

Highways To Continue as Dominant U.S. Transportation Mode--Turner

Highways will continue to be the "dominant mode" of transportation in the United States.

This is the view of Francis C. Turner, U.S. Federal Highway Administrator, expressed recently in an address to the 50th anniversary plenary session of the Highway Research Board, in Washington.

The Turner address, taking up the theme, "Transportation in the Seventies and Eighties," forecast that vehicles, like highways, probably will not change radically in appearance.

But there will be major safety and crash-worthiness improvements, increased reliability and simplification in maintenance and virtual elimination of engine pollution emissions.

The text of the Turner address follows:

In this panel we have been charged with the task of setting forth realistically what transportation is likely to be 10 and 20 years into the future. For highway engineers and administrators this is not a new or special task, because this is exactly what we have to be doing every day on every project which we undertake, and we start about 20 or 40 of them out anew on every working day.

By law, we are required to design all Interstate projects for the types and volumes of traffic forecast to be using a project 20 years beyond the year during which construction is to begin. With a six- to ten-year leadtime—and sometimes longer—between programming and the beginning of construction, it is obvious that in all such cases we are compelled to be realistically forecasting the situation in specific dimensions and numbers for more than 20 years into the future. We customarily follow much the same procedure with other Federal aid projects also, even though the law does not specifically require it in cases other than on the Interstate.

For a number of years, we have been making forecasts of highway needs into the future—20 years or more in response to Congressional directives, as well as on our own, as a part of the general management of highway programs of this country. Characteristically, then, and by the exercise of appropriate administrative leadership in the profession, we have been regularly doing exactly what this panel is asked to do this morning.

Looking backward from time to time, in order to see whether our previous projections had been accurate, I think it is fair to say that we have not been too far in error in our forecasting, especially in respect to broad totals and overall needs. Most of the errors are in individual project forecasting and these have been due in most cases to major developments under private control resulting from significant changes in the projected land use plan through operation of the zoning process.

Suppose, for example, a private developer comes in along the completed I-495 Beltway here in the Washington area and announces for the first time in the paper some Monday morning that negotiations have just been completed, including the financing commitment, for construction of a \$100-million sports arena, combined with a shopping center, a hotel-motel complex, and a number of office buildings, the whole thing expected to provide employment for 5,000 persons, with 40,000 persons to be in attendance at the sporting events which are planned. Multiply this kind of announcement several times

over in this dimension and many times over in lesser dimension during a 20-year period of time and you can see why we often make errors in forecasting what the needs are likely to be on the individual project.

This is the area of greatest weakness in the planning process in connection with our highway program. The public expects us to plan highways properly, but it refuses to work with us by advising us of its plans.

Public Cooperation Asked

We are supposed to fully inform the public of every move we intend to make, and why, when, where, etc.—and this is perfectly proper. But it seems to me that some appropriate public agency—with authority to coordinate and integrate development plans, including transportation—should have the opportunity to review in advance of finalization the plans of those private developers which will generate heavy highway traffic movements, so that it can either make adequate provision in advance to meet the new needs, or require such adjustment of the private developer's planning as is necessary to insure proper traffic flow on the affected portions of the network.

By nature, engineers are inclined to be conservative in making traffic forecasts or providing for loads on their projects; and public administrators likewise are by nature inclined in a conservative direction. Even if they were not so inclined, then the legislative bodies to which they must go to receive funding and authorizations to proceed with their proposed works would very quickly make them conservative, because such bodies will always look on that side in handling the public's monies, despite what some critics may say about such bodies.

This is no criticism of the process. In my judgment it is the proper attitude on the part of both the proposing administrative officer and the legislative representative of the people.

Forecast Considerations

In making our forecasts, we have had to consider many things such as:

1. what the shape of the urban areas will be and how land will be used in both urban and rural areas;
2. how best the transportation objective can be interwoven with the attainment of other objectives of our society;
3. how people will want to travel, and where, when, and in what volumes;
4. at what rate new technology will provide other options to them;
5. what other options will be available to them to meet their needs for movement;
6. what will be their capability to fund the indicated needs and their willingness to do so;
7. what will be the future trend of vehicle design;
8. what will be the performance characteristics of the vehicle;
9. and how best we can organize to attain the type and quantity of highways finally determined upon.

