

## NATIONAL ROAD BUILDING THROUGH STATE-FEDERAL COOPERATION

Address given by Thos. H. MacDonald, Commissioner of Public Roads, at the Twenty-fifth Annual Meeting of the American Association of State Highway Officials - Richmond, Virginia - October 10, 1939

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The compelling motive that brought the States together in 1914 to form this Association was to secure recognition of the highway problem and acceptance of financial responsibility by the Federal Government. The plan designed to accomplish these objectives has since been followed for other joint State-Federal undertakings, but the Federal Highway Act of July, 1916 pioneered the way. No worse time could have been found to organize on a nation wide scale a new and chartless project, for in less than a year the United States became an active participant in the world war. The energies and material resources of the country were mobilized to meet the emergency. The existing highways, without reasonably adequate maintenance, had to serve. Their deterioration under the rapidly multiplying motorized highway transport was appalling. The lack of improved highways where needed seriously handicapped operations and caused extravagant expense. The end of the war brought the realization that in four short years motorized highway transport had grown to material dimensions, demanding a new concept of highway building on a scale never before contemplated. As a result of extended hearings and consideration, the Congress, in November, 1921, rewrote the Act of

1916 to incorporate the principles which became, and have remained, the magna charta for State-Federal cooperative highway improvement through the years now intervening.

The spirit of this twenty-fifth anniversary observance is to pay grateful tribute to the founders whose vision created, and whose devoted efforts carried the Association successfully through the early years. Time's inevitable toll has included some of the stalwarts; fortunately many remain, - some in official life and some following other pursuits. All of these, without a single exception, have held a characteristic point of view. The one tribute of great value that lies within the power of the Association to bestow is a record of accomplished worth-while results and the assurance of greater efforts for the future.

The Association has continuously taken the important task of presenting and supporting before the Congress recommendations for Federal legislation, including road building funds. This activity is generally known. The important function which is not so widely known is the indispensable part the Association has taken in the formulation of the methods and policies incorporated in the structure of the Federal highway administration. The Association has acted in the capacity of a clearing house to refine State and Federal viewpoints, limitations and objectives, into the sound principles and policies which have been

productive of mutual respect and have sustained, with rare exception, cordial cooperative relationships between the highway departments of the States and the Federal Government.

These clearing house activities which go on continuously are so closely integrated with the content of all Federal aid agreements and operations that the spirit of equally balanced authority, State and Federal, written into the basic legislation, has been preserved intact. This does not overlook, but it does fail to find important, the differences of opinion over details that are inherent in planning and building an average of more than 14,000 miles of roads of all types every year for the past nineteen years. Without the understandings and standards developed through the standing and special committees of the Association, it would have been impossible in two decades to complete cooperative road projects of sufficient length to circle the earth eleven times.

All cooperative undertakings have a time factor, not of delay but of an additional period over that necessary for a single organization to act. The figures just quoted prove the degree to which, in the cooperative highway operations, this additional time element has been reduced to a minimum through the setting up of standards that permit mass production. As an example of these, in 1920 highway bridge specifications were chaotic in their lack of uniformity among the States. A

standing committee of the Association was appointed made up of competent bridge engineers from the State and the Federal highway departments. This committee has performed a Herculean work in developing standard specifications uniform for the nation, which are kept constantly abreast of the advancing technique of bridge design and construction.

The plan of selection and marking of the U. S. numbered highway system came through a joint State-Federal committee, and its administration continues through the Executive Committee of the Association. Here is a remarkable example of a nationwide service established through cooperation without the necessity of resorting to special State or Federal legislation. The selection and numbering of through routes met the Federal objective of providing for ease of inter-state travel without detracting from, but rather enhancing, the importance of the State roads incorporated in the system.

The code of uniform direction and warning signs came from a committee of the Association working in cooperation with other bodies interested in furthering the convenience and safety of travel on the highways.

The Subcommittee on Uniform Accounting is maturing a manual for uniform fiscal accounting and cost records that is seriously needed. Not until this is completed and universally adopted will it be possible to benefit by comparisons of costs between localities and States or to decide the true costs, or

the relative economies between, different types of construction. These must rest upon an adequate system of uniform accounting.

