



Vehicle standards and safety

July 2019

Issues paper

Report outline

Title	Vehicle standards and safety
Type of report	Issues paper
Purpose	For public consultation
Abstract	In May 2018, the Transport and Infrastructure Council directed the National Transport Commission (NTC) to review the Heavy Vehicle National Law (HVNL). This is one of eight issues papers that seek your feedback on the HVNL as it is, and opportunities to improve it.
Submission details	<p>The NTC will accept submissions until Friday 30 August 2019 online at www.ntc.gov.au or by mail to:</p> <p>National Transport Commission Public submission – Vehicle standards and safety Level 3, 600 Bourke Street Melbourne VIC 3000</p>
Attribution	<p>This work should be attributed as follows:</p> <p>Source: National Transport Commission 2019, <i>Vehicle standards and safety</i>, Issues paper, NTC, Melbourne.</p> <p>If you have adapted, modified or transformed this work in any way, please use the following:</p> <p>Source: Based on National Transport Commission 2019, <i>Vehicle standards and safety</i>, Issues paper, NTC, Melbourne.</p>
Key words	Heavy Vehicle National Law Review, HVNL, heavy vehicles, safe vehicles, safety, standards
Contact	<p>National Transport Commission Level 3/600 Bourke Street Melbourne VIC 3000 Ph: (03) 9236 5000 Email: enquiries@ntc.gov.au www.ntc.gov.au</p>

Have your say

What to submit

The views of a broad range of stakeholders are crucial to develop agreeable and workable policy options. This is why the National Transport Commission invites stakeholders to consider the questions asked in this paper. The questions are provided as a guide only. You're welcome to provide us with feedback on any aspect of this issues paper.

There are many ways to provide your feedback including:

- written submission
- online feedback through the interactive consultation website
- workshops and engagement activities
- through industry associations.

You can register on the [HVNL review website](http://www.hvnlreview.ntc.gov.au)¹ to stay updated on the project. Planned engagements will be publicised on the website and in regular newsletters.

When to submit

The NTC invites written submissions and online feedback on this issues paper by **Friday 30 August 2019**.

Submissions or feedback received on or before this date will be considered as part of the review.

How to submit

Any individual or organisation can make a submission to the NTC.

Making a submission

 Visit www.ntc.gov.au and select 'Submissions' from the top navigation menu.

 Send a hard copy to:

National Transport Commission
Public submission – Vehicle standards and safety
Level 3, 600 Bourke Street
Melbourne VIC 3000

Where possible, you should provide evidence, such as data and documents, to support the views in your submission.

¹ www.hvnlreview.ntc.gov.au

Publishing your submission

Unless you clearly ask us not to, we publish all the submissions we receive online. Submissions made on a confidential basis will not be published but may be shared with parties who have entered into a deed of confidentiality with the NTC for the purpose of the HVNL Review. We will not publish submissions that contain defamatory or offensive content.

The *Freedom of Information Act 1982* (Cth) applies to the NTC.

Online feedback

If you don't want to make a formal written submission, you can give us your feedback through our HVNL review website.

 Visit www.hvnlreview.ntc.gov.au and select 'Vehicle standards and safety' to participate in surveys, forums and polls relating to matters presented in this issues paper.

Publishing your online feedback

Any content published to the interactive consultation website is subject to a **moderation policy**.² Content that violates the moderation policy will be rejected and the submitter notified.

² www.hvnlreview.ntc.gov.au

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Purpose of this paper

The National Transport Commission (NTC) is reviewing the Heavy Vehicle National Law (HVNL). The goal is to ensure a modern, outcome-focused law. One that improves safety and supports increased productivity and innovation such as new technologies and methods of operation. A law that simplifies administration, compliance and enforcement and increases flexibility.

The NTC has adopted a first-principles approach to the HVNL review. Rather than looking to the existing law as a starting point, assumptions underpinning the existing law are being drawn out and tested.

This is one of eight issues papers.

The purpose of this paper is to:

- summarise the current vehicle standards and safety provisions in the HVNL and related instruments
- examine what is in the current law and how it is applied
- identify options for managing heavy vehicle safety using a risk-based approach
- identify the vehicle safety issues that a recast law should cover, and how they might be covered
- seek feedback on whether this paper has captured all the relevant issues.

The NTC invites your responses to the questions and issues covered in this paper.

Note: A list of common terms and abbreviations is included at the end of the paper.

Executive summary

The Transport and Infrastructure Council directed the NTC to review the HVNL from first principles. The HVNL commenced in 2014 and has been amended regularly since then. Despite this, there is a view shared by a wide range of stakeholders that it's not functioning as effectively as it could.

The primary purpose of the HVNL is to ensure a safe and efficient heavy vehicle journey. This is made up of a safe driver, a safe vehicle and a suitable route. This issues paper covers the requirements for a safe vehicle.

Application of vehicle standards

Safety is regulated across a heavy vehicle's life cycle, with standards implemented by different legislative instruments. In general terms, these are:

- The *Motor Vehicle Standards Act 1989* (Cth) (MVSA) and the Australian Design Rules (ADRs) which cover the design and build stages of the vehicle life cycle.
- State and territory laws, which cover registration, with reach into the areas of roadworthy compliance and inspection.
- The HVNL, which focuses on in-service standards and safety, supported by the heavy vehicle national regulations. They cover modifications, inspections, defects and repairs, as well as vehicle standards around mass, dimension and loading. The HVNL also sets out arrangements for the performance based standards (PBS) scheme.

There is a high level of national consistency with safety and standard regulation. The standards in the HVNL are implemented across Australia, including in non-participating jurisdictions. In most cases, Australia's standards are harmonised with international standards.

As a heavy vehicle degrades, either by incident or over time through wear and tear, it may become unsafe. Risks to vehicle safety are managed mainly through inspections and maintenance, while safety technology mitigates the consequences of a crash.

Analysing vehicle standards

In general, regulation of vehicle safety is working well. Vehicle standards are harmonised and safety risks are relatively well-managed. Despite this, there are still issues and gaps that offer opportunities for improvements to the law.

Safer and more productive vehicles and safety technologies face a range of barriers, limiting their uptake. PBS vehicles offer operators gains in safety, productivity and sustainability. Despite this, these vehicles face access restrictions and administrative hurdles because of legacy arrangements. As a result, operators are discouraged from taking up PBS vehicles. Another consequence is that the entry of more innovative vehicles into the prescriptive heavy fleet has stalled.

Prescribed limits for vehicle mass and width are limiting entry of safer vehicles into Australia. Some vehicles produced internationally with the latest safety technology face delays and modification at best. At worst, they are prevented altogether from operating in Australia.

Heavy vehicle safety technology has advanced considerably in the last 10 years. This includes technology that prevents crashes and reduces the consequences of crashes. It has become an effective way to manage risks and help operators meet their chain of responsibility obligations. Despite this, the HVNL doesn't encourage, or even recognise, the uptake of some safety technologies.

Furthermore, heavy vehicle inspection and enforcement practices vary across jurisdictions. This can cause inconsistencies with processes – and even outcomes – across state and territory borders. As a result, safety and regulatory efficiency are compromised.

Additional gaps exist in the coverage of the current HVNL that a recast law may address:

- Detecting unsafe or non-compliant heavy vehicles is difficult. Inspection is part of the current approach to enforcement under the HVNL but is reactive and has limited effect as a deterrent.
- Regulatory oversight of repair work and pre-registration modifications is limited.
- Administrative delays with clearing defects can result in delays in getting safe vehicles back on the road. This leads to loss of productivity and income for operators.

