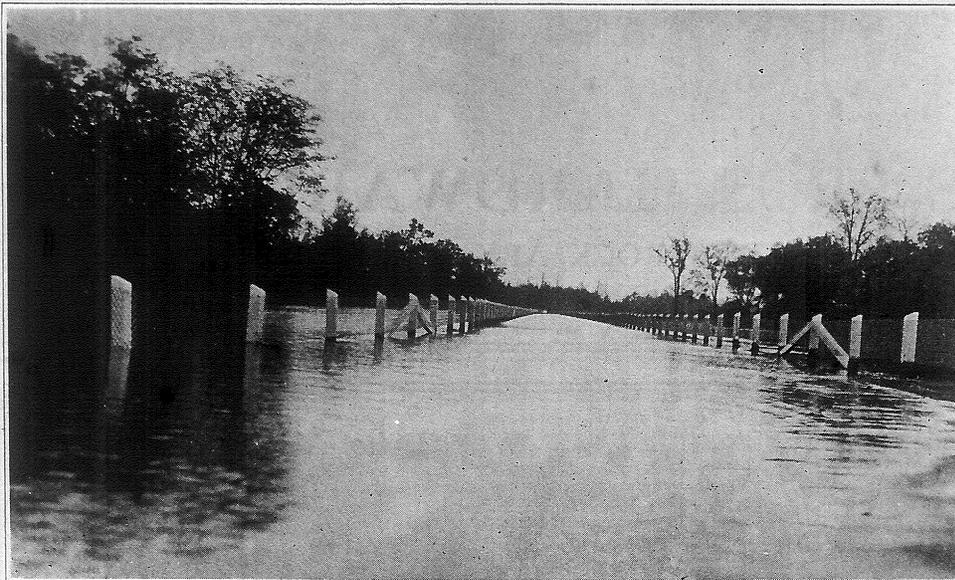


ARKANSAS HIGHWAYS

The Official Magazine of the Arkansas
State Highway Department, Little Rock



A typical view of the inundation, practically all Arkansas highways were visited with. The problem is, what will be the damage when the water recedes.

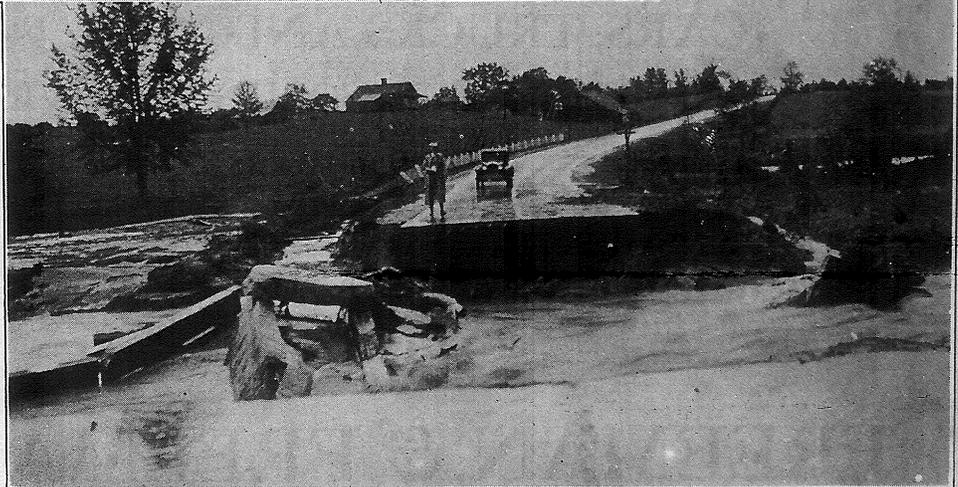


*Photo made on Little
Rock-Conway Highway.*

This view plainly shows a washout such as will be numerous throughout Arkansas, it is feared, when the water has left the roads.



*This picture made on
Little Rock-Hot Springs
Highway.*



Vol. 4

APRIL · 1927

No. 4

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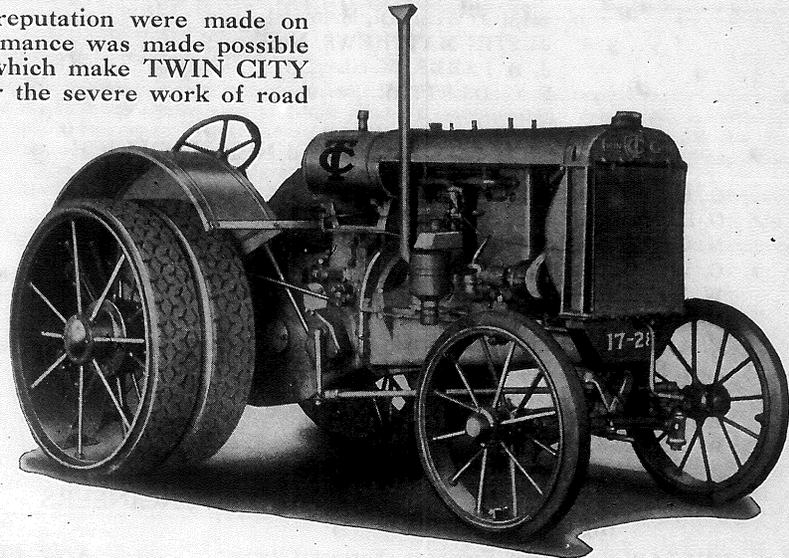
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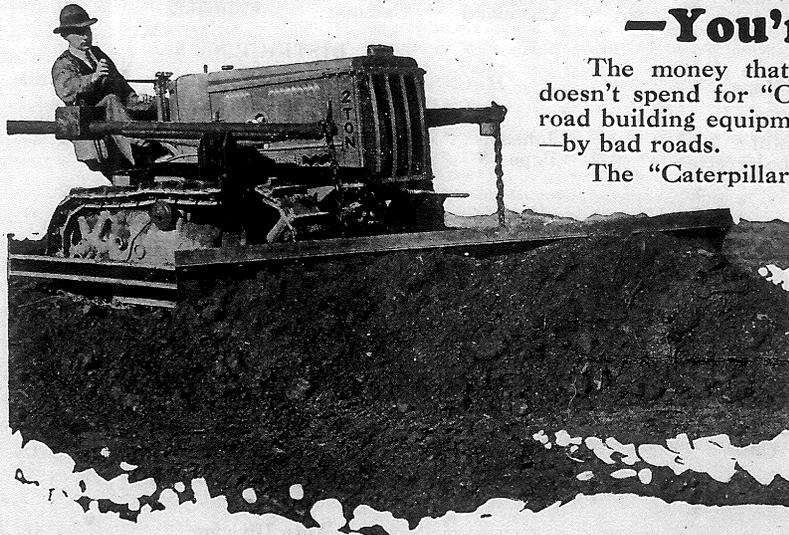


