THIRD SESSION

FRIDAY, DECEMBER 5, 1924, AT 10:30 A. M.

A J Brosseau, Presiding
Mack Trucks Inc , New York City

Chairman Brosseau Gentlemen, before proceeding with our program I want to express to all of you, and particularly to the Committee on Arrangements, my appreciation for the opportunity of presiding at this meeting It is a very high honor and I appreciate it I would say that I have had contact with the work of the Board for some time, and have participated in a very small way, especially in the study of highway transport I am glad that it appeals to so many activities and professions and I am very confident that some of us will in the near future have occasion to be very well satisfied with the solution that will come, and to be proud of the part we took in it

The first paper on this morning's program will be a report of the Committee on Highway Traffic Analysis

REPORT OF COMMITTEE ON HIGHWAY TRAFFIC ANALYSIS

Chairman, G E Hamlin
Connecticut State Highway Commission, Hartford, Connecticut

Your Committee No 4, on Highway Traffic Analysis, submits the following reports on the assigned subjects

REPORT ON A STUDY OF THE INCREASE IN MOTOR VEHICLE REGISTRATION TO DETERMINE FACTORS FOR FORECASTING FUTURE TRAFFIC AND A SATURATION POINT

Future traffic —During the past year the Committee has thoroughly investigated the practicability of determining a factor for forecasting future traffic based on an increase in motor vehicle registration It has been found that the future traffic on any given highway is a function of many variables such as, (1) the relation of the given highway to other highways of national, state, county, township, or municipal systems, (2) width, grade, type of wearing surface, character of maintenance, including snow removal, lack of safety accessories, etc , (3) motor vehicle legislation relative to speeds and licenses and physical characteristics of motor vehicles, (4) state and urban traffic regulations, (5) density of traffic, (6) character of vehicles using a given highway; (7) population and wealth per capita, (8) present and future commercial transport developments, (9) character of termini of certain highways, (10) competing and cooperating carriers such as steam and electric railroads, water transportation facilities and motor bus lines; (11) increase in the utilization of motor vehicles as indicated by registration statistics; and (12) several miscellaneous factors It is self-evident, therefore, that the future traffic on a given highway is dependent upon many local conditions and that it is impracticable to determine a factor, based on motor vehicle registration, for forecasting future traffic which would be anything but misleading from the standpoint of general application

The Committee recommends that the determination of the future traffic on a given highway be based only upon a comprehensive highway transport survey which shall include all investigations in the field and office that are necessary to ascertain the probable amount and character of the future traffic which will use a given highway during the lives of its several component parts

Saturation point—The Committee believes that the first point of attack in connection with the determination of a factor for forecasting a saturation point in the utilization of motor vehicles is to adopt some definition for saturation The Century Dictionary states that "saturation is the act of saturating or supplying to fullness, or the state of being saturated " Further, it states that "saturate (in chemistry) is to impregnate or unite with till no more can be received," and that "saturate (in physics) is to magnetize to saturation, or so that the intensity of its magnetization is the greatest which it can retain "

Granted normal increases in population in the United States and in each of the states of the Union, the Committee is firmly of the opinion that there will be no saturation point in the utilization of motor vehicles within our life time, except in congested urban districts Statistics show that the population has increased in the United States per decade during the past 50 years from 15 per cent to 30 per cent It is, therefore, logical to assume that even in California, where there is now one motor vehicle to every three persons, the saturation point, as defined by the Century Dictionary, has not been reached, nor is it liable to be reached in the near future as indicated by the growth in population from 1,486,000 in 1900 to 2,378,000 in 1910, and to 3,427,000 in 1920 These remarks refer particularly to automobiles, but in the field of utilization of motor trucks we are at present much further from the time when it is justifiable to discuss a saturation point with reference to this class of vehicles

At the present time, statistics pertaining to the registration of motor vehicles and to the number of people per car in a given community give but little valuable information for determination of a saturation point. For example, the following statistics are quoted covering states which varied to a marked extent in the persons per car in 1920

