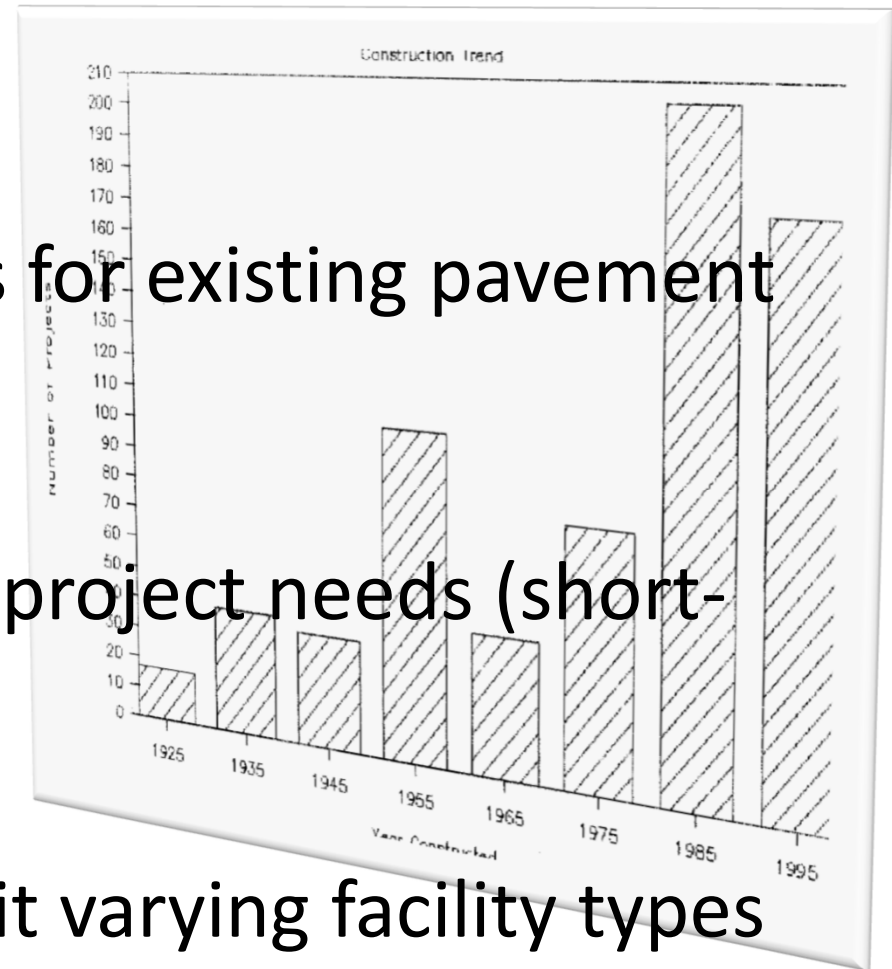


INTRODUCTION to CONCRETE OVERLAYS



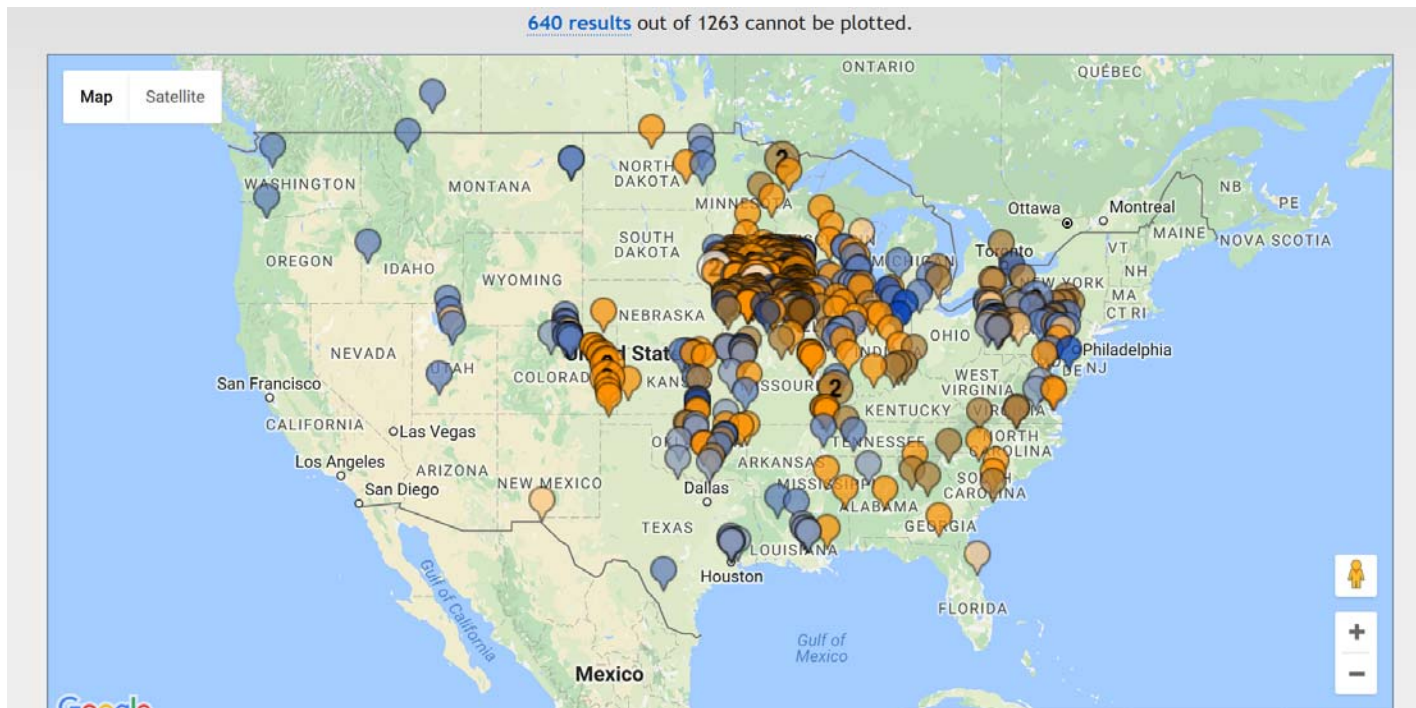
Concrete Overlays - Introduction

- Vast experience and performance history in the U.S.
- Different overlay types for existing pavement types
- Robust solutions to fit project needs (short-medium-long term)
- Versatile solutions to fit varying facility types

