An observational study of Center City Philadelphia's subway transit system

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Abstract

This study examined the layout of Southeastern Pennsylvania Transportation Authority's (SEPTA) five center city stations from the users' perspective, especially in regard to accessibility and transit transfer connectivity, which has implications for both residents and tourists alike. Several of the stations have pitfall design elements, which both residents and tourists must suffer to get to their destinations: residents on a daily basis and tourists, perhaps only once, but with likely greater impact on their overall travel experience. Washington, DC, with only half the population of Philadelphia, and Barcelona, with an equivalent population, have implemented LCD Passenger Information Display (PID) systems, that keep their passengers informed of when the next train will arrive. This simple design feature, if retrofitted into the design of SEPTA's underground stations, could help offset some of Philadelphia's outdated and poorly designed stations that currently lack signage, streamlined flows, visibility of the platform from the ingress and accessibility.

Introduction

SEPTA, which began operation in 1965, is a metropolitan transportation authority that operates various forms of public transit—bus, subway, elevated rail, commuter rail, light rail, and electric trolleybus. Its subway stations are part of Philadelphia's immobile spatial fix (Hannam, Sheller, and Urry, 2006). Accessibility and transit transfer connectivity were the two main attributes used to evaluate the design of SEPTA subway stations. For this study, accessibility was defined as the flow from the ground entries to the underground platforms. Transit transfer connectivity is

defined as the physical attributes of a subway station that reduce walk/wait/transfer burdens (Iseki and Taylor, 2009) including lighting, seating, signage, streamlined pedestrian flows, protection from the elements and visibility. For this study, visibility is defined as whether one can see a train is approaching the platform from the subway tollbooth or tollgate and how easy one can locate and read any directional signage, including the name of the station.

Methodology

Five SEPTA stations were selected for this study because of the position in the heart of the city and the amenities they serve: 8th and Market, 5th and Market, City Hall, Walnut and Locust, and Lombard and South. These transit and transfer stops serve Philadelphia's Market East, Washington Square, and Rittenhouse Square neighborhoods that are home to fifteen major hotel chains, Independence Mall, Reading Terminal Market, China Town, Convention Center, City Hall, five major performance theaters, three hospitals, two universities, one college, the financial district, the shopping districts, and numerous retails, restaurants and residential buildings. The first two stations are located on the Market-Frankford Line (i.e., Blue Line) while the last two are on the Broad Street Line (i.e., Orange Line). These two lines intersect at City Hall station. The transfer point to the PATCO (Port Authority Transit Corporation) line, which provides transportation to New Jersey, is 8th and Market station. Specifically, 5th and Market provides the access to the Independence Mall and surrounding museums. 8th and Market is also 0.4 miles away from Philadelphia China Town, 0.3 miles to Washington Square and Walnut Street Theater, Pennsylvania Hospital, Thomas Jefferson Hospital and University, and Wills Eye hospital are also 0.3-0.4 miles away from 8th and Market station. Reading Terminal Market, Convention Center, Market Street financial district, Prince Music theater, and City Hall historical site are within 0.3 miles distance from the station of City Hall. Across from the Walnut and Locust

station are Wilma Theater and Kimmel Center for Performance Arts. It is also the closest exit for Rittenhouse Square, and the Walnut Street shopping district. The Lombard and South stop provide easy access to Suzanne Roberts Theater, Peirce College, The University of the Arts, and South Street shopping district.

During the months of June and July 2014, on-the-ground observations were conducted by the second author to record the presence or absence of accessibility and transit connectivity attributes (Iseki and Taylor, 2009) and to photographically document the five stations selected for this study.

Results

The overall results of the observations are shown in Table 1, followed by a discussion of some of the key findings in specific stations.

Table 1: Philadelphia's Transit transfer connectivity

	Seating	Signage (esp. time of next train)	Streamlined flows (straight, uni-linear)	Visibility (of train or signage about train from entry)	Accessibility (presence of elevators/escalators)
5th & Market	X		X	X (semi visible)	X
8th & Market	X		X	X (semi visible)	X
City Hall	X			X	X
Walnut & Locust	X				X
Lombard & South	X				X

Seating

All of the stations have good seating options, which allow passengers to have a place to sit and wait for approaching trains. This is especially important since passengers don't know then trains will arrive.

