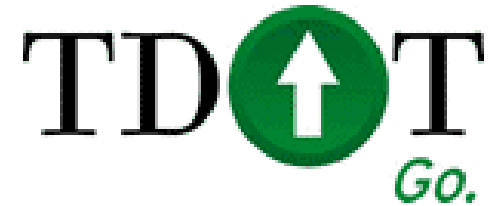


2007 WARM MIX GREEN ASPHALT TECHNOLOGY

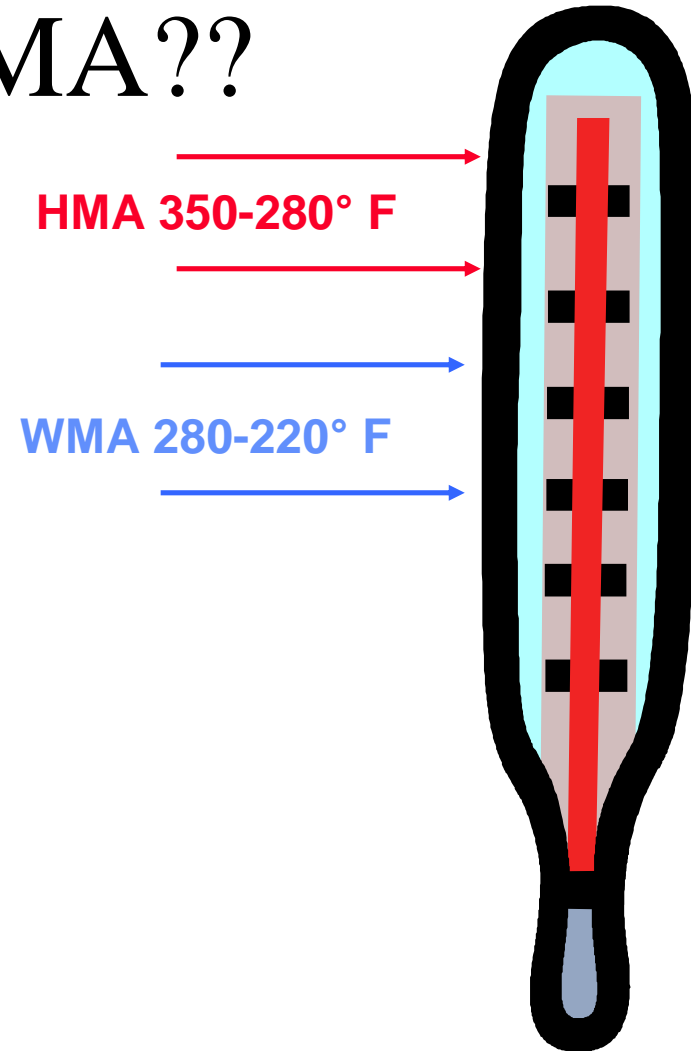


Goes GREEN

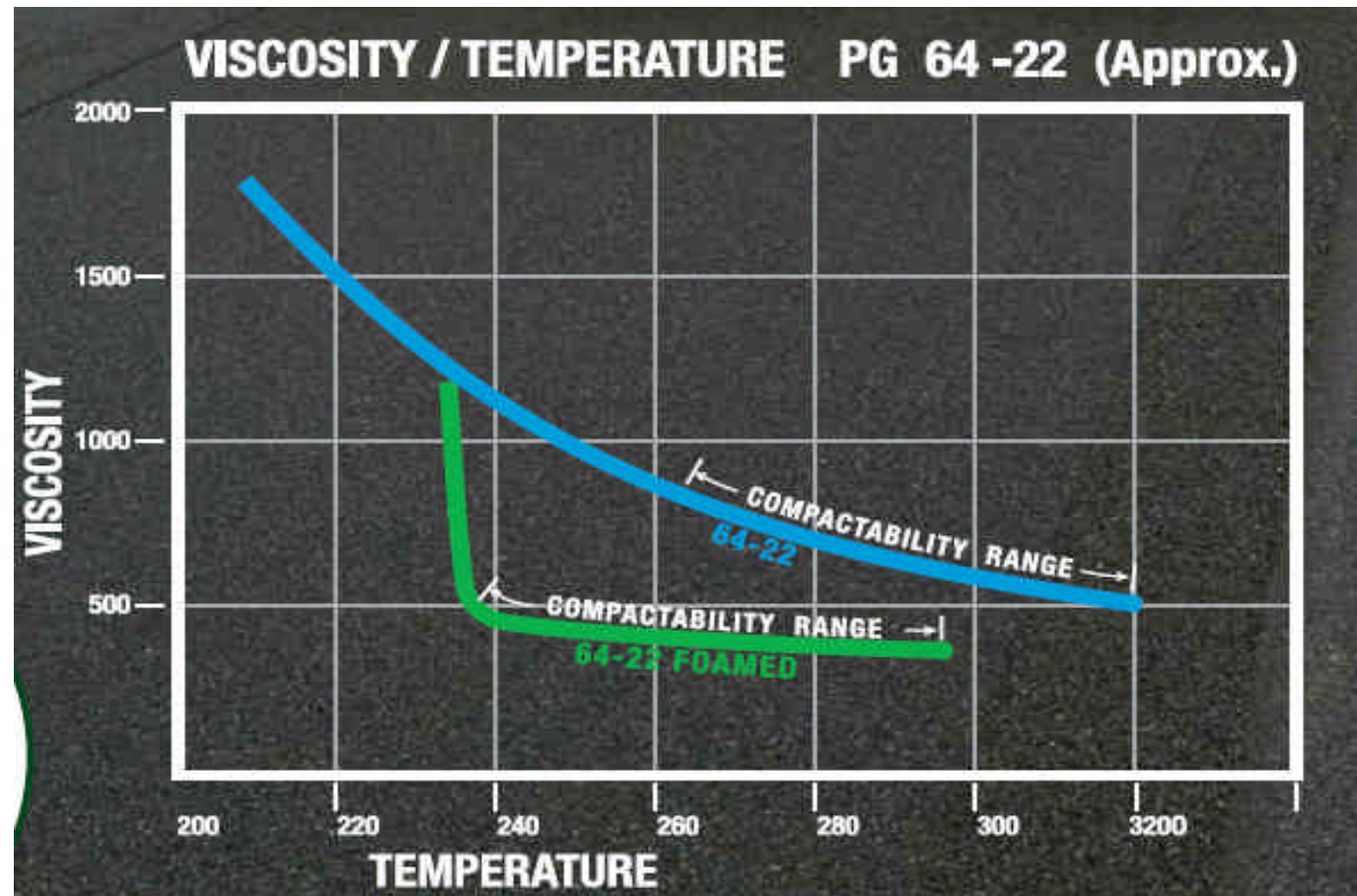


What is WMA??

- WMA is the term adopted to describe the production and placement of Hot Mix Asphalt (HMA) at temperatures from 50-75°F less than normal by using additives and different processes




How WMA works






Potential **Benefits** of WMA

- Less fumes/emissions and odor (<285°F)
 - Improved air quality and work environment
 - Non-Attainment Area concerns
 - Less energy/fuel to heat mixture at plant
 - Cost savings \$\$\$
 - Less compactive effort required or better compaction overall (?)
 - Less aging/oxidation of the mixture in plant/storage and hauling
 - Longer lasting??
 - More Recycled Asphalt Pavement (RAP)(?)
- 



Potential Concerns of WMA

- Effect on binder properties- (How long?)
 - Workability
 - Rutting immediately after traffic
 - Dry Aggregate and ASA's/bonding agents (European experiences)
 - Long Term Performance!
 - Rutting potential greater?
 - Subject to freeze-thaw damage?
 - Moisture susceptibility or stripping
 - Mixture design protocol
- 



Partnerships



Sasol Wax
Wax is all we do. So we do it best.

