiple above rail operators carrying a mix of freight and passengers.

That said, a consistent theme from ARA members is that they are not convinced that the ATSB is effectively fulfilling its mandate to prevent the occurrence of future accidents and incidents. Some of the reasons provided were that:

- The ATSB's investigations take too long, with the sense that industry has "moved on" from the incident by the time that reports are finalised, particularly given that operators invariably undertake their own investigations immediately following serious incidents and ONRSR may also conduct an investigation. Given incidents are costly to industry, operators are looking to understand causes of any accidents and incidents and learn any lessons quickly.

[23] ATSB website.

- ATSB's procedures, including in reporting and assessing incidents, were sometimes unclear with this causing concern where there was a clear benefit in clearing an accident scene.
- Concurrent police, OHS, ONRSR and ATSB's investigations involve significant duplication of effort. Furthermore, affected staff are commonly subjected to multiple interviews causing additional trauma.
- A perception that the ATSB's resources were spread thinly across a significant number of investigations that were unlikely to produce learnings.
- Issues were also raised with how well the ATSB's reports are targeted to the sector-specific audience, with many operators stating they did not find the reports useful.

Timeliness

ARA members are particularly concerned by the timeliness of ATSB feedback and reporting. We also understand that the ATSB has been engaged in processes to improve timeliness, for example through seeking further funding.[24]

Nonetheless, the ARA remains concerned that too little is being done in this regard. The ATSB's website indicates that final reports on incidents often take between two and three years to be published after an incident has occurred.[25] Further analysis of the ATSB's corporate plan and annual reports indicates that:

- The 2017-18 corporate plan reported that in 2016-17 that only 32% of complex investigation reports were completed within one year, but that benchmark (KPI) performance of 90% was to be achieved in years 2017-18 onwards.[26]
- Annual reporting for 2017-18 indicated that the *actual* percentage of complex investigation reports completed within one year fell to 8%.[27]
- Against a target of 90% of short investigation reports being completed within four months, only 41% of short investigation reports were completed within four months during 2017–18.[28]
- The revised 2018-19 corporate plan changes the ATSB's KPIs to now measure "average time taken to complete and publish complex investigation reports". This records actual performance of 23 months, with a 2018-19 budget of 21 months.[29]

The ARA remains concerned that such timelines significantly reduce the utility of the reports produced by the ATSB and their benefits in increasing safety across the industry.

We understand that the Australian National Audit Office (ANAO) has made a number of recent recommendations to improve the efficiency of the ATSB, including benchmarking against comparable international agencies, and the ARA endorses this.[30]

There must be sufficient resourcing for the ATSB to better fulfil its mandate, and ensure it provides accurate reports in an efficient and timely manner that support improved safety outcomes.

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[24] We understand that the May 2017 Budget included additional funding of $11.9 million for the ATSB over five years from 2016–17.

[25] https://www.atsb.gov.au/publications/safety-investigation-reports/

[26] ATSB corporate plan, 2017-18, p. 23.

[27] ATSB annual report 2017-18, p. 37.

[28] ibid.

[29] ATSB corporate plan, 2018-19, and Auditor-General Report No.29 2018–19, *Efficiency of the Investigation of Transport Accidents and Safety Occurrences*, p. 20.

[30] Auditor-General Report No.29 2018–19, Efficiency of the Investigation of Transport Accidents and Safety Occurrences

8 OTHER OPPORTUNITIES FOR IMPROVEMENT

8.1 Efficient intermodal competition is important to Australia

The overall efficiency of the rail freight industry is of critical importance in Australia with its relatively dispersed population centres. The freight industry accounts for up to 10 per cent of Australia's gross domestic product.[31] And its importance is growing — the domestic freight task increased by 50% in the 10 years to 2016, and is forecast to grow another 26% by 2026.[32] More generally it is critical for Australia's economy that its transportation systems (both passenger and freight) work as efficiently as possible.

For some freight tasks, rail operates in a competitive market with road and domestic sea transport — particularly in relation to inter-capital non-bulk freight. Excessive burdens imposed on rail will reduce its competitive position and distort transportation choices driving more freight to travel by road even where this is inefficient.

In contrast, a competitively neutral regulatory framework would leave market forces to drive modal outcomes and enable more efficient transport supply chains to emerge and reduce transport costs across the economy. Decreased freight transport costs, particularly between capital cities, would result in lower prices for consumers (in terms of manufactured goods and produce). Furthermore, this would increase the competitiveness of key markets and sectors.

In addition, moving more freight from rail will have an adverse safety impact for the entire community, given that road travel causes almost eight times more accident costs per kilometre travelled than rail.[33]

8.2 Safety regulation affects intermodal competition

There are many areas in which rail does not operate on a level playing field with road in respect to its regulatory environment. Road charging arrangements are one such area of concerns for our members. Our recent submission to the Consultation Regulation Impact Statement for HVRR Phase 2 Independent Price Regulation of Heavy Vehicle Charges, highlights that reforms to heavy vehicle pricing are needed to help create a consistent pricing and regulatory framework applying to all modes (see Attachment C).

But the RSNL also impose unnecessary burdens that reduce rail's competitive position and unduly favour alternative modes of transport. This should come as no surprise to the Productivity Commission as in a 2006 inquiry it highlighted that rail regulatory reforms which streamline incompatible or duplicative

[31] Australian Logistics Council (2014) The Economic Significance of the Australian Logistics Industry. http://austlogistics.com.au/wp-content/uploads/2014/07/Economic-Significance-of-the-Australian-Logistics-Indsutry-FINAL.pdf

[32] National Transport Commission (2016), Who moves what where, source: https://www.ntc.gov.au/Media/Reports/(D62E6EFC-36C7-48B1-66A7-DDEF3B04CCAE).pdf)

[33] Value of Rail – The Contribution of Rail in Australia' (2017) Deloitte Access Economics

regulations especially in relation to safety would have a beneficial impact on rail's freight share and volumes.[34]

Many of the issues discussed by the Commission in this 2006 inquiry report have not yet been addressed such as the overly prescriptive arrangements in some states relating to fatigue and drug and alcohol (see section 5). **Table 3** highlights the disparity between the regulation of driver fatigue in the road and rail safety legislation. It highlights that in NSW and QLD train drivers are subject to far more stringent restrictions on the hours they may work, despite rail operating in a more controlled isolated system.

Table 3: Disparity in the regulation of driver shift lengths in the heavy vehicle vs rail legislation

HEAVY VEHICLE	RAIL
Under the NHVL Operators with Basic Fatigue management accreditation can operate under more flexible work and rest hours, allowing for work of up to 14 hours in a 24-hour period. Operators with Advanced Fatigue Management accreditation are able to increase a solo truck driver hours to 15.5 hours per 24-hour period (including 1.5 hour regulatory breaks).	Under the RSNL there are currently no prescribed hours. But there is a requirement for an operator to develop a Fatigue Risk Management Plan. In NSW and Qld prescriptive requirements exist relating to train driver hours. This specifies maximum shift lengths which vary between: • 8 or 9 hours for suburban passenger services. • 12 hours for freight operations where there is a second driver who is a qualified train driver

Source: Frontier Economics summary of existing legislation.

In addition, there are several other areas we wish to bring to the Commission's attention where the rail safety regulatory regime is unduly burdensome and so should be further reformed:

- Rail safety worker definition
- Cost recovery from tourist and heritage operators
- Interface agreements

Further details on these issues follow.

8.3 Definition of a rail safety worker

The current definition of rail safety work in the RSNL (s. (1)(8)) results in a very subjective application throughout the rail industry of what is 'rail safety work' and who are 'rail safety workers'. As a result, divergent judgement calls and interpretations of the law are being made as to who are rail safety workers.

As it currently stands, rail safety workers may be broadly interpreted to include workers who are completing tasks with no impact on rail safety. Furthermore, the current definition of rail safety work overlaps with WHS/OHS obligations. By way of example, under current definitions in the RSNL, factory workers constructing new rolling stock at a manufacturing site could be considered rail safety workers. This, however, would not apply if the rolling stock is 'off the shelf'.

[34] Productivity Commission (2006), *Road and rail freight infrastructure pricing*, Productivity Commission Inquiry Report, N0. 41, 22 December 2006, p. XLVI

The RSNL, through this differential treatment, risks creating distortions that may affect incentives for domestic construction of rolling stock. Similarly, construction workers involved in early works or greenfield railway track construction could be considered rail safety workers. In the view of ARA members, the safety of these workers on manufacturing and construction sites is already governed by WH&S and/or OH&S legislation.

This problem of over classification (or broad interpretation) of employees as rail safety workers creates confusion and uncertainty and also puts a cost and administrative burden onto industry with no discernible safety benefit. With more than $100 billion in rail industry projects committed in the next decade, this definition of rail safety work needs to be amended promptly.

The industry view is that railway operations start when steel wheels are on rails and the focus of the RSNL should therefore be on two identified 'core categories' of risks:

- Risks to railway operations and therefore potentially to the public; and
- Risks to workers (that are specific to rail and not already covered by WHS/OHS).

The ARA welcomes the NTC's proposal to amend the definition of rail safety work within the RSNL. Although the proposed amendments would need to be viewed to be certain of their effectiveness to meet the objectives of the RSNL, without comprising safety, the industry supports the NTC's proposal to amend the definition of rail safety work.

Narrowing the definition of rail safety work will assist in ensuring rail is not unduly impeded relatively to the other modes of transport with which it competes.

8.4 Regulatory cost recovery

The IGAs underpinning the national transport regulatory reform associated with rail, heavy vehicle and maritime outlined the intent that the ongoing costs associated with the sector safety regulators should be recovered from industry.

Currently an RTO's annual accreditation fees comprise a single fixed component ($15,000) and a variable fee based on jurisdictional specific rates associated with either the length of track managed and/or train kilometres travelled.

These are adjusted each year consistent with a cost recovery model endorsed by the Standing Council of Transport Infrastructure (now the Transport and Infrastructure Council). Annual adjustment reflects change in CPI *plus* 5% in those jurisdictions not at full cost recovery. It is the industry's view that any amendments in the level of cost recovery needs to be transitioned in this way to avoid a price shock.

The ARA understands that at the Ministerial Council's direction, ONRSR is currently developing a new national cost recovery model, which will look to recover fees based on cost drivers associated with 'risk and regulatory effort'. In general, the industry is supportive of this approach but is aware there will be 'winners and losers'.

The fee review has the potential to have a significant impact on the tourist and heritage rail sector. Tourist and heritage operators currently pay a discounted accreditation fee of $2,000 which, in many cases, is paid by jurisdictional governments. Industry considers that it is reasonable for governments to support the tourist and heritage sector on the basis of the wider benefits these rail operations are likely to generate for the community; through tourism and maintaining history.

However, we also understand that this current discounted fee is not reflective of the 'regulatory effort' provided by ONRSR to tourist and heritage RTOs which has been estimated to be in the realm of

approximately $10 million per annum. Therefore, under current arrangements, other segments of the rail industry are effectively subsidising the costs of regulating these tourist and heritage operators.

It is our understanding that the Ministerial Council will ultimately be required to 'approve' the new national cost recovery model being developed. The ARA is concerned about this arrangement. Experience in drug and alcohol and fatigue reviews would suggest that Ministers might not be keen to unwind the existing funding arrangements and cross subsidisations which have to date been reducing the contribution government must make to supporting the tourist and heritage sector. This example further highlights industry concerns around the degree to which ONRSR takes direction from Jurisdictional governments discussed in section 6. In our view, fee setting is a task that can be undertaken by a regulator directly with reference to the costs of its own activities (and with some oversight or restrictions on increases in the cost of regulation).

8.5 Interface agreements

The RSNL requires that RTOs and road managers (jurisdictional agencies or local governments) must enter into interface agreements to manage the risks to safety at "interfaces". Interfaces are rail or road crossings such as level crossings or a bridge carrying a road over a railway, or *vice versa*.

An *interface agreement* is a formal written agreement between the parties which details relevant measures for the ongoing management of the risks to safety. While industry understands why these arrangements are important, RTOs often find their ability to negotiate and enter into an interface agreement with a road manager challenging.

For the most part, the rail industry initiates and drafts these interface agreements and in most case funds any risk mitigation works proposed in the agreement. In some cases, RTOs have been required to take over maintenance of road manager assets such as level crossing signage and controls in order to get these agreements finalised. Some examples of the issues that have emerged are contained in the **box** below.

While the RSNL suggests road managers should investigate risks with rail operators, it is the RTOs that ultimately own the risk and hence have an incentive to resolve these interface issues. In contrast it can be challenging to get the road manager to engage in these issues, particularly local councils and local land owners who may not realise what their obligations are and are unlikely to understand what is required in interface agreement.

These issues can be compounded by the fact that road managers are not required (or aware of the need) to inform rail operators that heavy vehicle access arrangements may have changed. This can cause issues for RTOs as different heavy vehicles present different risks to rail infrastructure and rail safety. For example, boom gates at level crossings may not be appropriately timed to enable safe passage for certain classes or lengths of heavy vehicles.

This imbalance in the degree to which safety critical risks are managed and regulated across sectors has the effect of placing a relatively higher burden for safety risk management on rail. This can impact on the efficiency of modal competition and ultimately the efficiency of the freight transport.

The ARA encourages the Commission to further investigate how these imbalances in the management of safety risks across sectors can be resolved.

Box 7: The challenges of negotiating interface agreements

Increased road haulage by a major heavy haul trucking company over a Pilbara level crossing

1. A major heavy haul trucking company increased production at its mine which increased its truck movement count over a major Pilbara Railway Active Level Crossing on the Great Northern Highway.

   As the RTO the Pilbara Railway was obliged under a Deed with MRWA to spend a capital sum of approximately $25M to upgrade the Active Level crossing to a full grade separation at the crossing.

   Under the RSNL, the full burden of cost ($25M) of mitigating the risk by installing grade separation falls solely on the RTO. The road Heavy Vehicle Operator has no obligation to contribute to the cost of mitigating the risk even though they were the catalyst for the increase in risk which required grade separation. In addition, MRWA collects funds from trucking companies but does not contribute an amount towards grade separation projects.

2. A major heavy haul trucking company increased production at its mine which increased its truck movement count at major Pilbara Railway Active Level Crossings on the East Wodgina Rd.

   As the RTO a Pilbara Railway wished to enter into an interface agreement (IA) with the trucking company to mitigate certain risks which were under the trucking company's control (such as geofencing speed limits over the crossing, D&A testing of its work force). But the trucking company refused to enter into an IA citing that it is not a requirement under the RSNL.

   Under the RSNL, the road Heavy Vehicle Operator has no obligation to enter into an interface agreement with an RTO even though they may be the catalyst for the increase in risk at the level crossing. Only Road Managers are required to establish an IA with an RTO, but not Road Operators.

Road Managers increasing Road Rating (Restricted Access Vehicle (RAV) rating) without informing the RTO

1. Road Managers can increase the Road Rating (eg max vehicle length) without informing the RTO which can increase the level of risk at level crossings due to timing settings becoming out of synch.

   This presents a safety risk because the Level Crossing boom arms may descend too quickly and clip the rear of a longer truck which exceeds the previous RAV rating.

   The RSNL does not obligate Road Managers (eg Main Roads Western Australia) to notify RTOs of a change to a road's RAV rating.

