

year plan. We worked on it from the standpoint of anticipated funding for 20 years, but we now believe that we need both a long-range plan and a short-range plan. Over the next 20 years, the population of Texas is projected to go from more than 14 million to more than 21 million. Texas is supposed to be second to California in population by 2000. That's a 50 percent increase in the population of the state. We can't work with a short-range plan in this circumstance, so we are working on it as a 20-year project development.

We don't see many new roadways being built, but we do see the need for preserving and expanding the capacity of the existing system. We are going to develop a 10-year project development plan that will, it is hoped, realistically fit what funding

can be expected in the 10-year time frame. As the time frames get shorter, of course we can be much more accurate in the projects and their scheduling.

But these time frames have to be coordinated with funding, and there must be the ability to adjust whenever drastic changes occur in funding. There must be alternative plans and plan flexibility that will fit project funding. I think we were guilty in many instances of having the communities expect more than we were ever able to produce because of long-range plans, and I think it worked to our detriment.

Implementing agencies charged with responsibility of deciding the most appropriate strategies for achieving planning consistency must perform the selection and staging of projects for the programming process.

The Evolution of Transportation Planning: Iowa's Perspective

C. I. MacGILLIVRAY

To be useful and effective, planning must continuously adapt and respond to change in conditions, issues, and decision-making needs. In a certain sense, a time line of transportation events is simply a chronicle of the way that planning has responded to change in decision-making needs and to the availability of new tools, knowledge, and understanding. By taking a look at the evolution of planning and forming some judgment about how well planning has responded to change, we may come away with some ideas that can help as we face a whole new set of trends, issues, and needs.

Probably the first indication of need for some kind of highway planning, at both the state and federal levels, concerned the issue of route continuity. Our first plan in Iowa was laid out long before highway transportation was understood in its present context. Early surveyors recognized that Iowa was a flat place, and they laid out a grid system of roads. In fact, that's the biggest control we've had in transportation planning in Iowa ever since. That was in the 1860s.

That surveyor (or planner) was kind enough to locate most county seats in the middle of a county. So, with the advent of early urban development, our second-generation plan became more sophisticated. We connected the county seats and had a grid system of main routes. That grid is still such a dominant factor in transportation planning that we actually have outlawed diagonal highways.

With the advent and rapid increase in the ownership of automobiles came the desire for long-distance travel and a corresponding need for an interconnected road system with the characteristic of continuity and service. In Iowa, at the time this need was being felt, there existed considerable sentiment against the concept of state control of

highways. With each county responsible for developing and maintaining its own road system, the result was a patchwork of highway service defined only by county borders. It was impossible to effectively meet the travel needs as they were developing at that time.

The Federal-Aid Highway Act of 1921 may be considered a milestone for Iowa. It provided the mechanism that led to state responsibility for the primary road system in 1927. The 1921 act essentially made eligibility for federal aid contingent on state control of federal-aid roads. With this came the state's authority to make improvements based on their contribution to a planned or coordinated system.

So, although planning, in the sense of defining a highway network to meet travel needs, had begun in Iowa as early as 1917, until 1927 the state had no power to require that improvements be made in accordance with a plan. Once this authority was established, system planning became an important and ongoing activity. In fact, the development of a highway system to serve travel demand safely and in a manner consistent with the nature of that demand has been a dominating objective in transportation planning at all levels of government ever since that time. Our forecasting efforts, functional classification, and needs studies have all become well-developed activities used in support of system planning. Network planning has been an appropriate response to a trend of continuous growth in travel demand. Questions then were these:

1. Where will facilities be needed--what is the demand?
2. What kind of facilities should be provided--how will they be used?

3. How much will they cost?--issues of programming and plan implementation.

Planning has provided answers to these questions over the years.

In the 1930s our attention focused on a basic understanding and knowledge of the highway system's functioning--our efforts were devoted to data collection and the early examination of the safe operation of our routes. The first recognition of urban and rural congestion was occurring. Planning for safety and congestion relief was becoming a significant responsibility of the highway administrator.