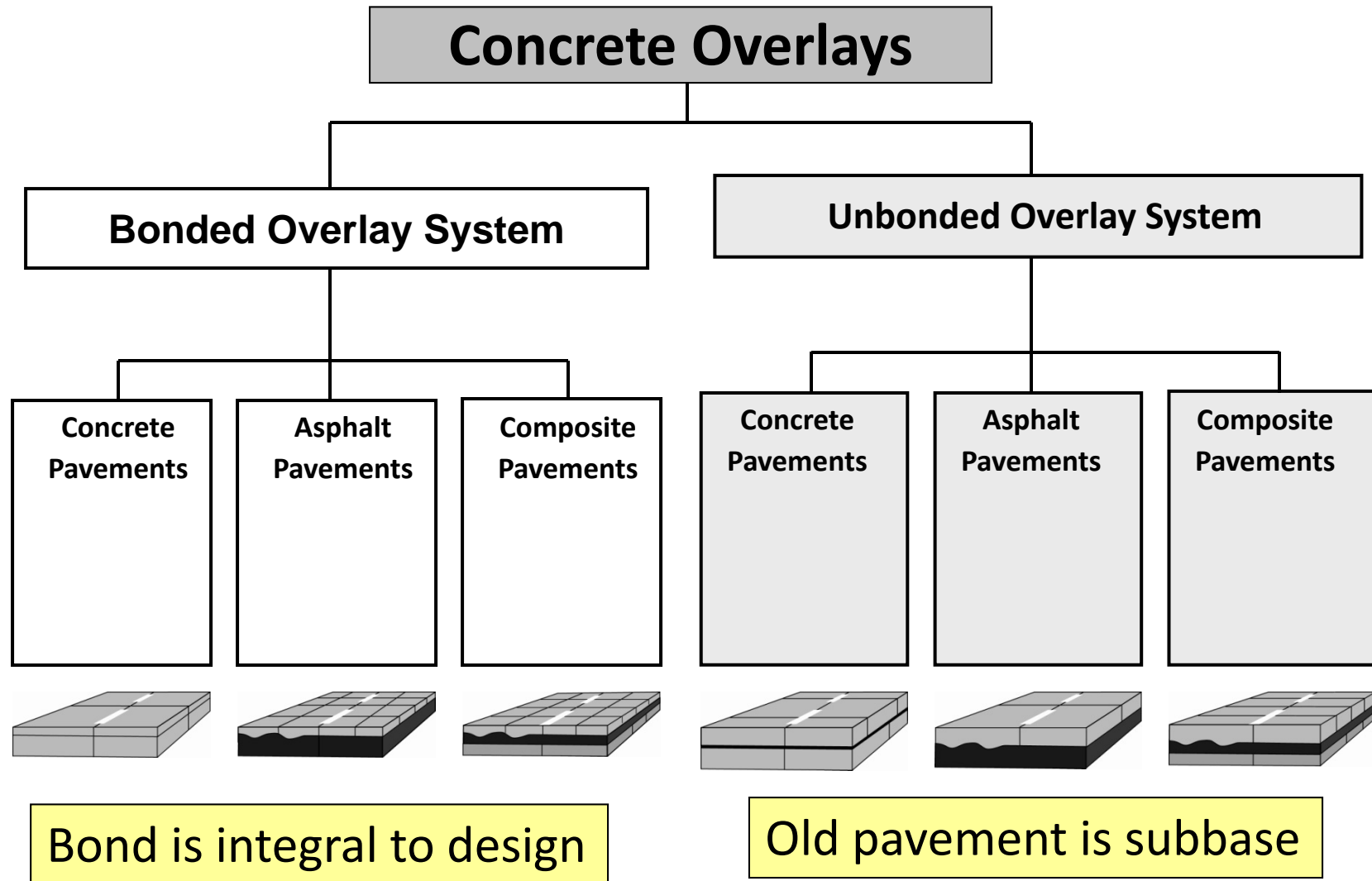


Concrete Overlays - Introduction

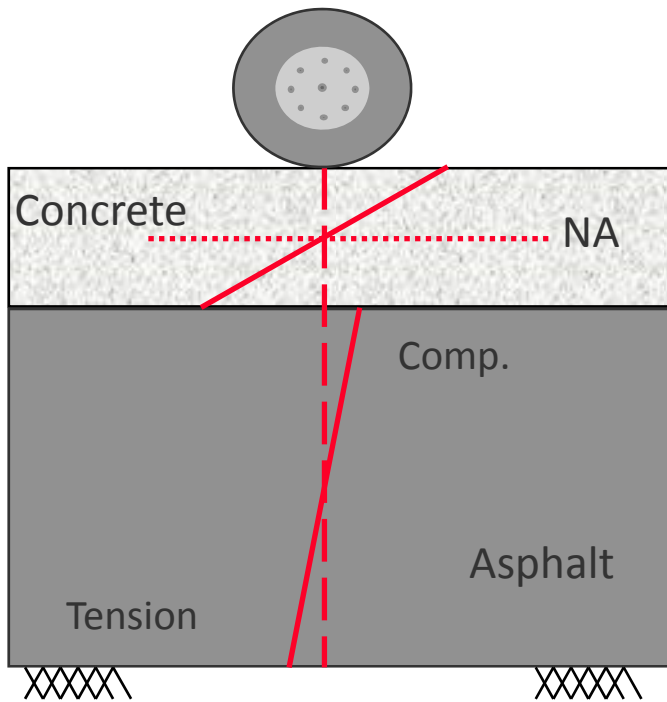
- >1,263 concrete overlays in the U.S., dating from to **1901** through present
- Concrete overlays have been successfully constructed in at least 45 different states



