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HAVE YOU HEARD THIS QUESTION RECENTLY?

- In this business climate you need to do more with less...
- But a typical 100 mile LOCAL street network is worth $100,000,000 new - and that’s only the pavement!
  - How long does an ignored street last?
    - 15 Years?
    - 20 Years?
INDOT Roads Cost Even More!

- A Typical Urban Project can cost around $3 million per centerline mile (2-12’ lanes).
- $1.5 million a mile just in asphalt road reconstruction costs.
HOW IN THE #%&! DO YOU DO MORE WITH LESS?

- How many feel you can only do less with less?

- How many have gotten to the point where you have cut to the bone and are watching your roadway assets crumble away?
WORST FIRST EXERCISE

Jot down the number of centerline miles in your city or town.

Let’s say mine is 50 miles. Typical small city of 6,500 people.

If a centerline mile costs $1,000,000 a mile to reconstruct every 20 years using today’s prices, your annual maintenance cost should calculate like this:

\[ 50 \text{ miles} \times \left( \frac{\$1,000,000}{\text{mile}} \right) \times \left( \frac{1 \text{ cycle}}{20 \text{ years}} \right) = \]

\[ \$2,500,000 \text{ per year} \]
You’ll get ahead of the potholes and base failure by milling and overlay every 12 years, instead. Most of us try to do this...

At $220,000 per lane mile your annual maintenance budget should look like:

50 miles x $220,000/mile x 1 cycle/12 years = $916,667 per year
You’ll get ahead of the surface failure by slurry seal every 6 years, instead.

At $40,000 per centerline mile your annual maintenance budget should look like:

50 miles x $40,000/mile x 1 cycle/6 years =

$333,000 per year
Fog seal and crack seal every 5 years. Town of Avon used rejuvenating fog seals with crack seal professionally installed. Crack Seal costs can vary but normally run between $0.50 and $0.75 a SYD. Fog Seals run anywhere from $0.90 to $1.05 a SYD.

At $25,000 per mile your budget looks like this

50 miles x $25,000/mile x 1 cycle/5 years =

$250,000 per year
A well maintained roadway base can last more than 60 years before the base starts to fail.

Normal PASER degradation is around 1 point every 2-3 years.

In Avon, Indiana PASER degradation was slowed to 1 point every 14 years with preventative maintenance.
LCCA COMPARISON

- Reconstruction LCCA = $2,500,000 Per Year
- Mill & Resurface LCCA = $1,750,000 Per Year (30% Saved)
- Slurry Seal LCCA = $1,166,000 Per Year (53% Saved)
- Crack + Fog Seal LCCA = $1,083,000 Per Year (57% Saved)

- Preventative maintenance can cut your yearly budget in half!
- 38% less than mill and resurface
RIGHT TREATMENT ON THE RIGHT ROAD AT THE RIGHT TIME.

HOW IS THIS ACCOMPLISHED?

THE MAINTENANCE IMPROVEMENT PLAN OR

M.I.P.
THE M.I.P.

- How to do more with less.
- Use GIS and Excel to create a Maintenance Improvement Plan or M.I.P.
- This plan will help slow down the aging process and give you time to rehab your network in a way that maintains its condition.
- Where do you start?
How do you catalog your roadway conditions in a way that you can use the data to create a plan of action?

Use PASER to keep it simple and GIS to catalogue your results.
PASER

• Easy to use and analysis criteria available on-line.
• Setup to delineate the rating with proper maintenance treatment.
• Can help avoid errors like crack seal base failure!

Slippery when wet!
QUICK EXERCISE – FIELD WORK

2001 – PASER 8

Minor L/T Cracks
Minor Raveling

2005 – PASER 7 -> 6

Severe L/T Cracks
Severe raveling
Minor Block Cracking
QUICK EXERCISE – FIELD WORK

- Cracks Sealed too late
- Moderate Alligator Cracking

- Severe Alligator Cracking originating from L/T Cracks

2009 – PASER 6 -> 5

2013 – PASER 4
QUICK EXERCISE – FIELD WORK

• Severe Raveling
• Severe Alligator Cracking
• Base Failure along the gutter joint.
• Pot holes
• Probably should have crack sealed the gutter joint and L/T cracks before 2005

2016 – PASER 3 = Pot Holes = Complaints
GIS SETUP

1. Obtain GIS data
   - Road centerlines
   - Corporate boundaries
   - Road classification (if available)
2. Modify base data

- Copy road layer
- Trim/delete roadways to jurisdiction boundaries
- Identify excluded roads (INDOT, private)
- Label street names
- Use colors other than red, yellow, green
- Set up layout view
3. Prepare to collect data
   - Calculate segment length in feet
   - Insert desired fields: measurements, distresses, PASER
   - Use proper field type: text, number, length
   - Use Shapefile-friendly names
   - Use pick lists
   - Assign color range to PASER field: 1=Red, 10=Green

4. Test data entry and start field collection
Select Each Roadway Centerline Segment and Add Attributes

- PASER #
- Defects – Cracks (Types), Rutting, Severity
- Date
- Pavement Width
- Anecdotal Traffic Volume (L,M,H) – Helps in assigning priority
- Other Observations (Standing Water, Drop-Off, Angry Resident….)

