

Preventative Maintenance – Fog Seals

On the City of Medford's Street System

Medford, Oregon

AN OUTDOOR PARADISE

Medford, Oregon, the county seat of Jackson County, is located in the southwestern part of the state near the California border. The city sits in a rain shadow between the Cascade Range and the Siskiyou Mountains called the Rogue Valley. At an elevation of 1,400 feet, it has a mild climate that allows for a long growing season, and, for many years, Medford's economy was fueled by agriculture—especially pears and wine grapes. The city was originally named in 1883 by David Loring, a civil engineer and right-of-way agent for the Oregon and California Railroad, after his hometown, Medford, Massachusetts.

Medford is the fourth largest city in the state with a population of 79,800. Its main economic drivers, today, are the healthcare industry and

AT A GLANCE MEDFORD, OREGON

WHAT: The fourth largest city in the state – pop. 79,800

WHERE: In the southwestern part of Oregon near the California border

WEBSITE: www.ci.medford.or.us

A Journey to Effectiveness

with Tad Blanton

Some Background:

- Medford incorporated in 1886 around the Oregon and California railroad depot.
- First “paved” City Street was completed in 1911
- In the 1920’s during the “PEAR BOOM” it had more cars per capita than anywhere in the country.

- Medford has a current population of about 85,000
- Currently, we maintain an infrastructure with about 270 centerline miles of streets and 23 miles of alleys

Historically,

- We used the “Fix the worst, first” mindset- like most agencies
- In the 1980’s our toolbox contained: “in-house” crack-sealing, pothole patching, and limited minor overlays, combined with contracted Capital Improvement Project Overlays
- But, we were one of the first Agencies to adopt a Street Utility Fee in the late 1980’s- dedicated to street maintenance

With the influx of Street Utility Fee Funds:

- We began a more aggressive “worst-first” program with more “in-house overlays” of residential streets
- More extensive contracted Capital Improvement Overlay on Arterials and Collectors
- The introduction of a “Slurry-Seal Program” for residential streets that “needed something” but where an overlay was pre-mature
- And eventually, we began an Alley Paving Program

Thru the 90's, we were doing more work, but with the constant deterioration of the "system", it seemed like we weren't making any "progress".

Then came a "paradigm shift" in the way we looked at pavement maintenance.

Cory Crebbin our new Public Works Director

- A “progressive” thinker
- “How do we make ‘progress’”?
- A new Philosophy: “Lowest Life-Cycle Cost”

In 2007, the Operations Division embarked on their own “paradigm shift”:
“Preventative Pavement Maintenance”

