Lecture 1
Transportation Planning Process

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Transportation Planning Process

Phase I - Base Year Inventory

Make inventory of existing network + existing traffic patterns.

- O/D travel demand tables
- counters on roads
- inventory of planning factors
  - is is industrial?
  - what is the income distribution?
  - types of employment.
Traffic Congestion in the USA

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Traffic Congestion in India

remixconcepts.blogspot.com
Collection of data to be used in model to predict the traffic flow pattern.

* The data must be extrapolated if it is to be used for predicting future traffic patterns.
US Interstate Highway Network

www.freightcenter.com
Phase II - Model Building

Interested in finding out relationships among parameters of the system.

3 categories of relationships

1. Trip Generation Models.
   # of trips attracted to a certain area or generated in a certain area.

   \[ O_x, D_y : \text{trip ends} \]

   \[ O_x = \# \text{ of trips produced (generated) at zone } x \text{ (production zone)} \]

   \[ D_y = \# \text{ of trips attracted to zone } y \text{ (attraction zone)} \]
2. Trip Distribution Models.

Given $O_x$’s and $D_y$’s find the O/D travel demand table.

Will then know how many travelers from $O_x$ will go to $D_y$; for all $x, y$ pair.
Transportation Planning Process

Travel Demand:

\[ d_{xy} = kO_x D_y f(c_{xy}) \]

\( c_{xy} \): travel cost from zone \( x \) to zone \( y \)

\* \( d_{xy} \) increases as \( c_{xy} \) decreases.


Given O/D table \( d_{xy} \)'s, find how this travel demand is distributed among different routes and modes of transportation.
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Relates traffic flow pattern to O/D pairs and characteristics of networks.

Can be applied to:

- communication networks
- energy networks
- electrical networks
- economic and financial networks
Another Type of Traffic Congestion!

www.darkroastedblend.com
Transportation Planning Process

Three Stage Model for Transportation Planning:

- Trip Generation
  \{Ox\} \{Dy\}
- Trip Distribution
  trip ends \{dxy\}
- Traffic Assignment
  O/D demand pattern
  link load pattern
  update for congested networks

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FOMGT 341 Transportation and Logistics - Lecture 1
**Transportation Planning Process**

**Phase III - Travel Forecasts**

Extrapolation - to predict parameters for which we have data from Phase I.

Data from Phase I may be crude.

**Phase IV - Network Evaluation**

Goal is to compare networks.

What is the traffic that will be generated by the 3 or 4 networks - evaluation of cost + benefits.
Amherst Area View from Mt. Sugarloaf

Travel Monkeys' Gallery

http://cowles.econ.yale.edu/archive/reprints/specpub-BMW.pdf


http://supernet.som.umass.edu/bookser/netbook.htm


http://supernet.som.umass.edu/austria_lectures/fulmain.html
Additional Reading

- Pocket Guide to Transportation (2008) by Bureau of Transportation Statistics
  

- For additional background material, see the Virtual Center for Supernetworks website:
  
  http://supernet.som.umass.edu