

114 PURDUE ENGINEERING EXTENSION DEPARTMENT

It may be interesting to note the difference in maintenance cost per mile of this section of road for six months after the surface treatment as compared with the maintenance cost for the six months prior to treatment.

Six months prior to treatment:

200 cu. yds. gravel applied @ \$2.50.....	\$500.00
Labor, dragging daily @ \$1.50 per mile.....	175.00
Miscellaneous expenditures	25.00
Total	\$700.00

Six months after treatment:

50 cu. yds. of covering applied @ \$2.50 per yd.....	\$125.00
50 gal. tar @ \$0.20 delivered.....	10.00
Labor, patching small holes and miscellaneous work.....	75.00
Total	\$210.00

Comparing the preceding costs and considering the benefits of a dustless road we consider a surface treated road a good investment.

CITY PLANNING AS AN AID TO TRAFFIC

By G. E. Lommel,
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Inability to efficiently control traffic, prevent traffic congestion and lessen the number of traffic accidents, especially in our large centers of population, cannot generally be charged against city officials. With funds entirely inadequate to perform the major operations on the civic structure which are necessary to afford permanent relief of the traffic congestion; with the number of vehicles increasing rapidly; and with building operations in the highly congested areas ever on the increase, it is hardly possible for them to keep pace with the problem. In fact, when we stop to analyze the situation, we are forced to the conclusion that with conditions as they are it is really surprising that the problem is not much more acute. City officials and police departments have done and are doing good work and have contributed a great deal to the science of traffic control. However, we must not lose sight of the fact that regulation of our traffic of today on our streets of today is the problem which these officials are attempting to solve. What about tomorrow and next year or ten years from now?

This query brings us to the subject matter of this paper which is pertinent to the title "City Planning as an Aid to Traffic."

First of all, in order to understand the relation between city planning and the traffic problem it is necessary to get a definite and complete understanding of what the city plan engineer does and how he arrives at his conclusions.

In working out a development plan for any city, the first step is one which could be taken to advantage in the study of many other civic problems. It is a thorough analysis of the conditions which exist in the city.

Such an analysis includes a study of physical, economic, social, legal and financial conditions.

Existing maps of the city showing streets, alleys, lots and blocks, steam and electric railway lines, docks and wharves, parks and other city owned areas are especially valuable in a study of existing physical conditions. If topographic maps are available, the results of this phase of the study are much more reliable and important.

In addition to these data and in order to work out zoning plans, the present use of each lot in the city must be known. In short, a comprehensive understanding of the physical city must be had by the planner before designs for future development can be made.

This list of requirements seems at first rather formidable but a large part of the data is already available in a great many cities and the collection of it is neither a particularly difficult nor especially costly procedure when compared to the value of the results obtained.

Too much stress can not be placed upon the importance of getting accurate information about the civic structure before attempting to outline recommendations for changes or additions to it.

The major divisions of the city plan problem are transportation, streets and street systems, parks and other recreation facilities and the location of public buildings.

An ideal arrangement of the facilities which make up the transportation system of any city would be such that passengers and commodities are brought into the terminals of the city and distributed to their final destination with little loss of time. When more than 50% of the transportation cost of moving a box of apples from the state of Washington to the ultimate consumer in the city of New York is paid out between the city limits of that city and the consumer, the transportation system could hardly be called ideal.

All modern methods of transportation have their place in an ideal system. Co-ordination and co-operation of the different facilities is an essential fundamental feature of an efficient system.

More definitely stated, an ideal arrangement in a large city would include the following: (1) the fewest possible number of tracks which would adequately serve the transportation

needs of the city. This usually means a unionization project involving several railroads; (2) least interference of these tracks with street traffic. This phase normally means track elevation plans; (3) track facilities and freight terminals as a part of the water front development, which obviously makes possible an efficient transfer of commodities from one agency to another; (4) the shortest possible haul from the manufacturing establishment to the freight station; (5) careful routing and scheduling of surface car service to all parts of the city; (6) elimination of competition between buses and street car system. The bus has its proper place in the whole scheme of transportation. That place, however, is not as a competitor of the surface car. It is best used in outlying districts as a feeder to the surface car or in aiding the surface car during the peak of the traffic load.

These then are ideals of transportation in the city which the city planner hopes to reach. In every case, the objective is efficient service to the citizen. Any scheme which would approach this ideal arrangement would obviously tend to lessen traffic congestion because the primary objective in all 6 points mentioned above is the elimination of unnecessary traffic on the streets and across the streets as well as elimination of duplication of service which only adds to the congestion.

