

Enhanced Maintenance Strategies for Popular Motorcycle Routes

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Abstract

Motorcycles are more susceptible to crashes than other vehicles because of road surface issues. The road risk action categories and road maintenance categories VicRoads uses to determine the timing of remedial actions were based on traffic volumes and the road's function. While heavy vehicle use was factored into this assessment, motorcycles were not.

If, instead of cars or heavy vehicles, motorcycles become the designated 'maintenance design vehicle', then road repairs, maintenance and reinstatement works need to be carried out in a slightly different manner.

Using the Great Alpine Road as an example, this paper specifies enhanced maintenance strategies that are suitable for motorcyclists.

Background

Motorcycles and scooters are susceptible to crashes associated with problems at the road surface (IHIE, 2010 & CROW, 2003). Especially so where the rider may be braking and/or turning, such as at an intersection or on a curve in the road (MAIDS, 2009). The road needs to have uniform and predictable surface friction (skid resistance). Any change in surface that may reduce surface friction should be avoided, and where this is not possible it should be clearly signed and made visible during all weather conditions and at night.

The road risk action categories, A to F, that are used in Victoria to determine the timing of remedial action to road surfaces are shown in Table 1. Road maintenance categories (using numerical values of 1 to 6 in Victoria) are commonly aligned with road classifications that reflect the strategic importance of the route and total traffic volumes. This reflects the total risk exposure of all road users so that the standards are highest on the busiest, most important roads. In urban areas the current approach is generally appropriate for motorcyclists. However, many popular recreational motorcycle routes, such as the Great Alpine Road, are lightly trafficked rural routes in hilly terrain with low strategic importance. They attract motorcyclists because they have low volumes and the terrain provides an enjoyable riding experience that includes the 'thrill' (higher risk riding).

Such routes are often in less frequent road maintenance categories and on higher speed roads (usually with a default 100km/h speed limit). As a consequence, there is a higher probability of encountering a pavement defect on these routes and a potentially higher probability of a motorcycle casualty crash as a consequence of the defect, road alignment, travel speeds and roadside conditions. This higher exposure to defects compounds the higher risk that such defects present to motorcyclists.

Available traffic volume data do not provide a comprehensive picture of motorcycle volumes on all arterial roads or enable the identification of high volume motorcycle routes. However, available motorcycle volume data and motorcycle trauma rates provide an appropriate means to identify roads for more frequent maintenance activities.

Table 1 Road Risk Action Response

Response Code	Control Mechanism	Response Time
A	Inspect and rectify, if feasible, or provide appropriate warning.	Within 4 hours of inspection or notification
B		Within 24 hours of inspection or notification
C		Within one week of inspection or notification
D		Within one month of inspection or notification
E		Within 3 months of inspection or notification
F		Within 6 months of inspection or notification

Results and Conclusions

Following a road safety audit of the Great Alpine Road conducted by an experienced motorcycle rider, it was determined that the standard VicRoads Hazard Response matrix needs amendment when motorcycles are the ‘road maintenance design vehicle’.

Figure 1 and Table 2 amend the standard VicRoads Hazard Response matrix that is used to determine maintenance action. Thus the Great Alpine Road is presently considered to be in road maintenance category three (RMC = 3) on the basis of its traffic volumes, which means that daytime inspections are undertaken weekly, and night-time inspections every six months. We have indicated, in red, the amended hazard definitions that are needed for motorcyclists (on the basis of the expert judgement of experienced riders) and indicated that for motorcyclists the pothole hazards and the deformation hazards are sufficiently serious that the RMC should be reduced to 2 (RMC = 2) which means that daytime inspections should be undertaken twice per week.

References

- CROW (2003). Handboek Gemotoriseerde Tweewielers (Powered two wheelers handbook)
Retrieved from:
http://www.crow.nl/publicaties/handboek-gemotoriseerde-tweewielers-__-een-handrei
- MAIDS (2009). Motorcycle Accident In-Depth Study: In-depth investigations of accidents involving powered two wheelers: Final report 1.2. ACEM - Association des Constructeurs Européens de Motocycle (the European Association of Motorcycle Manufacturers), Brussels.
Retrieved from: <http://www.maids-study.eu/>
- IHIE – Institute of Highway Incorporated Engineers (2010): Guidelines for motorcycling.
Retrieved from: <http://www.motorcycleguidelines.org.uk/>

Table 2 VicRoads Hazard Response matrix amended (in red) for motorcycles as the ‘maintenance design vehicle’. Red rectangles denote recommendations for the Great Alpine Road

