

Head Protection for Wheeled Recreational Device Riders: Finding the Right Standard

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Abstract

To better regulate the wearing of helmets by riders of wheeled recreational devices in NSW, Transport for NSW commissioned a study to identify which local or international standards best met the head-protection needs of riders of wheeled recreational devices (WRDs). The study included a review of head injury risks based on a literature review and analysis of WRD-related fatalities recorded in the National Coronial Information System Database. Local and international standards were compared to identify which best met the head-protection needs of WRD riders. The local standards AS/NZS 2063 were found to be the most suitable for protecting WRD riders.

Background

Bicycle helmet use is mandatory in NSW as helmets have been proven to reduce the risk of serious injury, including traumatic brain injury, following a crash or fall. Only bicycle helmets complying with the standard AS/NZS 2063 may be worn.

Riders of wheeled recreational devices (WRDs), such as skateboards or roller blades, are permitted to ride without a helmet or with a helmet complying to a non-Australian standard, available for sale in Australia. Without guidance on the most appropriate helmet standard, consumers are at risk of using helmets that do not provide adequate protection.

To identify whether there is an existing helmet standard suitable for riders of WRDs, Transport for NSW commissioned research to identify whether there is a current standard suitable to meet the principal requirements for WRD helmet performance, and to assess the performance of helmets meeting current standards.

Method

A literature review relating to WRD crashes and injuries was conducted. The National Coronial Information System database was searched for activity level one category case between 2000 and 2016, and then searched on a case-by-case basis to identify those fatal crashes relating to WRD use. From this research, the head injury risks of WRD users were identified.

From these findings, a list of head protection criteria was developed. Performance testing requirements of Australian, European and American helmet standards that may be appropriate for WRD riders were assessed against these criteria. A sample of helmets meeting local and regional standards were tested to assess impact, retention strength and stability based on test methods described in AS/NZS 2063.

Results

The study, including the results from testing of helmet samples, found that EN1078, ASTM F1447 and AS/NZS 2063 best met the predetermined head protection criteria. AS/NZS 2063 was preferred over the other two as the requirements were more robust, including testing of a larger sample size, consideration of internal and external projections, and ventilation.

A preference for this standard also simplifies usage for younger riders and their parents who may use both WRDs and bicycles, and gives TfNSW the ability to oversee changes to the standard, which is not possible with international standards.

The literature review identified that an ideal helmet would provide additional protection across the occiput (lower rear of the head). However, testing showed that the additional level of protection is marginal, so the potential benefits of regulating this requirement do not justify the financial imposition and likely confusion of different helmet standards for bicycles and WRDs.

To allow for multiple low-impact falls when learning to ride or developing skills, an ideal helmet should also be able to protect against multiple low-severity impacts over a 12-month period. However, only one standard currently allows for repeated impacts (ASTM 1492-15). Testing of helmets complying to this standard showed that helmets did not provide a safe level of head protection in subsequent impacts. Therefore, it is not reasonable to impose this requirement at this time.

Conclusions

The Australian bicycle helmet standard AS/NZS 2063 is most suitable for protecting users of WRDs, providing the most robust protection and reducing the risk of consumers using the wrong helmet for their desired activity.

References

McIntosh, A., Patton, D., 2016. Evaluation of standard requirements for helmets for wheeled recreational devices. Conducted for Transport for NSW.