

Program Development

J. Robert Harbison, Kentucky Department of Transportation

Few would claim that there is anything really new in the highway or transportation programming field. Most of the fundamentals and the complex variations provided by computer techniques are still in use and still valuable. But we would scarcely call them new. What is new is a need to review the fundamental assumptions on which all our programming techniques have been based.

We may not agree on the precise meaning of the word "programming." I will use a definition that was developed at a Highway Programming Workshop sponsored by the Highway Users Federation for Safety and Mobility in 1970: "Transportation programming can be defined as the orderly process by which transportation improvement projects are selected on a basis of factual need in accordance with established objectives and goals and includes allocation of resources, project scheduling, and program implementation."

As we have seen economic growth advance this country to one of the most powerful and affluent nations in the world, we have also found that this growth disclosed a need for a technology and methodology to complement and serve such a society in transportation as in all its other activities. Transportation has been a key element in the growth and affluence we have enjoyed—both as a contributor and as a cost. Although planning, programming, and building a national transportation system have not been orderly processes, they somehow have met the demands of economic growth in this country.

I suppose our success is all the more remarkable because not much of the urban transportation planning process was used during the earlier years of highway building in this country. The impact of that process, which was created by the 1962 Federal-aid Highway Act, on programming in urban areas was more than a palace revolution.

I believe strongly in that process. I am convinced that every effort should be made to catalog transportation needs and establish priorities for dealing with them. Inventories of all kinds are essential tools for the executive-professional. These include exhaustive detail about existing facilities, sufficiency ratings, cost-benefit ratio calculations, and functional classifications.

But after all the statistics are gathered, sorted, and weighed, money is the controlling element, the key to the development process. With ample money, one can expand, accelerate, modify, meet emergencies (and inflation), and even get by with fewer detailed and comprehensive data and rely to some degree on knowledgeable

insight. But with limited funds, one must have flexibility, the essential ingredient in program development. We simply must prepare to move in any and every direction in today's circumstances. The amount of funding likely to be available for any transportation program is so unpredictable that any attempt to make long-range schedules is an exercise in futility.

The involvement of the federal government in transportation seems to be shifting toward less federal control and more options at the state and local levels. I think that this is the right direction for a more efficient and effective transportation program. It raises a serious question about the role of the federal government in a continuing highway program. Perhaps leaving only the completion and maintenance of the Interstate Highway System to the federal government would be in the public's best interest.

I believe that the federal interest in rail, air, and waterways is stronger and more compelling. It seems to be needed to bring those modes to a more uniform level of service by providing adequate funding. Program development for urban public transit also requires federal support and oversight, but practical control of these programs and their priorities should be at the local level.

The various states are best able to provide responsible program development in transportation because they have both a statewide and a regional focus on transportation needs and because they represent the strength of the governor and the legislature. Because of the tremendous diversity in geography, natural resources, rural and urban development, and social and economic conditions, state-level program development and determination of priorities should be the most responsive to citizens and their needs. Thus, we should have flexibility among the states.

The same degree of flexibility does not exist when programs are imposed at the federal level. This has been dramatically demonstrated by the proliferation during the past 6 to 8 years of funding categories in the federal-aid highway program. They resulted from Washington's efforts to respond to the special interests of so many different transportation needs and to such a wide diversity of transportation problems: all the varieties of urban concentration, system adequacy, industrial development, topography, revenue sources, social customs, and political traditions in the 50 states and more than 30 different funding categories.

Now the American Association of State Highway and Transportation Officials and the administration are recommending a drastic reduction in categories—perhaps to 4. Highway administrators generally welcome this proposal but I would prefer 2: the federal government responsible for the Interstate Highway System and state and local governments responsible for all other roads and streets. Of course, this would require that a comparable level of highway user-tax revenue remain in the state. Some may see this as bringing more instability and added uncertainty in program development, but I believe this would provide means of developing more responsive and economical highway programs.

Most state transportation administrators and governors are frustrated by the 6 to 10 years required for a federal-aid highway project to go from planning to construction. In most cases, this period overruns one governor's administration and perhaps the administrations of several governors. The governor's influence on the transportation program is apt to be long-range at best.