It is self-evident that the saturation point in the utilization of motor vehicles in any given community will also depend on such factors as (1) wealth and income per capita, (2) status of highway improvement, (3) parking restrictions in municipalities, (4) compulsory liability insur-

IOWA

Year	Total registration	No of people per motor vehicle
1920	437,000	5 5
1921	461,000	5 2
1922	500,000	4 8
1923	571,000	4 0
TEXAS		
1920	428,000	10 9
1921	468,000	9 9
1922	526,000	8 9
1923	688,000	7 0
NEW YORK		
1920	670,000	15 5
1921	779,000	13 3
1922	1,002,000	10 4
1923	1,204,000	9 0
ALABAMA		
1920	75,000	31 4
1921	82,000	28 5
1922	90,000	26 1
1923	126,000	19 0

ance, (5) financial policies pertaining to highway improvement, (6) tendency to use higher-priced cars and not to trade in motor vehicles, as frequently as has been the practice, and (7) development of bus lines and school busses, the former particularly affecting the use of cars by salesmen, and both affecting residents of rural communities who do not consider that they can own both a family car and a motor truck, the latter being considered a necessity in the operation of many farms.

The Committee, therefore, has come to the conclusion that, except in congested urban districts it is useless to endeavor at the present time to consider further the determination of a factor for forecasting the saturation point in the ultilization of motor vehicles in any community

A STUDY OF THE WIDTH OF HIGHWAY REQUIRED TO BE CONSTRUCTED FOR THE ESTIMATED LIFE OF THE TYPE OF CONSTRUCTION

"A study of the width of highway required to be constructed for the estimated life of the type of construction" resolves itself into a study of the probable development of future traffic For the past ten or fifteen years we have been in a period of transition of motor transportation

Until very recently there was no basis for prediction as to the development of this new form of transportation, nor until the last few years was there any attempt at uniform regulation of traffic or of the type and size of vehicles—conditions which in part account for the inadequacy of many of the older highways. However, under present conditions with regulation of the type and size of vehicles and the growing control of traffic on the highways, we are enabled to arrive at reasonable assumptions from which to guide road design so as to avoid waste in construction This, of course, involves an analysis of the probable source, destination, and character of the traffic based upon a liberal survey of the territory to be served or which is tributary to the road. In general, the following features must be considered

First, is the road primarily for local or for interurban service? If for local use, what is the tributary area, the density of population, the character of future tonnage, and is there a probability of the road becoming a recreational route? In other words, will construction of a local road, by reason of the character of the country, develop market-gardening, dairy business, etc , or bring about pleasure or resort traffic in addition to the normal traffic, and if so, to what extent? Ordinarily a road which may be classed as local, i e , 500 to 1,000 vehicles per day, requires a minimum width of 18 feet of travel-way to provide for two lines of traffic, of which only a small per cent consists of busses or trucks, and with a total width between edges of gutters or ditches of not less than 30 feet to allow parking of vehicles outside of the travel-way The drainage structures on such a road should be preferably not less than 30 feet clear width, but never less than the combined width of travel-way and shoulders

If the road is in the nature of a through or interurban route or may so develop, the case is more difficult, especially if the road is on the line of interstate or long distance travel, for the development of this transportation cannot be so easily predicted Generally speaking, however, the same treatment of the subject applies as in the case of local roads, that is, an analysis must be made of the source, destination and probable character and volume of the passenger, express or freight business to be served.

Between the local road and the heavily traveled road there may exist a class of road relative to which there is insufficient evidence at hand to determine the operating safety of the three-lane road. The Committee considers that the desirability, or lack of desirability, of such a road should be the subject for further investigation before a recommendation can be made concerning the three-way road

Between congested manufacturing or industrial areas which will introduce a large volume of express and freight business that must move with considerably less speed than the passenger traffic, the travel-way should be designed so as to provide for at least four distinct lanes for traffic

It is imperative that highway authorities should study the question of adequate rights-of-way to provide for future highway needs, and that immediate steps be taken toward the establishment of present property lines and the acquisition of needed rights-of-way for future traffic developments. The Committee considers the subject of adequate right-of-way widths as a major topic in its program for the coming year.

