Michigan's

HIGHWAYS

1960-1980

* Needs
* Costs
* Benefits

Interstate and State Trunklines - County Roads - Municipal Streets

Michigan's

HIGHWAYS 1960-1980

* Needs
* Costs
* Benefits

a summary report

TO THE
MICHIGAN
JOINT LEGISLATIVE
HIGHWAY
STUDY
COMMITTEE

PREPARED BY THE
MICHIGAN STATE HIGHWAY DEPARTMENT
IN COOPERATION WITH THE
COUNTY ROAD ASSOCIATION OF MICHIGAN
AND THE
MICHIGAN MUNICIPAL LEAGUE
WITH THE PARTICIPATION
OF THE
UNITED STATES DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
1961

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To The Michigan Legislature and The Citizens of Michigan:

In carrying out my responsibilities under Act 51, Public Acts of 1951 as amended -- and as requested by the Michigan Legislature -- I herewith present for your consideration, a study of the estimated highway needs of Michigan for the 20-year period, 1960-1980.

This report, entitled "Michigan's Highways: 1960-1980, Needs, Benefits, Costs," is based on the most comprehensive inventory of Michigan roads and streets ever undertaken. It is the third study of highway needs within the past dozen years. The previous studies of 1948 and 1955, and the resulting legislative actions, laid the foundations for the current program of accelerated highway building which has met with such favorable public response in every part of Michigan. This study involved even deeper research than the two earlier studies. Every mile of State highway, County road, and City and Village street was evaluated as to its ability to carry the traffic load of the next 20 years.

It is important to keep in mind that this report is a study of highway needs and not a study of highway financing. A comprehensive study of potential highway revenues over the next 20 years is being conducted now by the University of Michigan, Michigan State University and Wayne State University. It will be finished later this year. The two reports -- the full technical engineering report on which this summary is based and the comprehensive study of highway financing -- will together comprise a document of great value in helping the legislature in its decisions affecting highway progress in Michigan.

This summary shows needs totaling $11 billion in the 20-year period under consideration.

The people of Michigan can be proud that the present rate of highway building, if continued over 20 years, will meet $8.1 billion or 73 percent of this need.

In preparing this study the Michigan State Highway Department benefited immeasurably from the full cooperation of the County Road Association of Michigan and the Michigan Municipal League. The participation of the Bureau of Public Roads, U.S. Department of Commerce, was an important asset at several steps along the way.

John C. Mackie
STATE HIGHWAY COMMISSIONER

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Foreword

Michigan is one of the leading states of the Great Lakes industrial complex which has contributed so much to the nation's well-being.

Within its borders live 7.8 million people who work at occupations as varied as computer programming and fish-net making. Michigan is bounteously endowed with woods and streams, farms and orchards, minerals and ores, and industrial "know-how" second to none. Michigan has the human and natural resources to build an ever stronger and more vigorous economy. Its people gainfully employed in jobs which use highly developed skills, produce incomes envied by many other states — incomes which enable them to enjoy the varied opportunities which nature and men have provided.

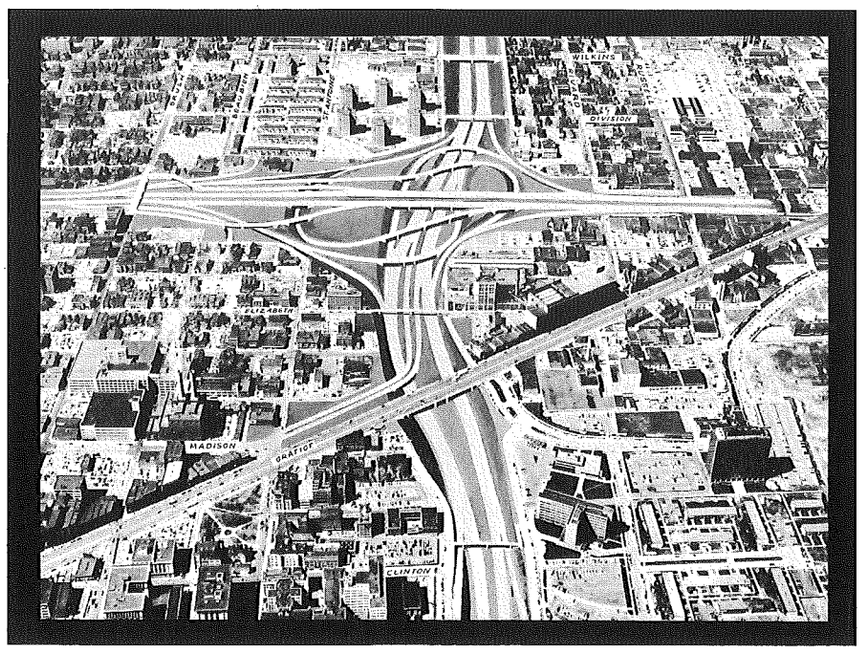
The 110,000 miles of Michigan's highways, roads and streets constitute a vital circulatory system, nourishing the state and keeping it healthy. A highly developed, integrated highway system is essential to our well-being and prosperity. It is prudent therefore to re-examine periodically the functioning of this network to assure its continued operation at maximum efficiency.

This report presents the findings of a study of highway needs made under Legislative direction. It is the result of over two years of concerted effort by the Michigan State Highway Department in cooperation with the County Road Association of Michigan and the Michigan Municipal League. Every mile of state highway, county road and city street has been evaluated and rated as to its ability to carry the traffic load anticipated over the next 20 years. This appraisal — the most complete inventory ever attempted in Michigan — has been reviewed and analyzed in great detail. All of the road agencies concerned have agreed on its fairness and objectivity.

This report presents, in summary form, the findings of this state-wide study. In general, the results are given in terms of the estimated dollar cost of correcting the deficiencies found and meeting the needs over the next 20 years. The advantages which would result from taking the corrective measures required are presented in terms of the transportation and economic benefits that will accrue to highway users and the public.

In the near future, the full technical engineering report, together with the report of the highway fiscal study now being made for the Joint Legislative Highway Study Committee by the University of Michigan, Michigan State University and Wayne State University, will be submitted to the Legislature to aid it in meeting its responsibility for the continued development of Michigan highways.

Michigan is currently engaged in the largest road building program in its history. As great as is our achievement to date, the challenge which faces us is even greater.



Summary

This is the summary report of a study of the needs of Michigan highways made for the Joint Legislative Highway Study Committee by the State Highway Commissioner, with the cooperation of the County Road Association of Michigan and the Michigan Municipal League.

NEEDS AND COSTS

✻ It is predicted that the volume of traffic on Michigan highways, roads and streets will increase 91 percent by 1980, but this needs study finds that only about one-tenth of the state's 110,000 miles of all kinds of roads will be adequate to carry the expected traffic load through the next twenty years.

All Systems

✻ To provide the highway improvements that are essential to serve the rising demands of traffic, 99,842 miles of roadways must be improved at an estimated cost of $11 billion during the period 1960-1980. The deficiencies and costs are distributed as follows:

System	*Miles of Deficient Road*	*Cost (in Billions)*	*Percent of Total Cost*
State Trunkline System (Including Interstate)	8,984	$ 5.2	47.3
County Road Systems	78,527	3.7	33.7
Municipal Streets	12,330	2.1	19.0
Totals	99,842	$11.0	100.0

✻ The Department estimates that receipts from existing sources of highway income will provide about $8.1 billion that will be available for highway purposes during the 20-year period, leaving approximately $2.9 billion of additional funds to be provided to meet the total cost of this essential highway improvement project.

The State System

✻ The state highway system, which carries one-half of all Michigan motor vehicle traffic, includes all the 1,101 miles of Interstate System routes in this state. Two hundred and six miles of freeway have been completed on this latter system—the longest continuous stretch of toll-free Interstate highway open to traffic in the country.

✻ Completion of the remaining 872 miles of Interstate freeways will cost $1.8 billion, while correction of deficiencies on the 8,112 miles of other state trunklines requiring improvement will cost $3.5 billion.

✻ Construction costs on the state trunkline system range from $100,000 per mile for new 2-lane rural sections to $15,000,000 per mile for new 8-lane freeway sections of Interstate routes in Detroit.

The County Systems

✻ The county road systems total nearly 86,000 miles of roadways, of which a little over a quarter are primary highways and the rest local roads. Improvements are required on over 24,000 miles of primary roads and on over 54,000 miles of local roads. However, the cost of meeting county road needs is evenly divided between the two classifications: $1.8 billion on the primary system and $1.8 billion on the local roads.

✻ On the county road systems, costs per mile of construction vary from $17,000 for lightly traveled local roads, to almost $2 million per mile for some urban extensions of important county primary highways.

The Municipal Systems

✻ There are more than 16,112 miles of streets in incorporated Michigan cities and villages, but about ten percent of this mileage

is included in the state and county systems. Of the 14,411 miles of streets that are the responsibility of municipalities, there are 4,017 miles of major, and 10,991 miles of local streets.

* The costs of meeting the needs on municipal street systems are: $1.2 billion on the 3,503 miles of major arteries needing improvement, and $879 million on the 8,827 miles of local streets needing improvement.

* Two-lane city streets may cost as little as $70,000 per mile to build, but multi-lane construction on some major arteries costs upwards of $2 million per mile.

Program Costs

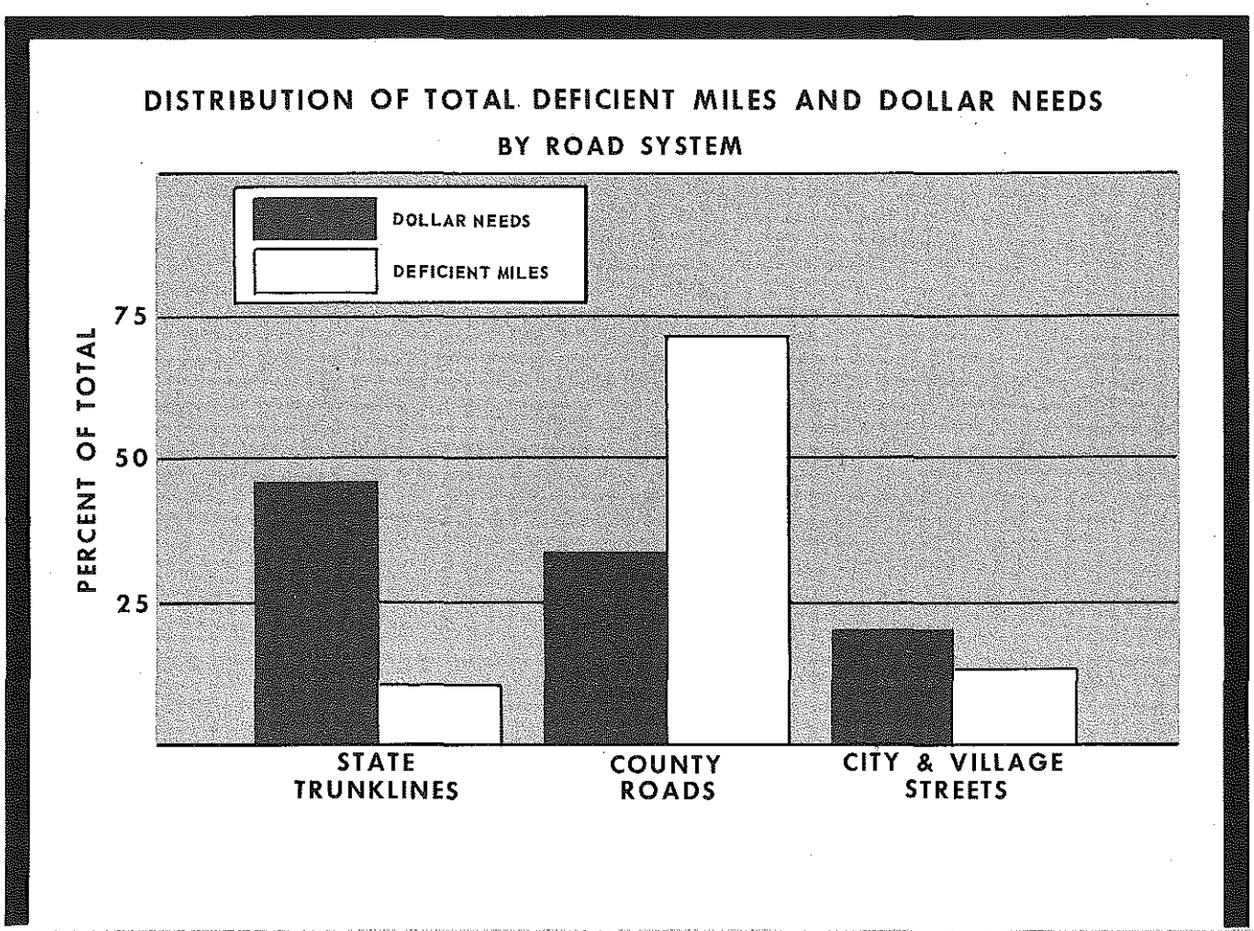
* The total average annual expenditures by all highway agencies required to completely meet the needs in a 20-year period would be $552 million, or approximately $147 million in excess of the estimated average annual income from existing sources.

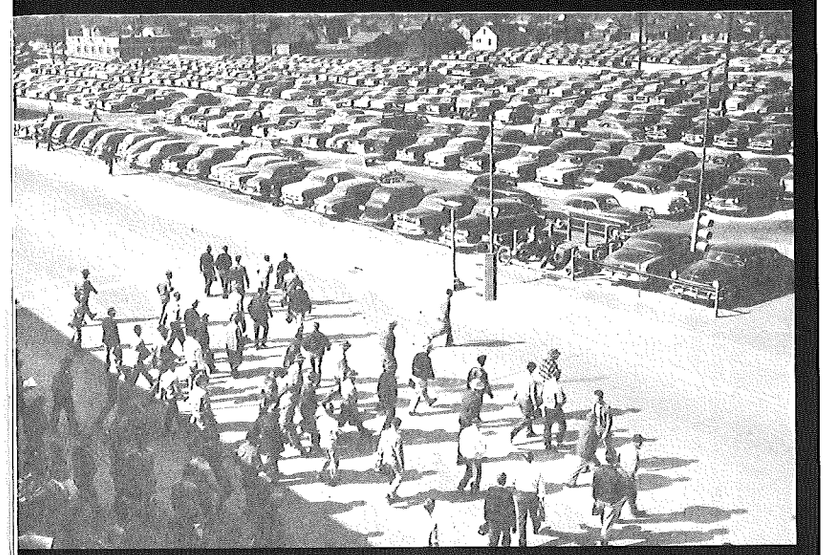
* Due to the critical nature of some of the deficiencies, higher annual expenditures would be required in the first decade of the program period, but these would be offset by lower requirements in the second decade. These average annual expenditures are estimated at $703 million and $400 million, respectively.

CONCLUSION

* It will require a strong effort on the part of Michigan and its highway agencies to meet the challenge of spiralling demands for highway transportation service during this critical period.

* Highway service is so essential to the state's prosperity and well-being that this challenge cannot be disregarded.





PEOPLE AND THEIR ECONOMIC ACTIVITIES GENERATE HIGHWAY NEEDS

Michigan's rapidly growing population and changing economy are putting more and more pressure on the state's highways and streets. Here are some of the relevant facts which form the background for this analysis of highway needs.

- Michigan's population will be 12.2 million by 1980, compared with the 1960 total of 7.8 million.
- In place of today's 3.3 million motor vehicles, there will be 5.6 million cars and trucks operating in this state in 1980.
- These vehicles will be rolling up 63 billion vehicle miles of travel annually by 1980, or nearly double the total traffic in 1960.
- Traffic grows in Michigan because highway transportation is an essential part of every one of our productive processes and of all the activities of life and living.
- Nearly 74 percent of Michigan people live in urban areas and there is a continuing trend toward suburban developments where highways provide the sole transportation service.
- Michigan is an important agricultural state and 48 of its 83 counties rank among the first 100 counties in the nation in the production of field crops, fruits and livestock. The people on the state's 112,000 farms depend on highways for access to the markets and services that make agriculture a profitable and rewarding way of life in Michigan.
- Highways are a basic part of the operations of industry in this state. The availability of adequate highway service is an important consideration in the selection of plant sites.
- There are 2.9 million workers in Michigan's labor force and most of them use highways to go to and from their jobs.
- Highways opened up Michigan's recreational attractions to the nation's tourists. About 10 million of them come to Michigan annually—90% of them by automobile—bringing $650 million to the state every year.
- Michigan is served regularly by 3,000 truck lines. They carry about a billion dollars worth of goods over Michigan roads each year.
- Adequate highways bring safety. On the basis of the 75 percent reduction in accident rates being recorded on our new highways, it is estimated that completion of the contemplated highway needs program will save more than 1,600 lives and avert almost 100,000 injuries in the year 1980 alone.
- Construction required to meet the 20-year highway needs will provide new jobs for 32,000 people annually during the first 10 years of the program and for 8,000 people annually during the second 10-year period.

Highway improvement will increase the productive efficiency and improve the competitive position of every industry and activity in Michigan. The state cannot afford not to keep pace with the growing demand of Michigan people and their economy for more and better highway service.


STOP
REPAIR ZONE
WET PAINT
INTERSTATE
MICHIGAN
75

Highway Progress Since 1955

CHAPTER 1

Highway construction in Michigan is progressing at an accelerated rate. This can be credited to changes in basic Federal and State highway legislation. These changes provided additional funds for highway development.

The Federal Aid Highway Act of 1956 raised the federal contribution to highway construction costs to 90% on the Interstate highway system. There are 1,078 miles of this system in Michigan.

Act 87, Public Acts of 1955, raised the Michigan gasoline tax rate from four and one-half cents to six cents per gallon, and also increased the weight tax on commercial vehicles by 10%. These provisions added about $28 million a year in revenues from the highway user taxes, which are apportioned to State, County, and City and Village road projects.

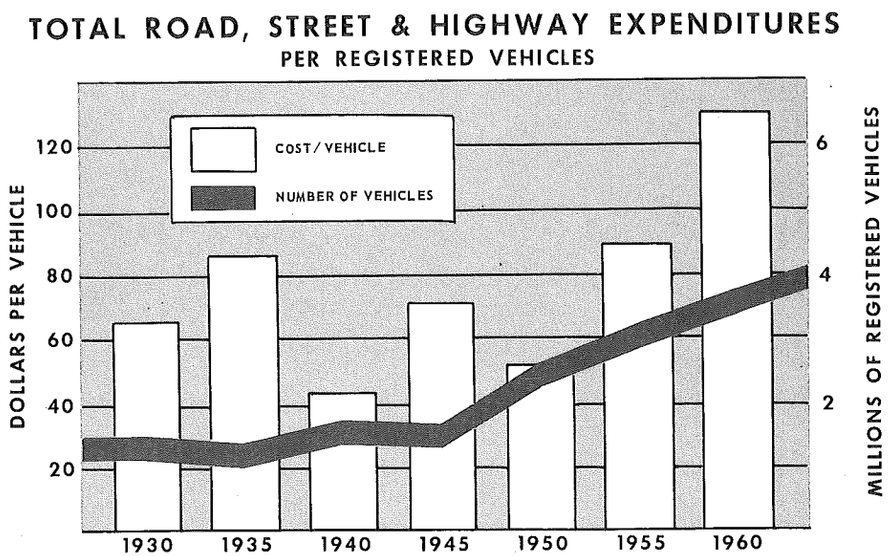
Act 262, Public Acts of 1957, expanded the State Highway Commissioner's bonding authority to permit larger borrowings for construction on the State trunkline system. It conferred similar expanded bonding authority on counties, cities and villages. This act also slightly revised the formula for distributing motor vehicle revenues to the state, counties and cities as follows:

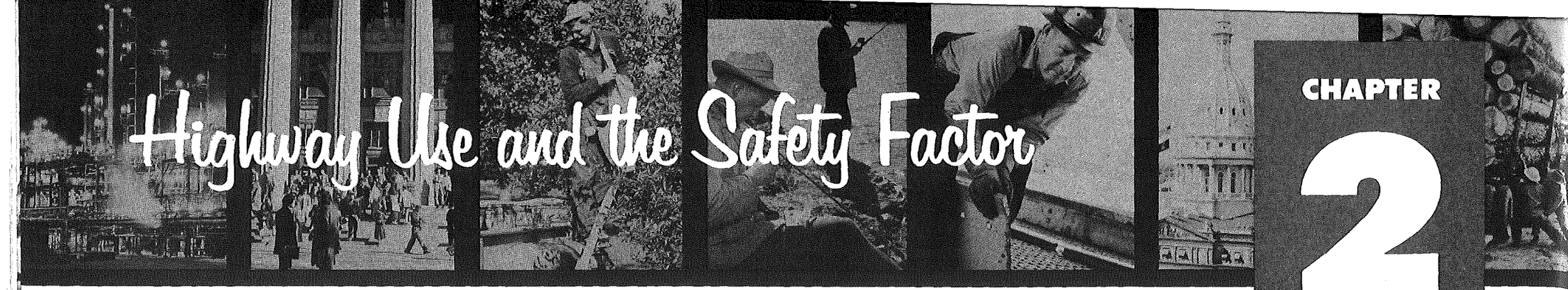
	1951	1957
State	44%	47%
Counties	37%	35%
Cities and Villages	19%	18%

The impact of these changes in Federal and State law have been reflected in the construction activities of all of the road agencies of the state. A comparison of average annual expenditures in the period 1951-1954 inclusive and in the last five years shows that all of these units have markedly increased the dollar volume of their road work programs:

AVERAGE ANNUAL EXPENDITURES

System	1951-1954 Inc.	1955-1959 Inc.
Municipal Streets	$ 49,298,000	$ 72,454,000
County Roads	59,856,000	82,213,000
Interstate and Other State Trunklines	91,513,000	190,045,000





Highway Use and the Safety Factor

CHAPTER 2

Today the traffic on the roads and streets of Michigan is constantly growing and the future will bring even greater volumes. This growth creates the need for more and better highways. The full cooperative efforts of all the responsible agencies will be required to meet this challenge.

