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Urban Mobility
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were purchased some time ago and current value does not reflect invested capital, we calculated cash flow as a percent of gross rent, with the former indicating, in one sense, a mark-up on a good which in this case was sheltered. While there is no typical mark-up that represents a good or bad return, our not very representative sample of cash flow statements seemingly indicates that a mark-up of 30% or more would represent a good cash position. In our median example discussed above, a 30% mark-up would result in a cash flow of \$273. In our sample, 9 out of 26 earned cash flows equal to, or exceeding, 30% of gross rents.

Urban Growth and Mobility in the United States*

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SUBURBAN DEVELOPMENT

WITHIN TWO DECADES half the workers in the United States may be living and working in the suburbs. Even now, Montgomery County, Maryland, one of the large suburbs adjoining Washington, D.C., claims 70% of its work force is employed within the county.

At any rate, it would seem inaccurate to characterize the suburbs in general as simply "bedroom communities" whose breadwinners are entirely dependent on the central city. Instead, it appears that suburbanization is bringing about in many respects, a *decentralization* of urban living with decreasing dependence on the *downtown* area for many urban activities.

Those who decry the spreading pattern of suburbanization find it easy to blame highway development for the so-called "flight to the suburbs." But the phenomenon is due to many factors, principally the *choice* of individuals.

HOUSING

The sheer increase in urban population created enormous demands for housing. Rather than translate this demand into increasingly higher density living many individuals, because their rising incomes would permit them to do so, showed their *preference* for *low-density, single-family, suburban* living.

The United States has sufficient land to satisfy these personal preferences and to accommodate further urban land development. Even today only a little more than 1% of our land use is urban, compared for example with 9 or 10% in England.

Economic considerations encouraged development of available land on the fringes of urban areas, rather than redevelopment of already built-up areas. This development has provided employment and has included shopping, educational, cultural and recreational land uses, in addition to housing.

* The above is taken from a talk presented by the author at the main technical session on "Urban Mobility" Sixth World Highway Conference, Montreal, Canada, on October 6, 1970.

PUBLIC POLICY

Furthermore, suburban development has been encouraged by public policy (which is responsive to public desires). It has been encouraged not simply by the public investment in transportation facilities but by: taxation and fiscal policies to promote home ownership and broadened tax bases; by housing and urban planning and development policies; by zoning and other land use controls, and by the provision of public services such as water and sewerage service, police and fire protection.

Certainly, highway access is a requisite for the type of suburban development described. But it should be noted that the existing highway network in and around the urban areas of the United States is, and has been throughout this period of suburbanization, extensive enough to permit access to nearly all underdeveloped land. Thus it is possible to continue the present pattern of developing rural and urban land, thereby increasing travel demand whether or not public programs of highway improvement are maintained. Continued suburban development therefore requires continued highway improvement, since failure to keep pace would simply compound future problems.

It may be contended by some individuals, particularly those in the urban planning field, that the trend toward dispersed, *low-density* development should be reversed. But at present this does not seem likely to occur because the majority of our people who have the income to express their preferences in a tangible way, *oppose* this view as previously discussed. Action to bring about *higher density* urban living would also have far-reaching socio-economic consequences and would require both full public acceptance as well as a fundamental shift in our public policy. On the other hand, greater application of the "new town" concept now receiving considerable attention would further accentuate the present trend.

TRANSPORTATION PROBLEMS

In attempting to meet the travel demand posed by the land use arrangements now prevailing in our urban areas, two basic and distinct urban transportation problems can be identified:

1. The peak-hour congestion problem arising from commuter trips oriented to the central business district.
2. The steadily increasing demand for person, goods, and service trips throughout the remainder of the day and night and throughout the rest of the urban area.

PEAK HOUR CONGESTION

Greater use of public transportation either by bus or rail-type facilities or in some cases both, in preference to private vehicles, can materially alleviate the first problem where it is in fact a real problem. In a few of our largest metropolitan areas, *rapid rail transit* provides an effective mode to attract commuters away from their autos. In all but a handful of our urban areas, however, the only practical answer lies in the use of *buses* on highways. Even in areas served by rail transit, buses now carry from nearly half to 90% of the transit load, and are needed to supplement the very restricted service capability of rails alone.

The low densities of most urban corridors pose difficult problems for *fixed* rail systems. Hence, the newer subways planned for the San Francisco and Washington, D.C. areas anticipate substantial reliance on *highways* for the collection and distribution of passengers, by both bus and auto. Low densities generally, however, dictate the use of buses as the only practical mass transit solution.

