

Product Material Investigation and Evaluation of Jay's Majic Mud for Use in KDOT Construction and Maintenance Applications

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Introduction

KDOT currently uses a variety of thin bonded overlay systems to prolong the life of bridge decks in Kansas. These vary in both thickness and material type from thin ¼ in. bonded polymer overlays to common 1.5 in. silica fume concrete overlays. Jay's Majic Mud was submitted as a potential new material product that could serve as a cost-effective alternative to our conventional materials, offering KDOT benefits both in its ease of use by light contracting or maintenance forces, as well as potential improved product performance.

Project Description

Evaluate the performance of the product and potential usefulness for KDOT.

Project Results

After conducting three phases of research on Jay's Majic Mud (JMM) material, the following conclusions and recommendations are summarized below:

- ◆ Mixing JMM at the recommended water/cement ratio of 0.16 is critical to obtaining desired strength results. Any increase in w/c ratio, will reduce strength. However, even when mixed at the optimum w/c ratio of 0.16, JMM does not meet the strength requirements to be prequalified by KDOT as a rapid hardening cement. It also does not meet the physical requirements to be prequalified as a blended cement (Type IP).
- ◆ JMM lacks the low permeability required to be used as a KDOT bridge overlay material when mixed neat. Therefore, JMM cannot be used in its current pre-packaged form as a standalone bridge overlay material according to KDOT's Standard Specifications.
- ◆ The long-term performance of a JMM overlay, as with any thin bonded overlay, is directly related to the condition of the substrate it is placed on; therefore, careful substrate preparation and/or repair of the substrate before placement is critical. Any existing delaminated concrete, areas of heavy cracking, or other damaged substrate locations, should be fixed by partial or

full depth patching prior to placement of the JMM thin overlay system. If not repaired, those areas of distress will reflect up through the JMM overlay. Heavy map cracks should be epoxy sealed before the placement of the JMM thin system to help arrest the map cracking.

Jay's Majic Mud (JMM) was investigated for possible use as either a rapid-set patching material or as a potential new alternative, novel, thin-bonded overlay system. In its current pre-packaged form, JMM does not meet the requirements for rapid-set material use, nor does it meet the permeability requirements needed for use as a standalone (neat) mix. JMM performs well as a resurfacing material for light industrial and residential applications, and the novel placement method Jay has developed by use of power troweling each layer works well for these applications. However, this material in its current mix design form does not meet the requirements for use by KDOT for use in bridge deck patching, pavement patching, or as a thin-bonded bridge overlay system.

Project Information

For information on this report, please contact Dan L. Wadley, P.E., Materials and Research Center, 2300 SW Van Buren St., Topeka, KS 66611, 785-291-3845.

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