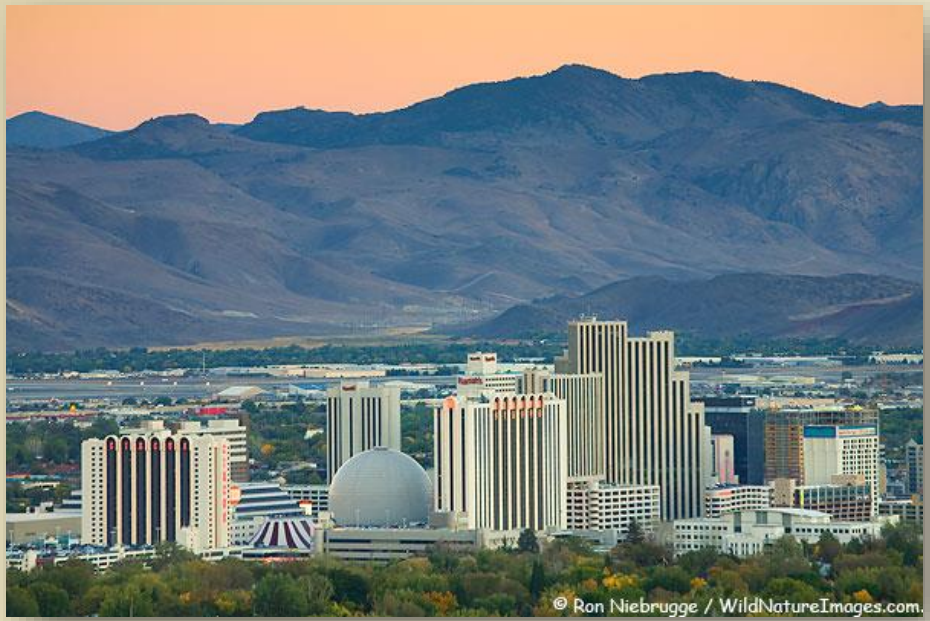
Decision Making: Putting Data to Work



2016 National Pavement Preservation Conference
Nashville, Tennesee
Scott Gibson P.E.

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)

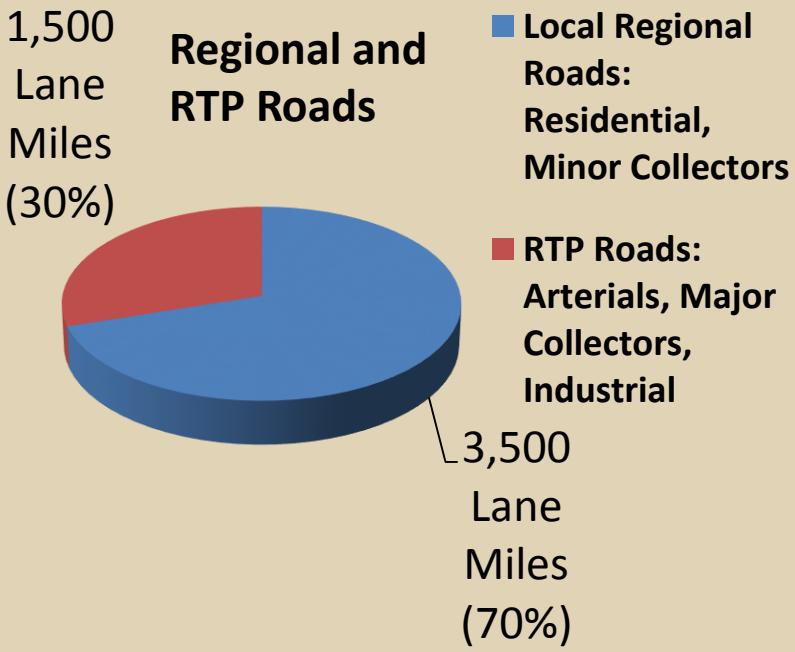
Member Agencies:

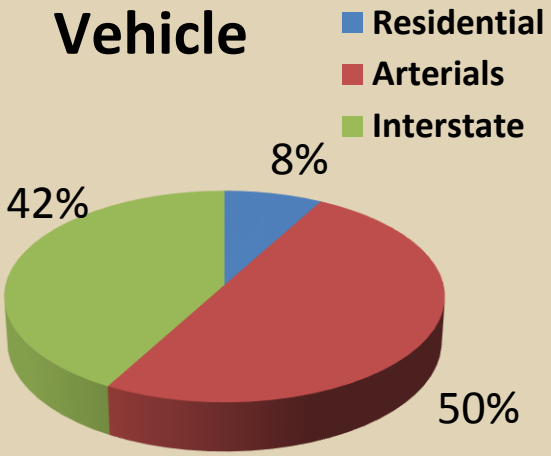
- Reno
- Sparks
- Washoe County

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





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 Rehabilitaion
    - 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?

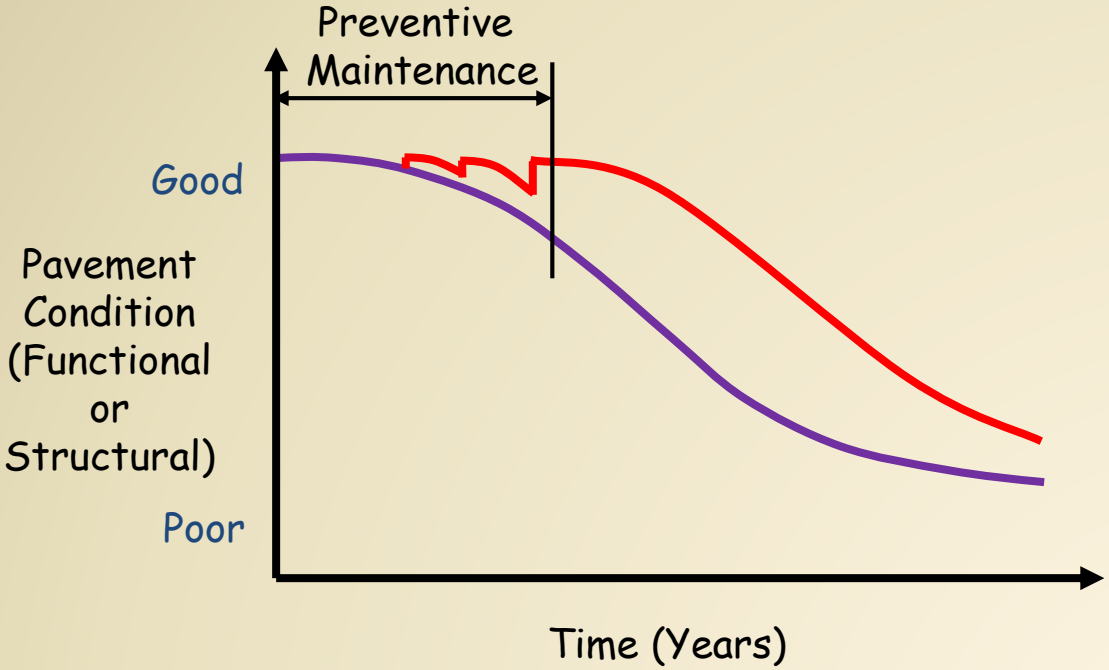
- **Long Range Transportation Plan**
  - Future Transportation Needs
  - Future Budget for achieving network condition goals
- **Current Program of Projects**
  - Project Priorities for construction and maintenance
- **Continuous Improvement**
  - Doing it better, faster, and more cost effectively.

What Data Sources do We Use?

