

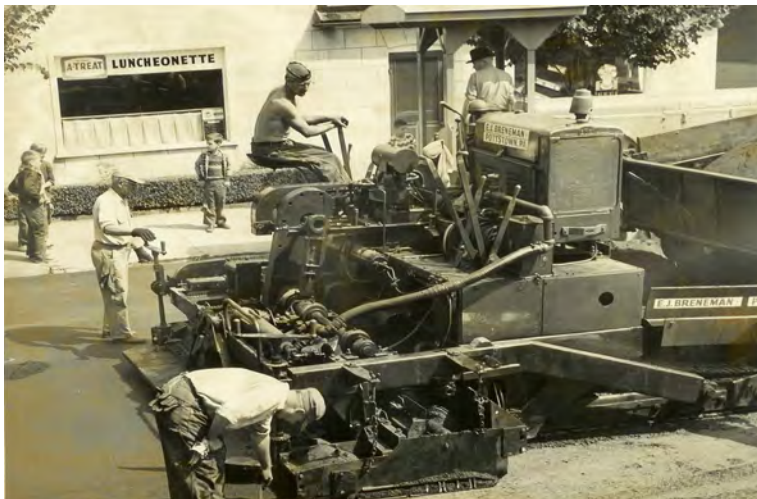


FACERS: The Pavement Panel

“working together to move people”

Our Nations most valuable asset

“It was not our wealth that made our highways possible; rather it was our highways that made our wealth possible”



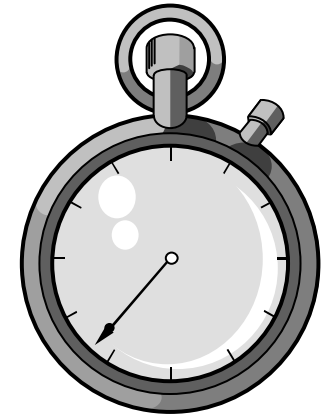
*Thomas MacDonald,
former U.S. Commissioner
of Public Roads*



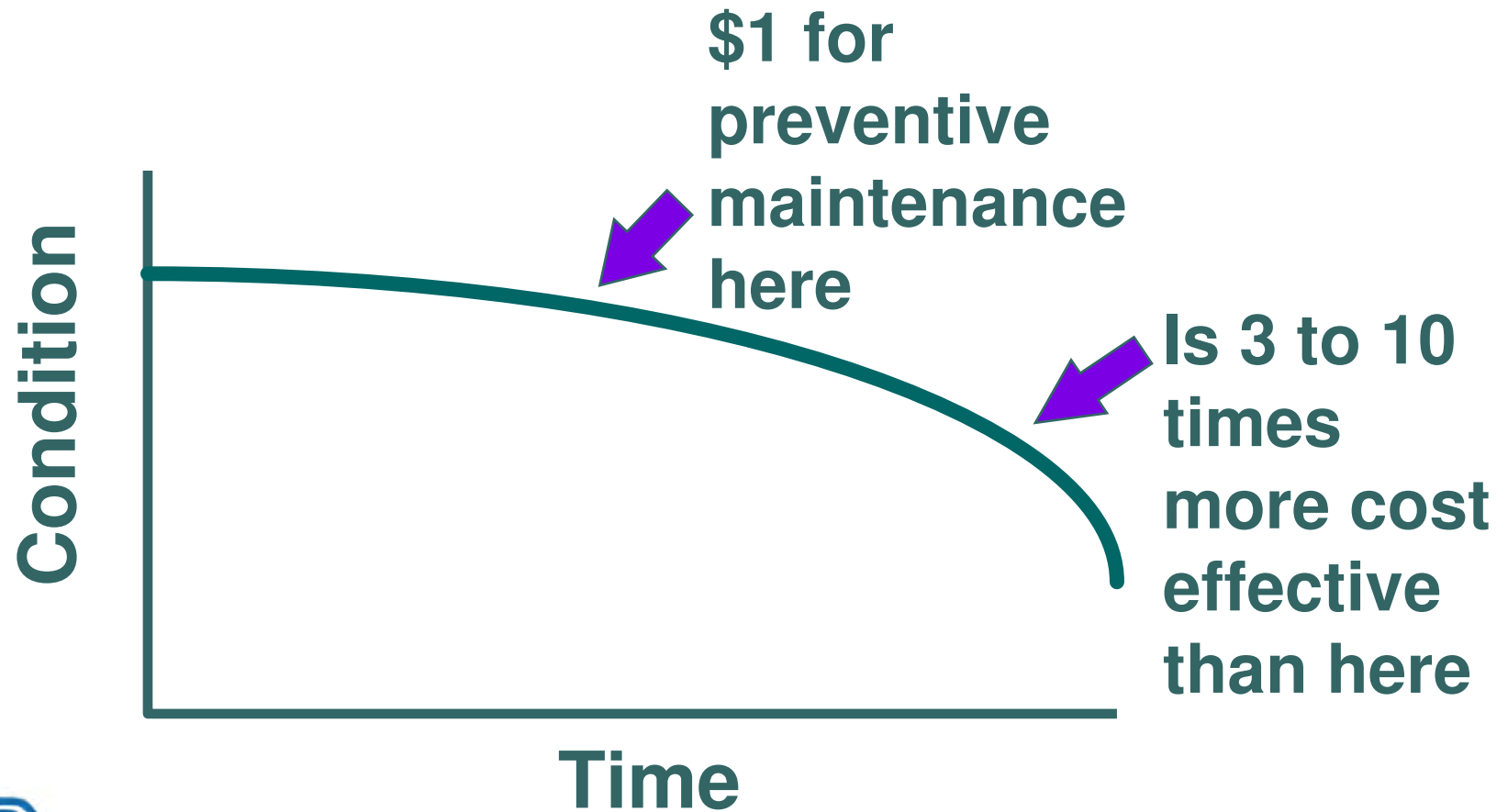


Our Nations most valuable asset

When should a pavement preservation treatment be applied?

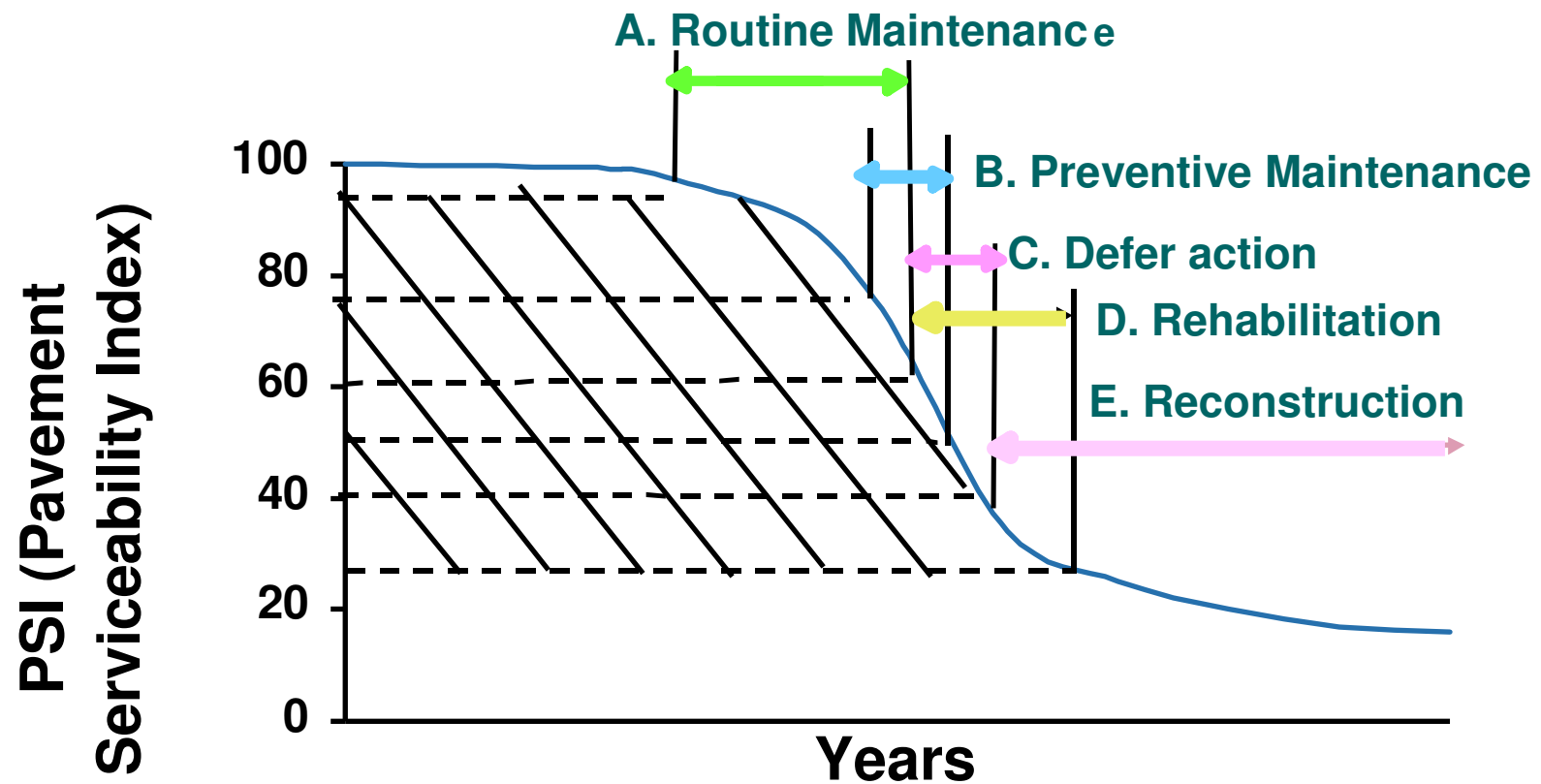


- ● ● Effective preventative maintenance
“Right Road with the Right Treatment
at the Right Time”



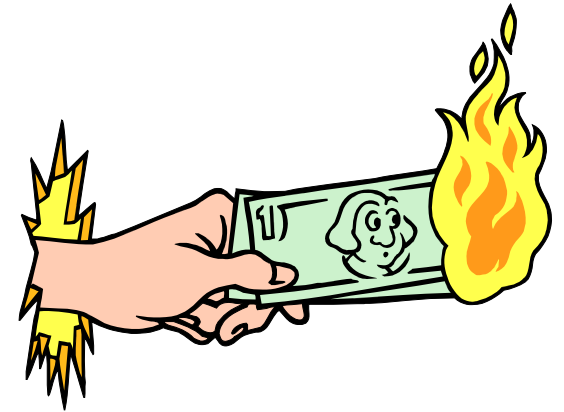


The Right Time Preservation and Rehab Strategies



Types of pavement maintenance

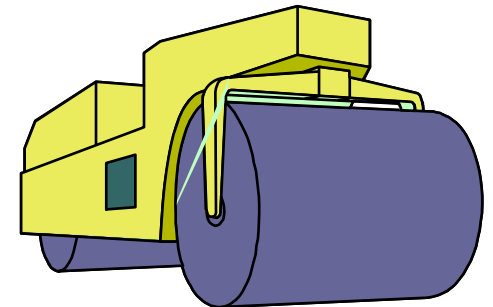
- Preventive (Proactive)
 - Arrest light deterioration
 - Retard progressive failures
 - Reduce need for corrective maintenance
 - “Right” treatment at the “right” time!
- Corrective (Reactive)
 - After deficiency occurs
 - More expensive