Where we stand today in relation to the past is the key to predicting the future. A view of the past and a forecast of future ownership and operation of motor vehicles on our highway system should be helpful in developing those public policies which are needed to solve the problems which the predicted huge growth of highway use will bring with it.

POPULATION

Michigan experienced a population growth of 23% in the period 1950-1960. For every five people that lived here in 1950 there are now six. For every six today, in 1980 there will be nine.

Michigan has been growing at a rate faster than the national average — and this trend is likely to continue. By 1980, it is anticipated that the present population total of 7.8 million will grow to 12.2 million, a 57% increase over our present population.

Michigan's population has grown unevenly within the state. The trend toward urbanization has continued. Since World War II, areas adjacent to large centers have grown very rapidly and many of the more densely settled suburban areas have been incorporated. In general, the larger cities have grown more slowly.

This pattern of population growth profoundly affects the highway system that must be developed to serve it.

MOTOR VEHICLE REGISTRATIONS

In 1960 3.3 million motor vehicles were registered in Michigan. By 1980 this figure will reach 5.6 million.

However, all previous forecasts of future registrations have been too low. New industrial development patterns, increased personal incomes, more leisure time, unexpected population trends — all contributed to increase motor vehicle ownership beyond predictions. The forecasts here may also prove too conservative, and the needs cited therefore would be a very minimum requirement. The more likely development will require an even greater effort.

TRAVEL

More people, owning more cars and trucks, will travel more miles and will need more and better roadways to accommodate them. It is estimated that 33 billion miles were driven on Michigan highways in 1960, and that by 1980 there will be at least 63 billion vehicle miles traveled — a 91% increase over 1960.

These figures indicate that, although Michigan's population has been growing steadily, travel on our road system has been increasing at an even faster rate.

The shortening of the work week, along with more money available for vacations, means that more people are using our roads more frequently, and are traveling greater distances each year.

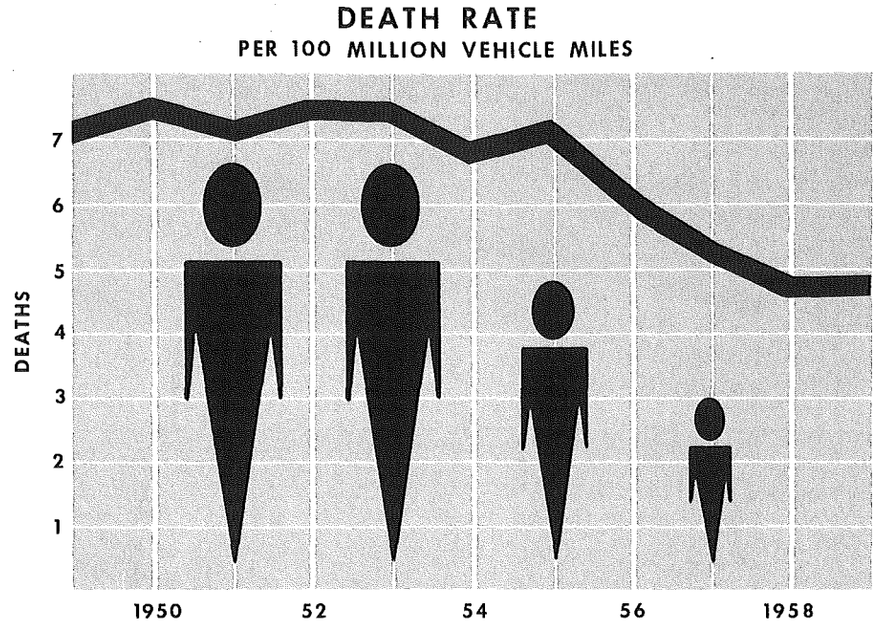
The growth of the suburban areas around our major cities generates tremendous new volumes of commuting travel. Most of these areas do not have adequate public transit facilities. The automobile has assumed an increased importance as the principal — and in many areas — the only means of transportation.

Moreover, growth in the industrial and commercial aspects of our state's economy increases travel on our road network. Highway travel in Michigan has been vastly expanded by the growth of business, industry and public services, all of which are closely geared to the use of motor vehicles.

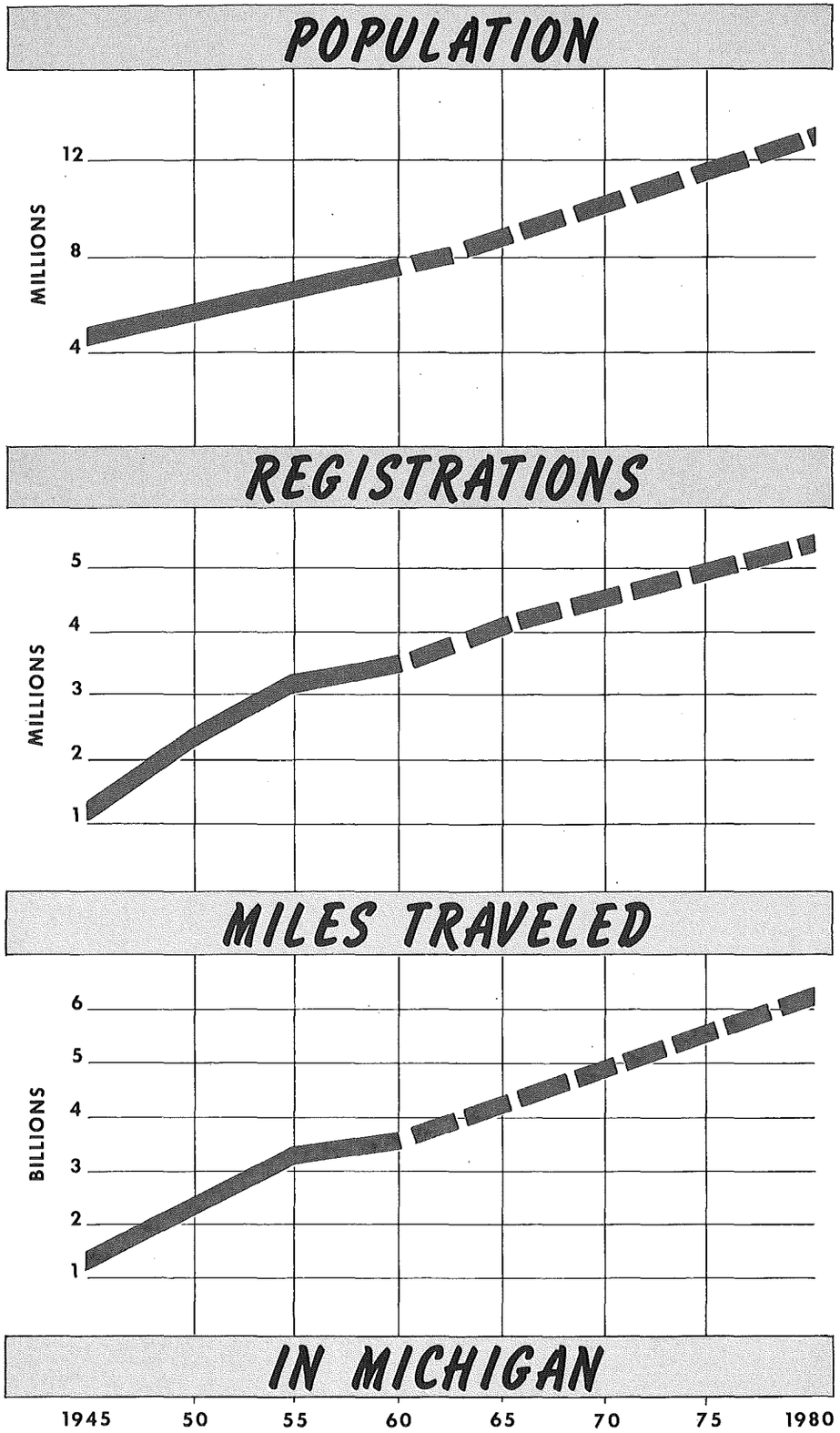
Michigan is experiencing a "transportation revolution" both in the demand for new roads, and in the great partnership progress — state, county, city — already taking place. Superior roads are most important factors in the dynamics of our economic growth.

THE SAFETY FACTOR

Safety is a tremendously important consideration in highway improvement. According to the records of the Michigan State Police, the average annual accident toll on Michigan highways during the period 1955-59 was 192,685 accidents resulting in death to 1,630 persons, and injury to 61,685 others. The accident rate in those years showed an encouraging decline from previous figures. But, even so, if those same rates should continue to be operative in 1980 when traffic volume is expected to spiral to more than 63 billion vehicle miles, the casualty totals would be appalling. No less than 3,200 people would be killed



Traffic congestion contributes to accident frequency.



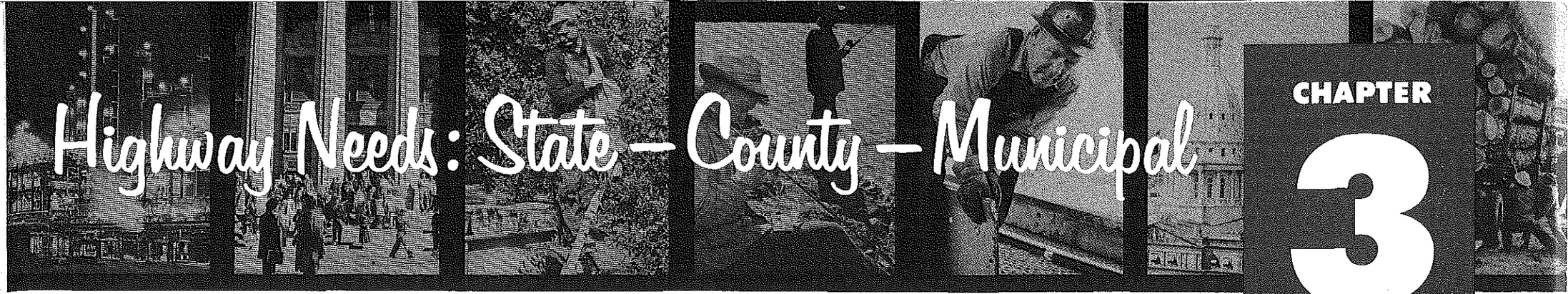
and 121,000 injured in the nearly 400,000 accidents that could be expected if highway conditions are not remedied.

Fortunately, however, the safety standards which are being built into our new roads and streets are "paying off". Their positive contribution to traffic safety is being proved by actual experience. Comparison of the accident occurrence on our new freeways and on the road sections they replaced reveals a striking 75 percent drop in the number of accidents and fatalities on the new facilities. On the 284 miles of old and new state trunklines compared in this analysis, total accidents on the new facilities fell 75.8 percent from 2,097 to 508; while fatalities were down from 42 to 8, an 80 percent reduction.

The improvement of road surfaces, increased capacity, elimination or reduction of grades and curves, and adequate shoulders, which are contemplated for all the state's highways, roads and streets by this needs study program should bring about comparable reductions of hazard on all road systems. Should that prove to be the case, the planned improvement of highways will in the year 1980 alone, save more than 1,600 lives and avert almost 100,000 injuries.

On the basis of the National Safety Council's estimates of the monetary losses involved in traffic fatalities and injuries, such a reduction in the accident toll would represent a monetary saving of more than 175 million dollars per year. In addition, with the completion of this program, highway users will realize great savings in convenience, travel-time and lower operating costs.

Effective driver license testing helps put safer drivers on the road— making an important contribution to highway safety.



Highway Needs: State – County – Municipal

CHAPTER 3

The people of Michigan are served by a vast network of 110,657 miles of highways, roads and streets. By law, responsibility for maintaining this system is delegated to the state, the 83 counties, and the 511 cities and villages. The State Highway Department is responsible for 9,309 miles of state trunklines, the county road commissions, for 86,145 miles of county roads, and the city and village road authorities, for 15,203 miles of city and village streets.

The present study, undertaken to bring the findings of the 1955 needs study up to date, was begun in 1958 and the field inventories and appraisals of needs were made for each roadway by the engineering staff of the responsible agency. The resulting data were tabulated and analyzed by Highway Department planning engineers. Their findings were inspected and approved by representatives of the County Road Association of Michigan and the Michigan Municipal League. This brief report was then prepared for the information of Legislators and highway users.

OVER-ALL NEEDS

The results of this latest study, as here presented, indicate that although improvement has gone forward on all systems since 1955, and although construction on the Interstate and other state trunkline routes has progressed at a record-breaking rate, the needs are 46 percent greater than those reported six years ago. It is estimated that meeting these needs will require the expenditure of just over $11 billion during the next twenty years. Of this $11 billion, $8.1 billion will be met if the present expenditure rate is continued over the 20-year span, leaving approximately $2.9 billion worth of needs not manageable under present circumstances.

The following totals of the estimated costs as determined for the three types of highway systems in the 1955 and 1960 needs studies show how highway needs have increased and how they are distributed:

System	1955 - 1975 Estimated Needs *In Thousands*	1955 - 1975 Percent of Totals	1960 - 1980 Estimated Needs *In Thousands*	1960 - 1980 Percent of Totals	Percent Increase 1955-60
State Trunkline	$3,469,620	46	$ 5,258,180	47.6	51.5
County Road	2,510,380	33	3,656,600	33.1	45.7
City Street	1,574,460	21	2,126,700	19.3	35.1
Totals	$7,554,460	100	$11,041,480	100.0	46.2

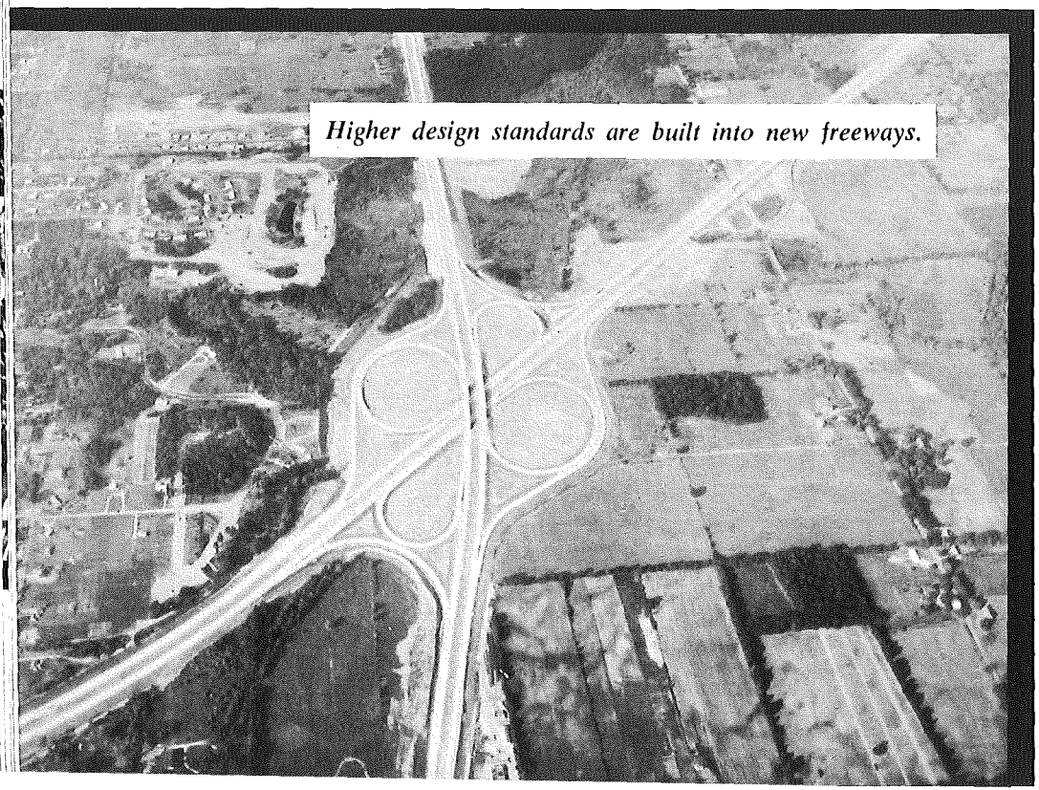
REASONS FOR INCREASED NEEDS

Two major factors are responsible for the larger sums required to meet the needs on the several roadway systems as determined

by this study. One of these is the rapidly expanding volume of highway traffic. Equally important are the higher types of highways and construction required to serve the increased amount and importance of this highway traffic movement.

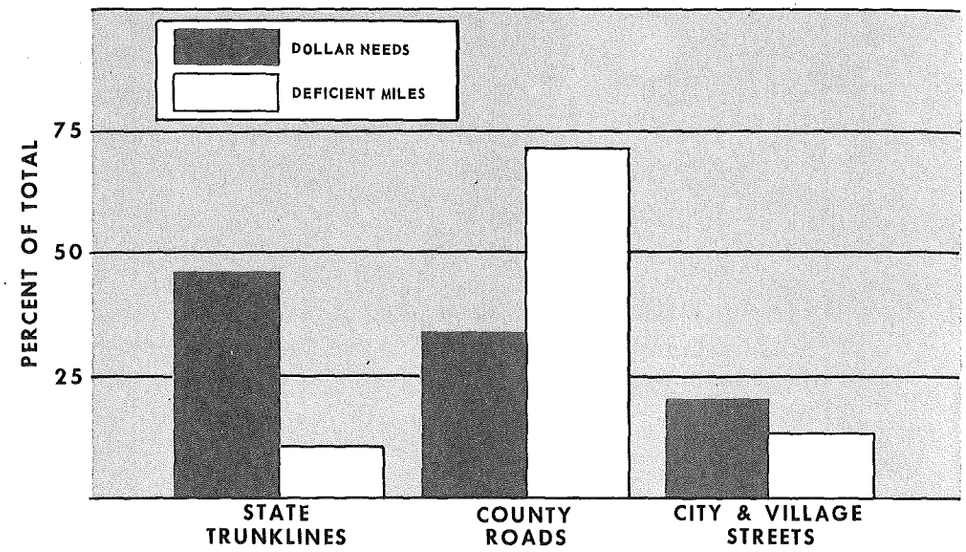
The twelve percent increase in traffic since 1955 did not seriously affect the adequacy of highways. However, estimates of needs are not based solely on a short range view of highway adequacy, but also on the deficiencies which will accrue during the service life of present highway facilities. Inasmuch as modern highway facilities last for at least twenty years, it was necessary to determine if their capacity would be adequate for the traffic load through 1980. Since it is estimated that Michigan highway traffic will increase 91 percent by that year, it is clear that the need to provide greater capacity was an important factor in creating the higher cost totals.

Also, in comparing the 1960 projection of needs with those reported in 1955, it is necessary to understand that in this study needs were determined in relation to stricter standards of service than were used in the preceding studies.



Higher design standards are built into new freeways.

DISTRIBUTION OF TOTAL DEFICIENT MILES AND DOLLAR NEEDS
BY ROAD SYSTEM



In the case of the state trunkline system, a very sharp upgrading of standards was brought about on a large and vital segment of the mileage by the passage of the Federal Highway Act of 1956. That measure, enacted in the year immediately following the state's 1955 needs report, established the standards for the National System of Interstate and Defense Highways. These standards require freeway design on the nearly 1,100 miles of Interstate routes included in the state system. The 1955 Legislature designated approximately 1,000 miles of additional state routes for special treatment, and it was determined that these routes should be improved as freeways. Subsequently, about 2,000 more miles of state trunklines were selected for like development on the basis of indicated traffic trends.