Source: Pilbara RTO

A ARA DRUG & ALCOHOL MEMBER BRIEF

AUSTRALASIAN RAILWAY ASSOCIATION

Association Number A03958 | ABN 64 217 302 489

ONRSR DRUG & ALCOHOL REVIEW

ARA Member Brief

2018

STATEMENT OF SUPPORT

The Australian Rail Industry strongly advocates for Ministerial Council to vote in support of each of the six recommendations made by the Office of the National Rail Safety Regulator (ONRSR) to achieve a nationally consistent framework to manage the risk of drug and alcohol use in Australia's rail industry.

A nationally consistent approach to drug and alcohol management in the rail industry will reduce regulatory burden and ensure that drug and alcohol management policies and procedures are structured to address identified risks rather than mandated targets.

The current variation of drug and alcohol requirements in NSW affects 53 of Australia's 186 accredited operators. This imposes regulatory burden on industry through increased cost, compliance and productivity impacts whilst also limiting the flexibility for rail transport operators to select the most appropriate testing means to mitigate their drug and alcohol risks.

Drug and alcohol management in the industry is a shared responsibility between operators and rail safety workers. Industry advocates for a risk-based approach to drug and alcohol management that provides industry with the flexibility to select its testing type based on the situation and the risk being managed, not according to a predetermined requirement.

Australia's Rail Industry employs in excess of 100,000 rail safety workers. Some operators test 100% of their rail safety workers yet positive detection rates of drugs and alcohol for Australia's whole rail industry are well below one percent. Rail continues to demonstrate its commitment to safety and the management of drug and alcohol. This should be recognised when Ministerial Council meets in May voting in support of the six recommendations put forward by ONRSR.

BACKGROUND

On 7 December 2009, COAG agreed to establish a National Rail Safety Regulator (NRSR). The ONRSR was established to deliver the Rail Safety National Law (RSNL) that the Regulator would operate under. This law was passed in the South Australian Parliament on 1 May 2012 with three key areas deferred for later decision. Namely:

1. Drug and alcohol management
2. Fatigue management
3. Cost recovery

ONRSR has since been tasked by Ministerial Council to review these and provide recommendations on how to achieve the best legislative framework for the rail industry to nationally manage drug and alcohol, the risk of fatigue and establish a national cost recovery model based on risk and regulatory effort.

ONRSR has prepared a *Drug and Alcohol Management Review* paper that identifies six recommendations for a nationally consistent approach to drug and alcohol management in the rail industry. Industry supports each of ONRSR's six recommendations for a nationally consistent approach to drug and alcohol management.

A copy of ONRSR's paper is available here: www.onrsr.com.au/__data/assets/pdf_file/0003/19749/Draft-Drug-and-Alcohol-consultation-paper-June-2017.pdf

DRUG AND ALCOHOL MANAGEMENT

Rail Transport Operators are obligated under the RSNL to ensure, so far as is reasonably practicable (SFAIRP), that rail safety workers are not on duty or performing rail safety work while impaired by alcohol or a drug.

Rail Transport Operators are required to prepare and implement risk-based a Drug and Alcohol Management Plan (DAMP). DAMPs include the operator's drug and alcohol policies and procedures, provision of information and education to rail safety workers and details of drug and alcohol testing regimes.

The rail industry uses drug and alcohol testing to mitigate the risk of rail safety workers undertaking rail safety work whilst under the influence of alcohol or drugs. ONRSR uses drug and alcohol testing to check for compliance with the RSNL. Industry and the Regulator conduct random testing throughout industry as a deterrent of drug and alcohol use and impairment on the rail network.

Detection rates in drug and alcohol tests across the whole rail industry are well below one percent, confirming Industry's commitment to safety and the management of drug and alcohol use.

The rail industry strongly supports a consistent, national approach to the management of drugs and alcohol use in the rail industry. A national approach will provide safety benefits and reduce regulatory burden on the industry.

The Industry is committed to working with ONRSR to achieve national consistency in drug and alcohol management within rail.

CURRENT INCONSISTENCIES

In November 2016, Ministerial Council was formally advised of more than 80 derogations to the RSNL (a derogation is an exemption from or relaxation of the law). At this time, the Rail Industry reported drug and alcohol management as one of the top four derogations with the most significant safety and productivity impacts.

Currently, a New South Wales (NSW) version of the law means two different sets of drug and alcohol requirements exist. According to ONRSR, there are 186 accredited rail operators in Australia. Of those, 53 are currently required to comply with the two different sets of drug and alcohol requirements. This has cost, compliance and productivity impacts for the industry and limits the flexibility for rail transport operators to manage their drug and alcohol risks according to the scenario being addressed.

Subregulation 28 (2) of the RSNL requires rail transport operations in or through NSW to implement additional elements in their DAMP for rail safety workers conducting rail safety work in NSW. In brief, these are;

- random preliminary breath or urine testing of not less than 25% of all rail safety workers;
- drug and alcohol testing a rail safety worker involved in, or reasonably suspected to have been involved in, within three hours of a prescribed incident; and

- that the testing outlined above must be completed to an evidentiary standard by an authorised person engaged by the operator (testing to an evidentiary standard enables the Regulator to use the results to prosecute).

Given the remoteness of some parts of the NSW rail network, implementation of the NSW provisions are not always reasonable or practicable. Removing the additional elements currently prescribed in NSW and establishing a nationally consistent risk-based approach to drug and alcohol management will generate efficiency and cost benefits for the industry, allow operators working within NSW to conduct drug and alcohol testing to target identified risks rather than to meet targets and provide clarity around expectations and the approach to drug and alcohol management for rail safety workers.

TESTING TYPES

Drug and alcohol management in the industry is a shared responsibility between operators and rail safety workers.

Rail transport operators have developed robust drug and alcohol testing regimes with significant investments in random and post-incident testing. Education and health programs ensure drug and alcohol management in the industry is a shared responsibility between operators and rail safety workers.

The RSNL requires operators to develop and implement a DAMP but does not prescribe testing methods, enabling operators to choose the most appropriate drug or alcohol test type according to the risk they are managing in a co-regulatory approach. As outlined above, NSW has specific obligations. Operators in all other jurisdictions can select their method of testing depending on circumstances. The rail industry most commonly uses oral fluid and urine testing to test for drugs. Breath tests / analysis is used to test for alcohol.

Currently ONRSR can only use oral fluid or blood to test for drugs and due to NSW legislation can also use urine testing in NSW.

Different drug test types; urine, blood and swab (oral fluid) have benefits and limitations in their ability to detect the presence of drugs or alcohol. For these reasons, providing both industry and ONRSR with the flexibility to choose their method of drug testing depending on the risk being managed is paramount.

DRUG TESTING TYPE COMPARISON		
	Urine Testing	**Oral Fluid (Swab) Testing**
Time since potential drug use	Presence indicates past use. Can identify long term drug use May not detect recent use of some drugs (some take 4-8 hours to be detected in urine)	Detects recent drug use only (usually within 3 hours)
Impairment indicator	Presence of a drug requires further indicia (e.g. observations of behaviour) to prove impairment	Presence of a drug indicates recent use and is therefore used as proof of impairment
Offence under the RSNL	Presence of a prescribed drug in urine testing is not an offence under the RSNL (due to the need for further indicia)	Presence of a prescribed drug via oral fluid (and blood) testing is an offence under the RSNL
Number of identifiable drugs	Detects a wider range of drugs than oral fluid testing	Detects less drugs than urine testing (typically only 6 drug types)

Privacy impact	More invasive	Less invasive
Cost	Less expensive	More expensive
Facilities to test	Private facilities required	Can be conducted on site at any location

The key differences between urine and oral fluid (swab) drug testing, highlights the advantages and disadvantages of both test types. Neither is more effective than the other. Both have their strengths depending on circumstances. While a positive swab test can be used as evidence for an offence under the RSNL, swab tests detect a smaller range of drugs than urine drug testing and only detect recent drug use. Urine drug testing can identify long term drug use and has the ability to detect a wider range of drugs but may not detect recent drug use.

The Rail Tram and Bus Union (RTBU) advocates for mandated swab testing and questions the efficiency of urine testing. The strengths and limitations of each test type highlights the need for Industry and ONRSR to be able to use all types of drug testing devices depending on the risk being managed and availability of appropriate facilities.

The following three drugs are prescribed in the RSNL:

- Delta-9-tetrahydrocannabinol (Cannabis)
- Methylamphetamine (Methamphetamine)
- 3,4-Methylenedioxymethylamphetamine (MDMA/ecstasy)

Under the RSNL, to undertake rail safety work with the presence of the above three drugs is an offence. However, noting the different capabilities between urine and swab testing, and aligning with the Road Safety Rules, ONRSR can only prosecute for the presence of these drugs from a swab test. Presence of these drugs in a urine test does not automatically allow for prosecution for presence. A urine positive drug test cannot be used by ONRSR to prosecute for presence but can be used with other evidence to support prosecution for impairment. ONRSR is not seeking changes to this arrangement.

The Regulator has the power to prosecute rail safety workers for breaching requirements in the RSNL. The presence of a drug, particularly evidence of long-term drug use as is identifiable through urine drug testing, can cause impairment over time. The Rail Tram and Bus Union (RTBU) "*believes that any disciplinary action for safety breaches must turn on the issue of impairment, rather than presence*". Disciplinary action, penalties and dismissal for safety breaches are usually identified within operator DAMPs and contained in Rail Transport Operator HR policies.

RECOMMENDATIONS

Industry supports each of the six recommendations made in ONRSR's *Drug and Alcohol Management Review* paper.

The RTBU states that it has "*consistently provided in-principle support for a national approach to drug and alcohol-management*".

Recommendation 1: ONRSR and operators should have access to all testing methods in the law and the flexibility to apply the most appropriate method of drug testing based on the organisation's identified risk.

The Rail Industry supports this recommendation. The RTBU does not support this recommendation.

Providing ONRSR and the rail industry with the flexibility to select the type of drug test based on the situation, location and risk being managed will provide a more robust drug testing program for Australia's rail industry.

The strengths and limitations of urine and swab drug testing is outlined in the table above and demonstrates the need for industry and ONRSR to have the flexibility to choose the type of drug testing device based on each scenario. Some drugs take four to eight hours to be detected in urine, relying solely on urine drug testing would mean drug use may not be detected if a rail safety worker is urine drug tested before this timeframe. On the other hand, oral fluid drug tests will detect drug use within a shorter timeframe but after three hours, drug use may go undetected. Urine drug tests can also identify a greater number of drugs than oral fluid drug tests. In addition, testing in remote locations may require oral sampling to overcome privacy issues.

Providing industry and ONRSR with the opportunity to select the drug testing methods based on the operator's identified risk profile will allow the selection of the most suitable drug testing method for the situation. Restricting industry and ONRSR to only certain types of drug tests will limit the ability to detect potential drug use in the industry. Although less than one percent of tests nationally are positive, the rail industry and ONRSR must have access to all testing methods under the law to be able to adequately test rail safety workers and ensure that the operator can satisfy its obligation to ensure rail safety workers are not on duty or performing rail safety work when they have prescribed drugs, or alcohol, over the thresholds, in their system.

Recommendation 2: The level of random testing conducted by rail transport operators should be determined using a risk based approach. ONRSR will issue guidance material outlining their expectations in relation to managing the risk of drug and alcohol use SFAIRP.

The Rail Industry supports this recommendation. The RTBU agrees with this recommendation in principle.

Removing the minimum level of prescribed testing in NSW will ensure that random drug and alcohol testing is completed to manage risks rather than compliance with a mandated target or percentage of rail safety workers. This will provide industry with the flexibility to focus testing according to risk rather than achieving a pre-determined target.

Some operators conduct drug and alcohol testing of 100% of their rail safety workers. Mandating a target (such as the 25% in NSW) can detract from conducting drug and alcohol testing to a risk-based approach. Rather than mandate a target, the rail industry should be consistently required to conduct random drug and alcohol testing based on identified risks within their operation. With no testing targets included in the RSNL, operators would have the ability to include their own targets, according to the risks they are managing in their DAMPs. ONRSR has the responsibility to ensure that these are sufficient to manage the risk.

Industry notes and welcomes ONRSRs proposal to develop guidance materials to support the industry to meet their obligations under RSNL and outline the expectations of how Industry should manage the risk of drug and alcohol use.

Recommendation 3: Rail transport operators should not be required under the RSNL to conduct drug and alcohol testing to evidentiary standards for use by the Regulator for prosecution purposes. Note the Regulator will increase their testing program.

The Rail Industry supports this recommendation. The RTBU agrees with this recommendation in principle.

No other industry in Australia is required to collect evidence on their employees on behalf of their Regulators for potential prosecution. Industry advocates the ONRSR position that Industry should not be required to test to an evidentiary standard. Removing the need for NSW accredited operators (53 of 186 accredited operators in Australia) to conduct drug and alcohol testing to evidentiary standards will remove regulatory burden and provide productivity benefits and cost savings for industry.

Evidentiary testing is completed by an authorised person in a manner that ensures it is admissible as evidence in a court of law. ONRSR has the power under the RSNL to undertake drug and alcohol testing to an evidentiary standard, allowing the Regulator to use drug and/or alcohol test results to prosecute.

Drug and alcohol testing in NSW must currently be completed to evidentiary standard. However, the Regulator has been unable to progress a number of NSW test results to prosecution due to the operator's authorised person not reasonably complying with the required evidentiary testing process. The evidentiary testing requirement was introduced by the NSW Regulator that no longer exists. Industry supports the recommendation that rail transport operators are no longer required to conduct testing to an evidentiary standard.

As the NSW Regulator no longer exists, the Regulator has the sole responsibility to prosecute and ONRSR has dedicated funding for evidentiary drug and alcohol testing, Industry supports the proposal that only ONRSR is able to test to an evidentiary standard. Removing the need for operators to test to an evidentiary standard will increase the likelihood that evidentiary testing is conducted as required and will be available to the Regulator to prosecute if needed. As well as achieving national consistency, this aligns with a co-regulatory approach, will remove an unnecessary regulatory burden for NSW operators and provide cost savings and productivity benefits. Rail operators will continue to undertake testing as per their DAMP.

Recommendation 4

4 (a) Drug and alcohol testing following a prescribed incident to be mandatory in legislation.

The Rail Industry and RTBU support this recommendation.

Mandated testing following prescribed incidents will ensure that testing is undertaken following incidents where rail safety worker action or inaction may have contributed to the incident. Clarification of post-incident testing requirements will assist in achieving national consistency in the industry's approach to post-incident testing, ensure testing is undertaken after incidents where the likelihood of a rail safety worker's action or inaction is high and providing clarity for industry and rail safety workers.

Currently, with the exception of NSW, the RSNL does not mandate post-incident testing following certain incidents. Most operators include post-incident drug and alcohol testing after certain incidents in their DAMP to identify whether the presence of a drug or alcohol was a cause or contributing factor to the incident.

Testing will be undertaken where possible by police or ONRSR however if this is not possible, legislation will require the operator to undertake this testing to ensure testing of the rail safety worker following a prescribed incident occurs. As test results are shared with the operator, this will remove the need for duplicate testing of rail safety workers which currently occurs in some jurisdictions.

