

## HIGHWAY PLANNING FOR COMMUNITY SERVICE

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Highway transportation, by its very nature, is short distance transportation. This being true, it follows that highway planning, at its best, aims first at meeting the transportation needs of communities, and serves the needs of wider areas by the judicious integration of community plans. This principle is accepted by those who know the pattern of highway use as it has emerged through the long and painstaking studies of the State Highway Planning Surveys, which are now well into their second decade as a cooperative undertaking of the State highway departments and the Public Roads Administration.

There has been much misconception of the component parts of highway traffic, the relative percentage of each part and the type of highway development that would most adequately meet the major service requirements.

In the early consideration of Federal legislation to advance modern highway improvement, there were many who held that the Federal Government should concern itself only with a system of national highways to function as transcontinental routes. There has been, from time to time, considerable support for the theory that such roads could be built on the basis of tolls, and thus become self liquidating. These ideas have not completely disappeared and there are still some advocates who hold persistently to the idea of national highways as such, even though transcontinental travel is known to be so small as to be relatively inconsequential.

Those who cling to the national highway idea have an apparent precedent in the national highways of France. From the time of Louis XIV the French nation has borne the responsibility for providing a system of main highways, inspired undoubtedly by the historic system of the Roman Empire. It is to be remembered that when both the French and Roman systems were conceived, all land transport was by highway. The highways were built primarily to hold and to administer a far-flung domain, which was the purpose of the Roman Emperors, or for military aggression, which may have largely motivated Napoleon. In recent years the German Autobahnen are now commonly believed to have been inspired by a similar vision of world conquest.

Fortunately, in our Federal legislation quite a different concept prevailed - that of aiding the States through national grants to develop a road system best suited to the needs of their particular areas. The major prerequisites of such grants are a competent State highway administration and a predetermined system of highways to be improved, integrated between the States, that would in the end produce a national coverage, but which would in its maturing leave to each State the initiative and direct control of the work within its borders from year to year. This plan fitted the conception of State-Federal relations written into the Constitution of the United States. Its practical operation through the years has been well demonstrated by the great service the war years demanded from our major highways. We look back now and appraise results. It is not conceivable that any other plan, in the relatively short interval between two world wars, could have produced so extensive a

system of highways or one that would function as well as did ours when the very life of the nation was in jeopardy. But the need for the complete mobilization of our resources disclosed some inadequacies in the Federal-aid program.

Highways bring food from the farms, minerals from the mines and timber from the forests. The highways in industrial districts became essential elements of the assembly line. New plants were built where labor was available. Highway transportation was required to get both the workers and the materials to the plants. The almost complete absorption of material resources and labor by other war essentials imposed great obstacles to new road building, and taught the lesson that the highways essential to the national defense must be built before and not after the emergency arises. With the experience of the war years standing out in bold relief, the Congress formulated a more adequate development plan, and enacted the Federal highway legislation of 1944. This legislation provided a balanced plan to meet previous lacks.

Engineering techniques, construction methods, and mechanical equipment have advanced far beyond the organization of administration to secure a high degree of efficiency. This is the result in part of the almost fantastic number of jurisdictions in limited areas which have responsibility for highway and street development. Many attacks have been made upon this problem, usually by an overall authority to accomplish specific undertakings. Some are highly successful.

The 1944 Federal highway legislation has for its major purpose the promotion of local, State, and Federal cooperation in the development of

systems of roads selected by agreement of the proper officials, and fully integrated to provide for traffic which is highly independent of jurisdictional boundaries. Four general categories of roads are recognized. Provision is made for aid in their improvement in cooperation with the States and local communities. First, the Federal-aid system of intercity routes, which includes the major traffic-flow lines of the nation. Second, the feeder or secondary roads made up of the principal farm-to-market rural roads, generally feeding into the Federal-aid routes. Third, urban routes which carry the Federal-aid routes into and through the cities. The selection of the routes has been left initially to the highway officials directly responsible. For the secondary system and the urban roads the State highway department makes the recommendations after consultation with the local officials. Fourth, the designation of a limited system of interstate highways was authorized. This system - now nearing final determination as selected by the State highway departments and the Public Roads Administration, with an aggregate length of about 40,000 miles - comprises only about one percent of the total public road mileage. It will carry upwards of 20 percent of the nation's traffic.

