

Feature Articles

LOCAL ROADS AND STREETS:

An Important National Asset

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Transportation has always been important to the development of this country or any other country. It has often been said that one can know the history of a country by reviewing the development of its transportation system. Certainly transportation has been most important to the United States. That was true in 1776, it was true in 1876, and it is still true in 1976.

To travel across the United States in 1776 was almost impossible. And to make that trip by sailing around the tip of South America easily took 6 months. By 1849 a trip by covered wagon from the east coast to the west coast still took 166 days. About 25 years later the same trip took 11 days by train, and today it takes 5 hours by plane.

Two hundred years ago the average human life expectancy was about 35 years. One did not think about a 40-hour work week but worked as long and as hard as the body would permit. The conveniences were few, and an epidemic disease was expected yearly. Most persons lived and died in the communities in which they were born, often never traveling more than 32 km (20 miles) from their birthplaces.

But many significant inventions, sizable population growth, abundant resources, and a democratic society dedicated to freedom of the individual transformed the op-



portunities of 1776 into a great modern society. Among those inventions were several significant ones in the field of transportation: the locomotive, the motor vehicle, and the flying machine.

This country was primarily an agricultural society until after the Civil War. About that time the industrial society began and continued well after the post-World War II period. During that time people left the farms in large numbers to live and work in urban areas. I believe we are now entering a post-industrial society that is based on services.

These changes in national effort brought many changes in life-styles and increasing demands for transportation. In the agricultural society, people were heavily involved in exploiting natural resources: agriculture, mining, forestry, and fishing. Life was controlled by nature: the seasons, the soil conditions, and the amount of rain. Work was done by the power of the human muscle. Transportation needs were few, for families were relatively self-sufficient and needed to travel only to obtain those things they did not grow or make.

The industrial society shifted the work to the production of goods. It created a technical, machine-dominated world in which people live by the clock. Mechanical or electrical energy replaced muscle power. People became dependent on others for most of their necessities, and most things they used had to be transported to them. They made daily trips, usually all at the same time. They had considerable leisure time and enjoyed the freedom to travel.

In the service society, that age we are just entering into in this country, the central person is the professional—the one who by education and training can provide the skills

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that the service society demands. Muscle power or energy is not so important as information. The services are primarily technical and professional in the areas of education, health, research and development, data processing, government, and management. Workers are shifted from producing goods on the assembly line to watching dials, repairing machinery, and managing the system. This requires more education but brings a higher standard of living for many and increases the demand and ability to travel.

Transportation is older than recorded history, and difficulties with transportation are just as ancient. In the early years of this country, transportation facilities were not much different from what they are today. Highways had to be built. Streets had to be paved. Waterways had to be developed, and later railroads had to be laid. Initially each was carved out of the wilderness. As the population grew and as cities developed during the industrial society, congestion and accidents became commonplace. In the early 1900s, Detroit experienced 30 fatalities for every 161 million km (100 million miles) traveled, mostly by horse-drawn vehicles.

Population growth has probably been the major factor in the demand for transportation and the growth of transportation problems. What results in more traffic problems than 10 000 Americans driving to work at 8 a.m. in a particular corridor? The answer is 20 000 Americans doing the same thing. In 1800, this country had approximately 5 million people. By 1880 there were 50 million, by 1920 106 million, and by 1976 about 215 million—40 times the population of 1800, 4 times that of 1880, and 2 times that of 1920.

But travel has grown even faster, especially in recent years, and much of it has become concentrated in urban areas. There were more than four times as many passenger-kilometers of travel in 1976 as there were in 1946, only 30 years ago. In the same period of time, the megagram-kilometers of freight have more than doubled. Of significance is the fact that about 90 percent of the intercity and 98 percent of the urban passenger-kilometers are by highway modes. About 20 percent of the megagram-kilometers of intercity freight also move by a highway mode, and a much larger volume of urban and other local freight moves over city streets and local roads.

Perhaps the major contribution that transportation engineering has made throughout the 200 years of national growth is that it has continually improved the ability of the transportation system to accommodate the rapidly growing travel demands. A person can travel farther, faster, more conveniently, more comfortably, and safer than ever before in human history. Millions of people can and millions of people do. We cannot picture our daily activities—jobs, social life, family life—without transportation—the airplane, the railroad, and the motor vehicle.

The United States has a transportation system that is the envy of the world. More people and more goods move with better efficiency here than in any other place in the world. That is a major contribution of transportation engineering to our bicentennial year.

