The effectiveness of a hot-mix asphalt (HMA) overlay is largely dependent on the quality of its bond to the existing surface. A good bond will evenly disperse traffic loads from one layer into the next, while a poor bond will concentrate stresses within relatively thin upper layer. This condition will expedite premature distresses like fatigue cracking, slippage cracking and delamination. All of these problems are then exacerbated by moisture accumulating at the bonded interface. Non-tracking tacks, recently introduced to the paving industry, bond asphalt layers together while avoiding the tracking problems under traffic associated with traditional tacks. While traditional tack has been well studied, these new products require further evaluation. Of particular concern is the loss of adhesion between exposed aggregate on the existing road and asphalt binder.

The objectives of this study were, therefore, to characterize existing non-tracking products, and measure the bonding potential to different types of aggregate from a chemo-mechanical perspective. Five non-tracking tacks and one conventional tack were characterized according to the rheological properties of the emulsion residues and base binder. The bonding potential between the tack and different aggregate substrates was measured with a pneumatic adhesion tester.

Results show significant differences in bond strength developed between various aggregates and the control binder or emulsion residue at different testing temperatures. Control binder and emulsion residues at different testing temperatures were also found to develop different bond strength with any given aggregate. The results show that control binder and emulsion residues have different degrees of sensitivity to aggregate type in terms of the bond strength.