AMQ INTERNATIONAL
STRATEGIC ASSET MANAGEMENT

ROADS: Renewal and Safety

Using Star Ratings

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For an explanation of WHY these roads are rated the way they are, turn to page 8

Our case study this week is **Managing the Renewal Gap with Star Ratings.**

It is an edited version of a paper by Jon Aujard, Assets and Planning Executive Manager at the Shire of Campaspe, Victoria, to the IPWEA conference, Melbourne, 2009 entitled "Service Levels for Local Roads - Shire of Campaspe". More detail is available in the paper itself which is available from Jon at j.aujard@campaspe.vic.gov.au Reading is recommended. It is a model of how a case study should be presented.

Also in this issue:

What and Who are you Rating For? In Australia it has become commonplace to rate roads for their use by motor vehicles (cars, trucks, buses). This focus has influenced design of roads as well as operational and maintenance concerns. But how would roads rate if we were to look at other road users - bicyclists, motorcyclists and pedestrians?

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Editorial: A passionate encounter!

A senior member of the British Institute of Civil Engineers and I engaged in a brief conversation at the IPWEA Conference in Melbourne.

He was telling me about how a UK council, financially unable to sustain its entire network, had chosen to deliberately downgrade one of its roads.

“Sounds eminently sensible to me”, I replied, “as long as they have given the matter serious consideration and taken into account community needs.”

“Sensible!” he exploded. “It’s appalling! We will sue!”

Faced with such a passionate response I could but reply “Well, I don’t know the situation in the council you are talking about but I do know that downgrading or even closing some roads may be the answer for some Australian councils where community needs have changed.”

“You are wrong!” he shouted. “Wrong! Wrong! Wrong! Once a road always a road!”

Had the fellow not then dashed off to the next conference session I probably would have provoked even more anger had I said what I wanted to say - “And once a field, always a field’?

Footnote:

In the UK, the law is on his side. Councils have to apply to a national authority to get permission to change the alignment or grade of road - and permission is not often granted. In Australia, we are fortunate that the local communities that have to fund their local road network can actually determine the configuration and standard of that network.

Even so, unless they understand the full situation of costs and benefits, that is what they must forgo in other areas by spending money on roads (and other existing assets for that matter), communities can be passionate to retain what they currently have - regardless.

Creating a rational atmosphere in which changes to the road network can be examined by the community is thus essential. In our case study this week, Campaspe Shire uses star ratings to communicate with its community and develop such a rational discussion.

As always, consider and enjoy! Penny

Managing the Renewal Gap with Star Ratings.

Jon Ajuard, Assets and Planning Executive Manager
Shire of Campaspe, Victoria,
(from a paper to the IPWEA Conference, Melbourne, 2009)

Context:

As with many councils in Australia, Campaspe Shire faces a 'renewal gap' - the cost to renew all of its existing and ageing assets is more than it can afford. Most of this renewal gap relates to roads, so it has, therefore, to carefully examine the cost (operational/maintenance and depreciation/renewal), the extent (how many roads), and the standard of its road network. Since the purpose of the road asset is to support the service needs of the community, this means that the council must understand community needs - and the community must understand the costs of any choice they may make. *Understanding is a 2-way street.*

What Campaspe Shire Council Did:

The Shire Council decided to review its rural road network in response to community concerns about service levels (and Council's concern about its ability to fund roads in a sustainable manner). The objective of the project was to set up a system to define the level of service provided by various roads, determine where roads delivering various levels of service should be located and ensure that the road network is financially sustainable. All this needed to be undertaken through discussion with the community. This required a language that would enable council to communicate with the community on service levels. For example, with a road, a service level might describe what length of road, at what level of smoothness, in what area, during what season of the year, and at what cost.

Methodology:

The methodology consisted of 5 steps. Campaspe Shire are now midway through Step 4.

1. Develop a star rating system to describe the service level provided by roads using factors identified through discussion with the community and industry standards.

2. Determine drivers that describe where different star rated roads should be located through discussion with the community

3. Determine costs for operations, maintenance and depreciation (cost of service) so that the total annual costs can be determined in

   a. changing a road from one star rating to another
   b. changing the location of various star rated roads

4. Analyse various network scenarios (i.e. different star rated roads in various layouts) and their annual costs. Discuss this with the community to produce a preferred network.

5. Adopt a network that delivers an agreed level of service at known cost of service in a financially sustainable manner.

As can be seen, the methodology places a strong emphasis on communication with the community, for which the star rating approach is ideal.

Brainstorming important drivers

Community discussions were held with a range of people from the local area plus specific invitees who had a special interest in roads (e.g such as transport operators). Brainstorming sessions produced a list of drivers of importance and discussion then determined that the following were of major importance:

Safety; width of road; quality of surface (long life seal, e.g. asphalt, camber of road, absence of loose material, corrugations, wheel ruts, potholes); offset intersections (vision at intersections, visible intersections); appropriately located signage (directional, warning and regulatory); drainage.

And there were also a range of other important factors but ones that the community considered not as important as those above. Understanding relative importance is critical to providing good service.

