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Civil Environmental Engineering

Paving Quality and Infrared Imaging

Joe Mahoney

This research was mainly funded by the Washington State DOT to address the problem of cyclic density, specifically the problem of lack of consistent density. Lack of density results in early deterioration of pavement surface which is manifested by increased cracking and roughness. The problem stems from cooling that occurs to the hot mix in transit to the job site. Typically, a mix placed on the road is about 280°F (138 °C). A “crust” forms in the truck bed in transit that can easily reduce the mix mixture to less than 150°F (66 °C), passing through the paving machine and precludes adequate compaction.

Two separate studies were performed that (1) identified the problem, and (2) quantified its severity, and (3) recommended changes to construction practices. Infrared imaging was used to survey projects under construction and this work was the first to use this technology in paving. Now, use of infrared imaging is commonly done through the US.



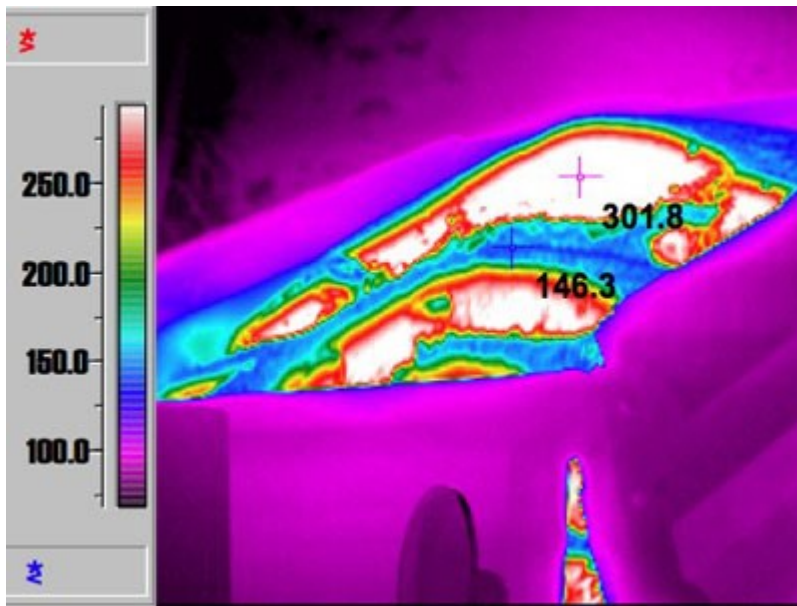
Cyclic Density: The pavement distress that occurs when low temperature HMA is compacted.



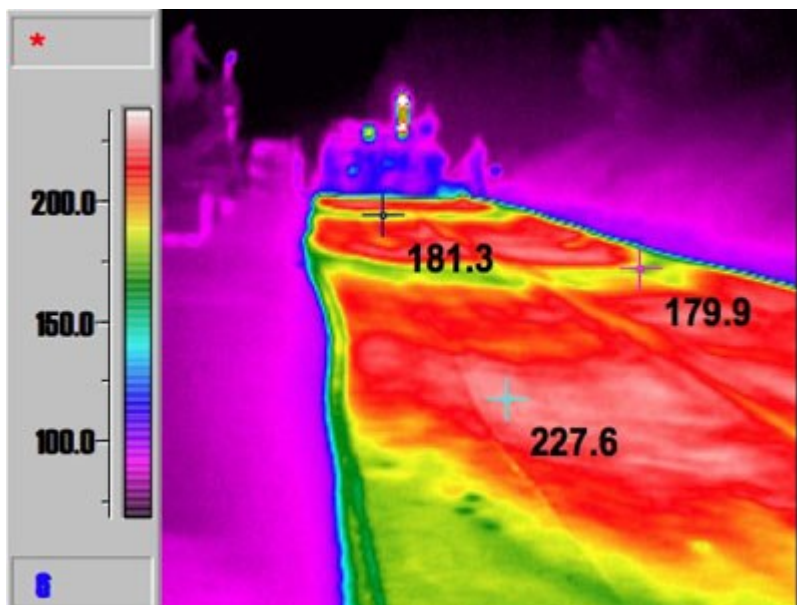
Night Paving: Paving at night can contribute to the cyclic density problem.

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IR Truck Temperatures: The problem starts with cooling of the HMA in the truck in transit to the job site.



IR Paving Temperatures: An infrared image shows where the cooler (undesirable) mix is located behind a paving machine.

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