

Internal Assessment Test –I Mar 2018
Solution

Sub: Urban Transport Planning

Code: 10CV843

Sem: VIII

Branch: CIVIL

1. Explain “Systems Approach”. Explain with flow diagram, systems approach to transport planning.

SYSTEM APPROACH TO TRANSPORT PLANNING

Urban-transport planning is a continuous process involving an interaction between government and the urban community. The appraisal of conditions within the community leads to a choice among alternative actions within the government and hopefully to the alleviation of unsatisfactory conditions through the implementation of the chosen action. Some evidence has been introduced above which suggests that the transport-planning process most commonly used has not been entirely successful in the alleviation of transport-related issues in many urban communities.

In the process the methodology was further refined and applied to various planning contexts. Steps involved in applying the original methodology after the conduct of planning inventories and surveys (e.g., land-use data, economic investigations, and travel surveys) and the postulation and calibration of models forecasting land use and travel demand to fit local conditions.

Step 1: Forecasts for the target year of the regional population and economic growth for the subject metropolitan area.

Step 2: Allocation of land uses and socioeconomic projections to individual analysis zones according to land availability, local zoning and related public policies.

Step 3: Specification of alternative transportation plans partly based on the results of step 1 & 2

Step 4: Calculation of the capital and maintenance costs of each alternative plan.

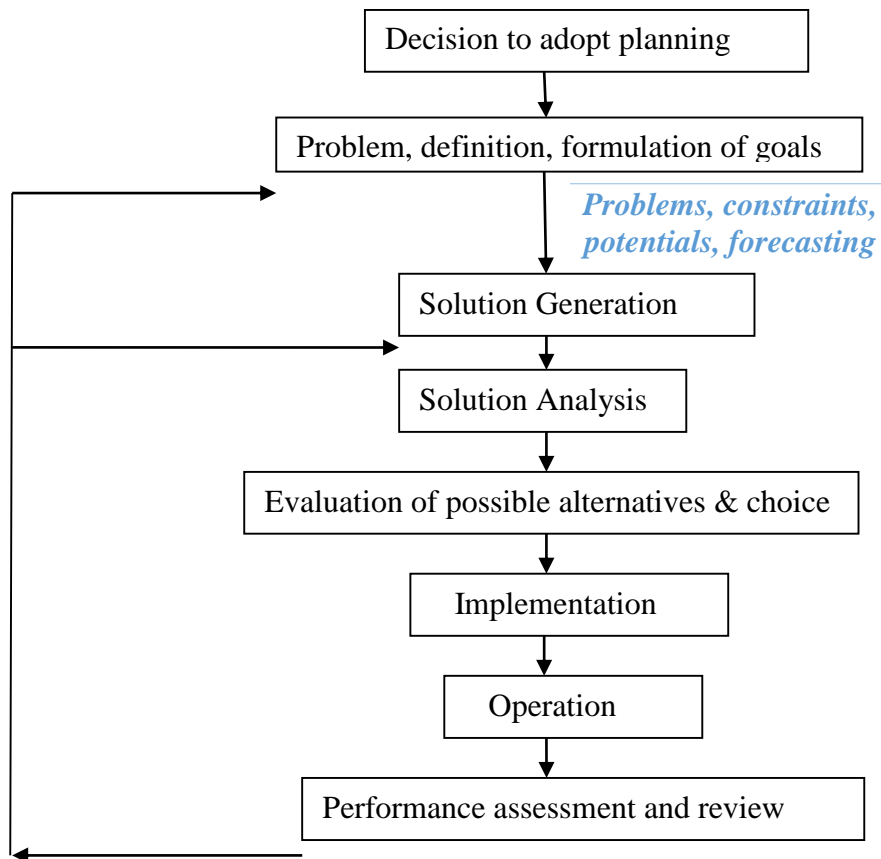
Step 5: Application of calibrated demand-forecasting models to predict the target year equilibrium flows expected to use each alternative, given the land-use and socioeconomic projections of step 2 and the characteristics of the transportation alternative (step 3).

Step 6: Conversion of equilibrium flows to direct user benefits, such as savings in travel time & travel cost attributable to the proposed plan.

Step 7: Comparative evaluation and selection of the best of the alternatives analyzed based on estimated costs (step 3) and benefits (step 6).