Aspirations for a better law

Through this issues paper, the NTC seeks your views on how we can regulate safe vehicles in a recast HVNL to achieve the following:

- encouraging safer vehicles
- effective maintenance and inspection
- effective identification, repair and clearance of defects
- a common-sense approach to minor breaches.

Questions

The NTC invites you to provide your views on the HVNL as it relates to safe vehicles by **Friday 30 August 2019**. We are particularly interested in your responses to the following questions, but they are provided as a guide. You are welcome to provide us with feedback on any aspect of this issues paper.

- Question 1: What risks to safe vehicles that are currently out of scope for the HVNL should be brought into scope? What is in scope that shouldn't be?..... 23
- Question 2: Have we covered the issues relating to safe vehicles accurately and comprehensively? If not, what do we need to know? 30
- Question 3: How can the future HVNL most effectively deliver safer vehicles to the road? Which aspects of the PBS scheme are working well, and which aren't? What barriers to the broad uptake of safer vehicles exist?..... 31
- Question 4: How can the future HVNL encourage suitable maintenance programs? How can it most effectively identify and remove dangerous vehicles from the road? 32
- Question 5: How can the future HVNL meet the assurance needs of all Australian state and territory road transport authorities in a way that does not unreasonably impose on operators?..... 32

Question 6: Do we need assurances regarding repairs and replacement parts? If so, could these be achieved using standards? Should third-party repairers be explicitly included in the Chain of Responsibility? How can defect clearance processes be reasonably expedited? 33

Question 7: Should the future HVNL apply a risk-to-safety threshold for vehicle standards and loading matters? 33

1 About this project

Key points

- The Transport and Infrastructure Council directed the National Transport Commission to review the Heavy Vehicle National Law from first principles.
- The HVNL commenced in 2014. Despite numerous amendments to the law over the years, there is a view shared by a wide range of stakeholders that it's not functioning as effectively as it could.
- This issues paper explores vehicles standards and the safety opportunities for the heavy vehicles operating on our roads. It examines how the current law could be changed to be more effective, so that it encourages and supports vehicle innovation, compatibility and productivity.

1.1 Project objectives

1.1.1 Purpose of the review

The goal of the HVNL review is to deliver a modern, outcome-focused law regulating the use of heavy vehicles. The review is being undertaken by the NTC from a first-principles perspective. We expect this will lead to a recast HVNL, rather than minor changes to the existing law. The aim is that the future HVNL will:

- improve safety for all road users
- support increased economic productivity and innovation
- simplify the administration and enforcement of the law
- support the use of new technologies and methods of operation
- provide flexible, outcome-focused compliance options.

1.1.2 Background

The HVNL was passed in 2012 and came into effect in 2014. It replaced 13 model laws and six state and territory transport-related laws. The aim of the reform was to put in place a seamless, national, uniform and coordinated system of heavy vehicle regulation in a way that:

- promoted public safety
- managed the impact of heavy vehicles on the environment, road infrastructure and public amenity
- promoted industry productivity and efficiency
- encouraged and promoted productive, efficient, innovative and safe business practices.

While the HVNL was an important step, many stakeholders have advised the NTC that the law, as it is, is not achieving its aim to the desired level.

In many ways, the HVNL represents a compromise between the views of jurisdictions, industry and other key stakeholders. The result has been inconsistency. Two jurisdictions have not adopted the HVNL. Participating jurisdictions derogate (depart) from the HVNL in the way they apply the law locally. There is varied application and enforcement of the HVNL.

The HVNL is made up of more than 800 sections and is supported by five sets of regulations. Together these provisions can be inconsistent in approach, difficult to read and interpret, and onerous for industry to follow. They're also difficult for the National Heavy Vehicle Regulator (NHVR) to administer.

Many parts of the HVNL are complex and prescriptive. They reflect an era when access to digital technology and innovation wasn't a consideration.

The HVNL doesn't adequately recognise a 'one size fits all' approach to regulation is not appropriate for many locations or in different industries.

In this context the Transport and Infrastructure Council agreed in May 2018 that the NTC would bring forward the planned review of the HVNL and supporting regulations by two years, to begin in January 2019.

In November 2018 the council agreed to the **Terms of reference**³ for the HVNL review.

1.1.3 NTC's approach to the review

In January 2019 the NTC published **its approach**⁴ to the review. It outlines and explains the project's framework, governance, deliverables and consultation.

The NTC adopted a first-principles approach to the HVNL review. Rather than simply looking to the existing law as a starting point, the assumptions behind it are being drawn out and tested.

This is one of eight issues papers in the HVNL review, and one of four that cover 'what is regulated' under the HVNL (see Figure 1). It explores and analyses provisions for heavy vehicle safety.

The first issues paper, published in March 2019, looked at how we regulate the use of heavy vehicles under the HVNL.

The other three issues papers that cover 'what is regulated' include effective fatigue management, easy access to suitable routes and safe people and practices.

The next two issues papers will cover more specific 'how to regulate' matters. They include matters of assurance, such as accrediting operators to deliver best practice, and managing compliance, including the regulatory role technology and data could play.

The last issues paper will cover policy matters not covered in the other issues papers.

³ www.hvnireview.ntc.gov.au

⁴ www.hvnireview.ntc.gov.au

Figure 1. HVNL review issues papers

<i>Foundation</i>	<i>What is regulated</i>			<i>How to regulate</i>		<i>Other</i>	
Risk-based regulation	Fatigue	Safe vehicles	Safe people and practices	Suitable routes	Accrediting operators	Managing compliance	Other policy matters



We will produce a summary of outcomes from the issues papers. This will bring together all your feedback and advice and serve as a basis for a regulatory impact assessment (see Figure 2).

Figure 2. HVNL review timeline



RIS = regulatory impact statement

1.2 This issues paper

1.2.1 Objectives

The purpose of this issues paper is to:

- summarise the current vehicle standards and safety provisions in the HVNL and related instruments
- examine what is in the current law and how it is applied
- identify options for managing heavy vehicle safety using a risk-based approach
- identify the vehicle safety issues that a recast law should cover, and how they might be covered
- seek feedback on whether this paper has captured all the relevant issues.

1.2.2 Scope of the paper

The primary purpose of the HVNL is to ensure a **safe and efficient heavy vehicle journey**. This is made up of:

- a **safe driver** – one who is well-trained, competent, fit for duty and alert when driving

- a **safe vehicle** – one that is registered, roadworthy and safely loaded
- a **suitable route** – one that minimises public safety risks and excessive impacts on road infrastructure (given a heavy vehicle’s mass and dimensions).

This issues paper covers the HVNL requirements that relate to a **safe vehicle**. Other issues papers cover safe driver and suitable route requirements.

