For Release March 19, 1926

National Conference on Street and Highway Safety

Report of the

COMMITTEE ON METROPOLITAN TRAFFIC FACILITIES

Appointed by

The Secretary of Commerce

This report is one of six issued for consideration in advance of the National Conference on Street and Highway Safety The reports are: A Uniformity of Laws and Regulations; B Enforcement; C Causes of Accidents; D Metropolitan Traffic Facilities; E. Statistics; F Public Relations

Washington, D. C.
March 5, 1926

Associations cooperating with the Department of Commerce in organizing and financing the National Conference on Street and Highway Safety

AMERICAN AUTOMOBILE ASSOCIATION
AMERICAN ELECTRIC RAILWAY ASSOCIATION
AMERICAN MUTUAL ALLIANCE
AMERICAN RAILWAY ASSOCIATION
CHAMBER OF COMMERCE OF THE UNITED STATES
NATIONAL ASSOCIATION OF TAXICAB OWNERS
NATIONAL AUTOMOBILE CHAMBER OF COMMERCE
NATIONAL BUREAU OF CASUALTY & SURETY UNDERWRITERS
NATIONAL RESEARCH COUNCIL
NATIONAL SAFETY COUNCIL

ORGANIZATION OF THE

National Conference on Street and Highway Safety

Honorable HERBERT HOOVER, Secretary of Commerce	*Chairman*
F. A DELANO, President, American Civic Association, Washington, D C	*Vice-Chairman*
A B BARBER, Chamber of Commerce of the United States	*Director*
ERNEST GREENWOOD, Washington, D C	*Secretary*
JULIUS H PARMELEE, Director, Bureau of Railway Economics	*Treasurer*
E K KLOMAN, Bureau of Railway Economics	*Assistant Treasurer*
SIDNEY J WILLIAMS, National Safety Council	*Consulting Staff*

COMMITTEES, 1925-26

Committee on Uniformity of Laws and Regulations

Gen NATHAN WILLIAM MACCHESNEY, Vice-President, American Bar Association; Chairman, Uniform Public Law Section, and Former President, National Conference of Commissioners on Uniform State Laws	*Chairman*
A P FEDERLINE, American Automobile Association	*Secretary*
J ALLEN DAVIS, Associate Counsel, Automobile Club of Southern California; Draftsman, Uniform Vehicle Committee, National Conference of Commissioners on Uniform State Laws	*Legislative Draftsman*

Committee on Enforcement

Hon WILLIAM MCADOO, Chief City Magistrate, New York City	*Chairman*
C W STARK, Chamber of Commerce of the United States	*Secretary*

Committee on Causes of Accidents

DR WALTER V BINGHAM, Director, Personnel Research Federation, New York City	*Chairman*
DR F A MOSS, George Washington University	*Secretary*

Committee on Metropolitan Traffic Facilities

F A DELANO, President, American Civic Association	*Chairman*
NORMAN C DAMON, National Automobile Chamber of Commerce	*Secretary*

Committee on Statistics

W M STEUART, Director, Bureau of the Census	*Chairman*
J H PARMELEE, Director, Bureau of Railway Economics	*Secretary*

Committee on Public Relations

GEORGE M GRAHAM, Vice-President, Chandler Motor Car Co; Chairman, Traffic Planning and Safety Committee, National Automobile Chamber of Commerce	*Chairman*
ERNEST GREENWOOD, Secretary, Conference on Street and Highway Safety	*Secretary*

For information concerning additional copies of the reports of the above committees address National Conference on Street and Highway Safety, Department of Commerce, Washington, D C.

COMMITTEES, 1924

Committee on Statistics

W M STEUART, Director, Bureau of the Census — *Chairman*
J H PARMELEE, Director, Bureau of Railway Economics — *Secretary*

Committee on Traffic Control

ROY F BRITTON, Chairman, Legislative Committee, American Automobile Association; President, Automobile Club of Missouri — *Chairman*
C W STARK, Chamber of Commerce of the United States — *Secretary*

Committee on Construction and Engineering

FRANK PAGE, Chairman, North Carolina State Highway Commission — *Chairman*
C W STARK, Chamber of Commerce of the United States — *Secretary*

Committee on City Planning and Zoning

F A DELANO, President, American Civic Association — *Chairman*
JOHN IHLDER, Chamber of Commerce of the United States — *Secretary*

Committee on Insurance

S S HUEBNER, Professor of Insurance, University of Pennsylvania — *Chairman*
ROLLIN M CLARK, Chamber of Commerce of the United States — *Secretary*

Committee on Education

A W WHITNEY, Associate General Manager and Actuary, National Bureau of Casualty & Surety Underwriters — *Chairman*
ERNEST GREENWOOD, Washington, D C — *Secretary*

Committee on the Motor Vehicle

H M CRANE, President, Society of Automotive Engineers — *Chairman*
JOHN R HOPE, American Automobile Association — *Secretary*

Committee on Public Relations

GEORGE M GRAHAM, Vice-President, Chandler Motor Car Co; Chairman, Traffic Planning & Safety Committee, National Automobile Chamber of Commerce — *Chairman*
NORMAN C DAMON, National Automobile Chamber of Commerce — *Secretary*

