Unit No. 1 Urbanization and Transportation
Details of Topic
Importance of Urban Areas
Structure of Urban Areas
Urban Design
Use of Road Space
Functional Classification of Urban Roads

Transportation and Importance of Transportation

Transportation is essential for providing mobility to the people, and for movement of goods. Transportation facilitates a broad spectrum of opportunities for an individual for desired activities. Though transport is not an end in itself, it is the means to many ends. Efficient transportation results in economic, social and political advantages. The economic advantages include: expanded market for goods; stabilization of prices in different markets; and economy of scale by concentration of activities in certain localities and subsequent distribution. The social benefits comprise: opportunities for travel for intellectual pursuits and pleasure; access to medical facilities; and choice of location for home and work. The political effects result from promotion of national integration, uniform extension of government services to various communities, and strengthening of the security of the country. Thus transportation is important for the progress of any nation. Government is associated with transportation both as a provider of facilities and a regulator of operations.

Transportation furnishes the fabric on which the cities depend for existence. Transportation contributes to the best geographical distribution of people and their activities by facilitating possibilities of exchange adapted to actual needs and safe-guarding future developments. The nature and efficiency of the transportation system determine the magnitude and distribution of economic activity in an urban area. Conversely, a wide variety of social, economic, demographic, and political factors interact to affect the type, nature and configuration of urban transportation systems as well as the urban form. Transportation engineering involves comprehensive planning, analysis, and design of the various components of transportation, such as the roadway or rail track with its nodes referred as fixed facilities, the vehicles, the signals and the geometric features required to secure safety in operation.

The desires of the people and their needs for goods create the demand for transportation. People travel primarily to earn a living, conduct family business, and engage in social and recreational activities. The sustenance of their activities requires the transport of goods within and among communities. The supply of transportation is in the form of travel by different modes, such as trains, buses, cars, motorized two-wheelers, cycle rickshaws, bicycles, and other vehicles, besides walking. The choice of the mode depends on the individual's preference in terms of time, cost,

Importance of Urban Areas

Cities function as the locus of commerce, invention and creativity, and have become the engines of economic development. Urban centres act as catalysts for growth, providing avenues for employment for the masses and improved standard of living. The major part (about 60%) of the country's Gross Domestic Product (GDP) comes from the urban areas. Also, the centres of learning and culture, the seat of administration and financial institutions are concentrated in urban areas. Hence it is important to devote special attention to the development of the urban areas. An effective urban transportation

system helps to maximize the economic efficiency of the city, while an inferior system retards economic progress.

Structure of Urban Areas

The structure of an urban area in a regional setting can be shown schematically as in Fig. (1). The density of population is maximum near the centre of the Central Business District (CBD). The density reduces as the distance from the CBD increases.

