should be 75 feet at street intersections and 100 feet for mid-block stops.

There are few streets over which street cars are operated that are wide enough for the street-car lane, a lane for moving vehicles, and a space for parking. The usual condition is that the moving vehicles must use the car-track space, since the other lane is used for parked vehicles. Just one parked vehicle per city block will keep the outside lane from being used by moving vehicles. In Indianapolis, parking has been prohibited during the hours of peak loads on several streets having car lines. These restrictions have definitely aided the street-car operation and made the service more comfortable and rapid. There are fewer accidents between moving vehicles and street cars and between moving vehicles and parked vehicles than before the regulations were established. These regulations should be established by ordinance and so worded that stopping and parking would be prohibited during the hours of peak loads.

Parking regulations must be enforced by arrests in order to get the proper observance by the drivers. Signs alone will not get results. The enforcement of the regulations must be uniform and continuous and impartially imposed by the police and the courts.

These regulations restricting parking are necessary in order that the streets may be used for their prime purpose, that of providing an unobstructed way for moving vehicles. We all demand an open way for the vehicle in which we are passengers, but when we reach our destination, we, like all others, expect to use the street for parking.

Traffic engineers, construction engineers, and civic leaders have a big job ahead in educating the people to the need and construction of off-street parking facilities. It is not always an easy job to establish and enforce parking regulations, but during the present war times everything possible should be done to expedite the movement of mass transport vehicles and vehicles to war industries.

SIGNAL TIMING AND MASS TRANSPORTATION SELECTIVE STOPS

James T. White,
Traffic Engineer, Fort Wayne, Indiana

The traffic signal in its early stages was placed in operation at a given location, which, for the most part, was experiencing difficult manual control of traffic and in turn creating undue
congestion of street traffic. The signal in its isolated form removes the decision on the part of the motorist as to the necessity of stopping at or proceeding through a street intersection. A traffic signal operating upon a fixed-time basis (not as a part of a signal system) serves as a particular safety factor rather than for expediting the general flow of street traffic.

As districts of a city or even a series of principal thoroughfares begin to carry large volumes of traffic, it becomes necessary in many cases to expand a signal system to include additional signals, which previously had been operating upon an independent basis. At this point we are approaching a stage of traffic signalization that requires a concerted study of the best timing possible to handle the general traffic pattern. Our traffic signals at this point should no longer remain in the category of stop-and-go lights; they should be timed for “Go” rather than “Stop”—the stop period remaining as a safety factor. Because of present traffic restrictions such as gasoline and tire rationing, the “Stop” factor is best realized by the motorist attempting to conduct his necessary travel with less than four gallons of motor fuel per week.

It is not the purpose of this paper to describe the many intricate signal systems used throughout the nation for movement and regulation of vehicular and pedestrian traffic. Many of our large cities have installed signal systems which a few years ago were little dreamed of as feasible, particularly from the standpoint of public expenditure, in order to bring about orderly movement of traffic and meet the changing patterns of traffic flow. One of the more recent developments in traffic signal timing is that installed in Detroit, which is actuated by traffic through a given area. Many other cities could be referred to you for consideration. However, it is my intention to discuss some of the more simple improvements of signal-timing accomplishments in Fort Wayne, Indiana.

**A Typical Example**

On Clinton Street (U. S. Routes 27 and 33) immediately south of the central business district of Fort Wayne there had been installed three traffic signals, each operating independently of the others. The original thought at the time of the installation was to prevent accidents and allow side street traffic an occasional opportunity of crossing this street, which daily carries approximately 7,000 cars per lane. This plan of traffic control proved to be very unsatisfactory, as accident experience continued; not only in numbers but in severity the accidents became worse. High speeds prevailed and spot-speed studies revealed that motorists were commonly traveling as fast as 45 and 50 miles an hour on Clinton Street. If you
know Fort Wayne, you will also realize that our street system will not permit such speeds in safety. Something had to be done—the police force could not break up speeding conditions or manually reduce the accident experience.

Through coordinated studies conducted by the Traffic Engineering Department of the Indiana State Highway Commission and that of the city of Fort Wayne, a solution was agreed upon. It was found possible to synchronize the three signals and operate them upon a 40-second-cycle, simultaneous system with a timing speed not exceeding 29 m.p.h. The distance between these signals does not exceed 1,300 feet, and cross-street traffic is negligible. After this change of signal operation, accidents were reduced and the speed regulation problem was automatically controlled by signal timing. This released the police traffic officer for service at trouble spots elsewhere in the city.

