Implementing a Strategic Highway Transportation Asset Management System at UDOT

Jeffrey L. Zavitski, B.A.
Asset Management Specialist
Deighton Associates Limited
&
Kim Schvaneveldt, P.E.,
Asset Management Director UDOT
Today’s Presentation:

- Introduction
- The “Asset Management Paradox”
- The Implementation Project
- UDOT’s Planning Process
- Asset Management Software
- Conclusions
Introduction: Asset Management - UDOT

• $1.59 Billion Project – 17 mile mainline interstate through Salt Lake City Corridor
• 130 structures – 3 major junctions with other freeways and 7 major urban interchanges
• Following completion: Legislature challenged UDOT to decide between UDOT Maintenance or a Private Maintenance Contract (PMC) for the new facility.
• UDOT chose to continue UDOT maintenance and to implement an asset management system.

I – 15 Design Build Project:

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Deighton Associates Limited:

- Located in Ontario, Canada;
- World wide partners and distributors;
- Asset Management system development and implementation since 1984 at the Federal, Provincial, State, Region and Municipal levels;
- Working with UDOT since 1991.
- Data integration and analysis software tools and expertise to empower asset managers.
Initial Project Development:

- Discussions commenced Summer of 2002
- Deighton software at UDOT
- Deighton was hired to develop the project scope and outline the framework for the asset management system implementation at UDOT.
- Initial discussions regarding the goals and objectives of the project as well as the scope, task, and deliverables resulted in the discovery of the “Asset Management Paradox”.
The Asset Management Paradox
The Asset Management Paradox

- Data
- +
- Integration
- +
- Analysis

is

Asset Management

- Data
- +
- Integration
- +
- Analysis

is not

Asset Management
"An asset management system can not be implemented in any agency unless that agency first adopts best practice asset management."

"An asset management system is not necessarily in itself good asset management"
“An agency uses asset management so it can deliver a safe, efficient and reliable transportation service to its community.

At the same time, an agency uses an asset management system so it can use a systematic practical approach to practicing asset management.”
The Implementation Project
Project History 2002 through to the present:

- **Phase 1: Strategy, Plan and Scope**
  - Asset Management Team
  - Asset Management Strategic Plan And Implementation Plan

- **Phase 2: Proof of Concept**
  - Will the Asset Management System deliver results?

- **Phase 3: System Implementation over 4 years.**
  - Pavements
  - Bridges
  - Safety
  - Mobility
  - Maintenance features
Phase 1: Strategy, Plan and Scope

Organizational Framework

- AM Team
  - UDOT & Deighton
- AM Committee
- AM Exec. Committee
- Nested Relationship

Glen A. Ames, P.E. UDOT Asset Management Engineer,
Asset Management Jump Start, (TRB Conference, November 2005)
Phase 1: Strategy, Plan and Scope

Incremental Development Methodology

- Functionality
- Time

Appropriate Level

IDM © Deighton Associates Limited, 2002
Phase 1: Strategy, Plan and Scope

- Other Asset Management Literature
- International Asset Management Guide
- Asset Management Best Practice Components
- NCHRP: Asset Management Guide
Phase 1: Strategy, Plan and Scope

- Asset Management Best Practice Components
  - Self-Assessment Survey
    - UDOT's Desired Asset Management Components
      - Develop/Adjust Asset Management System's Goals & Objectives
        - UDOT's Asset Management Strategy
        - UDOT's Asset Management Plan
Phase 1: Strategy, Plan and Scope

Accomplishments:

- NCHRP 20 – 24 Self Assessment Survey Modified and distributed;
- Survey results reviewed and presented;
- Asset Management Strategy developed and published
- Asset Management Implementation Plan developed and published
- Multi-phase dTIMS CT Asset Management System Implementation Plan developed
Phase 1: Strategy, Plan and Scope