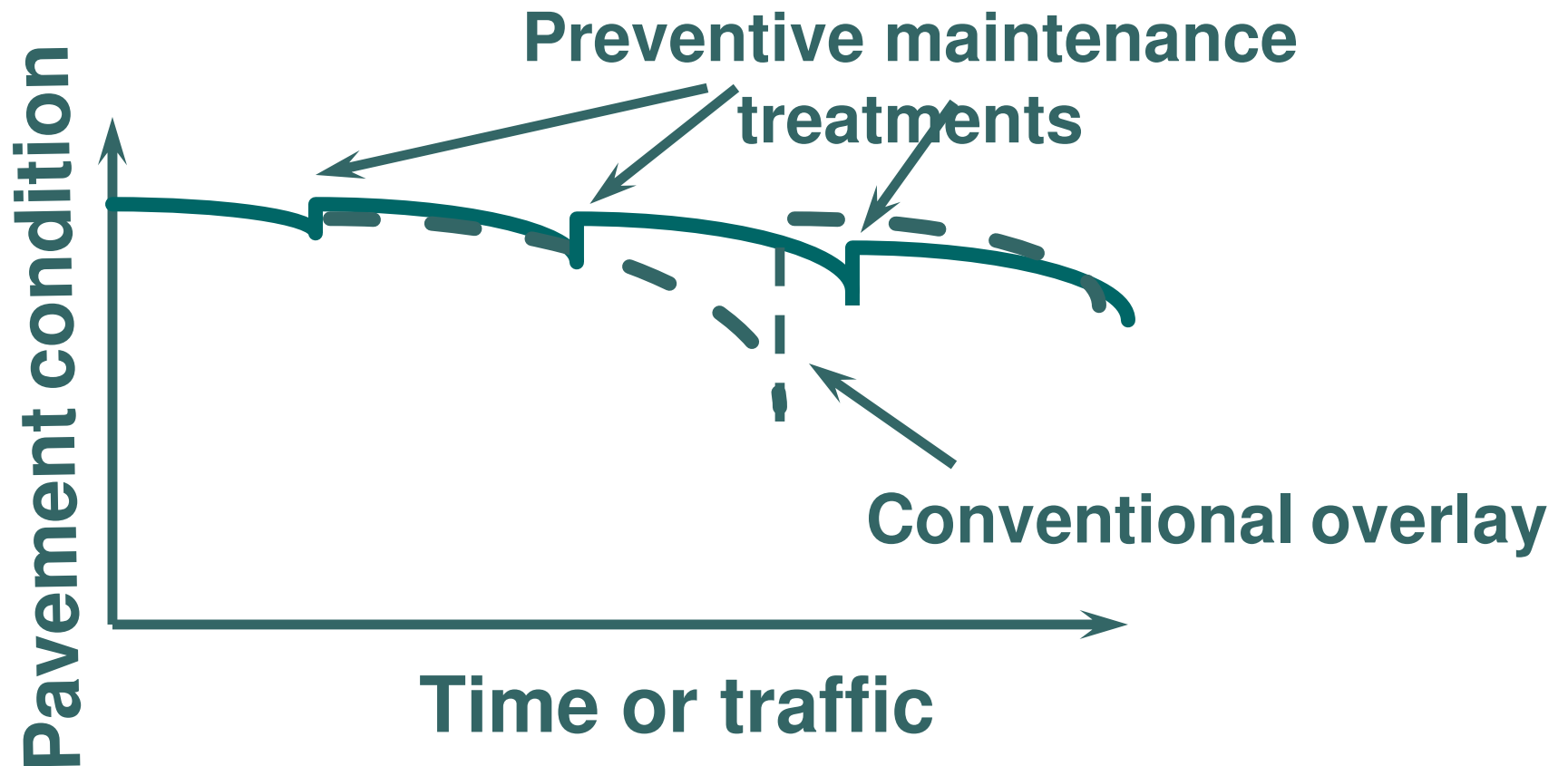
When do we have to fix our pavements

- Pavement Preservation - preserves good condition pavement
- Corrective maintenance - when the pavement loses:
 - Load carrying ability (excessive deflection)
 - Waterproofing (cracks)
 - Surface slope (rutting)
 - Surface roughness (too slick)
 - Ride quality (bumps)





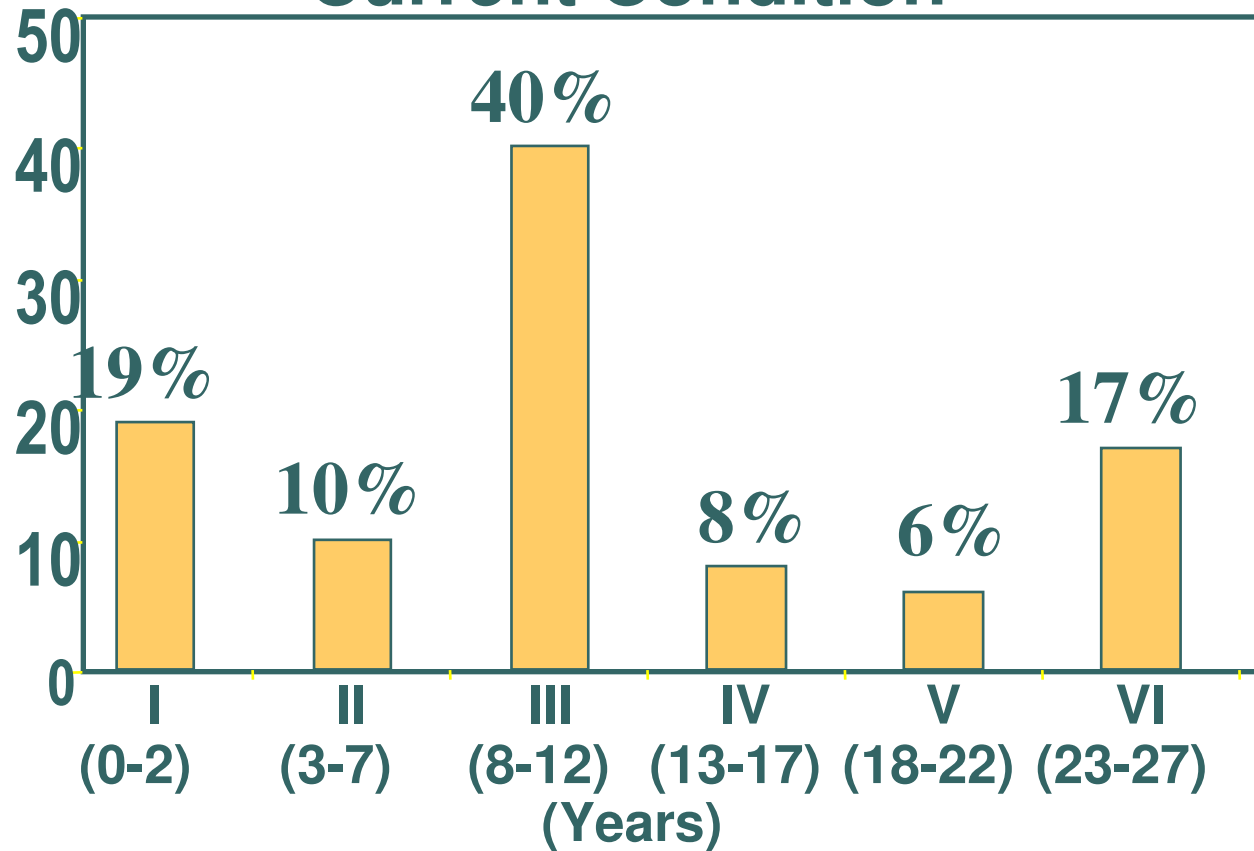
Strategy to Minimize Costs



Current network distribution Michigan DOT

Current Condition

% of Network Pavement

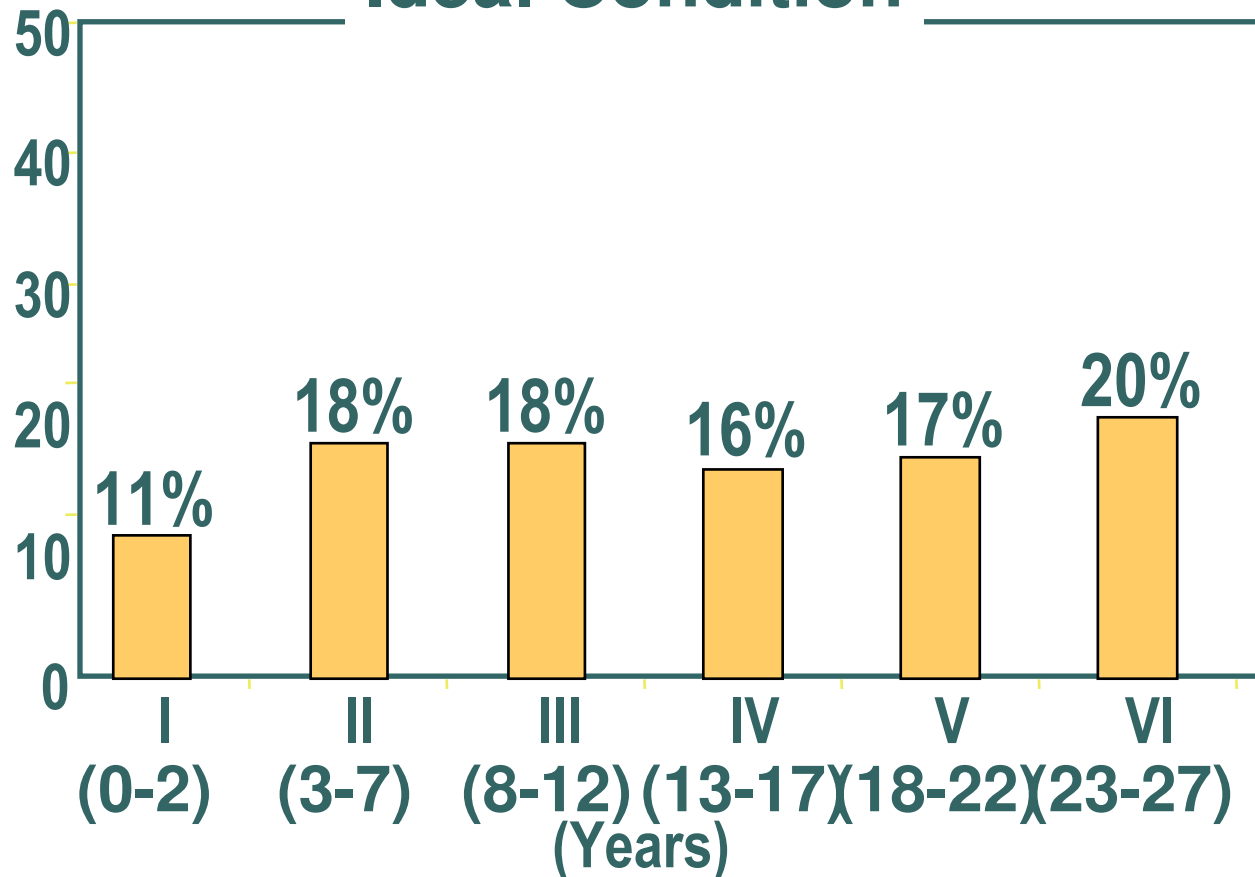


Pavement Remaining Life Categories

Ideal network distribution Michigan DOT

Percent of Network Pavement

Ideal Condition



Pavement Remaining Life Categories





The right treatment depends on...

