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TEXAS HIGHWAY SYSTEM

YESTERDAY, TODAY AND TOMORROW

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A REFERENCE BOOK

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THE TEXAS HIGHWAY SYSTEM

YESTERDAY, TODAY, AND TOMORROW

STATE HIGHWAY COMMISSION

Brady Gentry, Chairman
Harry Hines, Member
Robert Lee Bobbitt, Member

STATE HIGHWAY ENGINEER

Julian Montgomery

This report is based on a discussion of problems of the Texas Highway Department at a meeting of the State Highway Commission at Austin, Texas, on September 26, 1939. One or more topics were presented and discussed by each of the members of the State Highway Commission and by the State Highway Engineer. Representatives of the Texas Good Roads Association, the Texas Safety Association, and the Chambers of Commerce of East, South, and West Texas participated in the discussion.

It is hoped that this discussion of highway problems will be of interest to groups and individuals who want to know more about the Texas Highway System and the Texas Highway Department.

Austin, Texas, December 1, 1939

CONTENTS

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I. HISTORY OF THE TEXAS HIGHWAY SYSTEM

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Between the old Spanish trails and the network of modern Texas highways there lies the story of a State's gradual development. The beginning of commerce is seen in the picture of Mexican freighters hauling corn to the Spaniards at San Antonio by oxcart. Then came the increase in population -- Stephen F. Austin's colonists on horseback and in covered wagons entering over roads which were liquid mud when it rained and iron furrows in dry weather. The needs of this pioneer civilization evolved the oxwagon freighters, which often required months on the trip from their settlement to the nearest seaport and return; the cart and pony express mail line to Southern California; and the overland stage coach, guarded from the Indians and extricated from the mud by "Big Foot" Wallace, the ranger and Indian fighter, with his party of able men. With the development of these transportation facilities came the real need for good roads in Texas.

But from the era of the "prairie schooner" to the day of the rubber-tired buggy, little progress was made in the improvement of roads. In the sparsely settled Texas pioneer times the settlers were grateful for a trail which led to home. There were first the dangers and discomforts of colonization to be endured, independence to be won, and admission into the Union gained. Then, occupying a secure position politically and actually, Texas was free to begin real development and expansion, economically and culturally.

For both economic and cultural expansion the need of good roads at once became evident. Passable highways from the farm to the market, and to the church and school were necessities in a growing country like Texas. To meet the expense of their growth, counties collected a fee of 25¢ on the $100.00 valuation until 1883, but in that year there was started a more definite movement for good roads. By constitutional amendment the county tax rate for general purposes was lowered and provision made for a road tax of 15¢ on the $100.00 valuation.

This revenue proving insufficient, another constitutional amendment was passed in 1890 to provide for an ad valorem road tax not in excess of 15¢ on the $100.00 valuation. But continued growth of the State called for still more revenue for roads, and, in 1903, the Legislature passed an act authorizing counties to issue bonds for public road improvement. Later, provision was made for any county, political subdivision, or defined road district of the State, to vote bonds for public roads and levy an ad valorem tax for the payment of the principal and interest.

With economic conditions fairly stabilized, Texas now entered a period of cultural growth that brought the horse and buggy, the rubber-tired family surrey, and finally the automobile. As the use of these conveyances increased, the needs for more and better roads became acute, and, in 1911, clubs and other organizations had been formed to promote the construction of a system of public roads.

Acting as a parent organization to county and local road clubs, a state-wide association began an educational campaign in the interest of good roads, and, in 1913, passed a resolution asking the Legislature to create a state department which would furnish the counties information, advice, and aid on the construction of highways. A Bureau of Public Highways had been considered by the Legislature as early as 1903; the creation of the office of "State Expert Engineer" in 1905; the appointment of a State Highway Engineer in 1907; the office

of a Commissioner of Highways in 1909; and in 1911 and 1913, the establishment of a State Highway Department, with State Aid for the construction and maintenance of public highways, and the levying of a license fee on automobiles.

However, each successive legislative measure failed, and sufficient impetus was not gained in the good roads movement until approval of the Federal Aid Road Act on July 11, 1916. Providing for appropriation of Federal funds to aid the states in construction of rural post roads, this Act stipulated that such funds would not be expended until the State Legislature had given assent to certain provisions. The co-operation of the State must be through its State Highway Department; the Federal funds advanced must be matched with funds raised by the counties; and the Federal funds apportioned to a state which had not previously established a Highway Department would not be available until the end of the third fiscal year following approval of the Act.

In order to secure the Federal funds appropriated for Texas, the 35th Legislature passed an act assenting to the provisions of the Federal Aid Road Act, and on April 4, 1917, made provisions for the establishment of a State Highway Department.

Under this Act, the administrative control of the Department was to be vested in the State Highway Commission. The Commission was to be composed of three members appointed by the Governor, with the consent and approval of the Senate, for a two-year term, and one of their number was to be named Chairman. Their duty was to formulate policies and plans for the location and construction of a comprehensive system of state highways and public roads in cooperation with the counties or under the direct supervision and control of the Highway Department. To aid them in this work, the Commissioners were to appoint a competent civil engineer, a graduate of a first-class college of civil engineering, as State Highway Engineer. His duties were to prepare, under the direction and with the approval of the Commission, the plans for location and construction of State highways, and to carry out the policies and direct the work of the Department in general.

The act creating the State Highway Department provided further that upon an application from a county for highway construction, accompanied by appropriate plans and specifications, the Commission was to grant State aid, out of moneys made available by the Legislature for such purposes, to the counties in the order in which the applications were received, but not in excess of 25% of the cost of the work; and that State aid was not to be appropriated to aid in the construction of more than 10 miles of road in any one county during any year. In such counties where the assessed valuation warranted the construction of sections of major highways, the Commission was authorized to grant State aid not to exceed one-half of the cost of constructing not more than 10 miles of such highway in that county in one year. This act also provided that all highways constructed with State aid were to be maintained by the county in which the improvement was made.

Provision was also made for the laboratories of the University of Texas and the Agricultural and Mechanical College to be placed at the disposal of the State Highway Engineer for the purpose of testing and analyzing road and bridge material.

All State funds for highway construction or maintenance, as made available from automobile registration fees, or from Federal aid, were required to be deposited in the State Highway Fund of the State Treasury, to be used for the maintenance and operation of the Department and for county aid in the construction

of highways.

At its fourth called session, the 35th Legislature changed the amount of aid which could be allotted to a county so that the maximum would not be in excess of one-fourth of the cost of the construction, provided that the aggregate sum contributed to any one county during any one year would not exceed the whole cost of 10 average miles of highway construction.

Since the establishment of the State Highway Department a number of legislative measures have aided its progress. The 36th Legislature at its third called session authorized the acquisition, by condemnation, of timber, earth, gravel, or other materials needed for highway construction or maintenance. The 37th Legislature made an appropriation for operating expenses of the Department, providing for administration, registration and engineering facilities, equipment, and nine Field District Engineers to supervise construction. An act was also passed fixing the salaries of the State Highway Engineer and all other Department employees, in addition to the Highway Commission.

During the regular session of the 38th Legislature, the term of each Highway Commissioner was changed to six years, with the term of one Commissioner expiring every two years. An occupation tax of one cent per gallon of gasoline was levied, and the Legislature appropriated three-fourths of the amounts collected from this source to the State Highway Fund, the remainder being given to the Available School Fund. An act was also passed increasing the maximum amount of State aid that could be allotted to a county to one-half of the cost of the construction. On the failure of a county to maintain a State highway within its boundaries, State aid was to be withdrawn until such maintenance work was done, and the Highway Commission was authorized to take over and provide for such maintenance. This act further provided that as soon as sufficient revenue accrued to the credit of the Highway fund, the Department should assume the control and maintenance of State highways. The Maintenance Division of the Department was then created and organized, the number of District Engineers raised to 18, and the personnel of the Department increased to handle the added work. General maintenance of all State highways was taken over on January 1, 1924. However, as the Department's funds, personnel, and equipment for maintenance proved limited at that time, and since some of the counties already owned equipment, arrangements were made with these counties for the maintenance of highways, the work to be under the supervision of the State Highway Department. Such arrangements were continued until the first part of 1927; then the Department began the maintenance of State highways entirely with State forces and State owned equipment.

Under the Federal Highway Act, approved on November 9, 1921, the Federal Aid Road Act of 1916 was amended so as to provide that Federal funds appropriated for a state shall be matched by State funds, and that the State Department shall have direct control of the funds and of the maintenance of Federal Aid highways. Since this act specified "direct control" a radical change in highway construction procedure was necessary, and, in 1925, the Legislature enacted laws by which counties were relieved of construction and maintenance supervision, the State Highway Commission assuming this responsibility. Under this statute, the State Highway Department was charged with the making of surveys and plans and specifications for all highway improvement, this work having formerly been done by the county commissioners. The duties of the counties were reduced to aiding the State in construction of highways by contributions agreed upon by county commissioners and the State Highway Commission, such funds to be paid to the State Treasurer as work progressed.