2 Application of vehicle standards

Key points

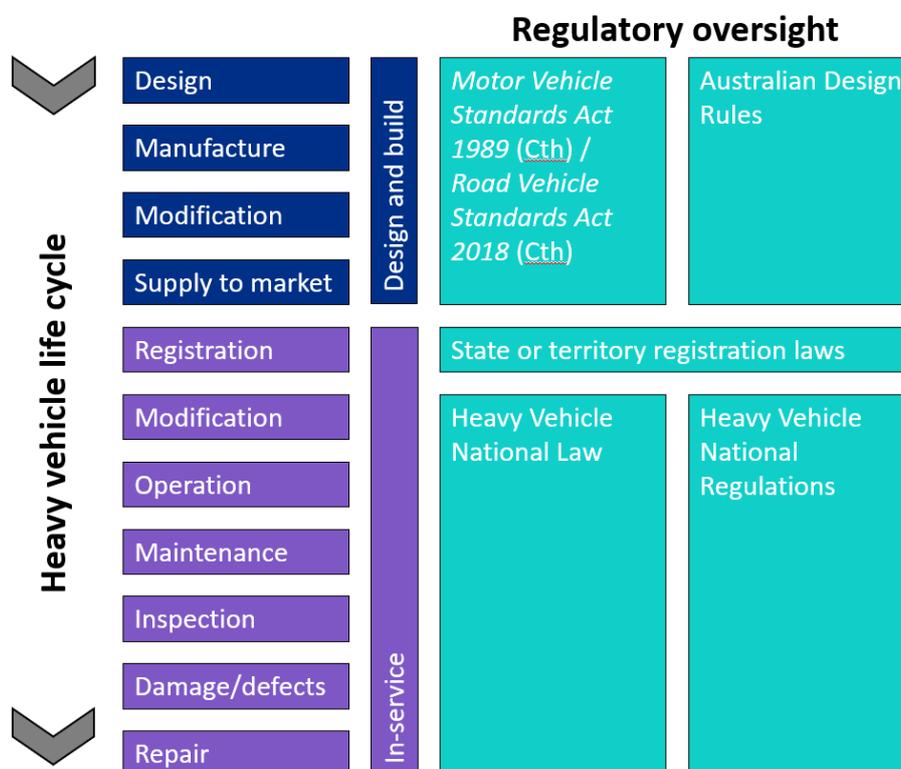
- Heavy vehicle standards are implemented by a range of legislative instruments that apply across different stages of the vehicle's life cycle.
- As a heavy vehicle degrades, either by incident or over time, it may become unsafe. Risks to vehicle safety are managed mainly through inspections and maintenance, while safety technology mitigates the consequences of a crash.
- Australia's heavy vehicle standards can be traced back to international standards in most cases.
- The HVNL focusses on in-service standards and safety.
- We have a high level of national consistency. The standards in the HVNL are implemented across Australia, including in non-participating jurisdictions.

2.1 Regulations for heavy vehicle standards and safety

2.1.1 An overview of heavy vehicle standards and safety

Heavy vehicle standards are implemented by a range of legislative instruments that have a different prominence at each stage of the heavy vehicle life cycle (see Figure 3).

Figure 3. Regulatory oversight of the heavy vehicle life cycle



Under the *Motor Vehicle Standards Act 1989* (Cth) (MVSA), all new or used imported vehicles must meet national standards to be certified as being fit for initial supply to market.

The *Road Vehicle Standards Act 2018* (Cth) (RVSA) will replace the MVSA. The RVSA introduces a Register of Approved Vehicles, which is a database of vehicles approved for use on Australian roads.

Vehicles enter service by being registered, which is handled by state and territory laws.

Under the HVNL, there are two key duties on operators and drivers of a heavy vehicle:

- vehicles are not to be used on a road if they do not meet the heavy vehicle standards (s 60 of the HVNL)
- vehicles are not to be used on a road if they are unsafe (s 89 of the HVNL).

The following regulations support the HVNL and cover other in-service safety standards:

- Heavy Vehicle (Vehicle Standards) National Regulation (HV(VS)NR)
- Heavy Vehicle (Mass, Dimension and Loading) National Regulation (HV(MDL)NR).

Non-participating jurisdictions, Western Australia and the Northern Territory, regulate in-service vehicle standards under respective state laws. These laws cover similar areas of heavy vehicle regulation as the HVNL.

Both Western Australia and the Northern Territory have adopted the heavy vehicle standards of the HVNL as model law in their jurisdictions. As a result, there is a high degree of national consistency for heavy vehicle standards.

2.1.2 Risks to be managed

Hazards

The hazard to be managed is primarily an unsafe heavy vehicle (see Figure 4). This is a vehicle that:

- has compromised control, safety-critical components or systems prone to failure, and/or
- presents other road users with a higher risk of injury or fatality in the event of a crash.

Threats

Degradation of the heavy vehicle, whether by incident or over time through wear and tear, may result in an unsafe heavy vehicle.

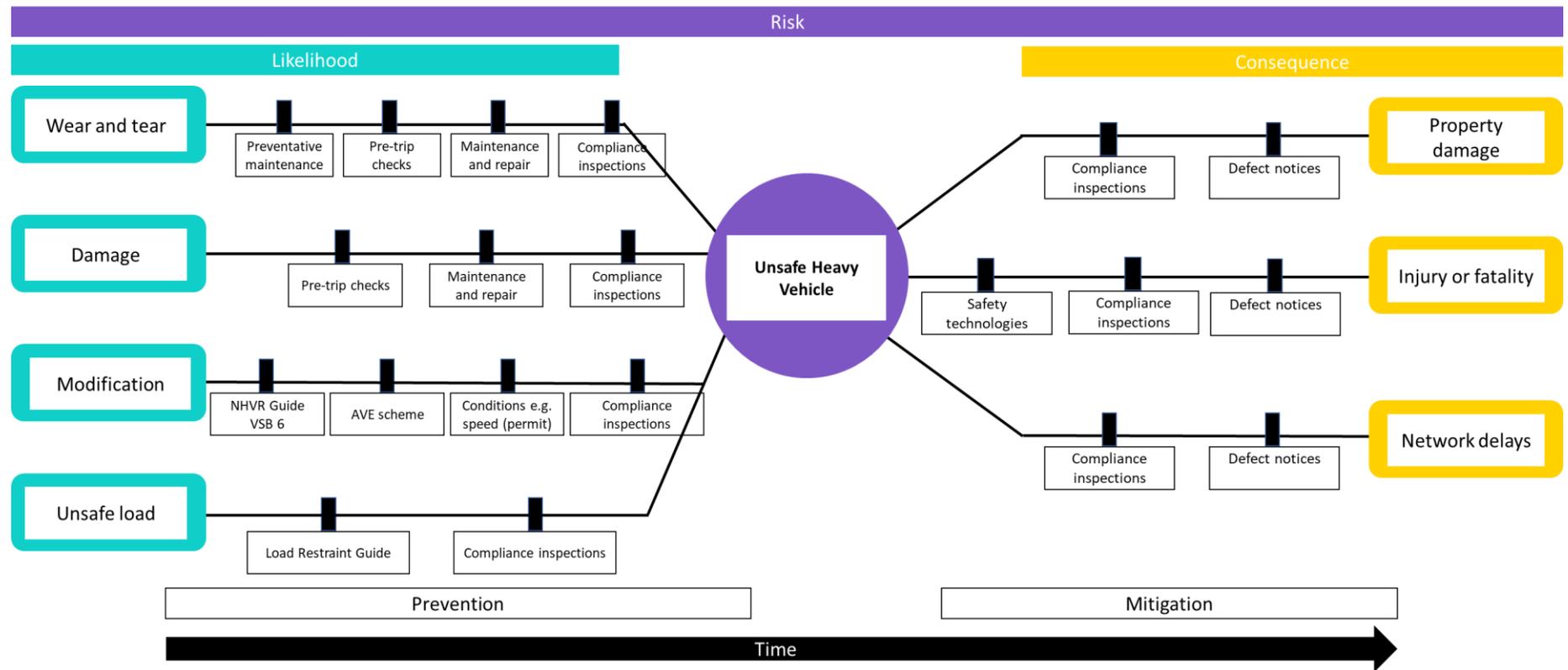
For the most part, threats are managed through inspections and maintenance to make sure the vehicle complies with applicable standards.

Consequences

Unsafe heavy vehicles are more prone to crash or, in the event of a crash, more prone to cause damage. As is the case with any heavy vehicle crash, the result may be fatalities, injuries, property damage or network delays.

