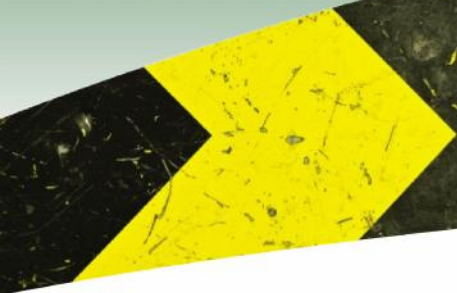


# iRAP Road Attribute Risk Factors

## Speed Management/ Traffic Calming



This factsheet describes the road attribute risk factors used in the iRAP methodology for Speed Management/Traffic Calming. Speed Management/Traffic Calming records the presence of facilities judged to have the ability to reduce the operating speed 10km/h below the speed limit (on roads adjacent to or adjoining the traffic-calmed sections).

### About risk factors

Risk factors, sometimes called crash modification factors (CMF), are used in the iRAP Star Rating methodology to relate road attributes and crash rates. Risk factors (or CMF) are described by the Crash Modification Factor Clearing House as follows:

*A crash modification factor (CMF) is a multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site.*

*For example, an intersection is experiencing 100 angle crashes and 500 rear-end crashes per year. If you apply a countermeasure that has a CMF of 0.80 for angle crashes, then you can expect to see 80 angle crashes per year following the implementation of the countermeasure ( $100 \times 0.80 = 80$ ). If the same countermeasure also has a CMF of 1.10 for rear-end crashes, then you would also expect to also see 550 rear-end crashes per year following the countermeasure ( $500 \times 1.10 = 550$ ).*

### Related documents

This factsheet should be read in conjunction with:

- *Star Rating Roads for Safety: The iRAP Methodology.*
- *Safer Roads Investment Plans: The iRAP Methodology.*
- *Star Rating and Investment Plan Coding Manual.*
- *Road Safety Toolkit (<http://toolkit.irap.org>).*

### Risk factors

Risk factors by road attribute category, road user type and crash type

Speed management/traffic calming	Vehicle occupants and motorcyclists at intersections	Pedestrians walking along and crossing the road	Bicyclists cycling along the road and at intersections
Not present	1.25	1.25	1.25
Present	1.00	1.00	1.00

### Selection of risk factors

The model shows a reduction based upon the change of speed and assuming a 10km/h reduction. A risk factor of

1.25 is used and this guides the establishment of the speed-risk curves.

The table below is produced by Turner et al. (2010) who settle on a reduction estimate of 20% for the Australian context. Elvik and Vaa (2004) reviewed research showing reductions of 10-30%. Other work by Elvik and Vaa (2004) cited on the CMF Clearinghouse website shows benefits of 25-33%.

Benefits for all road users are assumed to be similar. The benefits may be greater, especially in the rural situation. It depends greatly on the nature of the measure. There may be scope for refinement here but we recognise that our claimed benefits are at the lower end of the spectrum although not completely out of step with some of the literature.

### Summary of research (Turner et al. 2010) on speed management and traffic calming<sup>1</sup>

Study	Year	Country	Environment	Reduction
Slop and Catshoek	1995	Europe	Non motorway urban roads	In small towns and villages aimed at reducing speeds 0-35% crash reduction
Webster and Mackie	1996	UK	32.2 km/h speed zones using thresholds, narrowings and/or speed humps	Each traffic calming zone 2.5 km, average spacing of calming devices was 85 m 61% reduction in all crashes (21% of this reduction from speed reductions)
Wouters	1998	Europe	Not specified	15-80% (average 50%) crash reduction
Wheeler and Taylor	2000	UK	Village calming schemes	18% crash reduction
Highways	2000	UK	Hampshire	49% crash reduction at one site and 100% crash reduction at another
Ewing	1999	USA	Summary of 43 international studies	8%-100% crash reduction
Elvik	2000	International	Analysis of 33 studies - urban	15% crash reduction (25% residential streets and 10% on main roads) (In Australia best crash reduction estimate is 23% reduction)
Gorell and Tootill	2001	UK	Not specified	31% crash reduction

## References

The following publications are the primary references used in the selection of the iRAP road attribute risk factors. A complete list of citations is available in: iRAP Road Attribute Risk Factors: Full Reference List.

Elvik, R, Høy, A, Vaa, T, and Sørensen, M. (2009). The Handbook of Road Safety Measures, Second Edition. Emerald Group Publishing Limited. ISBN 978-1-84855-250-0.

Lynam, D (2012). Development of Risk Models for the Road Assessment Programme. RAP504.12 and TRL Report CPR1293, Published by iRAP and TRL and available at: <http://www.trl.co.uk> and at <http://www.irap.org>.

Mak, K. and Sicking, D. (2003). Roadside Safety Analysis Program – Engineer’s Manual. Transportation Research Board (TRB) National Cooperative Highway Research Program (NCHRP) Report 492. ISBN 0-309-06812-6.

<sup>1</sup> Traffic calming differs by location and country. Some examples are provided at: [http://www.walkinginfo.org/pedsafe/pedsafe\\_curb1.cfm?CM\\_NUM=-4](http://www.walkinginfo.org/pedsafe/pedsafe_curb1.cfm?CM_NUM=-4)

- Turner, B. Steinmetz, L., Lim, A. and Walsh, K. (2012). Effectiveness of Road Safety Engineering Treatments. AP-R422-12. Austroads Project No: ST1571.
- Turner, B., Affum, J., Tziotis, M. and Jurewicz, C. (2009). Review of iRAP Risk Parameters. ARRB Group Contract Report for iRAP.
- Turner, B., Imberger, K., Roper, P., Pyta, V. and McLean, J. (2010). Road Safety Engineering Risk Assessment Part 6: Crash Reduction Factors. Austroads AP-T151/10. ISBN 978-1-921709-11-1.
- University of North Carolina Highway Safety Research Center and U.S. Department of Transportation Federal Highway Administration (2013). Crash Modification Factors Clearing House: <http://www.cmfclearinghouse.org/>.

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