PARKING AND TERMINAL FACILITIES

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Parking and terminal facilities in urban areas include: (a) curb spaces along the existing street system; (b) offstreet facilities such as public and private parking lots and garages; (c) parking facilities within commercial buildings for autos and trucks, ranging from recessed street level truck tailboard spaces within building lines, to large areas below or above street floors, connected by ramps or elevators; and (d) such specialized terminals as union bus and truck terminals.

Vehicles that now utilize offstreet parking and terminal facilities arrive there for the most part via existing street systems. Even where urban limited access expressways are available, only portions of vehicles that use offstreet parking and terminal facilities arrive via expressways.

As more urban expressways are constructed and areas tributary to expressways expand, increasing proportions of vehicles parking at individual parking and terminal facilities will arrive or depart via expressways. New parking and terminal facilities will then tend to be located as close to expressways as possible in order to reduce vehicle travel on existing street systems to a minimum. This growing intimacy between expressways and large individual parking and terminal facilities is bound to create serious traffic problems, particularly in the vicinity of traffic interchanges. Engineers must consequently provide flexible designs for expressway interchanges that will relieve inevitable traffic pressures as they arise, since some types of expansions cannot be completely envisaged when the expressways are being planned.

It is a commonly accepted fact that a

limited access expressway lane can handle 3 to 5 times the traffic of a city street lane. Or, in other words, one expressway lane can deliver enough traffic to keep 3 to 5 street lanes busy absorbing the traffic, if the traffic can be absorbed. Query: What happens if the rate of diffusion on the street system in the vicinity of the expressway is slowed down by the rate at which cars can be parked at large concentrated off-street parking and terminal facilities? Answer: Chronic traffic backups on the expressway, when rush hour traffic is arriving in town.

Conversely several large individual offstreet parking and terminal facilities located in a local area in the vicinity of an expressway entrance ramp may in a peak period deliver to the expressway entrance ramp a flood of traffic far in excess of its ability to absorb it. In this case, too, there would be chronic traffic congestion on the city street system, in peak periods, when traffic was leaving town.

Approximate locations and spacing of entrance and exit ramps are usually determined by the vehicular volumes that originate in or are destined for one or more interchanges. More precise locations of interchanges can be determined by giving special consideration to individual existing and potential offstreet parking and terminal facilities that would contribute substantial portions of traffic to specific interchanges. Such offstreet parking facilities would also indicate the design types of entrance and exit ramps required. A number of these types are described in Mr. Winter's paper on expressway interchanges. For example, concentrations of parking facilities in a local area would require that some interchanges be provided with more than merely

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an accelerating or decelerating lane. Some might require adjoining service streets that could function as reservoirs, like the plazas of vehicular bridges and tunnels. It must also be borne in mind that while any given interchange proper may have the capacity to deliver to the expressway all the peak period traffic of the surrounding offstreet parking facilities, the expressway itself at this point would have only the margin of its available unabsorbed traf-

expressway traffic delivered by the local interchanges.

In the selection of locations, determination of the number of interchanges, and the provision of extra widths of expressways proper, in given local areas, the essential desideratum is to maintain a proper balance in the capacities of (a) the expressway proper, (b) its local interchanges, (c) the local traffic light controlled street system in the vicinity of interchanges and (d) the rate of ab-



Figure 1. Sketch of Proposed Ramp Connections Between the Port of New York Authority's Lincoln Tunnel and the Mid-Manhattan Union Bus Terminal to be Constructed by the Port Authority.

fic capacity to absorb the traffic delivered to it by this individual entrance ramp. If the available unabsorbed margin of traffic capacity of the expressway is less than the traffic contributed by the interchange, congestion is bound to occur.

Consequently, in the design of expressways in the vicinity of interchanges, particularly where there are or are likely to be concentrations of offstreet parking and terminal facilities, short stretches of expressways may have to be widened to provide extra lanes in the vicinity of interchanges. These short stretches of widened expressways would permit of properly absorbing peak traffic. They would also permit the storage of moving vehicles while the street systems in the vicinities were diffusing and the offstreet parking and terminal facilities were absorbing peak sorption or delivery of vehicles by local offstreet parking and terminal facilities.

Auto Parking Terminals - It may generally be said, that today, existing lots and garages in urban areas are very largely located without much relationship to where they are actually needed. Many garages are former stables. A few have been built at locations where land is cheap but at much greater than convenient walking distances from major urban destinations. Existing lots have been located wherever land is available, usually in blighted areas at the fringes of business districts, pending redevelopment of the areas. Consequently most existing garages and lots are no criteria for the future locations of offstreet parking and terminal facilities.

