

Application of MRWA RAP and ANRAM for Assessing Upgrades on Great Eastern Highway

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Abstract

A methodology has been previously developed to provide the required data for the iRAP Star Rating model using data sourced from corporate inventory and condition information supplemented by other data sources. This is referred to as MRWA RAP to distinguish from data collected in accordance with iRAP protocols which provides data for AusRAP. This same information is used by the Australian National Risk Assessment Model (ANRAM). This paper describes the work done on updating MRWA RAP as well as the application of the ANRAM model to assess proposed treatments on Great Eastern Highway to improve road safety.

Background

As documented in Karpinski (2014) a methodology had been developed to assemble the required data for the iRAP Star Rating model using data sourced from corporate inventory and condition information supplemented by other data sources.

This data is referred to as MRWA RAP to avoid confusion between it and AusRAP. The focus of MRWA RAP to date has been to produce star ratings for vehicle occupants and to provide the necessary input data for the Australian National Risk Assessment Model (ANRAM).

As the data used by MRWA RAP and AusRAP is different the results of the star rating using both data sets will be different. Comparison of the differences and of both the inputs into the star rating model as well as the outputs can be found in Karpinski (2014).

An assessment of proposed interim upgrades to Great Eastern Highway from the intersection of Great Southern Highway to Mitchell Avenue intersection at Northam, a distance of approximately 40 km was made using Star Ratings and ANRAM.

Method

The original MRWA RAP data set was created in 2014 and in order to be able to produce star rating of the highway as it currently is as well as being able to use the ANRAM model it had to be updated.

This was done by making comparisons between the inventory and condition as currently recorded versus the original data sets used. To simplify the process iRAP codes were assigned to the data.

For some attributes there is a range of values e.g. for paved shoulder width a rating of 3 which corresponds to Narrow applies to a shoulder $\geq 0\text{m}$ to $< 1.0\text{m}$. If between the years the paved shoulder had been increased in width but was still within the range then the data was still current. Comparisons were done either using Excel macros or by using Beyond Compare. Key data sets were checked for changes.

Additional information such intersection volumes was also used to update the data, locations of driveways were checked against previous proxy methods and different geometry data sets compared.

Once the base data had been updated it was loaded into ANRAM and used to set the basecase, the highway as it currently is.

The following treatments were then assessed:

- Introduction of 1 m central median – separating one lane in both directions
- Extension of existing overtaking lanes – not only to increase their length but to improve their start and end locations as a number had poor sight distances.
- Addition of overtaking lanes
- Intersection upgrades – provision of left and right turn pockets. Note that ANRAM will only assess right turn pockets.
- Provision of roadside verge barriers at targeted locations.
- Clearing at specific locations.

Treatments were assessed individually by the “backdoor” approach in which the codes in the raw data were modified to reflect the treatment being applied. For example as part of the introduction of the 1 m central median the median type was changed to wide centerline, centreline rumble strips were set to being present, paved shoulder widths set to medium (as their width would be 1.5 m) etc.

Based on the number of predicted crashes compared to the baseline crash modification factors were determined which was then used to calculate the number of crashes saved and used as the basis of an economic assessment. This was used to prioritise a program of treatments for an interim upgrade of the highway.

Results and Conclusions

The results of the ANRAM modelling indicates that the proposed treatments will make significant safety improvements to this section of Great Eastern Highway. The star rating of the highway will also be improved.

If iRAP data is to be generated from other methods other than from video there needs to be protocols developed to provide guidance on governance associated with the data (iRAP data has requirement for 10% to be checked), rules or guidance on how the data can be converted into a rating e.g. using condition data such as roughness, rutting how does this translate into iRAP road condition rating?

References

Karpinski, Jan (2014) 26th ARRB Conference, Main Roads trial of Australian National Risk Assessment Model (ANRAM)

iRAP (2014) Star Rating and Investment Plan Coding Manual Drive on the left edition - June 2014 (available at http://downloads.irap.org/docs/RAP-SR-2-2_Star_Rating_coding_manual.pdf).

iRAPa (2014) data load specification <http://vida.irap.org/en-gb/home>