



Kansas LTAP Fact Sheet

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The Many Benefits of Warm Mix Asphalt

By Lisa Harris

You've heard of cold mix and warm mix. Now the advantages of both have been combined ... in warm mix. Here's information about why FHWA is promoting this technology and some examples of its use in Kansas.

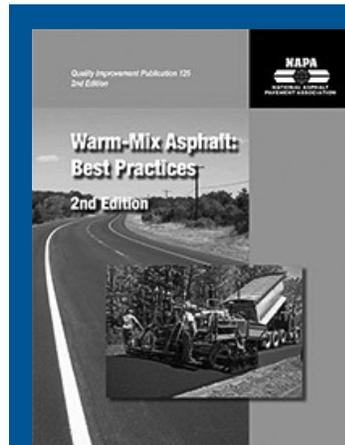
Warm Mix Asphalt (WMA) is the generic term for a variety of technologies that allow producers of Hot Mix Asphalt (HMA) pavement material to lower temperatures at which the material is mixed and placed on the road. It is a proven technology that can:

- Reduce paving costs.
- Extend the paving season.
- Improve asphalt compaction.
- Allow asphalt mix to be hauled longer distances.
- Improve working conditions by reducing exposure to fuel emissions, fumes, and heat.

Lower temperatures, shorter project times, lower costs

WMA production methods use temperatures 30 to 120 degrees Fahrenheit lower than traditional hot-mix asphalt. Because less energy is needed to heat the asphalt mix, less fuel is needed to produce WMA. Fuel consumption during WMA manufacturing is typically reduced by 20 percent.

In paving projects, the greater the temperature difference between the asphalt mix and the outside temperature, the faster the mix cools. Since faster cooling effects durability, cold ambient temperatures adversely



Learn More About Warm Mix

The National Asphalt Paving Association has an excellent guide on warm mix asphalt. It is reasonably priced at \$35 for governments and \$25 for NAPA members. It contains detailed information on the different technologies and additives available for producing warm mix and examples of their successful use on projects.

You can order this publication at NAPA's warm mix website at <http://www.warmmixasphalt.com>.

affect hot-mix asphalt. In contrast, WMA cools more slowly allowing WMA to be used successfully in lower temperatures. As a result, WMA extends the paving season. It also makes paving more feasible during cooler nighttime temperatures.

Warm mix asphalt saves time and money in other ways, too. Because WMA makes compaction easier, cost savings are achieved by reducing time and labor compacting the mix. Lower temperatures also permit more asphalt mix to be hauled for longer distances, reducing transportation costs with fewer trips back and forth to the plant.

How does it work? WMA technologies reduce the viscosity (the thickness) of the asphalt binder so that asphalt aggregates can be coated at lower temperatures. The key is the addition of additives (water-based, organic, chemical, or hybrids) to the asphalt mix. The additives allow the asphalt binders and asphalt aggregates to be mixed at the lower temperatures.

Reducing the viscosity also makes the mixture easier to manipulate and compact at a lower temperature.

Good for workers and the environment

Working conditions are much healthier with WMA. Both at the production plant and on the construction site, workers inhale far less smoke and dust, and the working environment is not as hot. Comments from workers have been highly positive, per FHWA.

WMA also produces fewer emissions, making it possible for paving to be done on some days in urban areas when the air quality would typically put a halt to paving.

Better compaction, better performance

Proper compaction is critical to well-performing pavements. One indication of proper compaction is density. KDOT and federally-funded projects have



density requirements as part of their quality control. WMA can help achieve proper density and improve pavement performance.

WMA has been used successfully in a range of pavement thicknesses. It is durable enough to withstand high traffic demands. According to FHWA, Warm Mix Asphalt has been used in all types of asphalt concrete: dense-graded, stone matrix, porous, and mastic asphalt. Multiple WMA technologies are available, so the choice can be adapted to the temperatures and materials required.

Warm Mix Asphalt has been used successfully in Europe for more than 10 years. In the United States, WMA projects are now in more than 40 States including Kansas.

WMA use is growing in Kansas

Mike Crow, executive director of the Kansas Asphalt Paving Association, said paving contractors in Kansas are latching on to the Warm Mix technology. He thinks that several years down the road, traditional Hot Mix will be a thing of the past.

To date, the two WMA technologies used most frequently by Kansas contractors are 1) a foaming method that employs water, and 2) a method using the chemical additive Evotherm™. For this method, an asphalt emulsion that contains Evotherm is used in place of the traditional asphalt binder. The emulsion is mixed with the aggregate in the HMA plant.

The foaming method with water is popular, said Crow, because there are no extra costs for materials beyond the initial cost for the foaming equipment. WMA methods that use additives have the cost of the additive with each job. However, significantly lower asphalt temperatures can be achieved with



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Paving crews are enthusiastic about Warm Mix Asphalt. Less smoke and less heat — better than at the above Hot Mix project.



chemical additives as compared with water, so the cost savings resulting from cooler temperatures can help recover the cost of the additive.

The manufacturer of Evotherm reports that their product improves aggregate coating, workability, adhesion, and compaction with no change in materials or job mix formula required.

Contractors are using WMA for projects in several KDOT districts. According to Shad Lohman of KDOT's District 3, contractors are now using WMA exclusively on KDOT projects in his district. KDOT does not specify the use of WMA, but it is an option contractors can choose. Most of the contractors use the foaming method and one contractor, Hall Brothers, uses Evotherm. Lohman said the WMA pavements are performing well, and that KDOT has been paying out a higher percentage of bonuses to the contractors

for meeting compaction requirements for their warm mix pavements. That indicates better long-term performance for KDOT's investment.

More information

For more information on Warm Mix, visit the National Asphalt Paving Association website at <http://www.warmasphalt.com>. You might want to also purchase their Best Practices guidebook on the topic (see above).

The Federal Highway Administration also has a good Web page of information at <http://www.fhwa.dot.gov/pavement/asphalt/wma.cfm>. Like the Safety Edge, WMA is a technology promoted by the FHWA's Every Day Counts initiative. ■

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Sources:

- FHWA. Warm Mix Asphalt Introduction. <http://www.fhwa.dot.gov/everydaycounts/technology/asphalt/intro.cfm>
- Kansas Asphalt Paving Association. Warm Mix Asphalt. <http://www.ksasphalt.com/Warmix.html>
- Phone interviews with Shad Lohman, KDOT, and Mike Crow, KAPA.