

# RESOURCE RESPONSIBLE USE OF RECLAIMED ASPHALT PAVEMENT (RAP) IN ASPHALT MIXTURES



U.S. Department of Transportation  
Federal Highway Administration

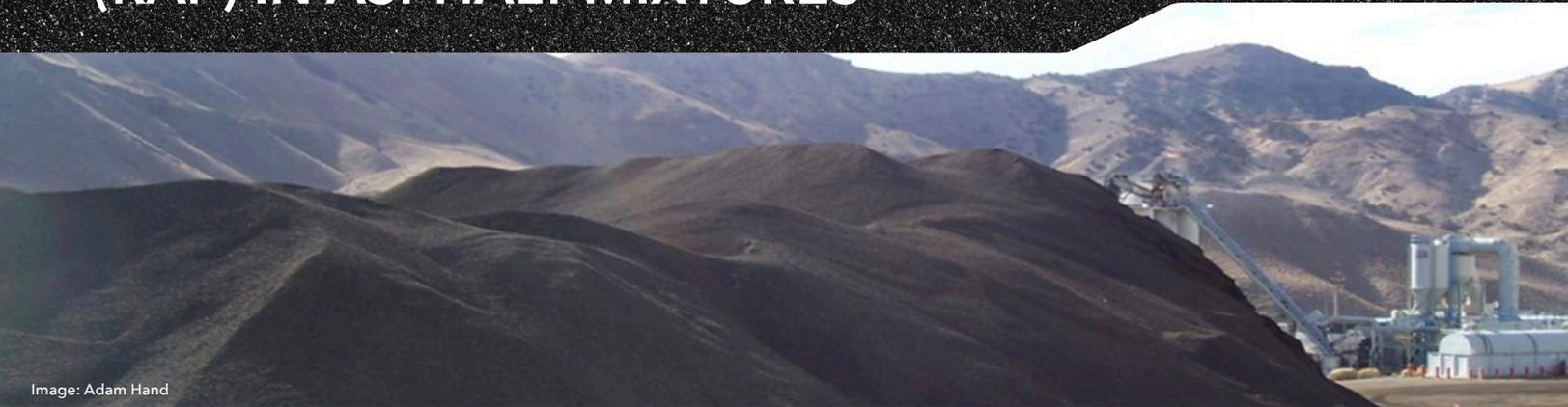


Image: Adam Hand

Reclaimed asphalt pavement (RAP) has been used in pavement rehabilitation and reconstruction for decades. Positive and sustainable benefits (cost, environmental and societal) of increased RAP usage have been documented by the National Asphalt Pavement Association (NAPA). Nebraska Department of Transportation (DOT) has recently reported annual savings of \$60 million by using RAP. National and State studies have compared performance of asphalt mixtures with and without RAP. When properly engineered, produced, and constructed, high RAP asphalt mixtures can provide comparable levels of service as asphalt mixtures with no reclaimed materials.

Some State DOTs have had challenges to specify, design, and control the quality of asphalt mixtures containing RAP. Six State DOTs with positive performance using 35 to 50 percent RAP were interviewed to learn about their practices.

## FOUR MOST COMMON KEY PRACTICES IDENTIFIED:

- **PROJECT SELECTION.** Although these States allowed high RAP, it was not always permitted in all asphalt mixtures. Allowance for RAP is based on mixture type, location in the pavement structure, binder type, or geographic location.
- **BINDER QUALITY.** Asphalt binder in RAP is aged and stiffer than the virgin binder. These States use a softer virgin binder by bumping the binder's low and high temperature grade down.
- **BINDER QUANTITY.** Not all the aged binder in RAP blends with the virgin binder. The States had various methods to increase the amount of virgin binder beyond typical amounts in the asphalt mixture.
- **QUALITY CONTROL OF RAP STOCKPILES.** Uniformity of RAP stockpiles was a common observation. States were most accomplishing this by using meaningful mixture acceptance specifications that encourage consistency.



Image Source: FHWA

In addition, States sometimes used criteria for mixture mechanical tests and/or recycling agents. The participating State DOTs indicated that optimizing RAP for good pavement performance can be accomplished through 1) regularly reviewing specifications, mix design procedures, and mechanical test methods; 2) monitoring field pavement performance; 3) working with asphalt producers for improvements, and 4) performing research as a basis for changes.

Read more about the findings in *Resource Responsible Use of Reclaimed Asphalt Pavement in Asphalt Mixture*. Publication Number FHWA-HIF-22-003, Federal Highway Administration, Washington, DC, 2021.

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