

High way Transportation.

Foreword and Synopsis

MOTOR transportation is a modern development of world-wide significance. This report seeks to summarize briefly the experience of the United States in this field and to set forth the methods which have been devised to facilitate, extend, safeguard and control this new form of transportation.

Chapter I indicates the extent to which the motor vehicle has become a vital factor in our rural, urban and business life. Chapter II shows the manner in which the problems are being met of providing adequate highways for the motor vehicle, and sets forth principles that have come to be widely accepted in the United States for financing and administering the construction and maintenance of the highways. Chapter III and the appendix related thereto outline progress that has been made, principles developed and future steps contemplated to safeguard and facilitate the orderly movement of traffic on the highways. Chapter IV sets forth what has been and is being done to coordinate motor transport with other transportation agencies, indicating the extent of utilization of the motor vehicle by steam and electric railways, describing typical methods of utilization, and outlining the present attitude toward and status of regulation of motor common carriers. Chapter V lists the public, semi-public and private agencies concerned with the development of highway transportation, and describes briefly the major functions of these agencies. The report also contains what is believed to be the most complete bibliography existing of American publications on highway transport.

In preparing the report liberal use has been made of standard authorities, such as the studies of the United States Bureau of Public Roads, the National Transportation Conference organized by the Chamber of Commerce of the United States, the National Conference on Street and Highway Safety, the National Automobile Chamber of Commerce and other agencies. Acknowledgment is made both of the information given by these organizations and of the assistance rendered by their representatives.

The report was originally presented by the American Section of the International Chamber of Commerce at the Third General Meeting of the International Chamber at Brussels in June, 1925. Extensive revisions have been made in this second edition, to take cognizance of important developments during the past two years, particularly in Chapter III, which has been entirely rewritten, and in Chapter IV, which

has been materially changed and amplified. The changes in Chapters I, II and V are of a minor nature.

HIGHWAY TRANSPORT COMMITTEE
American Section
International Chamber of Commerce

May 4, 1927.

BIBLIOGRAPHY ON HIGHWAYS AND MOTOR TRANSPORTATION

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- * Available in limited numbers or for reference only
 - ** Texts.
 - *** Available in limited number without cost.
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 - B. P. R.—U. S. Bureau of Public Roads, Washington, D. C.
 - A. A. S. H. O.—American Association of State Highway Officials, Munsey Bldg., Washington, D. C.
 - H. E. B.—Highway Education Board, Washington, D. C.
- (Many of these publications are also available at public libraries.)

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<i>Coordinated Highway and Other Forms of Transport</i>				
* * * *** *** * *** *** *** *** * * *** *** * * ***	Completed Transportation Coordination of Motor Vehicles and Elec. Rwys. Ser. by Elec. Rwys. Coordination of Elec. Rwys. and Bus Transportation Coordination of Transport Agencies in New England Coordinated Transportation Series How Highway Transport Cooperates Is Highway Transport an Aid to the Railroads? Motor Truck and Bus Operation Place of Train, Trolley, Truck and Bus in New England Railroad Abandonments and their Relation to Highway Transportation Report of Committee IV, Transportation Conference, U. S. Chamber of Commerce The Motor Vehicle, Competitor or Ally? The Pulse of Trade Using Transportation Effectively	A. J. Brosseau A. J. Brosseau Alfred Reeves Bulletin 204, N. A. C. C. R. D. Chapin A. J. Brosseau C. S. Duncan Bulletin 205, N. A. C. C. Public Roads, Vol. 6, No. 8 Chamber of Commerce of the U. S. Geo. M. Graham Alfred H. Swayne Arthur T. Waterfall	1924 1924 1923 1924 1924 1923 1922 1926 1924 Oct., 1925 1923 1920 1924 1926	N. A. C. C. American Elec. Rwy. Assoc. N. A. C. C. N. A. C. C. N. A. C. C. N. A. C. C. N. A. C. C. N. A. C. C. N. A. C. C. B. P. R. Chamber of Commerce of the U. S. N. A. C. C. N. A. C. C. N. A. C. C.
<i>Education, Economics</i>				
* ** * * *** * ** * * * * ***	Adjusting Production to Meet Home Market Demands in Blair Co., Pa. Automobile, Its Province and Problems Big Issues in Highway Transport Benefits of Improved Roads Cook County Survey of Motor Transport Economics of Highway Transportation Economics of Highways Transport Economics of Motor Transportation Education for Highway Engineering and Highway Transport Five Years of State Road Building and Its Results Good Roads and the Automobile	Pa. State College Bul. 184 Annals, Amer. Acad. Pol. and Soc. Science, Nov., 1924 T. H. MacDonald and E. J. Mehren Dept. Agric. Farmer's Bul. 505 H. R. Trumbower R. D. Chapin G. W. Grupp Highway Education Board Public Roads, Vol. 7, No. 0 Hon. Bolivar Kemp	1924 1924 1922 1917 1926 1926 1921 1924 1922 Nov., 1926 1926	Pa. State College Amer. Acad. Pol. and Soc. Science, Philadelphia, Pa. Chamber of Commerce of the U. S. B. P. R. B. P. R. N. A. C. C. N. A. C. C. D. Appleton & Co., 29 W. 32nd St., N. Y. C. H. E. B. B. P. R. N. A. C. C.

