E IMMEDIATELY IMPORTANT PROBLEMS IN HIGHWAY DEVELOPMENT

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The past year, 1948, set a new record for highway improvement and the related activities. The combined expenditures of local, State and Federal governments are estimated above three billion dollars. This total includes, in addition to construction and maintenance, such items as interest, bond retirement, traffic police and other charges against highway revenue. The five-year period 1941-45 has proven far more disastrous to the highway plant than we had currently realized, as the extent of depreciation and obsolescence becomes more certain. For example, in 1945, only 34 percent of the total expenditure for State highways went to capital improvements. More than 45 percent was required for maintenance. In the three years following, notwithstanding the acceleration in the rate of reconstruction and replacement of worn-out roads, the maintenance bill has jumped 138 million dollars to a cost for 1948 of 424 million. But this is only the amount required to keep our State highways in operating condition. If we add the estimated cost for maintaining county and other rural roads and urban streets, the maintenance bill for last year totals 1,132 million, nearly 37 percent of all expenditures. It should be noted here that the figures for local,

rural and urban expenditures are estimates and subject to correction as more reports are received. The conclusions are reasonably indicative.

The Federal-Aid Program.

There are a number of stages in the processing of the triple-phase Federal-aid highway program which might be used as the yardstick to measure progress. In Public Roads we think the amount of work actually put in place during a twelve-month period is the most realistic gauge. The highway construction program thus measured has accelerated steadily since the end of the war period. From approximately 90 million dollars total cost in the calendar year 1945, an advance to 329 million dollars in 1946, to 580 million dollars in 1947, and to 768 million dollars in 1948, is the record.

During the present calendar year, Federal-aid construction put in place will doubtless reach values of 850 million dollars in total cost and 440 million dollars in Federal funds. This will closely approximate the annual rate of Federal fund authorizations carried in the Federal-Aid Highway Act of 1948.

The Effect of Price Levels in Reducing Purchasing Power.

Although the 768 million dollars of construction put in place represents the largest year's production in Federal-aid history, measured in dollars, it is second largest when the purchasing power of the dollar is

considered. In terms of prices during the 1925-29 base period, the 768 million dollars reduces to the equivalent of 492 million dollars at base period purchasing power, compared with 530 million dollars, similarly adjusted, for the calendar year 1936.

Federal-Aid System Selection and Current Program.

There is a very deep significance in what has taken place during the past three years. It is not superficial progress. The highway officials are marching in step toward the objective of a coordinated program to serve the major highway traffic needs of the nation. The three systems--Federal-aid primary, Federal-aid secondary and urban arterial--as now definitely selected, total 611,226 miles.

The postwar construction program set in motion by the Congress in October of 1945, while apparently slow in getting under way, now extends to more than 70,000 miles in all stages, of which 37,529 miles of all classes and types have been completed.

This program has required the joint action of the 48 States, two Territories, the District of Columbia, 2,760 Counties, 450 Cities and the Federal Government, acting through their highway officials. The inherent inertia of setting in motion 3,261 agencies through cooperative action is not difficult to understand, but once under way the momentum is irresistible.

The Immediately Important Problems.

It is this irresistible momentum--the product of cooperation--that is the strength of democracy. Cooperation is only another term for working together under authority and methods prescribed by law, not by fiat of the dictator. So, as we find the weaknesses of either laws or methods in any of our governmental undertakings, the only course that makes sense is to remedy these on the foundation of fact. The setting in motion of a program of road building equal to three times around the world, and involving more than three thousand separate governmental agencies, brings to the surface the causes of delays and the sources of criticisms. Some of these are major in degree, some are minor. Of the major class, the greatest single lack is in the State laws necessary to provide a sound administrative pattern between the State and its governmental subdivisions, rural and urban. The Federal-aid highway legislation recognizes the State highway department as the representative of the State and its government subdivisions in the initiation and carrying forward of all Federal-aid projects.

It is the responsibility of the State legislatures to extend and broaden the authority of the highway departments so they can legally fulfill this function. There are some essential needs which will require additional State legislation. There are others that are matters of administrative and engineering policies that can be met through cooperative action.

Some of the problems that are most pressing are:

1. Adequate engineering administration for counties
2. Adequate and economical standards for bridges for secondary roads.
3. Broader legislative authority to secure and insure adequate rights of way.

Adequate Engineering Administration for Counties.

The results that are secured on county and local roads will depend upon the quality of the engineering administration of these roads. There are a number of patterns of secondary road administration that provide competent engineering supervision and are working successfully. So it is not the pattern, but the quality of administration that is more important.

At its latest meeting in Washington, February 7-10, 1949, the Board of County Consultants agreed to undertake, in cooperation with the highway departments and the field organization of Public Roads, an inventory of county road administration.

