TRAFFIC DATA INPUT FOR MECHANISTIC EMPIRICAL PAVEMENT DESIGN GUIDE (MEPDG) FOR TENNESSEE:
Project # RES2016-22

This study is conducted by the University of Tennessee at Chattanooga (UTC) on behalf of the Tennessee Department of Transportation (TDOT) to determine traffic input parameter to be used on the MEPDG design guide for the state of Tennessee.

INTRODUCTION

Traffic loading is one of the key inputs for the structural design and analysis of pavement structures using both the AASHTO Guide for Pavement Design (1993) and the Mechanistic-Empirical Pavement Design Guide (MEPDG). Traffic data provides necessary information in terms of traffic load distributions, intensity and number of repetitions. While the AASHTO design method use the number of axle load repetitions in the design/ analysis period in terms of equivalent singe axle loads (ESALS), the MEPDG on the contrary requires proper traffic characterization to determine traffic parameters required as inputs for the pavement design process. MEPDG was developed by the National Cooperative Highway Research Programs (NCHRP), Project 1-37A (2004), to provide pavement engineers with a more effective design guide that responds to changing design inputs, needs and the environment. The implementation of the MEPDG requires a large number of design inputs that characterizes traffic, pavement materials and climate. As detailed in Chapter 4 of the final report of NCHRP Project 1-37A, traffic data elements for the design guide include: Truck growth factors; Vehicle (trucks) class distribution; Base year truck-traffic volume; axle and wheel base configurations; Hourly distribution factors (HDF); Monthly distribution factors (MDF); Average number of axle groups per vehicles for FHWA vehicle class 4 – 13; and Normalized axle load spectra (NALS). To facilitate the design process, MEPDG provides a hierarchical approach for traffic data input requirements, known as level 1, 2 and 3 [NCHRP, 2004].

Level 1: Site specific data with very good knowledge of past and future traffic characteristics
Level 2: Regional or statewide data, with modest knowledge of past and future traffic characteristics.
Level 3: Poor or limited knowledge of past and future traffic characteristics.

UTC is studying Tennessee traffic data in order to provide TDOT with calibrated traffic data input parameters for MEPDG level 2.

SYNOPSIS OF THE PROBLEM BEING RESEARCHED

The implementation of MEPDG requires local calibration of different input parameters, mainly materials, climate and traffic. This project is geared at studying level 2 (Regional) traffic input parameters for the state of Tennessee. The scope of this research project includes:

- Extensive literature search in journals and reports from state DOT's that have already calibrated traffic input parameters.
- Obtaining, clustering and analyzing traffic data from TDOT using TrafLoad or related traffic analysis software.
- Determine MEPDG input parameters for FHWA class 4 – 13 truck traffic.
- Perform MEPDG sensitivity analysis using traffic input parameters to assess pavement response to traffic inputs.
- Submission of quarterly reports, recommended traffic input parameters and a detailed project final report.

PROJECT PROGRESS

Traffic data that meet MEPDG requirement has been obtained from LTPP sites. Data has been clustered, and traffic parameters for the state of Tennessee has been established. It is recommended that TDOT should establish new data collection sites that meet MEPDG specifications in order to update the parameters. The research team is currently conducting sensitivity analysis of the established parameters.