

# THE FEDERAL HIGHWAY ADMINISTRATION'S IMPLEMENTATION PROGRAM

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●IN many organizations in the highway community the emphasis on research implementation was accelerated by the conclusions and recommendations of the AASHO study in the late 1960's to find better ways and means to implement research results. We would probably find that, as a result of this AASHO emphasis, most states now have a successful implementation process that enables them to apply the research results from their own programs.

In the Federal Highway Administration the major development was the establishment of the Implementation Division in the Office of Development. The primary objective of the Implementation Division program as identified in the Federally Coordinated Program of Research and Development is "to stimulate and expand the application and the practical use of the products of highway research and development." To implement usable research from FHWA programs requires a technology transfer across jurisdictional boundaries in a manner similar to states accepting the results of other states.

In the past, this process has been slow because there has generally not been any formal or informal mechanism that would accelerate the implementation process across these boundaries. The key word is accelerate. In fact, if one asks what the real significance is of creating an implementation group in FHWA, one could say the major function of this group is to accelerate the movement and use of research results across jurisdictional lines, from state to state and from federal to state.

We believe meeting two major goals is foremost in achieving this objective. The first goal is to develop an environment conducive to the national coordination and acceptance of cooperative implementation efforts by FHWA, the state highway departments, and other highway users. Some key factors in developing this environment—or, as it has been called in FHWA, "an attitude of approval"—are the following:

1. Obtaining the interest for full cooperation and support of top management, including both state and federal organizations. In FHWA, the commitment of top management is very visible. In addition to the Implementation Division, FHWA also has personnel directly involved in implementation activities in the field regions and divisions, and a Regional Implementation Coordinator is to be established in each regional office. Other organizational components in FHWA with major roles in implementation activities are the Region 15 Research and Development Demonstration Projects Division, with responsibility for the Demonstration Projects Program; the Construction Methods and Practices Branch of the Office of Highway Operations, which is responsible for the Federal-Aid Experimental Construction Projects Program; and the National Highway Institute, which is responsible for developing and conducting programs relating to educating and training for the highway community. Dovetailing these personnel and their related programs with the activities of the Implementation Division is essential to an effective and efficient program.

2. Involving practicing engineers in the research and development process. As a matter of interest, in FHWA we follow the practice of involving operations people during the budgeting, conceptual, and performance phases of research efforts to ensure, first, that we are addressing real-world problems in the FCP and, second, that, at such time as it becomes apparent that usable research results will be produced, the implementers can take these results, translate them into user form, and then take the necessary steps to implement the results on a widespread basis. To achieve this, we have evolved a counterpart relationship among implementation managers, operations personnel, and research FCP project managers.

3. Providing sufficient funds for the necessary field test and evaluation of the research to be sure that results are ready for the practicing engineer and that he is able to apply the results with confidence. In FHWA, the experimental projects and demonstration projects programs have a key role under this item.

4. Providing solutions to the real problems of practicing engineers. Regardless of how successfully a research study may turn out, if it is not addressed to solving a real problem, you will have a difficult time implementing the findings.

5. Presenting research findings in a form or language that can be readily understood and immediately used by the practicing engineer. A research report does not meet this objective.

6. Providing educational programs so practicing engineers will better understand the benefits involved with adopting new technology. The National Highway Institute has a key role in this area.

7. Providing a management framework that is flexible, avoids duplication of effort, minimizes coordination requirements, is responsive to needs, and does not involve a lot of red tape.

The second goal is to be able to assess in a systematic way the success of the program and the benefits realized.

#### MANAGEMENT PLAN FOR IMPLEMENTATION

To meet these objectives and goals, a management plan was developed by the Implementation Division that is intended to form the basis for a coordinated, comprehensive, and cooperative FHWA-state approach to implementation. This plan is the major instrument for the FCP implementation program. It provides a role for other FHWA offices in Washington and in the field and for the state highway departments. It relates existing programs, such as experimental projects and demonstration projects, to newer implementation activities in identification, planning, packaging, and promotion.

