

JACKSON BOULEVARD ANALYSIS OF TRAFFIC OPERATIONS

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SYNOPSIS

Pending completion of the Congress Street Expressway in 1956, relief for the congested traffic from Chicago's west side into the Loop is being sought through the boulevard system. An extensive analysis of traffic operation on Jackson Boulevard is described. Based on this analysis, changes in traffic operation, parking, signing and signaling were recommended. This modernization program is described and illustrated. Although the entire program has not been completed, revision of parking ordinances, re-signing of the entire boulevard, and installation of lane markers and stencils have already had a marked beneficial effect. For the first six months of 1950 traffic volume increased 18½ percent while the accident rate increased only 3.3 percent. During the same period, accidents throughout the entire Park District increased 11.9 percent. Greater volumes of traffic are being operated over this boulevard without any material increase in running times.

The need for an east-west arterial expressway to provide relief for the congested west side of Chicago, has long been recognized by city planners and traffic engineers. Evidence of this lies in the present construction of the Congress Street Expressway scheduled for completion in 1956. However, during the construction period with each passing year, vehicle registration continues to increase with an attendant increase in traffic volumes and vehicle miles travelled.

Since 1946, vehicle registration has increased better than 10 percent for each succeeding year. The latest figures of vehicle registration in the City of Chicago for 1950 showed that there were 704,759 passenger cars registered. While the Congress Street Expressway provides a long range solution, there is the immediate problem of coping with these increases, therefore present traffic facilities had to be made to do a better job.

The yearly usage of our boulevard system is tremendous. Because of boulevard pattern, (see Fig. 1) physical conditions and our use of flexible regulations, millions of motorists find a recreational value driving the boulevard system to and from the central business district, all of which is accomplished with no sacrifice to general park usage, because of the design of operational measures instituted by the Chicago Park District.

The importance of the boulevard system is highlighted by the fact that, based on a cordon count made during 1949, almost 60 percent of the 260,027 motorists entering and leaving the central business district used boulevard facilities, although the boulevards composed but 20

percent of the available street width entering the central business district.

A vital component of the boulevard system is Jackson Boulevard. While other boulevards provide access to the central business district from the west side, Jackson Boulevard plays a dual role as a major route to the central business district, and also as the west side's gateway to the Lake Front.

The Jackson Boulevard roadway consists of sheet asphalt on a macadam or concrete base and varies in width from 38 ft. for about 3 mi. at the western portion to 48 ft. for about 4 mi. at the eastern portion, then it is reduced to 38 ft. through the central business district.

The nature of the district traversed is varied. Starting at the western limits, Jackson Boulevard traverses two major parks and for a distance of 5.5 mi., a district that is mainly residential in character. Continuing easterly, the character of the district becomes business in nature thence through the downtown area, into Grant Park and the Lake Front area.

Jackson Boulevard, as well as all other boulevards is a combination parkway and drive, as distinguished from general type arteries called streets or through-type arteries, called avenues. Commercial vehicles and street cars are prohibited from using the boulevards, therefore, traffic is composed of private passenger vehicles, augmented by taxi-cabs and local transportation motor buses.

Year after year public usage of the boulevard system has increased principally because they are safer, more efficient and, of considerable importance, because they are attractive.

During 1941, all-time-high traffic volumes

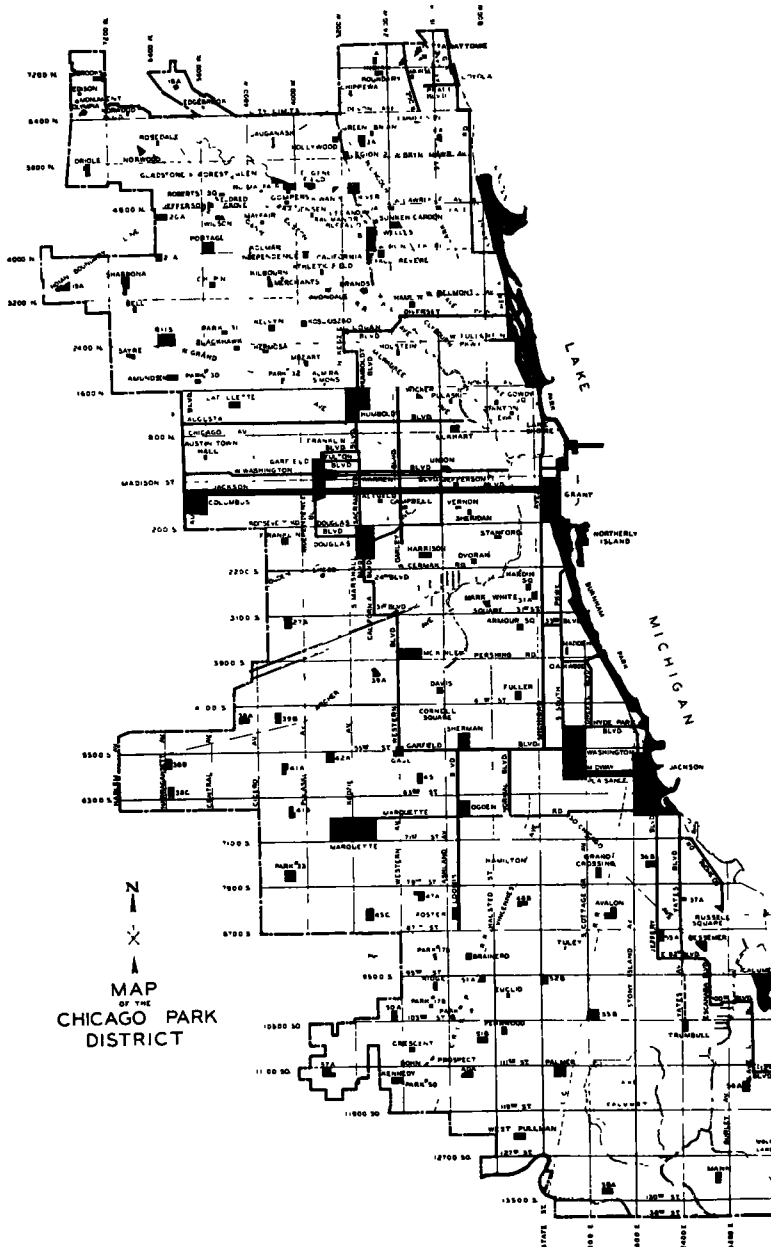


Figure 1

resulted in 60 million vehicle miles being travelled on Jackson Boulevard. Since 1946, key station counts showed that these all-time-high volumes were being surpassed and in order to provide for these increases, means for

making better use of present facilities had to be devised.