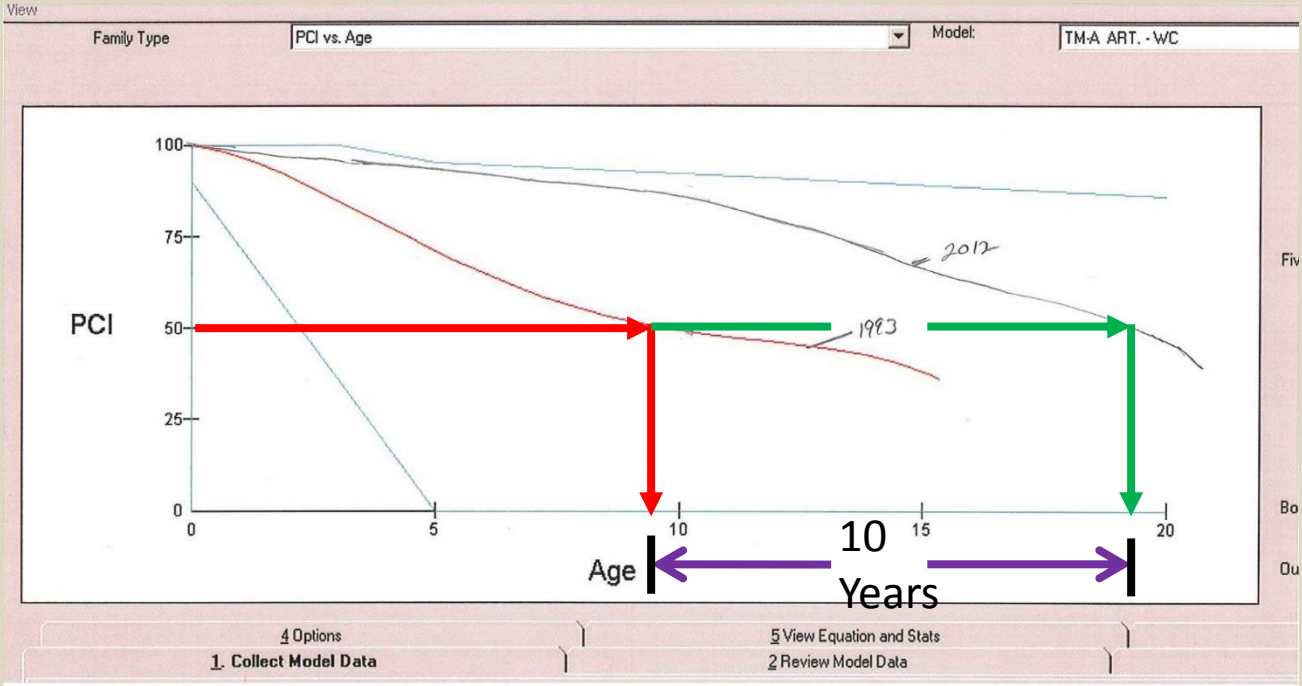
- Old Engineers
- Pavement Management Systems
  - PCI
- Research
  - UNR
    - Western Region SuperPave Center
    - Center for Advanced Transportation Education and Research (Cater)
  - National Studies
- Public Outreach/Community Involvement
  - Project Media
  - Corridor Studies

Type 3 Microsurface

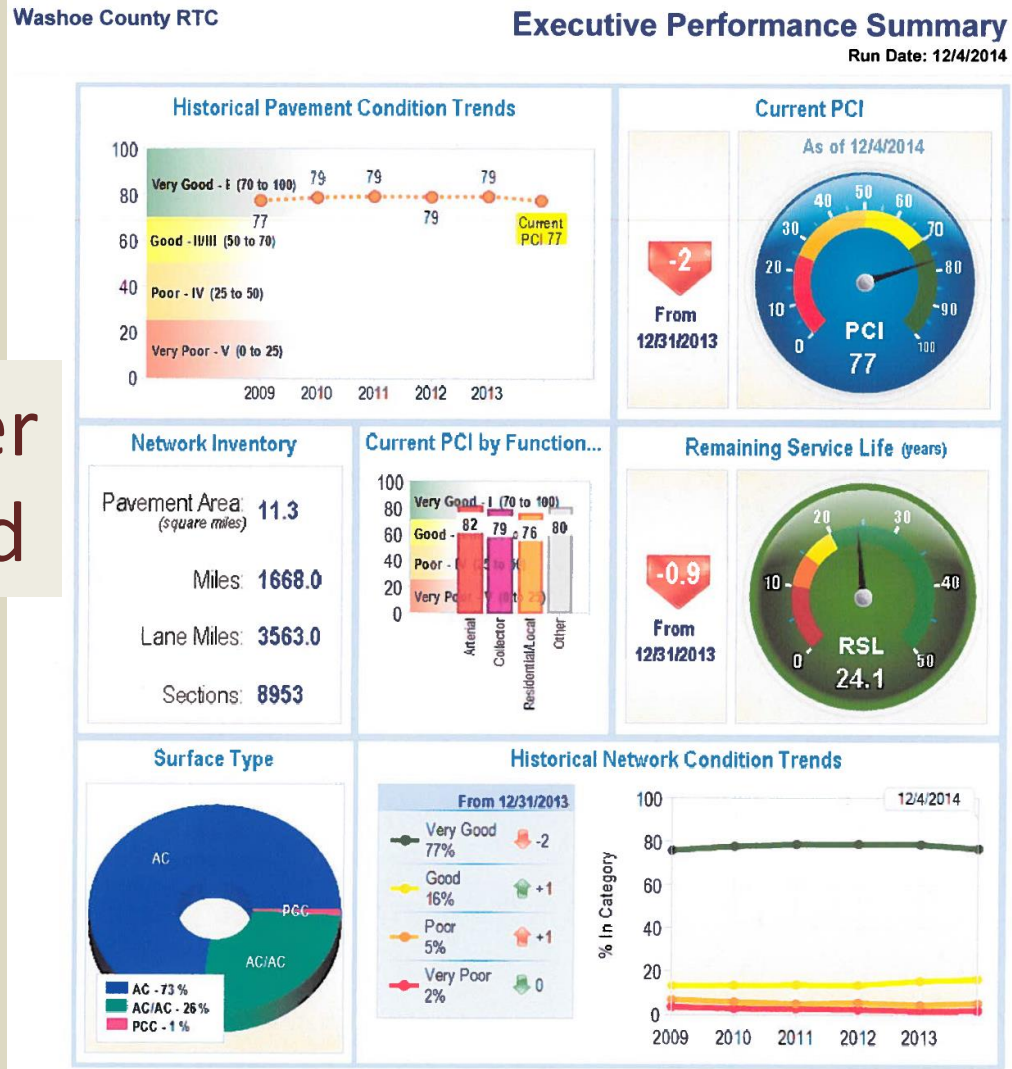
When should preventive maintenance be applied?