Industry and ONRSR must still agree about the protocols and systems to be established in terms of how they will work together to facilitate ONRSR or police drug and alcohol testing post incident, and what protocols will be used to inform an operator that they must undertake testing. These protocols and systems will need to account for the safety of the network, suitable testing timeframes, etc and may need to be arranged at a local operator interface level.

4 (b) Post incident drug and alcohol testing to be undertaken following those prescribed incidents listed in Table 10.

The Rail Industry supports this recommendation. The RTBU notes this recommendation.

An agreed list of prescribed incidents that require post incident drug and alcohol testing will establish national consistency and provide clarity for industry and rail safety workers as to when post-incident testing should occur.

Industry notes the proposed prescribed incidents that will require drug and alcohol testing are as follows:

- Running Line Collisions between rolling stock
- Level crossing collisions
- Running line derailments
- Fatalities (other than suspected self-harm)
- Serious injury (other than slips, trips and falls)
- Serious breach of network rules (further breakdown of this is currently being undertaken by ONRSR)
- SPADS (A1, A3, B4)

Post-incident testing is mandated in the Australian aviation industry but not in heavy vehicle or marine legislation. Industry welcomes the recommendation to mandate post-incident testing as per the incidents outlined above but notes that Industry and ONRSR must still agree about the extent and nature of testing. For example, in a running line collision, rolling stock drivers are obvious however clarity will be required as to whether the signaller, train controller, potentially a guard or conductor on the train etc. should also be tested.

4 (c) Rail transport operators to undertake drug and alcohol testing following a prescribed incident if this testing is not undertaken by police or ONRSR.

The Rail Industry and RTBU support this recommendation.

If ONRSR or Police are unable to conduct post-incident testing following a prescribed incident (as identified in 4 b), Industry is willing to adopt this recommendation, noting that this aligns to a co-regulatory approach.

As per recommendation 3, industry advocates that operators are not required to conduct testing to evidentiary standard as this would be a significant regulatory burden and cost to industry.

4 (d) ONRSR to endeavour to undertake drug and alcohol testing to an evidentiary standard unless undertaken by police, recognising that there will be circumstances where it will not be possible for ONRSR to undertake testing.

The Rail Industry supports this recommendation. The RTBU notes the recommendation.

ONRSR undertaking drug and alcohol testing to an evidentiary standard unless undertaken by Police will reduce the regulatory burden on industry, make it clear where the initial testing responsibility lies and that ONRSR testing will be done to an evidentiary standard.

Noting the challenges outlined in recommendation 3, providing ONRSR with the ability to conduct evidentiary testing, where possible, will reduce the regulatory burden on industry and reduce the number of tests that are unable to progress to prosecution due to the evidentiary standard process being inaccurately followed.

Recommendation 5: Include in the RSNL nationally consistent offence provisions for tampering or interfering with a sample.

The Rail Industry supports this recommendation. The RTBU notes the recommendation.

This recommendation would make it a national offence consistent under the RSNL for an individual to obstruct drug or alcohol testing or tamper with a sample. Industry strongly supports this recommendation and the inclusion in the RSNL.

Recommendation 6: Continue in researching the possibility of aligning drug and alcohol testing requirements under the national law, to be consistent across Australia.

The Rail Industry supports this recommendation. The RTBU notes the recommendation.

Currently ONRSR's drug and alcohol testing program mirrors state-based Police road-side testing laws. This has allowed Police to conduct ONRSR testing without changes to their current processes but has proven inefficient for ONRSR testing, inconsistent between jurisdictions (including jurisdictional differences of evidentiary testing), costly and complicated to implement.

The Industry recognises that additional work is required in relation to this recommendation but that it aims to provide legal provisions for third party testing on behalf of ONRSR as well as consistent legal parameters for Police testing of rail safety workers. Continued progress in this space will achieve a more efficient and effective national ONRSR drug and alcohol testing program.

ONRSR has stated that it would be unlikely for rail safety workers to be subjected to duplicated Police and ONRSR testing, a clear benefit for rail safety workers and therefore industry. As noted in recommendation 1, industry advocates the ability to choose between oral and urine testing as part of a risk-based approach according to their DAMP and that the specific type of testing is not prescribed in the National Regulations.

Industry advocates a nationally consistent approach to drug and alcohol management that would see authorised persons on behalf of ONRSR use the "same devices, advices, notices, certificates, testing methods and processes; and the same evidentiary periods" nationally and thus is supportive of this recommendation.

CONCLUSION

The Rail Industry, strongly supports each of the six recommendations made by ONRSR to establish a framework that best supports the management of the risk of drug and alcohol in the rail industry nationally.

Consistent, national adoption of the six ONRSR recommendations will drive national consistency in the management of drugs and alcohol in Australia's rail industry, reduce regulatory burden and ensure that drug and alcohol policies are based on targeting identified risk rather than meeting mandated targets.

The rail industry will work closely with ONRSR in the development of guidance material to support this legislative change and ensure an optimal outcome for the industry and its rail safety workers.

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Fatigue management: The impact of outer limits of service in the rail sector

August 2018

Contents

Charts

Tables

Figures

Executive summary

Deloitte Access Economics has been commissioned to investigate and quantify the impacts of outer limits of service for train drivers in Australia. Outer limits of service refers to legal or regulatory limits around work and rest. Outer limits of service currently apply for train drivers in New South Wales and Queensland as an additional legislative requirement for rail operators to manage fatigue.

Current and potential impacts in Australia

In order to quantify the impacts of outer limits of service, Deloitte Access Economics has developed four case studies, utilising data and other information provided by industry:

- two case studies quantifying the current costs worn by Aurizon and Pacific National to comply with outer limits of service for train drivers; and
- two case studies estimating costs that could occur for a Pilbara operator and TasRail if outer limits of service for train drivers were introduced in their respective jurisdictions.

The results of the case studies are summarised in Table i, below.

Table i Case study results – estimated costs of outer limits of service

Operator	Current or potential	Cost category	Value	
Aurizon – Blackwater Rail Corridor*	Current	Staff costs	$283,000	
		Road vehicle operating costs	$221,000	
		Road use externalities	$63,000	
			$567,000	Annually
Pacific National – Goonyella Rail Corridor#	Current	Staff costs	$722,000	
		Road vehicle operating costs	$81,000	
		Road use externalities	$23,000	
			$826,000	Annually
Pilbara iron ore miner	Potential	Capital costs[1]	$10,000,000	One-off cost
		Staff costs[2]	$50,400,000	
		Capital O&M	$300,000	
			$50,700,000	Annually
TasRail	Potential	Capital costs	$7,000,000	One-off cost
		Staff costs	$698,000	Annually

* This case study only applies to part of the network.

This case study only applies to one service on the network, Pacific National services at least 12 mines in the Goonyella System.

Source: Deloitte Access Economics calculations using rail operators' inputs.

[1] There is significant uncertainty around this figure. The rail operator has advised that the cost would be "in the tens of millions of dollars."

[2] Staff costs in this case study include: base salary, FIFO allowance, superannuation, flight assistance, bonuses, and other special awards.

The **Aurizon** and **Pacific National** case studies are similar in nature. The costs in both relate to the need to change crews and use road vehicles when outer limits of service are reached. This creates staff costs, road vehicle operating costs (both of which are born by the rail operator) and adverse safety implications through road use externalities (which includes costs associated with fatalities, injuries and property damage due to road accidents). In the Aurizon case study, it is estimated that outer limits of service for train drivers create the need to travel around 350,000 kilometres per year by road changing train driver crews; and in the Pacific National case study, the figure is around 128,000 kilometres. It must be highlighted, that these case studies consider only a part of the respective networks and, as a result, it is likely that the overall cost implications for Aurizon and Pacific National to comply with the train driver outer limits in NSW and Queensland are more substantial.

The case studies relating to a **Pilbara** iron ore miner and **TasRail** also have similarities in nature. The Pilbara iron ore operator currently operates using 12-hour driver only shifts. The Pilbara iron ore operator advised that complying with outer limits of service akin to what is in place in Queensland or NSW would require the construction of a new depot, costing "in the tens of millions of dollars." It is believed that, to continue operating at current levels, while complying with outer limits of service, the increase in train driver numbers could be in the order of 225, a 50% increase (from current levels of around 450 drivers).

In the case of TasRail, the $7 million capital costs noted in Table i relates to the purchase of additional rolling stock and facility upgrades to allow current production levels to be maintained with the use of fewer services (due to the loss of time associated with additional crew changes). The $698,000 yearly additional staff costs are driven by the fact that TasRail currently operates solely using driver-only services, and compliance with outer limits of service will involve the need to hire additional staff.

As for all case studies, there is uncertainty around the results. Their calculation has required rail operators to consider how their operations would be different under counterfactual situations where data is challenging to generate. Deloitte Access Economics has not independently verified the data.

A common theme across consultations with rail operators was that staff time spent driving on roads is among the greatest safety risks that rail operators face. By creating the need to change crews whenever outer limits of service are reached, irrespective of the location of a train, outer limits of service can significantly heighten a rail operators' risk profile.

If cost increases due to outer limits of service lead to higher prices for rail freight, this could lead to substitution towards road freight which could have greater costs for society. Road freight has accident costs (including fatalities and injuries to people and damage to property) around 14 times greater than rail freight (on a tonne kilometre basis) (Deloitte Access Economics, 2017).

There are also other costs and potential costs that have not been quantified. For example, recruitment and training costs have not been included in the analysis. According to the industry, introduction of outer limits of service for train drivers without a transition period in the order of 24 months could potentially jeopardise currently contracted arrangements given the lack of appropriately trained staff.

It could be argued that the ability to gain exemptions to outer limits of service, where a safety case can be made, means that rail operators would not be impacted by outer limits of service. However, there are costs to achieving exemptions. Pacific National has estimated that staffing costs and consulting fees were in the order of $59,000 for an exemption it has secured in Queensland.

Fatigue management in practice

The transport industry is generally moving toward risk-based approaches to fatigue management. Both the heavy vehicle and aviation sectors in Australia have shifted towards greater use of risk-based approaches. The maritime sector still uses outer limits of service, with approvals for risk-based approaches on a case-by-case basis.

Both the heavy vehicle and aviation sectors in Australia have a tiered approach to fatigue risk management. Reliance on outer limits of service to manage fatigue risk is generally a concession for smaller and less sophisticated operators. At the lowest tier, drivers or pilots must comply with prescribed limits on hours of work. At the other end of the hierarchy, only operators accredited for Advanced Fatigue Management in the heavy vehicle sector and those approved to operate under a fatigue-risk management system in the aviation sector can exercise greater flexibility by adopting a risk-based approach to manage fatigue.

By contrast, all rail operators in Australia are already required to employ a risk-based approach under the Rail Safety National Law and Regulations. They all need to demonstrate their competency and capacity to safely operate a railway, including how they roster staff and manage fatigue. This reflects the fact that the rail industry is predominantly made up of larger, more sophisticated organisations and also that investments have been made into engineering and technical approaches to managing fatigue related risks within the rail industry.

Evaluating outer limits of service from a safety perspective

A literature review has not revealed evidence that outer limits of service for train drivers improves fatigue management relative to risk-based approaches. Empirical evaluations have historically found that duty periods are positively correlated with fatigue and accidents, but these studies do not consider or control for other influences. Risk-based approaches *explicitly* seek to consider and control for the range of factors that impact fatigue as well as mitigate the consequences of fatigue-related impairment.

Of particular relevance to Australia, there appears to be no evidence that safety outcomes are improved by imposing outer limits of service within a risk-based approach (as is done in Queensland and NSW at present).

A note on national inconsistency

Aside from the costs that outer limits of service create, the inconsistencies relating to outer limits of service between Queensland, NSW and the rest of Australia creates costs for rail operators due to the need to manage compliance with different regulations in different jurisdictions.

The Productivity Commission (2012) has argued that "reforms which reduce the costs to operate across jurisdictional borders… have the potential to increase competition in affected markets. Over time, lower 'border' costs may mean more businesses find it profitable to operate interstate, which could result in increased competition and greater incentives for innovation, and therefore enhanced productivity."

The costs of inconsistency in itself have not been analysed in this report. However, all 44 rail operators (a quarter of all rail operators in Australia) who operate across some combination of Queensland, NSW and the rest of Australia would experience some costs due to allowances made for Queensland and NSW in Schedule 2 of the Rail Safety National Law Regulations.

Conclusion

Overall, this report finds that:

- Current outer limits of service for train drivers impose significant costs which would likely extend to other jurisdictions if outer limits of service applied there too.
- The transport industry is generally moving toward risk-based approaches to fatigue management.
- There does not appear to be evidence that outer limits of service for train drivers improves fatigue management relative to risk-based approaches.

1 Introduction

The Office of the National Rail Safety Regulator (ONRSR) is conducting a review on behalf of the Transport and Infrastructure Council (TIC) of the fatigue provisions within the Rail Safety National Law (RSNL).

Deloitte Access Economics has been commissioned to investigate and quantify the impacts of outer limits of service for train drivers in Australia. This report presents the results of that research and is organised as follows:

- Chapter 2 briefly describes what fatigue is.
- Chapter 3 discusses the concepts of outer limits of service and risk-based approaches to fatigue risk management, including available information evaluating each approach.
- Chapter 4 provides information on the risk management approaches taken in Australia's transport sectors, and transport sectors in other countries.
- Chapter 5 provides quantitative estimates of the actual and potential impacts of outer limits of service in Australia's rail sector.

The terms 'mandated hours', 'outer limits of service', 'outer limits of work and rest' and 'prescribed outer limits' are commonly used interchangeably within the industry to refer to approaches to fatigue management that rely on regulated maximum hours of work.

In this report, we use the phrase 'outer limits of service'.

2 Fatigue and safety

In the context of work and safety, fatigue is an impaired state, or subjective state of exhaustion that prevents an individual from working safely and efficiently. Fatigue is a complex phenomenon with a range of work-related and non-work-related factors that contribute to the development of a fatigued state.

With operations running 24/7 in the transport sectors and the need for constant vigilance and interaction with technical systems and machinery, workers in the transport sector are likely to experience exposure to situations that can contribute to fatigue and have significant implications for the safety of railway operations. As such, the need to manage fatigue and its negative effects is essential for the rail industry.

Many factors of fatigue relate to an individual's body clock and sleep loss. Primary contributors to fatigue include reduced duration of sleep, extended hours of time awake and disturbances to times that an individual is awake and asleep (Fourie et al., 2010). According to Fourie et al. (2010), and Bowler and Gibson (2015), both work-related and non-work-related factors contribute to fatigue, and generally fall under the following three categories:

- **Individual factors** include (but are not limited to) lifestyle factors, drug and alcohol use, and medical conditions such as sleep disorders.
- **Environmental factors** include (but are not limited to) the quality of an individual's sleeping environment (affected by factors such as ambient temperature and noise levels), family circumstances and domestic responsibilities.
- **Work-related factors** include (but are not limited to) the timing of work and rest periods, the length and number of consecutive work duties, and the nature of the work.

