INDOT Asset Management in 2016

John Weaver PE
Louis Feagans PE
GOALS
Take Care of What We Have

Maintain the existing network of roads and bridge at the highest level of service for the least cost of ownership.

Use the management systems to plan and prioritize projects for the most effective use of our funds.
INDOT Highway Network

11,500 miles of state maintained roads
3,500 miles in the National Highway System
5700 State owned and maintained Bridges
9000 Small Structures

These are the first areas of concentration and make up over 85% of our annual preservation budgets
Asset Management

- DATA MANAGEMENT
- DATA MINING and ANALYSIS
- PREDICTION of MULTI-YEAR NEEDS
- PROJECT REFINEMENT and PRIORITIZATION
- PROJECT SELECTION

TURN DATA into INFORMATION
Data Management

Data Warehouse controls relationships

- Feature Locations – GIS - Roads and Highways
- Asset Inventory – Road sections, NBI numbers, culvert ID’s
- Future Projects - Project numbers
- Current and Past Construction ID’s –
- Financial relationships – Purchase Orders, pay items and contract amounts
Roads and Highways integration
PeopleSoft

SPMS

Road & Bridge Conditions

Roads and Highways

Construction

- The GIS controls locations and asset inventory
- The data warehouse maintains relationships between major systems
Data Management Plan

Objective Rx model output

Pavement or Bridge analysis

DTIMS

ALRS, Asset & Roadway Characteristics

Collector for ArcGIS / ArcGIS for Server

RCE & GP services

GIS visualization

Web Maps - public info
ArcGIS desktop - analysis
Strip maps - visualization

PROJ ECTS/SPMS

WMS

BIAS

Field data collection

Subjective field review
DATA RELATED to the ROAD- Relationships

A TYPICAL ROAD SEGMENT – FROM HERE TO THERE

Inventory Features

R-23333 – Yr 2000
R-21234 – Yr 1997

Conditions

No work planned

Present and Future Work

Age 15, ADT, Asphalt, Poor 11%
Age 19, ADT, Asphalt and Bridge, Poor 19%

Analysis and Reporting

Project History

R-23333 – Yr 2000
R-21234 – Yr 1997

Cracks and IRI

DES 1567873 – FY 2017
Des 1300056

Landmarks, Ref Posts, Boundaries
Bridges & Culverts

A TYPICAL ROAD SEGMENT – FROM HERE TO THERE
Multi-year Prioritization Process

**STEP 1**
ANNUALLY ACCUMULATE DATA
Pavement and Bridge

**STEP 2**
ANALYZE to PREDICT FUTURE NEEDS
PROJECT SELECTION
3-6 year window

**STEP 3**
LIST OF CANDIDATE NEW PROJECTS to the DISTRICTS

- Budget Amounts
- Existing Programed Projects
- Project Cost, Treatment, Year of Need
Multi-year Prioritization Process

**STEP 4**

FIELD CHECK & REVIEW PROJECTS
- MODIFY LIMITS & PRIORITIES
- SELECT REHAB ALTERNATIVES
- PACKAGE LIKE WORK and YEARS

**STEP 5**

DOCUMENT INTENDED SCOPE OF PROJECTS
- COST
- ALTERNATIVES
- DELIVERY YEAR
COMBINE PROJECTS AND REPRIORITIZE PROJECTS
DOES IT MOVE the NEEDLES?

REVISE SCOPE COST AND DOCUMENTATION

MODIFY SCOPE?

BUDGET OK?

NEXT YEAR PROGRAM?

APPROVED 5 YEAR PROGRAM

Multi-year Prioritization Process

Pavement and Bridge Preservation - Percent POOR - $1B 2017 thru 2020 + $100m/yr after

- Total Pavement Invest
- Total Bridge Invest
- COMPOSITE % Poor
- Improvement TREND


Millions

0.0% 1.0% 2.0% 3.0% 4.0% 5.0% 6.0% 7.0% 8.0%

$0 $200 $400 $600 $800 $1,000 $1,200

Pavement and Bridge Preservation Percent Poor 2017-2030

Improvement TREND
Questions

(North Carolina)
Generate Strategies

- GENERATE all FEASIBLE ENGINEER ALTERNATIVES
  - Trigger first Treatment, Cost and Year
  - Calculate Treatment Results
  - Trigger next Treatment, Cost and Year
- Calculate Life-Cycle Costs
- Calculate Life-Cycle Benefits
TODAY'S CONDITION

COST $1.75 million in 2021, 1 Lay Overlay
Benefit for each Combo

Benefit is CONDITION POINT-YEARS x TRAFFIC of the Strategy

- Benefit Area Now
- Benefit Area of Treatment 1
- Benefit Area of Treatment 2
Lists of Projects, Year and Cost

- **Process repeated for each asset**
  - Generate all feasible engineering alternatives
    - Treatments
    - Cost
    - Benefit
  - Thousands of combinations

- **Calculate the Maximum Benefit**
  - Test Multiple Budget Scenarios
  - Test Mixtures of Replacement vs PM
  - Test Mixtures of Pavement and Bridges