Maine’s Experience’s Utilizing RAP Cold Mix as a Pavement Base Course
Recycled Asphalt Pavement (RAP)
Sources of RAP

- Mill and Fill projects
- FDR projects with thick pavement (mill 3” prior to reclamation)
- Mill existing pavement before reconstructing a road
Typical uses for RAP in Maine

- Allow HMA supplier to have for use in HMA w/RAP
- Place a 6” layer on top of subbase gravel
- Use to fill top of pipe trenches, build structure in shoulders, etc.
- Creating large stockpiles at DOT lots
Are there other, perhaps better uses for RAP?

We think so!
Plant Mixed Recycled Asphalt Pavement (PM RAP)
What is PM RAP?

- Cold mix
- Aggregate – 100 % RAP
- Emulsified asphalt
- Portland cement
Where is it used?

- Used as a 3” to 5” base course over subbase gravel
- On minor collector roads to add structure before resurfacing
From this....
….to this
Economic benefits of PM RAP

- Less expensive base course (especially when DOT provides RAP)
- Reduces thickness of new HMA layer
- Good reuse of a valuable product
Environmental benefits

- Recycles large amount of RAP
- Reduces need to mine new aggregates
- Uses lower asphalt content
- Requires no fuel for heating
Construction process
RAP processing

- If millings are relatively fine, need only screen oversize material
- Sometimes material must be crushed
Plant requirements

- Weigh bridge
- Metering system for emulsion
- Means of adding cement
- Pugmill (continuous mixing)
- Ability to add moisture to RAP
Typical plant

- Hopper
- Weigh bridge
- Emulsion added
- Mixer
Discharge into truck
Another example
Laydown process

- Standard paver
- Typical rolling train
- Compaction control with nuclear thin layer gauge
- Allow curing before HMA application
2004 Demonstration project
Cold mix with Foamed Asphalt
Reasons for Demo

- MDOT wanted to compare foam product to mix w/emulsion
- Plant manufacturer (Wirtgen) wanted to demonstrate process in New England
- MDOT investigating purchase of cold mix plant
Mix design

- Millings - screened to -2”
- 2.2 percent foamed asphalt
- Water for compaction
- Note: should have added cement, but did not have silo available
Cold feed bins

Screened RAP

Water

PG 64-28
Plant Control Panel
Weigh bridge
Foam test nozzle
Cement auger
Binder supply
Loading trucks
Cold feed scalping screens
Stockpiled foam mix
Existing roadway
Laydown
Improving cross-slope
Adding compaction water
Carried away with thickness??

“Now that’s what I call a leveling course!!”
Finished product – ready for overlay
Preliminary findings

- Foam mix seemed more stable during placement
- RAP should have been finer to reduce segregation
- Material was placed too thick in places
- Finished product appeared similar to emulsion mix
Summary

- Cold RAP mixes provide an economical base course
- Many maintenance applications
- Plants are simple, portable
- Investigating ability of material to be stockpiled for later use
- Comparing performance of emulsion mix to foam mix