TECHNICAL SUMMARY

Louisiana DOTD Maintenance Budget Allocation System

Summary of Report Number 369

P.I. Gerald Knapp, Ph.D., P.E.,
Louisiana State University

LTRC Contact:
Art Rogers, P.E.
Phone (225) 767-9166

INTRODUCTION

The Louisiana Department of Transportation and Development (LADOTD) currently lacks a functional computer model for allocating annual maintenance funds to the districts based on need rather than history. A model is needed that will allocate limited maintenance funds as effectively as possible and provide the LADOTD with a rational decision-making process that can be used to justify and defend allocation decisions to the state legislature and Louisiana's citizens.

This project developed a computer system to assist LADOTD maintenance managers in the preparation of zero-based, needs-driven annual budget plans for routine maintenance, which includes pavement, roadside, and bridge maintenance; traffic operations and assistance to traffic; and ferry operations. The budget plan
provides estimates for labor, overhead, equipment, and supply costs as well as contract maintenance.

The computer system provides management with ability to set planned service level targets for each maintenance function and to prioritize importance of both maintenance functions and use-based measures. It includes an optimization model that assists in allocating constrained financial resources among functions and districts based on these priorities and needs. It also includes a regression tool which can automatically update the planning model based on recent historical data.

OBJECTIVE

The objective of this research was to develop a zero-based budgeting system for routine maintenance expenditures, in which allocations are justified on quantifiable need and management service objectives to equitably and effectively distribute routine maintenance funds to the districts.

METHODOLOGY

Following is an overview of the methodology taken in this study:

1. **Data Collection**. Existing data sources were researched and data were collected relevant to the project. This section details what data were collected and what data are required by the planning system.

2. **Base Function Calculations**. Consists of two components:

   - **Maintained Units**. Calculation of the total units under maintenance in each district, system, and maintenance function combination.
   - **Average Unit Accomplishment Cost**.

Calculation of the average unit cost of accomplishment for each district, system, and maintenance function for personnel, equipment, and material costs.

3. **Accomplishment Units Prediction Calculations**. Regression and analysis of variance (ANOVA) was applied to develop a regression model for predicting how many units of accomplishment are required for each function at a baseline service level.

4. **Base Function Cost Calculations**. Calculation of total cost model (excluding overheads and fringe) for each maintenance function.

5. **Service Level Calculations**. Identification of service level measurement factors, and development of a predictive relationship between amount of maintenance dollars allocated and service level performance.

6. **Fringe and Overhead Calculations**. Addition of fringe and overhead rates to determine the total maintenance costs by function, district, and quarter.

7. **Function Prioritization Model**. Development of a model for representing effectiveness priorities between functions.

8. **Allocation model**. Development of a budget allocation model for optimizing service levels and/or budget levels.

CONCLUSIONS

This project developed an information system to assist Louisiana Department of Transportation and Development (LADOTD) maintenance managers in the preparation of needs-driven annual budget plans for routine maintenance work such as pavement, roadside, and bridge maintenance, traffic operations, and assistance to traffic. The system provides estimates by quarter, district, and routine maintenance function for labor, overhead, equipment, and supply costs. An optimization model is provided that allocates constrained financial resources among functions and districts based on priorities and needs.

IMPLEMENTATION

The results of this work can be implemented in the form of a PC-based decision support system for assisting routine maintenance budget planning/allocation. This software can be directly installed and utilized by LADOTD maintenance management.

RECOMMENDATIONS

The major recommendations of this work are: 1) LADOTD should immediately implement data quality controls to insure that only accurate and complete data is being stored related to maintenance, as this is critical to any planning effort; 2) Once data quality issues are addressed, this budget planning tool should be put into use in the near future for budget planning. A needs-driven budget plan provides better and more defensible justification of expenditures to the legislature and tax payers.