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***	Highway Platform of N. A. C. C.	N. A. C. C.	1921	N. A. C. C.
**	Highway Transport and Its Relation to the Public	N. A. C. C.	1922	N. A. C. C.
*	Highway Transportation: A symposium	Trans. Am. Soc. Civ. Eng., Vol. 85, p. 1034	1922	Amer. Soc. Civ. Eng., 33 W. 39th St., N. Y. C.
*	Highway Transportation in Tennessee Counties	(Same as above) Bul. No. 4	1923	(Same as above)
*	Highway Transportation and the Farmer	A. J. Brosseau	1924	N. A. C. C.
**	Highways and Highway Transport	G. R. Chatburn	1923	T. Y. Crowell Co., 387 4th Ave., N. Y. C.
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**	Maine Survey of Motor Transport	N. A. C. C.	1923	B. F. R.
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*	Our New Transportation System	Forrest Crissey	1923	N. A. C. C.
***	Outline of Highway Policy	R. D. Chaplin	1923	N. A. C. C.
*	Outline of Highway Trans. Economics	L. W. McIntyre	1923	H. E. B.
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*	Relation Highway Transport to Increased Production	Geo. M. Graham	1920	N. A. C. C.
**	Report of a Study of Highway Traffic and the Highway System of Cook County, Ill.	Bureau of Public Roads	1925	B. P. R.
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*	Transport and Human Progress	J. H. Barnes	1920	N. A. C. C.
*	World Transport Congress	N. A. C. C.	1924	N. A. C. C.
<i>Safety and Regulation of Traffic</i>				
*	A Study of Motor Vehicle Accidents in Mont., Ore. and Wash Causes of Accidents	Pub. Rds., Vol. 5, No. 12 Report of Committee	Feb., 1925 1926	H. P. R. Nat. Conf. on St. and Hwy Safety, Washington, D. C.
***	City Planning and Zoning	Report of Committee	1924	Nat. Conf. on St. and Hwy Safety, Washington, D. C.
***	Compulsory Automobile Liability Insurance	Motor Vehicle Conf. Com.	1927	N. A. C. C.
***	Construction and Engineering	Report of Committee	1924	Nat. Conf. on St. and Hwy Safety, Washington, D. C.
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*	Maryland's Road Accident Map Shows Great Danger of Speed Metropolitan Traffic Facilities.....	Pub. Rds., Vol. 4, No. 5 Report of Committee.....	Sept., 1921 1926	B. P. R. Nat. Conf. on St. and Hwy Safety, Washington, D. C.
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*	Penny Wisdom of Overloading Trucks.....	H. S. Fairbank.....	1923	B. P. R.
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*	Motor Trucks on Eastern Farms	H. R. Tolley, Dept. Ag. Farm Bul. No. 1201	1921	N. A. C. C.
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*	Rural Motor Express and Highway Transport Engineering	F. W. Fenn	1919	N. A. C. C.
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**	Dust Preventatives and Road Hinders	Prevost Hubbard	1910	John Wiley & Sons, Inc., N. Y. C.
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*	Researches Affecting Design of Roads for Heavy Motor Traffic.	Public Roads, Vol. 3, No. 34	Feb., 1921	B. P. R.
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*	Rural Highways Pavements.	W. G. Harger	1924	McGraw-Hill Book Co., N. Y. C.
*	Simplified Soil Tests for Subgrades and their Physical Significance.	Public Roads, Vol. 7, No. 8	Oct., 1926	B. P. R.
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*	The Bulking of Moist Sands.	Public Roads, Vol. 5, No. 5	July, 1924	B. P. R.
*	The Economics of Highway Grades.	Iowa State College Off. Pub. Bul. 65	Feb., 1923	Eng. Exp. Sta. Ames, Ia.
*	The Effect of Haul on the Cost of Earthwork.	Public Roads, Vol. 5, No. 7	Sept., 1924	B. P. R.
*	The Effect of Moisture on Concrete.	Public Roads, Vol. 6, Nos. 2, 3, 4	Mar., April, 1925	B. P. R.
*	The How and Why of Motor Truck Impact.	Public Roads, Vol. 3, No. 31	Nov., 1920	B. P. R.

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*	The Organization and Equipment of a Concrete Paving Operation	Public Roads, Vol. 6, No. 12	Feb., 1926	B. P. R.
*	The Relative Value of Different Types of Rural Pavements	Public Roads, Vol. 3, No. 33	Jan., 1921	B. P. R.
*	The Six-wheel Truck and the Pavement	Public Roads, Vol. 6, No. 8	Oct., 1925	B. P. R.
*	The Traffic Census and Its Use in Deciding Road Width	Public Roads, Vol. 4, No. 3	July, 1921	B. P. R.
*	The Trend of Highway Design	Public Roads, Vol. 8, No. 1	Mar., 1927	B. P. R.
*	The Value of the Foreman on Fresno and Wheel Scraper Work	Public Roads, Vol. 7, No. 3	May, 1926	B. P. R.
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*	Thin Brick Pavements Studied	Public Roads, Vol. 7, No. 7	Sept., 1926	B. P. R.
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*	Transverse Distribution of Motor Vehicle Traffic on Paved Highways	Public Roads, Vol. 6, No. 1	Mar., 1925	B. P. R.
*	Treatise on Roads and Pavements (3rd Edition)	L. A. Baker	1918	John Wiley & Sons, Inc., N. Y. C.
*	Valuable Study of Movement of Capillary Water in Soil	Public Roads, Vol. 3, No. 28	Aug., 1920	B. P. R.
*	Wear of Concrete Pavements Tested	Public Roads, Vol. 5, No. 3	May, 1924	B. P. R.
<i>Finance</i>				
*	Basic Principles of Highway Management and Finance	T. H. MacDonald	1923	B. P. R.
*	Collection and Disposition of Motor Vehicle Revenues	Public Roads, Vol. 7, No. 11	Jan., 1927	B. P. R.
*	Commercial Vehicles on Free Highways	Thomas H. MacDonald	Oct., 1925	B. P. R.
*	Common Carrier Truck Fees and Taxes	Public Roads, Vol. 6, No. 11	Jan., 1926	B. P. R.
**	Financing Highways and Highway Transportation Lines	G. R. Chatburn	1923	Highways and Highways Transport
*	Highway Finance	A. J. Brosseau		
*	Highway Financing and Taxation	Highway Green Book, 3 A's	1922	American Auto. Asso., Washington, D. C.
*	Highway Management and Financing in the Various States	Highways Green Book, A. A. A	1922	American Auto. Asso., Washington, D. C.
*	Highways and the Taxpayer	A. J. Brosseau	1922	N. A. C. C.
*	Motor Vehicle Fees and Gasoline Taxes	Public Roads, Vol. 5, No. 7	Sept., 1924	B. P. R.
*	Principles of Highway Finance	American Highways	Jan., 1925	A. A. S. II. O.
*	Problems of Highway Finance	Nat. Tax. Asso.	1924	N. A. C. C.
*	Pub. Rd. Mileage and Revenue in the U. S., 1914	Dept. Agric. Bul. 390	Jan., 1917	B. P. R.
*	Rural Highway Mileage, Income and Expenditure	Dept. Agric. Bul. 1279	Mar., 1925	B. P. R.
*	Taxation of Transportation Agencies	U. S. Chamber of Commerce	1923	Chamber of Commerce of the U. S.
*	Transportation and Taxes	John E. Walker	1923	N. A. C. C.
*	Urban Aspects of Highway Finance	Public Roads, Vol. 6, Nos. 11, 12	Jan., Feb., 1926	B. P. R.
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<i>Highway Transport Policies</i>				
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*	Interstate Regulation of Motor Vehicles	C. C. McChord	1926	N. A. C. C.
***	Motor Carrier Regulation	Irwin S. Rosenbaum	1926	N. A. C. C.
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APPENDIX A—PROGRAM OF RECOMMENDATIONS OF SECOND NATIONAL CONFERENCE ON STREET AND HIGHWAY SAFETY

