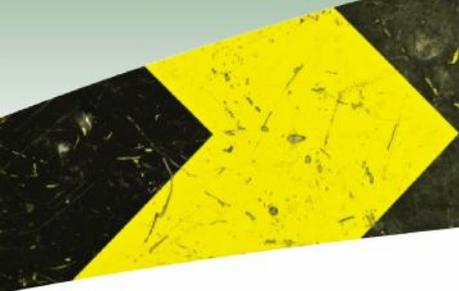# iRAP Road Attribute Risk Factors
Pedestrian Crossing Quality

This factsheet describes the road attribute risk factors used in the iRAP methodology for Pedestrian Crossing Quality. Pedestrian Crossing Quality records how well the crossing can be seen by drivers or if there are warning signs.

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 x 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 x 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

Pedestrian crossing quality	Pedestrian crossing
Adequate	1.0
Poor	1.5

Selection of risk factors

In their review of iRAP risk factors, Turner et al (2009) refers readers to work on delineation risk and comment that the Pedestrian Crossing Quality is similar to the attribute Quality of Curve in that it relates to the extent to which signs and markings help the driver see the feature and make the necessary judgements.

iRAP

The risk factor of 1.5 has been selected (rather than the lower values of 1.2-1.4 in earlier versions of the iRAP models) because it is recognised that a poor quality pedestrian crossing is likely to have a larger and more direct effect on safety.

Background research and model development

There is no directly relevant research on this risk factor although it is to be expected that clearly visible and designed road attributes will reduce risk. Lynam (2010) explained the research background to the values used in earlier versions of the iRAP model; it was an aggregate measure (which coders need to judge) which includes advance road signing warning of the crossing, roadside indicators at the crossing itself, and intensity of road marking (including texture differences) on the crossing. In the absence of robust research evidence an initial assumption was that "good" signing and marking might reduce risk at each crossing by 20% compared with "poor".

Turner et al (2009) suggested that where a pedestrian crossing is difficult to see, the situation is as bad as not having a facility, or that it is even worse for individuals in some instances because it encourages a false sense of security (i.e. pedestrians expecting vehicles to stop on a faded zebra crossing might present a higher risk than having no facility at all).

Because poor quality pedestrian crossings may actually focus risk at crossing points, in some countries in which iRAP has been active it has been agreed that their presence should not be rated as a benefit and that the section should be rated as though the crossing were not present. The availability of improved exposure data may enable such risk to be quantified more accurately in the future.

Risk factors in earlier versions of the iRAP model

Pedestrian crossing quality	Risk Factors
Adequate	1
Poor	1.25

Primary 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, Hoye A, Vaa, T, and Sorensen, M. (2009). The Handbook of Road Safety Measures, Second Edition (2009) 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.

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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