Authority was then given the Highway Department to acquire land needed for highways by either purchase or condemnation, and the 39th Legislature made provision for an increased personnel to take care of the extra work. The 40th Legislature raised the gasoline tax from one cent per gallon to three cents from March 16, 1927, to September 1, 1928, after which it was to be two cents Then in 1929, the 41st Legislature provided for a reduction and redistribution of automobile registration fees, and increased the gasoline tax from two cents to four cents per gallon This session also provided for the establishment of a Right-of-Way Division to supervise the securing of right-of-way for highways, and for the organization of the Highway Patrol to enforce highway laws

In September 1932, the Legislature, in special session, diverted the net proceeds from one cent of the State gasoline tax from the State Highway Fund to a special fund for the retirement of outstanding county and road district bonds, the proceeds of which were spent in the construction of highways which were then or at any time on the State Highway System

Under the present arrangement, the State Highway Department receives the proceeds from less than two cents of the four-cent gasoline tax, and under the present apportionment of motor vehicle license fees, the State Highway Fund receives approximately one-third of the net fees collected, two-thirds being retained by the counties for the maintenance of lateral roads

The Legislature authorized the construction of a new highway building to house the Department, to be paid for from State Highway funds A modern eight-story office building, designed to meet the requirements of the State Highway Department, was ready for occupancy in June 1933 The present home of the State Highway Department is a building of which not only the Department but the entire State is justly proud

Within the past several years a Division of Roadside Improvement, Compensation Insurance Division, and Traffic Division have been added to the Department, and the functions of each of these Divisions will be discussed in detail later in this article. On the outskirts of Austin the Department has erected an up-to-date testing laboratory where all materials used in the construction and maintenance of highways are tested, and a modern equipment repair shop.

There are throughout the State 25 Districts, each District comprising approximately 10 counties and about 900 miles of State highways. Each District Engineer is a man experienced in the construction and maintenance of roads, and under each District Engineer are the necessary assistants to carry on the construction and maintenance work in the District, together with the mechanical force which performs the immediate repairs of maintenance equipment, and the clerical force necessary for the operation and the record keeping required by law. Construction is performed under the supervision of Resident Engineers who report directly to the District Engineers, while maintenance is performed under the supervision of Maintenance Foremen who are assigned one to each county or several counties, as the case may be.

II PRESENT STATUS OF THE TEXAS HIGHWAY SYSTEM

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The State Highway System now contains approximately 22,400 miles of state maintained roads Last year 717 additional miles were taken over for maintenance There are approximately 5,500 miles on the State Highway System that are not dustless, all-weather roads. The estimated cost to pave these gaps in the present highway system is $217,600,000. There are also approximately 5,500 miles of obsolete or worn out pavements included in the present system The estimated cost to modernize these roads is $139,100,000

The State Highway Department has available annually for construction the approximate amount of $26,000,000 Assuming an arbitrary division of available construction revenues, so that $16,000,000.00 would be spent for new construction and $10,000,000 00 for modernizing obsolete roads, the present highway system would be completely surfaced and reconstructed in about 13-1/2 years This is assuming that during this period no additional mileage of the present system will become obsolete or worn out and that no additional mileage will be added to the present highway system.

There are two propositions in connection with the present status of the Texas Highway System that possibly might afford ultimate relief The first proposition is that great strides have been made during the past few years in the study of soil mechanics with the idea of stabilizing the soil in the roadway so as to use such a treatment as the initial all-weather treatment in a series of treatments which are added as traffic develops the need for them Application of soil mechanics is also expected materially to reduce the deterioration of high type pavements and therefore to reduce the replacement costs From experiments carried on by the Department, it appears that during the next two or three years stabilization procedure of the Texas Highway Department should be advanced beyond the experimental stage sufficiently to enable the Department's engineering staff to state conclusively that for light traffic roads the soil can be stabilized at a reasonable expense to provide an all-weather type of road. Even with the great strides the Department has made during the past two years, it is yet behind several other state highway departments in this work.

The second proposition deals with the obsolete highways. Literally hundreds of millions of dollars have been invested in obsolete highways on the Texas Highway System As a matter of fact, the investment is so great that it is impossible to abandon the obsolete highways because of the expense to replace them other than by piece-meal construction. It becomes necessary, therefore, to adopt some criterion, or yardstick, for the use of the obsolete pavements in a way that will provide the maximum efficiency, as well as the maximum safety, to the road user Recently the Highway Department, through its Traffic and Safety Division, conducted tests on various sections of heavily traveled highways, to determine the speeds at which motor vehicles travel under the particular conditions that exists on those sections of highway. A thorough investigation determined the maximum speeds that would be safe over the restricted hills and around the sharp curves From the information obtained, it seems possible to extend the survey to cover the dangerous sections of all of the obsolete roads, in order to be able to zone such obsolete roads with regard to the maximum safe speeds that should be allowed. This zoning of the obsolete roads for maximum safe speed determined by actual surveys is practical and can be done if adequate legislation is provided. It is true that such surveys will cost a considerable amount of money, but this cost is negligible as com-

pared to the cost of replacing some 5,500 miles of obsolete roads at one time

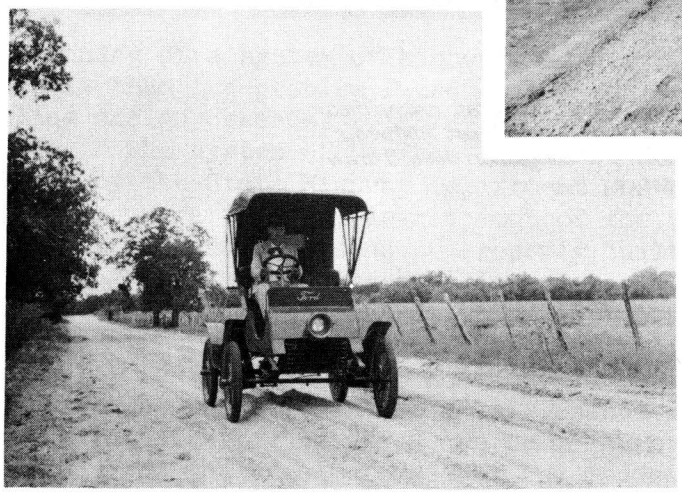
In the last fiscal year the Texas Highway Department completed 3,281 miles of roads, on some of which were constructed only grading and drainage structures, on some of which pavements were placed on previously constructed grades, and on a considerable mileage of which grading, drainage structures, and pavements were built. The mileage constructed in Texas last year exceeded that of any other state in the Union. In the fiscal year 1937 approximately $25,000,000.00 of work was placed under construction and approximately $34,500,000.00 of work was completed. In the fiscal year 1938 approximately $30,800,000.00 of work was placed under construction and approximately $29,000,000.00 of work was completed. In the fiscal year 1939, $31,321,706.00 of work was placed under construction and $34,927,651.00 of work was completed. The Department also has on its system some 3,424 miles of designated roads, called conditional designations, not being maintained, which are in addition to the 22,400 miles of maintained roads.

On September 1st of last year the balance in the State Highway Fund was approximately $9,180,000.00. On September 1st this year the balance was approximately $4,750,000.00, which shows that during the past year all programs were expedited aggressively. The amount of work under contract at present is approximately $30,000,000.00.