Lessons learned from Phase 1:
- The survey is only a “menu” of best practice components;
- Survey respondents will take an active role in implementing the selected best practice components;
- Asset Management System is one part of Asset Management;
- Strategy and Plan will cover many years, adoption will not happen overnight.
- There is no “silver bullet” solution.
Phase 2: Proof of Concept

Demonstrate the Asset Management System Analysis

- Could the AMS deliver the results?
- Could Deighton demonstrate the AMS “cross asset analysis and optimization”.
- Could UDOT get answers to the questions being asked by the legislature:
  - Effect on asset condition with a 15% increase in funding?
  - Effect on asset condition with a 15% decrease in funding?
  - Effect on asset condition with a trade-off of Maintenance and Preservation dollars against congestion mitigation dollars?
Phase 2: Proof of Concept

Demonstrate the Asset Management System Analysis

Operational Level Bridge Analysis: Total Needs Condition Distribution

Sign Replacement Strategies

Operational Level Drainage Analysis Results

Operational Level Pavement Analysis: Total Needs Condition Distribution

Bridges

Signs

Drainage

Pavements
Phase 3: AMS Implementation

Phase 3: Implement the AMS

- Pavements and Bridges completed in 2003
- Safety and Mobility completed in 2004
- Maintenance Features currently being implemented
- AMS includes:
  - Asset Management Database – provides the data integration
  - Asset Management Analysis –
    - stovepipe type
    - cross asset analysis and optimization
    - strategic analysis module
UDOT’s Planning Process
UDOT’s Planning Process

Organizational Structure

Stakeholders

Strategic Planning

Tactical Planning

Day to Day Operations

Quality information provided from strategic to operational levels from one asset management database

Data describing all assets integrated into one asset management database

Horizontal Integration

Vertical Integration

Pavement  Bridge  Signs  Safety  Mobility
UDOT's Planning Process

1. Project Harmonization
   Regions & Asset Groups

2. Harmonized Project Recommendations

3. Planning

4. Long Range Plan Development

5. Corridor Development Plan

6. Long Range Plan
## UDOT Planning and Programming Schedule

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The Asset Management System Software
AMS: dTIMS CT Software

- dTIMS CT Desktop
- dTIMS CT Enterprise
  - MS SQL Server
  - Oracle (2007)
AMS: dTIMS CT Software

- User Defined Database
- User Defined Analysis
- Any Asset
  - Highways
  - Railways
  - Airports
  - Utility sector
AMS: “Stovepipe Type” Analysis

- Pavement Analysis
  - Pavement Strategies
    - Budget Scenario 1
      - Reports and Graphs
    - Budget Scenario 2
      - Reports and Graphs
    - Budget Scenario x
      - Reports and Graphs
AMS: Cross Asset Optimization Model

- Official Network Definition
- Pavement Data and Models
- Structure Data and Models
- Safety Data and Models
- Mobility Data and Models
- Maintenance Data and Models

- dTIMS CT Asset Management Database
  - Pavement Analysis
  - Pavement Strategies
  - Structures Analysis
  - Structure Strategies
  - Safety Analysis
  - Safety Strategies
  - Mobility Analysis
  - Mobility Strategies
  - Maintenance Analysis
  - Maintenance Strategies

- dTIMS CT Cross Asset Analysis and Optimization

- Cross Asset Analysis Reports and Graphs
Future Developments

• Additional Strategic Level Performance Measures
  – Economy
  – Society
  – Environment

• Additional Analysis Methodologies – Optimization Objective Functions
  – Asset Value
  – User Costs
  – Risk

• Additional Assets
Conclusions

- Asset management strategy and implementation plan are the starting points in any asset management implementation;
- Asset Management Team must include Senior Management and have their support;
- An asset management system is not necessarily in itself good asset management;
- Asset management necessitates a well defined planning process to ensue actions relate directly to the asset management goals and objectives of the agency outlined in its strategic plan;
- Incremental Development focuses on Pragmatism before Perfection.
Thank you.

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