- Existing pavement
 - Type, structure, condition,
- Environment
 - Climate, past & future traffic, noise
- Life Cycle Costs
 - Construction, maintenance, rehab, user-delay costs, impact of business
- Available Treatments
 - Construction requirements, performance, costs, capabilities of local agency and contractors





What's the “Right” Project?

- Objective: to keep pavement condition such that corrective maintenance isn't needed



Micro-Surfacing: Current State of Affairs



Winderlakes, Orange County 2005

● ● ● | Micro-Surfacing

.. is a tough and durable thin overlay material which can restore the original service properties to worn --but structurally sound-- pavements.



Andrews AFB



John Young Pkwy, Orange County
2005



● ● ● | Micro-Surfacing

- Polymer modified asphalt emulsion
- Select crushed aggregate
- Mineral filler
- Field control additive
- Water





Micro-Surfacing

- Fills ruts & minor surface deformation
- Increases friction resistance
- Quick cure - Quick traffic
 - (Traffic ready in ~ 1 hour)
- Cold placed application
- Cost Competitive
- Proven performance since 1980
- Compatible with all surfaces

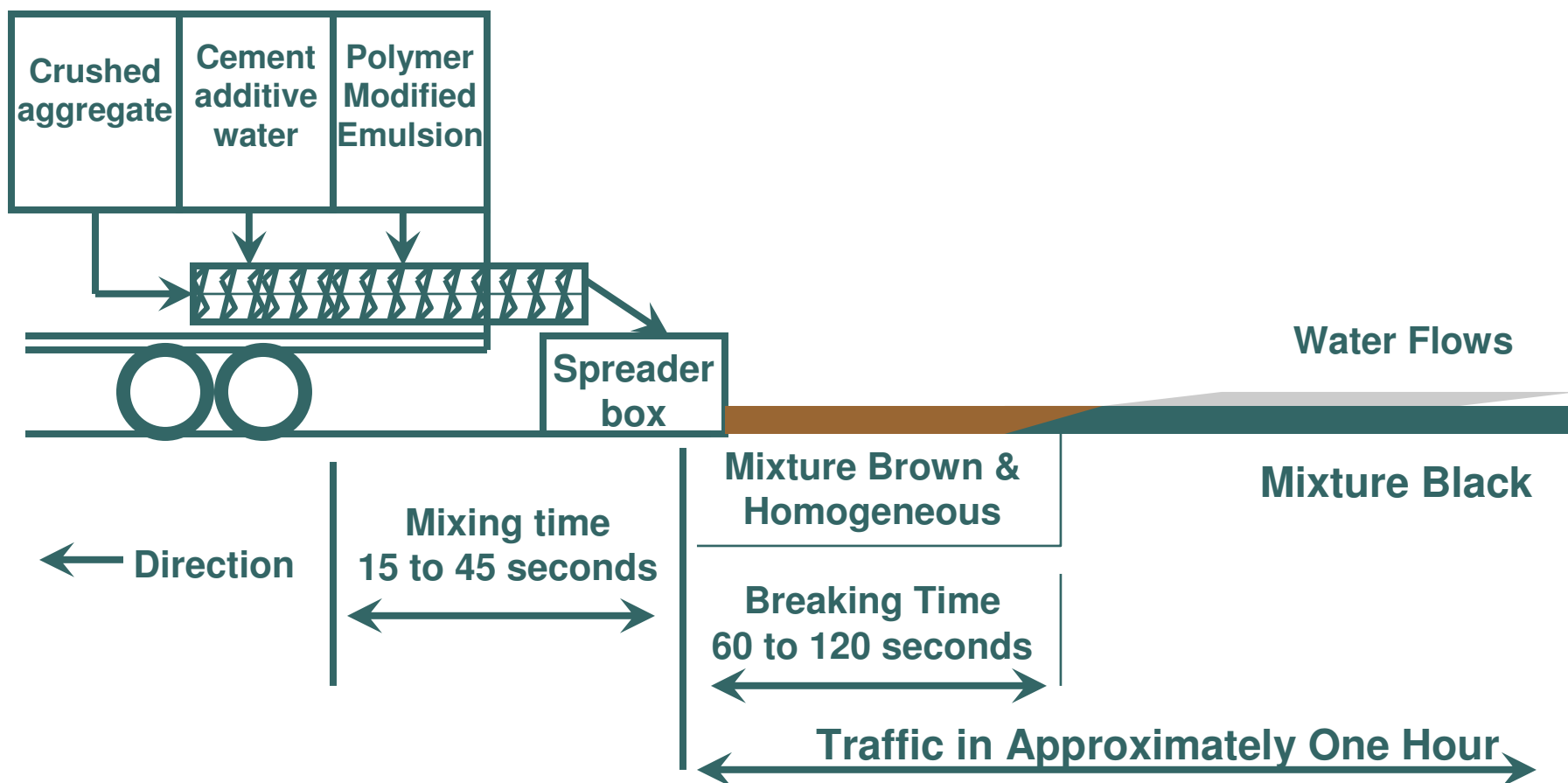


Winderlakes, Orange County 2005





Micro-Surfacing Application



● ● ● | Micro-Surfacing Today

- Aggregate plays a vital role in the success of the system
- Two major sources in Florida, Conrad Yelvington, Rinker
- While both meet the specifications there are differences
- Typically the East Coast has been supplied by Rinker while the West Coast has been supplied by Conrad
- Rinker tends to have less propensity to raveling
- Rinker is a more forgiving aggregate to work with
- Conrad aggregate is less consistent because it comes from different pits.



● ● ● | Trends in Micro

- Extending Warranties for the process to two years from one
- Greater amount of sampling and verification testing
- Performance Bonds to ensure quality workmanship
- Placement of full yield in one lift to reduce impact on traffic
- Allow crack seal sufficient curing time prior to placement of Micro



St. Pete Clearwater Airport 2006





Common Mistakes

- Using Micro-Surfacing in unsuitable locations
- Incompatible aggregate and emulsion
- Poor field control of the materials break
- Lack of proper mix design and field calibration
- Excessive speed of the machine
- Quality control of the emulsion
- Lack of accuracy in yield
- Too quick return of traffic



St. Pete Clearwater Airport 2006





Common Mistakes





Common Mistakes



Linebaugh Ave., Hillsborough County



Causes of Raveling

- Poor quality aggregate, too course, too dirty
- Low residual asphalt in the emulsion
- Low residual natural latex in the emulsion
- Moisture sensitivity of the aggregate
- Improper mineral filler used, cement vs. lime
- Low yield during application
- Too quick return of traffic

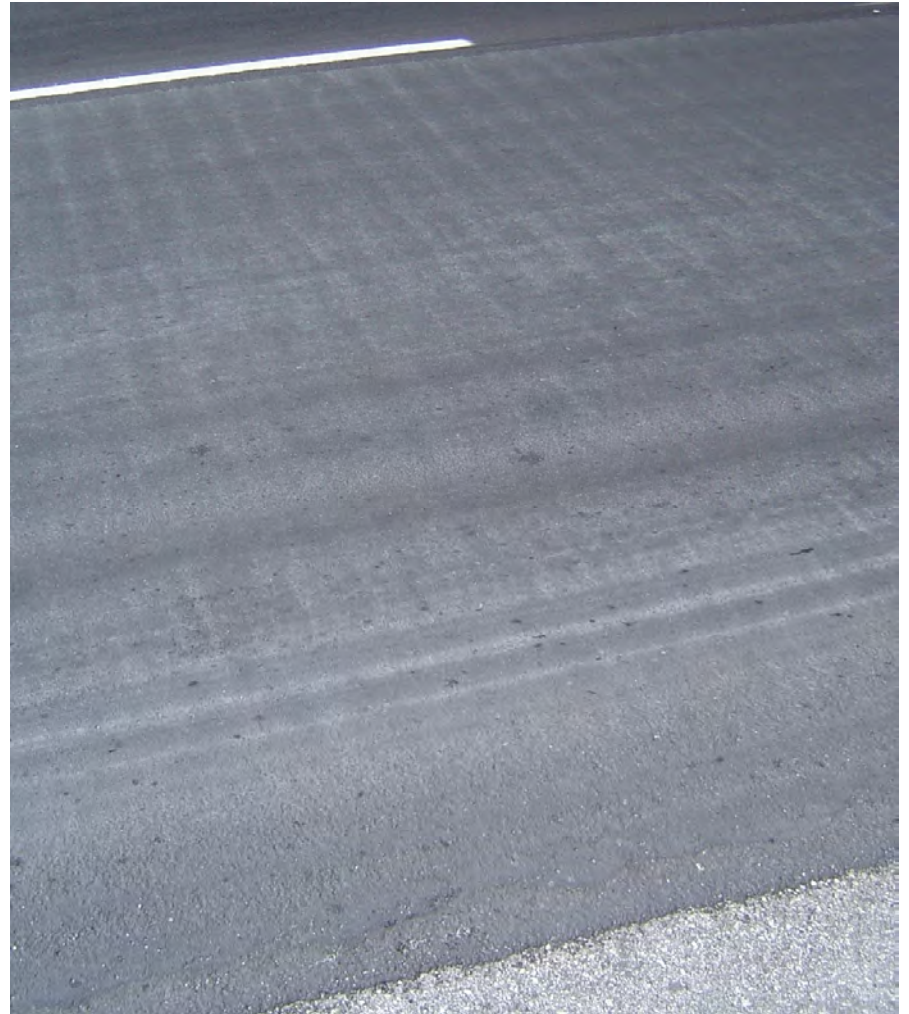




Common Mistakes



John Young Pkwy, Orange County
2005





Common Mistakes



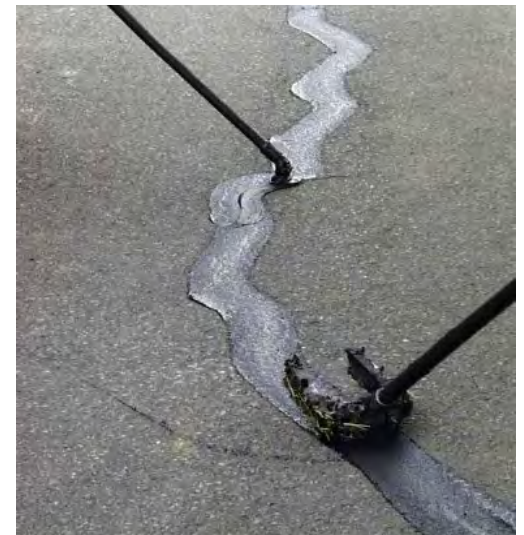
Queen Street, St. Petersburg





Crack Sealing with Micro

- ❖ The least expensive, most cost effective method of preventive maintenance available.
- ❖ This process will prevent water damage to the pavement subbase, which will extend the life of your roadways.