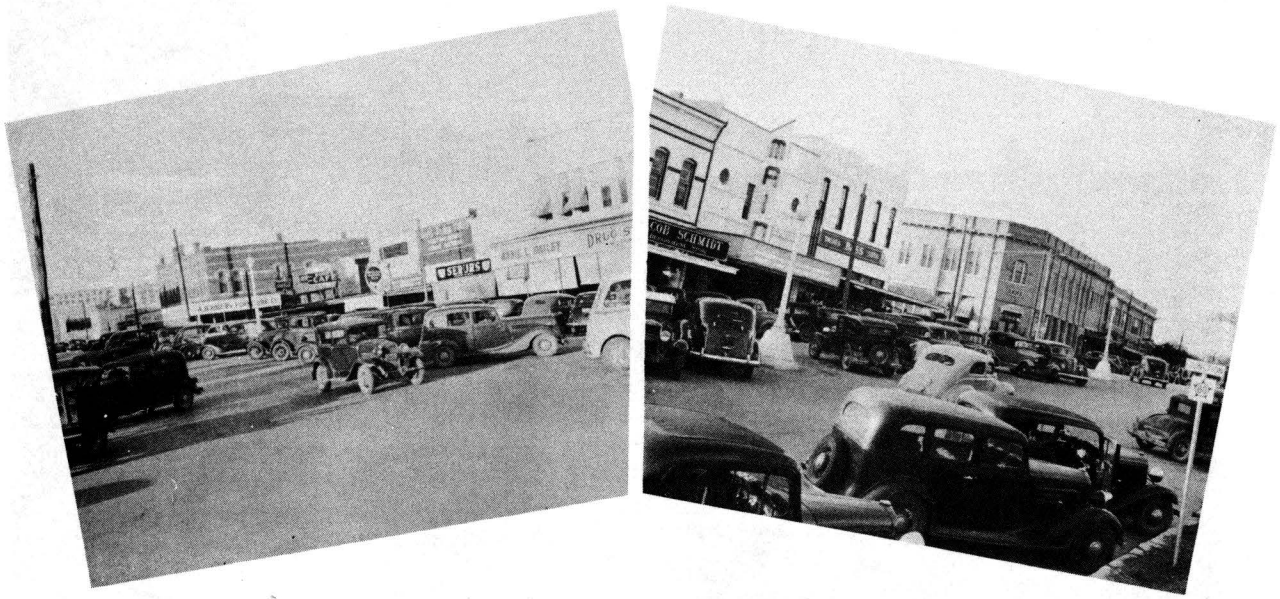
Each year the State Highway organization prepares in the field and in the Austin office some 1,000 sets of plans and specifications. Each month 35 contracts, on an average, are awarded, averaging in total amount from $1,500,000.00 to $3,000,000.00.

*One of the gaps in the Texas Highway system. Approximately $217,600,000.00 will be required to pave these gaps, totaling **over** 5,500 miles.*

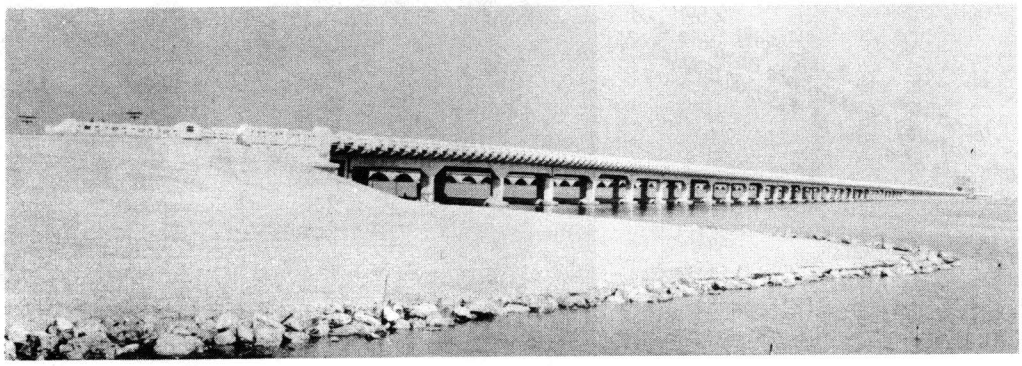
Obsolete surfaced road in Texas. Fully 5,500 miles of the Texas Highway System are obsolete and require rebuilding at a cost of $139,100,000.00.



Motor vehicles had to travel roads like this for the first twenty years.



Congested highway route through Texas town. By-pass routes would relieve congestion on transcity highway routes in Texas.



New causeway near Galveston, Texas, exemplifies improvements being made by the Texas Highway Department at points of congestion. Raised draw bridge in the distance.

III. SCIENTIFIC HIGHWAY PLANNING IN TEXAS

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The average motorist, who travels from city to town, between farm and market, from home to vacation resort, takes his highways rather more for granted than he does his automobile, his radio, and other modern conveniences. He may marvel occasionally at the scientific research which provides him with mechanical transportation approaching perfection in comfort and efficiency, but he gives hardly a thought to the scientific planning which must go into the modern highway system.

There was a time not so many years ago when planning for a state highway system was comparatively simple. The first objective was necessarily that of providing highways between the important centers of population in the State which should be passable by motor vehicle traffic under all conditions of weather. Attention was necessarily focused upon details of construction and design which would accomplish the immediately necessary object of lifting the people "out of the mud."

Today highway administration is entering a new phase, an era of scientific planning. Such planning must naturally entail a study of already existing conditions, the determination of projects requiring improvement, and the addition of new routes to the system where they will serve most adequately the interests of all the people rather than any particular group.

Scientific planning began in Texas with the ordering in 1936 of an engineering and economic survey. Conducted by the Highway Planning Survey, the initial task of collecting data was completed last year. There is now on hand and ready for use a vast quantity of information to form the basis of a comprehensive program of scientific highway planning.

In every business, public or private, there is a first period of expansion in which the needs of the business are relatively obvious. The problem then is to accomplish what needs to be done in the quickest and most efficient manner possible. But the recent rapid growth of the Texas Highway Department and of motor transportation in Texas has shifted the attention from details of construction to the formulation of far-reaching plans for future development. Today it is necessary to attempt to predict the future trends of population growth and its varying transportation demands to obtain the maximum benefit from the highway dollars.

The planning of a system of highways adequate to future needs is actually more difficult than the problem faced by any public utility because the factors controlling design, speeds, weights, and volume of traffic are very difficult to predict. The system of "tracks" required for highway motor transportation is provided by the State Highway Department and ownership is vested in the public. Ownership, operation, and development of the rolling stock on the highway rest with the individual citizens. Properly built highway facilities necessarily have a long life and represent a long-term investment of public money. Motor vehicles, however, are comparatively short-lived and newer models with greater power and higher potential speed are constantly making their appearance on the highways. The result is the enormously difficult problem of building highways in the present which will have a fair chance of being safe and serviceable to motor vehicle traffic twenty years or more in the future. The problem is one which requires the utmost foresight and ingenuity of economists and engineers,

but foresight and ingenuity are futile unless guided by reliable information

In beginning the work of the Planning Survey, it was first of all necessary to make a complete inventory of all existing road facilities in the State, together with their present condition of improvement. This inventory covered over 187,000 miles of road Along with this work went the cataloguing of the excessive grades and curves, as well as restricted sight distances This work revealed 42,863 danger points on the State highways, comprising 9,255 excessive curves, 3,303 excessive grades, 2,357 intersections with inadequate view of the intersecting road, and 27,948 points with insufficient clear view of the roadway ahead. It was also of primary concern to determine what volume and type of traffic uses these roads. By means of traffic counts systematically spaced over the entire road system and distributed over a period of a year to allow for seasonal variations, it has been possible to prepare reliable estimates of the traffic volume on every mile of road in the State. Traffic counts were secured at 3,600 points on the State Highway System and at 9,600 points on the county roads. Along with this work went other studies of less immediate and obvious applicability but of no less importance in a long-range view of highway planning. Among them was a detailed investigation of the history of the construction and maintenance of every section of State highway. The continuation of this study will reveal the life expectancy of the different types of construction under the varying conditions of soil and climate to which they are exposed in the widely different regions of the State Further studies have undertaken to determine the amounts of public money expended for roads by all agencies of government in the State. In the belief that the people themselves should furnish the guide to future highway construction, questionnaires concerning their use of the roads have been obtained from a representative sample of motor vehicle owners in the State, somewhat after the fashion of the polls of public opinion that have become increasingly popular during recent years. It was found, among other things, that approximately 60% of the travel of rural residents is on the 22,000 miles of State highways, the remainder being on city streets and 167,000 miles of county roads.

This vast collection of data and the compilation of them in usable form have necessarily cost money. Something over a million dollars has been spent up to the present time, approximately 75 per cent of which is federal funds. That is a great deal of money, but it is not large in proportion to the expenditure for highway construction and maintenance during 10 years, or even one year. It is no more than other large businesses, under private ownership, spend for fact-finding and planning, simply because they find that in the long run it pays dividends to the stockholders. Businesslike operation of the Highway Department also calls for the development of facts proven by past experience, observation of present needs and a scientific prediction of future requirements. This expenditure is in the nature of a long-term investment from which returns will be expected over a long period of years.

The work is not yet complete, however. Conditions change rapidly. Changes in the distribution of population over the State, the distribution of wealth among people, changes in the habits and preferences of people, changes in the design of motor vehicles quickly manifest themselves in changed requirements for highway transportation. As long as there are changes in these all-important factors, so must the fact-finding and research go on in order that highway planning may keep pace with the progress around us.

IV TEXAS HIGHWAY IMPROVEMENT PROGRAM

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The Federal Government provides aid for highway construction in several forms, namely, (a) Regular Federal Aid, (b) Secondary Federal Aid, (c) Grade Separation Federal Aid. It is necessary for the State Highway Departments to match the Regular Federal Aid and the Secondary Federal Aid dollar for dollar. It is not necessary for the State Highway Departments to match the Grade Separation Federal Aid.