NOTE: The Uniform Vehicle Code, the four Acts separately printed, the two Conference reports and the fourteen committee reports referred to below can be obtained from the National Conference on Street and Highway Safety, Department of Commerce, Washington, D. C.

Traffic Laws and Regulations:

1. A Uniform Vehicle Code, including (1) A Uniform Motor Vehicle Registration Act, (2) A Uniform Motor Vehicle Anti-Theft Act, (3) A Uniform Motor Vehicle Operators' and Chauffeurs' License Act, and (4) A Uniform Act Regulating the Operation of Vehicles on Highways should be enacted by each of the States and the District of Columbia. A suggested model for such a code is endorsed by the Conference and is recommended to the several State legislatures as the basis for uniform legislation on the subject.¹

2. The Uniform Vehicle Code should be supplemented by State administrative regulations which should, as far as practicable, be developed on a uniform basis through cooperative action of the associations of officials concerned, particularly the State highway officials and motor vehicle commissioners, together with joint committees including other public officials and representatives of automobile clubs, scientific organizations and commercial and other bodies concerned.²

3. The Uniform Vehicle Code should further be supplemented by local traffic ordinances with regard to which progress toward uniformity should be sought through State or regional conferences of officials and other persons or organizations interested.³

4. Local traffic ordinances should also be supplemented by the necessary detailed rules and regulations to be established by local authorities, and uniformity in such regulations should be secured through the associations of officials concerned, with the cooperation of other persons and organizations interested.⁴

5. In view of the fact that fatal collisions of motor vehicles with pedestrians, already amounting to 60 per cent of the total number of fatal traffic accidents, are increasing at a rate out of all proportion to the rate of increase in other traffic fatalities, the education and regulation of pedestrians as well as of drivers should be given greater attention than at present. Pedestrians and motorists should bear a considerate attitude each to the other. Along rural highways, wherever there are suitable sidewalks or paths pedestrians should use them. Where there are none, they can generally walk most safely on the left-hand side facing the traffic, having due regard to danger at curves, but should not force motor traffic out of line or otherwise impede it. In cities pedestrians should be instructed, urged and required to keep within the boundaries of designated safety zones and crossing places and, when there is congestion, to cross only with the traffic. Motorists should be required to accord pedestrians safe and dignified use of such safety zones and crossing places. Pedestrians as well as motor vehicle operators should be required to obey the traffic rules and regulations and should be punished by adequate fines for failure to do so.⁵

¹ Report of Committee on Uniformity of Laws and Regulations, 1926, pp. 9-14, 105-125, 205-218, and 305-337. See also report of Committee on Public Relations, 1924, p. 8, on need for a State department or bureau to administer the motor vehicle law; report of Committee on Insurance, 1924, p. 9, conclusion 2, and pp. 14-16, on need for certification of automobile title; report of Committee on Traffic Control, 1924, p. 11, conclusions 14-16, and pp. 22-24, and report of Committee on Causes of Accidents, 1926, p. 8, conclusion 2, and pp. 20-23, on need for examination and licensing of drivers; report of Committee on Traffic Control, 1924, pp. 8-10, conclusions 1-8 and 11-13, and pp. 12-18 and 20-22, on uniform rules of the road; report of Committee on Statistics, 1924, pp. 7 and 8, conclusions 2-5, and pp. 9-27, and report of same committee, 1926, p. 8, conclusion 9, on need for uniform reporting of accidents; report of Committee on the Motor Vehicle, pp. 8-11, 14-16 and 18-19, on regulation of equipment; report of Committee on Enforcement, 1926, pp. 8 and 9, conclusions 9-11 and 15, pp. 17-19, and Appendix A on need for definite and adequate penalties.

² Report of Committee on Uniformity of Laws and Regulations, 1926, p. 14.

³ Report of Committee on Uniformity of Laws and Regulations, 1926, p. 14.

⁴ Report of Committee on Uniformity of Laws and Regulations, 1926, p. 15.

