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Motorcyclist perception response time in stopping sight distance situations

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Abstract

One of the most effective engineering measures is the provision of an exclusive motorcycle lane that separates motorcycles from other mixed traffic to reduce traffic congestion and motorcycle crashes. Even though the existing exclusive motorcycle lanes in Malaysia reduced the incidents of motorcycle crashes with other vehicles, the design of this special motorcycle lane was based on a cross reference between a bicycle track and a highway. Thus, a suitable design guide is yet to be developed for the geometrical design of a proper and safer exclusive motorcycle lane. Safe stopping sight distance (SSD) has been recognized as a criterion for road design and should be taken into account. Motorcyclist perception response time (PRT) is the time from detection object until the rider reduces motorcycle speed in braking action is an essential component of motorcycle SSD. Two road experiments were conducted to obtain empirical values of motorcycle PRT to expected and unexpected objects. In the expected condition, 89 motorcyclists applied brake as quickly as possible following activation of a light beside the road. In the unexpected condition, 16 riders responded by braking in response to an obstacle that appeared suddenly in their lane. The mean PRT to expected and unexpected object is 0.71 s and 1.25 s respectively. The 85th percentile PRT to unexpected object is 2.12 s. This study found that most riders are capable of responding to an unexpected object along the roadway in 2.5 s or less. Therefore, PRT of 2.5 s is an appropriate value for motorcycle lane geometric design.

Highlights

► Field experiments on motorcyclist perception-response time were conducted. ► Results found a mean value of 0.71 sec (expected) and 1.25 sec (unexpected). ► Most riders are capable of responding within 2.5 sec or less to unexpected object. ► For geometric design of motorcycle lanes, a value of 2.5 sec is recommended.

Keywords

Exclusive motorcycle lane; Perception response time; Stopping sight distance; Motorcyclist behavior; Motorcycle crashes

Figures and tables from this article:

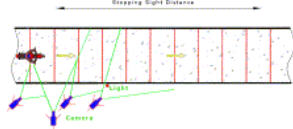


Fig. 1. The station for measuring motorcyclist PRT in expected object.

Figure options

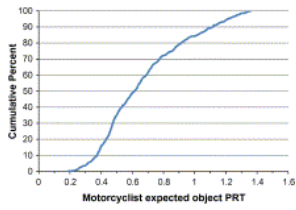


Fig. 2. Motorcyclist expected PRT distributions.

Figure options



Fig. 3. The yellow fabric barricade suddenly appeared across the experimental route.

Figure options

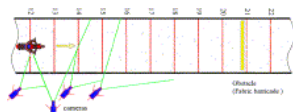


Fig. 4. The station for measuring unexpected object motorcyclist PRT.

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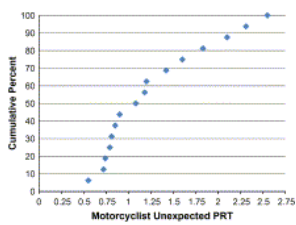


Fig. 5. Results of unexpected object PRT for motorcycle riders.

Figure options

Table 1. Summary of studies on passenger car driver PRT in expected object.



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Table 2. Summary of studies on passenger car driver PRT in unexpected object.



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