Star Rating Model

The factors identified in the community discussion group which describe the level of service provided by a road were grouped into categories. A scoring system of 1 to 5 was then developed so that each factor could be rated depending on the degree to which it was provided. Given that not all factors had equal importance a weighting system was developed. This is shown in the Appendix 1.

Roads could then be scored. A range of scores is possible depending on the level of service provided. This range was split into five segments to match a star rating 1 to 5 by technical staff based on their technical and local knowledge. (This could be tested with a focus group but in a practical sense there may not be anything to gain as the adopted weighted scoring fits well with the existing road types as will be seen below.)

The star rating against the weighted scoring is shown Table 1 below:

Star	Weighted score
1	less than 70
2	70-119
3	120-169
4	170-200
5	200 plus

To understand what this means in practice, the type of road that aligns with the mid range of the weighted score for each star rating is shown in the table to the right.

Star	Description
4-5	Freeway
3-4	Dual Carriageway
2-3	Two Lane Sealed
1-2	Single lane all weather
0-1	Single lane dry weather

It should be noted that it is the mid-range score that matches the typical road type, the condition of the road then determines where it sits in the range. Thus a well serviced single lane all weather road could be 3 star rated, but if it were poorly serviced it would rate only 2 stars.

Cost of Service

The next step is to determine the total annual expenditure to provide the service at the current level: operational/maintenance plus depreciation, (or the amortised costs of renewal). Renewal is excluded for this is already taken into account by depreciation. If a road is to be upgraded then the capital cost needs to be known. It is now possible to determine the cost to provide various levels of service (star ratings). Also the cost to move from one level of service (star rating) to another can be calculated.

Costing Scenarios

The next phase in the project was to cost various scenarios using the drivers identified by the community to determine where different star rated roads should be located. A number of scenarios were tested and estimates of costs produced.

For example,

- where should the roads be and what would the costs be if the community chose to ensure that all dwellings be located on at least a 2 star road. (Upgrade cost $20,000, increased maintenance costs of $500.)
-
- where should the roads be and what would the costs be if the community decided that all properties (dwelling or not) be located with 2 km of a 2 star road. (Upgrade cost of $205,000 and increased maintenance costs of $5,000.

and 12 more!

The scenarios included all the drivers that the community identified as being important - i.e. traffic volumes, traffic types, and connections. It is the degree to which these have been accommodated that is varied in each of the scenarios.

GIS

The council's geographic information system was useful in testing scenarios - but laborious.

Outcomes

You will recall that the objective of the exercise was to set up a system to define the level of service provided by various roads, determine where roads delivering various levels of service should be located and ensure that the road network is financially sustainable.

At this stage Campaspe Shire has defined the level; and determined where roads should go to meet difference service level scenarios, and the cost of each scenario.

Where to next?

The council now has in place the information that it needs and it has established a means of communication with its community. The next phase is to have Council consider the cost of the current network, the level of service provided by that network and the implications of any change from the network to another network with another level of service.

The new network needs to offer a reduced level of cost to assist in closing the asset renewal gap. This is likely to come from downgrading 2 star roads to 1 star roads and agreeing that when a number of 3 star roads reach the end of their useful lives that they will be downgraded to 2 star roads. This needs careful consideration as to maintain a current sealed road is a similar cost to maintaining a gravel road. It is only at the end of its life that the 2 star road would be downgraded.

Council then needs to adopt a preferred network so that the community can be engaged. As this is likely to be a sensitive issue, a community consultation strategy will be developed. The process will involve, amongst other things, engaging the Community Planning Groups across the Shire. Following this Council will need to adopt a revised road network.

And what have Campaspe Shire learnt from their Experience?

The whole exercise would not have been possible had it not been for the activities that have been undertaken over the last 6-7 years.

Council adopted asset management plans in 2004, and an asset renewal funding strategy in mid 2008 which aimed to progressively increase funding each year for 20 years to close the renewal gap. There has also been a recent restructure within the Assets and Planning division to focus on assets.

Without this background it would seem unlikely that any council would be willing to review its road network, particularly if it could result in a variation to the current arrangement.

Developing a star rating has not proved to be an overly difficult task although weightings in the scoring methodology is necessarily subjective. Analysing the annual cost of various network scenarios has also proved tedious because of the manner in which the data is held in GIS and how it can be manipulated. Community engagement over the network layout and possible changes to the service level may be more difficult.

The star ratings that Campaspe have developed are the most detailed that I have seen. Here is just a small excerpt, but do write to Jon if you would like to know more.