A rail safety worker could become impaired by fatigue due to one or more of these factors, which could compromise rail safety and contribute to a rail accident. For example, a rail safety worker may have difficulty sleeping well while taking care of a young family or potentially due to health issues such as sleeping disorders (Brake, 2016; Bowler et al., 2015). The rail safety worker may also then experience a particularly challenging set of work related factors, such as transitioning to a later shift start time and a particularly challenging route, such as one that involves multiple level crossings. In this situation, the rail safety worker would be experiencing a range of factors (individual, environmental and work-related) that come together to contribute to a state of fatigue.

3 Managing fatigue

At both an individual and organisational level, the negative impacts and consequences of fatigue reflect the obligation for it to be effectively managed and ensure the safety of rail operations, so far is reasonably practicable (SFAIRP).[3] Currently, approaches in Australia's rail sector to manage fatigue can broadly be categorised as:

- outer limits of service; and
- risk-based approaches.

There is potential for outer limits to be included within a risk-based approach, as is the case in Australia's rail sector in Queensland and NSW at present. The outer limits of service for train drivers imposed in Queensland and NSW are different though.

Generally speaking, outer limits of service approaches seek to manage fatigue-related risk by controlling one of the factors (hours of work) that can contribute to fatigue-related impairment. On the other hand, risk-based approaches take a holistic view to achieving the outcome of reducing fatigue-related risks by considering a range of factors that may contribute to fatigue, as well as understanding and mitigating the consequences.

A potential strength of outer limits of service is that they introduce a clear limitation around one of the factors affecting fatigue.[4] A consequence of that clarity is that it creates rigidity in the system, which may actually impede rail operators' ability to manage fatigue holistically and flexibly. The flexibility that operators can build into their operations under a risk-based approach also allows them to maximise productivity. This flexibility does, however, mean that operators and those regulating them need to be sufficiently mature and sophisticated in identifying and managing risks. Table 3.1 summarises of the strengths and weaknesses of the two approaches.

Ultimately, achieving good risk management practices requires competency and capability within the organisation. To be an accredited rail operator, a rail operator must demonstrate its competency and capacity to safely operator a railway. A railway does this through its Safety Management System and Fatigue Risk Management Program, both of which are reviewed in the accreditation process by ONRSR.

In addition, these approaches to managing fatigue related risks are also complemented by engineering controls. Engineering controls for risk management are used extensively within the Australian rail industry and include approaches such as Automatic Train Protection (ATP). The Australian rail industry has made significant investments in engineering controls to manage risks within a risk-based approach to fatigue management.

[3] This approach has been enshrined within rail safety law in Australia since the Model Rail Safety Bill was introduced in 2006. With the advent of the Rail Safety National Law, the concept remains as one of the central tenets for achieving a safe railway.

[4] 'Potential' because the clarity of the limitation depends on the clarity of the legislation or regulation. Compliance can be complicated by vagueness or indeterminacy in language.

Table 3.1 Strength and weaknesses of fatigue management approaches

Fatigue Management Approach	Strengths	Weaknesses
Outer limits of service	• Simplicity of interpreting and enforcing limited hours. • Limiting the amount of time that is spent work. • Potentially limiting the duration of continuous time on a task. • Ensuring a minimum number of opportunities for sleep and other non-work activities. • Defining minimum breaks for sleep and recovery.	• May not take into account the daily cycle of the circadian biological clock. • Overlooking the greater fatigue risk of work during night time and the smaller recovery value of sleep opportunities during day time. • Not addressing the duty cycle, which overlooks accumulated sleep debt and dose-dependent effects on performing at work, and the frequency of opportunities for full recovery from sleep debt. • Non-work-related time is not included in the calculation of rest opportunities, such as commuting, and the behaviours and schedules outside of work cannot be mandated. • May put workers at unnecessary risk; for example, employees being required to travel by road to relieve train crew who have reached their outer limit, whereas the safest action may be to allow the train crew to continue working their train to the next depot. • Not considering the effect of external commitments that affect the ability to have quality rest.
Risk-based approaches	• Consideration given to the hierarchy of controls i.e. developing solutions to mitigate unintended consequences. • More flexible and proactive manner of adapting to the nature of an organisation's operations. • Encourages consideration of the range of factors that affect fatigue, such as: – the length of time awake that is required for work; – the duration of continuous time on a task; – the daily cycle of the circadian biological clock fatigue across the duty cycle; – the nature of the task, and how work is designed and planned; and – involves workers in fatigue-management decisions during day-of-operations.	• Regulators, employers and employees need to better understand the complex relationships between risk and safety for risk-based approaches to be effective. • Regulators, employers and employees are required to sufficiently understand the causes and outcomes of fatigue in order to meet their responsibilities within risk-based approaches. • The effectiveness and operation of risk-based approaches is dependent on an organisation's size, complexity, competency and integrity. • The flexibility of the approach means it may be more difficult to regulate or enforce.

3.2 Outer limits of service

Outer limits of service rely on prescribed hours of work and rest, by explicitly limiting the maximum number of working hours and providing for mandatory minimum rest breaks (Gander et al., 2011). Regulators provide limits on the hours of service in the aim of balancing working conditions and remuneration (Gander et al., 2011) for industry workers.

In NSW and Queensland, train driver hours are prescribed, with different prescriptions in each jurisdiction. ONRSR highlights that in broad terms, the outer limits of service for train drivers relate to:

- maximum shifts and shift lengths depending on whether it is freight or passenger vehicles, and whether it operated by one or two people;
- minimum break length between shifts depending on whether the driver is taken to or away from the home depot;
- maximum numbers of shifts and hours in any 14-day period; and
- requirements in relation to the maximum length of time allowed between signing on for a shift and reaching the home depot or barracks when travel is involved in getting to the home depot or barracks.

Gander et al. (2011) states that as well as the simplicity of interpreting and enforcing limited hours, the key strength of regulating hours of service is limiting exposure to some of the causes of fatigue, such as by:

- limiting the length of the time awake for work;
- limiting the (continuous) time taken for tasks; and
- creating opportunities for sleep and other non-work activities.

Outer limits of service generally focus only on the time spent on task. This approach risks simplifying fatigue management, as it leads to natural limits in the ability to identify when fatigue is in play, how it could be affecting a rail safety worker and its implications for the frequency or severity of a rail safety incident. For example, a rail safety worker may face a difficult and long road commute to work through peak hour traffic, which could significantly add to the worker's fatigue even before they start working.

This means that **outer limits of service are not always effective in managing fatigue, and can result in adverse consequences** (Gander et al., 2011). Typically, outer limits of service regulations require additional strategies to manage fatigue-related hazards (Dawson & McCulloch, 2005) and many of the key causes of fatigue are not being managed under outer limits of service. Factors that impact fatigue but are not addressed by outer limits of service include:

- the effect of daily cycle of the circadian biological clock (overlooking the greater fatigue risk of work during night time and the smaller recovery value of sleep opportunities during day time);
- the duty cycle (overlooking cumulated sleep debt and dose-dependent effects on performing at work, and the frequency of opportunities for full recovery from sleep debt); and
- non-work-related time in the calculation of rest opportunities, such as commuting, and the behaviours and schedules outside of work.

Furthermore, under outer limits of service there can be variations or uncertainty on when the limited hours start and end. For example, a rail driver's nine-hour shift could start either when they commence their shift or could potentially start when they actually start actively operating the locomotive. The precise approach must be set out in legislation, not finely adapted to the particular task at hand.

3.3 The risk-based approach

An alternative to this is the risk-based approach. A risk-based approach does not rely on mandated requirements but, rather, relies on comprehensive assessments of the relevant factors that contribute to fatigue, the consequences of fatigue related impairment in a given situation, and an appropriate risk management strategy that is targeted to address those factors and consequences.

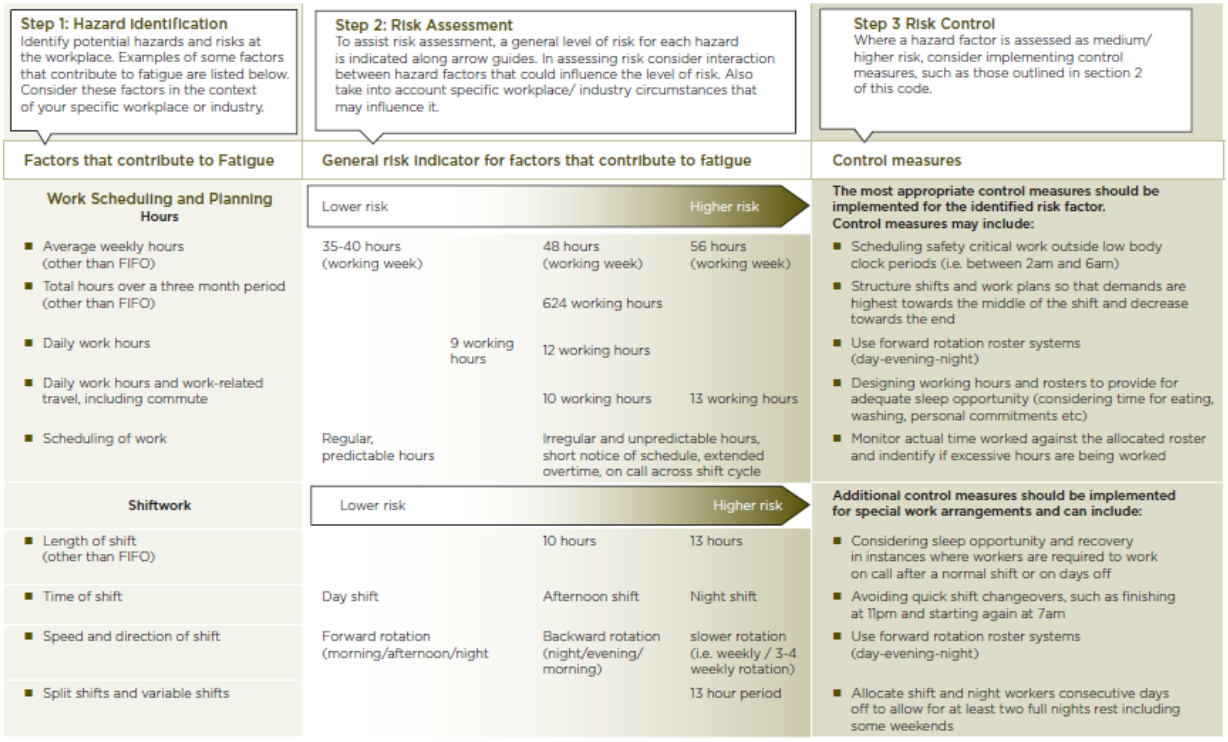
Under risk-based approaches, organisations tailor their Fatigue Risk Management Program to manage the level of exposure of fatigue risk. The approach to managing the risk is based on the nature of the operation and tailored to the work environment (Gander et al., 2011). In comparison to limited hours, risk-based approaches involve a holistic view of risks that are associated with a specific task. Controls are then identified to be implemented to address fatigue risks.

By considering the factors and their contribution to fatigue related risks for each task, risk-based approaches can potentially target certain tasks, and their overall risk of fatigue. Risk-based approaches could minimise safety risk by tailoring work-related rest-breaks during shifts, recover breaks between shifts, and resetting breaks towards a worker's likelihood of fatigue.

Overall, risk-based approaches aim to take a more scientific and data-driven approach to understanding and minimising the causes and adverse impacts of fatigue, as far as is reasonably practical (Gander et al., 2011; Civil Aviation Safety Authority, 2016).

Safe Work Australia (SWA) (2013) "provides practical guidance for persons conducting a business or undertaking and other duty holders on how to ensure it does not contribute to health and safety risks in the workplace". This includes guidance on how various factors that contribute to fatigue translate into risks and potential control measures. Figure 3.1 below is an excerpt from SWA (2013) relating to fatigue risk management.

Figure 3.1 Excerpt from the SWA risk management chart



Source: Safe Work Australia, 2013

The key strengths of risk-based approaches lie in the flexible and proactive manner of adapting to the nature of an organisation's operations that they provide for (Gander et al., 2011). Gander et al. (2011) also states that risk-based approaches have the potential to consider and manage exposure to a wide range of causes of fatigue, including:

- the length of time awake that is required for work;
- the duration of continuous time on a task;
- the intensity of work demands (workload);
- the daily cycle of the circadian biological clock; and
- fatigue across the duty cycle.

As the risk-based approach is more complex and nuanced, there is a need for are a number of associated challenges. In particular, "a better understanding is needed on the complex relationship between fatigue and safety" for risk-based approaches to be effective (Gander et al., 2011, p.586).

The effectiveness of such regulation at managing fatigue in practice may depend upon enforcement of non-compliance. There is potential for non-prescriptive approaches to be abused if regulatory enforcement is unlikely (Gander et al., 2011).

Another factor that can enhance the effectiveness of a risk-based approach is complementary engineering controls. Engineering controls involve physical systems built into the rail network and rolling stock that manage risks related to fatigue. An example of one of these types of controls is Automatic Train Protection. The Australian rail industry has made significant investments in engineering controls to manage risks within a risk-based approach to fatigue management.

Finally, the effectiveness and operation of risk-based approaches is dependent on an organisation's size and complexity. Smaller, less mature operators might struggle to cover the individualised costs of developing a safety case for the use of risk-based approaches.

3.4 Evaluation of different approaches

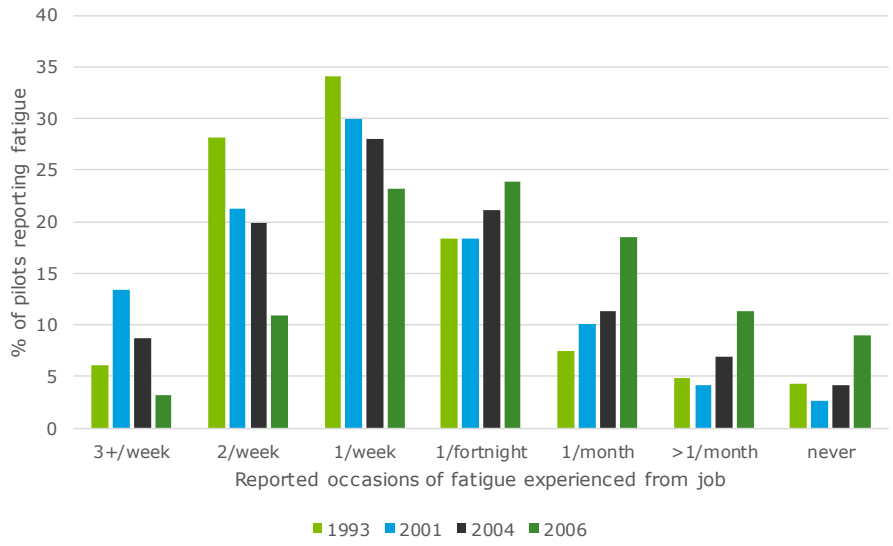
Empirical evaluations have historically indicated that duty periods are positively correlated with fatigue and accidents (Goode, 2003; Dembe et al., 2005; Pylkkönen et al., 2013). In isolation, this may appear to provide evidence for limiting duty periods. However, these studies do not consider or control for the other drivers of fatigue. As outlined in Chapter 2 above, fatigue is caused by a number of factors. In practice, a single night of limited sleep does not result in significant declines in performance; but when sleep is restricted over a period of 14 nights there is evidence of clinically significant reductions in performance across multiple measures of neurobehavioral performance (Dawson & McCulloch, 2005).

