Test conducted by Christopher Barnes, Ph.D., P. Eng., of Wood Environment & Infrastructure Solutions with Halifax Harbour Bridges and monitored by Dexter Construction.

PROBLEM

The team required the ability to measure compaction accurately in the 2-inch thick lift of asphalt concrete that was planned to be places on an orthotropic steel deck. Nuclear density gauges were ineffective due to the excess backscatter caused by the dense steel plate. The PaveScan was selected to monitor compaction since the surface dielectric was unlikely to be affected by the orthotropic steel deck plate.

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PAVESCAN RDM SYSTEM DEMONSTRATION ON MACKAY BRIDGE, HALIFAX, NS

METHODOLOGY

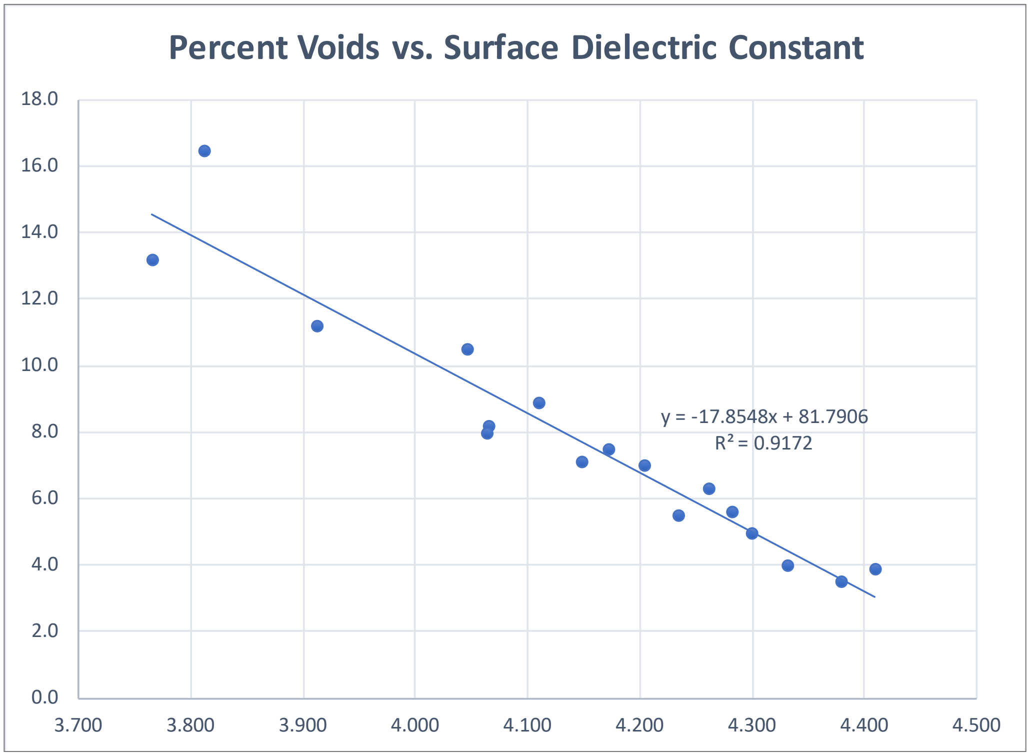
Prior to quality assurance, the dielectric values were calibrated by conducting a paving trial. The proposed asphalt mix was placed and compacted on thick steel plates to simulate construction on the orthotropic steel deck. Compaction of varying levels were achieved by reducing the number of roller passes along the asphalt mat. Detailed PaveScan data and core samples were obtained within different compaction zones to develop a correlation over a wide range of dielectric and void content or bulk density values.

The results demonstrated that the PaveScan calibration is valid for the pavement placed on steel plates. The linear calibration function developed by Wood demonstrated that the predicted void content of the asphalt concrete was within +/- 0.5 % voids of the actual void content. These results were confirmed objectively using blind results from extra core specimens.

OUTCOME

The original 2-inch thick placement of a single lift of asphalt concrete was changed to the placement of a 1.5-inch thick base course layer to be overlaid with a 10/12 inch thick fine graded wearing course to better achieve pavement smoothness over raised steel splice places that connect to the orthotropic steel deck plate segments. The 1.5-inch base course was found to be too thin to permit accurate PaveScan measurements, which resulted in interference of the steel deck plate reflection with the asphalt surface reflection. With a total asphalt concrete thickness in excess of 2-inches, it is planned to conduct a PaveScan survey of the final surface course to generate a relative density map over the project.

Comparison of actual percent void of Hot Mix Asphalt Concrete Test Strip versus actual Dielectric results.



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