

FIFTY YEARS OF ACCOMPLISHMENT ON STATE HIGHWAYS

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The United States has today by far the greatest system of highways of any nation in the world. Within the memory of the older groups of our population it has created a network of surfaced highways reaching to every part of the country. These highways have completely changed our way of life. They form essential links in production of all kinds, and they have made possible great changes in our system of education and in rural and urban social life. No factor has been more significant in the progress and development of the country in the past 50 years than highway transportation.

The building of main highways--those that carry the bulk of the nation's traffic--has been entirely the work of the State highway departments. Federal aid has had important influence. Certainly our highway system would be nowhere near as complete as it is without Federal assistance, but, except in Federal areas, the Federal Government has not itself improved highways. It has been the consistent Federal policy to aid the States financially and cooperate with them in planning and constructing highways. All improvements of main highways have been made by the States.

First Steps by the States Toward Road Improvement

Prior to 1900 most of the States had not assumed any responsibility whatever for the condition of the highways and no State had undertaken to construct and maintain a highway system. It is easy to understand why highways were regarded as a matter of local concern. Some years were to elapse before the country would emerge from the horse-and-buggy era. Few people traveled by highway more than 10 or 15 miles from their homes. There was no intercity highway travel. Outward expansion of cities was along the street-car lines. Practically all industry was located close to railroad tracks. Transport by highway was limited by the power and speed of horses and mules. Only about 125,000 miles of rural road had been surfaced. Highways were of local significance only and each community was left to its own devices as to how to get them.

However, there was a strong and growing demand for roads for local service. The slogan "get the farmer out of the mud" was heard with increasing intensity. No one had an adequate answer to the question "Where is the money to come from?" Then, as now, there was bitter opposition to increases in local taxes.

In seven States the search for funds had resulted in the passage of laws authorizing aid to the counties for highways. New Jersey enacted the first law in 1891 and by 1900 had been followed by California, Connecticut, Maryland, Massachusetts, New York, and Vermont. After 1900 other States adopted the plan in increasing numbers.

The State-aid policy as adopted by the various States took a number of forms. In some States the aid offered consisted only of advice which might be accepted or rejected by the local authorities who retained absolute control over all the roads. In such States no financial aid was extended. In those States which provided for financial aid its acceptance generally implied an agreement on the part of the county to accept the supervision of the State authorities until the work of construction was completed, after which the road reverted to full county control. In other States the joint participation of the State and county in the construction of certain classes of roads, generally the most important ones, was made mandatory; and there were still other variations which differentiated the systems as adopted by the several States.

Adoption of a policy of State aid, either in the form of technical assistance or funds, required the creation of a State highway agency. These agencies were the seed from which the present departments have grown. Considering their size and funds for support, they were very small seeds planted with little nourishment to support rapid growth.

In every State adopting the principle of State aid to local units, not many years elapsed before serious defects developed. The local units were not technically equipped to administer road construction. Highway engineering was in the first stage of development and few counties were in a position to apply the scant technical knowledge then existing. The counties did not maintain the roads once they were built.

As highways were improved and motor vehicles became more numerous the concept of intercity travel over planned State systems gained support. With this concept there came the realization that the only hope of developing a connected system of main State arteries was for the State to assume full control and financial responsibility for construction and maintenance. It was definitely demonstrated that complete connection of main arteries could not be made so long as there was any dependence on county cooperation. The through arteries were often not the ones in which the counties had the greatest interest.

All of our State highway departments were created in the period 1893-1917. The 22 in existence by 1910 were small but active departments busily constructing short sections of road that would bring vociferous demands for more improvements. Only seven had designated a State highway system but forces were at work that would soon bring rapid change.

Less than one-half million motor-vehicles were in use in 1910 but by 1915 the number was nearly $2\frac{1}{2}$ million. They were operated largely in cities but their owners joined vigorously in the movement for better rural roads, and particularly for the improvement of roads between the cities. Of greater effect was the increase in registration fees from small amounts covering registration costs to amounts that would provide some revenue for the highway departments.

Federal aid Strengthens State Organizations

Growth of State highway departments to full stature came as a result of the initiation of Federal aid in 1916. The State highway departments then existing exerted strong influence with committees of Congress in culling from the maze of proposals made to frame a practicable and workable act. In 1914 they formed the American Association of State Highway Officials for uniform and concerted action to get Federal legislation of suitable character.

