



Bonded Wearing Course  
Process, Materials, Construction

Scott Dmytrow  
Brad Albert – City of Hillsboro  
Chris Sneider – City of Vancouver

# History of BWC

- Developed in France in the late 80's as a thin lift that doesn't delaminate. (Novachip)
- Was introduced in the United States in 1992, with test sections in Alabama and Pennsylvania DOT.
- By 1996, it was a nationwide process being used in the U.S.A.
- First application in CA- LA County in 1998
- First Caltrans application 2002 Hwy 50 over Echo Summit to combat chain wear
- Today, it is known as BWC – Bonded Wearing Course.

# What is Bonded Wearing Course?



## Maintenance Technique that combines the best of two technologies

- Part Chip Seal
- Part HMA Overlay

# From the chip seal

- Spray application that seals the existing roadway
- Application of .14-.25 gal/SY of a polymer modified emulsion for bonding to and sealing of existing surface
- Quick process – up to 50,000 SY per day



# From the HMA overlay

- From the HMA overlay
  - Improved ride quality
  - Reprofilng
  - Quick return to traffic
  - No sweeping or fog seal needed
  - Use of gap or open graded, polymer or rubberized HMA to finish the process



# Equipment



## Conventional Paving Tack Coats



BWC Emulsion Membrane



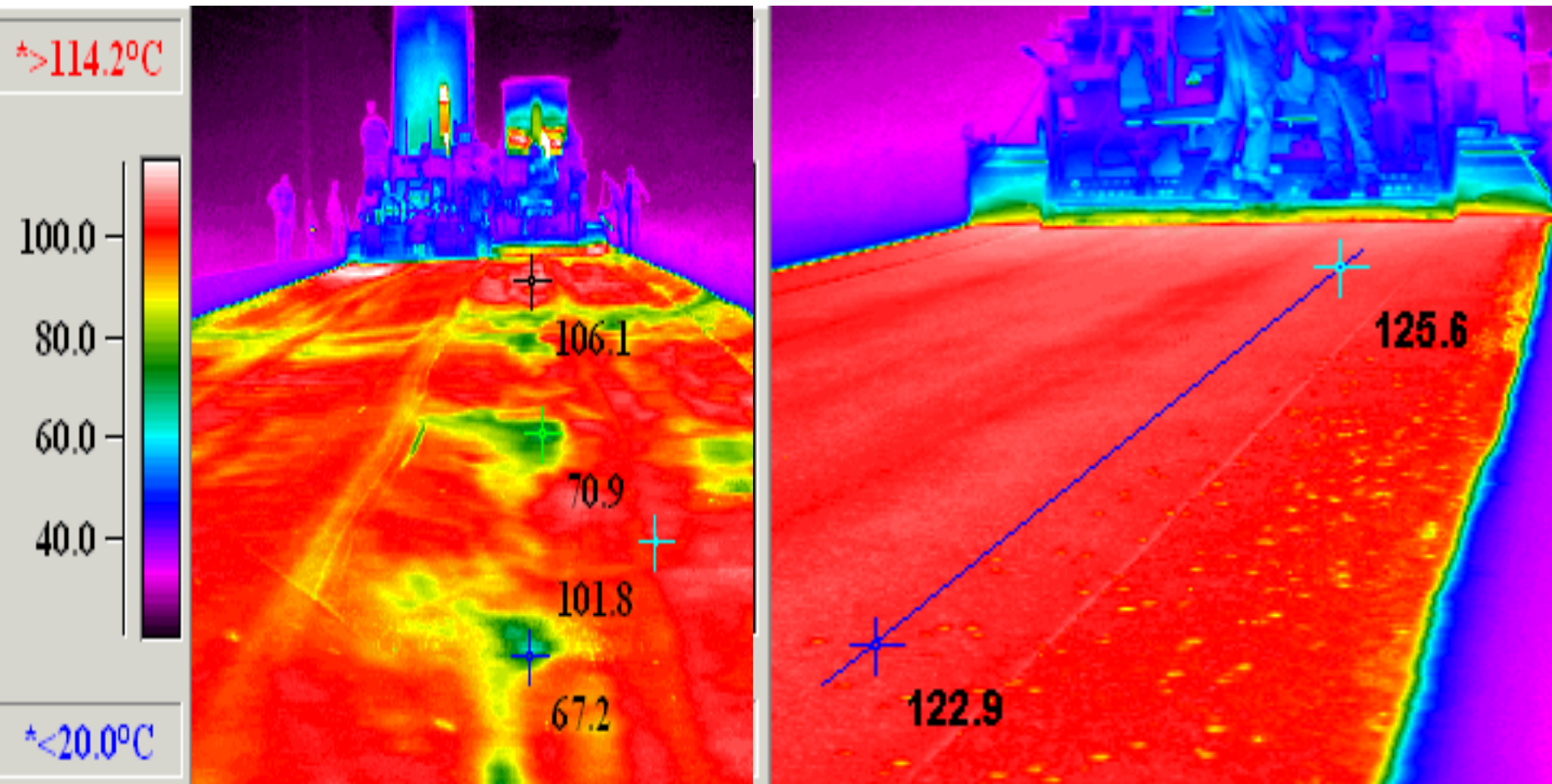
# BWC ride quality improvement



# MTV – Shuttle Buggy



# Process designed to reduce thermal and mechanical segregation

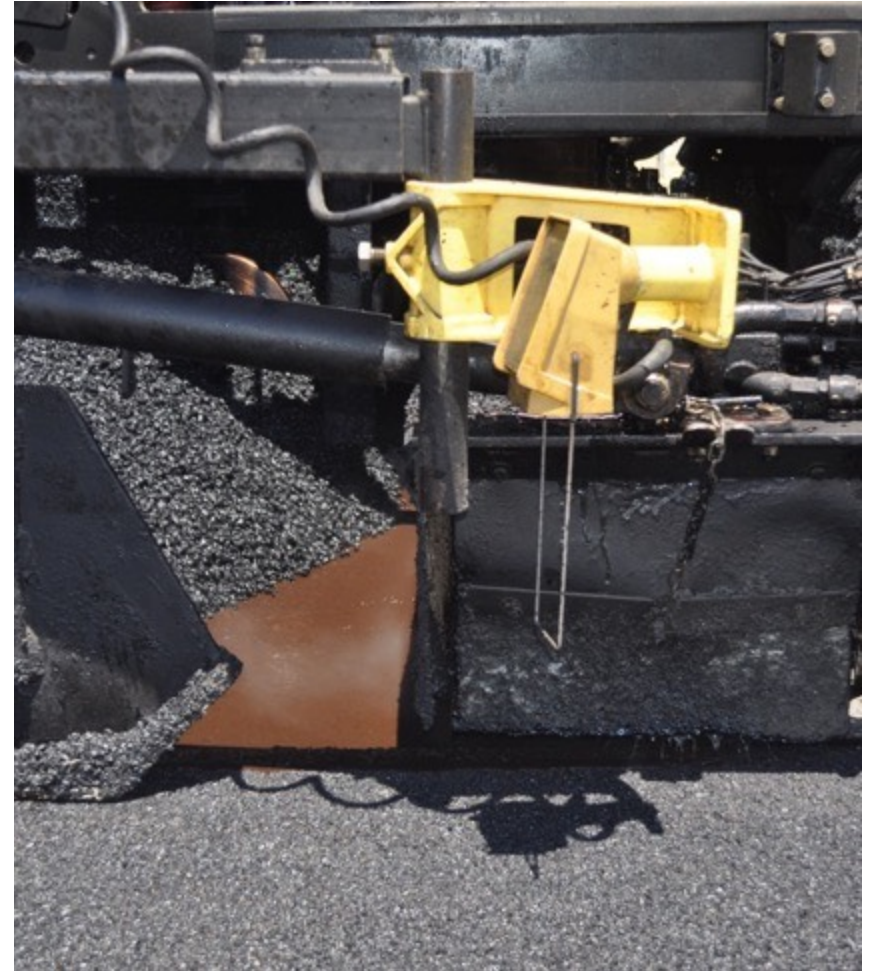


# Emulsion Transport and Transfer



# BWC Materials

- Polymer Modified Asphalt Emulsion Membrane
- Polymer Modified or Rubberized Asphalt Binder
- Gap or Open Graded Aggregate Gradation