Why is an inventory required of county administration?

First: The increasing pressures for more and better secondary or feeder roads.

Second: The demand for larger expenditures. No additional funds, however large, will meet the demand if a competent organization is not in charge.

Third: Many counties do not operate on unit basis. It is not possible to maintain an engineering staff and duplicate equipment.

Fourth: Because modern power equipment is the basis for all extensive and economical road building the small unit cannot afford to own and operate an adequate plant.

What is proposed to determine in the inventory?

It is proposed to determine the basic principles of competent local highway administration, based on the performance characteristics of the methods now in operation in the various States; to determine to what extent those characteristics stem from the requirements of the legal structure, and to what extent from choice on the part of administrative officials. The basic data needed for the determination of these principles must of necessity be comprehensive and up-to-date, but it is information which every State highway department needs, and needs urgently, if it is to hold a position of leadership in the solution of local road problems. The information which the State highway departments will be requested to cooperate in obtaining is not to be used for a dead statistical compilation, but rather for a very alive attack on the problem of county administration and inter-governmental working relationships, the number one obstacle to a successful secondary program in many States, and to a successful Federal-aid secondary program nationally.

The counties and townships in many States are today operating under laws and procedures which were devised in the pioneer days when modern highway transportation and modern road-building methods were impossible to conceive. In many instances too fine a line of demarcation is drawn between State, county, and township highway jurisdictions.

In many such States, each subdivision of government, regardless of its resources, is acting independently in making capital investments for construction and maintenance equipment; in providing storage, repair, and supply facilities; in purchases of materials; and in providing competent direction of work. Too many legal barriers prevent the loaning of men and equipment between agencies; the establishment of equipment pools by the larger agency for the benefit of the smaller; joint purchases at better discounts, and many other arrangements that could be made where there is a will to cooperate.

Any barrier to full cooperation between agencies is properly a matter of Federal concern in the administration of the Federal-aid secondary program. The scope of the problem will be revealed in the inventory of county administration. It is hoped that the inventory will also point the way to logical cooperative arrangements, where none now exist, between counties, or between county and State, which will require less capital investment and better management at less expense

to all agencies. The inventory will also point the way to enabling legislation where needed to implement the desirable cooperative arrangements.

The end result sought should be a plan which preserves local autonomy, but enables local governments to effect economies and improve management, through cooperation with each other and with the State. Stated otherwise, the end result sought is a plan which implements the concept of one State-wide highway transportation system rather than a hundred or more jurisdictional systems. Only by the creation of this cooperative atmosphere can a realization of the full possibilities of the Federal-aid secondary program be brought to a State or its local subdivisions.

Adequate and Economical Standards for Bridges for Secondary Roads.

The secondary road system comprises a vast network of local roads, most of which have an annual average traffic of less than 400 vehicles per day. Over a considerable portion of this mileage, the average traffic does not exceed 100 vehicles per day. In the design, the engineer must provide for bridges with a structural capacity sufficient to carry safely the equipment and supplies used by, and the products of, those who are served. The best judgment must be used to secure the maximum of improvement for the least expenditure.

The traffic on these local roads varies, however, from a high percentage of heavy vehicles found in commercial, industrial, mining and logging areas, down to the passing of an occasional heavy vehicle on the more strictly farm-to-market roads. In the former case, the bridges must be designed for the H-15 or H-20 loading, as are those on the primary road system. It is with the requirements of the more typical farm-to-market roads that this discussion is concerned. They carry the farm trucks and equipment, whose size and weight are constantly increasing. Bridges on these roads should be capable of carrying a single truck equivalent to H-15, and they should be designed for not less than one lane of H-15 loading, placed in any position on the roadway. This will provide a loading of reasonable intensity on the floor systems, where overstresses are the most serious. The superstructure cost of this single H-15 is not more than about 5 percent over that of a standard H-10 for the ordinary short-span bridge.

It is often possible to keep existing structures in service, if they can be made to meet the requirements of the new alignment and grade, even though they do not meet the desirable minimum standards of roadway width and design loading for new construction. To obtain a reasonable degree of safety to traffic, guard rail transitions from the approach roadway to the bridge roadway, and advance warning signs should be used. The safe loads for these bridges should be posted.

In the case of truss bridges, whose safe load is less than the desired minimum, the stringers and floor beams may sometimes be strengthened by the addition of cover plates, or they may have to be replaced. The use of a laminated timber or other light weight floor will frequently relieve the overstress in the truss members. Such reconditioning must necessarily be limited to bridges where the required expenditures are economically justified.

In the selection of materials to be used in the construction of new bridges, consideration must be given not only to first cost but also to maintenance costs and the length of useful life. Advantages are secured through the standardization of designs and the re-use of forms.