But one may ask, If we have a great transportation system that is the envy of the world, then why have we had all this antihighway talk during the past several years? Why have so many tried to sell us some great new transport mode? Why is it so difficult to get funds to maintain and rebuild the system we have? Let me suggest some answers.

New transport modes, such as personal rapid transit that will whisk you from your home to wherever you wish to go, are not around the corner. They are technically possible, but the costs of such systems are so high that they are not realistic. Proponents of such systems and even those who once thought public transport would solve our transportation problems do not recognize that the strength of the highway system is in its local roads and streets. And that is because they meet the objective of travel, which is to get to some specific place from some specific place. Those specific places are everywhere, but they are all connected by local roads and local streets.

Those who tell us there is a better mode are thinking only of through corridors of heavy travel, and in some of these corridors other modes are better than the private automobile for some trips. But all of these corridors do not make a complete transportation system by themselves. A complete system must also include those facilities that provide access to every specific place: the local roads and streets.

Why then do we not provide sufficient funds to maintain and improve this access system? I think the primary reason is that people are not aware of the need. They assume that maintenance is being performed and that there are enough funds for doing so. As highway engineers, we have done little to make the public aware of the importance of local roads and streets and their needs. We are not selling our product.

In August, the Federal Highway Administration published the latest study of the cost of motor vehicle ownership and operation. It now costs 11.1 cents/km (17.9 cents/mile) to operate a standard-sized 1976 automobile during its 10-year life. Federal and state taxes, mostly for highways, are only 8.7 percent of that, a little over 1.5 cents. Automobile insurance costs more than that. And when insurance goes up, owners pay it because they know they need insurance. They forget how much they need the roads to their homes and how much they cost. Let me note that, as highway engineers, our obligation is not to judge or assess the community's ability to pay. Our obligation, however, is to protect the community's assets by telling people clearly what must be done to protect and improve the road assets of the community—not just tell either, but sell them.

What are the challenges of the future?

Important areas that must receive attention are the adverse impacts of transportation on the natural environment, air and noise pollution, energy resource depletion, and community disruption. The application of technology from research has already resulted in substantial contributions in the air and noise pollution areas. Technology will also contribute substantially in the energy use area. As



important as technology, however, is the management of the system to minimize detrimental impacts on the environment and on communities. This may mean restrictions or even prohibition on use of elements of the system in some areas. Certainly it means proper use of the available modes where they will adequately fulfill the objectives of transportation and where they will also be most beneficial (or least detrimental) to the environment and life in the community. Transportation has already contributed much to a better life in this country and must continue to have the goal of not only improving transportation but also improving the quality of life.

The time is past too when we can afford the luxury of being wasteful of transportation facilities. We must make better use of the facilities we have by improving operational techniques, imposing beneficial controls, providing better guidance information, reducing delays, and managing traffic better. Perhaps this will mean traffic-restricted zones, more transit, car pooling, traffic progression, or

even techniques not yet developed. In addition, there are many simple little things we can do to make transportation better. For example, erecting a STOP sign where a YIELD sign would do the job adds about 2 seconds to every trip through that sign, adds a fraction of a cent to operating costs, adds pollution, and causes more fuel to be used. These effects are small, but added together for all intersections and for all cars they total to hundreds of thousands of hours of delay and millions of dollars of unnecessary cost.

We must expand our efforts in highway safety. Highway design and traffic operations must continue to concentrate in this area. The fatality rate of 3.5 for 1975 can and must be reduced even further, for 45 000 fatalities a year are still not acceptable. Every transportation engineer knows of hazard improvements that should be made and operational techniques that should be applied. We must continue to seek the funds that will permit these to be accomplished as quickly as possible. We must also promote uniform laws and uniform devices, expand driver education, seek safer vehicles with restraint devices, improve emergency aid, and institute all other effective safety programs.

The transportation engineering profession must also accept its responsibility to continually seek adequate funds to do its job correctly. We cannot be satisfied with having the expertise to provide better transportation provided we are furnished the funds. We must constantly inform the public and especially those elected officials who make the decisions relating to use of available funds. We must do more than defend what we have done. We must aggressively point out the needs and the costs and the benefits of eliminating those needs. We must accept the responsibility for obtaining funds for adequate transportation.

Clearly, transportation has been and is an important factor in almost every facet of our lives. We have a tremendous asset in our transportation system, and most important to that system is the access provided to everywhere by local roads and streets. We will be remiss if we allow these facilities in which we have made a tremendous investment to deteriorate.