The professional or technician has the responsibility for collecting, analyzing, and arraying sound and appropriate data from which the administrator can develop a program within the guidelines and framework established by the state's goals and objectives. Programs that have flexibility and contain acceptable options are the only ones that have a chance to find acceptance in today's political and economic climate. Programs that can be broken down into incremental segments of demonstrable value are more than desirable; they are necessary.

The long life of the federal-aid highway program has had much to do with institutionalizing the program development process. Twenty or 25 years ago, when federal aid became substantial, many departments began developing long-term improvement programs for the first time. The old ABC program rolled along and was joined by the Interstate Highway System program. Only in the past 6 or 7 years have things changed drastically. We have seen design and safety emphasized; standards reevaluated; re-

location assistance instituted; environmental, social, and economic impacts assessed and formalized; citizen participation encouraged; modal options explored and evaluated; an energy crisis; leveling off or declining revenues; and skyrocketing costs. Because of soaring costs, we have seen 5-year programs become 10-, 12-, or 15-year programs. No matter how streamlined the program procedure is, adjustments of time and cost estimates can hardly be made fast enough to keep pace with changing conditions.

Scheduling in program development is crucial, and the environmental impact statement contains perhaps the most difficult elements for which to develop representative criteria. The ability to forecast project phase completions realistically—and cost changes—is the hallmark of a successful program. We have found that the relocation assistance program in some urban areas and in Appalachian corridors, environmental impact statements on major urban projects, and the urban planning clearing house procedures almost defy scheduling.

Citizen involvement in projects is unpredictable as to degree and extent. After 25 years, having participated in many project meetings and hearings, I am still surprised at some of the issues that become controversial and time consuming. Every reasonable effort must be made to bring the interested and affected public into the planning process. Because we cannot control these time elements, we must have program flexibility.

Development of a multimodal statewide transportation program that relates relative priorities and needs among the different modes would be ideal, but it is practical only if flexibility exists. Can such a program come about? I am not aware of any place where it has, but some comprehensive urban transportation plans tend to approach multimodal evaluation of needs and priorities and the idea of the single transportation trust fund supports this concept.

All transportation modes and related programs have undergone substantial though seldom coordinated change in the last few years. The change has affected their economic health, their operating policies, their funding, and, most of all, their future plans.

DISCUSSION

Thomas F. Humphrey, Massachusetts Department of Public Works

The preceding observations on program development and the description of the experiences and problems are familiar to all who have been involved with the programming of transportation improvements. In Massachusetts we have recently embarked on what we feel is a new approach to program development. This is a discussion of what led us to take that approach.

In trying to establish procedures for implementing new federal rules and regulations (e.g., the Action Plan, multimodal planning, citizen participation, environmental analysis), we soon found that the traditional programming techniques did not work as they did in the more narrowly defined highway-building process of the 1950s and 1960s. The traditional programming process was driven by federal funding. When environmental considerations and citizen participation were not issues, when the engineer's words were taken as Gospel, and when public transportation was not taken seriously so that there was no real competition for transportation funds, then the churning out of projects seemed to work satisfactorily. The supply of funds seemed to be endless, and the need for the capital projects (based on simplistic models) was unquestioned by the powerful private and public interests or by the average citizen.

Since all projects were "needed" and funding was no problem, secondary criteria, such as pressure from various groups, only acted as valves. Certain projects were speeded up; but, since there were no other factors to slow down any projects, things moved along nicely.

The freeway revolt of the 1960s ended the effortless mass production of highway

transport facilities. The self-fulfilling prophecy that new roads would generate more traffic began to be recognized. New evaluation criteria began to be considered in the decision of whether to build a new road. The environmental and social impacts on the region and local communities became significant in decision making. New federal and state rules and regulations ensured that these issues be taken seriously. The need for openness in decision making was seen; citizen participation became an issue. Public transportation began to develop support and to compete for federal funding. Even within the highway program, funds were inadequate to build all the projects that had been planned as part of the comprehensive transportation planning process.