Network Performance Life after Preventive Maintenance



StreetSaver Dashboard



National Research

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

NCHRP REPORT 523

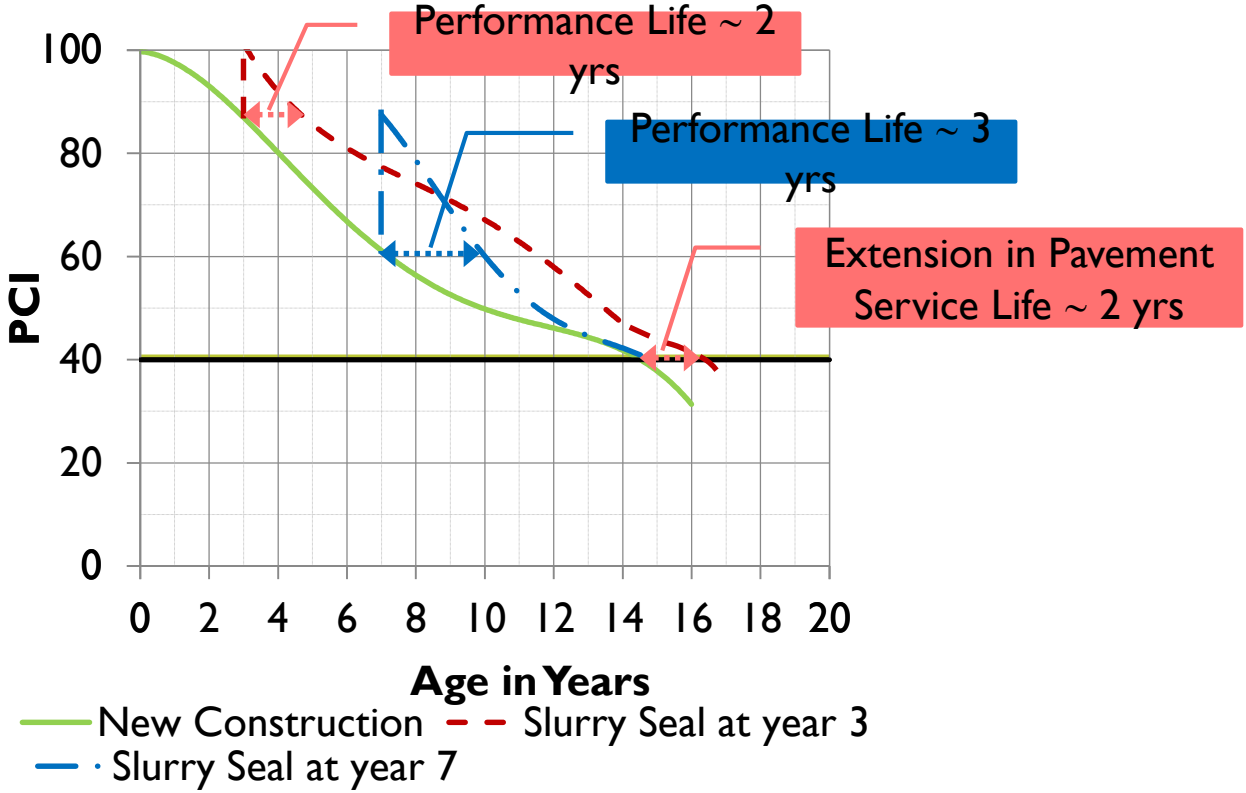
Optimal Timing of Pavement Preventive Maintenance Treatment Applications

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*

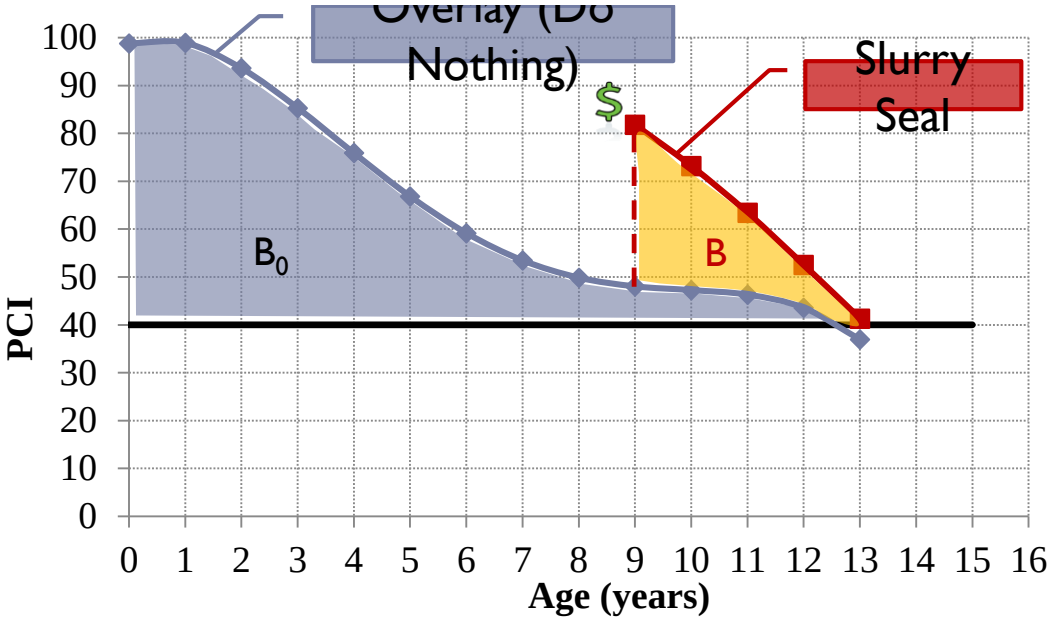


Phase I: SS Performance Life & Extension in Pavement Service Life

- 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***.

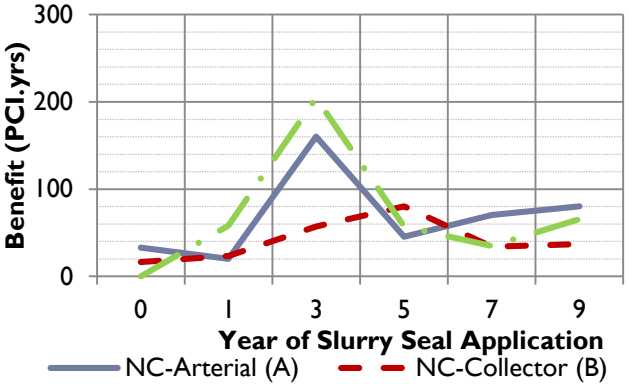
Phase I: Slurry Seal Effectiveness

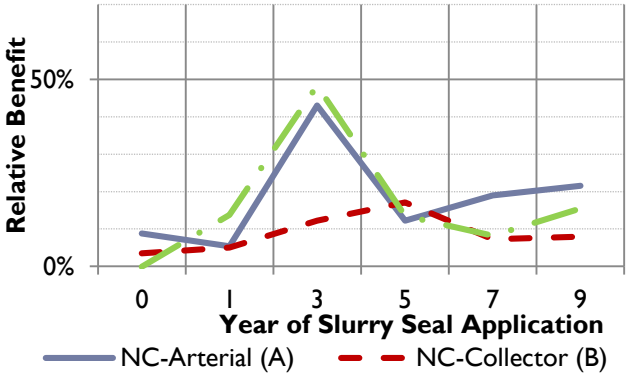


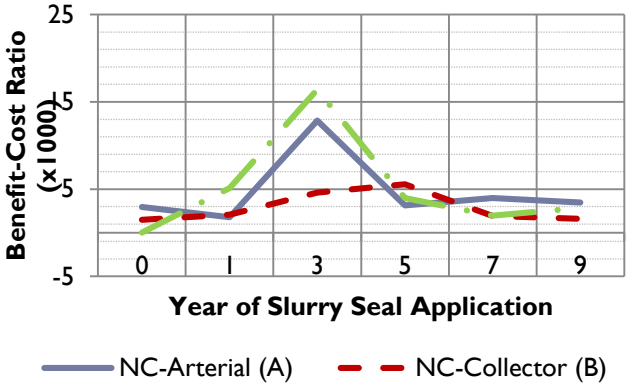
Relative Benefit = $100 \times B / B_0$

Benefit Cost Ratio = B / C

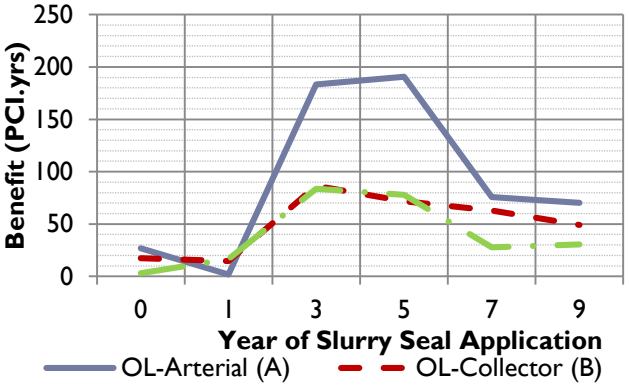
Phase I: Effectiveness Analysis – **New Construction**

