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National Transport Commission
Public submission – Options to harmonise rolling stock testing and test locations
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Submission to Consultation – Options to harmonise rolling stock testing and test locations Discussion paper

The Office of the National Rail Safety Regulator (ONRSR) welcomes the opportunity to provide comment on the Options to harmonise rolling stock testing and test locations Discussion paper (discussion paper). ONRSR is an independent body corporate established under the *Rail Safety National Law (South Australia) Act 2012* (RSNL) to enforce safe railway operations and promote the improvement of rail safety nationally. ONRSR supports the National Rail Action Plan and the National Pathway for Streamlining Rolling Stock Approvals.

ONRSR supports streamlining of rolling stock acceptance and does not expect unnecessary duplication of certification activities. Managing risks associated with construction and commissioning of new or modified rolling stock is the responsibility of the rolling stock operator (RSO) as the person best able to control those risks under s.50 of the RSNL.

Rail Infrastructure Managers are expected to assure themselves that RSOs have managed risk associated with construction and commissioning of new or modified rolling stock before registering the rolling stock to operate on their network.

RSOs are facing several challenges that harmonised rolling stock testing would address. These include not owning/managing infrastructure, keeping pace with innovative rolling stock components, and assuring independence and competence of engineering services. These challenges can and have translated into safety failures.

The NTC paper focuses on standardising what RIMs require to harmonise rolling stock testing. Section 2.1 of the paper states “Tests associated with certification and registration address network specific risks such as unique track geometry, gradients, clearances or operational condition.” However, rolling stock compliance certification goes beyond network specific risks. Most standards in a typical standards compliance register for rolling stock certification, and hence most verification testing against these standards, are about the vehicle, and components of the vehicle, independent of network.

Vehicle specific standards are typically in the AS7500 series, or the Association of American Railroads (AAR) standards or the European International Union of Railways (UIC) standards or others that the RSO might nominate. Harmonisation of rolling stock testing is primarily about harmonising vehicle and vehicle component testing against rolling stock standards. ONRSR suggests not limiting the focus of the project to harmonisation of network specific testing requirements.

Greater harmonisation in rolling stock testing can improve productivity by eliminating duplication and enabling consistent test methods at controlled locations that produce nationally agreed acceptance criteria, which leads to better safety outcomes. ONRSR notes three levels of effectiveness of harmonisation of rolling stock testing:

- > Level 1: approved test locations on operational network tracks
- > Level 2: dedicated testing locations, independent and separate from railway operational environments that enable testing in a controlled setting without production pressure, which leads to additional safety outcomes to Level 1.
- > Level 3: dedicated testing locations and laboratory testing facilities (National Testing Facility) capable of testing vehicles and components, which leads to additional safety outcomes to Level 2.

ONRSR recommends that the rolling stock testing harmonisation project has Level 3 as the outcome. The response to Question 4 contains more detail on this recommendation in the context of learning from the North American railway jurisdiction.

Further information is provided in response to questions from the discussion paper below.

Question 1: To what extent do current rolling stock testing requirements and practices contribute to inefficiency and delay in certification and registration. How should efforts to address testing requirements be prioritised relative to other rolling stock approval elements of the National Pathway? (page 15)

Current rolling stock testing practices have a major impact on efficiency, and hence implications for safety. Current testing practices might require duplication of tests to meet RIM requirements. Moreso, current testing depends on RSOs gaining access to operational train paths on RIM networks, which is not aligned with international best practice of dedicated testing locations, facilities and resources. See also the response to Question 5.

ONRSR agrees with the discussion paper statement on page 15 that a coordinated approach between testing and standards harmonisation would be beneficial. Testing is the process of verifying compliance to standards, so standards harmonisation should precede finalisation of testing harmonisation. The process is not linear but circular or iterative as elements of standards and testing harmonise.

Question 2: Are there particular types of tests or approvals where harmonisation would be most effective? (page 15)

Harmonisation of testing and locations has pronounced benefits for simulation and testing of vehicle dynamics. This is primarily because testing dynamic behaviour requires mainline track and expensive resources. Dedicated test facilities also enable high-cycle or long-duration testing of fatigue, wear and degradation, which is usually done on the component level.

Question 3: In rolling stock approvals, there are three stages: certification, registration and network approval. For Table 1 – on pages 21-22, could the various tests be identified as either belonging to certification, registration and network approval? For example ‘Inspection based compliance checks’ that are largely visual are related to certification. (page 15)

As a general guide, all vehicle tests belong to certification, and all train tests belong to network approval. No testing is required for registration because registration verifies that the testing has been done during certification and obtains necessary evidence of this testing.

So, all the tests in Table 1 belong to certification, except for stopping distance tests, which are train tests belonging to network approval.

The Discussion paper states in Section 2.1 “Registration is the process of assessing that a rail vehicle can operate safely on a specific network.” ONRSR suggests this should read: “Registration is the process of RIMs assuring themselves that RSOs have managed risk associated with construction and commissioning of new or modified rolling stock through the RSO’s compliance certification process.”

Question 4: Are there additional learnings, or approaches from international jurisdictions that should be investigated to inform potential reforms to rolling stock testing requirements or locations in Australia? (Page 19)

Additional learnings and approaches should be investigated from the North American jurisdiction. In North America, all rolling stock and safety-critical components of rolling stock on interchange railroads are tested at approved facilities such as the Transportation Technology Centre (TTC) and MxV Rail. Test data is used to secure approval of vehicles and components by the Association of American Railroads (AAR).

Australia’s rolling stock testing is not to the North American or European level of detail. In Australia:

- > Compliance testing practice is limited to the vehicle level only. New or modified vehicles equipped with sub-standard components might pass vehicle testing because the components only fail later in their lifecycle or under untested dynamic conditions arising in service.
- > Safety-critical components of freight rolling stock, such as brakes, bogies and drawgear (collectively termed running gear), have traditionally been required to be approved by the AAR. However, contemporary rolling stock supply chains might include components that are not approved by the AAR.

