Chapter – 2
Urban and Regional Transportation Planning
Introduction

• Urban Planning is in practice since long time whereas Regional Planning is a recent field of planning.

• The underlying theories of regional planning have originated from different fields like geography, sociology, ecology, economics and space economy and so on.

• Therefore the theory of regional planning should be developed from economic location theory (to find out the site for an activity corresponding to minimum cost), central places studies (source of goods and services to the surroundings area beyond its own) and agglomerative economics, theories relative to urbanization process, theory of spatial integration of rural and urban areas, theory of inter-regional migration, resource use, export base and pattern of different types of regions.
### 2.1 Difference between urban and regional planning

<table>
<thead>
<tr>
<th>Regional Planning</th>
<th>Urban Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is a category of planning and development that deals with designing and placing infrastructure and other elements across large area.</td>
<td>Urban, city and town planning is the integration of land use planning and transport planning, to explore a very wide range of aspects of the built and social environment of urbanized municipalities and communities.</td>
</tr>
<tr>
<td>A region in planning terms can be administrative or at least partially functional, and is likely to include a network of settlement and character areas.</td>
<td>Transportation planning is involved with the evaluation, assessment, design and siting of transport facilities (generally streets, highways, bike lanes and public transport lines).</td>
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<tr>
<td>The transportation Improvement Program (TIP) allocates federal funds for use in construction of the highest priority transportation projects in the near term of the Regional Transportation Plan (RTP). The TIP must be consistent with the long range objectives of the RTP and must be financially balanced.</td>
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Ten simple rules of urban transportation planning

• Rule 1
  • Accommodate real needs of People including children, old and disable people.
  • Prepare plan and programs with the public concern.
  • Urban Planning and transportation planning is a social, psychological, economical, ecological, architectural and engineering job.

• Rule 2
  • The prosperity of a city doesnot depends on private car traffic, but on accessibility in general, on amenity of its streets and open spaces and – to put it more succinctly – on its genius.

• Rule 3
  • Transportation and land use must be balanced.
  • Mixed land use must be achieved to reduce journey distance.
  • High density with mixed land use is effective from a transportation point of view without crossing the limits.
• Rule 4
  • Mathematical modeling of traffic behavior and traffic volume is an important preparation for decision making.
  • But don’t stretch it beyond its limited validity.

• Rule 5
  • Observe the environmental ranking of transportation modes: walking is preferable to cycling, cycling is preferable to public transit and transit is preferable to private car.

• Rule 6
  • Urban streets are open space for the general public.
  • Consider all functions of the streets – social life, strolling around, providing access to building, as well as transportation facility to pedestrian, cyclist, public transit or private car.

• Rule 7
  • With the increase in density the needs of traffic regulation and their enforcement grow rapidly.

• Rule 8
  • Especially in high density areas, is urban design and architecture according to human scale.
  • The design quality of a street helps to compensate for the environmental impact of car traffic.

• Rule 9
  • The ground level of streets has to be primarily designed for pedestrian and cyclist including bike lanes and crossways over the driving lanes.

• Rule 10
  • Provide more plantings and trees within the streets improving street climate and visual impression.
2.2 Difference in Planning for movement of people and goods

• Mobility is the basic need of human beings.
• It provides us with independence, allows us to express our individuality and enables us to enjoy a full social life and participate actively in society.
• The transportation of people or goods mainly consists of infrastructure, vehicle and operation.
• **Passenger transport** may be public where operators provide scheduled service or private.
• **Freight transport** is mainly transported in container.
• Transport plays an important part in economic growth and globalization but most type cause air transport and use of large amount of land. While it is heavily subsidized by government, good planning of transport is essential to make traffic flow and restrain urban sprawl.
Urban Planning model in SHANGHAI
2.3 Hierarchical structure to transport Planning: Intermodal approach and integrated development approach

• Transportation system is one system that relates to and is part of many other system. Transportation system itself consists of hierarchies that relate to the respective role of different system components.

• A road hierarchy is a means of defining each roadway in terms of its function such that appropriate objectives for that roadway can be set and appropriate design criteria can be implemented.

• These objectives and design criteria are aimed at achieving an efficient road system whereby conflicts between the roadway and the adjacent land use are minimized and appropriate level of interaction between the roadway and the land use is permitted. The road hierarchy can then form the basis of ongoing planning and system management aimed at reducing the mixing of incompatible functions.
• The four levels have been arranged in terms of an increasing degree of
detail with respect to functional objectives and are defined as
• **Level 1 : Purpose**
  • Relates to the primary objective of the element, whether to carry
    through traffic or provide direct property access;
• **Level 2 : Function**
  • Relates to the relationship between the roadway and the land use it
    serves (i.e. how the roadway serves the land use)
• **Level 3 : Management**
  • Relates to the emplacement of policies to achieve the envisaged
    function based upon the tributes of the element and of the adjacent
    land uses; and
• **Level 4 : Design**
  • Relates to specification of the form of the element in order to achieve
    its functional objectives.
# Road hierarchy

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<tr>
<th>Level 1: PURPOSE</th>
<th>ROAD</th>
<th>STREET</th>
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<td></td>
<td></td>
</tr>
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<td>SUBARTERIAL ROAD</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
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<tr>
<td>LOCAL STREET</td>
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## LEVEL 2 : FUNCTION

