

ROAD CONSTRUCTION AND MAINTENANCE AND THE USE OF HIGHWAYS
FROM THE NATIONAL STANDPOINT

Harrisburg, Pa., March 23, 1933.

There are two phases of highway transport which are needing major consideration. These are first highway finance and second highway operation. Other phases are important, and as yet are far from final solution. Perhaps this is a wrong term to use as there is always progress to be made, but it is used here as indicating that a condition of stability has not as yet been reached. For example, the matter of highway design, involving, as it does, the various types of construction, details of width, thickness, influence of soils, climate, topography, traffic and the economic factors of available materials, labor, rail transportation, - is not yet reduced to universally accepted practices. There is a relatively wide variation in practice, but rapid and reassuring progress is being made in the scientific recognition of those factors which determine highway design, and in the measurement of the extent of the influence of each one. From the definite facts disclosed in this progress, sound, basic theories are evolving. An extensive series of research projects is under way. The Advisory Highway Board of the National Research Council recently reported that a total of 430 individual projects

had been undertaken by various research agencies, including colleges and universities, industrial laboratories, municipalities, official highway departments, and State geologists. These projects are so divided as to subject that approximately 65 per cent of the total is devoted to materials, 19 per cent to the design of the road, 5 per cent to construction, 9 per cent to economics, and 2 per cent to operation. It will thus be noted that out of the total research projects only approximately 11 per cent seek to throw light upon fiscal and operation problems.

This program of highway research has been established and is being pushed forward almost entirely through the efforts of the highway engineer, and he is entitled to the credit from the public for the advance that has been made in laying a sound, scientifically built foundation under this new force in the life of the nation termed "highway transport." He is entitled to the credit for vigorous efforts to understand and for extensive studies to master the problems presented by the advent in such tremendous numbers of the motor vehicle on the public highway.

In the development of highway transport the automotive industry has followed a highly intelligent policy. In the production of the motor vehicle more consideration has been given the poor man than the rich one. Here is a product which might easily have been placed and for a long time have remained in the

class of luxuries. Yet such is not the case. Standardized design and quantity production have made the motor vehicle available to the man of very moderate means. Constant efforts to reduce the cost will bring it within the reach of many more of our population. This movement will be assisted by the lowered costs of operation and maintenance of the motor vehicle resulting from the extension of improved highways. The automotive industry is generally taking a position of cooperation with the highway engineer in two specific matters, - the proper regulation of motor vehicle traffic as necessary for efficient and economical highway operation, and the improvement and development of design of the motor vehicle toward the end that its use on the highways will exert the least possible detrimental effect on the road structure itself. We may confidently expect in the future as in the past real cooperation from this industry, both from the executives and the automotive engineers.

Up to this time the highway engineer has not received the support and help of the economist in those phases of highway transport which are essentially economic in character. It is very true that this is a new undertaking. Sufficient time has not yet elapsed to make available a large amount of the fundamental data essential to the study of this phase of transportation from the economic standpoint, but the very large sums invested in motor vehicles and the large capital outlays and annual maintenance funds

required to provide roadways, are so important as to challenge the very earnest attention of the economist.

The highway official today is not receiving support of the proper character from the executive and legislative heads of the governmental divisions which he serves. This is not true in all the States, notably in those States which have fixed upon and are holding to sound policies and a stabilized program of highway improvement and maintenance. It is true in so many States at this time that the effect upon their highway programs this year and succeeding years will be very serious. We have been passing through a difficult period. The amount of money which a State may feel that it is in position to expend at any particular time is a matter to be governed by the legislative representatives, and if a State shall determine through its proper representatives that it shall either hasten or retard a construction program, that matter is for the determination of the representatives of the public. The serious condition comes when policies are proposed which are antagonistic to all of the principles which have, through the experience of years, proven themselves the only successful policies of highway administration, highway finance, and highway operation. It is serious when there is a lack of coordination between the highway department and the legislative or executive department of the State government.

Under these circumstances, then, this meeting which has been called by the Governor of the State of Pennsylvania takes on a very large significance. The Chief Executive of this State has recognized and has made many public statements to the effect that the road improvement problem is one of the greatest questions which each State has before it at this time. He has given the highways a place in the sun from the standpoint of a State administration. The invitations to the chief executives of other States has brought together representatives from those States acting not for the highway departments but for the State government itself.

During the past year, from a program of great progress, we have seen the highway situation in many States change to one of chaotic conditions, and it is time that the highway administrators and the State executives should counsel together as is proposed through this meeting. A careful examination of the proposals made in State after State for legislative action with reference to highway matters indicates that these proposals were the outgrowth of political exigencies of a temporary character, and many of them are diametrically opposed to sound policies of continuous, efficient highway administration.