As a result, shift lengths should be considered in balance with other drivers of fatigue in making predictions about fatigue and safety impacts, as is facilitated through a risk-based approach to fatigue management.

A review of the literature did not uncover any empirical evaluations of comprehensive fatigue risk management systems. There is evidence to suggest that a holistic approach to fatigue risk management that addresses hours of work, and other factors offers better outcomes for both the safety of the organisation and the wellbeing of workers.

Air New Zealand introduced a comprehensive fatigue risk management scheme in 1993. The frequency with which pilots reported being impaired by fatigue dropped significantly (shown in Chart 3.1 below). In 1993, the majority of pilots reported experiencing fatigue at least once a week. By 2006, the majority of pilots reported experiencing fatigue less than once a fortnight (Gander et al., 2009).

Chart 3.1 Air New Zealand flight crew fatigue reporting following the introduction of a risk-based approach to manage fatigue in 1993



Source: Gander et al., 2009

Similar findings were made by McCulloch, Fletcher and Dawson (2003) in their evaluation of the shift from a prescriptive framework to a risk based approach to fatigue regulation. Sixteen operators of passenger and business aviation services were evaluated. The study collected qualitative responses from staff and examined the policies and training materials of operators. The study identified a generally positive response by managers and flight crew to the change in relation to operations and to personal experience.

The implication from this research is that while shift lengths are correlated with operator fatigue, they cannot be considered in isolation. Fatigue risk management programs can achieve the mutually desirable goals of operational flexibility as well as enhancing workplace moral and improving safety performance.

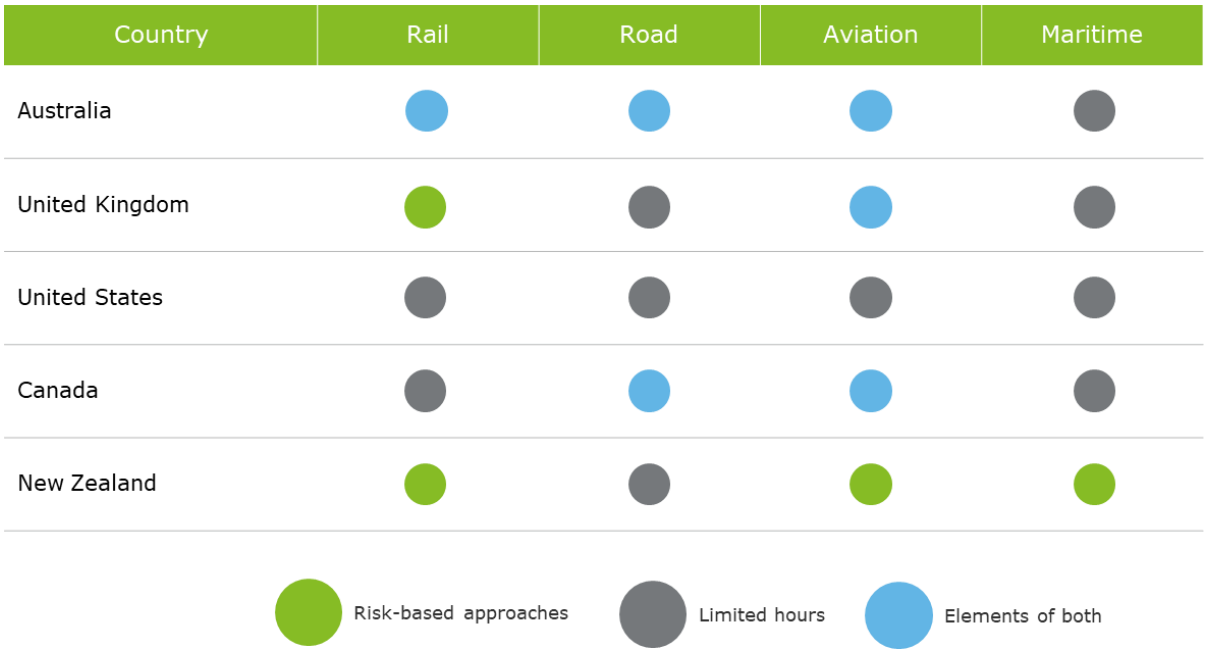
4 Fatigue risk management in practice

There is a mix of both forms of fatigue risk management across transport sectors in Australia and rail industries in other countries. In rail in Australia, the Rail Safety National Law and regulations create a consistent framework for fatigue risk management, but Queensland and NSW deviate from this approach with the imposition of their own specific outer limits of service for train drivers. The heavy vehicle and aviation sectors in Australia follow a mixed approach of both forms of fatigue management, while in Australia's maritime sector a risk-based approach is available with approval.

Currently, in other transport sectors overseas, New Zealand has been the most focussed on implementing risk-based approaches, Canada has shown similarities to Australia's mixed approach, while the US is still using outer limits of service. Figure 4.1 shows the current status of each transport sector in Australia and key overseas countries.

Section 4.2 describes fatigue risk management in Australia's transport sectors in more detail, while Section 4.3 does the same for other countries.

Figure 4.1 Fatigue managements in Australia and overseas



4.2 Transport sectors in Australia

Rail – Australia's rail industry is required to implement a risk-based approach to fatigue management. However, operators in NSW and Queensland have additional fatigue management compliance requirements, as train drivers in NSW and Queensland must work within prescribed outer limits of service. The other transport sectors in Australia – heavy vehicle, aviation and maritime industries –are tending to transition towards risk-based fatigue management.

There are variations on how the outer limits of service differ for train drivers in NSW and Queensland, which are summarised in Appendix A. Broadly, the two approaches apply limits of 8, 9, 10, 11 or 12 hours depending on whether it is freight or passenger and other factors such as the location of the depot. There are minor but material differences in other parts of the regulations as well with, for example, NSW's approach including additional breaks for drivers during the shift

but less break between shifts than Queensland's approach. In Queensland, there is also an overall limit of 132 hours of work within a 14-day period while in NSW the limit is based on the number of 12-hour shifts within a 14-day period.

Achieving a nationally consistent approach to safety and fatigue risk management in rail has been a longstanding goal of Australia's rail industry and policymakers. At present, all jurisdictions in Australia must manage fatigue risk using a risk-based approach, but NSW and Queensland also impose outer limits of service for train drivers (and the limits are different in each state). This inconsistency introduces red tape and increases compliance costs for businesses and workers operating across multiple jurisdictions. The ONRSR has indicated that 44 of 185 accredited Australian rail operators are impacted by the difference in regulations between Queensland, NSW and the rest of Australia.

A nationally consistent approach to rail safety management aims to not only improve the safety outcomes for rail workers, passengers, and the community at large, but also to generate efficiencies for rail, improve service quality, enhance job appeal and reduce costs (Webb, 2000). The Productivity Commission (2012) has argued that "reforms which reduce the costs to operate across jurisdictional borders (both between and within States) have the potential to increase competition in affected markets. Over time, lower 'border' costs may mean more businesses find it profitable to operate interstate, which could result in increased competition and greater incentives for innovation, and therefore enhanced productivity."

Leaving aside the benefits of national consistency in itself, imposing outer limits of service has the potential to increase costs for rail operators and reduce other aspects of safety for train drivers and the community (for example, where adherence to the limits increases the use of road travel).

Commercial vehicles – In 2008, Heavy Vehicle Driver Fatigue regulations replaced the traditional limited hours. Under these regulations, a mix of both traditional limited hours and a risk-based approach comprise three tiers: Standard Hours, Basic Fatigue Management (BFM) and Advanced Fatigue Management (AFM). Operators were given the duty to manage their workers' fatigue, and shared legal responsibility to prevent driver fatigue was given to a number of parties in the supply chain in road transport who were identified as influencers of driver fatigue (Fourie et al., 2010).

'Standard hours' apply to drivers that are not accredited for fatigue management, and includes prescriptions around shift and rest length for different types of operations (solo driver, bus driver, etc.). When operators are accredited for Basic Fatigue Management (BFM) or Advanced Fatigue Management (AFM) they can exercise greater discretion in how they operate their businesses and apply a risk-based approach to fatigue management. The expertise required for BFM and AFM in the trucking industry aligns more closely with that of Australia's rail operators than that of trucking operators operating under Standard Hours.

Aviation – In 2013, the Civil Aviation Safety Authority (CASA) introduced a three-tier approach for the aviation industry in Australia by allowing operators to follow either form of fatigue management, or a mix between the two (CASA, 2013). Introduction of this approach was driven by *The Independent Review of Aviation Fatigue for Operators and Pilots*, prepared for CASA. The approach emphasised the need to be more risk-based and data driven to understand the science behind fatigue management. A risk-based approach is deemed appropriate where scaled to the diversity of operations, while also taking into account unique operational environments more adequately (Dédale Asia Pacific, 2013).

Maritime – The Australian maritime industry is regulated with outer limits of service, while granting approvals for risk-based approaches. Under the *Marine Order 54 (Coastal pilotage) 2014*, licensed pilots must comply with the default Fatigue Risk Management Plan (FRMP) published by the Australian Maritime Safety Authority (AMSA), or an alternative FRMP approved by AMSA. The default FRMP sets out minimum mandatory leave requirements and rest periods between pilotage tasks, such as a pilot is required to have at least five consecutive nights of rest at home for any roster cycle exceeding 21 days, with a maximum of 28 days for any roster cycle. Exemptions

require pilots to monitor and manage their own fatigue risk under their hours of work and rest. These exemptions are approved as an alternative FRMP by ensuring the following criteria:

- The controls and treatment of fatigue-related risks associated with the alternative FRMP;
- Ensuring rosters are scheduled adequate leave and rest periods between pilotage tasks;
- Medical assessment on pilots' fitness for duty, and facilitating adequate fatigue management training;
- Clear responsibilities carried out across all positions under pilotage operations; and
- Adequate measures of monitoring and recording pilot hours of work and rest abroad vessels.

4.3 Transport sectors in other countries

This section provides information on the regulation of fatigue in the New Zealand (section 4.3.1), United Kingdom (section 4.3.2), the United States (section 4.3.3), and Canada (section 4.3.4).

4.3.1 New Zealand

Rail – Under the Railways Act 2005, there is no specific fatigue related regulation in New Zealand. Rather, New Zealand legislates general safety duties of rail and safety workers, whereby each operator must have policies that ensure their workers are not impaired as a result of fatigue (ONRSR, 2018).

Commercial vehicle industry - Commercial drivers in New Zealand have followed outer limits of service to manage fatigue. Since 2007, the differentiation between driving hours and duty hours has been abolished, and both are limited to a maximum of 13 hours per 24 hours (Gander et al, 2011; NZ Transport Agency, 2018b).

However, New Zealand is currently awaiting approval for an alternative fatigue management scheme (AFMS), which allows approved operators to proactively manage fatigue under their own risk-based approach. This involves approved operators managing their own work and rest time limits for their drivers. It is possible under an AFMS for an operator to permit variations in rest break limits or extend their cumulative work day (NZ Transport Agency, 2018a).

Aviation – New Zealand's aviation industry has the longest experience with risk-based approaches to fatigue management (Cabon et al., 2012). Since 1995, New Zealand operators in the aviation industry were able to either comply with regulated hours of service, or apply to the New Zealand Civil Aviation Authority to implement an alternative risk-based approach (Signal et al., 2009). Gander et al. (2011) states that the risk-based approaches require considerations on the factors that may cause fatigue, including:

- rest periods prior to and in flight;
- effects of time zone changes and night operations;
- crew composition;
- type and amount of workload; and
- the cumulative effects of work.

Maritime – New Zealand's maritime vessels were covered by amendments to the OSH legislation in 2003. Since 2003, Maritime New Zealand has been in charge of regulating fatigue management. As well as requiring certification, the maritime industry began regulating and developing risk-based programs under the existing safety management system, the Safe Ship Management Programme. In turn, the maritime industry in New Zealand fell out of international conventions and have not used prescribed limited hours of work and rest, with the exception of watch keepers on international vessels.

4.3.2 United Kingdom

Rail – For the rail industry in the United Kingdom, limited hours for both hours of work and rest were replaced by risk-based approaches in 2006, under 'Regulation 25 – Fatigue' of The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (Bowler and Gibson, 2015).

The Office of Rail Regulation (ORR) also published guidance on developing a comprehensive risk-based approach where employers are given specific duties to ensure safety-critical tasks are

operated by employees that are not affected by fatigue (Bowler and Gibson, 2015; ONRSR, 2018). This also applies to duty holders, as well as employees.

Commercial vehicles – Under the Management of Health and Safety at Work Regulations (1999), drivers and journey risks must be assessed, and all reasonably practical measures must be placed to ensure drivers do not exceed working limits and driver hours in managing fatigue (Brake, 2016; RSSB, 2013).

Since the 2006 regulation under the European Commission (Department of Transport, 2014), both goods and passenger-carrying vehicle drivers in the UK must comply with regulations of limits of service and rest either under the European Union (EU) Drivers' Hours Rules or (Great Britain) GB Drivers' Hours Rules, or a mix of both – depending on the country of the driver's journey.

The main EU Drivers' Hours Rules limit drivers to nine hours a day (can be extended to 10 hours twice a week at most), and a maximum of 56 hours in a week, and 90 hours in any two consecutive weeks.

The GB Drivers' Hours Rules on the limits to driving, duty, rest and breaks vary between goods and passenger-carrying vehicles. In general, exempted goods vehicle drivers following GB Rules are limited to a maximum of driving 10-hours and 11 hours of duty in any day (Gov.uk, n.d.).

Aviation – From 2016 onward, the aviation industry in the UK has transitioned to the European Aviation Safety Agency (EASA) Subpart Flight Time Limitations (FTL) (UK Civil Aviation Authority, 2015a). This transition is a step closer towards implementing risk-based approaches. All operators are not only responsible for allocating work and rest limitations, but to prescribe them under the consideration of fatigue risks within their operational context, such as the circadian rhythm and time-zone crossing (UK Civil Aviation Authority, 2015a; UK Civil Aviation Authority, 2015b; The Transport Committee, 2012). As a result, operators must demonstrate an adequate level of safety in compliance with time limits of service. Risk-based approaches are encouraged to be developed and implemented over time, unless an operator's risk-based approach is approved to continue under the EASA Subpart FTL (UK Civil Aviation Authority, 2016; UK Civil Aviation Authority, 2015b).

Maritime – The UK maritime industry manages fatigue by monitoring and managing the hours of work and rest, following compliance with various international conventions. From April 2018, the UK's Merchant Shipping (Hours of Work) Regulations have been updated with minimum leave and rest periods.

4.3.3 United States

Rail – The United States continues to use limited hours for work and rest but it must be noted that the US Regulator implements prescriptive regulation (ONRSR, 2018; Office of Research and Development, 2006). In 2011, there have been amendments on adding substantive hours of service in terms of: maximum on-duty periods for each group of workers, minimum off-duty periods for train and signal employees, and additional limitations on consecutive days and certain monthly limitations on the activity of rail workers (NTC, 2012; ONRSR, 2018).

Commercial vehicles – In 2011, the US Federal Motor Carrier Safety Administration (FMCSA) published the Hours of Service of Drivers Final Rule, which involves regulating commercial road transport with outer limits of service. The regulations apply to both property-carrying and passenger-carrying drivers and are summarised in Appendix A (FMCSA, 2011).