Signage

None of the stations have signage dedicated to when times will arrive.

Streamlined flow

Only two of the five stations have what could be called straight or linear flows. The rest have convoluted ingress and egress pathways, which impede transit transfer connectivity.

Visibility

Only two of the five stations have good visibility (i.e., the train or signage about train can be readily seen from entry point). The entry point for this study was designated as the turnstile.

Accessibility

Four (Walnut and Locust, City Hall, 5th and Market, and 8th and Market) out of these five stations are disability accessible. All of these four have elevators but only 8th and Market equipped with escalator. Note that this escalator only works for going up to the ground level but not the other around (see picture 1). Two (5th and Market, and 8th and Market) out of these five stations are not crossable, meaning that passenger cannot take the opposite direction subway without walking up to the ground level, cross the intersection, and get down to the station.

Photo 1: Escalator at Market and 8th station, southeast corner

Overall transit transfer connectivity

All these five subway entry points are located on the ground level, but the tollgates or turnstiles are located on the first underground level and platforms on the second underground level. Despite which entry point passengers choose to enter the system, they will still need to backtrack to the tollbooths located in the center of first underground level and then walk back again to where they originally came from to access the stairs leading to the platform on the second underground level. This non-flow design is observed at City Hall, Walnut and Locus, and Lombard and South stations (see pictures 2-5).

Photo 2: Exit at the first underground level at Lombard and South station. Note the stair leads to the platform but no entry to the stairs from this side.

Photo 3: First underground level at Lombard and South station. Passengers have to walk all the way to the center of the first undergrad level to enter the tollbooth.

Photo 4: After passages go through the tollbooth, they have to walk back to where they were in order to walk down to the platform at Lombard and South Station.

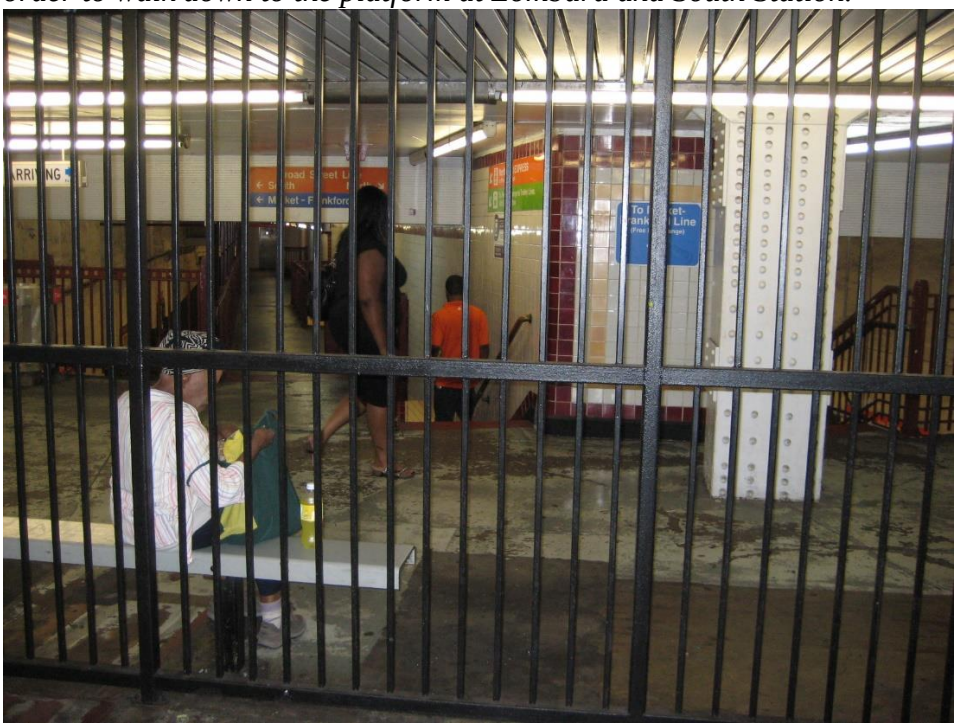

Photo 5: Similar design at the City Hall station where passengers can see the stars leading to the platform behind the bars. They have to walk to the center to get through the tollbooth and walk back.

