

## WHAT IS EXPECTED OF OUR HIGHWAYS?

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Such a simple question would appear to have an easy, almost obvious, answer. But place this question before ten individuals and it is likely there will be ten different answers. Extend the inquiry further and the answers will continue to vary widely and to be limited only by the number of groups approached. Each of these reactions may be different, may be even antagonistic and yet be wholly sincere and logical taken singly as related to the individual or to one group. Not only is this wide variation existing now, but the greatly desired highway services of the moment are quite different than those of five or ten years ago and much different than we must believe they will be in the future.

Is there any wonder the highway official and highway engineer ask in bewilderment, what is expected of our highways? To no group is this question quite as important as to the members of the American Association of State Highway Officials. The success or failure of each State highway department and of the Federal Bureau of Public Roads will be very largely determined by the degree to which the public's expectations of at

least reasonably adequate highway service are met, regardless of limiting conditions. At the moment there is a decided trend toward criticism of highway administration and the highways that have been produced. It is a situation to be met frankly. The public are entitled to, and must have, full information upon highway policies and the indicated needs. The public must be taken into full partnership in the matters affecting the highway budget and the highway program of maintenance and construction. Not until these are accomplished facts will the highway officials have fulfilled their responsibility or have done everything possible to secure public support. Over a long period, the progress made in each State will depend upon the confidence and support extended by the public upon the basis of information supplied by the highway departments.

When the full situation is intelligently disclosed and supported by the facts, the responsibility for providing the necessary legislation and adequate support funds rests fairly upon the State as a whole. Whatever failure there is then can not be charged against the highway officials.

The United States has been passing through a period of highway transportation development that has no parallel in any country and that can not possibly be paralleled here by a similar experience in the future.

What have we expected of our highways? In the year 1923, there were in operation 15 million motor vehicles. Now, in 1937, 14 years later, there are in operation more than 28 million - an increase of nearly 100 per cent.

In 1960, it has been competently estimated,\* there will be 37 million motor vehicles in operation, which would mean an increase of 32 per cent in 23 years. But in 1923 when the number of motor vehicles was one-half that of today, the normal speed was about one-half to two-thirds the present normal speed of passenger cars. Yet it is easily remembered that the public expectation, - rather, its vociferous demand, - in 1923 upon the highway builders, was not to provide roads that in 14 years would carry two vehicles for each one, and these moving at unforeseen higher speeds, but to build surfaces with the greatest possible economy to permit stretching the dollars over the maximum mileage of main routes as yet impossible for motor traffic in wet weather. No matter how far visioned, the highway designer was dealing not with the future but with pioneer necessities. To criticize what has been done only displays ignorance of the conditions that were controlling.

What do we now expect of our highways?

Evidently the first answer is that the public expects the highways that are being built today during their reasonable

\*See Charles F. Kettering - Motor Vehicles and Highways of the Future.

life must carry an additional traffic load of 32 per cent in number of units and an additional unknown per cent due to the increased per unit use. In these we find factors of change that may with some degree of certainty be provided for in highway design.

But what do we expect of our highways in other respects? Is it expected that highway transport is to be so changed as to take on the major characteristics and services of rail, air or water transportation? It is true that the fitting of each type of transportation into the national economy where each can perform its most efficient service and develop its own most useful characteristics is difficult and as yet far from completed. But the pattern is gradually emerging. In this the great utility of the motor vehicle for local transportation purposes becomes constantly more apparent. While this is not in any sense intended to be a discussion of types of transportation, so much is necessary as a background for the conclusion that to develop the highways of greatest service we must hold steadfast to the planning and building of adequate local systems in both metropolitan and rural areas. There should be no need for uncertainty if the facts available are properly evaluated. It will be most helpful to highway administrators when the public makes up its mind that highway transport is not fitted to invade the fields of mass transportation

and heavy hauling over long distances which belong to rail and water transport, or to emulate the speed characteristics of air transport.

There is too much hazy thinking. There has been too much of the spirit of controversy and too little hard study and analysis of the transportation services required or desired by the public for the purpose of adjusting these to the best transportation method or combination of methods.

