Off-Center Laning

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We will all agree, I am sure, that the capacity of most streets and highways, in urban areas particularly, is determined to a great extent by the volumes of traffic that can be handled at the intersection. With this in mind, I am of the opinion that many cities and many traffic engineers are overlooking the tremendous possibilities in off-center laning as a means of increasing street capacities for vehicular traffic movement. By off-center laning I mean the shifting of the center line to the right or to the left of the normal center line of the street to increase or decrease the number of lanes at an approach to an intersection.

In most instances, at least with traffic engineers, I feel that it is not so much a matter of not recognizing the advantages of this tool for increasing street capacity, as it is a matter of selecting the opportune time to instigate such a program for complete success. In many cases “bus stops” must be moved from the near side to the far side of the intersection, and in some instances rerouted; or parking at the curb must be eliminated. These and many other considerations disrupt the habits of motorists and pedestrians and are usually controversial proposals not easily accomplished.

The advantages in off-center laning far outweigh the disadvantages. By this method we not only provide additional lanes for vehicular traffic where necessary, but in most instances we are able to segregate the various movements into specific lanes, thereby bringing about an orderly movement which leads to a more expeditious flow of vehicular traffic. Specific types of accidents are decreased and more efficient operation of signals through signal timing and use of arrow indications results.

The three figures shown, of a typical block, illustrate the steps that were taken in South Bend, Indiana, to increase street capacity on Michigan street (U. S. 31 and 33) for a distance of nine blocks, approximately three-fourths of a mile through the heart of our central business district.

Figure 1 shows a typical block of Michigan street as it existed prior to August, 1952, with parking on both sides of the street and near side
Fig. 1. A typical block of Michigan Street, as it existed prior to August 1952, with parking on both sides of the street and near-side bus stops.
bus stops. With bus loading and parking occupying eight feet of the roadway at the approaches to all intersections through the nine-block area, the intersection approach is reduced to 25 feet, or two lanes, for vehicular movement. If "Right" and "Left" turns are allowed, then one lane serves as a "Thru or Left" lane and the other as a "Thru or Right" lane. Under this arrangement, in many instances "Thru" vehicles were blocked completely if the lead cars made right and left turns. This condition developed a single-file driving practice on this street.

Speed and delay studies made on this street showed that the average time required to travel the nine blocks during peak traffic periods was 12½ minutes, or 3.9 mph.

The practical capacity per approach, based on average conditions throughout the area, was 460 vehicles per hour. The possible capacity per approach was considerably higher. As indicated by the speed and delay studies, however, vehicular traffic movement during peak traffic periods was rapidly reaching the breaking point.

Attempts were made to increase the street capacity by eliminating left turns and right turns at key intersections. This was not successful, however, as it only caused an accumulation of these turns at other intersections and increased overall travel, which caused congestion elsewhere in the area.

One positive step was taken in an attempt to relieve the heavy industrial peak loads using this street by the establishment of one-way streets to the west of Michigan street leading directly to and from the industrial area. While this one-way system helped considerably, demand on Michigan street still exceeded the possible capacity.

We thought of eliminating the parking on the approach one-half block to all intersections along this street and moving the bus stop from the near side to the far side, as shown in Fig. 2, thereby providing at least one through lane, one left turn, and one right turn lane. Studies, however, indicated that even more lanes would be needed to handle the peak loads using this street. The peak loads attempting to travel north on this street varied from 800 to 1,300 vehicles per hour, and it was certain that this volume would increase.

We felt that it would be impractical to widen the street. One-way operation was out because of numerous reasons; so, therefore, to gain additional capacity, we went to the off-center laning as indicated in Fig. 3. This sketch shows one of the nine blocks with the bus stops moved to the far corner and parking eliminated entirely on the approach one-half block to the intersection. Also, the center line is shifted 4½ feet to the left of the normal center line to provide four lanes for vehic-
Fig. 2. Intermediate plan eliminating parking on the half-block approach to all intersections along this street and moving the bus stop from the near side to the far side.
Fig. 3. Adopted plan with bus stops moved to the far corner and parking eliminated entirely on the half-block approach to intersections. The center line is shifted four and one-half feet to the left of the normal center line to provide 4-lanes for traffic movement.
ular traffic movement. As indicated on the sketch, two lanes are for straight-through traffic, one for left-turn and one for right-turn vehicles. This arrangement provides for eight lanes, four in each direction, on the 66-foot roadway.

The system has been in operation since August of 1952 and every indication is that it is highly successful.

For example:

1. Speed and delay studies conducted show that the average time necessary to travel the nine blocks during peak traffic periods has been cut to $6\frac{1}{2}$ minutes, which increased the average speed from 3.9 mph. to 7.5 mph.

2. Accidents, especially side-swipe and rear-end collisions, have taken a decided dip—53% decrease along this street—due primarily to the increased capacity and segregation of traffic into specific lanes, which means less starting and stopping and weaving and generally a more orderly movement of traffic.

3. In the nine-block stretch, 98 out of a total of 144 parking spaces were eliminated. While it was at first felt that this space was indispensable, apparently no great harm was done. To overcome the possible harm, however, the metered area was expanded and some changes were made in the time limits. While the meter revenue is not necessarily a barometer of the parking problem, nevertheless, parkers were using the meters in the new expanded areas, as the parking meter revenue increased from $18,676.50 during the months of June and July, 1952, just prior to off-center laning, to $19,638.55 for the months of June and July, 1953.

4. Double parking along this street practically vanished, especially during peak periods, as it is impossible to double park without seriously interfering with vehicular movement.

5. With specific lanes for the various vehicular movements, it is now possible to favor heavy left- and right-turn movements at various intersections by the use of arrow indications. Under this system of separate lanes for all vehicular movements, and with our pedestrian control signals, it would be possible to develop a third phase for arrow movements at all intersections throughout the nine-block stretch.

I mention in this discussion Michigan street only, but South Bend has many isolated intersections and blocks where traffic flow has greatly improved since adoption of off-center laning.