The attainment of highway improvement in any State and for the nation as a whole is a long time issue. It is not a

matter that can be worked at for a single year or even two or three years and then abandoned or completed within that time. With more than eleven million motor vehicles now operating on our public highways the matter of additional improved highways and the maintenance of those already improved is one which can neither be laid aside or neglected. It will cost more to operate these motor vehicles over the highways in their present condition than it will cost to improve and maintain highways which are suited to the traffic demands. In other words, with the number of motor vehicles now in operation, the public at large will pay a sum equal to the cost of improved highways whether they secure such highways or do not secure them.

It would be well indeed if out of this meeting there could come a reiteration and an acceptance of some of these principles which have been solidly established.

It has taken a long time and the road building efforts - successes and mistakes - of many States, to crystallize these principles, but they are now so well stabilized that he who would deny them simply betrays his own lack of understanding of the definite progress which has been made in the science of highway administration, operation and financing.

It was for the purpose of encouraging the general adoption of these principles that the Federal Government in 1916 made its

first appropriation for road building. The law is not an arbitrary set of rules and regulations, but rather a clear-cut delineation of the principles which have proved successful in application over a period of thirty years. These principles have not only proved successful in the States where they have been in effect for the longest period; they have proved, in fact, the only methods that will insure a continuity of successful administration of the highways, and produce both new construction and continuous maintenance suited to the needs of any State.

One of these principles, clearly established by experience, is that the economic development of the country calls for roads of four classes. Whether they are recognized as such or not, there are roads of the four classes in every State, and these classes are, - first, the inter-State roads; second, the roads which are of importance to a whole State; third, the roads of county-wide importance; and fourth, the local road or roads which serve only one small community. As I say, the development of the country has already*****

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tion between the State and county roads and the county and local roads.

There follows from the acceptance of such a classification the necessity for the establishment of an adequate State highway organization to take over the duty of building and maintaining the roads which are peculiarly the interest of the State, and this is another of the principles that is recognized and required by the Federal Aid measure.

Now, it is carrying the logic of the analysis only one step further to set up as a third fundamental principle the idea that the roads, which are of importance to the State as a whole, and which the State has provided an organization to administer, should be built and maintained with State funds derived from the citizens at large. This principle also has been adopted by the States which have recorded the greatest progress in highway development; but in some it meets with resistance arising out of the conception of local self-government and the limitation of local responsibility to the improvement of local conditions. There is actually no conflict with the institution of local self-government. On the contrary, this principle recognizes what I take to be an axiom of political economy: - That improvements which benefit equally more than one locality or governmental unit should not be held to be the obligation of any one locality. The counties and smaller units have a great responsibility. There is imposed upon

them the burden of maintaining the 90 per cent of all roads which are solely of local benefit. It is not right to expect them to build the main roads of the State which lie within their borders when, as is often the case, such roads afford greater service to communities outside of the county borders than to the county itself. It is not fair to exhaust the credit of the counties by expecting them to pay for roads the income from which will return only in part, in small part, perhaps, to their citizens.

Let me illustrate my point by referring to a certain county I know of - not in this State - which is situated in a valley, surrounded by mountains. In order to obtain an outlet it bonded itself to the very limit and spent every cent of the money on a main line of highway. Its money spent and its credit exhausted, this county now finds itself with a road running through the center of it, but with no connection on either end, and there is no possibility of making these connections unless the State takes over the responsibility. The road is really a part of the main highway in that part of the State, and it is the State's duty to take it over, reimburse the county for the money spent, and connect it with the adjoining counties. It is not fair to place this burden on the county.

This principle was not included in the original Federal Aid Road Act, but it is now embodied in the Federal Highway Act, and hereafter it will be required of every State as a condition

precedent to the granting of aid by the Federal Government that the State shall provide State funds under the control of its highway department to pay the State's part of the cost of constructing the Federal aid roads and to maintain them perpetually when completed.

When, in recognition of these established principles, the highways have been classified according to use and a State highway organization, provided with State funds, has been created to care for the construction of the State roads, when the individual counties have thus been freed of the burden of providing for the more expensive roads which are the concern of the entire State, the next problem is to determine the rate at which the improvement of all systems is to go forward, and in this there is involved directly the problem of financing the improvements.

But here there is this principle that may be set down as most important, - that until a State has completed the backbone of its trunk line system with suitably paved or surfaced highways, the rate of construction should be independent of the source of revenue or the method of payment and should be limited only by the physical handicaps imposed by the available supply of labor and materials. Only by accepting this principle can the ultimate cost of the highways and their service be reduced.