A STUDY OF THE ECONOMIC VALUE OF ELIMINATION OF BOTTLE-NECK POINTS IN RELATION TO THEIR RESTRICTIONS OF MAXIMUM ROAD CAPACITY

The increase in the number of motor vehicles using a heavily traveled highway has caused a condition where, by numbers alone, the road capacity has been reduced Observations taken over such a highway during a particularly congested period have made it apparent that the reduction of speed due to any physical cause materially reduces the road capacity. Two specific instances are cited as possibly typical of this conclusion.

In Connecticut, on the Hartford-New Haven Road, at what is known locally as the Yalesville Underpass, the main road passes through an arch culvert entering by a right angle turn with a sight line restricted to 25 feet Traffic flow tests at this point during congested hours showed that the average speed was between 10 and 15 miles per hour with a considerable element of danger To eliminate this condition, a new concrete highway was built on a long curve approaching the underpass, with a clear vision of not less than 350 feet Tests made during one of the football games at New Haven, showed the passage of vehicles through the underpass at an average speed of 25 to 30 miles per hour with safety and convenience. Under previous conditions, slowing of the line of vehicles was observed for a distance of more than a mile to the north of the underpass. After the construction of the new roadway, no slowing of the vehicle speed was noticed on either side of the underpass, the average speed being maintained through this section practically as well as on the tangents to the north and south.

Another case in point occurred at the entrance to Bridgeport, where the raising of the draw-bridge for a period of four minutes resulted in a line of waiting cars four and five abreast for a distance of over one-half mile.

Many studies are being made at the present time to counteract these conditions and wider and secondary roads are being planned, where in many cases, economic value cannot be shown It being considered that the cost of such a road may approximate $100,000 per mile, enough care is not being taken to determine whether, by the expenditure of small sums locally, the free movement of the vehicle over any particular section of highway may not be maintained at a minimum cost

If, through a point of local congestion, the average speed per hour is restricted from 30 miles to 15 miles, the number of vehicles actually using this section of highway will be reduced materially, this point of congestion or retardation being responsible to a large extent for the slowing and irregularity of traffic throughout the entire length of the highway

With these facts in mind, the economic study of each road should include a survey which will develop points of congestion or retardation A study of each of these points will, in turn, develop the method to be employed to relieve the congestion at a minimum expense The relief of such determining points will include the flattening of all curves of short radius, together with the widening of the travel path, the removal of any obstructions to a clear vision on the inside of a curve, the widening of rock and earth cuts to the maximum width of highway elsewhere found, the compounding of vertical curves to increase the sight line at hill crests, the banking of all curves to conform with the average speed of traffic, and the proper marking and signing of all highways so that the travel may be furnished with an accurate fore-knowledge of road conditions to be encountered

In addition, a minimum speed limit on highways with four or more traffic lanes should be determined and enforced by law As stated in last year's report, it is probable that to the slow-moving vehicle can be charged the larger proportion of accident cases upon highways outside of urban districts

On a highway properly constructed, maintained and controlled, and furnished with suitable signs, the maximum speed can be raised to a point where the road capacity will be increased to a large extent, yet with safety and convenience Vehicular speed materially affects road capacity It therefore follows that to any one point of congestion or to slow-moving vehicles may be charged the restriction of free, quick, and safe passage over a highway

The Committee recommends that the problem of grade crossings and single lane bridges on two-way highways are subjects requiring immediate investigation and report.