Analysis of 1946 traffic volumes (see Fig. 2) on Jackson Boulevard showed a directional peak volume during the morning rush hour of

1480 vehicles with a counter rush volume of 395 vehicles occurring at Sacramento Boulevard, a point midway between the west city limits and the downtown area with 865 vehicles continuing on into the central business district.

rush period, recorded speeds of 27.3 mph., starting at the western limits and decreasing progressively to 11.3 approaching the downtown area. During the evening rush period, speeds of 15.2 mph. were attained, increasing

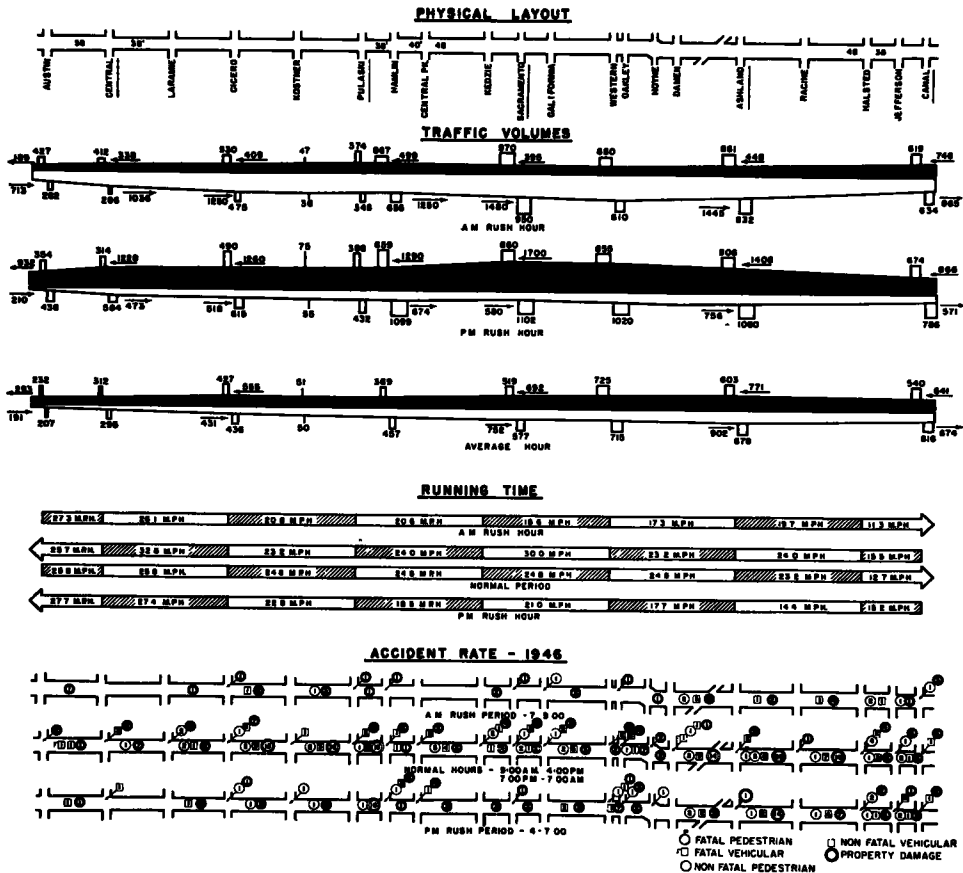


Figure 2. Analysis of Jackson Boulevard Traffic—Austin to Canal—Accidents 1946

	AM Rush	PM Rush	Normal Hours	Totals
Fatal	0	3	0	3
Non Fatal	15	132	41	188
Property Damage	34	231	106	371
Total	49	366	147	562

During the evening rush hour, 866 vehicles left the Chicago Loop, with volumes increasing to a peak of 1700 vehicles at Sacramento Boulevard, with a counter rush volume of 580 vehicles.

During normal hours volumes were more nearly balanced, with an almost constant rate of usage for the entire length.

Speed trial runs made during the morning

progressively to 27.7 approaching the western limits. During normal hours, inbound speeds ranged from 25.8 to 23.2 mph., decreasing to 12.7 upon entering the Loop area. Outbound speeds leaving the Loop area were 15.5 and varied from 23.2 to 32.8 mph. over different sections of the boulevard. This discussion of speeds does not carry any inference that high speeds were desirable, but merely to show that

in certain stretches, reduced speeds were encountered, indicating that further study of conditions was necessary to determine the causes.

An analysis of accidents revealed that 14.3 percent of all accidents during the morning rush period and 15.6 percent of all accidents during the evening rush period, occurred at intersections, while only 11.7 percent of the

The time and interference surveys included speed and delay studies, recording the amounts, causes, locations, durations and frequency of delays as well as the overall average running time and similar speed values. Interferences were also recorded as to type, intersectional, marginal, medial and interstream. Studies were made of parking practices. Especial attention was given to turning

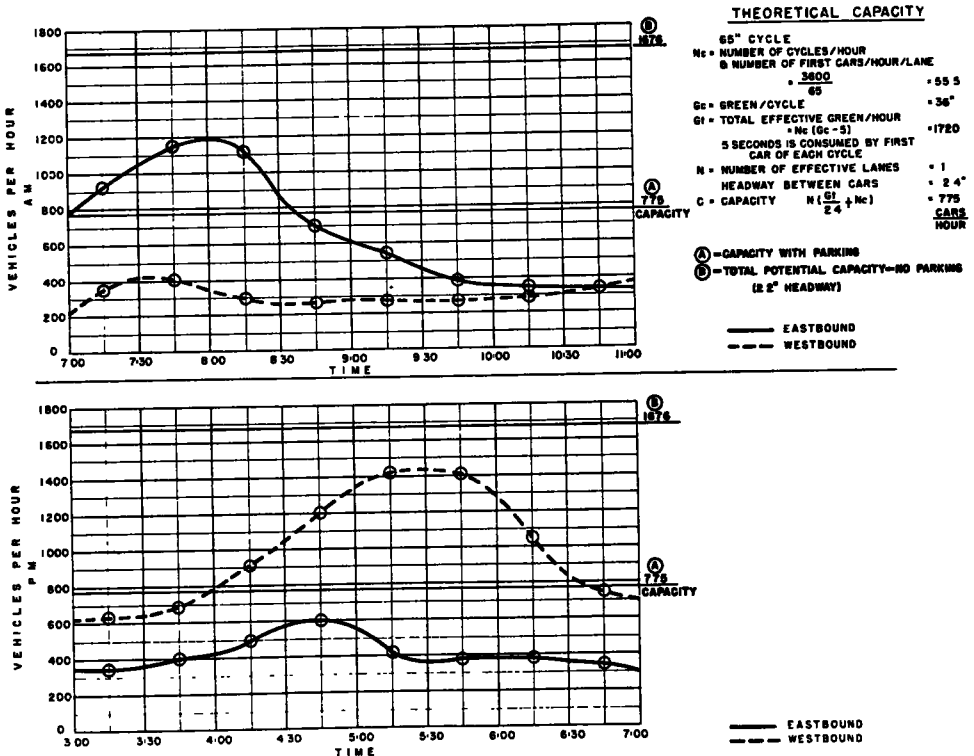


Figure 3. Jackson Blvd. Traffic at Central Ave.

normal hour accidents occurred at intersections.