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Magazine*



*State Highway
Department*

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No. 4

RESUME OF ARKANSAS HIGHWAYS

By G. Hunter Sykes, Assistant State Highway Engineer

The subject of Highways (or Good Roads) and how to obtain them is as old as civilization, in fact, older than modern civilization, and history tells us that the rise of the great nations of the earth began with the improvement of their highways. China had her primary highway 1,800 miles in length, which was built on top of the "Great Chinese Wall"; Rome has her wonderful "Appian Way" which have been upheld as ideals for more modern civilization. France under the Ducal Empire reached its acme of highway perfection, while England was building the route from Argyle through the Caledonion Marshes to Chesshire and thence to Gym in Wales.

America may be considered an exception to the rule as her waterways and great railroad systems backed by her unusual natural resources, enabled her to attain a very high state of civilization without a system of highways. This was especially true of Arkansas. Theoretically we knew the value of good roads, but until a few years ago, this was as far as we could go, for when told that a system of good roads would cost millions of dollars, the problem of how and where so much money could be obtained was not solved and Arkansas continued to stay in the mud.

In about the year 1893 the first Good Roads Association meeting was held in Little Rock, with subsequent meetings at intervals until 1915. At these meetings much enthusiasm was shown and many eloquent speeches were delivered on the question of improved highways and in all this time two plans were offered as

a solution of the problem "How to pay the cost of good roads."

First. A plan for a State Bond Issue was advanced but since bond issues had become so extremely unpopular during the days of the reconstruction following the Civil War, this plan died in its infancy.

Second. A plan for Local Improvement Districts was advanced.

At the Good Roads Association meeting of 1907, the Local Improvement District plan was proposed. The Legislature was in session at the time and some of the members were so much impressed with the idea that a bill to permit the forming of improvement districts was introduced and after all except eight counties were relieved from the provisions of the bill, it became a law. The courts held this law inoperative, and it was amended in 1909. Under this act most of the roads were built in Jefferson, Lincoln, Lonoke and Prairie counties.

Act No. 105 of the Acts of 1913, which created the Highway Department, was the first real step taken in road progress. It is a fact that this act provided no funds for road building and nothing could be done by the

commission except to meet, discuss and formulate plans to be submitted to the Legislature. At these meetings Act No. 338 of the Acts of 1915, known as the "Alexander Road Law," was conceived. This was the second important step toward a State highway system.

About this time the Congress of the United States, realizing the importance of improved highways conceived the idea of aiding and encouraging the several

Let's Rise From The Ruins!

The flood that is now receding reveals a staggering extent of damage done to the property and roads of Arkansas. A comprehensive survey is not yet possible, but it is full well known that a huge task confronts us, every citizen of Arkansas, in the rebuilding of the destroyed area.

In the rehabilitation of the devastated and the damaged sections of the State the actual co-operation of every citizen will be called upon. Arkansas will surely show the spirit of rising from the ruins, and it is to be hoped that all plans will be for bigger and better properties than those swept away.

Time is required for the total reconstruction, and team work is needed as never before. We of the Arkansas Highway Department are fully mindful of the tremendous undertaking at hand, and each individual promises his utmost.

Our district engineers are making a survey of the damage to the roads as fast as they are left by the water, and the big job of rebuilding has begun. Naturally the extent of damage will make it impossible to cover the whole State at once, but we are going to do our very best.

We earnestly solicit your co-operation and indulgence.

DWIGHT H. BLACKWOOD,
*Commissioner of Highways, Lands
and Improvements.*

States in modern highway building by making a substantial appropriation, which was available when roads were built on approved plans and under certain stated conditions.

In 1917 the Legislature passed what was known as the "Federal Aid Act" or Act No. 105 of the Forty-first General Assembly authorizing Arkansas to participate in the receiving of Federal aid on our highways.

During the Legislature of 1919, its special sessions and the special sessions of 1920 many road improvement districts were formed and approximately \$100,000,000 worth of bonds were authorized and approximately \$70,000,000 worth of bonds were sold resulting in a very enthusiastic and ambitious program.

On account of the fact that the Highway Bills of 1919 and 1920 failed to provide revenue and authority for the State Highway Department to maintain the highways on which Federal aid had been allotted, the Bureau of Public Roads withdrew Federal aid from the State of Arkansas.

The road situation was anything but satisfactory and as the land alone was taxed to pay interest charges and bond maturities, while those who used the road paid nothing, the Road Improvement District plan was very unpopular; this fact together with other reasons resulted in the Legislature of 1923 failing to provide an appropriation for the Highway Department.

On June 30, 1923, the end of the fiscal year, the Highway Department ceased to function and the Governor called a special session in October, 1923, at which session the "Harrelson Highway Bill" or Act No. 5 of the Extraordinary Session of 1923 was enacted.

This act provided authority and revenue for the maintenance of all roads on the State highway system and all Federal aided road projects, and a limited amount of money for construction, and Federal aid in Arkansas was again restored and systematic maintenance was started.

This law, while the best and most progressive that could possibly have been passed in 1923, had its shortcomings and limitations, but it was a start in the right direction.

The universal use of the automobile, the numerous tourists visiting our State and the resulting increase in traffic, proved conclusively that the gravel road was a type of road inadequate to cope with the new traffic condition due to the fact that these roads were extremely expensive to maintain, and that a higher and more permanent type of pavement was desired. This fact, coupled with the important fact that the more ideal, equitable and popular plan of financing the costs of highways was for the user of the highways to pay the bill and at the same time to relieve, as far as possible, the burden imposed on the land for roads already constructed, and in addition thereto, the necessity of a more rapid completion of our highway system, were the basis of the Administration Highway Bill which passed the Legislature in record time and with an unprecedented vote of confidence by the Senate and House of Representatives in the new administration. This law is known as Act No. 11 of the Forty-sixth General Assembly or the (Martineau Highway Bill) because Governor Martineau sponsored this bill from its infancy.

