A proactive approach to identifying high risk road corridors for pedestrians in Auckland, New Zealand

Dale Harris[a], Dave Smith[a], Irene Tse[b]

[a]Abley Limited, [b]Auckland Transport

Abstract

Auckland Transport commissioned the development of network-wide proactive risk model to prioritise pedestrian crossing improvements across Auckland.

The location of fatal or serious (FS) pedestrian crashes were compared to the location of pedestrian generators, community facilities and road/roadside attributes. Strong relationships were found between FS injury crashes and three road/roadside attributes.

A model was developed to identify roads which were high or moderate risk to pedestrians, with 2.3% of the road network prioritised as high-risk accounting for 23.1% of FS pedestrian crashes. Auckland Transport can now apply this model to prioritise pedestrian crossing improvements across the Region.

Background

In order to target locations that present a greater risk of fatal or serious (FS) injury to pedestrians, Auckland Transport commissioned the development of a network-wide proactive risk model for identifying pedestrian risk. This would then assist them to prioritise urban pedestrian crossing improvements across Auckland.

Methodology

The locations of FS pedestrian crashes between 2013 and 2017 were analysed against the location of fourteen pedestrian generators, including public transport hubs and stops and community facilities. The distance from each crash to each facility was calculated as the crow flies using a geospatial 'near' analysis and compared to the location of FS pedestrian crashes.

The locations of FS pedestrian crashes were also compared to these road attributes from the Infrastructure Risk Rating (IRR) dataset (Zia et al., 2016):

- adjacent land use
- road stereotype
- traffic volume
- IRR risk band
- speed limit, and
- One Network Road Classification (ONRC).

Results

All the pedestrian generators analysed showed either no relationship, or a weak statistical relationship with the location of FS pedestrian crashes at a network-wide level, however it was noted that many of these locations already have safe pedestrian crossing facilities installed. The analysis concluded that the location of these generators demonstrated demand for crossing movements but did not correlate with increased risk to pedestrians.

The following road attributes had a moderate to strong relationship with FS pedestrian crash risk:

- Adjacent land use (from IRR)
- ONRC
- IRR risk band

Crash rates were calculated for these attributes (and combinations thereof) for the Auckland region, (Figure 1). Risk thresholds were also created to prioritise roads with relatively high rates of FS pedestrian crashes (Table 1).

Table 1. Risk/prioritisation thresholds

	Pedestrian crash rate (FS crashes/km/5yr)
High	≥ 0.5
Moderate	≥ 0.2 and < 0.5
Low	< 0.2

The factors that indicated a high or moderate risk to pedestrians were identified from these results.

High risk roads were identified where:

- land use is commercial strip shopping, or
- land use is commercial big box/industrial and IRR is medium-high or high, or
- ONRC is regional strategic, IRR is medium-high or high, and the land use is urban, or
- ONRC is arterial, IRR is high and land use is urban.

Moderate risk roads were identified where:

- land use is commercial big box/industrial and IRR is medium, or
- ONRC is regional strategic, IRR is low-medium or medium, and land use is urban, or
- ONRC is arterial, IRR is medium or medium-high and land use is urban.

Roads classified as high risk totaled 181.2km (2.3% of the Auckland network), accounting for 134 (23.1%) of FS pedestrian crashes between 2013-2017.

Roads classified as moderate risk totaled 457.5km (5.7% of the Auckland network), accounting for 136 (23.4%) of FS pedestrian crashes between 2013-2017.

Conclusion

The pedestrian risk and prioritisation model developed from this analysis will assist Auckland Transport to prioritise pedestrian crossing improvements across the Auckland Region. The model also represents a proactive approach to identifying high risk pedestrian corridors.

Reference

Zia, H., Durdin, P, Harris, D. (2016). An automated process of identifying high-risk roads for speed management intervention. Proceedings of the 2016 Australasian Road Safety Conference, 6-8 September, Canberra, Australia.

