Transportation Planning Process

John K. Abraham

Model

Something which in some respect resembles or describes the structure and/or behavior of a real life counterpart
Types of models

- Iconic – look like the real one
  - Model car
- Analog – Correspondence between elements – no physical resemblance
- Symbolic – Compactly and abstractly represent principles of reality
  - \( F=ma \)

Deriving a Model

- Variables the planner has full control – \( X_i \)
- Variables the planner has no control – \( Z_k \)
- Variables the planner has indirect control – \( Y_m \)
- General relationships between above – \( R_n \)
- Parameters – coefficients, constants – \( P_r \)

\[ M=\{X_i, Z_k, Y_m, R_n, P_r\} \text{ for some } l,k,m,n,r \]
Transportation Model

- A series of mathematical equations that represent how choices are made when people travel.
- Transportation plans and investments are made based on projections models make on future travel.
Planning Vs. Problem Solving

- **Time Period**
  - Future (15 yrs) Vs. Present (1yr)
  - Can program a sequence Vs. brush fires
- **Breadth**
  - Broad Vs. Narrower in scope and more detail
- **Parking, congestion ..** may be problems, but have to all be considered in planning
Domain

- Cordon
- zones / sub-regions
  - Small enough to pinpoint problems / Large so that it does not get too involved
  - Zone 39: Heavy industry Employment -- 400 blue collar -- 123 white collar
  - Zone 3: Central Business District Employment -- 623 retail -- 1200 non-retail
  - Zone 136: Suburban shopping center Parking spaces -- 700 Employment -- 120 retail -- 43 non-retail
- Define problems contact with interested parties etc.
- Examples
  - Delay while traveling through zone 2
  - Air pollution in the region
  - Central zones shopping center going down
  - Zone 10 people have no viable transportation
Data Requirements

- Population & employment (present, trends)
  - By age, income, vehicle ownership, family size
  - Type of industry, occupation, income
- Land Use
  - Zoning, dwelling units-types, trends, master plans, anticipated growth
- Economic Base
  - Level of economic activity
  - Retail sales, wholesale sales, industrial output
- Travel Patterns
  - O-D, trucks, taxis, modes, characteristics
Data Requirements

- Transportation System
  - Highway Network
    - Inventory, Vehicle counts, classification, LOS,
  - Transit Network
    - # of vehicles in fleet, speeds, passenger counts
    - Fares, hours of operation, stop locations, headways, crashes, security data
- User Characteristics
  - Passenger
  - Freight
- Social and Value Factors
  - Attitudes, preferences, expectations regarding urban growth
- Ordinances, Statues, Regulations
  - Federal, state and local that affect development and transportation
Factors to consider in planning

- Physical Character
- Safety
- Capacity
- Cost
- The Design Challenge
- Environmental Quality
- Historic and Scenic Characteristics
- Multimodal Consideration
- Other

Wayne State University
Travel Demand Models

Questions asked:
- How many trips? Trip Generation
- Where from and where to? Trip Distribution
- Which mode? Mode Choice
- Which route? Traffic Assignment
THE MDOT-MPO COOPERATIVE PLANNING PROCESS

- Establish goals and objectives consistent with those of the State Transportation Commission.
- Develop a statewide revenue assessment.
- Identify tools for analysis and evaluation.
- Identify and assess needs.
- Forecast MPO revenues.
- Define program structure.
- Develop criteria for project prioritization within program structure categories.
- Develop the 20 Year Plan/Program.
- Identify 5 Year Investment Strategy.
- Develop 3 Year STIP/TIP.

2025 RTP Projects
Goals and Objectives

John K. Abraham

CE 7630

Values

- Basic social drives that govern human behavior
  - Desire to survive
  - Need to belong
  - Need for order
  - Need for security
  - Mostly societal

Source: Meyer and Miller
Goals

- Generalized statements that broadly relate the physical environment to values, no test for fulfillment can be readily applied
  - Maintain and improve quality of transportation
  - Enhance mobility and accessibility for all people

Source: Meyer and Miller

Objectives

- Specific and measurable statements that relate to attainment of goals
  - Improve reliability of transit buses
Measures of Effectiveness

- Measures or tests that reflect the degree of attainability of particular objectives
  - Level of service
  - Travel delay
  - Headways between buses

Standards

- Minimum acceptable level for the criterion
  - LOS should be E or better
  - Only 10% of the buses could be late
Standards

- Minimum acceptable level for the criterion
  - LOS should be E or better
  - Only 10% of the buses could be late

Goals and Objectives must be clear, concise, and understandable.
- Objectives must logically follow from applicable goals
- Goals and objectives must reflect the views, perceptions and aspirations of the community
- Each objective should have at least one MOE
- MOEs should be measurable with reasonable effort
- Goals and Objectives must be developed independent of specific transportation plans and not be mode specific
Proposal

- 5 goals
- 17 objectives
- 13 performance indicators

Goal 1 – Enhance Accessibility and Mobility for All People

Objectives

- Reduce time spent traveling
- Increase access to public transportation
- Increase development and use of non-motorized facilities
- Increase connectivity of transportation service across region, and provide access to major land uses
Goal 1 – Enhance Accessibility and Mobility for All People

Performance Indicators

- Travel delay
- Percent TSA potentially served by fixed-route transit
- Level of service of fixed-route transit
- Percent activity centers within x miles of non-motorized facilities
- Average travel time to major activity centers
Goal 2 – Enhance Accessibility and Mobility for Freight

Performance Indicators

- Truck travel delay
- Average truck travel time between industry/retail centers and:
  - Regional rail terminals
  - Ports
  - Airports
  - Border crossings