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ref. 04122c5

Graham Guile
Rotarola Wheel Ltd
3/10 Norfolk Close
TUNCURRY NSW 2428

Dear Graham,

re: **Multiple Directional Wheel**

I confirm that I have examined the drop-test rig that is used to test the physical strength of the Rotarola Multiple Directional Wheel, and to compare this strength with that of wheels manufactured by competitors.

The rig is shown in Figure 1.

Figure 1 – Drop test rig

The rig is used to drop the wheel under test from a height of one metre onto a steel plate, by activating a release handle holding the wheel and its mountings in place . The total mass of the drop assembly, incorporating the wheel under test, the steel bracket to which it is fixed, and its mountings, is 10 kg. It is estimated that the force applied to the wheel on impact is in the order of 50 kN.

The purpose of the drop test is to evaluate the strength of the wheel structure under vertical loading, since this type of loading is that to which the wheel is most commonly subjected. It is damage caused by this type of loading which is most likely to result in the malfunction of the wheel.

I also confirm that I have observed both a Rotarola Multiple Directional Wheel and a competitor's wheel tested in this rig. Figure 2 shows this wheel mounted in the rig.

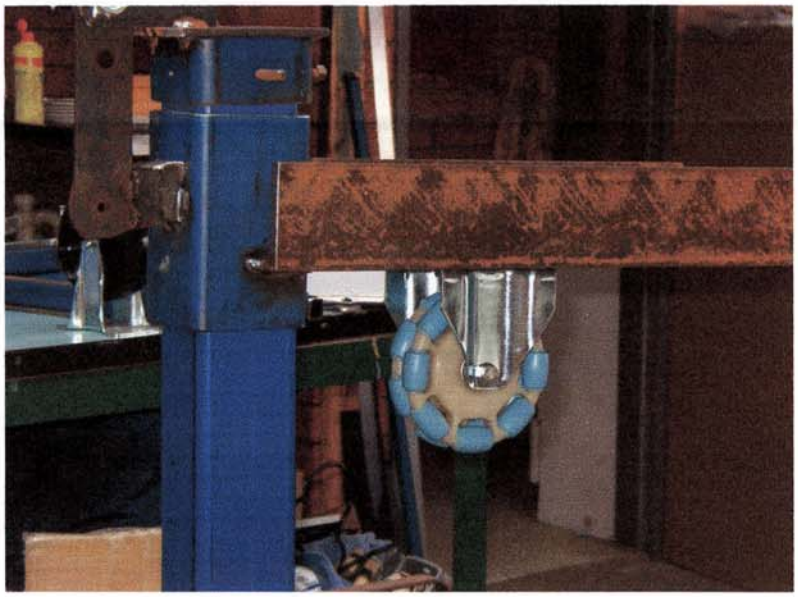

Figure 2 – Rotarola Wheel in drop-test rig

The Rotarola wheel showed no signs of distress, either visually, or in terms of its operation, after the first or second drops. The third drop resulted in some cracking in the wheel 'spokes', at the location shown in Figure 3. However, both the main axle and the rollers remained relatively free, and, if necessary, the wheel could still be used in this condition, though not indefinitely, and not under heavy loading conditions.

The competitor's wheel was a Richmond RR573 125 mm. wheel. It was noted that this wheel is not a castor-type wheel, and therefore, in normal operation, could not be moved over the surface in any other direction than parallel to its fixed mountings.

Figure 3 – Rotarola wheel after three drops
(Damaged area highlighted)

On the first test, this wheel bounced on its resilient tyre, and did not suffer any visual damage, but on rotating it, some minor bearing damage could be detected. On the second test the wheel plate failed (see Figure 4), and the wheel was rendered completely unusable.

Figure 4 – Competitor's wheel after two drops

I would anticipate for that a similar wheel with castor (i.e. a wheel mounted on a swivel which is not symmetrically above the axle), the drop test would also tend to damage both the swivel and the mounting side plates.

It is my opinion that the Rotarola Multiple Directional Wheel performed significantly better in the drop-test than its competitor.

Yours sincerely

G.C. Venn-Brown F.I.E.Aust. CPEng.
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