This upgrading of standards for the basic transportation system of the state had an effect on the standards used for the county and municipal systems. In the earlier studies, these roadways were judged by flexible and sometimes lenient criteria; any road that was in even tolerable condition was not listed among the needs. For this study, however, it was decided that a

more stringent appraisal was necessary in order to produce a consistent state-wide transportation network. So it was proposed and the county and municipal engineering committees agreed that the adequacy of all roadways and streets should be judged by modern concepts of highway design.

These two factors — increasing traffic and higher design standards — affected the needs on the several systems differently.

THE STATE TRUNKLINE SYSTEM

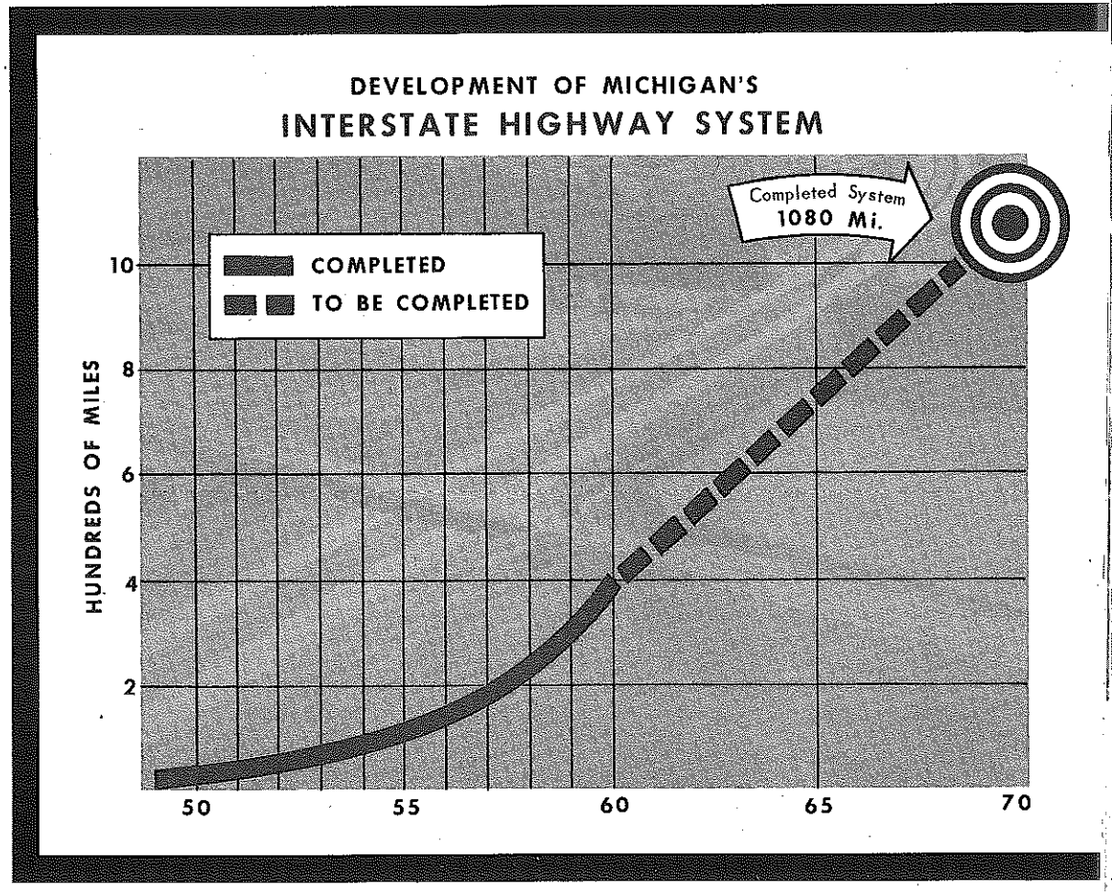
The State Highway Department must bear much of the brunt of the demands imposed by increasing traffic for, while state routes represent only a little over nine percent of the state's total roadway mileage, they carry and will continue to carry almost half of all highway travel in Michigan.

The State Highway Department is responsible for the development of the Interstate routes, with their higher design standards. However, the Federal Government now pays 90 percent of the cost of construction on these routes; rather than the 50 percent contribution that Federal Aid makes to costs of construction on all but a small part of other state routes.

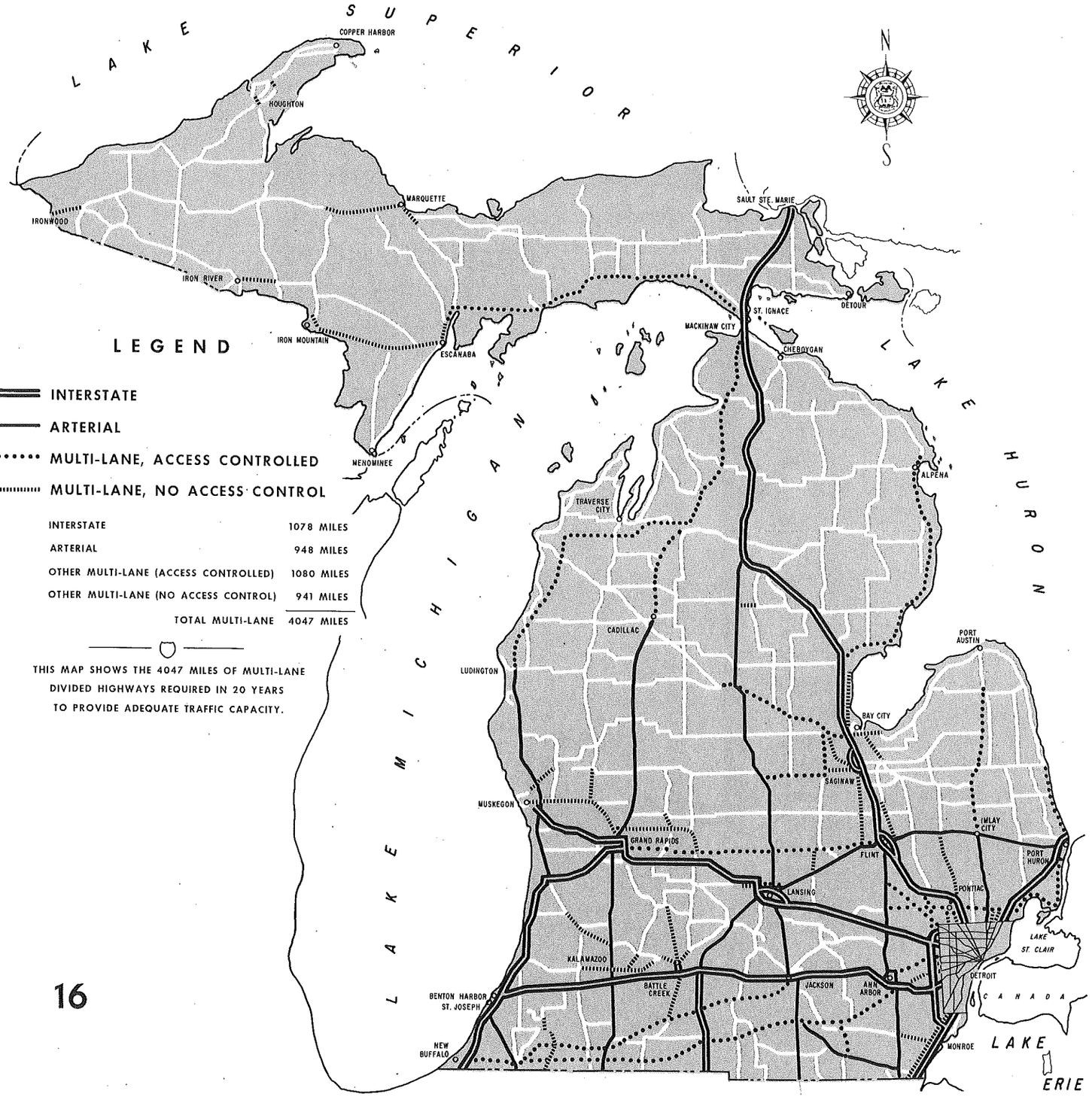
Trunkline Improvements and Needs

Faced with the obligation to build practically the whole of the state's 1,078 miles of Interstate routes, and to continue the improvement of the other trunklines on the state system, the Highway Department has pushed its construction program aggressively during the past five years. The length of construction projects completed during that period totaled over 4,300 miles, or 46 percent of the total system mileage. This work included completion of Interstate 94 from Detroit to Stevensville in Berrien County, 206 miles distant, the longest continuous stretch of Interstate toll-free highway in the nation that has been opened to traffic. In addition, major highway construction, much of it freeway design, went forward on other state trunkline routes.

However, in spite of this outstanding construction record, when the 9,478 miles of Interstate and state trunkline routes were inventoried, the study engineers found that on only 467 miles, or less than five percent of the system mileage, were design, capacity and condition adequate to serve estimated traffic through the next twenty years. On 80 percent of the Interstate system, completely new construction constituted the need. On the 8,112 miles of other state trunklines that require improvement, the serious deficiencies are in alignment, surface, base, capacity and limited sight distance — less costly than new construction per mile to correct.



MICHIGAN'S DIVIDED MULTI-LANE HIGHWAYS NEEDED BY 1980

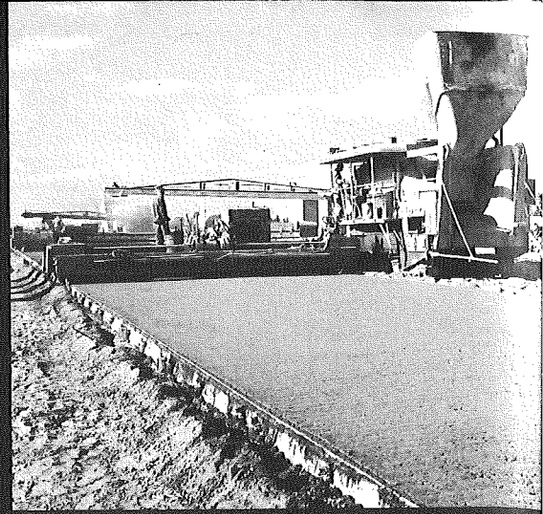


LEGEND

- INTERSTATE
- ARTERIAL
- MULTI-LANE, ACCESS CONTROLLED
- MULTI-LANE, NO ACCESS CONTROL

INTERSTATE	1078 MILES
ARTERIAL	948 MILES
OTHER MULTI-LANE (ACCESS CONTROLLED)	1080 MILES
OTHER MULTI-LANE (NO ACCESS CONTROL)	941 MILES
TOTAL MULTI-LANE	4047 MILES

THIS MAP SHOWS THE 4047 MILES OF MULTI-LANE DIVIDED HIGHWAYS REQUIRED IN 20 YEARS TO PROVIDE ADEQUATE TRAFFIC CAPACITY.



The following table shows the types of expenditures needed on the state system between 1960 and 1980 to complete the Interstate routes and to improve the balance of the system to the level required for the continued growth and development of Michigan.

NEEDED EXPENDITURES ON STATE TRUNKLINE SYSTEM
1960-1980

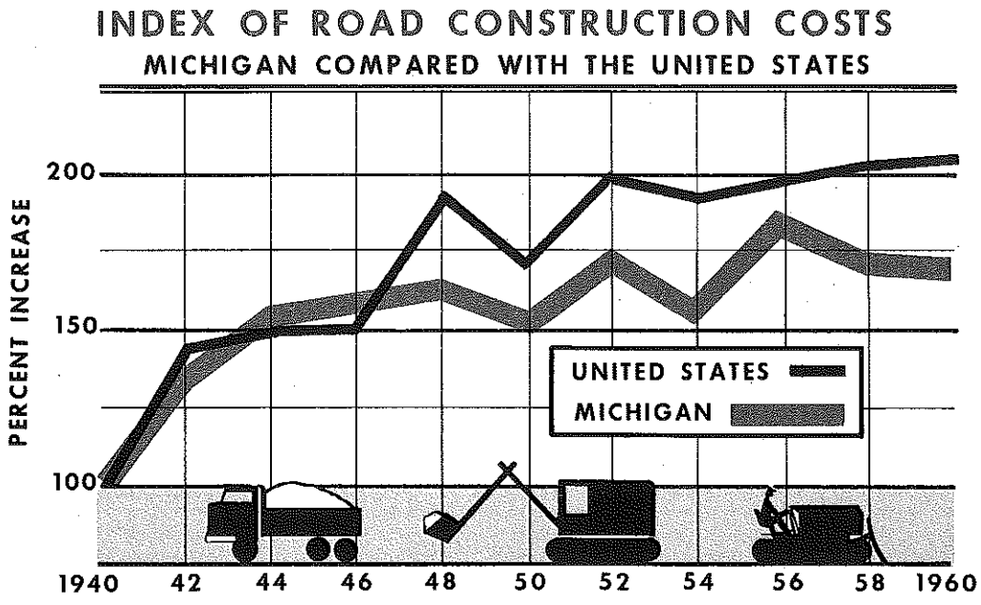
Routes and Purpose of Expenditure	Rural *In Thousands*	Urban *In Thousands*	Total *In Thousands*
Interstate Routes			
Right of Way	$ 73,984	$ 268,841	$ 342,825
Roadways	368,013	285,134	653,147
Structures	218,893	269,245	488,138
Total Construction	$ 660,880	$ 823,220	$1,484,110
Maintenance	103,970	79,550	183,520
Administration	45,880	54,170	100,050
Total Interstate Routes	$ 810,740	$ 956,940	$1,767,680
Other State Trunklines			
Right of Way	$ 179,812	$ 207,449	$ 387,261
Roadways	1,454,040	384,663	1,838,703
Structures	287,908	226,508	514,416
Total Construction	$1,921,760	$ 818,620	$2,740,380
Maintenance	422,780	129,750	552,530
Administration	140,680	56,910	197,590
Total Other State Trunklines	$2,485,220	$1,005,280	$3,490,500
System Total	$3,295,960	$1,962,220	$5,258,180

The maintenance items in the above table are the costs of the upkeep of facilities during the 20-year program period. Administrative costs, as estimated, are only about five percent of the total expenditures.

The total construction needs in the above table involve the following average per mile costs on the sections of the state system that require improvement:

Type of Road	Average Cost per Mile
Interstate Routes	
Rural (750 miles)	$ 881,200
Urban (122 miles)	6,747,700
Other State Routes	
Rural (7224 miles)	246,100
Urban (824 miles)	937,400

These averages sharply illustrate what the high design standards, which make the Interstate routes the most efficient and safest traffic arteries ever built, mean in higher construction costs. Likewise, they reflect the effects of urban land values and construction conditions on costs. But it should be pointed out also that for a number of years Michigan highway construction costs have been well below the national average. In the period covered by this study, the unit costs of construction declined somewhat, although the effects of this decline have been offset by higher design standards.



THE COUNTY ROAD SYSTEMS

The 83 County Road Commissions have a continuing responsibility for 85,825 miles of county primary and local roads built and improved over the years to meet the important needs of the rural areas. They must improve this immense mileage not only to serve rural agriculture, but also to serve the greatly increased patronage of many recreational areas and the mounting traffic needs of the multiplying suburban developments which are spreading outward from every urban center. The purpose of the county needs study is to estimate the construction and maintenance costs involved in creating such a transportation network, and coordinating it with city streets and state trunklines. It takes into account the costs involved in connecting county primaries with new interstate routes.

The 23,283 miles of county primary roads connect the principal centers of traffic interest in the counties with one another and with the state trunkline routes. Although they comprise only one quarter of total county road mileage, they carry 60 percent of total county road traffic. Most of them have qualified as Federal Aid secondary routes and benefit from Federal Aid Secondary allotments. Although the traffic load on the 62,542 miles of county local roads is light, they do provide such essential services as access to homes, schools, resource industries, and parks in the outlying areas. Also of prime importance, is the service that local roads must provide as routes for school busses, milk tank-trucks and rural mail carriers.

Design standards for the county primary roads are substantially like those for state trunklines, but ordinarily the counties have considered those standards less as rigid specifications than as desirable goals and they frequently have been graded down to meet what were called minimum requirements. Local road standards are somewhere within this flexible range, but customarily were determined by traffic usage. While the same county road design standards were used in this study as in 1955, this time

Deficiencies on the county local road system present a challenge to road authorities.

each mile of county road was individually appraised and the standards were strictly adhered to. This policy is reflected in the sharp increase of the indicated needs, particularly in the case of local roads.

County Road Improvements and Needs

During the past five years, county road commissions focussed 75 percent of their improvement operations on primary routes. The result is that the length of construction projects completed on that system during that period equalled nearly a third of primary road mileage. However, the current appraisal shows that only 215 miles of primary road, or one percent of the total system mileage, will be adequate for the predictable traffic demands arising out of the urbanization of rural areas and increasing agricultural and recreational travel during the next twenty years.

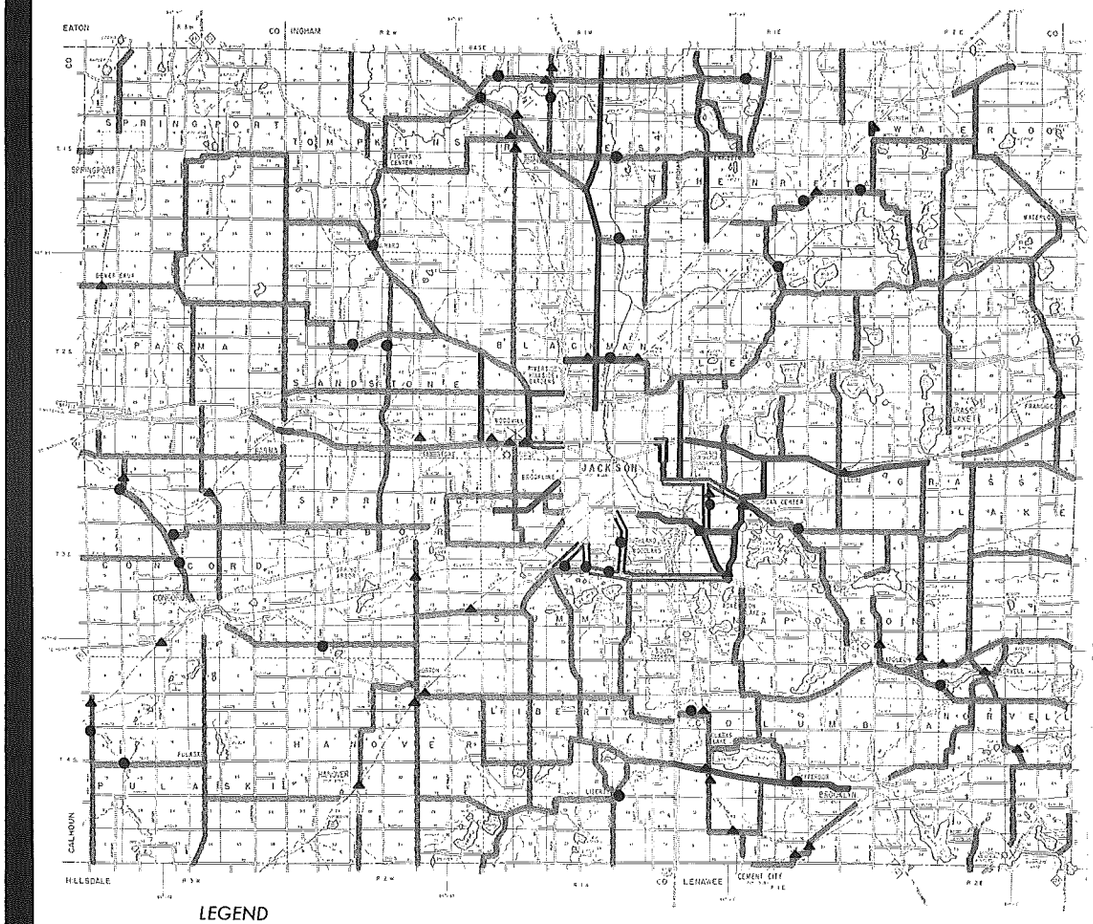
On the 24,197 miles of these roads where improvement will be needed, the major deficiencies are: narrow shoulders, important on the more heavily traveled routes; unsatisfactory base and/or surface conditions; inadequate surface width; and faulty drainage conditions. In suburban areas near the larger cities, lack of roadway capacity and of proper storm drains are critical problems. Moreover inadequate clearance dimensions and load-carrying capacity will require the construction of 302 new bridges and major repairs or reconstruction on 1,376 other bridges.

The building program necessary to meet the indicated primary road needs during the next twenty years involves the construction of the following mileage of the various road and surface types:

Construction Type	Miles
Gravel	898
Bituminous Surface Treated	3,731
Intermediate Type	16,443
High Type 2-lane	1,630
High Type Multi-lane	1,496
Total	24,198

Most of the multi-lane needs are in eight metropolitan counties and include 17 miles of freeway construction.

