Australasian Transport Research Forum 2025 Proceedings
18-21 November, Auckland, New Zealand
Publication website: https://australasiantransportresearchforum.org.au/

Understanding the experience and priorities of passengers with accessibility needs during major unplanned rail disruptions

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1 Introduction

Urban passenger railways dominate travel in many of the world's largest cities, with global ridership growing 39% in the 20 years between 1996 and 2016 (International Energy Agency, 2019). Growing reliance on urban rail achieves many environmental, traffic congestion relief and economic development objectives (Currie, 2021), however it can also result in significant problems if these services are unexpectedly disrupted. Research on the effects of these disruptions on passengers is less common (Currie and Muir, 2017) however widespread frustration and uncertainty are frequently voiced concerns (Passenger Focus, 2011); the "near paralysis" of urban transport systems is also noted by Meyer and Belobaba (1982).

This paper explores the experiences that passengers have during URDs. It contrasts the experience of passengers with physical and intellectual disabilities; a cohort we term the 'access needs' group, with that of others. The research explores URD experiences and passenger priorities for URD management improvements using an online panel survey of urban rail passengers in Melbourne, Australia.

This paper is structured as follows; a methodology section is presented next, followed by the review of results. The paper concludes with an outline of key findings and a discussion of their implications for practice and research futures.

2 Methodology

The research aims to understand passenger experience of URDs and to get their views on priorities for improving URD management. This targeted passengers with and without access needs. An online survey using a market research panel was adopted to undertake the research. The panel enabled control of sampling quota which targeted passengers with accessibility needs. Table 1 shows the sampling quota.

Table 1: URD rail user survey – sampling structure, quota and sampling outcomes

	No Accessibility Needs Group		Accessibility Needs Group	TOTAL
	High Frequency Metro Train Users[1]	Low Frequency Metro Train Users[1]		
Target Sample	200	200	200	600
Sample Outcome	204	206	186	596
% target achieved	102%	103%	93%	99%

Note: [1]No accessibility needs

Accessibility needs were established by asking the question; "Do you have a long-term health condition or disability which can be described under the following categories?". The categories were; Deaf/blind, Intellectual Disability, Blind and Low Vision, Neurological Disability, Deaf and Hard of Hearing, Psychosocial, Physical Disability, Neurodiverse, Long Term Health Condition

and Non-Verbal. The questionnaire was designed for a 20min response including screening questions to match the quota criteria and questions. It also had sections exploring:

- The Passenger URD experience.
- Passenger Views on Improvements to URD Management.

After approval of questionnaire design by the Monash University ethics committee, the survey was delivered between 18th October and 7th November 2024. Target quota were exceeded for the no accessibility needs groups but were slightly under-quota targets (-7%) for the accessibility needs group.

3 Results

3.1 Sampling outcomes – characteristics of the access needs group

Table 1 shows the results of the sample. Total 186 rail passengers were in the accessibility needs group comprising health conditions/disabilities. Most had long-term health conditions relating to neurodiversity or a physical disability. We asked these passengers if they travelled with a mobility aid; 76% said no. Of those using an aid a cane, crutches or a guide dog were more common; only 1% of those identifying in the access needs group use a wheelchair. We also asked the access needs users how difficult it was for them to use Metro Trains given their health/disability condition; 5% noted substantial impact, 60% only mild impacts, while 23% said there was no impact.

3.2 URD experience

In general, the access need users were quite high frequency users of public transport, demonstrating a degree of reliance on rail. On average they had experienced 2.6 URDs in the last 12 months, compared to the average of 2.4. This higher rate is thought to relate to the higher than average rail use frequency amongst those with accessibility needs.

Issues during an URD: importance - performance

A series of questions explored user views on the importance and performance of a large range of issues passengers experience during a URD. Figure 1 shows the results of this analysis. Importance Performance Analysis (IPA) highlights the high performance, low performance issue quadrant as a priority for policy attention (Currie and Delbosc, 2015). In this case all importance and performance scores are above mid-range of priority i.e., they are all considered important.

Priority low-performance issues (all users):

- (6) Notification of disruption before leaving home/work
- (5) Advance information that a disruption is underway
- (4) Access to up-to-date information during disruptions

Additional priorities for access needs users:

- (14) Availability of nearby alternative public transport
- (10) Being informed of alternative travel options during disruptions

Close to priority:

- (13) Avoiding penalties from missed appointments (e.g., childcare, interviews)
- (15) Availability of competent staff able to assist passengers with accessibility needs

It seems the access needs group is slightly more concerned about disruptions meaning they miss appointments and have to incur costs as a result. They are also particularly interested in staff help during a disruption particularly staff with experience handling people with access needs.