At the last election John E. Martineau was elected Governor and Dwight H. Blackwood was elected Com-

missioner of State Lands, Highways and Improvements and Chairman of the Highway Commission. In accordance with the provisions of the highway law the Governor is authorized to appoint four honorary members to serve with the elected Commissioner of Highways.

In making these honorary appointments Governor Martineau has appointed Justin Matthews of Little Rock, J. L. Williams of Osceola, S. J. Wilson of Portland and J. S. Parks of Fort Smith to serve as honorary highway commissioners. The new Highway Commissioner and the Honorary Board make an exceptionally strong board as it is composed of men of wide business experience and training and they are also held in high respect and esteem in the communities they represent.

The outstanding high points of Act No. 11 of the Forty-sixth General Assembly are as follows:

1. All highway bonds of road improvement districts maturing beginning January 1, 1927, and interest on same are taken over and paid by the Highway Commission, provided the annual payments covering maturities and interest do not exceed \$6,500,000.

2. The sum of \$13,000,000 is provided for new construction each year for the next four years. Where new construction is considered, a type of pavement will be decided on that will adequately take care, not only of the present day traffic, but the normal increase in traffic as well.

3. The sums of \$2,500,000 and \$2,750,000 are provided for the maintenance of the highways on the State highway system for the fiscal years 1927 and 1928, respectively.

4. The sums of \$1,288,854.75 and \$1,468,236.65 are provided to pay to the county highway funds of all the counties of the State to be distributed on or before June 30, 1927, and June 30, 1928, respectively.

5. Funds are secured from the sale of highway notes, which are secured by a pledge of the revenues derived from the sale of gasoline and automobile tax or so much thereof as may be necessary for the payment of said notes.

6. All new construction work costing \$1,000 or more shall be advertised and let by contract to the lowest responsible bidder unless in the opinion of the Commission the work can be done more advantageously to the State by State forces.

7. All contracts shall be protected by a surety bond in favor of the State Highway Commission.

8. The highway bill provides that the first construction work to be done shall be started in those counties in which no work has been done by Road Improvement Districts and then at the discretion of the Commission the work of connecting the gaps in the State highway system may be undertaken.

The counties in which the first work will be done are the following, viz:

- | | | |
|-------------|---------------|---------------|
| 1. Bradley | 5. Clay | 9. Pike |
| 2. Calhoun | 6. Hot Spring | 10. Scott |
| 3. Cleburne | 7. Marion | 11. Sebastian |
| 4. Crawford | 8. Ouachita | 12. Union |

9. It is hoped that at least 1,000 miles of high-typed pavement will be completed in four years.

10. That 500 miles of reconstructed pavement is completed by salvaging the present roads and using them as a base for a modern wearing surface.

11. That 1,000 miles of gravel road will be constructed.

12. That at least 20 large modern bridges are completed on the important trunk line highways over the larger rivers in the State during the next four years.

13. Funds for the construction of the major bridge projects are to be provided by the sale of special bridge district bonds to be retired by the collection of tolls. When the bonds have been retired and expenses paid, the bridges will become free bridges.

With all branches of the State Government in hearty accord with the highway programs, there is every reason to expect a permanent and speedy completion of the main arteries of our State highway system which in turn will be the foundation for a greater Arkansas.

A BILLION FOR ROADS

A huge highway construction and maintenance program entailing more than \$1,000,000,000 in the United States during 1927 was planned and urged by the American Road Builders' Association at their 24th annual convention held at Chicago, January 10 to 14, which was attended by 35,000 road men from every State in the United States and many North American countries. "The need for speedy closing of gaps in the network of Federal aid highways was urged upon State highway commissioners by Thomas H. MacDonald, chief of the United States Bureau of Public Roads.

"Traffic congestion on the highways demands that a third of the country's 3,000,000 miles of roadway be improved.

"Congressional appropriations make \$85,000,000 available for distribution among the State Commissioners this year, he pointed out. Of the 182,000 miles of highway called for in the Government program approximately 140,000 have been completed.

"Mr. MacDonald lauded the progress of modern road making, asserting that the arteries being spread out today are far superior to the much-sung roads of ancient Rome."

Charles M. Upham, managing director of the association, said:

"Automobile registration is increasing thirteen per cent annually. At this rate we can expect fifty million motor cars to be in use in this country within twenty years. That will mean that the point of saturation in ownership has been reached—about one car for every three individuals.

"Construction of a super-highway system to take care of the traffic at that date will be urged at the convention with a view to instituting construction so that the system can be well along toward completion with a decade."

Mr. Upham did not venture any suggestions as to means of financing, nor as to the type of road. The plans recommended by the convention, he said, would be submitted to the people of the country as a suggested solution to the problem which will arrive. "The decision is up to them. We'll tell them only how we think it can best be accomplished."

The possibility that construction of such a system would lead to decentralization of population was advanced by the engineer: "It is to be expected," he said, "that the construction of such a system will reverse the movement from country to city, due to the desirability of country residence.

"The type of road to be constructed would probably vary with the conditions of the location. In some places the roads would necessarily be of a width of 200 feet or more to take care of traffic at the saturation point.

"There is now only one such road in the country, that between Detroit and Pontiac, Michigan, which is 204 feet wide."

"The demand for more improved highways and for the widening and improvement of those already built was never greater in the history of the world," stated P. G. Shirley, of Richmond, Va., president of the association.

He further stated: "When the United States has completed a system of modern highways connecting the various cities in each State with trans-continental trunk lines, a great era of prosperity will be in effect.

"The influence of a system of highways properly constructed and maintained is so great that each of us has a responsibility to see that they are used for the betterment of mankind."

Mr. Shirley, who is chairman of the Virginia State Highway Commission, commended the gasoline taxes levied in many States as the best system for raising highway funds. Two hundred and fifty exhibits valued at over \$3,000,000 were displayed by manufacturers of building machinery and equipment in the coliseum on Wabash avenue and educational displays by several States and Pan American countries were viewed on the fourth floor of the Palmer Hotel where headquarters of the four-day convention were located.

