

MAKING PUBLIC ROADS PAY

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The most fundamental of the changes in highway transportation wrought by the motor vehicle is the increased range of travel. To this cause may be traced the distinction between highways of general and local use which, formerly of little significance, has now come to have such an important bearing upon many highway problems. For it is to this lengthened range of travel that we owe the accumulation of vehicles originating over a wide area that constitutes the dense traffic on the modern trunk line highways.

The condition of highway transportation before the development of the motor vehicle was extremely simple. All travel was of exceedingly short range. To say that it was virtually confined to county limits is almost axiomatic since the range of horse-drawn traffic was the prime factor in determining the limits. Except within a few miles of large cities there was no great accumulation of traffic on any road; and the service of all roads was primarily that of affording access to farm land and homes.

Since local land access was the primary purpose to be served, road improvement, within the limits required by the low

traffic density, reacted directly to enhance local land values, and real property taxation for road purposes, locally assessed, was both reasonable and fair.

Under the new conditions created by the motor vehicle the territorial extent of the local community and the county has lost all significance in relation to the range of highway travel. On many of the main roads today a major part of the traffic crosses completely over one or more counties. On these roads also there has developed a traffic of a new order of density and total weight. Traffic of this character demands road surface improvements requiring greater capital investment than was necessary under the old conditions, but this investment the new traffic justifies as a simple matter of operating economy, i. e., the cost of the improvement is more than balanced by the consequent operating savings accumulated by the numerous vehicles.

Careful surveys conducted continuously for the past ten years by the U. S. Bureau of Public Roads and the State Highway Departments reaching into all sections of the Nation show that this traffic flow of motor vehicles is concentrated upon and limited to the smaller part numerically of our total road mileage. There remain under these new conditions, and so far as can be seen, will always remain, other roads - feeders and land servers still - upon which almost the entire traffic originates or is destined

locally; and such roads constitute the major part of the rural mileage again as determined by the number of miles included. The larger trucks and busses rarely penetrate to these roads. Their usage is still such as to require no high standard improvement and so slight that, as a matter of transportation economy, none but the simplest measures of road improvement can be justified.

A more exact idea of the difference between these two distinct classes of roads developed by the motor vehicle is supplied by the transportation survey recently completed in Michigan by the Bureau of Public Roads and the State Highway Department. The survey shows that the approximately 7,700 miles of trunk line roads constituting the State highway system (exclusive of sections within cities) serve an average daily traffic of 1,144 vehicles. The roads classified as county roads, embracing 17,175 miles, serve traffic averaging 190 vehicles daily; and the 60,214 miles of minor township roads serve an average of only 22 vehicles a day.

The classification is the existing order as established by law prior to any attempt to determine the relative use of the roads included in the various classes. It may not be, and probably is not, in true accord with the relative traffic

importance of all the roads, and the breakdown into three instead of two classes somewhat beclouds the usage distinction. Yet it is clear enough that in Michigan there are broadly two distinctly different classes of roads. It is clear also that the one class, serving average daily traffic of the order of 1,000 vehicles a day is quite limited in mileage, and the other, serving less than 50 vehicles a day is very extensive, certainly more than 70 per cent of the total. No such quantitative measurements are available thus far for any other State, but there is no question that a similar situation exists in all the States and affects the nation's total of more than 3,000,000 miles of road.

The Michigan study shows also that of the slight traffic on the more than 60,000 miles of most lightly traveled roads more than 60 per cent originates within the local township and only 18.5 per cent comes from without the local county. Compare this with the fact that on the less than 8,000 miles of most heavily traveled roads only 16 per cent of the traffic comes from the local township and more than 60 per cent originates beyond the limits of the local county, and the difference between these extreme classes stands out more clearly. It is evident that the one class is serving a heavy general traffic flow originating over a large

area and the other is receiving a very light traffic originating in large measure on the lands which it immediately serves. As to the intermediate class, classified as county roads under the old system, it consists of roads that, upon a usage classification, would be thrown into one or the other of the two distinct classes.

Such facts as these have a very definite bearing upon principles of highway finance. They show that the old system of financing all rural roads by means of property taxation, entirely adequate and equitable in other days, is definitely impossible under modern conditions. They show that the usage of a relatively small mileage of trunk-line roads is of such a nature that local financial support and administrative control have become both inadequate and inequitable; but they show also that the major part of the rural road mileage is still, as it always has been, subject only to a very light and very local traffic movement.

