Southeastern Conference on Pavement Management and Design

Changing PM To AM

a

5 Phase Process

Jim Watson

Net Prophet, Inc and The NTC Group
Issues That Must Be Faced

• Budgets are under unprecedented attack by State legislators.
• Current business processes are often seen operating as “Silos”, or “independent islands”
• Need to present a solid **Business Case** for fully funding Requirements.
• Need to leverage every budget dollar to produce maximum return. (Do more with less)
• Lack of integration means inaccurate data and reduced capability for central reporting and planning
Current Status

- Typically Maintenance, Repave, Structures, and Design Departments are organized as functional Islands.
- Budgets are distributed based on formula or history
- Each Department collects data only to accomplish its mission.
- Departments are in competition for finite funding
- GASB 34 has caused some changes and confusion
- Needs cannot be articulated in a manner to produce the needed funding
Recommended Approach

- Phase I
  - Business Process Flow Chart

- Phase II
  - Standardization of data inputs into various legacy management systems (CMMs, PM, Pontis, etc)
  - “Umbrella“ system to sit over other Department systems, extract and input data into Asset Management Module

- Phase III
  - Financial and Operational What-if Modeling
  - Business Case for Optimized Budget

- Phase IV
  - Budget Implementation

- Phase V
  - Feed back to each MS through Asset Management module. Plus CPI

NetProphet, Inc and The NTC Group
PHASE I

Business Process Infrastructure Assessment
Phase I

Information Systems Assessment

- Executive Information Needs
- Decision Enablers
- Performance Management
- Data Collections
- Start-Up & Preparation
- Data Gathering
- Strategy Alignment
- Issues
- Individual Follow-ups
- Information Systems Assessment

Outside of Project Scope

- Applications Architecture
- IS Org Effectiveness
- Policies & Procedures
- Data Security & Control
- Disaster Recovery
- Applications Maintenance

Current Information Systems Support of Strategic Goals & Objectives, Decision Support, and Performance Monitoring
NetProphet, Inc  and The NTC Group

Strategic and Tactical Alignment

Phase II
DOT Challenge – Alignment and Mission Focus

Typical Issues
- Budgets
- Compliance
- Internal Reporting
- Resource Allocation
- External Reporting

Bond Ratings

Finance & Accounting
- Performance Measures
- Forecasting
- Planning
- Goals & Objectives
- Systems & Integration

Construction

Mass Transit

IT

Engineering

Safety

Administration

Maintenance

Communications

Public Relations

NetProphet, Inc and The NTC Group

Phase III
Benchmark Case

- The Pavement asset of an client represents an investment of over $1.2 billion*
  - Replacement cost of Management Unit
• This asset is being depleted at a rate of over $60 million per year*
  
  * assumes average life of 20 years
• With a strategic initiative to extend asset life, the potential savings in finance costs alone is over $50 million * per year

* Cost of bonding @ 4.1%
• **THE OPPORTUNITY**
  • For each year of additional life that investments in strategic repairs gains …
  • Client realized $110 million value added to its bottom line.

• Cost of Capital @ $50,000,000
• Cost of Depletion @ $60,000,000

NetProphet, Inc and The NTC Group
Program Foundation

NetProphet is an expert knowledge system powered by a comprehensive database of actuarial tables and deterioration curves.
Condition Index (PCI)

- By the Numbers approach.
- 1000 represents a component with all of its design life remaining
- 0 represents Financial failure
- “Deduct Values” are assigned to a component’s score based on the density and severity of its observed defects
## Transportation Asset Component Condition Index

<table>
<thead>
<tr>
<th>Building LT003</th>
<th>Facility Condition Index</th>
<th>510</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building LT002</td>
<td>Facility Condition Index</td>
<td>655</td>
</tr>
<tr>
<td>Highway Lt001</td>
<td>Asset Condition Index</td>
<td>795</td>
</tr>
<tr>
<td>Guard Rail</td>
<td>Signage</td>
<td>880</td>
</tr>
<tr>
<td>Drainage</td>
<td>Lighting</td>
<td>790</td>
</tr>
<tr>
<td>Landscaping</td>
<td>Rest Stops</td>
<td>810</td>
</tr>
<tr>
<td>Mechanical</td>
<td>Vistas</td>
<td>460</td>
</tr>
<tr>
<td>Pavement</td>
<td>Park And Ride</td>
<td>410</td>
</tr>
<tr>
<td>Bridge</td>
<td>Rails</td>
<td>810</td>
</tr>
</tbody>
</table>
Deterioration Curves