On the county local roads, construction projects since 1955 involved about 5,600 miles of completed work. The study appraisal found that about that same mileage, or nine percent of the entire local road system, would be adequate throughout the 20-year program period. The greater percentage of adequacy was due to the fact that these roads do not carry large traffic volumes. Nevertheless about 54,000 miles will need improvement. The deficiencies on these roads vary, but narrow roadways, poor drainage, and lack of all-weather surfaces are the most significant. Also important are the increasing demands for higher standards for these roads especially in the suburban areas. In addition, deficient bridges and railroad protection on the county local roads will require expenditure of over $94 million.



LEGEND

BITUMINOUS AGGREGRATE
CONCRETE, 2 LANE
CONCRETE, 4 LANE
R.R. IMPROVEMENT
STRUCTURE IMPROVEMENT

JACKSON COUNTY IMPROVEMENTS 1960-1980 TO MEET PRIMARY ROADS NEEDS

The estimated expenditures required to meet all the needs on the county primary and local road systems are:

NEEDED EXPENDITURES ON COUNTY ROADS, 1960-1980

Purpose of Expenditure	Primary Roads *In Thousands*	Local Roads *In Thousands*	County Total *In Thousands*
Right of Way	$ 68,958	$ 4,608	$ 73,566
Roadways	1,045,754	1,127,528	2,173,282
Structures	127,639	94,665	222,304
Total Construction	$1,242,351	$1,226,801	$2,469,152
Replacements	—	—	80,459
Maintenance and Administration	570,590	616,860	1,187,450
Total Costs	$1,812,941	$1,843,661	$3,656,602

About 15 percent of the primary road costs are for extensions of these roads within municipalities, most of them in three counties.

Overall average costs per mile on the county primary roads are as follows:

Construction Type	Cost per Mile
Gravel	$ 16,875
Bituminous Surface Treated	24,405
Intermediate Type	29,305
High Type, 2 lane	92,865
High Type, multi-lane	184,440

The average cost for the 17 miles of expressway construction required on county primaries is $1,982,000 per mile.

On the county local roads, average cost per mile ranges from $13,000 for minimum gravel surface and $34,000 for intermediate type surface to $146,000 for the wider, high-type multi-lane surfaces required in some more densely populated areas where heavier traffic volumes must be accommodated.

MUNICIPAL STREET SYSTEMS

This section reports the needs of the 14,411 miles of urban streets which are the sole jurisdiction of Michigan's incorporated cities and villages. There are a total of 16,112 miles of streets in these places. Approximately ten percent, or 1,701 miles, of these streets are urban extensions of rural state trunklines or county roads, and thus, the Highway Department and the county road commissions have varying degrees of responsibility for their improvement and maintenance. The needs of these urban extensions are included with those of the pertinent systems.

Acting under direction of Michigan basic highway statute, the municipalities generally have classified their street systems according to their transportation function and traffic use. There are 4,023 miles of major streets and 10,991 miles of local streets. In the planning and selection of these systems, the cities included the urban extensions of state trunklines and the principal county roads in their major street systems, even though these arteries were not under their direct jurisdiction.

Obviously, since most of the important factors that attract and generate traffic are located in urban places, travel is relatively heavy on city and village streets. These roadways which account for only about 13 percent of the state's total roadway mileage carry more than 25 percent of all roadway travel. While construction of by-passes and improvement of the urban extensions of the rural systems by the state and county agencies, provide relief or accommodation on some of the most heavily traveled arteries, there are very heavy traffic movements on many of the other major streets.

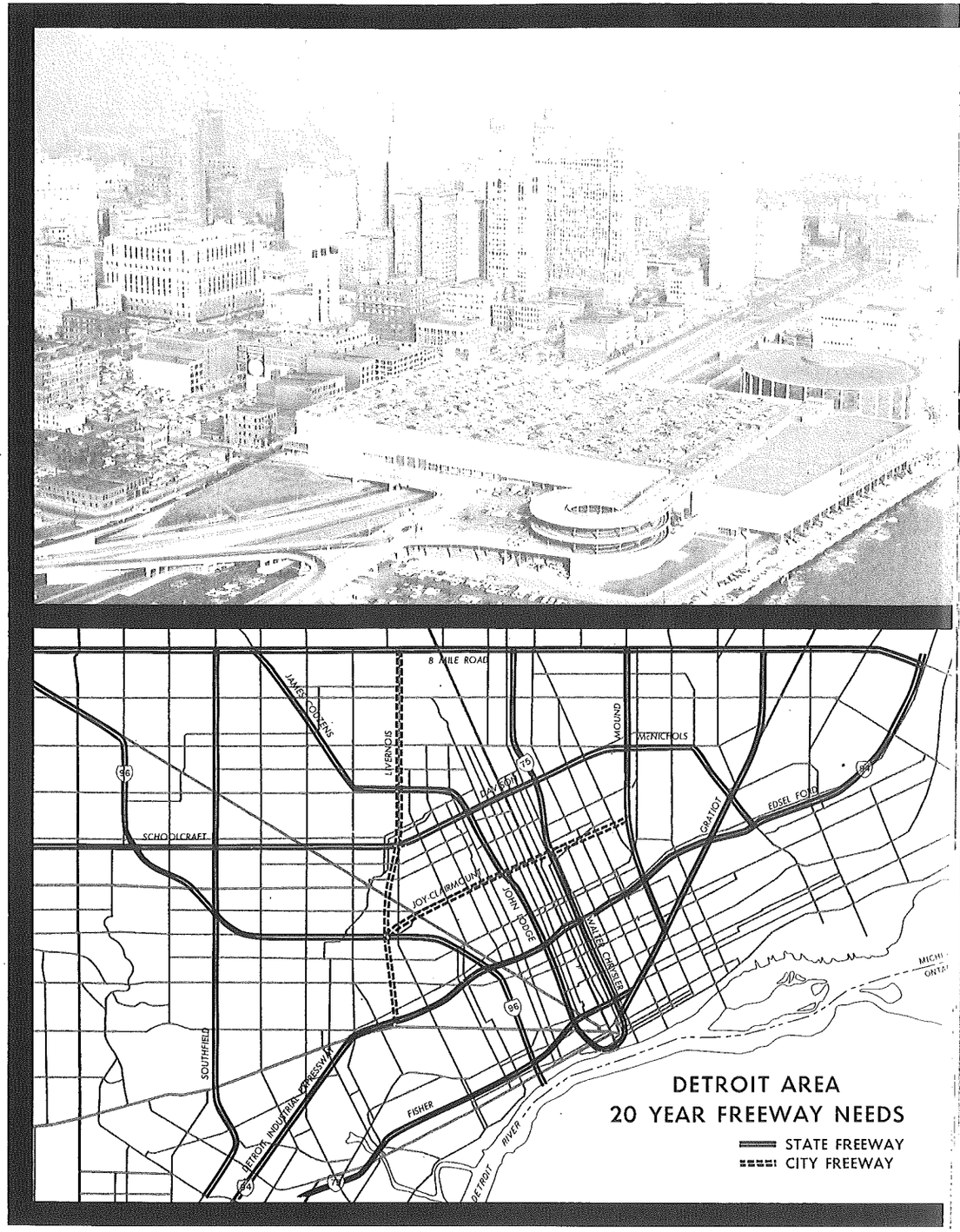
Municipal Street Improvements and Needs

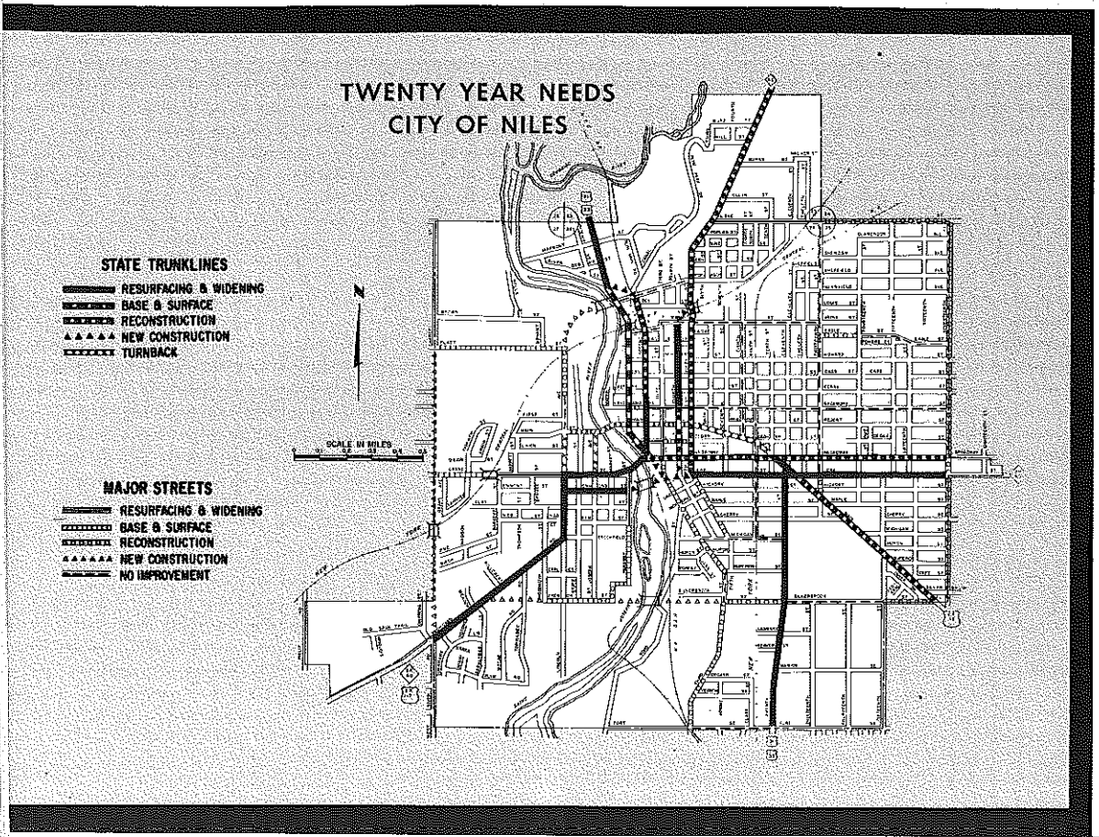
During the last ten years, the municipalities have made sustained efforts to remedy deficiencies on their major street systems, many of them using the bonding authority given them by Act 262, P.A. 1957, to provide additional financing for this work.

Generally speaking, the smaller municipalities, under 5,000 population, have made such progress on their essential major street improvements that they are able to devote a larger proportion of their income to their local streets. The larger places, where congestion is a more vital factor, have been contributing for street purposes $1.25 from their own resources for every dollar of state-raised revenues they have received. Nevertheless, the study shows that there remains a large backlog of deficiencies that must be corrected.

During the five years, 1955-1959 inclusive, the municipalities expended a total of nearly $168 million on street construction — a little over half of it on the local systems. The length of improvement projects on major streets totaled 1,118 miles and on the local streets, 2,170 miles, equalling respectively 28 and 20 percent of the milages of the two systems. The results of this work are reflected in the relatively high percentages of adequacy revealed by the needs study appraisal of these municipal street systems. The study found 520 miles — or 12 percent — of the major street mileage suitable to serve the expected traffic through 1980. Of the local streets, 2,164 miles or 20 percent of the total are similarly adequate.

On the 3,503 miles of major arteries and the 8,827 miles of local streets where improvement will be necessary, the most widespread and outstanding deficiency is lack of capacity, but drainage problems are important and costly to correct. Essential improvement to meet these and other needs will require resurfacing and/or widening, reconstruction or new construction of facilities on 3,503 miles of major streets and on 8,827 miles of local streets.





The mileages and average costs per mile of the various street and surface types involved in the building program necessary to meet the municipal needs during the next twenty years are shown below:

IMPROVEMENT COSTS FOR MAJOR MUNICIPAL STREETS*

Construction Type	Miles	Cost per Mile
Bituminous Surface Treatment	18	$ 100,900
Bituminous Aggregate	343	118,400
Bituminous Concrete (2-lane)	746	70,000
Bituminous Concrete (4-lane)	606	127,500
Bituminous Concrete (5-lane)	128	125,500
Bituminous Concrete (Over 5-lane)	205	881,500
Concrete (2-lane)	244	156,400
Concrete (4-lane)	144	280,500
Concrete (5-lane)	15	371,900
Concrete (Over 5-lane)	51	2,145,000
Total	2,500	

*Municipalities over 5,000 population.

The estimated costs for the principal items of expenditure for the improvement of the two street systems are as follows:

NEEDED EXPENDITURES ON CITY AND VILLAGE STREETS
1960-1980

Purpose of Expenditure	Major Streets *In Thousands*	Local Streets *In Thousands*	All Municipal Streets *In Thousands*
Right of Way	$ 196,530	$ 2,520	$ 199,050
Roadways	450,610	528,240	978,850
Structures	237,220	12,460	249,680
Total Construction	$ 884,360	$ 543,220	$1,427,580
Maintenance	314,460	303,760	618,220
Administration	48,960	31,940	80,900
Total Costs	$1,247,780	$ 878,920	$2,126,700

Almost a third (31 percent) of the municipal street needs are in Detroit. The following tabulation shows how needs are distributed among the cities in eight different population groups:

City or Population Group	Percentage of Municipal Needs	Number of Cities in Group
Detroit	31.0	1
Over 50,000	23.4	11
25,000 to 49,999	8.5	13
10,000 to 24,999	16.1	38
5,000 to 9,999	7.7	38
2,500 to 4,999	4.9	52
1,000 to 2,499	4.9	131
1 to 999	3.5	225
	100.00	509

Improvement Programs and Their Costs

CHAPTER 4

The magnitude of the total of Michigan's more than $11 billion of highway needs and the details of these needs as they exist on the several classes of highway systems, make it clear that correction will take considerable time, perhaps as much as 20 years. Whether these needs can be met in this period will depend on the funds made available for the task by the State, the Federal Government and the local units. To aid the Legislature and county and municipal bodies in arriving at decisions in these matters, estimates have been made of the annual expenditures that would be required under several alternative program periods.

AVERAGE ANNUAL COSTS OF VARIOUS IMPROVEMENT PROGRAMS

	State Trunklines		County Roads		Municipal Streets		All Systems
	Interstate	Other	Primary	Local	Major	Local	Total
	In Thousands	*In Thousands*	*In Thousands*	*In Thousands*	*In Thousands*	*In Thousands*	*In Thousands*
1st 10-year Period							
Construction	$127,692	$151,147	$ 87,904	$ 98,818	$ 53,756	$ 38,742	
Maint. and Adm.	16,136	35,582	27,536	31,072	18,028	17,132	
Total	$143,828	$186,729	$115,440	$129,890	$ 71,784	$ 55,874	
System Total	$330,557		$245,330		$127,658		$703,545
2nd 10-year Period							
Construction	$ 20,720	$122,891	$ 36,332	$ 23,862	$ 34,680	$ 15,580	
Maint. and Adm.	12,222	39,340	29,552	30,614	18,314	16,438	
Total	$ 32,942	$162,321	$ 65,884	$ 54,476	$ 52,994	$ 32,018	
System Total	$195,263		$120,360		$ 85,012		$400,635
20-year Period							
Construction	$ 74,205	$137,019	$ 62,118	$ 61,840	$ 44,218	$ 27,161	
Maint. and Adm.	14,179	37,506	28,529	30,843	18,171	16,785	
Total	$ 88,384	$174,525	$ 90,647	$ 92,183	$ 62,389	$ 43,946	
System Total	$262,909		$182,830		$106,335		$552,074

The table provides a basis for calculating the dimensions of the problem that confronts those responsible for highway development in Michigan and for determining the essential pattern of an adequate solution.

It is estimated that required annual expenditures under the 20-year program would average $552 million per year.

However, the twenty-year program contemplates that deficiencies would be corrected and needs would be met in twenty more or less equal annual increments. But there are many deficiencies which are critical and require early correction and it is obligatory that some important needs, such as completion of the Interstate routes, be met within a shorter time. For that reason, the 20-year program is divided into an initial ten-year "catch-up" period and a succeeding ten-year "completion" period. The table of estimated annual requirements includes schedules of average annual expenditures for these two periods.

Because needs arising from critical deficiencies are numerous and costly to correct, there would be a heavy concentration of nearly 70 percent of the construction expenditures in the first or "catch-up" decade. This is reflected in the average annual expenditures required for that period which it is estimated would total $703,545,000 for all agencies. As a result of this intensified initial effort, smaller average annual expenditures would be needed in the second decade to complete the 20-year needs program and it is estimated they would amount to $400,635,000.

REVENUES AVAILABLE AND NEEDED

Provision of funds for such annual expenditures poses a sizeable problem for the highway agencies, the State Legislature and the local governments. However, when these annual requirements are considered in relation to funds now available for highway purposes, the fiscal problems involved are reduced to more manageable proportions.

The highway fiscal study now in progress can be expected to prepare a considered estimate of future highway income. However, for the purposes of this report, the Department made a preliminary estimate based on available information. This estimate shows that during the twenty-year program period, highway revenues and receipts from existing sources will be in the following amounts:

	In Billions
State Highway User Taxes and Fees	$5.949
Federal Aid Allotments	1.884
Local General Funds and Taxes	1.200
Total	$9.033
Less Amount Earmarked for Debt Service	.933
Net Receipts Available for Highways	$8.100

This total is only about $2.9 billion less than the entire cost of the twenty-year needs program. Stated another way, of the $11.041 billion in needs, $8 billion lies within foreseeable revenues.

Over the whole twenty-year program period, estimated average annual receipts will amount to about $405 million. Comparing this figure with the $552 million which is the average annual expenditure required to meet total highway needs in twenty years, indicates the need for approximately $147 million of additional revenues annually to complete the twenty-year needs program.

The fiscal problem is further defined when the average annual program requirements during the initial "catch-up" period and the ensuing "completion" period are compared with the estimated average annual receipts during these periods. The comparison is presented in the following tabulation:

AVERAGE ANNUAL EXPENDITURES AND RECEIPTS
In Thousands

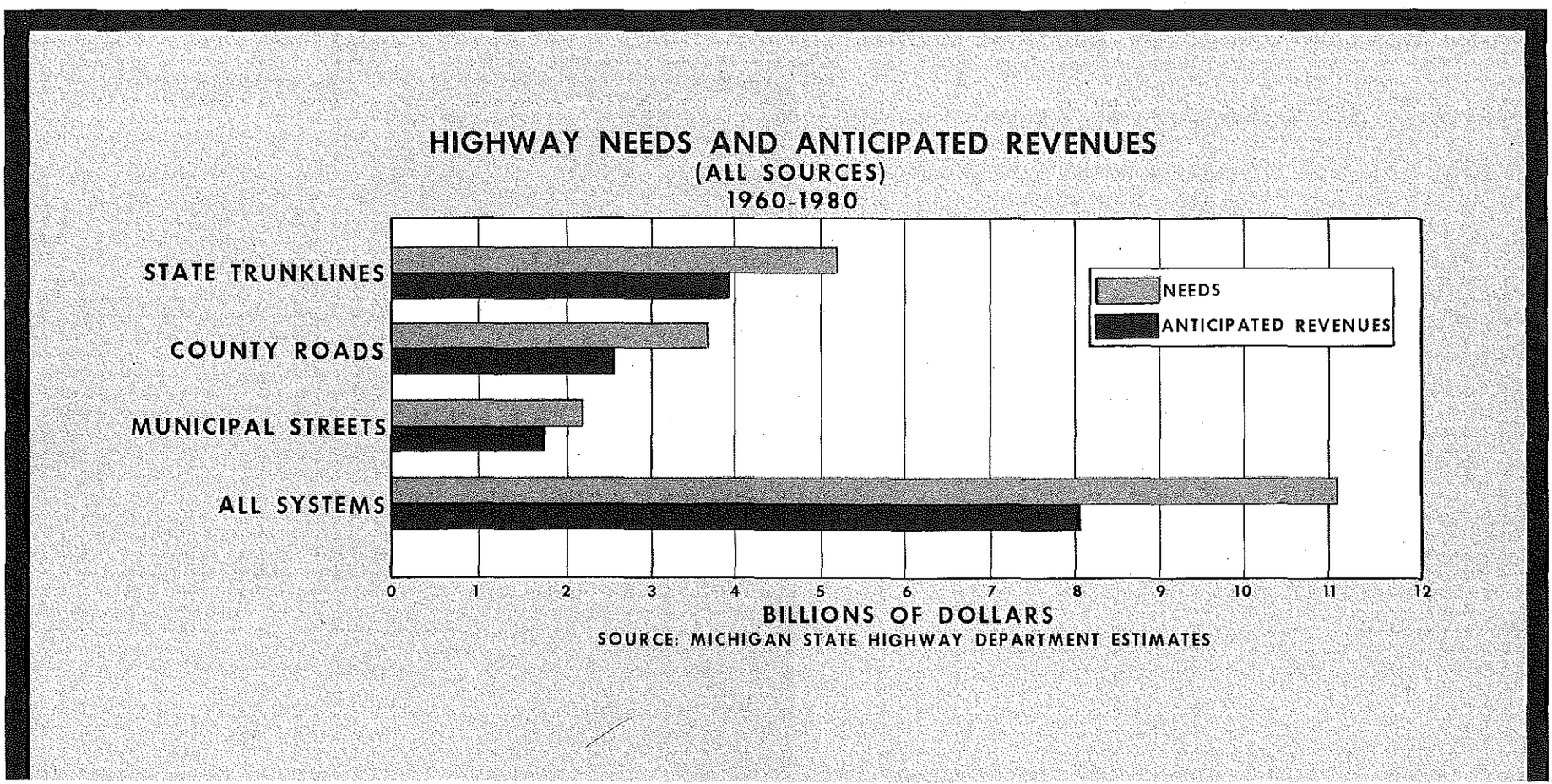
	"Catch-up" Period 1961-1970	"Completion" Period 1971-1980
Program Expenditures	$703,545	$400,635
Estimated Receipts	465,000	344,500
Additional Annual Revenue Needed	$238,545	$ 56,135

These figures suggest that, if additional revenues were provided to finance the over-all program needs and the continuing requirements of the highway systems, the heavier fiscal demands of the initial "catch-up" period could be met by borrowings to be amortized during succeeding years when the requirements for needs would be lighter. However, it is not the function of this report of highway needs to propose solutions of the fiscal problems involved. That is the responsibility of the highway fiscal study scheduled for completion later in 1961.