Regardless of traffic density, bridges on secondary roads must withstand floods, scour, drift and other forces of nature. Adequate waterway must be provided if they are to give their maximum years of service. Grades should preferably be kept above high water. If sufficient funds are not available to do all that is desirable, a spillway over the roadway may be used to provide waterway area for floods until a later time. For roads of light travel this type of design may need to be characteristic.

When Mr. Raymond Archibald returns next month to Public Roads from a leave of absence, we hope the Bridge Committee of the American Association of State Highway Officials will undertake at once the issuance of new standards for bridges on secondary roads.

Broader Legislative Authority to Secure and Insure Adequate Rights-of-Way.

There are three objectives to be served in the acquisition of lands for highway purposes. These are, first, the immediate use and possession of lands for construction purposes; second, the acquirement of a sufficiently wide right-of-way in a proper location, adequately protected; and third, the reservation of lands for right-of-way needs in the future.

Property needed for current highway purposes may be purchased by negotiation with the owner. No further difficulties result if an agreement can be reached regarding price and surrender of the premises. Where condemnation proceedings have to be resorted to--and this is necessary in approximately five percent of the cases on the average--the time that may elapse between the commencement of the litigation and its termination is necessarily long. Because highway improvement already has been long delayed and travel is increasing, it is urgent that work on programed projects be started as soon as possible. Immediate possession of the needed lands, now possible in only about half of the States, is desirable authority in all States.

Because of the critical housing shortage, right-of-way clearance frequently becomes more difficult than right-of-way acquisition. A public relations problem of great importance may be involved. An

inappropriate policy with respect to clearance of needed properties can spell deferment for a State's entire program of urban highway improvement.

It is obvious that the present outright acquisition of a fully adequate right-of-way is impossible in many States because of legal and financial obstacles. Effective public control over the area that will ultimately be acquired may frequently be obtained by the acquisition of highway development or reservation rights.

In addition to the right-of-way presently needed for a new facility, a strip of 50 or 100 feet or of any other desirable width should be designated on each side as a reservation strip, and rights in these margins acquired by the State with compensation. By such acquisition, the owners would have transferred to the State their right to develop those margins. If prohibited by the State, such enterprises as gasoline filling stations, hot dog stands, and billboards could no longer be erected thereon. But the owners could cultivate the strips and continue to utilize them in any manner not inconsistent with the preservation of the highway as an efficient traffic facility. When in the future more land is needed for highway modernization, it is obvious that the acquisition costs would be at a minimum.

The Ohio State Highway Department has used this device successfully, and according to our latest advice has paid less than

$110 a mile for these so-called "reservation rights," the cheapest form of insurance possible for the protection it affords. Should any State seek Federal-aid funds for the purpose, the costs involved in the acquisition of reservation rights will be shared in the customary one-third Federal, two-thirds State ratio applicable to rights-of-way generally, subject, of course, to administrative approval as to the reasonableness of the proposal. To be eligible for Federal reimbursement, the costs of the reservation would need to be incurred after program approval, embracing either the project or the planning of the project.

Perhaps it may appeal to the long-time members of this Conference as more than slightly humorous to list these problems as immediately important among the many that are pressing for attention. Certainly they are not new. It is my definite memory at least two were discussed at the first meeting of this Conference, yet they emerge to handicap highway progress because in State after State they have not been successfully resolved. The same comment may be as truthfully applied to many other problems of administration in particular. Each one will yield only to an intelligent, painstaking assembly of facts as the basis for advance in the science of highway administration. In his book, "The Road to Reason," M. Lecomte du Nouy says, "Observed facts are the only scientific data to work with." After

these many years there is no lack of my faith in the potentials for accomplishment inherent in the cooperative efforts of State and Federal highway officials, but the forthcoming report on the status of the Interstate System and other major roads will be an outstanding contribution from many angles. The public will have for the first time a nation-wide record of highway inadequacies for present traffic and a serious warning that our production of motor vehicles is badly out of balance with the production of highway capacity to carry them.

In the approach to all these problems there is the underlying major problem of recruiting a sufficient number of men competent for the service. "In our time the problem refers to the means by which we may provide men with the training necessary to do the tasks of the road engineer in an efficient manner****. One of the principal difficulties in arranging for the education of highway engineers arises from an entire misconception as to the extent to which they need training." The quotation is from "American Highways" by Dean N. S. Shaler. It was published in 1896, more than half a century ago. So there are some "problems of immediate importance" that toughly resist the years.

Perhaps the most reassuring evidence that this Conference and the member States are directionally sound is the growing collaboration between the Engineering Schools and the Highway Departments in the training of men and in research. No other approach could better serve the public interest.