

Development of Laboratory Testing Facility for Evaluation of Base-Soil Behavior Under Repeated Loading

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Problem

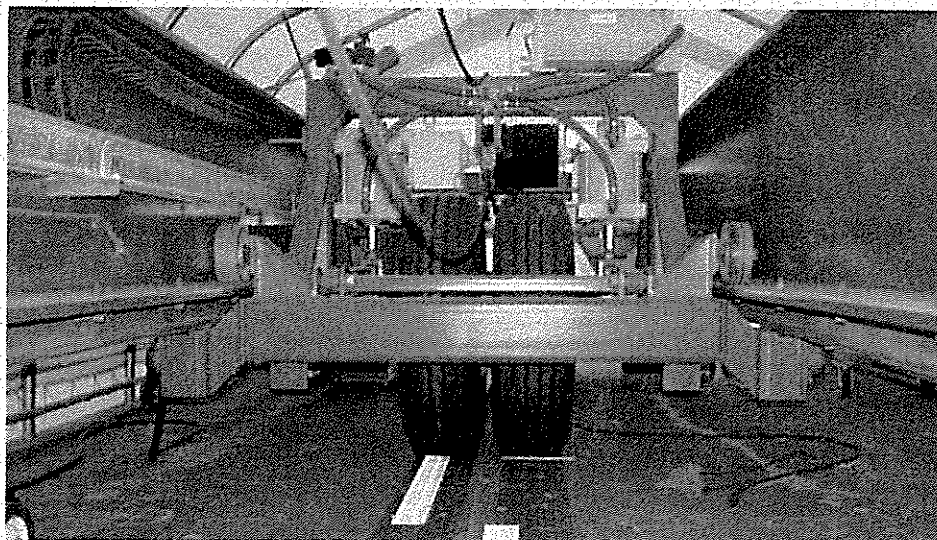
Improving the performance or extending the life of highways has been the concern of many researchers. Various approaches for improving pavement designs may be proposed, but evaluation of potential benefits is not always easily determined.

Currently, there are few options for test facilities that can be used for full-scale evaluation of pavement designs, and selection of the most appropriate method or facility is a matter of debate. In this study, alternative test facilities will be investigated. Based on comparative findings, conclusions about the effectiveness of each facility

will be provided.

The Accelerated Loading Facility (ALF) at the Louisiana DOTD Pavement Research Facility (PRF) is used extensively for large-scale simulation of vehicular loads on pavements. However, only a limited number of simulations can be performed each year due to the cost and time required to construct and test the different pavement designs.

A smaller portable facility capable of testing a larger number of sections in considerably less time is desirable. This proposal is a preliminary phase of a broader initiative aimed at



Accelerated Loading Device



LTRC



Louisiana Transportation
Research Center

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obtaining such a facility for DOTD.

Objective

The primary research objective of this project is the investigation of alternative methods and devices for evaluating pavement designs in the laboratory and in the field.

The ABAQUS finite element program will be utilized for its capabilities in predicting performance of pavements with reinforced bases.

Description

Initially, a comprehensive literature survey on available test facilities will be conducted.

Communication with research agencies that have expertise in pavement testing and modeling is considered vital to this study, allowing exposure to the experience of others, and assisting with the determination of advantages (or disadvantages) of the facilities being evaluated. Field visits will be scheduled to observe testing with various facilities.

Information obtained from the literature survey, communications with other researchers, and field visits will be compiled into a database for use during comparison of facilities. Facilities that have reliable performance prediction capabilities will warrant further study, considering initial and maintenance costs, test duration, mobility and adaptability.

Pavement performance prediction will be conducted using ABAQUS

software. Results of the ABAQUS finite element analyses will be compared, calibrated, and validated, leading to identification and recommendation of the most reliable testing facility.

Implementation Potential

The efficiency and reliability of various pavement testing facilities will be evaluated through this study. A portable test facility that is capable of evaluating pavement performance under real working loads will facilitate future investigations related to pavement designs.