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<td>Traffic Distributor</td>
</tr>
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<td>Sub Arterial Main Street</td>
<td>Major Collector</td>
</tr>
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<td>Sub Arterial Main Street</td>
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## LEVEL 3 : MANAGEMENT

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## LEVEL 4 : DESIGN

*as per guideline and code*
Intermodal transportation

• It refers to a system that connects the separate transportation modes such as mass transit systems, roads, aviation, maritime and railroad and allows a passenger or freight to complete a journey using more than one mode.
• Freight
Integrated transport planning aims to ensure that there is a suitable, safe and interconnected transport infrastructure for different transport modes such as private car, freight, public transport, walking and cycling, which results in improving the community’s accessibility to jobs, services, recreation and other daily activities.

The transport system is a main component of city’s infrastructure.

Transport influences and is influenced by the pattern of urban growth and development.

Key strategic principle for integrated transport plan are:
1) Safety
2) Efficiency
3) Effectiveness
4) Environmental responsibility
5) Social responsibility
6) Robustness

The transport system must provide service in the face of ongoing and largely predictable during the coming 35 years and must be able to respond to and take advantages of unpredictable economic, social, technological and other changes.
2.4 transport demand survey and studies: Survey design and field studies, data requirement for passengers and freight movement

• Basic movements in transportation survey:
  ➢ Internal to Internal
  ➢ Internal to External
  ➢ External to External
  ➢ External to Internal
• Survey data can be collected
  1. At home
  2. During the trip
  3. At the destination ends of trip

• Types of Transportation survey
  A. Home Interview survey
  B. Commercial vehicle survey
  C. Taxi Survey
  D. Road side interview survey
  E. Post card questionnaire survey
  F. Registration number plate survey
  G. Tags on vehicle survey
  H. Public transport survey
  I. Traffic flow survey (roadside traffic count, intersection traffic count, vehicle speed survey)
  J. Inventories of land use and economic studies.
A. Home Interview Survey

- Most reliable type of survey for the collection of O-D data. [Origin-Destination]
- It is intended to yield data on the travel pattern of residents of the household and general characteristics of the household influencing trip making.

- Information on travel pattern includes:
  I. Number of trips made,
  II. Origin and Destination
  III. Purpose of trip
  IV. Travel mode
  V. Time of departure and arrival

- Information on household characteristics includes:
  I. Types of dwelling unit (Types of house, apartment)
  II. Number of Residents
  III. Age, Sex and Composition
  IV. Vehicle Ownership
  V. Number of driver
  VI. Family income

- Type of Home interview
  I. Full interview technique
  II. Home questionnaire
B. Commercial vehicle survey

• It is conducted to obtain information on journey made by all commercial vehicle based within the study area.

• Types of Survey
  • Information from operators
  • Filling forms by drivers

C. TAXI SURVEY

  • Urban areas have large number of taxi making trips.
  
  • Survey procedure
    • Filling forms by taxi drivers

D. ROADSIDE INTERVIEW SURVEY

  • It is one of the methods of carrying out a screen line or cordon survey.
  
  • Types of Survey
    • Directly interviewing drivers of the vehicle at selected survey points.
    • Issuing prepaid postcards containing the questionnaire to all or sample of drivers

E. POSTCARD QUESTIONNAIRE SURVEY

  • Suitable in old postal time era.
  
  • Survey procedure
    • Reply paid postcard handed to all or sample of driver and ask them to fill.
F. Registration number plate survey
- This method consists of registration number of vehicle entering and leaving an area at survey point located on the cordon line.
- By matching the registration numbers of the vehicles at a point of entry and exit from the area, two points on the path of the vehicle can be identified.

G. TAGS ON VEHICLE SURVEY
- In this method at each point where the roads cross the cordon lines vehicles are stopped and a tag is fixed usually under the windscreen wiper.
- The tags for different survey stations have different color and shapes to identify the survey station.
- The vehicles are stopped again at the exit point when tags are collected.

H. PUBLIC TRANSPORT SURVEY
- Types of Survey
  - Direct interview with passengers.
  - Issuing postcards questionnaire.

I. TRAFFIC FLOW SURVEY
- Survey procedure
  - Roadside traffic count.
  - Intersection traffic count.
  - Vehicle speed survey.

J. INVENTORIES OF LAND-USE AND ECONOMIC STUDIES
- Inventories of land-use:
  - Zones and classification
    - Residential
    - Industrial
    - Commercial
    - Recreational
    - Open space
    - Institution etc.
- Inventories of economic activities:
  - Population zone wise
  - Age, Sex, family composition
  - Employment statistics
  - Housing statistics
  - Income study
  - Vehicle ownership.
2.5 predicting future demand

• Most important step in transportation planning
• It is estimating the demand for transport facilities and services for future design period.

• The traditional four step process:-
  ➢ Trip generation
    ✓ Forecasts the number of trips that will be made
  ➢ Trip distribution
    ✓ Determines where the trips go
  ➢ Mode usage
    ✓ Predicts how the trips will be divided among the available modes of travel.
  ➢ Trip assignment
    ✓ Predicts the routes that the trips will take, resulting in traffic forecast for the highway system and ridership forecast for the transit system.