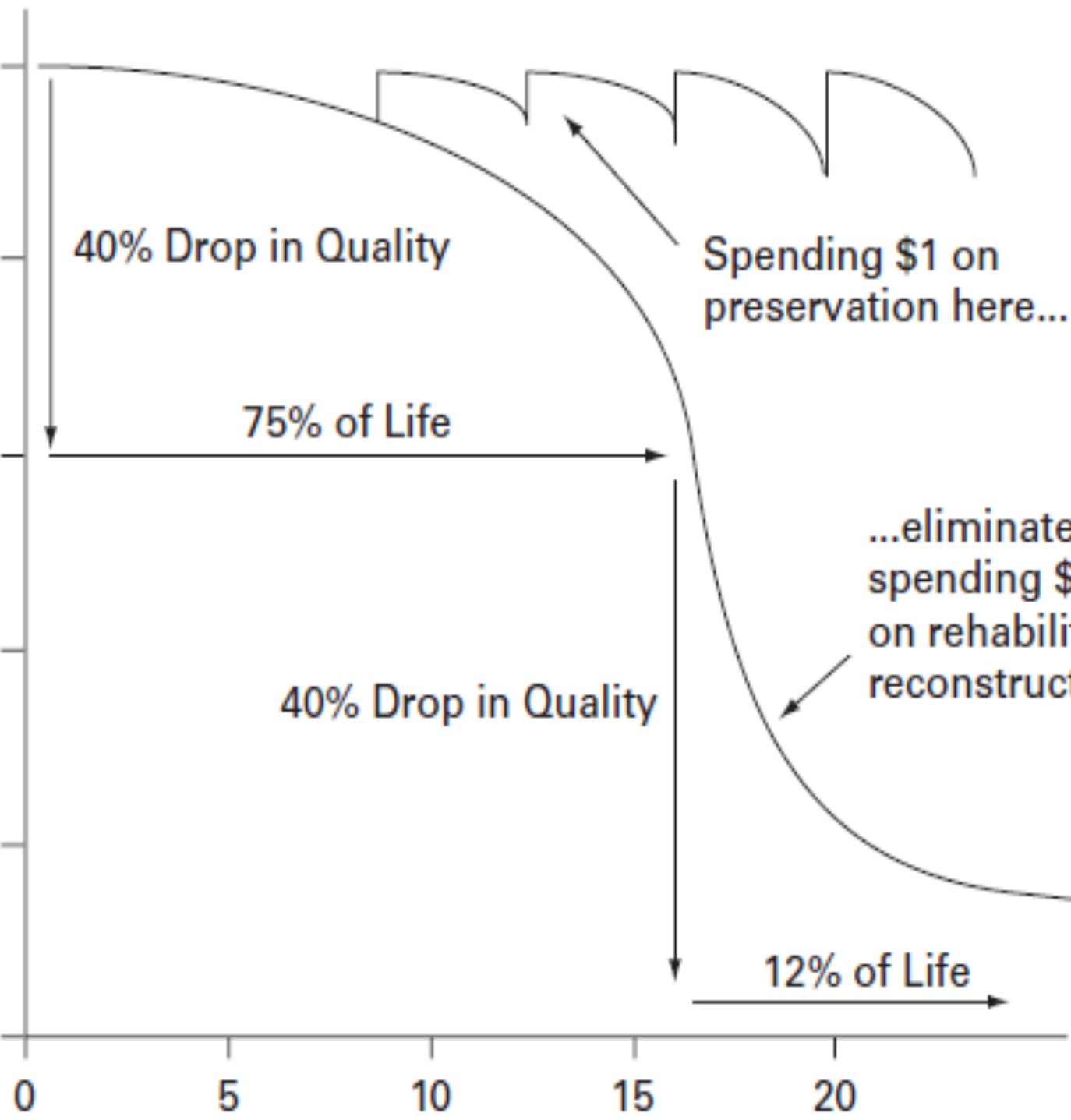
- No longer “Worst- First”
- Apply the right treatments at the right times
- Now “Keep the Good Streets Good”
- More emphasis on spending for lower cost treatments applied when the pavements are in good condition

PCI

100

20

Excellent
Good
Fair
Poor
Very Poor
Failed



40% Drop in Quality

75% of Life

Spending \$1 on preservation here...

40% Drop in Quality

12% of Life

...eliminates or delays spending \$6 to \$10 on rehabilitation or reconstruction here.

New Tools for the Tool-box:

- We embarked on a Scrub-Seal Program
- Followed by a Cape-Seal Program
- **And explored a Fog-Seal Program**

2007

Pavement Maintenance Seminar in Seaside, Or.
My first exposure to a “Fog-Seal”



2008

Tasked with coming up with a “Fog-Seal Program” with
ensuing research

2009

- TRMSS (Terminal-Blended, Rubber-Modified, Surface Sealant)
- RePlay (Soybean-based SBS/SBBS Rejuvenator)
- Demo of both products in similar circumstances

T.R.M.S.S.

- Application rate 0.05-0.07 G/S.Y.
- Dedicated “Distributor”-applied (1000-2000 gal)
- 3-4 hour cure time
- Opaque “black” appearance
- Masking or shielding of curb & gutter needed
- Cost “in-place” \$ -0.85 to \$1.00/S.Y. (depending on quantity)

RePlay

- Application 0.010 to 0.020 G/ S.Y.
- Applied w/ spray equipment from bed of a 1 ton truck (w/ 250 gal totes)
- 20-30 minute cure time
- Clear “wet pavement” appearance
- No shielding or masking needed
- Cost \$0.85 to \$1.05/S.Y. (depending on quantity)

Pros and Cons

- T.R.M.S.S. has an “obviously applied” conventional asphalt black appearance vs RePlay which is hard to see within an hour
- T.R.M.S.S. seals the surface- blocking UV rays vs RePlay which penetrates into the pavement rejuvenating the lighter oils
- The effect of TRMSS is immediate vs RePlay’s effectiveness which may take years to become known
- RePlay’s “return to traffic” is at least 5 times sooner than TRMSS

Pros and Cons (continued)

- RePlay is carbon-negative and non-polluting vs TRMSS which is petroleum-based
- RePlay applications do not require re-striping; the retro-reflectivity is virtually unchanged vs TRMSS requires re-striping
- RePlay can be over-sprayed onto the adjacent concrete with no ill-effect vs TRMSS overspray is unsightly and should be masked or shielded

After evaluation the City decided RePlay was the best fit.