The plan considers the necessary interrelationships required of research, management, and operating personnel in the FHWA, the states, and other government agencies and in HRB and other non-government highway organizations that are involved in highway-related research implementation processes. Effective consideration of these relationships is vital because the total resources that can be assigned to implementation activities are limited. No one organization is large enough or situated in a position so that it can do the job by itself. Although primarily a state-federal cooperative effort, there will be spin-off to other users such as counties, municipalities, and other federal agency programs.

#### STAGES IN IMPLEMENTATION

The plan recognizes six significant stages in the implementation process. These stages are identification, planning, packaging, promotion, evaluation, and adoption.

##### Identification

Identification consists of screening and reviewing current and past products of research and development to determine their relative importance and to evaluate their potential for implementation. The identification process answers two basic questions: (a) Was the research implemented or recommended for implementation by the sponsoring organization? (b) How useful and important is it to others? The plan attempts to establish an organized approach to identification, which we believe is essential to ensure complete and adequate coverage of the research and development activities of all highway organizations. For example, through discussions with our research counterparts at all working levels in the Office of Research, more than 100 items were identified from the FCP research and development program that were considered potentially implementable in FY 1973 from FHWA contract and staff efforts as well as items that research personnel had knowledge of through various contacts with other sources. Implementation managers discussed each identified item with personnel in the operating offices to zero in on those items that had the greatest potential and payoff for implementation.

The principal mechanism being used by the Implementation Division for identifying implementable results from state highway department research and development programs is an Implementation Data Report Form. This form is generally prepared after an item has first been applied in practice or recommended for application. It provides brief, minimum information to initially determine national implementation potential and importance. States have been very cooperative in completing the form, and we have received over 250 reports to date.

An initial screening of these reports has identified about 58 items where states indicated potential usefulness of the results outside their state. According to the information provided for each item, the state furnishing the report indicated not only that the results had been implemented and satisfactory results obtained but also that it believed the accomplishments had potential for implementation in most or some other states.

### Planning

Once an item has been identified and judged to have potential, the planning stage provides answers to the following questions: Where do we go from here and how? What and how much needs to be done to obtain implementation? Who is going to do what?

The planning process consists of specifically preparing the individual or group strategy to identify and accomplish the necessary steps to achieve effective implementation. For some items, this may be a very simple and rapid task. For others, a very detailed and complex strategy may be required, particularly when additional work is required for the "packaging" and "promotion" stages. The important thing is to make a plan scaled to the effort that is needed and to the importance of the item. I might note that, for every research result from the FHWA contract and staff programs identified as potentially implementable in FY 1973, an implementation manager prepared an action plan for implementing the product that included strategy and target dates for major milestones.

Depending on the complexity of the item, the difficulty of implementation, or the resources required, a technical advisory group composed of representatives of the various FHWA offices may be utilized to assist in the planning efforts. For example, to plan the implementation of an air quality training course resulting from a California Division of Highways research effort, a working committee of three representatives—one from the Implementation Division, one from the Office of Environmental Policy, and one from the National Highway Institute—was established to ensure that this course was responsive to the views of operations personnel as well as suitable for follow-on work to be undertaken by the National Highway Institute.

### Packaging

When implementation of new technology is encouraged or recommended, there should be a package of user-oriented material developed for the potential user. Interaction between research and operations personnel is a key element in its development. The user package is intended to provide a complete "how-to-use" kit so that the potential user can begin to apply it immediately.

Often, the formal research report is not suitable as an operating tool to apply new technology. Translation into field orders, manuals, specifications or standards, graphs, data tables, and other similar documents is needed. Training materials, films, and other explanatory and education documents may also be needed to assist in the implementation. Generally a combination of these preparations, assemblies, and translations constitute the "user package." Their size and complexity depend on the need. There is no pat formula. The Implementation Division is responsible for packages prepared for FHWA programs. For items emanating from the HP&R program, the state highway organizations are being encouraged to prepare the user package for items produced from their own research programs that have been applied within their state. This approach is being followed because some form of package or document was probably used to accomplish implementation and the same material is a logical starting point for a package that may be useful to others. The mechanism used by a state to implement its own results may help others to implement the same results.