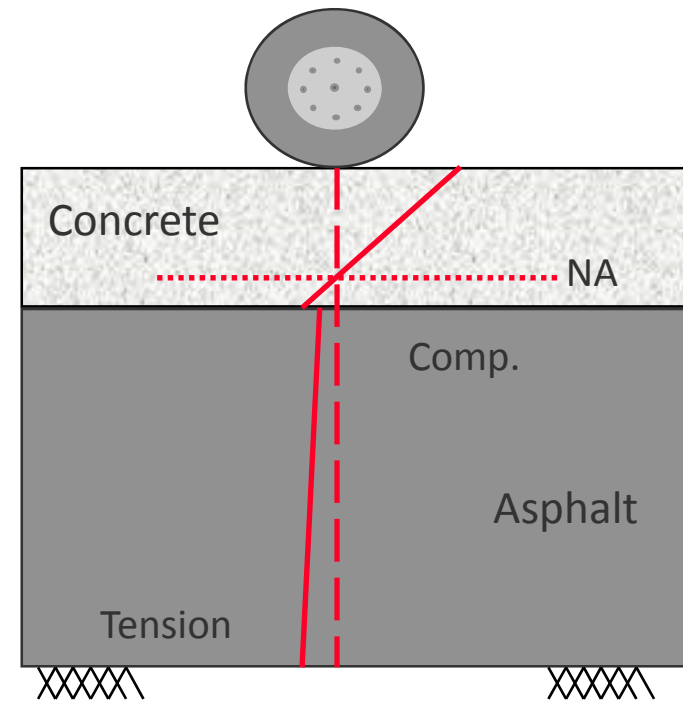
System of Concrete Overlays



Bonded and Unbonded Concrete Overlays

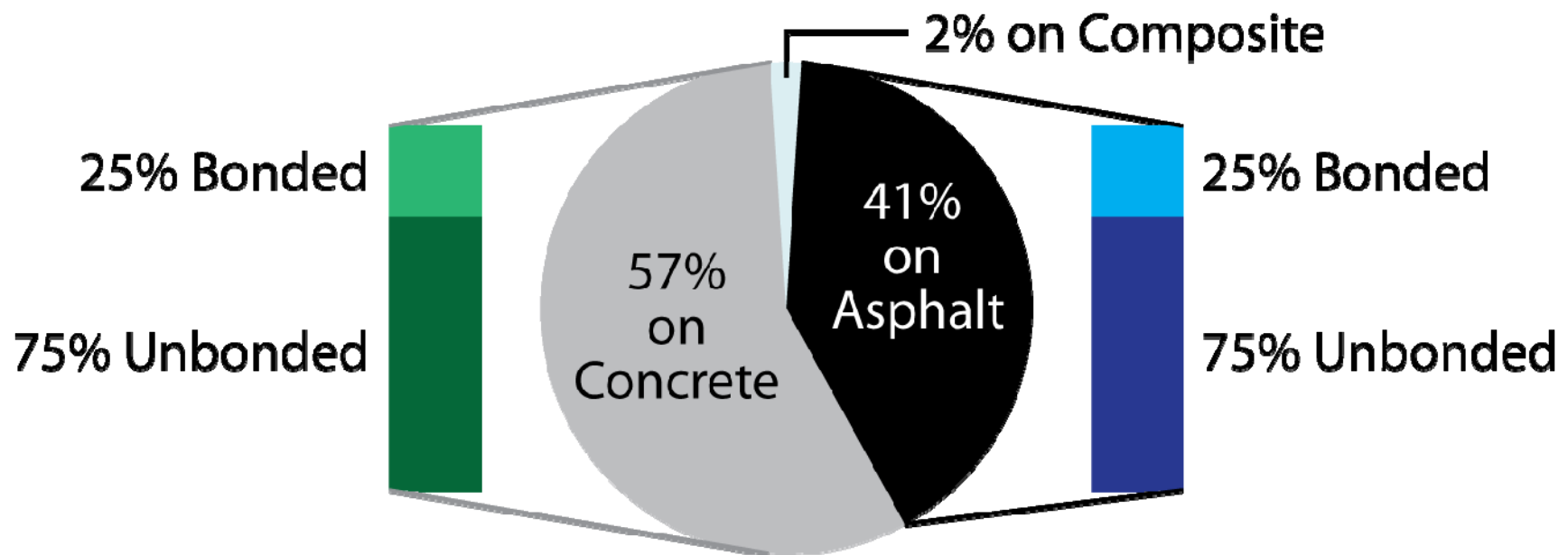


Unbonded



Bonded

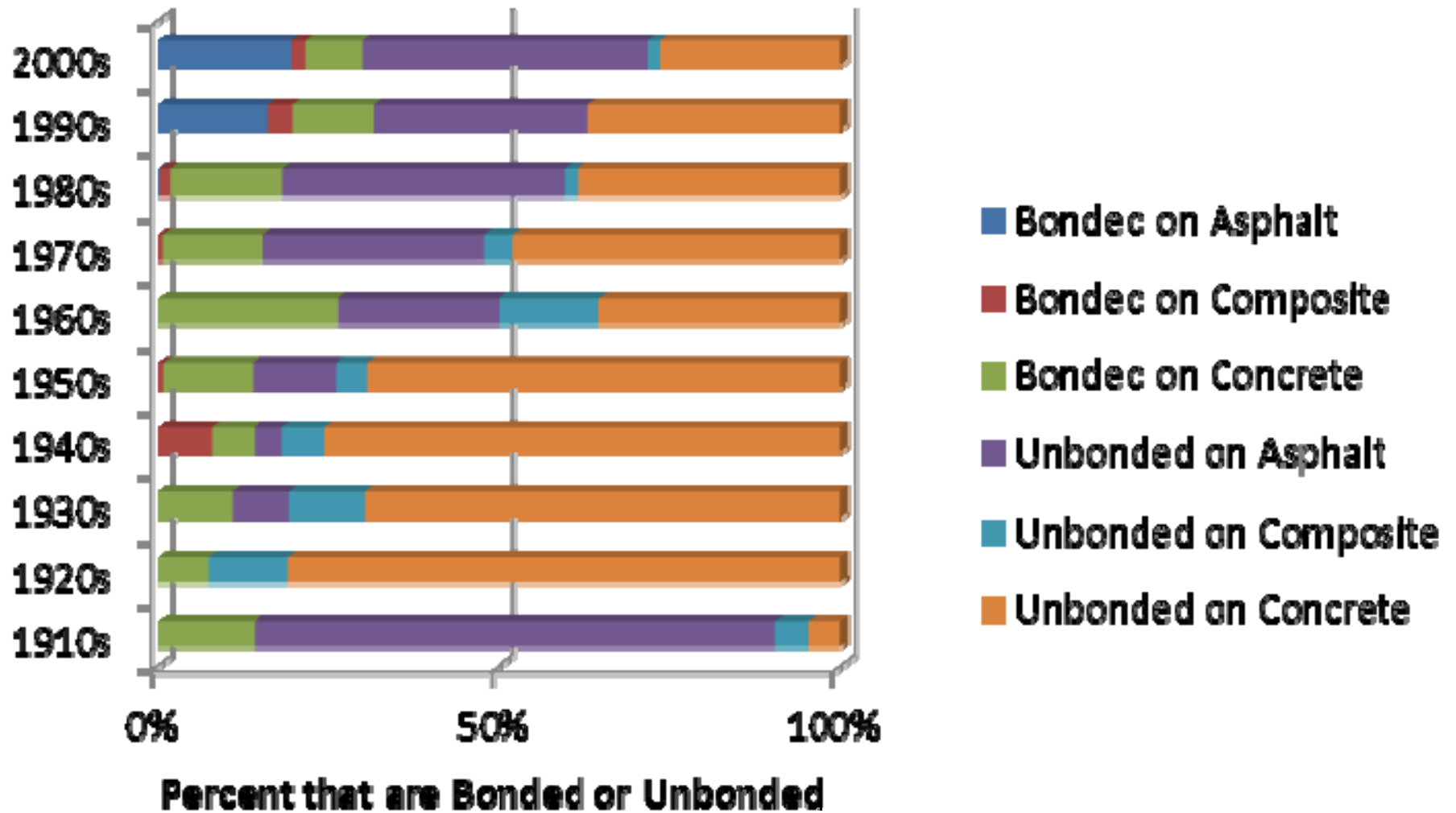
Adoption of Bonded vs. Unbonded Historically, Mostly on Concrete



