

**TECHNICAL SUMMARY**

**DETERMINATION OF APPROPRIATE FUNDING FOR MAINTENANCE**

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P.I. Dr. Lawrence W. Mann, Jr.  
Louisiana State University

LTRC Contact:  
Curtis Fletcher, P.E.  
Phone (225) 767-9109

**INTRODUCTION**

Recent national studies of DOT maintenance funding indicate that Louisiana funding levels have not kept pace with the national average, and the level of road servicing has declined as a result. In the long run, inadequate funding of maintenance operations will lead to increased total costs, as roadways and other facilities fail earlier than anticipated (necessitating premature reconstruction or replacement), and poorly maintained roadways induce higher liability costs. The LA DOTD has recently received criticism from the Legislature and state auditor regarding the low levels of funding for preventive maintenance and the need to increase preventative maintenance activities in the near future.

If preventive maintenance is to be done correctly, it is critical that 1) optimal maintenance functions and schedules be identified, 2) standard methods be developed for conducting these repetitive activities so they are performed as efficiently as possible, 3) existing resources (labor, equipment, materials) be organized and managed efficiently, and 4) costs for these activities be accurately estimated for planning and management purposes. This research studies each of these aspects of the current LA DOTD maintenance program, and recommends budgetary planning requirements necessary to achieve these improvements.

**OBJECTIVE**

The focus of this work is on 1) evaluation of the current state of the maintenance program in LA DOTD relative to programs in similar states, 2) evaluation of the current computerized maintenance management information system and recommendations for improvement, and 3) development of a long-term capital outlay budget planning structure for achieving a fully funded maintenance program.

**METHODOLOGY**

This activity sought to determine reasonable answers to the following two questions: 1) given the roads were brought up to good condition, what would be a reasonable allocation level for maintenance (in current dollars), and 2) what money must be spent to bring roads from their current condition up to a broadly acceptable condition? These questions were addressed through a four prong study:

- A survey of maintenance funding in similar southern states was conducted, and results were compared with the maintenance funding levels of the LA DOTD. Requests were sent to the DOT offices of Alabama, Arkansas, Florida, Georgia, Mississippi, South Carolina, and Texas, requesting the information needed.
- The results of the survey were validated against the 1993 Federal Highway Administration maintenance funding statistics, which includes overhead and benefits.
- The 1995 LA DOTD annual maintenance inspection survey was analyzed to see what Louisiana maintenance inspectors believe is required in maintenance.
- A mathematical Markov Chain budget planning model was developed using LA DOTD's own data to estimate optimal (least long-term cost) annual funding levels and analyze the effects of under funding.

**CONCLUSIONS**

1. The current computerized maintenance management information system has significant deficiencies in terms of supporting critical

maintenance management processes, data quality, and integration.

2. Current maintenance funding in Louisiana is seriously under funded.
3. Major maintenance activities should be funded at an on going level of \$200 million annually.

## RECOMMENDATIONS

The maintenance functions at LA DOTD should conduct an engineering study to 1) identify all mission critical processes, 2) determine the data requirements, data relationships, and data flows required to correctly and efficiently implement these processes, and 3) devise a management structure to properly supervise and control these processes.

Strategic maintenance planning is critical. Personnel must be assigned exclusively to the maintenance planning process (including annual budgeting). A supervisor must be given responsibility and authority for the planning process and must be evaluated on its success. In addition, tools should be provided (preferably online) for assisting in the periodic updating of whatever planning models are implemented.

Easy and flexible access to data is critical in a changing world. We strongly recommend that the current flat database system (requiring programming to do even simple reports) be replaced by a relational database system. We also recommend that a client-server type system be implemented so that users can access/download/analyze data with user-friendly query and report generators on their local PCs when they need the data while still maintaining close control over the data on the server.

Performance assessment is key to continuous improvement and will become increasingly critical to the LA DOTD in the near future as the public demands greater accountability. Measuring performance (whether of contractors or new/existing maintenance methods) requires that maintenance activities be directly linked to physical road sections at different levels of detail. The method by which road sections are currently represented in the database provides major difficulties when attempting to analyze historical data (see comments under TOPS database above). A Geographic Information System (GIS) database structure should be utilized as the underpinnings of any new information system design to facilitate maintenance analysis and performance measurement.

Appropriate reports should be automatically generated to support the planning process. These include Planning Totals, Section Priority Reports for District-Gangs, Progress Against Priorities Report, Budget Variance reports, Budget Variance by Section, Deterioration Variance by Section, and Condition Distribution Report.

Management control must be implemented to insure that districts are in step with budgeting and planned priorities and that significant budget variances (under or over) are explained and/or corrected.

There is no clear use for the annual maintenance inspection data at this time. It is not used by the planning module within MOPS, nor are there any personnel currently using the data for planning purposes. The field inspectors have undoubtedly become aware of this by now. The data must either be utilized or the LA DOTD should stop expending resources on its collection.

Data quality must be assured or there is no point in collecting it. Responsibility for data quality must be assigned. Someone (with appropriate authority) must be assigned the task of insuring that data quality is insured and be held responsible for that quality as part of his or her job description. There must be implications for poor quality and failure to submit data and means of correcting any problems. Audit procedures should be put in place to catch problems. They could include 1) random sampling of road section inspection data for completeness; 2) re-inspections of roads on a random sampling basis; 3) specialized CMMS reports to assist in checking data quality (e.g., percentage of miles of roads with no maintenance needs, percentage of roads with maintenance needs above or below state average, by maintenance function and system, etc.)

Maintenance inspectors must be trained to assess maintenance requirements to provide some level of consistency/calibration among the inspectors and to stress the importance of doing the inspection carefully (this goes back to the need for the data).

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