

A Progress Report on the Illinois Maintenance Management Program

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A short report on the State of Illinois' concepts of highway maintenance management and performance rating was presented at the Highway Research Board meeting in January 1968. This paper briefly restates a few of the major features of the system and discusses the present status of the project, including progress made and problems encountered.

A primary objective of the project is the development of reliable maintenance cost and accomplishment data. From the data, management reports are developed for the various supervisory and administrative levels concerned with highway maintenance, enabling them to make comparisons of costs and of work crew accomplishments for like units, or areas, under their jurisdiction. They may also compare their own area against similar areas, against statewide averages and against an established standard of performance.

The Illinois system includes a "roadway inventory" which is a count, or measure, of the significant items that make up the physical maintenance work load in a unit or area. This enables us to compare the potential work load of similar units. In conjunction with the unit costs we develop, this is expected to be a very useful aid in budgeting.

Management reports generated by our system are as follows:

1. Roadway inventory listings and summaries.
2. Monthly work accomplishment reports, which are a measure of work crew performance and develop unit costs from direct labor and equipment usage; overhead labor and material costs are not included since the work crew normally has little control over these items.
3. Quarterly and annual cost reports showing total charges against the maintenance appropriation, by work items and for the various breakdown of geographical units.
4. Monthly equipment usage reports giving a summary of hours used, and related costs, for all major items of equipment.

The inventory summaries, work accomplishment reports and cost reports are printed for the following: maintenance sections, field engineer's areas, districts, and state total. Costs are reported to 47 individual work items in 11 general categories.

The system is designed to provide for a flow of information and reports back to the various management levels within a relatively short time. The electronic computer is used to achieve timely processing of the large volume of data and feedback of management reports.

While the basic planning for the new system was done within the Bureau of Maintenance of the Illinois Division of Highways, Meiscon Division of Control Data Corporation, Chicago, was retained to aid in the development of the system. This company has done the programming, designed reporting forms, developed procedures, and generally, has made an extensive study of operations of other bureaus affected by our work so that all operations will be compatible.

We have strived for simplicity in our system, especially in the field reporting phase. Maintenance is a complex operation at best and we have tried to avoid an additional paperwork burden on our field personnel.

While planning and scheduling of work are encouraged when feasible, formalized scheduling is not a part of the system. No actual job-time studies have been made. We

expect to develop performance standards from actual average unit costs achieved over a period of a year or more.

The field reporting phase of the system was initiated on July 1, 1967. While most phases of the system are now operational, progress has been slower and effort required has been greater than anticipated. Much of this problem was related to the overlap of our work into the areas of payroll processing, general accounting, etc., where we disrupted many existing procedures and had to develop new ones to replace them.

Collecting and recording of cost data were changed from, essentially, a manual operation in 10 districts to a central, computerized process. This, in conjunction with new time-reporting forms and other documents, required new procedures and training for many people. It takes time to get all this operating smoothly again.

We feel that it would be preferable to have the processing of the time cards in the districts with a teleprocessing link to the central computer. The necessary checking and correcting of coding errors on the time cards would be easier for district personnel who are much more familiar with the field operations and have closer contact with the field employees.

One of our initial problems was the lack of an adequate number of trained people to check the time cards and to make the necessary corrections when processing was changed from a district operation to a centralized operation. A substantial backlog of cards had accumulated before anyone was assigned to this task and this, coupled with a considerable number of reporting errors in the beginning, made progress very slow.

The many capabilities of electronic computers are well advertised. Indeed, they sometimes are attributed to have almost magical abilities. In spite of all this, they are also very intolerant of any errors in input and programs. Electronic data processing is a bit like air travel. The "trip" through the computer, like the actual flight on the plane, is quite rapid. It is all the other problems and preparations on each end that consume the time and cause much of the frustration. There are many programs in our system and it has been difficult to get them all functioning properly.

The added load due to our maintenance management programs has taxed the capacity of our data processing section. Program refinements to improve the running time have helped in some cases. A proposed changeover to third-generation computer hardware should alleviate this problem.

The present status of our system of management reports is as follows:

1. The first roadway inventory summaries have been received recently. A few revisions in the inventory were found desirable. The inventory instructions have been rewritten and program revisions are being prepared. To be useful, an inventory must be kept up-to-date and provision has been made for this.
2. The basic reports from the work accomplishment phase are now being received on a monthly basis. Presently, these reports are being received 60 days, or more, after the end of the subject month. This is a longer period than desired and we hope to reduce this time to approximately 30 days. One report in this phase of the program will compare actual unit costs achieved against established "standards." These standards will be based on statewide average unit costs over a period of time, probably one year. Once these standards are established, they are expected to remain unchanged except for an annual correction due to changes in labor rates and costs of equipment and parts. In this way, the performance of an area, or unit, can be compared to its own performance in past years as well as being compared to similar areas on a current basis. This particular report is not yet being printed pending development of the standards from data received in other reports.
3. The first cost reports were received in July 1968. They will be printed on both a quarterly and an annual basis. In addition to the basic cost report form, annual reports will be issued to show costs per lane-mile for three basic highway categories: Interstate, regular and urban expressways. Also, we develop lane-mile costs for a special sampling of pavement surface types and costs per lineal foot for a sampling of bridge types.
4. Equipment usage reports are issued monthly in conjunction with the work accomplishment reports.

As a project like this progresses, the viewpoint may change a bit. One occasionally sees revisions, or additions, he would like to make. Sooner or later, this results in the problem of sufficient time or money to develop everything one might wish. In the contract with our consultant, we reached that point all too soon. Due to the effort required to complete, to our satisfaction, the basic system of data collection and reporting, we have not done as much work as we would like in the analysis of that data. However, if the foundation of our system is good we can continue to build on it.

Development of our basic system is essentially complete. We now want to make it operate a little smoother and a little faster. We also must learn to use, to greatest advantage, the information we now have available.