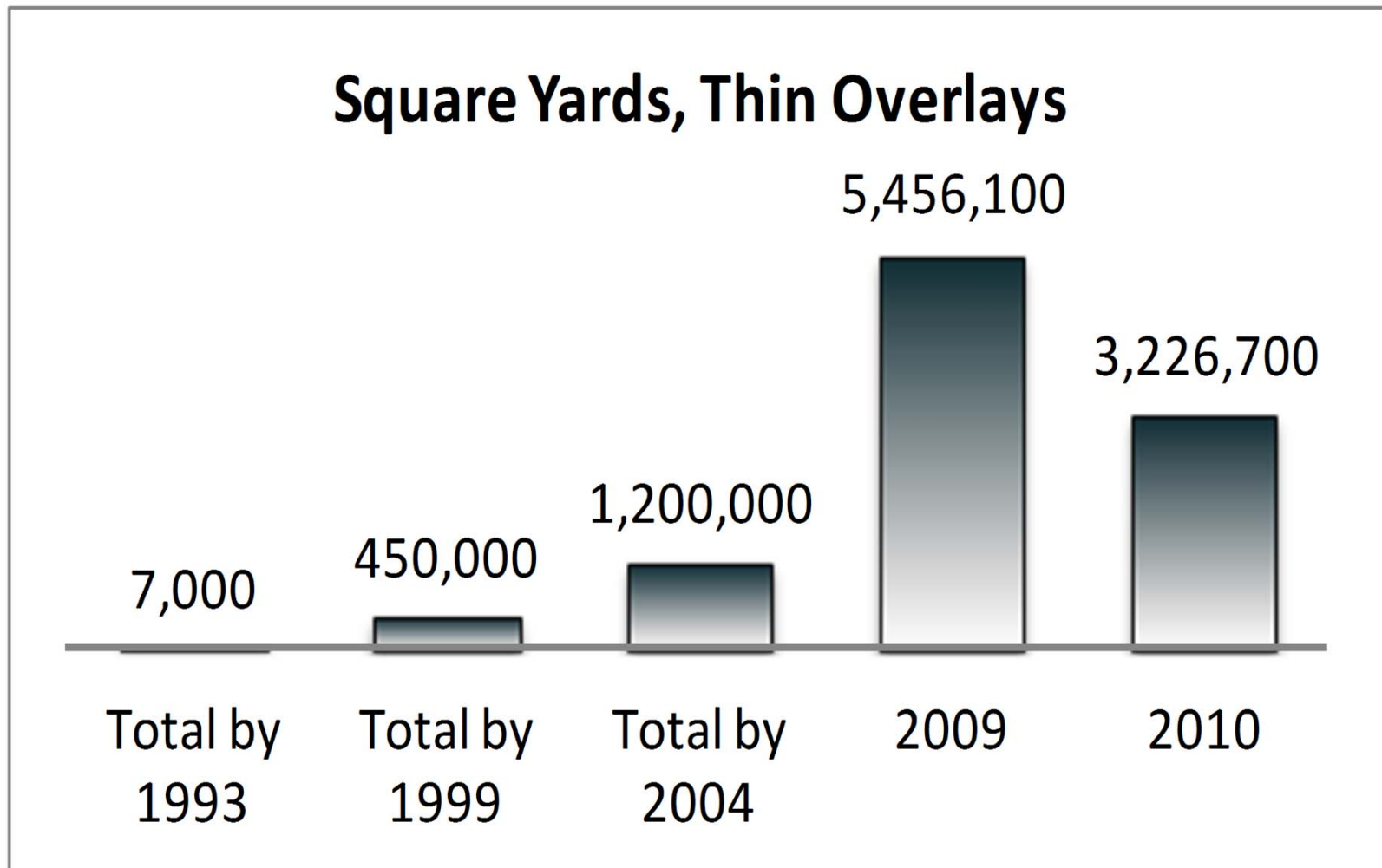
(by number of projects)

Based on over 1,000 concrete overlays from NCHRP Synthesis 99, NCHRP Synthesis 204, and ACPA's National Overlay Explorer

... But More and More on Asphalt



Thin (< 6 in.) Concrete Overlays in the U.S.

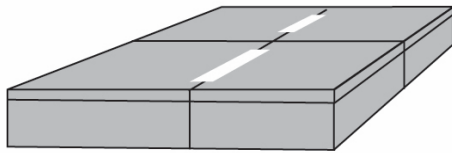


Types of Concrete Overlays

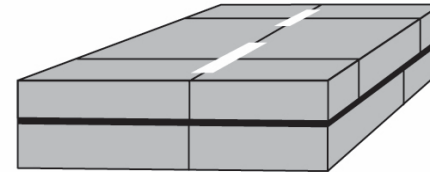
Bonded

Unbonded

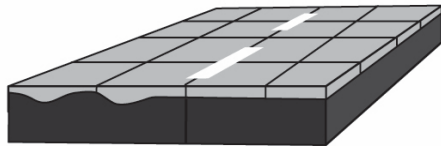
Bonded Concrete Overlays of Concrete Pavements
–previously called bonded overlays–



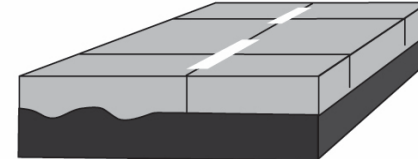
Unbonded Concrete Overlays of Concrete Pavements
–previously called unbonded overlays–



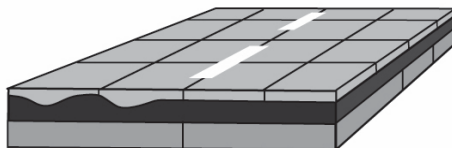
Bonded Concrete Overlays of Asphalt Pavements
–previously called ultra-thin whitetopping–



