

Transport for NSW

NSW Response to the Fatigue Risk Management – Hours of Work and Rest
Draft Regulatory Impact Statement

March 2012



**Transport
for NSW**

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1. Introduction

This submission is made by Transport for NSW - the lead agency for public transport and roads in NSW. Transport for NSW is responsible for improving customer experience, planning, program administration, policy, and regulation, the procurement of transport services, infrastructure and freight.

Transport for NSW welcomes the introduction of the *Rail Safety National Law* (National Law) and the *Rail Safety National Law Regulations 2011*. NSW considers that the National Law is a positive step toward increased rail safety outcomes across Australia and appreciates the opportunity to comment on the draft Fatigue Risk Management – Hours of Work and Rest Draft Regulatory Impact Statement.

Transport for NSW has identified four key areas in the RIS which require further analysis and consideration by the NTC prior to recommending a final position on fatigue management.

These areas relate to:

- The level of industry capacity to address risk;
- The analysis of prescriptive vs performance based regulation;
- Compliance under the National Rail Safety Law; and
- The analysis of current working time arrangements which underpin the RIS recommendations.

NSW supports the COAG principle that the establishment of the National Rail Safety Regulator (NRSR) should not compromise safety. In order to ensure that this outcome is achieved in NSW, comment has been provided both on the information in the Regulatory Impact Statement (RIS) upon which the options for fatigue management are based and on the suitability of a system without prescribed hour limits for train driver shifts in the NSW context. Transport for NSW requests that these comments, which are provided in detail in Section 2 of this submission, are carefully considered by the National Transport Commission (NTC) prior to recommending a final position on fatigue management under the NRSR.

1.1 Fatigue Management in NSW

Under the NSW *Rail Safety Act 2008*, a rail transport operator must have in place a program for the management of fatigue for rail safety workers as part of the operator's safety management system. Division 5 of the *Rail Safety (General) Regulation 2008* stipulates a number of factors which the operator must take into account when preparing a fatigue management program including:

- The impact on rail safety workers of the scheduling of shift and rest periods;
- The impact of work scheduling and relief practices generally on social and psychological factors that may impact on performance and safety;
- The kinds of rail safety work being carried out;
- Physiological factors arising out of work practices affecting rail safety workers, such as the effect on worker alertness and recovery of the time when work is undertaken and the length and frequency of breaks;
- The need for education and training of rail safety workers to identify and manage fatigue;
- The kind of rest environments that are to be provided by the operator for rail safety workers;
- The physical environment in which rail safety work is to be carried out;

- Any special circumstances in which rail safety work may be required to be carried out, including in emergencies or under degraded and abnormal conditions;
- The variations in shifts and rest periods that may be required by different rail safety work requirements, including different routes; and
- Relevant developments in research related to fatigue and any technology that may be applied to manage work-related fatigue.

In addition to the requirement for a fatigue management program, which is largely consistent with the provisions contained in the National Rail Safety Law, current NSW arrangements include a legislated “safety net” which limits train driver hours of work and mandates minimum rest breaks. These provisions are contained in Schedule 2 of the *Rail Safety Act 2008*.

Under Division 5 of the Rail Safety (General) Regulation 2008, ITSR may grant an exemption for an operator to comply with the requirements under Schedule 2 if the operator can demonstrate that appropriate risk assessment and control measures are in place providing a satisfactory alternative approach to managing fatigue risk for train drivers.

The rationale for this approach is that train drivers operate in a higher risk environment compared to other rail safety workers given their direct control over a train and the potential hazards to public safety should they become incapacitated. Therefore, in addition to the general duties and fatigue management program, the outer hour limit sets a safety net to which operators must adhere and an enforceable standard by which compliance can be measured and monitored by the Regulator. It should also be noted that freight and passenger trains share the NSW rail network and the judgement, performance and responsiveness of train drivers plays an important role in managing risks. Therefore, human factor risks such as fatigue must be properly controlled.

