

INFORMATION SYSTEMS RELATED TO HIGHWAY PLANNING

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A number of current information systems are characterized by their orientation to the business community. That they provide timely and valid information is very important to an enterprise where profits and losses may hinge on how soon or how well a decision is made. However, the concepts involved in the design of a system for a commercial enterprise are just as applicable in a public agency such as a highway department. In both types of organizations it is important for the managers to make decisions based on current information. Both kinds of organizations are committed to producing a product as efficiently and economically as possible. An information system can be a significant tool in accomplishing this.

Highway planners are especially concerned with having a tool for the efficient handling of information. Aside from accounting information, most of the information in a highway department that is used for more than one purpose is handled by the planning unit. This unit usually collects and processes a greater variety of data into usable information than any other unit.

Because of internal and external reporting needs every state highway department has had to build an information system. These systems work because reports are produced and questions are answered. The systems were man-based for many years; today, they are computer-based.

Perhaps the term information system should not be applied to these procedures, especially if we think of a system as being a set of related parts that interact to achieve some objective. A closer look at these procedures shows related parts and achievement of objectives; however, in a number of cases there is little or no interaction of the parts. My staff found this to be the case during a review of information and data-handling procedures in the planning divisions of the state highway department. It was normal for organizational units to be responsible for obtaining the data and information needed in particular planning activities that they were involved in. Theoretically, this means that coordination among the departmental units was necessary to acquire all data. Frequently, it was found, however, that the various units tended to act autonomously. Any coordination among the units usually was a result of the sequential nature of the work. It typically was the case that the different units had slightly different data names and slightly different ways of storing and using data. Because exchange of information and data among units was a manual process these differences became significant. Further, the units emphasize different aspects of the activities. Besides causing duplication, these things made it difficult to determine the status of a particular activity and the effect of any change in one activity on other activities. The duplication of effort was caused by the units' collecting and processing all the data they needed and relying very little on exchange of information.

We are certain that a similar review in other highway department functional areas would have similar results. We know the results are valid with respect to planning. It seems fair to say that until recently information processing has not been adequately systematized, and, in many cases, this is still true today. Even when the use of computers provided more sophisticated data-handling techniques, we seemingly were more concerned with processing data than with establishing methods to provide information.

Obviously, an information system in a planning division should do more than just reduce duplication. Such a system can be an important tool in developing the program of

improvements of every state highway department. During and after the development of a plan, various alternate plans and other modifications can be made. Also, an assessment of the impact of these changes on the total program can be made. An information system, which can take into account current and future availability of funds and manpower, distribution of projects within the state, and interrelationships of projects, will provide valuable information to the engineer and administrator.

The program is based on current and future highway needs, which are derived from projections of functional and structural obsolescence of highway segments. An information system can provide both kinds of information by tying together the data base resulting from routine planning survey operations and the specialized data base used in transportation planning models.

States are required to meet certain standards with respect to accident information, including maintenance of files about vehicles, vehicle operators, accidents, highway environment, and capability to analyze accidents in relation to the roadway environment. Although highway planning divisions are not solely responsible for this information, they have, for years, obtained and used these data for accident analysis, evaluation of need for improvements, and other internal reporting. An information system can be the means for providing this information to all interested parties without duplication of effort.

Many reports prepared by a planning unit are required periodically, but others are a result of special requests. Although it cannot be designed and built to answer all special requests, an information system can make preparation of the responses--to say nothing of the routine reports--much easier.

There are, of course, other benefits to be derived from an information system that need not be discussed here. The point is that different kinds of data and different information needs can be united through coordinated procedures; that is, they can become part of a system to provide information.

It is generally agreed that an information system must be tailored to a particular user. No one yet has successfully transplanted an information system, even when the organizations are similar. For this reason, it is necessary for a planning division to develop its own system according to its own needs.

The first, and probably most important, step in developing a planning information system is a clear and concise statement of the objectives of the system and a list of the steps to be taken to accomplish the objectives. Another necessary factor if the system is to be accepted and fully used after completion, is the involvement of all management levels in the development effort. It is equally important that other members of the organization be involved as well. Working-level personnel are most familiar with the data being collected and used, and it is from this group of employees that the most valuable information about data requirements will come.

One must recognize the ultimate use of the various data when designing the system, which should be information-oriented and not just data processing-oriented. Determination of data requirements is vital, but it is also very difficult. Because it is impossible to state accurately future data uses, there should be procedures to drop as well as add data at a later date.

Many of the users of the system will not have data processing or systems experience; therefore, complicated methods will discourage use of the system. One expert in the field has pointed out that an information system will tend not to be used whenever it is more painful and troublesome to have the information it produces than not to have it (1, p. 197).

The planning units of several highway departments are now developing systems similar to the one for which we have outlined concepts in a technical report (2). We call it a coordinated data system, but different names are used in different states. Several other states plan to start work soon on such a system, and a few states are currently working on department-wide information systems.

From this, we can see that there is increasing recognition of the value of information (as opposed to processed data) and the value of coordinated procedures for supplying information. This is only the beginning, however, because there are still many states that have not initiated strong efforts to build an information system. Even where such systems exist, there is still a need for improvement before we have systems

that tie all planning information together. Before we have such systems, there will probably have to be a general change in the attitude of our organizations about information. Management at all levels, because they are steeped in traditional ways of handling data and because they are ignorant of new equipment and processing techniques, often seem unable to envision new and better ways of displaying and using information. It would be a waste to develop an information system that processes information in the same way it has been done for the past 25 years. The potential uses of planning information systems are broad and numerous; we must learn to take advantage of them.

REFERENCES

1. Blumenthal, S. C. Management Information Systems: A Framework for Development. Prentice-Hall, Englewood Cliffs, N.J., 1969.
2. Blessing, W. E. Coordinated Data System for Highway Planning. Federal Highway Administration, Highway Planning Tech. Rept. 7, May 1968.