⁵ Report of Committee on Traffic Control, 1924, p. 10, conclusion 12, and pp. 20 and 21; First Conference on Street and Highway Safety, p. 28; Committee on Enforcement, 1926, p. 9, conclusion 16, and p. 20; Committee on Causes of Accidents, 1926, p. 8, conclusion 1, and pp. 12 and 13.

6. Additional legislative and administrative measures should be adopted as hereinafter recommended for enforcement of the traffic laws and regulations, public education in traffic safety, street and highway planning, construction and maintenance, railroad grade crossing protection and elimination, and other measures for improvement of the traffic situation.⁶

Enforcement of Traffic Laws and Regulations:

7. State laws should prescribe a uniform system of enforcement to be applied in part by the State courts and administrative machinery and in part by the local authorities. The necessary special traffic control and traffic patrol police should be provided and the regular police should participate in traffic enforcement. Provision should be made for prompt and thorough collection of evidence and investigation of accidents; for special traffic courts or special traffic sessions of general courts, and traffic violations bureaus with a schedule of penalties for disposing of minor infractions, so as to give the courts more time to deal adequately with more serious cases; uniform permanent records of all convictions of traffic violations and traffic accidents, suspensions and revocations of operators' licenses and refusals to grant licenses; and exchange of detailed information between jurisdictions as to suspensions and revocations of licenses and convictions for serious traffic offenses. Neither the traffic officers nor the court judges should receive any fees from the money collected from traffic convictions.⁷

8. The courts and the police through vigorous enforcement and even-handed treatment of offenders should instill in the public respect for the traffic laws and regulations.⁸

9. Public opinion in support of enforcement should be organized through a representative citizens committee in each locality, forming part of an organized effort of all elements in the community interested in street and highway accident reduction.⁹

Education:

10. Education in safety and accident prevention should be incorporated in the curricula of elementary schools, both public and private, parochial schools, night schools, vocational schools, citizenship schools and schools for non-English speaking adults, and should also be carried on through educational contests, organized playground training, school boy patrols, boy and girl scouts, and juror safety organizations. More advanced training in safety and traffic matters should be developed in secondary schools, normal schools, schools for playground supervisors, engineering schools and universities, including training of traffic engineers.¹⁰

11. A uniform manual should be compiled and distributed for the education of operators of motor vehicles in safe driving practices, divided into two sections, one comprising special instructions to drivers of commercial vehicles and the other special instructions to drivers of private passenger automobiles; and standardized plans should be further developed and put into operation for the education in safe driving and accident prevention of the employees of steam and electric railways, employees of taxicab and motor bus companies, and the drivers employed by operators of commercial vehicles.¹¹

12. Plans should be developed and put into operation for the education in safety of the general public through:

- (a) Newspaper and magazine publicity, including the foreign language press.
- (b) Posters in public places.
- (c) Motion pictures and lantern slides.

⁶ Report of Committee on Uniformity of Laws and Regulations, 1926, p. 15.

⁷ Report of Committee on Enforcement, 1926, pp. 7-9, conclusions 1, 3, 6-7 and 12-14, and pp. 11-16 and 18-20.

⁸ Report of Committee on Enforcement, 1926, p. 8, conclusion 8, and pp. 16-17.

⁹ Report of Committee on Enforcement, 1926, p. 9, conclusion 17, and pp. 21-24.

¹⁰ Report of Committee on Education, 1924, pp. 7 and 8, conclusions 1-5, and pp. 9-15; First Conference on Street and Highway Safety, pp. 30 and 33.

¹¹ Report of Committee on Insurance, 1924, p. 8, conclusion 1b, and p. 12; Committee on Education, 1924, p. 8, conclusion 7, and pp. 16-18; First Conference on Street and Highway Safety, pp. 32 and 33.

- (d) Radio talks.
- (c) Schools for motorists, including both men and women.
- (f) Safe drivers clubs.
- (g) Safety programs or addresses at meetings of various organizations.
- (h) The churches.
- (i) Mass meetings.
- (j) Plans for reaching parents through school children.
- (k) Special campaign.¹²

13. Standardized plans should be developed for the selection and training of traffic officers, and such plans should be put into operation by all communities either alone or in cooperation with other communities, or on a State-wide basis, so that the benefits of such training may be available to the smaller communities.¹³

Statistics:

14. To promote a better understanding of the traffic accident problem and the measures which should be taken for the elimination of accidents, accurate, complete and up to date statistical information should be secured by the duly authorized State officials, or, in large municipalities, by municipal officials, regarding all traffic accidents, with standard definitions of terms and reasonable uniformity in reporting and tabulating schedules, under the following headings:

- | | |
|--|---|
| (a) Location (place and position) | (m) Condition of car or cars at time of accident |
| (b) Time (hour) | (n) Speed of car or cars |
| (c) Type of accident | (o) Primary cause of accident |
| (d) Weather | (p) Contributing causes or circumstances of accident |
| (e) Road conditions | (q) Violation of traffic ordinances or motor vehicle laws |
| (f) Lighting conditions (street) | (r) Age and sex of injured |
| (g) Physical condition of persons involved | (s) Extent and character of injuries |
| (h) Experience of driver | (t) Character and amount of property damages |
| (i) Age and sex of driver | (u) Preventive safeguards recommended |
| (j) Relation of driver to car ownership | |
| (k) Mental condition of driver | |
| (l) What was the driver doing | |

The information secured should be analyzed and the summarized results published promptly and frequently. Accident spot maps should be maintained to detect those points at which accidents occur most frequently and to form the basis for plans to eliminate the conditions which cause accidents.¹⁴

15. To promote popular understanding and attention to the accident problem and stimulate competition between various communities in accident reduction, a comparative index rating of all the States and communities should be set up through the Bureau of the Census with the cooperation of the organizations concerned.¹⁵

16. A contest in accident reduction, based on (a) the performance of each State or community for each year as compared with its previous record, (b) the adoption of measures recommended by this Conference for improvement of traffic control and enforcement, and (c) the provision of improved traffic facilities, is recommended to such organization or organizations as may be able to undertake such a contest.