Compressed air cleaning cracks



● ● ● | Application of crack sealant



Crack sealing is effective but not cosmetic



Crack seal with Micro-surfacing application





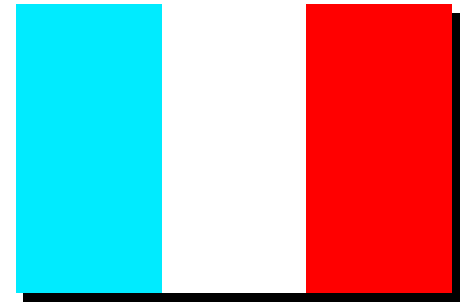
NovaChip® Bonded Asphalt Concrete Friction Course



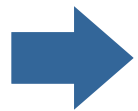
Kings Ave, Hillsborough County 2003



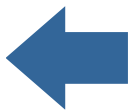
A Little History



- 1988 - First Trial in France
- 1992 - Introduced in U.S
- 1992 - Jobs in TX & AL
- 1993 - Jobs in NJ & PA
- 1999 - First job in FL



2007: Well over 100,000,000 yd² in U.S



● ● ● | Who has used it in Florida?

➤ Counties

- Alachua County
- Bay County
- Escambia County
- Hillsborough County
- Lake County
- Okaloosa County
- Orange County

➤ State DOT's

- FDOT has 3 jobs out to bid in July
- 41 other states have used the process



SR 26, FDOT 2003





NovaChip[®] - What is it?

➤ Surface Treatment

- Preventive Maintenance
- Corrective Maintenance (Surface Rehabilitation)
- Quality surface on new construction

➤ Single Pass System

- Novabond[™] emulsion membrane
- Thin gap-graded hot mix
- Placed with Special Equipment

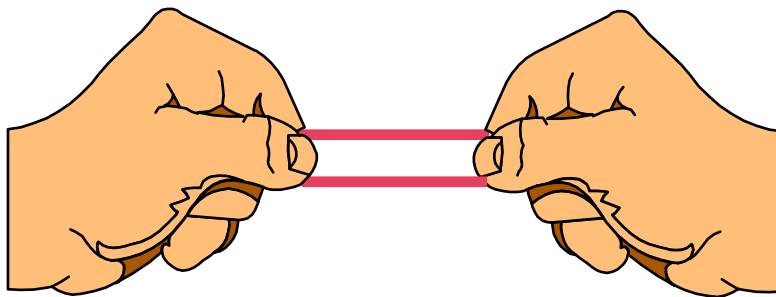




Novabond™

Polymer Modified Membrane

- Unique NovaChip Membrane
- Networked, reacted SB Polymer
- Sprays easily
- Cures quickly
- Superior bonding



● ● ● | The NovaChip HMA

- High quality aggregate
 - Restores & retains friction
- Gap-graded
 - Reduces noise
 - Reduces backspray
- Mix designed specially for process

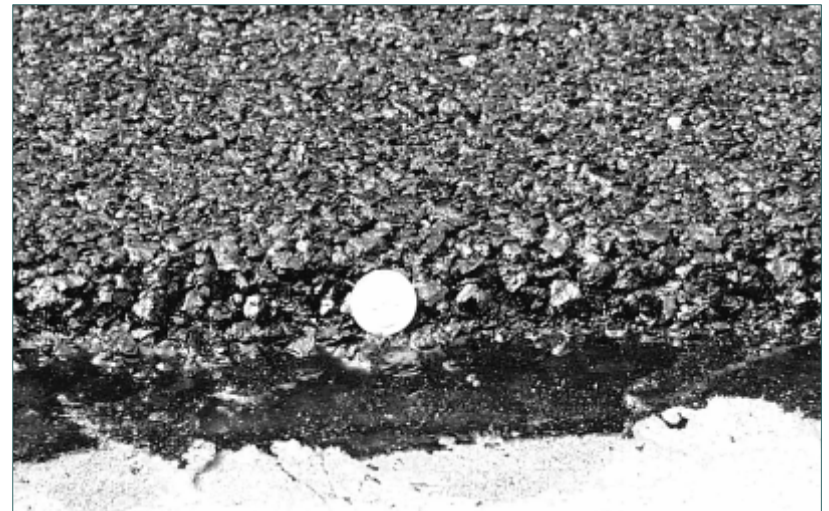


Old 441, Orange County
1999



● ● ● | Application rates

- Novabond™ emulsion membrane
 - 0.15 - 0.3 gal/yd²
- Ultra-thin hot mix asphalt overlay
 - Type B - 60-75 #/yd²
 - Type C - 65-85 #/yd²
- Total thickness: 3/8 to 3/4"



