

# REPORT OF DEPARTMENT OF TRAFFIC

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## REPORT OF COMMITTEE ON TRAFFIC REGULATION IN MUNICIPALITIES

### ONE-WAY STREETS

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#### SYNOPSIS

Additional data appear to confirm the preliminary findings of the 1937 report to the effect that the designation of streets, hitherto utilized for two-way movement, for one-way traffic may make available additional lanes, may nearly double the capacity and may materially increase the average running speed. Reduction in accidents, particularly between intersections, of as much as 50 per cent may be expected. Progressive signalization and control of speeds is greatly facilitated. Public approval is widespread following a few scattered dissensions during the early days of the change. With adequate information afforded the public, the new regulations are easily enforced.

The particular attention of the Committee during the past year has been directed toward the securing of additional data in an effort to confirm certain indications that appeared outstanding in the 1937<sup>1</sup> report.

The meager evidence then available tended to show that the designation for one-way movement of streets hitherto utilized for traffic in both directions has the effect of—

- 1 Increasing capacity
- 2 Increasing speed
- 3 Reducing accidents
- 4 Facilitating progressive signalization

During the past year traffic engineers, police officials and others in several cities have cooperated with the chairman in collecting such data as are available in an effort to provide information supplementary to the two streets in Philadelphia named in last year's report.

Detailed statistics on this subject are now available from six cities, relating to eleven separate streets, and general data from seven other cities.

In one city (chosen as a sort of labora-

tory) for which data are not included herein, rather elaborate studies have been made of "before" conditions on a number of streets some of which will soon become one-way. The "after" conditions will be studied at a period sufficiently far in the future—one year or more—to supply accurate information on the direct comparative basis desired.

Figures 1 and 2 showing effective one way use of streets were submitted by Otto K Jelnak, Traffic Engineer, Chicago Park District.

#### SUMMARY OF FINDINGS

*Capacity* Six streets now utilize three lanes for moving traffic where formerly but two lanes could be used, one street now utilizes four lanes and one four-lane street now carries six lanes of traffic.

Traffic volumes in all the lanes have been increased from 20 to 300 per cent, averaging about 93 per cent.

The average increase apparent in city-wide traffic during the same periods approximates 12 to 20 per cent.

*Speed* Six streets having an average speed of from 9 to 17.7 miles per hour before change attained a running speed

<sup>1</sup> Proceedings, Highway Research Board, Vol 17, p 389



Figure 1. Columbus Drive and Twelfth Street, Chicago. Looking North at 5:30 P.M.



Figure 2. Washington Boulevard and Kedzie Avenue, Chicago. Looking East at 4:50 P.M.

of 21.1 to 35 miles per hour after the change

*Accidents* Six streets having 1767 accidents per year prior to the change had but 878 accidents in the year after the change—a reduction of a little better than 50 per cent.

Three streets—on which directional flow is reversed morning and evening—showed an increase in accidents of 91 per cent while the city-wide rate over a three year period was 69 per cent

*Progressive Signalization* In almost every case where traffic signals are in use, reports indicate that progressive signalization has been facilitated and the systems are operating to a high degree of efficiency and satisfaction.

*Public Reaction* Since much of the effectiveness of any traffic regulation is dependent upon the manner in which the public accepts and obeys it, a review of expressed public opinion is pertinent

One-way streets, where intelligently designated, appear to have met with general approval.

Some opposition may develop from business houses which may be directly affected through possible loss of business, although this has abated in time

The greatest objection is the additional travel delays due to number of turns and additional exposure to hazard to both vehicles and pedestrians

Emphasis is placed upon the necessity for abundance of signs of proper size and design and at proper locations to tell the public what is wanted With these conditions met the regulation is found to be practically self-enforcing

#### SUPPORTING DETAILS

The streets on which study was concentrated were divided in three classes.

Class I—A one-time two-way street now changed permanently into a one-way street

Class II—A normally two-way street changed to a one-way street during peak traffic hours.

