Northeastern Pavement Preservation Partnership Meeting

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ASPHALT RECYCLING & RECLAIMING ASSOCIATION
ARRA 1976

HIR: Hot In-Place Asphalt Recycling
CIPR: Cold In-Place Asphalt Recycling
FHWA Releases Groundbreaking Recycled Materials Policy

ADMINISTRATOR'S MESSAGE:

The National Highway System (NHS) is extensive, with over 180,000 miles of highway pavements and over 128,000 structures, built using large quantities of asphalt, concrete, steel, and aggregate, and smaller quantities of nonferrous metals, plastics, and other materials. Much of the system was constructed in the 1960's and 1970's and is in need of major rehabilitation or total reconstruction; and much of the materials used to build the system can be re-used for use in the new construction.

In order to carry out the mission of the FHWA, i.e., to "improve the quality of the Nation's highway system," the NHS must be properly preserved, maintained, rehabilitated, and when necessary, reconstructed. Maintenance of highways and associated structures is critical to our ability to provide the safest, most efficient roadway system possible, while simultaneously providing the greatest level of protection to the human and natural environment.

The same materials used to build the original highway system can be re-used to repair, reconstruct, and maintain them. Where appropriate, recycling of aggregates and other highway construction materials makes sound economic, environmental, and engineering sense. The economic benefits from the use of nonrenewable highway materials can provide a great boost to the highway industry. Recycling highway construction materials can be a cost-saving measure, freeing funds for additional highway construction, rehabilitation, preservation or maintenance.

Recycling presents environmental opportunities and challenges which, when appropriately addressed, can maximize the benefits of re-use. The use of most recycled materials poses no threat or danger to the air, soil, or water. Furthermore, careful design, engineering and application of recycled materials can

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The FHWA policy is:

1. Recycling and reuse offer engineering, economic, and environmental benefits.
2. Recycled materials should get first consideration in materials selection.
3. Determination of the use of recycled materials should include an initial review of engineering and environmental suitability.
4. An assessment of economic benefits should follow in the selection process.
5. Restrictions that prohibit the use of recycled materials without technical basis should be removed from specifications.

FHWA has a long-standing position that any material used in highway or bridge construction, be it virgin or recycled, shall not adversely affect the performance, safety or the environment of the highway system. This remains a cornerstone in our policy statement. In order to foster innovation and future development we support research, field trials, and project demonstrations showcasing the findings.

We will do this with:

People:
- The FHWA Recycling Team
- Creation of a team of champions in our Division Offices that will be points of contact for recycling technology

Partners:
- The Recycled Materials Resource Center
- Working with the AASHTO Subcommittee on Materials and Environment
- AASHTO Standing Committee on Highways recently passed a resolution on "Use of Recycled Materials". That document recommends a joint task force should be created to provide the overall leadership for a coordinated national recycling program.
- Coordination with State highway agency (SHA) Recycling Coordinators and state solid waste management regulators
- Interaction and coordination with industry partners
- Taking the lead for coordination of recycling activities and initiatives

Promotion and Support:
- Agency emphasis on recycling technology in the FHWA Strategic Plan
- Research, development, and technology transfer programs to further innovation
- Demonstration projects
- Increased training opportunities for FHWA and SHA staff
- Active promotion of recycling technology by providing needed specifications, best practices, design guidance, and material testing results to overcome barriers
- Assistance in review, evaluation, and advancement of emerging technology
- Promoting the concept of "sustainable" construction, i.e., construction designed for later recycling.
Economic & Environmental Benefits

- Asphalt can be recycled 100%
- Recycling stops depletion of natural resources
- Aggregate and asphalt are none renewable
- Recycling offers significant energy savings
- Stretches roadway funding
- It is a less disruptive alternative to conventional methods
- Roadway remains open during construction
- Recycling saves time and money
HIR
Hot In-Place Recycling
1 – 2.5 Inches
HIR Requirements

- Base in good condition
- Asphalt roadway 20’ wide or wider
- Excessive crack filler or pot hole patching can be addressed by premilling
- Roadway must have enough strength to support the equipment
High Penetration Asphalt Rejuvenators can be added to bring the aged, stiff bitumen liquid in the mix back to life.

New hot mix asphalt or virgin aggregate specially designed for the individual project, can be added as required to improve quality.

Chip seals, micro surface, slurry seals, nova chip or thin overlays can be added during or after completion of the hot in place recycling process.
Pavement Heating

- Plus 50 Degrees F
- Plus 100 Degrees F
- Plus 150 Degrees F
- Excess of 350 Degrees F
Three Types of HIR

- Surface Recycling
- Repaving
- Remixing
Surface Recycling
Repaving
Cold In-Place Recycling
2.5 – 5 Inches

100% RECYCLABLE “IN-PLACE”

ARRA
TYPES OF COLD RECYCLING

Cold In-Place Recycling (CIR)

Cold Central Plant Recycling (CCPR)
Single Unit Train
Two-Unit Train
CIR - Lay Down
CIR - Lay Down

Mix Pavers may be used
CIR - Candidates

- Thermal Cracking
- Fatigue Cracking
- Dry, Raveled
- Poor Rideability
- Patched
Pavement Distress

- Potholes
- Rutting
- Corrugation
- Shoving
- Fatigue Cracking
- Edge Cracking
- Block Cracking
- Longitudinal & Transverse Cracking
- Ride Quality
CIR – Types of Pavements

- Airport Runways
- County Roads
- State & US Highways
- Interstate Highways
- City Streets
CIR – Selection of 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
CIR - Additive Application

Slurry Application. Portland Cement and Hydrated Lime may be applied in slurry form.

Dry Application. Type C Fly Ash, Portland Cement or Hydrated Lime may be spread dry in front of the recycling train.
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.
Completed Cold In-Place Recycled Asphalt Base
State of Maryland
Moyer Road
1992
Sign Reads
Rough Road
Travel at your
own risk
Moyer Road 1992
Problems associated with Moyer Road

- No drainage (no 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
All utilities & Services replaced
CIR first pass along new curb
Gradation of Moyer Road CIR
Cold In-Place Asphalt Recycling
Weather Limitations

- Air Temperature of 50 Degrees F' and rising is preferred.
- Do not Cold In-Place Recycle when it is raining.
Asphalt Pavement Recycling Technologies

Instructor's Manual

![Graph showing the benefits of recycling pavement over time. The graph illustrates how recycling extends pavement life and improves quality over years.]

National Highway Institute

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