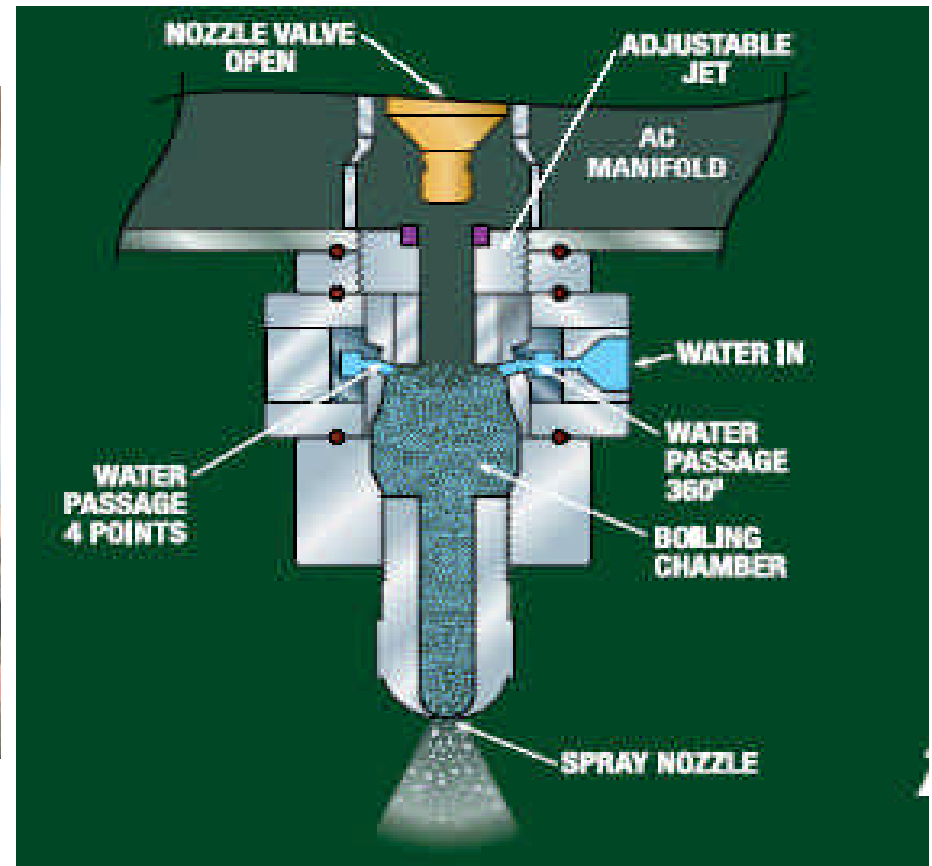
Sasobit®



ASTECC Double Barrel Green

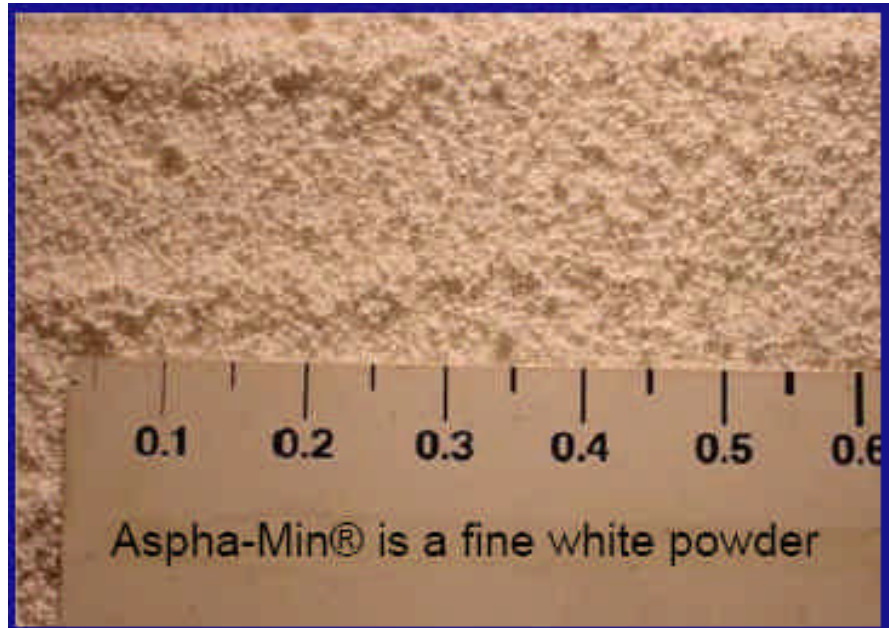


Water ~2% of AC content





Advera WMA (synthetic zeolite)