Old 441, Orange County 1999





NovaChip[®] Machine Specially Engineered

3 Processes

**Spray Novabond
Lay Hot Mix
Smooth the Mat**

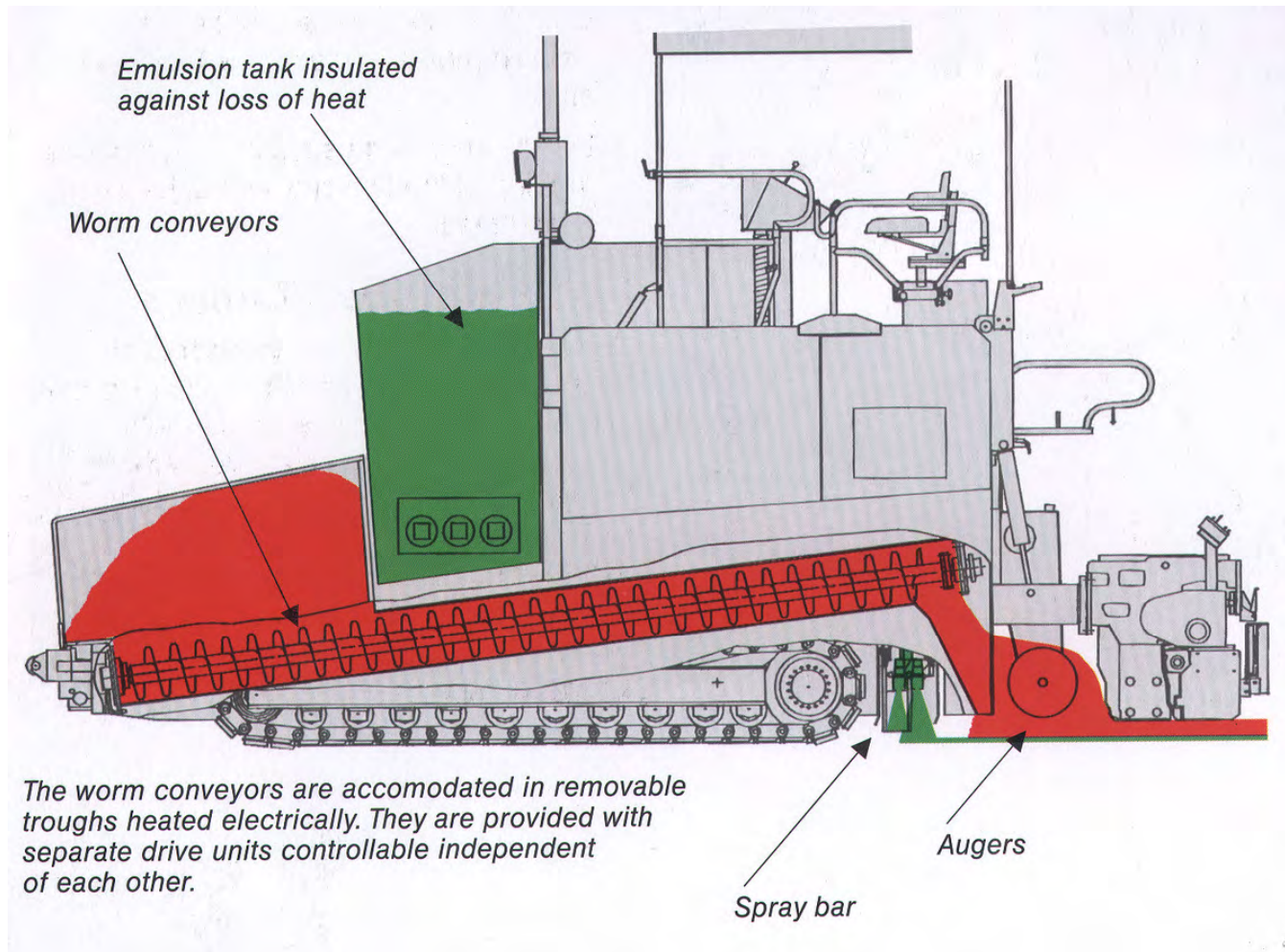
*Application of
membrane*



*Application of
HMA*

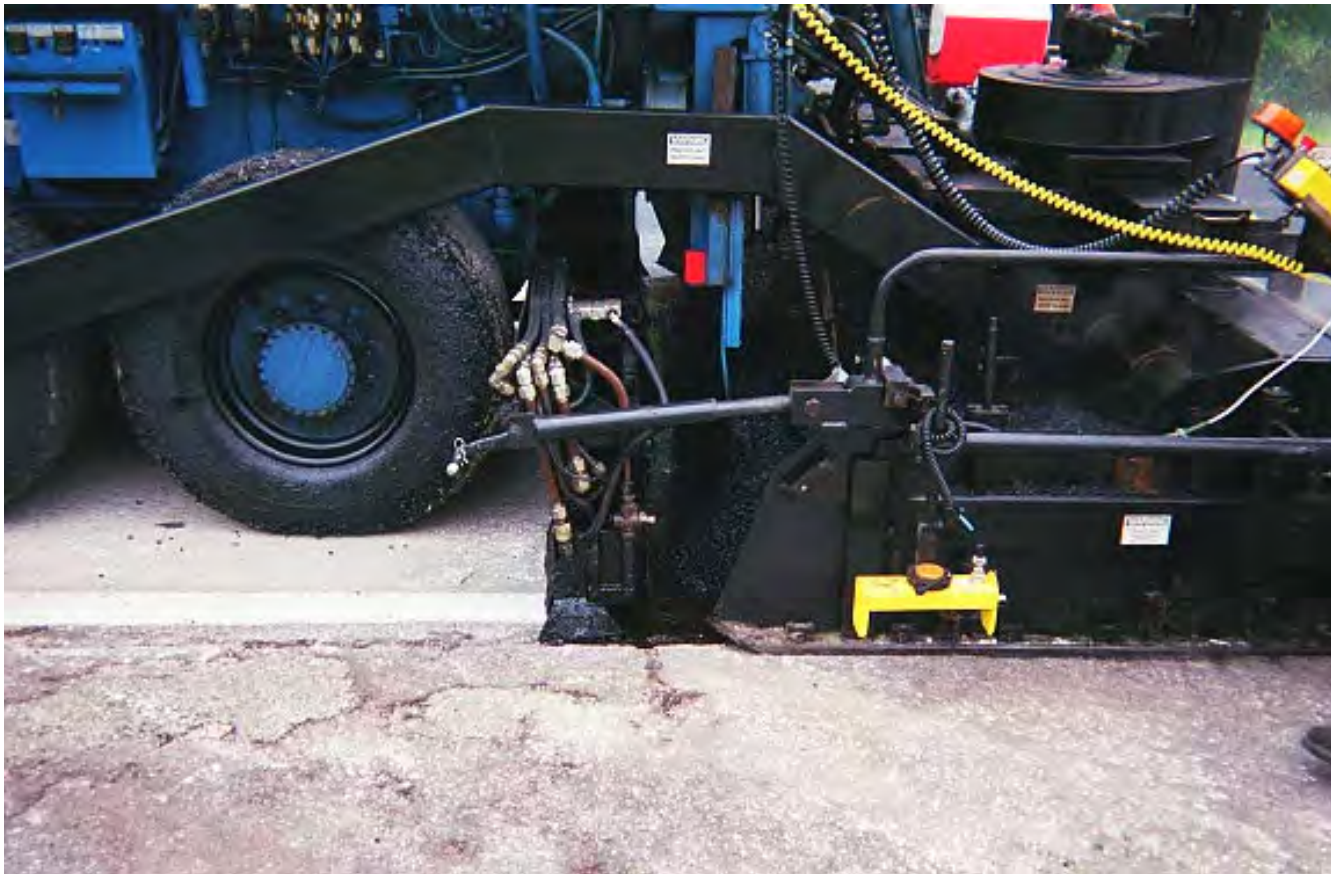


● ● ● | Paving System - Equipment





Close up of NovaBond spraybar

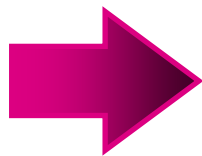


Old 441, Orange County 1999



NovaChip Machine

- Ultra-thin mat (as low as 65 lbs/yd²)
- 60-100 ft/min
- Minimum of stops
- Special combination tamping bar - vibratory screed
- Consistently smooth mat

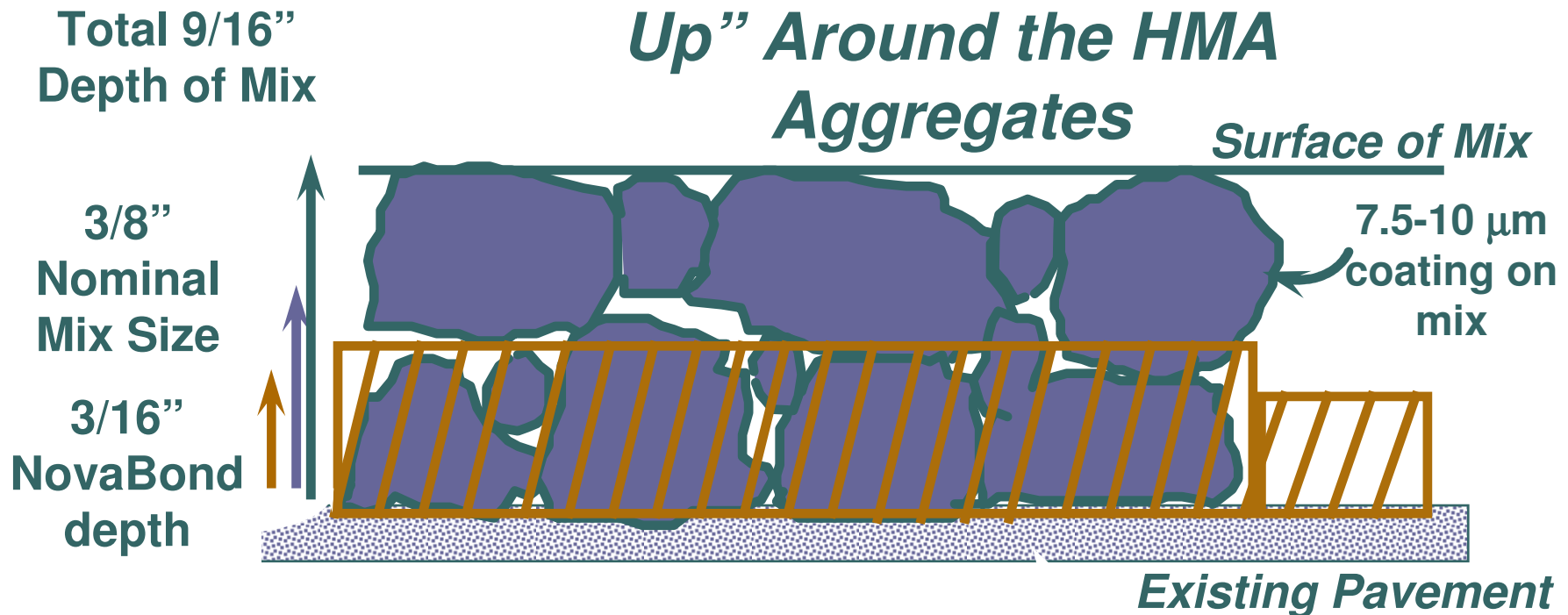


Up to 40,000 yd² / day

The NovaChip process

PHASE 1 : during application (3/8" nominal size)

***The Novabond Emulsion “Wicks
Up” Around the HMA
Aggregates***

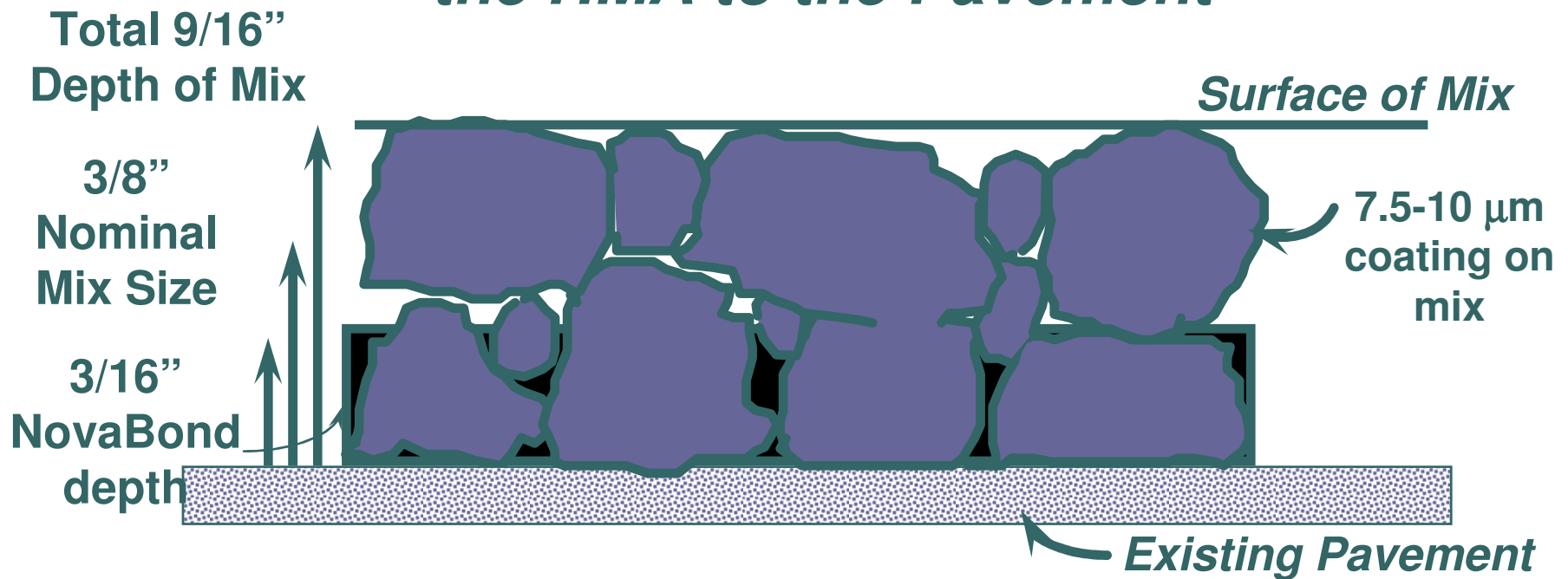




The NovaChip Process

PHASE 2 : Pavement Set-Up (3/8" nominal size)

***The Novabond Cures, Bonding
the HMA to the Pavement***



● ● ● | Rolling & return to traffic

- Rolling only to seat aggregate
- Requires only 1 pass
- Return to traffic in 10-20 minutes



NovaChip site selection - the RIGHT pavements



*Preventive
Maintenance*

*Also, high performance
surface for new
construction*



*Slick, noisy,
distressed surface
PCC pavements*



*Slightly distressed surfaces -
minor cracks, patches, etc.*





Orange County, FL

Old Route 441

October 4-5, 1999

NovaChip[®] Surface Over PCC





Unloading HMA into NovaPaver





NovaPaver Screed

Smooth Mat, Well Matched Joint





Finished, Striped Southbound
1 mi completed in 2 hrs



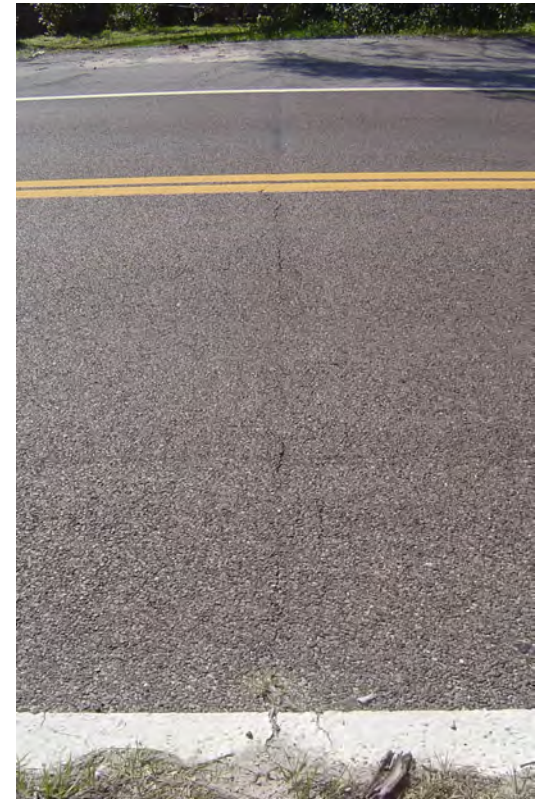
• • • Old 441 Joint Before, After



Before, 1999



2001



2005





Florida Nova Study

- In 2002 The Florida Department of Transportation, the University of Florida and Koch Pavement Solutions completed an in depth preliminary study on NovaChip.
- In the summer of 2003 District 1 completed a 6.2 mile section on US 27 in Highlands County and District 2 completed a section of SR 26 in Gainesville.
- In October of 2006 the final report was completed and presented to FDOT.





