Traffic Data for Network-Level Pavement Structural Assessment and Performance Grade Asphalt Selection

Problem Description

TDOT usually estimates the equivalent single axle loads (ESALs) data at the project level based on traffic data from the radar detector. However, the traffic data which is extrapolated to determine ESALs are not available in a format supportive of network-level analysis. Roadway traffic varies from time, lane direction, and pavement type. Also, the truck traffic may change over time due to the growing populations, and economic conditions. Hence, the default values recommended by design guidelines may not be suitable for traffic networks in Tennessee. A more sophisticated method is needed to alter the traffic data-related factors in ESALs estimations and network-level analysis. In "TDOT Roadway Design Guideline", asphalt PG selection depends on route types as well as average daily traffic (ADT) instead of network-level ESALs for construction projects. A more detailed binder selection standard is needed with the establishment of a confident dataset of estimated ESALs to support a potential revision to TDOT PG grade selection standards at the network level.

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PROJECT SCHEDULE:
August 2023 to January 2025

Research Objectives

The objectives of the proposed study are to

- Evaluate TDOT's approach of estimating daily ESALs based on loop detectors.
- Develop a method to estimate network-level ESALs that may be added to ETRIMs traffic table for use to determine funding needs and future rehabilitation projects.
- Incorporate estimated network-level ESALs into TDOT's binder selection.

Potential Implementation and Expected Benefits

This proposed research will significantly benefit TDOT in the following aspects:

- Evaluation and adjustment of TDOT's method for ESALs estimation;
- A dataset for estimated accumulated ESALs at network-level and a tool to support the updates of the dataset;
- An approach of transferring collected traffic data to load spectrum for ME pavement design;
- A Binder selection map based on estimated ESALs at network level;
- A proposed revision to the TDOT PG binder selection standards;
- A final report that documents the results and findings, as well as research presentation

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