In combining all the foregoing data, there were indications that adverse accident rates and lowered speeds were caused by vehicular delays and interferences at intersections. Further, time and interference studies were conducted on Jackson Boulevard from Austin Boulevard to Canal Street, omitting that portion traversing the downtown area as it was to be included in a survey being conducted for the improvement of traffic movement in the central business district.

movements and mass carrier loading and unloading stops causing delays at intersections, also, any slowing down of vehicular movement caused by poor sight distance.

The 32 traffic control signal locations on Jackson Boulevard are a part of 132 signalized intersections, all inter-connected, forming a coordinated simple progressive system. We found that this system is very inflexible as it is impossible to provide directional programming for rush hour operations, adding to vehicular delay.

The capacity (see Figs. 3, 4, 5, 6) of each

signalized intersection was computed by applying the formula: $C = N \left(\frac{Gt}{h} + Nc \right)$; where

C = capacity

N = number of effective lanes

Gt = total effective green or go time per hour

h = observed headway between vehicles in seconds

Nc = the number of cycles per hour.

stopping to pick up and discharge passengers caused delays to following traffic, because not enough curb space had been reserved for them, making it necessary to load and unload from the second lane. Left turning vehicles also were causing delays.

An analysis of current parking regulations was made to determine their conformity to traffic demands. The need for flexibility in

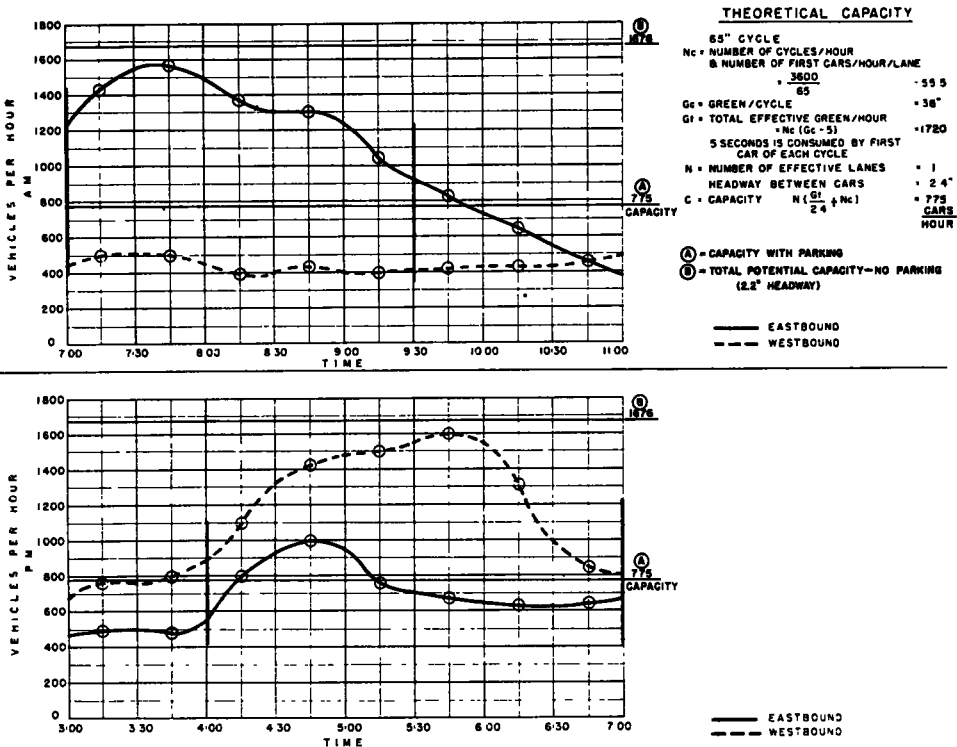


Figure 4. Jackson Blvd. Traffic at Pulaski Rd.

Computations of capacities were made on the basis of existing parking regulations and also with revised parking regulations. With existing regulations, it was found that capacities were being exceeded, indicating that traffic density was causing delays and reducing drivers' freedom to maneuver. However, when the same computations were made on the basis of revised parking regulations, it was found that the potential capacities, in most cases, would not be exceeded by actual traffic volumes.

Our field surveys revealed that mass carriers

regulations was recognized long ago, as illustrated by parking regulations in force (See Fig. 7). Parking on Jackson Boulevard through the residential district was restricted along the inbound curb from 7:00 to 9:30 A.M. and along the outbound curb from 4:00 to 7:00 P.M. Through the business district, parking was restricted on both curbs during both morning and evening rush periods; at all other times, in both residential and business districts, parking was limited to one hour. Through the downtown area, parking was, and still is, prohibited at all times. Observation