For information concerning additional copies of the reports of the above committees, address National Conference on Street and Highway Safety, Department of Commerce, Washington, D C

Contents

COMMITTEE ON METROPOLITAN TRAFFIC FACILITIES

F A DELANO, *Chairman*, President, American Civic Association, Washington, D C

J H ALEXANDER, President, Cleveland Railway Company, Cleveland, Ohio

HARLAND BARTHOLOMEW, Engineer, City Plan Commission, St Louis, Mo

ARTHUR H BLANCHARD, Professor of Highway Engineering and Highway Transport, University of Michigan, Ann Arbor, Mich

A J BROSSEAU, President, Mack Trucks, Inc , New York, N Y

LOUIS BROWNLOW, City Manager, Knoxville, Tenn

HAROLD S BUTTENHEIM, Editor, *The American City*, New York, N Y

ERNST FREUND, Professor of Law, University of Chicago, Chicago, Ill

ERNEST P GOODRICH, Consulting Engineer, New York, N Y

KANE S GREEN, President, The Automobile Club of Philadelphia, Philadelphia, Pa

JOHN M GRIES, Chief, Division of Building and Housing, Department of Commerce, Washington, D C

D W HELT, Grand President, Brotherhood of Railway Signalmen of America, Chicago, Ill

E S HIGGINS, General Manager, Yellow Cab Company, Philadelphia, Pa

JOHN IHLDER, Manager, Civic Development Department, Chamber of Commerce of the United States, Washington, D C

ALVAN MACAULEY, President, Packard Motor Car Company, Detroit, Mich

THOMAS H MACDONALD, Chief, U S Bureau of Public Roads, Washington, D C

COL I C MOLLER, Assistant Director of Traffic, Washington, D C

ALBERT G METZ, Editor, *Motor Transport*, Philadelphia, Pa

A HEATH ONTHANK, Chief, Division of Domestic Commerce, Department of Commerce, Washington, D C

PERCY OWEN, Manager, Foreign Sales Department, Dodge Brothers, Detroit, Mich

GEORGE A QUINLAN, Superintendent of Highways, Cook County, Chicago, Ill

G J RAY, Chief Engineer, Delaware, Lackawanna & Western R R, New York, N Y

ELMER T STEVENS, General Manager, Chas A Stevens & Bros, Chicago, Ill

F L SWETLAND, General Manager, The Swetland Company, Cleveland, Ohio

CHARLES P TOLMAN, Consulting Engineer, New York, N Y

HARVEY M TOY, Chief, Board of Highway Commissioners, San Francisco, Calif

EDWARD W TREE, Editor, *Good Roads*, New York, N Y

D L TURNER, Consulting Engineer, State Transit Commission, New York, N Y

HAROLD E WEST, Chairman, Maryland Public Service Commission, Baltimore, Md

FRANK C WIGHT, Editor, *Engineering News-Record*, New York, N Y

MRS ARTHUR V WATKINS, National Congress of Parents and Teachers, Washington, D C

COL W J WILGUS, Consulting Engineer, New York, N Y

HAROLD R YOUNG, National Retail Dry Goods Association, Washington, D C

National Conference on Street and Highway Safety

Committee on Metropolitan Traffic Facilities

Hon Herbert Hoover, Chairman,
National Conference on Street and Highway Safety,
Washington, D C

Sir The work of the Committee on Metropolitan Traffic Facilities follows largely as a sequel to the work of three committees of the First National Conference on Street and Highway Safety which reported respectively on Traffic Control, Construction and Engineering, and City Planning and Zoning The reports of those committees gave much detail as to measures for improvement of traffic conditions and should continue to be of value in the future, as they have been since their publication, to those concerned with traffic improvement in the various parts of the country

The problem of safety on our streets and highways is inextricably linked with the provision of streets, highways and traffic control systems which will insure an ordered flow of traffic Without such provisions there is bound to be uncertainty and confusion with continued losses of life, personal injuries and damages to property, and also congestion and delays resulting in great additional economic waste

The present report is, in large measure, a response to inquiries that have been received since the First National Conference on Street and Highway Safety from many different communities, organizations and state or local conferences as to the procedure which should be followed in dealing with the traffic problem Your Committee has, therefore, been especially mindful of the wide variety of conditions and sizes of communities, and has endeavored to present in this report a program of organization and procedure which it hopes will be of service to the communities or metropolitan areas concerned, whatever their circumstances

Summary of Conclusions

The Committee submits the following summary of its findings and recommendations

1 With losses of life, personal injuries and actual destruction of property in traffic accidents estimated at $600,000,000 annually, addi-

tional losses resulting from congestion and extra distances traveled as a result of inadequate traffic facilities, increased maintenance and operating costs of vehicles due to improper road surfaces, excessive grades, time lost at grade crossings and drawbridges, and other causes bring the annual loss to an estimated amount of $20 per capita on the entire population of the United States, or a total of more than $2,000,000,000 per annum