• A typical curve for a static exterior element (Such as a Paved Surface) can be described as an 80/20 curve
  – Eighty percent of the deterioration occurs within the last twenty percent of its life span
The Meaning of Life

by James Watson
United States
Financial Life (Remaining Life (RL))

Financial Failure

When the annual cost to maintain exceeds the annualized cost to replace*

Annual cost to replace

Annual cost to maintain

Money

Years

“0” on Condition scale

750 Condition scale

*Annualized Replacement cost includes the cost of capital
A New Metric Required

• “You can’t manage what you can’t measure.”
NetProphet
Integrated Highway Management System

The breakthrough Integration Tool.

Modeling the impact on system deterioration (Cost) of several funding options
## Strategically Distributed Fully-Funded Budget

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital</td>
<td>850,697</td>
<td>310,128</td>
<td>53,88</td>
<td>31,640</td>
<td>75,211</td>
<td>1,321,557</td>
</tr>
<tr>
<td>Patch L,H,S</td>
<td>10,223</td>
<td>8,371</td>
<td>11,371</td>
<td>18,927</td>
<td>5,280</td>
<td>54,172</td>
</tr>
<tr>
<td>Perm. Repairs</td>
<td>172,998</td>
<td>39,371</td>
<td>23,124</td>
<td>37,882</td>
<td>4,129</td>
<td>277,504</td>
</tr>
<tr>
<td>Total</td>
<td>1,033,918</td>
<td>357,870</td>
<td>88,376</td>
<td>88,449</td>
<td>84,620</td>
<td>1,653,233</td>
</tr>
</tbody>
</table>

| PCI | 767 | 771 | 763 | 758 | 759 | 763 |

- **Optimized Funding**: $1,653,232
- **Investment in Repairs**: $331,676
- **Value Generated**: $1,435,413
- **Return on Investment**: 423%
- **Value of ROI**: $1,103,737
## Constrained Budget

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital</td>
<td>284,381</td>
<td>870,702</td>
<td>45,395</td>
<td>284,171</td>
<td>67,500</td>
<td>1,552,149</td>
</tr>
<tr>
<td>Patch, L,H,S</td>
<td>37,418</td>
<td>30,433</td>
<td>23,959</td>
<td>43,533</td>
<td>33,762</td>
<td>169,105</td>
</tr>
<tr>
<td>Perm Repairs</td>
<td>135,330</td>
<td>44,657</td>
<td>73,086</td>
<td>64,765</td>
<td>27,369</td>
<td>345,207</td>
</tr>
<tr>
<td>Total</td>
<td>457,129</td>
<td>945,792</td>
<td>142,440</td>
<td>392,469</td>
<td>128,631</td>
<td>2,067,461</td>
</tr>
</tbody>
</table>

Constrained Budget:

- Total Investment based on Optimized Funding: $1,653,232
- Total Investment in Repairs: $331,676
- Value of life Extension Generated: $1,435,413
- Return on Investment: 423%
- Value of ROI: $1,103,737

Constrained Budget:

- Total Investment based on Optimized Funding: $2,067,461
- Total Investment in Repairs: $514,312
- Value of life Extension Generated: $1,198,358
- Return on Investment: 133%
- Value of ROI: $684,046
Penalty Cost of Under-Funding

- Benefit of Deferment: Cost to rent $600,000 for 1 year-- or $24,000 savings
- Increased Cost: $420,000 additional over five years
- Penalty Cost (Increased cost of Maintenance)
  \[ \$420,000 - \$24,000 = \textbf{\$396,000} \quad (NPV = \textbf{\$350,000}) \]
Other Penalties to Consider

• Accelerated structural damage
  (Loss of Leveling course, Loss of Base.)
• Damage to Autos
• Safety Issues
• Increased Drive Time
• Loss of Tourist Dollars
The Need

*Measured Budget*

- Maintenance Funds
- Capital Funds
- Cost
- Lowest Cost

NetProphet, Inc and The NTC Group
GASB 34 AM Adds Value

- Asset Management for Financial Returns
- Cost avoidance initiatives
- Provable Stewardship Metric
- Lets Public know the penalty cost of underfunding requirements
The Process

• Stage I – Process Flow Study
• Stage II – Integration of Legacy Data
• Stage III - Predictive Modeling
• Stage IV - Strategic Planning
• Stage V - Plan Implementation and CPI
The Holistic Perspective