It is my firm belief that the principles which characterized that Act would not have obtained had it not been for the sober judgment and wise counsel of the pioneer State highway officials who then composed the association. Hardly half of the States had effective highway departments, but it seems to me particularly significant that when the representatives of those that did have such departments gathered in the new association to discuss the possibility of Federal action, it is recorded that: "There seemed to be remarkable unanimity among the members as to the fundamentalities which should be observed in the granting of Federal aid."

In accordance with democratic concepts of division of authority between the Federal Government and the States the legislation preserved to the States the initiative in determining what roads were to be built and the character of their improvement. It gave Federal officers authority to approve or reject the State's proposals. It placed the immediate supervision of construction work in the hands of the State highway departments, but made certain that the Federal funds appropriated would be spent for sound workmanship. This it did by subjecting the results of the work to final approval of the Federal authority. It also imposed upon the States or their subdivisions the duty of maintenance.

Of particular immediate importance were the provision of funds which, when matched by the States, permitted the construction of much needed roads and the requirement that the State must have an adequate highway department to avail itself of the funds. By the end of 1917 every State had met this requirement.

We were then engaged in the First World War. Highway improvement almost ceased and was seriously checked in the readjustment period that followed. However, the State highway departments were being organized and prepared for the big job ahead of them. They little realized its eventual size but the means of accomplishing it were taking shape.

In 1919 Colorado, New Mexico, North Dakota and Oregon placed a tax on gasoline to provide funds for highways. The measure proved ideal for the purpose since it charged for highway use at the time of use, and in proportion to weight of vehicle and extent of travel. By 1928 every State was collecting a gasoline tax. The revenues produced have not gone entirely for highways but these so assigned have been a major element in highway financing.

Numbers of motor vehicles grew from less than one-half million in 1910 to more than 9 million in 1920 and continued the rapid climb upward thereafter. Highway revenue from registration fees followed a parallel course. Property taxes which had been the principal support of highway improvement soon ceased to be of significance.

From 1900 to 1920 was a period of development and preparation. The State highway departments were created, the job to be done outlined and sound methods of financing established. Preliminary efforts of the early roadbuilders had greatly increased the store of knowledge of how to build roads. Builders of machinery, sensing what was ahead, were feverishly developing machines that would convert road building fully from hand-labor methods to mechanical processes. The stage was set for the greatest road building effort in history.

Initial Objective Accomplished

In 1920 the objective was to build a system of two-lane roads interconnecting the cities and serving as main lines for such feeder roads as it might be possible to build. Just where the money would come from was not clearly evident. However, Federal aid, revenue from 9 million motor vehicles, and funds from miscellaneous sources permitted a beginning. The roads built brought more motor vehicles into use and still more funds for highways. This cycle or chain reaction continued throughout the twenties and thirties and still goes on some 30 years after its beginning.

The number of motor vehicles grew to 25.9 million in 1931, 34.5 million in 1941 and is now approaching 44 million. Travel on rural roads amounted to 122 billion miles in 1936 (first year for which an estimate is available) and is now well beyond the 200 billion mile mark. Always there has been a wide gap between the needs of the ever growing traffic and the highways available to serve it. Each State has sought to close the gap by increasing the duties, responsibilities and financial resources of its highway department.

With few exceptions, the highway departments were established to perform construction only but they soon found themselves with a rapidly increasing burden of highway maintenance. The years from the early twenties to 1933 were the most productive in highway construction of all the years in our history. Between 1923 and 1933 the mileage of designated primary State systems grew from 251,611 miles to 345,751, and the surfaced portions of these systems to be maintained grew from 111,400 miles to 271,845 miles.

The accompanying tables show the remarkable growth in miles of highway under State highway department care, the expenditures made and the growth in numbers of vehicles and in travel that made necessary still more highway facilities.