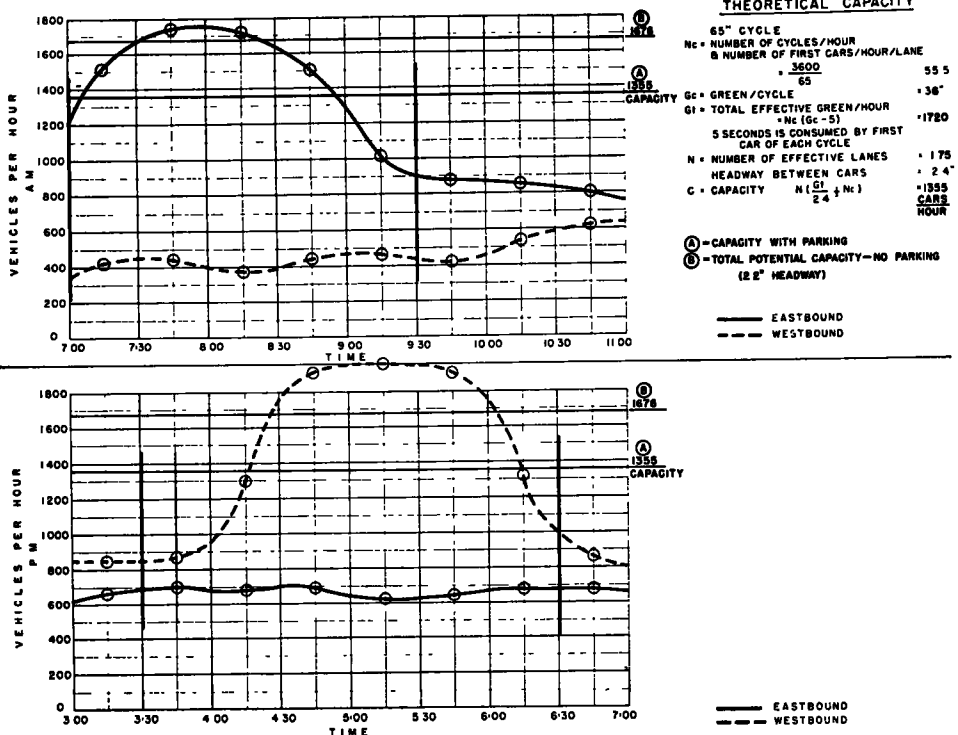


Figure 5. Jackson Blvd. Traffic at Sacramento Blvd.

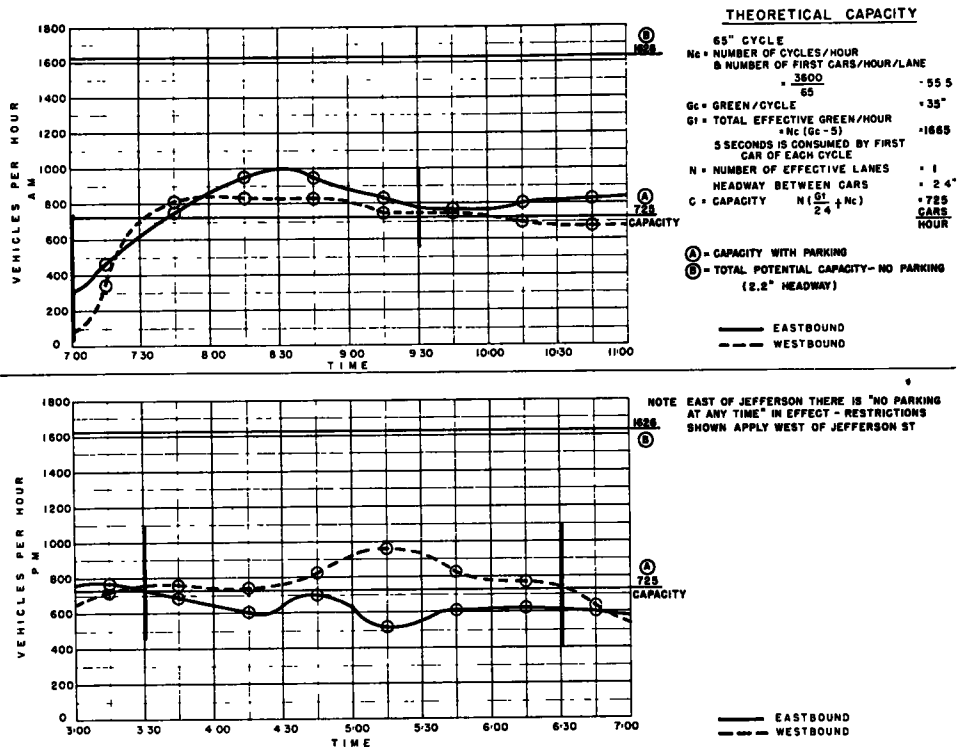


Figure 6. Jackson Blvd. Traffic at Canal St.

revealed that some changes in these parking regulations were necessary.

Many techniques, engineering and otherwise, were available that would definitely bring about a betterment of conditions, but the most important advances made toward improving capacities of existing roadways and their safety record involve non-static regulations, therefore particular attention was given to flexibility. This included flexibility of

that a space of 50 ft. back from the cross walk on the approach side of each intersection was required, as opposed to the existing 20 or 30 ft. The prohibition of parking from this roadway area, not only provided clear sight distance, but also provided two effective lanes through the intersection.

Far-side bus stops are maintained on Jackson Boulevard. Obviously, buses create a minimum interference to traffic if zones are

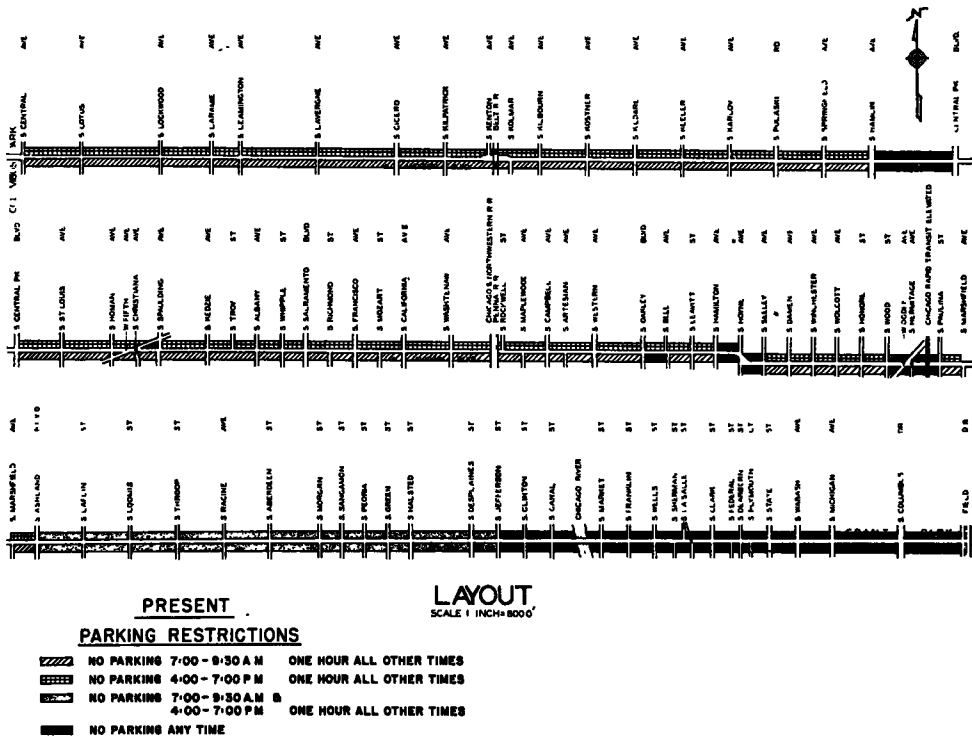


Figure 7. Jackson Blvd. Parking Restrictions

roadway and lane usage, in regulations and in the operation of traffic control devices. Based on our findings, a program was designed providing adequate clear sight distance at intersections, bus loading zones, curb access zones, left turn channelizations, special bus stop channelizations, realistic parking regulations tailored to fit present traffic trends, periodic left turn regulations, and signal timing programming (See Fig. 8).