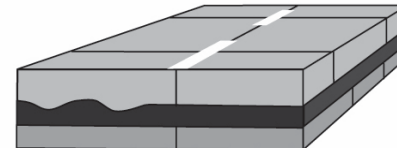
Unbonded Concrete Overlays of Asphalt Pavements
–previously called conventional whitetopping–



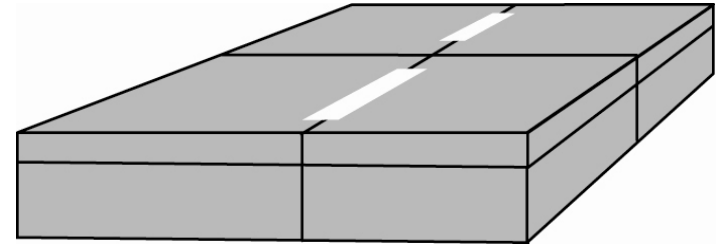
Bonded Concrete Overlays of Composite Pavements



Unbonded Concrete Overlays of Composite Pavements



Bonded Overlay on Concrete: Keys to Success



- Concrete Bonding is important
- Concrete aggregate used in overlay should have thermal properties similar to that of existing pavement
- Matching joints with underlying pavement allows structure to move monolithically.
- Existing joints must be in fair condition or be repaired
- Timing of joint sawing is important
- Cut transverse joints full depth +1/2" and longitudinal joints at T/2.
- Width of transverse joint of overlay to be equal to or greater than underlying crack width of the existing pavement.
- Curing should be timely and adequate



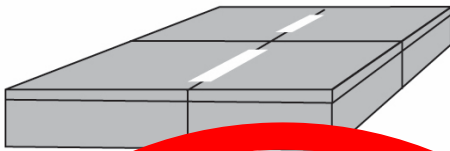
Types of Concrete Overlays

Bonded

Unbonded

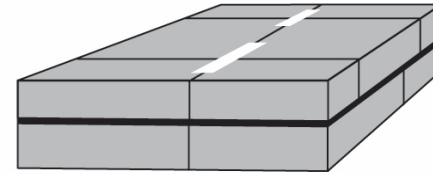
Bonded Concrete Overlays of Concrete Pavements

—previously called bonded overlays—



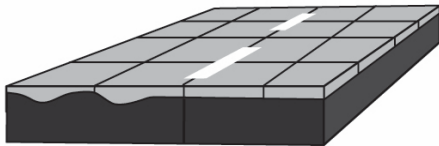
Unbonded Concrete Overlays of Concrete Pavements

—previously called unbonded overlays—



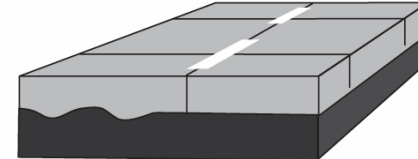
Bonded Concrete Overlays of Asphalt Pavements

—previously called ultra-thin whitetopping—

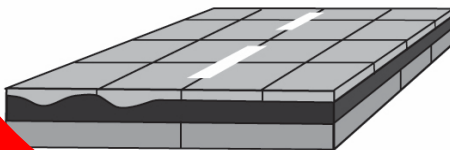


Unbonded Concrete Overlays of Asphalt Pavements

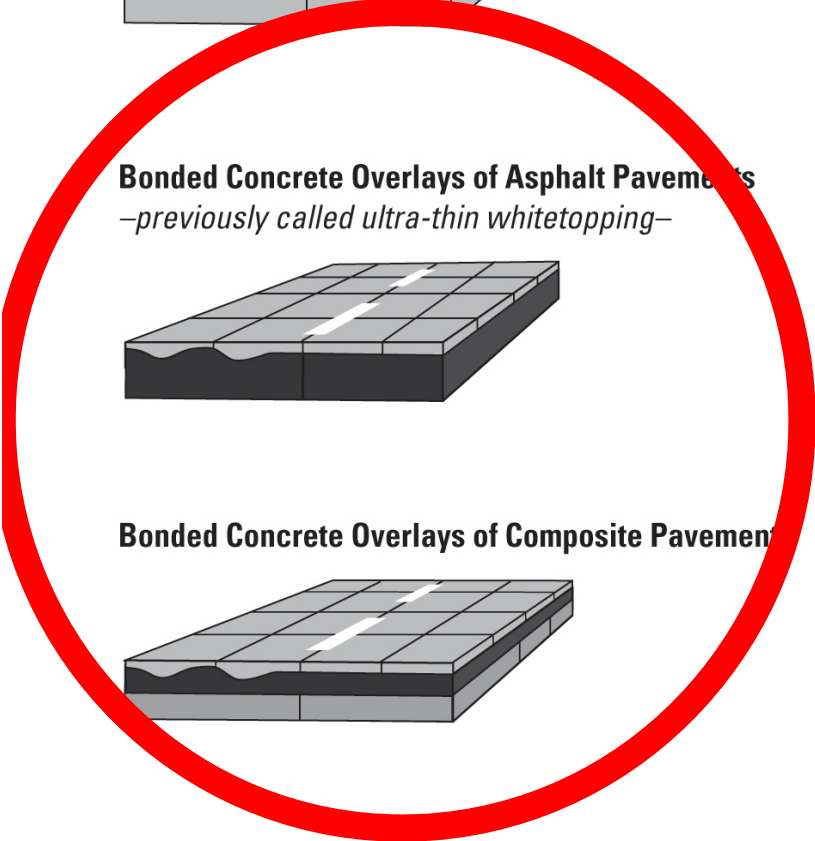
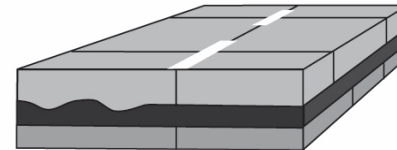
—previously called conventional whitetopping—



Bonded Concrete Overlays of Composite Pavements

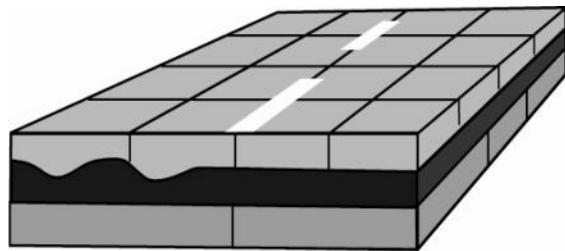
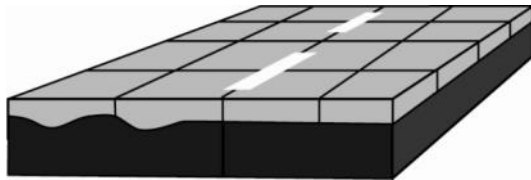


