

## **Submission to the Coroner's Inquest into the Death of Benjamin Lawless**

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### **Key assumptions:**

1 - 'Failure to see' is the reason for a driver having hit a cyclist or having turned into the path of a cyclist in 59% of 'driver at fault' cyclists-motor vehicle crashes resulting in injury or death. ([http://www.transport.govt.nz/research/Documents/Cyclist-crash-statistics-2011-\(1\).pdf](http://www.transport.govt.nz/research/Documents/Cyclist-crash-statistics-2011-(1).pdf))

2 - There have been significant improvements in motor vehicle and bicycle light technology since 2004 (when the 'Land Transport Rule: Vehicle Lighting' was signed off). These have led to a roading environment in which it is more difficult for dim bicycle lights to be noticed.

3 - Because a large proportion of bicycle/motor vehicle crashes happen during turning manoeuvres, it is important that bicycle lights have a wide beam.

### **Potential Bicycle Light Effectiveness**

The use of a rear bicycle light reduces the risk of a rear-end collision during the hours of darkness by around 80% ('The Handbook of Road Safety Measures, second edition' by Elvik et al.)

However, as rear-end collisions make up only about 21% of night-time bicycle-motor vehicle crashes, front lights have a much greater part to play in the prevention of crashes than rear lights. In the 1977 USA study by Cross et al, motorists exiting from side streets account for around 47% of crashes and motorists turning across the path of oncoming cyclist accounts for about 22%. (source: <http://www.johnforester.com/Articles/Lights/cpsreq.htm>)

## **New Zealand Regulations**

New Zealand applies **no** bicycle lights standards to the retail sector. Any light can be sold as a 'bicycle light' in this country.

Australia has a standard for 'Lighting equipment for bicycles' (AS 3562-1990) which is based on the international standard, ISO 6742/1. The ISO standards were developed in the late 1980s and are being reviewed in 2012.

Many other developed nations have technical standards for bicycle lights (including Japan, Germany, and the UK) which help to ensure cycle shops do not sell low quality cycle lights.

The 'Land Transport Rule: Vehicle Lighting' requires that bicycles on the road have a white or yellow front light and a red rear light in between 30 minutes after sunset and 30 minutes before sunrise (or when visibility is poor). The lights must be visible from a distance of **100m** in clear conditions. There is no requirement that they be visible from any angle other than 0 degrees.

Australia has similar road user regulations but requires that the light be visible from **200m** and be used between dusk and dawn.