Aviation – In 2011, the US Federal Aviation Administration (FAA) amended the regulations limiting hours of service and rest time to manage fatigue. Outer limits of service regulations include: the nine-hour maximum flight time, and eight hours at night; and a rest period of 10 hours, with the opportunity for at least eight hours of uninterrupted sleep (Houston, 2017; Joyner, 2018).

The FAA also recognises that the updates on the outer limits of service would not manage fatigue risk alone. The FAA has proposed each airline to implement a risk-based approach for operators to mitigate the risks of fatigue (FAA, 2011; Houston, 2017), and sponsored by multi-disciplinary subject matter expert work group (FAA, 2014).

Maritime – Since 2012, the US maritime industry has updated their hour limits of work and rest to manage fatigue in compliance to the amendments of required minimum hours of rest under the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) in 2010. Different marine staff follow different limits of work and rest.

4.3.4 Canada

Rail – Similar to the United States, Transport Canada is initiating amendments to the Canadian rail safety regulatory framework, which include amendments and additions to the current limited hours prescribed to operators. Transport Canada is currently undertaking a review on the best practice of applying a risk-based approach of fatigue management to support regulatory changes (ONRSR, 2018; Axxess International, 2018).

Commercial vehicles – Under the Motor Vehicle Transport Act, Transport Canada is responsible for the outer limits of service regulations. In 2004, Canada amended its limits of service for commercial vehicle drivers to 13 hours of driving and 14 hours of duty per 24 hours. This increased the minimum off-duty period from eight to 10 hours per 24 hours (Gander et al., 2011).

In addition to the regulated outer limits of service, Transport Canada also complements the fatigue management with other non-prescriptive programs that could be voluntarily adopted by operators (Transport Canada, 2016). These non-prescriptive programs include the Northern American Fatigue Management Program (NAFMP), which was scientifically developed guidelines and training sessions to help managers, drivers, dispatchers, and family members further understand and manage fatigue risk (Thiffault, 2011).

Aviation – In 2017, Transport Canada announced its proposal of a new fatigue management in the aviation industry. Two key aspects of the proposed change are the flexibility of operators using risk-based approaches approved by Transport Canada if they can demonstrate adequate levels of safety, and new scientific-based flight and duty time limits (Government of Canada, 2017). For example, an operator could be permitted to fly longer than the prescribed flight duty time limit if they can show that alertness and fatigue will not be affected, and that the operator meets the requirements of a risk-approach that is approved by Transport Canada (Government of Canada, 2017).

Maritime – The Canadian maritime industry follows various international conventions of limits to work and rest, such as the International Convention for the Safety of Life at Sea (SOLAS) and the ILO Maritime Labour Convention, 2006. Different vessel types in the Canadian maritime industry follow different limits of work and rest.

The Transport Safety Board of Canada is aware of the limitations to the current limits of work and rest. It is seeking to move towards a risk-based approach to manage fatigue, although it faces many challenges, including the subjective perception of fatigue – making fatigue difficult to measure.

5 Impact of outer limits of service

This chapter presents information on the current or potential costs of outer limits of service for train drivers for a number of rail operators around Australia. The total benefits related to national harmonisation of regulations (understood as bringing Queensland and NSW into line with the rest of Australia) have not been analysed because of the complexity and diversity of rail operations around Australia. Different operators are impacted by outer limits of service in different ways depending on the type of services they operate (and where they operate). The benefits of harmonisation in itself (for example, through reduced cost of understanding regulations in different states) have also not been analysed because they are outside the scope of the project.

Section 5.1 describes three broad ways in which outer limits of service can affect economics costs. Sections 5.2, 5.1, 5.4 and 5.5 present case studies relating to Aurizon, Pacific National, a major Pilbara mine operator and TasRail, respectively. Each case study below first describes the situation and how outer limits of service for train drivers currently impacts or if introduced, could impact efficient operational approaches. The cost in each of these categories are then presented. More detail on the calculation of costs is included in Appendix B.

The impacts have been calculated by Deloitte Access Economics using information provided by rail operators. The information has been provided in response to discussions and data requests relating to how their operations would differ with and without legislated outer limits of service for train drivers. This information has not been verified by Deloitte Access Economics. Publicly available information (for example, on the number of deaths per road kilometre travelled) have also been used where appropriate. Further detail on the approach to the modelling is set out in Appendix B.

The case studies included here are not exhaustive and do not cover the full range of ways that outer limits of service for train drivers in Queensland and NSW currently impact rail operators, or could potentially impact rail operators if introduced in other States. Rather, they present a range of examples of how changes to this regulation could affect the industry. The case studies have been selected based on availability of information.

5.1 Economic costs of outer limits of service

In each of the case studies below, costs are categorised into three broad groups, developed based on consultation with industry participants: staff costs, road transport costs, and capital costs.

- **Staff costs**
  By reducing the number of hours that employees can work in a shift, outer limits of service affect the way staff are rostered and how the workforce is managed. For example, to comply with outer limits of service additional workers are needed. This creates additional staff management challenges and additional requirements for training and recruitment of new staff. Outer limits of service also means that staff may be offered less appealing or less flexible working conditions. The total impact on staffing depends, in practice, on the interaction of a range of factors, including (for example) rest periods between shifts, enterprise agreements, and the spatial characteristics of impacted services. In jurisdictions with outer limits of service in place, these impacts have already occurred; while in other jurisdictions, they would occur if outer limits of service were introduced.

- **Additional transport costs**
  The heightened risk associated with increased use of road travel was a major concern expressed by many of those consulted. Time that rail employees spend on roads rates among the highest risks facing rail operators, and complying with outer limits of services can in some instances only be achieved through the use of road relief. Where this does have to occur, it may mean changing crews in less-than-ideal conditions. Ideally, train drivers begin and end shifts at their home depot (or undertake barracks working where necessary). Under outer limits of service, however, crew changes are forced to occur at other (non-preferred) points along the route, with fresh crew transported to the train by road and the relieved crew being transported back to their depot by road as well. This creates an increased likelihood of crashes causing fatalities, injuries and damage to property as well as increasing road vehicle operating costs.

- **Capital costs**
  Outer limits of service have the potential to increase capital costs for rail operators because of the need to invest in new depots or rolling stock (to increase the productivity of each service).

5.2 Impacts in the Blackwater Coal Rail System

The Blackwater Coal Rail System is the largest coal system in Aurizon's Central Queensland Coal Network. The system links mines from the Bowen Basin to the Port of Gladstone, Australia's third-largest coal terminal. This case study only applies to a small portion of the system and provides an example of how outer limits of service affect operations on the system.

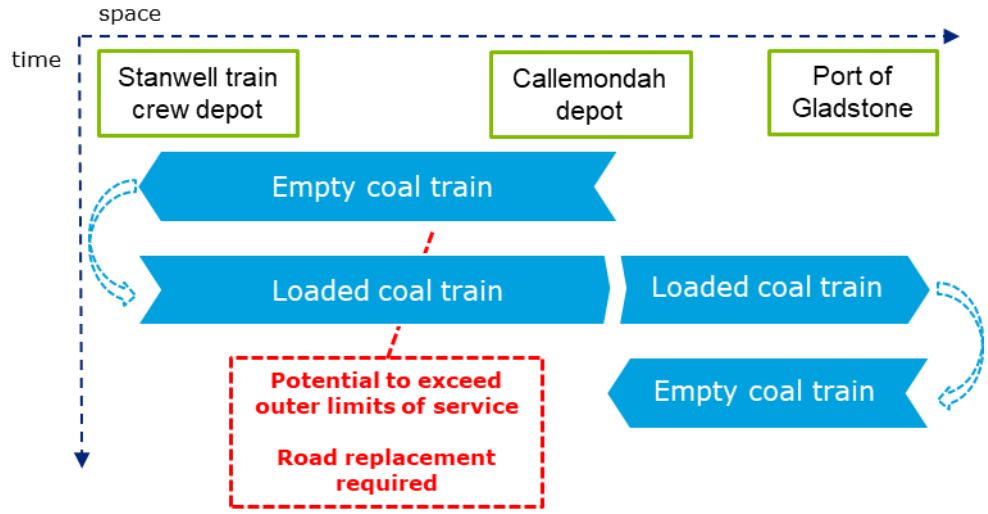
One of the shifts that Aurizon operates on this system involves two drivers operating an empty train from the Callemondah depot (located in Gladstone) to Stanwell depot, where they disembark and wait for a loaded train, which they then drive back to Callemondah, where their shift ends. At this point, a single driver takes over operation of the full train at Callemondah, and they drive it to the Port of Gladstone and back to Callemondah. This connected service is represented in Figure 5.1 below.

The timing of the arrival of loaded trains in Stanwell varies day to day, and progress along the trip back from Stanwell is not guaranteed. This makes it possible for train drivers' shifts to run over the current 12-hour limit for a two driver operation in Queensland (also in place within Aurizon's current Enterprise Agreement). To avoid this, Aurizon closely monitors its operations and transports fresh two-driver crews along the system between Callemondah and Stanwell, as necessary by road. Under legislated outer limits of service this has to occur no matter how close the train is to its final destination.

Aurizon has estimated that the round trip from Callemondah to Stanwell and back would approach or exceed 12 hours in duration around 20% of the time. Where this occurs, it would be illegal for the train drivers to continue operating under outer limits of service; so the train has to be stopped at a non-preferred location for a change of crew. This requires two fresh train drivers to be transported to the train via the road network, and the over-hours drivers would be driven back to the Callemondah depot by road (they cannot drive themselves under the laws). Figure 5.1 (see below) sets out this scenario.

When road relief has to occur, fresh drivers may drive themselves out to the train, with the crew previously driving the train then travelling on road back to Callemondah. Time spent driving on road, however, counts towards shift length calculations, as additional staff may be required to escort train drivers to and from the trains along the route.

Figure 5.1 Part of the Blackwater Coal Rail System



The introduction of additional road travel generally increases a task's risk profile than allowing drivers to complete their shift, for two reasons. Firstly, it involves transferring staff from the relatively controlled environment of the rail system to the relatively uncontrolled environment of the public road system. Secondly, it involves crew changes occurring at locations that are less desirable from a safety and accessibility perspective (compared to the home depot).

The impacts of Queensland's current outer limits of service come principally in the form of over-time paid to workers in order to manage crew relief where shifts would exceed outer limits of service. An important cost is the initial cost of relieving crew, through road travel, which includes road vehicle operating costs and road externalities. These initial changes then have flow-on effects for staffing other services as crews must be shuffled between different tasks. The annual value of these costs is:

- **Additional wages of staff associated with road relief ($283,000 annually).**
  - It is estimated that, each year, the initial road relief and flow on effects for staff time amount to an additional 4,380 hours of work being undertaken. At an industry average cost per hour worked of around $65, this gives a total annual cost of around $283,000. This hourly cost includes wages as well as administrative costs paid by the business to manage the worker (such as additional taxes).
- **Road vehicle operating costs ($221,000 annually).**
  - The road relief operations result in a total of around 350,000 additional vehicle kilometres travelled per year in road vehicles. The type of vehicles used in this operation cost around 63 cents per kilometre, resulting in total costs of around $221,000 each year.
- **Externalities associated with road vehicle use ($63,000 annually).**
  - Each of the additional 350,000 vehicle kilometres travelled creates externalities in terms of increased crash costs (including deaths and injuries), air pollution, greenhouse gas and noise. These costs total around 18 cents per vehicle kilometre. This gives a total externality cost of around $63,000 per year.

The total annual value of these costs on Aurizon's Blackwater Coal Rail System is around $567,000. The net present value (NPV) of these costs over a 30-year period is $7.0 million.[5] This is a compliance cost that reduces productivity. This cost must be worn by the operator or passed onto the customer. As these costs only apply to parts of the network, the overall costs of compliance to outer limits of service on the Blackwater Coal Rail System are likely to be higher.

[5] NPVs throughout the report used a 7% discount rate.

5.3 Impacts in the Goonyella Coal Rail System

The Goonyella Coal Rail System is a large coal system in Aurizon's Central Queensland Coal Network. The system links mines from the Bowen Basin to coal terminals at Dalrymple Bay and Hay Point. In operating in the Goonyella system, Pacific National seeks to minimise train driver car travel and 'barracks working' and maximise train driver driving time. This case study only applies to a small portion of the system and exemplifies how outer limits of service affect operations on the system.

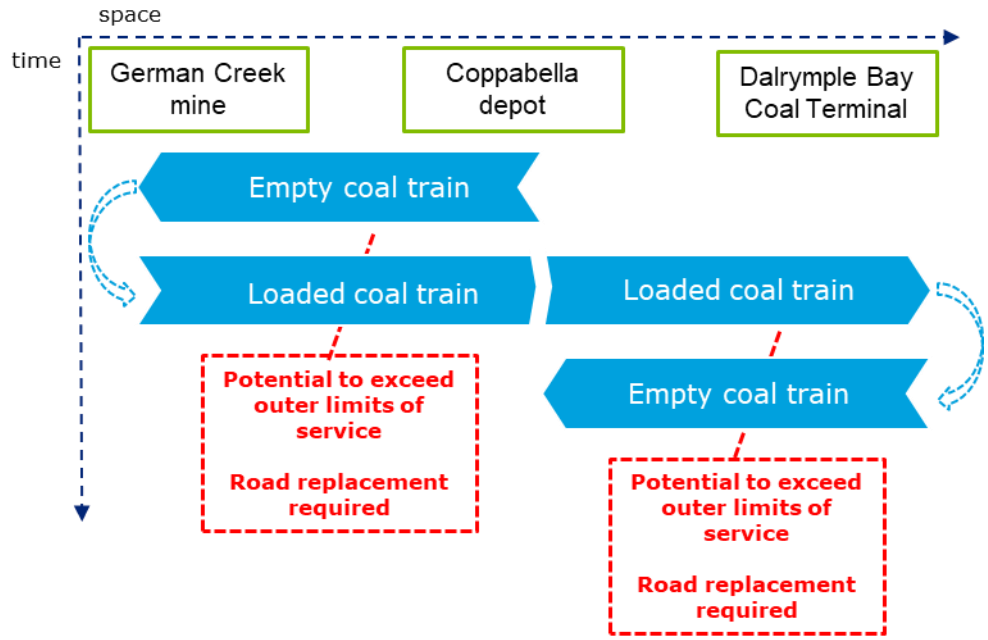
Among various coal hauls, Pacific National hauls coal from German Creek mine to Dalrymple Bay Coal Terminal (DBCT). To do this, two drivers board an empty coal train at Coppabella depot (approximately mid-way between German Creek and DBCT), travel to German Creek, load and then return to Coppabella. At Coppabella depot, these drivers will end their shift. The planned length of this shift is 9.25 hours. At this point, two new drivers board the loaded train, drive it to DBCT, unload the train, and then return to Coppabella. The planned length of this shift is 11.25 hours. This system is shown in Figure 5.2 below.

Pacific National has estimated that this service is able to be completed within the 12 hour outer limit of service around 60% of the time. On the remaining 40% of services, crew changes have to be done via the road network. Pacific National manages its operations to allow train drivers to drive road vehicles to and from trains that would exceed the outer limits of service.

This increases risk to crew due to the increased time spent on road and crew changes in non-preferred locations. It also increases costs and operational complexity for the rail operator.