Based on prevailing speeds on the boulevards and intersecting streets, adequate clear sight distances were calculated. It was found

provided that are of sufficient length so that a bus can load and unload passengers at the curb from a parallel position (See Fig. 9). With the 42-ft. buses now in use, the length needed for proper berthing was found to be 90 ft. However, the length was increased at certain locations to take care of special conditions. To provide such zones, parking was prohibited on the exit side of each intersection where buses stop. In conjunction with this regulation, lane markings were also revised (See Fig. 10). At the locations where the width would permit, the roadway was divided into five lanes instead

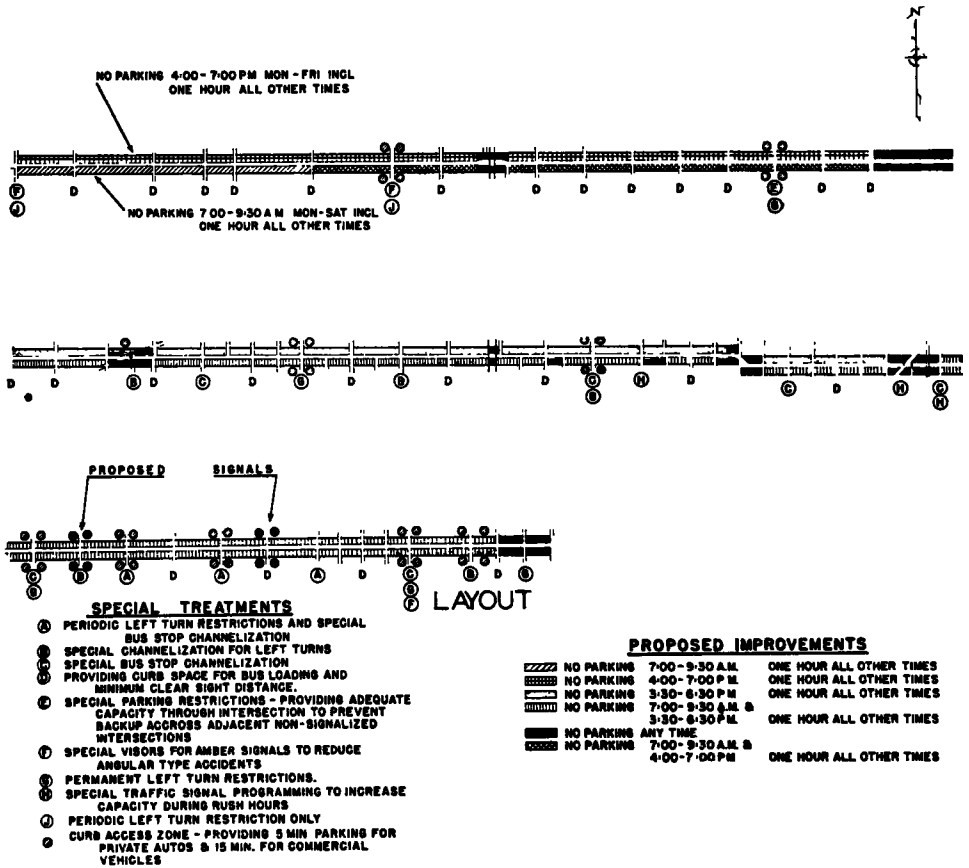