2 These great annual losses constitute one of the most conspicuous and widespread economic wastes, reaching every individual, not only through the continual menace to life and safety but also through the increased costs of nearly every necessity of life For the correction of this waste large expenditures are amply justified

3 The magnitude of the sums involved in providing adequate traffic facilities requires due consideration of the serious burden of taxation involved, and a properly worked out and budgeted program

4 Any program for improvement of traffic facilities will necessarily include some urgent, immediate items and some long-time items The latter will generally call for thorough study and correlation with other improvements but the necessity for thorough planning in such cases should not be permitted to prolong unduly the commencement of actual work, nor should it interfere with the prompt execution of urgent remedial measures

5 As a basis for any comprehensive traffic improvement program, every community or metropolitan area should have a traffic survey giving the necessary physical data as to increase and distribution of population and vehicles, street, highway and transit facilities, industrial and commercial developments, schools, recreational facilities and other factors affecting the traffic problem The survey should also give traffic data as to use of existing facilities, flow of traffic at various times, types of vehicles, average distances traveled, speed of operation, source, destination and other similar data Once completed the survey should be kept up to date

6 The program for improvement of traffic facilities may be part of a general city plan or metropolitan area plan or, if no such plan has been established, a traffic program may be developed in advance of a more comprehensive plan The traffic program should include

(*a*) A transit plan, covering facilities for the mass movement of population by vehicles of all classes, including rapid transit, steam railroad commuter service, street car lines, bus lines, private automobiles and other means

(*b*) A street and highway plan, providing for main thoroughfares,

by-pass and interconnecting thoroughfares, secondary streets, business and industrial streets, and local residence streets, with any necessary enlargements and improvements required to carry the traffic with expedition and safety

(*c*) A traffic control plan, to provide for the orderly improvement of facilities and measures for the safe and efficient utilization of street and highway capacity

7 To provide ways and means for developing and carrying out traffic improvements, a sound financial program should be established which will assure properly balanced progress in such improvements and which will properly distribute the burden of providing the necessary funds

8 The magnitude and ramification of the traffic programs are such that it will generally have to be carried out by a number of different departments of the city or local governments A traffic planning organization is needed, however to insure proper planning of traffic facilities and traffic control, to assure cooperation of the administrative agencies concerned and to enlist public support This organization may consist of

(*a*) An official traffic commission, including such officials as the chief of police, the city engineer, the engineer of the city plan commission, a representative of the public authority supervising city transit and transportation, a member of the city council, and a representative of the city's legal department This commission should be a permanent body with the services of a paid staff, in charge of a technically trained engineer It should prepare a comprehensive traffic plan, make and keep up to date the traffic survey and prepare a traffic ordinance and regulations or recommend from time to time modifications in the existing ordinance and regulations made necessary by changes in conditions

(*b*) It will usually be of value to have an unofficial traffic committee, including the members of the official traffic commission together with representatives of automobile clubs and associations, safety councils, chambers of commerce street railway companies, motor bus companies, retail merchants' associations, trucking organizations and other interested groups The traffic committee should serve in an advisory capacity to the traffic commission and assist in securing the interest and support of various representative organizations and the public generally If there is no traffic commission the traffic committee may temporarily carry out the functions of both bodies

9 In the improvement of main highways leading to and from large centers of population it is frequently found that administrative jurisdiction over various sections of the road is divided among municipal, county, state and even national authorities In such cases practical results in relieving traffic congestion will usually be obtained most quickly by voluntary cooperation between the authorities concerned through the creation of joint boards to consider and determine policies of location, construction, maintenance and use of the highways

10 To provide unified consideration and treatment of traffic problems in metropolitan areas which include more than one city or a city and politically independent suburbs, it will generally be necessary to depend upon an enlargement of the unofficial traffic committee of the central city by adding proper representatives of important suburban communities, or in the case of two large cities in a single metropolitan area, to form a joint traffic committee with representatives of suburban communities added When developments warrant, an official metropolitan authority may be created to control physical growth supervise public utility services and provide for proper traffic facilities within large population centers

By the Committee,
FREDERIC A DELANO, *Chairman*

Washington, D C ,
March 5, 1926

Mr Ihlder has submitted a statement, printed as Appendix A of this report, emphasizing the importance of the relationship of zoning and city planning to the problems of metropolitan traffic facilities

(The full text of the report follows)

LOSSES DUE TO INADEQUATE TRAFFIC FACILITIES

The losses due to inadequate traffic facilities obviously are shared by everyone They include (*a*) losses due to accidents, (*b*) time lost by vehicles in operation over congested thoroughfares, (*c*) increased costs due to traveling extra distances between origin and destination where a more direct route is economically possible and desirable, (*d*) increased maintenance and operating costs of vehicles where road surfaces are not of proper type, and where grades might be economically reduced, (*e*) time lost at grade intersections and drawbridges, (*f*) community costs due to the absence of traffic police, signal systems and other regulatory facilities, (*g*) delays due to turns, poor name signs and badly marked and maintained detours, (*h*) loss to merchants, (*i*) dormant real estate values and (*j*) increased costs and delays incident to the toleration of vehicles unsuited to local conditions These are but a few of the losses to be counted