There are some 14,500 miles of Federal Aid Roads in the Texas Highway System. Until recently the Public Roads Administration permitted the Texas Highway Department to submit a Secondary Federal Aid Program without having first designated a Secondary Highway System. In most states it is customary to designate the Federal Aid Roads as the Primary Highway System and to designate the remaining important state roads as the Secondary Highway System for the particular state. The Public Roads Administration has stated that no additional Federal Aid Secondary Programs will be approved until the Texas Highway Commission has designated and approved a Secondary Highway System. While such Secondary System has not yet been designated by the Commission, it is likely that the backbone of this system will be the 8,000 miles, approximately, of State maintained Highways which are contained in the present State Highway System and which are not on the Federal Aid System. The data and information used in connection with the studies to determine the Secondary System are obtained from the Highway Planning Survey.

It is interesting to note that only 11,000 miles of the state highway system carry more than 500 vehicles per day. It is likely that during the past few years many miles of highways have been over-designed. It is also equally true that many miles of highways have been under-designed. Accordingly, it has seemed logical to the Commission and to the State Highway Engineer to divide the highways on the Texas system into classes, depending on the amount of passenger and truck vehicles that each classification of road would carry daily. From the studies that have been made, four classifications have been decided upon tentatively: Class A being roads that carry more than 2,500 vehicles per day; Class B from 1,500 to 2,500; Class C from 500 to 1,500; and Class D less than 500. Incidentally, it is interesting to note that about half of the mileage on the Texas Highway System carries 500 vehicles or less per day.

The Highway Department has prepared standard designs for each of the Class A, B, C, and D classifications. Therefore, after the entire Highway System has been divided into the four classifications, the proper design for the particular classification will be adopted, thereby preventing both over-designing and under-designing the highways on the system. It is felt that by such classifications thousands of dollars will be saved each year by applying the proper design to the proper classification.

It is the purpose of the Highway Commission to provide long range programs and long range planning wherever possible, in lieu of piece-meal and haphazard planning and programs. For such reasons it is desirable to plan and approve construction programs as far ahead of time as possible. In the past Secondary Federal Aid Programs have been planned and adopted for the two-year program. The Regular Federal Aid Programs are adopted at least a year ahead of time, and sometimes more than a year. The State programs are prepared whenever State funds are available, and insofar as possible they are completed early enough

for the engineering staff to have sufficient time for planning, investigations, and study to provide the most economical type of construction.

A number of things must be taken into consideration when a program is prepared. First, the uncompleted gaps on the important highways, such as U. S. Highway No. 80 and U. S. Highway No. 81, etc., are naturally given early consideration. The Commission has felt for the past two or three years that it would be both logical and proper to provide a modern type of pavement for these two highways, first, because of the heavy traffic, and second, since the majority of the out-of-state tourists travel over U. S. Highways No. 80 and No. 81, the most favorable publicity could be obtained by placing these two highways in perfect condition.

Usually no particular attention is paid to highway district lines and county lines in selecting the projects that should be included in a given program. If a number of projects have been constructed on a given highway, such as State Highway No. 73 between Columbus and Houston, then it is logical and proper to complete such an important road as quickly as possible, and usually every program will include a number of projects on such a road until it has been completely constructed. The amount of traffic that a road carries, the condition of the obsolete sections, and the inadequate bridges are taken into consideration, as well as the nature and condition of the other highways in a given county or district. It is considered desirable to maintain intact the engineering organizations insofar as possible in each of the twenty-five districts, and for that reason each district should have at least a minimum of construction provided in each program. It is necessary to maintain a balance in the nature of the work. Some contractors perform dirt work only, some contractors confine their operations to bridge construction, and other contractors do only paving. For such reasons it is necessary to balance the programs so as to keep expert and experienced contractors and workers available at all times, and to keep from providing too much pavement work, for instance, thereby overloading the contractors and thus prohibiting their bidding reasonable prices because of the great amount of work that is provided for them. It is also desirable to maintain a proper balance in construction work over the entire State, taking into consideration the area, the amount of mileage, and the population, as well as the amount and kind of traffic on the roads. When State programs are prepared, as many of the projects as possible are made into W. P. A. projects This method assists the counties in working their relief labor without changing the Department into a relief organization.

During the past two or three years road design and construction have progressed rapidly, especially in regard to soil mechanics, stabilization, and a new design of concrete mix to be used for concrete pavements and structures. Realizing the rapid changes in road design and construction, the Department for the past year has been conducting a school to train its engineering personnel in the best procedure for design and construction.

The Department has found it desirable to standardize the best methods of design and supervision and these standard methods are being taught to the Department's engineering staff. The capacity of the school is about sixty and the course lasts from six to eight weeks. Beneficial results are already being felt, and especially are the number of contractors' claims being reduced because of the standardized and improved methods. It is significant that practically all claims that have been acted upon by the Commission during the past two years were on contracts awarded more than two years ago.

A laboratory course of three weeks in soil mechanics is included in the school.

A sufficient number of engineers have been trained in this work for the Department to know that during the next few years the instruction afforded by the school will provide for the Department new methods of road design and construction, utilizing roadway material to build permanent highways cheaply

One can better appreciate the difficulties and handicaps of the engineering staff when the vast size of the State of Texas is considered, together with the extreme variations in soil, rainfall, climate, and vegetation. The soil available for foundations ranges from the poorest to the best. Gravel road material is plentiful in some parts of Texas and is extremely scarce in other parts. The price of gravel ranges from a few cents to $3 00 per yard The rainfall varies from 5 inches per year in the extreme western part of the State to 55 inches per year in the extreme eastern part. The climate varies from temperate to torrid. The cost of water for domestic use and construction use varies from a few cents per thousand gallons to $1.00 per barrel. Vegetation ranges from the luxuriant tropical growth in the extreme southern and eastern parts of the State to an extremely sparse vegetation in some parts of the western section All of these factors have an important influence in the construction and maintenance of the State Highways and in the preparation of a state-wide program

The study that the Department will conduct in the near future will determine how long it will take to construct the unpaved gaps on the present system, taking into consideration the additional mileage that will be designated each year. It will also determine the amount of obsolete and worn out roads that can be replaced each year from available funds A rough estimate of the cost of paving the gaps and replacing the obsolete roads has already been made. This study will indicate whether the Highway Department can complete a modern highway system within a reasonable period, or whether the additional designations each year made by the Department will just about offset the mileage of roads on the System, unpaved, obsolete, or worn out, that are constructed each year by the Department. The study will show whether ultimately the present income can provide only for maintenance and obsolescence without new construction, as is now the case in certain other states, or whether the Department with its present income can successfully complete and maintain a modern system of highways. During the past year the Department completed and took over for maintenance an additional 717 miles of highway. It is estimated that the maintenance cost per mile is less today, and this despite the fact that today the Highway Department is rendering a greater maintenance service than ever before. Although the cost per mile is less, the Department maintains the entire right-of-way, from fence to fence. During the last year, more weeds have been cut, more roads have been centerstriped, more signs have been reflectorized and repainted than ever before. Most of the complimentary letters received by the Department today comment favorably on the manner in which the road is being maintained and especially the way it is marked by signs and stripes.

V. THE TRAFFIC AND SAFETY PROGRAM

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Early highway administrative functions centered chiefly around construction problems in a period of road building, commonly referred to as "getting out of the mud." From providing hard-surfaces, engineers concentrated their efforts to a stage in highway building from which we are slowly making a transition, the congestion era. The combination of these two periods gave two primary elements which developed the third and current stage in highway engineering. The elements were: (1) good roads; (2) increased production of motor vehicles.

"The Accident Stage" is the title generally used in reference to the contemporary scene portraying the progress of automobiles and streets and highways. It is this "stage" which furnishes the basis of the program of the Traffic and Safety Division of the Texas Highway Department.