Information sources during an URD: importance - performance

An Importance Performance Analysis was also undertaken regarding information sources used by passengers during a URD. Figure 2 illustrates the results of this analysis for the two groups.

Top priorities (both groups):

- (1) Loudspeaker announcements at the station/platform
- (2) Loudspeaker announcements on the train

Access needs vs whole sample differences:

- Overall, **performance scores lower** for access needs group → perceive information sources as less effective
- Importance scores generally **slightly lower** for access needs group

Slightly higher importance for access needs users:

- (7) Staff members directly speaking to me
- (10) Notification from Google Maps app

Notably lower performance for access needs users:

- (14) Notifications/posts from friends/contacts on social media

Experience of replacement bus services

Most rail users have had experience of a URD where replacement bus services were deployed (68%); although access needs users had slightly less experience (64%). Most rail users wait for the replacement bus (75%) though a slightly lower share of access needs users wait for the replacement bus (66%). A higher share of access needs users sought alternative travel to replacement buses (28% vs 25%), although it is noted that replacement buses tend to be older and less accessible in terms of low floor or ramp access. A higher share of access needs users also:

- used other local public transport services (6.7% vs 5.1%) suggesting they travelled in inner Melbourne where alternatives are available.
- they wait for rail services to resume (5% vs 3.8%); this can involve a long wait and some disruptions can last many hours
- they abandoned their trip altogether (3.4% vs <1% for the sample as a whole). This is a large difference and significant outcome for the access need group.

Dissatisfaction with bus replacement services is also higher among access needs users (15.1% vs 12.6%), although views of Metro Trains' overall URD response were similar across groups. Importantly, URDs discourage travel for access needs users relatively more, with 53% reporting reduced train use compared to 39% of the wider sample.

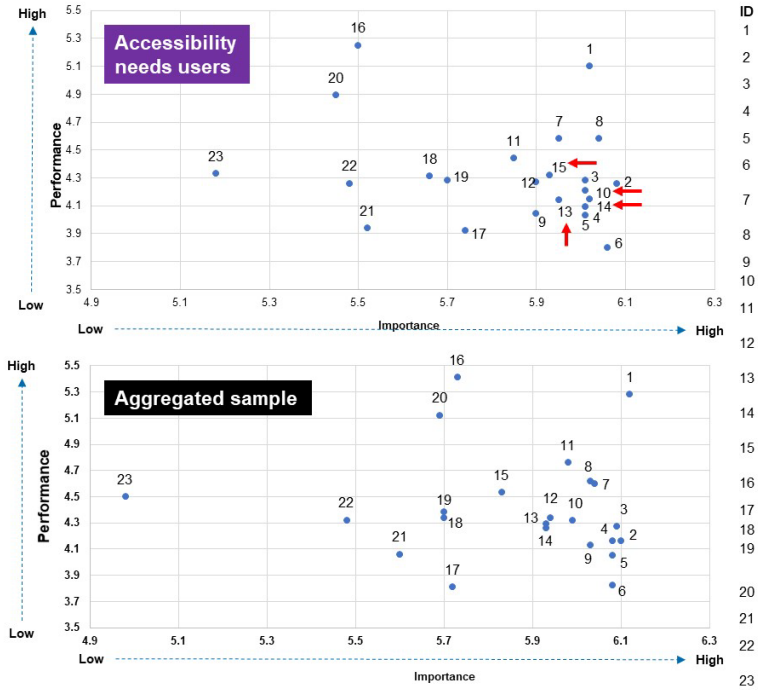
3.3 URD management improvement priorities

We asked rail passengers to rank priorities of a series of URD management improvement options to establish their priorities for improvements. They were grouped into 4 key areas to reduce the work load on respondents during the survey: a) Announcements and Staff Availability; b) Real Time Information and Displays; c) Transport Alternatives, Trained Staff and Alerts; and d) Accessible Transport and Amenities. Results are outlined in the following:

a) Announcements and staff availability

Survey results show that both rail users and access needs users prioritise clearer, more consistent disruption information, particularly through loudspeaker announcements and display systems. The top-ranked improvement for all groups was public announcements that are easier to hear, followed by consistent information across all display systems, reflecting concerns identified in earlier IPA analyses.