Indeed, this is a large order. But it is exactly what the highway administrator is faced with every day. And so, his looking into the future is not a new experience. He is always doing it.

He also is checking his backsight at the same time to be sure that he continues to head in the assigned direction; else he may find himself going in circles. Some persons

today would have us discard all hindsight, history, and experience, and erase the board completely clean, to blindly start all over again, without any prejudices that might have developed from prior experiences. Even if such were altogether desirable, and I'm sure it is not, it is impossible to do; and so we should not waste the time and energy in dreamy worlds of make-believe.

We live in a very real world and must react accordingly. We must build onto what we already have built before, start from where we are now, and not waste time re-inventing the wheel.

Realism Needed

So, we must be realistic. We must be realistic with regard to the material world and the technology we work with. And we must be realistic with regard to the human world and the customers we serve.

Being realistic, we do not rule out the possibility of revolutionary developments in transportation technology, even though these may be unforeseen as of now. But we know that even revolutionary breakthroughs in transportation knowledge are almost certain to be evolutionary in their development and application on a widespread basis. This was true of railroads, of motor vehicles, and of airplanes. Transportation is such an enormous industry that it takes very heavy investments in money and time to bring about even evolutionary changes. We can be virtually certain, then, that the foreseeable requirements for highway facilities in the Seventies and Eighties will not be seriously altered by technological developments in other modes.

Within the highway mode itself, the vehicle is most susceptible to change. But, it takes more than a decade to phase in technical innovations in the rolling stock, and that stock today numbers more than 160 million vehicles.

Widespread change in the physical highway plant is even more difficult to achieve. There are still less than half of the nation's 3.7 million miles of road and streets classified as paved. Roughly half of the paved mileage is on the Federal-aid system, which we have been building and rebuilding for more than half a century. Since 1958, when we launched the accelerated Federal-aid program, the total mileage affected by one kind of Federal-aid project or another has involved only about one-third of the total Federal-aid system. In other words, it takes about 40 years just to go around the cycle one time.

Little Outward Change

Many if not most of the new projects to be built or completed in the next decade already are somewhere in the plan or design stage, since the lead time is eight to ten years on urban projects and four to eight years on major rural projects. As a result, we will see little outward change in highway physical design by 1980.

I certainly have no desire to discourage innovation. We badly need it to cope with the growing challenges to transportation in this country. But I think we need to be aware of the practical obstacles to experimental and sweeping changes in our transportation system; or any other parts of our society for that matter.

Now, to be realistic about the human element, we must start with what it is that people want of their transportation system.

rather than what we as public officials might think will be the most efficient in dollars expended. With this in mind, it is apparent that what people want is the nearly infinite flexibility of the auto and highway network which permits each individual to program his own movements rather than be forced to conform to a rigid schedule of time and routing which, although it may suit some of his trip needs, will not suit all or even a majority of them. The individual also wants to control the place where he will live and the circumstances under which he will raise his family, and a majority of our people have shown a preference for the typical suburban spread-development living arrangement.

To some transportation experts, so-called, this sprawl type of arrangement is inefficient. But what they overlook is that they are measuring efficiency in terms of dollars expended just for transport, while the suburban "sprawler" is using a different set of numerators and denominators in which the factors are his personal desires as to how he wants to live. In calculating efficiency, his formula contains a whole series of plus and minus factors in both the numerator and denominator, as he makes trade-offs for this and that feature.

To argue, as some critics do, that the auto-highway system is responsible for suburban sprawl is beside the point. The real point is that motor vehicle transportation has greatly expanded the choice available to individuals for the location and development of various land uses, from houses to hamburger stands. And it is this exercise of individual choice, within the restraints set by public policy, that has effected the pattern of development on the edges of our cities.

In a free society we should hardly expect otherwise. To Americans generally, this is what America is all about; and why they rightly think it is the best country in the world.

Individual Preference Important

Certainly it is true that other factors are also involved in suburban land development, such as economic incentives and encouragement from various public policies. But the primary factor, I am convinced, is individual preference, and particularly the desire of a great majority for a private home and private transportation. Coupled with this, of course, has been the financial ability of large numbers of people to realize their preferences.

