

# Road Runner...

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## Road Management - It's a Plan

*The Local government authorities, like many organisations in asset intensive industries (such as manufacturing, utilities and transportation), are recognizing the untapped value inherent in their corporate assets and have also recognized that they cannot readily access and deliver this value because of a reliance on manual data-starved processes.*

This interest is being further accelerated with the pending introduction of the road management act into Victoria as well as recent developments in Queensland.

With the increasing interest in these systems, it is imperative that local authorities understand that each of these asset management systems has an underlying philosophy, and that the type of system purchased must possess a philosophy that is synergistic with the authority. Some of the questions that need to be asked are:

- 1. How are my assets defined and will data requirement change?**
- 2. How do I collect condition data?**
- 3. How do I assign maintenance?**
- 4. Is maintenance reactive or proactive?**
- 5. Do you want to include works management tasks to close the loop?**

The premium systems can help to develop a holistic asset management strategy by automating the collection, normalization of asset data, production of forward works planning, and dissemination of asset-related data. The more basic systems are purely a fixed register of assets that can be queried to react to conditions.

### Reactive vs. Preventative Maintenance

Probably the largest underlying philosophy in these systems, (apart from data structure) is the question of whether the authority/organisation undertakes reactive or proactive maintenance - or any planned maintenance at all. Reactive maintenance put simply, is where the authority collects condition data on their assets and when the condition data gets beyond a certain level, maintenance will be triggered, to ensure safety and serviceability.

At the other end, proactive maintenance is when the condition data is examined before it has reached terminal levels, to produce a forward works program, so that maintenance is undertaken before the condition data on an asset reaches a trigger level.

It has been shown extensively that the latter of these two methods will produce better condition profiles and lower cost.



Ideally, the system should include both proactive and reactive maintenance techniques, to keep costs down whilst ensuring safety and serviceability.

The proactive maintenance technique offers other benefits such as the ability to produce a plan of maintenance work (not merely reacting to bad situations), predict future budget requirements and the development of network Key Performance Indicators.

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### NEW DEVELOPMENTS

#### PARMMS® Pavement Acumen a new approach to Pavement design

*You, like most other pavement engineers know that, pavement materials, environment, loading and construction as well as structural design, effect performance and it's the variability in these attributes that introduces risk, so why doesn't your design procedure. Well at last there is... PARMMS Pavement Acumen.*



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## Cairns City Council Data Collection

*PMS has been commissioned by Cairns City Council to provide condition rating for pavement and asset items covering the entire council road network of 2,300 lane km and more than 20,000 assets.*

The Project Engineer, Kent Barnes is well known to the area having lived in Cairns for two years whilst an employee of Pavement Management Services, working for the Department of Main Roads in Cairns as an implant consultant. Indeed Cairns holds a special place in Kents' heart, having met his wife whilst working there.

To date PMS has collected over 375,000 different pavement faults and conditions. On average this equates to 175 faults per kilometre which is high compared to clients in urban areas but not uncommon in areas of rapid growth or declining populations. Kent Barnes is quoted as saying



“what this system will be able to do when it is fully operational, is target maintenance funding and priority to areas of concern with full regard to the level of spending needed.

“Over time, I have no doubt that the level of serviceability and safety across the entire network will improve. At the moment it appears some areas have been very well looked after at the expense of some of the older suburbs”.

The study includes all assets and pavement defects and

represents one of the most comprehensive surveys in recent times. “It is as detailed as locating and rating planter boxes on the Esplanade. The only way we could do this cost effectively is to collect digital video imagery of the entire network from a moving vehicle and then use advanced software tools to locate and rate each item.

“In some areas of the study we are locating and rating over 560 asset items per kilometre which would take a considerable amount of time if we were to locate and rate on foot using a backpack GPS unit”. He then continues on by saying, “On average this method takes about 3mins to locate and rate each asset item and then two to five mins to advance to the next item and wait for the GPS signal.