Safety technologies, such as under-run protection, may protect other road users and lessen the consequences of the hazard. This is especially relevant in the case of the unsafe heavy vehicle.

Figure 4. Managing vehicle standards and safety risks



AVE = approved vehicle examiner, NHVR = National Heavy Vehicle Regulator, VSB6 = Vehicle Standards Bulletin 6

2.2 Design, manufacture and supply to market

2.2.1 Australian Design Rules

In general, heavy vehicles have to comply with the Australian Design Rules (ADRs) to be supplied to the Australian market. The ADRs cover matters such as vehicle safety, anti-theft and emissions requirements. The standards apply to vehicles newly manufactured in Australia or imported as new or second-hand vehicles, until supply to the Australian market.

The ADRs are made under the MVSA and continually reviewed and developed by the Commonwealth Department of Infrastructure, Regional Development and Cities. The Australian Government's policy is to harmonise the national vehicle safety standards with international regulations, where possible, in particular the adoption of the international regulations of the United Nations Economic Commission for Europe (UNECE).

Most ADRs cover system performance requirements, but they can also apply to individual parts if the parts can be separated. Mechanical couplings, seatbelts and trailer foundation brakes, for example, have ADRs that apply to them.

2.2.2 Performance based standards scheme

The HVNL sets out arrangements for the PBS scheme (ss 19 to 26 of the HVNL). PBS vehicles are designed and configured to deliver higher productivity and safety for a given freight task. The PBS scheme allows operators to take advantage of innovative and optimised vehicle design (for more information on the scheme, see Appendix A).

The PBS scheme sets out 16 safety performance standards a vehicle must meet to be approved (see Appendix B). These includes standards for handling quality, acceleration capability and ride quality.

There are four PBS performance levels that determine which public roads vehicles can access. The levels reflect where the vehicle's performance capabilities match the road's service level and performance constraints.

2.2.3 Non-compliance and recall

The HVNL does not cover vehicle recall. Under the MVSA, vehicles may be recalled if they're faulty or don't comply with the ADRs due to manufacturing deficiencies.

When implemented, the RVSA will put in place provisions for compulsory recalls to road vehicles and vehicle components.

2.3 Registration and fleet entry

In general, a heavy vehicle must be registered before it can be used on a public road in Australia (exemptions apply in some cases). Registration links the vehicle with a garaging address and operator. Vehicle sales lead to a change in registration, as the operator and garaging address associated with the vehicle change.

State and territory road transport authorities manage and administer heavy vehicle registration. This includes new registrations, renewals, changes to registration and matters relating to carrying dangerous goods. The NHVR maintains a database of state and territory registered heavy vehicles.

Registration generally is conditional on a vehicle being roadworthy. To be roadworthy, vehicles must not be defective, and must comply with in-service vehicle standards.

2.4 Modifications

An operator may wish to modify a vehicle to improve its safety, productivity and operation more generally. The vehicle will be modified by being altered or having extra equipment fitted.

Vehicles may be modified before or after registration. The HVNL defines a modification as an addition to, or removal of, a component from a heavy vehicle or a change to the heavy vehicle from the manufacturer's specification (s 84 of the HVNL). This doesn't include a pre-supply modification to the vehicle approved under the MVSA.

2.4.1 Approval of modifications

Under the HVNL, modifications to heavy vehicles must be submitted for approval. They can be approved by an approved vehicle examiner (AVE) or by the NHVR (ss 85 to 87 of the HVNL).

AVEs are individuals or organisations approved or accredited by a participating jurisdiction's transport authority. The Heavy Vehicle (General) National Regulation (HV(G)NR) sets out the rules for their approval, authority and conduct (part 3 of the HV(G)NR).

The NHVR Code of Practice for the Approval of Heavy Vehicle Modifications ('the NHVR Code') classes modifications as either minor, common, or complex.

A minor modification is a modification that doesn't cause a vehicle to become non-compliant with a vehicle standard. A common modification is one that complies with a recognised modification standard under section 4 of the NHVR Code. These modifications are made often and are well understood by industry. They still must be assessed by an AVE, though, unless the NHVR Code states otherwise. Currently, there are two recognised modification standards under section 4 of the NHVR Code:

- Vehicle Standards Bulletin 6 (VSB6)
- the Queensland Modification Code S10: Concessional Livestock Loading – Vehicle Rating.

Complex modifications must be assessed by the NHVR on a case by case basis. To approve a modification, the NHVR must be satisfied that:

- using the modified vehicle on a road will not pose a significant safety risk
- the modified vehicle will comply with all relevant noise and emission requirements (except those for which an exemption has been issued).

2.4.2 Illegal modifications and tampering

Under the HVNL, it's an offence to make a common or complex modification to a heavy vehicle without authorised approval to do so.

It's also an offence to tamper with an emission control system or a speed limiter that is fitted to a heavy vehicle (ss 91 and 93 of the HVNL).

2.5 Vehicle operations

The HVNL covers most requirements for heavy vehicles while in service.

2.5.1 Vehicles must be safe

Once a vehicle is in service, both it and its parts can become damaged through normal wear and tear, or as a result of a collision or other misadventure. Either way, the HVNL makes it an offence to use a heavy vehicle that is unsafe or permit it to be used (s 89 of the HVNL). This includes if the vehicle, or any of its component parts, make the use of the vehicle unsafe or endangers public safety (s 89 of the HVNL).

2.5.2 In-service standards

In-service heavy vehicle standards are provided by the HV(VS)NR. Although implemented under the HVNL, non-participating jurisdictions (Western Australia and the Northern Territory) apply the HV(VS)NR as model law, resulting in national consistency in in-service standards for heavy vehicles in Australia.

Under the HV(VS)NR, a heavy vehicle must comply with the ADRs that applied to it at market entry for all of its in-service life.

A vehicle must meet these standards to be considered roadworthy. Under the HVNL, it's an offence to use a heavy vehicle on a road that does not comply with a vehicle standard applying to it or permit it to be used (s 60 of the HVNL).⁵

2.5.3 Ongoing roadworthiness

The HVNL does not define “roadworthy” or “roadworthiness”. It also doesn't provide a process for determining roadworthiness or declaring a heavy vehicle unroadworthy. Instead, the HVNL has a system for determining whether vehicles are defective and managing repairs (see section 2.7 of this paper).

The main system for managing roadworthiness is linked to vehicle registration, managed by state and territory authorities. Meeting applicable roadworthiness requirements is a condition of registration. This includes complying with relevant heavy vehicle standards.

This means that roadworthiness is only assessed by authorities at the point of registration. There is no continual assessment of roadworthiness.

The NHVR is developing a roadworthiness program, at the direction of state and territory transport ministers, made up of four work streams:

- a nationally consistent inspection framework for roadworthiness
- a consistent approach for managing and clearing defects
- roadworthiness data collection capabilities
- a national risk-based inspection criteria framework.

⁵ There are exceptions to this – for example, if the vehicle is on a journey to a place of repair.

2.5.4 Mass, dimension and loading

An over-mass, improperly-loaded or large heavy vehicle can pose a risk to public safety, road infrastructure and public amenity. The HVNL regulates the mass, dimension and loading of a vehicle. The HV(MDL)NR imposes:

- Mass and dimension requirements on heavy vehicles, as well as individual components and loads. This includes overall vehicle mass and maximum lengths, heights, widths, distances between axles, tow couplings and overhang.
- Requirements about securing loads.⁶

The HVNL also restricts access to roads by heavy vehicles of a particular mass, size or configuration, even if the vehicle complies with prescribed mass requirements.