2010

- Contract Awarded to Rose Paving from Denver, (nearest Vendor)
- 66 streets- all pavements aged 6-7 years
- Approx. 169,000 S.Y.
- Work done over 2.5 weeks- Late August to Early September
- No unusual problems
- \$0.89 per S.Y. cost





History of Innovation

- Installed Glas-Grid w/ CQS1-h in lieu of PetroMat w/ CSS- 1 prime-coat- 1995
- Used fibers in high/early concrete for 24 hour “return to traffic” repairs- 1996
- Reportedly, the first Oregon Agency to used warm-mix for overlays- partnered with Knife River for demo project- 2008
- One of the first Oregon Agencies to use aramid fibers in HMAC- 2010
- Use of RePlay fog-seal on pavements aged 6 years- 2010
- “Why not tool-up to do ‘in-house’ RePlay fog-sealing?”-2011
- Budgeted for and purchased spray system and material- 2014



**ROAD
CLOSED**









FOG SEALING
10/15
NO ON-STREET PARKING





Results to date

- Every year since 2014 treating pavements that are 6 years old- “in-house”
- Average drying time: about 20 minutes-in temps above 40 deg. F
- Public feedback
 - “What is that ‘citrusy’ smell”
 - “I can’t see that you even did anything”
 - “It’s okay to drive on it already?”
 - “Sounds like ‘snake oil’ to me!”
 - “How do you know it’s working?”
- Extraordinarily Environmentally Friendly- “NO WASTE!”

“Okay, but how do we know it’s working?”

- At first it truly was an act of faith!
 - Conversations with Dr. Sheldon Chesky of BioSpan
 - Our experience in usage being identical to those described by BioSpan
 - White Paper by Dr. Shakir Shatnawi
 - Case Studies from Missouri, Ohio, and Nebraska
 - Black Light photos of cores showing > 1” penetration
 - Beading of water without loss in skid-numbers

But now we have evidence!

But now we have evidence!

Here are a sample of streets paved in 2004
and treated in 2010

These streets are *14 years old* in these
photos

Crystal Springs E. Medford



Duncan Drive- S.E. Medford



Finley Rd in W. Medford





But, saving the best for last:

Fieldbrook in E. Medford





Looking W. from Link Dr Paved 2003, Treated
with RePlay in 2010- PCI 83.7 in 2018



Fieldbrook Looking E. from W. of Link Dr. Paved 2003,
Treated with RePlay 2010- PCI 83.7



Fieldbrook @ Link Dr. Note the color/texture change at the “Phase line”?



Fieldbrook- foreground paved in 2003, Treated with RePlay in 2010:
background paved in 2006, not treated; PCI 68.1 in 2018

A residential street with cracked asphalt pavement, lined with houses and trees. The street is paved in 2006 and has a PCI of 68.1 in 2018. The image shows a long, straight residential street with asphalt pavement that has significant cracking. On the left side, there are houses with lawns and sidewalks. A trash bin is visible on the left. On the right side, there are more houses, trees, and a fire hydrant. The sky is blue with some clouds. The text is overlaid in the center of the image.

Fieldbrook- 50' E. of Link Dr. paved
in 2006, not treated; PCI 68.1 in 2018



Link Dr. Looking N. from Fieldbrook, Paved
2003 Treated with RePlay 2010 PCI-85.1 in
2018

Comparison: Fieldbrook near Link

Paved 2003, & RePlay in 2010

Paved in 2006- untreated





Questions?

Contact Info:

- Tad Blanton- City of Medford
 - (541) 821-2902- Work Cell
 - (541) 973-0430- Personal Cell
 - E-.mail: Tad.Blanton@ci.medford.or.us
- BioSpan Technologies Dr. Sheldon Chesky
 - Website: biospantech.com
 - P.O. Box 4222 Ballwin, Mo. 63022
 - (800) 730-8980 Fax: (636) 583-1773