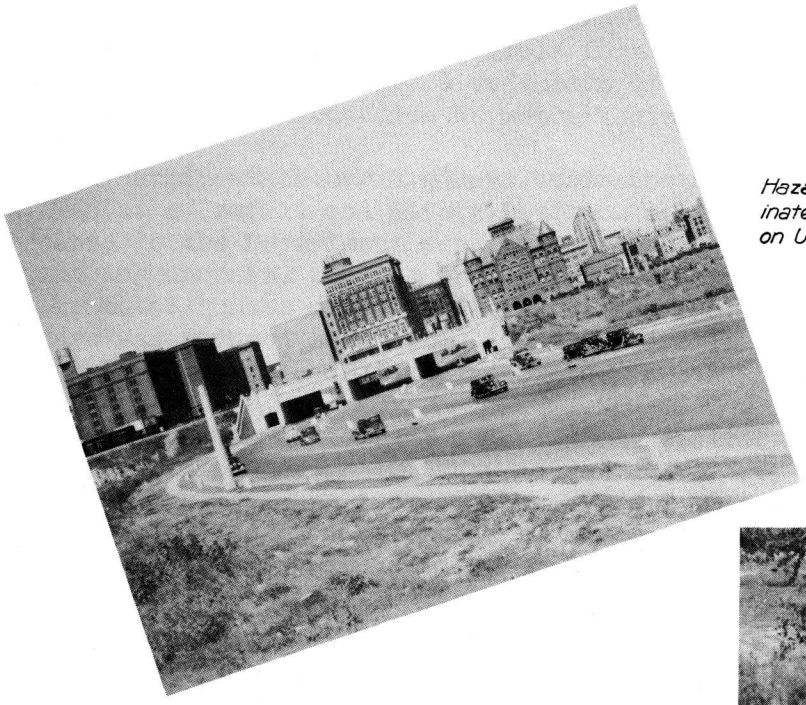
Fully organized in July of 1938, the Traffic and Safety Division seeks to expedite the safe movement of motor vehicle traffic on the State Highway System, county roads, and city streets. Such a policy incorporates certain phases of the three previously mentioned periods in highway history. To attain such ends, a program has been adopted, calling for the scientific investigation of motor vehicle accidents and the use of uniform traffic engineering principles.

Such a program includes the collection and analysis of motor vehicle accident reports. The data obtained from these reports furnish a basis for determining the accident-prone locations on the State Highway System. Corrective measures are applied at such high-accident sections. The Traffic and Safety Division studies the physical hazards in the highway at all high-accident locations and makes the necessary recommendations to the District Engineers to eliminate such hazards. These corrective measures follow the "three E's" of traffic safety -- Engineering, Education, and Enforcement. Under engineering it is often necessary for the Traffic and Safety Division to determine the justification of traffic control equipment essential for the particular location. Traffic signal lights, which constitute one of the major phases of the work of this Division, are among the several types of traffic control equipment which are given consideration. Where lights are not justified, the Traffic and Safety Division works with the various District Engineers in designing or redesigning traffic facilities.

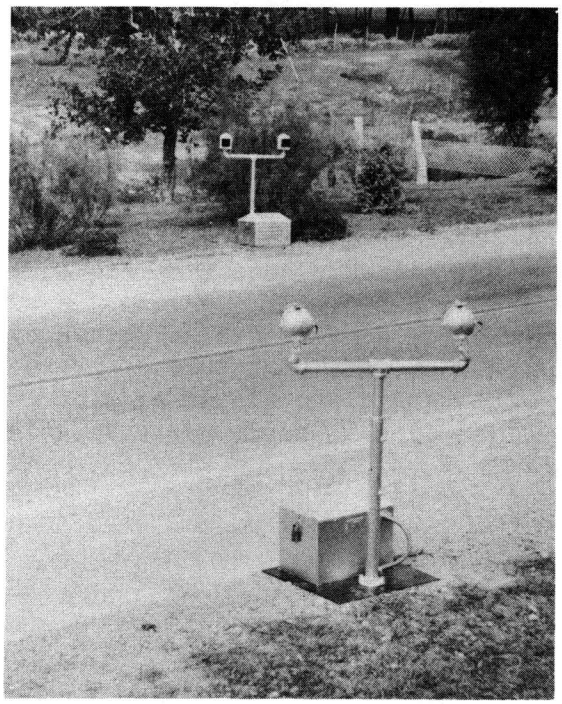
In the enforcement field of the "three E's," the Traffic and Safety Division cooperates with the Texas Highway Patrol, now in the Department of Public Safety. When all available engineering principles have been considered and found not applicable, the Chief of the Highway Patrol is informed about the locations where it is believed enforcement is necessary.

This division of the Highway Department is carrying on an intensive program in traffic education through civic clubs, county and state fairs, public schools, and by the state-wide distribution of pertinent and valuable educational literature as applied particularly to traffic engineering.

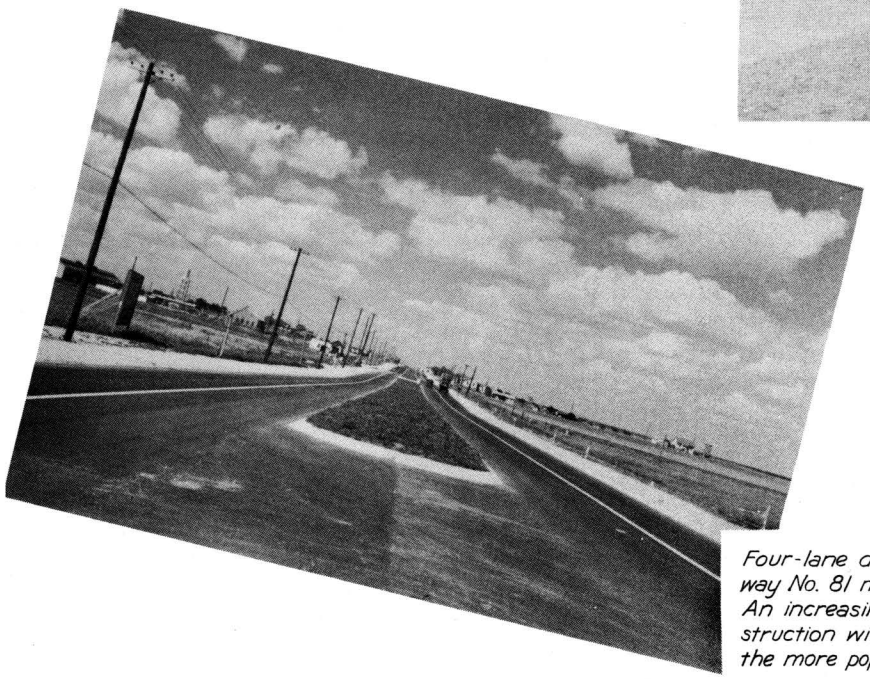
This division is also carrying on a limited service as consultant for various cities and communities throughout Texas to promote traffic safety in those cities and communities. Under this program, the State of Texas made marked improvement in 1938 when the fatalities for motor vehicle accidents were reduced to 1,610 as compared to 2,043 in 1937. The progress for the first eight



Hazards at railroad grade crossings are being eliminated by underpasses. The underpass pictured is on U. S. Highway No. 80 in Dallas.



Photoelectric traffic recorder developed by the Texas Highway Department and used to determine the volume of traffic on Texas highways.



Four-lane divided Highway on United States Highway No. 81 near Austin, Texas.
An increasing mileage of such superhighway construction will be required to relieve congestion in the more populous areas of the State.

months of 1939 shows a further reduction. In the first eight months of 1939, the total number of motor vehicle fatalities is 970, as compared to 1,021 for the same period in 1938, a reduction of 51 fatalities, all of which is attributable to a reduction in motor vehicle fatalities on the highways.

Every accident on our highways costs the State money. Prior to the inauguration of a Traffic and Safety Division of the Department, the total annual expense to the Department resulting from accidents on highways was estimated at varying amounts, ranging from $30,000.00 to $50,000.00 per year. Last year the total number of all the various kinds of accidents occurring on the highways was reduced some 40%. Such a reduction means a substantial saving to the Department in dollars and cents.

One of the most important and valuable contributions of the Highway Department during the past year is the center line stripe, together with auxiliary stripes. The center line has indeed been a life line and the resultant reduction in accidents will show clearly the time when the center line was put to use. All curves and fills have been outlined by reflectorized posts, and all warning signs and most directional signs have been reflectorized so they can be read at night as well as in the day time.

White paint is used for black surfaces and black paint is used for grey and white surfaces. It is interesting to know that white paint costs about 20 times as much as does black asphalt paint. On the other hand, an asphalt stripe will last from one year to two years when placed properly, while the average life of a white stripe is from four to six months. The black stripe is obviously many times cheaper than the white stripe Experiments are now being conducted to build up the black stripe by the use of fine trap rock so as to afford better visibility and longer life This is merely one example of the careful study that is given to the economics of every phase of activity in this large organization.

