

Research Project Title *MEPDG Climate Data Input for the State of Tennessee*

Purpose of the Project

The objectives of the proposed research are to develop:

- To select candidate sites and collect relevant data for NARR and MERRA analyses.
- To use NARR and MERRA climate data sources to predict pavement performance on selected sites with different pavement structures, materials and traffic levels.
- To analyze, compare and contrast performance (distresses) predicted by using NARR and MERRA climate data sources.
- To establish Level 1 climate data source for design of Tennessee pavements
- Develop procedure or framework for selecting climate data source (NARR or MERRA).

Scope and Significance

The scope of this project includes:

- 1) Extensive literature search in journals and reports from state DOTs that have already calibrated climate inputs data.
- 2) Use NCHRP Project 1-37A Part 2 Chapter 3 report and AASHTOWare PMED for guidance and analysis.
- 3) With help of TDOT select candidate sites for the analysis, that have complete PMED input data to include pavement structure, material data, and traffic data.
- 4) Collect, organize and clean all the relevant data required for the analysis and prediction for each site.
- 5) Analyses, compare and contrast the suitability of NARR and MERRA results for the state of Tennessee in terms of predicted distresses compared to actual distresses (if available).
- 6) Obtain actual pavement performance data from TDOT for the selected sites to validate the pavement performance (distresses) predictions by NARR and MERRA.
- 7) Perform layer optimization based on sensitivity analysis using NARR and MERRA climate data sources.
- 8) Develop procedure or framework for selecting climate data source (NARR or MERRA) for project design using AASHTOWare PMED version 2.5.2.
- 9) Submit quarterly reports, recommended climate data source and a detailed project final report.

Expected Outcomes

The proposed study will benefit TDOT in the following aspects:

- 1) The proposed study will provide TDOT with climate data source input for MEPDG Method.
- 2) The climate data source inputs will enable TDOT to implement a trial pavement design using MEPDG and monitor the performance of the pavement section.
- 3) Guidelines for selection of climate data source during pavement design in Tennessee.
- 4) Final report documenting the literature review, data analysis and findings from the research.
- 5) Recommendations and implementation will also be documented in the final report.

Time Period

The time period for the project is projected to be 24 months.



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