

yard of material pumped. Of the 1,911 cubic yards of material used, 899 cubic yards were required to raise the slab to grade. The remaining 1,012 cubic yards (53% of the total) went to fill the voids under the pavement.

While this method is slightly more expensive than the black top method (Iowa costs are about 75c per square yard for raising with black top), it is so much more permanent that we believe the extra cost is justified.

It is anticipated that this method can be extended to prevent settlements. Pavements on fills which are expected to settle can be sounded occasionally; and, if the soundings show voids under the pavement, these voids can be pumped full of mud before the pavement settles. Such procedure would result in greater safety to the traveling public and in greater economy to the state.

LOOKING AHEAD IN ROAD IMPROVEMENT

By Robert Kingery, General Manager, Chicago Regional
Planning Association

Beginning the year 1931 with 2,825 miles of state and county highway pavement in the metropolitan region of Chicago, those road officials who are collaborating in constructing their systems of paved roads in accordance with co-ordinated plans, have no thought of a let-up. They plan to continue the construction of new 40-foot-wide pavements, new two-lane pavements, highway grade separations, and railway grade separations until the paved highway system compares with the number of motor vehicles. It is their objective to remove the congestion by widening the present main highways where they are congested, and by building new routes to divide the traffic load more evenly.

Almost 280 miles of the highway system outside of the City of Chicago is four-lane pavement, 40 feet wide or more; and 1931 should see over 140 miles more of broad pavement of this type added to the system. At the same time the construction of 230 miles of new 20-foot pavement is definitely on the program, while 30 bridges, 21 highway grade separations, and 42 railway grade separations are to be planned.

A special feature of this program is the pavement construction under way or to be built this season within the City of Chicago by the County of Cook. When the 1929 gasoline tax law was adopted, the Board of Cook County Commissioners immediately allocated the county's entire share of this tax fund to City of Chicago streets, on recommendation of the County Superintendent of Highways and the Chicago Regional Planning Association. Last year, 1930, saw the beginning of

this construction by the county inside the city with work on north Central Avenue, 95th Street, and Devon Avenue, and the program will be in full swing during 1931 with the construction of Halsted Street, Avenues "L" and "O", Ashland, Crawford, North Cicero, Caldwell, Burr Oak, Foster, and Lawrence Avenues, Fifth-fifth Street, and many others.

Almost insurmountable difficulties have been overcome by co-operation of city, county, and state officials in clearing the way for this City of Chicago construction work by the County. Underground utilities work has been scheduled so that sewer, water, gas, and electric lines might be installed ahead of the pavement. Adjustment of the pavement program had to be made to correspond and not to conflict with the street car extensions planned in the traction ordinance. Co-operation of the city's engineers, of aldermen, and of property owners was obtained in the adjustment of old curbing which had to be moved back to accommodate the new pavement. And collaborating throughout were the Chicago Plan Commission and the Chicago Association of Commerce, in the interest of perfecting a system of through streets at the earliest possible moment, and certainly in time for the expected overload of traffic during 1933, the World's Fair year.

Late in 1929, the Cook County Highway Grade Separation Committee recommended the construction of 18 separations of grades at highway intersections. Although the special bond issue proposition to finance Cook County's share of this program failed to pass, the state and county have proceeded on a substantial part of this program. One separation has been completed on the Southwest Highway at 123rd Street; a second is complete, except for the approaches, on the Southwest Highway and State Route 51 at Orland; a third is half finished at Milwaukee Avenue and Dempster Street; and a fourth is well under way at the Northwest Highway and Dundee Road. Of the 21 more such structures which are planned to be under way during this season, 17 are on the Cook County program or the State of Illinois Metropolitan highway program and 4 are to be built by the State of Indiana in its program to furnish the same type of metropolitan highway service where it is so badly needed, around the south end of Lake Michigan.

It is certain that not all of these separations will have been completed in 1931. Property owners have resisted the construction of such structures because of their fear that property would be damaged, and have contributed in this way to the long delays which have preceded actual construction. Experience at intersections which have been so separated shows that this fear is groundless, and in one instance voluntary contributions from property owners, amounting to \$30,000, were collected, with which to stage a celebration at the opening and dedication of the grade separation.

While 1930 was especially annoying to the motorist because practically every main highway in the region of Chicago was barricaded at one point or another for widening or other improvement, it appears that most of the main arteries into and around the city will be usable during 1931, or will have a satisfactory parallel nearby.

TRAFFIC CAPACITY OF HIGHWAYS

By Nathan W. Dougherty, Professor of Civil Engineering,
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The traffic capacity of a highway depends upon at least three things: the width of the vehicle, the speed of the vehicle, and the uniformity of speeds. Other factors enter in, such as curvature and local surroundings, but these three are primary.

The over-all dimensions of the vehicle determine the width of the traffic lane. If a highway is to carry a large amount of truck or motor bus traffic, the width of each lane must be sufficient to allow easy passage of wide-bodied vehicles in addition to a clearance at the edges of the pavement and a clearance between the vehicles themselves. The ability to overtake and pass a more slowly moving vehicle is largely determined by the width of the traffic lane, and, of course, by the width of the vehicles passing.

When the lane is narrow, speeds are limited for ease of control. As the speed is increased, the width of the lane must be increased up to a practical minimum value, other things being equal, depending upon the speeds at which vehicles travel. Vehicles moving at very low speeds are under excellent control and the driver has no fear of leaving the roadway or taking the ditch and can, therefore, drive near the edge of the pavement. As the speed increases, a small change in direction carries the vehicle very rapidly into the ditch or into the opposing lane. To make the driver feel safe and actually to furnish him with more safety, the width of the lane must be increased.

It is obvious that the number of lanes is dependent upon the relative speed of the vehicles. If a certain number of the vehicles move at 15 miles an hour and another number at 30 miles an hour, the more slowly moving vehicles must be overtaken by those moving with the faster speed. To overtake and pass a vehicle, an extra lane is needed on the highway. The lane ordinarily used by traffic moving in the opposite direction can be utilized, provided the traffic in the opposite direction is not sufficient to obstruct the movement.