Figure 1: Importance- Performance analysis results – user issues during an URD

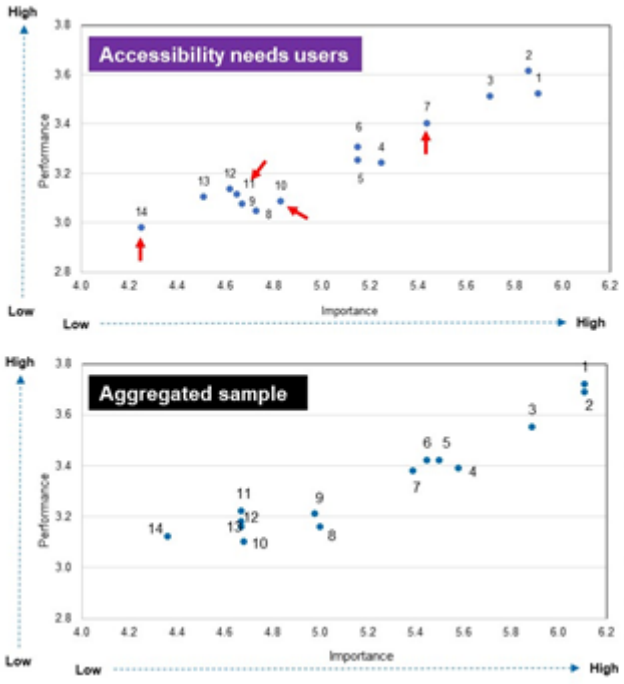


ID	URD issues
1	Being safe from accidents/crashes during the disruption
2	Being informed when services are expected to resume during a disruption
3	Being quickly informed that a disruption has occurred
4	Being able to find up-to-date information on unexpected disruption status
5	Being informed in advance that a disruption is underway
6	Being notified that rail services are disrupted before you leave home/work
7	Being informed about when and where replacement buses are available (if they are being provided) during a disruption
8	Being informed about whether replacement buses will be provided during a disruption
9	Being regularly updated about the status of the delay during a disruption
10	Being informed during a disruption about alternative options for travel
11	Feeling personally safe from crime/anti-social behaviour/harassment during a disruption
12	Being informed during a disruption whether alternative accessible travel options (e.g. accessible buses or taxis) are available
13	Not facing penalties due to missing appointments (e.g., late childcare pickup fees, missed interviews) due to a disruption
14	Having alternative public transport options available nearby if needed during a disruption
15	Rail staff who are competent in helping passengers with accessibility needs being available during a disruption
16	Being able to contact friends/relatives to ensure they don't worry about your delay during a disruption
17	Being able to quickly get off a delayed train not waiting at a station
18	Rail staff being available during a disruption
19	Being able to use facilities/amenities like toilets, shelter, public telephone etc. during a disruption
20	Being able to contact friends/relatives to arrange alternative transport during a disruption
21	Being informed about the cause of disruptions
22	Being able to use accessible amenities like accessible toilets during a disruption
23	Being able to use lifts rather than stairs, ramps or escalators during a disruption

QA2.1 Thinking about your experiences of MAJOR UNEXPECTED RAIL DISRUPTIONS, on a scale of 1 to 7 how IMPORTANT are the following to you, personally? Options are extremely important, important, somewhat important, neither important or unimportant, somewhat unimportant, unimportant, extremely unimportant]

QA3.1 Thinking again about your experiences of MAJOR UNEXPECTED RAIL DISRUPTIONS, on a scale of 1 to 7 to what extent DO YOU AGREE OR DISAGREE with the following statements about Metro Trains usual response to rail disruptions? Options are agree strongly, agree moderately, agree a little, neither agree nor disagree, disagree a little, disagree moderately, disagree strongly]

Figure 2: Importance - Performance analysis results – information sources during an URD



ID	URD Information Source
1	Loudspeaker announcements at the station/platform
2	Loudspeaker announcements on the train
3	Passenger information displays screen
4	Notification from the PTV App
5	Viewing Disruptions page of the PTV website
6	Viewing message on the PTV website
7	Staff members directly speaking to me
8	Notification from Metro Trains/PTV on social media
9	Notification from the metroNotify app
10	Notification from the Google maps app
11	Communication from friends/contacts on mobile phone
12	Information from TV/Radio, other media
13	Information provided by other passengers
14	Notification/posts from friends/contacts on social media