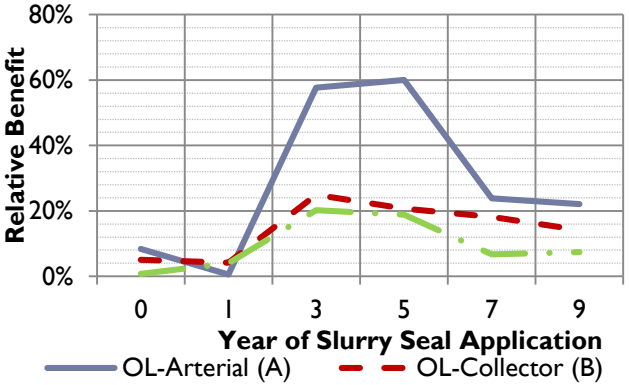


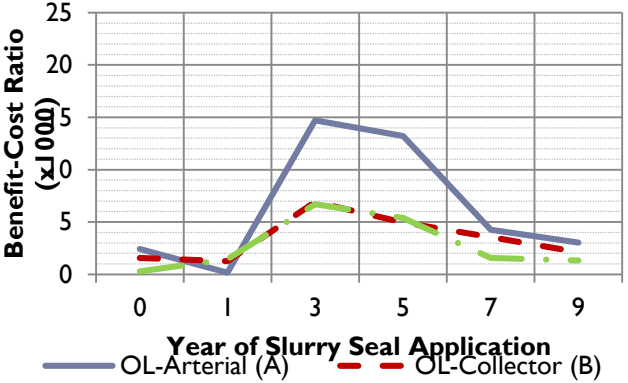




Phase I: Effectiveness Analysis – **Overlay**







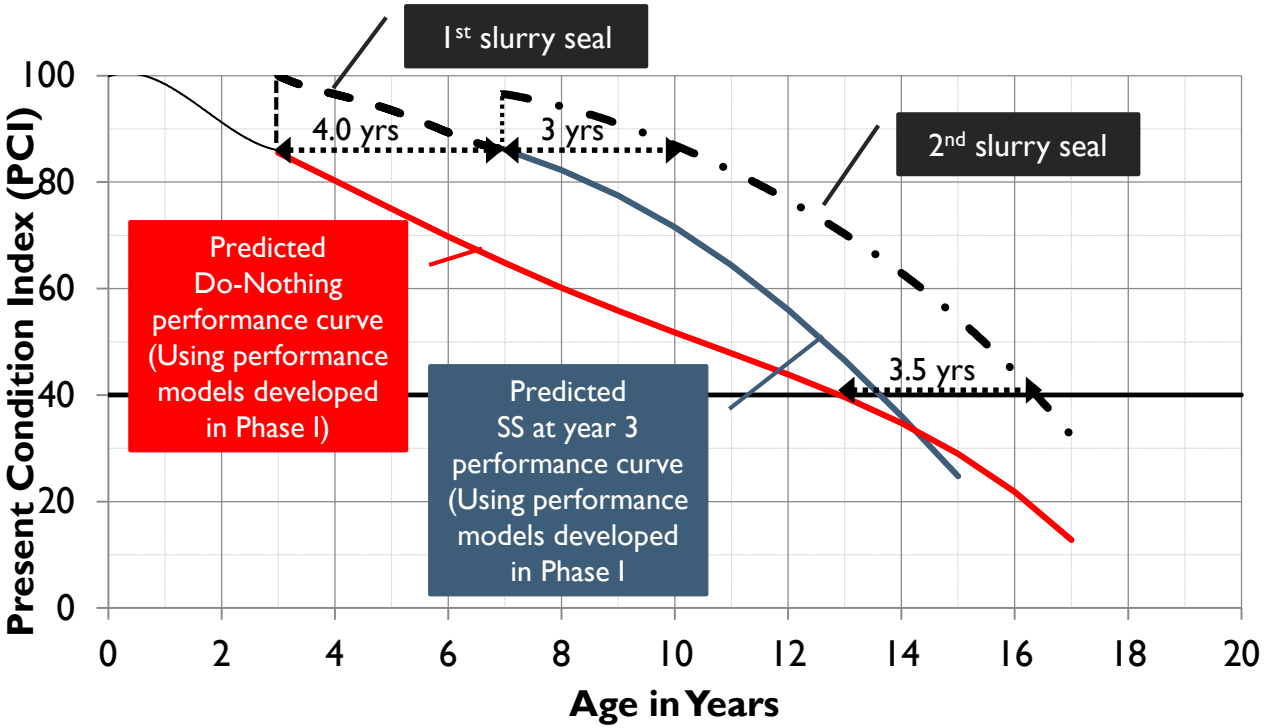
Phase I: Conclusion

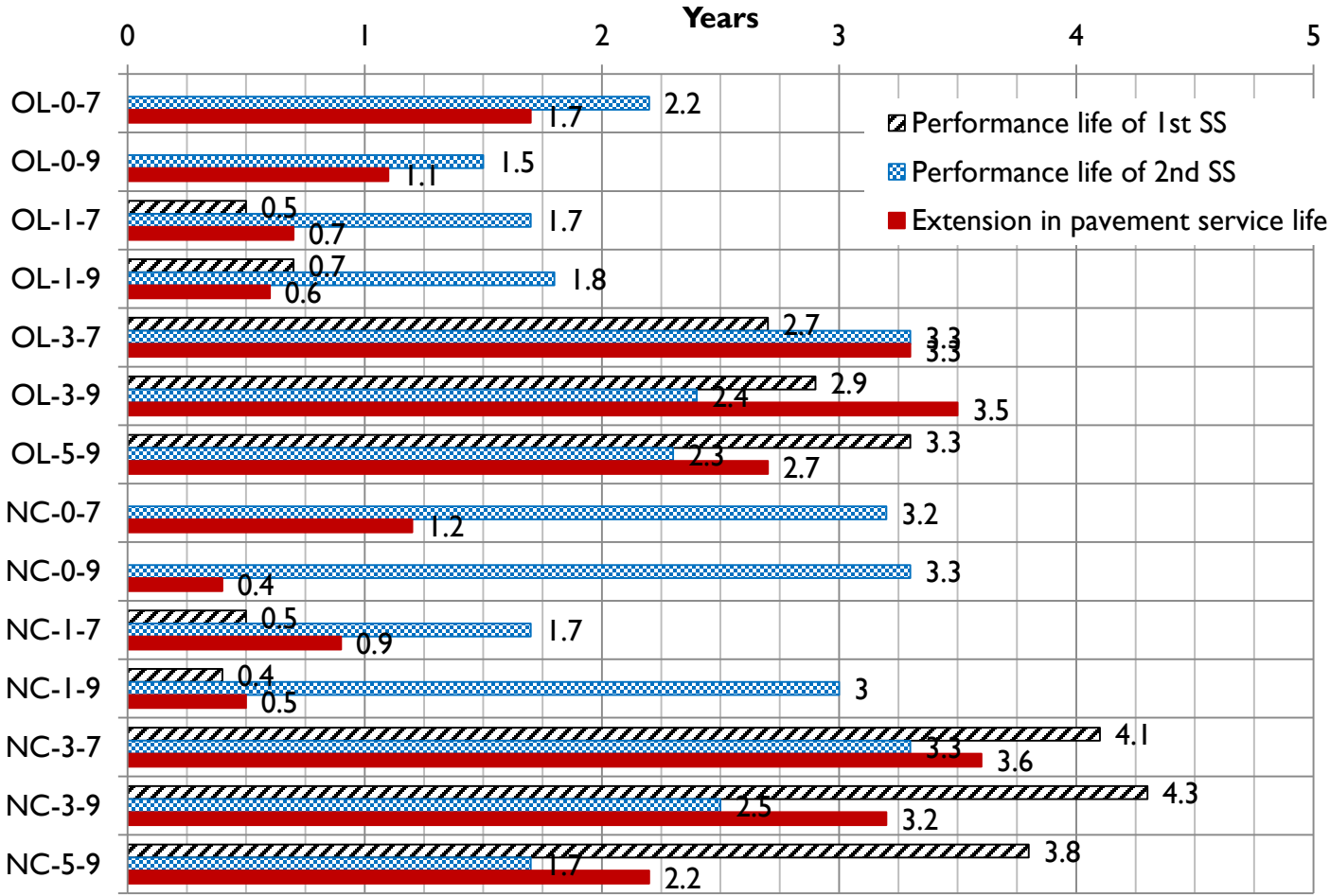
- Application of SS *immediately* or *one year after* construction of asphalt layer is not effective in terms of:
  - the benefit to the users and
  - the benefit-cost ratio for the agency.