FAMOUS SAYINGS OF FAMOUS PEOPLE

Sampson: "I'm strong for you, kid."

David: "The bigger they are, the harder they fall."

Nero: "Hot stuff! Keep the home fires burning."

Cleopatra: "You're an easy Mark Anthony."

Helen: "So this is Paris."

Noah: "It floats."

Methuselah: "The first hundred years are the hardest."

WHEN WIFEY TAKES THE WHEEL

Doctor (to patient who claims to be a nervous wreck): "What are your symptoms?"

Patient: "I jump when I hear a telephone, the door-bell sends me into hysterics. Any stranger coming to the house frightens me out of my life, and I'm afraid to pick up a newspaper. Do you know what's wrong with me?"

Doctor: "Yes. My wife drives a car, too!"

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Highway Administration in the United States

By Thos. H. MacDonald, Chief, United States Bureau of Public Roads

For the purpose of administration the highways of the United States are divided into three main classes: The local roads which are administered by counties or other sub-divisions of the States; the principal inter-county or State roads which are administered by the State highway departments; and the Federal Aid roads or main interstate highways, administered jointly by the State highway departments and the Bureau of Public Roads of the Federal Government.

This division of responsibility takes into account the relative importance of all roads and gives responsibility for each of the three classes of units of government most directly concerned with each class. Considering the form of the government of the North American Republic and the usage of the roads it is the most consistent and reasonable system that has been devised; and to it is due, more than to any other cause, the great modern progress in road improvement. Practically all roads, under this system, are administered, financed, constructed and maintained by one or another of the units of government or by two or more units jointly.

Looking backward, one perceives clearly that highway administration has been influenced profoundly by three factors: (1) The state of other arteries of transportation; (2) the mode of highway transportation, and (3) the density of population.

In the early days of the republic we find the States and the Federal Government taking a very active interest in the highways, and making provision for their improvement either by direct appropriation of public revenue or by franchises granted to turnpike companies.

The State of Kentucky early began the building of State highways under an administrative organization strikingly similar to the modern State highway departments. Other States depended to a great extent upon private enterprise to build and maintain the roads with tolls collected from travelers, but it is likely that those States also would in time have developed State administrative organizations had the functions of the highways not been suddenly altered by the perfection of the steam locomotive and the construction of railroads.

At once it was evident that the railroads would take the place of the highways as the arteries of communication between distant communities and States, and the latter soon ceased to be objects for the consideration of the States and Federal government. They became of local importance only, and their administration was lodged in the county and township government, where it was destined to remain for almost seventy-five years.

The creation of the first State highway department in New Jersey in 1891 antedated the coming of the automobile as a practicable facility by only a few years. This first step toward a revival of State participation was made in response to the demands of the cyclists, as was also the creation of the Massachusetts commission in 1892 and the Federal office of road inquiry, the forerunner of the present Bureau of Public Roads, in 1893.

These early State and Federal bodies, however, exercised little or no actual control over the construction and maintenance of the roads. Their functions were mainly educational and advisory, and the general condition

when the rapid development of motor vehicle usage began was the same as it had been for fifty years before. The counties were in complete control. The habit of half a century was difficult too. People had become accustomed to thinking of the highways as of local importance only, and long after the conditions justifying such control had been changed by the automobile, the change was not recognized. Highway administration had become involved with the conception of local self-government and the local governments were loathe to relinquish their control.

For this reason the framers of the New Jersey law were careful to vest in the local authorities the initiative in drawing the State into participation. If they invited the aid of the State the highway department was prepared to develop plans and specifications for the road improvement and to inspect and supervise the construction. But the contracts were let by the counties, and the roads after construction, remained as county roads, subject to maintenance by the local unit. More as an inducement for the counties to seek the aid of the State department than from any recognition of responsibility on the part of the State, funds were appropriated by the State legislature from which to pay a portion of the cost of the road construction.

THE PRINCIPLE OF STATE AID

This was the first establishment of the principle of State aid. With minor modifications it was subsequently adopted as the first step in State participation by every other State.

But the experience of the States which have operated for the longest periods indicates that not many years elapse after the adoption of the State aid principle before it begins to be realized that for the problem presented by the main roads there is only one adequate solution—complete State control. Not a single State that has adopted this principle has receded from it. The State aid principle has not been entirely abandoned in these States. In practically every one it is retained and employed as a means of developing the more important lateral roads; but their experience indicates that the only hope of developing a connected system of main arteries is for the State to assume full control and financial responsibility for the construction and maintenance.

There are several compelling reasons for this, which will eventually lead all States to adopt the plan. It has been definitely proved that complete connection of main arteries cannot be made so long as there is any dependence upon county co-operation. The section of the roads in the various counties are not invariably the roads in which the county has the greatest interest, and in such cases it is difficult to secure county co-operation.

By their very nature the roads of the State system are the most heavily traveled roads of the State; their traffic demands a higher type of improvement than is required for most other roads. In many instances the traffic which demands the improvement is largely extra county traffic and the county is unwilling and often financially unable, to assume its share of the cost of improvement.

The heavy traffic on the main roads is made up largely of vehicles passing from city to city. Not in-

frequently the city origins and destination are not included in a county through which a large portion of the route runs, and such a county almost invariably demurs to the proposal that it appropriates a goodly portion of its construction funds for the improvement of the road.

There is an insistent county demand for the distribution of the State aid funds in proportion to the incidence of the taxes, or the mileage of road, or area, or on some such proportionate basis which will secure to each county its full share of the State appropriation. Seldom can a system of State roads be so selected that the length of road in each county is proportioned on any such basis. The prime consideration in the location of the State roads is to serve the State needs, and county lines are ignored, or should be. Here, then, is another obstacle to a proper development of State roads under the State aid system.

Finally, it has been found that the counties cannot be depended upon to maintain the roads after completion. Even if the county which lies in the path of inter-city travel can be prevailed upon to appropriate its proportion of the cost of construction it soon wearies of the burden of maintaining the road for the use of extra county traffic.

