

13 High Street,
PRAHRAN, VIC, 3181.
16-06-83.

J. Lerk, Esq.,

Dear James,

Re:-- TRUCK MAINTENANCE
Weight distribution.

From experience in the three branches, it appeared that it was very important to have the correct weight distribution between driving and pony wheels of maximum traction tramcars. If there were insufficient weight on the pony then derailment would occur.

Concern was felt in Geelong over the frequency of derailments, and a check of weight distribution revealed that in some instances there was little or no weight on the pony wheels. Checking was carried out in Geelong by the use of a long lever, fulcrum and weights, but this system was rather bulky and awkward to handle.

It was understood the Ballarat used a hydraulic jack for checking the weight, the pressure required for a certain weight being known and this, therefore, was read from the pressure gauge in the jack system.

Inquires had been made into the availability of scales, but it appeared that the cost of any suitable scale would be in the vicinity of £250-£300 (\$500-\$600) (1953), and the expenditure did not seem justified in view of the effective use of a hydraulic jack as a weighing device, made by Ballarat.

Geelong distributed copies of a drawing showing the lever arrangement referred to, and Ballarat detailed their method as follows:--

1. By means of hydraulic jack, pony wheel is lifted until just clear of rails.
2. Pressure on gauge is noted, and nuts of spring post adjusted to give required reading of 380 lbs. per sq. in., which corresponds to 25% of weight carried by driving wheels.

Bendigo indicated that no difficulty was being experienced in that branch by derailments due to unbalanced weight distribution on driving and pony wheels. Their method of adjustment was, before dismantling each truck, to determine by means of straight edge and level the height between the side bearings and compression block. From long experience, this measurement was approximately 1-3/16". Where the truck was being dismantled for change of wheels, the wheel diameters were checked and the compression block adjusted to compensate for any differences between new and old wheels.

Following a general discussion, it was decided that both the lever arrangement used at Geelong and the hydraulic jack used at Ballarat were suitable for determining the particular objective, but that the hydraulic jack method was more convenient.

Bendigo was requested to endeavour to rig up a suitable hydraulic jack so that accurate measurements could be made.

During the discussion appertaining to this item, the question arose as to which of the particular ratios - 60/40, 66/33, 70/30 - was correct. It was left to the Works Division to make investigations in this regard.

I would like to offer the following comments:--

Reg. Tippett, MMTB Running Sheds Supervising Foreman, (P&MTT shed worker), now retired, was always very emphatic that the correct weight distribution was a major key to the successful operation of maximums.

"Bob", he used to say, "Make sure that the ratio of $66\frac{2}{3}$ on driving wheels and $33\frac{1}{3}$ on pony wheels is maintained.

"If you don't maintain that ratio, then derailments will occur with great regularity.

"Don't get me wrong, the ba+*?@*s will occasionally derail - but nowhere near with the frequency as trucks with incorrect ratio," he added.

The SEC Works Division confirmed the ratio from MMTB as above, that is, one third on pony wheels and two thirds on driving wheels.

Therefore James, the correct weight on pony wheels at $\frac{1}{3}$ will be 507.66 lbs or 3546.66 to nearest figure, 3547 kiloPascals.

For your information, I submit the following theory in relation to maximum traction bogies:--

"The pony wheels are the main turning force on the maximum traction cars because the theoretical turning point of the bogie is 6ins from the centre of the driving axle and 3ft 6ins from pony axle; therefore, the turning couple of the pony is greater.

When running on the straight, the top of the compression spring post fits into a 'dished' recess on a plate on the body.

When curving, the post must come out of this recess and in doing this there naturally is a greater compression on the spring, and this force should keep the pony wheels on the rail.

Any resistance of readily coming out of the recess could tend to stop the bogie turning and thus cause a derailment; therefore, it appeared essential that:--

- (a) correct weight distribution must be maintained on the driving and pony wheels;
- (b) too much coning (also known as ogee) must not be allowed on the flanges as this assists in 'climbing' the rails;
- (c) bearings must be kept in good order to eliminate excessive side movement;
- (d) body side wearing plates must be well lubricated.

If a rear bogie becomes derailed it could well be due to one of the above. This also applies to the front bogie, but mainly to the rear."

James, I hope that the above notes will assist you and The Trust.

Respectfully,

Bob