

# The Planning Function of Traffic Engineering

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## PLANNING IN TRAFFIC ENGINEERING TODAY

Much is being written and said today about highway planning and especially about urban planning. The tremendous growth of our cities and the resulting serious transportation problems have emphasized the need for solutions; and planning, it has been said, offers the mechanism by which these problems can be attacked.

Urban transportation is truly a major problem in cities of all sizes, but it is not new as many would have us believe. Urban congestion has always been with us, although today it probably is more intense and approaching more serious proportions.

Where does Traffic Engineering fit into the transportation problem? All traffic engineers undoubtedly believe they have a responsibility and an opportunity in this area, but do they truly understand what these are? Do other people recognize the place of the traffic engineer in transportation planning? The definition of traffic engineering, that it is the planning, design and operation of the transportation facilities required for safe and efficient transportation, should leave no doubt about the place of the traffic engineer, but is this fact understood by the average citizen?

During the past two years, I have asked many people, most of whom were actively interested in finding solutions to the urban traffic problem, what they thought traffic engineering was. Typical of the answers received were:

“Traffic engineering was the management of traffic signals.”

“The control of traffic on our streets and highways.” or “The installation of traffic signs, signals, and markings.”

“The control and movement of motor vehicles.” “The parking and movement of motor vehicles.”

Not one person questioned even mentioned that the traffic engineer had anything to do with planning or design.

After this trend became evident, I asked a second question of these same people: "Who is it that does the planning and design of the transportation facilities in your city?"

Typical answers received to this question were:

"City planners do the planning, that is, the little planning that is done; and state highway engineers do the design." "I do not know who, if anyone, does the planning and we do not build any new streets except in new subdivisions and local surveyors design those streets."

"Planning, what do you mean?"

As a fellow engineer commented recently: "In a nut shell, city planners do not believe engineers do much planning; and furthermore, they have serious doubts about their ability to do good planning."

With these beliefs of others quite clear regarding planning by traffic engineers, I investigated, more thoroughly, what planning traffic engineers actually do. I discussed their activities with several traffic engineers in cities of all sizes throughout the United States. I found very few doing any real planning at all unless they were assigned to do only planning, and this was only in the large cities and in consulting firms. Most cities are not large, and, have one traffic engineer. I found they were so overloaded doing traffic operations work they did not have time to do any planning. In some of these small cities, a consultant had been hired to do some of the planning; but in most of them, planning was not active or not being done at all.

It also is most certainly true that in many of these cities operational changes were being made to improve the flow of traffic, but I am sure, these were in a direction opposite to that which a transportation plan would indicate.

For example: One of the knottiest movement problems in a city is in the CBD. The typical condition has traffic feeding into a main street through the center of the CBD from all directions. This often is the best street for movement; and because all streets radiate from it, traffic movement on this street can be easily improved by signal coordination, incorporation in a one-way street system, elimination of parking and other traffic engineering techniques. And what happens? More traffic is attracted to the streets until the added capacity has been filled and congestion is present again. More traffic engineering operational techniques, or capacity increasing measures, such as street widening are then used and relief is obtained again for a few months

or maybe years. A lot of money is spent and a lot of effort is used, but still the problem has not been solved.

Would proper planning have called for attracting more traffic to the main street of the city? In most cities it would have suggested just the opposite—attract less traffic to the main street of the CBD by constructing an arterial system to and around the CBD but not through it. Large numbers of vehicles could then travel to their destination without becoming enmeshed in the congested web of the CBD. Such a plan would, for many cities, have suggested that money be spent on such arterials rather than on improving movement in the CBD. It would have suggested that the CBD is for the conduct of business, shopping recreation—for the pedestrian and not for the movement of vehicles.

Another example of the possible conflict between the use of only operational methods and good transportation planning concerns the role of mass transit in urban areas. In bowing to the demand for faster movement in congested areas, has all been done that could have been done to improve the position of mass transit? Perhaps a plan for the transportation of people and goods in every city for 1980 or 1990 or the year 2000 should be prepared before an answer is given to that question. The answer might be different if we looked at the problem in the light of the anticipated traffic of 1990 rather than that of the existing traffic of 1960.