It is often difficult to compute the money equivalent of these losses to any one individual—the value of the time element in particular to the average pedestrian and driver being impossible of exact measurement Many of the losses may be assigned definite money values, however, and the benefits which will accrue to individuals and the community more than justify replacing inadequate facilities or providing proper facilities where none exist

Losses Due to Accidents

The Committee on Statistics of the First National Conference on Street and Highway Safety reported a loss for the year 1923, due to street and highway accidents, of 22,600 human lives, 678,000 serious personal injuries and property damage bringing the estimated total economic loss to $600,000,000—85 per cent incident to automobile traffic

Were only a small percentage of these accidents to be prevented by correction of the fundamental conditions which caused them, it is obvious that the effort would justify large expenditures of time and money

Congested Thoroughfares

In Worcester, Mass , detailed traffic tallies indicated that congestion was costing the community $35,000 a day In Cincinnati, estimates were that congestion cost approximately $100,000 a day, while the cost of congestion in the metropolitan region of New York is fixed as approximately $1,000,000 a day

In Philadelphia, delays in the operation of a fleet of 843 taxicabs due to congestion amounted to 9 5 per cent of the working time of the cabs—the equivalent of about $2 50 per day per vehicle

Extra Distances

A traffic study in Newark, N J , indicated that the increased taxation from enhanced real estate values and traffic operating benefits would pay, within a period of five years, for the complete cost of an improvement which would provide a cut-off in the congested area

The United States Bureau of Public Roads and the State Highway Departments have consistently worked for the shortening and straightening of roads Not only is the flow of traffic greatly facilitated, with a higher degree of safety, but the upkeep costs of the highway are lowered

Relocation of the road from Washington, D C , to Richmond, Va , prior to completing improvements on this stretch of road will reduce the distance by highway between these points by more than ten miles This is but one of many similar cases

It will, however, sometimes be found that shortening of distances will not reduce congestion In fact, many times the longer route is the one which enables traffic to flow more freely—as, for example, highways by-passing traffic around cities The time and operating expense of the individual carrier is thus saved by avoiding the congestion of the downtown districts The downtown area is spared the additional congestion of thousands of vehicles which have no business in that area except to get through it

Inferior Road Surfaces and Heavy Grades

The construction and use of lower types of road surface than those justified by the volume of traffic, and the failure to reduce grades where economically possible, result in needlessly high vehicle operating costs Research by state universities, highway departments and United States Government agencies supports these statements with a large volume of fact The cost of operation is about 2½c greater per mile for a passenger vehicle operating on unimproved dirt roads in comparison with operation over the highest class of well-maintained pavements.

Grade Intersections and Drawbridges

Railroad Grade Crossings —Careful traffic tallies made in one instance of the number of vehicles which were stopped daily at

railroad grade crossings, and the length of the delay, showed an aggregate delay of 8,504 vehicle minutes experienced by 85,637 vehicles, the loss of time per vehicle varying up to 10 minutes The capitalized value of the time lost and the cost of railroad gate tenders and watchmen was nearly $3,000,000

On one single intersection in Cook County, Illinois, it was found that the railroad crossing gates were down 42 per cent of the twenty-four hour day

Data presented to the Conference of the Association of Highway Officials of the North Atlantic States held at Atlantic City on February 25, 1925, cited the value of lost time which might be obviated by a new state highway Based on the distance and time required to move from the New York side of the Hudson River through Jersey City and Newark to the west side of Elizabeth, it was estimated that the probable saving upon the expected traffic moving over this new state highway would amount to more than $20,000,000 per year, so that a very large expenditure could profitably be made to eliminate this delay This was to be accomplished through grade crossing elimination, reduction of rise and fall, detouring around congested centers, curves of large radius, proper widths and surfaces and other details

In addition to the monetary considerations referred to, there are, of course, the loss of life and cost of accidents at railroad grade crossings to be considered

Highway Crossings—The South Water Street improvement project in Chicago, which will be the first continuous double-deck street to be built in this country on the plan of segregated traffic, is now under construction The upper deck will be at the level of the river bridges and will carry fast traffic only The lower deck will be at the river dock levels and will serve the local freight districts Both levels will connect with the adjoining street system in such a way as to afford maximum grade separation The project as now being built is somewhat more than a mile long

This project will cost approximately $22,000,000, of which $9,000,000 is for construction and $13,000,000 for damages Special assessments, however, to the extent of $12,000,000 practically offset the damage payments.