Causes of Accidents:

17. A comprehensive program of research into the causes of street and highway accidents should be undertaken by a national body qualified for the purpose with the cooperation of other organizations interested, with a view to determining the direct and contributing causes of accidents and the frequency of the various hazards, and with a view to pointing the way to im-

¹² Report of Committee on Education, 1924, p. 8, conclusion 8, and pp. 18-21; First Conference on Street and Highway Safety, p. 34.

¹³ Report of Committee on Education, 1924, p. 8, conclusion 6, and pp. 15 and 16; First Conference on Street and Highway Safety, p. 30.

¹⁴ Report of Committee on Statistics, 1924, pp. 7 and 8, conclusions 2 and 5-9, and pp. 9-17 and 20-27; First Conference on Street and Highway Safety, pp. 10-21; Committee on Statistics, 1926, pp. 8 and 9, conclusions 9 and 10.

¹⁵ Report of Committee on Public Relations, 1926, p. 10.

improvements from the standpoint of safety in design, construction and adjustment of motor vehicles; design, construction and maintenance of streets and highways; traffic laws, regulations, systems, signs and signals; and methods of examining applicants for operators' licenses, including special examinations for professional drivers, persons suffering from physical or mental handicap, and persons who may be brought before the courts or motor vehicle commissioners for repeated traffic violations.¹⁶

Design and Maintenance of Motor Vehicles:

18. Continued effort on the part of manufacturers is urged with a view to improving further the design and construction of motor vehicles and accessories from the safety standpoint, with particular reference to proper road illumination without dangerous glare; construction and location of controls, accelerator and brake pedals to minimize possibility of confusion or uncertainty of application by the driver; greater certainty, durability and readiness of adjustment of brakes; improvement of driver vision, and other safety features.¹⁷

19. A simple and practical inspection chart and code applicable to all makes of motor vehicles, giving particular attention to items affecting safety, should be prepared and issued through the Department of Commerce; and public authorities having supervision of motor vehicles carrying passengers and freight for hire should require adequate inspection and upkeep of such vehicles.¹⁸

Street and Highway Traffic Facilities:

20. A comprehensive traffic improvement program, including urgent immediate items and long-time items, should be undertaken in every community or metropolitan area confronted with a traffic problem. In the preparation of such a program due consideration should be given to the relation of costs to benefits in safety and acceleration of traffic, and the program should be properly worked out and budgeted.¹⁹

21. The traffic improvement program should be based on a thorough traffic survey giving the necessary physical and traffic data and kept up to date, and due attention should be given to city and regional planning and zoning in their effect on traffic. The 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, bypass 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, efficient and complete utilization of street and highway capacity.

A sound financial program should be established which will insure properly balanced progress in such improvements and will properly distribute the burden of providing the necessary funds.²⁰

22. To insure proper planning of traffic facilities and traffic control, to assure cooperation of the different departments of city or local governments concerned and to enlist public support, a traffic planning organization should be created in each city or metropolitan area as follows:

¹⁶ Report of Committee on Causes of Accidents, 1926, pp. 9-11, conclusions 7-14, and pp. 16-23.

¹⁷ Report of Committee on the Motor Vehicle, 1924, pp. 7-18; First Conference on Street and Highway Safety, pp. 27 and 28.

¹⁸ Report of Committee on the Motor Vehicle, 1924, pp. 10-11, and p. 18; First Conference on Street and Highway Safety, p. 28.

¹⁹ Report on Committee on City Planning and Zoning, 1924, pp. 8 and 9, conclusion 8, and p. 19; Committee on Public Relations, 1924, p. 9; First Conference on Street and Highway Safety, pp. 16, 19 and 23; Committee on Metropolitan Traffic Facilities, 1926, p. 10, conclusions 2-4, and p. 19.

²⁰ Report of Committee on Traffic Control, 1924, p. 10, conclusion 9, and p. 18; Committee on City Planning and Zoning, 1924, pp. 7 and 8, conclusions 1, 3, 5 and 7, and pp. 10-18; First Conference on Street and Highway Safety, pp. 21-23; Committee on Metropolitan Traffic Facilities, 1926, pp. 10 and 11, conclusions 5-7, and pp. 19-23.

(a) In each city there should be an official traffic commission, including such officials as the chief of police, city engineer, engineer of the city plan commission, chief of the fire department, 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 having the services of an engineering staff, preferably in charge of a trained traffic engineer, and should prepare a comprehensive traffic plan, make and keep up to date a traffic survey, and recommend a traffic ordinance and regulations or recommend from time to time any necessary modifications in the existing ordinance and regulations.

(b) It will also be of value to have a traffic committee not made up of officials but including representatives of street railway companies, motor bus companies, taxicab companies, trucking organizations, chambers of commerce, automobile clubs and associations, safety councils, merchants' associations 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.

(c) 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.