Class III—A wide two-way street (three or more lanes) on which heavy directional flow at peak hours uses more than the normal number of lanes with reduced number of opposing lanes

#### CLASS I

*Chicago* A considerable number of minor residential streets of short length designated for one-way where, because of the narrowness of pavement and parked cars, a fire hazard exists Traffic volumes and accident hazard inconsequential

*Buffalo* Some one-way streets so designated for some years, no trouble in enforcing regulations and traffic flow definitely easier and accidents fewer in consequence

*Detroit* One street (length 0 625 miles) changed from two-way June 25, 1930

	Before Change	After Change
Number of free moving lanes	2	3
Traffic Volume, per max hr	680	980
Average Speed, miles per hour	14	22
Number of accidents per year	54	38

Approximately 45 per cent increase in traffic volumes using this street in spite of a city wide decrease of 8 per cent in traffic since the change was made. Regulations are self-enforcing and meet with public approval

*Dallas, Texas* One street changed to keep short cut traffic out of high residential area because of narrowness of streets, low rolling curbs and sharp grades Regulations are self-enforcing

*Pittsburgh* One hundred and forty-nine streets totaling 24.5 miles designated as one-way some years ago Widest one-way street about forty feet, no specific data Enables segregation of slow and fast moving vehicles thereby relieving congestion and increases fluidity and

speed of travel Experience indicates that their existence has been fully justified for the foregoing reasons as well as decreasing hazardous conditions for both vehicular and pedestrian travel Many citizens request one-way streets as an added protection for their children

*Louisville, Kentucky* Numerous one-way streets of 36 ft. in width; two effective one-way lanes plus one parking lane for commercial loading, no comparative figures, but volume increase greatly apparent in 1937 traffic count—1350 cars during maximum hour, no speed records taken, but speed very much increased, progressive signalization facilitated within limits of signal enforcement

With adequate signs regulations are practically self-enforcing and meet with general approval, principal objection is additional travel distance at times with possible loss of trade to business.

#### CLASS II

*Washington, D C.* Three streets (length from one to one and one-half miles each) Date of change—July 12, 1935. These streets are one-way Southbound 7 to 9:30 A M and one-way Northbound 4 to 6 P M. At all other hours traffic moves in both directions.

The change from normally two-way traffic to the present regulation was made in the period between March 22 and July 12, 1935

On each street there were two moving lanes before the change and three moving lanes after the change Traffic volumes per maximum hour increased from 660 to 980, from 526 to 722 and from 977 to 1176 vehicles before and after the change

Accidents on all three streets grouped together during the hours effected increased from 44 to 84 or about 90 per cent In the same period accidents throughout the City in 1937 as compared with 1934 increased 69 per cent Traffic volumes during the same periods increased 67 per cent

Progressive signalization was facili-

tated, but definite increases in speed are not stated The new regulations are practically self-enforcing and meet with definite public approval

*Philadelphia* Broad Street during Army-Navy game—the distance from City Hall to the Stadium approximately 4 miles

Maximum volume Southbound 12 N to 1 P M 5090 vehicles and Northbound 4:30 P M to 5:30 P.M 5170 vehicles; average speed of 14 miles per hour.

Under normal conditions Broad Street carries traffic in both directions, the peak hour of traffic approximates 1776 vehicles at a speed averaging 15 to 15.5 miles per hour

#### CLASS III

*Chicago Park District* Several streets in the Chicago Park District—Sheridan Road, Warren Boulevard and Lake Shore Drive, varying from one to 2.3 miles in length, utilize more than the normal number of traffic lanes for directional flow during peak hours with reduced number of opposing lanes

This scheme was inaugurated in 1929 and important additions made up to July 27, 1936

The number of free moving lanes increased from two to three, from two to four and from four to six in the three cases cited Traffic volumes per maximum hour increased from 1700 to 2630, from 1300 to 2900 and from 3375 to 7120 vehicles before and after the change

The average speeds increased from 9 to 30 miles per hour, from 14 to 28 and from 10 to 35 The total number of accidents per year on all three streets decreased from 993 to 553 or nearly 45 per cent

During the period covered by the change city wide traffic increased approximately from 8 to 11 per cent Progressive signalization was facilitated; regulations are practically self-enforcing and the change meets with public approval

*Los Angeles, Cal* Six or eight streets designated for direction flow January 1,

1937 Wilshire Boulevard is the outstanding example. This Boulevard is approximately 6 miles long and from 70 to 72 ft wide. During the evening peak three-fourths of the available street area is set aside for outbound traffic. Outbound figures average about 3000 cars per hour as against 1200 to 1500 cars per hour before the change. Speeds increased from 4 to 10 miles per hour.

