SP&R Project RB13-016

Evaluation and Correlation of the Dynamic Friction Tester on Iowa Pavement Surfaces

Background

Frictional properties of pavement surface materials on roadway shoulders and highway ramps are of concern to state and county pavement engineers. Currently, the frictional properties of pavement surfaces are obtained via testing with a locked-wheel skid trailer. Operational limitations prohibit the use of a locked-wheel skid trailer on roadway shoulders and highway ramps. A Dynamic Friction Tester (DFT) can be used in these areas to test for frictional quality and characteristics of the pavement surface.

Evaluation Procedure

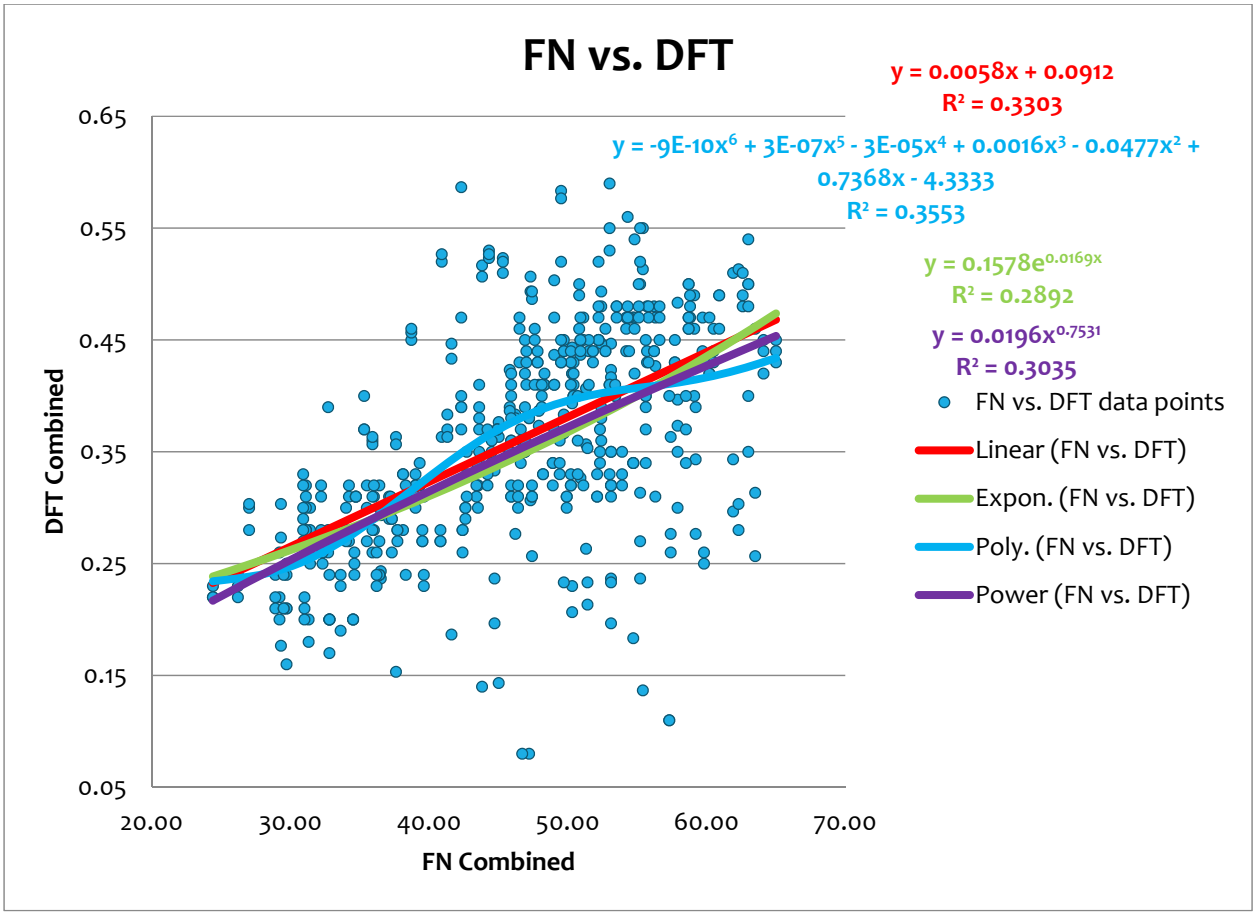
Side-by-side testing of the DFT and a locked-wheel skid trailer (ASTM E274) was conducted on a selection of Iowa pavement surfaces. A matrix of pavement types (asphalt, PCC) and surface friction values (low, moderate, high) were tested to establish a correlation relationship between the DFT friction values and the locked-wheel skid trailer friction values.

- Pavement candidates were established based on pavement type and current frictional characteristics.
- Pavement segments were tested at three speeds (50, 70, 80 km/hr) using the locked wheel trailer.
- Each pavement segment was then tested using the DFT at three testing speeds (50, 70, 80 km/hr rotational speeds) at the beginning, middle and end of the locked-wheel skid length. An average DFT friction value was established for each locked-wheel skid length and testing speed.
- A dataset of locked-wheel friction and DFT friction values was established and plotted for correlation.

Results

Viable correlation equations were established between the locked-wheel skid trailer and the Dynamic Friction Tester. This will enable testing to be conducted on areas previously beyond the capabilities of the locked-wheel skid trailer (e.g. pavement shoulders, highway ramps). Correlation equations are shown in the attached plot.

Seasonal variations of the frictional characteristics of the matrix of pavement surfaces was deemed beyond the capabilities of this study effort. Sound intensity studies of the pavement surfaces was deemed beyond the capabilities of this study effort as well.



Recommendations and Implementation

Study results show a viable correlational relationship between the locked-wheel skid trailer and the DFT. This relationship is quantified best in the linear equation $y = 0.0058x + 0.0912$.

This correlational relationship can be utilized to provide investigators and engineers with frictional information with which they are familiar (e.g. locked-wheel Friction Numbers) in areas previously not testable using ASTM E274 methods.

It is recommended that future studies of this same dataset be broken down by individual pavement type (HMA, PCC) for further analysis of the correlational relationship between ASTM E274 locked-wheel skid units and the Dynamic Friction Tester.