“We are able to do one pass with the video cameras in which the GPS information is ‘tagged’ to each video frame, and post-rating takes less than 1min per item. This technology over the size of this network is saving Cairns City Council around \$100,000 in additional manpower costs when compared to a foot survey.”

The system utilised is a further development of the sys-

tem used for the Vicroads contract when PMS undertook a survey of the entire State. “Two years ago when we took our two camera system and expanded it to five in order to offer a better level of service to Vicroads, we never envisaged just how much it would change the industry” the company's CEO John Yeaman said. “However the response from the insurance industry is the most encouraging with insurance underwriters looking favourably on authorities with such systems in place.”

Using the condition ratings, PMS, in consultation with Cairns City Council, are able to determine a valuation for each road asset section and item, and ultimately for the entire network.

All data is collected with both chainage and GPS location for entry into both the Council's SMEC PMS and GIS mapping software.

*“This dual referencing system allows Council staff to easily view the location of trouble spots or even a particular type of asset in the mapping software (using GPS coding), as well as having an easily understood physical location (using chainage) for a maintenance crew to locate.”*

Kent Barnes said, “The most important step for Council is to ensure they maintain a vigilant approach to asset management by ensuring the data set is up to date. If condition data is not kept current, the validity of the output of any asset management process is compromised. I believe Cairns City Council are approaching this task with the necessary attitude.” ■

### Bankstown Designs



PMS has just completed all testing and engineer design for all Bankstown City Councils rehabilitation and resheet projects for under \$50,000.

The study involved testing and design analysis on all sites selected for works over the next twelve months.

During the project around 30% of all sites selected were lowered from rehabilitation to heavy patching, and 30% went from planned rehabilitation to reconstruction.

“By understanding the structural capacity of the pavement combined with a good understanding of the traffic, we were able to ensure that Bankstown City Council weren't going to waste money on inappropriate treatments.” The Project Manager, James Erskine said.

For more details call James on (02) 9674-9488. ■

# PARMMS® Pavement Acumen a new approach to Pavement design

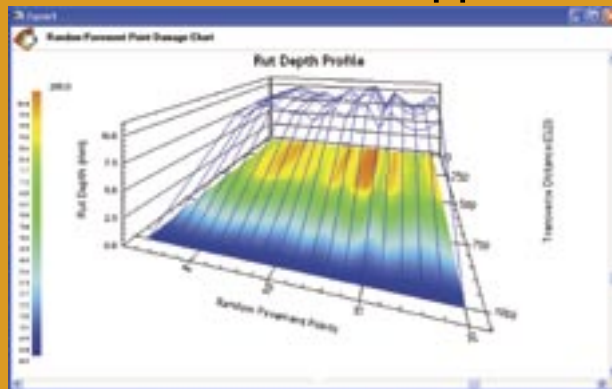
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**PARMMS Pavement Acumen is a new approach to pavement design, embracing fundamental materials analysis, climatic conditions, actual loading regimes and the perpetual pavement design philosophy. The approach moves from the traditional deterministic analysis to the probabilistic analysis, to develop a holistic solution for functional (safety and serviceability), structural (load carrying) design and risk assessment.**

## Can You Quantify the Risks?

PARMMS Pavement Acumen quantifies this inherent risk, which is present in any engineering design, by assigning variable input parameters, instead of the traditional fixed input parameters. Risk can then be quantified by taking random values from within the distributions of the input variables with approximately 100 estimates of performance being produced. Risk can then be assessed as the probability of premature failure.

Additionally, probably more



important in pavement design, where some level of failure can be accepted. The probabilistic approach produces the expected distribution of failure against time.

## Are Your Materials Under Stress?

Just as significant as the structural design in determining pavement performance, is the material design. It is unfortunate that in general, the current methodology separates material from structural design, increasing risk and decreasing performance.

In the current methodology, typically all asphalts are treated as the same material, as with all granular materials and subgrades. While this does not present problems when the pavement was designed and

constructed based on the same assumptions of the methodology, it does however when designs extend beyond these assumptions were unknown and un-quantifiable risks can be introduced.

