

North Carolina DOT: Moving Towards a New PMS

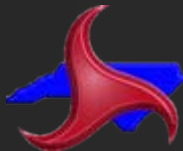
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About NCDOT



Personnel

- Over 14,000 Employees
- 14 Field Divisions
- Maintenance Offices in 100 Counties



North Carolina Road Facts

- Nearly 79,000 State Maintained Miles
- Approximately 73,000 State Maintained Paved Miles
- Over 1000 Miles of Interstate
- Paved Mileage is nearly 99% Asphalt



How much do we spend?

- \$3.2 Billion Dollar Total Annual Budget
- \$1.55 Billion Construction Budget
 - Includes both new construction and large widening and rehab projects
- \$700 Million Dollar Maintenance Budget
 - ~ \$200 – 210 Million of this is resurfacing and re-treatment oriented



NCDOT Pavement Management



Pavement Management Unit

- PMU is responsible for both Pavement Management activities and structural pavement design activities
- Staff includes engineers, technical coordinators and data collection technicians and summer/student help for data entry
- Equipment includes 3 laser profilers, 2 friction testers (trailer-type), 3 FWDs



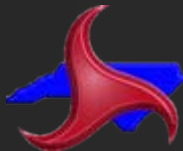
What does PMU do?

- We coordinate and train raters for the bi-annual asphalt Pavement Condition Survey.
 - This is a 100% coverage, visual survey of all primary (US/NC) and secondary routes and is performed by field personnel
- PMU personnel conduct yearly interstate and concrete pavement surveys



What we do (Continued):

- We collect and store laser road profile and skid data
 - Profile and Skid data are collected on all primary routes every two years
 - Profile data is used primarily for HPMS at present (this will change in the near future and be included in PM decisions)
 - Skid data is queried to reveal any questionable pavements



Bi-annual Pavement Condition Report

- The report is produced and distributed in both printed and electronic (spreadsheet) form. It can also be queried on our website.
- It includes distress summaries as well as recommended activities and cost based on surveyed distresses for a survey section.
- The report is used to drive the distribution of funding to the operational divisions for resurfacing activities.



The Current System



What is our current system?

- The current system consists of oracle tables managed via a combination of MS Access, web and Windows applications
- Applications are geared mainly for data entry and reporting purposes
- Most data entry is handled by PMU Personnel
- ~1.4 Million rows of condition and inventory data
- 24 Years of condition data



So, what's wrong with the current system?

- System is strictly needs based
- No predictive or modeling capability. All such work must be done manually in other software (read: cumbersome)
- No economic analysis capability (Inc-Ben, B/C, etc.)
- Really more of a pavement inventory system



What's wrong (continued)

- Very difficult to aggregate and overlay data from different sources for analysis purposes
- Update of linear referencing data is incredibly cumbersome and must be conducted manually
- Simply cannot do what we want it to



A New PMS



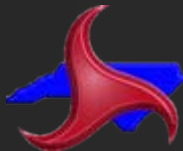
Why a new PMS?

- Huge inventory owned by NCDOT needs better management tools
- NCDOT wishes to pursue a shift towards maintenance, pavement preservation and existing facility upgrade oriented funding and away from new construction.
 - Currently, construction makes up nearly 50% of NCDOT's budget, maintenance < 19%



Why a new PMS (continued)?

- We need a better way to drive and analyze preventive maintenance treatments
- We desire interoperability with the MMS software to allow better tracking of maintenance activities



System Selection

- AgileAssets Inc. was selected to provide the Pavement Management System
- Vendor previously provided the MMS for NCDOT
- System is extremely flexible with excellent user customization tools
- Web based system has a zero footprint client and requires no local software other than a browser



The Reconciliation Project



Project Structure

- The first phase of the project was used to establish the software modifications needed to fit the PMS to NCDOT requirements
- NCDOT Pavement Functional Manager is on-site with consultant to serve as a quick reference guide and decision-maker
- Subject Matter experts from various areas in DOT were recruited for their input and business process knowledge



Subject Matter Experts

- The SME group includes central office and field personnel
- The goal was to determine how these users would want to use the system and what data and modifications they saw as necessary to make using the system worthwhile
- The system is of limited value for NCDOT if the field users do not believe the results or find it too cumbersome to use



Additional Benefits for PMU

- Concurrent with the PMS Project and driven by the expected data needs, PMU is conducting several internal projects including:
 - Sorting and normalizing of existing data
 - Improving inventory data as we fill in gaps in historical construction records
- The project has led to a better understanding and improvement of data flow coming into PMU and tracking of that data (construction, resurfacing etc)



Implementation Phase



Configure and Implement

- NCDOT determined the most cost-effective software required to support our needs
- An Implementation plan was developed detailing the time schedules and planned modifications
- After a beta test period, statewide rollout of the software will occur
- Software will likely run concurrently with the existing system while models and decision trees are worked out



How is the planned implementation different?

- Will include a much greater number of users than previous implementations of AgileAssets Software
- Manipulation of work plans by a large number of field users is a new wrinkle
- Export of work plan to MMS to allow its use in budgeting and planning
- Use of MMS data to fill in construction history information where appropriate



How we would like to use the system:

- PMU will be responsible for most data entry
- PMU will handle decision trees, analyses and base-line work plan generation
- Cycles of work plan generation by the PMU and modification of the work plans by field users will help hone scenarios and budgets



Using the system (continued):

- Eventually, we'd like to move away from some of the funding formula constraints currently in place and have the PMS drive maintenance plans and resurfacing activities
- Institutional resistance and legislative factors will be a big factor in this regard but we hope to use the PMS to generate persuasive arguments to change funding strategies

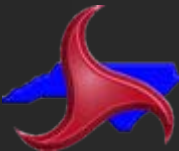


Using the system (continued)

- Via a planned GIS interface, update of Linear Referencing data should be automatic and cascade throughout the database
- Ability to produce data that can be used by mapping software to produce useful and informative documents (Such as maps of survey sections). The current process for map production is very cumbersome.



Difficulties



Potential Stumbling Blocks

- Risk of field personnel not supporting and thus not using a new product
- Risk that GIS automatic linear referencing update procedure not in place when project goes live
- PMU loses some control due to greater dependency on field personnel for data entry



Lessons Learned (so far)

- Involve various agency and state level IT departments as early as possible.
- Field user buy-in is an important goal and their input is an informative tool.
 - Field users had strong feelings about features that they did **NOT** want in the software. Simple but informative is their goal.



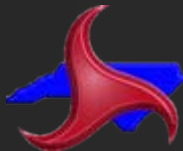
Other Issues

- The following issues will be critical during and after implementation:
 - Converting NCDOT data to PMS format
 - Converting and modifying NCDOT decision trees to make sense in the PMS
 - Developing NC specific models for pavement deterioration and improvement



Conclusion

- NCDOT has huge quantities of Pavement Management related data, but a limited and cumbersome capability to analyze this data
- Implementation of an appropriately modified PMS will give us new capabilities to better manage our highway system



Conclusion (continued)

- A robust PMS is key to supporting agency financial and pavement condition goals
- The combination of an MMS interface and the inclusion of field users will put us at the cutting edge of PMS usage



Questions?

