



# Special issue: Heavy vehicle safety

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## Peer-reviewed papers

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### Electronic work diary: Policy, specification and operational pilot

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#### Abstract

The heavy vehicle driver fatigue legislation was enacted in Queensland, New South Wales, Victoria and South Australia in September 2008. While the legislation allows for the approval of electronic work diary systems, a lack of specification on the composition of an electronic work diary was identified. The Australian Transport Council in November 2008 directed Austroads to start on the 'immediate development of a performance based specification for electronic heavy vehicle speed and driver fatigue systems, enhancing the use of in-vehicle telematics and adding value to the Intelligent Access Program'. At the same time, the National Transport Commission was tasked to develop a policy framework and

regulatory impact statement for heavy vehicle driver systems. This paper presents the findings of the draft policy paper and the accompanying draft specification that was released for public consultation in late 2010. The three presenters at the consultations have combined to produce this paper. A number of unresolved policy and technical issues were identified and submissions have since been received from governments and industry. In 2010, the NSW Minister for Transport proposed the undertaking of an Electronic Work Diary Operational Pilot and this initiative has since gained national support. The paper will also report on the scoping and plans for the pilot which commenced in July 2011.

## Introduction

Excessive speed and driver fatigue have been recognised as major risk factors for all drivers of motor vehicles. Both of these factors are of particular concern to heavy vehicle drivers -fatigue due to the long distances to be covered in moving freight across Australia's large land mass, and speed due to the large mass of road freight vehicles.

Electronic and telematics devices that have the potential to improve the ability of drivers operators and schedulers to manage the amount of work and rest taken by drivers, and monitor the level of compliance with speed limits, are becoming increasingly common (EU-digital tachograph 2011, FMCSA 2011). Electronic devices offer the potential to record and use information in ways not possible within the current paper-based system. The devices can assist drivers to comply with the law and plan their work and rest times. This information can also be electronically fed back to operators to assist them in responding proactively to on-road events (such as loading delays) by changing trip schedules, roster and planned rest breaks. They also have the capability to replace paper-based records for enforcement and compliance purposes including chain of responsibility obligations.

New national laws to address heavy vehicle driver fatigue management were agreed to by Ministers in 2007, and in September 2008 the *Heavy Vehicle Driver Fatigue National Model Legislation 2008* (NTC 2008) came into force in Queensland, New South Wales, Victoria and South Australia. This new fatigue reform makes parties in the supply chain legally responsible for preventing driver fatigue. The model fatigue legislation applies to trucks with a gross vehicle mass (GVM) of over 12 tonnes and buses with more than 12 seats including the driver's seat.

These laws respond to the potential benefits of electronic record keeping by allowing for the use of an Electronic Work Diary (EWD) as an alternative to the written work diary. They also established a process for approval of an EWD. In 2008, the tasks of specifying the level of performance the electronic devices need to meet in order to satisfactorily play the role currently undertaken by a written (paper) work diary, developing the necessary policy and guidelines, and technical specifications were assigned by the Australian Transport Council to the National Transport Commission and Austroads respectively. This paper will concentrate on one aspect of this work – the creation of a policy framework and specification for electronic record keeping of drivers' hours of work and rest.

## Electronic Work Diaries: A case for action

It is widely recognised that fatigue is a serious and common contributing factor to heavy vehicle crashes in Australia and around the world (NTC 2006). The 2008 heavy vehicle driver fatigue reform sought, for the first time, to apply the best available scientific information on the causes of and

countermeasures to fatigue as a basis for legislation. In particular it recognised that merely limiting hours of driving is a poor surrogate for properly managing driver fatigue and alertness, introducing a general duty to manage fatigue and offences for allowing a person to drive a regulated heavy vehicle while adversely affected by fatigue.

The new law recognised that there was still a need to prescribe work and rest hours, for sustained safe operation. Consequently, it included maximum periods of work and minimum periods of rest. Importantly, these limits are limits to the amount of work, not of driving; the fact that a driver may not have exceeded their maximum permitted hours of work in a day is not a defence to the offence of allowing a person to drive while adversely affected by fatigue.

While the regulations for the use of EWD currently exist, approvals are being impeded by the absence of agreed national processes or guidance. Guidance material is needed to ensure that decision making by regulators is informed by knowledge of the technical requirements that a device must meet in order to satisfactorily fulfil the function of regulatory record keeping. It also has an important role to play in ensuring consistency between jurisdictions when approving applications and providing potential designers, providers and users of an EWD with certainty – that they can understand the requirements for their device to be acceptable as an alternative to the written work diary.