In this appraisal of our customers and their transportation desires highway administrators are supported by an impressive collection of facts—such as facts about the actions of individuals collectively measured by traffic flow counts, facts about individual travel preferences and practices gathered from millions of personal interviews, facts about land use which determines transportation demand, and studies of public attitudes, such as those sponsored by the HRB.

We need to be clear-eyed about suburbanization and the transportation demands associated with it, because this is where the action is. During the past quarter century, virtually the entire net growth in our population occurred in the expanding suburbs, while at the same time central cities decreased in average population density, and even in absolute numbers of residents. By 1990 we expect the population of our urban areas to grow by some 40 to 50 percent, and it seems altogether likely that this growth will continue along the present pattern of spread development.

I can see nothing to reverse this pattern

Urban Transportation Conference Scheduled

E. D. Brockett, chairman of the Board of Gulf Oil Corporation, an IRF member, will head the Fifth International Conference on Urban Transportation, to be held in Pittsburgh, September 8-10.

The Pittsburgh Urban Transit Council (PUTC) will sponsor the conference. Mr. Brockett was recently elected chairman of this organization. The Transportation Research Institute (TRI) of Carnegie-Mellon University and the Gulf Oil Corporation will act as co-sponsors to this year's conference.

Conferees will include transit system designers and builders from all over the world as well as government and civic leaders interested in mass transportation.

short of a fundamental shift in public policy, which would require public approval. And since it is hard to see how such a reversal could be accomplished without eliminating or reducing the choices available to individuals—either with regard to personal mobility or to housing preferences, or both—it is not likely to win voluntary acceptance. In fact, housing authorities now foresee a swing back toward single housing as a result of the life cycle of the many new families founded.

Lessons of Urban Dispersal

Spread development as we now know it is characterized not only by low average population densities, but also by the dispersal of many urban activities once concentrated in the central cities, such as commercial, industrial, educational, cultural and recreational activities. This means employment and travel have been dispersed, as well. It is no longer true that transportation lines generally are to and from the central city; in fact, this travel is now only a small fraction of the total—about 5 to 15 percent to be explicit—and this is the situation everywhere. It is also the most important and elemental piece of information often overlooked or disbelieved by those who glibly talk about the urban transportation "problem".

The result, for transportation, is that in our urban areas today from 85 to 95 percent of all personal trips take place outside the central business district. They are spread throughout the length and breadth of the urban areas, simply because of the wide dispersal of origins and destinations and the great variety of trip purposes.

These trips are dependent almost entirely on highways, primarily by the private auto, with some supplementary assistance from buses. Certainly no other mode could begin to handle most of these trips within the next 20 years. Nor could any other mode handle the enormously diverse movements of goods and services which are so essential to the vitality of our urban areas.

The continuation of spread development, therefore, will create huge additional demands for highway transportation in the Seventies and Eighties. Given an urban population increase of about 50 percent by 1990, we can expect an urban travel increase of 75 percent or more.

But the urban areas, even though they account for 70 to 80 percent of our population, are only part of the market for highway transportation. We also have the transportation needs of rural America and of intercity movement, both of which rely heavily on highways, for both passengers and goods.

These are the real demands to which the highway program must respond in the Seventies and Eighties.

We can conclude then, that while all modes will be substantially upgraded and expanded to keep pace with national growth, highways will continue to be the dominant transportation mode, except for long haul passenger movements by air, and long haul, medium haul and heavy weight freight movements by rail.

Highways in Key Role

Precisely because highways are the dominant mode, and the only mode which ties all other modes together, they must play the key role as we strive for improved coordination of our transportation system and achievement of an overall transportation policy.

The highway program has, in fact, pioneered in this coordinating effort through sponsorship of the comprehensive, and continuing urban transportation planning processes now operating in all urban areas of the nation. Most of the interaction between modes actually takes place in the urban area and so the urban transportation planning process provides the basic data essential to the coordination of all modes. While much progress has been made herein over the past decade or so, we can look for continued improvement, refinement and effectiveness in this total transportation planning endeavor in the 70's and 80's, especially if planning assistance from the other modes can be channeled into the organizations already carrying on the highway planning function.

