

Townsville City Council, From Condition Data to Informed Decisions Using PARMMS-Horizons Management Tool

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ABSTRACT: Townsville City Council (TCC), one of the largest local government authorities in Northern Regions, is responsible for managing and maintaining one of the largest roads network in Australia. Pavement Management Services (PMS) has been appointed to conduct road condition surveys using ARAN LRMS Technology. The road condition survey has provided TCC with an accurate picture of its road assets. However, to better manage public scrutiny and enhance its overall asset management approach, TCC also needed to make more proactive use of the detailed data that had been collected.

On this basis, the council began looking for a versatile asset management software solution that would allow them to carry out enhanced pavement modelling; put strategic works programmes in place that take into account optimising budgets, and ultimately ensure better allocation of available funds to ongoing road capital and maintenance plans. It has been recognized that its existing system struggled to visualize the network condition and interact with deterioration modelling to make informed decisions.

To rectify this, council moved to use PARMMS-Horizons Road Manager powered by Yotta. PARMMS-Horizons are now integrated into PMS technology suite, following the consultancy's recent partnership agreement with Yotta.

TCC is now using PARMMS-Horizons to develop a detailed future works programme, including in-depth capital and maintenance plans. The goal is to meet prescribed levels of service around road quality, while maintaining tight control of rate payer spending. In line with this, TCC is now using PARMMS-Horizons to create a capital works programme that enables it to understand how much it needs to spend every year for five years to maintain the network to the required standard. PMS also uses PARMMS-Horizons software to prepare future maintenance plans.

This paper summarises the implementation of PARMMS-Horizons Platform into TCC Asset Management Systems, and how this tool assist the Council for making informed decision for managing their network.

KEYWORDS: Townsville City Council, PARMMS-Horizons Asset Management, Network Level, Deterioration Modelling, Capital Works Program.

1 Introduction

Providing a laid-back tropical lifestyle that is complemented by capital city comforts, no other Australian city boasts the resilience, diversity, lifestyle and economic potential that the Townsville North Australian Region enjoys.

Known as the Capital of Northern Australia and with a population of approximately 195,000 people, Townsville offers a dynamic lifestyle coupled with strong economic prosperity. Townsville is a thriving precinct with access to a variety of world class education facilities,

leading edge health care, affordable housing, unique retailing, spectacular events and entertainment, dining precincts and a wide range of outdoor recreation options. With over 300 days of sunshine each year, Townsville's lifestyle is second to none.

Like most councils, Townsville City Council (TCC) has been under growing pressure to deliver greater levels of service to the community while at the same time having to combat growing financial challenges. The team set out to find an approach that incorporated a scientific pavement management methodology

and the use of multiple data sets, already available to the council. The consensus view was that this approach needed to be available across councils and councillors in a format that was easy to consume across stakeholders.

TCC has been the first large Council in Australia that fully implemented PARMMS-Horizons system for managing the road network.

The result has been a more accountable approach for managing the pavement network with the utilisation of scientific data and advanced modelling tools provided by PARMMS-Horizons Asset Management System. As data collected included video data, TCC look to operate smarter, faster and better by utilising fresh video data collected to perform desktop validation.

2 The Project

In 2018 PMS surveyed 9,108 sections (1,562.25km) of TCC sealed network for processing and delivering video imagery, distress rating and laser data (roughness, rutting and texture). From the 1,562.25km updated distress data collected, 1,488km has been uploaded into PARMMS-Horizons Road Manager for modelling the condition of the sealed network (seal and asphalt surface type) considering different budget scenarios. It allowed developing a one (1) year (2018-2019) capital and maintenance works.

In order to upload the condition data into PARMMS-Horizons platform, the distress data has been formatted and included into the GIS file provided by TCC. Attributes related to road class, surface type, lane width and carriageways are required as part of the data format, and have been provided by the Council. On this basis, the current condition data of the sealed network with all attributes required by PARMMS-Horizons system has been uploaded.

The condition data at 10m interval has been used by PARMMS-Horizons platform for modelling purposes. It allows dynamic segmentation and merging rules to be applied at 10m intervals for treatment selection.

The appropriate and applicable resurfacing, rehabilitation and reconstruction maintenance options considered in the analysis were provided by Townsville City Council as part of their maintenance practices for the seal and asphalt surface type.

To allow investigation as to what treatment would be applicable once the pavement has reached an agreed serviceability level, intervention levels were determined in conjunction with TCC that would indicate the minimum condition when maintenance would be undertaken. These levels are set out for each of the road class based on TCC's requirements, alongside with the treatment cost.

PMS has prepared and proposed deterioration curves for each network parameter, based on the road hierarchy and surface type. The deterioration curves followed the HDM-4 models and PMS's experience on these types of parameters. The model incorporates the science of how assets behave as part of the deterioration curve. Through the use of multi-year consistent data sets, TCC aims to improve the model further by having a more customised curve for how assets behave in its region.

