About the RTC (Regional Transportation Commission)

- RTC of Washoe County, NV
  - MPO (long range mobility)
  - Transit (mode split and trip reduction)
  - Engineering and Construction (Provides Opportunity)

Member Agencies:
- Reno
- Sparks
- Washoe County
Funding: Indexed Fuel Tax

- Passed Twice by Voter Initiative
  - CPI then PPI (Construction Inflation)
- Indexes County Fuel Tax to Inflation
- Also:
  - Indexes **State Fuel Tax** and Keeps that Increment,
  - Index **Federal Gas Tax** and Keeps that,
  - Indexes **Federal Diesel Fuel Tax** and Keeps that!
Local Regional Roads and RTP Roads

- **Regional and RTP Roads**
  - 1,500 Lane Miles (30%)
  - 3,500 Lane Miles (70%)

- **Local Regional Roads:** Residential, Minor Collectors

- **RTP Roads:** Arterials, Major Collectors, Industrial

- **Vehicle**
  - Residential: 42%
  - Arterials: 8%
  - Interstate: 50%
Integrated Elements

- **Condition Survey Calibration**
  - PCI from Agency Pavement Management Systems *(Can’t be more than 3 years old!)*

- **Uniform Regional Road Categories**
  - Arterial, Collector, Industrial

- **Regional Treatments**
  - Slurry seal, micro-surfacing, thin overlay, patching
Pavement Preservation Program
Program Elements

- **Rehabilitation / Reconstruction**
  - PCI 0-50
  - Rank by Traffic
    - PCI 40-50 Rehabilitation
    - PCI 0-40 Reconstruction

- **Preventive Maintenance**
  - PCI 56-100
  - Structural Distress less than 5%

- **Corrective Maintenance**
  - Everything Else (≈PCI 45-65)
  - Variety of Tools
  - Cost Effectiveness
  - Agency Driven
What Decisions do We Make?

- **Long Range Transportation Plan**
  - Future Transportation Needs
  - Future Budget for achieving network condition goals

- **Current Program of Projects**
  - Project Priorities for construction and maintenance

- **Continuous Improvement**
  - Doing it better, faster, and more cost effectively.
What Data Sources do We Use?

- Old Engineers
- Pavement Management Systems
  - PCI
- Research
  - UNR
    - Western Region SuperPave Center
    - Center for Advanced Transportation Education and Research (Cater)
  - National Studies
- Public Outreach/Community Involvement
  - Project Media
  - Corridor Studies
Type 3 Microsurface
When should preventive maintenance be applied?
Network Performance Life after Preventive Maintenance
StreetSaver Dashboard
Optimal Timing of Pavement Preventive Maintenance Treatment Applications

D.G. Peshkin
T.E. Hoerner

AND

K.A. Zimmerman
Applied Pavement Technology, Inc.
Downers Grove, IL
Phase I: Slurry Seal *Performance Life & Extension in Pavement Service Life*

**Performance Life ~ 2 yrs**

**Performance Life ~ 3 yrs**

**Extension in Pavement Service Life ~ 2 yrs**

**Age in Years**

- New Construction
- Slurry Seal at year 3
- Slurry Seal at year 7
In general, performance life ranged between 2 & 4 years.

- Except when slurry seal was applied at year 0 and 1, performance life ranged from 0 to 1 year.

- Except few cases, the pavement service life was not extended by application of the single slurry seal.
Phase I: Slurry Seal Effectiveness

Relative Benefit = $100 \times \frac{B}{B_0}$

Benefit Cost Ratio = $\frac{B}{C}$
Phase I: Effectiveness Analysis – New Construction

- Phase I: Effectiveness Analysis – New Construction

- University of Nevada Reno, www.wrsc.unr.edu
Phase I: Effectiveness Analysis – Overlay

![Graphs showing effectiveness analysis for various phases and years.](image-url)

- **Benefit (PCI.yrs)**: Graphs for OL-Arterial (A) and OL-Collector (B) showing benefit over years.
- **Relative Benefit**: Graphs for OL-Arterial (A) and OL-Collector (B) showing relative benefit over years.
- **Benefit-Cost Ratio (x1000)**: Graphs for OL-Arterial (A) and OL-Collector (B) showing benefit-cost ratio over years.

University of Nevada Reno, www.wrsc.unr.edu
Phase I: Conclusion

- Application of SS *immediately* or one year after construction of asphalt layer is not effective in terms of:
  - the benefit to the users and
  - the benefit-cost ratio for the agency.