It is such facts as these that justify the use of motor vehicle taxes for the support of the general-use roads and the retention of property taxes as the means of financing the local roads. The problem ahead is to determine by such surveys as have been made in Michigan where to draw the line between

the roads of general and local use. It should be accented that this proposal goes outside the present legal designation of State roads, county roads and such; and seeks to draw the line where the traffic, present and potential, establishes the division. There is no question that, in all States, there is a large mileage the traffic upon which is so slight as neither to require nor to warrant any other surface improvement than that necessary to carry the farm traffic and an additional large mileage upon which practically no improvement would be justified. In every State there is a considerable mileage designated as public roads which should be reincorporated in the adjoining farm lands reserving the right to pass over these farm lanes for seasonal access to the fields. Neither is there any question that there is a relatively small mileage in every State that is used by a concentrated traffic of such proportions as both to require and economically justify adequate surface improvement.

By the steady process of annual transfer of mileage from local to State control we have been gradually grouping the general-use roads in the State highway systems. These systems, however, probably do not yet include in any case all of the mileage of truly general-use highways. What is needed to bring

our methods of highway finance and administration into more appropriate relation with the modern conditions of highway utilization is the completion of this process of classification upon the basis of evidence of highway usage obtained by means of surveys such as the one conducted in Michigan.

The logical consequence of such a classification will be the adoption of a financial system which will place the entire cost of the general-use roads upon the motor vehicle which, in this case, is the principal beneficiary, and the entire cost of the local roads upon the local property which they directly benefit. And it may be emphatically stated at this point that such a system will not increase the present taxes upon real property for road purposes, but will materially decrease them; the corollary being, naturally, that it will result in an increase in motor vehicle taxation in some of the States - an increase, however, which will be within economically justifiable limits. Reference is made later to the rate of motor vehicle taxation.

Such a classification will establish at once the total tax responsibility of motor vehicles as a group. It will not indicate the scale of contributions that should be made by the various classes and weights of vehicles. That is another problem.

It is a popular idea that the heavier vehicles must necessarily cause greater road damage than the lighter ones. This idea is the basis for the demand that vehicles of the various sizes shall be taxed according to the highway wear and tear for which they are severally responsible.

The idea lacks factual support and the method of proportioning taxation is both improper and impracticable. Highways must be built to withstand the forces of climate at work continuously over long periods as well as to resist the forces of traffic; and it is generally true that the road design, based upon consideration of long-time durability and resistance to climatic forces and subgrade conditions, will be adequate to support nearly all classes of vehicles, including the larger, if not the largest classes permitted to operate under reasonable restrictions as to wheel loads, tire equipment, and speeds.

There is no denying that roads have occasionally been damaged seriously by vehicles of weight in excess of the load for which they were designed. This is a matter of adjustment of design to the traffic and with adequate policing should not occur. Such avoidable damage should not be made the basis of a system of taxation of vehicles. To illustrate the impropriety of such a method, suppose a pavement adequate for 3-ton trucks actually fails structurally under the load of 5-ton trucks. The

damage to the pavement, say 7 inches in average thickness, may and probably will be considerably greater than the cost of the slight increment of thickness that would have made the surface adequate for 5-ton trucks. Damage is thus shown to be an improper basis of vehicle taxation. And it is not only an improper, but also an impracticable basis, since there is no conceivable means by which the damage that may be caused by vehicles of any given size can be distinguished from that caused by all other sizes, or the damage resulting from weight of vehicles can be dissociated from that resulting from density of traffic, or either from damage due to climatic forces and non-uniform soil support.

As a substitute for the unreasonable and impracticable basis of "wear and tear," the Bureau of Public Roads has proposed what is believed to be the more reasonable method of adjusting the total tax to be laid upon vehicles of the several weight classes in accordance with some measure of the cost of building roads adequate for their support.

We have suggested a method which employs the cost of building concrete pavements of the various thicknesses theoretically required for the support of the several weight classes of vehicles as the means of proportioning the contributions required of each. It should be noted here parenthetically that this

proposal is based on the theoretical strengths required of rigid road surfaces as a method for determining fair relative taxation between the different weight classes of motor vehicles, and should be distinguished from the designs actually adopted which must vary between rather wide limits among the States and even within the different sections of the States themselves due to the variation in subgrade soils, temperature ranges, rainfall, and other causes divorced from the traffic. The cost of grading and drainage and the minimum thickness of pavement theoretically required for the support of passenger vehicles is regarded as a base charge to be shared equally by all vehicles of all classes. The amount thus determined represents the total to be paid by passenger vehicles and very light trucks. For the accommodation of one-ton trucks a certain additional thickness of pavement would be required and the cost of this increment is apportioned equally among the one-ton trucks and all heavier vehicles. In a similar manner the cost of the further increment of thickness required for the support of two-ton trucks is apportioned among all vehicles of that class and all heavier vehicles; and a continuation of the same process finally produces a graduated scale of taxation

which exacts from each weight class of vehicles an amount fairly proportioned to the road costs which their operation entails.