VI. ROADSIDE DEVELOPMENT

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Several years ago the Highway Commission created a Division of Roadside Improvement for the purpose of improving and beautifying the roadsides and developing to advantage the scenic beauty as seen from the highways. There was little need for such development prior to that time because with narrow rights-of-way and badly eroded deep ditches, there was no place for anything but the strictest utility. With modern rights-of-way now acquired, with a minimum width of 100 feet, usually 120 feet or wider, there is an opportunity to preserve the natural vegetation on the roadsides. This preservation is now going on over the entire highway system, both on new construction and on wider rights-of-way on older roads. The course of the road is often located where it offers scenic beauty to break the monotony which would otherwise be experienced. Every man in the field receives instructions on the preserving, pruning, and cultivation of sprouts and saplings. It is estimated that two million young trees have been saved and each year these add to the beauty of the highways. The heavy earth cuts which formerly made unsightly scars are now reshaped into smooth form and covered with a vegetative mat for utility and beauty. Millions of square yards of Bermuda grass sod, vines, and other ground covers have been planted, and by continuing this work all the ugly scars along the roads will be covered with a beautiful green mat. Instead of rock and metal checks in the deep ditches to prevent water from cutting even deeper into the soil, methods of using living vegetative retards have been developed. Sod in blocks or strips, canes, and other plants are used to prevent the erosion of the drainage channels. Many of the new highways have a protective cover from fence to fence. In the drier sections native grass and contour drainage aid in the prevention of wind and water erosion. To supplement the existing trees, a system of planting trees and shrubs has been developed for all parts of the State. Planting behind highway markers, guard fences, at bridges and culverts, over hill tops, and on the outside of curves, all add to the beauty, safety, and utility of the highways. The type of plants used varies greatly within the State. For convenience, the vegetation of the State may be divided into five general regions, each having its own characteristics due to its peculiar topography, soils, and climate.

To begin with, in East Texas where there is an average rainfall of 35 to 50 inches per year, there is a great variety of vegetation, particularly flowering shrubs, which are being planted in great masses within view of the motorist. Plantings of red bud, dogwood, elderberry, yaupon, crape myrtle, wisteria, and native oaks are featured, and it is planned that each individual road may be identified by its characteristic native flora.

In Central Texas with average rainfall from 25 to 35 inches and quite distinctive soils, the Department is utilizing very effectively agarita, mountain laurel, sumac, red bud, flowering willow, live oak, and Spanish oak.

Then in the southern portion of the State, in the Rio Grande Valley with its almost tropical climate, use is made of native plants such as esperanza, flowering hibiscus, wild olive, huisache, anaqua, and ebony, together with turk's cap, palms, and numerous other colorful evergreen plants in a tropical setting.

In West Texas, with rainfall less than 25 inches, use is made of quite different groups of plants including senisa, ocotillo, salt cedar, retama, huisache, Spanish daggers, and various other semi-arid types. The planting in this sec-

tion adds greatly to the interest of motoring

Next are the Panhandle plains of Northwest Texas with fertile soils, limited railfall, and severe frosts. With long, level, unbroken vistas, the planting along the highways is greatly appreciated. Flowering willow, salt cedar, hardy evergreens, elms, and honey locusts are planted extensively. The Department is investigating the feasibility of constructing small lakes, and also providing wells and water systems to develop attractive oases in the arid sections.

Federal Aid funds have been used for landscape work in planting 40,000 trees, 315,000 shrubs, vines, and perennials on 482 miles of highways and improving 20 intersections. In addition, State maintenance forces have planted over 400,000 trees, and 698,000 shrubs. An estimated total of 80 tons of wild flower seeds, threshed and unthreshed, have been collected by Boy Scouts, school children, and highway employees for sowing along the roadsides. The continuation of this work will eventually result in a riot of color on the highways.

In all, 390 small roadside parks and 316 turnouts have been secured and improved for the convenience of visitors as well as Texas citizens. As a part of the Centennial celebration, the Highway Department erected 264 historical markers on the roadsides.

This work of highway beautification and improvement of the roadsides in which every citizen of the State is interested, is undertaken with great enthusiasm; however, patience must be exercised, because all of this is of slow growth, and several years will be required for ultimate development. The Highway Department is indebted to a great many citizens for donation of park sites and beauty spots along the roads, and for the fine co-operation received from all citizens of the State

VII COMPENSATION INSURANCE FOR HIGHWAY DEPARTMENT EMPLOYEES

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The Texas electorate in 1936 approved a constitutional amendment providing that workmen's compensation insurance could be made available for employees of the State of Texas. Pursuant thereto, the Legislature in June, 1937, passed an enabling act providing for a system of workmen's compensation insurance for employees of the Highway Department. The law provided that the Department should be self-insuring; that it should administer the Act; that all employees, coming under the Act, in the employ of the Department on the effective date of the insurance should be physically examined to determine their fitness; that all new applicants for employment should be similarly examined; that the Department appoint a suitable number of surgeons throughout the State to make these examinations; that the Department appropriate an amount not exceeding three and one-half per cent (3-1/2%) of its annual labor pay roll "with which to pay all costs, administrative expense, charges, benefits, and awards authorized by the law"; and that the Department have "authority to make and enforce such rules for the prevention of accidents and injuries as may be deemed necessary." The law then simply adopted, in toto, the provisions of the general workmen's compensation law of the State pertaining to amount of weekly compensation, minimum and maximum payments, specific indemnities, medical and hospital fees, partial and total incapacity, compromise settlement agreements, subrogation against third parties, etc. It further provided that administration of the law by the Department should be subject to the review, supervision, and awards of the Industrial Accident Board exactly in the same manner as the Board supervises private insurance carriers. Protection under the law is not extended to employees of the Department whose duties do not require them to travel or work away from their office. With slight variations, all other employees of the Department are protected.

The law was placed into effect January 1, 1938. A separate division with a director in charge was set up within the Department to administer the law and direct the safety program which was made effective concurrently with the insurance program. The Insurance Division employs five field men with the title Claims Investigator-Safety Instructor. Each of these five men has a definite territory comprised of five districts each, thus covering the twenty-five districts of the Highway Department. They handle the field details incident to claims and co-operate in the accident prevention activities by co-ordinating activities, lending inspiration, and maintaining enthusiasm.

The medical organization consists of Chief Surgeons for the State located in Austin, a District Chief Surgeon for each of the twenty-five districts, and about 500 local surgeons, or approximately two for each county in the State, located at strategic points. Approximately 7,000 employees were examined just prior to the effective date of the insurance. Of these, something over 300, or about 4-1/2%, were found to be physically unfit. Approximately 200 were found to have hernias. The Commissioners and Highway Engineer, by proper action, made it possible for such of these old employees who cared to do so to secure the necessary financial aid to defray the cost of surgical and medical repairs for correction of physical disabilities to permit continuance of their employment. Some 200 availed themselves of this opportunity.

Prevention of accidents was made the first duty of the Insurance Division. As a basis for the safety program it was provided that all field employees should be trained in first aid. To accomplish this the American National Red

Cross co-operated in a splendid manner by providing schools for lay instructors at various places throughout the State and approximately 200 of our regular employees have been trained as first aid instructors. These instructors have taught the standard first aid course to some 8,000 employees of the Department and about 3,000 employees of contractors, policemen, firemen, deputy sheriffs, ambulance drivers, and other members of the public.

Each field employee of the Department is required to attend at least one safety meeting each month. Every resident engineer, maintenance foreman, and other supervisory employee has established individual safety councils. The safety meetings are held on State time, usually for a period of thirty to forty-five minutes. The following is a typical excerpt from the minutes of one of these safety meetings:

> "Mr. H_____ took the floor and spoke on the relationship of efficiency to safety. He disapproved of the old adage, 'Haste makes waste.' If one is capable of doing his work efficiently, he can do work quickly and do it safely. One must first learn the right way to perform his duties, then dispense them with accuracy and speed, and in so doing safety is brought out as well as economy. No efficient worker is negligent in his performance of duty."

It is felt that the safety program has achieved highly satisfactory results in the short period of its existence. Accidents of all kinds, including those which did not result in lost time, were decreased from one for each 3,085 man-hours worked in January, 1938, to one for each 15,089 man-hours worked in December, 1938, showing a reduction of about four-fifths of the accidents in twelve months. On the basis of the national code, which covers only lost time accidents, the accident frequency was reduced from 35.53 disabling injuries per million man-hours of work for the calendar year 1938 to 21.62 for the first six months of 1939, a reduction of 39.15%. On the same basis, the accident severity rate was reduced from 4.31 days lost per 1,000 man-hours of work for 1938 to 2.24 for the first six months of 1939, a reduction of 48.03%. In 1938 the field employees of the Department worked a total of 15,195,841 man-hours with 65,522 days lost from accidents. For the first six months of 1939 a total of 7,676,492 man-hours were worked with 17,204 days lost. At such a rate the Department's safety program should show a gross saving of some 30,000 days, a net saving of approximately $110,000.

It may be of interest to know that contractors constructing the Department's projects have been paying an average premium rate of 11% for compensation insurance. Providing exactly the same coverage for its employees, the Department has had an expenditure of slightly under 2%, which includes all administrative costs, as well as compensation and medical.

