

Urban Planning and Transportation Network Analysis – An Introduction



Jan-Dirk Schmöcker

Department of Urban Management

Department of Civil and Earth Resources Engineering

Scope of Urban Planning at KU

- To promote knowledge to create safe, comfortable and sustainable cities.
- General research themes of urban planning laboratories:
 - To develop comprehensive and practical methodologies for infrastructure design and management.
 - These methodologies are then used to assess potential future scenarios and to develop policy suggestions.
- Given the complexity of our societies and wide ranging impacts of urban planning policies, a broad range of skills and knowledge is required:
 - Operations research, Geography, Economy (micro- and macro), Sociology, Psychology, Philosophy ...

Why focus on urban problems?

- **Cities (= density) create unique opportunities**

- Better access to goods
- Better access to jobs and services
- Better access to information
- Interaction, entertainment



- **But cities create competition leading to problems**

- Various capacity bottlenecks
- Pollution
- Desire for scarce space
- ...



- **..all of which require better transportation networks**

Transportation Systems

- Often mentioned keywords in “Masterplans”:
 - Accessible (interchanges, entering/exiting, local/global)
 - Reliable (travel time, terminal, capacity, ...)
 - Sustainable (air/ noise pollution, land-use dynamics)
 - Efficient (speed, appropriate capacity, comfort)
 - Safe (accidents, crime)

Transportation Systems

- Solution approaches:
 - Creating additional capacity
 - Traffic Management and ITS
 - Pricing policies
 - Promotion of sustainable modes
 - Enforcement
 - Integrated Land-Use Policies
 - Contingency plans
 - ...



Research Example: Developing A Methodology to assess PT Reliability

- Specific Problem: Overcrowded trains and buses



- Decision makers need tools to estimate the effect of their solution approach

Problem: Limited Capacity

- Passengers might not get onto the service because of overcrowding
 - But react to the overcrowding by adopting (complex) routing strategies
- Model objective: Develop a simple assignment approach applicable to large scale networks considering
 - Absolute capacity of services
 - Passenger's routing strategies

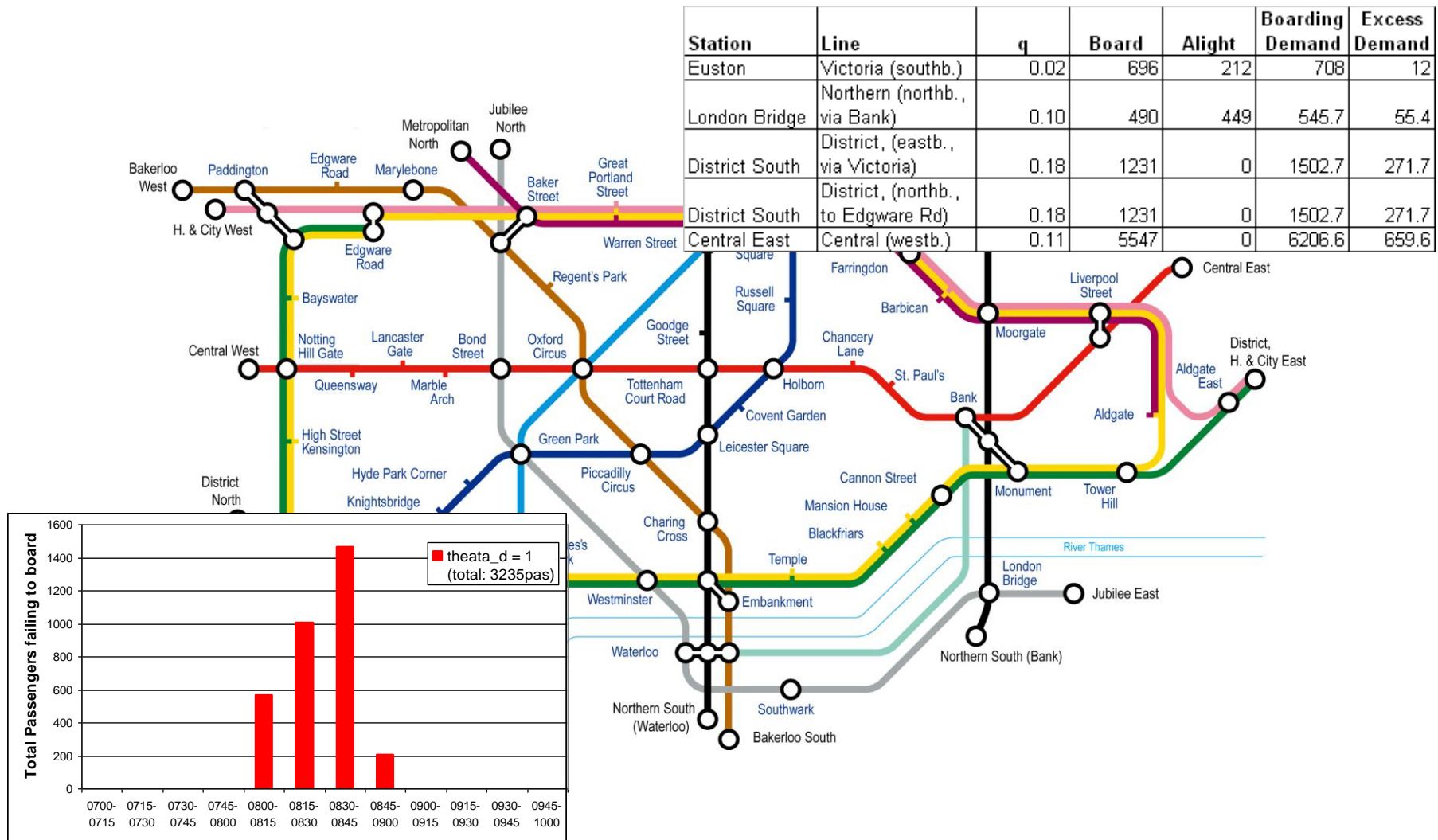


Outline of methodology

- Assume that passengers consider in their route choice:
 - On-board travel time
 - (Strategy dependent) waiting time
 - Risk-aversion of being unable to board
- Introduction of time intervals
 - varying levels of congestion
- Search for equilibrium
 - re-routing of passengers.



London inner zone case study



Final Comments

- Transit Assignment with capacity constraints is one example for new methodologies developed as part of Urban Planning research.
- Subsequent research should discuss recommendations and policy implications,
 - e.g. change of service details and its various implications.
- For this urban planners often interact with various organisations and interest groups.



Thank you for listening