Because of habit and lack of a truly effective planning and programming process, new projects continued to be proposed. There was no real way to determine project need (except to say that all projects were needed because the simplistic models showed—in many cases wrongly—that level of service would be improved), and there was no feedback between what could be built in terms of realistic funding constraints and negative impacts of projects and what state highway departments desired to be built.

But no longer did the project shoot through the "pipeline" frictionlessly as if through a pneumatic tube. The factors discussed above caused projects to be delayed, and the pipeline became clogged with too many projects. Instead of making decisions about which projects to pursue, the agency remained passive, and de facto decisions just "happened." The clogging of the pipeline and the pressure applied by various groups led to further problems—the "cycle of promises":

1. Constituent asks politician for project;
2. Politician asks the transportation or highway agency for the project;
3. Agency agrees to study it;
4. Years pass; and
5. Step 1 is repeated.

The results of this cycle of promises are bad for the politician and bad for the agency. The politician cannot deliver on a promise, and constituents become angry. The agency cannot produce. In some cases, the project actually is studied, and the early results show that the project is not feasible. However, work is continued because of pressure from the politician, good money is thrown after bad, and the project is stopped only after it is well into design. This wastes money and time, harms morale in the agency, reduces the agency's credibility, and prevents other more desirable and realistic projects from being studied and built.

Many times the politician will be happy with a "no" answer if it is arrived at in an open way. But because of the web of politics among the governor, agency heads, and the legislature and the process of approving budgets and appropriations, the agency perceives the need to deliver promises to legislators and other special interests. This reinforces—and is reinforced by—the lack of a visible decision-making process, which makes it difficult for an agency head to make a firm "no" decision early in the life-cycle of a project.

This brings us to the frustrations of the planner. Such an institutional framework in which to make programming decisions really means there is a lack of a planning process. The need for a real, effective planning process was perceived in 1962, when the urban planning process was created, but this process has gone through many false starts. At first, no one knew how to implement the "cooperative" part [now we have the institutions of the regional planning agency (RPA) and transportation policy advisory groups (TPAG) in Massachusetts]. Instead, the focus was on "comprehensive," and planners established a glamorous technology (numbers, computers) that would match the awesomeness of the final products—the expressways. And, in fact, the studies based on "sophisticated" technique did rival the awesomeness of the final construction in terms of cost and length of time. After all the money and techniques and time were spent, the plans were not used anyway for program decisions. In the pursuit of scientific objectivity, the plans missed the obvious; they overlooked the real world of funding constraints, and they did not tie into the political process that formulates and constrains policy decisions. After all these years planning still remains a murky area, and

projects still get lost in the never-never land of long-range plans.

The definition of "project need" is complex, for it involves many (sometimes conflicting) objectives and multiple impacts on different groups of people with different values. We have decided that the pursuit of glamorous, objective models is a red herring. The computer-oriented transportation planning study process has its own dynamics of unreality, self-perpetuation, and oversimplification. The consensus of the TRB Conference on Statewide Transportation Planning Issues was that another type of modeling and analysis process was needed: a sketch-planning analysis, using off-the-shelf models, and quick and efficient analyses to allow planners to respond quickly to a variety of issues.

All these lessons bring us, finally, to the approach that we have been following for the past year or so in Massachusetts. We are using the program development process to bring the planning process down to earth, to keep planning in touch with reality.

The basis of the program development process is the establishment of project priorities. This process ties together all the elements of the planning process. Priorities are based on a variety of factors: project need (from judgment of various impacts), environmental problems, community support, RPA and TPAG recommendations, and funding and scheduling constraints. Hence, transportation improvements are based on a number of factors, including the availability of funds for a multiyear period.

This priority setting and program development are embedded in the planning process because it is through the planning activities that the preliminary information on which to base priority decisions is developed (e.g., estimation of available funding, regional and corridor planning study reports, public discussion in the TPAGs and RPAs). More important, a firm decision-making structure is embedded in the institutional framework by organizing the first step in the process of program development and controlling the organization of project proposals in the systems planning phase through the TPAGs and RPAs.

