

FEATURE ARTICLES



THE LOUISIANA MAINTENANCE MANAGEMENT SYSTEM*

The Louisiana Department of Highways is now putting into operation a management system for its Maintenance Section—a system based on four years of research and testing. Not only is the new system expected to provide a uniformly high level of maintenance through the state, but conservative estimates project an annual maintenance cost savings of between \$6 to 8 million.

Louisiana officials feel that these savings will be brought about through upgrading the quality of work and improving productivity. The new system will also enable the Department to allocate its maintenance resources of manpower, equipment, and materials on the basis of planned operations based on a known area work load. This, in turn, will permit a more intelligent meeting of the maintenance demands on its resources.

In recent years, there has been considerable interest among highway departments across the nation in the application of management techniques to highway maintenance functions. This interest is, of course, spurred by the rapidly increasing cost of maintenance.

NATIONAL FORERUNNER

Louisiana has been one of the forerunners in maintenance management research. When the State Highway Department made its first management study in 1965, the event marked the second time any state in the nation had undertaken an effort to establish a modern maintenance management system for its highway department.

How does one plan such an unpredictable operation as highway maintenance? The number of hurricanes that will occur or the number of potholes that will develop in the coming year cannot be predicted. Most highway departments plan maintenance on the basis of the previous year's maintenance costs and how much money is available for the next year's budget. Where this money will be spent is left to the judgment of a group of maintenance administrators. The money is usually divided among the different highway districts on the basis of available men, equipment, and materials, rather than on the basis of work to be done. Over the years this system has worked with varying degrees of success in most highway departments.

Recently, however, with the ever-increasing cost of maintenance and the greater degree of competition for a share of the tax dollar among the highway (construction and maintenance), education, welfare, and a multitude of other state agencies, the problem of financing maintenance operations is becoming critical. Highway maintenance is now costing, nationally, \$3 billion a year.

*This article was prepared for the Highway Research News by Verdi Adam, Research and Development Engineer, Louisiana Department of Highways.

Planning and programming highway maintenance is now becoming a must if the departments are to justify to state legislatures their budget requests for funds based on actual needs.

As mentioned earlier, the Louisiana Department of Highways decided in 1965 to conduct management research with regard to the Maintenance Section. In September 1965, the Department entered into a contract with a private engineering management consultant to conduct the study. The project was jointly financed by the Department and the U. S. Bureau of Public Roads.

BASIC PROBLEMS DEFINED

The Louisiana Department of Highways is responsible for 15,500 miles of highways located in 64 parishes (which make up the nine Highway Districts). There are 5,000 maintenance employees and the annual maintenance expenditure of \$50 million for labor, equipment, and materials. As a result, the scope of the management study was very broad and covered all phases of maintenance operations—from work functions and responsibilities of administrative personnel to manpower planning and training.

Because work planning is a major element that enables management to manage, the early stages of the project collected data to determine if a work-planning system would be feasible for the Maintenance Section. Existing practices of the Department were pinpointed and areas where improvements could be made were defined. The data revealed that there was a wide difference in performance from management unit to management unit. This variation, in turn, indicated the potential for improvement. By planning work, the highway maintenance administrator or supervisor would be able to allocate the available resources of manpower, equipment, and materials on the basis of the needs of the state highway system.

In order to plan work, it was determined that standards would have to be formulated. A year-long Performance Laboratory was set up, and the data from both laboratory and field observations pointed out the causes of the variations in performance and provided the information necessary to establish standards. During the operation of the Performance Laboratory, it was concluded that the best method of obtaining improvements was to establish better management practices.

Data collected during the period of the Performance Laboratory also revealed facts and figures to enable the maintenance supervisors to plan and schedule more efficiently. Standards for the major maintenance functions were developed to show the best way to do work. Objectives for planning and budgeting were set. The best staffing, equipment assignments, and procedures for efficient work performance were developed. In addition, the potential for improved performance of maintenance operations through the use of standardized work methods and management procedures was proved in an actual working situation. Improved performances were traced to the simplified management procedures tested by the supervisors.