Zoning of the city is one feature of the work of the city planner which is not as yet fully appreciated by the average citizen. Our cities have grown from villages to large industrial centers in comparatively few years. In most cases, the growth was without supervision. Land owners used their lots for whatever purpose they desired. Buildings were erected to any height and no one, in the feverish effort to use all the building material available, gave the Golden Rule half a chance to operate. As a consequence, citizens, rich and poor alike, suffered from the effects of encroachments of undesirable manufacturing establishments, business buildings or apartment houses in dwelling house districts; narrow streets in the business sections of large cities soon became man-made canyons filled with everything except fresh air and sunshine. Congestion heaped upon congestion. Street traffic, human beings, brick, mortar, stone, steel and concrete all piled up in the central districts until the end, saturation and resulting stagnation seemed imminent. Fortunately that end was not quite reached even in New York City. Zoning as a municipal function began to operate and the result of its operation, although not so apparent to the uninformed, is nevertheless vital to the welfare of our cities of today. The future is also taken care of by the operation of a zoning ordinance.

Zoning is a reasonable restriction placed on the use of all lands within the city and for the benefit of all the citizens. It treats rich and poor alike. It gives protection and security

to all citizens not only from the standpoint of stabilized property values but more important, from the standpoint of health.

The principle of zoning is constitutional. The latest decision on this point was handed down by the United States Supreme Court on November 22, 1926, in the celebrated *Euclid, Ohio, vs. Ambler Realty Company* case. The decision was so decisive a victory for zoning that there is no question as to the right of the city to protect its citizens by this means.

That zoning is important is further evidenced by the fact that Mr. Herbert Hoover created a special committee on zoning in his department. This committee has published excellent bulletins on the subject and offers limited advice to all cities and states undertaking this project.

The actual zoning of a city is preceded by a use survey of the area. Based on the present use maps, areas of the city are set aside for industrial, business, or residential uses and no building can be erected unless its use is restricted to that stated in the zoning ordinance. Uses higher than those stated in the ordinance are permitted in any district.

The ordinance also establishes front yard, side yard and rear yard lines in all classes of use districts.

Height districts are established which results in a tendency to expand building operations in a horizontal direction rather than vertical.

Area districts are established. This latter restriction results in larger lots and again a spreading growth. These area districts specify the number of square feet of lot area required for each family.

A natural question at this point would be "How does zoning affect traffic?"

Zoning affects traffic indirectly because it has a direct effect upon the development of the street system which in turn directly affects the traffic flow. Zoning also makes possible a more efficient development of the transportation system.

It is hardly possible to discuss these effects without a consideration of another major problem which the city planner is called on to solve. This is the problem of the street system of the city.

Efficient traffic control in any city depends largely upon the width and arrangement of the streets in that city. No one can be justly blamed for the conditions which exist in a great many cities of today. The most far sighted citizen living at the time when these cities were founded could not be expected to anticipate an automobile for every three or four persons. Street widths which were adopted were adequate to satisfy the requirements of horse-drawn traffic. Jogs and dead ends were not nearly as objectionable as they are today.

Alignment and grade were also, in comparison with present day needs, not highly important considerations.

With few exceptions, then, the problem confronting the city plan engineer is that of fitting today's traffic needs to a system of thoroughfares entirely inadequate to serve those needs.

In attacking this problem the engineer must resort to a study of existing traffic conditions. The volume and character of traffic using the streets and the traffic capacity of the streets are obviously desirable data. Kind, amount and duration of parking must also form a part of this study.

Again, as is the ideal result in zoning, decentralization is the key to the solution of the traffic problem. In order to eliminate congestion it is necessary to:

- (1) Decrease the number of vehicles using the street by providing serviceable and attractive by-pass routes around the congested areas for all traffic passing through the district.
- (2) Increase the traffic capacity of the street by:
 - a. Widening the street.
 - b. Eliminating parked vehicles.
 - c. Eliminating traffic barriers such as grade crossings.
- (3) Increase the capacity of the street system in the congested area by:
 - a. Cutting through new streets.
 - b. Eliminating jogs and dead ends.
- (4) Provide traffic rules which are reasonable and enforceable.

Certain of these suggestions if carried out lead to what has been referred to as major operations upon the civic structure and due to the cost are not always possible.