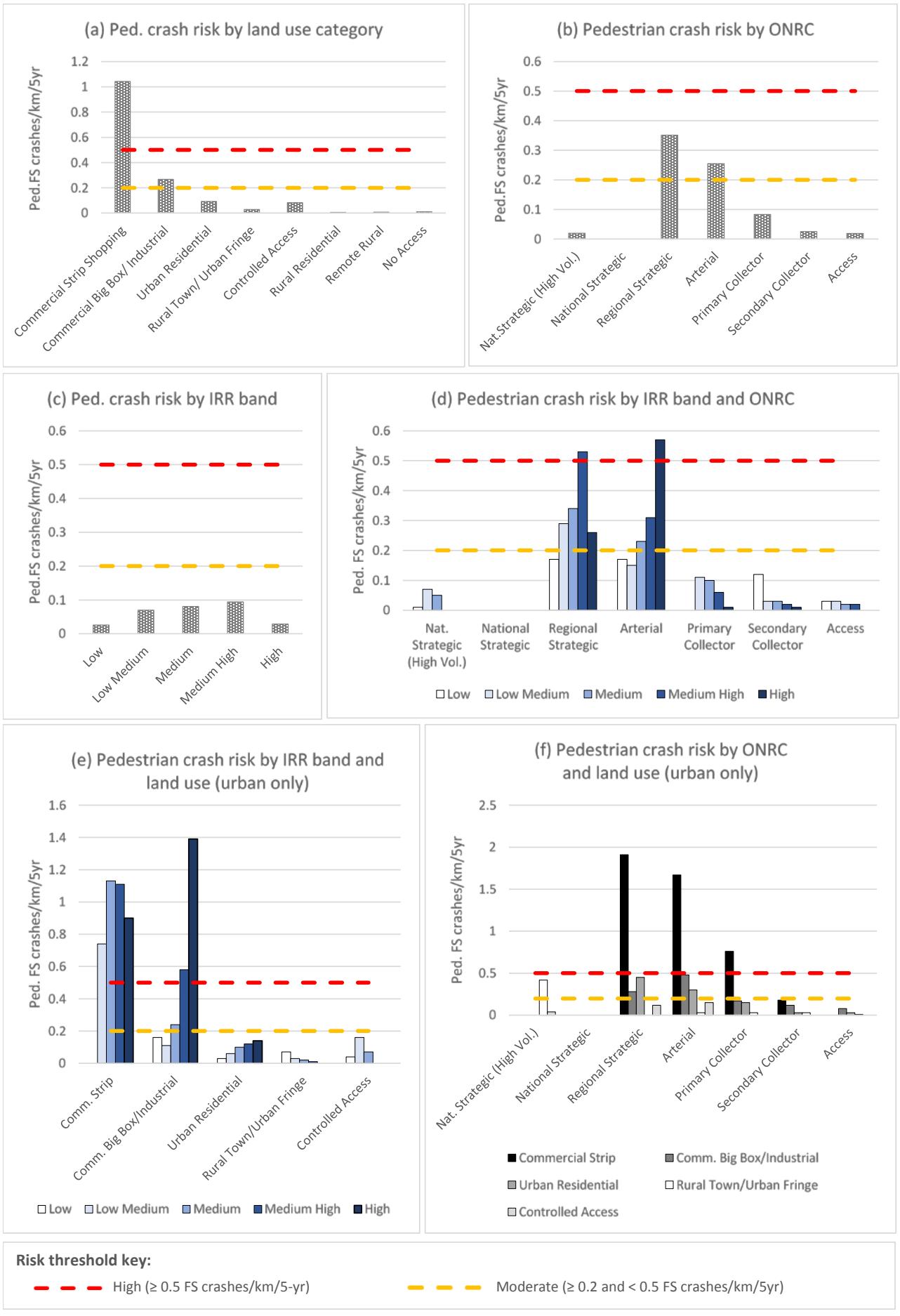

Figure 1. Graphs displaying pedestrian crash rates against IRR band, land use and ONRC