EXECUTIVE SUMMARY

Structural evaluation can be very useful at the network level for project prioritization purposes. In the project priority ranking procedure of the Kansas Department of Transportation (KDOT), a pavement rating attribute, Pavement Structural Evaluation (PSE), is used. These ratings are subjective and based on the condition of the pavement as indicated by the visual distresses and maintenance histories and the ability of the section to provide an adequate surface for the prevailing traffic. PSE is expected to be an indicator of the structural deficiency of the pavement sections. However, since KDOT does not collect any deflection data at the network level, the PSE computation process does not directly take into account any structural evaluation. This study outlines an approach based on the classical multiple regression analysis resulting in a better estimation of the PSE values using the results from the Falling Weight Deflectometer (FWD) tests and network-level distress survey.

The regression models proposed in this study predict the *decrease* in PSE values by taking into account the FWD data, age, thickness, and distress levels of the pavements, and very closely approximate the current PSE ratings obtained at the district level. FWD data on approximately 20% of the KDOT network is needed for network level structural evaluation. This translates into 750 lane-miles of FWD testing per year. Three FWD tests per mile are recommended for the network-level evaluation. This testing would also be necessary for using/updating the models developed in this study. The *decrease* in the structural number values obtained from the models developed in this study was about 33% higher than the KDOT design assumption.

A parallel study at Kansas State University used the Bayesian Regression methodology developed by the Canadian Strategic Highway Research Program. The Bayesian regression models developed are very similar in form to the classical regression models and yielded statistically similar results when tested on a different set of pavements. However, the Bayesian regression models appeared to give slightly better results for some pavements during testing.