SELECTION OF TYPE
BASED ON TRAFFIC REQUIREMENTS

Your Committee wishes to stress the need of a careful economic study of the relation of highway design to traffic needs during the estimated life of any particular type of wearing course and the annual costs of different types of wearing courses, before making highway expenditures The view is too prevalent that the high class, expensive type of pavement is the solution of all road problems It is not so necessary to trace the origin of this view, as to combat it with known facts It is poor engineering to underdesign, but still poorer engineering to overdesign Available highway funds are so limited that many miles of wearing courses capable of carrying traffic 365 days in the year are more needed than a few miles of high class pavement overdesigned for the particular traffic to be carried during the life of the type of pavement used There is a place for the high type pavement, and as traffic increases on a particular highway the investment in such pavement will be justified.

HIGHWAY TRANSPORT SURVEYS

I Purposes of a Transportation Survey

(1) *Highway administration and engineering data—*

1 To determine daily, seasonal and yearly traffic density and distribution on state highway systems
2 To estimate future traffic on state highway systems
3 To determine the relation of traffic density to the factors responsible for the growth of traffic, such as motor vehicle registration, production and population
4 To classify highways as industrial, high, medium or low type traffic routes and to determine design requirements based on (1) passenger car and motor truck density and (2) motor truck capacities, gross loads and prevailing wheel loads
5 To determine highway width in proportion to traffic.
6. To estimate the extent to which the improvement of old or the opening of new traffic routes is economically justified
7 To correlate traffic loads and density on the highways with highway construction and maintenance costs
8 To determine the type and volume of traffic on the highway as an index to the allocation of highway construction and maintenance funds
9 To determine the amount and frequency of motor truck overloading
10 To compare the cost of various types of highway improvements such as re-locations, grade reductions, elimination of grade crossings (both rail and highway), traffic "bottle necks," with the estimated saving in transportation costs resulting from such improvements
11 To compare the earning value of the state highway system (based on passenger miles and freight ton miles) with the present worth of the highway system using replacement value minus depreciation as the basis of computing present worth

(2) *Highway economic data—*

1 To obtain highway transportation information concerning the volume of tonnage shipped by motor truck and the relation of highway transportation to other types of transportation
2 To determine the mileage zones of motor truck haulage
3 To determine the situs of ownership of passenger cars and motor trucks operating over the highway systems.
4 To estimate the value of motor truck net tonnage hauled over the highway systems.
5 To determine the type of origin and destination as well as the origin and destination of net tonnage of commodities transported by motor truck over the highway systems

6 To estimate passenger car business and non-business usage of highways
7 To determine the proportion of farm traffic on the highways

II. Costs of a Transportation Survey

The cost of a survey which will furnish data to adequately answer the purposes outlined above will vary with the size of the state, the mileage of highways, relative density of traffic, and the thoroughness with which the highway system is surveyed The cost will be divided approximately as follows

1. *Administration and analysis of data, 15–25%*
2 *Field expenses, 75–85%.*
    1. Equipment, 15%
    2 Salaries of field personnel, 60–70%

III. Typical Organization of Highway Transportation Survey

(1) *Highway Transport Engineer*—

Duties Responsibility for planning and direction of the survey and supplementary data

1 Assistant Transport Engineer
2 Office Personnel
   Duties Responsibility for direction of office force in analyzing of survey data and obtaining additional data to supplement the traffic survey records

(2) *Field Manager*—

Duties Responsibility for field work, general supervision and inspection

1 Division Supervisors
   Duties Responsibility under Field Manager for successful operation of one section of area surveyed In states the size of Pennsylvania or Ohio, about one-fourth to one-third of state
   Close and regular inspection and supervision of parties operating in Division Detailed inspection of all data obtained in Division. Each Division Supervisor has supervision of from three to six operating parties.
2. Operating Parties
   Duties To record prescribed data at specified locations Parties vary in size from 2 to 8 men and are under a party chief who is responsible for the efficient operation of his party. Operating parties are of two types.
   a Recording parties Complete density records on all types of vehicles, detailed information on passenger cars, and detailed information except weights on all trucks.
   b. Weight parties. All data recorded by recording parties and weight data on all trucks.