MOTOR VEHICLES REGISTERED, VEHICLE TRAVEL, AND STATE HIGHWAY INCOME

AND EXPENDITURES

		<u>1914</u>	<u>1921</u>	<u>1931</u>	<u>1941</u>	<u>1944</u>	<u>1948</u>
Motor Vehicles registered <u>1/</u>		1,763,018	10,493,666	25,862,038	34,472,145	30,086,189	40,622,264
Miles of travel by vehicles	(Billions)	(<u>2/</u>)	55	216	333	212	398
Rural	(Billions)	(<u>2/</u>)	(<u>2/</u>)	(<u>2/</u>)	170	101	199
Urban	(Billions)	(<u>2/</u>)	(<u>2/</u>)	(<u>2/</u>)	163	111	199
Total State highway income	(Thousands)	\$75,020	\$420,485	\$1,092,637	\$1,820,280	\$1,295,724	\$2,838,943
Road-User revenues <u>3/</u>	(Thousands)	(<u>3/</u>)	103,592	639,585	1,402,432	1,092,338	1,997,085
Federal aid	(Thousands)	(<u>3/</u>)	77,457	218,074	156,938	91,179	362,462
Other Sources	(Thousands)	(<u>3/</u>)	239,436	234,978	260,910	112,207	479,396
Total State highway expenditures	(Thousands)	\$75,020	\$411,995	\$1,091,009	\$1,752,383	\$1,167,500	\$2,757,403
State-administered highways <u>4/</u>	(Thousands)	75,020	405,543	1,050,960	1,179,025	727,608	1,915,232
Expenditures and transfers for							
local roads and streets <u>4/</u>	(Thousands)	-	6,452	32,969	359,000	297,808	652,801
Nonhighway purposes	(Thousands)	-	-	7,080	214,358	142,084	189,370

1/ Does not include publicly owned vehicles.

2/ Data not available.

3/ Net after deducting collection expenses.

4/ Includes payments for construction, maintenance, administration, highway police, and interest and principal on highway debt. Expenditures for county roads under State control are included with those for State-administered highways.

MILEAGE OF ROADS AND STREETS UNDER STATE CONTROL, 1914-1948

	<u>1914</u>	<u>1921</u>	<u>1931</u>	<u>1941</u>	<u>1944</u>	<u>1948</u>
Total Mileage under State Control.....	40,000	203,000	374,000	555,000	564,000	588,000
State Primary Systems.....	40,000	203,000	329,000	332,000	335,000	350,000
State Secondary Systems...	*	*	45,000	196,000	200,000	206,000
Urban Extensions.....	*	*	*	27,000	29,000	32,000
Paved Mileage.....	*	84,000	258,000	456,000	473,000	506,000
State Primary Systems.....	*	84,000	243,000	306,000	312,000	335,000
State Secondary Systems...	*	*	15,000	124,000	133,000	140,000
Urban Extensions.....	*	*	*	26,000	28,000	31,000

MILEAGE OF THE PRIMARY FEDERAL-AID HIGHWAY SYSTEM, 1923-1948

	<u>1923</u>	<u>1928</u>	<u>1931</u>	<u>1941</u>	<u>1944</u>	<u>1948</u>
Total Mileage.....	169,000	189,000	202,000	235,000	231,000	235,000
Paved Mileage.....	*	120,000	159,000	221,000	223,000	226,000

* Data not available

In the face of increasing demands for schools, roads, hospitals, public safety and other public functions the local units continually sought to shift financial burdens to the State. Large mileages were added to the primary State systems for this reason and a number of secondary State systems have been designated and given State support. This movement was particularly intensive during the depression years.

At the same time local units have continuously sought to share in State motor vehicle revenues. In 1931 they received \$33 million from State highway income and by 1948 they were receiving \$653 million from that source.

During the 1930's one State after another approached the end of what is now regarded as the pioneer period of road construction. They had nearly completed the job of constructing a system of two-lane roads connecting the centers of population. But our highway system was far from adequate. Need for highway improvement on a scale larger and broader than in any preceding period became evident.

Reorienting the Highway Program

Most of the States had applied a policy of stage construction; that is, an effort was made to construct permanent graded highways and to save money by constructing low-type surfaces which might later be converted to higher types without great loss of expenditures already made. This procedure, though sound in principle, was not completely successful, either because the road builders of that day were unable to visualize the enormous advances in traffic volumes, and in the weight and speed of vehicles or because, visualizing these things, they were unable to provide for them without too greatly curtailing the mileage which could be constructed with available funds.

Main route problems.--Highway users, as they became acquainted with roads built to new standards for width, grade, and sight distance, complained vociferously about the older, low-standard roads. The mounting toll of accidents on the more hazardous early construction added force to the complaints. Many miles of main rural highways now carried a traffic that justified four traffic lanes. On main routes near cities, businesses and developments of various kinds fronting immediately on the highway gave them the aspect of business streets rather than through routes for unobstructed travel. Practically every city had serious congestion problems that could be solved only by major highway improvements. The improved rural highways brought a great volume of traffic to each city entrance where it must pass over streets designed for the traffic of an earlier day. Urban residents demanded that a greater share of motor-vehicle revenues be applied to solution of their problems.