CONCLUSION

Although the greater needs revealed by the present study point to the need for additional funds for highway purposes, the increase of highway needs is not, in itself, a reason for discouragement. It is merely a further indication of the magnitude of the job of keeping pace with the ever-growing utilization of highway transportation by Michigan business and people. Needs increase with traffic and both traffic and needs will keep right on increasing just as long as the state continues to develop its resources and productive industries.

Michigan cannot afford to slacken its efforts to keep abreast of the highway transportation needs that its energy and prosperity have generated. For our highway systems have been developed step by step with the development of our industrial might and are now essential built-in parts of the basic processes, not only of industry and business, but of the operations and services of government and of the most essential and treasured patterns of life in this state.



Highway Development and Michigan Growth

CHAPTER 5

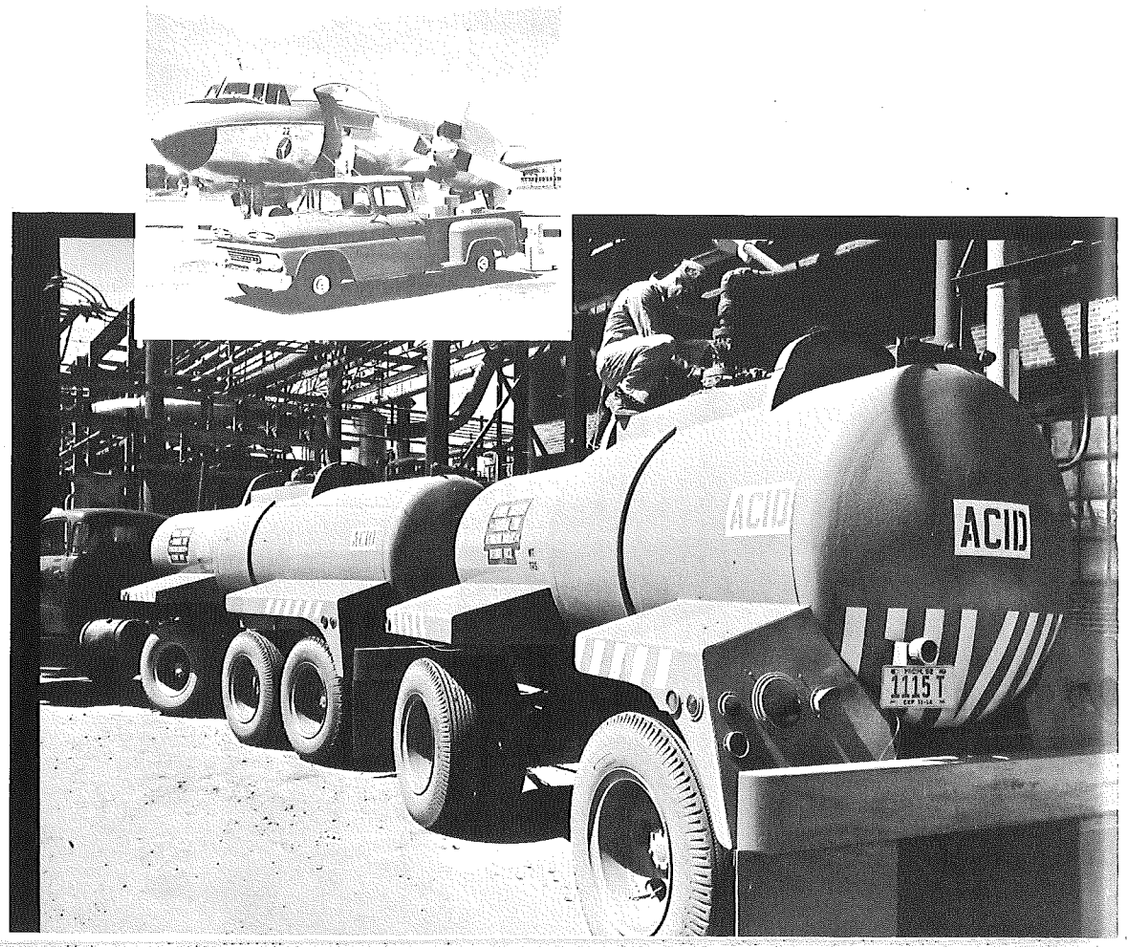
Michigan developed the automobile as a vehicle for universal use and the American people, everywhere and in every occupation, adopted it enthusiastically for all their transportation needs. Nowhere, however, were motor vehicles adopted and used by everybody for all purposes to the same degree as right here on the automobile's home grounds. On the farms, trucks superseded horses and today almost all farm products are carried by highway at least to the point where the farmer is paid for his produce.

MICHIGAN'S DEPENDENCE ON HIGHWAYS

In other fields, Michigan's dependence on highway transportation had its beginning at the start of the automotive age and is now practically complete. The early automobile industry developed the assembly line technique to meet the spiralling demand for cars and trucks. When the demand outstripped the capacity of individual factories, the assembly lines were extended out over the highways to link many parts and sub-assembly plants into huge production complexes.

The same methods which produced today's automotive giants have been adopted by large-scale manufacturing enterprises in many fields, not only all over Michigan, but throughout the nation and world. Taking a leaf from industry's record of growth and efficiency, wholesale and retail business, and all governmental agencies have adopted highway transportation as a means of improving and integrating their operations and services.

Michigan people do not have to be told that the automobile has deeply changed the whole pace and pattern of individual



and community life, nor that highway transportation has revolutionized the entire American economy. But they may need to be reminded that these conditions make a modern, efficient highway plant a basic and essential factor for the continuance and growth of prosperity in this state.

Such a reminder is particularly necessary at this time when, after a long period of almost unexampled industrial growth and prosperity, Michigan is now experiencing strong competition, not only in the marketing of the products of its plants, but in attracting new industries and even in retaining plants long situated here.

HIGHWAY CONSTRUCTION AS AN ECONOMIC GENERATOR

During the next ten years Michigan's population will continue to increase and will bring the challenge to create a million new jobs if we are to continue to prosper.

Employment of men and machines boosts the economy of the area.

The $11 billion road construction expenditure needed over the next 20 years to provide a road plant capable of meeting expanding traffic demands would make a major contribution to providing additional gainful employment opportunities. The U.S. Department of Labor estimates that every billion dollars spent for highway construction generates a total of 227 million man-hours of employment. On this basis, a decision to embark on this program would result in employment for 32,000 Michigan people each year in the initial ten-year "catch-up" period and for 8,000 each year in the ten-year "completion" period.

It goes without saying that the impact of this program would be felt in all sectors of the state's economy.

HIGHWAYS AND ECONOMIC DEVELOPMENT

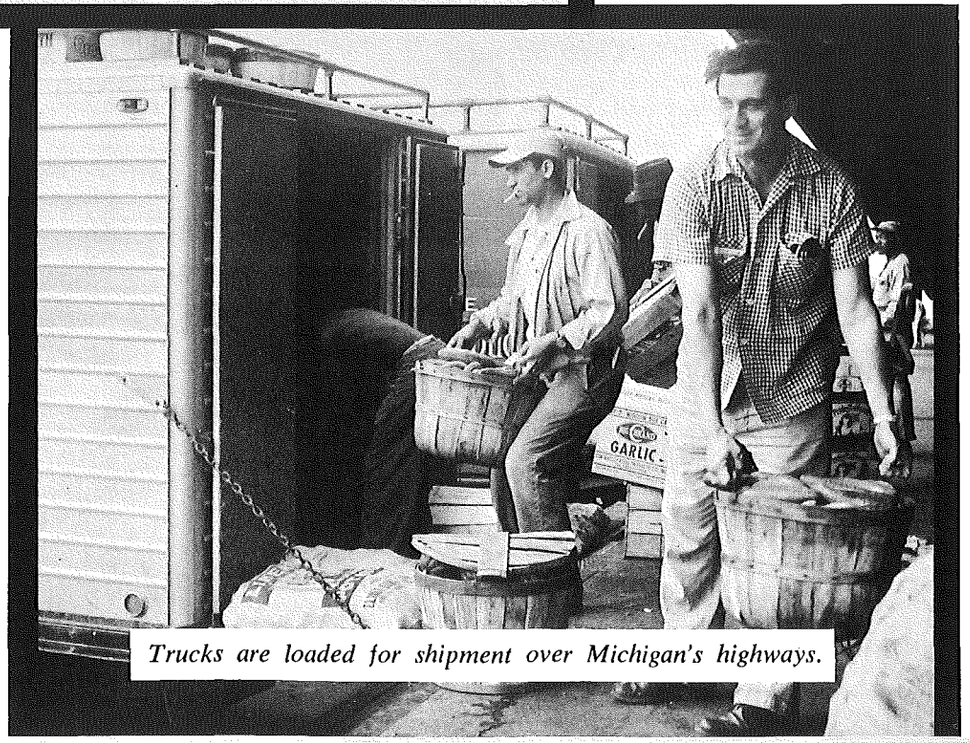
Michigan — the world's arsenal of democracy in time of war and one of its major workshops in time of peace — has human "know-how" and the natural resources to reassert its leadership among the leading industrial states.

Natural resources in abundance make Michigan a storehouse of potential wealth — oil, limestone, chemicals, copper, iron ore, and timber. All of these resources are widespread across the state from Lake Erie to Lake Superior.

Michigan's people — of whom some 74% now live in urban centers — possess a wide range of skills. More than a million of them work in some 12,000 plants in every part of the state turning out the many manufactured products for which Michigan is known throughout the world.

Highways–The Key Factor

The highway network is the key to the fullest development and use of the state's human and natural resources. It brings man and materials together for production and affords easy access to markets all over the nation and to trade routes all over the world.



Trucks are loaded for shipment over Michigan's highways.

As an integral part of Michigan's production processes, the road system enables hundreds of small parts and tool suppliers to easily reach their customers. The trucks performing this service are, in effect, stockrooms on wheels — bringing materials to the plant in time to be fed into the production stream when needed; thus eliminating costly storage facilities at the plant site.

Manufacturers, distributors and retailers all recognize the value of roads to their business and readily testify to the importance of good roads in making management decisions. Their comments illustrate this clearly: "Relocation of our plant near a freeway shortens travel time and reduces costs" — "We are dependent upon rapid delivery of finished products" — "We chose this industrial site because of more land and better transportation advantages" — "Location of our new plant near the highway permits easy shuttling of materials between our two plants."

Services To Industry and Commerce

The development of Michigan's road system profoundly affects land use and values. Easy access — provided through good roads — is stimulating the conversion of agricultural land to residential, commercial, and industrial uses. Cities, which once were choked by the shortage of land for expansion, can now make plans for new land development. Bypasses have opened up new developmental prospects. The interchange points around our new freeways become foci for new commercial and industrial development.

The opening of the Mackinac Bridge and the St. Lawrence Seaway and the construction of the state's freeway system together have broadened and facilitated the movement of persons and goods to all parts of the state. In effect, distance has been shrunk. Time has replaced space as a measure of mobility. The radius of access to consumer markets has been lengthened.

The impact of the state's freeway construction program is reflected in plans being formulated in many parts of the state to take advantage of highway benefits. Many cities in Michigan

are considering the development of industrial parks adjacent to these arteries. Others are studying the effect of these facilities on their major street systems and central business districts.

With the development of local street plans integrated with the state trunkline system, through traffic will be separated from local traffic and downtown business areas will become more readily accessible to potential customers.

BASIC ELEMENTS OF INDUSTRIAL DEVELOPMENT

The part that highways play in strengthening the industries of the state to meet increased competition, is reflected in interviews that were conducted with local officials, chambers of commerce, and industrial leaders in a number of cities in the state.

BATTLE CREEK

The city is looking for new diversified industry as well as expansion of existing firms.

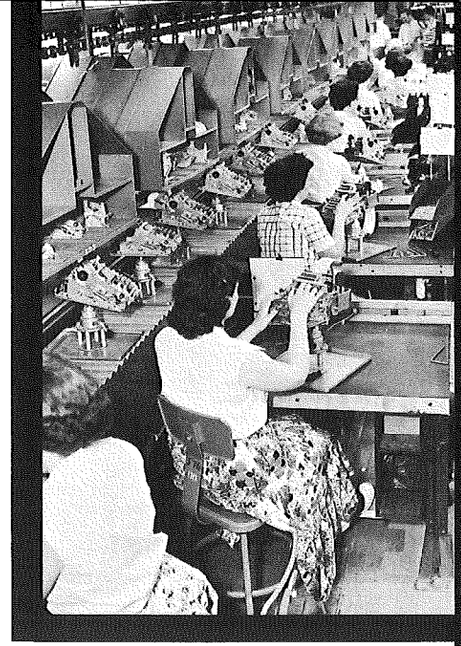
New industrial sites adjacent to Interstate 94 provide maximum transportation benefits. The traffic manager of a transportation machinery manufacturing firm illustrated the importance of these benefits:

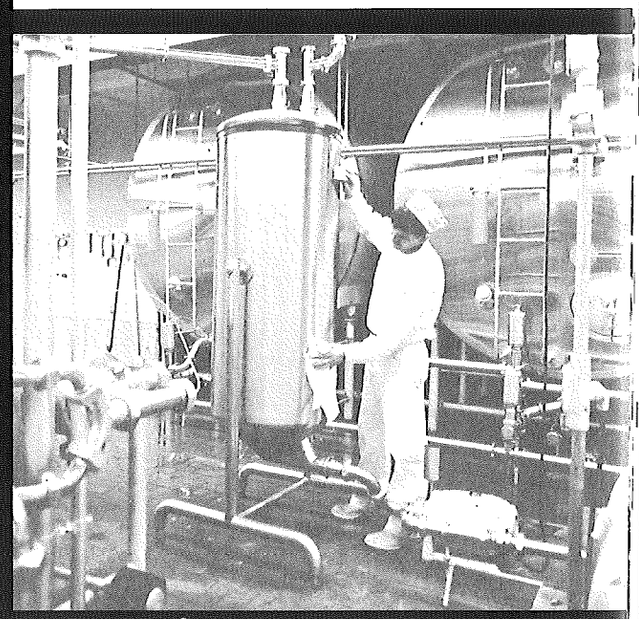
"Ten years ago 45% of our products were shipped out by truck. Today, that figure has risen to 75% — in addition, 95% of our supplies come in by truck. I would estimate that approximately 25 million pounds a month is shipped from our four Michigan plants located at Jackson, Battle Creek, Benton Harbor, and Buchanan, which are all served by I-94."

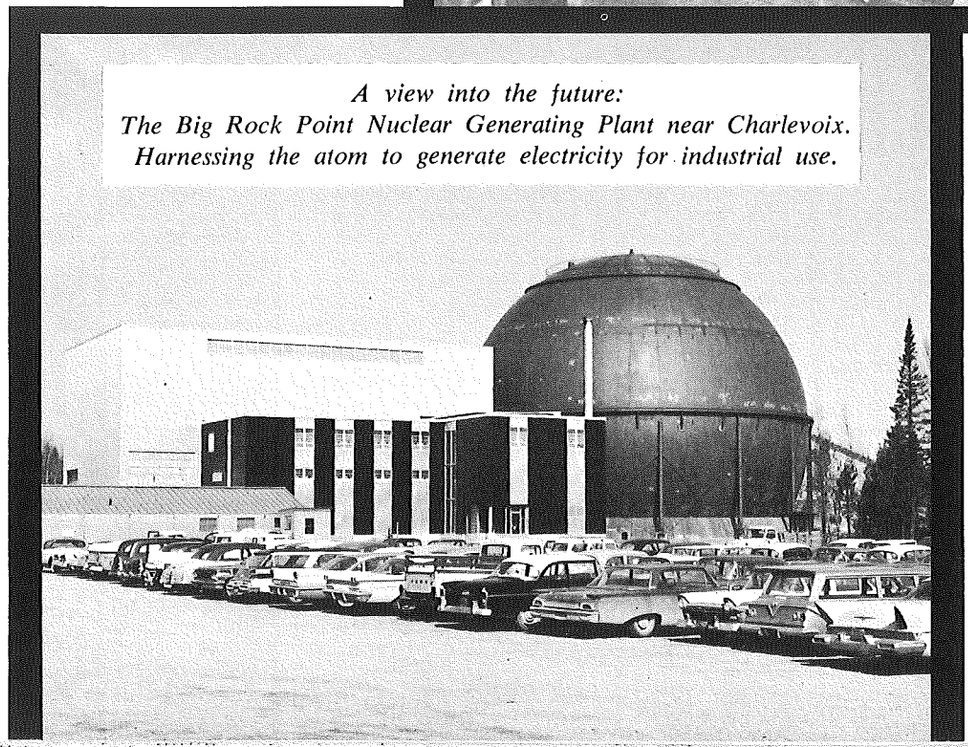
BAY CITY

The city is counting on the expansion of highways to aid future industrial growth. As a Chamber of Commerce official stated:

"Good highways will provide for extensive development of our retail and commercial trading areas and will help industrial expansion."







A view into the future:
The Big Rock Point Nuclear Generating Plant near Charlevoix.
Harnessing the atom to generate electricity for industrial use.

Towering structures give mute testimony to Michigan's industrial might.

A ship building company executive emphasized his firm's almost total reliance on Michigan's highway system:

"Ninety percent of our supplies and heavy machinery come in by truck. We rely on highways for rapid and dependable movement of material."

BENTON HARBOR - ST. JOSEPH

These twin cities contain 26 manufacturing plants which each employ 100 or more people. These plants have been expanding and providing additional jobs.

Located in a large agricultural region, the area has the largest fruit market in the world. Plans are now under way to move this market to a site adjacent to I-94. A Chamber of Commerce official explained this proposed move:

"This new location will give us easy access to a larger market area and save the time which is so important in transporting perishable goods. With agricultural sales now reaching about $40 millions annually, we hope the new location on I-94 will increase this sales figure."

GRAND RAPIDS

Grand Rapids — the "Business Capital" of Western Michigan — serves an area of 1,600,000 people. Located in this city are 800 plants producing 200 classes of products and providing jobs for over 50,000 people. Highways are contributing to the continuing development of this industrial and commercial center and the network of new limited-access bypasses and business routes will aid future growth.

The new highway plan developed by the Highway Department and the City is now under construction. It provides for freeways on bypass and business routes of I-96 and US-131 which will reduce traffic congestion in the central business areas and improve traffic circulation throughout the city. To make the new freeway system operate most efficiently, the City is currently engaged in a million dollar program of street improvement. Special emphasis

is being placed on the improvement of traffic flow at freeway interchange points. Easier access to industrial plants is also an important objective.

This new road plan will open additional areas for expansion and for new plants and make possible the rehabilitation of the central business district. Rapid and efficient freeway transportation will be available to all principal users, including the 35 truck lines which serve the area and shipments will be greatly expedited.

The importance of freeway development is revealed in the statement of the president of a corrugated container manufacturing firm, with headquarters in central Indiana — which has just opened a new branch in Grand Rapids:

"Considering that we will be transporting material between central Indiana and the new plant, it was essential that the location we selected have access to first-rate highway connections — this new plant will be served in all directions by freeways. We are relying on completion of the US-131 freeway south from Grand Rapids to insure best operating conditions for us."