The Motor Bus Company adjusted schedules to provide for 16 per cent increase in speed. The average speed is approximately 25 miles per hour and is controlled by progressive signalization.

Offset lanes are denoted by pedestal signs which are rolled into place prior to the inbound peak in the morning and the outbound peak in the afternoon, signs are largely self-enforcing and the plan is entirely successful. The public now demand this service, when originally installed there were scattered complaints from business houses, but this opposition has been gradually dissipated. Left turns are permitted only at certain key points. The public has quickly adjusted itself to these conditions.

*Providence, Rhode Island* Practically all one-way streets were changed from permanent two-way more than 15 years ago. However, comments offered on observations of more than the normal

number of lanes allotted to directional flow indicates that special attempt is necessary to indicate adequately what is wanted. The pedestrian problem is made more difficult and the thought is advanced that the public should be cautioned so that that under restricted and special conditions this system may be properly applied.

*Philadelphia.* The system of allotting more than the normal number of lanes to accommodate more than occasional flow has been in use on the Delaware River Bridge. It is carried out by moving portable mushroom buttons during slack hours between changes of peak flows and affords maximum utilization of width of bridge which is approximately 1.2 miles in length. The width is 56 ft between curbs.

The Parkway, City Hall to the Art Museum is approximately 78 ft wide with five or six lanes to accommodate directional flows and is utilized without lane marking and without signs, some confusion results, but heavy traffic volumes are accommodated.

Plans are underway to designate movable center lines by "Keep Right" signs on pedestals similar to those used in Los Angeles.

Little pedestrian traffic and infrequent serious accidents are reported.

## DISCUSSION ON ONE-WAY STREETS

MR. R. A. MITCHELL, *Traffic Engineer, Philadelphia*. Mr. Canning asked me to make a test of traffic movement on South Broad Street during the Army-Navy Game, which was played in Philadelphia last Saturday. At that time Broad Street was made one-way southbound to take the mass of traffic to the stadium, which is at the southern end of Philadelphia. After the game the reverse was true, Broad Street being made a northbound street taking the full six-lane width of the highway for traffic moving in one

direction. Figures which were computed by W. P. A. men, under my supervision, indicate that from 10.00 A. M. to 1.00 P. M. Broad Street carried 13,000 vehicles or approximately 4,000 per hour southbound to the game. From the time the game was over, which was about 4:00 P. M., until 6.30 P. M. it carried 8,000 vehicles northbound, or approximately 3,200 per hour. From 4.00 to 5.00 P. M., the peak hour, 4,650 cars were accommodated. The count during average traffic conditions on Broad Street, that

is under two-way movement, taken for a 12 hour period, which is the only basis of comparison I can give, shows a total flow of 14,435 vehicles or approximately 1,200 cars per hour. The Army-Navy Game traffic shows a peak of over 4,500 cars. It was, of course, under forced conditions that the street carried that many cars, but it did show what capacity Broad Street could have if made one-way.

PROF. R. L. MORRISON, *University of Michigan*. I would like to ask Mr. Mitchell if he thinks from his experience that there is any limit to width of one-way streets.

MR. MITCHELL. In some of the reports received by Mr. Canning mention is made of four and six-lane streets being used in other cities. One street called to his attention now utilizes four lanes in one direction, and one four-lane street under two-way movement now carries six-lanes of one-way traffic. Some of the cities are finding it convenient to use certain wide streets for one-way movement of traffic especially during peak periods. In Philadelphia most of our streets are

26 ft. wide and one-way regulations are absolutely necessary. We also have a pair of one-way arterial streets with 44-ft roadways.

MR. J. S. BURCH, *North Carolina State Highway and Public Works Commission*. Did you find it necessary to put up extra signs on South Broad Street?

MR. MITCHELL. We do not put up extra signs for special events of this kind, because the public are informed of the regulations through the newspapers and police are stationed at every vital corner to enforce the regulations. In addition to being well policed, the traffic signal system on Broad Street is timed so as to encourage one-way movement. There is a signal at each block of the 4-mile stretch. We have no streets which are one-way in one direction during the morning and in the opposite direction in the afternoon, as a regular thing, which would require the posting of special signs to indicate the change in direction. Washington is the only city I know of that uses that system.