Pacific National has estimated that this situation results in five additional train drivers being employed to deliver this service over and above what would be the case if the outer limits of service were not in place.

Figure 5.2 Goonyella Coal Rail System



The impacts of Queensland's current outer limits of service come principally in the form of the additional staff that are needed to cover the possibility of shifts exceeding outer limits of service, but also include road vehicle operating costs and road externalities. Their annual value is as follows:

- **Costs of employing additional train drivers (including on-costs) ($722,000 annually).**
  - It is estimated that, each year there would be a requirement for an additional 5 Full Time Equivalent (FTE) workers. At a location specific average cost per FTE of around $144,000 gives a total annual cost of around $722,000. This cost per FTE includes wages as well as administrative costs paid by the business to manage the worker (such as additional taxes).
- **Road vehicle operating costs ($81,000 annually).**
  - The road relief operations result in a total of around 128,000 additional vehicle kilometres travelled per year in road vehicles. The type of vehicles used in this operation cost around 63 cents per kilometre, resulting in total costs of around $81,000 each year.
- **Externalities associated with road vehicle use ($23,000 annually).**
  - Each of the additional 128,000 vehicle kilometres travelled creates externalities in terms of increased crash costs (including deaths and injuries), air pollution, greenhouse gas and noise. These costs total around 18 cents per vehicle kilometre. This gives a total externality cost of around $23,000 per year.

The total annual value of these compliance costs is around $826,000. The net present value (NPV) of these costs over a 30-year period is $10.2 million.

The time and cost associated with training the additional train drivers employed to maintain compliance with Queensland's outer limits of service have not been included in the above figures.

As these costs only apply to parts of the network, the overall costs of compliance to outer limits of service on the entire Goonyella Rail System are likely to be higher. In particular, Pacific National serves at least 12 mines in the Goonyella system and while the costs of fatigue management would vary, depending on the mine location and the number of train services, the costs identified in this case study are only a small portion of the total costs of outer limits of service in the Goonyella system.

5.4 Potential impacts on a major Pilbara mine operator

This Pilbara mine operator case study employs around 450 train drivers involved in the transport of iron ore from various mines to ports in the Pilbara region of Western Australia.

Currently, train drivers work 12-hour shifts that involve driving loaded and unloaded trains back and forth on a portion of track between mines and the port. For example, one driver may drive an unloaded train south from the port, hop off that train, and drive a loaded train back to the port.

In that 12-hour shift, there is typically around an hour of time spent undertaking paper work, attending pre work safety meetings and other essential aspects of their role. The remainder of the shift is spent operating a locomotive.

If outer limits of service for train drivers were introduced in the Pilbara, two strategies could conceivably be pursued:

- employ additional drivers and invest in a new depot along the rail line at which drivers could start and finish shifts (due to area remoteness); or
- employ additional drivers and transport drivers to and from trains along the railway by road as they approach the outer limits of service.

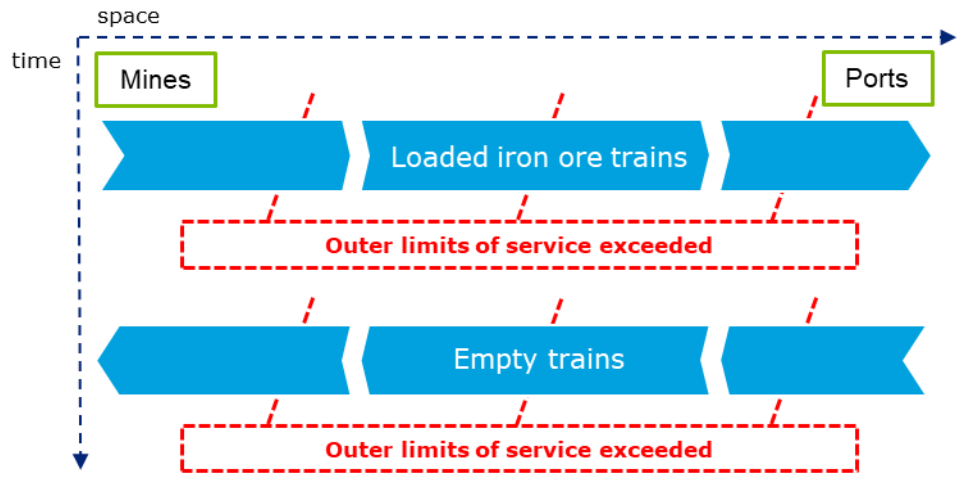
The operator has indicated that the second strategy would not be feasible for safety reasons. Road accidents, often involving collisions between animals and vehicles, are a major risk to personnel safety in the rural environment in which these rail services operate. If road relief was used instead of building a new depot it would likely involve in the order of an additional 200,000 kilometres of

road travel, on mostly poor quality surfaces each year. Public roads only intersect the rail line in a few locations, so there is a reliance on locally constructed service tracks. In addition, seasonal weather events (monsoonal rain and cyclones) often impact the ability to utilise these tracks for weeks at a time, making this approach unworkable for months of the year during monsoon season.

It would be necessary to employ additional train drivers because outer limits of service similar to what is currently legislated in Queensland or NSW would fundamentally change how much work a given number of employees can do. Currently, two employees can do 22 hours of driving in a 24-hour period (the 12 hour shift, less an hour of time spent not driving). If they could only do 9-hour shifts, 2.75 employees would be needed to do the same amount of driving in a 24-hour period.

Based on these changes, it is estimated that 225 additional train drivers would be needed to maintain current levels of operations, a 50% increase on the operator's 450 train drivers currently employed.

Figure 5.3 A major Pilbara iron ore miner and rail operator



To continue operating at current levels, the potential cost of complying with outer limits of service akin to what is used in Queensland or NSW would come in the form of staff costs and capital costs (and the operating and maintenance costs of that capital). These are estimated as follows:

- **Costs of employing 225 additional train drivers (including on-costs) ($50.4 million annually);**
  - It is estimated that, each year there would be a requirement for an additional 225 FTE workers. At a location specific average cost per FTE of around $224,000, this gives a total annual cost of around $50.4 million. This cost per FTE includes wages as well as administrative costs paid by the business to manage the worker. In particular, this includes base salary, FIFO allowance, superannuation, flight assistance, bonuses and other special awards.
- **Capital costs of a new depot and accommodation facilities are estimated to be $10 million, and ongoing operating costs are assumed to be 3% of this value ($300,000)**

The total annual value of these compliance costs is around $50.7 million annually. The net present value (NPV) of these costs over a 30-year period is $640 million.[6] These costs do not factor in the additional time taken to train new staff, or the fact that staff would need to be paid while not being fully trained (potentially for up to 24 months).

These costs assume that additional workers can be recruited and retained under current wages. In reality, this may be difficult because the current rostering and wage agreements are predicated on the operator's ability to operate 12-hour driver-only shifts. Changes to this may affect the wage

[6] NPVs throughout the report have been calculated using a 7% discount rate.

and work conditions that can be offered, potentially affecting the ability to recruit and retain staff in the Pilbara. For example, many rail workers in the Pilbara live in locations around Australia, New Zealand and Asia with the rostering approach around 12-hour shifts being an appealing part of the work. If this rostering approach was changed, these workers may not find work in the Pilbara as attractive.

Building a new depot would also require appropriately managing potential environmental, cultural and heritage impacts, given the location of the rail line. These have not been included in the figures provided above.

An additional cost that has not been included in the calculations is the increase of train cycle time associated with decelerating, exchanging safety critical information and crew and then accelerating back to speed. In total, this results in a roughly 4% reduction in effective operating time each day. This additional cycle time has a direct impact on productivity and is likely to affect the competitiveness of Australia's iron ore exports. The operator has estimated that export volumes could potentially be reduced by 35 million tonnes of iron ore in a single year for all Pilbara operators under this scenario and if mitigating productivity improvements weren't achieved. At July 2018 prices this would equate to delays in the delivery of trade worth in the order of $2.4 billion. This would not be a net loss to the economy overall but would mean that revenue from sales of this iron ore would be realised later, reducing its current value to the economy.

Each crew change also creates additional wear and tear on trains and maintenance and fuel costs could be significantly increased by the need to accelerate the train additional times. In the supply chain for an internationally traded commodity, these costs could affect the competitiveness of Australian businesses and ultimately, impact the Australian economy.

5.5 Potential impacts on TasRail

TasRail, the government owned business that handles all of Tasmania's rail freight needs, would be impacted by the introduction of outer limits of service. All of TasRail's services are driver only at present, and a number of these services currently have shift lengths greater than either the current NSW or Queensland outer limits of service.

TasRail has estimated how its operations could be affected if 9 hour shifts with 15 minutes fatigue breaks were introduced. These estimates assume that no exemption is sought or granted to operate outside the hypothetical outer limits of service.

Estimates have been produced for impacts on the Melba line, TasRail's service freighting cement from Railton to Devonport, and in the main line services.

On TasRail's Melba line, which connects Burnie and Melba Flats, there are regular shifts of 10.5 and 11 hours. With 9 hour shifts, a likely alternative would be to operate the service using three 9 hour shifts, implying an increase in person-hours per trip of 5.5 hours. Assuming four trips per week, this equates to 22 extra hours per week, which would likely need to be resourced through the recruitment of an additional FTE driver.

TasRail has a contract with Cement Australia at Railton for the transport of cement to Devonport, where the cement is then transported by ship. This involves the transport of around 1.35 million tonnes of cement annually, and the contract is serviced by nine FTEs at present who typically work 12.5-hour shifts. TasRail has estimated that moving to nine-hour shifts would create a need to hire an additional driver. This is based on the amount of paid time needed to accomplish the same amount of work as previously (taking into account additional shift changes and so on) increasing by 23 hours per week.

TasRail is contracted to provide a service every four hours for Cement Australia per day. This would be impacted if outer limits were introduced. TasRail has estimated that there would be a loss of productive time in its Cement Australia operations (a loss of roughly 30 minutes per cycle, reducing the number of cycles possible per week from 42 to 37). TasRail considers that this loss in number of trains would likely need to be addressed through providing a longer, heavier train each cycle. This would require investment in additional capital (an extra two wagons, a DQ locomotive,

and extending existing rail sidings and boundary fencing). TasRail has estimated the total cost of this capital investment at $7,000,000.

Throughout its main line services (including operations linking Burnie and Hobart – Tasmania's main freight corridor), TasRail has estimated that compliance with outer limits of service would increase staffing requirements by 4 FTEs. These additional drivers would be located in different depots around the state.

Across these three areas – the Melba Line, the Cement Australia contract, and the mainline services – TasRail has estimated that outer limits of service involving maximum nine-hour driver only shifts would require the recruitment of around six additional FTE drivers and one additional rail operator.

In total, these costs are estimated as follows:

- **Costs of employing additional train drivers (including on-costs) ($8.7 million annually);**
  - At an average wage of $80,000 per year for drivers, and $57,200 for the rail operator, and assuming that on-costs for employees amount to 30% of their wage (this includes training, tools, safety gear, etc.), the additional wage bill would amount to $698,360 annually.
- **Capital costs of extra wagons, locomotives and supporting facilities of ($7 million)**

The total annual value of these compliance costs is around $698,000. The net present value (NPV) of these costs over a 30-year period is $15.7 million.

The potential impact on the competitiveness of TasRail's services and available road freight alternatives has not been factored into the above analysis. At the distances involved, moving freight throughout Tasmania on rail competes directly with road.

Over recent years, TasRail and Tasmanian State Government investments in rolling stock and rail infrastructure have resulted in a rail freight system that provides services of comparable price and quality to what is available on road.

The potential cost increases noted above would need to be recovered through efficiencies or price increases, potentially resulting in some freight moving to the road system. This would have a net increase on congestion, emissions, and the risk of road incidents – creating costs for the Tasmanian community at large. Price increases for rail users may also be passed through to consumers or affect the competitiveness of the company using rail. Research conducted by ACIL Allen for the Tasmanian Department of State Growth found that rail price increases of 20% would potentially result in all freight moving onto road in the Burnie to Hobart Freight Corridor (ACIL Allen, 2017).

At the same time, there are some identifiable limitations to substitutability and loss or change to current rail services could adversely affect downstream businesses. For example, the road network in western Tasmania would potentially have difficulties providing the iron ore mine at Rosebery with the same level of service as TasRail currently does, and transporting cement between Railton and Devonport would be similarly difficult. Where substitution is possible it would likely involve certain transition costs (as businesses need to reconfigure supply and freight needs to align with what is possible on road). This may also result in the need for significant investment in road improvements or maintenance. These are only two examples of particular businesses that may face difficulties substituting road for rail freight.

Conclusion

Overall, this report finds that outer limits of service currently impose costs on the Australian economy and that further extension of outer limits of service has the potential to increase costs for rail operators across the country. Outer limits of service reduce rail operators' flexibility to efficiently run their business, both within a state and also across state borders.

In the face of these costs, there does not appear to be evidence that outer limits of service for train drivers improves fatigue management relative to risk-based approaches. Outer limits of service can also reduce safety for train drivers and the community, particularly where the use of road travel increases. Movements towards applying outer limits of service is also counter to trends seen across the transport industry.