(d) 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 should be created to control physical growth and provide for proper traffic facilities within large population centers.²¹

23. In street and highway construction attention should be given to adequate roadway width with provisions for pedestrians, adequate rights of way to provide for parking space, for clear view at curves and intersections and for future roadway widening; space for parking off the traveled portion of rural highways, either continuously or at intervals not exceeding 300 feet; reasonable grades of not more than six per cent where feasible on thoroughfares of primary importance; curves of not less than 300-foot radius on highways of primary importance; widening and banking of curves; avoidance of combinations of heavy grades and sharp curves; adequate curb radii and smooth grades at street intersections; cross-sections of the pavement or roadway as flat as drainage conditions will permit; guard railings of substantial type on the shoulder of embankments; clear view of approaching vehicles for at least 300 feet on highways of primary importance, provided by necessary control of private advertising signs on the right-of-way or upon private property near the highway and by the removing of trees, shrubs and sloping banks on or off the right of way at curves and intersections, and the cutting down of sharp hillcrests; bridges at least 22 feet wide, to enable two lines of traffic to pass without difficulty, and suitable provision for the safety of pedestrians on such bridges; careful selection and clear marking of detours and maintenance thereof in safe condition; maintenance in good condition of pavements and roadway shoulders; prompt snow removal from streets and highways of heavy traffic; proper signs, signals and highway surface markings on a uniform basis; and proper illumination of city streets, and of State highways wherever financially practicable.²²

²¹ Report of First Conference on Street and Highway Safety, p. 16; Committee on Metropolitan Traffic Facilities, 1926, pp. 11 and 12, conclusions 8-10, and pp. 24-28.

²² Report of Committee on Construction and Engineering, 1924, pp. 5-8, conclusions 1-2, 4-10, 14-17, 21 and 23, and pp. 9-14 and 18-24; First Conference on Street and Highway Safety, pp. 23-27.

24. Adequate playgrounds throughout the community should be provided, and particularly there should be available a playground for every school as a safety measure to keep the children off the streets. Schools and playgrounds should, as far as practicable, be so located that children will not have to cross busy traffic streets in going to and from them. Adequate provision for skating and coasting, where practicable, should be made in parks and playgrounds, properly lighted and supervised, or on streets set apart, safely marked, and traffic controlled during the hours used for these purposes.²³

Elimination and Protection of Grade Crossings:

25. Elimination of grade crossings, either by relocation of highways or rail lines or by grade separation, which constitutes the only perfect solution of the problem, should be carried on under a proper program, first eliminating the most dangerous crossings on thoroughfares carrying heavy traffic, and with due recognition of the enormous costs involved, which, if elimination were attempted on a wholesale scale, would impose an excessive financial burden resting in the last analysis upon the public. The program should have due regard to the relative costs and advantages of grade crossing elimination and other methods of protection, and should be given the most thorough joint consideration by proper authority. In laying out new highways or railroads, or relocating existing highways or railroads, grade crossings should be avoided or eliminated whenever feasible. In eliminating grade crossings, narrow or obstructed underpasses and sharp turns in the approaches thereto should be avoided. Authority to order grade separations or proper protection at grade crossings should be vested in the commission having jurisdiction over the railroads, and this commission should also determine the proper division of costs between the railroads and the public. The State highway department or other highway authorities should plan the improvement and initiate the proceedings for all highways under their jurisdiction. Time is an essential element and a prompt decision should be provided for in the law.²⁴

26. Railroad crossings remaining at grade should be safeguarded in every reasonable way. Standard warning signs and pavement markings should be used to mark clearly the approaches to all public railroad crossings. Where the volume of traffic requires it, additional protection should be afforded by the use of flagmen, gates or approved electric or mechanical devices standardized as far as practicable. So far as possible a clear view along the track in both directions from both sides thereof should be maintained. The placing of railroad cars near unprotected grade crossings so that the view is thereby obstructed should be discouraged. Sharp curves, abrupt changes of grade, roughness in the pavement or other conditions at or near the tracks which tend to divert the attention of the motorist should be avoided. Properly designated State commissions should be empowered to designate dangerous grade crossings at which motorists must stop.²⁵

²³ Report of Committee on City Planning and Zoning, 1924, p. 8, conclusion 6, and pp. 17 and 18; First Conference on Street and Highway Safety, p. 19.

²⁴ Report of Committee on Construction and Engineering, 1924, p. 6, conclusions 11 and 12, and pp. 15-17; Committee on City Planning and Zoning, 1924, p. 7, conclusion 1a, and pp. 10-11; Committee on Public Relations, 1924, pp. 9 and 10; First Conference on Street and Highway Safety, pp. 16 and 17.

²⁵ Report of Committee on Construction and Engineering, 1924, pp. 6 and 7, conclusion 13, and pp. 17 and 18; First Conference on Street and Highway Safety, 1924 pp. 17 and 26.

APPENDIX B—CHIEF PROVISIONS OF UNIFORM MOTOR VEHICLE
REGISTRATION ACT RECOMMENDED BY NATIONAL CONFERENCE
ON STREET AND HIGHWAY SAFETY

Motor Vehicle Department or Division—The State is to have a vehicle department or division of an existing department, with a motor vehicle commissioner in charge, whose duties are to enforce the provisions of the vehicle act or acts, keep all license and registration records, maintain and publish or post records of suspension and revocation of operators' licenses, and collect, analyze and publish accident statistics.

Registration of Vehicles—All motor vehicles, with the exception of farm tractors, road rollers and road machinery temporarily operated or moved on the highways, must be registered, and number plates must be displayed on the vehicles. Registrations must be renewed annually, and new registrations must be obtained when the ownership of a vehicle is transferred. The act also contains provisions to enable manufacturers and dealers to move vehicles under certain conditions without separately registering each vehicle, to make it possible to obtain duplicates for lost number plates or registration cards, and to enable the department to suspend registrations upon notice of theft or embezzlement of vehicles.

Reciprocity—Complete reciprocal rights and privileges in all States with reference to vehicles registered are provided for non-residents.

For Rent Cars—Owners of motor vehicles for rent without drivers are made liable for the negligence of the drivers of such vehicles, are required to carry public liability insurance, and are required to maintain public records of the identity of persons renting their vehicles and the time such vehicles are in the possession of such persons.

Refusal or Cancellation of Registrations—Registrations are to be refused when the applicant has not complied with the requirements, and registrations are to be rescinded for causes specified. Violations of the registration provisions are made unlawful.

