

114 *PURDUE ENGINEERING EXTENSION DEPARTMENT*

sheet asphalt, asphaltic concrete, rock asphalt and emulsified asphalt. The contracts were let in August and the last section was completed in September, 1925.

The first section of five inches of reinforced concrete was built by Reed and Sons of Mishawaka at a cost of \$2,150.

The second section was of penetration macadam rolled to three inches, built by the Highway Improvement Co., of South Bend, at a cost of \$1,100.

The third section is sheet asphalt rolled to a thickness of three inches, built by the Williston Construction Company, at a cost of \$1,430.

The fifth section is rock asphalt rolled to two inches, built by the Highway Improvement Company at a cost of \$1,400.

The sixth section of emulsified asphalt rolled to one inch was built by the Emulsified Asphalt Company of Indianapolis, at a cost of \$1,150.

In mentioning cost, we refer to the contract price, each section being let by contract. The several sections were each 500 feet in length. In choosing a location, we took a section of highway that was devoid of cross and side roads, thus compelling all traffic to traverse each and every section.

What the ultimate outcome will be, we are unable to say. Time alone will enable us to determine what type of reconstruction will be the best and most practical for future traffic on this particular road.

THE CITY'S SHARE IN OUR TRAFFIC PROBLEMS

By W. P. Cottingham,
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From New York to Los Angeles—from Duluth to Jacksonville—the people are clamoring for a solution to the traffic problem, and none of them are willing to be prevented from building up congested high value districts. Buffalo, Detroit, Toledo, Cleveland, Chicago, St. Louis, New Orleans, Indianapolis—all our great commercial cities are paying the price for congestion. Many are hopefully watching the experience of Washington, D. C., where precedent was recently upset and the traffic problem placed in the hands of an engineer. A great many accomplishments have been recorded in the past year, but the weak spot was found to be the lack of oppor-

tunity to enforce the traffic rules laid down. The engineer brought forth many useful ideas, but met with considerable difficulty in enforcing them. This might turn us back to the question, "Do the people—who are the city—want traffic regulation?" Of course they want it for the other fellow, but until they decide they need it for themselves it is a job for the policemen to force them into it.

The American Engineering Council has announced the organization of a nation-wide movement among engineers to solve the growing traffic problem. A general committee is to serve as a clearing house of ideas between the engineering societies and the National Conference on Street and Highway Safety. Their announcement says: "In every community in the United States the traffic problem is acute in some form. The country is beginning to realize that this problem is essentially of an engineering character. This is because, in most places, the local police have reached the limit of accomplishment and still the problem continues to grow with increasing speed and seriousness. Under these circumstances, it behooves the engineering profession to undertake to meet its responsibility in the matter."

Congestion is invariably the cause of our traffic problems. If there was no congestion on our streets we usually believe there would be no problem; but the fatal traffic accident does not occur in congested traffic as often as in the clearway where speeding occurs. Reckless driving must be curbed through the exercise of police power but congestion must be remedied through the application of engineering knowledge and common sense.

Improperly controlled traffic in the United States costs \$2,000,000,000 a year or \$20 a year for each man, woman and child in the nation, according to estimates made in official reports. That is the price the country is estimated to pay in loss of life, accidents, loss of time through congestion, depreciated real estate values and in other ways for the lack of properly developed traffic facilities and their control. This estimate, which is four times the waste caused by fire losses annually, is based on data gathered by the committee on metropolitan facilities of the national conference on street and highway safety.

What does congestion cost the public? A recent study in Chicago develops the fact, quite logically, that time valued at \$26,250,000 could be saved annually by the citizens of the city if one-half hour could be gained in the time spent in transportation. In this estimate it is considered fair to count the time of various classes of traffic as worth so much per hour, and to allow a reasonable length of time to make a

given trip. What time is consumed in making the trip over and above the reasonable or expected running time may be valued at fifty cents per hour for pedestrians and passengers, \$1.25 for horse drawn vehicles, \$2.50 for automobiles or motor trucks, and \$5.00 per hour for street cars. A motor car with driver and two passengers will gain time valued at \$1.75 per day if a reduction of fifteen minutes each way is made in a daily journey to the city. In 300 days the value of time saved the car and occupants is \$525.00. At this rate 50,000 cars entering and leaving the city daily will be saved time valued at twenty-six and one-quarter million dollars (\$26,250,000) yearly.

It was considered remarkable a few years ago that St. Louis could approve a bond issue amounting to eighty-seven million dollars (\$87,000,000) for developing their major street plan, yet in view of figures like those given for Chicago it would seem a most logical procedure. Through the development of the major street plan in St. Louis the traffic problem is being relieved—adequate street widths, to accommodate the present and future traffic, are being secured. The street improvements are being designed to carry the traffic expected both in respect to number of vehicles and weight of loads. They are building safety into the streets in all ways known to them and are giving to the citizens of St. Louis the benefit of their sincere attempt to apply engineering knowledge to the solution of the traffic problem.