Added at ~6lb/ton of mix






EVOTHERM



**-Added at ~5%
of the AC
content**

**-85% water /
15% “chemical
package”**





SASOBIT (Organic paraffin wax)



Added at ~2-3% of AC Content



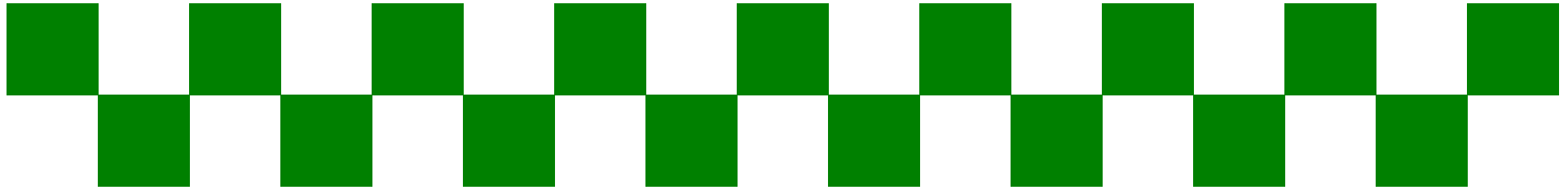


From mixing drum to hot elevator



Hot mix and Warm mix

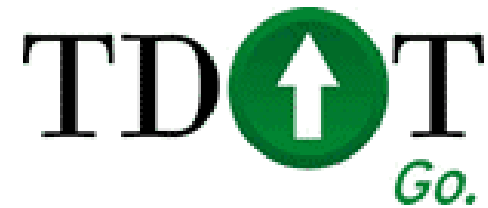




--Williamson County SR 46--
-CNF 172-



Goes GREEN



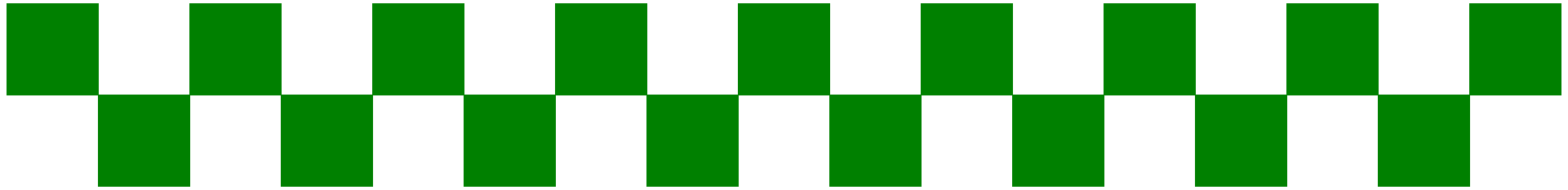
The Project- TDOT's Test section

Williamson County

SR-46 (Old Hillsboro Pike) From US 431 to SR-96

Length 5.559





What did we do...