QA5 Thinking about the possible sources of information you get during a major unexpected rail disruption; how IMPORTANT ARE the following to you ? Options are extremely important, important, somewhat important, neither important or unimportant, somewhat unimportant, unimportant, extremely unimportant]

QA6 Thinking about the possible sources of information you get during a major unexpected rail disruption; how well do these sources PERFORM in helping you know what you need to know during the disruption? Options are very poorly, poorly, neutral, well, very well

Access needs users placed greater emphasis on **line captioning of announcements on display screens** (ranked 3rd vs 5th overall), highlighting its value for those with hearing impairments or in noisy environments, and also rated staff trained in accessibility needs more highly than other users.

b) Real time information and displays

In terms of real-time information, the top two improvements for both groups were inclusion of disruption details on the PTV journey planner and **disruption messages within the planner itself**, showing a clear demand for integrated, specific updates. Access needs users, however, rated easier-to-read text (larger fonts, clearer contrast) and simpler, **standardised wording on information displays as higher priorities** than the general sample, underscoring the importance of accessible, user-friendly communication.

c) Transport alternatives, trained staff and alerts

The top priority for all users is **shorter wait times for replacement buses**. For access needs users, the next priorities are **more accessible buses** and **greater staff support**, with **better trained staff** also ranked higher (5th vs 7th overall). Both groups valued **pre-trip disruption alerts** (4th for access needs, 2nd overall), along with **easier access to PTV's disruption webpage**, and **more accurate, frequent media and email updates**.

d) Accessible transport and amenities

Access needs users prioritised **proactive staff support during replacement bus services** (vs 4th overall) and shared with all users the importance of **more services/seats/room on alternative transport**. Their next priorities differed, emphasising **accessible pathways to bus locations** (7th overall) and **better information on alternative options** (1st overall). They also placed higher importance on information about accessibility of alternatives, accessible toilets, and seating during delays.

Other issues

The questionnaire also explored a number of other issues about URD improvements. One question explored the frequency of disruption information updates. All user groups preferred disruption updates every **5 minutes** (20–30%), with a secondary preference for **10-minute updates** (9–14%). The survey also examined views on **push notifications** for disruptions and related **privacy concerns**.

A majority (52%-67%) agreed with the view:

- "I only want to have disruption messages sent to my phone IF I HAVE PREVIOUSLY CONSENTED TO or AUTHORISED THIS"

A minority (36-37%) agreed with the view:

- "I would like to have disruption messages sent to my phone WITHOUT having consented to or authorised this"

There is clear support for 'push notifications' amongst rail users; however most prefer to consent to authorize this type of communication.

4 Discussion and conclusions

The research aimed to understand the passenger experiences of URDs and to get their views on priorities for improving URD management with a particular focus on passengers with access needs. Overall, it's clear that communications during a URD are top priorities for all rail users including those with access needs. There is some suggestion that those with access needs are more understanding and positive about URDs than other rail users; perhaps this result from having the resilience to successfully navigate less accessible systems to use rail. It seems possible that those with access needs who use rail are more resilient. This does however raise the question of those with access needs who are not using rail; perhaps they are less accepting of access barriers and more concerned about barriers such as URDs?

It is also quite interesting that those with access needs tend to share top concerns and priorities for improvements with other rail users in many cases. URDs are by definition unexpected events for all so everyone needs more information, better loudspeakers and quicker replacement buses.

It is also interesting to highlight issues which were of greater concern and priority for those with access needs: alternative transport options in a URD, better performing information sources, dissatisfaction with replacement buses (which are not accessible), higher impacts on ridership, support for line captioning, disruption information in journey planners, easier to read/understand text, more staff support, more capacity and better information about on alternative transport.

The implications of these findings for practice suggest priorities for planning and investment to mitigate the impacts of URDs on passengers notably those with access needs. Less frequent occurrence of URDs would also be preferred where possible.

For future research the obvious gap in this area are those with access needs who are not using rail. Are access barriers and URDs themselves a constraint to rail use? How many potential rail passengers don't use rail because of these issues?

Overall, it is clear that URDs represent a major cause of stress and vulnerability for those with access needs who display a substantially greater sensitivity to these issues when it comes to future rail ridership than other rail users. Both transport practice and research need to recognize this and act on these recommendations to improve the sustainability of rail services into the future.

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