Various estimates have been made, some of them running into fantastic figures, of savings in time, costs of operation, and all the other costs incident to congestion that this great marginal way will effect in by-passing the business district On the basis of any

of these estimates, however, it is apparent that the savings to the using public will suffice to amortize the construction costs within a very few years

Drawbridges—In many instances a vast flow of overbridge traffic is held up to permit the passage of almost inconsequential river traffic through drawbridges

One observation, taken on a Sunday afternoon at the drawbridge over the South River on the main road between Annapolis and Washington, showed the drawbridge held open approximately fifteen minutes to permit the passage of a small launch containing three people. During this period some four hundred motor vehicles were held up on both sides of the bridge

It has been estimated that replacing the drawbridges over the Chicago River in Chicago with fixed bridges would result in an annual net gain in excess of $1,000,000 to street traffic The total openings of thirty-two city bridges have been found to be more than 82,000 annually The use of bridges for a typical weekday, and the aggregate time lost per annum because of bridge openings, were as follows

	Number per day	*Time lost (hrs) per annum*
Passenger vehicles	211,000	56,430
Commercial vehicles	109,300	32,580
Street cars, elevated trains and busses	39 800	6,880
Passengers and pedestrians	1 933,600	375 240

Of course other considerations, such as the river traffic, and the relative cost of maintaining fixed bridges and maintaining and operating drawbridges, enter into the problem

Traffic Police and Signal Systems

In Syracuse, the mechanical system now installed is saving $30 000 a year Traffic police are placed only where traffic is congested or dangerous—the mechanical system serving in the place of officers at other points

It should be borne in mind, however that hasty and ill-considered installation of mechanical systems of traffic control may result in far greater costs than would their omission altogether It is advisable, therefore, that the selection and installation of such systems be done with great care and only upon competent advice

Turns, Poor Name Signs, Badly Marked Detours

Observations at the intersection of Market and Broad Streets in Newark, N J , prior to the abolishing of the left-hand turn at

that point, showed that the ten per cent of vehicles making the left-hand turn at that intersection caused forty per cent of the delay experienced, aside from regular traffic regulation stopping

The abolishing of all turns on Woodward Avenue in the congested district of Detroit has materially reduced accidents and expedited traffic along Woodward Avenue

Lack or inadequacy of street name and direction signs causes embarrassment to those who in stopping to find their way invite congestion and constitute a potential source of accidents Badly marked and maintained detours are unnecessarily costly and annoying to the public, and sometimes dangerous

Loss to Merchants

It is obvious that traffic delays in the delivery of merchandise must add to the cost of that merchandise and be paid by the consumer Direct loss to the merchant himself is reflected in congestion which prevents customers from reaching his store, or causes them to buy in less congested areas

The parking of vehicles in front of a merchant's property calls for thorough study and careful regulation, so that its advantages may be retained to the greatest possible degree and its disadvantages diminished It should be remembered that it is essential to provide access to mercantile establishments, both for customers and goods, and that needless hampering of such access results in loss

Long continued diversions of traffic caused by unreasonably delayed street repairs are another source of loss to the merchants whose entrances are blocked, whether for customers or merchandise delivery

Dormant Real Estate Values

The improvement of street and highway facilities in the area around a municipality invariably enhances the value of the land, particularly for residence purposes

Special street widening or straightening projects frequently increase property values by more than the cost of construction, not to mention the benefits flowing from the improved facility

Vehicles Unsuited to Local Conditions

The moving of super-sized vehicles through narrow streets or at congested periods of traffic constitutes an avoidable source of costly delays in traffic movement In other instances the manner of utilization of different vehicular units may cause delay and congestion

The failure to segregate traffic by classes to certain streets and

highways, or to exclude the use of some types of vehicles on certain streets at specific times, is a fruitful source of congestion and delay

An enormous annual tribute, estimated at $20 per capita on the entire population of the United States, is the price which is being paid for inadequate traffic facilities, including for accidents only those attributable to congestion and similar remediable conditions

Your Committee is not unmindful of the serious burden of taxation that would be involved in such a comprehensive program of improvements as would reduce to a minimum the congestion, accidents and other losses mentioned above Such undertakings should not be embarked upon without adequate knowledge of the essential facts surrounding the problem in each locality, proper detailed plans for the improvements, and effective organization for carrying them out Your Committee therefore considers that the greatest service which this report can render to communities with unsolved traffic problems will be through an outline of what appear to be the best methods of establishing these facts, the necessary plans and suitable administrative organization to cope with these problems Such an outline is given in the succeeding sections of this report

ESSENTIALS OF A TRAFFIC PROGRAM

It is possible to formulate general principles which will serve as guides in every community, but the practical application of these principles will vary according to the character of the community and its present development

It is essential to study local conditions before drafting a program of action The first need is a traffic survey which will make clear the extent and character of the problem as it exists in the particular community With the results of such a survey in hand, it will be possible to fix on the steps to be taken

Necessarily the program will contain short-time and long-time items The short-time items will consist largely of regulation and of utilizing to the full such traffic facilities as now exist The long-time items are those which call for thorough study and considerable capital expenditures They consist of such permanent improvements as by-passes, street widening, layout of new streets, and similar rearrangement of, or addition to, present facilities

The relation to city and regional planning is definite Traffic facilities should be provided in ways which will cause the greatest benefit and the least damage to the community Streets to meet trucking needs, for example, should be provided in the city plan without traversing those shopping or residence districts where trucking is an unnecessary injury

Careful consideration should also be given to the effect on traffic conditions of limitations on the use of private property through city planning, zoning and building-height restrictions

