Course: **Transportation Planning and Management** **Program: MS**

Exam: **Mid Term Exam**

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AnsQ#1

Planning:

Planning is the process of thinking about the activities required to achieve a desired goal. It is the first and foremost activity to achieve desired results. It involves the creation and maintenance of a plan, such as psychological aspects that require conceptual skills.

Or

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.

Scope of transportation planning

Transportation planning is a process that develops information to help make decisions on the future development and management of transportation systems, especially in urban areas. It involves the determination of the need for new or expanded highways, transit systems, freight facilities, and transportation terminals, their location, their capacity and the management of their demand. Typically transportation planning involves a forecast of travel patterns 15 to 25 years into the future with an aim to develop a future transportation system that will work effectively at that time.

Why is transportation planning necessary?

Transportation can have significant effects on mobility, economic development, environmental quality, government finance and the quality of life. Wise planning is needed to help create high quality transportation facilities and services at a reasonable cost with minimal environmental impact and to enhance economic activity. Failure to plan can lead to severe traffic congestion, dangerous travel patterns, slow economic growth, adverse environmental impact and wasteful use of money and resources. Transportation planning is required by federal and state law in order to receive most types of federal, state and local funding for transportation projects. Significant transportation projects require a long lead time for their design and construction. Furthermore they can have major effects on future land use patterns which need to be assessed

Transportation planning strategies and Model:

Regional transportation planning shapes the transportation policies, strategies, and programs for the region, resulting in an integrated multimodal system that moves people and goods efficiently. As part of the planning process, transportation demand modeling facilitates the evaluation of alternatives for current and future problems, helping to guide long-range transportation infrastructure investment decisions. Modeling also provides information to jurisdictional engineers and planners for localized analysis of short-range transportation issues.

What is a transportation model?

The transportation demand model is a mathematical representation of supply and demand for travel in the region and represents the choices that people here make to travel. Traffic on the roads results from individual decisions like where, when, and how to travel. The transportation supply is generally represented by roadway, transit, and trail networks. The roadway network represents major roads in the region, the transit network represents public transportation service in the region, and the trails network represents major trails. In addition to the transportation networks, the other major input to the model is the land use data for the region. The demand for travel is developed using a series of equations and mathematical models applicable to the region. Land use decisions such as where to live, work, and shop also greatly impact our travel behavior. To account for all these decisions and to assess the impact of such individual choices on our

community and transportation system, analysts formulate behavioral equations within the transportation model that are driven by regional surveys applicable to the greater Thurston area.

Why is transportation modeling needed?

In addition to the federal requirement for using transportation models to develop regional plans, such modeling provides a platform to assess future problems, potential solutions, and the outcome of employing such solutions. Policy makers can compare these alternatives and either select the most promising option, or propose measures and policies to alleviate the problem. To provide data to inform decision making, the model generates a variety of outputs: vehicle volume to capacity ratios, travel delay, vehicle miles traveled, and mode split. Transportation models help to build high quality multimodal transportation systems, reducing environmental impacts, minimizing traffic congestion, and avoiding dangerous travel patterns and undesirable land use patterns.

Assumptions and limitations

- Delay occurs on links. Most traffic assignment procedures assume that delay occurs on the links rather than at intersections. This is a good assumption for through roads and freeways but not for highways with extensive signalized intersections. Intersections involve highly complex movements and signal systems. Intersections are highly simplified in traffic if the assignment process does not modify control systems in reaching an equilibrium. Use of sophisticated traffic signal systems or enhanced network control of traffic cannot be analyzed with conventional traffic assignment procedures.
- Travel only occurs on the network. It is assumed that all trips begin and end at a single point in a zone (the centroids) and occurs only on the links included in the network. Not all roads streets are included in the network nor all possible trip beginning and end points included. The zone/network system is a simplification of reality.
- Capacities are simplified. To determine the capacity of roadways and transit systems requires a complex process of calculations that consider many factors. In most travel forecasts this is greatly simplified. Capacity is found based only on the number of lanes of a roadway and its type (freeway or arterial). Most travel demand models used for large

transportation planning studies do not consider intersection capacity and the use of sophisticated traffic control systems in their calculations.

- Time of day variations. Traffic varies considerably throughout the day and during the week. The travel demand forecasts are made on a daily basis for a typical weekday and then converted to peak hour conditions. Daily trips are multiplied by a "hour adjustment factor", for example 10%, to convert them to peak hour trips. The number assumed for this factor is very critical. A small variation, say plus or minus one percent, will make a large difference in the level of congestion that would be forecast on a network. Most models are unable to represent how travelers often cope with congestion by changing the time they make their trips.
- Emphasis on peak hour travel. As described above, forecasts are done for the peak hour. A forecast for the peak hour of the day does not provide any information on what is happening the other 23 hours of the day. The duration of congestion beyond the peak hour is not determined. In addition travel forecasts are made for a 'average weekday'. Variations in travel by time of year or day of the week are usually not considered.

Recommendation:

Transportation system is like a back bone of a country. A Good transportation system saves the lives of human beings through different aspects like road accidents and environmental pollution. It's also beneficial for the economic growth of a country. Smooth roads can leads to supply goods and services well in time to the desired place. The majors advantages of good transportation system and modeling are as following

- Its helps to keep the environment net and clean
- Reduces chances of road accidents
- Reduce chances of transportation cost
- Time saving
- Increase economic growth

So it's the need of time that government must take attention towards good transportation system because a good transportation planning and modeling is useful for economic growth and development of a country.

AnsQ#2

Transportation modeling:

Transportation modeling is used to develop information to help make decisions on the future development and management of **transportation** systems, especially in urban areas.

Four Steps of Transportation

- Trip Generation.
- Trip Distribution. ...
- Modal Split. ...
- Traffic Assignment.

Trip Generation.

For each discrete spatial unit, it is estimated the extent to which it is an origin and destination for movements. The output is usually the number of trips generated and attracted by a given spatial unit.

Trip Distribution.

Commonly a spatial interaction model estimates movements (flows) between origins and destinations and which can consider constraints such as distance. The output is a flow matrix between spatial units.

Modal Split.

Movements between origins and destination are then disaggregated by modes. This function depends on the availability of each mode, their respective costs, and also social preferences.

Traffic Assignment.

All the estimated trips by origin, destination and mode and then “loaded” on the transportation network, mainly with the consideration that users want to minimize their travel time or have to flow through existing transit networks. If the traffic exceeds the capacity of specific transport segments (which is often the case), congestion occurs and negatively affects travel time. This in turn, through a feedback process, may influence trip generation and distribution.

AnsQ#3

Solution

Land Use Category		**Area**						
		Zone1	Zone2	zone3	zone4	zone5	Zone6	Zone7
Residential		990720	2689200	1586952	3015300	1612435	25938720	2030910
Commercial	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