

# Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage: 2020

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## Executive Summary

The results of the asphalt pavement industry survey for the 2020 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 2020 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 50 states, and the District of Columbia completed the 2020 construction season survey. A total of 274 companies and 1,406 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 2020 construction season survey versus prior year survey respondents. Respondents to the 2020 construction season survey increased by 62 companies compared to 2019. Of the companies responding to the 2020 survey, 93 did not respond to the 2019 construction season survey.

The following are highlights of the survey of usage during the 2020 construction season:

### ***Reclaimed Asphalt Pavement***

- Asphalt mixture producers remain the country's most diligent recyclers, with more than 93 percent of asphalt mixture reclaimed from old asphalt pavements being put back to use in new pavements and the remaining 7 percent being used in other civil engineering applications, such as unbound aggregate bases.
- The total estimated tons of RAP used in asphalt mixtures was 87.0 million tons in 2020. This represents a 55.4 percent increase from the total estimated tons of RAP used in 2009. Since 2009, total asphalt mixture tonnage has increased only 13.8 percent.
- The percentage of producers reporting use of RAP was at 98.9 percent of respondents, up 1.2 percent from 2019. Three producers reported landfilling a minor amount (77,000 tons, or 0.016 percent) of RAP during 2020.
- RAP usage during the 2020 construction season is estimated to have reduced the need for 4.4 million tons (24 million barrels) of asphalt binder and more than 82 million tons of aggregate with a total estimated value of more than \$2.9 billion.
- The total estimated amount of RAP stockpiled nationwide at the end of the 2020 construction season was about 135 million tons.
- Fractionated RAP represents about 26 percent of RAP use nationwide, and the tons of RAP mixtures produced using softer binders are estimated at 23 percent while tons produced using recycling agents is estimated at 6 percent.

- Reclaiming 96 million tons of RAP for future use saved about 58.4 million cubic yards of landfill space, and more than \$5.1 billion in gate fees for disposal in landfills.
- The use of RAP in new asphalt mixtures reduced greenhouse gas emissions in 2020 by 2.3 million metric tons of CO<sub>2e</sub>, which is equivalent to the annual emissions of 510,000 passenger vehicles

### ***Reclaimed Asphalt Shingles***

- The total estimated tons of RAS used in asphalt mixtures decreased 36 percent to an estimated 586,000 tons in 2020. This continues the decrease in the use of RAS reported during the 2019 construction season, with utilization at about 70 percent below the 2014 peak level of reported usage.
- The total estimated amount of RAS stockpiled nationwide at the end of the 2020 construction season was about 1.27 million tons, a 11.3 percent increase from 2019.
- RAS usage during the 2020 construction season is estimated to have reduced the need for 117,200 tons (more than 644,000 barrels) of asphalt binder and about 293,000 tons of aggregate with a total estimated value of more than \$59 million.
- Reclaiming 514,000 tons of unprocessed RAS for future use saved about 310,000 cubic yards of landfill space, and more than \$27 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 2020 construction season were recycled tire rubber, blast furnace slag, steel slag, cellulose fibers, and fly ash.
- More than 900,000 tons of other recycled materials was reported as being used in nearly 9.1 million tons of asphalt mixtures by 70 companies in 28 states during the 2020 construction season.

### ***Warm-Mix Asphalt Technologies***

- The estimated total tonnage of asphalt pavement mixtures produced with WMA technologies for the 2020 construction season was 186.4 million tons. This was a 13 percent increase from the estimated 164.5 million tons of WMA in 2019, driven by increased WMA tonnage in all sectors.
- Mixtures produced with WMA technologies made up 45.7 percent of the total estimated asphalt mixture market in 2020. About 49.9 percent (93.1 million tons) of these mixtures were produced with a temperature reduction of at least 10°F.
- Production plant foaming, representing 49 percent of the market in 2020, remains the most commonly used warm-mix technology, despite decreasing about 46.2 percent since its peak in the 2011 construction season.
- Chemical additive technologies accounted for a little more than 46 percent of the market in 2020, a slight decrease from their use (48 percent) in the 2019 construction season.
- About 67 percent of survey respondents produce asphalt with WMA technologies; 184 producers in 47 states reported using WMA technologies.
- The use of WMA technologies to produce asphalt mixture at reduced temperatures reduced greenhouse gas emissions in 2020 by 0.06 – 0.25 million metric tons of CO<sub>2e</sub>, which is equivalent to the annual emissions of 13,000 to 54,000 passenger vehicles.