Street widening if attempted as an immediate remedy may involve expenditures out of all proportion to the ability of the citizens to pay for it. Wider streets for future traffic may be obtained at reasonable costs by establishing building lines along the streets. As building goes on and the new structures conform to the set back, the street will gradually become of proper width. Obviously, the time to widen a street is when the abutting property is being used for dwelling house purposes and not for business uses.

On this point, we have again conclusive evidence of the value of a comprehensive plan for the development of any city.

The results of the plan engineer's study take the form of designs of the future street system which is based on the present one with the necessary revisions and additions to it. In the design, the major thoroughfares are first in importance. These are intended to carry a very large percentage of the total traffic. Their width, locations, alignments, grades and surfacing materials are selected with that primary objective. Feeding these main arteries are secondary streets, also selected to serve their particular purpose. Finally, the purely local street completes the circulatory net work of the city which

if properly designed and executed will serve the traffic needs adequately and efficiently.

Adoption of a thoroughfare plan by city officials enables them to anticipate street needs and provide for those needs at a time when the cost is not prohibitive.

With only minor changes possible, the application of the provisions of a zoning ordinance establishes definitely the uses of all lands within the city. The character of the traffic flow and the volume of traffic is determined by the use of the land. As a consequence it is possible to plan streets rather definitely for the volume and kind of traffic which these streets must carry as the building operations gradually conform to the restrictions for any particular section of the city. Widths, alignments, grades and surfacing materials can be selected to satisfy best the traffic requirements of any one street. There is, therefore, in zoning, some additional promise of help for the future, in the solution of the problem of streets.

Park areas and connecting drives are a part of the structure of the modern city and are admittedly a very desirable feature of it. The selection of these park areas and the location of the boulevards or parkway drives are problems of no minor importance.

The drives become a part of the street system, but differ from other streets in that they serve a special purpose and are designed with not only utility as an objective but also beauty. Driveways located along streams and rivers are especially valuable as links in the park system.

Areas which are to serve as places of recreation for the citizens must be carefully located with respect to the anticipated users of these areas. Again we have in this phase of the City Planner's work, evidence of the inter-relationship existing between all features of the comprehensive plan. For example, the zoning plans, transportation scheme and thoroughfare plans must be considered in working out the park system plan. Parks are intended to be used and must therefore be located so as to serve the present and future population.

Fortunately, areas which are not highly desirable for development as residence properties are especially useful as park properties. Broken and rough topography, river banks, marshy lands and the like can be utilized for park purposes to decided advantage.

In closing this short paper on an extremely important subject, I would like to leave you with the following impressions:

1. That city planning as a municipal function is highly desirable and in our large cities absolutely necessary.
2. That every city large or small becomes a better place in which to live and work if it is developed according to a reasonable plan.
3. That zoning is constitutional.

4. That no single feature of planning should be attempted without recognition of other problems. The plan should be a comprehensive one.

5. That in planning there is offered material assistance in the solution of traffic difficulties.

6. That planning offers to the citizens of a community one thing which is not possible under the ordinary condition of affairs, and that is an established and definite policy of public improvements continuing from one administration to and through the next.

7. That planning does not necessarily mean large expenditures of public money for the creation, revision or addition of the civic structure. It does mean spending at the right place and at the right time.

8. That no plan is worth a German mark unless it is used.

CITY TRAFFIC PROBLEMS

By A. R. Ross,
Mayor, Lafayette, Indiana.

In the points to be submitted in this paper the conditions in Lafayette will be dealt with, in the belief that with slight modification the conditions are present in every Indiana city of any size.

The curb to curb width of the down town streets in Lafayette varies from 30 to 51 feet but the greater majority of the streets will not average over 36 to 38 feet in width. The maximum width is found on the four sides of the public square. Automobiles parked parallel to the curb extend 6 feet into the street and where angle parking is established they extend from 10 to 13 feet into the street. Our principal street has an average width from curb to curb of about 39 feet. With double street car traffic traversing its center, and a solid row of automobiles parked parallel to the curb on both sides, it can be readily seen that there is not sufficient room between the street car and the parked automobiles for the passage of traffic. This condition results in numerous traffic blockades when street cars stop to take on and discharge passengers. This is a constant menace to the Fire department in making its runs in the congested portion of the city where it is most necessary for it to arrive promptly.

Traffic Census

In order to secure more definite data upon which to base corrective measures, a twelve-hour traffic and parking census