Passenger Flows in Underground Railway Stations and Platforms

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It is important that designers consider the station as an entire system, rather than only in terms of its individual parts in order to optimize passenger flows.

Because many underground transit stations have been in service for decades, they often must accommodate more passengers than they were designed for. Thus transit operators must devise strategies to provide for the safe and comfortable movement of passengers through transit stations and implement these strategies within an environment of physical and financial constraints. Our research seeks to understand how transit professionals analyze and design for passenger crowding but also compile recommendations for optimizing passenger flows in underground stations.

Study Methods

The study reviewed scholarly literature as well as manuals, standards, and codes on the management and analysis of pedestrian flows and passenger flows in rail transit stations. This was followed by in-depth, semi-structured interviews with 16 experts in transit rail station design.

Drawing on the themes identified from the interviews, the authors administered an on-line survey to 18 transit professionals representing all 16 transit agencies in the US and Canada with heavy rail transit stations. The survey asked respondents to indicate existing strategies and methodologies in planning and designing for passenger flows and assess whether these strategies and methodologies are effective.

Findings

The study makes observations and develops recommendations in each of four areas: (1) agency planning for passenger flows; (2) data collection and forecasting; (3) analysis; and (4) design.

Agency planning for passenger flows

One individual within a transit agency often has responsibilities for both planning/analyzing and designing for passenger flows.

There is more separation among planners/designers, those responsible for construction, and those who formulate emergency evacuation procedures.

Data collection and forecasting

Collection of existing passenger volume data and, to a lesser extent, forecasting of future passenger volumes are more likely to be done by in-house transit agency staff than contracted to outside consultants.

Ridership forecasts used to justify new rail transit projects are often inflated. In light of this bias, planners should use caution in applying such forecasts as the basis for station design decisions.

Analysis
A transit station planner can apply several different tools to determine pedestrian needs within the station environment. Deterministic models, established standards, and microsimulation models are all in use today, and each offers distinct advantages and disadvantages in particular situations.

Design
Most design strategies are implemented in a particular area of the station. However, they can affect the entire station. It is important that designers consider the station as an entire system, rather than only in terms of its individual parts in order to optimize passenger flows.

Policy Recommendations
Among a number of specific short-, medium-, and long-term recommendations offered in the report with regard to the analysis, operations, messaging and wayfinding, and station design, three broad themes arise:

Analysts, planners, and designers of underground rail transit stations should:

1. Consider transit stations as complete systems rather than only in terms of individual components;
2. Cooperate and coordinate among individuals and organizations responsible for different aspects of station design and operation; and
3. Consider and account for the variety of contexts in which passengers experience a transit station

About the Authors
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To Learn More
For more details about the study, download the full report at ***transweb.sjsu.edu/project/1230.html***

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