Optimum time for application of a Single Slurry Seal:

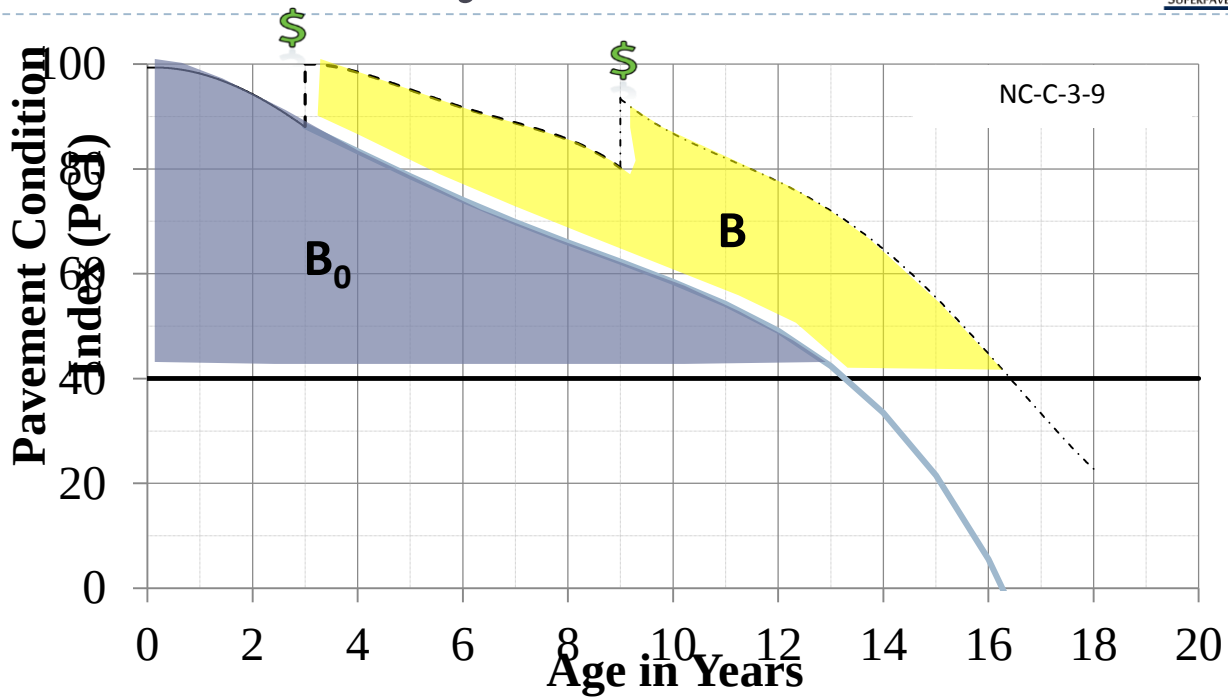
- *Newly constructed pavements: 3 years after construction.*
- *Pavements subjected to overlays: 3-5 years after construction.*

Phase II: *Newly Constructed* Pavements: 1st SS at year 3, 2nd SS at year 7




Years
0
1
2
3
4
5
OL-0-7
OL-0-9
OL-1-7
OL-1-9
OL-3-7
OL-3-9
OL-5-9
NC-0-7
NC-0-9
NC-1-7
NC-1-9
NC-3-7
NC-3-9
NC-5-9
2.2
1.7
1.5
1.1
0.5
1.7
0.7
0.7
1.8
0.6
2.7
3.3
3.3
2.9
2.4
3.5
3.3
2.3
2.7
3.2
1.2
3.3
0.4
0.5
1.7
0.9
0.4
3
0.5
4.1
3.3
3.6
4.3
2.5
3.2
3.8
1.7
2.2
Performance life of 1st SS
Performance life of 2nd SS
Extension in pavement service life

