

Project Description:

The objective of this research is to develop the calibration procedure for the NCHRP design guide (M-E PDG) models for both flexible and rigid pavement structures for this region and to assist the state highway agencies (KS and NY) in the implementation of the new Guide for pavement design and surface selection practices.

Progress this Quarter (includes meetings, work plan status, contract status, significant progress, etc.):

Design tables for all eleven regions of NYSDOT have been developed based on runs of the MEPDG software calibrated for the NE region of the United States and with material, climatic, traffic and pavement structure data specific for each region. These tables were submitted to the NYSDOT project monitor for review. It was found that the design solutions compare well with those obtained by the current design method used by NYSDOT. At medium traffic volume, the design solutions are very comparable to those included in the NYSDOT Comprehensive Pavement Design Manual. The work this quarter has concentrated on expanding design tables developed in the previous quarter by considering comparative construction costs.

Anticipated work next quarter:

The evaluation of the revised design tables will also be conducted. The pavement distress models will be calibrated for the AASHTOWare Pavement ME Design software and a new set of design tables will be obtained. The traffic data collected in 2013 will be processed, and the inputs needed by the MEPDG software will be obtained.

Significant Results:

The research efforts to date were concentrated on the development of the library of material characterization data for typical pavement materials and the identification of pavement test sections for which performance data may be available. The survey of literature has been conducted to identify existing material characterization data and pavement performance data collected already by the highway agencies and reported in internal documents.

The testing program for measuring the dynamic resilient modulus of typical asphalt concrete mixes and the binder shear modulus and phase angle is under way. Testing has been performed on more than 15 HMA mixes. For all mixes tested, the measured dynamic moduli were compared with the moduli predicted by the Witczak equation and by the Hirsch model. The comparison revealed that, for all mixes, the measured moduli were 50 to 100 percents higher than the moduli predicted by the Witczak Equation. The Hirsch model severely under-predicted the dynamic modulus.

The TrafLoad software has been used for axle load spectra extraction for the weight and classification stations that continuously recorded data for at least twelve continuous months, seven consecutive days in each month. The traffic data collected in 2004, 2005, 2006, 2007, 2008, 2009, 2010 and 2011 has been processed for all stations that had sufficient data.

A major new task has been added to the research plan. The objective is to develop a pavement design procedure for flexible pavement structures based on the MEPDG that the local environment, materials, construction practices, soils and maintenance needs and to assist the NYSDOT pavement design personnel in the implementation of the Procedure in to the pavement design practice. The calibration of MEPDG for the NE region of the United States was done using the data recorded on seventeen LTPP GPS-1 and GPS-2 sections. The current work is concentrated on performing runs with the calibrated MEPDG model for pavement design scenarios specific to each of the eleven NYSDOT regions; design tables have been developed for all eleven regions. The design tables will be further refined.

Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might the completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).

A major new task has been added to the research plan. The objective is to develop a pavement design procedure for flexible pavement structures based on the MEPDG that takes into account the local environment, materials, construction practices, and maintenance needs and to assist the NYSDOT pavement design personnel in the implementation of the procedure into the pavement design practice. The recently released software for the design of pavement structures is AASHTOWare Pavement ME Design.