## Evaluating the Suitability and Performance of Dynamic Modulus Predictive Models for North Dakota's Asphalt Mixtures

Authors : Duncan Oteki, Andebut Yeneneh, Daba Gedafa, Nabil Suleiman

Abstract : Most agencies lack the equipment required to measure the dynamic modulus ( $|E^*|$ ) of asphalt mixtures, necessitating the need to use predictive models. This study compared measured  $|E^*|$  values for nine North Dakota asphalt mixes using the original Witczak, modified Witczak, and Hirsch models. The influence of temperature on the  $|E^*|$  models was investigated, and Pavement ME simulations were conducted using measured  $|E^*|$  and predictions from the most accurate  $|E^*|$  model. The results revealed that the original Witczak model yielded the lowest Se/Sy and highest R<sup>2</sup> values, indicating the lowest bias and highest accuracy, while the poorest overall performance was exhibited by the Hirsch model. Using predicted  $|E^*|$  as inputs in the Pavement ME generated conservative distress predictions compared to using measured  $|E^*|$ . The original Witczak model was recommended for predicting  $|E^*|$  for low-reliability pavements in North Dakota.

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Keywords : asphalt mixture, binder, dynamic modulus, MEPDG, pavement ME, performance, prediction

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