Widespread adoption of electronic record keeping will allow industry to reduce costs by integrating electronic systems for business and fatigue regulatory compliance purposes; remove the potential for conflicting information being recorded in separate recording systems; encourage innovation and safety improvements by allowing the use of current information to manage driver fatigue; and potentially allow more effective compliance measures than are possible by relying exclusively on current enforcement practices.

## Policy issues

Several issues needed to be addressed in developing a policy for the use of electronic record keeping. An important principle is that an EWD must be able to perform at least all of the functions of a paper work diary, with at least the same level of data integrity and security. It may, however, perform a much wider range of functions. The electronic record is the declaration by the driver of their hours of work and rest, and the times and locations that they changed between working and resting. Electronic record keeping could allow information on time and location (if a GPS unit is part of the device) to be filled in automatically. However, the fact that working hours, not driving hours, are prescribed in legislation means that the driver must be able to record work done away from the vehicle. The electronic record is the driver's – and it must be able to be read, and written to, by any device approved as an EWD, to allow for the many drivers who have more than one employer, or move between employers and vehicles.

The data must be able to be authenticated as being that of a specific individual. For example, when using a paper-based diary the driver's signature is prescribed as the form of authentication. A corresponding level of security for authenticating an electronic record will be required for an EWD (as set out by the National e-Authentication Framework). Furthermore, the electronic record needs to be demonstrably complete and unaltered, so as to maximise the ability for driver declarations to be used as credible evidence in any legal proceeding. Consequently, an EWD should assure the integrity of driver declarations to at least the same degree offered by the written work diary.

Roadside enforcement is, and can be expected to continue to be, a major driver of compliance with fatigue management rules and many other regulations affecting heavy vehicles. Consequently, access to the data stored in an EWD at the roadside is an essential requirement. A range of strongly held views have been expressed by both industry and the enforcement community on whether this requires a roadside printing option to be available. Resolution of this issue requires information from the national Pilot program described below.

Another key difference between written and electronic record keeping is the recording of time. Under current legislation, time is required to be recorded in 15 minute blocks, with work time being rounded up, and rest time rounded down. Consequently, the smallest breach offence in regulation is 15 minutes.

Electronic time keeping allows time to be easily recorded to the nearest second. This makes it possible for breaches by trivial amounts to be detected. Industry is unlikely to adopt an alternative record keeping system which will hold them to a much higher standard of compliance than other operators who have not invested in technology to assist them in improving their management of driver fatigue. A clear policy need is to develop an enforcement and sanction policy. The policy should not only achieve the objective of improving road safety, but should also ensure that the potential benefits of accurate record keeping - as a means to improve scheduling and fatigue management - are not sacrificed for the sake of prosecuting minor timing errors that pose negligible safety risks.

A specification which describes the minimum performance requirements for a device to provide an equivalent, reliable and secure alternative to the written work diary has been developed by Transport Certification Australia (TCA) for Austroads. Any device for which approval is sought will need to meet this final approved standard, which may be modified from its current form as a result of the outcomes of the national Pilot program. State and Territory road authorities (or after January 2013, the National Heavy Vehicle Regulator) will require certification of any device as meeting the final approved standard before approving it for use as an alternative to the written work diary.

## The work diary application

Under national model law, drivers of regulated heavy vehicles who travel over 100 km from their base of operations (or 200 km from their base of operations in Queensland) are required to maintain a work diary. A work diary must contain information specified in the fatigue management legislation, including the driver's identification, their work/rest option (Standard, BFM or AFM accreditation), their vehicle identification and a record of when and where a driver performed their work and rest interchanges.

The Heavy Vehicle Driver Fatigue (HVDF) legislation allows for two forms of work diary: the Written Work Diary (WWD) and the EWD. The WWD is a prescribed diary issued by Authorities. It has a single format independent of the Authority which has issued it. The EWD is envisaged as a non-prescribed system which maintains the driver's declarations but allows the transport industry and Authorities greater efficiencies in managing driver fatigue.

## Roles within the electronic work diary environment

The electronic work diary system requires the involvement of up to eight participants. Each of these participants has defined roles and responsibilities as follows:

- The **Driver** is responsible for declaring their work and rest changes into the EWD system and in the case of a malfunction, maintaining supplementary (paper) records of their work and rest until the EWD system is rectified.
- The **Transport Operator** is responsible for engaging the EWD provider (or electing to take on the EWD provider's responsibility and be their own EWD provider) to instrument their heavy vehicle with an In-Vehicle Unit (IVU). The transport operator may also engage the EWD provider to supply the IVU for commercial purposes.
- The **Authority** is responsible for maintaining the HVDF regulations and ultimately approving EWDs for use.
- The **Enforcement Officer** is responsible for verifying that drivers are recording their work and rest declarations in the correct diary and inspecting these declarations for compliance against the relevant regulations.
- The **DRD Issuer** is responsible for authenticating the identity of the driver, recording the details for the DRD against the identity of the driver and ensuring that only one DRD is disseminated to the driver at a time.
- The **Record Keeper** is responsible for maintaining the records as specified by the HVDF legislation.
- The **EWD Provider** is to ensure that the EWD system is correctly installed, and performs during day to day operation in the same manner as it did when it was approved.
- The **System Manager** is to maintain the technical specifications for the EWD system and may be required to assist Authorities and certification bodies, or may be a certification body itself.