These are the causes which, under modern traffic conditions, militate against the success of complete or partial control of the improvement of main highways by reasons which induced the Federal Congress to provide in the Federal Aid legislation that all States should have an adequate state highway department, with sufficient authority and funds under its control to exercise complete jurisdiction over the construction and maintenance of the Federal aid roads.

FEDERAL AID ESTABLISHED

The first Federal Aid legislation was enacted in 1916. It provided for the improvement of roads under the joint supervision of State and Federal authorities and for the payment of any amount up to one-half the cost of construction by the Federal Government, the roads to be maintained by the States. To administer the work for the Federal Government it designated the Secretary of Agriculture, who delegated the details of administration to the Bureau of Public Roads which, by virtue of its intimate knowledge of the roads of the country resulting from its long-continued educational and investigational activities, was well fitted to assume the burden. To insure adequate State supervision it required that every State, to receive the benefits of the Federal aid, should have a State highway department equipped with sufficient authority to carry on the work efficiently.

This latter requirement had the immediate effect of causing the creation of highway departments in the seventeen States which up to that time had not adopted this reform, which had been proved by the experience of the leading States to be necessary for efficient control.

In 1921 this legislation was amended to provide that the expenditure of the Federal funds should be limited to the improvement of a restricted system of main interstate and intercounty roads consisting of not more than 7 per cent of the total mileage of highways in the country, and known as the Federal Aid highway system. It also added the provision that the highway departments required by the earlier act should have under their direct control sufficient funds to insure the proper construction and maintenance of the roads; and, although the main-

tenance was still left with the States, it provided stringent requirements covering that important phase of the work with a penalty for their non-observance.

The Federal Aid road work is administered jointly by the States and Federal Government. Projects are initiated, surveys and plans made, contracts are let, and construction work is supervised directly by the State highway departments subject to the approval of the Secretary of Agriculture, who acts through the agency of the Bureau of Public Roads.

The entire personnel of the Bureau of Public roads is covered by the Federal civil service act which is destined to insure selection on the basis of merit and to prevent removal for political reasons. The headquarters office at the National Capitol is headed by the Chief of Bureau, under whom is a chief engineer and divisions of design, construction, bridges and research, the heads of which constitute the advisory engineering staff of the Chief of Bureau, in addition to which there is a division of control in charge of fiscal matters and minor divisions in charge of the legal work and publicity.

FEDERAL AID WORK

This part of the organization is located at Washington. There are in addition twelve district offices each headed by a district engineer who has charge for the Federal Government of all Federal Aid roads work in the States which are included in his district, and under whom are engineers who represent the bureau in each of the States. Four of these districts include the States of the far West in which in addition to the Federal Aid road work the Bureau is also responsible for the construction of national forest roads.

A State desiring to receive Federal Aid in the construction of a section of road which is included in the designated Federal Aid highway system, submits to the Federal district engineer a statement of its intentions, describing the location of the road, its length, the character and amount of traffic it serves, the character of improvements proposed, the width of pavement and other general data, together with an approximate estimate of the cost of the construction and a request for a definite allotment of Federal Aid funds. The district engineer investigates the conditions surrounding the project and on the basis of his investigation transmits the proposal to the Washington office or the office of the deputy chief engineer, as the case may be, with his approval or disapproval. Meanwhile the State highway department proceeds to make the necessary surveys and to develop the detailed plans, specifications and estimates. If the project is approved by the Chief of the Bureau it is submitted to the Secretary of Agriculture and when it receives his approval a definite legal agreement is entered into between the State highway department and the Federal Government in which the portion of the cost to be paid by each party and other details of the co-operation are clearly set forth.

The immediate supervision of the construction rests with the State highway department, but the work is inspected at frequent intervals by the district engineer or one of his representatives. If the work done is satisfactory the Federal Government will make progress payments of its share to the State which deals directly with the contractor, and a final Federal inspection after the completion of the project serves as the basis for the closing of the transaction between the two governments.

STATE HIGHWAY DEPARTMENTS

The State highway departments, which have immediate supervision over the Federal Aid roads and which administer also the State and State Aid road work with various degrees of authority are generally of two classes with respect to their overhead administrative control. They are headed either by a commission, board, or other elective or appointive body or by a single commissioner appointed by the Governor of the State.

Only nine States have the single-headed form of department. The other thirty-nine States have commissions or boards with membership varying from two to fifteen. In five States the administrative body consists in whole or in part of the Governor of the State and other elective officials serving ex-officio; in two, the membership is made up in part of educators holding chairs of engineering in a State engineering school; in four the members of the commission represent congressional districts or other political sub-divisions of the State; and in all others the members are appointed by the Governor at his discretion.

In all States in which the administrative head is a single commissioner a salary is paid which in some cases is purely nominal considering the character of the services rendered. Commission consisting of more than a single member in a number of States are not paid for their services, and receive only an amount sufficient to cover the expenses incurred in the performance of their duties.

Practically all States employ as the head of the engineering work of the department and generally as the chief executive officer a highway engineer who is, in all cases, a salaried official, appointed by the Governor or by the commission.

The forms of organization of the State highway departments differ in detail. In general, there are two main classes: Those which, like the Bureau of Public Roads, have a district organization reporting directly to the chief engineer and administrative head who are supported by a headquarters staff made up of divisions of construction, maintenance, etc.; and those in which there are main divisions of the headquarters organization with the head of each in charge of all construction, maintenance, etc., in the State and these divisions operating through district representatives. The latter is a more highly centralized form of organization than the former.

Between the two extremes there are variations in form to describe which would require a detailed statement of the organization of each department.

In the performance of the works of surveying, designing, constructing and maintaining the highways and their pertinent bridges and structures, practically all of the State highway departments make the surveys and prepare the plans with their own engineering forces. A few of the smaller organizations employ regularly or occasionally private engineers both for road and bridge designs. The majority occasionally call in expert assistance in the design of large bridges.

As a rule construction work is done by contract according to plans and specifications prepared by the department. There are exceptions in which the work is done by labor employed and paid directly by the department, especially in those States which so employ State convicts.

The maintenance of the roads, on the contrary, is generally performed by State labor forces, with exceptions in the case of such operations as the surface treatment of macadam road which are in some States performed by contractor.

In certain of the States the county or local road work, and indeed the main roads also, are improved under especially created bodies known as road district commissioners. Such bodies function only with respect to the improvement of the roads included in the districts, generally narrowly restricted, for which they are created. This is the road district plan.