On the other side of the picture is the fact that many good transportation plans have been completed and have laid on the shelf gathering dust for many years. Many excellent plans which were prepared 20 to 30 years ago were seldom used or followed. Is this a condemnation of planning? I think it is a condemnation of the planner, the traffic engineer, the city officials. Most of these plans were not used, because not enough citizens of the city were sold on the plan. Too little effort was put into putting the plan to work and some of this is a responsibility of the traffic engineer.

The traffic engineer must accept more responsibility for transportation planning. He is the logical person in a city to do a great part of it. It is the best way he can minimize traffic problems in the future city. It is the best way he can bring new professional stature to the traffic engineering profession. It is a job which can be done, but many are not now doing. Transportation planning, and that means coordination with all other needs and plans of the city, such as school, sewage disposal, water, drainage, and park requirements, must become a primary function of traffic engineering.

## WHAT IS PLANNING?

What is planning? Webster says planning is "to arrange before hand." Expanding this a bit, one could define street and highway planning as the orderly and continuing collection of information about streets and highways including history, condition, use, affects, costs, and needs, and the analysis of these data for the efficient and economic development of street and highway systems. It is a never-ending process which is best approached in an organized manner, for the periodic collection and the maintenance in a current status of basic information are most important to planning.

The objective of urban highway planning is the establishment of a street network capable of accommodating all desirable urban travel in an orderly, safe, efficient, and economical manner. This goal is also the objective of all who are concerned with the development of the urban area. Three conditions, however, make the achievement of such a goal impossible unless planning procedures are used. These are (1) the unprecedented demands for travel; (2) the complex relationships between the many governmental units concerned with street and highway development; and (3) the necessity of obtaining the most for every dollar spent.

The great need for urban facilities is the result of four separate demands which must be satisfied. One of these is the lost-ground demand, the accumulated backlog of construction which has been postponed during the past thirty years. In the 1930s the money was not available, because of the depression, to keep urban highways up-to-date. Materials, manpower, and equipment were not available during most of the 1940s because of World War II. In the early 1950s, many cities developed sizable construction programs, but they were not able to make significant reductions in the backlogs accumulated during the thirties and forties.

The second demand is due to replacement. Old facilities are constantly wearing out and in need of replacement. These must be replaced according to a regular schedule or traffic services will fall further below the minimum level.

The expansion demand is third. This is the construction necessary to accommodate an increasing population and an increasing amount of travel.

An increasing quality of service is the fourth and final demand. The motorist today demands higher standards of construction and maintenance so that he may travel faster, farther, easier, and more

comfortably. This demand has resulted in many miles of street and highway becoming obsolete although structurally adequate.

The sum and urgency of these demands are so great that careful planning is a necessity, but other factors also compel the use of planning. The American system of government results in a multiplicity of units responsible for providing parts of the transportation system. In addition to the federal government and the 50 state governments, there are over 3,000 counties and 17,000 municipalities in the United States. Several of these units are independently responsible for some part of the transportation problem in a single area. Some are overlapping in responsibility; and unless coordination is present, construction plans may be in conflict with each other. Paralleling the pattern of government is an equally complex pattern of tax systems and financial arrangements for construction of transportation facilities.

Another reason for planning is the need to eliminate waste, duplication, and extravagance in the use of public money. It is not possible to identify all of the economies possible through planning, but it is known that they are sizable. With well-laid plans, economies are possible through the purchase of sites and rights-of-way before property is heavily developed. Lower interest rates are also possible when entire programs are financed by a single bond issue instead of on a piecemeal basis. Careful planning can also minimize costly mistakes in design and construction.

The quantity of the work to be done, the complexity of the governmental responsibility involved, and the necessity of obtaining the most for each tax dollar require the establishment of some technique to insure projects are initiated with forethought and careful investigation, funds are committed to one project only after consideration of the needs of others, and future demands are anticipated. Planning is that technique.

## THE SCOPE OF URBAN TRANSPORTATION PLANNING

Good transportation planning is long-range, comprehensive, and coordinated.

Long-range planning means the determination of the needs for as far ahead as can reasonably be determined. The time period selected should be at least as long as the life of the facilities which are to be built initially. Most long-range plans for streets and highways have been for 15-25 years. Such looking ahead can produce several tangible results:

(1) Physical resources can be used more effectively. Rights-of-way can be identified years ahead of construction and obtained. Schedules of construction can be made realistic and engineering and contractor needs anticipated and programmed.

(2) Development of the area by private agencies is facilitated and cooperation with them is achieved. If citizens and interested groups know what is planned for an area, they can develop their own improvement programs and goals. Support for a plan can also be gained quite easily if it is long range and well known.