In this way, the demands of the political process (e.g., legislator and constituent requests) are met by being channeled into the open process of the TPAGs. This is justified because we recognize the transportation planning process as a political process, not simply a technical process. The paradox of the difficulty of precisely defining project need is resolved by understanding the policy-oriented nature of the planning and programming process. Furthermore, the process is decentralized by involving the RPAs and TPAGs in the formulation of regional project priorities that are balanced by statewide policy.

Through all these means, the evasive long-range program dissolves into a decision tree of flexible strategies, and the short-range program represents the current view of the availability of funds expected for the next 5 years and matched with a schedule for the projects to be developed. Such a short-range program is monitored continually and reviewed annually.

Clearly, a necessary part of this short-range program development process is public discussion of all projects. To achieve this, we have been working on a project information system. This is a means of collecting, maintaining, and distributing information about the projects that the state is planning, developing, and designing and presenting it to the public in an understandable form. Such a system is necessary because there is an increasing amount of information being generated concerning each project, and the number of individuals who are directly concerned with the decisions being made has expanded greatly. In addition to informing the general public, the system is used for communications within the agency, coordination with other government agencies, and the data base for program development decisions and monitoring progress.

The types of information covered are location, type of work, economic and noneconomic benefits and costs and user and nonuser benefits and costs (including community, social, and environmental impacts), eligibility for funding programs, time and personnel required for project activities (expected schedule), attitudes of interested parties, RPA and TPAG positions, and current status of proposed projects.

The Massachusetts approach to program development is the key to a realistic planning process, which obviates both the frustrations of the planner and the cycle of promises. I would like to disagree with 2 points made by Pikarsky. First, he stated

that he felt planning and programming functions should be separate, that programming should be a check on planning. Second, he said that planning should take place in an unconstrained environment, i.e., without consideration, necessarily, to available resources. My position is that the purpose of planning is to arrive at a set of priorities and to program improvements on the basis of available resources. In an earlier paper, Nelson commented that continuous feedback between planning, programming, and budgeting is essential. I agree. If planning is conducted in an unconstrained environment, then the plans developed will be totally unrealistic. That was the problem with the urban studies in the 1960s. We cannot afford to repeat that mistake.

DISCUSSION

Thomas P. Messier, Federal Aviation Administration

I would like to review the administration's legislative proposal for the airport grant-in-aid program. I have been one of a number of people in FAA who have been involved during 2 years in developing this revised program. I will briefly review the principles of the bill, its key features, my prognosis regarding its passage, and what I think is a significant lesson to learn regarding its development from a long-range planning point of view.

Basically there are 4 principles.

1. To increase state and local decision flexibility. We had received a great deal of feedback from those involved in the Airport Development Aid Program regarding the degree of federal influence on investment decisions. Therefore, one of our goals was to reduce the federal influence in those areas where we felt that local and state authorities could better make decisions that more immediately reflected local priorities.
2. To reduce federal control and cut red tape. Basically there are 105 steps between the time an airport grant project is initiated and the time the money is received. This often takes 2 years; our proposal will drastically reduce that time.
3. To provide long-term predictable funding. Under the existing act it appears as though funding consistency exists, but in reality it does not. There are no guarantees that a sponsor will get grant money even based on the apportionment formula in the present act. Our proposal corrects this.
4. To focus federal development on what we consider to be critical national needs; that is, to make more effective use of resources at the federal level.

Let me review the key features of the bill. We are proposing a total program level of \$350 million per year for a 5-year period, a 9 percent increase over present legislative levels. The program is divided into 3 categories.

1. We have allocated about \$250 million for air carrier development based on a formula keyed to aircraft departures and principally focused on development and master planning at air carrier airports at about 600 locations.
2. A discretionary fund of about \$50 million is reserved for the use of the Secretary of Transportation for the development of critical needs at air carrier airports and development of general aviation airports. Also included are funds for airport system planning and a small amount for test and development of airport pavements.
3. We have allocated \$50 million to be funneled through the states for the development of general aviation airports. The bill provides for a takeover by the states at the end of 3 years so that by fiscal year 1979 the states will fully assume responsibility for the development of the general aviation airports in this country.

