



Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage 2018

Information Series 138 — Executive Summary



9th Annual Survey

Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage: 2018

Executive Summary

The results of the asphalt pavement industry survey for the 2018 construction season show that asphalt mixture producers have a strong record of employing sustainable practices and continue to increase their use of recycled materials and warm-mix asphalt (WMA). The use of recycled materials, particularly reclaimed asphalt pavement (RAP) and reclaimed asphalt shingles (RAS), conserves raw materials and reduces overall asphalt mixture costs, allowing road owners to achieve more roadway maintenance and construction activities within limited budgets. WMA technologies can improve compaction at reduced temperatures, ensuring pavement performance and long life; conserve energy; reduce emissions from production and paving operations; and improve conditions for workers.

The objective of this survey, first conducted for the 2009 and 2010 construction seasons, was to quantify the use of recycled materials, primarily RAP and RAS, as well as the use of WMA technologies by the asphalt pavement industry. For the 2018 construction season, the National Asphalt Pavement Association (NAPA) conducted a voluntary survey of asphalt mixture producers across the United States on tons produced, along with a survey of state asphalt pavement associations (SAPAs) regarding total tons of asphalt pavement mixture produced in their state.

Asphalt mixture producers from 49 states, two U.S. territories, and the District of Columbia completed the 2018 construction season survey. A total of 272 companies with 1,328 production plants were represented in the survey.

A degree of fluctuation in year-to-year comparisons of data is influenced by which companies responded to the 2018 construction season survey versus prior year survey respondents. Respondents to the 2018 construction season survey increased by 35 companies compared to 2017. Of the companies responding to the 2018 survey, 82 did not respond to the 2017 construction season survey; also, 48 companies that did respond to the 2017 survey did not participate in the 2018 survey.

The following are highlights of the survey of usage during the 2018 construction season:

Reclaimed Asphalt Pavement

- Asphalt mixture producers remain the country's most diligent recyclers, with more than 97 percent of asphalt mixture reclaimed from old asphalt pavements being put back to use in new pavements and the remaining 3 percent being used in other civil engineering applications, such as unbound aggregate bases.
- The total estimated tons of RAP used in asphalt mixtures was 82.2 million tons in 2018. This is a nearly 7.9 percent increase from the 2017 construction season, and represents a nearly 46.8 percent increase from the total estimated tons of RAP used in 2009. Since 2009, total asphalt mixture tonnage has increased only 8.6 percent.
- The percentage of producers reporting use of RAP was at 97.4 percent of respondents, down 0.6 percent from 2017. Three producers reported landfilling a minor amount (12,120 tons, or 0.012 percent) of RAP during 2018.
- RAP usage during the 2018 construction season is estimated to have reduced the need for 4.1 million tons (23 million barrels) of asphalt binder and more than 78 million tons of aggregate with a total estimated value of more than \$2.8 billion.
- The total estimated amount of RAP stockpiled nationwide at the end of the 2018 construction season was about 110.3 million tons.

- Fractionated RAP represents about 24 percent of RAP use nationwide, and the tons of RAP mixtures produced using softer binders are estimated at 20 percent while tons produced using recycling agents is estimated at 4 percent.
- Reclaiming 101.1 million tons of RAP for future use saved about 61.4 million cubic yards of landfill space, and more than \$4.5 billion in gate fees for disposal in landfills.

Reclaimed Asphalt Shingles

- The total estimated tons of RAS used in asphalt mixtures rebounded 11.6 percent to an estimated 1.05 million tons in 2018. This reversed much of the drop in the use of RAS reported during the 2017 construction season, but is still about 45 percent below the 2014 peak level of reported usage.
- The total estimated amount of RAS stockpiled nationwide at the end of the 2018 construction season was about 1.4 million tons, a slight decrease from 2017.
- RAS usage during the 2018 construction season is estimated to have reduced the need for 210,600 tons (nearly 1.2 million barrels) of asphalt binder and about 527,000 tons of aggregate with a total estimated value of more than \$107 million.
- Reclaiming 890,000 tons of unprocessed RAS for future use saved about 540,000 cubic yards of landfill space, and more than \$49 million in gate fees for disposal in landfills.

Other Findings

- The use of softer binders and recycling agents with mixtures incorporating RAP and RAS was reported nationwide. There was little correlation between the level of RAP and RAS used and the use of softer binders and/or recycling agents.
- Other recycled materials commonly reported as being used in asphalt mixtures during the 2018 construction season were recycled tire rubber, blast furnace slag, steel slag, and cellulose fibers. Recycled materials less commonly reported as being used in asphalt mixtures included fly ash, foundry sand, carbon fibers, crushed concrete aggregates, and start-up waste.
- Nearly 1.8 million tons of other recycled materials was reported as being used in nearly 12.3 million tons of asphalt mixtures by 79 companies in 31 states during the 2018 construction season.

Warm-Mix Asphalt Technologies

- The estimated total tonnage of asphalt pavement mixtures produced with WMA technologies for the 2018 construction season was 157.7 million tons. This was a 7 percent increase from the estimated 147.4 million tons of WMA in 2017, driven largely by increased WMA tonnage in the Other Agency sector, but changes to the reporting of WMA utilization at reduced temperatures from 2017 to 2018 may have also been a factor.
- Mixtures produced with WMA technologies made up 40.5 percent of the total estimated asphalt mixture market in 2018. About 50.5 percent (79.5 million tons) of these mixtures were produced with a temperature reduction of at least 10°F.
- Production plant foaming, representing nearly 63 percent of the market in 2018, remains the most commonly used warm-mix technology, despite decreasing about 1.5 percent since the 2017 construction season.
- Chemical additive technologies accounted for a little more than 34 percent of the market in 2018, an increase of 6.5 percent from their use in the 2017 construction season.
- A gradual increase in the use of chemical additive WMA technologies and a decrease in plant-based foaming technologies been seen in the survey since 2011.
- About 68 percent of survey respondents produce asphalt with WMA technologies; 185 producers in 44 states, reported using WMA technologies.