1.2 Previous NSW comments on fatigue management under the National Rail Safety Regulator (NRSR)

In August 2011, NSW provided a submission to the NTC on the draft National Rail Safety Law, Regulation and Regulatory Impact Statement. The issue of fatigue management was raised as part of that process. The following comments were provided:

Fatigue Management

NSW considers that the proposals for the management of fatigue contained within the National Law and Regulations are an improvement from the National Model Law (which was silent other than for the general requirement for a Fatigue Management Program). However, they are still overall insufficient to manage this critical area of safety.

As a particular measure to control the risks arising from the fatigue of rail safety workers, NSW considers that “safety net” limits for hours of work and rest breaks for rail safety workers who are train drivers (as for example, set out Schedule 2 of the NSW Rail Safety Act) should be included in the National Law rather than regulated by a subordinate instrument that is not directly enforceable. In NSW’s view, a failure to include a “safety net” for train driver hours of work and rest periods in the National Law could result in a diminution of safety standards when compared to the provisions of the NSW Rail Safety Act.

The current NSW approach to fatigue management includes the application of standard hours for work and rest breaks set out in Schedule 2 to the NSW Rail Safety Act which is embedded in the risk management regulatory framework of the Act with the capacity for rail transport operators to apply for exemptions. ITSR advises that it has received very few applications for exemption since the provisions were originally enacted⁸ which suggests that the provisions are operationally workable and do not create any practical problems in their implementation. NSW considers that this model represents international best practice⁹ and provides for a flexible performance based risk management approach that operates within the boundaries of specified limits. The Independent Expert Panel on Rail Safety Policy Issues Report¹⁰ contained clear recommendations that there should be a safety net and that a regulatory approval process was required for operators to work outside a standard set of limits. NSW is of the view that the Panel’s Recommendations in relation to an “approval process” for working outside the limits would be difficult to achieve, if the initial safety net limits are set in an approved Code of Practice rather than legislation/regulation.

At the May 2011 meeting of the Australian Transport Council of Ministers, additional information on the Expert Panel’s recommendations, in particular a request for additional evidence and analysis of the proposed scheme, was endorsed by all Ministers. NSW understands that this further work will be the basis of a second Regulatory Impact Statement (RIS) to be available in the first half of 2012. Both these processes will be critical to ensure that the National Law manages fatigue in a comprehensive manner.

⁸ The provisions were originally enacted in the *Rail Safety Act 2002 (NSW)* since that time ITSR has only received three applications for exemption.

⁹ See, for example, Council of the European Union, Council Directive 2005/47/EC of 18 July 2005 on the Agreement between the Community of European Railways (CER) and the European Transport Workers' Federation (ETF) on certain aspects of the working conditions of mobile workers engaged in interoperable cross-border services in the railway sector, Official Journal of the European Union, L195, Volume 48, 27 July 2005 at p15, available at <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:195:0015:0017:EN:PDF>, viewed 29 July 2011.

¹⁰ http://210.247.132.180/alt-host/assets/pdf_file/0004/70753/IndependentRailExpertPanelreport.pdf

2. NSW comments on the draft Regulatory Impact Statement (RIS)

This section outlines the four key areas Transport for NSW has identified which require further analysis and consideration by the NTC prior to recommending a final position on fatigue management.

Section 2.1 relates to concerns that the level of industry capacity to address fatigue risk has been underestimated in the RIS. While the RIS acknowledges there are varying levels of capacity across the Australian rail industry, the potential impact this may have on safety outcomes has not been fully explored or analysed. It is considered that justification for not having a legislated safety net should be backed by evidence that there is a uniformly high standard of existing risk management systems by operators backed by strong industry standards. Without this, the policy case for the preferred option is weakened.

Section 2.2 covers concerns that the RIS does not provide an accurate analysis of prescriptive and performance based approaches to regulation. The RIS poses an argument for and against each approach without recognising that the most common approach to fatigue management, both internationally and in NSW and now Queensland, is to implement a combination of prescription (eg. outer limits) and performance based regulation (eg. safety management systems). Further in presenting this argument, the RIS fails to accurately characterise the application of fatigue management legislation and practices in NSW which is problematic given it is provided as one of the options for the national system.