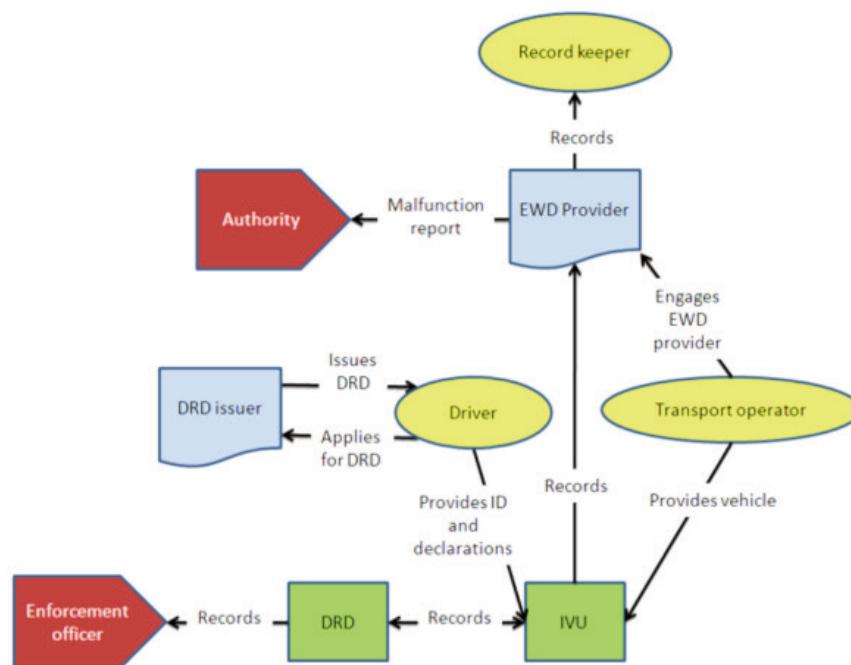


Figure 1. The specified EWD system

## Technical architecture

The architecture of the EWD system is shown in Figure 1. Complementing the roles shown above, the specified EWD system includes two key pieces of technology: a Driver Recording Device (DRD) and an In-Vehicle Unit (IVU).

Note: There may be a need for the IVU to feature an in-cabin printer, should Authorities and/or enforcement agencies determine that this is necessary.

The purpose of the technology is described below in context of the operation of the specified EWD system.

### Driver Recording Device (DRD)

Similar to the WWD, the DRD acts as the driver's single electronic record repository for their work and rest declarations. Drivers' declarations are stored in a standardised format within the DRD and as such, the DRD is designed to work with any approved EWD. Physically, the DRD is a secure and driver-specific mass storage device (can be read from and written to, but does not allow deletions) based on a Universal Serial Bus (USB) connection. Whilst availability decisions have not been made by Authorities, the DRD can store in excess of 12 months of EWD records resulting from normal operation.

### In-Vehicle Unit (IVU)

The IVU processes the driver's work and rest period declarations and stores these onto the DRD. Optionally, the IVU may include features to assist the driver in making declarations such as utilising a Global Navigation Satellite System receiver to provide location and time information. In conjunction with storing the driver's declarations on the DRD,

the IVU stores these records for transmission to the EWD provider. This transmission allows the EWD provider to inspect the records to confirm system operation and to forward these on to the driver's record keeper.

Dependent on the final national policy on EWD systems, the IVU may periodically record the location and speed of the vehicle between driver declarations. This creates an auditable trail of the vehicle's travel which may be used to corroborate the driver's declarations.

### System operation

To be able to use an EWD, the driver applies to a DRD issuer to obtain a DRD. Before being issued with a DRD, the driver's identity is authenticated by the DRD issuer. The driver will need to be registered within the transport operator's EWD system and be issued with an identification and authentication method. As this is not required to transfer with the driver across system, this method may be proprietary to the EWD provider's system.

Once registered, the driver will use their DRD with the IVU installed in the vehicle. At the start of the day, the driver will insert the DRD into the IVU and, using their identification and authentication method, declare that they have started work.