Any consideration of street and highway facilities must also take into account all transit accommodations Transport of persons and goods by steam or electric railway, air water-way and by motor is intimately connected with metropolitan traffic facilities Each must be considered in its relation to the safety and traffic program

Regulations for the control of both vehicular and pedestrian traffic must be considered, together with the means for their effective enforcement

Traffic Survey

The first step, then, to be taken in the formulation of any traffic program is a traffic survey The purpose of such a survey is to obtain and keep constantly up to date all the information needed to insure adequate traffic facilities and decreased hazards for the community It should enable the community to utilize to the full the facilities it now

has, thus preventing unnecessary expenditures It should be a practical guide in plans for future improvements, making those improvements fit closely to their purpose and in that way preventing unnecessary or unwise expenditures

There are two types of data to be obtained—physical and traffic

Physical Data—Definite information should be obtained on traffic capacity of street roadways for transit agencies, vehicular traffic and pedestrians, and data relative to street, roadway and sidewalk widths and the practicability of increasing traffic capacity by widening, arcading, elevating or depressing roadways

By maps, charts and other means the survey should develop precise information as to distribution and past and prospective growth of population, distribution and growth of automobile registration, building activity—i e , maps of new buildings, platted and classified by 5-year periods, street widths and grades, types of pavement, street lighting, present methods of traffic control, all special features, such as pedestrian bridges and subways, drawbridges, etc , and city plan proposals and zoning regulations

Zoning regulations should be analyzed to determine the effect of height, bulk and use of abutting buildings and use of abutting premises on volume of traffic and amount of parking on adjacent streets The zoning classification should include (*a*) industrial plants—heavy manufacturing and light manufacturing, (*b*) business buildings—office buildings, retail shops, department stores, theaters, motion picture houses and large halls in business areas, (*c*) schools, playgrounds and park entrances, (*d*) professional baseball fields and other commercial amusement places outside of the business district

Traffic Data—The traffic data developed by the traffic survey may include information as to

Flow of traffic by time of day, day of week and month of year (Periods of measurement should not exceed 15 minutes The standard "day" should be 10 to 12 hours with additional periods for exceptional conditions)

Type of vehicle—passenger car, taxicab, delivery motor truck, heavy motor truck (classified by weight of vehicle and load carried, dimension, kind of motive power, and by contents, as coal, building materials, etc), horse-drawn truck, street car, motor bus

Average distance traveled, speed of operation, source and destination.

Areas of traffic concentration, i e , central traffic districts

Major traffic streets

Rush-hour traffic flow map.

Location of freight and passenger terminals.

Merchandise loading on streets and alleys.

Classification of streets as to use.

Street-car routing map.

Street-car operating schedules and methods of loading and unloading. Effect of street cars in diminishing other vehicular traffic and effect of automobiles on the car tracks in hindering street-car service. Unnecessary street-car turnings.

Relation between traffic and parking on the street. Public open space and private space parking.

Study of parking habit.

Time lost by open drawbridges, closed gates at grade crossings and by inadequate or improper street name and direction signs and detour markings.

Special routes, such as state highways, boulevards and one-way streets.

Traffic accident reports and spot map.

Existing traffic regulations.

Existing methods of traffic control.

The traffic survey should be kept up to date by a continuing inventory.

Program of Improvement

With the information at hand which outlines the particular difficulties facing the community, it becomes necessary to consider the program of improvement. The transit plan, the street and highway plan and the traffic control plan must all fit into and supplement each other. From the point of view of providing adequate traffic facilities they are all parts of one unified program. Each one, however, has its own characteristics, which can best be presented under separate headings. In working out improvements and changes the interrelationships will be clearly evident, but the detailed setting forth of the various factors will serve to concentrate attention upon each step which must be considered and provided for.

Transit Plan.—The elements to be taken into account in the transit plan are rapid transit (on exclusive or private right of way); steam railroads; street car lines—local and interurban; bus lines—local, interurban and touring; private automobiles (volume and facilities required); taxicabs; sight-seeing busses; commercial vehicles; fire apparatus; police patrol and ambulances; water lines and ferries; special traffic movements

requiring permits (parades, transport of heavy structural iron, house moving, etc.); terminals with consideration of the advantages and disadvantages of downtown terminals for car lines and busses, both local and interurban; air transport facilities.

Street and Highway Plan.—The street and highway plan should embrace the present and proposed general layout of the metropolitan street and road system, including main arterial thoroughfares and superhighways, by-pass and interconnecting thoroughfares, secondary streets, business and industrial streets, and local (residence) streets; and enlargement and improvement of the elements of this layout.

Such enlargement and improvement may embody widening and extension of streets and roads; elimination of drawbridges at intersections with important navigable waterways; elimination of grade crossings and protection of vehicular traffic at grade crossings (both railroad and street); elimination of gaps, dead-ends, jogs and abrupt curves; widening of throats at important intersections; grade reduction; elevated roadways; elevated sidewalks and arcaded sidewalks; parking facilities; cab stands; street name signs; improvement of paving; street lighting; arrangement of aesthetic treatment so traffic will not be interfered with; regulation of billboards and abolition of needless signs.

