

Asphalt Pavement Industry Survey on

Recycled Materials and Warm-Mix Asphalt Usage 2017

Information Series 138 — Executive Summary



Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage: 2017

Executive Summary

The results of the asphalt pavement industry survey for the 2017 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 production of WMA by the asphalt pavement industry. For the 2017 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. A degree of fluctuation in year-to-year comparisons of data is influenced by which companies responded to the 2017 construction season survey versus prior year survey respondents.

Asphalt mixture producers from all 50 states completed the 2017 construction season survey. A total of 238 companies with 1,158 production plants were represented in the survey.

The following are highlights of the survey of usage during the 2017 construction season:

Reclaimed Asphalt Pavement

- Asphalt mixture producers remain the country's most diligent recyclers, with more than 99 percent of asphalt mixture reclaimed from old asphalt pavements being put back to use in new pavements.
- The total estimated tons of RAP used in asphalt mixtures was 76.2 million tons in 2017. This is a 0.91 percent decrease from the 2016 construction season, but represents a greater than 36 percent increase from the total estimated tons of RAP used in 2009. During the same time frame, total asphalt mixture tonnage increased only 5.9 percent.
- The percentage of producers reporting use of RAP remained at 98 percent of respondents, as it was in 2016. Four producers reported landfilling a small amount (9,595 tons total) of RAP during 2017.
- RAP usage during the 2017 construction season is estimated to have reduced the need for 3.8 million tons (21.5 million barrels) of asphalt binder and more than 72 million tons of aggregate, with a total estimated value of more than \$2.1 billion.
- The total estimated amount of RAP stockpiled nationwide at the end of the 2017 construction season was about 102.1 million tons.
- Fractionated RAP represents about 23 percent of RAP use nationwide, and the tons of RAP mixtures produced using softer binders are estimated at 18 percent while tons produced using recycling agents is estimated at 4 percent.

• Reclaiming 79.9 million tons of RAP for future use saved about 48.6 million cubic yards of landfill space.

Reclaimed Asphalt Shingles

- The total estimated tons of RAS used in asphalt mixtures decreased 32 percent to an estimated 944,000 tons in 2017. This downward trend in the use of RAS has persisted since 2015; still, the use of RAS in the 2017 construction season was 34 percent above the estimated 701,000 tons used in asphalt mixtures in 2009.
- The total estimated amount of RAS stockpiled nationwide at the end of the 2017 construction season was nearly 1.39 million tons.
- RAS usage during the 2017 construction season is estimated to have reduced the need for 188,000 tons (1.0 million barrels) of asphalt binder and nearly 472,000 tons of aggregate, with an estimated value of more than \$74 million.

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 used and the use of softer binders and/or recycling agents, but their use with RAS was more consistent.
- The most commonly reported factor limiting utilization of RAP and RAS was specification limits.
- Other recycled materials commonly reported as being used in asphalt mixtures during the 2017 construction season were ground tire rubber, blast furnace slag, steel slag, and cellulose fibers. Recycled materials less commonly reported as being used in asphalt mixtures included fly ash and foundry sand.
- Nearly 1.5 million tons of other recycled materials was reported as being used in nearly 7.5 million tons of asphalt mixtures by 58 companies in 26 states during the 2017 construction season.

Warm-Mix Asphalt

- The estimated total tonnage of asphalt pavement mixtures produced at reduced temperatures with WMA technologies for the 2017 construction season was 147.4 million tons. This was a 26 percent increase from the estimated 116.8 million tons of WMA in 2016, driven largely by increased WMA tonnage in the Commercial & Residential and the DOT sectors.
- WMA made up 38.9 percent of the total estimated asphalt mixture market in 2017.
- Production plant foaming, representing nearly 65 percent of the market in 2017, remains the most commonly used warm-mix technology, despite decreasing about 15.6 percent since the 2016 construction season.
- Chemical additive technologies accounted for a little more than 32 percent of the market in 2017, an increase of 52.4 percent from their use in the 2016 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. 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 66 percent of respondents who produce WMA, 107 producers in 44 states, reported also using WMA technologies at HMA temperatures. An estimated 26–32 percent of these companies' HMA tons were produced with production plant foaming, and 16–20 percent were produced with chemical additive technologies.