On each work and rest change, the driver will use their identification and authentication method to declare their working state. Each time the driver declares their working state, records are written to the DRD and sent to the EWD provider for provision to the record keeper.

If the driver wishes to switch between trucks, the driver ejects the DRD from the current IVU and inserts it into the new

IVU. If the driver is pulled over for a roadside compliance check by an enforcement officer, the driver ejects their DRD and supplies this to the officer. The enforcement officer uses the DRD with a remote data terminal (laptop, PDA or similar) to view records and determine compliance.

If the driver detects a fault with the IVU, the driver contacts their transport operator who then contacts the EWD provider. The EWD provider also monitors the operation of the IVU remotely and may contact the transport operator if a system fault is detected. The EWD provider, with the cooperation of the transport operator, shall rectify the IVU in a timely manner.

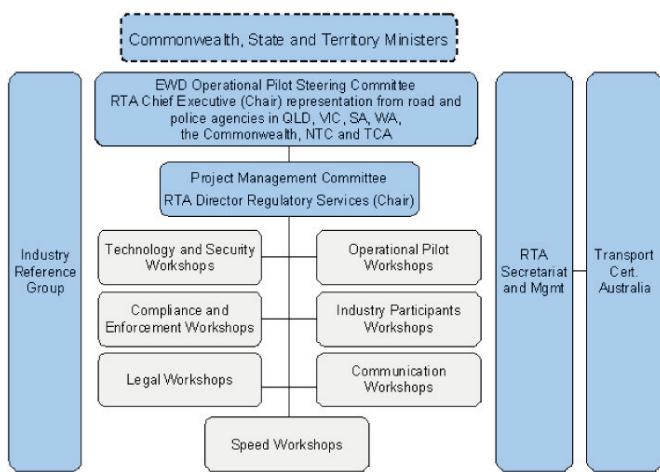
## Operational pilot

## Background/context

On 29 March 2010, the NSW Government announced the \$170 million Road Toll Response Package, a five-year investment to improve road safety. The Road Toll Response Package builds upon the recommendations from a Road Safety Roundtable held in July 2009 which was set up to engage road safety experts and community representatives to examine road safety issues in response to a rising road toll. One of the projects to improve safety for heavy vehicles is the Operational Pilot of EWDs and speed monitoring systems. This pilot has been allocated \$5 million in funding over three years, 2010 to 2013. The pilot is being led by the NSW Roads and Traffic Authority and involves the jurisdictions of Queensland, Victoria, South Australia, Western Australia and the Commonwealth, with the other jurisdictions participating as observers.

## Pilot objectives

The operational pilot is intended to thoroughly test and refine the proposed national draft policy and technical specification for the approval of electronic systems and their use for enforcement and business purposes and for better safety, productivity and environmental outcomes.



**Figure 2. Governance of the EWD pilot**

## Outcomes - What the pilot will achieve

The outcomes for the pilot include benefits for both industry and authorities. The information generated by the electronic heavy vehicle systems can be used in many more ways than the data from written work diaries. The electronic systems can help drivers to comply with the law, for example, by assisting them in planning their work and rest times.

In addition, the opportunity for an electronic system to generate warnings or reports would significantly help many operators and drivers to comply with their required hours of work and rest and better manage on-road speeds of their drivers and vehicles. For example, an EWD system could notify the driver of the amount of work time remaining before he or she must take a rest break.

It is likely that these electronic systems will provide more efficiencies for transport operators than the current written work diary. At present, written work diaries provide transport operators with minimal assistance in monitoring and managing the work of their drivers. For example, electronic systems can assist operators in responding to on-road events (such as delays in loading) by amending trip schedules, rosters and the planned rest breaks of drivers.

At present many operators have a parallel system in place: both an electronic system and the written work diary. The former is employed for commercial purposes and the latter for adherence to regulatory requirements. If these two structures were combined into one system, a significant amount of administrative work would no longer be required of operators.

The heavy vehicle electronic systems have the potential to reduce the shortcomings of the written work diary and substantially increase compliance with heavy vehicle fatigue and speed laws. A more robust method of recording hours of work and rest will significantly improve the accuracy and integrity of driving and speed records. This will also result in greater confidence in heavy vehicle safety for the general public.

Governance

The governance framework is detailed in Figure 2. The structure includes an inter-jurisdictional Steering Committee of senior representatives of the participating road authority/transport agencies, senior police representatives from these jurisdictions and representation from the National Transport Commission and Transport Certification Australia. The Steering Committee is chaired by Michael Bushby, Chief Executive of the NSW Roads and Traffic Authority, and was established to guide and steer the development and implementation of the Operational Pilot of Electronic Work Diaries and Speed Monitoring Systems.