Perhaps this pattern for a long-range development can best be visualized as a vast net spread over the whole of the United States. Within the structure of the net the individual cords are of unequal size and strength. A limited number extend between and tie together the great population clusters grouped around major cities from coast to coast. These represent the interstate arterial highways. Next in order are the cords of the Federal-aid system - nearly six times as long as the interstate

arterial system. They fill the great areas between the major routes, tying these together and extending to every population center of any size. Extensions of this system reach into and around the urban areas much like the rim and spokes of a great wheel. These roads, developed with vision, will do much to stop the decay of our cities at their centers. They will help to prevent the attendant vanishing property values, and the accelerated growth of blighted areas which are the product of traffic congestion, lack of planned land use, and the failure to create attractive opportunity for investment of private capital. The redevelopment of our urban areas is a whole book within itself, but what is or is not done will affect every property owner in such concentrated population and industrial areas as northern New Jersey.

The fourth and final group of roads, more extensive in mileage than all the other systems, in total, are the secondary or feeder roads. These tie together the coarser meshes of the Federal-aid system. Their purpose primarily is to serve the land with all-weather roads. It may escape the urban citizen, beset with traffic ills, that he is also vitally interested in the problem of farm roads. But it is certainly true that a stable agricultural population well served by adequate highways is essential to the well-being of the urban populace, particularly the industrial communities, and to the nation's economy as a whole.

These four categories of roads, then, completely integrated, define the objectives of the Federal-State cooperative program. It is a long-range undertaking, but every project must fit into the overall pattern and thus become a part of the ultimate road system, and each project

should be designed to perform its function adequately. Federal highway funds are apportioned to the different classes of roads so that each class will benefit annually by aid from this source. The inauguration of each annual program is the initiative of the State highway department. Highway research, both physical and economic, painstakingly carried forward over many years, has developed scientific methods and principles with which the highway administrator and engineer are now equipped. The economic planning of the highway systems and the structural design of their elements are no longer subject to rule of thumb or opinion determination.

The chemical and physical laboratories control the materials of construction and determine their service values. The economic studies are predicated largely upon the requirements and behavior of the highway user. The highway planning surveys, inaugurated in 1935, have given the highway officials throughout the nation an accurate knowledge of the quantity and character of the traffic which uses the highways. It is upon this overall use that the choice of systems largely depends. Among these systems and within each system itself there is a wide variation in the type of improvement that is needed. The use of the motor vehicle has become so universal that the highway official determines first what highway services are required by the user, and upon this foundation plans the facilities to meet them. Here is no preconceived opinion as to what the user should want, and no effort to attempt involuntary regimentation. With this approach to planning, the facilities must be in harmony with the requirements of the majority of the individuals and their requirements

in each community. One of the road planner's tools now relied upon is a type of planning survey which goes far beyond the mere counting of the number and kind of traffic and, particularly in urban communities, has extended to the determination of individual needs through the origin and destination surveys. This latter type of survey is particularly necessary in the urban communities. With reasonable accuracy the requirements in rural areas can be determined by the number and character of the vehicles that are moving, but a very different situation confronts the highway official in metropolitan areas. In these, a study of the movements of passenger cars, trucks, and busses is not sufficient. He needs the basic measure of the travel of individuals themselves, whether by private car, by bus, by street car, taxi, or rapid transit. In the city, effective planning calls for a detailed knowledge of the daily movement of masses of people and the provision of facilities for that movement by whatever type of vehicle is indicated as most likely to be chosen. Of course, to supplement that knowledge there is required an equally detailed knowledge of, and the provision of appropriate facilities for, the movement of goods. The amassing of such comprehensive data might seem to be an almost impossible undertaking, but it has been found to be entirely practicable. With assistance from the Bureau of the Census, the Public Roads Administration and the State highway departments, in the last several years, have developed methods that have proven 90 to 95 percent accurate in their determination of the way in which individuals are using transit and other travel facilities within the urban areas.

One of the most difficult surveys of this character that has been undertaken is in this Newark district. Here the problem was highly complicated by the existence of more than 50 municipalities in the area covered, with an overall population of a million and a half people. The results of this survey are now in process of reduction to usable form. The State Highway Department is to be commended highly for the thoroughness with which the data were secured, and we have high confidence in the conclusions which will be drawn from the detailed factual information. Projects which are to be financed in part from Federal-aid funds must necessarily be in harmony with the findings of this highly determinative survey. It is not appropriate here to go into all the whys and wherefores of these detailed traffic surveys, but anyone who has had occasion to go through one of the great medical clinics has experienced how careful a record is developed of the functioning of the organs of the body before a diagnosis is made of the ailment or a treatment prescribed for its cure. This highly professional approach to the treatment of disease is much the same as the methods applied now to the planning of highway systems and the design of the individual elements by highway technicians. Eighty-five percent of the origin or the destination, or both, of the traffic, lies in the urban districts. In such a concentrated industrial area as that surrounding Newark the percentage may be even higher. A considerable percentage of the traffic using the downtown city streets - recent studies show as high as 45 percent - may be destined to other parts of the city. Such traffic imposes an unwanted and unnecessary burden upon the business streets. On the other hand only a relatively



