



# RAP/RAS Workshop

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# General Rules

- RAP & RAS increases mix stiffness
- Most WMA additives decrease stiffness
- Tear-Off shingles are stiffer than Man-waste shingles
- Using multiple recycled bins improves consistency
- Finer RAS material improves consistency



# RAS has gotten a Bad W-rap



# Coarse Ground RAS

- Tabs sticking up in the mat
- Less effective asphalt
- Less blending
- More segregation issues
- Raveling issues
- Customer complaints





# Fine Ground RAS

- No Tabs
- More effective AC
- Better blending
- Better for WMA
- Better for SMA & PFC
- Less segregation and raveling issues
- Customer happy





# RAS Scalping Screen





# SMA with RAS

- IH 30 Downtown Dallas October 2011
- SMA-D with 5% RAS PG 76-22
- Test Strip outside east bound lane (2,400 tons)
- TTI Hamburg: 4.71 mm @ 20,000 passes
- Overlay Test: 403 cycles
- Advera WMA @ 1.5# per mix ton



# IH 30 SMA 5% RAS Spring 2012



# IH 30 SMA 5% RAS Fall 2012





# Warm Mix & RAS

- Do you get good blending at WMA temperatures?
- Will it help compaction?
- Will it affect the Hamburg test?
- Will it help prevent raveling?
- Will it help thermal segregation?
- Will it improve winter paving?

# apac Warm Mix Additives



# WMA Additive Considerations

- Quality and field performance
- Plant introduction issues
- Anti-strip replacement
- Performance testing (Hamburg, IDT, & Overlay)
- Required dosage
- Cost

# Advera Treated RAS



# Advera Treated RAS













**apac** **Safety First** *Always*



# Projects

- IH 820 Ft. Worth (Type D RAP/RAS PG 64-22) (Advera WMA) Production temperature 260°F
- US 287 Ft. Worth (Type D RAP/RAS PG 64-22) (Arrmaz LOF 6500 with Cecabase WMA) Production temperature 270°F
- Commercial trials: Type D RAP/RAS PG 64-22 with Hydrogreen rejuvenator/WMA





SCAN

253.9 °F

MAX 258



# Take Away

- Grind size (the finer, the better)
- Time is critical (haul time/project wait time)
- Use a WMA additive to help haul times, compaction, and workability
- Don't overheat the mix
- Do your homework



# Questions