A Project Management Committee was established to coordinate all activities of the pilot. This includes overseeing a series of workshops to assist in informing specific pilot issues, coordinating all activities of the Industry Reference Group and any other entity as directed by the Steering Committee.

An Industry Reference Group, was set up to ensure that the transport and logistics industry has the opportunity to contribute to the operational pilot, including advising on the operation of electronic systems and the business and commercial matters which impact upon the transport and logistics industry.

The Director of Regulatory Services, NSW Roads and Traffic Authority, chairs both the Project Management Committee and the Industry Reference Group. Transport Certification Australia was contracted by NSW Roads and Traffic Authority to conduct the pilot.

### Methodology

The pilot will be conducted in two stages.

Stage 1 is designed to assist in developing the required business systems, processes and procedures for the application, selection, deployment and data collection of pilot systems. Stage 1 will incorporate trialling and refining the proposed processes and procedures designed for the pilot across a small sample of diverse systems.

Stage 2 involves the application of the refined systems, processes and procedures in the pilot. It will incorporate a sample of systems representative of those offered by industry. This stage will include extended periods of field work across Australia and encompass a representative sample of transport operators, vehicles and drivers.

These two stages are detailed below and depicted in Figure 3.

### Timeframe

It is anticipated that Stage 1 will commence in July 2011 and Stage 2 will commence in January 2012, subject to the timely development of national technical specifications, a policy framework and support of other jurisdictions and industry stakeholders.

## Conclusion

Following direction from the Australian Transport Council in 2008, the NTC and Austroads responded with a draft policy framework and specification for electronic heavy vehicle speed and driver fatigue systems. These were taken to public consultation in late 2010.

An Operational Pilot led by New South Wales with national support has since commenced with the intention to thoroughly test and refine the national draft policy and specification for the approval of electronic systems. This two year pilot will conclude in 2013 and is expected to provide outcomes that benefit both industry and authorities.

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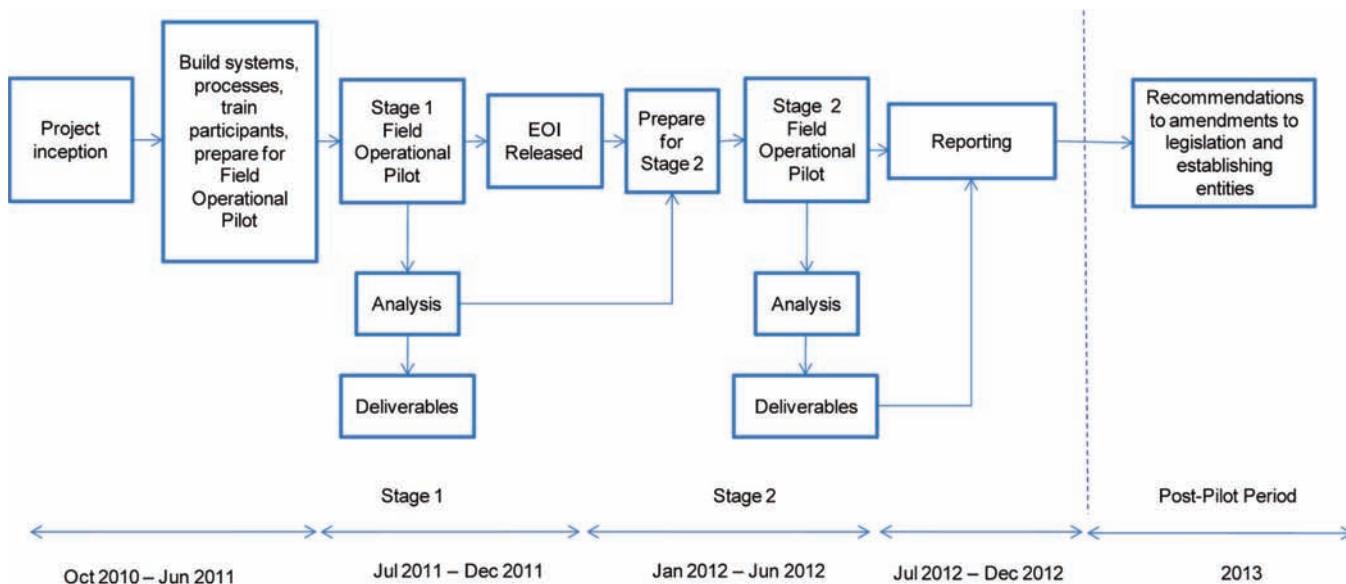


Figure 3. Pilot staging