## **Bicycle Light Brightness Tests**

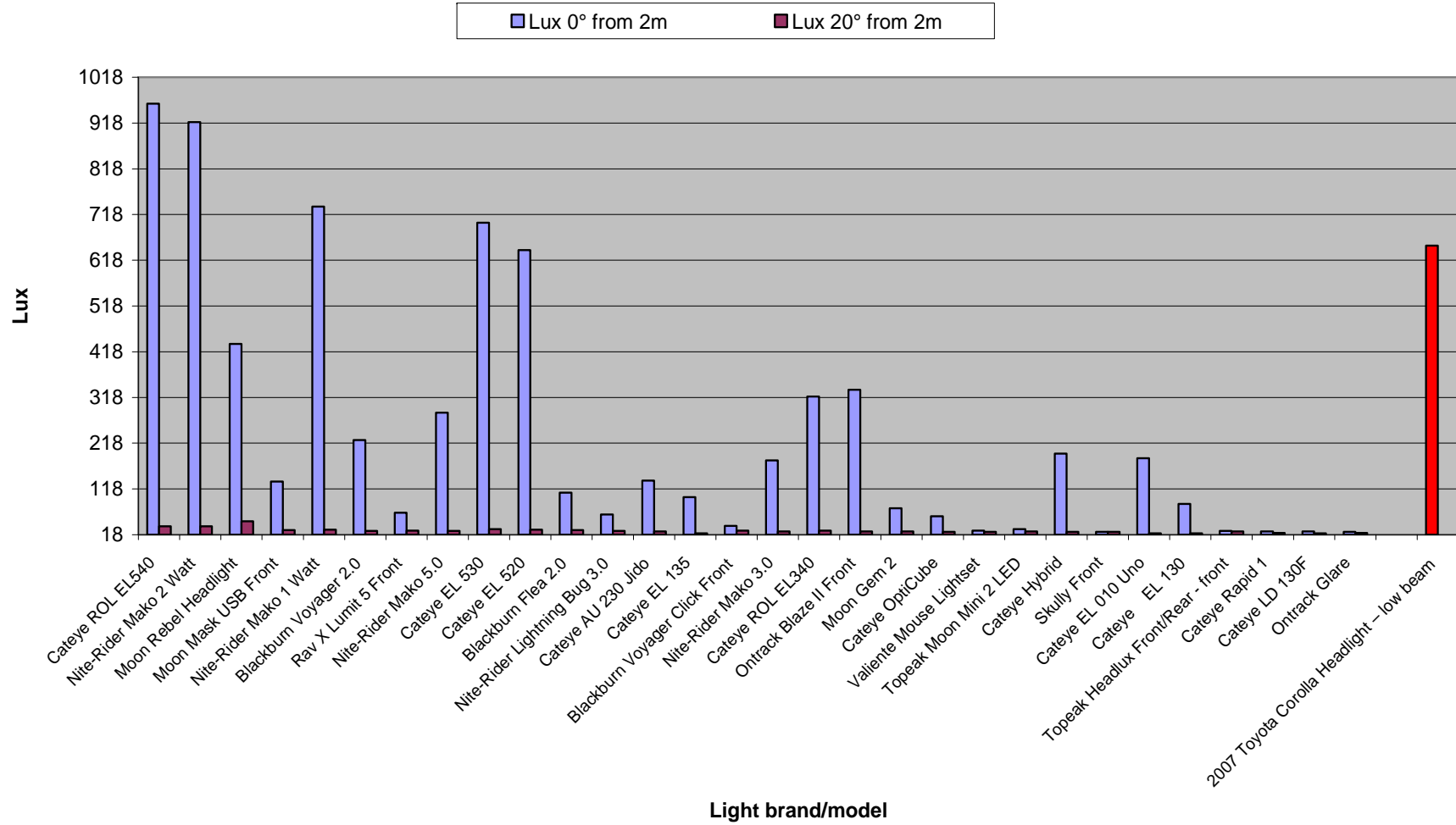
The Sustainable Transport Team at Greater Wellington Regional Council has carried out bicycle lights tests each autumn for the last three years. In 2012 they used an illuminometer to measure the illuminance of 60 lights available in bike shops in the Wellington region for less than \$100. This testing methodology uses the same units (lux) as the German bicycle lights testing.

The following graphs show the results:

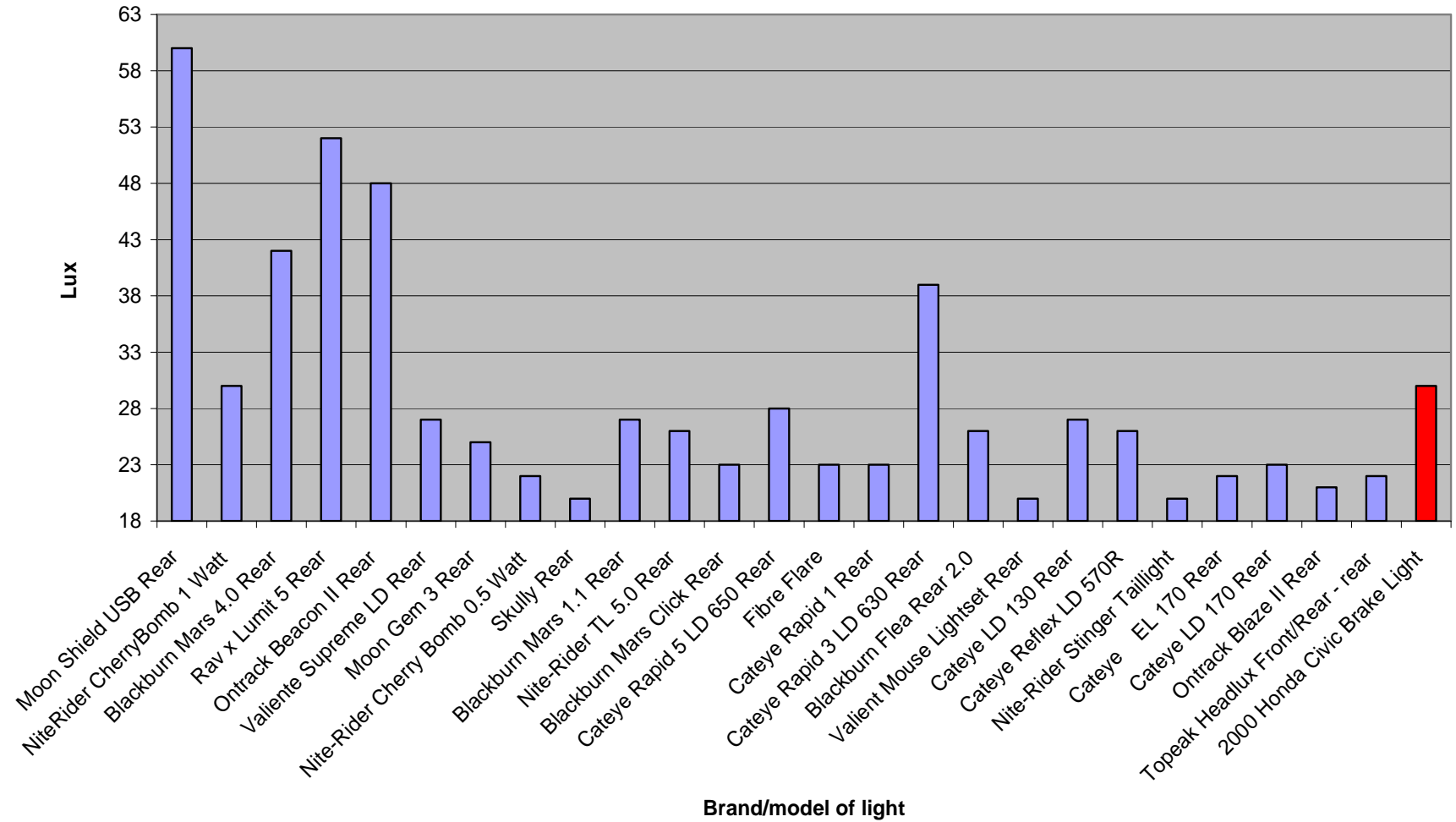
Note: Background illuminance during testing was 20-22 lux.

Full test results are also attached.

### Bicycle front light illuminance



## Rear bike light illuminance



## **Summary of Results:**

1. The light used by Benjamin Lawless (the Ontrack Glare) is the least bright light that we have tested, yet it is visible from a distance of 600m (with fresh batteries, in 5 LED flashing mode). All lights tested were legally compliant when used with fresh batteries.
2. 73% of the front lights tested have illuminance less than 50% of a modern car headlight (on low beam). This is with fresh batteries. Illuminance drops away sharply once the batteries are halfway through their life (or charge). Half of the lights tested would fail the Japanese bicycle lights standards.
3. 44% of the rear lights tested have illuminance less than 50% of a modern car brake light. This is also with fresh batteries.
4. Many of the brightest front lights had very narrowly focused beams that shone almost no light sideways at angles of 20, 40 or 80 degrees (in the direction of vehicles approaching from side streets or driveways, or near the end of a turning manoeuvre such as that inflicted on Benjamin Lawless).
5. There is huge variability in the illuminance of bike lights available for less than \$100. The five brightest front lights all registered over 600 lux, while the 5 dimmest front lights registered less than 27 lux (measured from a distance of 2 m, with ambient light of 20-22 lux)

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## **Recommendations:**

- 1 – That New Zealand adopts or develops bicycle light standards to be applied to all bicycle lights sold in New Zealand.
- 2 – That a minimum illuminance at 0, 20, and 45 degrees be established for all front and rear bicycle lights sold in New Zealand. Lights must be capable of meeting these minimum standards in all steady and flashing modes.
- 4 – That the use of bicycle lights be mandatory between dawn and dusk (and at all times and places where visibility is limited) rather than 30 minutes after dusk to 30 minutes before dawn.
- 5 – That regulations be amended so that the Police test for bicycle light compliance is that lights are visible from 200m (rather than 100m).

## References

Cross, Kenneth D. & Gary Fisher; A Study of Bicycle/Motor-Vehicle Accidents: Identification of Problem Types and Countermeasure Approaches; National Highway Traffic Safety Administration, Sept. 1977

[http://www.transport.govt.nz/research/Documents/Cyclist-crash-statistics-2011-\(1\).pdf](http://www.transport.govt.nz/research/Documents/Cyclist-crash-statistics-2011-(1).pdf)

<http://www.gw.govt.nz/be-safe-be-seen>