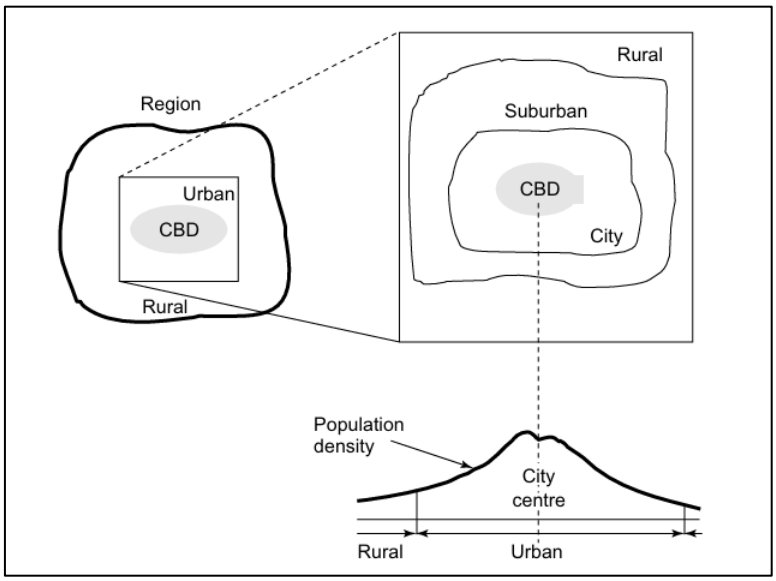

Fig. (1) Schematic Diagram of Urban Area in Regional Setting

The pressure of population in a metropolitan city can be reduced if a few urban nodes are developed outside the city but within the metropolitan region as indicated in Fig. (2). Such urban nodes are referred as relief poles and the strategy is known as the relief pole strategy.

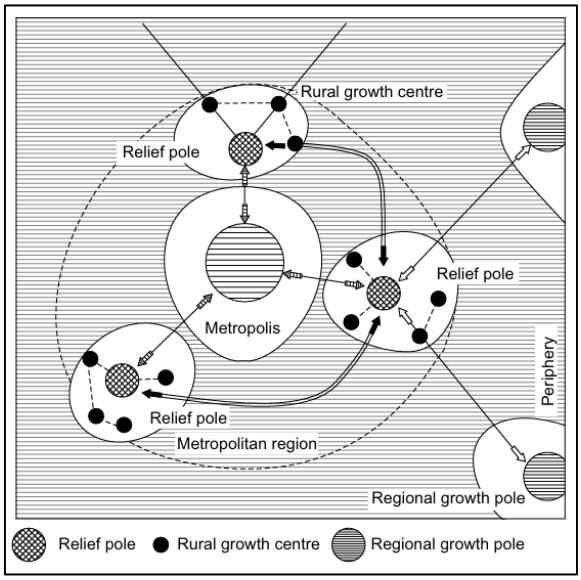

Fig. (2) Relief Pole Strategy

Urban Design

The urban system can be visualised as composed of five components

Moving objects : People, Goods, Vehicles, Services

Activities : Residences, Jobs, Production of Goods and Services, Movement
Infrastructure : Buildings, Roads, Railways, Power Plants
Land : Land under varied uses
Policy : Goals, Decisions, Plans

Urban design is a way of interpreting and improving people's perceptions of the final form of the city. The following three aspects of the design are important:

a) City Form-the physical organization of the city reflecting the pattern of developments and the corridors used for transportation systems.
b) Transportation Architecture-the physical appearance and qualities of open and closed public spaces or buildings, which include transportation facilities.
c) Human Factors-design for pedestrian and rider comfort, social contact, and stimulation of the senses by light, sound, visibility and weather.

Secondly, transportation architecture should be given attention in ensuring spatial organization, old/new continuity and surfaces needing minimum maintenance. The different buildings, roads, bridges, pedestrian ways, open spaces, gardens and trees should be effectively integrated to form aesthetically pleasing overall composition. The modern pedestrian malls in shopping areas of new towns contribute to enhanced aesthetics of city centres.

The third aspect to be considered is the quality of the personal environment in transportation, involving image, microclimate, social distance, human engineering and information/ communications. Image is a sense of being in a space, visual impact and environment. The ideal microclimate has clean air, low noise and vibration, moderate temperature, and good lighting. Transportation information should be legible and easy to understand. In a country with many languages and low literacy, directions and orientation could be communicated in graphics to the possible extent. Letters must be of appropriate size to enable reading from a distance. To be effective, physical planning of the urban area should be accompanied by social planning. Our challenge is to devise ways to promote the amenities of life in the midst of urban development, so as to make urban life more fulfilling than frustrating.