There will be a direct pass through of funds to airport sponsors for air carrier air-

port development. Each of these airports will receive at least \$100,000 per year on a guaranteed basis; large air carrier airports will receive as much as but no more than \$5 million. Without this restriction, some of the larger airports like O'Hare could receive \$12 to 14 million under the formula. This approach, therefore, provides predictable long-term funding for these airports. In addition, it places almost total responsibility for developmental decisions with local people. It cuts red tape because we will no longer have the 105-step horror story for airport grant processing. Further, federal control will be reduced to requiring that such development adhere to federal standards from an engineering standpoint. Beyond that, local people will be responsible for making the actual investment decisions.

The discretionary fund retained at the federal level starts at about \$50 million and tapers off to about \$30 million at the end of 5 years; \$10 million is to be used for airport system planning. A variation that many people have been concerned about in aviation heretofore is taken care of in that we will provide for funding of continual planning. The discretionary funds will be focused principally on safety and efficiency items.

In the general aviation fund, the distribution will be made 75 percent on area and population and 25 percent on state-based aircraft. We feel that is a better formula than that which currently exists in the act. Without question, phasing general aviation airport development back to the states is an obvious expression of the decreased federal interest in the development of these kinds of airports.

In terms of overall matching funds, our proposal is to require a 75-25 split on all projects. In effect, this brings the \$350 million up to about \$470 million for airport development by providing for 25 percent local-state participation.

We will require master planning at the local level; that is, the airport sponsors will be required to develop master plans. However, the funds for planning will come out of the development money. Metropolitan, regional, and statewide system planning is provided for by the \$10 million discretionary money. In addition, we will require that air carrier airport sponsors submit a 3-year capital improvement program within 1 year after passage of the bill. The former National Airport System Plan will no longer exist. However, we will publish annually a report that will be by and large a summary of the 3-year capital improvement programs at air carrier airports.

We have provided for 2 new eligible items. First, we will allow funding of the public-use portions of the terminal, that is, any facilities used for the passage of people and goods in the terminal area. Second, we have identified the purchase of land for environmental purposes as an eligible item that, when taken together with our engine retrofit proposal, will provide noise relief at many large airports.

The whole theme of our legislative proposal is in large measure aimed at decreased federal interest and a return to the local level of decision-making responsibility and authority.

One issue that is still open is our proposal to delegate the responsibility for development of the general aviation airport system to the states. There appears to be a difference in view between the executive and legislative branches regarding what is in the federal interest. Congress may take the position that a federal interest does exist in general aviation airport development and thus such funding should be supported at the federal level.

One lesson that I learned from working on this proposal is when to use a tactical rather than a strategic approach to solve a problem. The need to use a tactical approach stemmed from our inability to define the national airport system. There clearly exists an interdependent air traffic control system; when you disrupt the system in Chicago, it will back up the flow of traffic to London. However, I have no comparable analytical basis on which to place any credence that airport capacity investments at different locations are immediately intertwined. The analytical or philosophical foundation for the airport system simply does not exist, nor do we even find what I would consider a rational statement of goals for a national airport system.

Although we have been urged to determine programmatic effectiveness of airport grants for a number of years by the Office of Management and Budget, I think by and large we have been unable to do so. People, therefore, reached the logical conclusion at the policy level that perhaps there really was no national system of any significance

and that we did not know what we were about after all in this large program.

Certainly we could not define the interrelation of airport development in economic or analytical terms across various airport types. So there was a significant lack of data, a significant lack of analysis, and a significant lack of sound thinking behind what constitutes the national airport system. Because of this, we were forced into a tactical kind of approach to the development of the bill. However, this approach leaves me with a lot of serious questions. I am not at all sure that what we have defined as the federal interest sets us on the proper path. I am enough of a bureaucrat to realize that this is not the last word in the development of the national airport system. I think we have to define very rigidly what the airport system is and develop the data and analytical foundation that will then serve to provide whatever policy changes we might make later. In that way, our approach to airport system development can be substantively rather than tactically based.