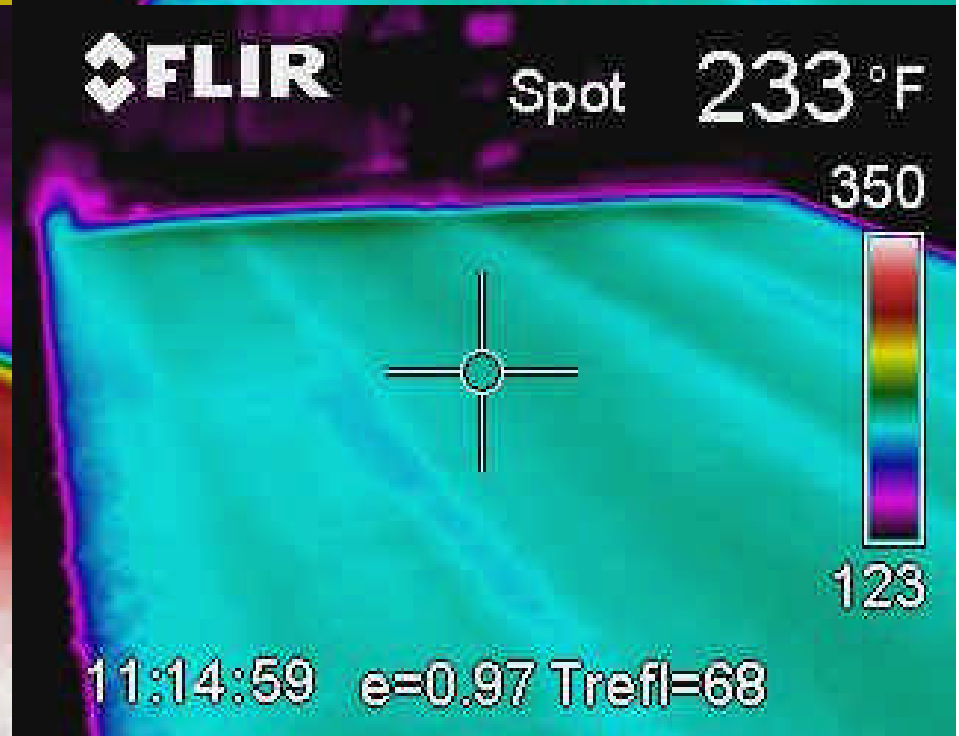
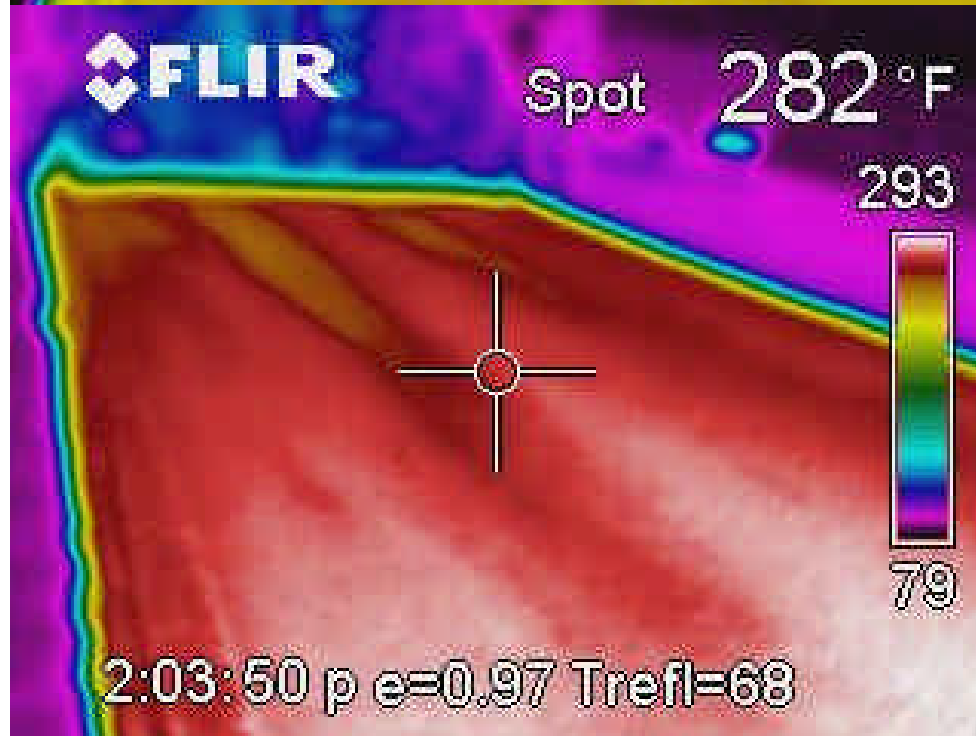
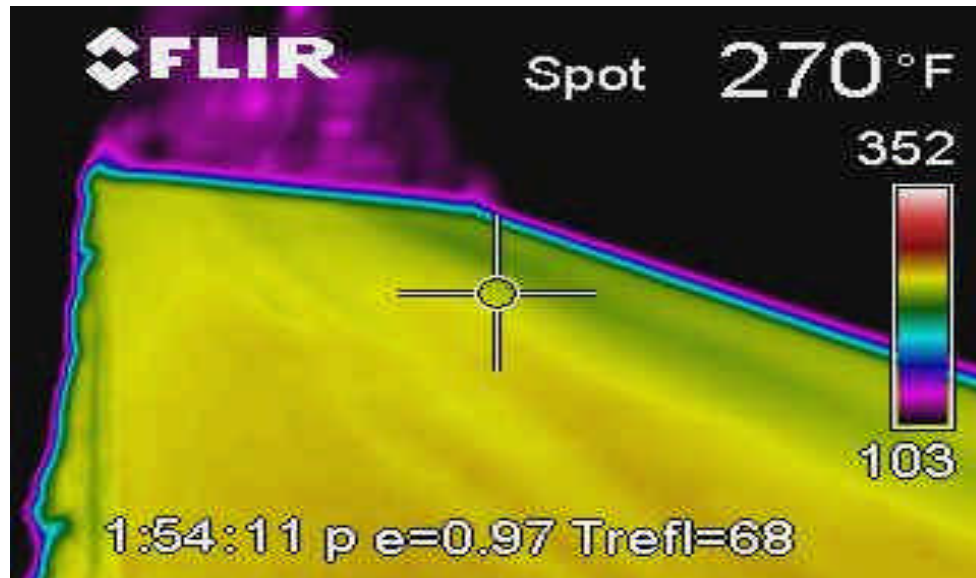
- Full day's production with control mix and each of the 4 processes/products-
 - From 700 to 1150 tons each
- Tested daily mix properties, temperatures and densities

