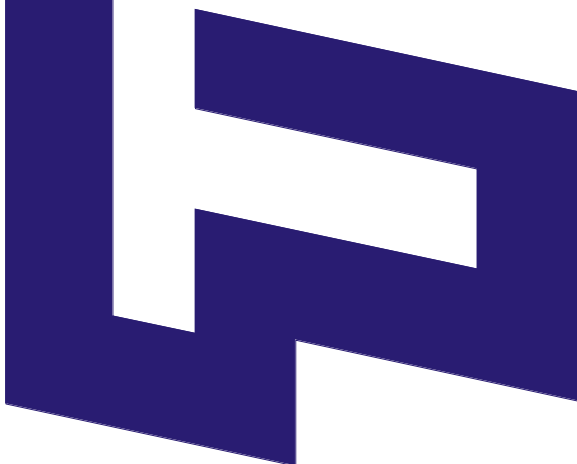


50 Tonne Braking tests



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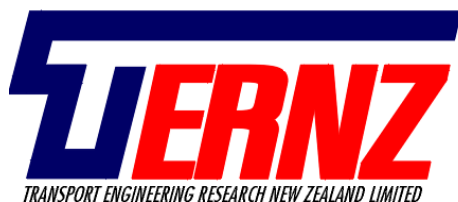
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1 INTRODUCTION

1.1 PURPOSE

The purpose of the tests described in this report was to determine whether 50 tonne heavy combination vehicles are able to perform as well as 44 tonne rigs in terms of meeting the current heavy vehicle brake requirements as specified in the Land Transport Rule Heavy-vehicle Brakes 2006 Rule 32015.

The Rule requires the service brakes to be:

“2.3(3) capable of stopping the vehicle at any load condition up to the gross vehicle mass or gross combination mass, as applicable, either:

- *(a) within a distance (s) in metres calculated by the following equation:*

$$s = 0.15v + \frac{v^2}{130}$$

where the speed of the vehicle (v) in km/h before the start of braking is at least the lesser of 50 km/h or 80% of the maximum speed of the vehicle; or

- *(b) within a distance of 7 m from a speed of 30 km/h”.*

2.3(8) The stopping distances in [2.3\(3\)](#), [2.3\(5\)](#), [2.3\(6\)\(a\)](#) and [2.3\(7\)](#) are to be measured from the point at which movement of the brake control begins to the point at which the vehicle is brought to a complete stop”.

The above requirements equate to an average vehicle deceleration of 0.5g.

1.2 METHOD

Braking tests were undertaken at various speeds with a truck and trailer combination loaded to 44 tonne and 50 tonne gross combination mass. The tests were undertaken near Kinleith on a sealed private forestry road owned by Hancock Forest Management NZ Ltd. The road was closed for the duration of the tests for safety reasons. The test vehicle was a Kenworth logging truck owned by Alan Forbes Transport Limited. A logging truck was selected because of the availability of logs, loading and unloading facilities and the weighbridge at the nearby Kinleith mill. In terms of braking performance, it would not have made any difference whether we had used logs, or any other payload with the same CG height that was not liquid.

Brake performance was measured using two Autotest AUTOSTOP Maxi devices. These devices measure vehicle speed, stopping distance, average and maximum deceleration, time and the force applied to the pedal. Stopping distance is measured from the time the driver applies the brakes. One of the devices (SN: 23150) was used as the primary device. Its pedal switch was attached to the brake pedal. The pedal switch from the other device was not attached. The primary device was calibrated in October 2008 and the calibration is valid until October 2009. The other device (SN: 27030) was calibrated in 24 September 2008 and is due for recalibration in September 2009.

An experienced driver drove the truck and braked when requested to do so by the observer in the cab with him.

Only the performance of the brakes was tested, no consideration was given to load securing, stability and other factors that may affect truck safety.

2 RESULTS

The following table summarises the results.

Test run	Gross Vehicle Mass (tonne)	Target speed km/h	Recorded Speed (km/h)	Average deceleration (g)	Peak acceleration (g)	Max Pedal effort (N)
1	45.3	50	59.4	0.54	0.73	270.6
2	45.3	60	62.5	0.53	0.65	261.8
3	45.3	70	83.2	0.62	0.74	400.4
4	45.3	80	91.4	0.58	0.69	403.7
5	50.3	50	53.7	0.56	0.68	354.2
6	50.3	50	56	0.58	0.68	404.8
7	50.3	80	89.2	0.59	0.71	

The estimated level of uncertainty in the measured average deceleration is $\pm 0.05G$.

On test runs 1, 2 and 5, the driver did not apply full braking effort as seen by the maximum pedal effort values in the last column of the table.

3 CONCLUSIONS

The vehicle met the performance requirements of the NZ Brake Rule 32015 in both load cases: 45.3 tonne and 50.3 tonne gross combination mass.

Differences in the performance of the brakes at 50.3 tonne compared to 45.3 tonne were less than the uncertainty in the measurements. In other words, there was no discernable difference in the measured brake performance between the two load cases.