Description Of Hazard	RMC	1	2	3	4	5	6
Pavements							
Obstructions and Substances in Traffic Lanes							
Materials fallen from vehicles, dead animals, wet clay and other slippery substances, hazardous materials, accumulation of dirt or granular materials on the traffic lane of sealed roads	A	A	B	B	C	F	
Ponding of water >300mm deep, fallen trees, oil spills, stray livestock	A	A	A	B	B	F	
Pavement or Surface Defects							
Potholes in traffic lane of a sealed pavement greater than 200mm in diameter and greater than 75mm deep, or greater than 100mm in diameter and 50mm deep on a curve or on the approach* to the curve	A	B	C	C	D	F	
Where assessment in accordance with the skid resistance policy indicates remediation is required.	C	D	D	D	D	F	
Deformations > 75mm under a 3 m straight edge, or in the sealed traffic lane on a curve (or on the approach* to the curve) greater than 50mm deep under a 3 m straight edge.	A	B	C	C	D	F	
Edge drops onto unsealed shoulder >100mm	n/a	B	C	C	D	F	
Drainage							
Damaged or missing drainage pit lids, surrounds or grates in pedestrian areas or traffic lanes	A	B	B	D	D	F	

*the approach to a curve is the area where a motorcyclist is braking and then begins to lean before the curve. Depending on the approach speed, this area can be up to 100m in advance of the curve. See Figure 1 below.

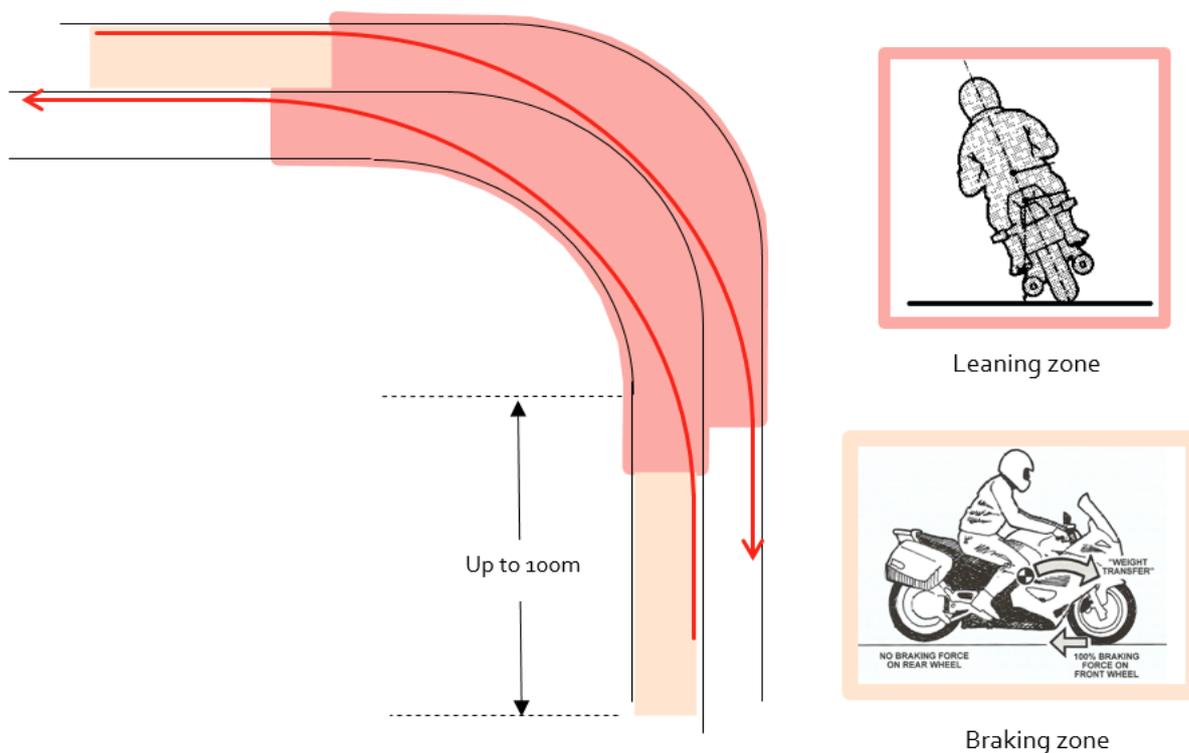


Figure 1. Typical motor cycle ride paths around curves. The shaded light pink areas indicate the extra approach distance for motorcyclists that needs to be kept free of road defects