Phase II: Slurry Seal Effectiveness

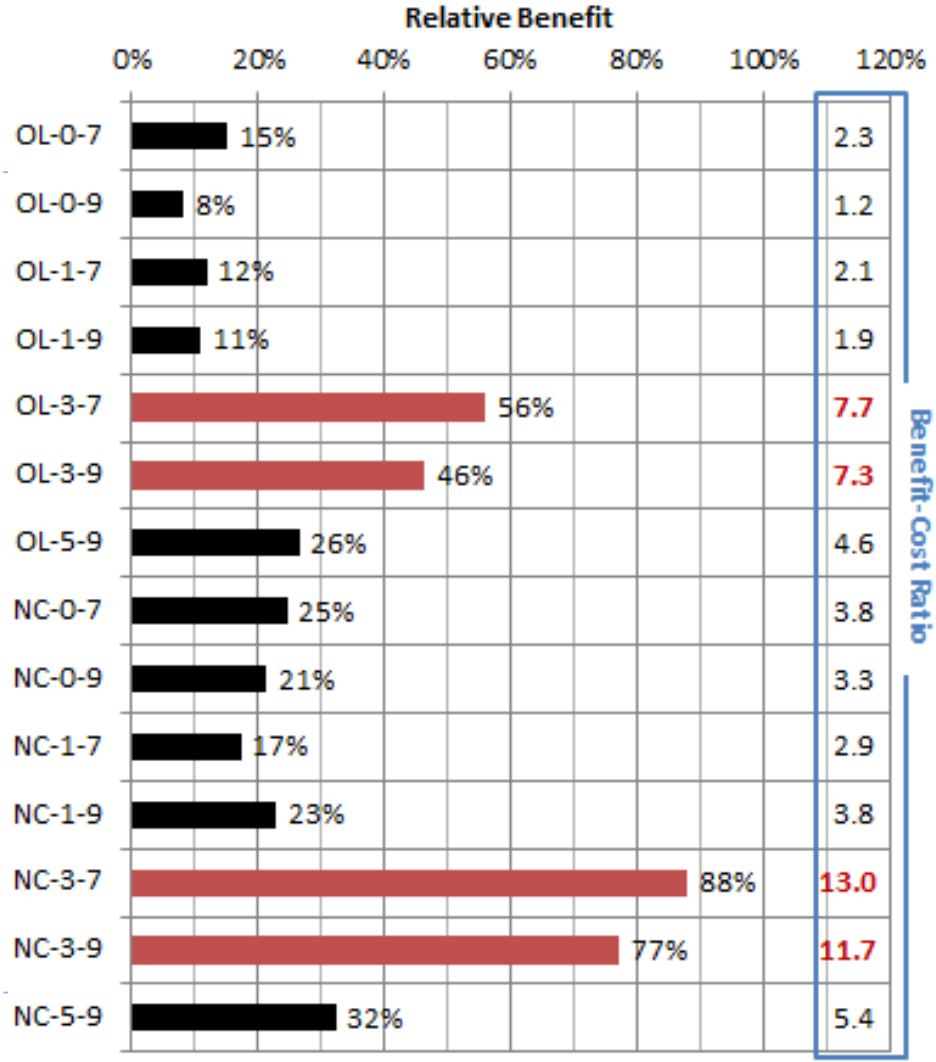


Relative Benefit = $100 \times B / B_0$

Benefit-Cost Ratio = B / C

Phase II:

Effectiveness



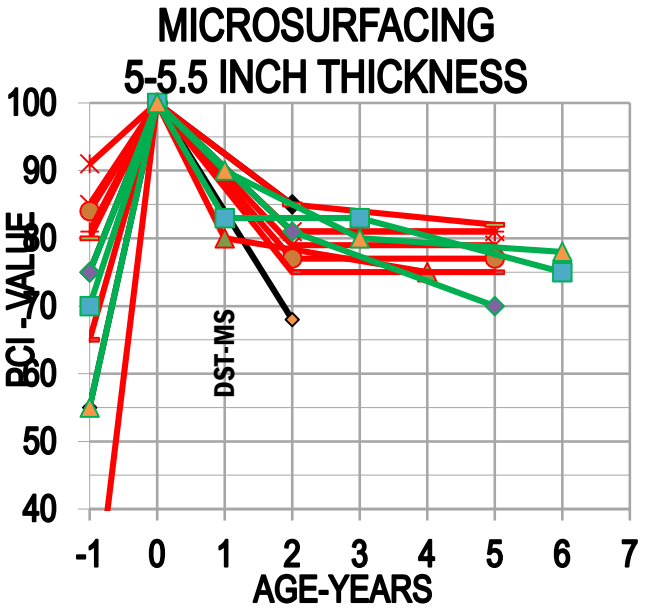
UNR-RTC Pavement Technology Research

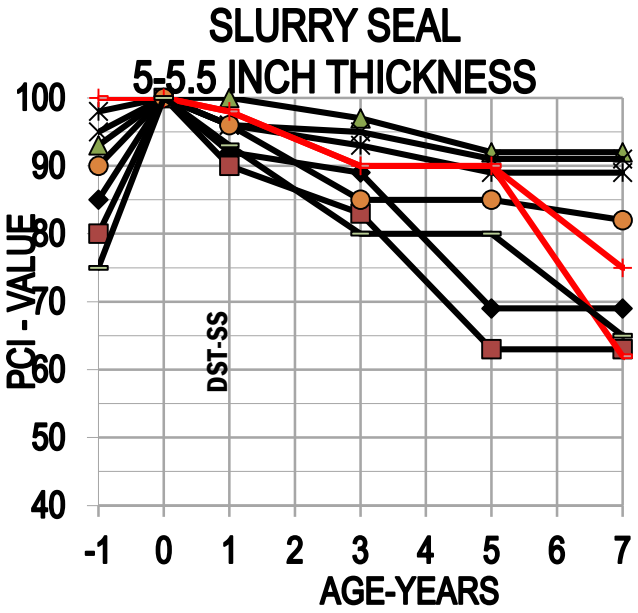
Long-Term Performance of New Technologies

Current Projects: Overall Progress

Effectiveness of Cape Seal Pavement Preservation

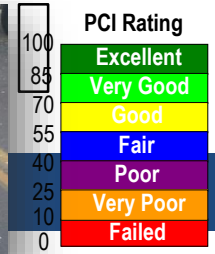
- Collected pavement information and performance data.
- Working on data processing and analysis.

