

NDOT RECYCLING

Reid G. Kaiser, P.E.

Chief Materials Engineer, NDOT

April 08, 2009

PRESENTATION OVERVIEW

- My History/Perspective
- Federal Perspective
- Nevada DOT Perspective
- Final Conclusions

My History with recycling...

Yogi Berra - "If you don't know where you are going, you will wind up somewhere else"

Federal Perspective

The FHWA policy is:

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

Federal Perspective (continued):

FHWA has a longstanding 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.

Federal Perspective (continued):

National Resources available on recycling:

- FHWA
- State DOT's Recycling Coordinators
- Center for Environmental Excellence by AASHTO
 - TERRI – Research Center Database
- Transportation Research Board

Federal Perspective (continued):

Recyclable Materials: baghouse fines, various types of slag, fly ash, foundry sand, kiln dusts, quarry byproducts, reclaimed asphalt pavement (RAP), concrete material, roofing shingles, scrap tires, waste glass, organic material.

Federal Perspective (continued):

Summed up with one statement:

“Must have an equal or better performance than the origin Product.”

Nevada DOT Perspective:

- Not all states are created equal.
 - RAP usage in other states.
 - Climate.
 - Get in, get out, stay out.
- Nevada has ample supply of HMA and concrete aggregates.

Nevada DOT Perspective:

Asphalt Rubber Concrete (ARC)(Crumb Rubber):

1. Dry Method

- Tire rubber is used as an aggregate

2. Wet Method

- Tire rubber is soaked in AC
- Reduced noise levels on PCCP by 10.7 decibels



Nevada DOT Perspective:

Terminal Blend Asphalt:

- Terminal Blend Asphalt is a process of that completely incorporates and digests the tire rubber particle into the base asphalt binder. Polymerized AC is not affected by this process.
- Adapted 2 Modified AC tests to Terminal AC.

Nevada DOT Perspective:

Benefits of Terminal Blend:

- Acts as a polymer
- Resistant to oxidation and UV degradation
- Negligible cost increase
- Using Rubber Tires

Performance – time will tell





08/25/2008



Nevada DOT Perspective:

Concrete:

1. Crack and Seal existing PCCP
2. Rubblizing PCCP

Fly Ash – is a coal combustion product that replaces cement in the paste in concrete.





Nevada DOT Perspective:

Coldmilled Plantmix:

1. Shoulder Material
2. Base Material
3. Reclaimed Asphalt Pavement (RAP)

Nevada DOT Perspective:

Cold-In-Place Recycling (CIR) and Full Depth Reclamation (FDR):

- Benefits: Cost Effective, reduce traffic delay, preserve natural resources
- Savings has allowed Nevada to spend money on Pavement Preservation Projects

Nevada DOT Perspective:

Cold In-Place Recycling:

- Implemented when there are functional deficiencies
- Through 2008 NDOT has recycled 986 lane miles
- Life of 15-20 years with lime-slurry
- Surface is determined by ESAL's



Nevada DOT Perspective:

Full Depth Reclamation:

- Implemented when there are structural deficiencies.





Nevada DOT Perspective:

Other Recycled Items:

- Landscaping – pine needle waddles, paper mulch, decorative boulders, wood fiber mulch, wood chips, dead trees

Conclusions:

- Current HMA specifications
- Warm Mix Asphalt
- Recycling on NDOT projects