Appendix 1

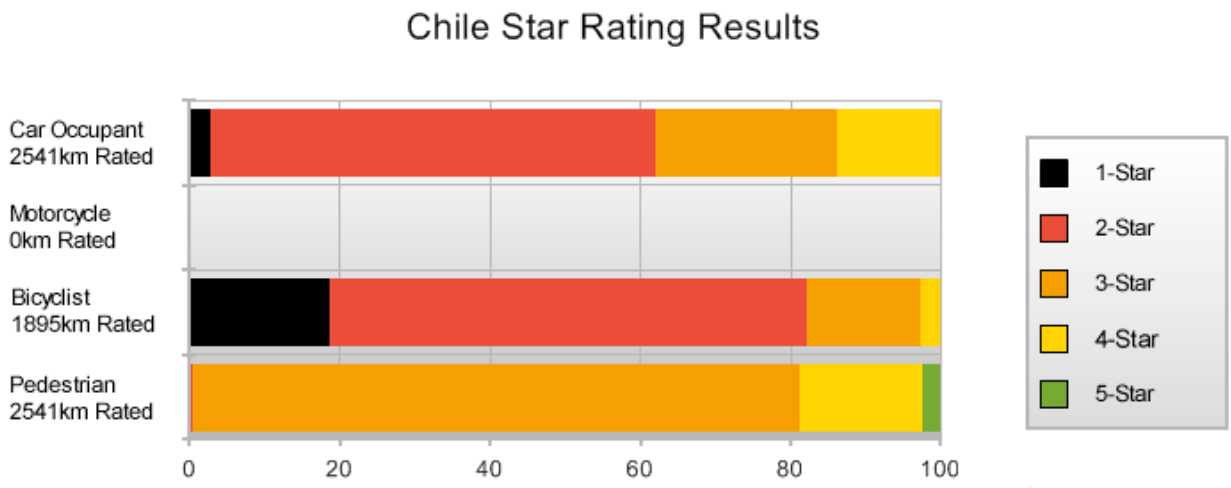
		SCORE						
Factor	**Technical Level of Service**	**1**	**2**	**3**	**4**	**5**	**Weighting**	**Maximum Score**
Accessibility								
Travel in all weather conditions	Surface type, depth of pavement	Natural	Sand or naturally occurring gravel	Gravel	Seal	Asphalt	3	15
Road subject to flooding	Depth of flooding, location of floodways	Floodway with depth of water exceeding 350mm in 1 in 10 year event	Floodway with depth of water less than 350mm in 1 in 20 year event	Floodway with depth of water less than 350mm in 1 in 50 year event	Floodway with depth of water less than 350mm in 1 in 100 year event	No floodway	3	15
Traffic congestion	Traffic volumes, lane widths, % commercial vehicles	Forced flow - capacity exceeded	Unstable flow - nearing capacity	Restricted stable flow	Stable flow	Free Flow	3	15
Connectivity	Hierarchy, truck routes, B Double access, Bus Routes	Access	B Double Route	Collector or Bus Route	Arterial	Freeway	3	15
Access to businesses and growth areas		Other				Access to industry and growth areas	3	15
Affordability								
Maintenance response	Road Management Plan response times	Slowest response times		Medium response times		Quickest response times	2	10

What and Who are you Rating For?

In Australia it has become commonplace to rate roads for their use by motor vehicles (cars, trucks, buses). This focus has influenced design of roads as well as operational and maintenance concerns. But how would roads rate if we were to look at other road users?

IRAP (International Road Assessment Program) has looked at a range of developing countries in South America, Africa and Asia with **a focus on road safety** for **all road users**. In these countries bicycle use is high so is pedestrian use. But if we wish, in developed countries, to encourage more bicycle and pedestrian use, perhaps it is to these studies that we should turn?

So here is just one example, from Chile. More detail on Chile and links to other country studies can be had at http://www.irap.net/partner-countries/chile.aspx. Note motorcycle use is not rated as there are not many motorcycles in Chile. The safety ratings assume vehicles are travelling within the given speed limits.

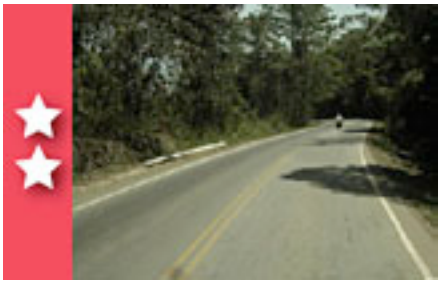


Car Occupant Safety

A 5 star Car Occupant Road would be median separated, have clear roadsides, have only a few grade separated junctions with long merging lanes and would have a speed limit suitable for the design environment

Dual carriageway road with median barrier, grade separated junctions and good delineation

Straight single carriageway road with relatively clear roadsides and some paved shoulders



Single carriageway road with sharp curves, narrow paved shoulders and roadside obstacles

Single carriageway with side friction and roadside obstacles

Bicyclist Star Ratings

A 5 star road for Bicyclists would have bicycle facilities physically separated from the main road carriageway with either a barrier or a wide run off zone.

Separated bicycle path

Paved shoulder for bicyclists

Narrow unpaved shoulder for

Bicyclists riding in road

For Pedestrian Safety Ratings, see the website at http://www.irap.net/partner-countries/chile.aspx

Road safety, cyclist and pedestrian safety measures might differ in developed countries to take account of different traffic conditions. But it is of interest to note that few of our roads would be rated 5 star for bicycle safety - and maybe we need to think of this if seeking to switch travel from motor vehicle to bicycle in the name of environmental sustainability - and reduced petrol consumption.