2.5.5 Coupling and towing

A heavy vehicle combination that is not securely coupled can pose a serious risk to public safety. Under the HVNL, it's an offence to use a heavy combination and a trailer on a road if the combination isn't securely coupled to the vehicle in front of it. It's also an offence to permit such a heavy combination and a trailer to be used on a road (s 185 of the HVNL). This also means the coupling equipment must be compatible and properly connected.

The HVNL also makes it an offence for a heavy vehicle to tow more than one vehicle (s 184 of the HVNL).

2.6 Maintenance and inspections

2.6.1 Maintaining vehicles

Keeping a vehicle safe and compliant with standards throughout its operating life requires a program of maintenance. Operators have to keep their vehicles in a safe, roadworthy condition as a condition of registration. Yet there are limited ways to make sure operators adhere to this requirement for the in-service life of the vehicle:

- periodic inspection by government employees or agents
- enforcement-related inspection by authorised officers, including police
- third party audits to verify heavy vehicle maintenance through an accreditation scheme.

2.6.2 Vehicle inspections

Jurisdictions undertake heavy vehicle inspections, including scheduled, unscheduled and targeted inspections. Inspection methods and practices vary between jurisdictions though. In South Australia and Victoria, heavy vehicles are inspected when the vehicle is first registered and when it changes ownership. Other jurisdictions have different requirements for periodic inspection.

The HVNL empowers authorised officers to inspect heavy vehicles or order that heavy vehicles are presented for inspection (ss 520 and 522 of the HVNL). It also gives authorised

⁶ The NTC *Load Restraint Guide* (2018) provides guidance on how to comply with load restraint requirements under the HVNL.

officers powers that support them to conduct an unscheduled inspection. It allows authorised officers to stop heavy vehicles, direct them to be stopped, move them or direct them to be moved (ss 513 to 519 of the HVNL). An authorised officer can also start or stop a heavy vehicle and direct a driver about sitting in the driver's seat (ss 523 and 524 of the HVNL).

The National Heavy Vehicle Inspection Manual (NHVR, 2016) introduced a single national approach to inspecting vehicles for roadworthiness.

2.7 Damage, defects and repairs

2.7.1 Using a defective vehicle

The HVNL defines a defective vehicle as one that contravenes a heavy vehicle standard or that has a part that either:

- Doesn't perform its intended function, or
- has deteriorated to an extent that it can't be reasonably relied on to perform its intended function (s 525 of the HVNL).

A vehicle can become defective through either normal wear and tear or as a result of a particular incident. Under the HVNL, it's an offence to use a defective vehicle or permit it to be used, irrespective of the cause (s 529 of the HVNL). That is, it doesn't matter if the vehicle has become defective through misadventure or because of lack of maintenance.

2.7.2 Defect notices

The HVNL uses a system of defect notices to manage defective vehicles. An authorised officer can issue a defect notice if they reasonably believe a vehicle is defective and its use on the road presents a safety risk (s 526 of the HVNL). A defect notice can be major or minor depending on whether or not the defect presents an imminent or serious safety risk (s 526 of the HVNL).

2.7.3 Clearing defects

There are different methods for removing a defect notice under the HVNL.

The NHVR can clear a defect notice if it's satisfied the vehicle is no longer defective or if it receives a notice to that effect from an authorised officer (s 530 of the HVNL). In this case, the vehicle has to be inspected by the NHVR or an authorised officer to verify the vehicle is no longer defective.

A defect notice can also be withdrawn or amended by an authorised officer (s 530 of the HVNL). Once this happens, the authorised officer has to give notice to the NHVR and the relevant person associated with the vehicle.

If a vehicle is found to be defective but doesn't pose a safety risk or has a number plate that is wholly or partly readable, it can be issued with a self-clearing defect notice. This means there is no requirement for the vehicle to be inspected after repair to have the defect notice cleared.

The HVNL makes it an offence to continue using a heavy vehicle in contravention of a self-clearing defect notice or to permit it to be used (s531A of the HVNL). This helps manage the risk of a person continuing to use the vehicle once the self-clearing defect notice is issued.

It's also an offence for a driver to fail to notify an operator of a self-clearing defect notice within 14 days of the notice being issued.

2.7.4 Written-off heavy vehicles

Australia has a national framework for managing heavy vehicles written off after collision, fire, water inundation or malicious action. Such vehicles must be classified as either a statutory write-off (SWO) or repairable write-off (RWO).

An SWO can only be sold subject to a statutory restriction that it is only used for parts or scrap metal. An RWO can be repaired and re-registered as long as the vehicle passes specific safety and identification inspections. Austroads and the National Motor Vehicle Theft Reduction Council have produced criteria to identify and classify heavy vehicles that are write-offs. It helps identify vehicles that shouldn't be repaired on safety grounds and are only suitable for dismantling or scrap.

New South Wales also has a register for written-off heavy vehicles. The register allows buyers to check if the vehicle is too badly damaged to be repaired, or if the insurance company has declared it a total loss.

Question 1: What risks to safe vehicles that are currently out of scope for the HVNL should be brought into scope? What is in scope that shouldn't be?

3 Analysing vehicle standards

Key points

- The current arrangements for vehicle standards are harmonised and working well, but there are still opportunities to improve the law.
- Safer and more productive vehicles and safety technologies face a range of barriers, which limits uptake.
- Inspection and enforcement practices vary, which can cause inconsistencies across state and territory borders.
- Detecting defective heavy vehicles is difficult, and regulatory oversight of repair work is limited. Clearing defects can take time and be costly.

The current vehicle standards instruments appear to be, for the most part, harmonised. Despite this, there are still a few issues that affect the potential safety, compatibility and productivity of heavy vehicles. These issues aren't necessarily caused by a failure of the HVNL to regulate risk. Most of the issues relate to policy, administrative or operational problems.

3.1 Safer PBS vehicles face administrative barriers

3.1.1 PBS vehicles are safer and more productive

PBS vehicles are designed to perform as productively, safely and sustainably as possible. These intentions are being fulfilled. The NTC found the use of PBS-approved vehicles was associated with:

- an average productivity gain of 24.8 per cent
- 46 per cent fewer major crashes, compared to the rates for conventional vehicles (NTC, 2017, p. 29).

Since the introduction of the HVNL, the PBS vehicle fleet has grown rapidly in some sectors of the heavy vehicle market. In 2016 the NHVR approved 2,893 PBS vehicles, which reduced the entire heavy vehicle fleet size by about 900 vehicles (NTC, 2017, p. 26).

3.1.2 Barriers for PBS vehicles

Despite the productivity gains and stringent safety standards of PBS vehicles, they have restrictions on their operations and access to the road network (discussed in the *Easy access to suitable routes* issues paper) (NTC, 2019).

There are also administrative hurdles in the approval process for using them. PBS vehicle operators need to set aside at least seven weeks (35 business days) to get a permit (NTC, 2017, p. 23).

The PBS Review Panel has oversight of all PBS applications. The panel has 11 members, including a representative from Commonwealth and each state and territory. The average time taken by the PBS Review Panel to respond to applications is around 25 business days (NTC, 2017, p. 20).