Section 2.3 addresses the potential impact that the removal of outer limits may have on compliance under the national system. There are concerns that in lieu of the current legislative safety net in NSW, the RIS suggests that the Regulator become the “safety net”. However, the RIS appears to underestimate the significant additional resources which will be required by the Regulator to oversight fatigue management arrangements within such a framework and the specialised nature of the skills required in this area. Transport for NSW is also concerned that removing outer limits will mean that some sectors of the industry with less complex operating environments will be provided with less direction on work and rest scheduling.

Section 2.4 raises issues with aspects of the financial analysis in the RIS. The analysis provided makes it difficult to assess in what ways shift times in jurisdictions other than NSW are incompatible with the Schedule 2 safety net arrangements and consequently the conclusions the RIS reaches.

These points are further explored in the following sections.

2.1 Level of industry capacity to address risk

Despite improvements in technology in recent years, the safety of railway operations is still dependent on human performance and many of the technical defences remain vulnerable to human error.

In NSW, freight trains routinely share tracks with intercity and interstate passenger trains that may be carrying over 500 people. Metropolitan passenger trains routinely carry over 1200 people during peak times. Train corridors pass through highly populated areas and close to transmission and gas pipelines and other important infrastructure. Because of NSW’s density and mix of rail operations, the risk environment creates a greater exposure for serious risk. In

addition neither passenger or freight services operate in NSW with Automatic Train Protection (ATP), hence the hazard of driver distraction/incapacitation remains a significant risk to passenger safety.

Recent investigation reports from the Australian Transport Safety Bureau (ATSB) and the NSW Office of Transport Safety Investigation (OTSI) have found that human error is a major contributor to accidents and incidents with 16 of 22 recent reports citing human error as a contributing factor (See Appendix A). Fatigue was specifically cited as a potential contributing factor in the OTSI and ATSB investigations into rail incidents in Kogarah on 13 April 2010, Lithgow on 1 April 2011 and Junee on 9 September 2009. Despite its prevalence as a contributing factor in rail incidents, the area of human factors and more specifically fatigue is a complex area to manage with few skilled specialists working in the industry and currently no industry generated standards or guidance.

In this context, the importance of a legislated safety net such as Schedule 2 cannot be underestimated in providing assurance that any “gaps” in operator competency are being addressed through legislated controls that apply consistently across the industry. With a safety net in place, the Regulator can work co-operatively with industry to address the gaps and help develop the capacity of industry to design risk controls that reflect good understanding of the nature of the risks.

There is concern that the Australian rail industry’s competence to manage fatigue risk is not consistent or sufficient enough. For example, small to medium sized operators unlikely to have fatigue management expertise or the skills to manage fatigue risks internally to the degree of sophistication required under a purely risk based approach.

This concern is supported by the RIS which recognises that industry capacity levels may be “insufficient to produce a safety outcome” but notes that “guidelines, standards or codes of practice could be employed to assist operators...in the management of fatigue” (s9.3.2 page 46).

As the NSW Regulator, ITSR advises that the lack of capacity of industry to manage fatigue within a purely risk based approach has been an ongoing concern particularly with regard to the over-reliance on fatigue index software as a ‘one stop’ fatigue risk management solution. This particular problem prompted ITSR to commission the Review of Rostering Software Tools for the Management of Fatigue which found that while a body of knowledge exists on the effects of fatigue on operational tasks such as train driving, it appears that there is little awareness of this information among the personnel responsible for the design and management of scheduling.

The ITSR review also found that due to the lack of understanding as to how outputs from rostering software tools are derived, too much trust is placed in their value as control measures and there is little understanding of what factors are considered by fatigue models and what are not¹. This problem is reflected on page 11 of the Frontier Economics report that suggests that larger operators are meeting the requirement in s29 of the regulation for “safe hours of work” by rostering rules typically based on EBA’s and the “use of FAID on master rosters in order to take into account a broad set of factors that are believed to affect a workers level of fatigue”.

¹ Independent Transport Safety Regulator, 2010 Transport Safety Alert 34, Use of Biomathematical Models of Human Fatigue.