Registration Fees—The act assumes that it is the function of each State to determine the amount and disposition of the registration fees.

Unlawful Taking, Transfer of or Injury to Vehicles—Driving a vehicle without the owner's consent, injuring a vehicle and tampering with it except in an emergency or under the direction of a public officer are made misdemeanors, and knowingly receiving or transferring a stolen vehicle is made a felony.

APPENDIX C—CHIEF PROVISIONS OF UNIFORM MOTOR VEHICLE
ANTI-THEFT ACT RECOMMENDED BY NATIONAL CONFERENCE
ON STREET AND HIGHWAY SAFETY

Certificate of Title Required for Registered Vehicles—No motor vehicle shall be registered unless and until the owner thereof shall apply for and be granted an official certificate of title for the vehicle, or present satisfactory evidence that the department has previously issued a certificate for the vehicle. The department shall issue a certificate when satisfied that the applicant is the owner of the vehicle, such certificate to carry thereon a statement of all liens and encumbrances on the vehicle. Such certificate shall be good for the life of the vehicle so long as the vehicle is owned by the original holder of the vehicle. Duplicate certificates may be issued if the originals are lost.

Endorsement and Delivery of Certificate Upon Transfer of Title or Interest—The owner of a motor vehicle must not sell it unless he has obtained a certificate of title therefor, and when selling a vehicle for which he has such certificate, must endorse on the certificate an assignment and warranty of title with a statement thereon of all liens and encumbrances on the vehicle. The transferee shall present this certificate thus endorsed to the department, and shall apply for and obtain a new certificate.

Refusal to Issue Certificate or Rescission of Certificate—Certificates of title are to be refused when the applicant has not complied with the requirements, and certificates granted are to be revoked for proper reasons.

False Statements and Altering or Forging Certificates—Making a false statement in any application or other document required by the act is made unlawful. Altering or forging a certificate of title is declared a felony.

Anti-Theft Provisions—Police officers must report and the department must maintain a list of stolen motor vehicles. Destroying or altering an engine or serial number is made a felony, except that an owner may restore a number on a vehicle for which a certificate has been granted. Receiving or transferring a stolen vehicle is made a felony.

Dealers in Used Cars—Dealers in used cars must be licensed by the department, and must maintain records of every motor vehicle bought, sold or exchanged.

Auto-Theft Fund—All fees and revenues received under the act are to go into the "Auto-Theft Fund," which is to be used by the department in carrying out the provisions of the act.

APPENDIX D—CHIEF PROVISIONS OF UNIFORM MOTOR VEHICLE OPERATORS' AND CHAUFFEURS' LICENSE ACT RECOMMENDED BY NATIONAL CONFERENCE ON STREET AND HIGHWAY SAFETY

Operators and Chauffeurs Must Be Licensed—No person may drive a motor vehicle upon the highways, either as an operator or as a chauffeur, without first having been issued a license, unless expressly exempt.

Reciprocity—Complete reciprocal rights and privileges in all States, with reference to drivers' licenses, are provided.

Age Limits—Minimum age limits of sixteen years for operators and eighteen years for chauffeurs are established. No person under eighteen is permitted to drive a vehicle in use as a school bus, and no person under twenty-one is permitted to drive a public passenger-carrying vehicle. The application of a minor for a license must be signed by the applicant's parent, guardian or employer, and such parent, guardian or employer is held jointly responsible with the minor for any damages caused by negligence of a minor when driving a motor vehicle, as is the owner of a vehicle a minor is knowingly permitted to operate.

License Restrictions and Examination of Drivers—Besides persons under the legal ages, licenses are not to be issued to any habitual drunkard or narcotic drug addict, or to any person found by the vehicle department to be incompetent to operate a motor vehicle with safety. The department is required to examine every applicant for a license before issuing same, except that it may waive the examination of any person applying for a renewal, or of any person who has operated a vehicle satisfactorily in the State for not less than one year at the time the law goes into effect.

Duration of Licenses—Chauffeurs' licenses are to be renewed annually, but operators' licenses are made valid until suspended or revoked, except that the department may order the renewal of all outstanding operators' licenses not more often than once in three years.

Suspension and Revocation of Licenses—The courts are authorized to recommend suspensions of licenses, but power to suspend or revoke is vested in the department, which may suspend or revoke for reasons which the department deems sufficient, subject to right of appeal to the court. Suspension or revocation is mandatory for certain major offenses. No person whose license has been revoked may receive a new license within one year after such revocation.

Liability for Public Employees—Counties, cities and municipalities are held jointly liable for damages caused by the negligence of their employees while driving in the course of their employment.

APPENDIX E—CHIEF PROVISIONS OF UNIFORM ACT REGULATING THE OPERATION OF VEHICLES ON HIGHWAYS RECOMMENDED BY NATIONAL CONFERENCES ON STREET AND HIGHWAY SAFETY

Driving While Intoxicated—Driving while under the influence of intoxicating liquor or narcotic drugs is declared unlawful and punishable as provided elsewhere in the act.

Reckless Driving—Reckless driving is defined and declared punishable as provided elsewhere in the act.

Speed Restrictions—Subject to the provisions that a vehicle shall not at any time be driven at a speed greater than is reasonable and proper, having due regard to all of the existing conditions, it is declared *prima facie* lawful to drive a motor vehicle at a speed not exceeding fifteen miles an hour in congested districts, twenty miles in residential districts, and thirty-five miles in the open country. Exceeding these speeds is declared *prima facie* unlawful. Local authorities are authorized to increase the speed limits on through traffic highways properly safeguarded, and the speed limits are declared not applicable to certain emergency vehicles. Provisions are made for special speed limitations according to weight and tire equipment, and for special limitations on bridges.