In the highway field new policies and new activities that are now under way give assurance that the future of highway development will more and more rest upon sound research. The list of progressive steps is impressive and at the top as the major undertakings are the State-wide planning surveys now in progress in 43 States. Many of the States are rapidly reaching the second stage of the highway planning surveys. The field surveys and the gathering of the factual data have been large scale operations and have required State-wide organization and direction. In general, these surveys have been satisfactory in the thoroughness and quality of the material gathered. While this first stage is important and necessary, the second stage, - the analysis, assembly and study of the survey data, - is more important than what has been done. A vigorous attack upon the mass of accumulated data is required to bring the several kinds of factual information to understandable and usable form. This

will not be accomplished easily or quickly. It will require the most intelligent effort of which each department is capable. It is the most worth while task ahead to which the commissioners and chief executives of the departments can give their best efforts and ample time. The factual data must be squeezed dry of pertinent information to be used as a foundation for a sound future highway administration program.

But from this effort intelligently and painstakingly carried to completion will emerge a true pattern of the present use, of the indicated needs, of the strength and weakness of our highways, State by State. It will be possible for the first time to bring the income and the demand for expenditures into parallel columns. Likewise it will be possible to correct legislation that is now out-moded and to formulate new legislative policies based on factual information.

Coordinate with the highway planning surveys, is the work of the Special Committee on Administrative Design Policies of this Association. While this Committee has just held its second session, this does not mean that the Committee must start at the beginning to develop design information. The policy of the Committee is to review all the previous results of research and the studies which have been made in the field to bring this all-pertinent information together and by this means to disclose

the blind spots in existing information. It has immediately become apparent that many of the practices developed through research, on which we are now relying, must be discarded or materially modified as a sound basis for design practice because of the changed conditions. The major subjects will be considered in so far as possible in order of importance. For example, the first subjects are highway classification and sight distances. As rapidly as policies are formulated that are in agreement with the best information that can be secured, these design policies will be made available to the members of the Association and will become effective for the Federal aid highway development.

Unquestionably we will look back upon the substantial program of railroad-highway grade crossing elimination as one of the most advanced and productive undertakings of this period. Since the Public Works program started in 1933, there have been 3,506 new projects programmed for elimination or reconstruction of existing inadequate structures. Of this total, 66 per cent are now in service. It must be remembered that these projects are selected as nearly as possible in the order of their importance on the basis of the combined railroad and highway traffic carried. This means that we are rapidly doing away with the most important and therefore the most dangerous crossings in every State. In addition to the crossings eliminated, there have been during the same period, 2,249 projects programmed for protection.

While it is admitted that only the actual elimination of grade crossings is a solution, there are a great many crossings where the combined traffic is so small as to postpone the possibility of their elimination for an indefinite period. We must then resort to protection devices which must be at once low-cost and so designed as to give ample warning. Without being limited by the amount of highway traffic, the elimination of all grade crossings on fast through rail routes remains a major policy. This will mean that as the grade crossing program continues, we must be more discriminatory in the selection of the projects to be improved and can not continue to use, without modification, the present method of division in such a fixed ratio between the various railroads.

In the field of soil stabilization the technique and practical application are steadily moving forward. In this development we have, for the first time, some assurance of the possibility of building really low cost roads where traffic service requirements are also in the lower ranges. It is apparent that this is a field in which a little learning may be misleading or even quite dangerous, and it is more than desirable that in each State highway department there shall be technicians fully abreast of the rapidly developing science in this subject. It is the purpose of the Bureau to continue short courses of instruction in theory and practice of soil stabilization, and these courses are open to the engineers of the State highway departments.

It is the opinion of those in the Bureau who have devoted long years to the studies, that the possibilities for better and more durable construction inherent in the application of the principles which are becoming more and more clear, have matured only in a very limited way.

While there has been a general advance in the details of design and standards of construction, attention should be called to the desirability of a more general adoption of such items as flatter slopes, raised curbs on both concrete and bituminous construction, paved gutters, the use of top soil and fertilizer on shoulders and slopes, and all other design items that will prevent soil erosion.

On a nation-wide basis the highway builders have an important part to play in furthering the national policy of soil conservation. In our national economy there is nothing more timely or that in the past has failed to receive the recognition it should have, and we must now make up for lost time and give full weight of the highway organization to the furtherance of effective soil conservation.