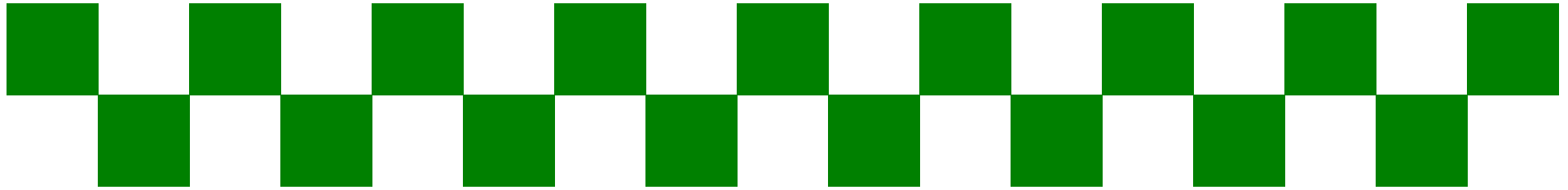


Hot mix and Warm mix



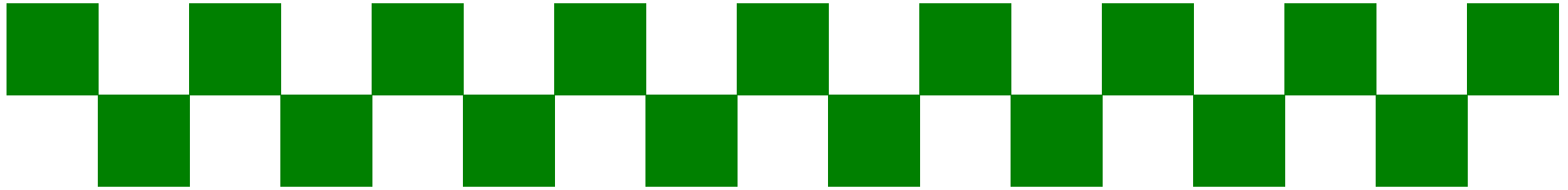
Hot mix and Warm mix





It all looks the same... Then...