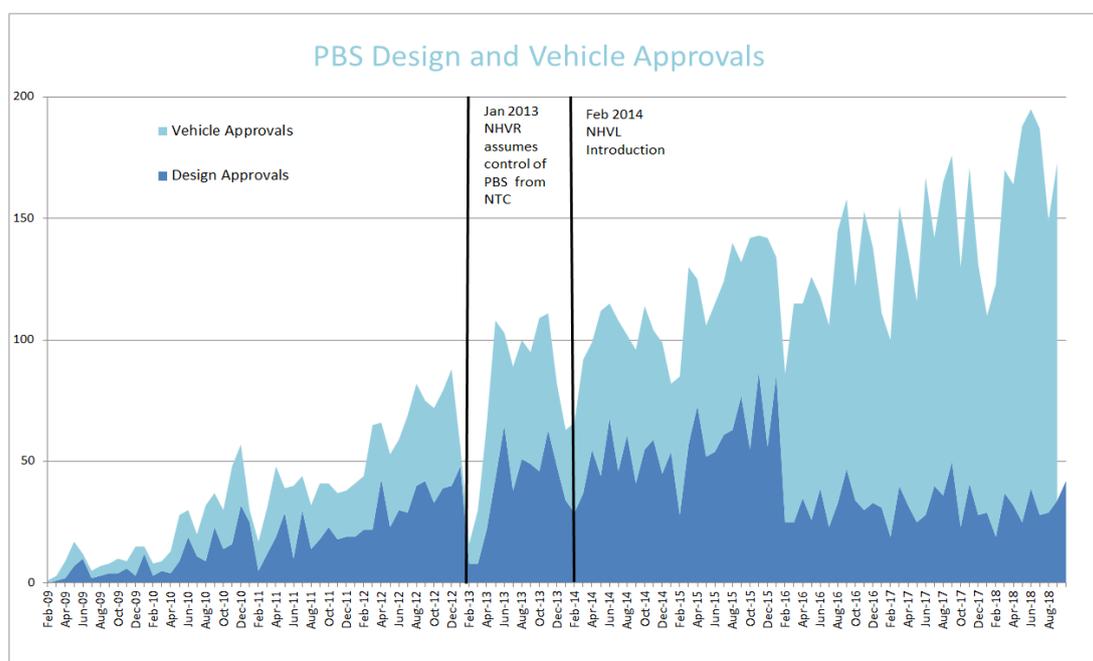
It may be that not all PBS vehicles and PBS designs need oversight by the PBS Review Panel. The NHVR has the expertise and technical capability to assess PBS applications. Yet under the HVNL they must consider the advice of the PBS Review Panel when assessing applications (ss 22 and 23 of the HVNL).

A possible solution would be to allow the NHVR to sign off on some PBS approvals. The NHVR has commenced a trial to allow some well-known PBS designs to be 'pre-advised' by the PBS Review Panel. This has reduced the average approval time from four weeks to three business days (NHVR, 2019).

The PBS scheme was intended to be a testing ground, where new vehicles and combinations would transition to the prescriptive heavy vehicle fleet (NRTC, 2000). This has not eventuated. To date, no PBS vehicles have transitioned into the prescriptive heavy vehicle fleet.

There has been a continual increase in PBS vehicle approvals, but the number of design approvals has decreased significantly between 2014 and 2018 (see Figure 5), suggesting a trend towards a more standardised PBS fleet.

Figure 5. PBS design and vehicle approvals



Source: NHVR, 2018

Another regulatory burden identified by industry involves paperwork requirements. The HVNL requires the carriage of paper documentation of the PBS vehicle approval (s 25A of the HVNL). The HVNL does not accommodate electronic methods of assurance. This burden could be reduced by allowing carriage of electronic documents.

The restrictions and delays associated with PBS vehicles discourage operators from using them. For many operators, it's easier to use a larger number of less safe and less efficient vehicles.

3.2 There are barriers to advanced safety technology

3.2.1 Australia's vehicle standards can delay safer vehicle entry

Heavy vehicle standards impose mass and dimension limits, so heavy vehicles can operate safely within Australian road and bridge infrastructure constraints. In some cases, though, these limits present an unintended barrier to the supply of safe vehicles to the Australian market.

Austrroads is exploring the possibility of moving to a permissible vehicle width of 2.55 metres, up from the current 2.50 metre width (Austrroads, 2018). The project is considering if there is evidence to support a change in ADRs and examining the impact of increased vehicle widths on network access (Austrroads, 2019). The project will be completed by the end of 2019.

Others have called for consideration of a 2.60 metre width for heavy vehicles. This would allow Australians to select from the broadest and most updated range of internationally-produced vehicles, with a wide range of safety technology.

The steer axle mass and vehicle width limits in the ADRs and the HV(MDL)NR are inconsistent with international standards. Europe and North America have higher limits for both steer axle mass and width of heavy vehicles.

As a result, vehicles fitted with advanced safety technology can comply with international limits but exceed Australia's limits. These vehicles have to be redesigned to meet our heavy vehicle standards. This can substantially delay the entry of these safer vehicles into the Australian market and, in some cases, prevent it altogether.

3.2.2 There are missed opportunities for safety technology under the HVNL

Advanced safety technology can reduce the risk and severity of crashes and injuries. This includes technology to prevent crashes, such as electronic stability control, advanced braking systems and blind-spot monitoring devices, and technology to reduce the consequences of crashes, such as under-run protection.

The HVNL doesn't encourage, or even recognise, the uptake of some safety technologies. This may limit uptake and use by heavy vehicle operators.

Electronic stability control, for example, is fitted in around 25 per cent of new trucks and 40 per cent of trailers in Australia (NatRoad, 2018). These figures are much lower than in Europe, where it's mandatory to fit these systems in all new heavy vehicles (with some limited exemptions).

Vehicle under-run protection has the potential to reduce the severity of injuries after a crash. Rear, side and front under-run protective devices on heavy vehicles can stop pedestrians, cyclists, motorcyclists and light vehicle occupants from running under the heavy vehicle on collision and being injured or killed by the inherently-large mass of the heavy vehicle (Transport for NSW, 2017).

Implementing advanced safety technology can also help operators meet their legal obligations. This includes requirements under the chain of responsibility. For example, technology that helps drivers and operators comply with speed, fatigue, route and mass requirements. Again, the HVNL does not universally recognise the use of this kind of technology to manage risk.

The Commonwealth Department of Infrastructure, Transport, Cities and Regional Development is considering how the ADRs could accelerate new safety technology in the Australian market.

3.3 Inspection requirements and enforcement approaches vary

3.3.1 Inspection requirements vary by jurisdictions

Different inspection requirements across jurisdictions leads to inconsistent outcomes for operators. It may also have a negative impact on vehicle safety.

Some jurisdictions impose extra requirements for heavy vehicles operating in their jurisdiction. For example, the NSW Environment Protection Authority has issued determinations for tank trailers used to transport dangerous goods (Environment Protection Authority NSW, 2018). Under the determinations, all dangerous goods tank trailers in New South Wales must be fitted with roll stability systems. This is not a requirement in other jurisdictions. This kind of piecemeal approach to mandating vehicle safety equipment doesn't promote regulatory efficiency or safety at a national level.

Different jurisdictional systems also link up with old state-based requirements and new national requirements inconsistently. For example, some authorised officers don't enforce the latest changes to the National Heavy Vehicle Inspection Manual. This can lead to situations where defects are not cleared. In another example, some jurisdictions use old paper forms that don't include new categories.

3.3.2 Enforcement approaches vary

On occasion, authorised officers identify non-compliances on vehicles that may have been present for many years but were unknown to the operator. These are non-compliances that were not originally detected by relevant authorities.

The level of experience of authorised officers can also lead to inconsistent outcomes. There are examples of inexperienced authorised officers interpreting guidance material as being prescriptive. They then rely on their mistaken interpretation to determine if a vehicle or load is non-compliant.

