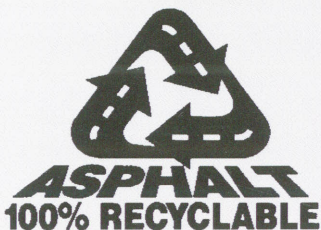
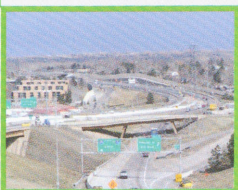
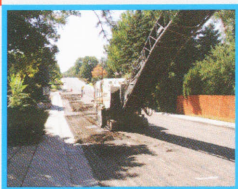


THE BENEFIT OF USING RECYCLED ASPHALT PAVEMENT (RAP)

RAP IS NATIONAL LEADER IN RECYCLED MATERIALS

Recycled or Reclaimed asphalt pavement (RAP) is a good choice for incorporating into Hot Mix Asphalt (HMA) mixes. RAP is the term used to describe reprocessed or rotomilled asphalt paving materials containing asphalt and aggregates. RAP has been incorporated into pavements successfully for many years and provides a key savings of natural resources. Every year, approximately 90 million tons of reclaimed asphalt pavement are reused, nearly twice as much as the combined total of recycled paper, glass, aluminum and plastic.

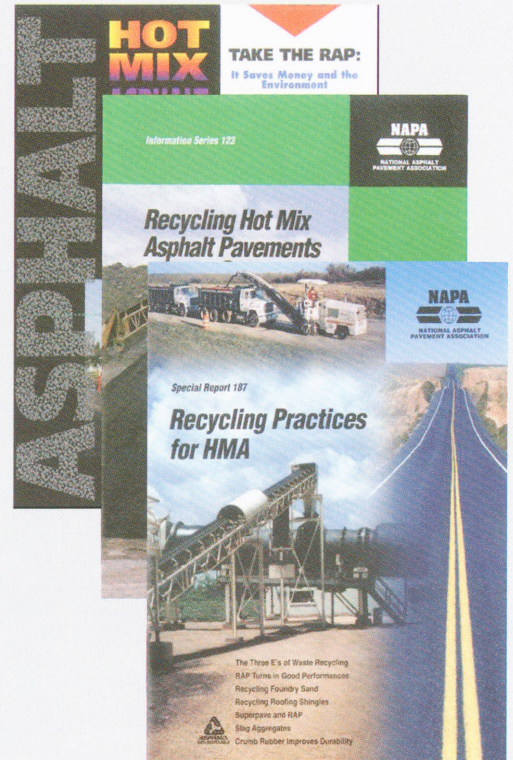


ASPHALT
THE SMOOTH QUIET RIDE

TECHNICAL RESOURCES

TECHNICAL GUIDANCE AND RAP PUBLICATIONS

A full report and Technician's Manual on RAP can be obtained from the Transportation Research Board or by downloading it on the web at www.trb.org/publications/nchrp/nchrp_rpt_452.pdf and www.trb.org/publications/nchrp/nchrp_w30-a.pdf. Also, the National Asphalt Pavement Association (NAPA) has several publications related to the use of recycled asphalt pavements, Information Series 123, Special Report 187 and BB11. These publications can be obtained thru the Colorado Asphalt Pavement Association (CAPA) at 303-741-6150.



COST REDUCTION ACHIEVED THRU USE OF RAP

When HMA pavements reach the end of their usable service life, the material in them retains considerable value. “Reclaimed asphalt pavement is a treasure trove of pre-processed road building material,” according to Mike Acott President, National Asphalt Pavement Association. “The aggregate has already undergone the processing, permitting, blasting and washing. The major cost benefit stems from the recovery of the asphalt binder.” Besides the cost benefit the use of RAP represents an environmentally positive method of recycling. The use of RAP in HMA has saved taxpayers over \$300 million annually by reducing materials and disposal cost.

RAP SPECIFICATIONS IN COLORADO

The Colorado Department of Transportation allows up to 25% RAP to be used in mixes. The Metropolitan Government Pavement Engineers Council (MGPEC) specification and the newly developed Pikes Peak Regional Asphalt Paving Specifications allow up to 20% reclaimed asphalt pavement. Each specification requires that all criteria for virgin material mixes be met. Thus, the end product will be the same with or without RAP.

FOCUS ON RECYCLING

THE ADVANTAGE OF CONTRACTOR RETAINED ASPHALT MILLINGS

The value of asphalt rotomillings to the contractor from pavement rehabilitation projects has increased significantly with the ever increasing costs of construction materials, including asphalt and aggregate. Many projects specify that the Owner/Agency retains the ownership of the millings for maintenance use. Lower bid prices would result from allowing the contractor to retain the rotomillings or a portion of them.