With such a background, there are certain principles of highway finance and administration which can be made applicable to

all of the States. The variation of conditions within the State will be reflected in matters of detail, not in the application of the principles. For the purpose of discussion before this conference I wish to present the following:

1. The total cash expenditures in each State for highway purposes shall be considered as the annual highway budget.

2. The annual highway budget shall be adjusted in amount to the relative needs for other public purposes.

3. All revenue secured from the motor vehicle or road users shall be set aside for highway purposes.

4. The highways within each State shall be classified into four systems - interstate - state - county - and local roads.

5. For the purpose of securing efficiency all expenditures on these systems shall be correlated under engineering and economic supervision.

6. The order, character and extent of highway improvement shall be determined by the relative probable future traffic requirements.

7. A much larger mileage of highways than at present should be immediately placed under patrol maintenance, and as far as possible made available for traffic the year round.

8. The large sums involved in highway expenditures, and the broad training and experience required in handling them demand that political considerations be eliminated in all highway administration.

9. The cost of building and maintaining an adequate system of highways should be distributed equitably between the sources of highway revenue in proportion to the benefits derived from the improvement. These may be summarized as follows:

- a. General benefits to society such as influences on education, recreation, health, the national defense, the postal service, rural life, cost of living, and marketing methods.
- b. Special benefits such as those to agriculture, manufacture, labor, railroads, mining, forestry, and waterways.
- c. Benefits to real property.
- d. Benefits to the road user.

10. The wide variance in the present status of highway development in the several States prevents the adoption of uniform policies for securing the funds necessary to the annual budget. Generally speaking, however, these principles may be set forth:

- a. States in the initial stage of highway development should issue bonds to defer that portion of the annual charge for construction which would over burden either property or the road user.
- b. States where original construction programs are well under way can, in the main, finance normal new construction from current funds utilizing bond issue funds to defer the cost of special projects.
- c. States where original construction is largely completed are concerned chiefly with maintenance and reconstruction, and should depend on current funds save in cases of emergency.
- d. The maintenance of interstate and state highways should be a charge against the road user.
- e. Roads serving a purely local purpose will generally require only light upkeep and should properly be a charge against the adjacent property, which in these cases is the first and often the only beneficiary.

f. No road should ever be improved to an extent in excess of its earning capacity. The return to the public in the form of economic traffic is the sole measure of such improvements.

These points are not presented as covering the whole field of highway finance, but set forth a definite proposition upon certain of the phases upon which there seems to be the greatest lack of agreement. The highway engineer who has been faced with these questions is in a position to make valuable suggestions and recommendations in determining State policies, and certainly the highway departments, the legislative and executive branches of the government, should work in close harmony in the determination of these policies if the State is to be served.

The second major point - that of highway operation - concerns, first, proper traffic regulations and, second, the methods of enforcement of such regulations. Highway transport is in the development stages, and it should be regulated only to the extent necessary to insure safety of life and property on the highway, and to prevent the destruction or rapid deterioration of the road structure through improper use or too heavy loads. So long as the character of the traffic on the highways remains similar to that at present, it appears that proper regulation is a matter to be determined by the individual States with careful attention given to the uniformity of legislation which may be effected through such conferences as this. It appears doubtful whether there exists any real necessity for national legislation if the necessary uniformity

of legislation can be accomplished so as not to work unnecessary hardships upon the road user.

The studies which have been made by the Connecticut State Highway Department and the Bureau of Public Roads of highway traffic reveal some highly interesting figures.

1. During the three months from September 11 to December 2, 1922, approximately one-fourth of the total motor truck net tonnage was transported over the highways from 0 to 9 miles; one-half from 10 to 69 miles, and one-fourth over 70 miles.

2. Analysis of the passenger vehicle information indicates that 35% of the movement is for business purposes and 65% for recreation. Passengers per vehicle average 1.7 when used for business and 3 when used for recreation. The average business mileage is 29.7 and the average recreational mileage 55.9%.

3. A seasonal comparison of Connecticut highway transportation indicates that in January and February, 1923, motor truck traffic decreased 40% below the October, 1922, traffic, while passenger vehicle traffic in January and February, 1923, was 68% lower than in October, 1922.

4. Analysis of 10,645 loaded trucks from September 11, 1922, to December 2, 1922, shows that 29.8% are overloaded beyond their rated capacity, and that with increasing width of truck bodies there is an increasing percentage of overloaded vehicles.

The fact seems to be well substantiated from these figures that highway traffic in the main is local traffic, and while there is a crossing and re-crossing of the State boundaries, still the length of haul and the nature of the traffic itself are local as between communities, and proper regulation can be brought about through joint action of adjoining States effected through such conferences as this one.