

## Road Building Progress

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As we approach once more the end of the busy season of highway building I find it not only profitable, but gratifying as well to step apart from the active work of the moment and review the results of our combined efforts during the passing year.

We shall be especially gratified this year, I believe, at the progress that has been made. Though the figures are yet to be compiled, I believe, we shall find when the count is made that we have completed a greater mileage of serviceable highways than ever before have been built in one year since the work began. For the Federal-aid roads the figures are at hand, and they show, not only that the mileage completed is greater than in any previous year, but greater than the entire accomplishment since the beginning of the cooperative work in 1915. More than ten thousand miles have been opened to traffic this year, as against 7500 miles, the accomplishment of the preceding five years. Much of the new mileage turned over to the public was begun, of course, in previous years, but while that has been completed and the barriers removed other roads have been under construction, and the work done

on them added to the work of completing the ten thousand miles brings the actual construction of the year up to the equivalent of more than 9000 miles of completed roads.

The report for the fiscal year will show that at the close of the preceding year there were 7469 miles completed and 17,978 miles under construction which were estimated as 50 per cent complete. In one year the completed mileage grew to 17,716 miles, an increase of more than 10,000 miles and there still remained under construction on the thirtieth of June, when the fiscal year closed, 14,513 miles which the district engineers reported as 56 per cent complete. If you will do a little figuring you will find that at the beginning of the year we had 7469 miles entirely completed plus 50 per cent completed on 17,978 miles under construction, which makes the equivalent of about 16,400 miles completed. At the end of the year we had 17,716 miles entirely completed and 56 per cent completed on 14,513 miles which makes the equivalent of about 25,800 miles completed. Actually therefore the work done during this one year has been equivalent to the construction of something like 9400 miles of road.

That is the record that has been made in the Federal-aid work only. I presume that a considerably greater mileage has been constructed by the States and counties without the aid of

the Federal Government. A little later we will know exactly how much has been done. In the meantime I should say that 20,000 miles would be a very conservative estimate, probably it is nearer to 25,000. At any rate, I think we may be sure that the year's record, from the point of view of actual construction only, will be one of which we can be justifiably proud.

And yet, if we take the broader view, that what we are all working for is the betterment of the nation's transportation system and not merely the construction of roads, I believe we shall find in two other developments of the year more significance than in the actual physical work that has been done. I am thinking of the great studies that have been made in providing a more scientific basis for our work as the result of research and the definite program of future work that is being mapped out as the result of the enactment of the Federal Highway Act.

For more than two decades there has been in progress a slow but certain development of highway construction from a casual activity in the hands of unskilled officials, without plan or program, other than to maintain an established minimum of facility in highway transportation, toward a reasoned industry in the hands of State and national officials, supplemented by intelligent local aid, the aim of which is to provide complete and economical highway transport service throughout the nation. In this development the adoption of the Federal-aid highway system, provided for by the Federal Highway Act,

and the significant researches of the past year constitute the greatest forward steps that have ever been made.

The adoption of the Federal-aid highway system gives assurance that, hereafter, the work that we do is going to bring us nearer the goal of a consistent system of roads for the whole country. The research work, organized now as it has not been in the past, points the way to more lasting and more economical construction. With the assurance given by these developments that what we do hereafter will be well done and rightly directed, and with our proved ability to conquer the physical task involved, there is every reason for confidence in the success of our efforts. Certainly there is less reason for doubt and less for reaction to feed upon in the present status of highway improvement than at any time since the movement for better roads began.

At intervals there is a recurrence of the alarm that the roads we are building are perhaps not worth what they cost. They cost a great deal. Who can say that they return full value for the price paid? The best answer to that question is to compare the present condition with that which prevailed before we had started upon the work which is now well under way. We will think back to the state of the roads of this country in 1900 and compare with that state the conditions of today, and assert that, blunders and neglect and waste included, the roads that have been built in 22 years are not worth every cent they cost? Who, with the memory of

fleets of army trucks that saved the day in 1918 still strung upon him, will say that the damage they caused was not fully repaid by the saving service they rendered? Who will compare the isolation of the remote farms of 20 years back with the same farm, today, drawn closer to city and town and their conveniences by the new road and the new motor? Who will compare the one-room school of that other day with the consolidated school of this, the whole benighted system of rural education as it was, with those systems, impossible without the improved roads, that now equal and surpass, in some cases, all that the cities have to offer; who will make these comparisons and still say that the improved roads have not been worth all they cost to the farmer's wife and the farmer's child? Who will think of the recreational and utilitarian uses of the roads that have been provided for the operation of motor-cars, now more than nine million in number and still increasing; who will project his thought into the future and consider the almost unlimited transportation opportunities offered by the fast multiplying motor trucks and still harbor the fear that these roads we have built and those we will build in the future will not be worth any expenditure that has been or is likely to be made for them? No one, I believe, who really considers these things will be able to entertain a doubt as to the wisdom of the present highway construction program on the ground that it will not be worth what it costs.