Recently it has been possible to change the signal timing within the central business section of Fort Wayne. (Fig. 1.) This change, when completed, will affect almost forty-five per cent of the city’s signal system. Previously, our signal system was paired in a two-block alternate arrangement and

Fig. 1. Master traffic control panel of the central business district of Fort Wayne, Indiana. Pictured from left to right are Robert Gaskill, Sr., Signal Superintendent; James T. White, Traffic Engineer; and Custer A. Dunifon, Captain of Traffic.
operated on a 70-second-cycle. During peak traffic periods this system simply collapsed, and congestion was created to the point of actual stand-still for two and three changes of a signal before the clearing of a single intersection. Delay studies revealed that motorists required from eight to fifteen minutes to travel a distance of approximately 1,300 feet; whereas had the motorist been properly conducted through this district, it should not have required more than two or three minutes at the most to complete the same trip.

From the preceding illustration it is evident that the economic loss suffered by the motorists can and should be reduced. Our plans now call for a straight, single-block alternate system with the cycle lengths varying throughout the day according to the fluctuation of traffic volumes and taking into account pedestrian volumes and transit vehicular operations.

**Mass Transportation**

We have given the city-transit operation phase of our traffic problem considerable attention. In order to expedite this type of traffic, we have studied the time required to load and discharge passengers at representative intersections within the central business section of the city in order to keep our mass transportation delays to a minimum, meet the demands of motor vehicular traffic, and permit ample time to pick-up and discharge transit patrons. Recently, all cities with public carriers have been instructed to meet requirements as outlined by the Office of Defense Transportation in the twelve-point program of conservation to aid the war effort.

Before instituting a change in the riding habits of patrons of the transit company, it was deemed necessary to be properly fortified with adequate fundamental information thereon. The transit company was requested to furnish basic information concerning the total of passengers getting on and off at each stop, the distances between stops, and the percentage of times the vehicles passed each stop without picking up or discharging passengers.

After this information had been obtained and summarized from riding counts conducted on at least 50 trips in and out on each line, it was turned over to the city traffic engineer for study and recommendations. When the study of the data had been completed and a tentative list of all stops had been prepared, transit company officials were called into conference with the traffic engineer to consider the list of proposed stops from the point of view of service and operation. It was necessary that the recommended stops be mutually agreed upon from the standpoint of distance between stops, the use made of each stop, and compliance with standards as set by the O.D.T. as to desirable distances between stops.
A meeting then was called involving the mayor, the entire board of safety, the chairman of the board of works, the chief of police, the captain in charge of traffic, the city traffic engineer, the local war traffic administrator, and officials of the transit system. After a discussion of the proposed plan of selective stops, this group was taken on an inspection trip.
over each major line, after which the stops that were to remain in service were agreed upon.

Plans had been formulated as to the method of preparing the public for the coming change in mass-transportation operation. Stops which were to remain in service were to be plainly identified in order to secure passenger acceptance of the plan.

Fig. 3. Posts made of discarded pipe carry the stop signs where trolley spans are not convenient, as at this point.
Each stop remaining in service was marked with a \( \frac{1}{8} \)-inch, hard finish, masonite sign, 16 inches square. The background of the sign is white, with a large red "V" processed thereon, and over it the words "War Emergency Stop" in blue. (Figs. 2 and 3.)

Not only were the "selective stops" identified, but each eliminated stop was posted with a cardboard sign, 12 x 18 inches in size, carrying the following message to the transit patrons: "No Stop Here Due to U. S. War Policy." These signs were intended to remain in service only during the transition period while the public became accustomed to the change in location of stops. A sign of this character was chosen because of the readiness with which they could be placed to catch the eye of the patron and inform him of the discontinuance of service at the point erected.

The plan of "selective stops" was inaugurated in Fort Wayne in such a manner that very few complaints were received by either the city or the transit company. The management of the Indiana Service Corporation attributes this to the following three factors:

1. The public was prepared for the move by newspaper and other publicity for some time before the actual changeover.
2. Choice of each individual stop could be substantiated with actual riding data.
3. The large signs used to mark the stops made it possible for any prospective passenger to see the place to which he should go to board his vehicle from any corner at which a stop had been eliminated.

The following table presents a summary of the number of stops before and after the change, the percentage of elimination, the average distance between stops in both instances, and its effect on each type of service.

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Number of Stops</th>
<th>Percentage Eliminated</th>
<th>Distance Between Stops</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Original Retained Eliminated</td>
<td>Eliminated</td>
<td>Original</td>
</tr>
<tr>
<td>Trolley Coach</td>
<td>285 172 113</td>
<td>40</td>
<td>459 ft.</td>
</tr>
<tr>
<td>Motor Bus</td>
<td>80 43 37</td>
<td>46</td>
<td>406 ft.</td>
</tr>
<tr>
<td>Street Car</td>
<td>373 210 163</td>
<td>44</td>
<td>400 ft.</td>
</tr>
<tr>
<td>System (Entire)</td>
<td>738 425 313</td>
<td>42</td>
<td>423 ft.</td>
</tr>
</tbody>
</table>