Unbonded Concrete Overlays of Composite Pavements



Bonded Over Asphalt/Composite

Keys to Success



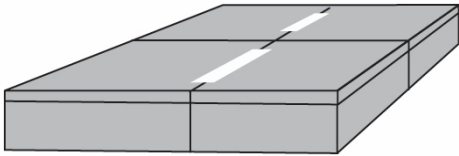
- Bonding is critical
- Small square panels reduce curling, warping, & shear stresses in bond.
- Mill to remove surface distresses, or improve bonding.
- Be sure to leave 3" or more of HMA after milling.
- Avoid placing longitudinal overlay joints in the wheel paths.
- Application of curing compound is critical.
- Joint sealing

Types of Concrete Overlays

Bonded

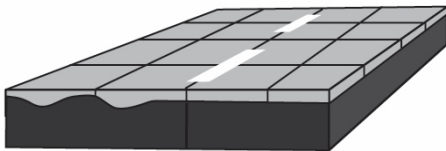
Bonded Concrete Overlays of Concrete Pavements

—previously called bonded overlays—

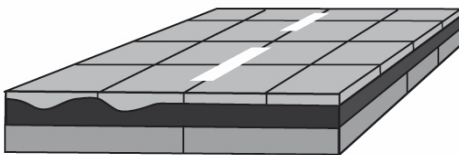


Bonded Concrete Overlays of Asphalt Pavements

—previously called ultra-thin whitetopping—



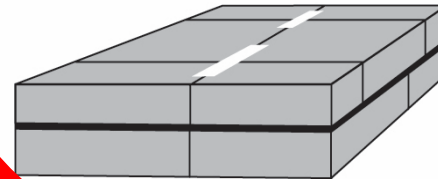
Bonded Concrete Overlays of Composite Pavements



Unbonded

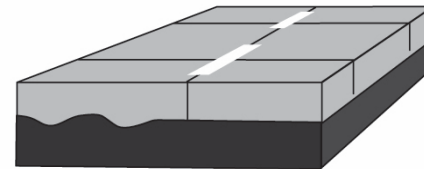
Unbonded Concrete Overlays of Concrete Pavements

—previously called unbonded overlays—

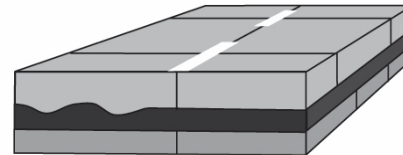


Unbonded Concrete Overlays of Asphalt Pavements

—previously called conventional whitetopping—

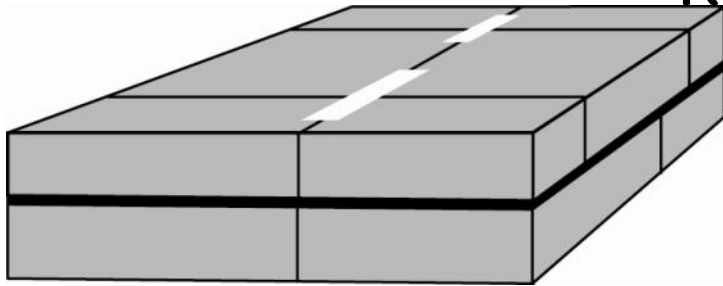


Unbonded Concrete Overlays of Composite Pavements



Unbonded Overlay of Concrete Pavements

Keys to Success



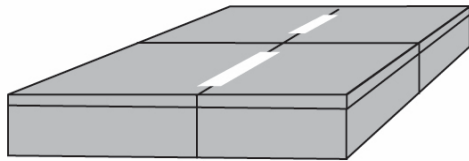
- Full-depth repairs - only where structural integrity is lost at isolated spots.
- Separation layer (normally 1" asphalt or geotextile fabric)
- Use to restore structural capacity of the existing pavement and increase pavement life equivalent to full-depth pavement
- Faulting of 3/8 in. or less in the existing concrete pavement
- Shorter joint spacing helps minimize curling and warping stresses
- No need to match joints with those of the underlying concrete pavement

Types of Concrete Overlays

Bonded

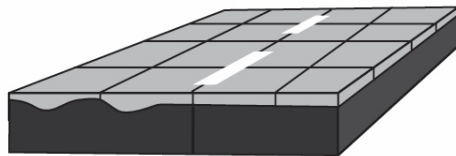
Bonded Concrete Overlays of Concrete Pavements

—previously called bonded overlays—

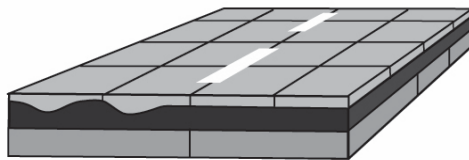


Bonded Concrete Overlays of Asphalt Pavements

—previously called ultra-thin whitetopping—



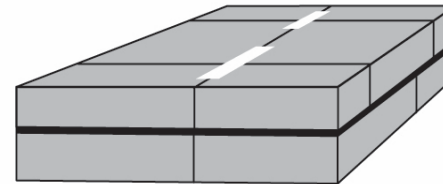
Bonded Concrete Overlays of Composite Pavements



Unbonded

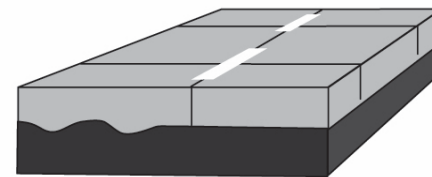
Unbonded Concrete Overlays of Concrete Pavements

