SCDOT PAVEMENT MANAGEMENT

Here we go again!!
SCDOT PAVEMENT MANAGEMENT

WARNING

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HOW WE GREW
by...

- ADDING...
- **31,000 MILES TO THE SCDOT PAVEMENT MANAGEMENT INVENTORY**
SCDOT Pavement Management 1994 - 1998

Data Collection Responsibilities

- **US / SC System = 10k** miles collected on a three year cycle
- **Interstate System = 863** miles collected annually
Life was easy
Life was Simple

TABLE OF ORGANIZATION
SCDOT PAVEMENT MANAGEMENT
1994 - 1998

- Pavement Management Engineer
  - Assistant Pavement Management Engineer
    - State Planner III
      - Collects data on I-System
      - Collects data on US / SC System
    - State Planner III
      - Collects data on I-System
      - Collects data on US / SC System
What the Mandate meant

• Pavement Management was being asked to:
• Collect / QC / Prioritize / Optimize / Report on almost four times what the office was already collecting
What Was Our Reaction?
(end of the good times)

We need to study this----
Quickly!
Evaluating our existing resources

• We decided that with modification our HPMA Software was up to the job of analyze / prioritize and optimize.

• Our data collection method was in question...therefore we developed **Feasibility** and **Pilot Studies** in 1998 – 1999 to determine the type of data collection system to use.
1997-1998 Data Collection Feasibility Study

- **Study 1**  S. D. Road Profiler w / 3 lasers
- **Study 2**  Vehicle equipped with ICC MDR 2010 System (lower level of rut & roughness evaluation)
- **Study 3**  Distress Evaluation Teams manually tabulate distress. (lowest level of evaluation)
Important Feasibility Study

Recommendations

• Secondary PM be regional
• Collect via hand tabulation (can progress)
• Three regional offices
• Each office staffed by engineer and two raters
Feasibility Recommendations continued

Hand tabulation was selected primarily due to the cost factor
Pilot Study

Lee County became our Bikini Island (test grounds) because: small / ideal mix of urban & rural roads that could provide fast answer.
Pilot Study...continued

- Develop a training course
- Develop a training manual
- Select two maintenance workers
- Training = 1 week
- They collected all of Lee County
- Met with us weekly
- S.D. profiler rates Lee County
What the Pilot Study Taught Us

The Pilot Study was quite valuable. It showed us that there were really only two important ideas we needed to follow to successfully expand our Pavement Management operation:

I. **First Idea**: Reconsider collecting... go High Tech ... same way as the Primary System. Hand tabulation was labor intensive / time consuming / very subjective.

II. **Second Idea**: Given the first idea, understand that the Secondary System presents new challenges that require new solutions.
How Did the Pilot Lead Us to the Two Ideas?

• The pilot project gave us a format for experimenting.

• We chose to try a technically unsophisticated, least-cost approach—and clearly saw this would not work.

• By the end of the pilot we knew:
  – We needed to automate – S.D. Road Profiler
  – All route collection data should be held to the same standards.
  – The mere size of the Secondary System (31,000 miles) meant that a completely digitized format was the only way to collect / process / store / analyze / report accurately.
  – We needed enhancements to the existing software
ENHANCED MANDATES !!

- Upper Management now wants: (they thought we had an easy button)
- Digital images on the Secondary System
- GPS on the Secondary System
Some of the New Challenges...

- **Size:** Over 31,000 additional miles. This is MASSIVE!!
- **Fragmentation:** Large number of short routes. In urban areas the system consisted of a vast network of short routes. Our software was not designed to analyze.
- **Data collection time:** Route characteristics and the number of routes would increase collection time per unit mile. We reduced acceptable collection rate.
- **Data storage:** Videos and MDR.
- **Data processing:** Enhancements
- **Quality Control:** Enhancements due to size. Must change and speed up QC.
- **Collection Schedule:** What is realistic? Weigh marks
Some New Solutions: Phase I

- **Business Rules**: for data collection / processing / filtering of bad data.
- **Logistics**: Set up 3 regions.
- **Quality Control**: Strict protocol. Data review process must be automated.
- **Rate of Collection**: 20 miles per day (Pilot adjusted downward for the urban and the unknown).
- **Downtime factor**: Assume 30%---about 6 days per month (US/SCs adjusted downward for the unknown).
Some New Solutions: Phase II

• We bought: 3 vans with laser sensors and cameras.
• We set up an office for each of the three regions: Low Country (Charleston), Midlands (Columbia), and Piedmont (Greenwood).
• We worked with IT Services to install the set-ups, links, and high-speed lines.
• ...and...
Looking for a job ??