The Special Committee on Road Design is earnestly engaged in modernizing basic design principles to serve traffic requirements of the new order. The object of this work is to minimize, and to the extent attainable to eliminate, hazards to traffic safety, and these considerations are ruling. As rapidly as the results of current extensive research upon traffic behavior are reduced to sound conclusions they are being given full weight by the committee. Out of these research studies in traffic behavior there is rapidly emerging new light on necessary minimum requirements for highway design with built-in safety margins. Too many decisions in the past have rested upon the conception of the motorized traffic unit as static when using the roads. This conception must be replaced by the established dynamics of the motor vehicle in motion on the road.

These examples of the important continuing work going forward under the Association's policy of developing standards to lift the technique of engineering and administration to even higher levels required by modern highway traffic are indicative of these facts; first, that all important standards are developed through cooperation between State and Federal highway organizations; second, that the standards enforced on all Federal aid projects have been approved by a majority of the States; and third, that the policy of the Federal administration in all

matters of regulations and requirements will continue to seek prior consideration and action by the proper committees of the Association, and through the established routine the approval of the Association itself.

This reaffirmation of the will on the part of the Public Roads Administration to cooperate with the State highway departments in generous measure, and the accenting of the greatly changed character of today's highway usage, appear now very important for major reasons. At this moment the nation is facing, at home, serious problems within our economic structure, and abroad, a crisis of cataclysmic potentiality to the world's existing order. Adequate highways are an essential element of our national economic and social well being during all ordinary periods, and their importance increases at an accelerated rate through the whole period of a national emergency. If the national defense is involved, needed highways are without price.

Under the present disturbed conditions it is to be expected that the State highway departments would be deeply interested and perhaps a little uncertain as to the future of Federal road policies and programs, and as to the import of the reorganization which transferred the Bureau of Public Roads from the jurisdiction of the Department of Agriculture to the Federal Works Agency as the Public Roads Administration. The statement by Administrator Carmody of the broad gauged forward-looking general policies under

which the Federal Works Agency will operate, effectively disposes of any uncertainty as to the future support by the Federal Works Agency for the road program, but it imposes the responsibility upon the State and Federal organizations to develop a planned and coordinated program with full justification.

Without too much statistical detail the past record of State-Federal highway improvement now stands thus.

The Federal aid system of highways first selected totaled 168,798 miles. By September, 1939, this had increased to 226,051 miles - partially by the addition of mileage within the seven per cent limitation, and partially by the addition of the permissible one per cent increments. Twenty-five States have thus added to the original seven per cent. Not included in these totals are Hawaii, 623 miles, and Puerto Rico, 1152 miles.

Highway improvement projects on the Federal aid system from 1917 to 1933, of all types, totaled 121,064, - to September, 1939, 150,713 miles of initial construction, and 62,974 miles of second stage improvements to the original projects.

The 121,000 miles initially improved prior to 1933 are then an average of about 15 years old and the standards are of that period.

Since 1933 approximately 30,000 miles have been initially improved on the Federal aid system. In general the standards under which this mileage has been constructed are better, but still deficient, particularly in sight distances, alignment and width, to meet the desirable requirements of modern design.

Approximately 77,000 miles of the Federal aid system as it now stands, have had no improvement as Federal aid projects.

The maintenance inspections made by the Public Roads Administration during the calendar year 1938 covered 139,000 miles on the Federal aid system, and this mileage as a whole averaged a rating of 89.6 per cent on the standard scale. This mileage is classified by surfaced types as follows: low type, 15 per cent; intermediate, 35 per cent; and high type, 50 per cent. This means that on the Federal aid system there is in excess of 70,000 miles of the higher type surfacings as a whole in excellent condition of maintenance exclusive of the mileage of such improvements provided by the States without Federal aid. The State highway departments can well be proud of the record made in maintaining this mileage in service under the tremendous increase in usage.