A number of the more serious weaknesses, each a potential cause of failure have been corrected or eliminated. There was, for example, the lack of a definite program and the scattering of effort that resulted in the construction of isolated sections of improved road. We now have in every State the beginning, at least, of a definite plan for the construction of a connected system of roads designed to serve the whole State and the more important localities to a degree consistent with the traffic demands. This condition is brought about by the passage of the Federal Highway Act in those States which had not previously evolved a plan for an independent State system; and the various systems are now being correlated into a nation-wide system through the agency of the Bureau of Public Roads.

There was the warfare of types of surface construction, each type represented as the only "permanent" type, which threatened to divide us all into as many camps as there were types, each group convinced of the superior merits of its chosen type for all situations.

We are getting around that difficulty in the only way it can ever be overcome - by scientific experiment and research. We have made this much progress, if we have accomplished nothing more - that we have banished the illusion of "permanence". We know that

road surfaces, of whatever type, deteriorate. And we know more that each type has its limitations and its advantages, its proper use and its misuse. We know what some of the limitations are and some of the advantages of each type and we are going to know more as a result of the splendid work that has been done and is still being done in highway research.

There was the fear that the motor trucks would destroy the roads faster than they could be built and the reaction which threatened by arbitrary legal limitation to destroy the effectiveness of the motor trucks. We are coming to realize that regulation of traffic is an administrative matter and should be so regarded, that under the average regulatory law that has been thus far made effective, the utility of the best roadways is not realized in full, and the safety of the roadways of lesser capacity is not assured. Through research we are learning that the carrying capacity of the roads is influenced by subgrade soils, and their moisture content, by tire equipment of vehicles, by the distribution of load to their wheels, and by the speed of the traffic. We are isolating the variables and determining their limits; we are studying the laws of variation; and as, one by one, we establish the facts and principles of highway engineering science that were unknown to the road builders of the last generation we are laying the solid foundations of future highway policies upon which the road will be built for the special

use it is intended to serve and the use will be regulated to the capacity of the road.

There has been and still remains to a certain degree a lack of appreciation of the importance of constant maintenance. Partly the product of a naive belief in the "permanence" of the roads built, partly the result of the pressure for road construction which has lead officials and law-making bodies to apply for construction purposes, revenues that were better held in reserve for maintenance, this has been one of the last of the major causes of possible failure to yield to the advancement of highway science. One of the most dangerous policies that can be adopted in my opinion, is that which hypothecates the motor vehicle revenues for the payment of indebtedness for construction. This form of revenue is exactly of that certain character that is the first essential of a satisfactory revenue for maintenance purposes. The experience of the more advanced States points to the fact that it grows in amount approximately as the need for increased maintenance funds appears, and that, without undue burden it remains equal to all the demands. If there is difficulty in developing other sources of revenue for payment of interest charges on construction costs, it is far better to limit construction than to jeopardize the integrity of the investment by gambling upon the development of such other sources for maintenance.



No limit construction is merely to mark time, to fail in maintenance is to lose ground and to invite disaster. There should be a maintenance policy and a maintenance fund ready to be applied as soon as the new road is thrown upon to traffic, and the higher the cost of the road, the more careful in detail should be the maintenance. The federal Highway Act has in it a clause which calls for exactly that kind of maintenance and that clause will be enforced.

If inadequate provision for maintenance is still one of the causes of possible failure in carrying out the road program, it is certainly not because the danger has not been repeatedly pointed out, and the same may be said of that other possible source of failure - partisan political control. There is perhaps no question upon which there is greater unanimity of thought and opinion than the question of political control.

Certainly there can be no efficient administrative, engineering or financial policy unless the business is kept absolutely free of political bias, and unless the employment of personnel is determined solely upon the basis of competency and service. The instability of administration, the sudden overturning of established organizations to replace them with new and untried organizations, short terms of office and other accompaniments of political control will continue to make it one of the most serious obstacles to progress until an

intelligent public opinion puts an end to the underlying cause.

There may be other possible causes of failure - I presume there are. We have been told occasionally that the pernicious system of Federal aid is one of them. But I venture to suggest that when they are analyzed it will appear that they are the results mainly of ignorance and the lack of a definite plan for the job - and that is why, at the beginning I said that the passage of the Federal Highway Act and the significant highway researches of the past year constitute the greatest steps that have been made in the gradual development of highway construction from a casual activity to a reasoned industry.