Step 8: Based on the step 7 once best plan is identified, then the transportation plan is implemented and operated.

This methodology was refined and expanded to cover additional social, economic, and environmental benefits and costs; to admit a wider range of multimodal transportation alternatives; to be more sensitive to the relationship between land-use and transportation planning; and to admit multiagency and public participation.



2. Define transport planning. Explain the interdependence of land use and traffic.

Transport planning is a science that seeks to study the problems that arise in providing transportation facilities in an urban, regional or national setting and to prepare a systematic basis is more on urban transport planning.

Interdependence of the Land Use and Traffic:

Previously transportation planning was limited to the measurement of traffic using streets, identifying those sections where the present traffic had exceeded the capacity and undertaking improvement measures to relieve the congestion and bottlenecks in the crux of the transportation problem and only supplied the engineers with short-term palliative to deal with the transport malady. This approach has now been virtually abandoned.

In 1954, Mitchell and Rapkin made a statement that urban traffic was a function of land use. This statement paved the way for a new line of thinking in urban transportation and land-use planning.

Based on the observation, various kinds of activities based on the land- called land use- “generated” different amounts and kinds of traffic. They concluded that though measures such as (i) regulation and control of traffic and (ii) provision and improvement of physical channels of movement were effective in dealing with urban traffic, the most basic level of action for a long-run solution of the traffic problems is the planning, guidance and control in the pattern of land use.

More recently, Buchanan has also emphasised the inter-relationship between traffic and buildings in a town. He states that in towns, traffic takes place because of buildings, and in fact all movements in a town have an origin and destination in a building.

The pattern traced by traffic is thus closely related to the manner in which buildings are arranged.

Commuter flows are closely dependent upon the location and size of the work-places and of the home-areas.

School traffic is governed by the location of the schools and the home areas.

Just as transport is a function of land-use, the reciprocal statement that land-use is a function of transport is also true. As new systems of transport are built, the land-use pattern that follows has a close relation to the accessibility that has been made possible.

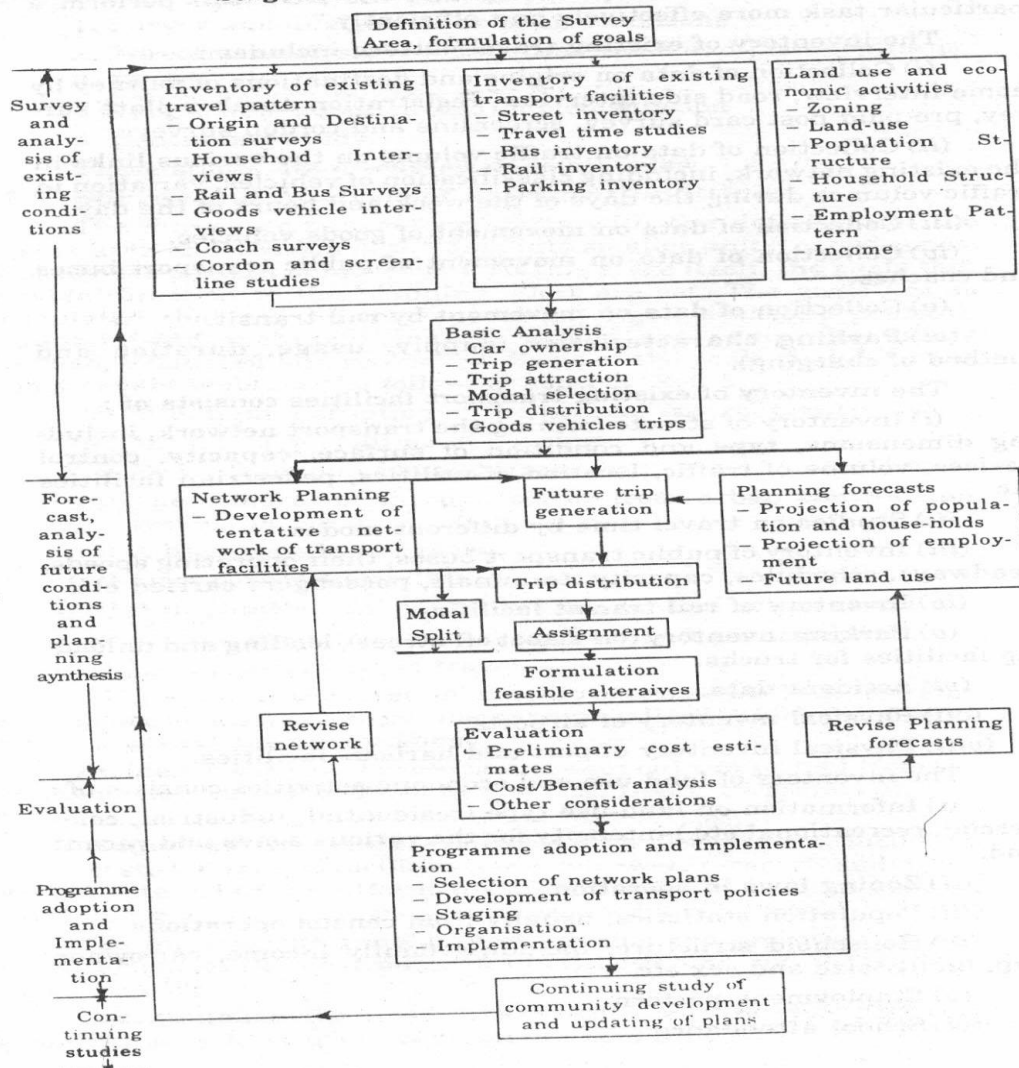
The urban socioeconomic environment is in turn influenced by the characteristics of the transport system. Different patterns of land development result in different transport demands and require different transport systems to service them. On the other hand, the type of transport system provided also influences the pattern of land development.