ONRSR supports maximisation of safety outcomes through a National Testing Facility for rolling stock vehicle and component approval. Like at MxV Rail, components should be tested under dynamic conditions into their fatigued or worn state to ensure they continue to function safely throughout their lifecycle. This is the highest level of effectiveness of harmonisation of rolling stock testing.

The NTC paper describes the TTC but does not mention MxV Rail. The AAR formed MxV Rail and relocated testing assets and programs from the TTC to MxV Rail’s nearby industrial area in Pueblo, Colorado after the FRA awarded management of TTC to ENSCO in 2021. MxV Rail includes track testing loops and laboratories with numerous rigs for testing bogie, brake and drawgear components through their lifecycle. ONRSR visited the MxV Rail facility in November 2025 and would welcome the opportunity to share more details with NTC on the learnings gained.

Questions 5: To what extent is there a need for a national testing facility in Australia, and how could it deliver value to the industry? (page 26)

ONRSR supports a National Testing Facility to assist in the streamlining of approval of rolling stock and components for use on Australian railways and maximise safety outcomes.

Current practice is for RSOs to engage with RIMs to secure track access and train paths to conduct vehicle dynamic behaviour tests. RIMs earn income from track access and train paths, so granting access for testing constrains their income. This situation introduces the risk that time- and location-constrained testing compromises methodology.

Consider a real example: an RSO seeks access to track for testing a suspension modification on its wagons. Access is granted based on proximity to RSO crew and vehicle resources and RIM availability of train paths. The RSO does not obtain adequate evidence that the test track meets the

track standard criteria stipulated in AS 7509 for vehicle dynamic behaviour testing. Due to constraints, a single test run is conducted to test vertical acceleration with a result obtained that is marginally within the allowed limit. The test is passed. For this example, a national testing facility would allow dedicated access time and resources; test track would be adjusted and verified to be of the standard required for valid testing in terms of AS 7509; and a representative sample of test runs would be conducted to verify compliance, especially since measurements are close to allowable limits.

As discussed in the response to Question 4, current practice is to do vehicle-level testing only and there is no consistent testing of safety-critical components on vehicles. As stated, for components, Australia has traditionally relied on suppliers providing AAR-approved running gear components. If the components are not AAR-approved, the suppliers' evidence of component standard might be the only assurance. A National Testing Facility would allow independent component testing and verification against AS 7500 series and AAR standards in Australia.

Question 6: Are the options for harmonisation mentioned in section 4.3 better considered as standalone options, as a combination of options, or altogether? Which options should be implemented as a priority? (page 26)

As stated in Section 4.3 of the NTC paper, the options are not mutually exclusive. ONRSR suggests the first four options should be implemented in an integral pathway. Test requirements matrix, harmonised acceptance criteria and standardised test methodologies should form the 'user specification' for the design of test locations and a National Testing Facility.

The fourth option for harmonisation mentioned in Section 4.3, namely consolidated Australian Standards with documented RIM variations is considered a separate, but coordinated, workstream to testing harmonisation. See also the response to question 1.

Section 4.3.1 only mentions RIM test requirements. RIM test requirements make up a small proportion of the tests that an RSO and rolling stock manufacturer perform on rolling stock. Further, as mentioned above, ONRSR recommends component testing in the test requirements. See also the response to question 4.

Question 7: Are there specific acceptance criteria or documentation requirements that could be quickly harmonised to delivery immediate benefits ('quick wins')? (page 26)

The assessment of whether there are quick benefits should be part of the first two options in section 4.3 of the Discussion paper, namely 'test requirements matrix' and 'harmonised acceptance matrix'.

Question 8: Would allowing greater flexibility in where dynamic and static tests are conducted (for example, recognising results from a wider range of approved sites or simulators) help reduce costs and improve timing? (page 26)

Yes, it would because of the geographical extent of the Australian rail network. But note, the key word is 'approved' and note comments above about the benefits of test tracks being dedicated to testing activities.

A good example to illustrate the point that sites must be appropriate is the testing requirements for AS 7509, which calls for testing of base ride accelerations to be conducted on track at "the lower end of the quality range", considered to be track with geometry close to the 'priority class 2 (P2)' classification per AS 7636.

Question 9: Is simulation testing a viable alternative to physical trials and, if so, what protocols would need to be adempted to validate simulation models? Are there specific tests that simulation testing could be used to demonstrate compliance? (page 26)

Certain static clearance requirements can be proven with calculations only. Other tests, such as hunting in AS 7509 Rolling Stock Dynamic Behaviour can be simulated. However AS 7509 states that hunting simulations do not replace the need for a hunting test. The requirements for calculations, simulations and/or physical testing are usually stipulated in the AS 7500 series and other standards.

Question 10: Should harmonisation of testing requirements and locations be progressed as a separate, dedicated project, or could it be effectively managed by the Technical Working Group for a single registration application spilt during a future stage of the National Pathway? (page 26)

The project should be separate and dedicated to implement 'quick wins' while learning from relevant jurisdiction/s such as North America, and based on this, deriving the concept design and appropriate location for an MxV Rail-type National Testing Facility.

Question 11: Would a testing location register be useful? (page 26)

A register would only be required if Level 1 above, namely multiple approved test locations on operational network tracks were the result of the testing harmonisation project. For dedicated testing locations (Level 2) and a National Testing Facility (Level 3), there are not likely to be enough locations to warrant a register.

I look forward to our continued engagement with the NTC on the matter of harmonising rolling stock approval processes. If you have any questions relating to this submission, please contact [contact details removed].

Yours sincerely

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