Visualizing Pavement Management Data at the Project Level

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Outline

• Considerations in Data Visualization and Software Development
• Pavement Management: Decisions and Data
• Segment Viewer: Interactive Straight Line Diagram
• Segment Viewer Examples
• Conclusion
Considerations in Data Visualization

• Horizontal Scale
• Vertical Scale
• Color
• Color Intensity
• Text or symbolization
• Data Density
Considerations in Software Development

• Code Reusability (Templates)
  – How many different pieces of data fit this particular visualization?

• User Experience (Interaction)
  – What is an intuitive way to interact with the visualization?
Pavement Management Decision Levels

- **Strategic**: Broad based decisions, low level of detail
- **Network**: Moderate level of detail and breadth of decisions
- **Project**: High level of detail with focus
- Decisions at all levels are synergistic
Data Complexity for Pavements

Factors affecting pavement performance (after Haas 2001)
Data Complexity in Pavement Management
Segment Viewer

- Interactive Straight Line Diagram
- Pick *any* segment of State Route
- Choose from over 40+ Data Components to stack vertically and compare
- Draw a straight line down to compare data at the same location
Segment Viewer Examples

Segment Scope
Segment Viewer Examples
Segment Scope
- SR 509 Milepost 21.42 to Milepost 29.89
- Total Length
- Slider Allows for Quick Limit Changes on Same Route
- Slider serves as reference scale
- Other Controls
Segment Viewer
Examples
Segment Scope
- Number and Type of Lanes
- Changes in Configuration (Number of Lanes, Divided/Undivided)
- Total Lane Miles
- Surface Type
- City Limits
- Speed Limit
Segment Viewer Examples
Segment Scope
<table>
<thead>
<tr>
<th>Access Control Type Description</th>
<th>Federal Functional Class Description</th>
<th>Urban Other Principal Arterial</th>
<th>Urban Other Freeway/Expressway</th>
<th>Freight Classification</th>
<th>T3</th>
<th>NHS</th>
<th>True</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Limited Access Least Restrictive</td>
<td>Limited Access Fully Controlled</td>
<td>Urban Other Principal Arterial</td>
<td>Urban Other Freeway/Expressway</td>
<td>Freight Classification</td>
<td>T3</td>
<td>NHS</td>
<td>True</td>
</tr>
</tbody>
</table>

- Access Control
- Functional Class
- Freight Classification
- NHS Status
Segment Viewer Examples

Segment Scope
- AADT
- Percent Trucks
- Annual ESALs
Why the large change in AADT?
Why the large change in AADT?
Cracking not an issue

Rutting ~0.7"

Section determined due for resurfacing in 2011, based on rutting.

Acceptable

Unacceptable
Segment Viewer
Examples
Condition and History

Cracking not an issue

Rutting ~0.7”

Section determined due for resurfacing in 2011, based on rutting.
• Material Type
• Year of Work
• Vertically Scaled to Thickness
• Click for Details
Segment Viewer
Examples
Condition and History

Cracking not an issue
Rutting ~0.7"

Section determined due for resurfacing in 2011, based on rutting.
• Cracking
• Rutting
• Roughness
• Indexes
• Due Years

Cracking not an issue
Rutting ~0.7”
Segment Viewer
Examples
Condition and History

Cracking not an issue
Rutting ~0.7"

Section determined due for resurfacing in 2011, based on rutting.

Acceptable
Unacceptable
Section determined due for resurfacing in 2011, based on rutting.

Acceptable

Unacceptable
Progression from:

Survey Unit (0.1 mile)

to Preservation Unit (~1 mile)

to Planning Unit (~2 miles)

to Pavement Preservation Project
Segment Viewer Examples

Multi Lane Data
Segment Viewer on a Mobile Platform

- Sync to GPS Location
- Track GPS
- Save Comments and Photos
- Straight Line Updates with GPS
Part of a Robust Pavement Management Toolbox
Questions?

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