Weight parties operate a sufficient number of stations to obtain samples of truck weights in sufficient numbers to determine accurate average weights, and accurate distribution of weights on various roads Under average traffic conditions from 30 per cent to 50 per cent of all stations should be weight stations

3 Operation.

Each station is operated for a ten-hour period one day each month The schedule of operation is so arranged that operations cover each day of the week Hours of operation are so arranged that adequate records are obtained for all hours of the day

IV Equipment Required

Motor vehicles.

Automobiles for Field Manager, Assistant Field Manager, and Division Supervisors.

Light trucks (speed wagons) for weight parties

Light cars for recording parties.

Portable scales for weight parties

"Drive On" Loadometers or Berry scales

Tally clickers for recording density

Miscellaneous small equipment, traffic signs, etc

V. Data Recorded.

(1) *Weighing Stations—*

At these stations the following data will be recorded·

a. Trucks.

Density per hour, State of license, situs of ownership, make, capacity, body width, body type, origin and destination, type of origin and destination, commodity, value of load, type of trucking (commercial trucking company or owner operator), gross weight, front and rear axle weights, empty weight, tire type, tire size, tire depth, and tire impression on pavement.

b Passenger cars

Density per hour.

c Passenger busses.

Density per hour, State of license, passenger capacity, number of passengers, name of operating company, origin and destination, mileage, trip time and tire types

d Horse drawn vehicles.

Density per hour, origin and destination, type of origin and destination, time, commodity

(2). *Recording Stations—*

a At these stations all data are recorded similar to weight stations except truck weights and tire information.

(3). *Passenger car data—*

Such data will be obtained by sampling passenger car traffic at all stations This data will include

State of license, make, type of body, number of passengers, business and non-business usage, long distance touring, situs of ownership, origin, destination

VI DATA FORMS

(1) *Truck Weight Sheet.*
(2) *Truck Recording Sheet*
(3) *Passenger Car Data Sheet*
(4) *Density—Passenger Cars*
(5) *Density—Busses and Horse Drawn Vehicles*
(6) *Empty Weight Card*

It is the recommendation of this Committee that each state conduct a highway transportation survey for the purpose of obtaining traffic data for use as an aid in determining the construction and maintenance program and the planning of the future highway program of the state. The minimum recommended for any state is accurate traffic density records at selected key traffic stations taken regularly each year or two as an index of traffic over the highway system

THE USE OF HIGHWAY TRANSPORT SURVEY DATA IN THE CLASSIFICATION AND DESIGN OF HIGHWAYS

There is no better index of the type of motor truck traffic over highway routes than the relative distribution of motor trucks in the light, medium, and heavy capacity groupings The capacity of a motor truck regulates, to a large extent, the net tonnage and, consequently, the gross tonnage transported by that truck A predominating percentage of light or heavy truck capacities on a highway route will regulate in the same way the tonnage transported over that route by trucks

In different areas, however, the average tonnage per truck is modified by the predominating types of commodities and also by the practices in truck loading Although it is possible to determine the type of motor trucking over highway routes on the basis of truck capacities, it is also necessary to include an analysis of motor truck gross loads and to give special consideration to extremely heavy gross and wheel loads

An analysis of motor truck capacities and gross loads, supplemented by wheel load evidence, determines the type of truck traffic on highway routes and, supplemented by truck and passenger car density, indicates the volume of traffic By comparing the type and volume of traffic and including an analysis of future traffic, the relative importance of highway routes can be determined and the routes can be classified as industrial, high, medium, or low type traffic highways. The type of highway construction, design, and width necessary adequately to serve the traffic can then be reasonably determined

The following tables show the percentage distribution of motor trucks, by capacity and gross weight groups, on the highways of the states of Pennsylvania and Connecticut, and those of Cook County (Illinois)

TABLE I

Capacity and Gross Weight Group Distribution of Loaded Motor Trucks Pennsylvania Highways