● ● ● | Florida Nova Study Cont.

The study looked at:

- Raveling
- Cracking
- Rutting
- Permeability



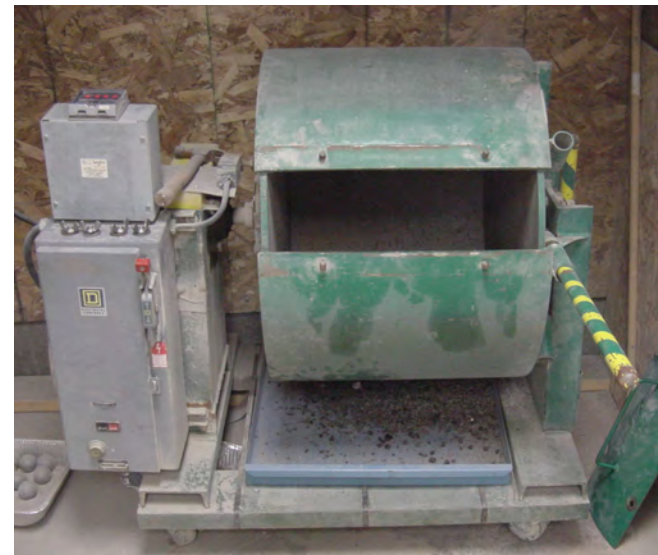
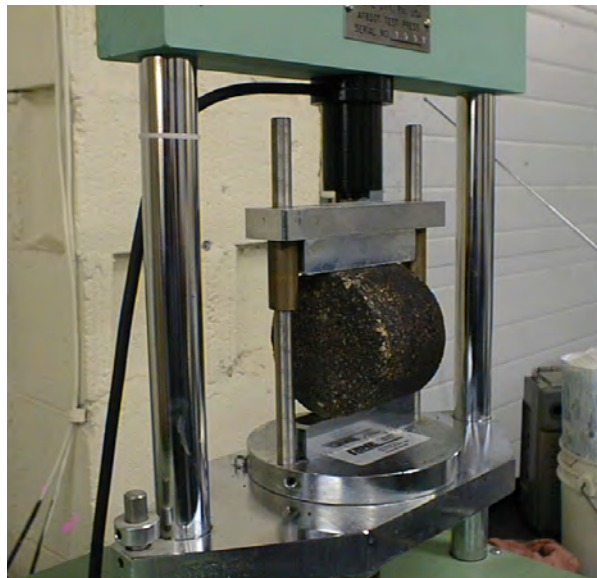
I-4/I-75 Ramps 2005



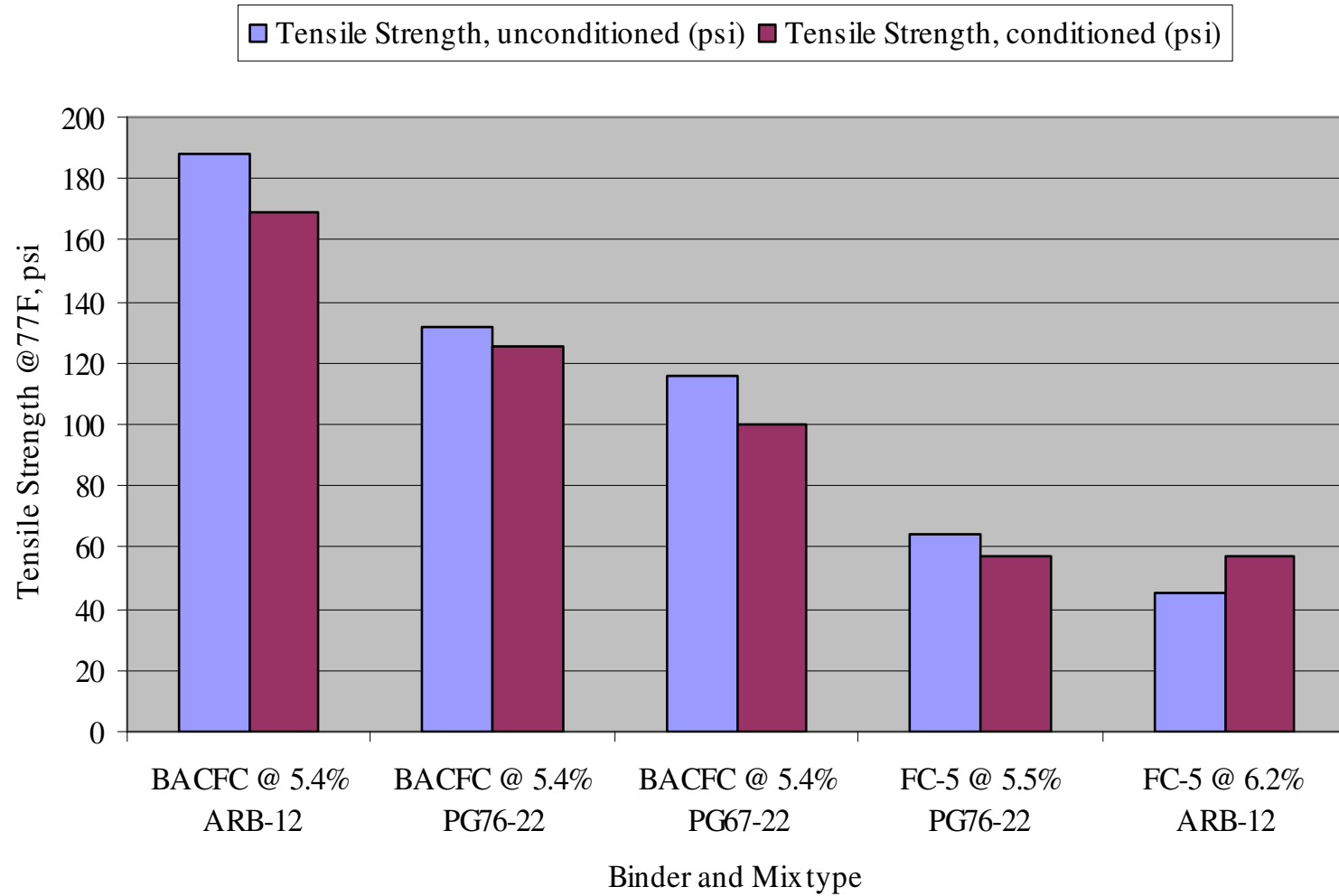


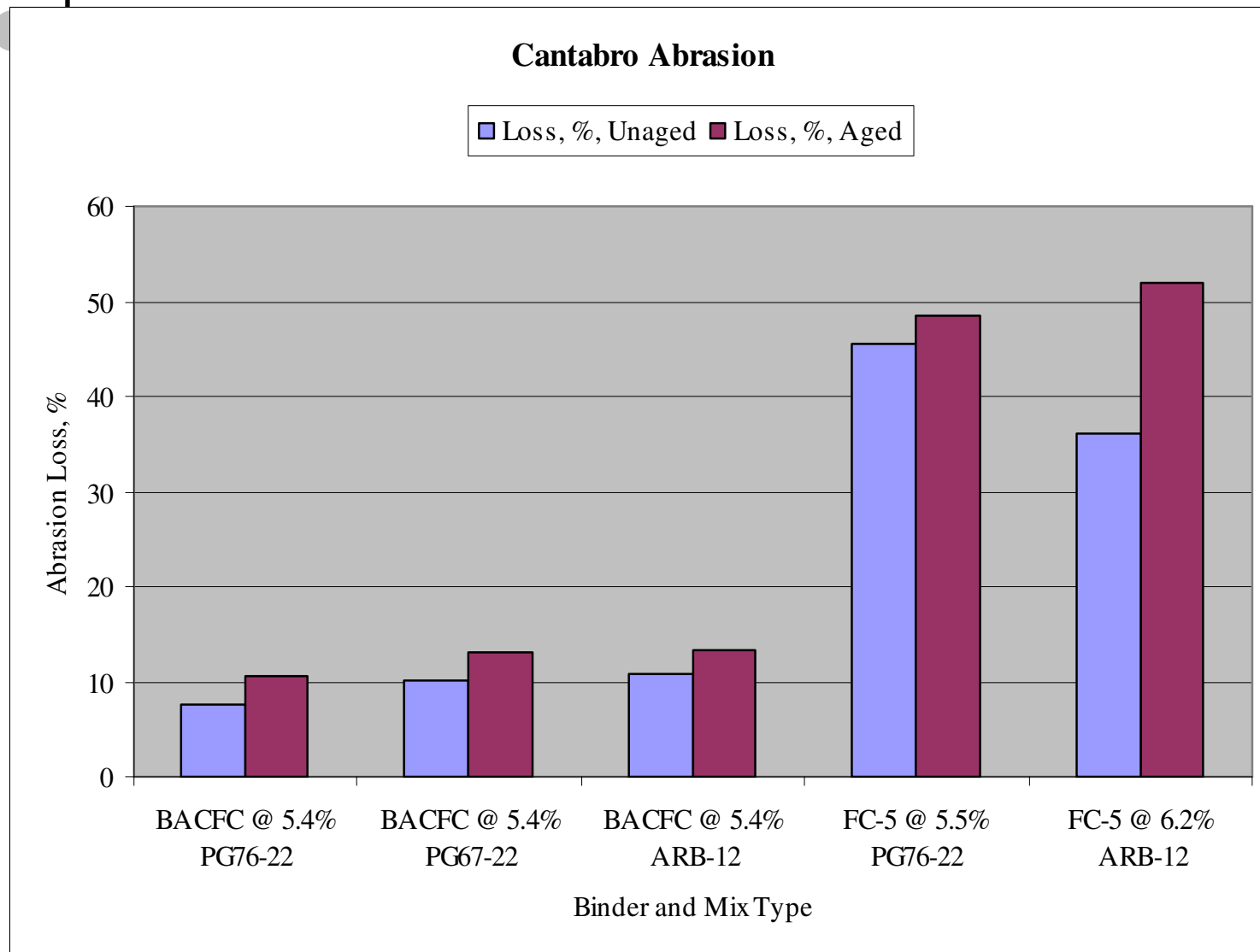
Raveling Evaluation

- Indirect Tensile testing - modified T-283
- Raveling - measure mix cohesion
 - Cantabro Abrasion
 - Indirect Tensile



