



Pavement Recycling

October 7, 2014

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Pavement Recycling

- **What it is**
- **Types**
- **When to use it**
- **Elements of the specifications**
- **What we have done**
- **Way Forward**

What is it

Simple – Taking existing materials and using them....again.

But not all recycling is equal.....

Types

- **RAP (Reclaimed Asphalt Pavement) in Hot Mix**
 - Using RAP with the Virgin Mix

Focusing on these types:

- **CCPR – Cold Central Plant Recycling**
 - Typically 100% RAP processed off site and stabilized (thickness varies)
- **CIR – Cold In-Place Recycling**
 - Bound asphalt layers mixed in-place and stabilized (3” to 6”)
- **FDR – Full Depth Recycling**
 - Deep mixing-includes bound and unbound (aggregate/soil) material (6”to12”)

When to use it

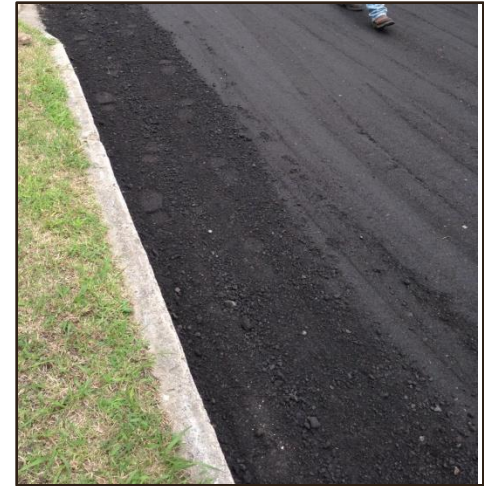
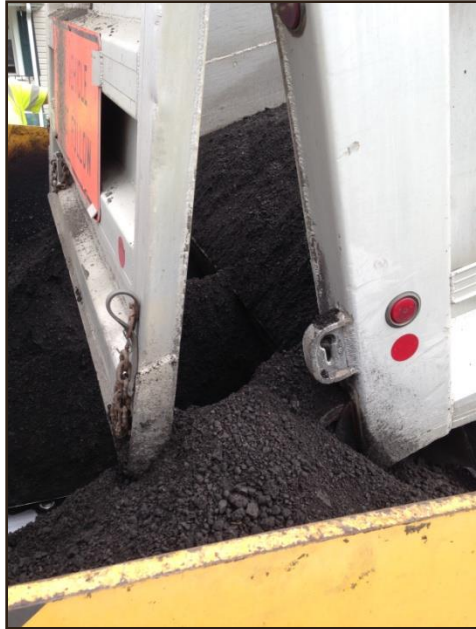
- **RAP (Reclaimed Asphalt Pavement) in Hot Mix Asphalt (HMA)**
 - Used since the 1980's
 - Currently allow up to 30%
 - Contractor Option
- **CCPR – Cold Central Plant Recycling**
 - As a base material replacing a portion of Base Mix/Aggregate Base, shoulder strengthening, can be placed in multiple lifts (3" to 6")
- **CIR – Cold In-Place Recycling**
 - Pavement has deterioration in the deeper layers (3" to 6"), but only the bound layers – Major Rehabilitation
- **FDR – Full Depth Recycling**
 - Pavement has deep deterioration (6" to 12") – secondary roads and primary routes where applicable – Major Rehabilitation

CCPR – Cold Central Plant Recycling



Millings being plant processed

CCPR – Cold Central Plant Recycling



Looks Like HMA.....Placed like HMA....
Compacted Like CMA

CIR – Cold In-Place Recycling



Cement placed ahead, mixing with
asphalt

FDR – Full Depth Recycling



Cement placed ahead, mixing with water

Elements of the Specifications

- **Test Strip Prior to full production**
- **Quality Control Plan**
 - Identify team responsible for quality and duties
 - Sampling, Testing and Analysis Plan for QC
 - Quality Control activities – what is being done
 - Actions to meet contract requirements when corrective actions are required
 - How the stabilized material will be protected
- **Technical Representative**
 - Experienced with the process
 - May be a manufacturer's representative, consultant or other experienced rep
- **Responsible for design of mix (Job Mix Formula)**
 - Gradation
 - Density
 - Stabilizing agents
 - Water

What we have done

Since 2008

- **FDR, 11 Projects**
- **CIR, 4 Projects, 3 additional projects advertised, but not awarded (1 over estimate and 2 alternate designs not selected)**
- **CCPR, 2 Projects (one of which is underway)**

Lessons

- **CIR – Nighttime work, open to traffic too soon**
- **Apply to the right project can be very beneficial – an investment**

Way Forward

Early Oct 14 – CIR specification to be posted and current FDR specification circulated for feedback

Mid Oct 14– Draft permissive CCPR spec for Section 200 & 300 circulated

Late Oct 14– Strengthen Recycling Requirements – Issue Materials Division Memorandum for inclusion in Section 600 – Manual of Instructions

Late Nov 14– (Revised – if necessary) FDR Specification posted

Mar 15 – Permissive CCPR spec posted

Approx \$50-\$60M/year spent on restorative maintenance and reconstruction – first consideration is recycling.

Use of CIR and CCPR is still new and we are learning together to take existing materials and use them.....again



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