...And Now






Mix Comparison From Danley and Murfreesboro Plant

- Astec Green System
 - 775 Tons Placed
 - % AC 5.19 & 5.29
 - % Air Voids 4.0
 - Stability 2200
 - TSR 84.3%
 - Density 91.6%
 - Evotherm
 - 750 Tons Placed
 - % AC 5.22 & 5.36
 - % Air Voids 5.1
 - Stability 1455
 - TSR 72.7%
 - Density 91.0%
- 




Mix Comparison From Franklin Plant

- Advera WMA
 - 1150 Tons Placed
 - % AC 5.16 & 5.28
 - % Air Voids 4.7
 - Stability 1475
 - TSR 51.9%
 - Density 92.7%
 - Sasobit
 - 705 Tons Placed
 - % AC 5.14
 - % Air Voids 3.5
 - Stability 1825
 - TSR 65.5
 - Density 91.0%
- 



What did we learn...

- May want to run 2-3 loads of hot mix through the plant and paver to “warm” it up
 - Start warmer and adjust down as allowed or needed
 - PG 70-22 - Modified binders will perform differently than un-modified at lower “warm mix” temperatures just as with “hot mix”
 - Each product will probably perform different at same temperature because they work differently
 - Smells better!!
- 

LOCAL NEWS

WEDNESDAY, OCTOBER 10, 2007

ROADS | A 'GREENER' PAVEMENT



PHOTOS BY GEORGE WALKER IV / THE TENNESSEAN
Lojac Enterprises workers Brian Phillips, left, and Josh Buck spread warm-mix asphalt on Old Hillsboro Road in Williamson County. The company and Tennessee Department of Transportation will test the cleaner, less harmful mix.

Tennessee tests eco-friendly asphalt on Williamson road

Engineers to see how it fares in traffic, weather

By KATE HOWARD
Staff Writer

New asphalt being poured in one Middle Tennessee county may look like regular pavement, but state transportation officials say it's cleaner, less harmful to the environment and smells a whole lot better.

The Tennessee Department of Transportation has partnered with Lojac Enterprises to test a warm-mix asphalt on Old Hillsboro Road in Williamson County.

The warm mix releases fewer pollutants into the air and is easier on workers laying it in the summer because it's about 100 degrees cooler than traditional hot-mix asphalt.

While the new asphalt has been 28 percent more expensive in tests done by other states, TDOT is trying it at one location to see how it stands the test of time.

"Right now, it's up in the air, since it's new and experimental," said Brian Egan, assistant director of construction at TDOT. "We expect competitive



Lojac workers pave Old Hillsboro Road with a warm mix. The asphalt, which is about 100 degrees cooler than traditional hot mix, is much easier on workers laying it.

bidding to drive the cost down."

Lojac decided to create the mix at two of its plants, in Murfreesboro and Franklin, and TDOT agreed to use the asphalt in the state's first test on a public road. Lojac is also selling the mix to private companies.

"With the lower temperatures, there are less emissions coming from our plant, less emissions on the road where we're working and less energy to make it," said asphalt sales manager Warren Garner.

Engineers with the

National Center for Asphalt Technology at Auburn University in Alabama plan to sample the pavement and put it through a battery of tests to predict its performance in different weather and traffic scenarios.

A construction project can often be the site of increased ozone pollution given the combination of warmer weather, stop-and-go traffic and hot asphalt, said Laura Artates of the Clean Air Partnership of Middle Tennessee.

Contact Kate Howard at 726-8968 or khoward@tennessean.com.

WARM MIX VS. HOT MIX

Traditional asphalt consists primarily of rock and oil that is mixed and kept between 285-350 degrees Fahrenheit.

Warm-mix asphalt, popular in Europe but still experimental across the United States, uses either chemicals or plain water to bring the temperature to 220-275 degrees Fahrenheit.

SOURCES: Lojac, TDOT

National Interest





Where's it going Nationally...and at TDOT

"Warm-mix asphalt is a tool in the tool box, but it's not yet ready for prime-time. The technology will prove very useful if environmental regulations become tighter in defining limits for greenhouse gases. In ozone-non-attainment areas, for example, warm mix may be a way for plants to operate longer on a daily basis. Warm mix also could allow contractors to extend their paving season, or to haul greater distances from plants."

Dave Newcomb- NAPA 3/1/2007

