NESMEA 2004
Portsmouth, New Hampshire

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

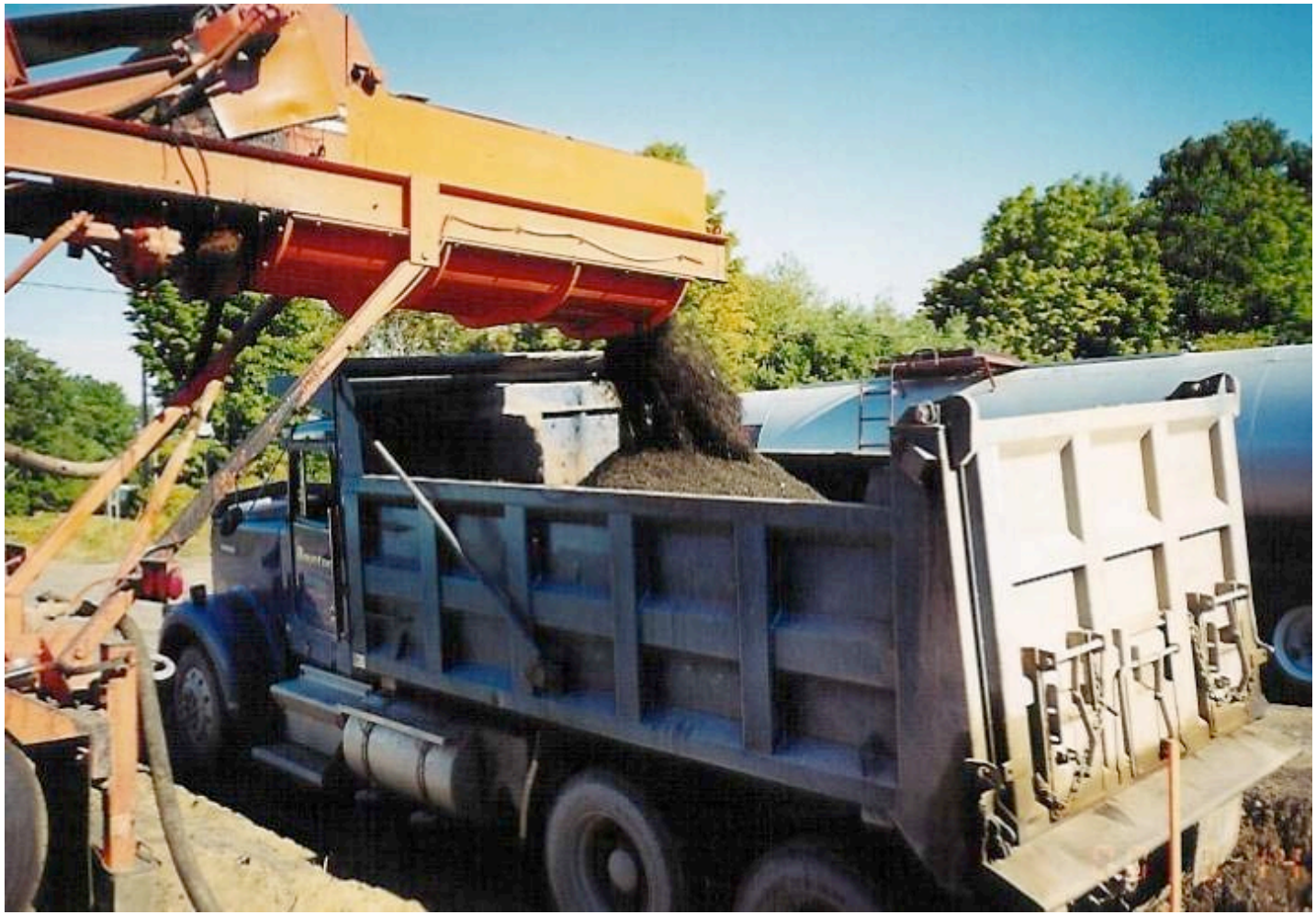
Typical uses for RAP in Maine

- 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

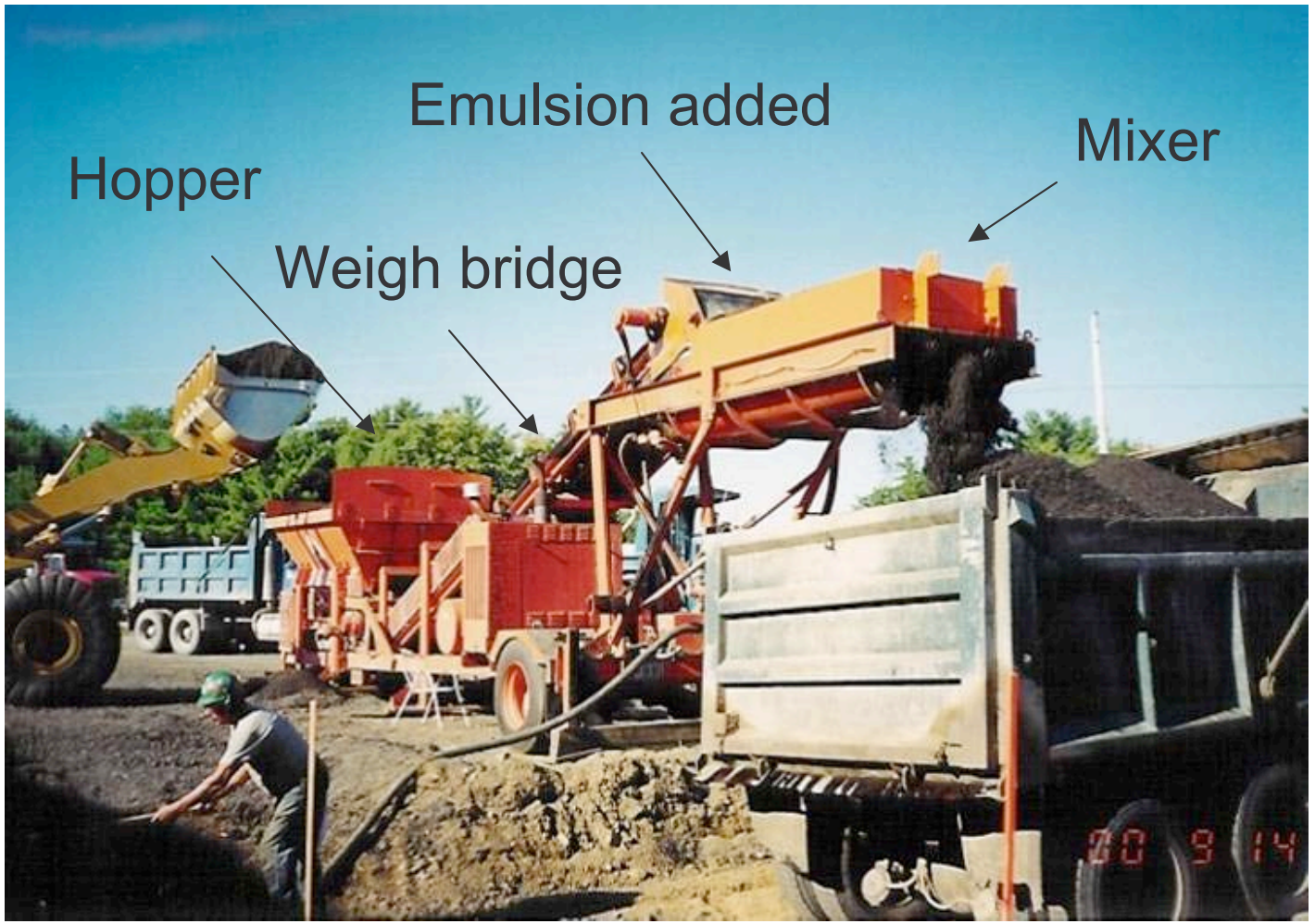
RAP processing

- 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



Discharge into truck

Another example

Laydown process

- Standard paver
- Typical rolling train
- Compaction control with nuclear thin layer gauge
- Allow curing before HMA application


