

Optimising the planning and operation of interchanges

We help our clients to understand the requirements of both passengers and operators in determining how best to plan and operate interchanges to get the most out of the space, resources and funds available.

The issue

Within stations and major interchanges, the need to improve and optimise the potentially complex interaction between operational needs, passenger behaviour and infrastructure is increasingly important. As levels of demand continue to increase, measures to mitigate increased levels of congestion, discomfort, frustration and concerns for safety are likely to be required from the perspective of the passenger. From the perspective of the operator, maintaining or improving operational efficiency becomes even more critical with increased demand.

How we can help

We are able to offer help and advice in the planning of stations and interchanges. By combining our expertise in demand forecasting, rail operations, pedestrian flow and capacity modelling and business case appraisal, we can assist you to improve the efficiency of stations and interchanges.

Whether the assessment requires particular focus to be paid to normal “day-to-day” operations, disrupted (so called “perturbated”) operations or emergency conditions, we can resolve the various issues at play to ensure that informed and robust investment decisions are taken.



Investment planning

As part of Transport for London's (TfL) 5-year investment programme, the Major Projects Business Unit is responsible for the redevelopment of Stratford Regional Station. As a major interchange, the station is currently served by two rail operators, two tube lines and the Docklands Light Rail. Typically in the morning peak 3 hour period 36,000 passengers use the station.

As part of the investment programme to accommodate growth and handle passengers attending the 2012 Olympics we quantified the current and likely passenger demand. We managed and supervised an extensive survey programme to determine current demand over a 12-hour day. From the data we derived demand matrices, which formed the basis of future year forecasts, using output from TfL's strategic RAILPLAN public transport model to determine growth factors.

Assessment of operational capacity

With the likely introduction of Train Operating Company smart cards, longer read-times on London Underground ticket gates are expected and may be detrimental to operational capacity, causing congestion in station ticket halls. In the absence of any quantifiable data that distinguished read-time from the total time taken for an individual to pass through a ticket gate, the Department of Transport commissioned us to model the movement of passengers to understand the impact on gate capacity.

This work necessitated undertaking video surveys at London Victoria and Canary Wharf stations to obtain a cross-section of passenger and behavioural profiles. We analysed the data to determine the distribution of individuals' transaction times. Our analysis of passenger behaviour revealed how a pattern of gate utilisation emerged depending upon a number of localised factors including arrival profiles, the availability of gates and lines of sight.

Pedestrian flow and capacity modelling

We worked closely with Cross London Rail Links in evaluating and optimising station designs for the proposed Crossrail Line 1 scheme, including support during the Parliamentary Committee Stage of the hybrid bill. We provided advice on the suitability of proposed layouts and suggested alternative configurations to enhance capacity. We modelled the likely use of station entrances and ticket halls based on local catchment areas.

Revenue protection

We advised First ScotRail on the initial feasibility of installing Automatic Ticket Gates (ATG) at eight stations within the Glasgow conurbation, including both levels at Glasgow Central, Paisley Gilmour Street and Partick stations. We commissioned passenger head count surveys at each station in order to determine gating requirements for each station taking into account 5-year growth projections.

Station accessibility

Through many studies examining opportunities for improved station access we have developed schemes to improve access arrangements for pedestrians and cyclists, whilst also allowing for improved interchange with other modes. Schemes have been developed into detailed designs suitable for submission for funding approval and implementation.

Masterplan and business case studies

Masterplan studies bring together different work streams and a number of stakeholders to facilitate and promote the enhancement of interchanges. Improvements to facilities, better integration with other transport modes, enhanced linkages and accessibility to city centres and enabling commercial, retail and residential opportunities to be realised are typical objectives. We have been involved in a number of these projects providing inputs to demand forecasting, pedestrian modelling and economic and business case appraisals.

