

Shifting Emphases in Transportation

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•I WOULD first like to take this opportunity to commend the Highway Research Board for including in its program for its annual meeting this panel discussion. For its very inclusion represents an awareness on the part of those concerned primarily with highways of "the shifting emphasis from the specific mode of transportation to the total function and need for an integrated transportation system."

But I would like to slightly modify the topic for today's discussion and talk about more than one shift in emphasis in transportation. For besides the new emphasis on the integration of modes of transportation into a total system, there are, in my view, three other shifts of emphasis which are just as dramatic, just as vital, and have enormous implications for research. They too involve integration, but integration of another kind. These other shifts in emphasis are:

1. A recognition that transportation is basically a regional, rather than a local problem;
2. Transportation must be viewed in terms of its impact on the total well-being of the community it is intended to serve; and
3. Its problems demand a new order of intergovernmental cooperation for their solution.

A number of factors have been responsible for these shifts, but the major cause has been the changing nature of the transportation problem itself.

Up to the present, the major problem of transportation has been to move the products of farm, factory and mine to market, and people throughout the world. The emphasis has been on moving people and goods across oceans and land masses, from country to city and from nation to nation.

But today, the major problem is not spanning continents. It is not crossing oceans. It is not even landing on the moon and, even more importantly, getting back from the moon.

Rather, it is the problem of moving large numbers of people—millions in fact—from home to work, to stores, to school and to recreation within metropolitan areas; and of providing for the circulation of people and goods to, from, and within urban areas and the megalopolitan regions now emerging.

This problem—the metropolitan transportation problem—affects not only the truck or automobile driver, the bus rider, the subway strap hanger, or railroad commuter. It affects the total social and economic development of the metropolitan region.

And although the elements and often the intensity of the urban transportation problem vary in different sectors of the country, it is essentially a national problem, as about 75 percent of this country's population now lives in urban areas.

It is this change in the nature of the transportation problem itself which has sparked the shifts in emphasis in our approach to transportation and created the necessity for a dramatic increase in the kinds, degree, and scope of transportation research.

THE SHIFT TO A TOTAL TRANSPORTATION SYSTEM

In the past, the passenger by common carrier tended to think the most arduous part of his journey ended when he reached the terminal; the automobile driver when he

reached the boundary of a city. Today, the terminal or boundary line usually marks the beginning of the most trying—at times even the longest—part of the journey.

The same problems afflict freight movements. Freight generally moves swiftly and economically over the line haul only to find terminal costs and delays becoming more burdensome.

Much of this is the result of the fact that in the past we set policy and developed programs for railroads, for highways, for aviation, for water transportation, each separately, and more often than not, with little attention paid to the impact one would have on the other. There was no policy for a total transportation system.

Never did we carefully assess how each mode or combination of modes would best contribute in a particular area to the improved and more efficient movement of goods and people. The result has been a severe imbalance in transportation—some modes promoted; others regulated and some even penalized.

The task ahead is to achieve a balanced transportation policy. This involves rectifying the imbalances in transportation research as well as promotion.

Frankly, the technological revolution in the 20th Century seems to have passed by much of transportation. The railroad car operating today is basically the same as it was at the turn of the century. The commuter along the Hudson River in 1967 spends as much time on the train as did his counterpart in 1900. The city bus of today on Madison Avenue has become as inflexible as the trolley car of yesterday. Technological research on the short-haul movement of people and goods seems to have been overwhelmed by our fascination with covering long distances.

We are now about to spend billions of dollars of public funds on developing the SST to move relatively few people across the world, but the federal research and development program for urban mass transportation is almost infinitesimal, even though urban mass transportation involves the movement of millions daily. And what about the slow development of steep and vertical rise aircraft which could possibly provide improved service for short distance inter-city travel, or perhaps even for daily journey trips from outer suburbs to the city core?

Research for a total transportation system also requires that we carefully review technological advances in one mode to see if they can be adopted to another. In the New York Metropolitan area, the Metropolitan Commuter Transportation Authority (MCTA) has begun an eight-month experiment with a gas turbine-propelled passenger car. At its suggestion, and for the first time, the aerospace industry joined with the traditional railroad supply industry in putting together this interesting demonstration project. Preliminary results have been encouraging.

The MCTA has also been urging the transportation industry to develop a dual-drive commuter car which would run efficiently and economically on both third rail and through its own turbine power.