ITSR further advises that in undertaking regulatory functions, it has observed that the general industry approach to fatigue management is also often deficient in the following areas:

- Lack of sufficient understanding of the link between work scheduling, fatigue, performance of particular tasks and increased accident risk;
- Relaxation of work hours justified by weak administrative controls;
- Poor risk management of changes to rosters through swapping, callouts and overtime; and
- Lack of systematic procedures for investigation of fatigue causal factors of accidents.

It is acknowledged that industry should be encouraged to develop a better knowledge base in the area of fatigue management. However, the RIS does not take into account the time and costs associated with industry developing this level of skill and designing and implementing fatigue management plans which reflect it.

The RIS also appears to assume that all operators require unique and tailored fatigue management plans. This approach fails to recognise that removing standard hours may actually have a negative impact on industry as operators will no longer have the direction provided by prescribed outer limits when rostering and scheduling work and non-work periods.

Transport for NSW considers that the RIS does not contain sufficient evidence to support the proposition that safety will not be compromised in NSW under option 1. In fact, it acknowledges that there may be a gradual drift to longer hours, shorter breaks and that fatigue related errors, incidents and accidents may increase (s 9.3.2 page 45). It also acknowledges that commercial pressures and driver shortages may adversely impact on safety, noting that there are deficiencies in the industry's abilities to manage risk, particularly in the area of fatigue management (s 9.3.2 at page 46).

The removal of limits in an environment without a consistently capable industry has the potential to lead to operators implementing longer train driver shift lengths, shorter breaks, or more consecutive shifts without a robust risk management process. Industry has already foreshadowed an intention to implement longer shifts as outlined in an Australian Rail Association (ARA) media release² seeking parity with road transport arrangements where 16 hour shifts are permitted.

2.2 Analysis of prescriptive vs performance based regulation

The RIS does not differentiate between a purely prescriptive approach where compliance with limits is all that is required; and "safety net" limits that are prescribed within risk and performance based legislation. Further, the RIS does not recognise that the current co-regulatory approach to rail safety regulation in Australia is a mixture of prescriptive and performance based legislation. In fact, many aspects of the NRSL follow this principle including the provisions surrounding emergency management plans where Section 113 of the NRSL requires an operator to have an emergency management plan in place (performance approach) and Division 3 of the Regulation sets out a series of conditions with which the emergency management plan must comply (prescriptive approach).

² Media release – Australian Rail Industry Calls for Uniform Fatigue Regulation. Australasian Railway Association. 28 July 2010.

The value in using a combined prescriptive and performance based approach to manage fatigue risks in the rail industry is that operators are given the opportunity to determine what limits are appropriate for the risk context of their operations *within* the boundaries of legislated limits. This combined approach applies in NSW and several international jurisdictions such as the United States, the European Union, the United Kingdom and Canada. (See Appendix B)

The use of prescriptive rules, such as those contained in Schedule 2 of the *Rail Safety Act 2008*, play an important part in the overall risk management framework. It is considered that a good safety regulatory scheme has *both* risk based rules and prescriptive rules. For example, in the Work Health and Safety context, prescriptive rules in relation to requirements such as the need to use personal protective equipment in certain situations and the conditions provided by employers for staff required to work from heights, complement outcome based rules such as general duties.

Currently, NSW uses a combination of prescriptive and performance based legislation to support the management of fatigue risk. The RIS does not recognise this. Rather, it depicts NSW arrangements as being only prescriptive without acknowledging that the prescribed limits are embedded in risk and performance based legislation.

The RIS is critical of Option 2 indicating that the limits will be perceived as "safe" by operators. While this may be true of prescriptive limits that are not embedded in risk-performance based legislation, it is not accurate to describe the NSW regulatory framework in this way. The NSW limits exist to prevent extreme rostering scenarios but in themselves do not represent adequate risk management.

NSW currently has in place Regulations similar to Regulation 29 under the NRSL which clearly place the onus on operators to implement "safe hours of work". In doing so the operator must consider a range of factors including the time of day that the work occurs (Regulation 291d). If operators merely comply with the margins of prescribed limits regardless of the risk context, they will have non-conforming safety management systems.

