Asset (Pavement) Management Systems: Overview

Arif Rafiq
Deighton Associates Limited

October 20, 2010 - Rocky Mountain PPP (Boise, Idaho)
### Data is Simply Data

<table>
<thead>
<tr>
<th>Age</th>
<th>Behavior</th>
<th>Duration</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>2</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>9</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>16</td>
<td>9</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>16</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
<td>15</td>
<td>2</td>
</tr>
</tbody>
</table>
Effectiveness of Grounding Your Kids (Ages 8 to 16)
Effectiveness of Treatment “A” vs. Time Elapsed

Effectiveness

Time Elapsed

Optimal Delay
Social Acceptance of Beating Your Kids

Physically Disciplining

Acceptance Level

Transform Your Data Into Information

Physically Disciplining
Social Acceptance of Beating Your Kids

1960: “Instilling fear is a good thing!”

1970: “Bring it on!”

1980: “It’ll make ‘em stronger”

1990: “Poor kid’s going to live with these emotional scars”

2000: “what a cruel, heartless parent!”

2010: *knock knock*…
“Good evening sir, this is child protective services”
An Asset Management System provides you with the tools to transform your data into *Information*

... Present it clearly and effectively

... Permit multiple people access to it

... with an easy to use interface

... and allow them to ask the real tough questions.
What is the best way to discipline my kids?

- Grounding
- Spanking
- Family Discussion
- Timeouts
- “The Belt”
- Silent Treatment

... and when should I use them?
Which Treatments Should I Use?

What are the best treatments for my network?

- Crack Seal
- Cold-in-Place Recycling
- Overlay
- Full Depth Reclamation
- Chip Seal
- Micro-surfacing

... and when should I use them?
Your Kids’ Behavior as a Result of Treatment

- Treatment A: Grounding
- Treatment B: Timeout
- Treatment C: Family Discussion
Optimized Recommended Treatment Program

Pavement Condition as a Result of Treatment

- Treatment A: Crack Seal
- Treatment B: Micro-surfacing
- Treatment C: Cold-in-Place Recycling

Pavement Condition vs. Time
Your Kids’ Behavior as a Result of Treatment

- **Treatment A:** Grounding
- **Treatment B:** Timeout
- **Treatment C:** Family Discussion
Effective Process Planning

Identify Problem

Behavior Index < 75% ?

Use Appropriate Discipline

Adequate Time elapsed since last event?

Behavior Index < 85% ?

Planned Behavior Index > 90% ?

Deliver Warning

Do Nothing

Use Planned Discipline
Effective Process Planning

Identify Distress

Condition Index < 75% ?

YES

Use Appropriate Treatment

NO

Scheduled Maintenance?

Yes

Planned Resulting Index > 90% ?

NO

Mark For Examination Next Cycle

NO

Condition Index < 85% ?

Do Nothing

YES

Use Planned Treatment

This decision tree / workflow is shown for demonstration purposes only and does not reflect any actual process.
Smooth Process Workflows

Changes to Network?
- YES: Update Network Definition
- NO: Review suggested program and Adjust
  For factors not considered during optimization process
  Eg: Political, Favoritism

Update Budget Scenarios
- YES: Changes to Budget?
- NO: Run Analysis

New Treatments Identified?
- YES: Update Treatment List
- NO: YES: Update Network Definition

Initiate Program & Generate Reports
Smooth Process Workflows

- Minimize the learning curve
- Straightforward Process Development
- Create ad-hoc Customizable Workflows
Effective Visualization

Illustrate the answers to those tough questions…
Effective Visualization

Illustrate the answers to those tough questions...
Effective Visualization

Illustrate the answers to those tough questions…
Effective Visualization

Illustrate the answers to those tough questions…
What is the best way to discipline my kids?

- Grounding
- Spanking
- Family Discussion
- Timeouts
- “The Belt”
- Silent Treatment
What is the best way to discipline my kids?

- Grounding
- Spanking
- Family Discussion
- Timeouts
- "The Belt"
- Silent Treatment
- Scolding
- Refrain From Petting
- Withhold Doggie Treats
- Stare down
- "The Belt"

Different set of treatments… same overall goal
Optimize Treatment Program Across Assets

Different set of treatments… same overall goal

Targets:
- Child’s behavioral index > 80%
- Dog’s behavioral index > 70%

Constraint:
- Limited Budget
  ... of “disciplinary energy”
  cannot exceed 100%
Different set of treatments… same overall goal

Targets:
• Roads’ Condition index > 80%
• Bridges’ Condition index > 70%

Constraint:
• Limited Budget
  ... of “available funds”
  cannot exceed $10M per year
What are the possible career choices for my kids?

- Engineer
- Doctor
- Physicist
- Sanitation Worker
- Stripper
What are the possible career choices for my kids?

- What is the likelihood they will choose to become an engineer?
- Doctor
- Physicist
- Sanitation Worker
- Stripper

- What is the risk they will make a “less than ideal” or “less traditional” choice?
- When should I intervene to help prevent this choice from being made?
Beyond Deterministic Models

What are the possible negative effects of my selected program?

- Catastrophic Failure
- Extensive Vehicle Damage
- Environmental Harm
- Reduced Safety
- Negative Public Perception

- What is the likelihood of material failure?
- What is the risk of environmental degradation due to a particular treatment program?
- When should I intervene to help prevent these effects from occurring?
An Asset Management System provides you with the tools to transform your data into *Information*

… Present it clearly and effectively (*visualization*)

… Permit multiple people access to it (*transparency*)

… with an easy to use interface (*efficiency*)

… and allow them to ask the real tough questions. *(even the ones you haven’t thought of yet)*
Thank You

Arif Rafiq
Deighton Associates Limited
arif.rafiq@deighton.com

October 20, 2010 - Rocky Mountain PPP (Boise, Idaho)