Some Attempted Solutions

Two present conditions are set down in this discussion as permanent—as known quantities. Automobile speed is not going to be cut down; rather it is likely to increase. And the number of automobiles is going to keep climbing; the saturation point is still far off. There is no use fighting these conditions. They must be accepted, and the building of safety into streets and roads must be planned accordingly.

In cities like Chicago it will require the separation of heavy and light traffic, pedestrian traffic and traction and railroad lines; the creation of through routes protected by traffic signals; subways under streets or bridges over streets at schools or other important pedestrian crossings; smooth paving of streets; widening and straightening of streets; placement of safety islands at dangerous crossings; removal of obstructions from the streets; and a traffic signal to give the pedestrian an equal chance with the automobile to cross in safety.

Los Angeles has proceeded during the past year to put

some of these practices to the test and in addition to reducing its automobile fatalities in 1925 they have speeded up traffic 60% and trolley traffic 30%. If time is worth anything in California the saving should be in the millions. At any rate, lives are worth saving and this report indicates a justifiable claim for the saving of 29 lives in the year despite an increase of 15% in the number of autos operated.

In accomplishing this the metropolitan traffic control system has been operated to regulate pedestrian as well as vehicular traffic. Stern traffic and parking rules have been enforced. Tunnels have been built under busy boulevards for the children going to and from schools. Jay walkers and pedestrians going against traffic are arrested. Passenger safety zones protected by traffic buttons give the necessary protection to street car traffic.

Detroit claims the distinction of having the densest traffic points in the country, a condition formerly found in New York. An official report shows that traffic in Detroit at Grand River and Grand boulevard west is in excess of what it was at the last count made at Forty-second St. and Fifth Ave., New York. Traffic at Jefferson Ave. east and St. Antoine St. exceeds the traffic at the famous New York intersection by 18 per cent. The 15 heaviest traffic streets in Detroit carry at the center 4 per cent more than the 15 heaviest traffic streets in New York.

Detroit is undertaking the solution of this problem through the establishment of a complete system of super-highways encircling the city and providing optional routes into, through and around the congested areas. In general the layout provides for rights-of-way 204 feet in width, improved with two 40-foot pavements separated by a car track space. On the two paved areas traffic lanes are established to segregate the fast through traffic from the slower heavy or local traffic. Intersecting streets and approaches to the car tracks will pass under the lanes of fast traffic and regulated speeding will be encouraged. The development has reached a stage in Woodward Avenue that is attracting the attention of traffic officials and city planners from many communities.

Arthur S. Tuttle, Chief Engineer of the Board of Estimate and Apportionment of the City of New York, speaking on City Planning as a Permanent Solution of the Traffic Problem, is quoted as follows:

" . . . It was not until about 1903 that the inadequacy of our present streets began to be realized, and since this date there has been a continuous progressive movement in the direction of improving conditions at points of congestion.

. . . With a view of ascertaining the sense of the community and more particularly the views of the various organizations which have made the problem one of great concern, a public hearing was given by committee in New York a short time ago for the purpose of collating all of the suggestions which might be offered as an aid in its investigation, at which time, however, practically no suggestions of value which could be construed as strictly novel were offered, although most of those which have heretofore been under consideration were placed in evidence, these comprising the following:

1. The systematic control of street traffic, both vehicular and pedestrian, in which connection an effort should be made to bring about uniformity in traffic signs and signals throughout the country, with sufficient variation in control to meet the requirements of local situations.

2. The improvement of existing streets through the removal of obstructions, the laying of smooth pavements, the widening of roadways where practicable without undue encroachment upon the sidewalks, and the provision of easy curves at the intersections.

3. The introduction of by-passes to enable through traffic to avoid congested centers.

4. The limitation of the dimensions and weight of different types of vehicles.

5. The fixing of roadway widths to conform with the types of vehicles which they are likely to be called upon to accommodate.

6. The separation of grades at street intersections at points where this can be effected without undue property damage.

7. The construction of elevated express streets along the waterfront or where they can be introduced without undue deprivation of light and air or interference with surface traffic.

8. The provision of adequate parking accommodation for automobiles in or near the congested business and commercial centers, this being accomplished either by setting aside public areas for this purpose or through the construction, either municipally or privately, of parking garages.

9. The placing of the burden of providing parking and loading spaces at least in part upon the property owners.

10. The widening of existing streets, where practicable, or accomplishing a similar result by the introduction of sidewalk arcades with a corresponding widening of the roadway.

11. The cutting through of new arterial streets where additional facilities can be obtained by no other method.

12. The control of density of traffic by imposing additional restrictions on height of buildings.

13. Lowering the peak of vehicular traffic by compulsory night trucking.

14. The substitution, where practicable, of buses for surface railroads, and the removal of abandoned surface tracks.

15. The construction of underground rail facilities for the delivery of store freight.

16. The provision of undercrossings for pedestrians at the busy traffic points, preferably in connection with the operation of underground rapid transit systems.