Certain properties of urban areas may be described in terms of the concept of a system. Urban areas consist of parcels of land occupied by various types of physical facilities, or adapted spaces, that house one or more types of human activities. These adapted spaces are serviced by other types of physical facilities such as transport, water supply, and sewage services. The human occupants of the adapted spaces within the urban structure interact within the context of such activity subsystems as the residential-workplace subsystem, the residential-retail trade subsystem, and so on.

Changes in the properties of the transport system influence the interaction pattern within these activity subsystems. The activity system of an urban area may be regarded as constituting the environment of an urban transport system.

3. With a neat flow chart, explain various stages involved in transportation planning process.

Table 29-2
Stages in the Transport Planning Process



4. (a) Define “zones”. Mention the various factors considered in dividing the whole area into zones.

The defined study area is sub-divided into smaller areas called zones. The purpose of such a sub-division is to facilitate the spatial quantification of land use and economic factors which influence travel pattern.

The external zones are defined by the catchment area of the major transport links feeding to the study area. Few guidelines to be considered for selecting zones are given below.

1. Zones should match other administrative divisions, particularly census zones.
2. Zones should have homogeneous characteristics, especially in land use, population etc.
3. Zone boundaries should match cordon and screen lines, but should not match major roads.
4. Zones should be as smaller in size as possible so that the error in aggregation caused by the assumption that all activities are concentrated at the zone centroids is minimum.
5. The zones should have a homogenous land use.
6. Natural or physical barriers such as canals, rives etc can form convenient zone boundaries.

7. Zones boundaries should preferably be water-shed of trip making.
8. The zones should preferably have regular geometric form for easily determining the centroid which represents the origin and termination of travel.
9. Sectors should represent the catchment of trips generated on a primary route.
10. Land-use is the most important factor in establishing zones for a transportation survey. It is only when the origin and destination zones reflect properly the land-use can traffic generated within the zones be predicted, measured and quantified accurately.

(b) Mention the factors to be considered while drawing a cordon line for a study area.

The selection of the external cordon line for an urban transportation study should be done carefully due to the following factors.

- i. The external cordon lines should circumscribe all areas which are already built-up and those areas which are considered likely to be developed during the period of study.
- ii. The external cordon line should be compatible with previous studies and the area of studies planned for the future.
- iii. The external cordon line should be continuous and uniform in its course so that movement crosses it once. The line should intersect roads where it is safe and convenient to carry out traffic surveys.
- iv. The external cordon line should contain all areas of systematic daily life of the people oriented towards the city centre and should in effect be the 'commuter-shed'.

5 (a) Explain in detail with sketch about the basic movements in transportation survey.