A critical condition is being reached in a number of States in highway affairs. This condition is the outgrowth of diversion of income, refunds of large amounts of highway user taxes collected, and bad organization. A stage has been reached, or is being rapidly approached, where the very large maintenance costs, obligations on

past indebtedness, and other demands are absorbing almost the entire income, leaving no balance for reconstruction or for new construction, and of course this does not permit covering the Federal allotments with State funds. These conditions are often inherited and are not the product of those now in control, but the important consideration is the drastic revision of policies to overcome the drift toward highway bankruptcy. A considerable amount of the difficulty is chargeable to fallacies of so-called low cost construction which have now proven themselves to have been excessively high cost construction. Low cost road building is desirable where applicable to conditions, but the annual cost of our highways is the ultimate and critical cost. The cost of road maintenance should be determinative in the selection of design types in so far as possible.

The calendar year 1936 marked a high point in the mileage of highway construction completed under the joint direction of the State highway departments and the Bureau of Public Roads. Last year 19,054 miles of all types were completed which has only been exceeded slightly in one previous year, - 1934.

At the present time a program of work, including the 1938 Federal aid funds, is available to the extent of \$565,000,000 which requires \$220,000,000 of State funds. A large part of this total amount available has been programmed. The work is lagging in a number of States, particularly in those States where the highway organizations are wholly inadequate to place under way the available sums, although these are the States which need the work most seriously.

Up to this point highway safety as such has not been isolated. It is established now that the safety of traffic is influenced by a large number of factors, and that all accidents are the result of a combination of these factors, each contributing in some degree. It will be recognized, then, that this whole discussion bears upon highway and street safety in so far as it is possible to remove our highways and streets from the role of accident factors.

It must be emphasized that the extent to which the use of streets and highways can be made safe by highway design alone is as yet purely conjectural. Accidents do not result from the careful use of highway facilities, even though inadequate; but this does not relieve the highway administrator from his responsibility to design and build and re-build highways to standards that permit the safest possible use. The highway engineer, in his great effort to serve the public, by designing meagerly and as he thought economically, is now being paid in public criticism.

Likewise, the highway administrator has been mistaken in not attaching the same degree of importance to the planting and improvement of the roadsides, as to the building of the roadways themselves. Out of really adequate highway facilities comes the safest possible use of our highways; out of the proper grading and planting of the roadsides come not only safer highways but their protection against erosion and consequent deterioration. The proper treatment of roadsides under trained and experienced direction can

be made a large factor in economical maintenance. This advanced thinking in roadside treatment is demonstrated by the really marvelous improvement that the State of Massachusetts has achieved in a period of only a few years. This Association is fortunate to have the opportunity to see the transformation from ordinary highways to veritable parkways which has been brought about by the extensive program of intelligent roadside improvement, and which has been made a permanent policy of the Massachusetts Department of Public Works, applying to all future work. The State in this respect has set an enviable example, and is to be congratulated.

Also, the Association has the opportunity to inspect new highways designed in the modern manner to fit metropolitan needs. The Newburyport Turnpike and the Boston - Worcester Highway are examples of the construction necessary to unbottle our cities. The Pulaski Highway in New Jersey, the West Side Improvement in New York City, the San Francisco Bay Bridge, the Lake Front Drive in Chicago - all accomplishments of the past very few years - in common with these new highways radiating from Boston, are examples of the type of projects which will be necessary to free our cities. The implication of cost and effort indicates the need for the adoption of very different policies for the administration of such projects.

Finally, the highway engineer speaks, as to what he must have from the public if he is to serve it well. He has put into effect on an individual State basis the nation-wide planning

surveys from which sound future programs can be developed; an intensive study of design practice out of which will come the necessary standards; the control of soils to insure greater durability of construction; the improvement of roadsides to provide beauty and contribute to the national soil conservation program. But there are two fundamentals which he does not have and which he cannot secure without a change in public policies: First, the rights of way necessary not only for the highway improvements themselves, but the additional land necessary to protect these improvements. Some of the arterial highways which we are building today, because of the lack of control, or divided control, or uncontrollable local control, of the roadsides, will become congested city or village streets tomorrow. The highway authorities are unable to carry out expensive construction improvements and to pay for the acquisition of high-cost land out of current revenues. These costs should be divided, and the land costs paid out of long-term bonds issued to cover such projects. There is no form of investment that would be more safe or prove a sounder one.

The second fundamental is the stabilization of our highway organizations. Under our form of government we can always expect changes at the top, but the men who constitute the going organization and who are essential to its continuity and efficiency, must

be put upon a career basis by the establishment of proper Civil Service policies. It is hopeless to expect the public business of highways to be run on an efficient basis unless highway engineering is put on a professional basis with assurance of uninterrupted service as compensation for training, intelligence and devotion to duty.