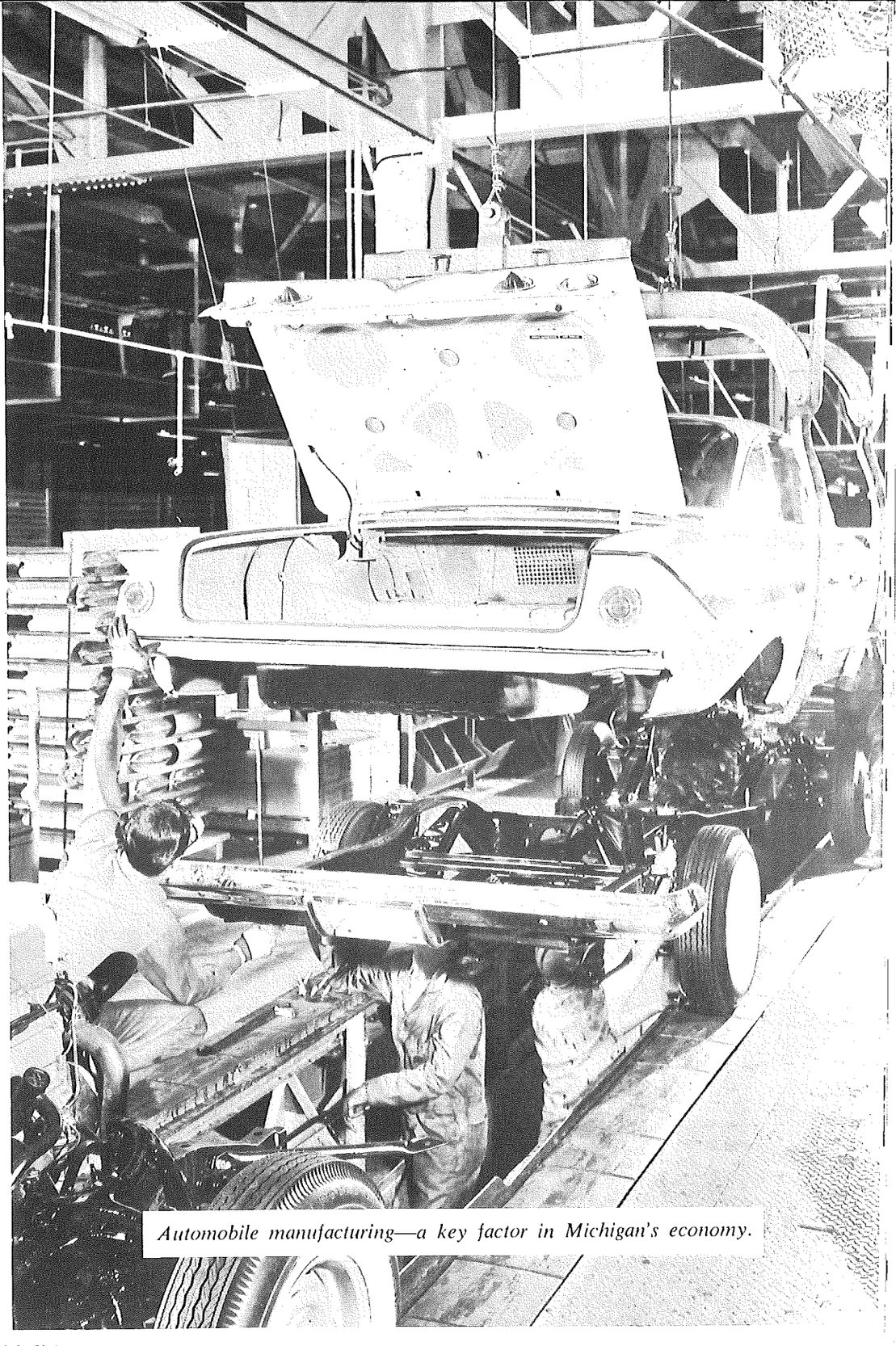
JACKSON

The city of Jackson is actively engaged in attracting new industry by the development of two industrial parks adjacent to transportation facilities. Two main areas — the Scheele Industrial Park and the Jackson Central Industrial Park — have been provided.

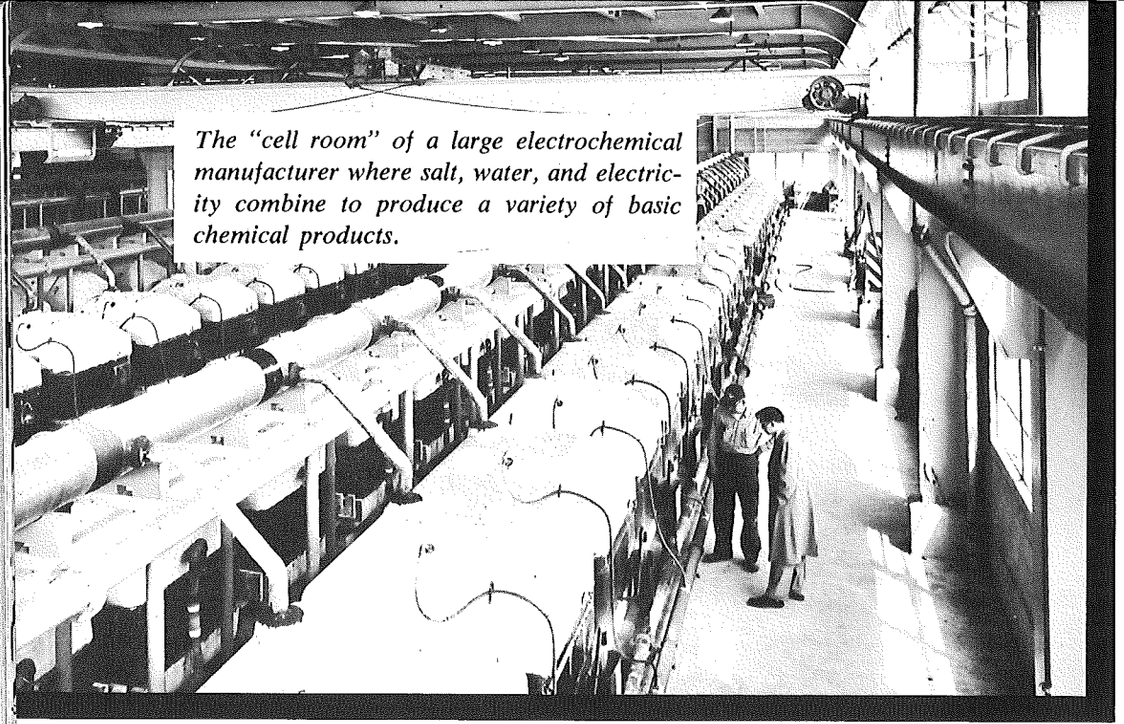
This development program has the support of the Jackson Chamber of Commerce, the Jackson Industrial Development Corporation, Consumer's Power Company, and a private development corporation. All of these groups stress the importance of good highway facilities.

In addition to important street development to aid in an extensive urban renewal project, the City is constructing a major access road to serve the Industrial Park area.

An official of a private development corporation stressed the absolute necessity of good highways.



Automobile manufacturing—a key factor in Michigan's economy.



The "cell room" of a large electrochemical manufacturer where salt, water, and electricity combine to produce a variety of basic chemical products.

"Without the new highway system around Jackson, the corporation would not consider the Jackson Central Industrial Park."

A number of small companies spoke of the importance of a good highway network. A typical comment was that of an aircraft-hardware manufacturer:

"Our plant is right near the highway — our access to the highway is nearly perfect. These two factors are very important because 95% of our products go out by truck. In addition, our 130 employees find the highway convenient. To sum it up, we wouldn't have chosen this site without the present highway system."

KALAMAZOO

The city of Kalamazoo has embarked on a thorough economic development program. This program is designed to aid the expansion of existing and the development of new industries. Committees have been formed to: relocate existing businesses; locate and zone industrial sites; provide financial aid to new business; and, aid in the retraining of workers.

At the present time, Kalamazoo's Downtown Mall is winning world-wide recognition.

To supplement its commercial achievements, the City has designated several industrial parks near Interstate 94 and is working with Kalamazoo County to develop them. The transportation specialist of the Chamber of Commerce explained the benefits of I-94:

"Travel-time to both Chicago and Detroit has been reduced by I-94 — raw materials and finished goods are closer to their markets. Because this new freeway is a time and distance saver, it is a big shot in the arm for Kalamazoo."

LANSING

The city of Lansing is becoming a commercial as well as an industrial center. Its commercial success is dependent on the ease with which customers can get into the city. As the general manager of a department store explained:

"While any successful shopping center or retail store must have aggressive merchandising and advertising, it is the good roads that bring customers to our doors. The chief advantage of a good road is that it shortens time, for it is the time which is important and not the number of miles. Good roads can help Lansing merchants attract customers from other areas. We can also depend on over-night delivery of merchandise from Chicago."

An official of a forging plant explained that good roads are important to both the firm and its employees:

"We employ 650 people on two shifts. Some of them come from as far as Elsie, St. Johns and Williamston. Because of Michigan's efficient highway network, our products can be and are delivered to our customers in a shorter time. We are fortunate in having an excellent highway system to serve Michigan."

MUSKEGON

Muskegon is striving to tap the vast markets of northern and western Michigan. To do this, there is a greater reliance on

highway transportation. Established plants in the area find the good roads a major factor in their transportation picture. As an official of a machine assembly plant explained:

"Our production is right off the tailgate of the truck — about 90% of our incoming and outgoing material is moved by truck. Highways bring most of the materials from foundries and small suppliers throughout the state".

Most manufacturers in Muskegon rely almost completely on truck transportation. As a representative of an office furniture manufacturer said:

"Most of our shipments in the Michigan area are by truck. When going to such nearby markets, where time is of the essence, good highway facilities are vital."

The City is developing and improving two major streets, one to improve access to the downtown business area, and the other to provide an adequate artery for east-west crosstown traffic, particularly in the resort season.

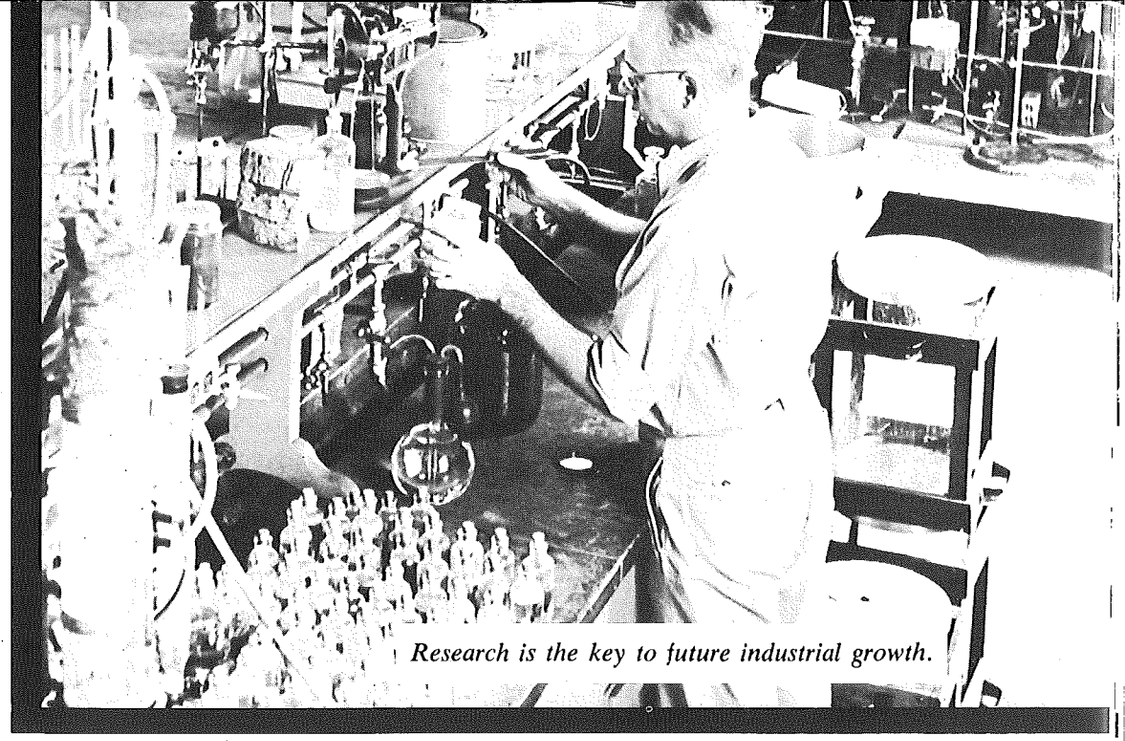
PORT HURON

City officials are developing industrial sites in the area. These development plans are tied in with the Michigan freeway program. With excellent port facilities and good roads, civic leaders expect Port Huron to receive much of the tonnage which Detroit cannot handle. As the Mayor explained:

"Although Detroit is 57 miles away, this will be offset by the fact that cargoes can be discharged at once and delivered quickly via I-94 to downtown Detroit."

MIDLAND

At the present time, the City of Midland is intent on serving the chemical plants in the area. Several street improvements have been made to better serve the industry. At present, an important street is being widened and resurfaced to afford access to several major chemical installations. The Chamber of Commerce is also working with Bay City and Saginaw to develop the "Golden Triangle Plan." Two results have been the establishment of the Tri-City Airport and Delta College. Regarding the 2,000 employees who commute daily to Midland from Bay City and Saginaw, a Chamber of Commerce official says:



Research is the key to future industrial growth.

"The improved highway system aids these workers in going to and from work. It will also help bind the three cities together."

Highways in the Midland area are very important to its industry. The transportation officer of a large chemical plant explained that the percentage of shipments by truck has increased from 7½% in 1940 to 45% today. As he said:

"There are about 100 truck movements a day from the Midland plant. Extension of the "frost-free" highway network has enabled us to maintain a continuous supply of raw materials to our plants. US-10 is important as a means of moving materials from the Bay City deep water port area."

The general manager of a container manufacturing plant illustrated his company's dependence on the Michigan highway system in this way:

"About 600 tons of raw materials are shipped from Chicago to Midland by truck every month because we find highway transportation to be efficient."

SAGINAW

The Saginaw Chamber of Commerce is working to aid existing firms and to bring new enterprise into the area. They rate highway facilities as a major factor in encouraging industrial development. As a Chamber official pointed out:

"With the completion of the Interstate system around Saginaw, many new areas will be opened. One of these areas is on the East Side, adjacent to I-75. A good highway system increases the customer area of retail business. As a result of M-81, a new shopping area has been constructed on Saginaw's East Side."

ANN ARBOR

Because of the character of Ann Arbor as a leading educational center, the city is attracting research-oriented industries. The University of Michigan is developing an entirely new campus devoted primarily to graduate studies and research in many fields of engineering and science. Included in this development is the Institute of Science and Technology which is expected to attract outstanding scientists and engineers interested in areas of potential economic importance to the state.

To exploit these advantages, the Industrial Research Park is being promoted by the Chamber of Commerce. The City has built the South Industrial Highway to service this development and has provided additional improvements to the urban section of M-14 to meet traffic needs created by two industrial research developments on the west side of the city.

Assisting Ann Arbor to become the research center of the Midwest is adjacent Interstate 94 which enables businessmen to be within 20 minutes of Willow Run Airport and 45 minutes from downtown Detroit. Time is important to the visiting lecturer or scientist.

Recently, this accessibility was a prime factor in attracting the following types of companies: the systems division of a large electronics manufacturer, a multi-million dollar research laboratory, the engineering science division of a metal products company and the research and development division of a pioneer furniture company. These firms rated Ann Arbor's excellent highway facilities as a key consideration in locating there.

FREMONT

Highway transportation is especially vital to industry in this section of the state.

The traffic manager of a large canned-food company illustrated the extensive use his firm makes of Michigan's highways:

"We ship 400 truckloads per month — During the crop season, we receive 350 truckloads per month — The advent of Michigan's "frost-free" highways has aided many canners — We find that because of the flexibility of highway transportation, we are able to make many time-savings — The nature of the food industry demands rapid and efficient delivery of goods."

DETROIT METROPOLITAN AREA

The Detroit Metropolitan Area is the metropolis and manufacturing center of the state and a major contributor to the industrial health of the nation. It has gained international recognition as the center of the automobile industry, which has somewhat obscured the fact that its metal-working machinery plants, its iron and steel foundries, its tool and hardware producers, its pharmaceutical companies, and its non-ferrous metal working industries, rank first or second in the nation.

These industries provide employment for over 1,000,000 workers in some 6,000 plants. The combination of a highly-skilled work force, "managerial know-how," and efficient transportation facilities, have made the area's growth possible while at the same time presenting new challenges to the leaders of this industrial complex — both public and private.

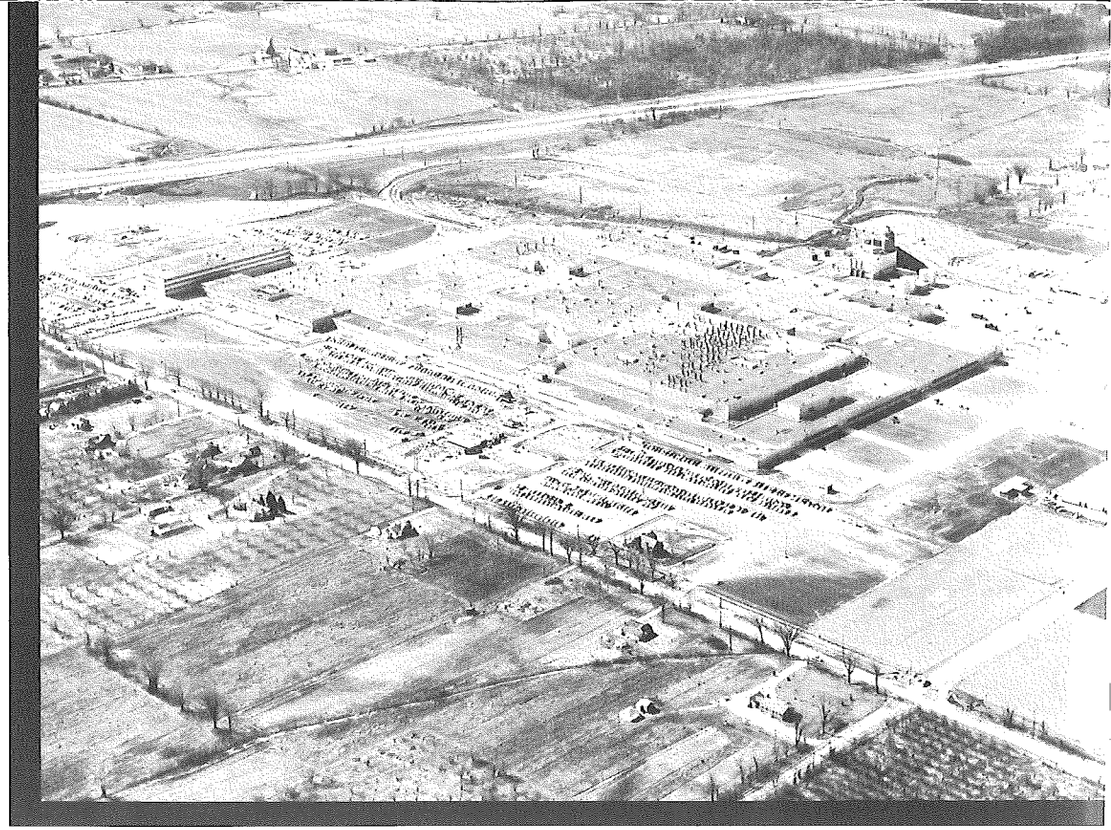
The industrial development plans formulated by industry and government, significantly, place considerable emphasis on the relationship of highway transportation to the continued growth and prosperity of the area.

A Highway Hub

Detroit's importance in Michigan highway transportation is reflected in the pattern of principal state and interstate highways which radiate from the metropolis to all parts of the state and to the major out-of-state centers.

The City of Detroit is in the midst of a major expressway-building program. Many firms have located on sites adjacent to the Ford and Lodge Expressways for accessibility to all sections of the city.

The Mayor's Committee for Industrial Development emphasizes the efficiency of these transportation facilities. It points out that because of Michigan's highway network, trucks leaving Detroit can reach 1,100 cities with next-morning deliveries.



Highways and Plant Location

One international firm, with plants in nine Michigan cities, names highways as an important factor in choosing plant sites. A spokesman also emphasizes the prime importance of highways in the firm's day-to-day operations:

"We must have continuous transportation — Highways are part of the assembly line — We must keep our products moving — We do not have the storage space — A fast, efficient highway system in Michigan has decreased our unit costs."

