LOW VOLUME VEHICLE TECHNICAL ASSOCIATION Inc

Review of Electronic Deceleration Meters

Introduction:

LVVTA has considered for some time, whether there is, in this electronic age, a means by which the LVV certification cyclic brake fade-resistance testing process can be better done by taking advantage of the available electronic wizardry, as opposed to the manual stop-watch operation that we have used since the beginning of LVV time in 1992 to measure each individual cycle and the total test time.

The purpose of this Information Sheet is to provide LVVTA's findings to LVVTA Certifiers, so that they can consider whether or not they wish to use methods other than a stopwatch, when conducting brake tests.

Deceleration meters tested:

LVVTA tested three different types of deceleration meters that are currently being sold by local suppliers. The three deceleration meters that were assessed were the '*Autostop Maxi*', '*Autostop Mini',* and the '*Circuitlink Brake Check*'. Tests were conducted by LVVTA's Justin Hansen and Matt Sharland on a 100 kph road near Plimmerton Wellington, over two days with both days presenting similar driving conditions. To follow is a summary of the three meters that were tested:

Autostop Maxi - $2231.35 + GST

A portable, battery powered in-vehicle brake performance tester that measures, road speed, stopping distance, average and peak deceleration, mean fully developed deceleration (MFDD), total test time and pedal effort.

Pros:

- Prints out easily to read evaluations of each brake test at the test site (easy for certifiers not in close proximity of a PC or Laptop);
- Calculates MFDD which captures a more accurate overall test measurement and would accommodate an operator who is less aggressive with the brake pedal;
- Encased in a robust and portable case that is water-resistant;
- Measures pedal effort.

Cons:

- Doesn't allow or store multiple tests, which means the operator needs to print each test individually as he finishes it; - if the operator was too slow with this action he could go over the total allowable test time (for LVV cyclic brake tests);
- Time is consumed with setting up the meter at the test site, since pedal pressure is recorded, the operator has to fasten the load cell to the brake pedal which would require bending down or exiting the vehicle to get into the foot well to fasten the load cell to the brake pedal;
- Doesn't measure lateral or vertical acceleration.

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Autostop Mini - $1095 + GST

A portable handheld, battery powered in-vehicle brake performance tester that measures, road speed, stopping distance, average and peak deceleration, lateral and vertical acceleration and total test time.

Pros:

- Lightweight and portable (can be used on motorcycles and trikes, straps needed), and can be placed on the passenger seat to be made more accessible to the operator;
- Only 2 buttons are required so the *Mini* is very easy to use and set-up at the test site;
- Measures lateral acceleration; this would help the operator to determine whether the vehicle is braking evenly;
- Produces a simple and easy to read brake report for the operator to retrieve using a PC or Laptop;
- Measures vertical acceleration which could help the operator to determine what condition the vehicle's shock absorbers and suspension is in;
- Has three-test memory to allow three quick tests to be conducted one after the other;
- Basic results can be taken directly from the meter and recorded.

Cons:

- For data to be down-loaded from the unit, it needs to be connected via a PC or Laptop, so some computer knowledge is required for initial setup of the programme;
- Can only store up to three tests so not possible to carry out a five cycle brake test.

Circuitlink Brake Check - $970 + GST

A portable handheld, battery powered in-vehicle brake performance tester that measures, road speed, stopping distance, average and peak deceleration, lateral acceleration, total test time and brake efficiency.

Pros:

- Lightweight and portable (can be used on motorcycles and trikes, straps needed),and can be placed on the passenger seat to be made more assessable to the operator;
- Only three buttons are required so the brake check is very easy to use and set-up at the test site;
- Measures lateral acceleration, this would help the operator to determine whether the vehicle is braking evenly;
- Produces a simple and easy to read brake report for the operator to retrieve using a PC or Laptop.
- Basic results can be taken directly from the meter and recorded. *(continued on page 3)*

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Cons: *(continued from page 2)*

- For data to be downloaded from the unit, it needs to be connected via a PC or Laptop so some computer knowledge is required for initial setup of the programme;
- Can only store 1 test at a time

Summary:

LVVTA found that all three meters had their advantages and disadvantages, but all three could be used by LVV certifiers for cyclic brake tests.

The 'Autostop Maxi' has the capability to fulfil the LVV requirements of both the three and five cycle brake test so long as the operator was fast enough to print each test before he commenced onto the next, and so long as he was within the LVV requirements of the total allowable test time. The price of this unit is higher than the other two units and the servicing cost of the Maxi would also be more as it requires paper and ink rolls.

The 'Circuitlink Brake Check' was an easy unit to manage but the main disadvantage was that it could not store multiple brake tests, so the LVV Certifier would have to carry something to record the results after each test. To deal with this he could record the first couple of tests and leave the last test on the unit to transfer onto the paperwork once he was back at his workshop.

The 'Autostop Mini' was in our opinion the best of the three units that were tested. It was easy to set up at the test site and is light-weight and portable. This unit measured the same forces as the other units but on top of that it measured vertical force. The down-side of this unit was the fact that it can only store three tests in its memory so the operator could not use this when conducting a five stage test.

At the time this report was written we were unable to find a brake test unit available in New Zealand that would provide LVV Certifiers with the ability to electronically measure and record the five-cycle brake fade-resistance test. The simple use of a stopwatch brings consistency and reliability, but the disadvantage is that it still relies on the LVV Certifier to be capable of determining whether the vehicle's braking system is compliant without the help of the easy to read print-out test results that the deceleration meters produce. At this point, we still think that the stopwatch is the best all-round option, however any of the above units could be acceptable if an LVV Certifier wanted to use them.

Given the lack of an ideal unit, LVVTA has no intention of mandating electronic deceleration meters for LVV brake testing, but we would allow any of the three meters to be put into use if an LVV Certifier was interested in purchasing one. If this is the case we do suggest that you carefully consider the 'Autostop Mini', as this was the best of the three meters tested, and it could be used for three-cycle tests. The prices on the meters are trade prices.

If you would like any more assistance with this Information Sheet or if anyone has any information that they think may be useful to LVVTA regarding this, please contact an LVVTA technical team member at the Wellington office.

Tony Johnson
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Low Volume Vehicle Technical Association