

Traffic Engineering— A Dynamic Profession

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The science of traffic engineering was practiced even before it was named; in fact, we might consider the regulations and control for the movement of people and goods was perhaps the origin. However, more realistically, this field of science was born with the era of the rubber-tired vehicle and came to be recognized as such with the growing operational problems of highway transportation.

From the all-too-narrow field of signs, signals, and markings, traffic engineering has expanded into a much broader field of transportation operations and public service. Largely through the resourceful use of application of workable techniques to accommodate increasing traffic on facilities that quickly become obsolete, traffic engineering is assuming an increasingly important function in the transportation picture.

PERSPECTIVE

To gain a perspective, consider what we have been doing in the field of traffic engineering and where we are going. Basically, the traffic engineer has been and is an operations engineer, concerned primarily with the use of highways. In performing this function, the traffic engineer accumulates a wealth of data and other information, develops techniques and analyses, applies sound engineering practice, and demonstrates by many successful and resourceful solutions, that his experience is a valuable contribution to highway transportation planning and operations.

The proper role of the Traffic Engineer includes all matters having to do with operations of the highway transportation system and relationships with other modes of transportation, land use and urban development. As far back as the 1942 annual meeting of the Institute of Traffic Engineers, Burt Marsh, recognized as a traffic engineer, even before the founding of the Institute of which he is an honorary member, in discussing the subjects which properly belong in the traffic engineering field, listed the following:

- (1) Geometric Highway design.
- (2) Road surface characteristics affecting traffic.
- (3) Terminals—their location, design and operations.
- (4) Methods of securing efficient highway transportation including accident prevention and public education.
- (5) Vehicle performance.
- (6) Traffic capacity, speed, composition and other characteristics of the traffic stream.
- (7) Driver characteristics and driver behavior.
- (8) Methods of supervision and control of both vehicular and pedestrian traffic.
- (9) Use and relationship of metropolitan highway transportation systems to other transportation facilities and to city planning.
- (10) Highway transport economics.

Certainly the knowledge from these activities provide a broad base for dealing with problems ahead, but many of the foreseeable problems that may be expected with more miles of the Interstate System in use will certainly tax the traffic engineer's ingenuity in the application of proven techniques and ability to resolve the traffic operation problems.

CHALLENGE

However, past achievements in traffic engineering, important as they have seemed, are likely to appear simple and commonplace, when we consider the problems beginning to appear with the growing and dispersing population, the pyramiding vehicle registrations, and the magnitude of the national highway program of controlled access highways. These problems appearing on the horizon will present a real challenge to the traffic engineer.

Perhaps a brief statement of this challenge might be deduced from an address given by Teke Wiley, commissioner, New York City Department of Traffic, at the 1959 annual meeting of the Institute of Traffic Engineers in New York City, on "Transportation Progress Requires a Broad Flexible Prospective To Keep Pace With Modern Social, Economic, and Physical Advances."

During the past three decades in which traffic engineering has been recognized as a profession, we have observed a transportation evolution created by a continuing growth in population, higher standards of living, and the desire for spatial expansion. We have also witnessed the annual vehicle registrations growing at an increasing rate result-

ing in development of larger urban areas, increased travel, and many other social and economic changes which are reflected in this changing transportation picture. During this period, our highway needs failed to keep pace with the increasing traffic, and it was the traffic engineer who had to do the best he could with the facilities available. The problem was, and still is, most critical in the urban areas.

The National Highway program, particularly the Interstate System, which is now under construction, will have a vital impact on the nation's economic welfare. The traffic engineer has a most important role in this program, from the planning, right through to the operation of the completed facilities.

There is a tendency to feel this new and modern highway system is the panacea for all of our problems of traffic congestion. I am sure that, as traffic engineers, we know the Interstate System, the controlled access highways, cannot be expected to handle all of the increasing volume of traffic anticipated in the next 15 to 20 years.

