COLD IN-PLACE ASPHALT RECYCLING
What is Cold In-Place Recycling

- The milling of a deteriorated asphalt pavement material that has reached the end of its useful life. This includes asphalt wearing and asphalt base course material.
- This milling machine then 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.
Features & Benefits

- Conserves energy and natural recourses
- Environmentally friendly
- Improves mix characteristics
- Cracking eliminated or reduced
- Improves cross slope
- Restores reveals to concrete curbs and gutters
- Cost effective
- Saves time
- May be performed under traffic
Equipment for CIR Train

- Emulsion tanker for CIR train.
- Down cutting milling machine 10 foot cutting width.
- Conventional paver 16 foot minimum screed width.
- Steel drum vibratory roller (12 ton)
- Pneumatic tired roller (25/30 ton).
- Small milling machine for utilities.
CIR – Materials or Additive(s)

Bituminous Additives:

- Asphalt Emulsion (with & without polymer)
  - Anionic Emulsions: HFMS-2, HFMS-2s
  - Cationic Emulsions: CSS & CMS
- Cutback Asphalts
- Rejuvenating Agents
- Foamed Asphalt
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.
CIR - Candidates

- Thermal Cracking
- Fatigue Cracking
- Poor Rideability
- Dry, Raveled
- Patched
Core samples are essential in any Cold In-Place Recycling project
Road Preparation for CIR

- Any damaged cross pipes should be replaced.
- Drainage and water problems should be addressed.
- Any vegetation growing on the pavement should be removed.
- Shoulder or pavement widening should take place before CIR.
Things to consider in a CIR – QC/QA Plan

- All meters and computers should be calibrated
- Recycling additive – check on specifications and compliance.
- Recycled mat smoothness
- Moisture added to RAP
- Compacted density
- RAP gradation
- Moisture content before overlay
- Recycling additive content
- Depth of pulverization/milling
Weather Limitations

- Air Temperature of 50 Degrees F’ and rising is preferred.
- Do not Cold In-Place Recycle when it is raining.
Traditional asphalt pavers are used. This unit has a windrow elevator, the mix is lifted into the hopper.
CIR – mix sent directly to paver hopper
Both pneumatic and steel drum rollers are used for compaction.
Sonic depth control system
Specialized milling for curb reveal
Area along curb is excavated
Pavement is recycled and curb reveal restored
Manhole and utility valve milling
Excavated manhole before recycling
Compaction of recycled asphalt around manhole
CIR – Pavement Widening

Existing section before CIR

Proposed widening section (addition of stone or RAP)

Completed widening section after CIR
Specialized mill excavates shoulder to desired depth
Excavated shoulder backfilled with reclaimed asphalt millings or aggregate
Shoulder fill material is recycled with RAP from existing pavement
The existing asphalt pavement properties may be enhanced with the addition of aggregate or RAP. Not only can the mix properties be improved, but additional structure may also be added to the asphalt pavement.
RAP or aggregate added to increase pavement thickness
Aggregate laid to grade by paver
Recycling train picks up aggregate and old asphalt roadway
Problems associated with Moyer Road

- No drainage (natural or storm water inlets)
- No crown or cross slope
- No curbs
- Trees and utility poles at edge of pavement
- To many width changes in roadway
Moyer Road, existing problems
New curb and storm water catch basin
Gas, water, sanitary sewer services repaired or replaced before CIR
CIR first pass along new curb
Gradation of Cold In-Place Asphalt Recycling (CIR)
Cold In-Place Asphalt Recycling before hot mix overlay
Moyer Road 2002
Bad cross section, bleeding chip seal, standing water
Recycling restores cross section and improves drainage
Alligator cracking
8% percent cross slopes create water problems
Old chip seal flushing
Old pavement is milled off the road base
It is necessary to mill the full depth of asphalt when slope exceeds 4%
RAP is then added to adjust cross slope to 2% or 3%
Milled asphalt pavement before re-profiling with RAP
RAP paver-laid before cold in-place recycling
Old pavement & RAP material undergo CIR treatment
Cold In-Place Recycling before compaction
Gradation of cold in-place recycled material & US quarter
Completed cold in-place recycled asphalt base
Lorewood Grove Road cold in-place recycled asphalt pavement
Intermediate asphalt course laid above the CIR
New hot mix wearing course and aggregate shoulders
CIR – Runway, Taxiway, Parking Areas
CIR can Transform a Roadway
Surface treatments that can be placed on top of CIR

- Chip Seal
- Slurry Seal
- Micro-Surfacing
- Hot or Cold Mix Overlay
THANK YOU

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