Figure 8. Jackson Blvd. Special Treatments and Improvements

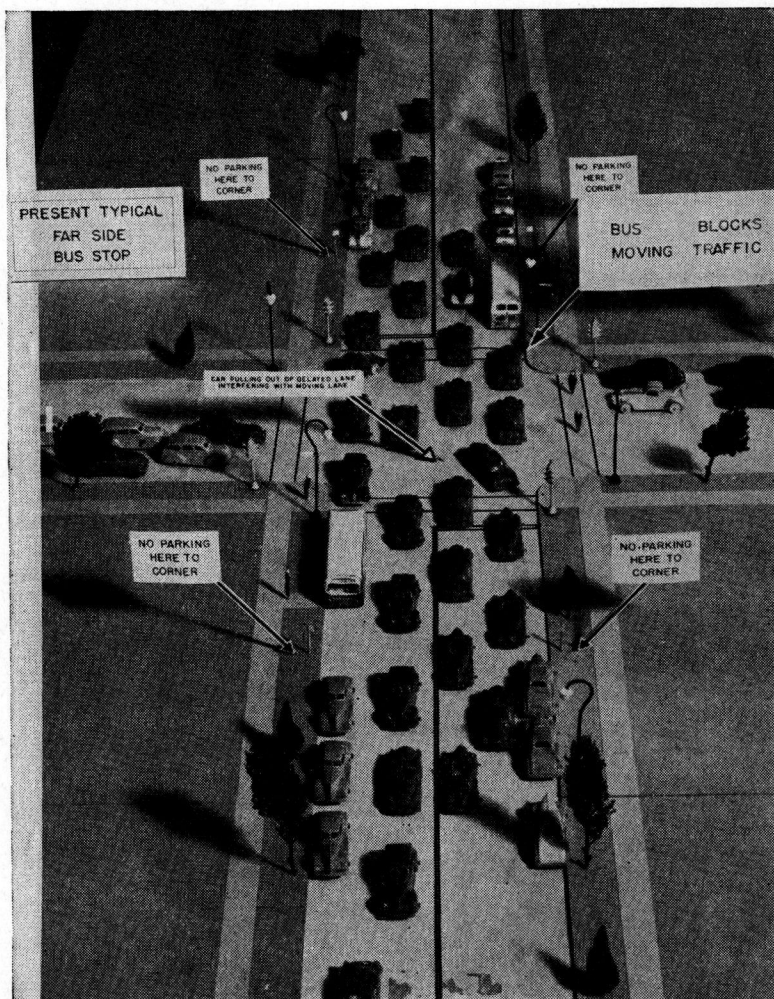


Figure 9

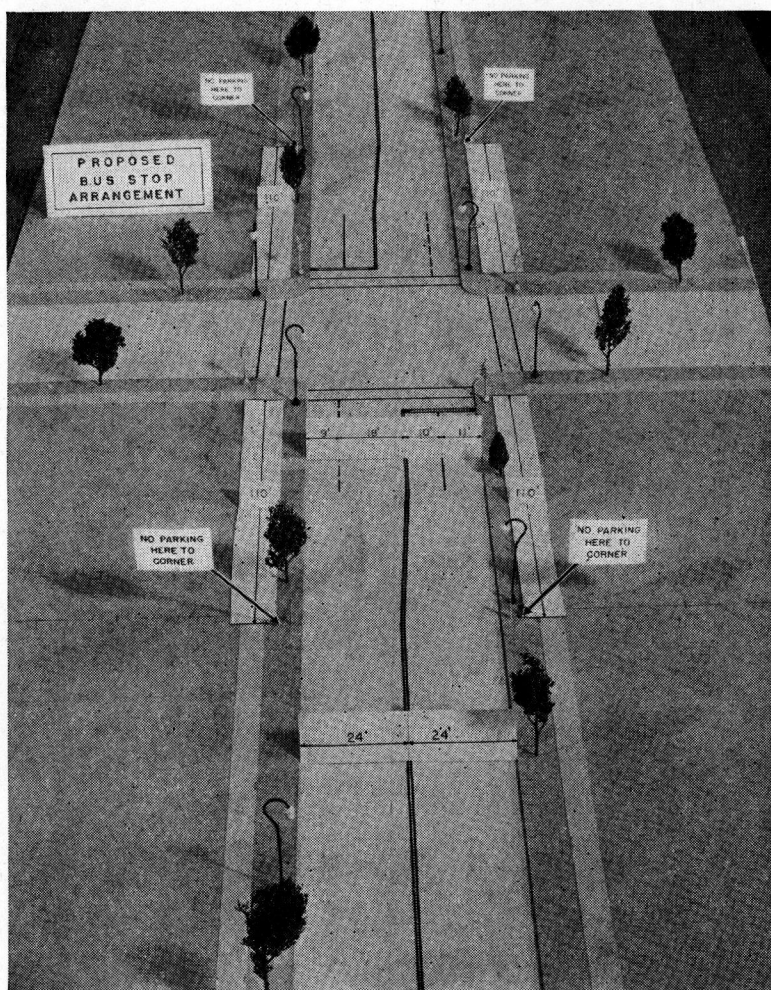


Figure 10

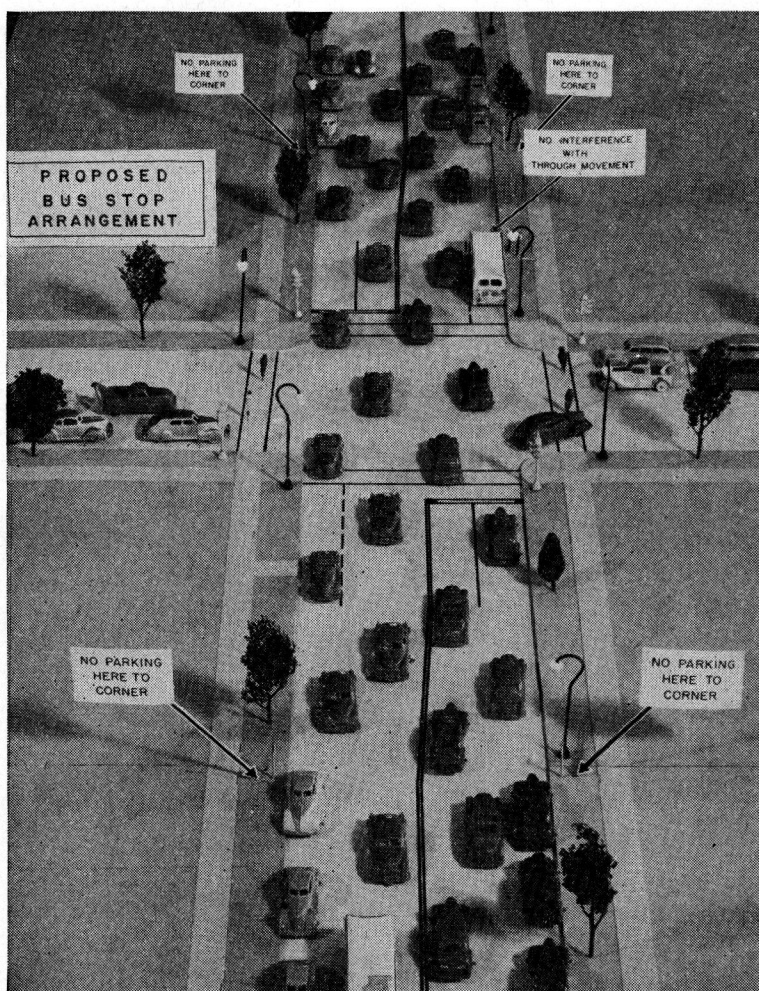


Figure 11

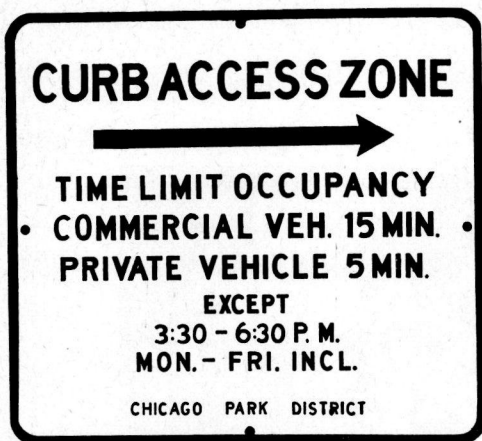


Figure 12. After

to the 50- or 90-ft. parking regulations. Commercial vehicles are limited to an occupancy of 15 min. in these zones, and private passenger vehicles to 5 min., with all parking prohibited during those times as regulated by periodic restrictions (See Fig. 12).

Left turn interferences were dealt with in some cases by offsetting the center line at intersection approaches, providing for left turn storage with no loss of through traffic lanes (See Figs. 13, 14, 15).