The highway program is now and will continue to materially assist in this solution. In some cases, it is accomplishing this by providing for exclusive or preferential use by buses of freeway lanes or streets during peak hours thus providing a rubber-tired form of rapid transport.

Acute as the peak-hour congestion problem can be, and as obvious as it is to commuters through the over-loading of highway facilities, it is necessary to keep it in perspective. It is significant, therefore, that trips to and from the central business district comprise only about 5 to 15% of the total trips within an urban area, depending on the particular area, and roughly two-fifths of these trips occur during the morning and evening peak periods.

Moreover, consistent with the trend in suburban growth, the percentage of downtown trips has been *declining* almost everywhere. In New York, for example, CBD trips have declined absolutely as well as percentage-wise and at last count accounted for only 11% of all area trips. In Washington D.C., CBD trips over a seven-year period dropped from 15 to 10% of areawide trips, which had increased 52%. In Flint, Michigan, in a 16-year period, areawide trips increased over 350%, but CBD trips declined from 19% to 7% of the total.

HIGHWAY FLEXIBILITY

Thus, the second urban transportation problem involves from 85 to 95% of all area trips and is growing. Because of the large numbers and wide dispersal of trip origins and destinations, almost infinite in amount, this aspect of the urban transportation problem obviously *cannot* be resolved effectively by a fixed rail system. It requires a highway solution (autos, buses, and trucks) to provide the required flexibility to satisfy this enormous range of many trips in all directions at all hours.

Today, in urban areas of 50,000 or more population within the U.S., some 93% of all person-trips are by auto, 5% are by bus, and only 2% are by rail transit. Highways therefore account for 98% of all trips and 97% of all person-miles of travel. In 1968, this 97% translated to 675 billion person miles of travel on our urban streets and highways, or a little more than 5,000 miles for every man, woman, and child in our urban areas.

In addition, virtually all of the movement of goods and services within urban areas is by highway vehicles using the same facility and sharing in its cost. Since trucks and service vehicles share the road with autos, the adequacy and efficiency of urban highway systems have a direct influence on the cost and quality of urban living. Even if all person movement were by any other mode than auto or bus, such as rail, bicycle, sidewalk, an extensive street and road network not much different from that which we now have, would still be required to move the freight, groceries, garbage, police, fire, medical aid, and service equipment to maintain life and its amenities.

Continuation of low-density, dispersed development will create enormous additional demands for highway transportation, simply because low density and the wide dispersal of origins and destinations and purposes of trips are overwhelmingly dependent on the auto, bus, and truck, with their flexibility to permit personalized routings and scheduling combinations. Realistically, these needs *cannot* be accommodated to any substantial degree by public transportation, although public transportation such as buses must be provided to serve the special needs of those who for a variety of reasons do not use autos.

HIGHWAY DEMAND

In the next 15 years, our U.S. metropolitan areas anticipate a population increase of over 30%. This increase coupled with continued dispersal of urban activities spells an *increase* in highway travel of at least 50%. The rising demand for highway transportation will occur generally in the new urban, or suburban areas, and to a lesser degree—perhaps even a decreasing degree—in the downtown areas. It indicates the need for a high-level program of highway improvement, concentrating on the need for freeways and high-capacity arterial routes in the growing, outlying sections of urban areas.

We in the highway field are the first to wish for some easy relief from our heavy transportation load. But in view of the patterns of urban growth and land use in the United States and the desires of our people (so clearly and forcefully expressed in the statistical trends stated herein) there is no apparent ready substitute for highway transportation in fulfilling many of the great variety of services highways perform.

IMPROVEMENTS

If this assessment of urban mobility in the United States is accurate, then the solution to problems arising from our use of highway transportation, such as air pollution in particular, lies not in the substitution of some other impractical and often unworkable mode, but rather in bringing about needed *improvements* in highway transportation. In the case of harmful motor vehicle emissions, technology can and must provide an acceptable solution, and government is making this clear to industry.

In summation, urban growth in the United States has been characterized for some time by *low-density* residential development and dispersal of many urban activities. This pattern of growth is responsive to the preferences of many individuals. It is made possible by highway transportation and is heavily dependent upon it.

If this pattern of urban development is to continue, and if the viability of central cities is to be maintained, transportation programs must be directed toward two principal aims: first, to upgrade public *mass transit*, in most cases, bus transit, in order to relieve the peak-hour commuter and downtown congestion problem; and second, to increase the efficiency of the *highway plant* that will be serving the suburban and exurban areas surrounding the city.

Urban Transportation Impact Analysis*

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* The above is taken from an article which appeared in Highway Research Board Special Report III, *Impact of the Bay Area Rapid Transit System on the San Francisco Metropolitan Region*.

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