PARMMS Pavement Acumen overcomes this by using improved material classification methods, based on the approach of the AASHTO 2002 design guide, on which one of our engineers spent 2 years developing. By doing this, the risk involved with pavement design and ownership is reduced.

## Failure Level It's Up To You!

It is well acknowledged that one of the largest deficiencies in the current methodology, is that it does not allow for user defined failure levels. Most

likely you have different failure levels for different classes of road... so why not your design procedure?

Take for example a pavement with a terminal life of 30mm rutting (used in many rural areas) against that of 10mm rutting (used for freeways).

If in these two cases the same failure criteria is employed, as in the AUSTRROADS methodology, the former pavement will be significantly over-designed with a low risk of failure, the latter will be well under-designed with an undesirably high risk of failure.

PARMMS Pavement Acumen overcomes this by using a continuum damage approach; this approach unlike the current methodology does not determine time of failure but predicts damage against time allowing users to define their own failure levels.

For more information on the PARMMS Pavement Acumen Pavement Design program or pavement design course information please contact Pavement Management Services on (02) 9674 9488. ■

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### ASSET REGISTER

The Asset Register is the first and most important stage in a comprehensive system for the recording and life cycle management of assets. If possible, the system design should allow authorities to determine asset structures, hierarchies, and relationships to meet authorities business and reporting situations. All attributes attached to assets or categories of assets should be user definable by each authority (not set in concrete by the data design).

### BENEFITS

The implementation of the full asset management solution, with a preventative maintenance solution will provide significantly improved business and customer outcomes including:

1. Ability to better organise and manage works and asset functions and operations.
2. The ability to accurately predict budget requirements and forward works programs for period's up-to 10 years into the future.
3. Produce network key performance indicators for network performance monitoring.

4. Lower maintenance costs through better planning.
5. Improved safety and serviceability.
6. Provides effective workflows and processes to improve efficiencies and costs.
7. Ability to meet customer, regulatory and governance needs.
8. Eliminates paper based functions and procedures.
9. Options for distributed or centralised data storage and operation.
10. Includes an integrated reporting function to monitor results. ■



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## SERVICES WE OFFER

### ASSET MANAGEMENT SOFTWARE SOLUTIONS

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VISUAL WITH VIDEO, LASER, STRUCTURAL AND SKID ASSESSMENT

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PAVEMENT MANAGEMENT SERVICES HAVE OFFICES IN WA, QLD AND VIC WITH THE HEAD OFFICE IN NSW.

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## Middle East Opportunities

PMS has just returned from the Middle East where it put the finishing touches to an ambitious project. The project involves the supply and installation of a Road Asset Management System for the Municipality and Public Works Department of Abu Dhabi along with the satellite township of Al Ain. The task includes all consulting, software and data collection for the entire 22,000 km network and will take over three years to implement.

All Parties are very excited about the project as this is the first time all three departments have worked together on a project of this size and nature. Further, because it will use everything that PMS has developed and undertaken over the last ten years in Australia. During the same visit the CEO, John Yeaman, met with the Bahrain Ambassador to the UAE and a member of the Bahraini Royal family who are interested in implementing a similar system for the Kingdom of Bahrain.

## Victorian Justice

PMS have been contracted by the Justice Department of Victoria to assist in the examination into why the Road Speed Cameras in Victoria are falling out of calibration. The project involves both visual and laser profilometry examination of over 43 intersections across the city in order to determine if deformation of the pavement is, or has, contributed to the problem. The project may involve long term monitoring and analysis of the sites to ensure calibration is maintained.

## Canada Bay

PMS has just finished the road asset management study for the newly created City of Canada Bay. The study resulted from the amalgamation of Drummoyne and Concord City Councils, necessitating a complete analysis of the required maintenance and funding in order to maintain the newly created entities infrastructure assets. By completing an accurate 'snapshot' of the entire network we were able to set budgets and develop business rules for effective and efficient road asset management, said the Project Manager, Megan Collingwood. For more information call Megan on (02) 9674-9488. ■