17. The setting up of more liberal standards for the width of both local and arterial streets in the planning of new territory, or the assignment of a greater proportion of the city area to street purposes.

18. The acquisition of court yard areas during early stages of development which can be thrown into the street system when and as required."

Many of the suggestions offered in this list have been applied to the traffic problems of other communities and many of them are not at all applicable to your local problem or to the traffic problem of Gary. In studying our local problems we find that we must work out our own salvation—and it is usually undertaken with fear and trembling. When we can find a similar problem satisfactorily solved in some other community we gratefully accept it as a guide for our endeavors. When we find that some other community has solved one of their problems in a similar manner to our solution we feel that they must surely be a wide awake and exceedingly progressive group.

President Elliott, last evening, expressed the hope that the state road system would be so developed that it would give state-wide access to all the state parks. To accomplish an entrance to the newly acquired park in the Dunes will require some solution to a traffic problem that at present is quite effective as a barrier to the Dunes on a good day in summer. The Dunes Highway is so overloaded with traffic on Sundays and holidays that drivers have spent from four to five hours traveling on concrete pavement the distance of 25 miles from Michigan City to Gary.

The Chicago City Council has effected the creation of a Street Traffic Commission to make an analysis of traffic problems for a year and then to formulate a comprehensive traffic plan and uniform traffic code for the Chicago Metropolitan area. The commission is to be made up of aldermen, city officials and the street traffic committee of the Chicago Asso-

ciation of Commerce which proposes to furnish \$50,000 for the first year's survey operations.

Already they have developed some rather startling data in reference to truck traffic. On the highways leading into Chicago the truck traffic is not 25% to 40% as the average driver supposes but less than 7% as shown by traffic count. The maximum truck traffic is on Indianapolis Avenue where in the count of 12,635 motor vehicles, 782 or 6.2% were trucks. The average on all roads is probably about 4%. On a study of truck traffic it was found that about 96½% of total truck mileage is on city streets.

The fact that Gary is in the district being studied by the Chicago Regional Planning Conference and is co-operating in this study is offered as an explanation for the use of so many examples from Chicago.

When we find, as we found last summer, that approximately 1,000 cars per hour were passing through our city with no desire to stop, we set about making it easier for them and safer for our citizens. We opened up and widened a route that became available as a by-pass to separate this through traffic from our local traffic.

When we found that our main down town street was becoming inadequate because of rough pavement, poor car track construction, and unlimited parking, we remedied the situation by paving the entire width with smooth pavement, limiting parking to one hour, removed the raised cross walks, increased the radius at intersections and have as a final step removed the center poles that have been supporting the trolley lines on brackets. This final step has accomplished the mental effect of increasing the width of the pavement about six feet.

There are many other items that enter into the traffic problem. Congestion of traffic at railway grade crossings on busy streets may be eliminated through grade separation and many of our Indiana cities are proceeding to remove this obstruction both as an obstruction and as a hazard.

The installation of traffic signals, if given the proper preliminary study, will certainly assist in regulating and directing traffic. It has been our experience in Gary that our signals are best adopted to serve the needs of the community when they are of the same type as in use in Chicago. This but emphasizes the need for uniformity in signals.

In some cities one-way traffic on some streets solves the problem but we have not found this true in Gary. Chief Collins of Chicago stated recently at the American Road Builders' Association meeting that Chicago could not operate on one-way traffic streets.

Gary tried out a restriction against left turns at several busy intersections and received such protest from the business men in all directions from the several intersections that the rule was abolished.

TRAFFIC OBSTACLES

By Howard R. Olson,
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There is nothing complicated or involved in the regional planning idea. It is merely a simple answer to a difficult problem that arises whenever similar or related work extends across political boundary lines. The condition that gave rise to the Chicago Regional Planning Association is the same that caused state highway commissions to be formed throughout our country, namely, a common problem too big for small political units, separated as they are, to handle effectively. The result desired was also the same: a co-ordinating influence to bring about unity in local plans and work with greater vision for future needs. The principle underlying the Chicago Regional Planning Association is a departure from that usually followed in metropolitan planning. It recognizes all officials whose specified duties are related to the work involved. It also includes public spirited citizens whose special knowledge or interest will be of value. These men are made consultants and directors of the planning and what special staff is required, work under their policies. The final result is that all phases of the plan receive immediate public support and are assured of realization.

Although the Chicago Regional Planning Association is concerned with all problems bearing upon community development, such as water supply, sanitation, rail, water and air transportation, parks and forest preserves and others, the most important and urgent is highway transportation. The common problem confronting the highway authorities in the many counties and towns grouped around the lower end of Lake Michigan can be divided into two parts: one, transforming their old horse-and-buggy age roads and streets into more efficient and safe carriers of motor vehicle traffic; and, two, planning every new road for modern automobile traffic with extra width for future widening when traffic conditions warrant.