The greatest immediate challenge to intermodal planning and the highway program lies in what most people are thinking of when they refer to an urban transportation crisis—that is, the daily morning and evening rush-hour movement. As I indicated earlier, this is actually a relatively minor portion of the total of all urban travel, since all of these downtown-oriented trips together represent only five to 15 percent of total urban trips. Nevertheless, it is a problem—separate and distinct to a large degree—which we must resolve.

The immediate practical solution to this problem is to increase the people-moving efficiency—sometimes referred to as "productivity"—of our existing urban highway system through the greater use of higher capacity vehicles, particularly, buses, and the back seats of now lightly loaded passenger cars.

Now, I said before that public officials have to build for what people want, and what they prefer is the kind of flexibility that comes from personal rather than large group transportation. However, where large numbers of individual trips coincide with one another in both time and space, as they do in rush-hour traffic, then buses, using the same accessible and flexible highway network, can reasonably duplicate the services of a portion of private transportation.

Since buses can make use of existing and planned urban highways, a material increase in the use of bus transit will not require the heavy capital outlays needed to provide some totally new system. And very importantly, it can be achieved in the very near future—2 or 3 years, rather than 15 to 25 years.

Buses on highways, therefore, offer the only realistic answer to the need for improved public transportation in the overwhelming majority of our urban areas in any early time frame—and this will continue to hold true throughout both the Seventies and

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the Eighties.

Fortunately, we obtained this past year the new legislation needed to make this solution work. First, the Urban Mass Transportation Assistance Act contains the authority to assist in acquisition of transit vehicles and their servicing facilities, and second, the Federal-aid Highway Act of 1970 contains authority to construct the required roadway facilities and many other appurtenances. The two acts in combination are complementary to each other, and in my opinion will essentially supply the answer to the vast majority of center city transportation needs in both the immediate and 20-year future.

I am convinced we will look back on this 1970 legislation as a landmark in the development of modern urban transit, just as we look back now on the 1956 Highway Act, with its program for Interstate System construction, as a landmark in highway development.

In addition to increased use of buses, I believe we can expect to see other measures to cope with the downtown congestion problem, such as greater emphasis on car pools, staggered work hours, and perhaps even staggered work days and weeks, perhaps even, months, as well. We probably will see some vertical separation of pedestrians and auto traffic in the downtown areas, such as putting sidewalks at the second-floor level, or in limited cases, underground as in Montreal and New York. There also will be time separation of commercial vehicles using streets to deliver and pick up at stores in the CBD (Central Business District). These measures will free up vehicles and pedestrian flow and produce substantial relief from present congestion and safety hazards.

It should be kept in mind, however, that most cities will not see much increase in volumes of rush-hour traffic to and from the CBD. A few may even see some decline, because the center city work force will not be growing at a rate parallel to that in other areas. With most of the growth occurring in suburban areas and medium size cities there will be little increase in the need for new or additional major transportation arteries in the CBD's. This will hold true for both freeways and rail transit lines.

Integrated Transportation Stressed

Returning now to the highway role in integrated transportation, the future will see better coordination, under the auspices of the Department of Transportation, in such areas as the development of airports and their access facilities. We will be considering ways to properly coordinate heavy freight truck movements with available railroad facilities so that some reductions can be achieved in the numbers of vehicles and heavy axle load passages, to produce a possible increase in traffic safety, an increase in present roadway lane capacities, and an increase in length of life of roadbeds and structures; while simultaneously assisting railroad revenues without increasing trucking costs. This refers, of course, to "piggy-backing" operations as a means to increase the efficiency of an overall integrated transportation system.

We also will be considering the possibility of increased use of rail passenger movement in the medium trip length range to reduce both passenger automobile volumes on our highways, and airways and airport congestion.

In a number of cities we will be exploring the possibilities of consolidating railroad trackage and terminal facilities to permit

abandonment of some presently used rights-of-way which could then be made available for improvement as mass transit arteries, either for rail transit or as busways, thus reducing rail taxation burdens, operating costs, and permitting construction of needed transit facilities or new roadways without major displacement of people. In most cases, the freight generation or delivery requirements on such abandoned routes could be satisfactorily handled by trucks, especially if combined with piggy-backing.