RESOURCES ON RECYCLED ASPHALT PAVEMENT (RAP)

One of the most informative sessions at the 33rd Annual Rocky Mountain Asphalt Conference & Equipment Show was a presentation entitled, “Using RAP with Confidence - Maximizing RAP Percentage while Maintaining High Quality”

by Tom Blair, Schmidt

Construction Co., Colorado Springs, CO. The presentation is posted on the Annual Conference website. Also, two excellent resources for information on recycled asphalt pavement (RAP) are the Asphalt Pavement Alliance (APA)

website at www.asphaltalliance.com and the National Center for Asphalt Technology (NCAT) website at www.ncat.us. The latest of research and industry best practices on RAP are located at these two e-locations.



FHWA SUPPORTS THE USE OF RECYCLED MATERIALS

The Federal Highway Administration (FHWA) has developed policy guidance on the use of recycled materials.

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

AGENCY BENEFITS OF USING RAP

1. Reduces cost and bid prices of hot mix asphalt materials.
2. Reduces consumption of our natural resource supply.
3. Less dependence on foreign oil because of energy savings in haul, mining, etc. and less new asphalt binder is required.
4. Competitive bidding process to obtain the HMA material alternative at the least cost.
5. For pavement design, recycled hot-mix can be assigned the same structural equivalency factor as a conventional mixture.
6. Eliminates decisions of logistics of the salvage material, processing form, use of excess materials, and how to incorporate materials into future contracts.
7. Acceptability of the recycled material and proportions can be determined through mix design prior to allowing the use provided that the recycled product meets minimum criteria for all layers.
8. Provides a means where pavement material removal is economically justified, thus, stretching available funds to meet current needs.
9. If designed correctly it can meet all Superpave design criteria.
10. Long-term performance is equivalent to or better than virgin mix.

CONTRACTOR BENEFITS OF USING RAP

1. Reduces cost of hot mix asphalt material production.
2. Allows for contractor ingenuity because the specifications are oriented toward the control and acceptance of the end products rather than the specifics of the process or method.
3. Allows the contractor to back haul, reduces handling, reprocessing costs, energy, aggregate and environmental problems associated with mining, etc.
4. Reduces the depletion of a contractor's aggregate reserves.
5. Agency possession or ownership of removed materials is discouraged so that private enterprise is not restricted for the most effective utilization of these materials.
6. Allows inventorying material until such time sufficient quantity is available to economically hot-mix recycle.



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QUESTIONS AND ANSWERS

1. What is Reclaimed Asphalt Pavement?

Reclaimed Asphalt Pavement (RAP) is an asphalt pavement material that is recycled. For this spec, the RAP is mixed with virgin aggregates and binder to make new asphalt paving material. RAP is produced in several ways. RAP is produced when asphalt is milled from Colorado roadways before overlays are applied. RAP can also be acquired from removed or reconstructed asphalt roadways. The old asphalt material can be crushed and screened for use in future pavements.

In 1999, a CDOT and Industry task force developed a specification allowing the use of up to 25% RAP in CDOT mixes. Prior to this specification, CDOT asphalt mixes could not contain more than 15% RAP. This new specification requires the contractor to have an approved Quality Control (QC) Plan that details how the RAP will be processed and controlled. The QC Plan must address the processing and stockpile operation, control of the RAP AC content, and control of the RAP gradation.

CAPA and CDOT are currently working together to improve the RAP specification and evaluate innovation in RAP usage. These changes are expected to increase RAP usage in Colorado.

2. Why use RAP?

Reclaiming asphalt material offers financial savings in material costs, energy costs, and total job costs. There is an additional benefit in that our natural resources are preserved, as is the environment.

Studies have shown that mixes with RAP produce equivalent or improved performance to conventional asphalt mixes. Mixtures with RAP can be expected to age at a slower rate than mixes with virgin materials. This is attributed to the binder in the RAP having all ready undergone oxidation, so the rate of hardening of the RAP mix is slowed.

3. Is there a limit on the percentage of RAP that should be used in mixes?

Colorado Asphalt Pavement Association (CAPA), the Asphalt Institute and the National Asphalt Pavement Association (NAPA) strongly endorse the use of RAP in hot mix asphalt mixtures. RAP has a history of positive performance. Regarding limiting the RAP content, that is the decision of the specifying agency or owner. Almost all of the state departments of transportation now allow the use of RAP and many are routinely using mixes with 20% to 25% RAP or more.