Another firm, of the same size, also stresses the fact that highways are a fundamental consideration in site selection and subsequent development of industrial facilities. They explain:

"Adequate highways are necessary for employees to go to and from their places of employment in a reasonable time — They (highways) are vitally important for transportation of raw materials, parts and finished products — One major consideration in selecting the site for our new plant outside the city limits of Detroit, was that it is adjacent to Interstate 96, an excellent highway facility."

An official of a firm which manufactures and distributes a food specialty item emphasizes that due to the availability of the expressways, they have changed distribution routes and shortened travel time. He explains:

"Because we cover an area which stretches as far north as Alpena, time is a major factor — The prime consideration is to get our equipment (trucks) there and back — This is especially important during the holiday and summer seasons, which are our peak periods — Our 372 paid employees come from all parts of the Detroit area and save time because of the Detroit expressway network — We will soon build a new plant in Farmington, and a major factor in choosing this site was its proximity to I-96.

The traffic manager of a soft-drink manufacturer points out that the most important feature of the Michigan highway network is its time-saving aspect. He said:

"This new network enables our drivers to save time in the city, as well as in rural areas — This means that each driver is able to make more stops and save an average of 15-20 hours driving time per week — In addition, some of our 250 employees come from as far away as Pontiac and Mt. Clemens. These employees could not do this without the expressways."

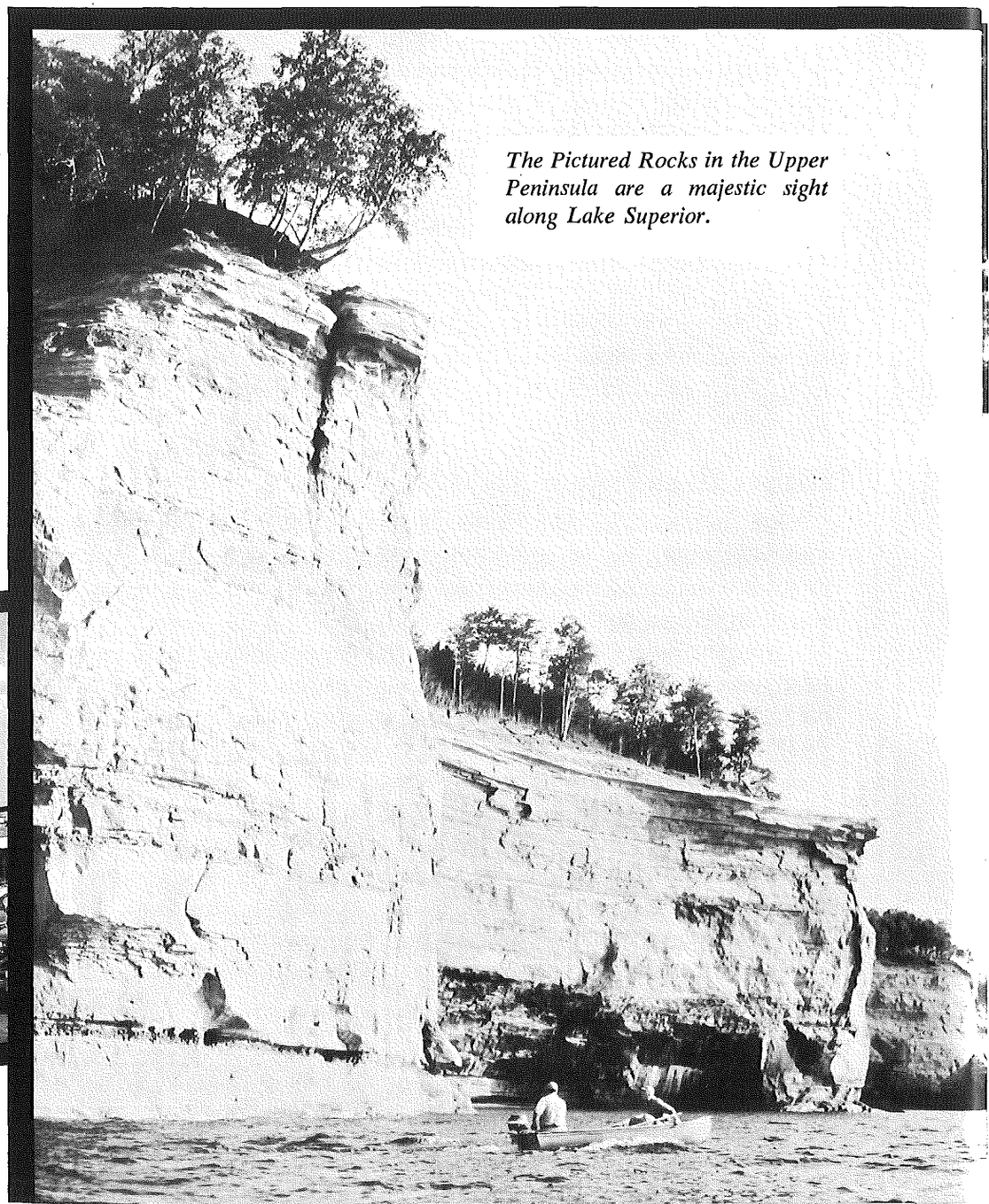
Importance To Retail Trade

The manager of a suburban shopping center emphasizes the importance of location in relation to good highway facilities:

"Besides being adjacent to excellent highway facilities, we also have adequate access roads to the highways — This virtually eliminates traffic jams on the adjacent highways, which makes for good public relations — In addition, vendors find it easier to serve a shopping center than a downtown area because of the absence of traffic problems — The 4,000 employees of the stores in this center find it easier and faster to get to and from work."

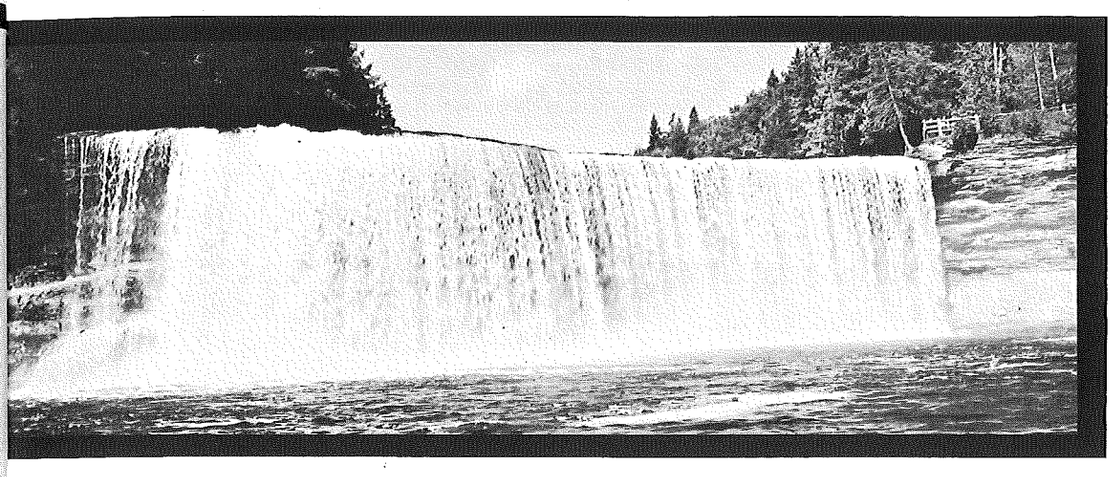
THE UPPER PENINSULA

The Upper Peninsula finds good roads just as important as does the Lower Peninsula. Businessmen and Chamber of Com-



The Pictured Rocks in the Upper Peninsula are a majestic sight along Lake Superior.

merce officials throughout the area rate good highways as a vital factor in their operations. One of the largest industries in this area is the tourist and resort business. This area attracts vacationers from all over the nation.



Rivaling tourism as the U.P.'s major wealth producer, are the natural resource industries. Recently, two new plants — an ore-pelletizing plant at Humboldt and a new fiberboard plant at L'Anse — were opened and gave economic resurgence to the area.

A wide variety of manufactured items are now being produced in the Upper Peninsula. The list ranges from clothing to portable air compressors, industrial exhaust fans, aluminum castings, sheet metal products and storage tanks. Good highways enable the manufacturers to move these products to their markets.

Resource Development

In addition to Humboldt, low grade ore operations have been developed at another iron mine and, recently a coal and ore corporation opened a new mine at Groveland, 15 miles northeast of Iron Mountain. The copper mining industry has rejuvenated itself. One copper company has opened a new site, producing 50,000 tons of copper a year and employing 1,200 workers. The forest products industry is typified by the establishment of a paper company at Ontonagon.

An official of an Upper Peninsula foundry and machinery products firm says:

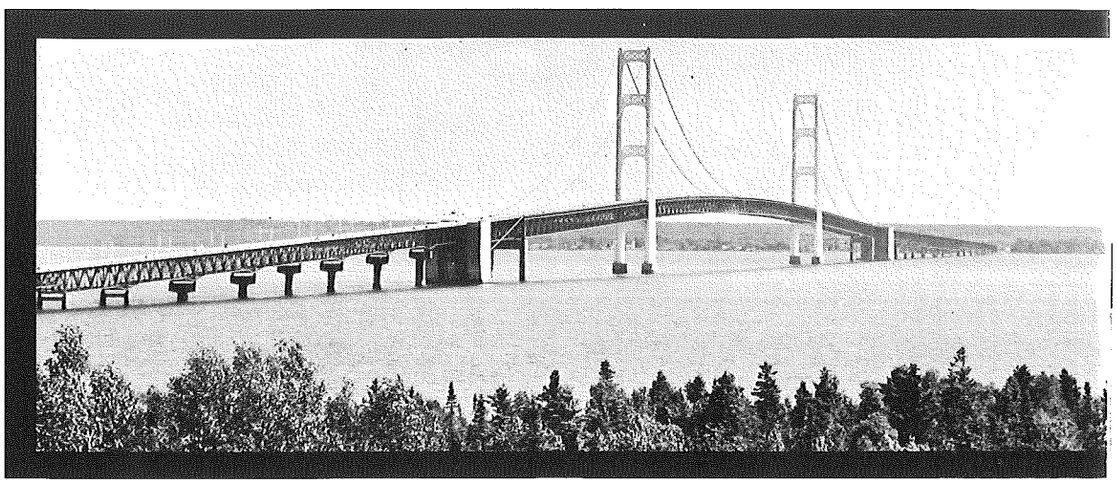
"The Upper Peninsula is more accessible and closer to many markets than most people realize. The fact that our company and many others find it profitable to operate here, even though a substantial part of our markets are in other areas, is the best evidence of the industrial potential of the U.P."

Recreational Industry

Larger cities, such as Escanaba and Marquette, also place much reliance on adequate highway transportation. The need for good highways was expressed by a Chamber of Commerce official in Ironwood:

"Highway development is one of the most important factors in this area's economic life as it pertains to tourist travel both summer and winter. We believe the improvement of US-2 in Ironwood will enable the area to handle the tourist travel."

The Mackinac Bridge is a vital link in the Upper Peninsula's transportation service.



The bridge, connecting the Upper Peninsula with the more populous section below the Straits, promotes tourism and improves market access for industry in the Upper Peninsula. Truck traffic from Canada and the East also uses the bridge and the Upper Peninsula as a transport route to the Northwest.

AGRICULTURE

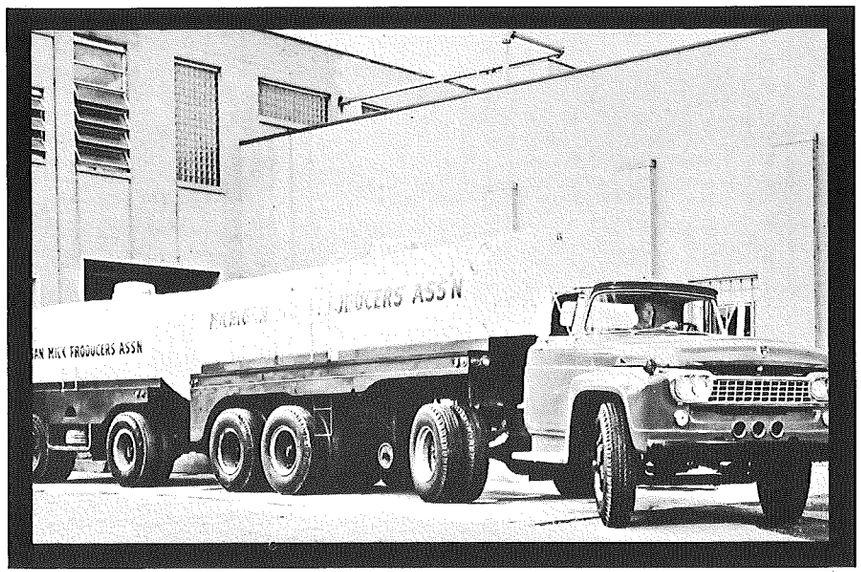
Agriculture is a major industry in Michigan. Farming is an occupation in each of the 83 counties of the state and farms produced crops in 1960 with a value of $729 million.

Michigan is a leading farm state with 48 of its counties ranking among the first 100 in the nation for production of field crops, fruit, and livestock. The farms of the state — raising a wide variety of crops — give Michigan national leadership in the production of plums, tart cherries, carrots, field beans, cauliflower, cantaloupe, celery, cucumber pickles, strawberries, chicory and gladiola bulbs.

Link Between Farm and Market

To the Michigan farmer, the truck and the automobile are integral parts of his farm operation. All the products of the state's farms go to market by truck over county, city and state roads. These same roads also provide the farmer with easy access to the other business, social, recreational and educational centers of the state. They have completely changed the character of farm life.

Thanks to highway transportation, the peach that is picked in the morning in the orchards of southwestern Michigan can be



served in the restaurants and dining rooms of Detroit at lunch that same day. Processed milk can be speeded from the dairy farm to the dairy plant and then to the door steps of thousands of homes throughout the state.

In the handling of perishable commodities — rapid highway transportation can be a key factor in reaching out into new marketing areas. The municipal fruit market at Benton Harbor offers

a good example of what this has meant. Thirty years ago about 96% of the produce sold there went to consumers in Michigan. Today, the fruit growers of Michigan can sell their products to customers in 567 cities in 28 states.

TOURISM

Tourism is one of Michigan's major industries — providing employment for thousands and bringing over $650 millions into the state each year.

Michigan, with its 3,000 miles of shoreline along the four Great Lakes, 11,000 inland lakes, 36,000 miles of rivers and streams and 3½ million acres of national and state forest and parks as well as hundreds of public fishing and hunting sites, offers unsurpassed recreational opportunities to suit any taste or interest.

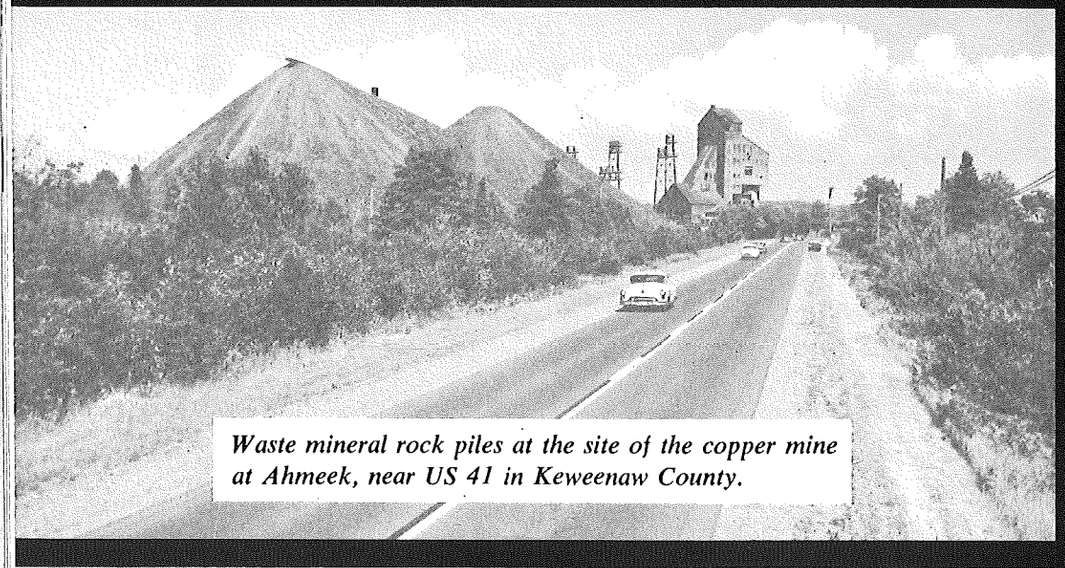
The road system of the state makes Michigan's tourist attractions readily accessible not only to the people of the state, but also to the visitors from all over the nation and the world. In 1960, over 18.1 million people visited our state parks alone, and

many had to be turned away because available campsite facilities were full.

With the current growth of population, the increased availability of leisure time, and the rise in income available for vacations, the tourist industry is due for great expansion. Within the next decade, the development of the state's freeway system, the expansion of our park facilities and the provision of new tourist accommodations, the annual total dollar volume of the tourist industry should reach $1 billion.

Highways For A Growing Industry

"To reach this goal," according to the Director of the Michigan Tourist Council, "we must recognize that we are competing with other states and vacation areas in the growing travel market. Michigan must expand and improve its tourist accommodations; it must adequately and effectively promote its vacation advantages; and it must continue to develop its freeways, scenic drives and secondary roads, which make our tourist attractions easily accessible."



Waste mineral rock piles at the site of the copper mine at Ahmeek, near US 41 in Keweenaw County.

The development of scenic highways to provide easy access to these areas without destroying their beauty will provide the recreational opportunities for a growing population.

NATURAL RESOURCE INDUSTRIES

Highway transportation has met the challenge of the major natural resource industries in Michigan.

In some instances, as in lumbering, the highway has displaced the river and the stream for the movement of logs. With the wood lots scattered over the countryside, instead of the large stands of timber near water, the demand arose for a more flexible method of moving logs to the sawmill for cutting and finishing. Truck transportation has filled this need.

To the oil industry, the highway system has provided easy access to the oil fields for the special type vehicles and equipment used in oil exploration. The products of Michigan's refineries are very largely carried to market by tank-truck.

In the mining industry, trucks haul a considerable part of the $350 million annual output of minerals of Michigan's mines.

Fishing is another industrial activity which requires rapid transportation. Commercial fishermen are entirely dependent upon highway transportation to carry their catch from the Great Lakes to market. In 1960, over 25 million pounds of fish were shipped from Michigan. The needs of the shippers for rapid delivery to protect a perishable commodity was met by the availability of efficient refrigerated trucks.

ROAD TRANSPORTATION AND PUBLIC SERVICES

Not only is motor vehicle transportation an indispensable necessity to the successful operation of industry and commerce in Michigan, but its importance to the operations and services of government cannot be overlooked. Government agencies make intensive use of highways in administering and operating various

public services. Without adequate highways, these agencies could not make the most efficient use of the tax dollar, nor could their services be made fully available to the public.

Service To Schools

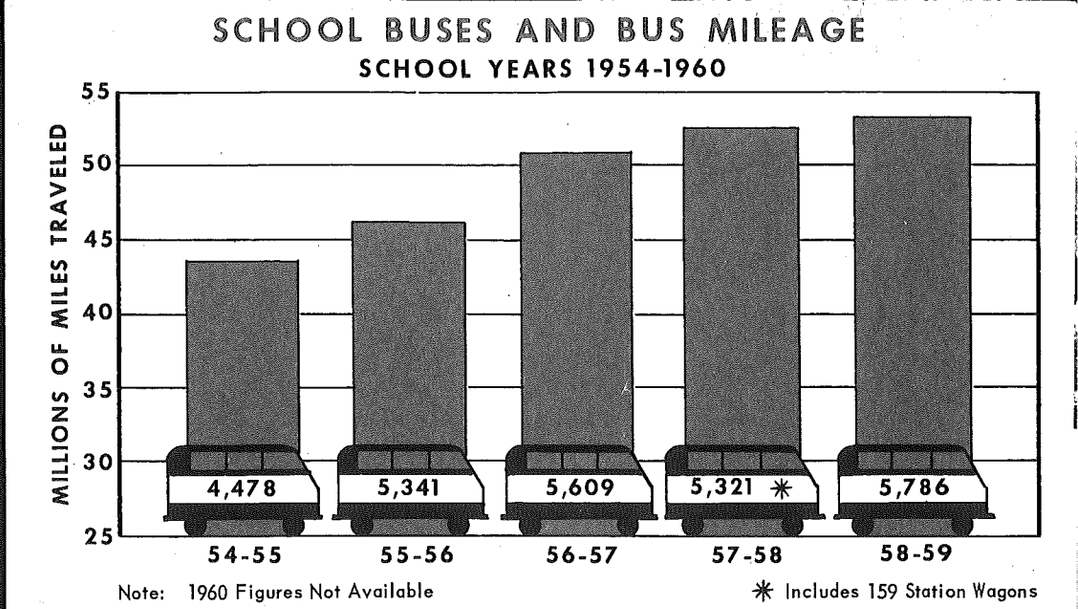
One of these services is the school bus program by means of which nearly 30% of Michigan students are carried to and from school. This program has enabled many school districts with inadequate facilities to consolidate with other districts to provide a better educational system. The number of school busses has increased from 1,800 in 1946 to 5,786 in 1959, and these busses travel more than 53.5 million miles each year. Every day, this service carries upwards of 460,000 school children in 843 Michigan school districts.