While secondary roads as a part of the regular Federal aid program have only been included since 1937, together with the use of emergency funds, the initial improvement has been made on projects totaling 28,311 miles. The most important problem now is the wise choice of a system of secondary roads whose improvement may be undertaken in the same orderly manner as has been followed on the original system of major roads.

In the Federal aid program prior to 1933, 6,287 railroad-highway grade crossings had been eliminated. In the period 1933 to 1939, 4,056 eliminations have been added, making the total of 10,343 completed or in process of construction. In



addition, warning and protection devices have been or are being installed at 3053 crossings.

These improvements are not represented to be the sum total of highway work within the nation by any means. During the period 1921 to 1931 the expenditures by the States for construction additional to that included in the Federal aid projects, were in excess of the State-Federal program. In 1920 the registration of motor vehicles reached 9,231,000; that is, motorized highway transport grew to national dimensions during the previous four or five-year period. The maximum production of new mileage was during the period 1920 to 1930. While Federal expenditures increased after 1933, the total amounts expended for new construction on the major roads reached their peak in 1930 and 1931, and have not since that time touched the same level. Thus the larger highway building program of major roads ended nearly a decade ago, and the average motor vehicles in service during that period were not much in excess of one-half the registration of today. Much of our major highway system was built during the period when the speeds of the individual units, the use per year of each unit, and the number of units in operation, were all very much under the figures of today. The standards of road design were geared to those figures, and not to today's requirements.

We have passed through the period of large mileages of new construction on the main roads of the nation, and through the period of rapidly growing road income. Motor Vehicle

registration has reached reasonably stable figures in that annual changes are in relatively small percentages. There has been a material increase in the amounts demanded for maintenance, administration and debt requirements, with the consequent depletion of construction funds. The distribution of highway user income to the local units, and the diversion to other purposes have also depleted the funds available to the State highway departments, while large mileages have been added to their responsibility for construction and maintenance.

All of these trends sum up in one fact, - that the future ability of the State and Federal highway departments to meet traffic requirements more adequately must come largely through painstaking and intelligent planning. This is the purpose of the State-wide highway planning surveys. There has been some irritation here and there within the States because of the insistence of the Public Roads Administration upon the highway planning surveys, and perhaps the feeling that too much information and too much detail have been required.

Generally the cooperation of the State highway departments has been splendid, and fullest acknowledgment is here extended to them. It is unfortunate that in the few cases where there is any reluctance to continue these surveys and studies on an adequate scale, the information is most seriously needed because of inadequacy of funds for the demands upon them.

During the past two decades there has been a constant and remarkable improvement in every physical element of the highway program, and these advances have been attended by equally constant lowering of unit costs. The same progress has not attended the economic planning of the highway systems, and it is this lack that the highway planning surveys were designed to fill. Before these surveys were undertaken the relative decrease in funds available to the highway departments, the increase in the number and speed of motor vehicles, and adverse legislation, were full of disaster for the highway departments. It was and is the firm conviction of the Public Roads Administration that the only possible chance the highway officials of the States and the Federal Government have to combat the crippling trends is to present the budget requirements of the highway system so soundly supported by the facts from the surveys, that their recommendations will receive the support of the legislative bodies.

The principal elements of the survey are:

1. A perpetual inventory recording the extent and condition of the whole highway system, the life expectancy of all existing improvements, and their probable salvage value in future reconstruction.
2. Currently revised estimates based upon an elaborate system of sample counts of the volume and variation of traffic on all roads and a determination of the class, size, weight, origin, destination, and purpose of travel of all vehicles composing such traffic, and the character and weight of the loads carried by them.

3. The dynamics of traffic flow, with particular reference to the characteristic behavior of traffic of all volumes under various conditions of road capacity and design.
4. The situs of ownership of all motor vehicles.
5. The relative usage of all classes of rural roads and city streets by residents of cities and rural areas, respectively, and by residents of the respective governmental subdivisions, for the purpose of determining the spread of benefit afforded by highway improvements.
6. The kind and rates of all taxes directly or indirectly imposed for highway purposes by all divisions of government, the amount of revenue raised by all such taxes, the amounts, terms, interest rates, and status of all bond issues, the incidence of all highway taxation, and the purposes for which all revenues collected are expended, such as for construction, maintenance, administration, regulation, police protection, etc.
7. The assembly of all available information necessary as a basis for the estimation of trends of increase in motor vehicle registration and traffic, both in general and in relation to particular classes and sections of roads, for the purpose of estimating future changes in the amount and character of road usage.