If adequate funds were available and if there were a concerted and coordinated research effort, I cannot help but think that the advances in the aero-space industry could be of greater benefit to transportation in general. Are we really doing all that is possible to see, for example, if the "power package" of the space craft could be adapted to provide liquid fuel cells for the automobile or bus? Could fuel cells be used to achieve an economic and high performance battery-powered rail car?

By calling for a balance in the allocation of resources for research and development, I do not mean to deny funds for space or the SST. But if we are to achieve a total transportation system, those elements of transportation which have been too long ignored must begin to receive their fair share of investment in research and development.

An integrated approach to transportation also requires that we investigate the possibilities of integrating modes of transportation if not actually physically, at least from the point of view of services. The concept of transportation centers located at strategic points along say a commuter railroad where the benefits of express and local rail service, convenient auto and bus access and ample parking, along with shopping and other service facilities, could be combined needs additional experience through experimentation. Such a transportation hub might serve as a convenient interchange between rail, bus, air and private auto transportation.

Research wherein we could apply systems analysis to transportation seems promising and needed. For once we view all modes as members of a composite transportation system, the question becomes how best to assemble all parts into a system that provides the best over-all performance. Research is required to define the means for evaluating system performance.

This research need is becoming more and more critical. The public though not using the term, is beginning to question the cost-benefit ratio of various modes, and as of yet, we do not have an acceptable way of measuring it. As public awareness of the problem grows, and as public involvement in transportation planning and development is increased, it is even more essential that we develop criteria or measures of effectiveness.

Just what for example will be the long range cost-benefit ratio of funds devoted to supersonic aviation if it takes the air traveler as long to get from the airport to his office or home as it does to get across the ocean.

And what frankly is the cost-benefit ratio of the multi-billion dollar six lane, super highway in an urban area jammed during the journey to work hours—some four hours each weekday and lightly used the remaining twenty hours? This every day sight has highlighted the need for good highway utilization studies and more effective traffic control. At present, highways are poorly utilized because of a lack of adequate traffic control.

The shift in emphasis to a total rather than fragmental transportation system has highlighted the need for a balanced research and development policy in the technology of transportation and for a better means to evaluate the productivity of each mode within a transportation system.

THE SHIFT TO A MORE COMPREHENSIVE APPROACH TO TRANSPORTATION'S ROLE IN THE URBAN ENVIRONMENT

The second shift in emphasis springs from our recognition of the intricate relationship between transportation and the entire community—its land use, its livability and its economic and social health. This inter-relationship is especially felt in urban areas where the scarcity of land and the high population density make the impact of transportation even more acute.

In a metropolitan area, unlike rural areas where it is a relatively simple and uncomplicated matter, the taking of land for transportation facilities in densely populated areas can have a serious impact on the total life of the community. It can involve the destruction of homes, the reduction of the real property tax base, the isolation and deterioration of neighborhoods, and the threatening of historical and conservation values.

Urban society not only depends on transportation for its existence: it is shaped in major dimensions by transportation. The dispersal phenomenon has been made possible by transportation, but extended suburban development has in turn created many of our problems, frustrations and challenges of today.

That transportation will continue to mold metropolitan regions is obvious. But the question before us all is how will it mold the future of these regions. Will it help enhance urban living or will it cause strangulation and stagnation? Can we make transportation a positive ally in our efforts to create a better urban environment?

The shift to a more comprehensive approach to transportation's role in the urban environment requires that transportation decisions in the future be made on the basis of research indicating the effect a particular facility will have on such factors as public health and safety and elements of land use such as trends in industrial development and employment, new residential developments and aesthetics.

Historically, transportation facilities have not been established with sufficient regard for their impact on population distribution and land use. Conversely, land has been subdivided and whole communities built without analysis of the burdens they would create on existing transport or the pressure for costly new transportation facilities.

But now, thanks to modern methods of data gathering, statistical techniques and electronic data processing, we are able to make reasonably good projections on what the

future population and its distribution in a region will be, given certain sets of circumstances. We can estimate, for example, the travel which is likely to be generated by different densities of land occupancy—the single family dwelling, the high rise apartment, "the apartment city." On this basis, we can project needed transportation facilities.

Conversely, we can also know the capacity of the existing transportation systems and what can be done to add to their capacity. We can also judge the probable impact of improved new transportation facilities on land use.

In the New York Metropolitan Region, the Tri-State Transportation Commission is conducting a long-range transportation-land use research program.

