

## INTRODUCTORY REMARKS—MANAGEMENT VIEWS MAINTENANCE FROM THE EXECUTIVE SUITE

Roger F. Nusbaum, Illinois Division of Highways

•IT IS A PLEASURE and privilege for me to have this opportunity to address the participants in the 1970 Maintenance Management Workshop and discuss with you some of the things that are of concern to the Office of the Chief Engineer as they relate to the whole field of highway maintenance. Rest assured that the chief engineer's office is very concerned with the maintenance function for many reasons.

Recent statistics released by the Highway Users Federation indicate that the estimated expenditure for maintenance of highways and streets in the nation in 1970 will amount to in excess of \$4.3 billion. Bearing in mind that there are in excess of 105 million motor vehicles registered, this amounts to approximately \$43.00 per registered vehicle or, stated in other terms, approximately \$1.00 per week per motorist which is about what the average motorist pays each week to have the daily newspaper delivered to his home. Considered in these terms, it would appear that the motorist is getting a real bargain for his weekly dollar. However, the maintenance engineer shares with the chief engineer the responsibility to determine whether it is possible to reduce the maintenance cost to the motorist, whether better service can be provided for the same money, or whether more money should be spent to provide a higher level of maintenance service.

Another reason that the chief engineer's office is concerned with maintenance expenditures is the very simple fact that every dollar spent for maintenance is a dollar that cannot be spent for badly needed upgrading and rehabilitation of our existing highway system. There is a natural tendency on the part of the chief administrator to keep maintenance expenditures as low as possible so as to release the maximum amount of funds for new construction. For this reason, at budget time the maintenance engineer finds himself in a defensive position trying to defend his budget request. The chief engineer's office has an obligation to demand that the maintenance budget being requested be supported with adequate data and statistics to show conclusively that the fiscal requests to provide manpower, commodities, and equipment are based on identifiable needs. I need not tell you that this is an extremely difficult thing to do.

In Illinois we have made some rather drastic changes in maintenance management techniques in an effort to improve our level of maintenance service, to reduce our maintenance costs, and to identify and justify the cost of the various elements that make up our maintenance needs. One of the first steps taken was to revise and computerize our maintenance cost accounting system in order to provide useful and meaningful management cost data. Stated in very simple terms, our system produces unit costs for direct labor and equipment usage for each maintenance activity broken down to show the average cost of the activity per unit on a statewide basis, the average cost of performing the same unit of work on a district basis, and the average cost of performing the unit of work in a sector of an area supervised by one highway maintenance supervisor.

The report also provides an index of productivity for the state as a whole, each district, and each supervisor's area. We feel that this is a very important part of the cost accounting system because it is our belief that every individual and every unit of the organization need a yardstick against which to measure the effectiveness of their efforts. Such a yardstick has been lacking in the past. If we were operating a large meat packing company and employed 30 salesmen, the one that sold the most meat would probably be the most likely prospect to be promoted to vice president in charge of marketing. It is our hope that our system of measuring productivity will provide some of the necessary indicators to determine which of our field engineers are doing a better-than-average job and should be considered for promotion.

It is our hope, ultimately, to use our accounting system to prepare our annual budget. This could be done on a district-by-district basis by multiplying the unit cost per activity times the inventory of the particular item to be maintained. You have all heard the term PPBS which stands for Planning-Programming-Budgeting System. More and more states are going to this method of budgeting on a statewide basis, applying these principles to all state expenditures by all agencies of the state. Such a system will allow the legislators of the various states to make a more meaningful analysis of the appropriations requested by the various agencies. We feel that our new accounting system will provide the basis on which we can make the transition to the new PPB System with a minimum amount of confusion.

Several years ago, in analyzing our maintenance costs, a very simple fact became apparent, and that is that our costs are almost directly related to the number of maintenance employees on our staff. The amount of commodities purchased and the amount of equipment required are very closely related to the number of persons engaged in the maintenance activity. A miner cannot work without a pick, and he must have coal to shovel. Likewise, each maintenance employee must be equipped with the tools needed to do the job and the commodities with which to work.

Being aware that our costs and level of service provided are directly related to the size of our maintenance staff, we decided to have a management review made by a nationally known consultant in the maintenance field. We asked this consultant to compare our maintenance organizational structure and manpower contingent with other states and to make recommendations to us concerning changes that would provide a desirable level of service, increased efficiency, and, if possible, a reduced staff and a reduced total maintenance expenditure.

Basically, the consultant's report recommended that we convert from the old patrol system of maintenance to a gang-type system operating out of centrally located sector headquarters in each of our 102 counties. Each sector was to be under the supervision of a highway maintenance supervisor, aided by a clerk, a serviceman, 3 or 4 foremen, 5 or 6 equipment operators, and approximately 25 workmen, making a total contingent of approximately 35 to 40 men for each sector with the responsibility of maintaining approximately 200 centerline miles of highway. The report also recommended that two-way mobile radios be installed in all of our snow removal units and that only one man be used to operate trucks while plowing snow and spreading salt.

On July 1, 1969, we made the transition to the new system; and, while we still have many difficulties to iron out, we are very pleased with the results of the change. Those of you who are familiar with the problems associated with managing a patronage-oriented maintenance organization can appreciate the problems that were involved politically with making such a change. The change resulted in a reduction of manpower and the necessity for men to travel farther from their homes to report for work. This change was made in Illinois immediately following a change in administration, at which time we have a complete turnover of maintenance personnel. While we encountered much political opposition in the early stages of the conversion, many of those who were opposed to the change now recognize the benefits that were gained and realize that the old patron system had become obsolete and that change was inevitable.

