

LABORATORY STUDY OF AIR VOID AND TEMPERATURE EFFECTS ON HMA FRICTION PROPERTIES

Mohammad Ali Khasawneh *

Assistant Professor, Ohio Northern University (ONU), USA

Robert Y. Liang

Professor, The University of Akron, Akron, OH, USA

* ONU, Department of Civil Engineering, 525 S. main street, Ada, OH 45810, USA, Phone: (419) 772-2376, Email: m-khasawneh@onu.edu

ABSTRACT

Pavement surface must be maintained at an adequate level of friction to ensure safety of traveling vehicles. Both short-term and long-term variations in pavement texture with densification, temperature, moisture and traffic wear and polishing reduce the available friction and thereby increase the potential for skid related accidents. Although friction of pavement surface is viewed as surface characteristic, there are recent research findings indicating that air voids and temperature may also affect the measured friction values. This paper provides the results of a laboratory study aimed at evaluating the effect of air void and temperature changes on the measured frictional properties of the Hot Mix Asphalt (HMA) surface. The British Pendulum Tester (BPT) was used to measure the friction values of the HMA surfaces at different air voids and temperatures. Statistical analysis was performed to quantify the effect of air void and temperature changes on the measured BPN values. The statistical analysis and linear regression analysis of test results indicate that both air void and temperature exert significant effects on the BPN values based on the 0.05 significance level. A practical approach was proposed to allow for extrapolating the BPN or SN values measured at given air void and temperature to the values at other air void and temperature.

KEY WORDS: Air void, temperature, friction, HMA, BPN, SN, correlation.