

**NYSDOT Cold In-Place Recycling**  
Federal Highway Administration National Review  
Close out meeting, July 14, 2005

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**Purpose**

The purpose of this review is to capture for technical deployment the most advanced uses of Cold-In-Place recycling (CIR) and then transfer the knowledge to all State Transportation Agencies (STA). Through this sharing of information, we intend to showcase how other STAs overcame barriers and advanced the routine use of CIR as a pavement rehabilitation strategy. “Best Practices” will be identified along with barriers and benefits. Specifications, construction practices, implementation challenges, and identification of ongoing and completed research will also be documented. This information will then be disseminated to all STAs through technical guidance, training, and guide specifications, as necessary.

**General**

- CIR at New York State Dept OF Transportation (NYSDOT) is one of a series of pavement treatments for maintenance engineers. It is widely used because of abundance of rural roads in fair condition that can benefit from something more than a traditional overlay but less than a full-scale rehabilitation/reconstruction project.
- CIR (4”) with a 1 ½” overlay is expected to last 10-15 yrs with little maintenance as compare to a 5-8 year life with a 1 ½” traditional overlay.
- At NYSDOT, decision-making is decentralized. Resident engineers - usually responsible for a county - decide which roads to utilize CIR based on criteria established in Comprehensive Pavement Design Manual (CPDM) and annual windshield distress survey.
- CIR has been used by NYSDOT on about 300 projects Since1991. Since 1999, it averaged approximately 2 million m<sup>2</sup> per year with roadways having 8,000 AADT, 10% trucks or less.
- CIR has been used in the State of NY for nearly 30 years (by others).
- The CIR effort would have not been successful without the strong support from the NYSDOT central office for specification development, information dissemination, and training.
- Contractors that specialize in CIR have a large capital equipment investment and recognize the importance of high quality workmanship.

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- CIR methods attract only high quality contractors because of the cost of equipment and unacceptable cost of failure with strong commitment to quality and performance.

### **Best Practices**

- The relationship between the Liquid Asphalt Distributors Association (LADA) and NYSDOT has fostered a cooperative partnership to advance the CIR initiative.
- Strong industry trade group, LADA, helps foster innovation and sharing of technological information.
- NYSDOT has developed construction/inspection standards that clearly identify the responsibilities of the owner and the contractor.
- NYSDOT requires pre-construction meeting at least one week prior to paving including the CIR crew supervisor. This is followed up with a pre-pavement meeting on the first day of the CIR operation with the entire crew and the inspection team.
- Pavement managers and pavement management teams residing in the regions serve resident engineers by providing them with technical services. This is unique in a decentralized organization, and has provided continuity in a time when there is a lot of turnover in the residencies. This has been practiced for the last eight years.
- NYSDOT develops a mix design using the average gradation and asphalt content, by ignition, from 6" diameter roadway cores cut to the depth of the proposed recycling (3 or 4 inches). The agency determines the percent "add stone" (maximum 20%) and either the agency or contractor establishes the project emulsion content (minimum 3%) depending on the type of contract. The contractor is permitted up to 10% of the emulsion bid quantity.
- NYSDOT requires that CIR withstand traffic for a minimum of seven (7) days before an overlay is placed as a performance-like acceptance mechanism.
- When possible, operate the CIR train against the flow of traffic to minimize dimples created by vehicles stopping on the fresh mat.
- CIR is considered as a standard pavement treatment in NYSDOT "Comprehensive Pavement Design Manual" (Sec 5.4.2.3. P. 5-26).

### **Barriers Overcome**

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- A key barrier was lack of knowledge concerning performance characteristics and CIR production processes. It was overcome by education, provided by LADA, the contractors themselves and NYSDOT providing outreach to the regions.
- Traditional construction contracts tend to exclude the CIR; e.g. specialty contractor performing the CIR work becomes sub to general contractor who simply administers the project. This contracting hurdle was overcome thru the use of an Office of General Services (OGS) contracts. These contracts are line-item contracts based on quantities, cost, and conditions. Bids can be based on prices provided on the original award, or when specific conditions of the project are known, a “quick quote” can be requested. “Quick quote” may not exceed original prices. Contracts can be implemented quickly for CIR using this method.

### **Current Barriers/Issues**

- CIR is as much an art as it is science.
- No nationally recognized mix design process.
- No construction oversight acceptance testing.
- Restricted use for low volume roads with less than 8,000 AADT.
- Reliance on skill and expertise of contractors.
- CIR is not taught traditionally. It typically is excluded from university curriculum.
- There are no density requirements.
- The capital-intensive investment for contractors, and maintenance of skilled labor pool specific to this industry, requires having a sufficient volume of work. This is difficult due to current funding constraints, and competing program needs. SDOT’s must be cognizant of the program level to help maintain a healthy industry.

### **Follow up**

- Synthesis of past research.
- Reports on long-term performance.
- Results of CIR uses on higher volume roads.

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- CIR should be marketed as a pavement rehabilitation or pavement preservation tool depending on the magnitude of the project.
- Chip seal performance over CIR.
- The use of mineral fillers (e.g., fly ash or cement) and their effects on performance.
- Appropriate control parameters for this process
- Structural number
- Comments/suggestions regarding NYSDOT's CIPR research proposal.