Types of Surveys

The basic movements for which survey data are required are:

1. Internal to Internal
2. Internal to External
3. External to Internal
4. External to External

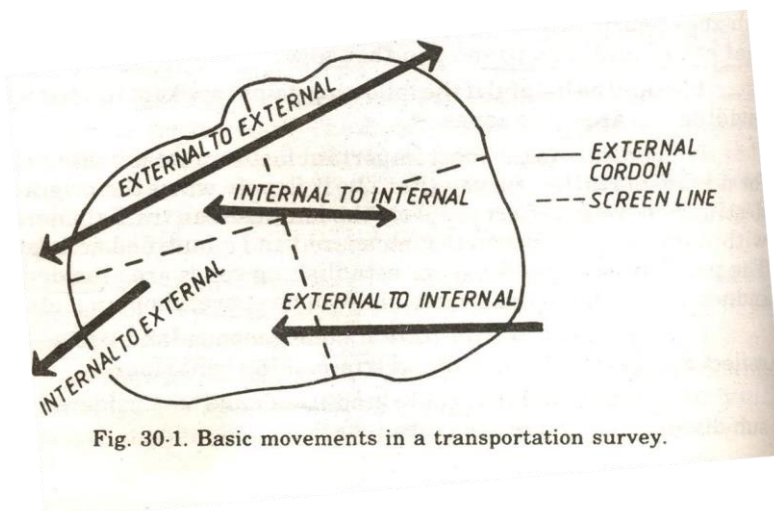


Fig. 30-1. Basic movements in a transportation survey.

For large urban areas, the internal to internal travel is heavy whereas for small areas having a small population the internal to internal travel is insignificant. The internal to

internal travel is best studied by the home interview technique with checks by screen-line surveys. The internal to external, external to internal and external to external travels can be studied by cordon surveys and also be surveyed by home interview technique.

(b) Mention the different types of transport surveys.

The surveys can collect the data, (i) at the home, (ii) during the trip and (iii) at the destination end of the trip.

When collected at the home, the data can be wide-ranging and can cover all the trips made during a given period. The data collected during the trip is necessarily of limited scope since the procedure yields data only on the particular trip intercepted. At the destination ends, the direct interview types of surveys provide data on demand for parking facilities and on major traffic attractors such as factories, offices and commercial establishments.

The following are some of the surveys that are usually carried out,

1. Home interview surveys
2. Commercial vehicle surveys
3. Taxi surveys
4. Road-side interview surveys
5. Post card questionnaire surveys
6. Registration number surveys
7. Tag surveys
8. Public transport surveys

5. Explain the inventory of transportation facilities.

Inventory of Transport Facilities

The inventory of existing transport facilities should be under taken to identify the deficiencies in the present system and the extent to which they need to be improved. The inventory consists of:

1. Inventory of streets forming the transport network
2. Traffic volume, composition, peak and off-peak
3. Studies on travel time by different modes
4. Inventory of public transport buses
5. Inventory of rail transport facilities
6. Parking inventory
7. Accident data

Inventory of streets:

An understanding of the extent and quantity of the road network is very important to formulate plans for future. The inventory should cover details such as classification of the street system, length, cross-sectional dimensions, type and condition of the surface, capacity, intersections, control devices, structures, street furniture, etc.

Traffic volume:

Data pertaining to traffic volume and its composition will be needed to check on the survey data collected by the home-interview and cordon surveys. The variation of the traffic volume over different hours of the day, different days of the week and different months of the year is also needed.

Travel time studies:

An estimate of travel times between different zones by various modes is necessary for transport planning. Travel times are usually measured for the peak-hour conditions and non-peak hour conditions.

Inventory of public transport buses:

The inventory of public transport buses includes information on the total number of buses, their capacity, schedules, routes, operating speeds, terminals, number of passengers carried, economic picture of the public transport system and the fare structure.

Inventory of rail transport facilities:

The inventory of rail transport facilities should include the length, capacity, schedules, operating speeds, stations, number of passengers carried, economic picture of the rail transport undertaking and the fare structure.

Parking Inventory:

The parking inventory should collect information on the existing on-street and off-street parking facilities, the parking demand and utilization of existing facilities. Data on parking charges and the system used for charging should also be collected.

Accident data:

Accident data over the past years will help to understand the nature and extent of the hazards inherent in the present system and the need to improve the situation.