Use of Road Space

The operational planning for transport in urban areas will require a consideration of planning the use of the road space. The activities which compete for the road space are many; and these also vary with time. Some of the uses of road space are :

a) Passage of vehicles along the road;
b) Access to property;
c) Parking of vehicles;
d) Pedestrian traffic along the road;
e) Pedestrian crossing;
f) Carriage of goods along the road;
g) Collection and delivery of goods;
h) Window shopping;
i) Appreciation of views, works of art, buildings;
j) Admission of light and air to buildings;
k) Passage of gas, sewage, water mains and electrical cables below ground;

l) Selling from shops, eating and drinking from cafes;
m) Exercising pets;
n) Hawking;
o) Advertising;
p) Play;
q) Courtship; and
r) Gossip.

All these activities have their place in life. For a smooth life in general, it is necessary for us to set up priorities between them. The priorities so desired will also vary with the hours of the day and the location. Most of the roads will have more than one use, though the functions are predominantly to serve for movement and access. The transport plan should take cognisance of this fact, modify the priorities and control some of them. It should be dynamic to respond to changing priorities and technologies.

Functional Classification of Urban Roads

Urban roads cater to the following functions:
(a) movement function-facilitating smooth movement of motorized vehicles, bicycles and pedestrians;
(b) access function-providing access to land, buildings and roadside facilities;
(c) promotion of urban area formation-to induce an urban structure and form a framework for urban area; and
(d) spatial function-to accommodate public utilities such as electricity, water supply, drainage, underground railways, etc.

The design of an urban road will depend heavily on the relative importance given to its various functions, particularly the functions of access and mobility. A local street whose function is strictly land service must be designed with frequent access points, whereas a freeway emphasizes high speed movement. The traffic characteristics to be considered are: average trip length, average travel speed, access control, spacing between streets of the same category, traffic volume and type of control used.

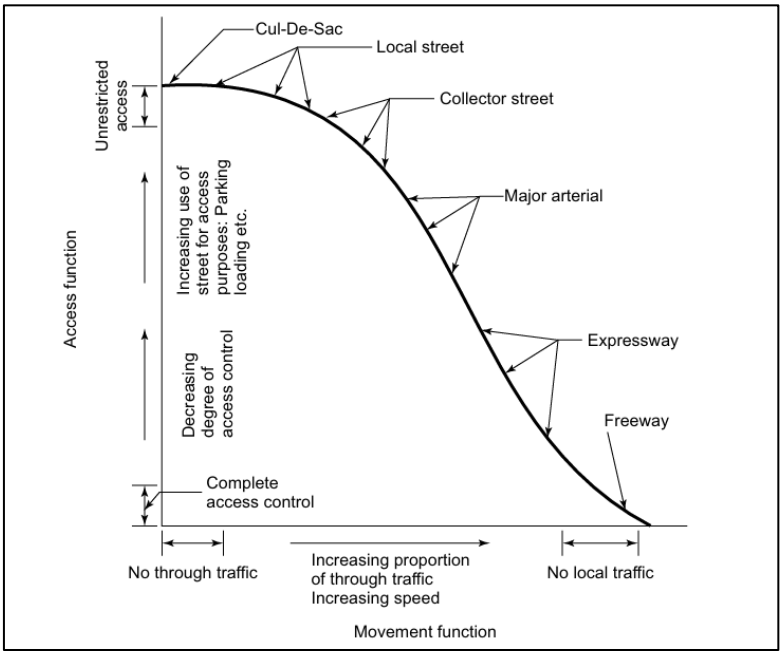

Fig. (3) Classification of Urban Roads with Reference to Movement and Access Functions

Based on the geometric and traffic characteristics, the urban roads may be classified as freeway, expressway, arterial, collector street, local street, or cul-de-sac. Cul-de-sac is a short discontinuous street giving access to dwelling units (DU). Local street separates individual DUs and integrates a cluster of DUs. Collector street separates clusters of DUs and integrates a neighbourhood. Arterial separates neighbourhoods and integrates a community. Expressway/Freeway separates communities. The classification of the various types of urban roads with reference to movement and access functions is shown in Fig. (3). The urban roads have to be organized into an efficient road network system consisting of the various types of roads, incorporating measures to harmonize traffic and the environment in the urban area.