ADDING DATA
TYPICAL ARCMAP PASER COLOR SETUP
TYPICAL DATA INPUT
1. Bring field Shapefile into prepared map.
2. Prepare exhibit showing PASER ratings.
3. Correct any missing segments.
4. Export .dbf file for MIP calculations.

And you get....
DBF is a readable format for Excel – Just import

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<th>Material</th>
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*EDITING DATA FOR MIP*
START MANIPULATING DATA

- Use sorting and data features in Excel
• Calculate Segment Areas and Add Maintenance Activities and their Unit Costs
FIVE-YEAR PLAN

- Rule of thumb – cycle of preventative maintenance activities is 5 years

- Divide your PASER organized streets by 1/5 and add your segment yearly costs together

- Prioritize Preventative Maintenance vs. New Pavilion
FIVE-YEAR PLAN – NEW PAVEMENT

- Find all roads < PASER 5
- Prioritize - High Volume, Lowest PASER First
- Divide Between
  - Reconstruction (PASER 1,2)
  - Mill, Patch, Overlay (PASER 3,4)
  - Mill and Overlay (PASER 5)
  - Overlay / Glasgrid with Underseal (PCCP PASER 3-5)
  - Again, divide all segments by 1/5 to get annual pavement rehab needs. FY 2015- FY2019
FIVE-YEAR PLAN – PREVENTATIVE MAINTENANCE

- PASER > 6

- Find all Roads with a PASER 6, 7. They need a waterproof seal. Their base is still good. Use slurry seal, chip seal with fog seal, UTBWC, etc.

- Find all Roads with a PASER 7, 8. They need crack sealing and fog seal rejuvenators.

<table>
<thead>
<tr>
<th>Road Name</th>
<th>Type</th>
<th>PASER</th>
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<td>24 G</td>
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### Preventative

- **Low up-front costs (Touch Many Roads)**
- **High Return on Investment**
- Some don’t like how some treatments look
- Environmental and other INDOT requirements are small

### New pavement

- **Nice new pavement (Everyone is asking for new pavement)**
- **High Up Front Costs (Touch Few Roads)**
- **INDOT requires review of Impacts (usually a formality)**
- Requires expensive supplemental features like new ADA ramps
FIVE-YEAR PLAN – TOTALS

- **Moment of Truth – What do you need?**
- This may become iterative when real world budgets are used.
- You can also forecast what the roads will look like now by calculating a revised PASER number 6 years out.
TAKE EXCEL DATA BACK TO GIS SOFTWARE
• Check Excel file & Join Excel file to previous data.
GIS MAPPING

- Prepare MIP exhibits using different colors for planned maintenance.
- Prepare maps scaled to show necessary details.
TAKE PRELIMINARY PLAN TO DECISION MAKERS & ADJUST
## SET YOUR YEARLY BUDGET

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<tr>
<th>Action</th>
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<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
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<td>HMA + Patching</td>
<td>$201,489</td>
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**First Group Engineering, Inc.**
CREATE YOUR MARCHING ORDERS

- Use Exhibits to Send Crews Out
- OR
- Use Exhibits to Create Bid Documents
OBSERVE TREATMENTS – ENFORCE SPECIFICATIONS

- Make sure you get what you expect
Re-run your field observations every 3-5 years

Don’t go more than 5 years (try to beat election cycles)

Ideally you run your field observations yearly.
USE DATA HISTORY TO TRACK YOUR RESULTS
SUCCESSFUL PLAN

- THIS PROCESS FOCUSES ON WHAT IS NEEDED and does not waste effort or jeopardize safety on time intensive field measurements or expensive LIDAR.

- Its also easy to present to the public and decision makers!
SUCCESSFUL PLAN

- Means Job Security!
- Long Term Reduction in Road Rehab Budget of 40-50% compared to what is needed to maintain your network at its current level.
- This process is low cost – not a budget killer.
- It pays for itself when you use the right treatment at the right time!
QUESTIONS?

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