Session 11: Strategy Selection
Learning Outcomes

1. Describe the treatment selection process
2. List the components of a life-cycle cost analysis
3. List other factors that may enter the selection process
Treatment Selection Process

1. Conduct pavement evaluation.
2. Determine distress causes.
3. Identify potential treatments.
4. Identify constraints.
5. Develop feasible treatment strategies.
6. Assess the life-cycle costs associated with treatment strategies.
7. Select preferred strategy.
Step 1. Pavement Evaluation

- Distress survey
- Drainage survey
- Deflection testing
- Roughness and friction testing
- Field sampling and testing
Information from Pavement Evaluation

Table 11.1 on p. 11.2

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Distress</th>
<th>Drainage</th>
<th>Deflection</th>
<th>Rough/Friction</th>
<th>Field Sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Adequacy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>Functional Adequacy</td>
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<td>✓</td>
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<tr>
<td>Drainage Adequacy</td>
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<td>Materials Durability</td>
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<td></td>
<td>✓</td>
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<tr>
<td>Maintenance Applications</td>
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<tr>
<td>Shoulders Adequacy</td>
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<td>✓</td>
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<tr>
<td>Overall Variability</td>
<td>✓</td>
<td>✓</td>
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</tr>
</tbody>
</table>
Step 2. Determine Causes of Distress and Deficiencies

- Determine root cause(s) for observed distress and deficiencies
  - Structural problem?
  - Functional problem?
  - Materials problem?
  - Drainage problem?
Step 3. Identify Treatments

- Preservation Treatments
  - Restore slab integrity
  - Restore functional performance

- Rehabilitation Treatments
  - Provide structural enhancement
  - Overlays

- Reconstruction
  - No remaining life
Treatment Timing

Pavement Preservation window

Preventive Maintenance

Pavement Condition

Good

Poor

Time

Maintenance

Rehabilitation

Reconstruction
Distress? Causes? Treatments?
Distress? Causes? Treatments?
Distress? Causes? Treatments?
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Distress? Causes? Treatments?
## Trigger/Limit Values for Pavement Preservation (JPCP)

<table>
<thead>
<tr>
<th>Performance Indicator</th>
<th>Trigger Value</th>
<th>Limit Value</th>
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</thead>
<tbody>
<tr>
<td>Trans. Cracking</td>
<td>1.5-2.5% of slabs cracked</td>
<td>5-15% of slabs cracked</td>
</tr>
<tr>
<td>Joint Spalling</td>
<td>1.5-2.5% of joints</td>
<td>15-20% of joints</td>
</tr>
<tr>
<td>Joint Faulting</td>
<td>0.10 inches</td>
<td>0.50-0.70 inches</td>
</tr>
<tr>
<td>Roughness</td>
<td>63-90 in/mi</td>
<td>160-220 in/mi</td>
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</table>
Step 4. Identify Constraints and Selection Factors

- Key factors that might influence selection process
  - Treatment related factors
  - Project-related factors
Example Constraints and Selection Factors

- Available funding.
- Future maintenance requirements.
- Geometric restrictions.
- Available lane closure time.
- Traffic control options.
- Contractors’ experience with the treatment.
- Availability of equipment and materials.
- Competition amount providers of materials.
- Agency policies.
- Political concerns.
Step 5. Develop Strategies

- **Strategy:** a treatment or a group of treatments needed to address all of the deficiencies on a project
  - Currently
  - In the future
Treatment Strategies

**Strategy 1**
- Initial Construction
- Rehabilitation
- Time

**Strategy 2**
- Initial Construction
- Preventive Maintenance
- Rehabilitation
- Time
Step 6. Assess LCC

- Life-cycle cost analysis (LCCA)
  - Compares design or rehabilitation alternatives
  - Considers all significant costs
  - Evaluates the alternatives over the same analysis period
- Analysis approaches
  - Deterministic
  - Probabilistic
Inputs to the LCCA Process

- Agency costs
  - Initial
  - Future M & R
- Analysis Period
- Treatment Performance Period
- Discount Rate
- Salvage Value
- User Costs
LCCA Commentary

- Lowest LCC suggests most cost-effective strategy
- Some aspects of LCCA controversial (especially user costs)
- Small (<10-15%) differences in LCCA not considered significant
- Other selection factors may override
Example Constraints and Selection Factors

- Available funding.
- Future maintenance requirements.
- Geometric restrictions.
- Available lane closure time.
- Traffic control options.
- Contractors’ experience with the treatment.
- Availability of equipment and materials.
- Competition amount providers of materials.
- Agency policies.
- Political concerns.
Step 7. Select Strategy

- Consider LCC results
- Evaluate strategy in relation to key constraints and decision factors
- Develop appropriate sequencing of activities
Treatment Sequencing

Fig. 11.2 on p. 11.10
Review: Learning Outcomes

1. Describe the treatment selection process
2. List the components of a life-cycle cost analysis
3. List other factors that may enter the selection process