Capacity Groups (Tons)	Route 20	Route 21	Route 43	Route 84	Route 86	Route 87	Route 108	Route 128	Route 142	Route 156	Route 180
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
½–1½	58 2	79 1	73 1	85 2	74 6	75 4	60 5	57 3	44 1	63 9	52 9
2 –2½	25 1	11 7	10 2	8 4	14 6	11 5	24 7	19 1	20 9	16 9	14 7
3 –4	8 9	6 9	6 4	6 4	6 1	10 4	10 0	12 9	12 8	7 9	12 0
5 –5½	7 8	2 3	7 4	0 0	4 7	2 7	4 8	10 6	21 3	11 0	20 1
6 –7½	0 0	0 0	2 9	0 0	0 0	0 0	0 0	0 1	0 9	0 3	0 3

Gross weight Groups (Pounds)	Route 20	Route 21	Route 43	Route 84	Route 86	Route 87	Route 108	Route 128	Route 142	Route 156	Route 180
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
18000 & under	94 3	98 6	89 1	98 1	94 4	95 4	96 6	92 1	85 2	90 5	89 1
18001–24000	4 8	1 2	8 3	1 9	4 7	3 8	3 2	6 5	8 2	6 4	9 2
Over 24000	0 9	0 2	2 6	0 0	0 9	0 8	0 2	1 4	6 6	3 1	1 7

Pennsylvania Highway Routes

No	Name	No	Name	No	Name
20	Pittsburgh–Greensburg	86	Erie–Cleveland, O	142	Lincoln Highway Philadelphia- Ardmore
21	Trout Run–Blossburg	87	Erie–Buffalo, N Y	156	Doylestown–Phillipsburg
43	Lincoln Highway Gettysburg-Chambersburg	108	Pittsburgh-Washington	180	Philadelphia-Chester
		128	Lincoln Highway Lancaster-York		
84	Erie-Meadville				

TABLE I—(*Continued*)

Connecticut Highways					Cook County Highways			
Capacity groups (Tons)	Route 1 Per cent	Route 2 Per cent	Route 3 Per cent	Route 12 Per cent	Capacity groups (Tons)	State Route 6 Per cent	State Route 42 Per cent	State Route 68 Per cent
½-1½	46 5	52 5	56 2	58 8	½-1½	64 6	46 3	58 9
2 -2½	20 1	17 1	12 6	16 7	2 -2½	16 6	16 6	11 9
3 -4	10 4	9 7	11 5	7 7	3 -4	13 0	13 6	13 5
5 -5½	21 4	20 3	16 9	13 8	5 -5½	4 8	19 0	7 0
6 -7½	1 6	0 4	2 8	3 0	6 -7½	1 0	4 5	8 7
Gross weight groups (Pounds)	Route 1 Per cent	Route 2 Per cent	Route 3 Per cent	Route 12 Per cent	Gross weight groups (Pounds)	State Route 6 Per cent	State Route 42 Per cent	State Route 68 Per cent
18000 & under	82 8	84 7	84 6	87 5	18000 & under	94 7	79 5	87 1
18001-24000	14 9	13 4	13 2	10 6	18001-24000	5 3	7 6	11 4
Over 24000	2 3	1 9	2 2	1 9	Over 24000	0 0	12 9	1 5

Connecticut Highway Routes		Cook County Highway Routes	
Number	Name	Number	Name
1	NewYork-New Haven	6	Roosevelt Road
2	Hartford-Springfield	42	Indianapolis Avenue
3	Plainville-Hartford	68	Chicago-Waukegan-Milwaukee Road
12	Norwich-Putnam		

Of the Pennsylvania highways analyzed, Route 142, the Philadelphia-Ardmore section of the Lincoln Highway, has the heaviest truck traffic On this Route 22 2 per cent of the total trucks are of 5-ton capacity or larger and 14 8 per cent of the total gross loads are over 18,000 pounds. On Route 180, the Chester-Philadelphia Highway, 20 4 per cent of the total trucks are of 5 to 7½ ton capacity, and 10 9 per cent of the total gross loads are over 18,000 pounds These routes, having a very high percentage not only of large trucks but also of heavy gross loads, can be classified as industrial highways