Railroad Grade Crossings—Failure to obey railroad warning signals is declared unlawful, and the proper State authorities are empowered to designate certain grade crossings at which all vehicles must come to a complete stop.

Driving on Right Side—Vehicles are required to drive on the right side where possible, and particularly at intersections and railroad crossings. Slow moving vehicles must keep as close as possible to the right hand edge or curb of the highway.

Meeting of Vehicles—Vehicles meeting must pass each other to the right, each driver giving the other at least half of the traveled way where possible.

Overtaking a Vehicle—Vehicles overtaken must be passed on the left. A vehicle in overtaking must not be driven to the left of the center of the highway unless the left side is clearly visible and free from oncoming traffic for a sufficient distance ahead to permit such overtaking in safety. Overtaking is prohibited at highway intersections or railroad crossings, and on curves and on the crests of hills where the driver's view along the highway is obstructed within 500 feet. Vehicles being overtaken must give way to the right when signaled.

Following Too Closely—One motor vehicle must not follow another more closely than is reasonable and prudent. Outside of business and residence districts one motor truck must not follow another motor truck within 100 feet.

Turning at Intersections—Drivers of vehicles intending to turn to the right at intersections are required to approach such intersections in the lane of traffic nearest the right hand side of the roadway. Those intending to turn to the left are required to approach in the lane to the right of and nearest the center line, and to pass to the right of the center of the intersection. Local authorities may modify these rules by placing suitable markers or direction signs.

Signal on Starting, Stopping or Turning—Drivers intending to start, stop or turn must first see that they can do this in safety and must give a signal either with an approved mechanical or electrical device or by extending the arm horizontally beyond the left side of the vehicle.

Right of Way—Except at through traffic highways, and except in the case of fire, police or other emergency equipment, vehicles approaching an intersection are required to yield the right of way to vehicles approaching the intersection at approximately the same time from the right. Except as controlled by traffic officers or traffic signals, vehicles are required to yield the right of way to pedestrians on marked crosswalks or regular pedestrian crossings included in the prolongation of sidewalk lines at the ends of blocks; elsewhere in the roadway pedestrians are required to yield the right of way to vehicles.

Through Highways—The public authorities are empowered to designate certain through highways and erect "stop" signs at the entrances thereto from all intersecting highways, and all vehicles must come to a full stop before entering or crossing such through highways from an intersecting highway.

Passing Street Cars—Street cars must not be overtaken on the left when a travelable portion of the highway exists on the right. The driver of a vehicle overtaking a street car stopped or about to be stopped to receive or discharge passengers must stop not less than ten feet in the rear of the street car and not proceed until any passengers have boarded the car or reached the adjacent sidewalk, except that where a safety zone has been established, or where the traffic is controlled by an officer or traffic signal, they may proceed with caution, at a speed not greater than ten miles per hour.

Driving Through Safety Zone—Driving through a safety zone is prohibited whether or not the zone is occupied.

Stopping on Highway—Except in case of an emergency, stopping or parking on the traveled portion of a rural highway is prohibited when it is practicable to stop or park off the traveled portion.

Stopping and Reporting in Event of Accidents—Drivers are required to stop immediately in the event of accident, give their names, addresses and license and registration numbers and render reasonable assistance to injured persons, and to report serious accidents to the Department or other designated authorities within twenty-four hours. Garage keepers are required to report damaged vehicles within twenty-four hours.

Size, Weight, Construction and Equipment—General provisions controlling the size, weight, construction and equipment of vehicles are provided, and the Department is authorized to supplement these provisions with regulations as the conditions require. The subjects covered include size and weight of vehicles and loads, tire equipment, trailers and towed vehicles, brakes, horns and warning devices, mirrors, windshields, muffler cut-outs and lighting equipment. Required and additional permissible lighting equipment is indicated, and the requirements as to head lamps and auxiliary driving lamps, test and approval of lamps and the enforcement of the provisions are set forth. Requirements for lights on parked vehicles are indicated, and red and green lights visible from the front are prohibited.

Penalties—Penalties are provided for misdemeanors under the act and special penalties, including specified minimum penalties and higher minima for second or subsequent convictions, are provided for driving while intoxicated, reckless driving, failure to stop in event of accident involving personal injury or death, and felony. These penalties for major offenses are in addition to the mandatory revocations of licenses provided in the proposed Uniform Motor Vehicle Operators' and Chauffeurs' License Act.



AND WEIGHT RESTRICTIONS RECOMMENDED
 MOTOR VEHICLE CONFERENCE COMMITTEE

Size Restrictions

1. Width, including load, 96 inches. (Traction engines 108 inches.)
2. Height, including load, 14 feet 6 inches.
3. Length, including load:
 - a. Single vehicle, 33 feet.
 - b. Combination of vehicles, 85 feet.

NOTE.—From the foregoing it is apparent that in order to admit of the safe passage of two vehicles each of which with its load is 96 inches wide, a highway at least 20 feet in width is desirable.

Weight Restrictions

1. Single vehicular unit of four wheels or less. (Tractors and semi-trailers to be regarded as separate units)..... 28,000 pounds
2. Any one axle of the vehicle or any additional axles or semi-trailers or trailers 22,400 pounds
3. Per inch width of tire measured between flanges of the rim in case of solid rubber tires.

Size of tire	Load per inch (Maximum)
3".....	400 pounds
3½".....	400 "
4".....	500 "
5".....	600 "
6".....	700 "
7".....	750 "
8".....	800 "
10".....	800 "
12".....	800 "
14".....	800 "

4. Minimum thickness of rubber for solid rubber tires:

3"; 3½"; 4"; 5" Tires.....	¾"
10"; 12"; 14" Tires.....	1½"
6"; 7"; 8" Tires	1"