NSW also has in place arrangements to grant exemptions to provide flexibility for operators that can demonstrate the capacity to work outside the legislated boundaries. The RIS states a perception by industry that it is difficult to obtain an exemption in NSW with the "bar being too high". However, ITSR advises that it has granted two of the three exemptions that have been applied for since specific exemption regulations were introduced in 2005.

Relevant research conducted in Australian aviation suggested that a premature move to a fatigue risk management approach without the protection of regulated hours resulted in pilots flying longer hours, citing commercial pressures, and pressures to work when tired due to biomathematical model output score³.

The move to fatigue risk management approaches in the aviation industry was driven out of necessity to support ultra long range flights, but it is acknowledged that the capacity to implement fatigue risk management in other parts of the industry such as general aviation is lacking and this is why in aviation the regulatory approval process to move outside prescriptive limits, is being strengthened.

³ Keer, F., 2009. Organisational Cultures of Safety and Regulatory Effectiveness: The Civil Aviation Safety Authority's Fatigue Risk Management Systems in Australian General Aviation. PHD Thesis. Australian National University.

The RIS states that there is a lack of quantitative evidence that the “law” (the “safety net”) leads to better safety outcomes. What needs to be recognised is the impact of safety law as a general deterrence and its role in modifying the behaviour of duty holders. Further, the RIS does not appear to recognise that the causation of railway incidents is the result of a range of interacting causes and trends over time and subject to a wide range of impacts other than regulation. This makes it very difficult (if not empirically impossible) to compare jurisdictional regulatory arrangements and isolate the effects that a legal requirement (such as Schedule 2) has on the overall level of safety in the industry.

For industry as a whole, taking into account the diverse range and nature of operators, a hybrid approach utilising both risk based approaches and limits beyond which a regulatory approval process is triggered, is considered to be a better way forward for the NRSR.

2.3 Compliance under the National Rail Safety Law

It is considered that the RIS has not fully addressed the impact on compliance under a system which does not include outer hour limits for train drivers.

In several sections, the RIS refers to the Regulator as the “safety net” as it has the ability under the National Law “to enforce standards as it considers appropriate”. However, the proposed approach does not include standards against which the Regulator may assess and enforce compliance. Nor does the approach provide the Regulator with an opportunity to approve the fatigue management plan or changes to it. Further, as the previous National Model Law did not include specific requirements about the contents of a fatigue management plan in the Regulations (and this is what is in place in the majority of jurisdictions at present), consideration would need to be given to a transition period, where operators would be required to submit fatigue management plans to the Regulator for its acceptance. This would then give further confidence to the Regulator that the industry did in fact have the requisite capacity to manage fatigue in a purely risk based approach.

The NRSL contains the requirement to *have in place* a fatigue management program which addresses certain elements but does not set down how those elements are to be specifically addressed. If problems are identified with an operator’s rostering or work scheduling practices, the Regulator’s recourse would be to provide advice on fatigue management to the operator or to issue an improvement notice or direct an amendment to a safety management system. In each case, the onus would be on the Regulator to prove there is a problem with the operator’s rostering or work scheduling making compliance and enforcement more difficult. To properly monitor compliance, a sufficiently resourced and skilled Regulator needs to be in place.

The RIS argues that various industrial instruments in place nationally also constrain shift length and so effectively, even without legislating outer limits, shift length would not exceed certain hours. However, it is considered inappropriate to rely solely on industrial negotiations to establish hours of rest and work from a safety perspective as these can change depending on the outcome of negotiations. Safety issues are not the primary or sole purpose of enterprise agreements and it would be possible in circumstances of an increase in “operation requirements” for an employer to negotiate an enterprise agreement with employees whereby they could be required to work longer hours.

Further, industrial agreements are not an effective mechanism by which to regulate fatigue risk management as the maximum working hours that are prescribed for employment in general are not set by reference to the specific risks associated with train operations in the rail industry.