Manily, however, the local roads are administered by boards of county commissioners or equivalent elective bodies of the counties or townships. These bodies are generally made up of one commissioner from each election district or precinct of the county; and they are the sole governing bodies of the counties. With respect to the highways they function as an administrative body, employing labor, or entering into contracts for the construction and the maintenance of the roads. In the wealthier and more progressive counties the board of commissioners employs an engineer or an engineering staff to attend to all engineering detail of the highway administration, and highly commendable work is done. In hundreds of counties, however, the simple methods of the road repair practiced for more than a hundred years prior to the appearance of the automobile, are still followed without the least engineering guidance.

The bulwarks of the system of road administration in the United States are state of public roads is the national co-ordinating agency, and the leader in experimentation and research. The county roads administrations are, with conspicuous exceptions, the weak links in the chain; in form and efficiency but little improved since the days of the horse and wagon; and unreformed only because the needs of transportation have not yet urgently demanded a more effective control for the local roads of light traffic which they have in their charge.

The Highway Stenog

The Highway Stenog is the one I would praise
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She's a stenographic marvel
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And she knows her subjects thoroughly
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She faces exams, with a confident air
For Escher or Stanton have nothing on her;
She's hard to get on with and harder without
And I like 'em all, either tall, short or pleasingly plump.

She's a paragraphic Flapper
With a sophisticated air;
But if you are halfway decent
You can bet she'll do her share.

Some Requirements of the Highways of the Future

"Super-automobile highways built through private enterprise are inevitable," says Walter Parker of Fenner & Beane, New Orleans financial house, and formerly manager of the Association of Commerce, New Orleans. "Highway construction is imposing a monster burden on the taxpayers for a system which, long before its completion, is known to provide inadequate facilities. Automobile owners do not object to the cost of good machinery, good roads and good service. That fact has made possible the rapid development of the automobile industry and the speed shown in highway construction. But the new generation will require far more in highway building than is provided for in present programs or capable of being paid for out of present-day tax revenues. The American people now pay in Federal, State and local taxes some \$11,500,000,000 annually. They are demanding reductions, not increases, in taxes."

Mr. Parker predicts that "automobile owners will soon be demanding wide, protected concrete speedways connecting the great centers. They will desire grade crossings wholly eliminated. Even if super-highways of this character are to cost no more than \$50,000 a mile, the addition of such a cost to the cost of normal highway construction and the carrying out of existing highways plans would bankrupt the tax collector and the public treasury.

"But super-highways of this character would be a good investment from the viewpoint of the automobile owner. They would save him time and real money on tires, wear and tear and on repair bills. Such roads would double the tire mileage and the life of the car. No automobile owner would hesitate to pay, say, one cent a mile for the privilege of using such a highway in preference to using free publicly built highways of less comfort and convenience. The contrast would equal that of a Pullman car and a day coach."

That the time has arrived when private enterprise may well begin to think of the investment opportunity presented by the need for super-highways is the belief of Mr. Parker. Assuming that such a highway could be built for \$50,000 a mile, 100 miles would involve the expenditure of \$5,000,000, he states, and a toll of one cent a mile would produce an annual revenue of \$1,825,000 with 2,500 vehicles using such a road each way each day.

It is suggested that in this manner business enterprise might well enter the field of highway building so as to relieve congestion through offering to motor-vehicle owners a better and more economical service than the free public highways offer.

The production in the future of a very low-cost type of motor car and the liquefaction of coal and lignite in the form of a low-cost motor fuel are foreseen by Mr. Parker, and these developments will, he thinks, hasten the need for the construction of super-highways of a de luxe character.

With the idea of building super-highways by private enterprise is not altogether new, the New York Times points out in a recent editorial that it has not been much discussed in recent years owing to the prevalent hope that the Federal and local governments would be able to improve existing roads and build new ones to meet the nation's needs. "But that the use of the

roads is and will continue to be far in excess of the rate of building and repair now seems established," says the Times. "Aside from the constant increase in private cars and trucks, the bus system promises to grow so fast as to add to the congestion and to increase the wear and tear. Each new invention which cheapens the cost of motoring will increase the strain on the nation's roads. To meet this will require ever-growing sums of money, which will have to come out of the taxpayers in some form or other."

Already the building of special motor-vehicle roads, generally toll roads, has received particular attention in Italy. The Engineering News-Record states that in Italian practice the autostrada, or special motor-vehicle road, is a paved highway on a separate right-of-way fenced and guarded at entrances, without intersections and crossings at grade, designed and reserved for motor vehicle—truck or automobile—traffic solely. It is described as an independent road, separate and distinct from existing highways between the same termini, designed and built for uninterrupted speed.

"Voluminous conclusions broadly in favor of such roads were adopted recently at the International Road Congress at Milan, with, however, the delegates from Great Britain and the United States declining to vote on the basis that the experience and service records are lacking for 'definite conclusions capable of general application,'" says the Engineering News-Record. "The conclusions are most interesting, perhaps, for the indication they furnish of the liberal views which European highway authorities express regarding the financing of special roads. It is held that they may be financed from the State's general balance, by a general motor tax, by general taxes (tolls) on users, by local bonds or subsidies or by any combination of these which may be for the public weal. Tariffs for tolls, it is considered, should be regulated by public authority. In regard to the justice and expediency of the toll-road principle the conclusion is that "it is quite fair and rational that a special tax should be levied upon those who willingly make use of a speedier and more convenient means of transport over certain distances, while they are still free as any other motorist to choose between the autostrada and the ordinary road." As the problem of the high-speed trunk road, perhaps the toll road, is directly before us in America, these conclusions of European engineers are of particular interest."

The increasing congestion on the highways of the country will force many innovations in highway engineering, in the belief of W. C. Markham, executive secretary of the American Association of State Highway Officials. Among these innovations will be cross-overs and cross-unders at intersecting points on all important highways and boulevards. Wide roadways, well lighted at night by electricity, or possibly by some method yet to be applied, such as a radioactive substance, will, if present trends continue, be policed through their lengths by "stop" and "go" lights. Indications are that on main highways instead of speed limits of 35 miles an hour motorists will be required to maintain some minimum figure, say 25 miles per hour, and failing to do this, may be arrested for obstructing traffic. There is a possibility of pedestrians who risk their lives and peace of mind of drivers by crossing opposing traffic being ar-

rested for interfering with the movement of traffic. In congested areas Mr. Markham believes that separate traffic lanes will be provided for pedestrians and vehicles.

