

Research Summary

Recycled Asphalt Shingles

Recycled Asphalt Shingles (RAS) are an environmentally friendly alternative to using 100% virgin asphalt binder. Asphalt binder is an expensive and limited resource whereas asphalt shingles typically end up in a landfill. While many states have adopted using RAS waste from the shingle production process, MoDOT led a Pooled Fund Study TPF 5(213) on Performance of Recycled Asphalt Shingles in Hot Mix Asphalt to look at using “tear-off shingles,” or shingles that have been removed from a roof. Study partners included FHWA and seven other states (CA, CO, IA, IL, IN, MN, and WI). The Pooled Fund study concluded at the end of 2013 and was completed by Iowa State University.

Each year approximately 10 million tons of post-consumer shingles are placed in landfills in the United States. These shingles contain 20% to 30% asphalt by weight which can be used to replace virgin asphalt binder, in turn decreasing pavement costs and reducing the burden on landfill space. Utilizing tear-off shingles allows the DOTs to save money on constructing pavements, while at the same time positively impacting the environment and increasing rutting resistance. Historically, as the cost of virgin binder continues to increase, utilizing RAP and RAS helps agencies offset rising costs.



As part of the study, each state highway agency proposed a unique field demonstration project that investigated different aspects of asphalt mixes containing RAS specific to their state needs. The results showed that RAS can be successfully processed and incorporated into asphalt mixtures that meet state agency requirements for asphalt content, volumetrics and density. The tear-off shingles also contain fibers that can help reduce rutting.

Two years after construction, field studies were performed at the test sites and found no signs of rutting, wheel path fatigue cracking or thermal cracking. Some transverse reflective cracking from underlying jointed concrete pavement was identified in a few locations.





Stockpile of Pre-Processed Post-Consumer Asphalt Shingles

The research project found that states can successfully use tear-off shingles in asphalt mix designs.

For more information on this project, please visit the following links.

Missouri's Demonstration Project

<http://www.intrans.iastate.edu/tpf-5-213/states/?state=missouri>

Transportation Pooled Fund TPF 5(213)

<http://www.pooledfund.org/Details/Study/441>.

*In 2013, MoDOT
incorporated **62,500 tons**
of recycled shingles into
new asphalt pavements.*

Project Information

PROJECT NAME: Performance of Recycled Asphalt Shingles in Hot Mix Asphalt

PROJECT START/END DATE: October 1, 2009-April 30, 2013

LEAD CONTRACTOR: Iowa State University

PRINCIPAL INVESTIGATOR: R. Christopher Williams

REPORT NAME: *Performance of Recycled Asphalt Shingles In Hot Mix Asphalt*

REPORT NUMBER: [TPF 5\(213\)](#)

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