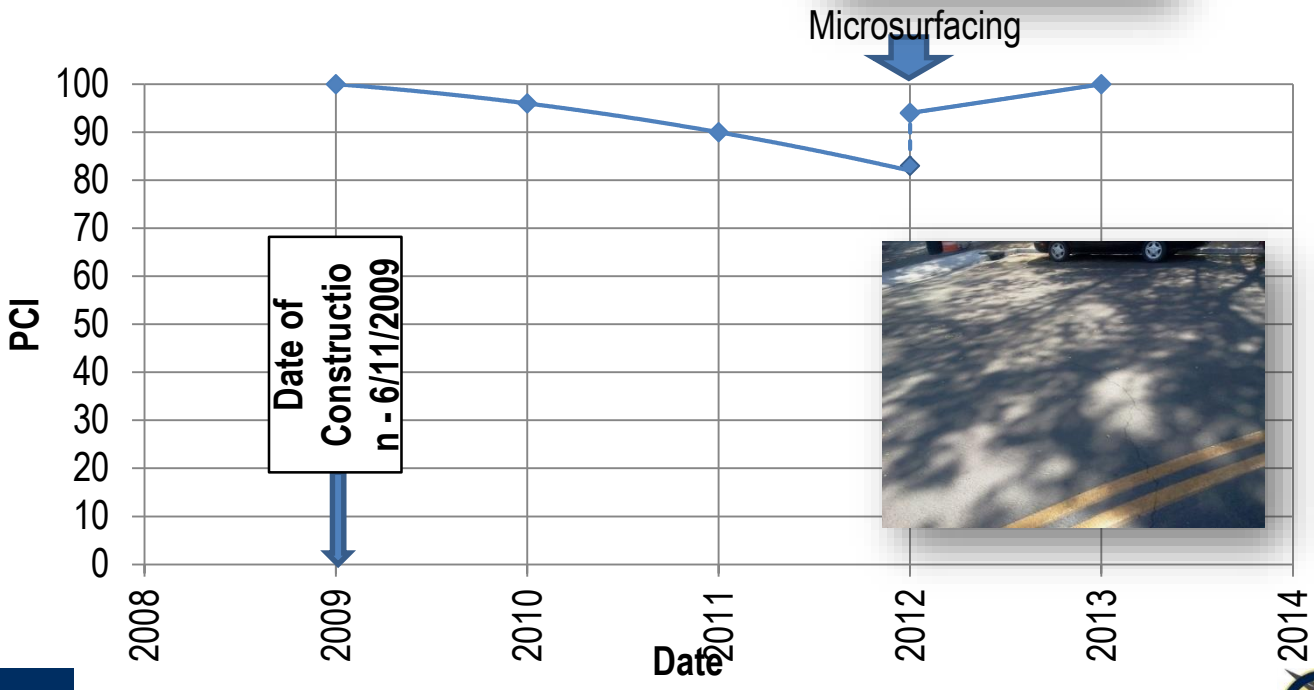




Performance of Green Technologies

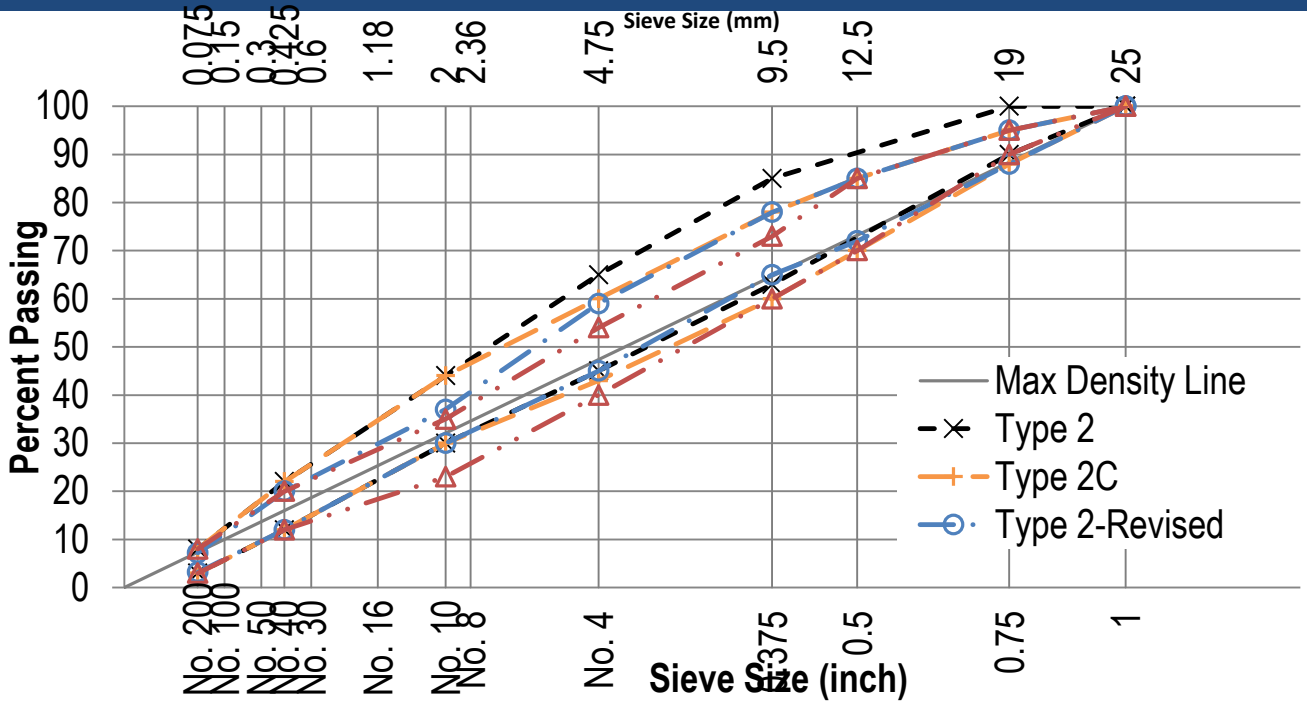
Chism St. -15%RAP+WMA (6" PG64-22)



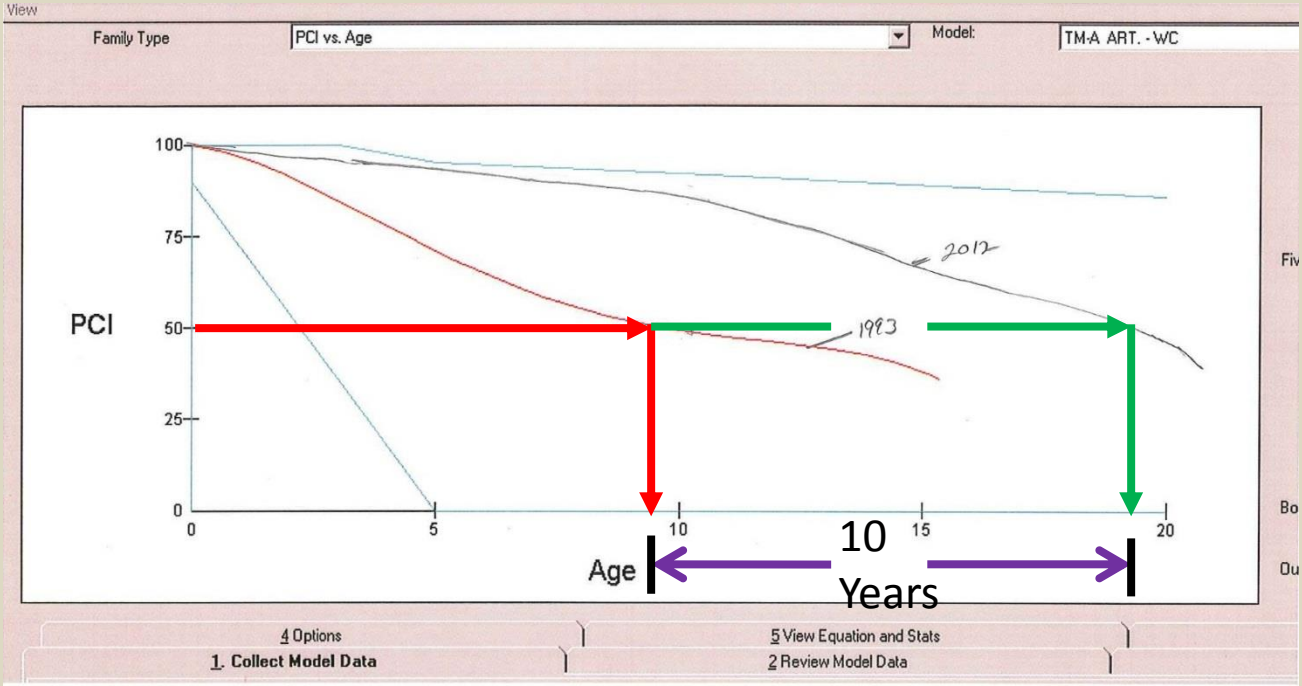


Performance of Intersection Mixtures

Overview



Network Performance Life after Preventive Maintenance



Complete Street Concept

"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

Location	Before	After	% Reduction
Wells Ave			-31%
California/Mayberry	33.4	19.4	-42%
Arlington	18.6	10.0	-46%
Mill Street	7.7	4.4	-43%

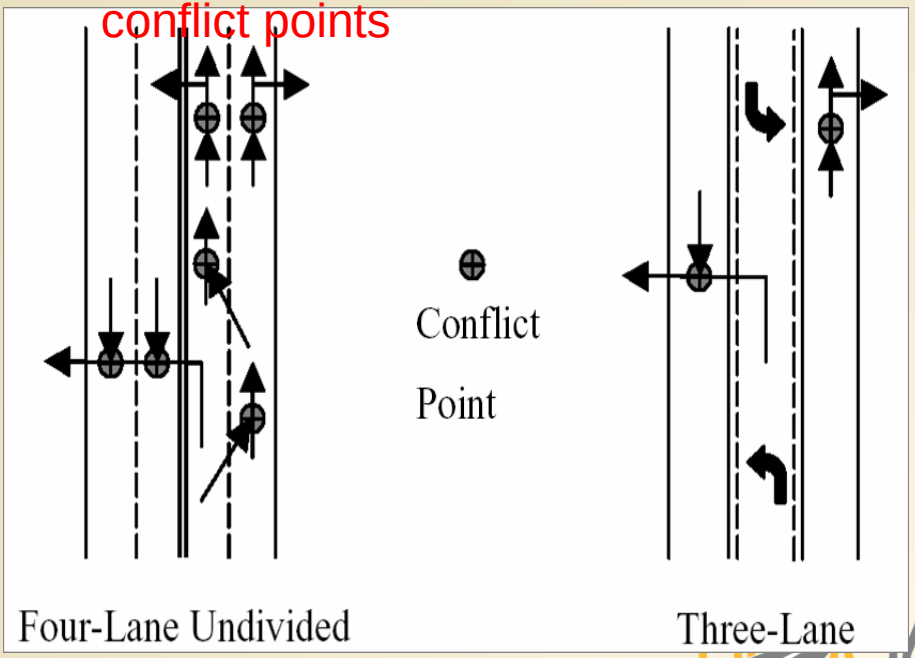
Sources: UNR Center for Advanced Transportation Education and Research and Nevada Department of Transportation