These predictions are even now being fulfilled in part. In Pennsylvania and Indiana the Lincoln Highway is being widened to 36 feet. Four lane pavements with each 20-foot strip kept within its bound, preventing cutting-in either from opposing or accompanying traffic, are already being built in Illinois and Wisconsin. In Chicago an underground escalator will carry the pedestrian across the street, where now he is forced to pass through 14 lines of automobiles. Pico boulevard, in the Southwest, has been widened to 75 feet, and the Cahuenga Pass road out of Los Angeles is being widened to 72 feet. Around Detroit 88-foot roads are being constructed on a right-of-way 204 feet wide. There are two separated roadways, 44 feet wide, for one-way traffic. On each of the four-track roadways horse-drawn vehicles keep to the right, slow-moving trucks outside them and automobiles in the two other lanes. Thus rapid, safe and easy movement is provided for all types of traffic. Space is provided between the roadways for trolley lines, and there is also space for parking and for pedestrians. Chicago has just completed a double-deck boulevard at a cost of \$22,000,000, known as Wacker Drive. It is eight blocks long and is expected to reduce present traffic congestion in the "loop district" 43 per cent. Automobile traffic on the upper level is wholly separated from the trucking on the lower level. Even before its completion new values in surrounding

property of between \$200,000,000 to \$300,000,000 had been created. An elevated "express highway" is the answer the Borough of Manhattan and the State of New Jersey are making to the big traffic problem that will come next spring with the opening of the Holland Vehicular Tunnel, and traffic engineers say it is a forerunner of wholesome revolution in city motor highways as a whole. The Manhattan boulevard will cost \$13,000,000 and the New Jersey highway \$40,000,000.

To make highways safe and to speed up traffic it is predicted that separate roads will be built for freight and for passenger service—a heavy-type construction for the first and a lighter type for the second. To promote safety at the intersection of important roads highways grade separations are now being built in the West, the design providing for two levels—through traffic proceeds on an overhead bridge and turning traffic swings wide of the bridge down to the level of the highway crossing at right angles beneath.

Thus throughout the country a digest of expert opinion shows the overwhelming conviction is upon traffic officials that automobile production will continue at high levels and the only way out is to find room for more cars and to handle traffic more efficiently.—*Manufacturers' Record*.

Teacher—"Robert; give me a sentence using the word 'satiated'."

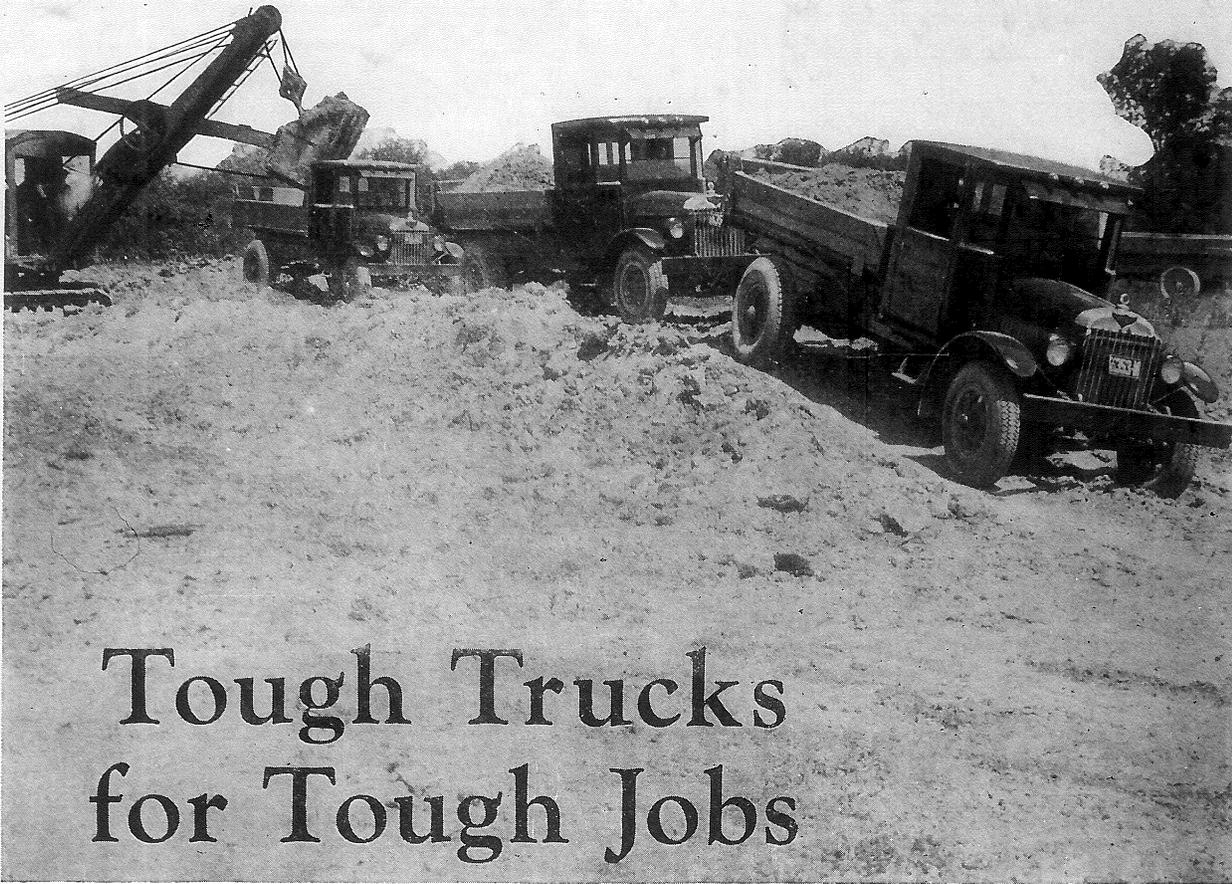
Bobby—"I took Mamie Jones to a picnic last summer and I'll satiate."—*Kentucky Highways*.