There are, however, certain existing



EFFECT OF PORT AUTHORITY BUS TERMINAL ON INTERSTATE BUS TRAFFIC THROUGH IND-MANHATTAN STREETS



parking facilities which would require particular attention in connection with the design of proposed urban expressways. They are the concentrations of parking in connection with places of public assembly, such as, large ballparks and stadia. Designs of expressway interchanges in their vicinities require special study and treatment, if chronic traffic congestion is to be avoided.

With regard to future offstreet parking facilities, current thinking appears to favor municipally financed lots and garages. Where large public parks of wide boulevards are available, these are being suggested for underground municipal parking facilities. In some cities like Pittsburgh, for example, comprehensive plans have been prepared for a system of municipally financed and operated garages; those near the shopping areas for short time parkers and toward the fringes of the business district for long time parkers. It is believed that these plans for large municipal parking and terminal facilities will eventually materialize, then designs for interchanges in their vicinities should be flexible enough to be constructed or enlarged if and when, traffic to and from them develops.

It is the opinion of the author that, gradually, municipalities will adopt zoning ordinances requiring new commercial buildings to provide offstreet parking and truck berths. Should this be the future trend, offstreet parking facilities would once more become less concentrated, more diffused. This gradual diffusion of offstreet parking facilities should improve traffic conditions around expressway interchanges by spreading peak traffic loads by the travel time required between nearest and farthest parking areas tributary to individual expressway interchanges.

Bus Terminals - Interurban and intercity buses usually enter cities from several directions via city streets. Large buses travelling along narrow city streets congest these streets out of all proportion to the number entering the city. Where the number of buses are substantial, municipalities out of self protection will eventually require them to use a union bus terminal. A union bus terminal would be so located as to be convenient to downtown offices, shopping areas, theatres and hotels but also as close to urban expressways as possible so as to utilize city streets to a minimum. Where municipalities are contemplating requiring one or more union bus terminals, expressway interchanges should be



Figure 3

designed to give easy access to and from such bus terminals.

For example, the Port Authority's Union Bus Terminal in mid-Manhattan will be provided with special ramps connecting the terminal with the north and south tubes of the Lincoln Tunnel. These ramps will keep 85% of the 2,500 daily bus trips into the Union Bus Terminal entirely off city streets in the vicinity of the terminal. (A sketch of the Port Authority Union Bus Terminal and its ramp connections with the Lincoln Tunnel is attached.)

Union Truck Terminals - Into and out of most cities long haul, over-the-road tractor-trailer combinations haul freight daily. Individual operators' truck terminals are usually scattered throughout the city. Many of these trucks and trailers meander about on the narrow streets of cities picking up and delivering small lots of freight. Whether moving or parking on these narrow streets, these oversized vehicles congest these narrow streets out of all proportion to the numbers of tractor-trailer combinations in relation to other traffic. Consequently, where this type of tractortrailer traffic is growing, municipalities will eventually demand that overthe-road truck operators operate out of union truck terminals and that smaller trucks pick up and deliver their freight within the cities. Where union truck terminals are built, they would be located close to expressways. Large tractortrailer combinations would thus arrive via expressways and proceed to the Union Truck Terminal using city streets to a minimum.

Where it is anticipated that a union truck terminal will be constructed close to an expressway, interchanges in the vicinity of the terminal should receive particular attention. Expressway interchanges should be so designed as to be convenient for vehicles to enter and depart from the union truck terminal with a minimum use of city streets. The streets which trucks do use, however, should have



Figure 4

the capacity to absorb all trucks delivered to them by the expressway in peak periods. Interchanges should be designed to pass peak traffic; the expressway should be able to absorb all trucks delivered thereto by the interchanges. The Port Authority is now constructing two Union Truck Terminals, one in New York City in lower Manhattan, the other in Newark, N. J., and in selecting their locations has recognized these principles.

The truck terminal on Manhattan is within 1/2 mile of the Holland Tunnel via which vehicular crossing most of the over-the-road trucks will arrive at this union terminal. The Manhattan entrance and exit of the Holland Tunnel being so convenient to the lower Manhattan Union Truck Terminal, trucks will use city streets to a minimum to reach it. (See attached sketches which show location of the Port Authority's lower Manhattan Union Truck Terminal).

The Newark Terminal is located close to the existing New Jersey Route 25 and in the vicinity of proposed Route 100, the major arterial routes via which most of the over-the-road trucks will arrive at this union terminal. The interchanges of the New Jersey routes will be designed to give easy access to the Newark Truck Terminal and consequently there, also, trucks will use the streets in the vicinity to a minimum. (The illustrations herein show the location of the Port Authority's Newark Truck Terminal).



Figure 5