Case study 1: Ten-year-old defect

When a fertiliser spreader vehicle was first registered, it was fitted with specialist equipment that exceeded rear overhang allowances. The non-compliance wasn't detected at the time of registration. Ten years later an authorised officer picked it up when inspecting the vehicle. The operator was then required to either modify the vehicle or obtain a permit.

Modification would have been expensive, so the operator applied for a permit. Due to provisions in the HVNL, the NHVR had to reject the permit application. This outcome was frustrating for both the operator and also the NHVR. It had to exclude a vehicle that posed a minor safety risk and could have operated safely subject to specific conditions.

Recent updates to load restraint rules in the HVNL have improved the performance requirements and provided legal and safe compliance options for some over-size, over-mass loads.

There is still the potential to interpret minor, inconsequential load losses as a breach of load restraint requirements – for example, water dripping from a wet load, minor livestock effluent loss or several strands of straw from a bale.

Case study 2: *Load Restraint Guide* interpreted as a standard

Some authorised officers misinterpret the examples in the *Load Restraint Guide* (NTC, 2018) as demonstrating compliance or non-compliance. The *Load Restraint Guide* only provides guidance, though. The loading performance standards can be complied with in many ways.

3.4 Detecting unsafe and non-compliant vehicles is not easy

Under the HVNL, operators can demonstrate their heavy vehicles meet the minimum standards for use on the road in two ways:

- Participating in the maintenance module of an accreditation scheme, confirmed by regular audits. For example, the National Heavy Vehicle Accreditation Scheme (NHVAS), the Australian Trucking Association's TruckSafe and the petroleum sector's Safe Load Program.
- Inspection by an authorised officer.

Only the former of these is proactive. Inspection is part of the current reactive approach to enforcement under the HVNL. This is because regulators can only respond to defects found on heavy vehicles being used.

It's also difficult to detect unsafe and non-compliant vehicles. The entire heavy vehicle fleet is subject to inspection at any time by authorised officers. This includes inspection at roadside locations where there is little or no equipment available to facilitate the inspection. An authorised officer may suspect a vehicle doesn't comply with applicable standards or is unsafe. Under the HVNL, all they can do is direct that a vehicle is presented for inspection at a suitable location. There are few other sanctions available to them.

To be effective deterrents, on-road and periodic inspections need to be perceived as being:

- frequent and intense, therefore likely to discover any defects
- subject to serious consequences if non-compliance is found.

Some jurisdictions require heavy vehicles to be inspected regularly as a condition of registration renewal. Yet this is not covered by the HVNL.

Some jurisdictions also give authorised officers the power to suspend the registration of a heavy vehicle. This is an effective sanction to stop an unsafe heavy vehicle from being used, or to stop a fleet of heavy vehicles where there are systemic safety problems. But this power is not available in every state, and the HVNL does not give the NHVR this power.

A proactive way for an operator to assure themselves, regulators and authorities that a heavy vehicle is in a safe condition before being used on a road is to take a safety

management system (SMS) approach to vehicle condition, loading and maintenance. This is partially provided for by participating in one of the maintenance systems set out in an accreditation scheme, as noted above.

3.5 Risks of repairs, replacement parts and modifications

3.5.1 Limited oversight and testing ability for repairs and replacement parts

Replacement parts that are fitted once a vehicle is in service may not be exactly the same as the original parts fitted to a given heavy vehicle. These replacement parts may exhibit different performance characteristics to the original, raising safety concerns.

The HVNL attempts to deal with this situation by referring to a part performing its “intended function” (s 525(b)(1) of the HVNL). Yet there is no objective measure for that, nor an applicable standard. It can also be difficult to assess the performance of these replacement parts at the roadside or in a workshop.

Case study: Lack of established performance standards for safety-critical components

Drum-brake linings and disc-brake pads are regularly changed on heavy vehicles. The original parts may be replaced with parts that don't have the same friction characteristics or deliver the same stopping effectiveness. This can affect compliance with braking technical standards. Yet there are no applicable performance standards for these replacement parts. As a result, an operator can meet their general safety duty but still be unable to tell if they've fitted an effective component or a sub-standard one.

3.5.2 There is uncertainty about how modifications should be handled

The HVNL doesn't cover modifications to a vehicle that has not yet been supplied to market. This has led to uncertainty in the industry about how pre-registration modifications should be handled.

In the past, pre-registration modifications were arranged by heavy vehicle dealers, acting as agents for the manufacturers. Under the HVNL, though, these modifications require approval from an AVE (s 731 of the HVNL).

One way to improve efficiency may be to include new policy tools, such as type approvals for vehicle modifications, in the regulations.

3.6 Defect clearance can be costly and time-consuming

A heavy vehicle that is defective needs to be repaired. Adding to the cost of repairs is the productivity loss of having the vehicle off the road. Administrative delays can add to the time it takes to get a heavy vehicle safely back into service.

Before a major defect can be cleared, it needs to be entered into the relevant jurisdictional registration system. Operators advise that it can sometimes take days after the issue of the defect for this to happen. Sometimes the defect is fixed before this administrative task is completed. This can result in days of lost productivity and loss of income, even though the vehicle has been returned to a roadworthy condition.

Question 2: Have we covered the issues relating to safe vehicles accurately and comprehensively? If not, what do we need to know?

4 Aspirations for a better law

Key points

This section sets a high-level vision for managing safe vehicles in a future HVNL. It outlines four draft regulatory principles to guide development of a recast law:

- encouraging safer vehicles
- effective maintenance and inspection
- effective identification, repair and clearance of defects
- a common-sense approach to minor breaches.

While current vehicle standards are largely harmonised, there is still room for improvements in a recast law.

4.1 Encouraging safer vehicles

Draft regulatory principle 1: The future HVNL should promote greater use of vehicles that perform to higher safety standards and deliver productivity benefits. It should support the use of safer vehicles from other markets and recognise and encourage the use of safe vehicle technology.

The future HVNL should enable and encourage increased use of safer and more productive vehicles. PBS vehicles offer significant safety and productivity benefits. A future HVNL should seek to reinvigorate the PBS scheme so that it continues to drive innovation, safety and productivity in an efficient way that encourages operator uptake.

Better harmonisation of international standards, although largely the domain of the MVSA and future RVSA, should be supported by the future HVNL. It should seek to remove obstacles identified by industry, such as limits on steer axle mass and vehicle width, as appropriate. It should also work with other regulation to reduce cases of safer vehicles being delayed or prohibited from entering the Australian market.

Safe vehicle technology can allow vehicles to exceed minimum standards and reduce the risk and severity of crashes and injuries. The future HVNL should recognise and encourage the take up of advanced technology that makes vehicles safer. At the same time, a recast HVNL should remain technology-neutral to avoid being restrictive and instead promote flexibility.

Question 3: How can the future HVNL most effectively deliver safer vehicles to the road? Which aspects of the PBS scheme are working well, and which aren't? What barriers to the broad uptake of safer vehicles exist?

4.2 Effective maintenance and inspection

Draft regulatory principle 2: The future HVNL should support effective, flexible, risk-based maintenance regimes to improve safety outcomes. It should support efforts to bring consistency to inspections.

Improved safety outcomes should be the focus of the future HVNL. It should give operators flexibility to put in place efficient and assured maintenance systems and suitably recognise operators that have proactive maintenance programs. It should also recognise different ways of attaining or surpassing minimum standards. These may include different accreditation and assurance schemes.

The requirements for managing vehicle safety risk under the future HVNL should apply and be interpreted consistently across the country. A recast HVNL ought to support a cohesive national approach to vehicle inspections. The future HVNL should aim to fill the gaps in the current coverage of standards. This may involve, for example, giving the regulator more tools such as, the power to generate compliance standards or codes of practice.