Aside from the points outlined above regarding the compliance and enforcement issues with regard to the Regulator itself being the “safety net”, the RIS also underestimates the potential costs involved if the Regulator is to take on such a role.

The main concern relates to the fact that the Regulator would be required to assess individual operators’ fatigue management plans to ensure compliance and enforcement where necessary. It is envisaged that this will require a high level of oversight by a number of highly specialised and skilled assessors which is likely to incur significant costs particularly given that the onus will be on the Regulator to investigate and then demonstrate that an operator’s fatigue management system is flawed in order to justify the imposition of any limits or improvements which are deemed necessary.

In addition, the direction to amend a safety management system or issue an improvement notice to an operator are “reviewable decisions” under the NRSL. Therefore, should an operator choose to seek a review of the Regulator’s decision to impose outer limits, this will result in further costs.

The cost recovery model for the NRSL which was approved by the Project Board in February 2012 is based on the cost of regulation for each jurisdiction for 2012. Currently, the only jurisdiction that requires the level of detail in an operators fatigue management plan as stipulated in the NRSL is NSW and this is managed within the context of legislated safety limits. As such, it can be expected that the costs of regulation in all jurisdictions will increase under the NRSL due to the need to monitor the strengthened fatigue management plan without the benefit of a prescribed safety net. The RIS does not address this variance in current approaches to fatigue management, therefore it does not appear that the budgetary impact of option 1 has been adequately assessed.

2.4 Analysis of current working time arrangements

The economic analysis provided by Frontier Economics indicates that extending the current Schedule 2 provisions (Option 2) would be too inflexible for operations in other jurisdictions and would result in an additional cost of \$185 million per annum. However, there is no information provided on the operational circumstances in which working time arrangements practiced in other states are incompatible with Schedule 2. It is noted that there may be circumstances where rail operators working in remote mining areas may be required to roster shift lengths outside of those prescribed in Schedule 2.

It is further noted that the majority of the advanced driver safety systems in Australia are in rail services operating in the mining sector in Queensland and Western Australia. In a NSW context, operators that have invested in these superior technical defences would be considered strong candidates for exemption from Schedule 2. However, the Frontier Economics report provides a footnote that the cost estimates in implementing Option 2 in other states and territories do not take into consideration likelihood of operators seeking exemption. The exemption capacity is an integral part of the NSW arrangements and it should not be overlooked by the RIS.

3. Conclusion

Transport for NSW considers the establishment of a National Rail Safety Regulator to be an important national reform and is eager to assist in the process to bring about a more consistent regulatory regime for the rail industry in Australia to improve productivity. However, as was noted by COAG, the reform should also improve safety.

Consequently, Transport for NSW expects that the National Transport Commission will give careful consideration to the points raised in this submission prior to making a recommendation on the final policy position for fatigue management under the National Rail Safety Law and in addition requests that the final version of the RIS provides:

- A more accurate representation of the current fatigue management practices in NSW including the risk management framework in which the prescribed safety net limits are embedded and the flexibility provided by exemption provisions contained in Regulation;
- Evidence to support why the Australian rail industry requires a different approach to fatigue management to what has been adopted in modern and complex rail systems internationally;
- Analysis on how the requirement for operators in all jurisdictions to have in place fatigue management plans consistent with Regulation 29 will impact on the total cost of regulation; and
- Details on the precise circumstances in which operators in other jurisdictions are currently working outside of the safety net limits in Schedule 2.

APPENDIX A

ITSR analysis of OTSI and ATSB investigation reports to determine percentage involving human factors

1. ATSB final rail investigation reports published since January 2011 pertaining to incidents in all Australian states excluding level crossing incidents

Results

Fourteen final reports of completed ATSB rail investigations were published between January 2011 and March 2012 pertaining to incidents in all Australian states. Excluding level crossing incident reports, eight of the 14 involved human error as a contributing factor. Investigations citing human error contributing factors are highlighted in red.