Information on travel patterns of people, movement of goods and uses of land has been compiled. All of these facts are presently being fitted into a plan testing technique that will allow the Commission to take alternative land use and transportation plans—add them to the existing inventory of information—and simulate the impact which they would have if plans were actually implemented.

For illustration, we shall be able to demonstrate what is likely to happen if the region continues on the basis of its past unplanned sprawl. We can indicate what would be likely to occur if severe restrictions were put on the use of present open space and were reserved for greenbelts—or if New York City added to its skyscrapers or if such suburban and ex-urban centers like White Plains, Mineola, New Brunswick, Bridgeport and the like became "hyrise" with so called greenbelts in between—and of course various permutations on these themes.

Armed with this research information, policy makers should be able to make more intelligent and rational decisions than ever before possible.

A comprehensive approach to transportation also requires increased technological research on ways of lessening the impact of adverse effects of transportation. Low cost tunneling methods for example would greatly ameliorate the disruption caused by new transportation facilities. And the increasingly important necessity to reduce air pollution caused primarily by the automobile would also improve urban living.

The total cost-benefit ratio of an investment in transportation must be measured then not only in terms of its contribution to the total transportation system, but also in terms of its contribution to orderly urban development.

THE SHIFT TO A REGIONAL APPROACH

The urban transportation problem is essentially a regional problem. It has little regard for the traditional lines of political jurisdictions. It spreads across towns, cities, counties, and, in some cases, states.

In our urban areas, individual local units of government cannot control many of the basic causes of their transportation problems, nor are they equipped with all the legal and financial resources necessary to cope with these problems which spread beyond their boundaries.

The New York Metropolitan Region, for example, is essentially one unit from the point of view of the demand for and supply of transportation facilities.

But though united economically by this and other factors, the Region is divided by numerous governmental jurisdictions. It embraces parts of three states, 22 counties, and over 1,400 local governmental units, not to mention the federal government with its constitutionally mandated concern for interstate and foreign commerce.

If metropolitan areas are to meet successfully the difficult challenges they face now and in the future, there is really no alternative to a regional approach. The regional approach obviously means that research must be broader in scope, but it also means that if we are to effectively utilize the modern computer and systems analysis techniques, we have to develop a more uniform basis for data.

One of the immediate problems is to develop a uniform geographic reference system which is not based solely on the boundaries of political jurisdictions.

In the New York Metropolitan Region, for example, the Tri-State Transportation Commission has found it useful to devise, jointly with the U. S. Bureau of the Census, a new system which gives all locations a coordinate designation—longitude and latitude or X and Y positions. While the old names are retained, they now have an identification telling where they are.

The regional nature of the transportation problem highlights the whole problem of data comparability among states and areas. This problem is in some degree handled by the statistics of the Census Bureau and other federal collection agencies. The \$8 million program to improve transportation statistics originated by the U. S. Department of Commerce is expected to produce a degree of standardization of statistics which will be of great use to all. Although this program, now being carried forward by the new federal Department of Transportation, will concentrate on inter-city transportation, the methods utilized will hopefully also prove useful in gathering information on transportation within our large metropolitan regions.

More research work also needs to be done on specific elements of transportation such as tracing the movement of commodity goods and inter-city bus travel.

Better statistical data will greatly help the metropolitan regions of this country in their efforts to more effectively formulate future land use-transportation plans on a regional basis.

THE SHIFT TO INTERGOVERNMENTAL COOPERATION IN TRANSPORTATION

Given the regional nature of today's transportation problem, its solution requires a new order of intergovernmental cooperation. It requires a new definition of public responsibility and new intergovernmental machinery to cope with this responsibility.

Fortunately, this is taking place. For a new level and new dimensions of meaningful cooperation between the local, state and federal levels of government have been achieved—a level and dimensions that only a few years ago would have been improbable and fifteen years ago impossible.

A number of factors have been responsible for this shift. On the federal level, for example, Congress has taken action to require regional planning activity as a prerequisite for federal highway aid and also for monies granted by the Department of Housing and Urban Development. Congress has also enacted federal aid legislation to specifically assist in meeting the capital needs of urban mass transportation. The creation of the new Federal Department of Transportation is a recognition of the importance of developing a comprehensive transportation policy.