—previously called unbonded overlays—

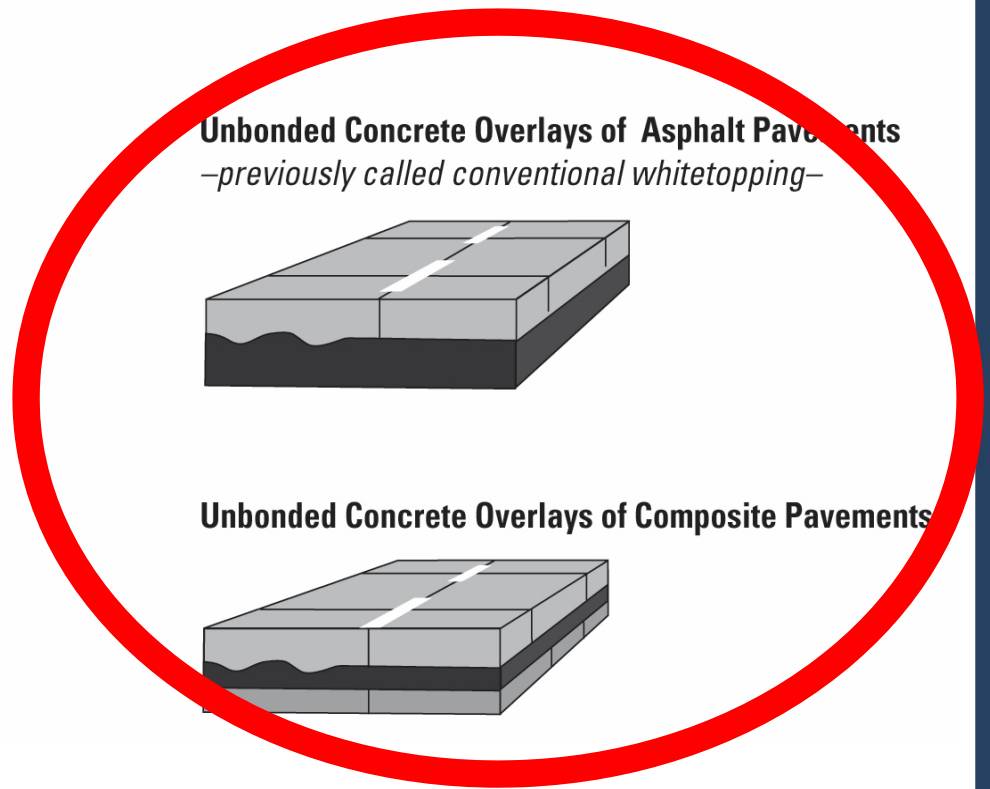
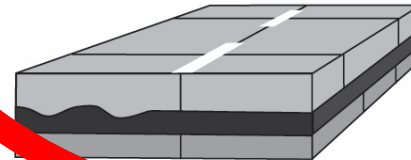


Unbonded Concrete Overlays of Asphalt Pavements

—previously called conventional whitetopping—

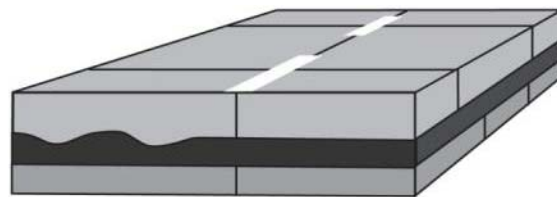
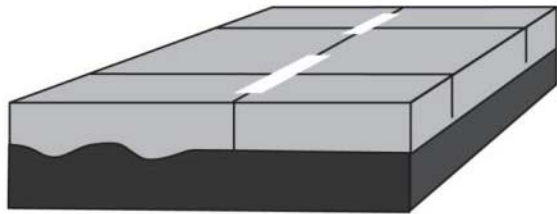


Unbonded Concrete Overlays of Composite Pavements



Unbonded Over Asphalt/Composite

Keys to Success



- Milling to eliminate surface distortions of 2 in. or more
- Complete repairs at isolated spots where structural integrity needs to be restored
- Partial bonding between the overlay and the existing asphalt pavement is acceptable and may even improve load-carrying capacity

Louisiana Concrete Overlay Projects



At least 18 since 1943

Highway Applications

- 2014 – 4” Bonded on Asphalt – Julia Street, New Orleans
- 2003 – 4” Bonded on Asphalt: US 90 at Lapalco Blvd
- 2003 – 4” Bonded on Asphalt: US 425/65 Ferriday–Red Gum Northbound
- 1998 – Bonded on Asphalt: US 167 Winnfield (West Court St)
- 1997 – 4” Bonded on Concrete: Jct. LA 73 – Jct. LA 30
- 1995 – 12” Unbonded on Asphalt: I-10/I-12 W. Pearl River / I-59
- 1993 – 4” Bonded on Concrete: Jct LA 42 – Jct LA 73
- 1992 – 4” Bonded on Concrete: Jct LA 30 – Jt LA 22
- 1990 – 4” Unbonded on Concrete: I-10, Siegen Lane – Jct LA 42
- 1989 – 4” Bonded on Concrete: Siegan Lane – LA 42
- 1981 – 4” Bonded on Concrete: US 61 North of Baton Rouge

Airfield Applications

- 1943 to 1992: Several Unbonded Overlays of Taxiways, Runways and Aprons at Barksdale, Chennault and England AFBs
- 1954 – 10” Unbonded on Asphalt: Baton Rouge Muni Airport