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)

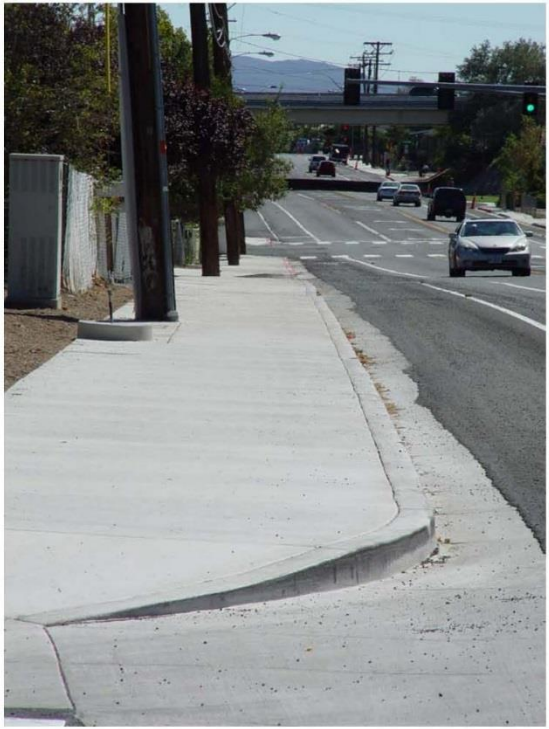
6 conflict points Vs. 2 conflict points



Making Adjustments/Costs

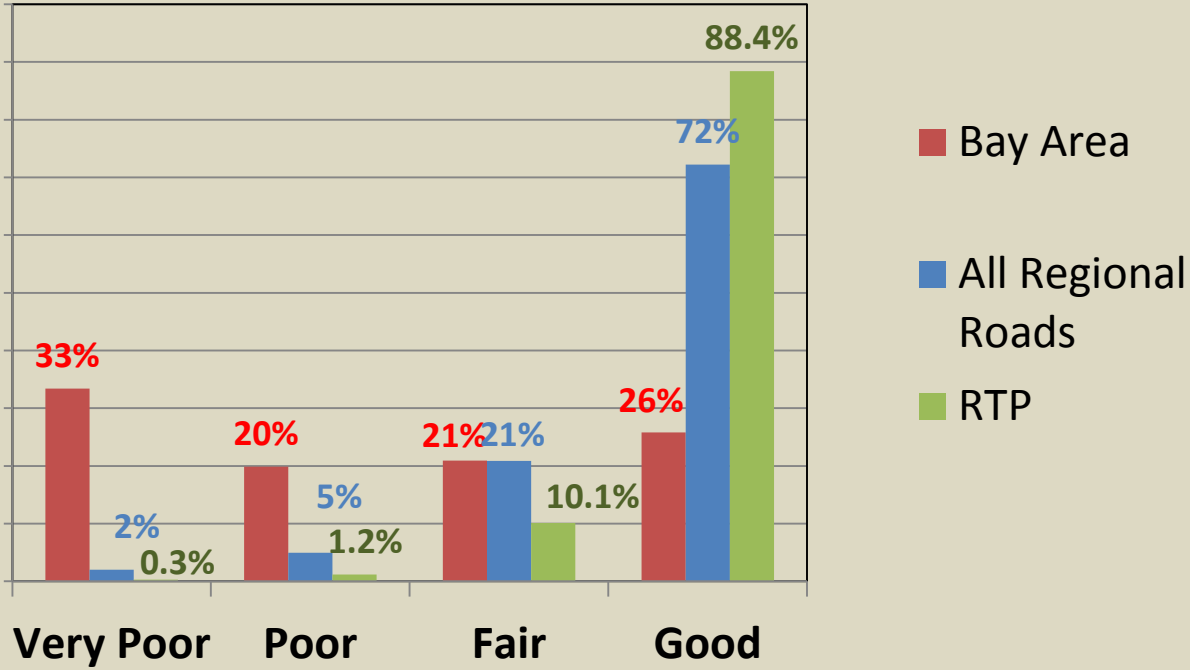
- Striping design
- Lane reconfiguration
- Signal Head placement
- Signal timing
- Loop detection
- Continued evaluation
- Added maintenance costs
- Honey Dos

Other Opportunities – TCSP Grant – Sutro Complete Street



Other Opportunities – TCSP Grant – Sutro Complete Street

Good Roads are Cheaper!



System Equity Provides for Major Opportunity

4th Street/Prater Way RTC RAPID Transit Project

Located in Reno & Sparks, Nevada
Nevada's Second Congressional District

Type of Application: Capital Project
Applicant Organization: Regional Transportation Commission of Washoe County (RTC)
Type of Applicant: Metropolitan Planning Organization (MPO)
TIGER Grant Amount Applied For: $22.47 million
RTC has already committed $30.1 million to this $52.57 million project

BELIEVE, by artists Jeff Schomberg and Laura Kimpton, was developed for Burning Man and is currently displayed on 4th Street in Reno, Nevada. It reflects the iron working heritage of the corridor as well as its emerging industrial arts activities. BELIEVE is shown with a zero-emission RTC electric bus.

A community collaboration strengthening mobility between Reno and Sparks, Nevada.

Chip Seals

And Roll.

UC Davis Surface Effects Study

ITS UCDAVIS
INSTITUTE OF TRANSPORTATION STUDIES

Research Report – UCD-ITS-RR-13-30

Surface Treatment Macrotexture and Bicycle Ride Quality

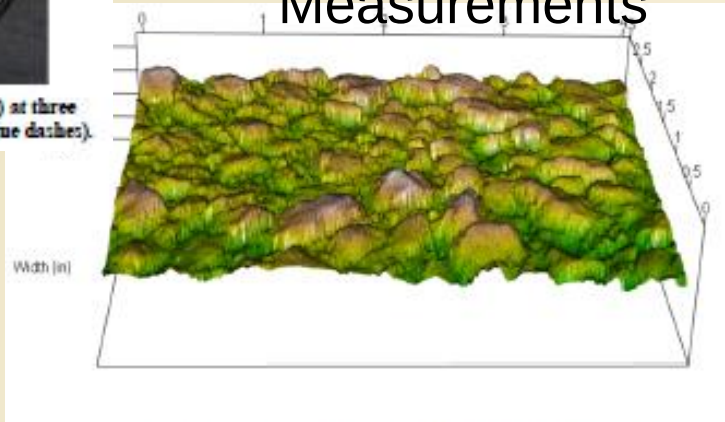
December 2013

Hui Li
John Harvey
Calvin Thigpen
Rongzong Wu

UC Davis Surface Effects Study

Figure 3.6: Bicycle instrumented with accelerometers (solid red circles) at three typical mounting locations and a GPS unit on the handle bar (circle of blue dashes).

Correlated to Laser Surface texture Measurements



(d) Coarser 3/8" gradation chip seal on Mon-198 EB PM 10.05 placed in 2012

Bike Mounted Accelerometers and GPS

UC Davis Surface Effects Study

Figure 4.7: Instrumented vehicle with an inertial profiler (IP).

And to sand patch Measurements

(a) SLO-1 PM 60.16 coarser 3/8" gradation chip seal

Also Correlated to Inertial Profiler…

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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(775) 335-1874

sgibson@rtcwashoe.com