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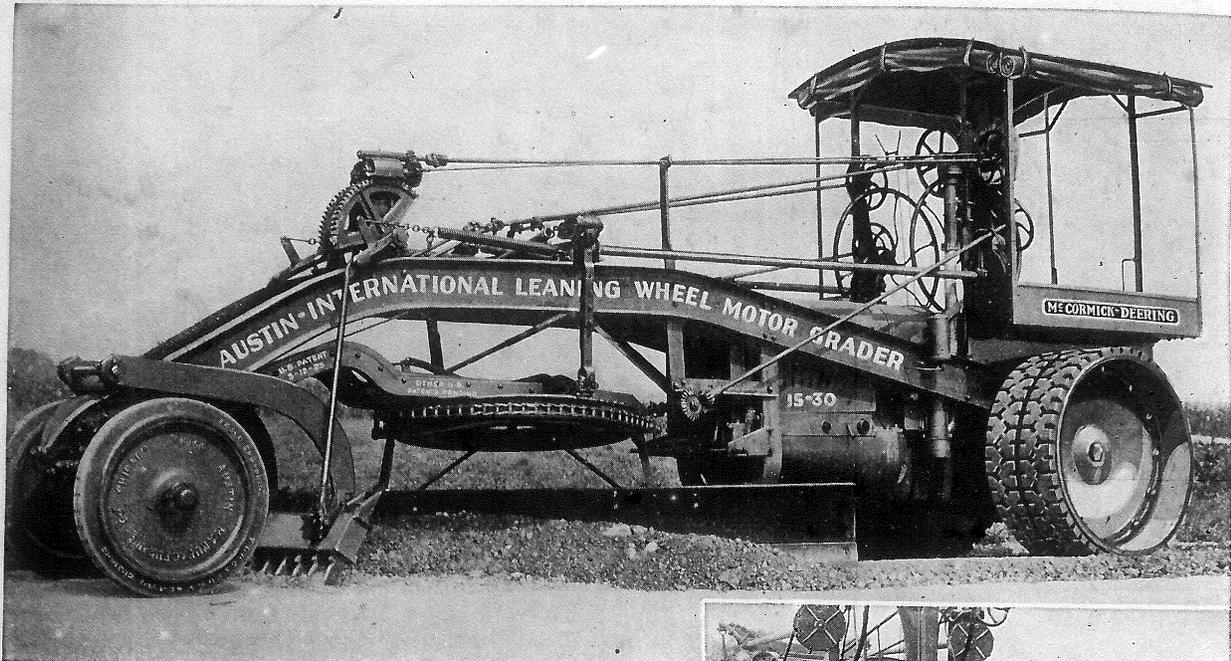
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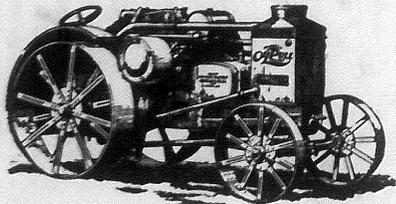
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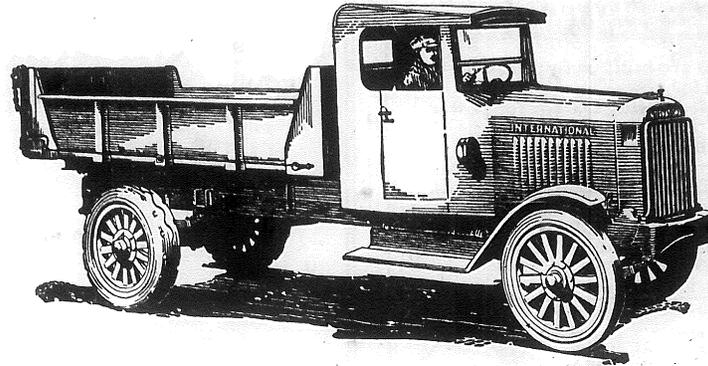
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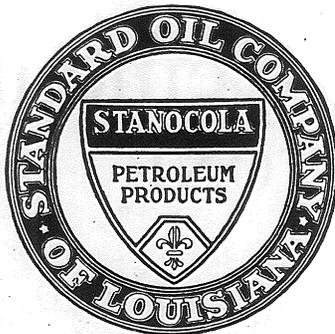
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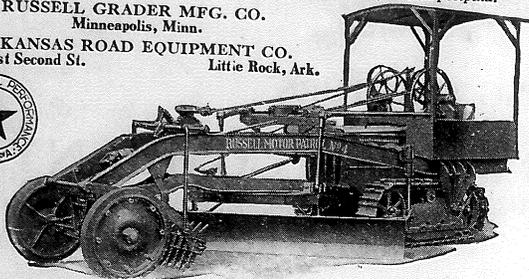
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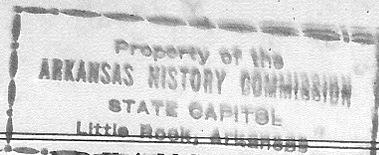
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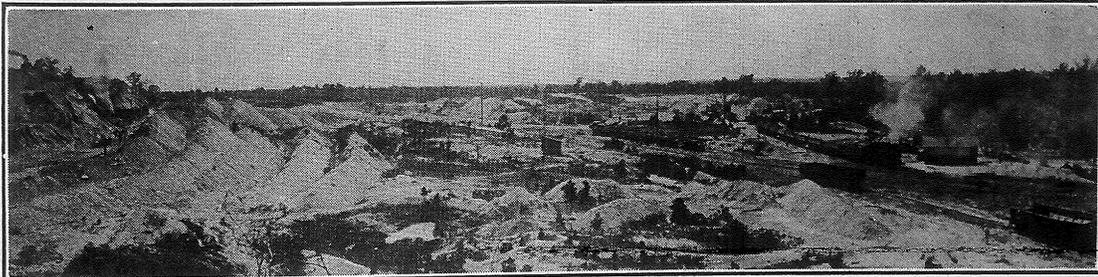
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Our capacity for washed ballast, washed concrete gravel or washed sand is from 60 to 70 cars per 12-hour shift. Our service to road districts, railroad projects and large construction jobs is of proven dependability.

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