For its part, the highway program will be an active partner in community development. Our overall transportation planning process will be broadened to encompass even more of the community goals and objectives, and to bring the citizens into the planning process if means can be found to make their contributions useful and effective. It is gratifying that yesterday the Board devoted the entire day to consideration of this problem. Environmental factors will be spread throughout the total planning and development processes from their very beginnings with proper weighing of these values in relation to other factors. Our housing and relocation provisions already provide a positive commitment to alleviate the adverse impact on those citizens who must be displaced to provide the transportation facilities needed for future societal goals. In fact our authority now permits and has already brought about considerable upgrading of the housing of many low income families displaced by the highway program.

Social Objectives Emphasized

This concern for social objectives and the well-being of the individual will increasingly characterize the highway program of the future. It indicates the direction in which highway research should be heading—toward greater emphasis on the human or customer approach, rather than on the material or technical side, although this still will be needed.

We on the operational side are dealing with people, and it is this aspect of our assignment that is difficult to plan and design for.

As to the technical side, we will in the future have more electronic gadgetry of all kinds to vastly increase the engineer's capability to improve his end product.

Although highway design will not change radically by 1990, we will see much more upgrading of older (that is, present) roads. Reconstruction—mostly added lanes and resurfacing—will have occurred on a considerable mileage of the present Interstate routes due to normal traffic growth and required maintenance.

I think there will be some limited application of automation and other glamorized items, such as dual-mode, for example, in both vehicles and roadways. There will be substantial gains in signaling and communications to drivers by aural means to increase safety and volume of flow, thus increasing the overall efficiency of the present highway and street network.

There will be major improvements in highway safety, through better roads, drivers and vehicles as we force the pace of the evolutionary process I mentioned earlier. We are today receiving substantial benefits from recent safety improvements in our highway plant and we will see even greater emphasis on safety in the future.

Vehicles, like highways, probably will not change radically in appearance. But we will see major safety and crash-worthiness improvements, increased reliability and simplification in maintenance, and virtual elimination of engine pollution emissions.

Again, the attention being devoted to safety and pollution reflects the concern with people and with the quality of life in the United States.

Adequate Funding Essential

The acceptance of a broad range of social responsibilities by the highway program, together with its responsibilities to transportation, implies a major commitment of resources, and makes adequate funding a necessity. I believe financing will continue to lean toward general user charges because of their demonstrated success, but these may possibly be supplemented by general funds, as for example some form of a readiness to serve charge.

Administration of the highway program will continue reasonably similar to the present, through the Federal-State relationship. However, counties and Metros, or their equivalents under another name, will increase, especially as planning and public works and service agencies, and these could have an important role in urban transportation and development planning.

The highway of the Seventies and Eighties, I believe, will outwardly look much like the present ones, but the planning and administrative processes by which these highways are produced will undergo substantially increased attention to the social and environmental factors. The lack of outward change does not imply any shortage of technological development or capability—rather that we will shift our emphasis toward the intangible factors related to the humanities. We will continue to rely heavily and principally on a personalized mode of transportation because this is what our people will continue to want; they can afford it; and it will best meet their needs. I do not visualize our country without autos or their equivalent whether called by that name or not. We therefore had better learn how best to live with—rather than without—the automobile and the highway network.

The points of social and humanitarian emphasis in the highway field will be the same as those in other transportation modes, so that what we learn and use in highways can be equally applicable to others without the need for duplicative research. We should look in this direction for our HRB research programs in the immediate and long range future and in doing so, we will apply our abundant capability and resources to others as well as ourselves, with little or no additional cost to the public. I believe we are already the leaders in these areas and I suggest that we broaden our interests sufficiently to cover the similar needs of our other modal neighbors.

We fully recognize that the provision of highway transportation is for the purpose of helping communities—from the neighborhood to the nation—to meet their goals and objectives. That is our goal. And as understanding of how to establish community goals advances and our understanding of how transportation can aid in achieving them improves, our efforts and success toward meeting our goal will become increasingly apparent.

We must never forget that mobility, which means transportation, is itself a community goal, perhaps more important than any other single goal, or at least as any single item in achieving other goals. We can never accept that our concern, or the concern of society, is over transportation in relation to community goals. It has to be a concern for transportation in relation to other community goals.