Periodic parking restrictions were amended to fit the movement of directional volumes, including changes in time limits between origin and destination. All time parking prohibitions were imposed at some signalized intersections to provide adequate storage capacity, thus

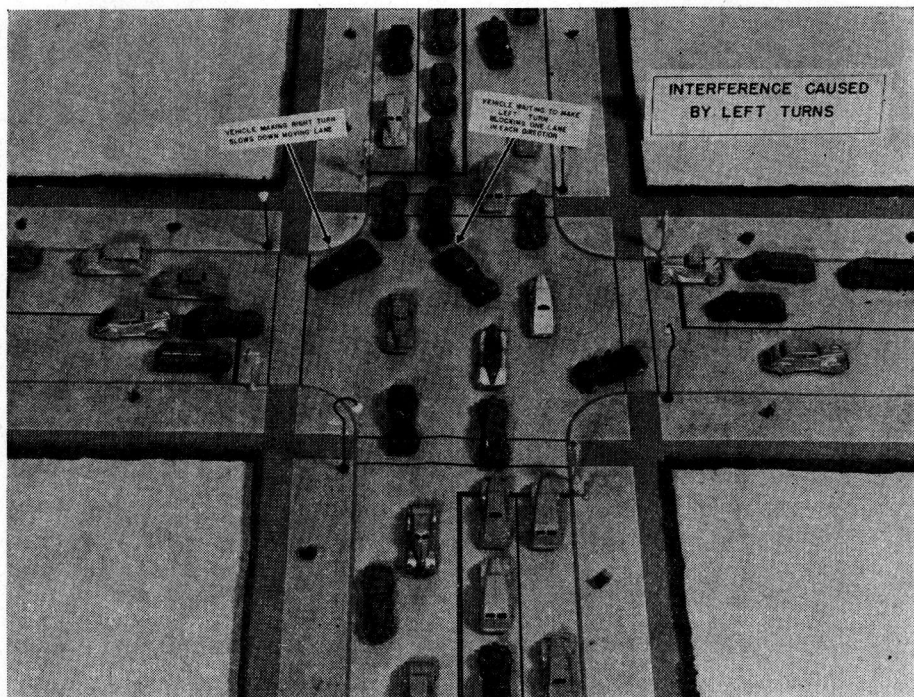


Figure 13

of the customary four. The center line was offset providing two lanes for approaching vehicles and three for exiting vehicles, thus a bus could stop in the bus zone leaving two free lanes for through movement (See Fig. 11).

At key commercial intersections, curb access zones 22 ft. in length were provided in addition

preventing back-ups across adjacent non-signalized intersections.

The foregoing have already been installed with further measures to be installed as work schedules and procurement of materials permit.