A risk-based approach to inspections may require developing risk profiles of operators and fleets, based on vehicle registration, inspection and defect data.

Question 4: How can the future HVNL encourage suitable maintenance programs? How can it most effectively identify and remove dangerous vehicles from the road?

Question 5: How can the future HVNL meet the assurance needs of all Australian state and territory road transport authorities in a way that does not unreasonably impose on operators?

4.3 Effective identification, repair and clearance of defects

Draft regulatory principle 3: The future HVNL should support proactive, efficient identification, repair and clearance of defects. It should support getting vehicles back to service quickly.

The future HVNL should support quality repairs and efficient clearances of identified defects.

If repair and replacement standards can support this aim, they should be developed for priority safety systems, such as braking, in the first instance. The future law must consider how reasonable it is for an operator to ensure that third-party repairs are safe.

Defects should be repaired quickly and cleared efficiently. Vehicles should not be kept off the road unless they pose an imminent safety risk that is not manageable in any other way.

Question 6: Do we need assurances regarding repairs and replacement parts? If so, could these be achieved using standards? Should third-party repairers be explicitly included in the Chain of Responsibility? How can defect clearance processes be reasonably expedited?

4.4 Common sense approach to minor breaches

Draft regulatory principle 4: Technical breaches that do not pose a safety risk to operators, drivers or other people should be managed proportionally.

The future HVNL should have sanctions proportional to safety risk. Minor and trivial matters, such as minimal load movement or losses that do not pose a safety risk, or vehicles that do not meet a technical standard but also do not increase safety risks, should not be subject to harsh sanctions.

Question 7: Should the future HVNL apply a risk-to-safety threshold for vehicle standards and loading matters?

5 Next steps

Key points

- We want to hear from you. Consultation is open until **Friday 30 August 2019**.
- Other issues papers provide opportunities to tell us about the specifics of effective fatigue management, easy access to suitable routes, safe people and practices, accreditation, compliance and technology and other matters.

5.1 Have your say

The NTC wants to give everyone affected by the HVNL an opportunity to have a say.

The NTC invites your responses to the questions and issues we have identified by **Friday 30 August 2019**.

To stay updated on the project, visit the [HVNL review website](#)⁷ and register to receive newsletters and consultation alerts.

5.2 Future publications

This is one of eight issues papers.

The next two issues papers will cover assurances, such as accreditation, and managing compliance, including the regulatory role that could be played by technology and data.

The last issues paper will cover other policy matters not covered in other issues papers.

We will produce a summary of outcomes from the issues papers to bring together all your feedback and advice, and to serve as a basis for a regulatory impact assessment.

⁷ www.hvnlreview.ntc.gov.au

Appendix A Performance based standards

Performance based standards (PBS) rules differ from Australian Design Rules (ADRs) or other standards in that they specify performance standards and allow a vehicle to be classified as meeting level 1, 2, 3 or 4 performance standards. This then allows the vehicle to be granted access to those parts of the network where their operation poses a low risk to safety and infrastructure, as the performance capabilities of the vehicle match the performance constraints of the road.

The PBS scheme is designed so that innovative heavy vehicles' designs that meet specified performance levels can operate on public roads. The scheme uses a performance-based approach by using safety and infrastructure standards to assess vehicle performance.

Under the Heavy Vehicle National Law (HVNL), the National Heavy Vehicle Regulator (NHVR) administers the scheme through the exercise of statutory powers to approve PBS design and vehicle applications.

The purpose of the PBS scheme was to develop a framework to deal with innovations in heavy vehicle design through a nationally harmonised system. The PBS scheme was expected to provide a more comprehensive approach to ensuring that heavy vehicles operate safely and that road and bridge assets are protected.

An underpinning principle that applied to the PBS scheme's development was that performance standards would be set at a level at least equivalent to corresponding prescriptive schemes. The higher costs resulting from achieving and demonstrating compliance with the performance standards were intended to be offset by the ability to run more productive vehicles on a more extensive road network.

Under the PBS scheme, there are 16 safety standards and four infrastructure standards. These are broadly classified into four categories as shown below.

- *Powertrain* – specifies engine and acceleration requirements
- *High Speed* – stability, roll over and rearward amplification
- *Low Speed* – swept path, frontal and rear swing requirements
- *Infrastructure* – bridge and pavement requirements and maximum axle group mass limits.

A vehicle's performance results against these standards decide the vehicle's maximum permissible mass limits and access levels. These standards replace use of the ADRs and the Mass, Dimension and Loading Regulation to regulate heavy vehicles.

The ADRs and Mass, Dimension and Loading Regulation cap the maximum length, width, height, drawbar length, overhangs, axle groups and tow coupling locations for heavy vehicles. However, the PBS scheme allows vehicles outside of these limits to be constructed using a performance-based approach against specific PBS safety and infrastructure performance standards.

Appendix B provides a short description of each standard.

Appendix B PBS vehicle standards

These are the performance-based standards under the PBS scheme.

Safety performance standards	
Startability	Ability to commence forward motion on specified grade
Gradeability	Ability to maintain forward motion on specified grade; and achieve a minimum speed on 1 per cent grade
Acceleration capability	Ability to accelerate either from rest or to increase speed on a road
Overtaking provision	Currently assessed as part of the Network Classification Guidelines that prescribe maximum vehicle lengths to PBS network levels
Tracking ability on a straight path	The total swept width while travelling on a straight path
Ride quality	This standard is currently undefined and not used
Low-speed swept path	The maximum width of the swept path in a prescribed 90° low-speed turn
Frontal swing	Maximum lateral outswing of the front outside corner of the prime mover and trailer
Tail swing	Maximum lateral out-swing of the outside rear corner of the truck or trailer as the turn commences
Steer tyre friction demand	Maximum steer tyre friction in a prescribed low-speed turn
Static rollover threshold	The steady-state level of lateral acceleration that a vehicle can sustain during turning without rolling over
Rearward amplification	Measures the 'whip crack' effect of a lane-change manoeuvre
High-speed transient off-tracking	The lateral distance that the last-axle on the rear trailer tracks outside the path of the steer axle in a sudden evasive manoeuvre
Yaw damping coefficient	The rate of decay of the 'sway' from the rearmost trailer after a single pulse steering movement
Handling quality	This standard is currently undefined and not used
Directional stability under braking	The ability to maintain directional stability under braking

Infrastructure protection standards

Pavement vertical loading	Degree to which vertical forces are applied to the pavement
Pavement horizontal loading	Degree to which horizontal forces are applied to the pavement
Tyre contact area	Degree to which tyre contact pressure is distributed over the pavement
Bridge loading	The maximum effect on a bridge measured relative to a reference vehicle

Common terms and abbreviations

Term	Definition
ADRs	Australian Design Rules
AVE	approved vehicle examiner
HV(G)NR	Heavy Vehicle (General) National Regulation
HVNL	Heavy Vehicle National Law
HV(MDL)NR	Heavy Vehicle (Mass, Dimension and Loading) National Regulation
MVSA	<i>Motor Vehicle Standards Act 1989 (Cth)</i>
NHVR	National Heavy Vehicle Regulator
NHVR Code	NHVR Code of Practice for the Approval of Heavy Vehicle Modifications
NTC	National Transport Commission
PBS	performance based standards
RVSA	<i>Road Vehicle Standards Act 2018 (Cth)</i>
SMS	safety management system
HV(VS)NR	Heavy Vehicle (Vehicle Standards) National Regulation

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