In-Place Recycling and Western Federal Lands

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Who is Western Federal Lands?

- Part of FHWA
- 1 of 3 Federal Lands Divisions
- Located in Vancouver, Washington
- Develop and administer construction projects
- On or access to Federal Land
- Territory includes
  - Alaska
  - Idaho
  - Montana
  - Oregon
  - Washington
  - Wyoming (Yellowstone and Grand Teton)
Our Clients

- National Park Service
- National Forest Service
- Department of Defense
- Bureau of Indian Affairs / Individual Tribes
- Local counties / agencies
Recycling History

- Started in the 1980’s
- Numerous projects
- CIR, FDR, CTB, Foam
- Central plant recycling
Grand Teton National Park
Eastside Highway -1985
Cold In-place Recycling
Lakeside – Nelson Road - 2004
Helena National Forest
Foamed Asphalt
Wise River – Polaris – 2010
Pioneer Mountain Scenic Byway
Cold In-place Recycling
Project Selection Process

- Pavement condition evaluation
- Investigation plan
- Subsurface investigation
- Testing
- Pavement Selection Team (Design, Geotech, Materials)
- Focus on re-use possibilities
Step 1 – Pavement Evaluation

Cracking but stable pavement

Fatigue and evidence of loss of support
Step 2 – Evaluation Plan

- Review of previous construction data
- FWD
- Subsurface investigation and boring plan
### Boring Log (English Units)

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Asphalt</td>
</tr>
<tr>
<td>0.5</td>
<td>Brown to gray, silty fine to coarse GRAVEL, some line to coarse sand, some clay, some cobbles, angular fragments, damp (GM) (BASE).</td>
</tr>
<tr>
<td>1.5</td>
<td>Light brown to light gray, silty fine to coarse GRAVEL, some fine to coarse sand, some clay, subangular to angular fragments, damp (GM).</td>
</tr>
<tr>
<td>5.0</td>
<td>Boring completed at 5 feet.</td>
</tr>
</tbody>
</table>

**Notes:**
- Water content (%)
- Plastic Limit
- Liquid Limit

**Sample Numbers and Blow Count:**

- **SAMPLE #**
- **BLOW COUNT**

**Graphical Log:**

- Standard blows per foot (140 lb mass, 30 in drop)

**Drilling Details:**
- **BEGAN:** 9/15/03
- **COMPLETED:** 9/15/03
- **DRILL:** Unknown
- **DRILLER:** Unknown
- **WEATHER:** Foggy Rain, 35 F
Step 4 - Testing

- Pavement – thickness/visual
- Base Materials
  - Gradation
  - Atterberg Limits
  - Sand Equivalent
  - R-Value
- Subgrade Materials
  - Gradation – Hydrometer
  - Soil composition (%sand, silt, clay)
  - R-Value
Pavement Selection Team

- **Support issues / corrective action**
  - Subexcavation can cause issues with replaced material
- **Design constraints – profile and grade**
  - In-place, stockpile, or central plant
- **Re-use possibilities**
- **Selecting structural components**
Cost Effective Solution

- Project by project basis
- Comparing construction costs
  - Haul costs
  - Additive costs
  - Available equipment / technology for mobilization
- Usually driven by material sources
Challenges

- Remote location – available contractors
- Mobilization cost
- Thin pavement layers
- Inconsistent existing condition – variability
- Curvature and grade
- Seasonal limitations
The Challenging – thin pavement
The Challenging — variable surface
The Challenging – support issue
The Challenging – subex condition
Coordination Efforts with Client

- Education on recycling techniques
- Obtain support
- Client assumes maintenance of completed project
- Tell the story of success
  - Reuse
  - Smoothness improvement (% improvement)
  - Structural value
Opportunity for Improvement

- Improve Prime and Sub contractor interaction
- Environmental component
- Reinforce sustainability
- Optimizing structural benefit vs. cost
- Specifications
The Future

- Changes in additives and technology
- Balance cost and structural value
- Re-use of material is vital
- Recommendations from CFL report
  - Focused on CIR quality and construction
  - Mix design and properties
  - Specification changes
  - Test methods to monitor quality
Questions??

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