OPERATIONAL TIPS:
THE ROAD FORWARD TO LOWER EMISSIONS AND HIGHER PROFITS

PAVING UNDER STOCKPILES PAYS OFF ENVIRONMENTALLY & ECONOMICALLY

The Road Forward
AsphaltPavement.org/Forward

Contractors are continuously searching for the latest technical innovations that will make their plants more efficient and cost-effective to operate. Governments and citizens, especially young people, want transparency, and are calling for companies to be greener and develop sustainability goals. With new industry goals centered around carbon neutrality in 2050, it is fortunate that increasing profitability and reducing emissions often go together.

~ 50%

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~ 10%

One of the most impactful asphalt plant efforts is reducing aggregate moisture, and one way to do this is to pave the stockpile area. According to Greg Renegar, President, Astec Industries, approximately 50% of the energy required to produce asphalt mixtures is to remove water. Reducing moisture by 1% can reduce fuel consumption by approximately 10%. In addition, a 1% moisture reduction can also increase production – by approximately 12%. Finally, a paved stockpile area will decrease aggregate loss by preventing aggregate contamination caused by stockpiled material being comingled with the underlying material. Unpaved stockpiles can result in a 3% aggregate loss per year.

Michigan Paving & Materials, A CRH Co., had leftover mix after conducting trial runs and decided to use it to pave under a portion of their stockpile area at their Grand North asphalt plant in Comstock Park, Mich. For comparison purposes, the company left unpaved a similar aggregate stockpile at a plant eight miles away in Grand Rapids. Since the plants are geographically close together, both experience the same levels of precipitation annually.

The fine aggregate in the stockpile that was paved accounts for about 20% (80,000 tons) of the plant's annual production. Michigan Paving measured the moisture in the stockpile from April through November 2020 and found that the percentage of moisture in the paved stockpile was 4.6% while the unpaved stockpile averaged 5.2% moisture. A detailed analysis found that the lower moisture content resulted in a 14,400 BTU per ton reduction in natural gas fuel usage, saving the company $0.13 per ton, for a total of $10,165 annually. Paving under the

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ASPHALT PERFORMANCE MANAGER | CRH AMERICAS MATERIALS INC.

stockpile cost the company $10,000, so within a year they'd recouped the stockpile paving expenditure.

From a carbon reduction standpoint, a 1% reduction in moisture equates to a global warming potential reduction of 1.1 kg CO2e per ton of mix produced. Michigan Paving's 0.6% reduction equates to a reduction of 0.6 kg of CO2e per ton. To put this in context, for a plant that produces 100,000 tons of mix per year, this modest reduction in fuel consumption would reduce GHG emissions by 60,000 kg CO2e/year. While these are not large reductions, HMA Manager John Peters of Michigan Paving stressed that these results were achieved by paving under just one aggregate stockpile – both the fuel-cost savings and emission reductions would be multiplied if more stockpiles at the plant were paved. Over multiple stockpiles and multiple years, the savings become significant.

If half the asphalt plants across the country paved under one stockpile, this would yield a reduction of more than 125,000 metric tonnes CO2e/yr. This is equivalent to the annual emissions of nearly 10,000 passenger vehicles, assuming annual emissions of 4.6 metric tonnes per vehicle (EPA, 2018).

Asphalt Performance Manager Shane Buchanan of CRH Americas Materials Inc. stated, "With the growing global conversation on lowering emissions, tied to our belief that climate stewardship is a part of corporate responsibility, reducing emissions through less energy consumption via stockpile paving provides considerable opportunity."

In this case, good environmental stewardship pays off in profitability. Paving under stockpiles is an easy way to decrease operating costs and carbon emissions. Learn more about proper stockpile maintenance and reducing emissions and costs with these resources:

MANAGEMENT OF AGGREGATE STOCKPILES

AGGREGATE MOISTURE MEASUREMENT

ENERGY CONSERVATION IN HOT-MIX ASPHALT PRODUCTION

EMERALD ECO-LABEL OPTIMIZER

This feature of the Environmental Product Declaration tool allows users to measure CO2e reduction and economic savings when aggregate moisture is reduced.

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