Secondary road needs.--At the same time farmers throughout the country made strong claims for improvement of the secondary or farm-to-market roads which they had to travel to reach the main highway or the nearest

population center. A motor vehicle was now found on almost every farm. Better rural education was provided by consolidation of schools to which children were brought by bus. The automobile brought to the farmer a broader social life, but he needed good road surfaces to enjoy the full advantages.

Comprehensive studies undertaken.--In spite of the great length of highways already completed, highway problems were not nearing a solution--on the contrary, they became more complicated.

In this situation the Bureau of Public Roads saw a need for comprehensive studies to determine the condition of all rural highways, the character and extent of their use, the source of funds for different classes of highways, and how the burden was distributed among classes of highway users and other groups. This information was needed as a basis for the establishment of a definite, economically and socially defensible, integrated highway improvement program in all States.

Use of $1\frac{1}{2}$ percent of the annual Federal-aid funds by the States in making highway planning surveys and other engineering and economic investigations was authorized by Congress in 1934, and the Bureau of Public Roads undertook to assist the States in organizing the surveys and coordinating the work so that the data could be used for analysis on a national basis.

The first of the planning surveys was initiated in 1935, and by the beginning of the war every State was engaged in such work. The facts disclosed by these surveys have had important application in revising and broadening the highway programs of the States and of the Federal Government. In 1944 when postwar Federal highway legislation was being framed, State representatives joined with the Bureau of Public Roads in urging an enlarged program of greatly widened scope. The Act passed provided \$500 million for each of the first three postwar years to be expended according to the long established Federal-aid plan. It provided for continued improvement of the Primary Federal-aid System by assigning \$225 million of the yearly total for this purpose. It emphasized that importance of urban sections of the system by assigning \$125 million to them. It required the States to cooperate with local officials in the designation of Federal-aid systems of secondary roads and authorized \$150 million for each of the three years for their improvement. This initial legislation provided funds for the fiscal years ending June 30, of 1946, 1947 and 1948. A subsequent amendment has provided funds for the fiscal years ending in 1950 and 1951 at a rate of \$450 million annually. An important feature of the 1944 legislation was the requirement that a National System of Interstate Highways not exceeding 40,000 miles in extent be designated and made a part of the Federal-aid Primary System. This has been done and has had the effect of centering attention on the urgent needs of the most heavily traveled routes.

Since the end of the war increasing traffic volume, resulting delay and congestion and a continued high accident rate have impelled the States toward more intensive efforts toward a solution of their highway difficulties. Many of them have initiated or completed highway needs studies for

the purpose of presenting to the public a full statement of the facts and of enlisting support for the solution of problems. Sound highway policy requires: (1) Determination of the proper size and the probable cost of owning and operating highway systems of the different classes, (2) an equitable plan for distribution of costs among highway users and general taxpayers, (3) allocation of authority and financial responsibility among the several levels of government, and (4) a plan for the regulation of highway use to protect users and obtain maximum service. Studies are made and reports prepared by groups appointed and composed according to the election of the particular State but in every instance the work revolves around the highway department and it is the source of much of the data and analysis of data.

The Changing Pattern and Problems of State Highway Administration

Most of our highway departments were established to perform a single function. They were to construct a rather small mileage of highways annually with limited funds. From this they have grown to large organizations with many different functions on different road systems and are spending many millions of dollars annually. Maintenance problems grew rapidly with the completion of road surfaces, and now require about twice as much expenditure as did all construction in 1930. The construction program is six times what it was in the early days.

Planning of programs was once a simple matter. Two-lane roads connecting the cities were to be built and unimproved sections nearest the cities and towns were of first importance. Now the highway departments are confronted with a multiplicity of needs in every direction--on primary rural roads, extensions of main routes through cities, and on secondary or farm-to-market roads. Many factors must be considered in the allocation of funds among systems and to the parts of systems. While the highway department is often directed by law as to the division of funds between systems it is always responsible for producing facts indicating what the distribution should be.

Highway departments must now be staffed with highly trained men of special skill and technical ability for each class of work. Among the special needs are men trained in design of structures at major intersections, soil work, traffic handling material control, design of different types of surfaces, highway planning, control of funds, and purchasing.

The various branches of most highway departments are directed by men who entered the highway field as young men and have increased their knowledge and ability as the importance of their jobs has grown. They guide departmental operations with a background gained from long experience and constant development.

The State highway departments face a big job in the future--one which they are well equipped to perform. They are doing a big job under the present scale of operations and they owe it to the public to produce the facts that will lead to a fully adequate improvement program.