**Optimum time** for application of a *Single Slurry Seal*:

- Newly constructed pavements: 3 years after construction.
- Pavements subjected to overlays: 3-5 years after construction.
Phase II: *Newly Constructed* Pavements:
1\textsuperscript{st} SS at year 3, 2\textsuperscript{nd} SS at year 7

Predicted
Do-Nothing
performance curve
(Using performance
models developed
in Phase I)

Predicted
SS at year 3
performance curve
(Using performance
models developed
in Phase I)
Phase II: Slurry Seal Effectiveness

Relative Benefit = $100 \times \frac{B}{B_0}$

Benefit-Cost Ratio = $\frac{B}{C}$
Phase II:

Effectiveness
Long-Term Performance of New Technologies
Current Projects: Overall Progress
Effectiveness of Cape Seal Pavement Preservation

- Collected pavement information and performance data.
- Working on data processing and analysis.
Performance of Green Technologies
Chism St. -15%RAP+WMA (6” PG64-22)

PCI Rating
- Excellent
- Very Good
- Good
- Fair
- Poor
- Very Poor
- Failed

Transverse Cracks
Microsurfacing

Date of Construction: 6/11/2009

PCI
0 10 20 30 40 50 60 70 80 90 100

Date
2008 2009 2010 2011 2012 2013 2014

www.wrsc.unr.edu ; www.arc.unr.edu
Network Performance Life after Preventive Maintenance

PCI vs. Age

Age 10 Years
“My favorite subject: watching asphalt congeal.”
Complete Streets / Road Diets

Before: incomplete urban street

- 4-lane undivided
- No center turn lane
- No bike facilities
- Numerous driveways
- Pedestrian unfriendly
- Wide lanes
- No designated parking
Complete Streets / Road Diets

After: More complete urban street
✓ 3-lane divided
✓ Center turn lane
✓ Bike facilities
✓ Pedestrian Friendlier
✓ Narrow lanes
✓ More Parking
✓ Free!
✓ Neighborhood Building
Safer Streets

Recent Road Conversions Reduce – Annualized Crash Rates

<table>
<thead>
<tr>
<th>Location</th>
<th>Before</th>
<th>After</th>
<th>% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wells Ave</td>
<td></td>
<td></td>
<td>-31%</td>
</tr>
<tr>
<td>California/Mayberry</td>
<td>33.4</td>
<td>19.4</td>
<td>-42%</td>
</tr>
<tr>
<td>Arlington</td>
<td>18.6</td>
<td>10.0</td>
<td>-46%</td>
</tr>
<tr>
<td>Mill Street</td>
<td>7.7</td>
<td>4.4</td>
<td>-43%</td>
</tr>
</tbody>
</table>

Sources: UNR Center for Advanced Transportation Education and Research and Nevada Department of Transportation
Complete Street/Road Conversions

Significant safety benefits:

- **Lower** speeds,
- **Reduced** conflict points and crashes,
- **Better** sight distance,
- **Refuge** for pedestrians,
- **Space** for bicycles (and others)

![Diagram showing comparison of conflict points between a four-lane undivided road and a three-lane road. The diagram illustrates that there are 6 conflict points in the four-lane road compared to 2 conflict points in the three-lane road.]
Making Adjustments/Costs

• Striping design
• Lane reconfiguration
• Signal Head placement
• Signal timing

• Loop detection
• Continued evaluation
• Added maintenance costs
• Honey Dos

Honey Dos
Other Opportunities –
TCSP Grant – Sutro Complete Street
Other Opportunities –
TCSP Grant – Sutro Complete Street
Good Roads are Cheaper!

The chart shows the percentage of roads in different conditions in the Bay Area, All Regional Roads, and RTP. The conditions are categorized as Very Poor, Poor, Fair, and Good.

- In RTP, the Good roads make up 88.4% of the roads.
- In All Regional Roads, the Good roads make up 72% of the roads.
- In the Bay Area, the Good roads make up 26% of the roads.

The chart also shows that the percentage of Very Poor roads is low across all categories, with RTP having the highest percentage at 33%, followed by All Regional Roads at 20% and the Bay Area at 2%.

The chart suggests that investing in good roads can save money, as better roads are associated with a lower percentage of Very Poor roads.
System Equity Provides for Major Opportunity
Chip Seals

And Roll.
Surface Treatment Macrotexture and Bicycle Ride Quality

December 2013

Hui Li
John Harvey
Calvin Thigpen
Rongzong Wu
Bike Mounted Accelerometers and GPS
Correlated to Laser Surface Texture Measurements
UC Davis Surface Effects Study

Also Correlated to Inertial Profiler…

And to sand patch Measurements

Figure 4.7: Instrumented vehicle with an inertial profiler (IP).
Urban Surface Study
Parting Thoughts on Good Data and Good Decisions

• There are many data sources available.

• Not only can good data help you make good decisions about your program but it can help decision makers make good decisions about supporting your program.

• Data can help make your pavement program part of a bigger conversation: safety, Complete Streets, and stronger communities and neighborhoods.
Thank You!

Questions?
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