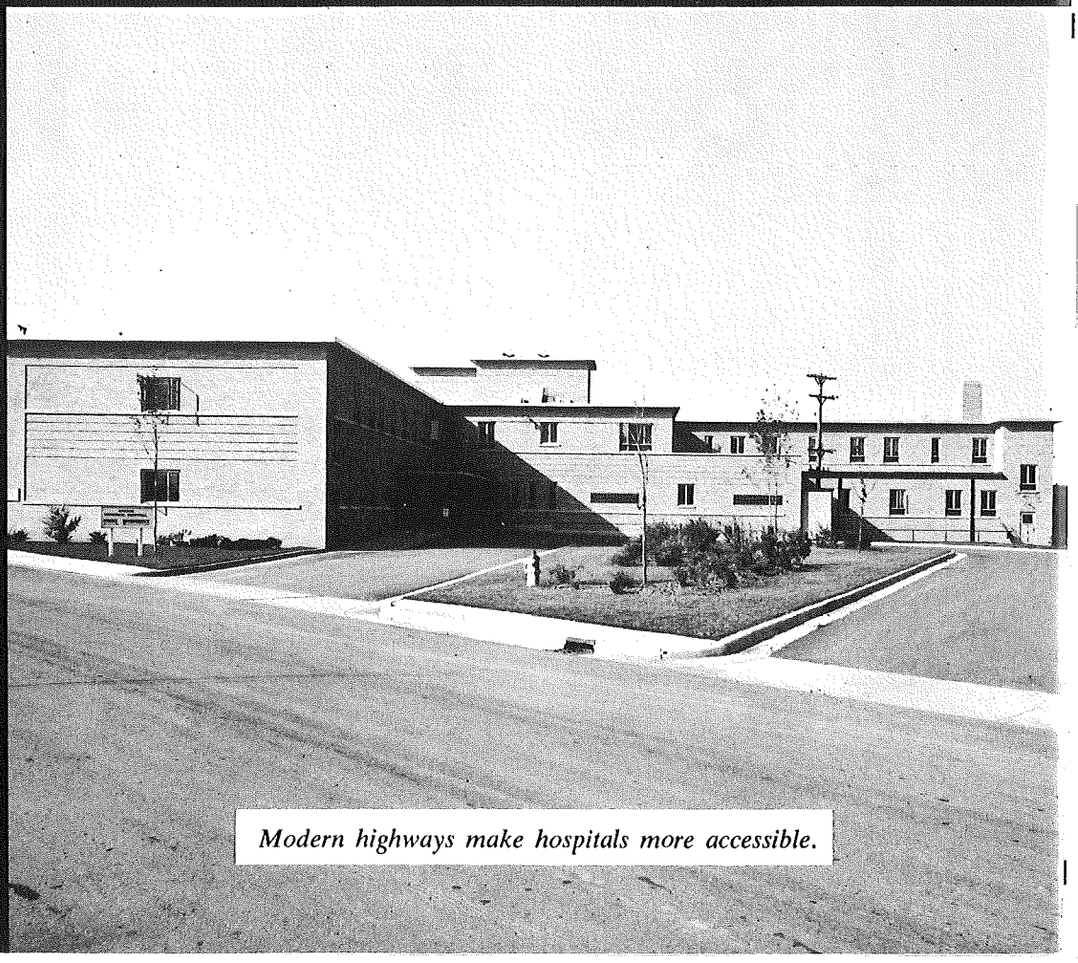
Impact on Medical Care

A network of good roads is essential for access to adequate health services, including both hospitals and physicians.

The state plan for the distribution of federal funds to assist in the construction of hospitals divides the state into 75 hospital areas so designed that no person should be more than thirty minutes driving time from a hospital. A plan such as this is only possible with a system of good roads.

Good roads also mean easier access to physicians. As the ratio of physicians to population in Michigan has declined over the years, shortened travel-time becomes more important. Increasing specialization and the growing importance of hospital facilities in the provision of modern medical care have accelerated the tendency of doctors to locate in large communities with hospitals. Good roads have made it possible for this trend to continue without decreasing the accessibility of the patient to the doctor. In the future, for many areas of the state, the distance to physicians will probably increase, but good highways will make a major contribution to improving the availability of medical services by keeping the time-distance factor down.



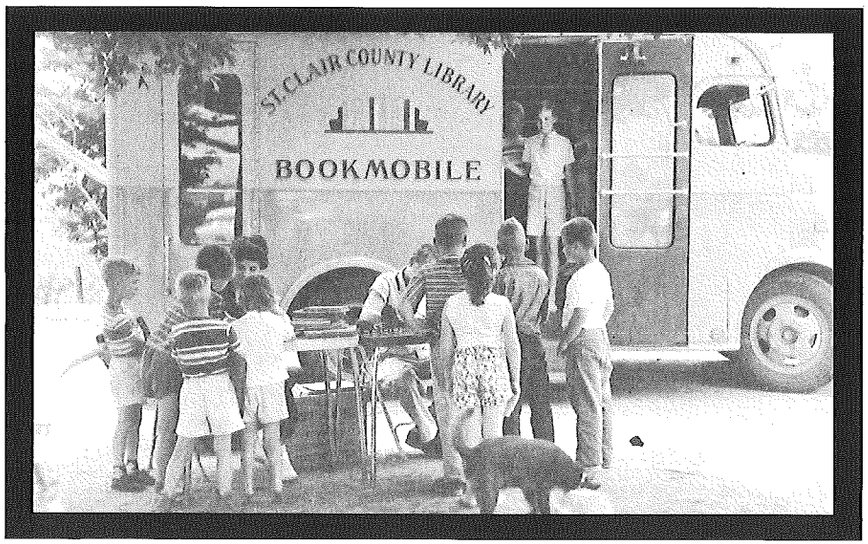


Modern highways make hospitals more accessible.

Highways, Postal Service and Libraries

Another governmental agency which utilizes highways to provide a basic service is the Post Office Department. In Michigan there are 1,145 rural mail routes using over 65,664 miles of rural roads. Rural mail carriers travel over 20 million miles a year to provide mail service to more than 406,000 families. The importance of this service is recognized in the distribution of Federal Aid funds for rural roads on the Federal Aid systems.

The postal service was formerly static and inflexible, but now increasing use of highway transportation is giving the public a



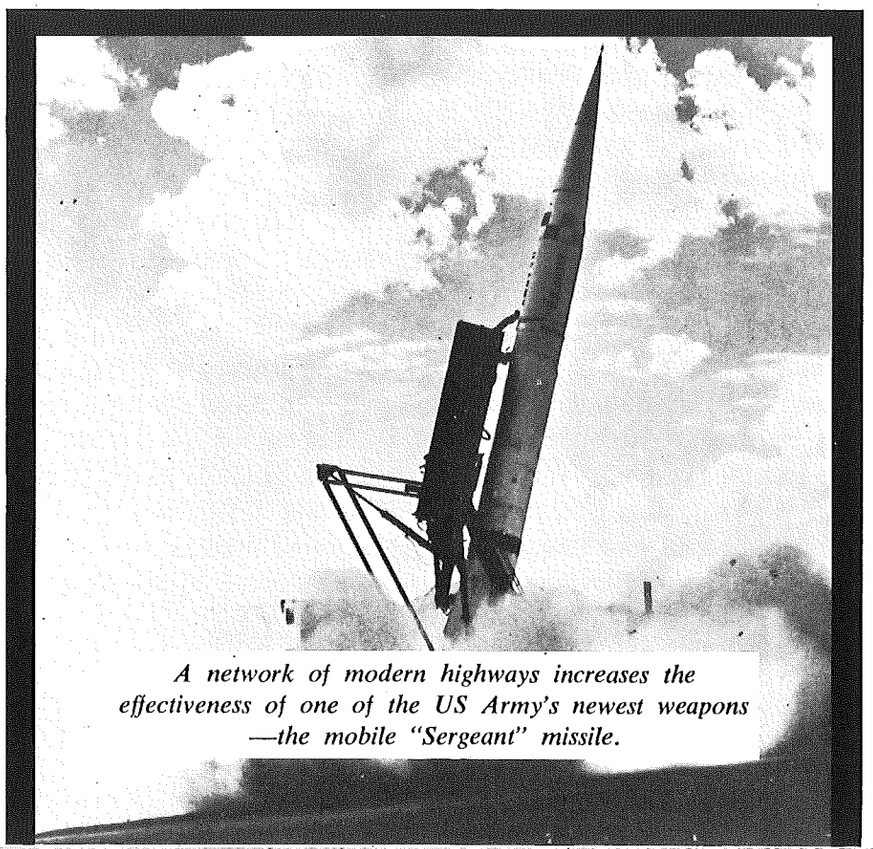
higher type of service. The Department now utilizes 325 contract carriers in Michigan who travel over 13 million miles a year. In addition, eleven mobile post offices are in operation and these travel more than a million miles annually.

The Michigan Mobile Library System, by means of 50 bookmobiles operating in 29 counties, is providing many smaller communities with the latest in reading materials suited to all ages and other invaluable cultural services.

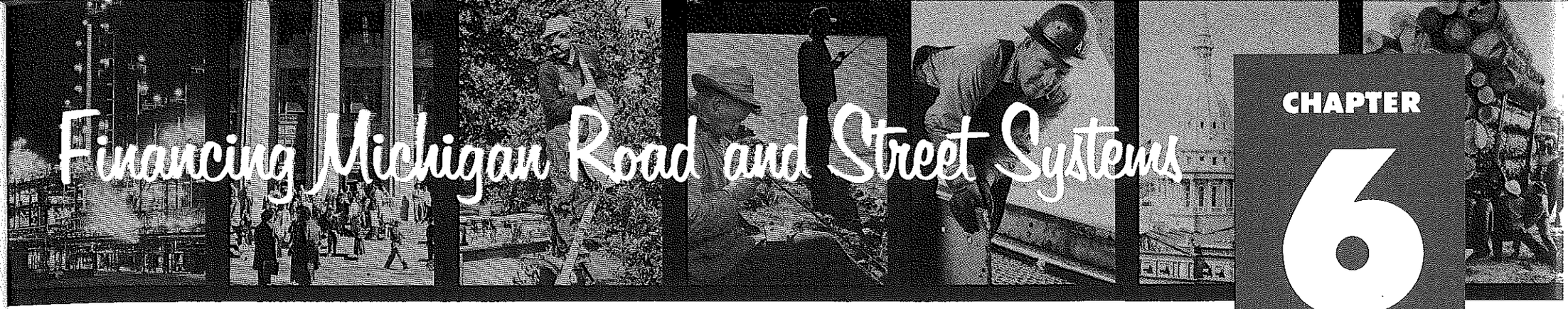
National Defense and Civil Preparedness

All the plans of the Michigan Office of Civil Defense for operation in case of national emergency or domestic disaster are based on the state highway network. In an emergency, these routes would be used for the movement of 70 mobile hospitals and 10 rescue trucks to any part of the state. In the case of the Michigan National Guard, the highway system provides the essential links between its Michigan bases and military supply channels throughout the nation. During the peak summer training periods, the highways carry the movement of men and equipment from Michigan and other states to Camp Grayling. The more than 578 thousand miles traveled by the Michigan Guard's 1,385 service vehicles in the month of July alone is an indication of the magnitude of this military traffic.

By and large, the dependence on and demand for an improved system of roads involves everyone in Michigan. Not only does highway transportation affect the livelihood of citizens throughout the state, but it reaches into every facet of their lives.



A network of modern highways increases the effectiveness of one of the US Army's newest weapons —the mobile "Sergeant" missile.



Financing Michigan Road and Street Systems

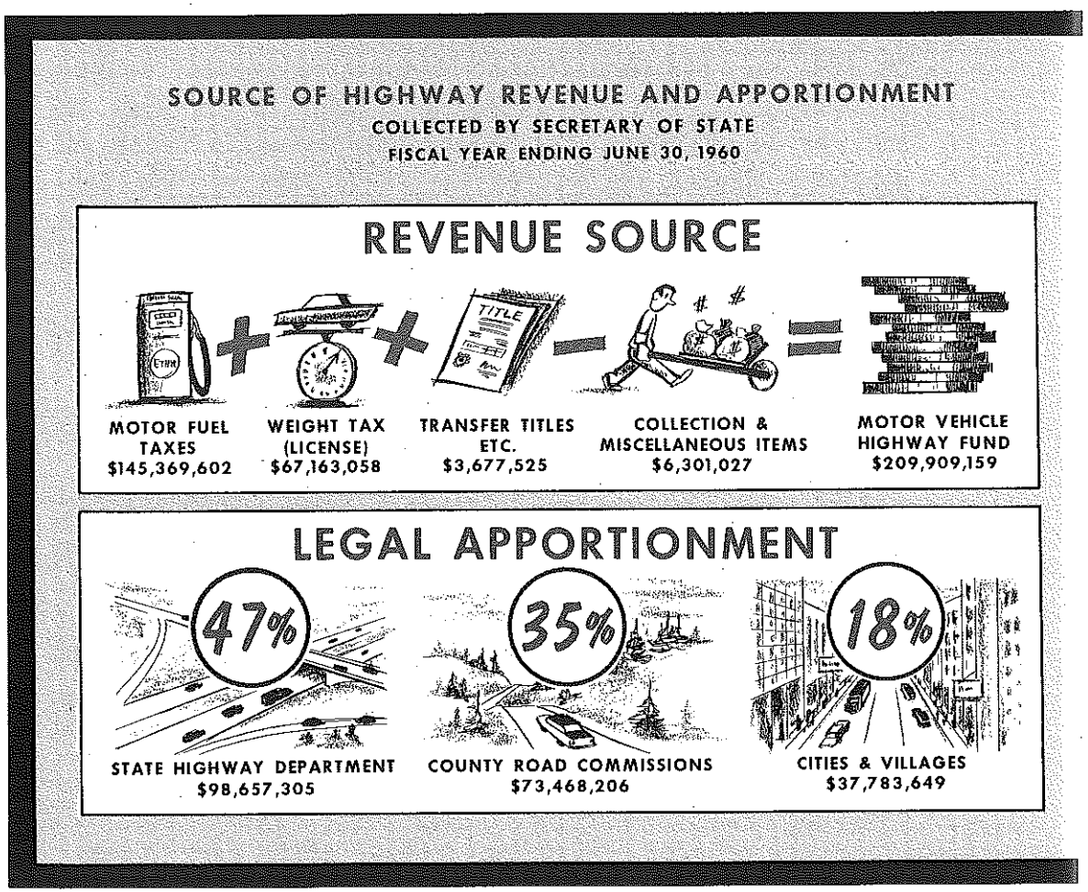
CHAPTER 6

Funds for Michigan highways, roads and streets come principally from two major sources: state-collected highway user taxes and Federal Aid appropriations. These funds are channeled to the improvement and maintenance of the several road or street systems according to formulas established by state and federal laws. These statutory formulas determine the contribution that is made from each type of source to the income, respectively, of the State Highway Department, the County Road Commissions, and the incorporated cities and villages. In addition, other revenues raised by, or available to, the local units of government are used for highways on the county and municipal systems.

HIGHWAY USER REVENUES

Under Michigan law, taxes on motor fuels (gasoline and diesel oil) and motor vehicle license fees provide the principal revenues used to finance the various road programs on the state trunkline system, the county road systems and the municipal street systems. The revenues from these taxes, collected by the Secretary of State, are earmarked by constitutional provision for highway purposes and are placed in a special account — the Motor Vehicle Highway Fund — from which they are distributed to the several road and street agencies as prescribed by law.

Under Act 262, P.A. 1957, the distribution formula is: 47 percent to the State Highway Department, 35 percent to the county road commissions, and 18 percent to the incorporated cities and villages. Act 87, P.A. 1955 also raised the rates of the gasoline and weight taxes, increasing annual revenues by $28 million.



FEDERAL AID ALLOTMENTS

Prior to 1957, Michigan received Federal Aid allotments equalling 50 percent of costs of approved construction projects on designated Federal Aid Primary routes on the state trunkline system, and Federal Aid Secondary routes on the state trunkline and county primary systems. However, the Federal Aid Highway Act of 1956 increased Federal participation to 90 percent of costs of construction on routes of the Interstate System. More than $330 million of Federal Aid were received by Michigan during the past five years. This amounted to about 17 percent of total highway expenditures during that period.

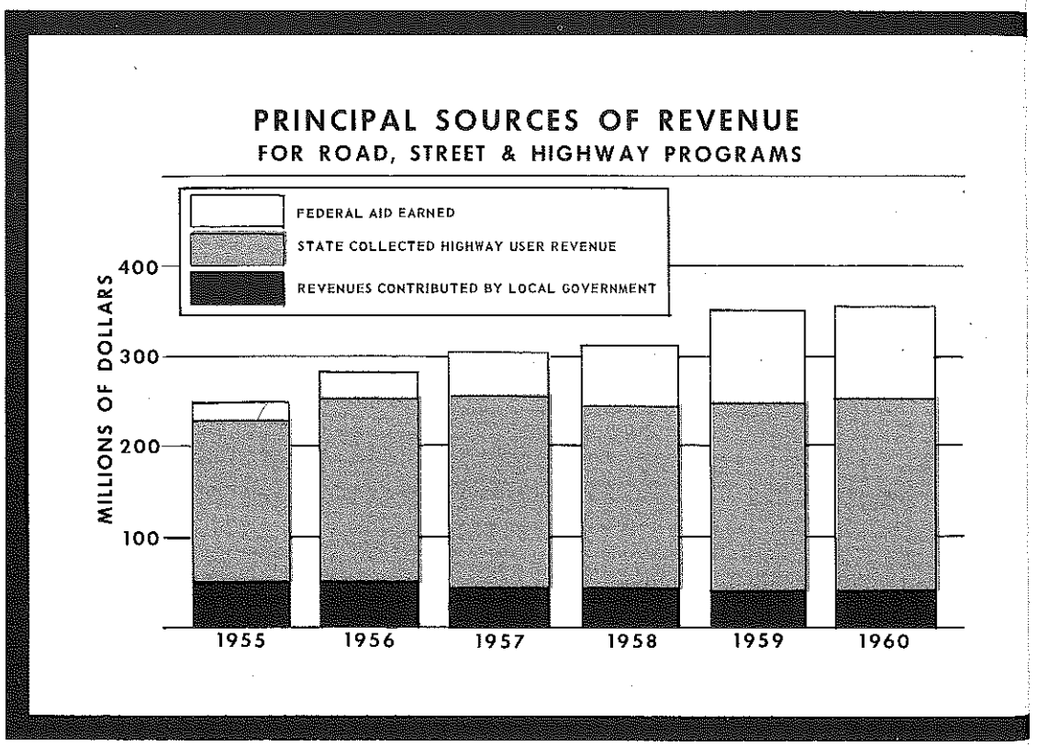
LOCALLY–CONTRIBUTED HIGHWAY FUNDS

Whereas in the past, property taxes levied by local units provided the bulk of the funds available for Michigan's highways, by 1940 they had come to make a minor contribution to total highway funds. However, largely as a result of the bases for highway administration and development laid down by several legislative statutes, notably Act 51, Public Acts of 1951, contributions by local units have increased steadily during the past fifteen years. In 1959, general revenues for highways raised by the local units amounted to $37 million, of which $11.6 million were raised by the counties and townships, and $25.3 million by the cities and villages.

BOND FINANCING

The accelerated programs of highway development initiated under Act 51, P.A. 1951, as amended, and subsequent state legislation, were further speeded up — in the case of the State Highway Department — by the passage of the Federal Aid Highway Act of 1956. The latter measure greatly increased the State Highway Department's need for funds to match the larger Federal Aid allotments. At the same time, rising traffic volumes put pressure on the counties and municipalities to further accelerate their improvement programs.

Although the monies distributed to the agencies from the Motor Vehicle Highway Fund were increased by higher gasoline and weight tax rates, they have not been sufficient to keep pace with the increased demands. To enable the agencies to meet this situation, the Legislature, as early as 1941, authorized the Department, the county road commissions, and the municipalities to issue revenue bonds in anticipation of their receipt of the apportionments of highway user revenues. While this method of financing has not been used extensively by the local units, the State Highway Department, with local unit participation, availed itself of it to a considerable extent. Since 1941, $471 million of bonds have been issued, of which $45 million have been repaid, leaving $426 million outstanding as of December 31, 1960.



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