The difficulties in the application of this method of determining the ratio of taxation to be employed for the different classes of motor vehicles are more apparent than real. The reference to concrete pavements should not be misinterpreted. This suggested method of apportioning motor vehicle taxes on a fair ratio between the classes employs the costs of rigid concrete pavements. This does not imply that only concrete surfaces are or would be built. In every highway improvement program various types of roadway surfaces are being built. This particular type is used as a "measuring stick" for the reason that it is the only type that lends itself to the reasonably exact theoretical design that is necessary if a distinction is to be made between the costs entailed by the various sizes of vehicles. In any actual application of the method it would be necessary to modify the taxes determined upon the basis of concrete pavement costs in the ratio of the cost of the road program based upon uniform concrete construction to the cost of the program with types of surface as actually planned.

It will also be found in many States that registered vehicles of the heavier classes are so few in number that the attempt to charge to them the costs of the corresponding increments of thickness upon the entire mileage included in the vehicle tax budget will result in prohibitive taxation. Where such is the case, however, it will be found that vehicles of the heavier classes make use in significant numbers of only a relatively small part of the total mileage of road involved and that only upon such small portion does their operation actually require the additional surface thickness. It will be necessary to take this fact into account in any practical application of the method.

It is possible that there may be other practical difficulties that will be encountered when effort is made to apply the principle. It will need sympathetic application. It will have to be recognized at the outset that precision of adjustment is impossible: that there is no conceivable means by which the exact road costs entailed by the operation of the various kinds and sizes of vehicles on the numerous types of road surface laid under an almost limitless variety of conditions can ever be determined. With due consideration of that fact as an essential premise, and assuming that there is the desire to proportion the special taxation of vehicles of the various sizes in approximate

accord with the costs of the road service provided, it is believed that the method suggested will be found to offer a fair and reasonable solution of a difficult problem.

This article dwells upon two phases of the problem of making public roads pay which I believe are of major importance at the moment, especially in relation to the present reconsideration of measures of highway finance and motor vehicle taxation. The first is the question of the part of the road system improvement of which may be financed by motor vehicle contributions with prospect of direct return to the vehicle in excess of the cost. By use of data obtained in the Michigan traffic survey - the first of its kind - I have indicated that the mileage of true general-use highways is a relatively small part of the total in that State. There is every reason to believe that a similar situation exists in all other States; but as a basis for the proper solution of pressing tax problems it is most important that similar surveys be made in all States. Only upon the basis of information thus obtained will it be possible to gauge the proper extent to which the motor vehicle should accept responsibility for road costs.

The second phase touched upon is that of apportioning the motor vehicle's total share among vehicles of the various sizes in fair proportion to the portion of road cost entailed

by each. A rational method of accomplishing this apportionment has been suggested. It must be employed with judgment and sympathy. Admittedly there are difficulties in its practical application, but in principle it appears to have no major fault; and it is our belief that it can be intelligently used as the basis for an equitable apportionment of the motor vehicle's just responsibility for road costs.

Generalization can go no further. The application of these principles must be made State by State, and subject to the conditions prevailing in each. The rate at which additional general-use roads can be taken over for financing against the motor vehicle income will depend upon what has been done in the past and particularly upon outstanding obligations. The time element is all important. Those States which up to this time have not succeeded in establishing a backbone system of roads that will carry the traffic economically can not expect from their earnings to take on large additional obligations. It must be recalled that practically all of the large bond issues which have been made for road purposes in recent years are not an obligation against property but are revenue bonds, in some cases entailing a large annual lien against the income from the special road user taxes. The only logical, sound

administrative procedure is to establish an annual highway budget which, without burdening the motor vehicle to the point of diminishing returns or placing an unfair ratio of taxation against the different classes, secures the maximum fair return from these special taxes. This revenue should then be divided fairly to the road system for fixed requirements for maintenance and necessary reconstruction and new construction. Such a plan offers the only possible relief to property taxes for road purposes unless obtained at the sacrifice of adequate road surfaces.