The Department sponsored a first aid contest among its employees which was concluded last February. The finals of the contest between five teams, winners of inter-district contests, were held in the gymnasium of the University of Texas in Austin. Competing in this contest were 208 teams of six men each, totaling 1,248 employees, or an average of eight teams for each of our twenty-five districts. Handsome medals donated by one of the Commissioners were awarded to the members of the winning teams in each district, and the American Red Cross contributed beautiful Borglum medals to the members of the team winning the final contest. Everyone conceded that this contest resulted in a tremendous amount of good.

The Department has records proving that more than thirty lives have been saved as the result of this first aid training. As typical examples:

(1) Two workmen cleaning out an old well adjacent to one of our construction projects were overcome by gas. When discovered, they had been unconscious for some time and were rescued by employees of the contractor constructing the project. After approximately thirty minutes of artificial respiration both men were resuscitated by the Departmental employees.

(2) In another case, the twelve year old son of one of the Departmental employees, who had learned first aid from his father, came upon an accident on the highway in which a woman had received severed arteries in both arms. This boy applied digital pressure, stopped the flow of blood, was lifted into an automobile with the lady, traveled several miles to the nearest hospital, and continued to hold the pressure while the surgeon made necessary incisions and sutered the arteries.

(3) In another instance, three employees of the University of Texas, working on the construction of the McDonald Observatory in the Davis Mountains, twenty miles from the nearest doctor, were critically injured in an explosion of a box of dynamite caps. Several maintenance employees of the Department working on a road nearby were summoned, stopped arterial bleeding, splinted broken bones, treated for shock, etc., and were accredited by the doctor with having saved these lives.

Recognizing that the Texas Highway Department in the final analysis pays for accidents to employees of contractors, the Department extended the facilities of its first aid training and safety program to the superintendents, foreman, and key men of contractors working out of the Department. Many of the contractors have availed themselves of this privilege, have had their key employees attend the safety meetings, and have accepted the facilities for first aid training. Some of the contractors have established effective safety programs of their own. The Board of Insurance Commissioners of the State recently announced a reduction of 8.8% in the compensation rate on road building. In releasing this announcement the Board said, "Intensive safety programs and better working conditions made possible the cuts." This reduction in rate will mean a saving of approximately $100,000.00 per annum in the amount of compensation premiums paid by the Department through the medium of contractors.

The success of the safety program is attributed to the fact that it has in every sense of the word been made an integral part of the general work program. Every supervisory employee in the Department has been made to feel and to know that upon him rests the responsibility for accidents; that the promotion of safe practices and efficiency is a vital, integral part of everyday work and not something that can be set aside and directed by some employee or employees whose sole duty it is. The degree of responsibility of each supervisory employee, in this work, is comparable to the general responsibility of the position which he occupies.

The following quotation from a letter of one of the District Engineers is typical of the reaction to the safety program:

> "I was particularly impressed by the development of initiative in the men themselves. The safety program has resulted in a development of initiative and leadership

in the men and brought these characteristics to our notice in a way that cannot fail to result in increased efficiency in our regular work.

"This safety program and first aid work has served as a medium for bringing the organization together on common ground and has undoubtedly made a vast improvement in the morale of the personnel "

VIII. PROBLEMS OF THE TEXAS HIGHWAY DEPARTMENT

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1. Highway Finance

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The revenue of the State Highway Department is derived almost entirely from motor vehicle license fees, gasoline tax collections, and federal aid, these three sources supplying 99.3% of the highway revenue during the last fiscal year. The distribution of receipts and disbursements of the State Highway Fund for the fiscal year September 1, 1938, through August 31, 1939, are shown in Table 1.

Federal aid is an important source of highway revenue in Texas, receipts from this source during the last fiscal year totaling more than the receipts of the Federal Government from its 1¢ gasoline tax. Texas is in a favorable situation for federal aid on account of its large area and extensive mileage of rural mail delivery routes. On this account, Texas receives more federal aid than any other state. While there is no obligation on the part of the Federal Government to appropriate money for highway expenditure equal in amount to its collections from the 1¢ gasoline tax, in the past this is approximately what has been done by Congress and it is hoped that similar appropriations will be made in the future.

In addition to the 1¢ gasoline tax collected by the Federal Government, the State of Texas imposes a tax of 4¢ per gallon. A little less than half of the proceeds of the State gasoline tax goes into the State Highway Fund, however, the remainder going largely to the county and road district fund and the available school fund, as provided by legislative act.

Table 2 shows the distribution of the revenue from special motor vehicle imposts, consisting of the motor vehicle license fees and the motor tax collections for the fiscal year ending August 31, 1939. These figures show that only 46.2% of the revenue from these imposts goes to the State Highway Fund. This figure is only slightly larger than the 35.5% which goes direct to the counties or to the county and road district fund. The remaining 18.3% goes to the available school fund and other non-highway purposes.

Referring again to Table 1, it is evident that approximately half (50.7%, to be precise) of the State highway revenue during the last fiscal year came from gasoline tax collections. The remaining half came almost entirely from motor vehicle license fees, which contributed 18.4%, and federal aid, which made up 30.2%.

Table 1 indicates that highway expenditures are mainly for construction and maintenance of State Highways. These two items comprise 93.9% of the total, with 74.8% for construction and 19.1% for maintenance. During the past ten years the expenditure for maintenance has shown a downward trend, in spite of an increasing demand for maintenance. This increasing demand for maintenance is brought about by an increasing mileage on the State Highway System and the provision of additional services to the public, such as center stripes, warning signs, and improved maintenance of the shoulders and rights-of-way. It is not to be expected that a similar division of expenditure between maintenance and construction can be continued indefinitely. Highway improvements recently

constructed may be serviceable for several years with little expenditure for maintenance, but if such a policy were to be continued indefinitely, it would result in deterioration of these facilities and loss of a considerable part of the investment represented by them The Highway Department is thus faced with the probability of a considerably increased maintenance cost during the next few years without any diminution of the demand for new highway construction

When the Legislature in 1932 diverted the net proceeds from 1¢ of the State gasoline tax from the State Highway Fund to a special fund for the retirement of outstanding county and road district bonds, it was expected that the diversion would be only temporary and that after a few years this money would return to the State Highway Fund However, the last Legislature perpetuated the diversion by providing that all of this 1¢ of the gasoline tax should be used by the counties in accordance with certain provisions, not all of these provisions being for highway purposes (An outline of these provisions is given in section 3 below)

Of the four states contiguous to Texas, three have a gasoline tax higher than that of Texas and the remaining state has a tax equal to that of Texas Of these states, Louisiana has the highest tax rate, this being 7¢ per gallon, and Arkansas follows closely with a tax of 6-1/2¢ per gallon The tax in New Mexico is 5¢ and that of Oklahoma 4¢ per gallon Many of the other states have a higher gasoline tax than Texas Whenever an automobile from a neighboring state travels in Texas it leaves a 4¢ tax for each gallon of gasoline purchased; when Texas automobiles travel in neighboring states they pay a gasoline tax greater than the 4¢ charged in Texas It seems that to protect Texans touring in adjoining states and other states in the Union, it will be necessary to have a State gasoline tax equal to the gasoline tax of these states Such an increase in the gasoline tax may be necessary in order to meet the increasing need for highway construction and maintenance both in rural and in urban areas

TABLE 1

RECEIPTS AND DISBURSEMENTS OF THE STATE HIGHWAY FUND OF TEXAS
FOR THE YEAR ENDING AUGUST 31, 1939

Balance State Highway Fund September 1, 1938		$ 9,164,117.89	
Receipts			Per Cent
License Fees	$ 7,874,902.46		18.4
Gasoline Tax	21,708,416.15		50.7
County Reimbursements on Construction	62,771.79		.1
Federal Reimbursements on Construction	12,951,547.18		30.2
Miscellaneous	254,463.05		.6
		$42,852,100.63	100.0
Total		$52,016,218.52	
Disbursements			Per Cent
Maintenance	$ 9,046,693.84		19.1
Construction	35,353,240.71		74.8
Legislative Appropriations	552,084.50		1.2
Investment - Equipment, Lands and Buildings	671,258.25		1.4
Miscellaneous and Sundry	826,940.30		1.7
State Highway Patrol	712,283.75		1.5
Other	120,719.89		.3
		$47,283,221.24	100.0
Balance State Highway Fund August 31, 1939		$ 4,732,997.28	
Total		$52,016,218.52	

TABLE 2

DISTRIBUTION OF REVENUE FROM SPECIAL MOTOR VEHICLE IMPOSTS IN TEXAS FOR THE YEAR ENDING AUGUST 31, 1939

			Per Cent of Total
State Highway Fund			
From Motor Vehicle License Fees	$ 7,874,902.46		
From Motor Fuel Tax Collections	21,708,416.15		
License Fees Due from County Tax Collectors	17,070.63		
		$29,600,389.24	46.2
Counties and Road Districts			
From Motor Vehicle License Fees	$11,918,944.94		
From Motor Fuel Tax Collections	10,854,208.04		
		22,773,152.98	35.5
Available School Fund			
From Motor Fuel Tax Collections		10,854,208.04	16.9
Other (General Revenue Fund, Motor Fuel Tax Enforcement Fund, Etc.)		897,200.86	1.4
Total Motor Vehicle and Motor Fuel Collections		$64,124,951.12	100.0

2. Sectional Interests

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It has been remarked on several occasions that there are in Texas 254 county judges, 1,016 county commissioners, and innumerable city officials and chamber of commerce officials. Each one of these city and county officials has a different temperament, and it is necessary for the Highway Commission to deal with these many different temperaments in the course of the Department's business. An average of 45 delegations appears for each public hearing, and the requests presented by the delegations uniformly are for the designation and the construction of highways. The Commission extends every courtesy to delegations at public hearings.