# The Process

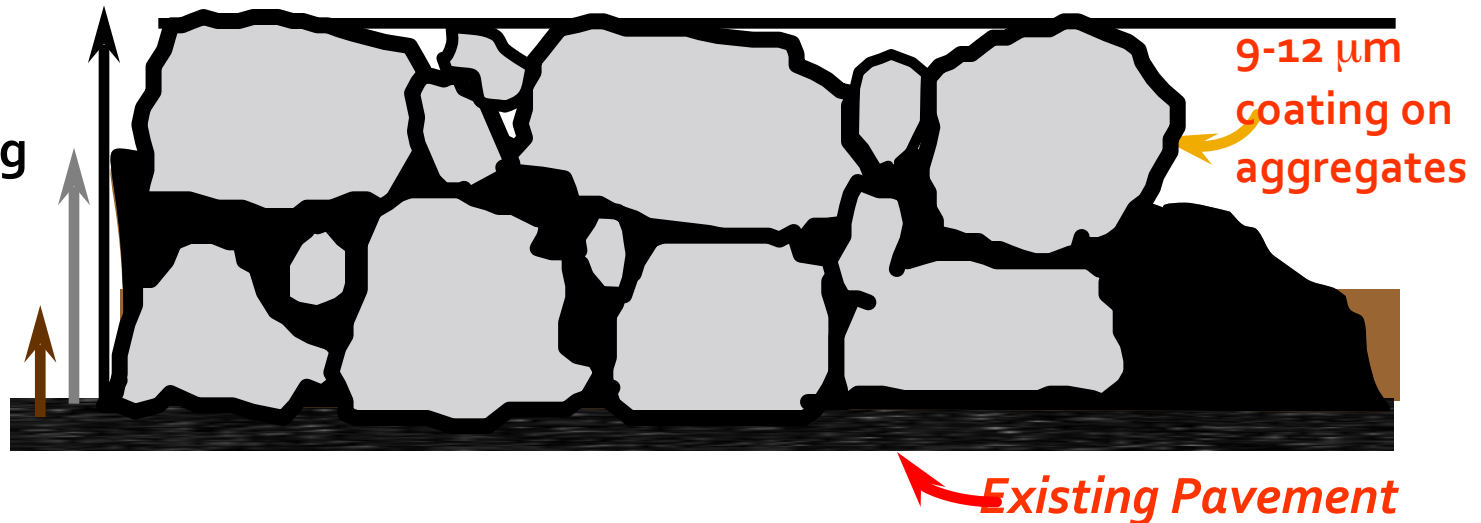
*The emulsion membrane “wicks up” around the HMA aggregates*

*The emulsion cures, bonding the mix & pavement*

3/4” minimum  
Depth of Mix

3/8”  
Nominal Ag  
Size

.14-.25  
Emulsion  
membrane  
depth



# BWC – in place







# BWC Candidates

- Roads that have a PCI of 55-60 or better
- Collectors
- Arterials
- Connectors
- Highways
- Residential
- Private

# Prep Work – Crack Fill



Preferably 2-4 months prior to paving

# Prep Work - Repair localized failures



# Prep Work - Grinding



# Finishing Work – Raising Iron



# Other prep work



# BWC Construction

- Conventional Paving Practices – except for layout – NO hotlaps
- Emulsion Application Rate:
  - 0.14 – 0.25 gal/yd<sup>2</sup>
- Lift Thickness:
  - Typically ¾" – .1'
- Finishing:
  - Method – 2 coverages with a minimum of two rollers in static mode



# BWC Construction





# BWC Construction





15 10:45 AM



15 10:52 AM

**Construction  
Speed and Quick  
Return to Traffic**



15 10:47 AM



15 11:00 AM



15 11:02 AM

# Speed of Construction



# Does it work?



15 Years as of May, after picture taken last week

# CALTRANS District 4 – HWY 37



Highway 37  
Caltrans District 4  
Bonded Wearing Course

# Highway 37



# Sonoma County – BWC - 2013



# City of Hillsboro - 2015





# City of Hillsboro - 2015



# City of Hillsboro - BWC



# March 2017



# BWC – Far Niente Winery



# City of Oakland - 2017



# City of Oakland - 2017



# Local Agency Experience

- Project Selection
- Outcomes
- Challenges & Improvement Areas
  - Hillsboro
  - Vancouver

# So, does it work?

■ YES.

■ Thank you.

***TELFER***



- Cesar Lara  
925-914-1724  
[cesar.lara@telferpavements.com](mailto:cesar.lara@telferpavements.com)
- Scott Dmytrow  
916-825-9415  
[scott.dmytrow@telferpavements.com](mailto:scott.dmytrow@telferpavements.com)
- Victoria Martinez  
916-517-3026  
[victoria.martinez@telferpavements.com](mailto:victoria.martinez@telferpavements.com)