Note: Incidents coded in red involve human error as a contributing factor

RO-2010-013	Collision of grain train 3234 with grain train 8922 at Yass Junction, NSW on 9 December 2010	09 Dec 2010	Final	30 Jan 2012
RO-2010-012	Derailment of freight train 4DA2 near Cadney Park, South Australia, 25 November 2010	25 Nov 2010	Final	20 Dec 2011
RO-2011-007	Parting of train 9827 near Gunning, NSW on 30 March 2011	30 Mar 2011	Final	23 Nov 2011
RO-2010-011	Derailment of Train 3PW4 at Wodonga, Victoria on 23 October 2010	23 Oct 2010	Final	19 Oct 2011
RO-2011-002	Collision between suburban passenger trains G231 and 215A in Adelaide Yard, SA, 24 February 2011	24 Feb 2011	Final	11 Oct 2011
RO-2010-010	Derailment of freight train 5MPR5 near Keith SA on 8 October 2010	08 Oct 2010	Final	28 Sep 2011
RO-2010-001	Derailment of freight train 2224 at Exeter, NSW on 24 January 2010	24 Jan 2010	Final	04 Jul 2011
RO-2010-009	Safeworking Irregularity/Breach at Bomen NSW on 6 September 2010	06 Sep 2010	Final	07 Jun 2011
RO-2011-003	Signal passed at danger at Yerong Creek, NSW, 25 February 2011	25 Feb 2011	Final	19 May 2011
RO-2010-002	Safeworking irregularity involving a freight train and an empty passenger train Manildra, NSW, 10 February 2010	10 Feb 2010	Final	18 May 2011
RO-2010-007	Safeworking incident - Junee, NSW on 4 August 2010	04 Aug 2010	Final	18 Apr 2011
RO-2009-008	Signal Passed at Danger by Train ST24 Junee, NSW, 9 September 2009	09 Sep 2009	Final	11 Feb 2011
RO-2010-006	Safeworking irregularity involving passenger train SN57 and train D231 at Moss Vale, NSW, 17 June 2010	17 Jun 2010	Final	21 Jan 2011
RO-2009-009	Reported signal irregularity at Cootamundra NSW involving trains ST22 and 4MB7	12 Nov 2009	Final	20 Jan 2011

OTSI final investigation reports of rail incidents occurring since January 2010 in NSW (excluding level crossing incidents)

Results

Eight final reports were published (to date) by OTSI pertaining to incidents that occurred since January 2010 in NSW excluding level crossing incidents. 100% (eight reports) involved human error as a contributing factor.

Note: Incidents coded in red involved human error as a contributing factor

3 May 2011	Enfield Yard - 1.35 Mb PDF	Runaway Rolling Stock	Complete Final
1 Apr 2011	Lithgow - 1.39 Mb PDF	Collision	Complete Final
29 Oct 2010	Bankstown - 987 kb PDF	Near Miss	Complete Final
13 Apr 10	Kogarah - 206 kb PDF	Track Worker Fatality	Complete Final
11 Apr 10	Woy Woy - 902 kb PDF	Equipment failure	Complete Final
1 Apr 10	Strathfield - 1.99 Mb PDF	Near Strike	Complete Final
13 Mar 10	Whittingham - 1.72 MPDF	Derailment	Complete Final
27 Feb 10	Darling Park - 2.8 Mb PDF	Monorail Collision	Complete Final

Fatigue factors

Fatigue was specifically cited as a potential contributing factor in the following OTSI and ATSB investigation reports: Kogarah 13 April 2010, Lithgow 1 April 2011 and Junee 9 September 2009. Note that due to incomplete evidence it is often difficult to assess fatigue factors in investigations and many investigation reports rely on outputs of fatigue models that are not valid for this purpose. Some investigation reports do not provide any information to determine if fatigue was a potential factor.