We had an early highway engineer in Iowa that most of us are very proud to be associated with, even if we didn't have much continuity with him. His name was White. I was reading one of his reports to our Highway Commission of the 1930s recently; he was expressing concern for the growing recognition of congestion on the road system. Of course he was also talking about 1,500 vehicles a day, but it's amazing how time changes our standards.

In the 1940s there was a better understanding of the characteristics of highway travel demand and use, a knowledge that allowed a planned response. In this era forecasts and the studies of function, needs, and service were developed.

In the 1950s planning and programming began to mature as the equalization of service benefits for all users became a compelling issue. New tools began to be available to assist the planner, such as sufficiency ratings for priority rating.

During the 1960s, the transportation planner was one of the first analysts to turn to extensive application of computer technology. The development of sophisticated tools has continued to preoccupy us too much in our planning evaluations. For the first time, we had easily usable and generally accepted methodologies for objectively assessing development and traffic distribution issues.

Over time it became evident that the large-scale highway construction program was affecting communities and the natural environment in a manner and to an extent far beyond that initially anticipated. Although the 1969 National Environmental Protection Act (NEPA) was legislated in response to a variety of perceived problems, clearly highway construction was the target of its provisions. As a result of NEPA, project planning has become an important antecedent to project engineering, and today it is among our most intensive planning activities.

Sensitivity to social and environmental concerns in the decision-making process has increased as a result of NEPA requirements. In this sense, the primary objective of NEPA has been met. This success has not, however, come without its cost in manpower and other resources, response time, and overall planning productivity. Moreover, judicial interpretation of what constitutes compliance with NEPA has indicated that it is the process that counts. The information must be provided, but the decision makers are free to base their decision on other information as well. The danger in this concept is the general example being set that process is more important than results. Although this policy may be defensible, and perhaps even necessary with respect to NEPA, it is not something that is applicable to all other planning efforts. We do not wish to see it spilling over into all areas.

The area of urban transportation planning is one in which the federal government actually legislated a planning requirement. The Federal-Aid Highway Act of 1962 made continuing receipt of federal aid for highway projects in urban areas contingent on a continuing, comprehensive, and coordinated (3C) planning process. The federal government made a corres-

ponding commitment of funding in support of this new planning effort and over time they came to define in detail the actual planning activities that would be required.

During the 1960s, we invested substantial resources in the development of urban travel forecasting models. We have been providing technical assistance to our eight urban areas ever since. This was one of our real successes as planners. Perhaps, also, this was the source of our biggest mistake--the contribution to false expectations (which still plagues us today): expectations for services and facilities that couldn't and didn't materialize, expectations that system development (new construction) could solve so many urban problems that continue today.

In 1983 the 3C planning regulations were relaxed considerably. A question for today is how to redefine roles and responsibilities with a lesser federal presence. This, too, seems to be the result of an object lesson. Because of the diversity among urban areas in the nation, the federal government was never able to define planning regulations that would fit the needs of every urban area. Perhaps this is a lesson we should heed as we examine the future of urban planning and the planning process needs of each state.

Systems planning, project planning, and urban planning have all been influenced by federal requirements or initiatives, although they have been developed to meet our specific conditions and needs. We have taken the initiative more recently in monitoring what affects the viability of our transportation system as a whole, including all modes, and in developing responsive plans for that system. It is in these areas that our planning must be most responsive and relevant. For example, our changing agricultural transportation needs, with the changing national and international agricultural market, and a changing transportation system (e.g., railroad abandonments) mean new needs in highway service and highway planning to support our state's economy. So highway planners must learn all about a new industry, railroading, and a changing economy we have never dealt with, agriculture.

An example of adapting planning tools is our needs study. As we became concerned more with system management than system development, we began learning to use the needs study concept to test alternative policies and to account for fiscal constraints. Also, through constant monitoring and analysis we can anticipate problems before they occur and be prepared with a response conceived in a noncrisis atmosphere (e.g., pavement management and projecting pavement failures with planned response). For example, we were concerned with the effects of changes in truck technology on our highways before this became a major issue at the national level. We equipped ourselves to deal with issues such as truck weights, cost recovery, cost allocation, truck fees, truck route systems, and truck size policy. This preparation allowed us to gain legislative support for recovering increased highway costs due to increased truck weights at the time Iowa's truck weight limits were revised. We were able to develop, without the contention we have noted in much of the country, the new truck service route systems that provide basic service to both agricultural and urban economics. So, in this respect, monitoring and analysis is one of our most important planning activities.

