Pavement Recycling – In-Place Cold Recycling
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CIR Introduction

- **Definition**
  - The process and treatment with bituminous and/or chemical additives of existing HMA pavements without heating to produce a restored pavement layer (AASHTO, 1998)
- **Performed by:**
  - Milling 2” – 6” of existing pavement
  - Grading the milled material
  - Incorporation of an additive material (typically cement, foamed asphalt or emulsion)
  - Paving of the material
  - Compaction with rollers
- **CIR layer overlaid with new AC layers or surface treatment**

Contribution to More Sustainable Pavement Solutions

- Few new roads being constructed, existing pavements require maintenance
- Maintenance needs range from functional improvements to addressing structural deficiencies
- CIR contribution to more sustainable pavement solutions:
  - Reuse of existing materials
  - Minimal need for new materials
  - Allows for addressing deeper material deterioration issues than typical mill/fill
- Other contributions
  - Reduces truck fuel consumption
  - Improved work site safety
  - Potential quicker return of traffic to roadway
  - Geometric constraints

Gaps in CIR Knowledge

- Lack of knowledge of processes by DOT engineers and management
- Lack of documented performance on higher-volume facilities, existing information is dated and sparse
- Uniformly accepted mechanistic pavement design procedures and mix design processes
- Relationship between early-age material stiffness and loading
- Uniformly accepted construction inspection process
- Impact of curing on pavement loading, construction time (day vs. night), materials used, etc.

Needed Research to Fill the Gaps

- **Investigation and reporting on existing CIR performance on high-volume facilities to include pre-CIR pavement condition, design methods, lessons learned, reasons for selecting CIR, etc.**
- **Research and Development of standardized CIR mix design methods at national/international level**
- **Research and Development of standardized CIR mechanistic design methodology for use in pavement maintenance and rehabilitation**
- **Research and Development of CIR construction acceptance and control processes**