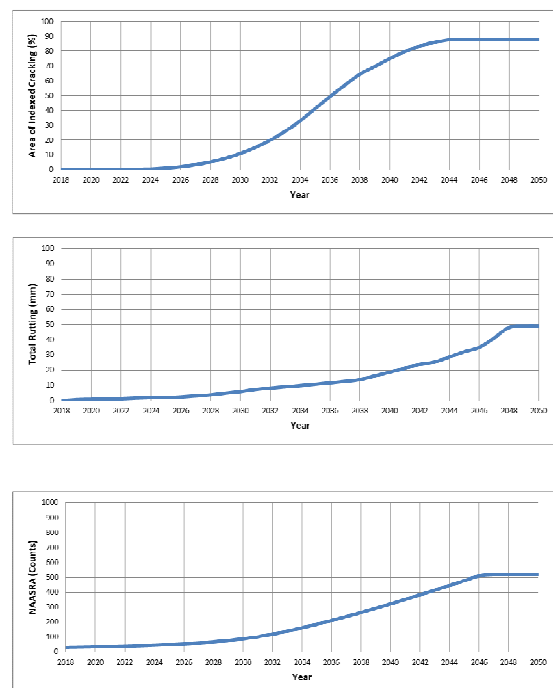


Figure 1: Deterioration Model Curves
(Structural Cracking, NAASRA and Rutting)

The serviceability assessment of the network was uploaded into PARMMS-Horizons Road Manager using the current condition of the 8429 segments (1488km) collected in 2018. Some collected sections have been excluded due to attributes missing. On this basis, the visual distresses and roughness, rutting and texture of the sealed network (seal and asphalt surface type) were assessed. Using the

Explore module of PARMMS-Horizons Road Manager, the following figures show the condition of the network in 2018.

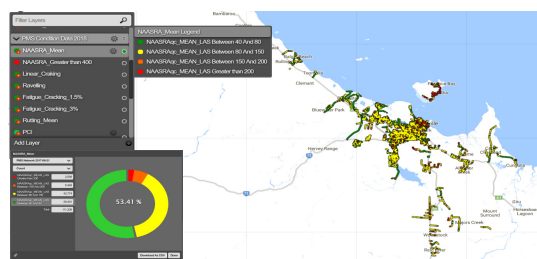


Figure 2: Distribution of Roughness (NRM) Across the Network

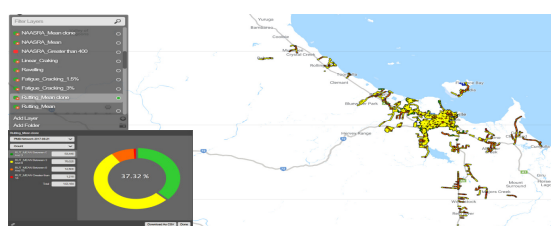


Figure 3: Distribution of Rut Depth (mm)

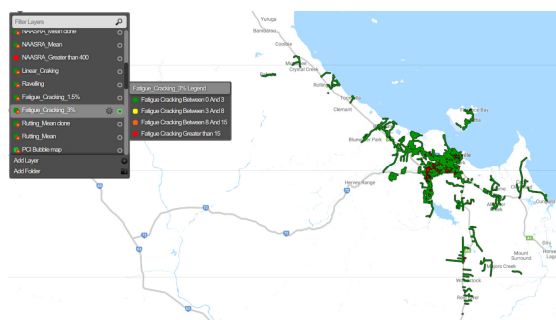


Figure 4: Distribution of Fatigue Cracking

The current pavement condition analysis was conducted for the level of cracking, roughness (NAASRA counts) and rut depth. Similar analysis could be conducted using other distresses as part of the surveyed data in 2018 also uploaded into PARMMS-Horizons Road Manager.

Based on the current condition of the network, four (4) budget scenarios were investigated over a ten-year analysis period. The analysed annual budgets were \$10,000,000; \$15,000,000; \$18,000,000 and \$25,000,000 million a year. In addition, unlimited budget (\$1000M a year) was analysed. The expenditure showed that the whole amount of the budgets will be spent every year along the 10 years period of analysis. The majority of the

budget is spent in rehabilitation treatments for seal and asphalt sections. Resurfacing treatments are applied the first two to three years within the analysed budgets. Even though there are some sections due to reconstruction treatments along the 10-year design period, all budgets showed that at the end of the design period (year 10) there is an increase of sections due to reconstruction.

The following figure shows an example of the roughness progression vs. budget allocation. Similar modelled was performed for the three (3) condition parameters.

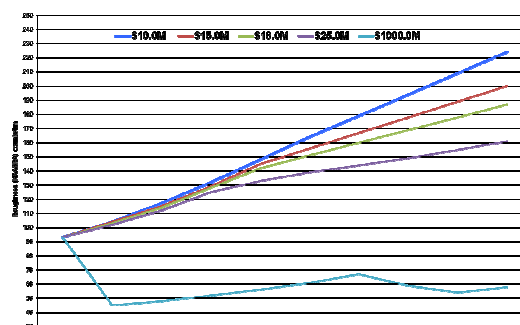


Figure 5: Roughness Progression vs. Budget Strategy

3 Community & Economical Contribution

Who benefits - Council, Community, Region?

Overall benefits are across council and the community. As road infrastructure network makes up one of the largest areas at council and saving or better utilisation of funds has meant that council can provide a better level of service to its entire region. This flows into areas including public safety, through the delivery of better-quality infrastructure for the region.

This project is designed to lower our environment impact by optimising the way council delivers treatments to the road network.

The project is designed to grow and evolve as TCC grows in asset maturity. Council have specifically selected a software solution to support changes in how and what data we use to make our decisions within council.

Acknowledgements

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