Traffic Control Plan.—The traffic control plan should cover facilities for traffic control and means for increased utilization of existing streets.

Facilities for traffic control embrace street traffic signs and pavement surface and other markings; illuminated or reflecting devices; safety zones; control by traffic police; and manual, mechanical and automatic traffic control systems and devices. Such systems should be planned well in advance and installed wholly or in part as required.

Means for increasing the utilization of existing streets may include synchronized or platoon movements of traffic, protection and control of pedestrian movement, stops at intersections with through-traffic streets, segregation of different kinds of traffic, encouragement of heavy trucking by night instead of by day, restriction of unnecessary traffic movement, one-way streets, regulation of left-hand and right-hand turns and parking regulations.

The traffic control plan should also govern street repairs, excavations, piling of building material, installation of service mains or connections and similar infringements on streets, and also infringements on or use of the streets for shorter periods, such as in loading and unloading trucks.

Financial Program

Adequate traffic facilities are vital to the community. To keep their cost at a minimum, however, requires a sound financial program, which will provide for a traffic engineering department, a continuing traffic survey, renewal or improvement of traffic signals and signs, proper maintenance of paved streets, a sound construction program, assessments on all parties benefited in proportion to the benefits accruing, limitation of bonds to the estimated life of the improvement, serial bonds instead of sinking funds, and proper allocation of proceeds of gasoline and special vehicle taxes.

It will be borne in mind, of course, that the last four items enumerated are sometimes covered by state law, hence the metropolitan district must be governed accordingly.

ORGANIZATION FOR TRAFFIC PLANNING

The control of modern traffic in cities is a new field of governmental activity, but is not a new function of government. It involves thorough cooperation of several municipal departments—police, engineering and construction, city planning, lighting and legislative. The traffic problem is of such magnitude and ramification that it cannot be the sole function of a single governmental agency as those agencies now exist. The lack of public understanding and the present incompleteness of the science of handling traffic in cities and metropolitan areas now demands an organization for traffic planning that will insure proper planning of traffic facilities and regulations, cooperation of administrative agencies, and public support.

There can be no ultimate satisfactory solution of the traffic problem that is not based upon thorough knowledge of all the factors that influence traffic movement. The numerous officials and bodies having special knowledge and facts should unite for comprehensive study and planning. By thus pooling information and jointly agreeing upon plans and regulations of a comprehensive character, the mistakes of piecemeal projects, praiseworthy in themselves but inadequate and unwise when considered from the viewpoint of the whole plan, can be avoided. A comprehensive ~~program of traffic control—a~~ traffic plan ~~should~~ should be evolved. Such a plan ~~should~~ would be susceptible of expansion as the volume of traffic increases, and minor adjustments should be possible as changing conditions warrant.

It is not necessary or possible to place in the hands of the traffic planning organization the functions of street construction, lighting installations or policing. These functions now have their place in existing city departments. The officials in charge of these departments can best execute public work that affects traffic movement, but they should be guided by the knowledge gained through their joint participation as members of the traffic planning organization and they should abide by the traffic plan and program there devised.

On the other hand, in cities where a general city plan has been established or is in process of establishment, the traffic commission should take this into account and should refer to the city planning authorities any matters affecting the city plan, or otherwise arrange for proper cooperation.

Public support is essential to any successful system of traffic regulation. A comprehensive program properly conceived, and published in its simplest form, will command public attention, support and com-

pliance. Constantly changing regulations and plans based upon the ideas of changing administrations invariably lead to public distrust and lack of hearty compliance.

Official Traffic Commission

Each city should create by ordinance an official traffic commission or traffic council. The traffic commission should usually be composed exclusively of the following city officials, or those whose positions most nearly correspond thereto: Chief of police, city engineer, engineer of the city plan commission, a representative of the public authority supervising city transit and transportation, a member of the city council, the city official in charge of lighting, the city official in charge of streets, and a representative of the city's legal department.

The traffic commission should be a permanent body, with regular meetings at stated intervals. It should elect its own chairman. It should have adequate funds, appropriated as are funds for other city departments, and a paid staff in charge of a technically trained traffic engineer. As an alternative or preliminary arrangement it may be in some cases desirable for the commission to utilize the services of engineering staff or consultants provided through one of the existing departments.

It should be the duty of the traffic commission to prepare a comprehensive traffic plan. The preparation of such a plan presupposes exhaustive surveys as outlined in this report under the heading "Essentials of a Traffic Program." The commission should prepare the traffic control plan and propose such changes in the transit plan or in the street and highway plan as may be necessary in the interest of traffic. In case no street and highway or transit plans exist, it should be the duty of the traffic planning commission to develop such plans as far as necessary in the interest of traffic, pending the preparation of comprehensive plans by a city plan commission. The traffic commission should also prepare a traffic ordinance as the basis for traffic control.

The traffic commission should have accurate records of traffic movement, observe changing conditions affecting traffic, suggest amendments of the traffic ordinance and keep the traffic survey and plans up to date.

