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

- Safety
- Pavement
- Maintenance
- Other Assets
- Planning
- 511 Travel Info
- HPMS
- Deighton
- Agile Assets
- Bentley® inspecttech™

Indiana Department of Transportation
A State that Works
Data Management

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

PeopleSoft

SPMS

Road & Bridge Conditions

Rocks and Highways

Construction
**Data Management Plan**

- **Pavement or Bridge analysis**
  - DTIMS

- **Objective Rx model output**
  - Collector for ArcGIS
  - ArcGIS for Server

- **Subjective field review**

- **GIS visualization**

- **Rocks and Highways**

- **Field data collection**
  - ALRS, Asset & Roadway Characteristics

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

- **PROJ ECTS/SPMS**
  - Event Collection
  - Project Management System

- **BIAS**

- **WMS**
  - Resource Collection
  - Geoprocessing Services
DATA RELATED to the ROAD- Relationships

A TYPICAL ROAD SEGMENT – FROM HERE TO THERE

Landmarks, Ref Posts, Boundaries

Bridges & Culverts

Inventory Features

R-23333 – Yr 2000

R-21234 – Yr 1997

Project History

Cracks and IRI

Conditions

Present and Future Work

Age 15, ADT, Asphalt, Poor 11%

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

No work planned

DE 1567873 – FY 2017

Des 1300056

Analysis and Reporting
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
Multi-year Prioritization Process

- 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?
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
Treatment Prediction

Individual Project Forecast Method

- Average Family Deterioration
- Current Condition and Prediction
- Treatment Result
- Life Cycle Subsequent Treatment

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