• AND….We hired a lot of folks.
• We hired four engineers
• We hired six state planners
We went from: (four guys & a truck)...to

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Table of organization SCDOT Pavement Management 1998 - 2006
Some New Solutions: Phase III

Keep Solving!
Pavement Management---especially with the Secondary System----is a work in progress.
Execution

• The Five Essentials of Success:
  – Training
  – Process
  – Tracking
  – Quality Control
  – Timetable
Training for Engineers and Raters
Part 1

• Intense Training period: 2.5 weeks…after which 3 months on the job training.
• Study Distress Identification / extent / severity)
• Study MDR Profiler System / digital image System and GPS System)
• Study Trouble Shooting…working with booby trapped profilers )
Training for Engineers and Raters (2.5 weeks) Part 1...daily activities

- Hands on training
- Review / Critique
- More hands on training
- Review / Critique
- Finals / certification
- Additional monitoring of raters
Training for Engineers Part 2

HPMA ops

• Training period: 1.5 weeks
• Basic HPMA functions
• Hands on practice
• Review / Critique
• Intermediate HPMA functions
• Hands on practice
• Review / Critique
• Testing / certification
Training..continued

- All Training Courses developed by the SCDOT Pavement Management Office

- All Training Manuals developed by the SCDOT Pavement Management Office
Training…con’t

- Training Manuals included
- Introduction to Secondary Pavement Management Procedures
- Secondary Pavement Management Training Manual
- HPMA Training Manual Vol 1.1
Training...hindsight

- We knew that time allotted for training was insufficient....
- Obviously there was a great deal of:
  - Trial by fire
  - On the job training
- But...We were successful!!
Process

• Organizing for storage
  – MDR – hard drives / portable hard drive = space
  – Images – big space eaters / must be kept with MDR at all times.

• Organizing for processing and loading
  – MDR – network drive storage via year / region / week / county
  – Images – as above
TRACKING

• Comprehensive matrix that was designed for maximum accountability. This tracking sheet provides the status of every secondary route in the state.
TRACKING

- Inclusive of image collection / data collection / process / loading of distresses / images / hand data collection on very small routes / will this route be re-visited next cycle.
Quality Control

• Data quality: Size again placed new demands.
• QC control points and develop new protocols
  – Raters
  – Regional Engineers
  – Pavement Management Engineers
  – Rater Performance Reviews
QUALITY CONTROL...CON’T

• Develop with Stan-Tec the ability to perform QC in mass via new software that compares new data with historic distress.
Timetable

The System will require 3 years: huge unknown

• Based on daily rate for USSCs adjusted downward
• Based on margin for downtime
• Based on margin for unknown factor—all still new tasks
• Based on margin for other unexpected developments from other directions
What we learned

• Always expect the unexpected (DESRALI)
• The unexpected .. Suddenly, Management imposed a drastically shortened timetable for data collection and reporting on 46 counties
What we Learned

• Original schedule allowed for a three year data collection and reporting season.

• Management’s new and improved schedule called for a shortened 2 year data collection 6 months reporting season.

• We fulfilled 92% of mandate while minimizing adverse impact on QC and rater moral by focusing on rural routes collecting 100% and collecting urban as time allowed.

• In the end we collected 100% in 32 counties / 72-95% in remaining 14 counties.
What We Learned...con’t

• Pavement Management is a work in progress.
• Quality MUST be job one.
• Management needs us.
Where we are ?? and where we might go ??

Where we are !!!

- **Strong identity**: We are well known throughout the Department as a successful management system. We have produced quality data since 1994. We have been asked to take on much more responsibilities since our original Mission Statement.
- **Continuous learning**: We know that we are not the finished product.
- **Resource for management**: and they are learning that. We are almost appreciated
Where we are...and where we might go...con’t

Where we are!!!

- Highly skilled unit: We promote from within. We take our time when shopping for new personnel, performing a lot of upfront homework in the hiring process to ensure that the new personnel are a good fit...the tail does not wag the dog. It takes about 1.5 years for a rater to come up to snuff. Results?? Excellent staff with a very low rate of attrition.
Where we are...and where we might go...con’t

• Where we are

Outstanding QC
program...this is the genre of our whole system. We are information brokers. Our reputation is the quality of our data

Forward thinking looking for new ways to solve problems

We are becoming a more important resource for management
Where we are ?...Where we might go ?...con’t

• Management is now asking us what it will take to collect and report on the Secondary System on a two year cycle.
I say...I say
QUESTIONS....?????