The emphasis in planning has evolved over time from a concentration on physical, network planning to inclusion of management policy and planning. Although policy and management planning have always had a role in our planning program, they are assum-

ing primary importance today as we make the transition from system development to system management. This change has required adaptation of existing planning tools, as with the needs study, and the development of new tools, as in the case of the pavement management program. Existing planning efforts, and the data used in their support, are being put to new uses. For example, our roadway sufficiency rating program was initially devised to measure progress in meeting legislatively mandated equalization of service in the primary road system in all areas of the state. It is a development planning tool. But it has become an invaluable tool in establishing the location and immediacy of pavement rehabilitation needs in an aging system. It joins with our new pavement management tools as part of the kit.

Changes in planning have come about as a result of expansion in scope and shift in program emphasis. The tendency is for products of the planning process to be oriented less to a specific desired end state and more to a series of short-range studies and decisions, efforts that will have the effect of keeping our options open for a future that cannot be predicted with complete certainty. The time frame for much of our planning has become short range.

With increasing comprehensiveness has come the need for an expansion in the data base used in sup-

port of transportation planning. In cooperation with FHWA our base of information has increased, particularly with respect to the characteristics of highway use and performance. With continuing advances in computer technology, we have been able to make data more accessible and make more effective use of information from those data. Today we have weigh-in-motion and traffic telemetry systems that tell us more about use of the system, analytical procedures available to us such as the Highway Performance Monitoring System, and perhaps one of the most significant developments in a long time--the new needs study approaches that will rival in usefulness the planning tools we had in the 1960s for traffic forecasting.

In looking back at the evolution of transportation planning, our efforts corresponded pretty well with the decision-making requirements of the times. In that sense we have been successful. However, if we look around, we see examples of problems that might have been avoided through better planning. In fact, many of the problems and issues we currently face might even be blamed on poor planning or a lack of planning. Our current problems and issues should be viewed as a signal of the need to make another adaptation in our transportation planning process.

Response

W. L. GARRISON

We have heard five proud, varied, and candid papers. They are proud papers because there is much to be proud of. The states and the federal government began varieties of highway planning well before World War II and that planning flourished after World War II. With the development of the Interstate system, techniques were rapidly developed or adapted that served well.

These are varied papers because the story is different here and there. We invest in transportation systems to achieve goals; goals from the federal perspective are one thing, and goals are spelled out differently in individual states and regions.

And we have heard candid papers. Not all has gone smoothly. Sometimes rules and regulations have gotten in the way rather than served. Rules and regulations pressed by special interest groups have caused problems. We are fortunate to have speakers who can recognize problems, speakers courageous enough to name causes of problems, and speakers whose institutions have found ways to manage them.

Five proud, varied, candid papers.

REFLECTIONS

In this spirit of doing better in the future, these remarks in response to the papers will begin with what went wrong rather than accomplishments, al-

though the record is 99 percent accomplishment. We will speculate on how we might have avoided getting in trouble. Then we will seek comments that will help us understand what we ought to be doing now.

As the papers do, these comments have a historical orientation.

Making Enemies

My first observation is a simple one. It is that more attention to history would have alerted us to some of the tensions between suppliers of transportation and those who are negatively affected by it. For example, Lord Parnell's Treatise on Roads, written in the first decade in the 1800s, warned highway builders of the dangers of building through cemeteries and parks and a character in John Bunyan's Pilgrim's Progress, written in the late 1600s, longed for places where "there is no rattling with (stage) coaches, nor rumbling with wheels . . . (places where) one may think . . ."

Early railroads had some problems that sound familiar. The Stockton-Darlington, the world's first railroad, which opened in 1825, was stalled for several years by the Duke of Cleveland because the rail engineers had proposed a route through one of his fox covers. Charles Dickens hated railroads, seeing them as the cause of premature childbirth, a