APPENDIX B
Summary of international work and rest periods

Country	Regulation	Maximum work period	Minimum rest period
Australia	<i>Rail Safety Act 2008</i> (NSW)	9-12 hours; 12 shifts in a 14 day period	Not less than 30 mins between 3 rd and 5 th hour of each shift; 7-11 continuous hours between shifts
	<i>Transport (Rail Safety) Regulation 2010</i> (Qld)	9-12 hours; 12 shifts in a 14 day period; 132 hours in a 14 day period	8-12 hours
	<i>Civil Aviation Regulations 1988</i>	11 hours for any tour of duty, 8 hours fly time within that period; no more than 900 hours in 365 days; no more than 100 hours in 30 days; no more than 30 hours in 7 days	9 consecutive hours between 10pm and 6am local time, or 10 consecutive hours; 2 consecutive nights rest between 10PM and 6AM in a 7 day period
	<i>Navigation Act 1912</i> (Cth) (enforcing the <i>Standards of Training, Certification and Watchkeeping for Seafarers, 1995</i>)	Intervals between consecutive periods of rest not exceeding 14 hours	10 hours in every 24 hour period (including one 6 hour block); 77 hours minimum rest for every 7 day period
United States of America	<i>Hours of Service Act</i>	12 continuous hours; limitations on consecutive shifts; if a worker works 13 days in any 14 day period, a minimum of 2 days off; 24 hours off for every 6 consecutive shifts if at least one of those shifts includes night work	10 hours off duty after 12 hours on duty; 8 continuous hours in a 24 hour period

	<i>Rail Safety Improvement Act of 2008</i>	276 hours per calendar month; 12 consecutive hours on duty	10 continuous hours in a 24 hour period
	<i>Final Rule on Pilot Fatigue</i>	8 to 10 hours for unaugmented flights, and 16 hours for augmented flights	10-hours rest prior to flight duty period;
	<i>Hours of Service Final Rule</i>	70 hours per week	
Canada	<i>Work/Rest Rules for Railway Operating Employees</i> (approved under the <i>Railway Safety Act, R.S 1985, c.32 (4th Supp)</i>)	12 continuous hours	6-8 continuous hours off duty
European Union	<i>Directive 2003/88/EC concerning certain aspects of the organisation of Working Time</i>	48 hours per week; for night work, average hours must not exceed 8 hours per 24 hour period, no heavy or dangerous work for longer than 8 hours in any 24-hour period	11 consecutive hours in every 24; rest break during every shift over 6 hours; weekly rest period of 24 uninterrupted hours for each 7 day period; paid annual leave of at least 4 weeks per year
	<i>Directive 2005/47/EC on the Agreement between the Community of European Railways and the European Transport Workers' Federation (ETF) on certain aspects of the working conditions of mobile workers engaged in interoperable cross-border services in the railway sector</i>	9 hours for day shifts, 8 hours for night shift; 80 hours drive time over a 2 week period	12 hours per day; breaks of 30-45 minutes; daily rest periods away from home of 8 hours; non-driver rest periods of 30 minutes if the shift is longer than 6 hours; rest periods of 24 hours in every 7 day period
	<i>Council Directive 2000/79/EC of 27 November 2000 concerning the European Agreement on the Organisation of Working Time of Mobile</i>	2000 hours annually, with total flight time limited to 900 hours spread evenly over the year	7 days per month; 4 weeks annual paid leave

	<i>Workers in Civil Aviation</i>		
	<i>Council Directive 1999/63/EC of 21 June 1999 concerning the Agreement on the organisation of working time of seafarers</i>	14 hours in any 24-hour period; 72 hours in any 7-day period	no less than 10 hours in any 24 hour period; 77 hours in any 7-day period
United Kingdom	<i>The Working Time Regulations 1998 (UK)</i>	Average of 48 hours for each seven days	11-12 consecutive hours in each 24 hour period; 24 hours uninterrupted rest period of in each 7 day period
	UK Office of Rail Regulation Guidelines	Fatigue management controls should be reviewed when: shifts exceed 12 hours; 4 consecutive night shifts or very early shifts are worked in a rotating shift pattern; more than 6 consecutive night shifts or very early shifts are worked in a permanent shift pattern; more than 12 consecutive day shifts are worked; 72 or more hours of work (planned or unplanned) are accumulated in a working week; more than 240 hours of work (planned or unplanned) are accumulated over a 28 day period	