These surveys are regarded as of such importance by the Federal administration that the Congress has provided for the use of the one and one-half per cent fund for surveys and economic investigations without the requirement that it be met by State funds. It is hoped, however, that the States will continue to support the surveys with State funds until the data now available have been consolidated and the reports are ready for the next sessions of the State legislatures. This work

should now be speeded up since certain elements are of the highest importance in the development of plans for the national defense. A year ago the Executive Committee authorized the President of the Association to request the appointment by the Secretary of War of a committee representing that Department to work with similar committees from the Association and the Public Roads Administration for the purpose of bringing the standards of highway design and the planning of highway systems into adjustment with the needs of the national defense. These committees were appointed and much progress has been made in this field and a definite program of further cooperation is now being drafted. It is expected that a representative of the War Department will appear before the Association during this meeting to outline the importance of adequate highways to the national defense and the increased reliance upon them because of the rapid development of motorized equipment of all kinds.

From time to time there has been much agitation for so-called military highways, usually conceived on a trans-continental basis by enthusiasts who had neither highway nor military background. The report presented to the Congress by Public Roads entitled "Toll Roads and Free Roads" which was made possible through the active cooperation of the State highway departments, discusses in detail based upon factual evidence, the weaknesses of our present road system. It outlines the character and extent of the corrections that are vitally

necessary to serve existing and probable future traffic. It is soundly established that the national defense will be best served by a highway system that provides adequately for the traffic at all times, and special requirements are very limited. The report recommends a system of inter-regional highways which will connect the population centers of the country, with first attention to be given to the highways within and through the metropolitan districts. The report also recommends the modification of the existing Federal aid system by the replacement of inadequate bridges, correction of bad alignments and similar improvements. In addition to these types of improvement already recommended, the national defense needs would include a limited mileage to serve areas of mobilization as contemplated under the protective mobilization plan.

From this it will be evident that a highway program developed through cooperation between the State highway departments, the War Department and the Public Roads Administration to serve adequately the national defense, would follow in the main the recommendations already made to the Congress of the program now needed to serve existing and future traffic, and that the chief element of the program would be the establishment of priorities as to the order in which the improvements should be undertaken. The road program that is most important for the future, therefore, remains as a whole a single program, but intelligent planning is more necessary than ever before.

The chief obstacle to progress which has been discussed in detail in the report to the Congress is the difficulty in acquiring rights of way of adequate dimensions, and in the proper locations for the development of main traffic arteries, also for improvements such as grade crossing eliminations and correction of alignments on existing roads. This need is pressing, and it appears that prompt action can only be secured through Federal legislation. Senator Hayden and Congressman Cartwright introduced at the close of the last session of the Congress a proposed bill to make it possible for the Federal Government to assist the States in acquiring adequate rights of way and to help with the financing by extending the payment over a long period of time. In the whole detail of the road program most desirable for the future, nothing is more important than that legislation of this character shall become effective. Without some such authority it is impossible to accomplish promptly important undertakings whose construction costs are already financed in whole or in part. The difficulty of securing rights of way, even in small tracts, has held up many Federal aid road projects, and has been one of the most serious factors in delaying the grade crossing elimination program.

All of the elements and agencies of both State and Federal governments concerned with road improvement are being constantly brought into a more closely knit endeavor so that their combined efforts will be more effective. When legislation is before the

Congress during the coming winter it is hoped that the major handicaps to progress, particularly the land difficulty, will be removed.

Every circumstance affecting highways and their utilization with which we are now faced, domestic or foreign, can be best met by complete and generous cooperation between the States and the Federal Government acting through their established highway departments, if the planning of the immediate and long-time programs for action receives the intelligent and continuous attention necessary from these agencies.