A special implementation line item has been established in the HP&R Part II Work Programs to assist the states in funding this work. The Implementation Division is coordinating this overall effort to avoid duplication, to assess the effectiveness of this activity, and to provide feedback to those concerned. As part of the coordination, we are creating a new department in Public Roads magazine to report on user packages in preparation and, in addition, will issue periodic status reports pertaining to ongoing activities in these areas. As user packages are received, the Implementation Division will start efforts to promote nationwide application of these products to appropriate users.

### Promotion

When the user package for a product is completed, the product is ready for the promotion stage in the manner that has been decided earlier during the planning phase. This is the "action stage of implementation." Depending on the plan and the strategy previously developed, promotion is carried out by one or more selected federal-state avenues to reach the potential user. The principal avenues are the Experimental Projects Program, the Demonstration Projects Program, official bodies such as AASHTO and ASTM, educational and training programs of the National Highway Institute, films, slides, workshops, publications—whatever may be needed to accomplish the implementation.

Through the Experimental Projects Program, actual field tests and evaluation of new highway construction materials, equipment, and processes that have a high priority for application can be achieved. Through the Demonstration Projects Program, opportunity is provided for states to observe actual field demonstrations that show the practical application of new technology resulting from research and development. Implementation Division personnel work very closely with these offices in the early stages of the promotion process. In many cases, user packages will have been prepared by the Implementation Division or state highway departments for use in these programs. The involvement of FHWA field personnel in promotion activities is considered a key element in the success of this phase. In FHWA this is particularly significant since the primary customers for new technology are the state highway departments and other local highway agencies.

As you are aware, the states are far removed from Washington, D.C., in the organizational chain of command. Therefore, FHWA field and state highway personnel are being invited to become involved in parts of or to take over appropriate nationwide implementation efforts. Two items where national promotion is currently being handled by FHWA field offices are the structural steel acoustic crack detector and magnetic crack definer under Anthony Leone, Regional Bridge Engineer for Region 6 in Fort Worth, and the computerized bridge rating system under Richard Sharp, Regional Bridge Engineer for Region 8 in Denver. State highway department personnel have agreed to participate in FHWA implementation efforts, such as the air quality workshops, which include instructors from the California Division of Highways; the computerized bridge rating system workshops, which include Wyoming Highway Department personnel as instructors; and the recently completed roadway design system demonstrations, which included Texas Highway Department personnel. We believe the involvement of FHWA field and state highway department personnel in these implementation efforts expedites the acceptance of the new technology because these personnel, being users themselves, better understand the needs of their "customers."

In addition, to assist the field, a new series of announcements called Implementation Division Alerts (IDA's) has been instituted. These alerts are intended to provide advance notification of significant products of research that will soon be ready for a major implementation effort. They include sufficient information to allow initiation of preliminary planning and strategy on the implementation approach that will be used within a region on the product highlighted. So far, six IDA's have been issued covering the following products: dryer drum process, delamination detector, computerized bridge rating system, curriculum on managing highway maintenance, epoxy resin coated reinforcing steel, and air quality workshops.

### Evaluation

Throughout the several implementation stages, evaluation has an important role. There are two points, however, where it is most critical. One is between the identification and planning stages, when the preliminary decision is made by an implementation advisory group in the FHWA field office or in the Washington headquarters on whether an item is ready for implementation. The second critical point is after implementation has been tried in one place or many places and its value determined.

Identification and documentation of measurable benefits and accomplishments emanating from the application of research results are the most important evaluation goals. Documentation is extremely important to the research implementation program and the overall highway program for two reasons. In conjunction with the user package, it is a most effective tool for encouraging implementation by others. It is also the most visible evidence of the values of research and development programs to present to the public, to administrators, and to program sponsors in Congress and the state legislatures.

### Adoption

The adoption stage of implementation consists of the actions taken to make the item part of a standard procedure or practice. In some cases, the approval develops over time without a distinct action. In others, it consists of an order, specification, or standard that is prepared to officially adopt the item. Final actions may be taken by appropriate AASHO committees or by state or FHWA offices.

### CONCLUSION

I have given a brief review of the FHWA implementation program. We believe it is on the right track and offers an excellent opportunity for success. As the program begins to jell and states start to receive user-oriented materials from other states and FHWA that benefit their operations, I am confident the necessary environment will be achieved to provide the solid foundation required for a successful implementation program.