**Assignment #1**

**Subject: Transportation management and planning**

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**QUESTION NO. 1: What is planning, briefly describe the studies carried out in the scope of transportation planning strategies in their modelling with assumption and limitation. Present your answer in the form of formal technical report?**

**Answer:**

* **PLANNING:**

**Definition:**

Planning is the fundamental management function, which involves**deciding beforehand**, what is to be done, when is it to be done, how it is to be done and who is going to do it. It is an**intellectual process** which **lays down** an **organisation’s objectives and develops various courses of action**, by which the organisation can achieve those objectives. It chalks out exactly, how to attain a specific goal.

**Transport planning** is defined as planning required in the operation, provision and management of facilities and services for the modes of transport to achieve safer, faster, comfortable, convenient, economical and environment-friendly movement of people and goods.

**Characteristics of Planning**

 

* **SCOPE OF TRANSPORTATION PLANNING:**
	+ - All man-made projects should start with a plan.
		- The more significant the project, the more intensive and long term the planning
		- For large transportation projects, planning starts 20 years before construction.
* **FUNDAMENTAL ASSUMPTIONS IN TRANSPORTATION PLANNING:**
* Travel patterns are tangible, stable and predictable.
* Movement demands are directly related to the distribution, and intensity of land use, which is capable of being accurately determined for some future date.
* **ADDITIONAL ASSUMPTIONS:**
* Decisive relationship exists between all modes of transport and that the future role of a particular mode cannot be determined without giving consideration to all other modes.
* The transportation system influences the development of an area, as well as serving that area.
* Area of continuous urbanization require a region-wide consideration of transport situation.
* The transportation study is an integral part of the overall planning process, and cannot adequately be considered in isolation.
* The planning process is continuous, and require continuous updating, validating and amendment.
* **SHORT & MEDIUM TERM TRANSPORTATION PLANNING (S&M):**
* Making existing system efficient.
* Short range transportation needs.
* To increase efficiency:
	+ Efficient use of existing road space.
	+ Reduce vehicle use in congested area.
	+ Improve transit service.
	+ Improve internal management service.
* Planning with short range objectives based upon studies with limited scope and local orientation.
* Evaluation Criteria can be accidents, travel time etc.
* **STRATEGIC TRANSPORTATION PLANNING:**
* Capital intensive improvement
	+ Major S&M synonymous to small strategic plan
	+ Recycling of S&M during long time possible
* New facilities.
* Major changes in existing facilities.
* Long range policy actions.
* Future land development policies, adding highway link, bus transit system.
* Travel demand forecasting play an important role
	+ **TRAFFIC VOLUME COUNTS:**
* Number of vehicles passing a point.
* May be comprehensive counts covering the entire main road system in an area.
* Counts on all roads intersecting a cordon line which encircles a particular area.
* Counts on screen line(s) which divide a city into two or more parts.
* Counts at specific points.
* The information sought
	+ Traffic volume and the direction.
	+ Volume of turning traffic at intersections.
	+ Hourly, daily, and seasonal variations of traffic
	+ Proportion of cars, trucks and buses.
* **ORIGIN & DESTINATION SURVEYS:**
* Traffic counts give the amount of traffic passing specified points on the road but they do not indicate where traffic desires to travel, i.e. Its origin and its destination.
* The survey is primarily for transportation planning, particularly the location, design, and programming of new or improved highways, public transport, and parking facilities.
* An origin and destination survey may range from a relatively simple study to determine the amount of traffic that would by-pass a town to a comprehensive transportation survey for planning and design of the transportation system in a large metropolitan area.
* **Methods include:**
* Recording registration numbers
* Handing postcards to drivers
* Roadside interviews
* Tag-on-vehicle surveys
* Home interview surveys
* **SPEED STUDIES:**
* Using a radar meter, which gives a direct reading of speed.
* Taking photographs of a section of road at a predetermined time interval and measuring the distance
* Results may be presented in tables, graphs and diagrams.
* These may include
	+ Speed distribution and cumulative frequency distribution curves.
	+ The mean speed (TMS & SMS)
	+ The 85th percentile Speed