Since the tollbooths are located on one level and the platform another, particularly at Walnut and Locust, and Lombard and South stations, passengers cannot see which train is at or entering the station without paying the toll and proceeding (either walking or running) to the platform down one level (see pictures 6 and 7). In terms of visibility, layouts of 5th and Market and 8th and Market stations are slightly better, but even the glass is half blocked by the blue color stripe (see picture 8).

Photos 6 & 7: The non-transparent glass block barriers obscure passenger view of pathways. No proper signage indicating the train schedule is provided given the situation. One simply cannot tell when/what train is coming without paying the toll. Photo taken at Walnut and Locust station.

Photo 8: At 8th and Market station, the view to the platform is half blocked by the blue color strip. Also, directional signage designed to guide passengers to exit the right way for their final destinations, are not easily seen by passengers exiting the train.

Conclusions and Suggestions

Focusing on five SEPTA stations, this observational study discovered major design flaws which contribute to poor overall transit transfer connectivity and accessibility in its Center City stations. The current design of four of the five SEPTA subway stations contribute to poor accessibility, transit transfer connectivity and visibility, as well as wasted transfer times (i.e., before entering and after exiting subway cars), impacting rider experience. Given the influence of public transportation on the travel behavior (Iseki and Taylor, 2009) and the resident quality of life, the current subway system design is outdated and non user-friendly. Compare to other metropolitan cities of equal and lesser populations, there is room for improvement.

With a population of 1.548 million, Philadelphia is the 5th largest city in the United States. Because of its importance as a site of historical significance in the birth of the nation, it has become a major tourist destination. Thus, the city's mass transit is utilized by residents and tourists alike. However, SEPTA, which began operating back in 1965, has not modernized over the past several decades to keep pace with technological innovations in transportation. If one compares Philadelphia's subway system to those located in Washington D.C. (pop. 632,323), which is half that of Philadelphia, or Barcelona (pop. 1.621 Million), whose population is close to Philadelphia's, SEPTA has a long way to go to achieve optimal transit transfer connectivity. For example, in Washington, DC, "rider tools" include LCD passenger information displays (PIDs) in all of the Washington Metro Area Transit Authority's (WMATA's) 90 stations, which allow passengers to immediately see when the next two or three trains will arrive (see Photo 9) once they arrive at the platform, and real-time arrival data can also be accessed via their website, http://www.wmata.com/, and/or downloadable applications or apps. The Catalonian city of Barcelona also employs the use of PIDs (see Photo 10) to keep its citizen informed and moving.

Photo 9: PID display in the DC Metro shows the expected arrival time of the next three trains.

Photo 10: Barcelona Metro PID display showing when the next train will arrive.

Studies show positive correlation between the healthy public transportation system, and the revenue generated from the tourists/local commuters (Dziekan and Kottenhoff, 2007; Guo and Wilson, 2011; Hickman and Wilson, 1995).

Although it would probably be incredibly costly change the physical layout of the center city stations in this study, the authors recommend that SEPTA should consider exploring a partnership with Signature Technologies, Inc.dba ComNet Software, which is the sole contractor for the PIDs deployed in DC's WMATA system, as well as the sole supplier of PIDs in Amtrak's 500 stations nationwide (personal communication with Jansen Davidson, Business Development Manager (Ground Transit Systems), Com-Net Software, August 15, 2014). Davidson also suggested the possibility of pushing real-time to an application instead of a display, which would be another option to make SEPTA more user-friendly. And, if stations were retrofitted with PIDs, they can also be used as a messaging system by rotating the display between schedule information and supplementary information such as elevator outages. Thus, this added functionality would serve to improve transit transfer connectivity and accessibility at the same time.

References

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