IN-PLACE PAVEMENT RECYCLING –

KEY TO MEETING LOCAL ROAD/STREET NEEDS

Doyt Bolling, Utah LTAP Center
UTAH ROAD SYSTEMS

- STATE SYSTEM – 13.35%
- COUNTY SYSTEM – 53.9%
- CITY SYSTEM – 22.7%
- FEDERAL ROADS – 10%
Historical Comparison of Surface Type Combined
Totals on State, City and County Roads

Figure 3.3

2006

- Bituminous or Higher: 20,668 (53%)
- Gravel: 8,250 (21%)
- Unimproved: 9,111 (23%)
- Graded & Drained: 1,338 (3%)
- Unimproved: 9,111

Figure 3.4

1986

- Bituminous or Higher: 14,844 (46%)
- Gravel: 7,503 (23%)
- Unimproved: 8,948 (28%)
- Graded & Drained: 1,118 (3%)
- Unimproved: 8,948
Distribution of Funds to Local Governments
Class B&C Roads
FY 2007

Figure 4.3

B & C Revenues (Figure 4.2)
$106,439,418

State Sales Tax 1/16%
$17,618,420

Overweight Truck Fines & Levies
$357,513

Total Distribution to Cities and Counties
$124,415,351

Distribution To Counties
"B" Funds
$45,658,636
% Distribution 36.7%

Distribution To Cities & Towns
"C" Funds
$78,756,715
% Distribution 63.3%
Allocation of Federal Highway Trust Funds  
FY 2007

Figure 4.6

<table>
<thead>
<tr>
<th>Disbursements</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDOT Administered Funds</td>
<td>$201,080,500</td>
</tr>
<tr>
<td>Metropolitan Planning Organizations (MPO's)</td>
<td>40,534,000</td>
</tr>
<tr>
<td>Joint Highway Committee</td>
<td>11,241,100</td>
</tr>
<tr>
<td>Earmark Projects</td>
<td>$56,128,500</td>
</tr>
<tr>
<td>Total Disbursements</td>
<td>$308,984,100</td>
</tr>
</tbody>
</table>

Allocation of Federal Highway Trust Funds

- Earmark Projects: 18%
- Joint Highway Committee: 4%
- Metropolitan Planning Organizations (MPO's): 13%
- UDOT Administered Funds: 65%
Construction Costs

- Asphalt Oil Doubled in one year
- Concrete Cement Doubled in one year.
- Fuel Prices are near $4/gallon.
AVERAGE LIFE SPAN OF ROADS

LOCALS = 25 YEARS
COLLECTORS = 20 YEARS
ARTERIALS = 15 YEARS
LOCAL GOV’TS NEED TO DO MORE WITH LESS
VISUAL CONDITION SURVEYS

- TYPES OF DISTRESS
  - SEVERITY
  - EXTENT
- DRAINAGE
- SHOULDER CONDITION
- SAFETY HAZARDS
Remaining Service Life (RSL) Approach

• PSALMS 90:10 –
  “THE DAYS OF OUR LIFE ARE THREE SCORE AND TEN …
  AND IF BY STRENGTH THEY BE THEY BE FOUR SCORE YEARS..”
## Condition Assessment

- **Pavement Distress**
- **SHRP Distress Manual**
- **Severity & Extent**
- **Remaining Service Life**

### Flexible Pavement

**Low Volume Asphalt Fatigue Cracking**

<table>
<thead>
<tr>
<th>Extent (Percent of Wheel Path)</th>
<th>Low</th>
<th>Med</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSL (20)</td>
<td>0-10%</td>
<td>10-30%</td>
<td>&gt;30%</td>
</tr>
</tbody>
</table>

#### Severity

- **Low**
  
<table>
<thead>
<tr>
<th>Extent</th>
<th>Low</th>
<th>Med</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitudinal crack in wheel path with no or only a few connecting cracks, no spalling or pumping</td>
<td>RSL (10)</td>
<td>RSL (8)</td>
<td>RSL (6)</td>
</tr>
</tbody>
</table>

- **Med**
  
<table>
<thead>
<tr>
<th>Extent</th>
<th>Low</th>
<th>Med</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interconnected crack pattern in wheel path, slightly spalled, no pumping</td>
<td>RSL (8)</td>
<td>RSL (6)</td>
<td>RSL (4)</td>
</tr>
</tbody>
</table>

- **High**
  
<table>
<thead>
<tr>
<th>Extent</th>
<th>Low</th>
<th>Med</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderately to severely spalled pattern of interconnected cracks in wheel path, pumping may be noticeable</td>
<td>RSL (6)</td>
<td>RSL (2)</td>
<td>RSL (0)</td>
</tr>
</tbody>
</table>

Reference: SHRP Distress Manual pages 8-9
Remaining Service Life Distribution State

State Highway Network (RSL)

Remaining Service Life Category

Percent Surface Area

0 1-3 4-6 7-9 10-12 13-15 16-18 19-20

42% 7% 7% 8% 10%
Tooele County Remaining Service Life Distribution

RSL Category

- 0: 5.8
- 1-3: 4.0
- 4-6: 50.2
- 7-9: 9.8
- 10-12: 25.5
- 13-15: 3.1
- 16-18: 1.3
- 19-21: 0.3

Average RSL: 6.9
Remaining Service Life Distribution City

- Heber City

Remaining Service Life

- 46% in 4-6 yrs
- 23% in 10-12 yrs
- 10% in 7-9 yrs
- 10% in 16-18 yrs
- 6% in 13-15 yrs
- 10% in 19-21 yrs
- 1% in 1-3 yrs
- 3% in 0 yrs

% Street Network

Average RSL 7.9

Years

0 yrs, 1-3 yrs, 4-6 yrs, 7-9 yrs, 10-12 yrs, 13-15 yrs, 16-18 yrs, 19-21 yrs
IN-PLACE RECYCLING-CANDIDATES

Source: PASER Manuals, Transportation Information Center, University of Wisconsin-Madison
IN-PLACE PAVEMENT RECYCLING

- Full Depth Pulverization & Reclamation
- Granular Base Stabilization Techniques
Construction Processes

Mechanical stabilization - 1st step in reclamation; also used to describe FDR without addition of binder (Pulverization)

Chemical stabilization - FDR with chemical additive (Calcium or Magnesium Chloride, Lime, Fly Ash, Kiln Dust, Portland Cement, etc.)

Bituminous stabilization - FDR with asphalt emulsion, emulsified recycling agent, or foamed / expanded asphalt additive
Old Way/New Way
Emulsion FDR and GBS - Key Components

1. Project selection, pavement & material assessment
2. Engineered mix design
3. Performance-related specifications
4. Innovative emulsion technology
5. Construction Guidelines & QC specs
Engineered Mix Designs

Superpave Gyratory Compactor

Lab Mixer

Cohesiometer
PIONEER PARKWAY – ST. GEORGE
EXISTING CONDITION
CONSTRUCTION PROCESS
FINISHED SURFACE
Summary- In-Place Recycling Benefits

- FDR and GBS can address major pavement issues and be cost effective.
- Stabilization additives offers the following:
  - Early Strength and return to traffic
  - Cured Strength and Structural Adequacy
  - Cracking Resistance
  - Moisture Resistance (durability)
  - Cap can be surface treatment or thin HMA
LOCAL AGENCY EXAMPLES

• LOCAL AGENCIES USING ASPHALT ZIPPER
• SUMMIT COUNTY PROJECT
• Other Projects