The Interstate System is primarily for longer distance travel, which is, in the end, a small part of the total vehicular travel on our streets and highways of the nation. We will continue to find the greatest concentrations of traffic will be in the urban areas. In fact, less than 15 per cent of the total mileage of Interstate highways will be in urban areas; yet these areas will account for at least 50 per cent of the travel on all our highways. This travel will be made up largely of shorter trips, and will be crisscross and complicated, requiring new and improved facilities to satisfy the transportation needs of suburban communities.

Traffic engineering is the basic tool for determining the location and alignment of the major arteries and the capacities that should be provided on the major routes, the crossroads, and adjacent streets, to assure a fluid interchange of traffic. Improved methods for forecasting future traffic will be necessary to give assurance that the capacity needs will be known and ultimately provided for.

With the growing dispersal of population, industry, and commerce to the rapidly expanding urban areas, home-to-work travel becomes a critical problem. To accommodate this travel, as well as the social and recreational travel that is increasingly desired by the growing population, facilities must have flexibility to serve the dispersed satellite communities as well as the central core. The location and alignment of these facilities will undoubtedly call for a departure from the traditional radial system of streets and highways which normally fan out from the central business district like spokes from

the hub of a wheel. It will be necessary to consider circumferential, peripheral, and inter-suburban highways to satisfy the needs of suburban concentrations of population and industry.

The existing streets and highways in our cities, however, will continue to handle the majority of vehicle-miles of travel. The increasing density of the growing population and traffic leaves little room for expanding the travel ways. Greater operating efficiency of the existing facilities will be necessary. To meet this challenge, the traffic engineer must utilize all opportunities to demonstrate his ability and foresight to raise the level of service and efficiency of the transportation plant he has to work with. Improved transportation service will gain the necessary public support and justify the dollars spent.

The increasing use of electronics offers many opportunities to improve traffic control, to obtain and to maintain essential and useful data to better understand traffic behavior. Continuing research in this and other fields will undoubtedly open up new vistas, and the traffic engineer will meet this challenge.

There is an increasing trend toward a recognition of the traffic engineer's important role in transportation planning and urban development. The very nature of his training, knowledge, and experience makes the traffic engineer a valuable and essential member of the transportation team. More and more communities of all sizes are recognizing the need for a comprehensive transportation and urban development plan.

Urban development, whether in new community areas or the modernization of old undesirable areas, is inextricably tied to transportation service. The traffic engineers and planners have a major role in this program in the public interest.

The public interest is best served when such plans provide for balanced and coordinated transportation facilities related to land uses. The traffic engineer is well aware of the advantages of mass transportation and the need to maintain it. However, in the major cities throughout the country, a general decline of this mode of transportation largely for economic reasons has been observed. Here again is an opportunity for the traffic engineer to use his talents to improve traffic operations on the streets and thus permit improved efficiency of public transit.

In recent years, we have observed the traffic engineer assuming a more important position in the management team responsible for the transportation job. His responsibilities are no longer limited to

the sign signal and marking era, but involve administration, planning design, construction, operations, and maintenance on a broad scale.

However, as Grant Mickle, member and former president of the institute, pointed out in his paper "Traffic Engineering in Tomorrow's Transportation," given in response to receiving the Theodore M. Matson memorial award in 1958: "The best efforts of the traffic engineer will not mature unless the climate is right. One essential of a good climate is a proper administrative structure that provides authority and responsibility for the overall transportation job, whether in city or state." To carry out our responsibilities requires adequate authority to get the job done. Successful application of professional knowledge, research, and modern techniques will certainly gain the traffic engineer proper authority on the transportation team.

As we look ahead and go forward in our chosen profession, traffic engineering, the horizon is unlimited in the dynamic opportunities offered to make effective contributions to the overall transportation problem. Our roll is tremendous, and we must be alert and aggressive if we are to assure the safe, convenient, and economic transportation of persons and goods.