Clutching at holds: Railway carriage design and passenger placement decisions in Mumbai, India

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Introduction

The daily commute may be mundane and tedious for passengers worldwide, but in Mumbai, India, securing a place on the train can be a matter of life or death. During peak times, Mumbai experiences ‘super-dense-crush-loads’ of 14-16 passengers per square metre (Basu and Hunt 2012). This is in vast contrast to ‘crowded’ conditions in London with 5 people per square metre (London Assembly Transport Committee 2009). As the cheapest and most efficient form of transport in Mumbai, rail passengers are willing to take a multitude of risks to ensure they board and remain on the train. This includes their location in, and sometimes out of the carriage.

This paper will explore the influence of internal and external carriage design on passengers’ chosen location within the carriage in Mumbai. Mumbai was an ideal location for determining the influence of design on placement because its suburban trains are the most densely crowded in the world. Additionally, with two starkly different carriage designs in operation, the impact of carriage interiors on passengers’ perceptions is more evident (see Figure 1 and Figure 2). An understanding of the ways in which carriage design, particularly handhold design and layout influences passengers’ experience of crowding and their crowding-related choices is required to improve services, comfort and crowding tolerance. This paper will explore the influence of internal carriage design on passenger’s chosen location within the carriage and their interactions with each other.

Figure 1: Mumbai's carriages: old (left) and new (right).
Figure 2: D-ring grab handles in the old carriages (left), and new carriages (right).

Method

To gain a trans-disciplinary understanding of passengers’ perceptions of aspects of the carriage’s interior we used a mixed-methods protocol. It included a quantitative phase (survey) and a qualitative phase (interviews and observations).

In the first stage, a quantitative online travel survey with 142 regular local train passengers was undertaken. Respondents comprised 105 males (74%) and 37 females (26%), aged between 18 and 65. The gendered breakdown of the responses is consistent with the gendered travel patterns on Mumbai’s trains (Mumbai Railway Vikas Corporation Ltd and Wilbur Smith Associates 2013).

The second stage comprised of 49 in-depth semi-structured interviews with rail users (59% male, 41% female), aged between 20 years and 73 years and from a range of socio-economic backgrounds. In addition, 48 hours of ethnographic observations were run in conjunction to interviews by the primary researcher in carriages and on platforms. Observations were conducted on the three suburban lines between 6am and 11pm, but with a focus on the morning and afternoon peak periods.

Results

This paper discusses two ways in which design influences passenger perceptions of and tolerance to crowding. Firstly, we note how the colour theme of carriages impacts passenger mood and affects their emotional and physical comfort in the carriage. Secondly, we examine how the design of the carriage, especially handholds influences passenger behaviour and location within the carriage.

Discussion

Through an exploration of the extreme crowding experienced on Mumbai’s trains, we found that passenger experience, mood, perceived comfort and placement within the carriage was influenced by the overall ambiance of the carriage which included the location and design of handholds, the quality of ventilation, and combinations of colour. We conclude with some observations on Branton’s person-centred ergonomic approach (Branton 1993) and the significance and implications of the two discussion points for future carriage design in India and countries with future expectations for high passenger densities. Finally, we identify passenger preferences that could alleviate the negatives of crowding.

Keywords

Mumbai, passenger crowding, handholds, colour, design

Acknowledgements

The authors acknowledge and thank: Prashant Acharekar, Ayesha Aggarwal, Vishakha Aggarwal, and Debmalya Mukherjee, who gave permission for their photographs to be used in this article.
This work was supported by the CRC for Rail Innovation (established and supported under the Australian Government's Cooperative Research Centres program); Project No. R2.104. ‘A socio-economic study of platform and carriage crowding in the Australian metropolitan railway industry’. http://www.railcrc.net.au/project/project/crowding

References