00 9 14


00 9 14


NationsRent
SVEDALA
DYNAPAC
1-800-No Sweat
H33-514

2004 Demonstration project

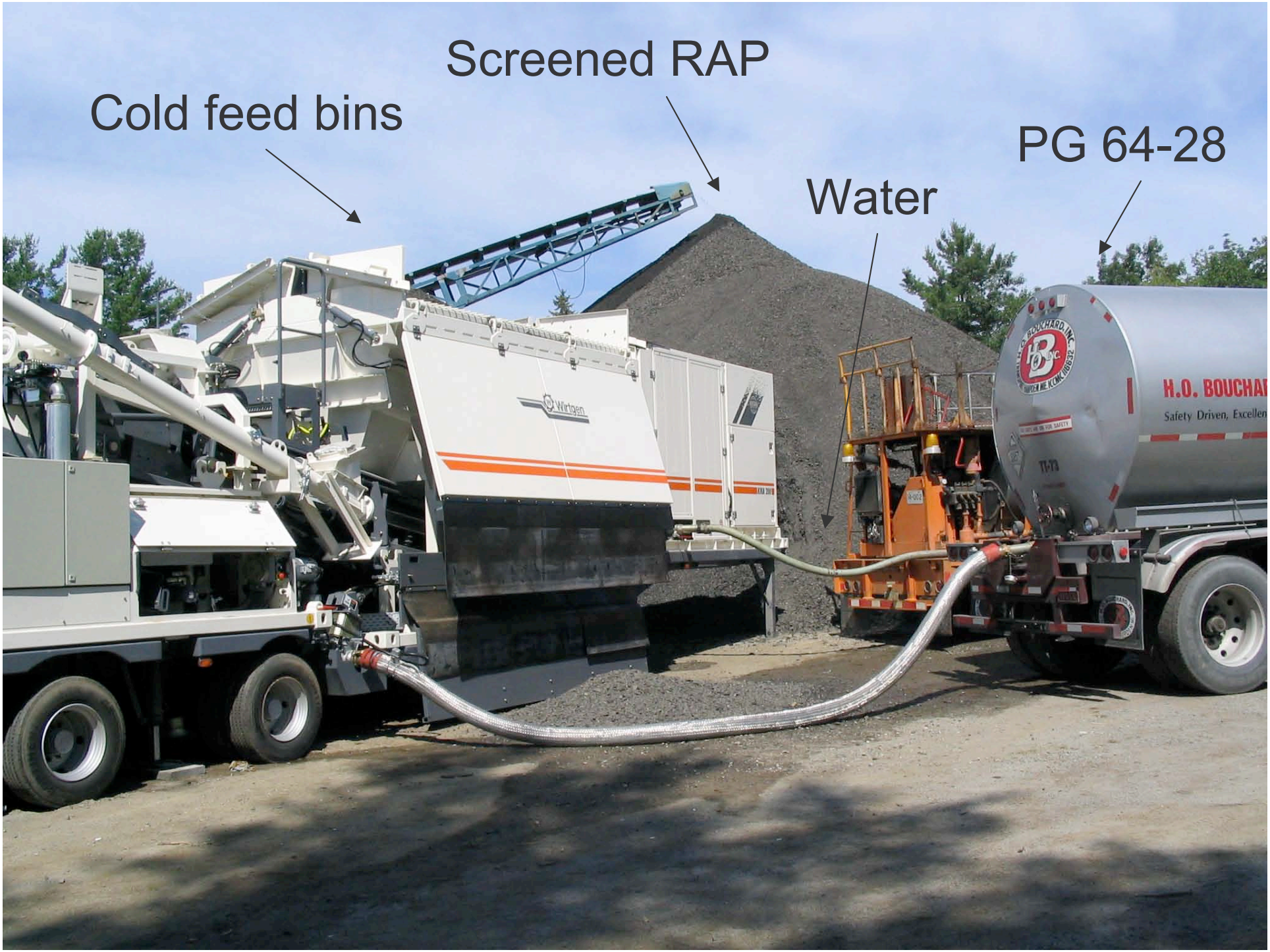
Cold mix with Foamed Asphalt

Reasons for Demo

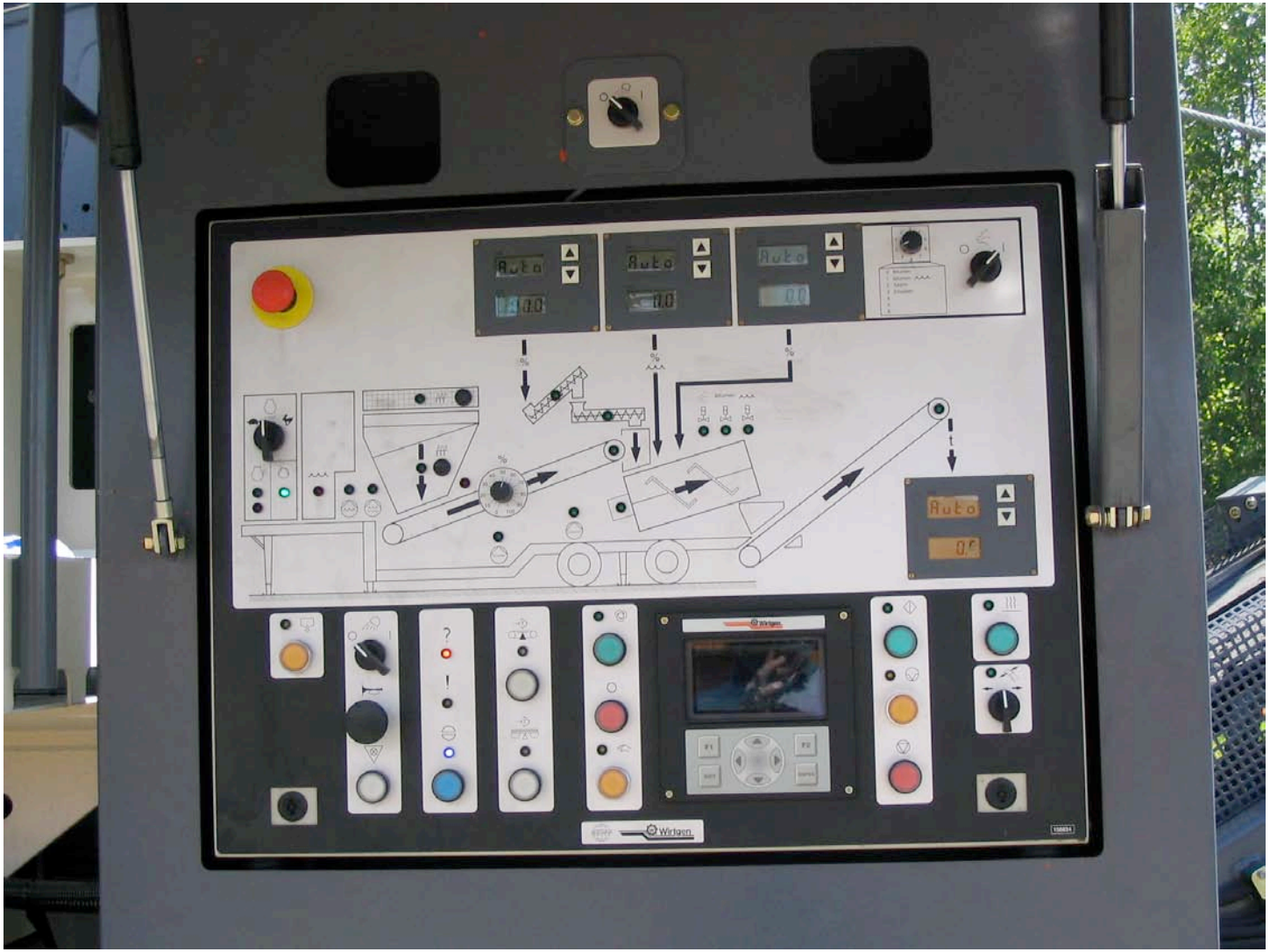
- MDOT wanted to compare foam product to mix w/emulsion
- Plant manufacturer (Wirtgen) wanted to demonstrate process in New England
- MDOT investigating purchase of cold mix plant

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
Wirtgen
H.O. BOUCHARD, INC.
Safety Driven, Excellen

Plant Control Panel



Weigh bridge

Foam test nozzle

Cement auger

Binder supply

Loading trucks

Cold feed scalping screens


PLEASE
DO NOT
TAILGATE


PLEASE
DO NOT
TAILGATE

Stockpiled foam mix

Existing roadway

Laydown

Improving cross-slope

Rolling

Rolling

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