Source: Bill Temple, CAAL



Source: Bill Temple, CAAL



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Source: Bill Temple, CAAL



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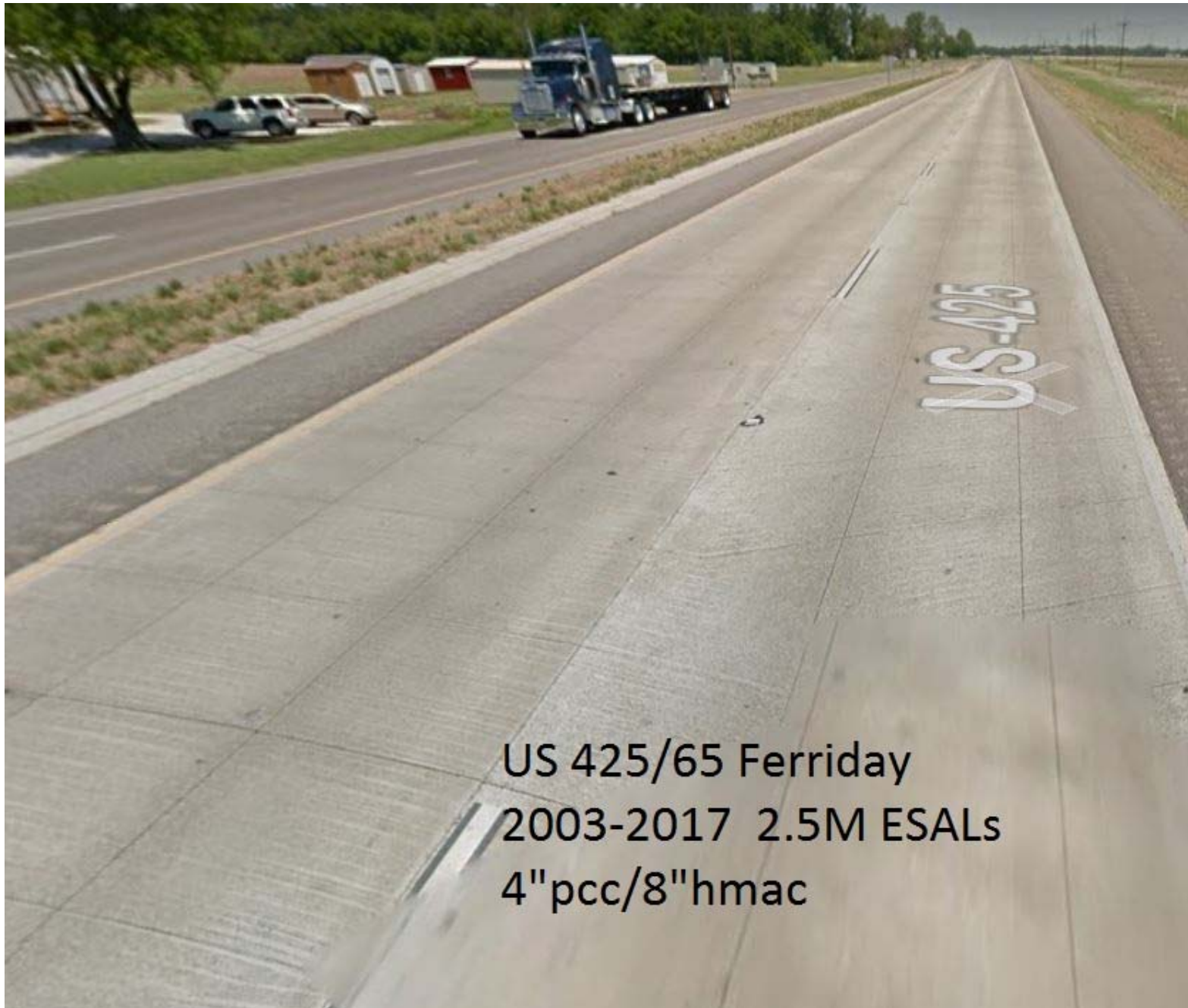
Source: Bill Temple, CAAL



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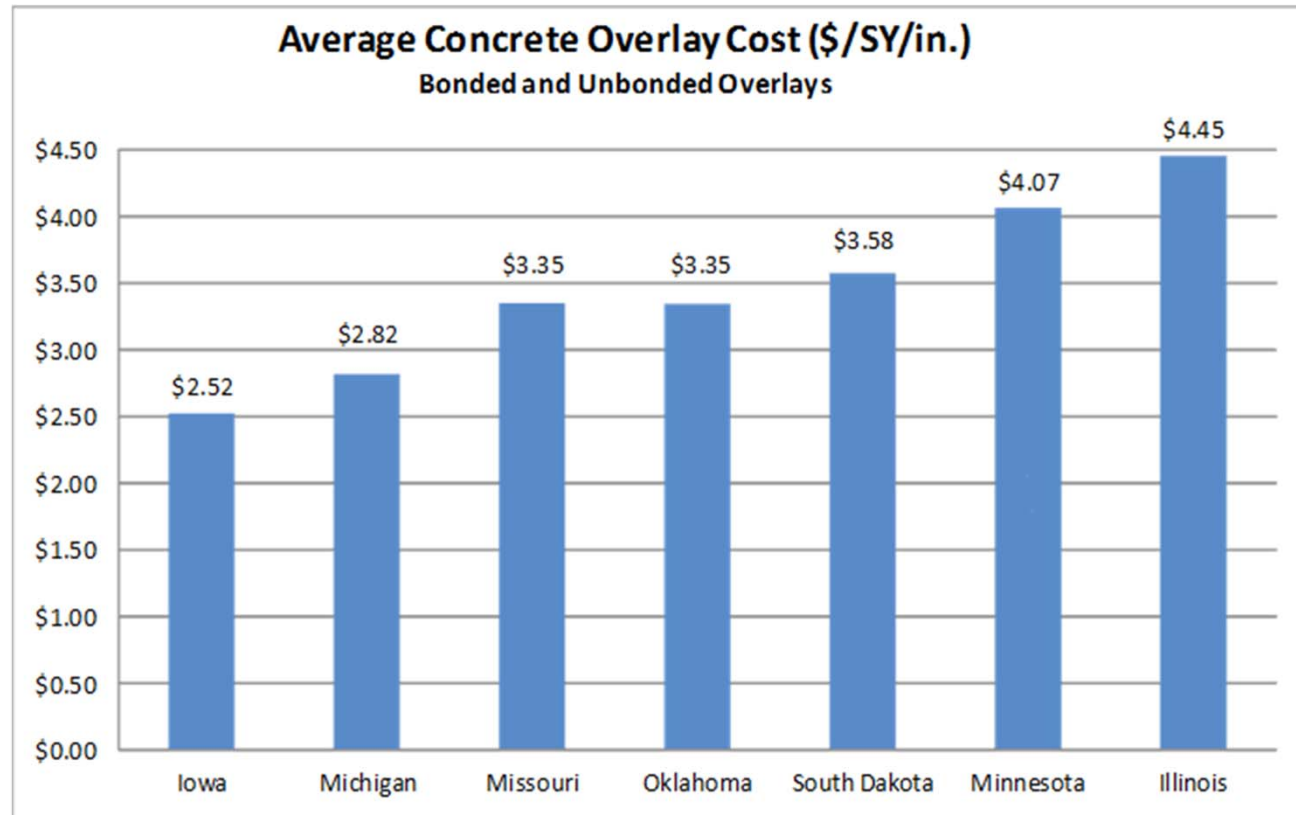
Source: Bill Temple, CAAL



Source: Bill Temple, CAAL

Benefits of Concrete Overlays

- Concrete overlays cost-effectively extend pavement life and improve both functional and structural characteristics.
- Are an effective means to enhance pavement sustainability by improving:
 - surface reflectance (albedo),
 - increasing structural longevity,
 - enhancing surface profile stability and maintaining ride quality.



2015 Overlay Cost Survey

- Based on 31 projects in 7 states
- Includes concrete materials, placement and jointing
- Excludes pre-overlay repairs and separation layer if used
- 2015 avg. among 7 states = \$3.45 / SY/ in.
- 2010 avg. among 6 states = \$2.99 /SY/ in.

Overlay Guide

- 1st Edition – 2007
- 2nd Edition – 2008
 - Added “Managing Concrete Work Zones Under Traffic”
- 3rd Edition – May 2014



QUESTIONS?



THANK YOU!