Measuring Sustainability on Tollway Projects

Paul Kovacs, Illinois Tollway
April 12, 2017
Move Illinois Program

ADDRESS EXISTING SYSTEM NEEDS

JANE ADDAMS MEMORIAL TOLLWAY
$2.5 billion

ELGIN O’HARE WESTERN ACCESS
$3.4 billion

I-294/I-57 INTERCHANGE
$719 million

INTERCHANGES AND OTHER EMERGING PROJECTS

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Measuring The Sustainability Of Pavement

You cannot control what you do not measure
Process For Pavement Type Selection

Agency-based pavement-type selection

1. Identification of feasible alternatives
2. Development of pavement life cycle strategies
3. Life cycle cost analysis
4. Evaluation of economic and noneconomic factors
5. Agency-based selection of preferred pavement type
6. Design-bid-build preferred pavement type
### Pavement Type Selection Grade Card

*Combines economic and noneconomic factors*

<table>
<thead>
<tr>
<th>Guide Factors</th>
<th>Tollway Factors</th>
<th>Factor Weight</th>
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<tbody>
<tr>
<td>Initial cost</td>
<td><em>Initial Construction Cost</em></td>
<td>40%</td>
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<tr>
<td>Rehabilitation cost</td>
<td><em>Capital Preservation Cost</em></td>
<td>40%</td>
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<tr>
<td>Maintenance Cost</td>
<td>“Green” - Recycling Factor</td>
<td>10%</td>
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<tr>
<td>Conservation of materials/energy</td>
<td><em>Constructability / Schedule Factor</em></td>
<td>10%</td>
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<tr>
<td>Sustainability</td>
<td>Preference to keep Maintenance yards consistent</td>
<td></td>
</tr>
<tr>
<td>Traffic during construction</td>
<td>No difference between alternatives</td>
<td></td>
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<tr>
<td>Availability of local materials</td>
<td></td>
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<tr>
<td>Stimulation of competition</td>
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<tr>
<td>Maintenance capability</td>
<td></td>
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<tr>
<td>Subgrade soils</td>
<td></td>
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<tr>
<td>Future needs</td>
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<tr>
<td>Experimental features</td>
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<tr>
<td>Safety</td>
<td></td>
<td></td>
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<tr>
<td>Continuity of adjacent sections</td>
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<tr>
<td>Continuity of adjacent lanes</td>
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<tr>
<td>Roadway geometrics</td>
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<tr>
<td>Noise issues</td>
<td>Not considered</td>
<td></td>
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<tr>
<td>Local preference</td>
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</tbody>
</table>
LCA Application to Pavement Life Cycle

Designs for current and future traffic

Pavement types evaluated

Life cycle strategy examples

- Jointed Concrete
- Reinforced Concrete
- Full-Depth Asphalt
- Asphalt over Reinforced Concrete
- Asphalt over Jointed Concrete

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Illinois Tollway LCA Process

Intended to be used for projects more than $10 million

Includes five categories

- Drainage
- Landscaping
- Lighting
- Pavement
- Structures (six sub-categories)
Illinois Tollway LCA Process

Each category broken into as many as four phases
• Materials and construction
• Maintenance and rehabilitation
• Use
• End-of-life

Environmental impact categories
• Global warming potential
• Total energy
• Single point score (several impacts combined into a single value)
Lessons Learned And Future Direction

Input and output data must be trustworthy and accurate

Programs must be made easy to adopt and implement (training manuals and programs are critical)

Programs should be easy to update or modify

Pavement tools need to be developed for future performance-related specifications
THANK YOU