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Vehicle Standards Guide 21 (VSG – 21)

National roller brake testing procedure

Revised April 2020

This guide provides information for inspectors who operate roller brake test (RBT) machines, about the *National roller brake testing procedure* (RBT procedure).

This VSG has been updated to provide guidance on calibration schedules during the COVID-19 outbreak.

Background

A heavy vehicle's ability to brake effectively and efficiently is critical to the safe operation of the vehicle on roads. Given the importance of a vehicle's brakes, regulators, operators, drivers and the community have an interest in ensuring rigorous assurance processes are in place to verify brake performance.

Considering the location, time and safety limitations of the roadside or workshop, the National Heavy Vehicle Regulator (NHVR) and industry use various brake testing methods that provide an indication of brake performance. Testing methods include decelerometer testing, skid plate testing or roller brake testing (RBT). Collectively, these testing methods are referred to as in-service brake tests.

Roller brake testing, like all in-service brake tests, is intended as a screening tool to:

- verify that a vehicle's braking system is functioning
- provide information that highlights potential issues relating to non-compliances and/or system performance.

This information can then be used to determine if inspection of specific brake components is needed.

National RBT procedure

The NHVR developed an RBT procedure to ensure that all in-service brake tests of heavy vehicles are safe, fair and repeatable, enabling accurate assessment of a vehicle's brake system.

The NHVR conducted a series of trials, in conjunction with NSW Roads and Maritime Services (RMS), Heavy Vehicle Industry Australia (HVIA) and the Australian Trucking Association (ATA) to gain a better understanding of how real-world heavy vehicle brake performance relates to test results for roller brake machines. As a result of these trials, the NHVR developed a National procedure for in-service brake testing using an RBT machine. The procedure is available here.

National RBT procedure rollout

The NHVR recognised that to test brake performance using an RBT in line with the new National RBT procedure, certain equipment and software updates were required. To address this requirement, the RBT procedure was rolled out in two stages.

Note: A list of RBT machine operators that this procedure applies to can be found in Appendix D of the RBT procedure. For inspectors who do not have an RBT machine, and instead conduct in-service brake tests by a stopping distance, decelerometer or skid plate test, there is no change to how these tests are conducted.

Stage 1

Stage one of the rollout required RBT machines to be updated, where necessary, to provide both dynamic and static test results. Once stage one RBT machine updates were completed, brake performance testing were to be conducted in line with the *Alternative phasing in (AP) procedure*.

For RBT machines that do not display both test results, updates to the machine were required. The NHVR has consulted with RBT machine manufacturers who have confirmed that the necessary updates would be made as part of the next scheduled maintenance and calibration inspection or will be remotely made by the RBT machine manufacturer. The necessary updates to RBT machines were required to be made by 31 January 2019.

Where an RBT machine already provides dynamic and static results, or following the necessary updates, RBT is to be conducted using the AP procedure.

Stage 2

Stage two of the RBT procedure required a more comprehensive software update to RBT machines. These updates ensured that test results are reported correctly and will include a simplified pass/fail read-out ensuring that outcomes align the *National Heavy Vehicle Inspection Manual (NHVIM).*

The NHVR is currently working with RBT machine manufacturers to develop the necessary software updates and has not set a date for the completion of stage two of the rollout. It is expected that stage 2 of the roll out will be completed by June 2022.

COVID-19

Calibration requirements: roller brake test machines

In an effort to slow the spread of COVID-19, States and Territories have implemented strict new measures advising people to stay at home and to limit their travel.

Currently there is no way of knowing when these restrictions may be lifted and the NHVR recognises that this will impact operator's ability to carry out calibrations of their RBT machines in accordance with the RBT Procedure.

RBT machines are significant pieces of equipment located in various sites across the country. Calibration of this equipment requires a trained technician using specialised equipment to physically attend the machine.

For this reason, the NHVR, in consultation with RBT manufacturers, is extending the date by which the calibration is required by 12 months.

Background

Brake testers are used to inform routine maintenance and as an assurance tool that a vehicles braking system is functional and likely to be meeting regulatory standards.

The RBT Procedure requires that machines used to conduct roller brake tests are calibrated, in accordance with the manufacturer's standards, at least every 12 months, or in remote areas where usage of machines is lower, every 24 months.

There is a concern that if machines are not routinely calibrated, they could be less accurate. This document identifies some of the causes for an RBT machine to lose accuracy and identifies steps that operators may take to maintain confidence in their test results.

Delayed Calibration

The NHVR has been advised that delaying calibrations should not have a major impact on the reliability of test results. To assist operators, the NHVR has identified the following areas that may impact the reliability of results generated from an RBT test. These include:

- Loss of friction (between tyres and rollers)
- Drift in the accuracy (of load cells and strain gauges)

Loss of friction

The rollers on a roller brake tester wear over time and may result in a loss of friction (grip) between the roller and the vehicle's tyres. This loss in friction is only likely to impact a test where there is a high brake force. For most brake tests, conducted up to the point of slip, there should be no impact from any loss of friction.

If friction loss does occur, operators can expect to see a drop in the highest brake force measured across multiple vehicles as vehicles will tend to slip before maximum deceleration can be measured.

Where friction loss is starting to occur, operators are advised that the following steps may be taken to ensure that testing measurements remain valid:

- Ensure that testing is only performed on dry days or when tyres and rollers can be kept dry
- Take extra care to ensured that tyres are free of dust, moisture and other contaminants
- Contact you RBT service provider they may be able to provide advice that can improve the situation

Accuracy Drift

RBT machines use load cells and strain gauges to produce brake force measurements. Over time, there can be slight drift in these cells and gauges which reduces the accuracy of the brake force measurements.

Many modern RBT machines in use have load cells and strain gauges which use 'solid state' technology which are not as prone to drift as previous technologies.

While drift in modern cells and gauges are minimal or unlikely, the following steps may be taken to ensure that results remain valid:

- Follow the manufacture start-up and self-test procedures
- Look for biases in results between left and right hand sides, consistently higher or lower readings on one side may indicate a problem
- Consistently high, low readings or error messages indicate complete failure of an RBT – these results should not be used
- Contact your RBT machine service provider if you have concerns or for advice on any specific risk areas for your make and model.

Validation of results

Where calibration of the RBT is delayed, it may be useful to include information from other sources such as driver feedback and physical inspections to validate the readings obtained.

Performing a physical inspection will identify many causes of low performance such as, worn linings, incorrect adjustment, seized shoe bearings, defective brake chamber, contamination of lining surfaces etc.

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