COLD IN PLACE RECYCLING

Sponsored by LADA of New York

OVERVIEW
- What is Cold Recycling?
- Why Recycle?
- Types & Processes
- Candidate Selection
- Core Sampling
- Mix Design
- Economics

WHAT IS COLD RECYCLING?
- Effective Road Rehabilitation Technique
  - Removal or Reduction of Distress & Fatigue
    - Pavilion Only (CRBC)
    - Pavilion & Sub-base (Stabilization)
- Economically Attractive Alternative to HMA
  - Re-use of Existing Materials
    - Typically 80-100%
    - Addition of Coarse Aggregate (Optional)
    - Addition of Emulsion Additive
    - Environmentally Friendly

WHY COLD IN-PLACE RECYCLE?
- Improve Pavement profile, section, and structure in one operation
- Breaks up the Cracking pattern
  - cracks won’t come back as soon
- Eliminates existing ruts, potholes, utility cuts, etc.
- Flexibility of Cold Recycle BC
  - More forgiving over marginal bases
  - Withstands movement from freeze thaw cycles

WHY RECYCLE?
- CORRECT PAVEMENT DEFECTS
- REUSE VALUABLE RESOURCES

WHY COLD IN-PLACE RECYCLE?
- Conserves Energy
  - Entire process is done cold
  - Reduces hauling requirements
  - Reuses valuable natural resources
    - Typically 80-100% RAP
  - Dramatic Cost Savings Over HMA
    - Potential 20-40%
WHY COLD IN-PLACE RECYCLE?

- Less Disruption of Traffic
  - Can process entire traffic lane and shoulder in one pass
  - Construction done under traffic
  - Construction done quickly (up to 2 lane miles/day) reducing exposure time
    - Approx. 3000 - 3600 ton/day

RECYCLING TECHNIQUES

SINGLE UNIT TRAIN
- GRINDER / MIXER
- PAVER

MULTI-UNIT TRAIN
- GRINDER
- SCREEN / CRUSHER
- MIXER
- PAVER

CENTRAL PLANT
- GRINDER
- SCREEN / CRUSHER (OPTIONAL)
- PUGMILL
- PAVER

CANDIDATE SELECTION

CORE SAMPLING
EQUIPMENT

- **STONE BOX / AGGREGATE SPREADER**
- **MILLING MACHINE**
  - MILL & MIX
- **PAVER**
  - AUTOMATED w/ PICKUP ELEVATOR
- **ROLLERS**
  - VIBRATORY (10 – 12 TON DUAL DRUM)
  - PNEUMATIC (20 – 30 TON STATIC or VIBRATORY equivalent)
  - VIBRATORY FINISH (10 – 20 TON IN STATIC MODE)

SINGLE UNIT TRAIN WITH ATTACHED PAVER

Single Unit Train

Multi-Unit Train
**PROJECT INSPECTION**

- CHECK MIX DESIGN
- ADD STONE
  - PROPER TYPE
  - PROPER AMOUNT
- EMULSION / PG BINDER
  - PROPER TYPE
  - PROPER AMOUNT
- DEPTH OF CUT
  - CHECK DEPTH AND CROSS SLOPE

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**INSPECTION (CONT.)**

- MIXING
  - COATING
  - SEGREGATION
- LAYDOWN
  - DEPTH
  - CROSS SLOPE
- COMPACTION
  - ROLLING PATTERN
  - TEST STRIP
- FOG SEAL
  - AMOUNT/TYPE

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**PLACING ADDITIONAL AGGREGATE**

Remove Aggregate from a known area
Place in a Container and weigh
Measure Aggregate depth
Mixing and curing

GRADE AND COMPACTION

IDEAL ROAD PROJECT

2% Mat
2% Cut

CONTINUOUS THICKNESS

2% Pavement
2% Cut

CONSISTANT COMPACTION FORCES

EASIEST COMPACTION

GRADE AND COMPACTION

3% Mat
3% Cut

CONTINUOUS THICKNESS

2% Pavement
3% Cut

VARIABLE THICKNESS = INCONSISTENT COMPACTION

1% Wedge extra material
Mixing & Curing

PROJECT INSPECTION

Central Mix Set Up

Density Monitoring

Daily test strip to establish a roller pattern, the routine monitoring throughout the day.
**FOG SEAL**

- **WHEN TO FOG SEAL**
  - WHEN SURFACE IS OVERLY DRY
  - COOL TEMPERATURES
    - Shaded areas
  - WHEN RAVELING OCCURS
    - In curves
    - Center joint
  - PRIOR TO SEAL COAT OR MICRO SURFACE
    - Mix is hungry - will pull oil from thin top courses

**FOG SEAL**

- THIN APPLICATION OF TACK COAT LIKE EMULSION
  - TYPICAL RATE – 0.05G/SQ.YD - 0.15 GAL/SQ.YD
- THEN A LIGHT APPLICATION OF SAND
  - TYPICAL RATE – 2#/SQ.YD - 5#/SQ.YD
- TIGHTENS SURFACE
  - SLOWS RAVELING

**CURING**

- ALLOW RECYCLE MIX TO CURE FOR SEVEN DAYS (MINIMUM) BEFORE APPLYING SURFACE COURSE
  - Moisture Content < 2 - 3% at some point
  - Longer = Better
RECYCLING

- WHEN FINISHED = IMPROVED:
  - RIDE - PROFILE
  - CROSS SLOPE
  - STRUCTURAL CAPACITY
    - Pavement section only

QUESTIONS

- THANK YOU
- THE END