The official traffic commission above suggested is composed exclusively of city officials in order to meet the natural objection to additional commissions and bodies within existing city governments, which are contrary to the modern trend in municipal government. It is believed that effective results will be obtained by such a body because of

the joint cooperation of officials now charged with various administrative duties relating to traffic control.

Unofficial Traffic Committee

To insure the interest and support of various representative organizations concerned with and having special knowledge relating to various phases of the traffic problem, it is suggested that every city may well have, in addition, an unofficial traffic committee or group who would have various valuable services to render. Such a traffic committee should be thoroughly representative without becoming a cumbersome body. Usually it will be found best that such a committee have a membership of not more than fifteen or twenty persons. Within this group should be numbered the officials who comprise the official traffic commission and representatives of automobile clubs and associations, safety council, chamber of commerce, street railway companies, motor bus companies, retail merchant associations, trucking organizations and the like. In some cities it has been found desirable to have this group function as a committee of a single organization such as the chamber of commerce or the safety council, where such organization is properly representative. In other cases it may be better for the group to function as an independent committee representative of all affected organizations and interests, but not directly connected with any one of them.

If an official traffic commission with adequate budget and technical staff, as already outlined, is already in existence or can be created forthwith, then the unofficial traffic committee will immediately take its place as advisory to the official commission and as a connecting link between the official commission and the general public and commercial interests. One of its principal functions should be public education and the mobilizing of public support for proper traffic control. Furthermore, the unofficial committee, including within its own membership the representatives of the principal groups affected by traffic control measures, can often work out in private sessions differences of opinion on such controversial matters as parking regulations, and present a unanimous recommendation thereon to the official commission, thus avoiding much public dispute and opposition to needed reforms.

An unofficial committee performing these advisory functions may in some cases require a budget and a staff for its publicity and other educational work, but in other cases these services can be furnished by the organization or organizations sponsoring the committee.

If, on the other hand, the municipality has no official traffic commission and is either slow to create one or unable properly to finance it, then the unofficial committee may have to function on a much broader scale, temporarily at least. In other words, if the city has not and for any reason cannot at once set up the proper official machinery for meeting the traffic problem, the quickest and most effective way to secure proper handling of the problem is through the creation of a strong unofficial body. This unofficial committee will in such case still be constituted as outlined above, except that it may well have a considerably larger membership, with a smaller executive committee to direct its detailed activities. A committee organized under such circumstances will generally have, as its first duty, the raising of sufficient funds from private sources to finance a comprehensive traffic study by a technical staff, leading to the formulation of a platform or program of remedies, one of which will be the creation of an official commission with proper budget and staff to carry on the technical work. With this initial program put into effect and the proper official machinery set up, the unofficial body may then function as outlined in the two paragraphs preceding. Under any circumstances, however, the unofficial committee should carefully refrain from attempting to exercise official functions and should always maintain the most friendly relations with public authorities. These officials almost always recognize the need for a comprehensive technical study of the traffic problem and usually will be glad to cooperate with an unofficial body which has funds for performing this task.

Metropolitan Traffic Control

Traffic problems throughout a metropolitan district should be considered as a unit. The lack of unified government will limit the jurisdiction of an official municipal traffic commission to its particular community. In such instances the unofficial traffic committee should enlarge its membership to include proper representatives of the several important communities comprising the metropolitan district. The traffic plan should be enlarged to comprehend the entire metropolitan area.

Unquestionably the next step in local government will be the creation of a metropolitan authority to control physical growth and to provide certain public utility services within large population centers. The Metropolitan Commissions of the Boston district are an example in point. As such authorities are created, power to plan for and to super-

vise metropolitan traffic should be vested in them. The exact nature of the power so conferred will vary according to local conditions. Such a metropolitan authority for traffic purposes alone would seldom be justified.

APPENDIX A

Statement by John Ihlder,

Manager, Civic Development Department, Chamber of Commerce of the United States

Attention can not be too strongly directed to the importance of city planning and zoning in their effect on traffic.

There would be no traffic problem, except perhaps on a few arterial highways between important centers, if there were no use of abutting premises. With increased intensity of use of such premises the traffic problem becomes more difficult. Buildings which shelter large populations cause the crowding of neighboring streets. If zoning regulations keep this building population to reasonable size, as compared with street facilities, the traffic problem, aside from that part of it caused by parking, usually is not difficult. If zoning regulations are inadequate or nonexistent and great buildings are erected on narrow streets, the traffic problem becomes almost unsolvable or solvable only at a great and uneconomic cost.

City planning is the complement of zoning in that it provides facilities for the traffic which the use of abutting premises—except on through streets—originates. It provides for traffic flow—adequate width of roadway, reduction of delays at intersections, parking or terminal facilities, etc., etc. This it can do effectively, however, only in terms of the population which the zoning regulations permit to be housed or sheltered in a given area.

Given then proper zoning and city planning the traffic problem is reduced to a comparatively simple proposition where traffic control and regulation may function effectively. Leave out or minimize city planning and zoning and the traffic problem becomes increasingly difficult.

Of course there are those who believe the only solution is to stop, check or diminish traffic by prohibitions. My belief is that the solution lies in distributing population and providing facilities for free movement.