small percentage of the traffic normally may be bypassed around an urban area of any appreciable size. These facts taken together indicate the necessity of carrying traffic through the urban areas, in close proximity to the business districts, but with provisions for separating the through and the local traffic. The conflict between these two is a real factor in the present congestion and accident hazards of our principal business streets. These conditions indicate the need for some highways of materially different design than the conventional city street or rural highway.

The controlled-access highway meets the requirements of speed, capacity, and safety. In this type, foremost is the provision for access (or exit) at predetermined locations with the approaches arranged to feed into the main stream directionally. Cross traffic at grade is eliminated. Generally, the opposing traffic flows are separated by a median strip and, where needed, separate frontage roads are provided to serve nearby property. In some cases provision is made for different types of traffic. This has not been so evidently necessary in the United States as in other countries. In Holland, for example, separated paved ways are provided for bicycles. Perhaps in urban areas more emphasis should be given to this type of traffic. Understandably, this type of highway takes wider right of way, and in the urban districts this is a very real obstacle.

In urban and suburban areas where large peak volumes are certain to occur, the provision of shoulders wide enough for accommodating any type of vehicles is essential, but the surface should not encourage their use as a traffic lane. The evidence supporting this need is piling up. The original narrow shoulders of the German Autobahnen proved a defect

even with an over-capacity in the pavement width. Because of the width required to provide the necessary features, including shoulders, the depressed type of construction is generally considered preferable to the elevated highway, and should be used where practicable. Experience has demonstrated that an additional lane is necessary to insure the capacity functioning of the other lanes of an elevated highway. This is an important element of cost which should be taken into consideration in choosing the type. Quite understandably the first reaction on the part of the highway official or the public at large is that the controlled-access highway is very expensive. This results from our thinking in terms of the cost per mile, which has long been our unit of measure, rather than the cost measured by vehicle capacity per lane per hour. Some such cost unit will have to be used in the future to get a real cost appreciation of plans to relieve urban congestion.

One well designed four-lane expressway will carry the same number of vehicles, at nearly double the average speed, as five 40-foot wide ordinary city streets on which parking is prohibited, and under favorable control of cross traffic from intersecting streets. Under less favorable conditions, eight 54-foot wide city streets on which parking is permitted would be required to carry the same volume of traffic that may be carried on a single properly designed four-lane, controlled-access highway. These comparisons are so startling that many well informed people will not easily accept them. However, the proven lane capacity per hour is a fair measure to use for cost comparison rather than the per mile cost without qualifications as to capacity. The per-hour

capacity is all important in meeting the problems of urban congestion, because it is the normal pattern of morning and late afternoon periods of peak traffic which ties our arterial streets into knots.

Also, the safety record of controlled-access highways is excellent. The Arroyo Seco Parkway in California compared to major city streets in the same vicinity has five to eight times less fatal and personal-injury accidents. The Merritt Parkway in Connecticut has shown the low record of 3.5 fatalities per one hundred million miles of vehicle traffic. At the time of the President's Highway Safety Conference in May 1946, the national average was 12 per one hundred million vehicle miles. This record has since been materially reduced, but as yet stands at eight.

Controlled-access highways have been in operation for periods sufficient to establish reliable records of their functioning which justify confidence that this type of design can be used successfully for major traffic relief in the Newark area. A careful approach to the details of location and design is essential. There are perhaps no typical urban areas, particularly as to the most needed arterial traffic facilities. Recent travel habit surveys have been made or are in progress in 54 urban areas in 26 States. The extreme variations which are thus disclosed indicate how essential are the thorough analyses of the economic data for each specific community, to be followed by detailed engineering studies to determine the design for each major project. It is hardly necessary to suggest to the Joint Council of Municipal Planning Boards in Essex County that a long-range plan includes not only the arterial

routes but their proper integration with existing streets which will involve efficient traffic control, parking facilities, interchanges, and coordination with other transport facilities. Very fortunately, much of the economic data has been gathered. The spirit of cooperation evidenced by this gathering, which brings together representatives of the communities, the State, and the Federal Government, can very well motivate the development of a thoroughly sound, long-range program that will best serve this important industrial and residential urban area. Certainly our best wishes and the assurance of such assistance as we may extend are wholeheartedly yours.