Examples of high type traffic routes in Pennsylvania are Route 43, the Gettysburg-Chambersburg section of the Lincoln Highway, Route 128, the Lancaster-York section of the Lincoln Highway, and Route 156, the Doylestown-Phillipsburg Highway. The 5 to 7½ ton trucks are 10.3 per cent of the total traffic on Route 43, 10 7 per cent on Route 128, and 11 3 per cent on Route 156 The gross loads over 18,000 pounds are 10 9 per cent of the total loads on Route 43, 7 9 per cent on Route 128, and 9 5 per cent on Route 156

The heavy traffic on these routes is a sharp contrast to traffic on Route 84, the Erie-Meadville Highway. Of the total trucks on this route none are over 4-ton capacity and only 14 8 per cent are over 1½-ton Of the total gross loads only 1 9 per cent are over 18,000 pounds, and there are none over 24,000 This route can be classified as a medium type highway.

The wide variation between heavy truck traffic on one highway and extremely light traffic on another shows clearly the necessity for different types of highway construction and design to meet traffic needs It indicates the necessity of the classification of highways on the basis of motor truck capacities and gross loads and the subsequent construction and design of highways on the basis of such classification.

Similar comparisons and classifications can be made for Connecticut, and for Cook County, highways Of the total trucks on State Route 42, Indianapolis Avenue, in Cook County, 4 5 per cent are 6–7½-ton capacities and, 19 per cent are 5-ton capacities Extremely heavy trucking on this route, as compared with other Cook County highways, is further exemplified by the fact that 12 9 per cent of the total gross loads are over 24,000 pounds, and 20 5 per cent are over 18,000 pounds

In comparison with traffic on Indianapolis Avenue, the truck traffic on Roosevelt Road (Cook County) is relatively light Of the total trucks only 1 per cent are over 5½-ton and 5 8 per cent over 4-ton Of the total gross loads none are over 24,000 pounds and only 5 3 per cent over 18,000 pounds Here, again, is shown the necessity of variation in highway construction and design on the basis of motor truck capacities and gross loads.

The distribution of motor trucks by capacity and gross weight groups on Connecticut highways is fairly uniform, the New York-New Haven section of the Boston Post Road having the highest percentage of large trucks (5-ton and over) and also the highest percentage of gross loads over 24,000 pounds

A comparison of Pennsylvania, Cook County, and Connecticut highways shows the effect of variation in the predominating types of commodities and practices of motor truck loading It indicates that main, through highways and sections of highways near or between large centers of population carry the heaviest traffic, viz , sections of the Lincoln Highway in Pennsylvania, Indianapolis Avenue in Cook County, and the Boston Post Road in Connecticut It illustrates the classification and, finally, the economic construction and design of highways on the basis of motor truck capacities and gross loads.

The report of the Committee on Highway Traffic Analysis was discussed by John Mackall of the Maryland State Road Commission. In his talk, Mr Mackall pointed out that it is to be hoped that the Committee will recommend some definite road width intermediate between 18 and 35 feet The slow-moving vehicle was condemned and a plea made for the establishment of a minimum speed limit In closing, the speaker said, "I hope that this Research Council will drive home the fact that it is time we knew the cause of accidents upon the highway, and stop substituting the guess of the highway administrators "

Arthur H Blanchard of the University of Michigan, in his paper on "Comprehensive Research Program Justified Because of Increase in Efficiency in Highway Transport," brought out the necessity of research to help in the highway development The speaker offered his opinion that the highway departments would save their commonwealth many times their investment if they would annually set aside for research an amount equal to one-half of one per cent of the total amount available for highway improvement

Chairman Brosseau The next report is that on the Character and Use of Road Materials