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Appendix A: Outer limits details

Table A.1 Outer limits of service for train drivers in NSW and Queensland

Configuration Type	Variation
Freight train – Single driver	• Queensland has no prescribed breaks • NSW has a minimum prescribed break period of not less 30 minutes between the third and fifth hour of each shift.
Freight train – Two persons	• NSW delineates the maximum shift length hours as: – 12 hours where the second driver is a qualified train driver (including a qualified train driver who is learning a route or undergoing an assessment); and – 11 hours in the case of any other two-person operation. • Qld only has a maximum 12-hour shift length where the second driver is a qualified train driver (including a qualified train driver who is learning a route or undergoing an assessment)
Freight train – All rail safety workers driving freight trains	NSW has one hour less of a prescribed break (hours to be continuous hours) between each shift where: • Shift ends at home depot (11 hours for NSW, and 12 hours for Queensland) • Shift ends away from the home depot and the break is taken away from the home depot (7 hours for NSW, and 8 hours for Queensland) In any 14-day period, both NSW and Qld have a prescribed maximum of 12 shifts. However, NSW prescribes that not more than 6 of those shifts are to be 12 hours whereas in Qld there is a limit of 132 hours of work within the 12 shifts.
Passenger train – Single	• For suburban services, NSW and Qld both have the same prescribed maximum shift length of 9 hours but Qld drivers can only drive for 8 hours at a maximum. • The maximum shift length in NSW for interurban or long distance services is 10 hours whereas 'any other passenger train' in Qld (that is not suburban) the maximum shift length is 9 hours (with no limit on driving time). A one-hour difference. • As per freight train drivers, Qld has a 1 hour longer (continuous) break between each shift where work ends both at the home depot or away (12 hours at home and 8 hours away) versus NSW (11 hours at home depot and 7 hours away). • In a 14-day period, NSW and Qld both have a maximum of 12 shifts but Qld prescribes a maximum amount of work hours of 132. NSW does not prescribe a maximum amount of work hours.
Passenger train – Two persons	NSW delineates the maximum shift length hours as: • 12 hours where the second driver is a qualified train driver (including a qualified train driver who is learning a route or undergoing an assessment); and

Configuration Type	Variation
	• 11 hours in the case of any other two-person operation. Queensland only has a maximum 12-hour shift length where the second driver is a qualified train driver (including a qualified train driver who is learning a route or undergoing an assessment).
Passenger train – All rail safety workers driving passenger trains	NSW has one less hour of a prescribed break (hours to be continuous hours) between each shift where: • Shift ends at home depot (11 hours for NSW, and 12 hours for Queensland) • Shift ends away from the home depot and the break is taken away from the home depot (7 hours for NSW, and 8 hours for Queensland) In any 14-day period, both NSW and Qld have a prescribed maximum of 12 shifts. However, NSW prescribes that not more than 6 of those shifts are to be 12 hours whereas in Qld there is a limit of 132 hours of work within the 12 shifts.
Train drivers who are transported to home depot or rest place	Similar provisions in NSW and Queensland
Emergencies and accidents	No variations

Source: ONRSR, 2018

Table A.2 Outer limits of service for road transport in the US

Property-carrying drivers	Passenger-carrying drivers
11-Hour Driving Limit May drive a maximum of 11 hours after 10 consecutive hours off duty.	10-Hour Driving Limit May drive a maximum of 10 hours after eight consecutive hours off duty.
14-Hour Limit May not drive beyond the 14th consecutive hour after coming on duty, following 10 consecutive hours off duty. Off-duty time does not extend the 14-hour period.	15-Hour Limit May not drive after having been on duty for 15 hours, following 8 consecutive hours off duty. Off-duty time is not included in the 15-hour period.
60/70-Hour Limit May not drive after 60/70 hours on duty in 7/8 consecutive days. A driver may restart a 7/8 consecutive day period after taking 34 or more consecutive hours off duty.	60/70-Hour Limit May not drive after 60/70 hours on duty in seven or eight consecutive days.
Sleeper Berth Provision Drivers using the sleeper berth provision must take at least 8 consecutive hours in the sleeper berth, plus a separate 2 consecutive hours in either the sleeper berth, off duty, or any combination of the two.	Sleeper Berth Provision Drivers using a sleeper berth must take at least eight hours in the sleeper berth, and may split the sleeper berth time into two periods provided neither is less than two hours.
Rest Breaks May drive only if eight hours or less have passed since end of driver's last off-duty or sleeper berth period of at least 30 minutes. Does not apply to drivers with short-haul exceptions.	

Source: https://www.fmcsa.dot.gov/regulations/hours-service/summary-hours-service-regulations

Appendix B: Modelling details

B.1. Modelling details

B.1.1. Global Parameters

The global parameters are the key assumptions applied for across each case study. For the modelling, the following assumptions are in detail below:

- Discount rate of 7%, under the guidance of the Australian Office of Practice Regulation (OBPR).
- Train drivers have 365 work days each year.
- Assume each train driver is mandated to follow eight hours of work for each working day, as each case study would following different regulations in practice.
- The operating and maintenance (O&M) cost is 3% of the accommodation capital cost, assuming a 40-year asset life and maintenance to maintain the book value of an accommodation asset, under Transport for NSW's *Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives*.
- Drivers are paid $50 per hour, in accordance to Glassdoor's *Train Driver Salaries* (unless specific wage rates have been supplied by operators in each case study).
- Total road externality cost of 18 cents per kilometre, in accordance to the externality unit costs for freight vehicles under Transport for NSW's *Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives*. The road externality costs comprise of: air pollution costing 0.03 cents/km; greenhouse gas emissions (GHG) costing 2.49 cents/km; water pollution costing 0.05 cents/km, nature and landscape externalities costing 0.58 cents/km; and upstream and downstream costs of 4.25 cents/km (and zero cost of noise externalities). The road externalities of costs are 11 cents/km, under the crash costs from road and passenger transport in Australia by Deloitte Access Economics.

B.1.2. Case study assumptions

With the global and case study assumptions, the additional costs of following outer limits of service were calculated.

Staff costs

The total staff costs include ongoing and new staff, and both involve wage and training costs.

Existing staff costs

The existing staff wage costs are totalled as:

$$Total\ existing\ staff\ cost = total\ working\ hours\ \times\ driver\ pay\ rate\ (assumed\ as\ \$50\ per\ hour)$$

With the total working hours for each case study are calculated as:

$$Total\ working\ hours\ per\ year = total\ number\ of\ drivers\ \times\ hours\ per\ driver\ (per\ year)$$

And the hours per driver (per year) is calculated as:

$$\begin{aligned} &Hours\ per\ driver\ (per\ year)\\ &\quad = hours\ per\ day\ (not\ under\ outer\ limits\ of\ service)\\ &\quad \times\ work\ days\ per\ year\ (assumed\ as\ 365\ days\ per\ year)\\ &\quad \times\ percentage\ of\ work\ days\ and\ off\ days \end{aligned}$$

New staff costs

The total cost of new staff wages under the outer limits of service (OLoS) is given under the following formulae:

$$\begin{aligned} &Total\ new\ staff\ cost\ (under\ OLoS)\\ &\quad = total\ drivers\ required\ under\ OLoS\ \times\ driver\ pay\ rate\ (assumed\ as\ \$50\ per\ hour)\\ &\quad \times\ hours\ per\ driver\ per\ year \end{aligned}$$

- The total drivers required under OLoS are calculated as the total working hours of existing staff (calculated in the previous section) divided by the total hours per driver under OLoS. The total hours per driver under OLoS are calculated as:

$$\begin{aligned} &Total\ hours\ per\ driver\ under\ OLoS \\ &\quad = mandated\ hours\ per\ day\ (assumed\ as\ 8\ hours) \\ &\quad \times work\ days\ per\ year (assumed\ as\ 365\ days\ per\ year) \\ &\quad \times percentage\ of\ work\ days\ and\ off\ days \end{aligned}$$

The hours per driver (per year) is given as:

$$Hours\ per\ driver\ per\ year\ =\ work\ hours\ per\ day\ \times\ percentage\ of\ work\ days\ and\ off\ days\ \times\ work\ days\ per\ year\ (assumed\ as\ 365\ work\ days\ per\ year)$$

Vehicle costs

Additional vehicle costs include the total on-road vehicle operating costs (VOC) per year and the total additional costs for on-road externalities per year.

Note that the number of round trip rail journeys per year is calculated as:

$$Number\ of\ round\ trip\ journeys\ by\ rail = total\ working\ staff\ hours\ \div (round\ trip\ time\ \times crew\ per\ journey)$$

Total additional VOC per year

The on-road operating costs are calculated by using the formulae below:

$$Total\ opeating\ cost\ on\ road = total\ number\ of\ road\ trips\ \times VOC\ per\ road\ trip$$

- The total number of road trips is given by:

$$Total\ number\ of\ road\ trips = road\ trips\ per\ round\ trip\ by\ rail \times total\ number\ of\ rail\ trips$$

- And the VOC per road trip is given by:

$$VOC\ per\ road\ trip = VOC\ per\ kilometre\ \times kilometres\ per\ road\ trip$$

Total additional road externalities per year

The additional road externalities (per year) are calculating using the following formula:

$$\begin{aligned} &Total\ externality\ cost\ on\ road\ per\ year \\ &\quad = total\ cost\ of\ road\ externalities\ per\ kilometre \times kilometres\ per\ road\ trip \\ &\quad \times number\ of\ road\ trips\ per\ year \end{aligned}$$

Fatalities and injuries

The potential increase in road crashes is based on the additional road kilometres travelled, which are calculated as:

$$\begin{aligned} &Additional\ road\ kilometres\ travelled\ per\ year \\ &\quad = Drivers\ per\ rail\ journey \times kilometres\ per\ road\ trip \\ &\quad \times Total\ number\ of\ road\ trips\ per\ year \end{aligned}$$

From the calculated additional road kilometres travelled, the potential additional fatalities and major injuries per year are calculated by multiplying their corresponding ratios per billion kilometres:

$$\begin{aligned} &Potential\ fatalities\ per\ year \\ &\quad = Additional\ road\ kilometres\ travelled\ per\ year \\ &\quad \div (fatality\ rate\ per\ billion\ kilometres \times 10^9) \end{aligned}$$

$$\begin{aligned} &Potential\ major\ injuries\ per\ year \\ &\quad = Additional\ road\ kilometres\ travelled\ per\ year \\ &\quad \div (serious\ injuries\ rate\ per\ billion\ kilometres \times 10^9) \end{aligned}$$

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C ARA SUBMISSION TO THE CONSULTATION REGULATION IMPACT STATEMENT FOR HVRR PHASE 2 INDEPENDENT PRICE REGULATION OF HEAVY VEHICLE CHARGES

AUSTRALASIAN RAILWAY ASSOCIATION

Association Number A03958 | ABN 64 217 302 489

AUSTRALASIAN RAILWAY ASSOCIATION SUBMISSION

On the

Consultation Regulation Impact Statement HVRR Phase 2

Independent Price Regulation of Heavy Vehicle Charges

ABOUT THE ARA

The Australasian Railway Association (ARA) is a not-for-profit member-based association that represents rail throughout Australia and New Zealand. Our members include rail operators, track owners and managers, manufacturers, construction companies and other firms contributing to the rail sector. We contribute to the development of industry and government policies to ensure Australia's passenger and freight transport systems are well represented and will continue to provide improved services for Australia's growing population.

INTRODUCTION

Rail needs to be both competitive and integrated to strengthen its role in Australian freight supply chains. To achieve this, there needs to be a consistent pricing and regulatory framework applying to all modes of transport. Reforms to heavy vehicle pricing are needed to create this consistent regulatory environment.

Heavy vehicle pricing reform provide benefits to both the road and rail sectors through the more efficient use and supply of land transport. Furthermore, it will help to maximise the non-economic benefits of freight rail, including reduced traffic congestion; safety improvements and a reduction in environmental impacts. More broadly, it is critical to the future growth and sustainability of the national economy.

The ARA therefore welcomes the decision of the Transport and Infrastructure Council to request a consultation Regulation Impact Statement (RIS) on the introduction of independent price regulation of heavy vehicle charges and a forward-looking cost base for road expenditure.

As the ARA has previously advocated in its submission to Government on the Independent Price Regulation of Heavy Vehicles[1] this reform process provides an important opportunity to address

[1] Page 4, ARA Submission - Independent Price Regulation of Heavy Vehicles, https://www.ara.net.au/sites/default/files/17-07-21_Independent%20price%20regulation%20of%20heavy%20vehicles.pdf

competitive neutrality issues between land transport modes on corridors where road and rail compete and to create a more direct link between road user funds received and the investments made by governments. This 2017 submission also voiced support for the introduction of a standard regulatory pricing model incorporating both future operational costs and both past and future capital investment.

The consultation RIS needs to be seen within the context of significant reports on this matter advocating the need for reform. This includes, most recently, the Inquiry into National Freight and Supply Chain Priorities Report, which identified as an industry priority efficient pricing and competitive access arrangements for key infrastructure assets[2]. The Report also appropriately highlighted that an integrated approach to freight modal pricing will foster more informed decisions about the appropriate mode for a particular class of freight[3].

COMMENTS ON THE RIS

The ARA notes that this RIS is a key part of Phase 2 of the HVRR road map. The core elements of this phase of reforms relate to:

- establishing an independent price regulator, which would have powers to set prices independently of government and potentially perform a range of oversight activities related to forward-looking road expenditure
- Implementing a forward-looking cost base, which would develop a building-block model to determine allowed revenue under heavy vehicle charging based on expected future expenditure.

The ARA understands that reform option A implements a simple level of independent price regulation, while reform option B is a larger step involving more ambitious regulatory reforms

[2] Page 49, National Freight and Supply Chain Inquiry Priorities Report, https://infrastructure.gov.au/transport/freight/freight-supply-chain-priorities/files/Inquiry_Report.pdf

[3] Page 56, National Freight and Supply Chain Inquiry Priorities Report, https://infrastructure.gov.au/transport/freight/freight-supply-chain-priorities/files/Inquiry_Report.pdf

The ARA's longer-term policy objective is for the establishment of a national economic regulatory framework for transport and the establishment of more consistent pricing principles. The ARA believes the transition to a regulated utility model (and overseen by an independent economic regulator) would provide benefits to both the road and rail industries by achieving greater efficiency in the freight logistics supply chain.

In light of this, the ARA supports Option B which provides more ambitious implementation settings and will lead to a model that is closer to the end-state reform (full economic regulation) than does Reform option A. Fundamentally, the ARA supports reform that leads to more efficient price signals, introduces important accountability measures and provides incentives to use infrastructure more efficiently. To help achieve these principles, the ARA believes there is also scope to expand the powers of the national regulator to strengthen its regulatory oversight abilities. The ARA is not in a position, however, to provide an informed view on matters such as road maintenance costs; road capacity expansion costs and road quality and levels of service under scenario B.

In terms of the reform pathway, the ARA also notes that both of these reforms are considered under two scenarios; Scenario 1 where no further reforms would be undertaken and Scenario 2 where further reform would be pursued. The ARA encourages a practical reform pathway that can be delivered at the earliest opportunity in a way that provides business certainty, productivity improvements and community benefits. In particular, the ARA supports a practical reform pathway leading to phases 3 and 4 (the implementation of more direct user charging) and therefore supports Scenario 2. Adopting scenario 1 would effectively stall heavy vehicle road reform indefinitely and result in significant opportunity costs and is not supported.

The ARA notes that there will be one Building Block Model for each state or territory government based on road management data and proposed expenditure in that jurisdiction. As noted in the National Freight and Supply Chain Priorities Report[4], a nation-wide, consistent and integrated

[4] Page 7, National Freight and Supply Chain Inquiry Priorities Report. https://infrastructure.gov.au/transport/freight/freight-supply-chain-priorities/files/Inquiry_Report.pdf

approach to freight and supply chain issues, including regulation, is needed to enhance the efficient movement of freight. In this sense, the ARA queries the establishment of different BBMs at the state and territory level, particularly in respect of the economic inefficiencies and distortions that could arise as prices vary across state borders. The ARA would welcome further consideration of this issue in the decision RIS.

COMPLEMENTARY ROAD REFORM

The RIS consultation process is being carried out alongside broader work being undertaken by the Commonwealth to support Heavy Vehicle Road Reform. This includes the Business Case Program for Location-Specific Heavy Vehicle Charging Trials and the National Heavy Vehicle Charging Pilot. The ARA has been a vocal supporter of a Mass Distance Location (MDL) charging regime for heavy vehicles on arterial roads, including national highways, commencing on national highways between Melbourne, Sydney and Brisbane.

The ARA takes this opportunity to encourage ongoing focus in this area in a timely manner to implement pilots and trials of the proposed reforms and to trial different elements of heavy vehicle road user charging, based on MDL charges, as the best way to better understand the most appropriate approach to implementing this reform.

CONCLUSION

The reform options presented in this RIS – **specifically Reform Option B and Scenario 2** – are important building blocks to strengthening regulatory consistency between road and rail freight and in so doing, improving the efficiency of Australia's freight supply chains.

The ARA appreciates the opportunity to provide comments on the Consultation RIS and looks forward to further engagement as this reform progresses. For further information, please contact Duncan Sheppard, General Manager, Freight and Industry Programs at dsheppard@ara.net.au or (02) 6270 4531.

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