**TRAVEL TIME AND DELAY STUDIES:**

* Travel time measures the average journey time and journey speed on sections
	+ Used in traffic assignment
	+ Quality of the traffic route
	+ Before and after effect of traffic engineering techniques
* **Delay study**
	+ By analysing the delays, the location and cause of the congestion can be identified and remedied.
* **PARKING STUDIES:**
* Carried out to
	+ Assist in cordon counts
	+ the number and location of existing parking spaces, both kerbside and off-street;
	+ existing parking practices, including usage of available spaces, parking duration, illegal parking;
	+ the need to impose or vary parking time limits or to install parking meters;
	+ The adequacy of existing enforcement measures.
* For larger cities, a comprehensive parking demand study is required
* It includes the determination of parking usage, parking habits as well as the origin, destination and purpose of trip of drivers parking in the area.
* It is used primarily in determining the demand for parking space by evaluating the individual parker’s desires.
* The actual survey is carried out in the form of questionnaire cards or direct interviews.
* **OTHER TRAFFIC STUDIES:**
* Turning movement counts
* Vehicle delay studies
* Saturation flow rate
* Queue lengths
* Gap study
* Vehicle occupancy study
* Commercial vehicle survey.

**Q:2, What activities are exercised in planning for a four step conventional transportation modelling, discuss in detail with reference to different zonal production and attraction attributes?**

**Answer:**

t was one of the first travel demand models that sought to link land use and behaviour to inform transportation planning. Originally applied in the highway planning context, the model was expanded in the 1970s and 1980s to include multimodal trips and improved modelling techniques.

## The Four Steps

The four steps are described as follows:

### **Trip Generation**

Trip generation determines the frequency of origins or destinations of trips in each zone by trip purpose, as a function of land use, household demographics, and other socioeconomic factors.

### **Trip Distribution**

Trip distribution matches origins with destinations, often using a gravity model– a calculation that takes into account the relative activity at the origin and destination as well as the travel cost to go between them.

### **Mode Choice**

Mode choice computes the proportion of trips between each origin and destination that use a particular transportation mode. (This modal model may be of the logit form, developed by Nobel Prize winner Daniel McFadden.)

### **Route Assignment**

Route assignment allocates trips between an origin and destination by a particular mode to a route. Often (for highway route assignment) Wardrop's principle of user equilibrium is applied (equivalent to a Nash equilibrium), wherein each driver (or group) chooses the shortest (travel time) path, subject to every other driver doing the same. The difficulty is that travel times are a function of demand, while demand is a function of travel time, the so-called bi-level problem. Another approach is to use the Stackelberg competition model, where users ("followers") respond to the actions of a "leader", in this case for example a traffic manager. This leader anticipates on the response of the followers.

**BASIC ACTIVITIES IN TRANSPORTATION PLANNING**

* Collect travel information
* Identify existing system performance levels
* Estimate future travel demand
* Forecast future system performance levels
* Identify different alternative solutions

Main focus: meet existing and forecast travel demand

**STUDY AREA:**

* Clearly define the area under consideration
* May be country
* May be regional
* Metropolitan area
* Overall impact to major street/highway network
* Local
* Divide study area into study zones, TAZs (Travel Analysis Zones)
* Homogenous urban activities (generate same types of trips)
* Residential
* Commercial
* Industrial

**TRAVEL ANALYSIS ZONES-TAZs**

* May be as small as one city block or as large as 10 sq. miles
* Natural boundaries, major roads, rivers, airport boundaries
* Sized so only 10-15% of trips are intrazonal
* Links: sections of roadway (or railway)
* Nodes: intersection
* Centroids: centre of TAZs
* Centroid connectors: centroid to roadway network where trips load onto the network