Left turns will be prohibited during rush

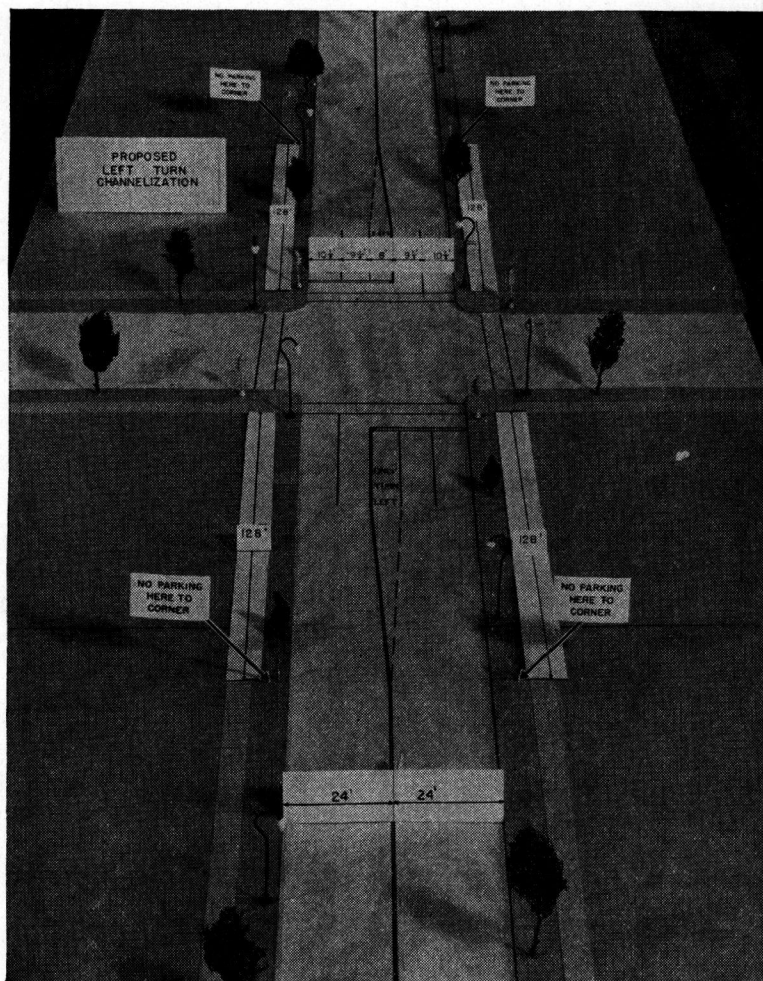


Figure 14

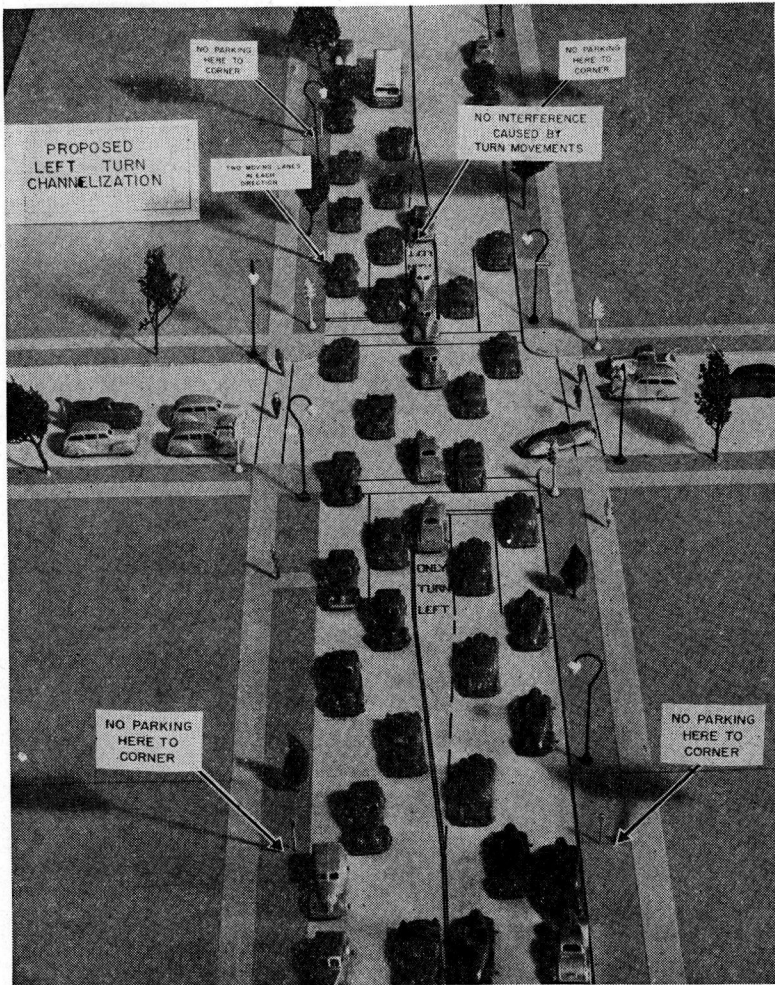


Figure 15

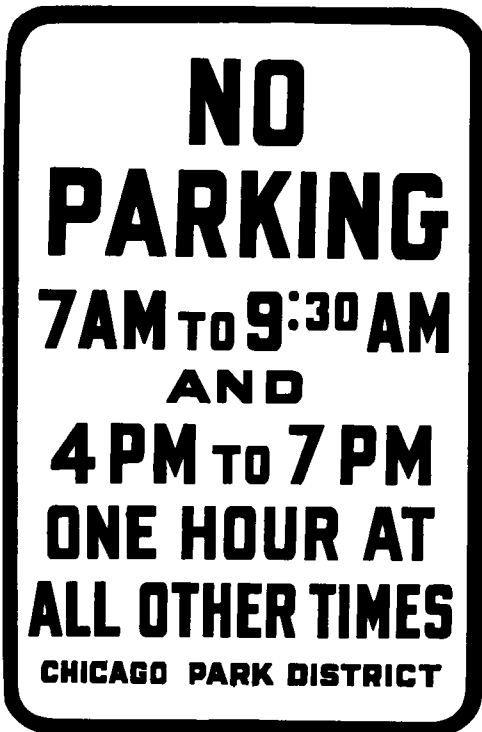


Figure 16. Before

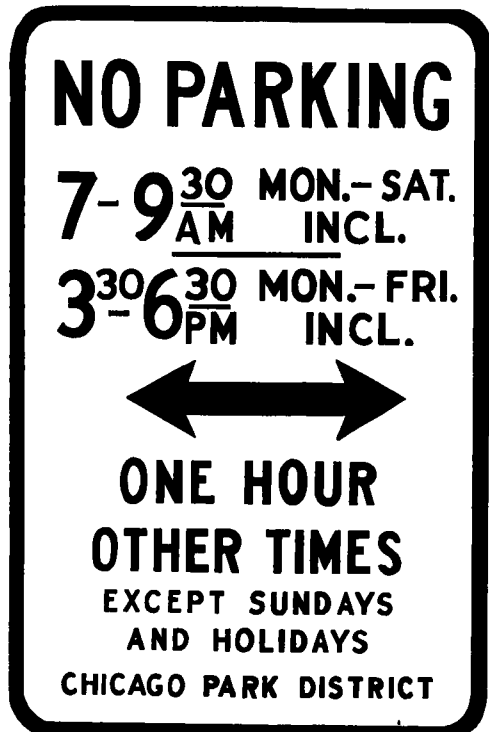


Figure 17. After



Figure 18. Before



Figure 19. After



Figure 20. Before



Figure 21. After

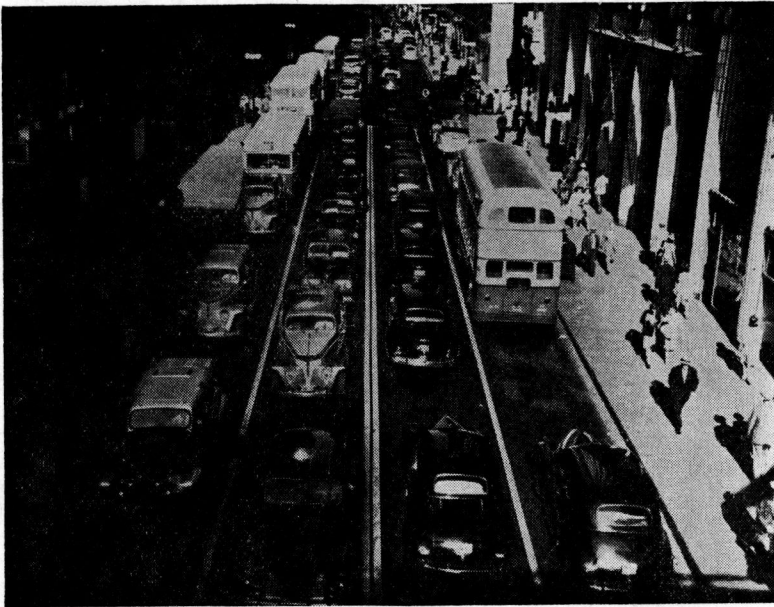


Figure 22

hours at certain intersections in order to increase capacity. To make this regulation effective, an illuminated flexible control device, designed by the Traffic Section of the Chicago Park District, will display these regulations by means of a time clock arrangement when necessary, and remain blank when not required.

As discussed earlier, greater flexibility of traffic control signals were required in this modernization program; in cycle length and timing programs to meet the demands of inbound and outbound rush hour volumes, thus moving a greater total number of vehicles in the desired direction.

The implementation of the survey required the rescinding of existing parking ordinances and the passage of others compatible to recommended regulations, the resigning of the entire boulevard, (see Figs. 16, 17, 18, 19, 20, 21), and the installing of lane markings and stencils according to the accepted designs. A little over a year ago, lane markings and sign installations were completed. Despite the lag in the fulfillment of the entire program, those items already installed have had a beneficial effect.

Benefits derived can only be measured by improvement in capacity, running times, and

reduced accident rates. During 1949, almost 66 million vehicle miles were travelled on Jackson Boulevard, which is approximately 10 percent higher than the previous all-time high of 1941. For the first six months of 1950, volumes continued to climb showing an increase of 6 percent over 1949. Capacities have been improved when this increase in volume is related to running times. Greater volumes of traffic are being operated over this roadway without any material increase in running times.

Our key station counts show an increase in traffic volumes of 18.5 percent for the first six months of 1950 over a similar period of 1946 for the entire Park District, (see Fig. 22). For the same period, fatal and non-fatal accidents throughout the Park District increased 11.9 percent; however, the increase in accidents on Jackson Boulevard was found to be only 3.3 percent which, when evaluated, is extremely below the expected increase due to higher traffic volumes.

A similar program of rehabilitation is being conducted for Garfield Boulevard. Field surveys have been completed, results are being compiled, and based on these findings, similar recommendations for improvement in traffic operations will be formulated.