Indirect Tensile Strength





● ● ● | Raveling Summary

- Mix/binder show similar trends on abrasion and tensile
- Modified binders improve tensile strength
- All binders in BACFC show similar loss on abrasion
- FC-5 mix with PG binder or ARB show high loss on abrasion





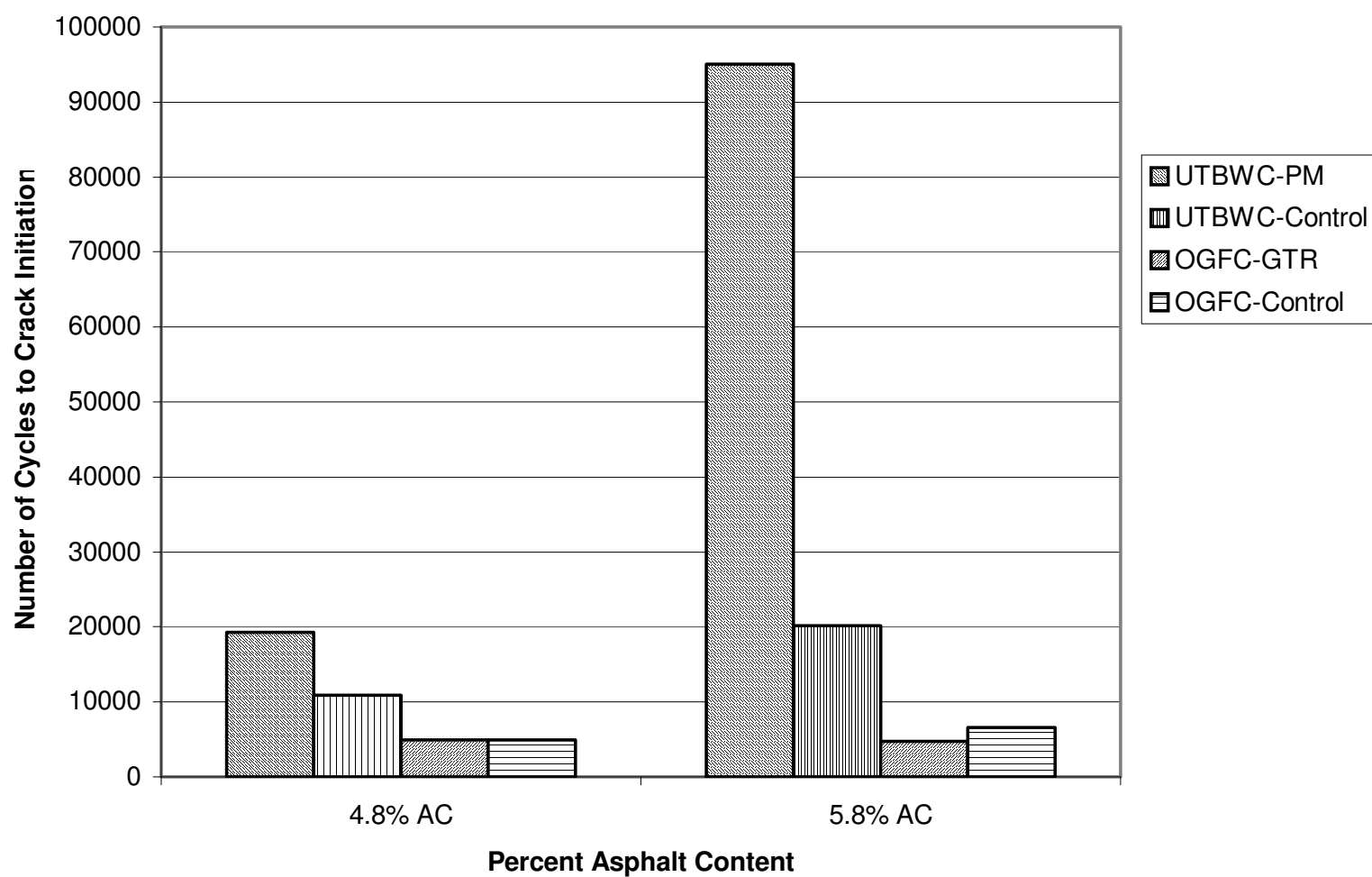
Cracking and Rutting Evaluation

- External study to evaluate BACFC mix in top-down cracking model at University of Florida
- Utilize Hamburg Wheel Tracker to test rutting