**Question # 3: The settle area of KP is being divide into different district…**

**Answer:**

|  |  |  |
| --- | --- | --- |
| **Land Use Category** |   | **Area (ha)** |
|   | **zone 1** | **zone 2** | **zone 3** | **zone 4** | **zone 5** | **zone 6** | **zone 7** |
| **Residential** |   | 7740 | 24900 | 17064 | 40204 | 29317 | 576419 | 53445 |
| **Comercial** | **Retail**  |   | 6972 | 5688 | 26220 | 6172 | 126091 | 15270 | 1290 |
| **Whole Sale** |   | 14940 | 10744 | 20976 | 7715 | 90065 | 7635 | 1935 |
| **Services** |   | 5976 | 2528 | 1748 | 6172 | 162117 | 10180 | 1720 |
| **Manufacturing** |   | 1290 | 4980 | 1264 | 1748 | 4629 | 36026 | 12725 |
| **Transportation** |   | 1935 | 8964 | 5688 | 5244 | 4629 | 90065 | 10180 |
| **Public Buildings** |   | 2580 | 9960 | 4424 | 6992 | 3086 | 252182 | 30540 |
| **Public Open Space** |   | 3010 | 22908 | 15800 | 71668 | 92580 | 468338 | 114525 |
|  |  |  |  |  |  |  |  |  |  |
|  |
| **Land Use Category** |   | **Trip Generation Rate(personnel Trips Per Hectare)** |
|   | **zone 1** | **zone 2** | **zone 3** | **zone 4** | **zone 5** | **zone 6** | **zone 7** |
| **Residential** |   | 128 | 108 | 95 | 75 | 55 | 45 | 38 |
| **Comercial** | **Retail**  |   | 850 | 423 | 563 | 670 | 463 | 485 | 380 |
| **Whole Sale** |   | 135 | 90 | 115 | 73 | 60 | 48 | 40 |
| **Services** |   | 445 | 258 | 505 | 385 | 365 | 338 | 328 |
| **Manufacturing** |   | 353 | 183 | 83 | 73 | 55 | 53 | 35 |
| **Transportation** |   | 73 | 25 | 35 | 25 | 13 | 18 | 15 |
| **Public Buildings** |   | 595 | 265 | 375 | 245 | 90 | 48 | 10 |
| **Public Open Space** |   | 5 | 3 | 10 | 5 | 5 | 3 | 3 |
|  |  |  |  |  |  |  |  |  |  |
|  |
| **Land Use Category** |   | **Trip Genration** |
|   | **zone 1** | **zone 2** | **zone 3** | **zone 4** | **zone 5** | **zone 6** | **zone 7** |
| **Residential** |   | 990720 | 2689200 | 1621080 | 3015300 | 1612435 | 25938855 | 2030910 |
| **Comercial** | **Retail**  |   | 5926200 | 2406024 | 14761860 | 4135240 | 58380133 | 7405950 | 490200 |
| **Whole Sale** |   | 2016900 | 966960 | 2412240 | 563195 | 5403900 | 366480 | 77400 |
| **Services** |   | 2659320 | 652224 | 882740 | 2376220 | 59172705 | 3440840 | 564160 |
| **Manufacturing** |   | 455370 | 911340 | 104912 | 127604 | 254595 | 1909378 | 445375 |
| **Transportation** |   | 141255 | 224100 | 199080 | 131100 | 60177 | 1621170 | 152700 |
| **Public Buildings** |   | 1535100 | 2639400 | 1659000 | 1713040 | 277740 | 12104736 | 305400 |
| **Public Open Space** |   | 15050 | 68724 | 158000 | 358340 | 462900 | 1405014 | 343575 |
| **Total Trips generated in Each Zone** |   | 13739915 | 10557972 | 21798912 | 12420039 | 1.26E+08 | 54192423 | 4409720 |
| **Total Trips Generated from All Zones** |   | **242743566** |