One of the most important reasons for the increased intergovernmental cooperation in transportation has been the development of positive state leadership in transportation. This state leadership was not born out of, nor has it resulted in, any desire or action on the part of the states to usurp municipal or local transportation responsibilities. Rather, state leadership has been based on the recognition that the states must play a vital role in helping to meet the regional transportation problem.

The states are in the logical position to provide leadership in bringing about regional, local, state and federal cooperation. They can serve as the instrument for the coordination of the aspirations of individual localities and for the necessary federal support and participation looking toward a comprehensive program for total regional development.

This new era of state assumption of responsibility, leadership and concern for transportation which has developed over the past seven years or so, has resulted in dramatic, in fact startling, changes in the types of government structures involved in transportation. These changes have been and will continue to be a response to a type of research that I have not yet mentioned—research which is not social, not economic, not technological, but essentially political.

For the states, in researching—in searching for—new mechanisms to cope with regional transportation problems have brought about a profound and dramatic restructuring of public transportation bodies. The states have, in fact, displayed a degree of innovation, flexibility and breadth that many thought them incapable of achieving.

Indicative of this surge in state action is the fact that state Departments of Transportation have become a subject of discussion and action throughout the nation. New Jersey has one; Hawaii and Wisconsin have similar arrangements; and the Governors of Connecticut and New York have called on the state legislatures to create one—to mention but a few examples.

But even more dramatic has been the willingness and ability of states to develop new intergovernmental machinery to cope with regional transportation problems. For the

Boston, Atlanta and Philadelphia metropolitan areas, to cite a few examples, the states have brought about new inter-local cooperative arrangements often enlisting federal support and participation.

In the New York Metropolitan Region, we have been fortunate in the foresight and leadership of our state leaders, Governor Rockefeller in New York, Governor Hughes in New Jersey and Governor Dempsey in Connecticut, who five years ago established the Tri-State Transportation planning program.

The Tri-State Transportation Commission, charged with long-range transportation-land use planning for the entire 3 state, 22 county Region, represents a unique partnership of local, state and federal agencies. The members of the Commission are the very persons who have policy and operational responsibilities at the federal, state and local level, and the work of the Commission is financed with state and federal funds.

And now, there are in the three states, regional transportation operating agencies which have the power to implement the recommendations of the Tri-State Transportation Commission—the New York Metropolitan Commuter Transportation Authority, the Connecticut Transportation Authority and the New Jersey Department of Transportation, with its Commuter Service Agency.

As a next step, Governor Rockefeller has recommended a new program for the coordination of prime transportation agencies within the New York State portion of the New York Metropolitan Region. This would involve making the MCTA board responsible for unified regional policy direction and control by its assumption of responsibility for the activities of the New York City Transit Authority and the Triborough Bridge and Tunnel Authority.

In addition, Governor Rockefeller has also recommended a massive Transportation Capital Facilities Bond Issue in an amount sufficient to meet, on a balanced basis, transportation needs throughout the state.

I believe that these actions illustrate the sweep of the new state leadership in transportation. They represent the type of action which other states will, in all likelihood, take in the years to come.

The developing and increasing concern of the states for improving transportation and their willingness to develop new structures to cope with the problems bodes well for the future.

If new structures are to be effective, they must assure that planning for transportation, research on transportation, and the operation of transportation facilities are all closely related.

Unless planning and research take cognizance of actual operating conditions and problems, the potential contribution that sound planning and research can make towards improved transportation will not be realized. Conversely, unless those responsible for operations are receptive to the findings of the researchers and planners, the possibility of improving transportation services will be greatly minimized.

The Tri-State Transportation Commission is an example of an intergovernmental structure which links planning, research and operations. The functions of the Commission itself are planning and research, but its members are the very persons who have policy and operational responsibilities at the various levels of government. This structure thus provides for close relationship between those who are conducting the research and developing the plans and those responsible for utilizing the research and implementing the plans.

A true partnership of the three levels of government—state, local and federal—is essential for the achievement of a truly total, comprehensive and regional transportation policy. This, combined with the best efforts of the transportation industry itself, is the key to supplying the momentum needed to solve the metropolitan transportation problem.

Experienced research organizations such as the National Academy of Sciences and its Highway Research Board can be of great assistance to public transportation agencies. The collaboration of the states and the federal government through the Highway Research Board is an outstanding example of the pooling and exchange of research that has helped to make the American highway system an example for the entire world.

I am hopeful that a comparable, comprehensive effort on the urban mass transportation problem will hasten the time when we can point to equally visible results and take equal pride in accomplishment.