SYSTEM IS FEASIBLE

With the closing of the Performance Laboratory, several conclusions were drawn. First, it was feasible for the Department's Maintenance Section to function under a management system. Second, applying such a system would result in a valid annual plan of operations. Third, there would be a substantial financial savings to the Department. Thus, the ground rules were laid for statewide implementation.

In order to find out how such a system would work on a statewide basis, the system was given a one-year shakedown on a district-wide scale. District 07,

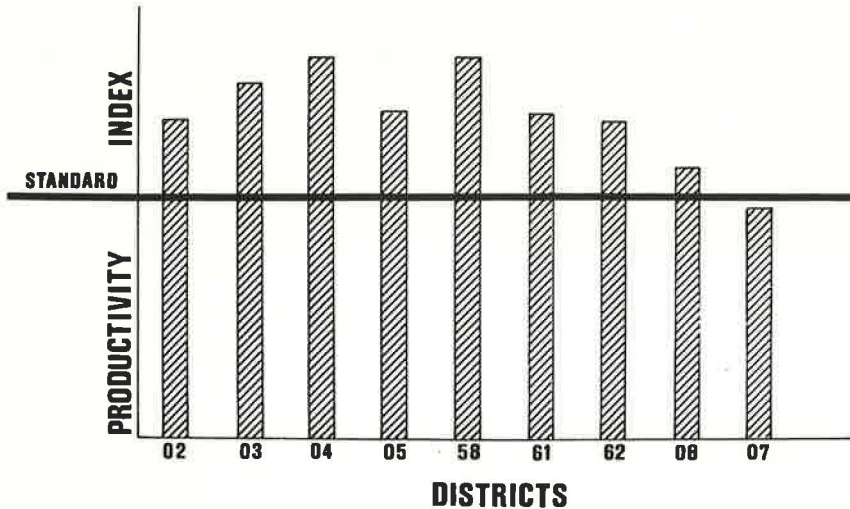


Figure 1. Average productivity index of the Louisiana State Highway Department's nine Districts.

headquartered in Lake Charles, was chosen as the site. During this shake-down period, the standards, crew sizes, and production factors were made final.

The pilot program in Lake Charles showed that there are two areas in which the maintenance management system will help the Department save money. The first, and most important, is that with the management system it is possible to do the same amount of work more efficiently because men, equipment, and materials can be scheduled and assigned on the basis of actual needs. In addition, money can be saved by doing the same amount of work with a reduced work force.

An analysis of the productivity of District 07 in comparison with the other eight districts shows a marked difference. (See Figure 1.) With an overall standard productivity index of 1.00 or less than 1.00 as the goal of the highway districts, it becomes obvious that the Lake Charles district, with a productivity index of 0.94, has a definite advantage over the other eight districts. The average productivity index of 1.38 for the other eight districts shows the potential of savings.

AREAS OF SAVINGS

Every productivity index over 1.00 shows an area of possible savings to the state. When the maintenance management system is fully implemented, all of the districts should be able to bring their productivity close to the standard of 1.00. As noted earlier, the Maintenance Section of the Louisiana Department of Highways has a budget of \$50 million this year. The entire state highway budget is \$280 million. If the statewide productivity can be brought close to the standard, the state will realize annual savings of from \$6 to 8 million.

In order to put the maintenance management system into statewide operation, it was necessary to first develop training materials for the superintendents in the nine highway districts. An audio-visual training program teaching the basic principles of planning, scheduling, organizing, and controlling work was developed by the Department's Research and Development Section. Slides, tapes, workbooks, and tests were used to present the material.

The audio-visual program introduces the superintendent to the basic theories of good management. He learns how they work and how he can make them work

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for him. The second phase of the training involves discussions of particular problems and of some of the physical aids, such as a scheduling board, used by the maintenance management system.

Implementation of the program is under way. Men in all of the highway districts have completed the two-phase training. There is no feeling that the use of the management system will cause an initial reduction in the work force. There is a feeling that it will result in a definite upgrading of the quality of the work and improvement in productivity.