We recognize the Teamsters' Union as the official bargaining agent for our maintenance employees, and the business agents for the various Teamsters locals were greatly concerned over several aspects of the change. They, of course, were concerned over the reduction in the number of employees; and, in particular, they were concerned about the fact that we were only using one man on a truck during snow removal. We have been able to convince them that with mobile radios installed in each truck the men are able to secure help if and when it is needed more rapidly than under the old system.

Another area of concern to the chief engineer's office concerns ecology, aesthetics, and the protection and enhancement of the highway environment. The Audubon Society would like us to alter our program of vegetation management on the highway roadsides by reducing the frequency of mowing, thereby increasing the acreage of nesting cover along our highways for song birds. While the Audubon group is interested in this program to increase the bird population, ironically, the hunters are also interested in the same program so that they will find more game birds to shoot. The conservationists

are concerned with our turf management program as it relates to the conservation of soil erosion. The antipollution interests are equally concerned with our turf management program to insure that the discharge from our culverts and ditches does not pollute water systems. The farmers are concerned with our vegetation management program because they want us to mow or otherwise control the growth of weeds which are detrimental to their crops. The narcotics people want us to identify and eradicate wild growing marijuana. The Keep America Beautiful group wants litter-free highways, while other groups want billboards removed and junkyards screened. In other words, the public, and therefore the chief engineer's office, have become quickly and more keenly aware of the environmental influence that our highways have. We have come to recognize that we have a distinct responsibility to contribute to the preservation and enhancement of our country.

In the future we must give greater attention to the management of our roadsides. Now, given the fact that the chief engineer recognizes his responsibility with respect to environmental values, how does he insure that his subordinates will accept, support, and implement his objectives? In my opinion, the work necessary to carry out a desirable environmental values program should be performed by the maintenance department under the direction of the maintenance engineer and his subordinates. Unfortunately, I sense a reluctance on the part of many of the supervisory personnel in maintenance departments to accept their proper role in this important function. We have all seen maintenance supervisors who are excellent housekeepers but pay little or no attention to the structural condition of the pavement. Conversely, we have supervisors who keep their pavement structures in excellent condition but are poor housekeepers.

There was a time not too many years ago when the traffic units of the various state highway departments were under the maintenance department and ultimately supervised by the maintenance engineer. Because the maintenance engineers failed to place the erection and maintenance of traffic control devices in proper perspective, this function was ultimately taken away from them and vested in a separate traffic department. I hope that this same thing will not happen with regard to roadside enhancement and development. I hope that the maintenance engineers and their subordinate staffs will immediately recognize the importance that the public and the chief administrator have placed on roadside development and preservation. In the past, much roadside development work has been placed on a very low-priority basis compared with other maintenance functions. The maintenance engineer must readjust his perspective and give roadside work its proper priority.

An additional area of concern relates to safety, the safety of our employees and also the safety of the motoring public. We know that after working on and adjacent to the roadway month after month our maintenance employees tend to become complacent and lax in taking adequate precautions to avoid accidents. We feel that a continuing educational safety program is necessary to keep our employees on their toes.

Illinois has recently issued a whole new set of standards governing the signing and traffic protection that is required on construction and maintenance projects. These standards are adaptable to the various operations on the roadway that require traffic control. The new standards call for 48-inch signs faced with hot orange reflective sheeting.

Additionally, we have adopted stringent rules concerning the use of seat belts and high-visibility safety vests. We have reduced the severity of accidents involving mowing operations by installing antiroll bars on our tractor mowers. To reduce backing accidents, we have installed backup alarms on all of our trucks.

Other areas of concern to the chief engineer's office involve the future and specifically what we can do today to prepare for the future. We are told that by 1990, 159 million motor vehicles will be registered in the United States, which represents an increase of 50 percent over those registered today; and, during the same period, the number of drivers will increase from 110 million to 165 million. In urban areas today, approximately 94 percent of person-mile travel is by automobile and 7 out of every 10 Americans live in urban areas on about one percent of the land.

In spite of the pill, it seems as though no one has found a way to defuse the population explosion. There is a real question as to whether the nation can devote enough of its

resources to highway construction to keep pace with the travel demands of an expanding population. If we fail to keep pace and are unable to upgrade our existing roads and construct new roads at the rate needed, then our existing highways must absorb the added burden of the increased travel demands.

Higher traffic volumes will result in more rapid deterioration of the roadway structure. The increased volumes and speeds of traffic will make many normal maintenance functions much more difficult and hazardous to perform. Where, today, we may be able to close one lane of a two-lane pavement and control traffic by flagmen, tomorrow we may find that the traffic volumes have increased to a point where such traffic control is intolerable. Already on our urban expressways many lane closures must be performed at off-peak hours, and we can expect this requirement to extend farther and farther from the metropolitan centers and even exist on our major rural trunk highways. At best, we may have only a few hours to keep a lane or a road out of service before it must be reopened to traffic.

These facts present a major challenge to the maintenance engineer and will necessitate the invention of new techniques and the development of new products to repair and refurbish the roadway surface. How we cope with these problems will determine whether the automobile will continue to be the basic mode of transportation in the United States. The possibility exists that these problems will reach such staggering proportions that they will be beyond our capacity to control.

Gentlemen, I am confident that our engineers have the foresight and the technical ability to develop the new techniques that will be needed and that we will be able to keep these problems under control. It has been a pleasure to have the opportunity to share with you some of the thoughts that concern the chief engineer's office regarding the maintenance and preservation of the tremendous investment in our highway system. If I can lay stress on one final thought as I close, it is the great concern that the public and the highway administrator have with respect to the environmental quality, preservation, and development of our roadsides.