(3) Sufficient finances for carrying out the plan can be more easily obtained. Fiscal plans can also be prepared on a long-range basis and finances allocated when required. Unforeseen needs are less likely to occur, and actual financing can be timed to take advantage of favorable market conditions.

A good plan should have breadth in addition to being long range. The transportation plan should be only a part of an over-all plan, the master plan of the area. The master plan considers all the needs and desires of the area and determines the facilities and services which are necessary. It determines the best orderly plan for future growth and places the street and highway plan in its proper perspective.

Comprehensive planning assures that the various elements of the plan are in scale with the economic prospects and financial resources of the community and in keeping with the sentiments of the community. Recreational areas, fire protection, and many other community needs, including the plans of other transportation media, rail, air, waterway, and pipeline, are considered when planning is comprehensive. Each community need is considered and integrated with each other to assure the most efficient and economical use of public funds to build a common community future.

In this respect, transportation plans may be part of a national plan, a state plan, or at least a regional plan. In urban areas, they are a part of the metropolitan plan.

As a final test of a good plan, it should be determined if the plan is coordinated with the plans of other governmental units and developers of transport facilities. Coordinated planning means that the plans of overlapping governmental units, such as state and county or state and city, are considered and steps taken to insure that each governmental unit can work cooperatively with each other so agreements may be reached that are mutually satisfactory.

A coordinated plan does not stop at artificial jurisdictional boundaries, but is carried on by the joint efforts of all governments within the area. Coordination must also exist in the development of transportation plans between governmental units and private agencies concerned with providing travel service on the highways, such as mass transit.

A good example requiring coordinated national highway planning is the Interstate System of Highways. This is a national system of highways to be constructed by the several states. The development of the plan required the cooperation of each state and region of the country, and increased coordination is necessary to insure that the various facilities in the plan are constructed efficiently and for the benefit of our entire nation. The best results in cities cannot be obtained if the detailed location of streets and their construction are made by each local unit of government without regard to development in adjoining counties and states. Neither can best results be obtained unless the local unit of government, the city, has a major voice in the development of the plan.

Long range, comprehensive, coordinated planning will give new streets and highways the benefit of both planning and engineering. Planning factors, such as land use and the potentiality of land use, will be considered just as important in the location of the facility as engineering factors, such as the alignment and cost of the highway.

## STEPS IN THE PLANNING PROCESS

An effective plan is built upon a determination of the needs. The first step in the planning process, therefore, is the collection of information about the needs and the measurement of these needs. This is followed by the preparation of a long-range program to meet these needs, and then the division of this program into phases. A five-or-six-year action program is next prepared which results in the securing of the right-of-way and the preparation of detailed plans. The final step of the plan is the preparation of a fiscal plan which will provide the finances for the actual construction.

Urban transportation planning then must be comprehensive, long-range and coordinated. It must have a clear public purpose, a well-defined end product. It must be administered and prepared by competent technical personnel with the assistance of the citizens of the community. It must have a moral quality, having more than efficiency, a thing of beauty, a use of imagination, and artistic. It

must be a continuing process with changes incorporated that are necessary.

## THE RESULTS OF PLANNING

The planning process and planning steps just described are the foundation of any effective planning process. When a properly staffed and organized transportation planning agency uses these techniques, and works with all the agencies concerned to develop a long range, comprehensive, and coordinated plan, better transportation programs must result. The pamphlet "Planning for Public Works" prepared under the direction of the special assistant to the president for public works planning states:

"Putting these techniques of good planning to work and establishing good planning organizations does not mean that the human element is giving way to automation in our public works programs. In every stage of the planning process there will be problems, disagreements, and conflicts of opinion. There will be arguments as to the essentiality among functions and the accuracy of the standards each agency employs. When finances are considered, it may be that the goals of the community cannot be as high as the people desire. Despite all the problems that arise inevitably in any program, the need for effective planning in public works is not diminished. Planning provides the foundation for meeting the demands of our rapidly growing and prosperous nation. It provides a sense of order and rationality rather than guess work in decisions about what to build, where, and when. Planning does not promise perfection in the public works program of America—but planning guarantees progress."

Planning is a part of the opportunity and responsibility of the traffic engineer in determining the manner in which cities will develop. It is a challenge which traffic engineers must and will accept.