Often a delegation is heard to state that other sections are receiving more consideration than their section. When the other section is heard from, similar remarks will be made about the first section. This is evidence that the Commission is being fair and impartial to all parts of the State of Texas. It is impossible to satisfy all of the delegations. A fair and impartial arbiter in making his decisions naturally will disappoint both sides to the arbitration. There could be no better evidence that the State Highway Department is acting in a fair and impartial manner concerning the various sections of Texas.

The main problem confronting the Commission today is, of course, the matter of designating and constructing highways. It seems futile to continue to designate highways when there are already more miles on the System than can be constructed for a considerable number of years. It will be necessary either to increase the revenues of the State Highway Department, if the continual requests of delegations for designations and construction are to be complied with, or else it will be necessary to curtail and diminish such requests close to the vanishing point.

3. The Counties

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In 1932 the Legislature diverted the net proceeds from one cent of the State gasoline tax from the State Highway Fund to a special fund for the retirement of outstanding county and road district bonds, the proceeds of which were spent in the construction of roads which were then or at any time on the State Highway System. House Bill No. 688, which was passed by the recent Legislature, provides that all of this one cent of the gasoline tax shall be used by the counties as follows, in the order of priority:

1. To pay the annual principal and interest charges of the eligible bonds, including the unpaid bonds which were spent on highways designated between the periods of September 17, 1932, and January 2, 1939.

2. A reserve fund of $3,000,000.00 must be maintained by the Board at all times out of surplus funds.

3. The remaining surplus shall be known as the "Lateral Road Account." Before the "Lateral Road Account" is allocated to the counties, the Board shall determine the retroactive amounts paid by the counties as part of the State's obligations on principal and interest payments for eligible bonds since January 1, 1933, and then credit the "Lateral Road Account" of such counties with the amount paid toward the retirement of the eligible bonds since that date.

4. After such retroactive payments have been credited to the counties from the "Lateral Road Account," the remaining money in said Account shall be allocated to each county according to a formula as follows:

   1/10 on the basis of area
   2/10 on the basis of population
   3/10 on the basis of motor vehicles
   4/10 on the basis of lateral road mileage

   The moneys allocated to each county from the "Lateral Road Account" shall be used by the counties as follows:

   (1) For paying the annual debt service charges on bonds, warrants, and other legal obligations issued prior to January 2, 1939, the proceeds of which were expended in acquiring rights-of-way for State designated highways.

   (2) Funds remaining in the county's Lateral Road Fund after the payment of said right-of-way obligations may be used by the county, under the direction of the Commissioners' Court, for any one or all of the following purposes:

      (a) For the acquisition of rights-of-way for county lateral roads and for the payment of legal obligations incurred thereby prior to January 2, 1939.

(b) For the construction or improvement of county lateral roads.

(c) For paying the principal, interest, and sinking fund requirements of any bonds or warrants which were legally issued by such county or road district prior to January 2, 1939, the proceeds of which were actually expended in the construction or improvement of lateral county roads.

(d) For the purpose of supplementing funds appropriated by the United States Government for W. P. A. and P. W. A. highway projects, and for supplementing such other grants of Federal funds as may be made available to the counties for county lateral road construction.

(e) For the purpose of co-operating with the State Highway Department and the Federal Government in the construction of Farm-to-Market Roads.

5. Within 60 days after receiving notice of the amount of Lateral Road funds accredited to each county, the county must notify the Board of County and District Road Indebtedness of the manner in which it has exercised its option as to the one or more specified uses of said money permitted under this Act.

Regardless of how the funds allocated to the county from the "Lateral Road Act" are used, the County Judge of each county must file with the Board, on or before October 1st of each year, a verified report showing the manner in which the said funds have been expended, the nature and location of the roads constructed, and such other information as the Board may require from time to time.

The Department has had a hard fight the last two years to prevent illegal registration of motor vehicles and retention of auto license fees that should come to the State Highway Department. The work of the Department, assisted by the Attorney General, has resulted in adding some $600,000.00 to the Department's Fund that for the last three years was kept illegally by the counties.

In view of the fact that the counties receive proceeds from the State gasoline tax equal to one-half of that received by the State Highway Department and approximately twice as much of the net license fees as the State Highway Department, while the State Highway System carries nearly three times as many vehicle miles as the county roads, -- in view of these facts it is evident that the counties are receiving more than their due share of the road user revenue. When this circumstance is considered along with the need for highway improvement in urban areas, the question of a more equitable redistribution of this revenue is immediately raised.

4. Municipalities

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In building a highway system adequate to the needs of motor vehicle traffic, the first and inescapable need was for the construction of roads, passable under all conditions of weather, between the important centers of population of the State. This work is not yet complete. There is on the State Highway System a total of 5,500 miles of highways that are not yet dustless, all-weather roads, and the estimated cost of paving these sections is $217,600,000.00. The highway system will not entirely serve its purpose until these gaps are closed.

In order to join the centers of population as quickly as possible with all-weather roads, a policy was resorted to which, while necessary at the time, has resulted in the creation of a great many miles of the highway system that are now considered obsolete. It is estimated that fully 5,500 miles of the State Highway System are now obsolete and that the reconstruction of these obsolete roads to meet the current needs of motor vehicle traffic will cost approximately $139,100,000.00. This program of modernization constitutes the most pressing need for highway funds at the present time.

If the experience of the more densely populated states of the Northeast can be trusted, it can be expected that after the completion of the gaps and the reconstruction of obsolete portions of the rural State Highway System the next problem of major importance will be found in the congested regions in and about the centers of population, particularly the larger ones. Already this condition is beginning to make itself felt in the larger cities of Texas and, indeed, in a number of the smaller ones.

While the State Highway Department has not in the past had funds available for the improvement of highway routes through municipalities, except in a few emergency conditions, the inadequacy of the facilities provided by most of the municipalities for trans-city highway traffic is evident.

In the case of the smaller towns, the problem could be economically solved by the building of by-pass routes with convenient connections for those who have business in town. These by-pass routes, where justified, would not only serve the interests of the through traffic, but would help to relieve congestion and promote safety on the streets of the towns. The construction of such routes, when proposed by the State Highway Department, has frequently met with loud opposition from urban interests. This opposition, short-sighted as it must appear, has succeeded in preventing the construction of improved facilities at a number of towns in the State. The continuance of this opposition constitutes an important obstacle to the extension of safe and economical highway transportation in Texas.

In the case of the larger cities, however, it is now known that the construction of by-pass routes does not adequately solve the problem. A by-pass route is justified in case the through traffic at a town is large in proportion to the traffic having origin or destination in the town, or desirous of stopping there. In the case of the larger cities, most of the highway traffic in their immediate vicinity has origin or destination in the city, and the volume of through traffic is small in proportion. Recent studies made by the Public Roads Administration indicate the desirability of limited access highways cutting through the hearts of the cities. It has been proposed that these trans-

city express highways be either elevated or depressed to avoid interference from cross traffic. It is also proposed that the right of access be withheld from adjacent property to prevent these highways from becoming congested from adjacent development like the other city streets. Whether the time is yet ripe for the consideration of such facilities in the larger cities of Texas has not yet been determined, but it appears that the cities are not prepared to undertake such an expensive improvement program, and the Highway Department could not undertake such a program without an increase in the gasoline tax.

It is to be expected that in the future, after the rural part of the State Highway System has been completed and brought up to date, the most pressing problems of highway improvement will be in the larger cities and their vicinities. At such points we must plan for superhighway construction, for multiple-lane divided surfaces, for elevated and depressed roadways, for clover leaves and other grade separation structures, and for the various other improved facilities which contemporary engineering has produced in response to the ever-increasing demands of motor vehicle traffic.