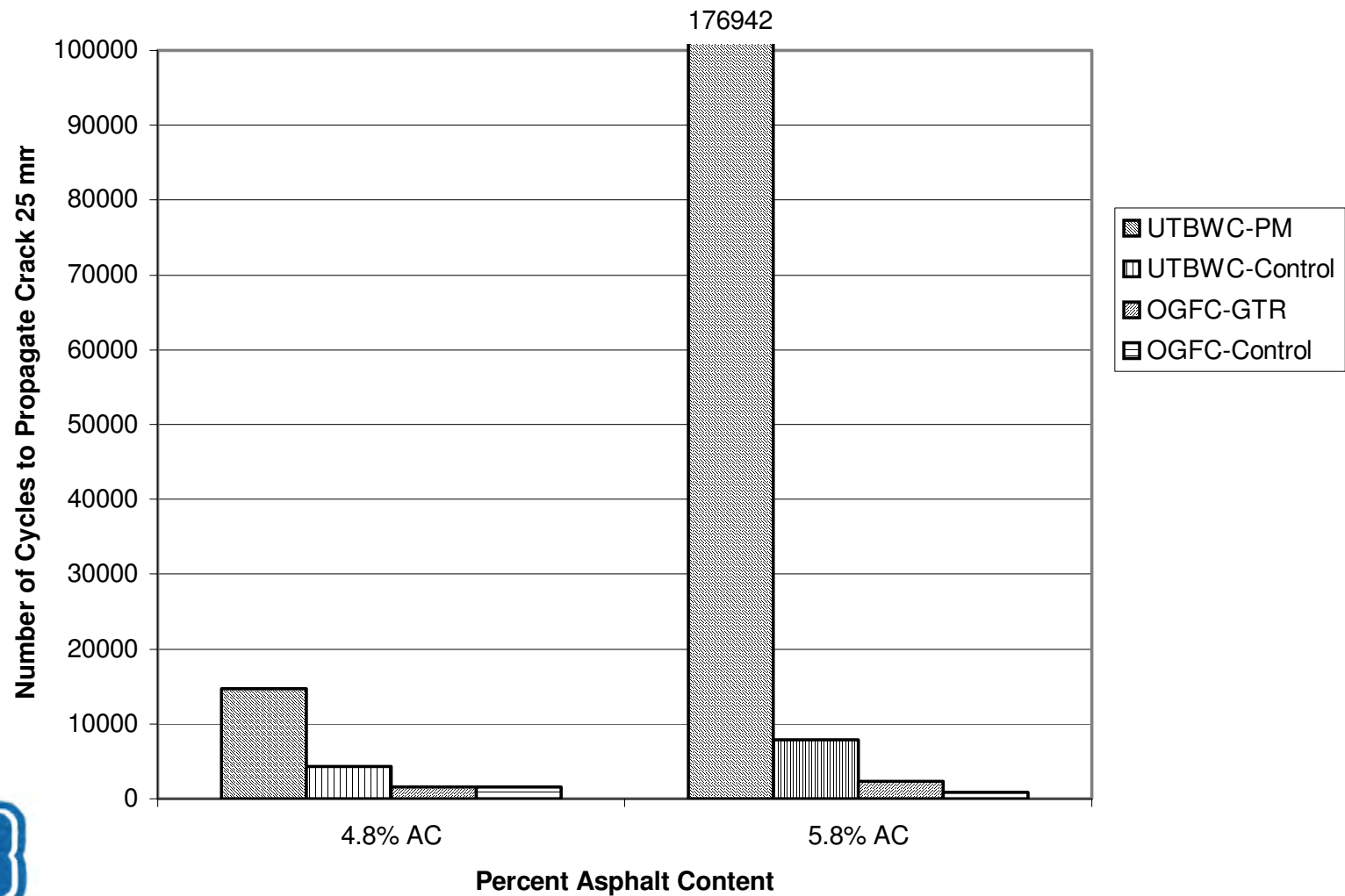


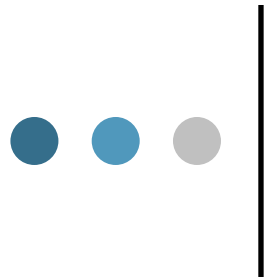


Cycles to Crack Initiation

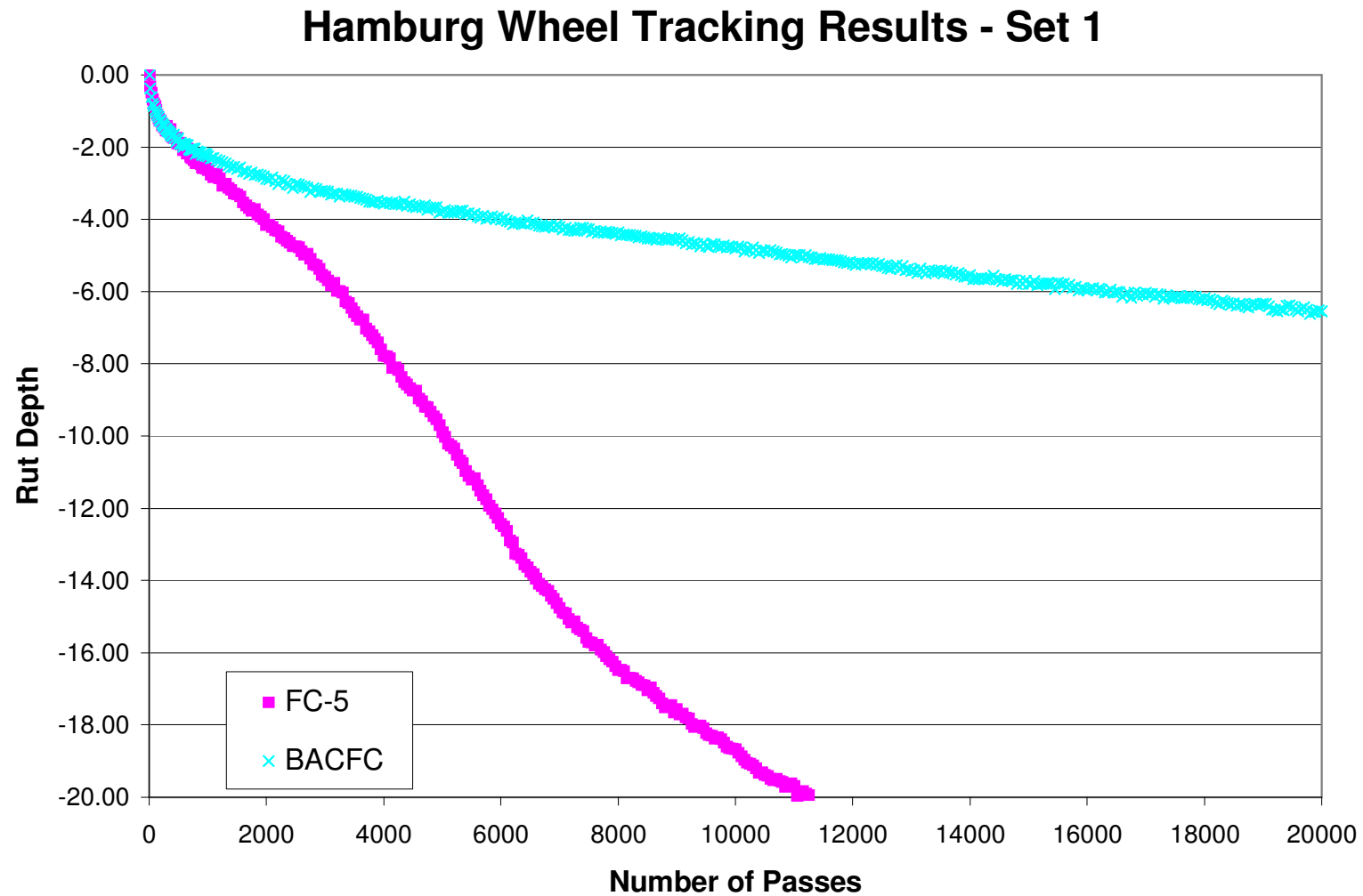


Cycles to Crack Propagation



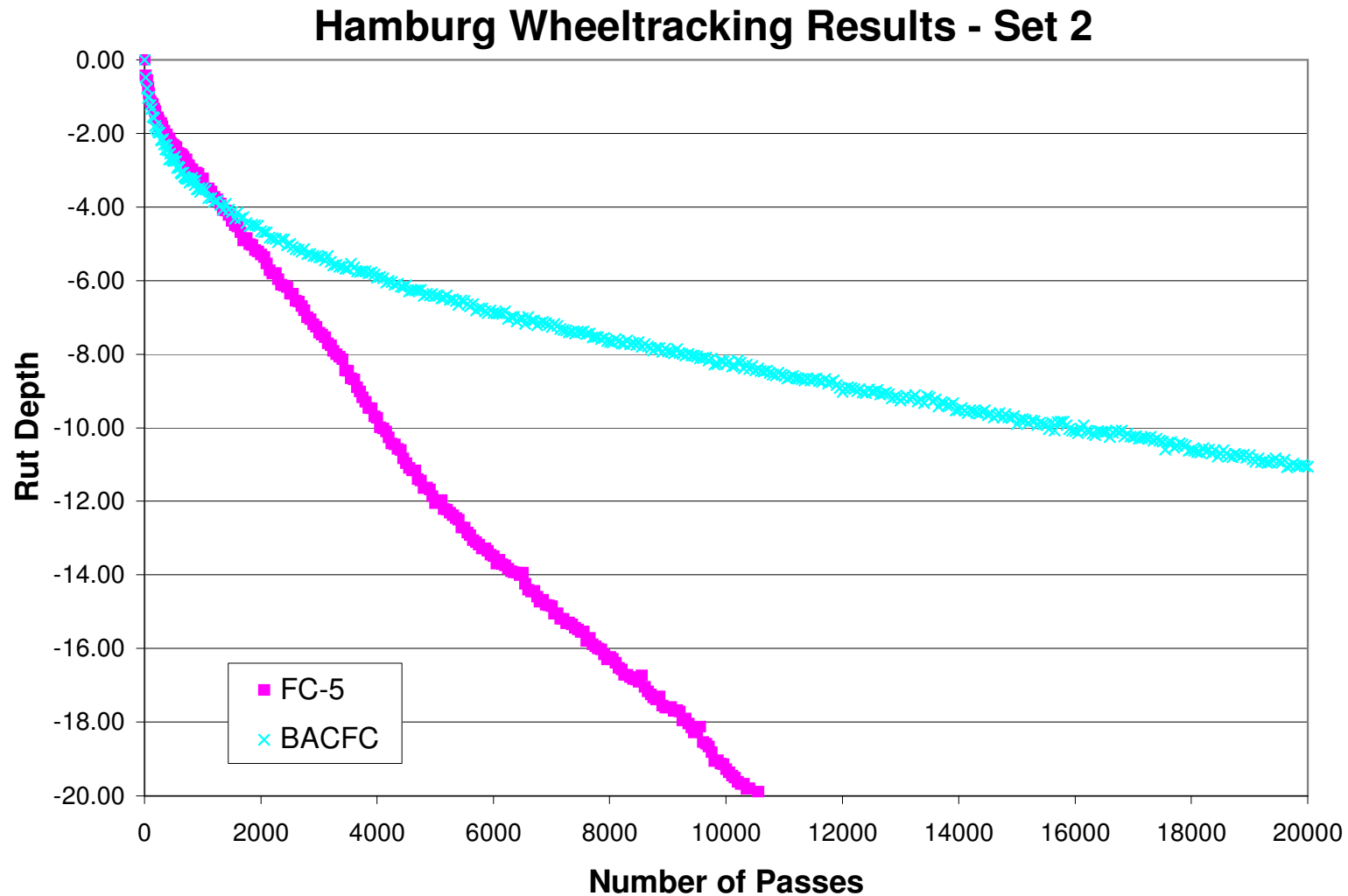


Hamburg Wheel Tracking





Hamburg Wheel Tracking



● ● ● | HWT BACFC Slab on PCC
@ 40,000 passes





HWT FC-5 @ 11,000 passes



Cold In-Place Recycling vs. Full Depth Reclamation



CR 512, Indian River County
2004



Swanee Rd., Charlotte County
2006



Cold In-Place Recycling



CIR on Independence Parkway, Tampa, 2003



What is Cold In-Place Recycling?

- The recycling of a deteriorated asphalt pavement material that has reached the end of its useful life. This includes asphalt wearing and asphalt base course material. Typical depths are 3 to 5 inches.
- The milling machine cuts and sizes the old asphalt. The material is then mixed in-place with a new asphalt binder, paver-laid and compacted to the desired depth and scope of the project specifications.



Okeechobee Runway 14/32 2002



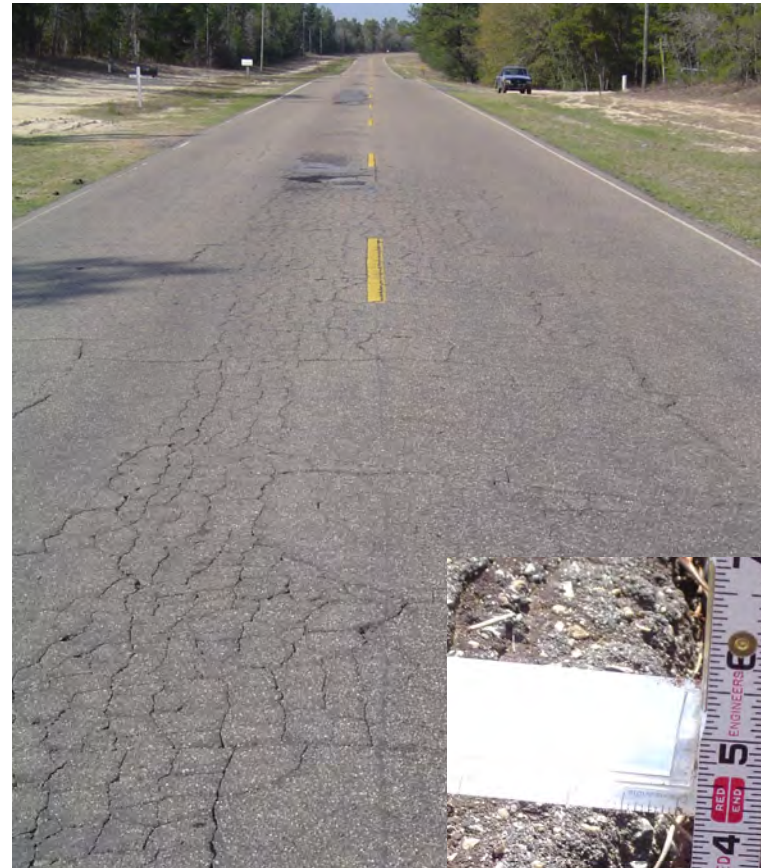


Why CIR?

Asphalt pavements eventually will develop distress such as:

- Cracking
- Raveling
- Pot holes
- Poor ride quality

Traffic, weather and hardening of the asphalt binder all contribute to these problems.



Okaloosa CR 393

Benefits of Cold In-Place Recycling

- Roadway remains open during construction
- Up to one lane mile per day production
- Reduced impact to adjacent roadways
- Reduced cost over reconstruction
- Re-use existing material
- Reprofile roadway



Ridgemoor Dr. Pinellas County 2006



What does a CIR candidate look like?

- Transverse and Longitudinal cracking
- Alligator cracking
- Oxidized, raveled pavement
- Some structural deficiencies
- UGLY!!!

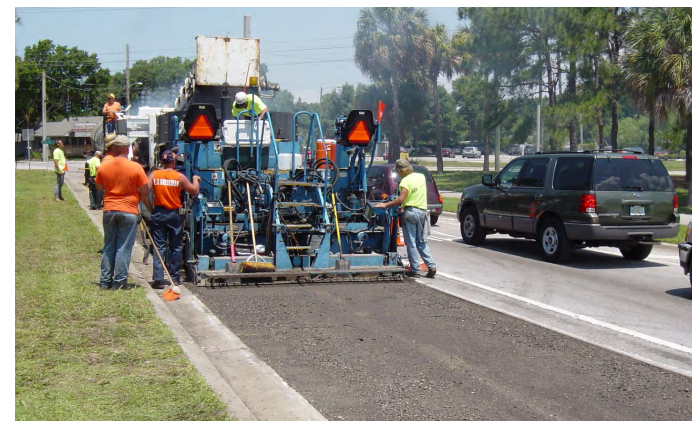


Independence Parkway, Tampa 2003



● ● ● | The CIR Process

- Core the roadway and perform a mix design
- Any widening should take place prior to CIR
- The CIR train pulverizes, mixes and paver lays the new asphaltic base course to the desired cross-slope
- Compact with a 10-12 ton steel wheel roller and a 27 ton rubber tire roller
- Place the HMA surface course



Independence Parkway, Tampa



● ● ● | One of the first steps is to core the roadway



- ● ●

Often times, the cracking network penetrates the full depth of the mix



Curb-line milling performed by a specialized road widener

- The Bartmill PR205 is a specialized piece of equipment that is used for widening.
- This type of equipment is capable of widening from one to four feet per pass.



Cold In-Place Recycling saves time and money



CR 512, Indian River County 2004



Recycled pavement being placed into the paver



Orange County, Starry Road 2005





Both pneumatic and steel drum rollers are used for compaction



Quincy Gadsen Airport - Design/Build 1997





Quick return to traffic after compaction



ERROR: undefined
OFFENDING COMMAND: r#S?a

STACK: