ASSESSMENT OF UTILISATION OF FOOT OVER BRIDGES IN DELHI

ITO FOB

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4 - 6 November 2022, Urban Mobility India

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INTRODUCTION

- **Safety, continuity, and comfort**: principles for planning pedestrian infrastructure
- Walkability- extent to which characteristics of built environment & land use support pedestrian-friendly environment
- Mobility parameters such as accessibility, safety, comfort, environmental effect, quality, and location
- **Gender perspective**
  - Transportation plays a key factor that allows women to participate in the workforce and access social opportunities

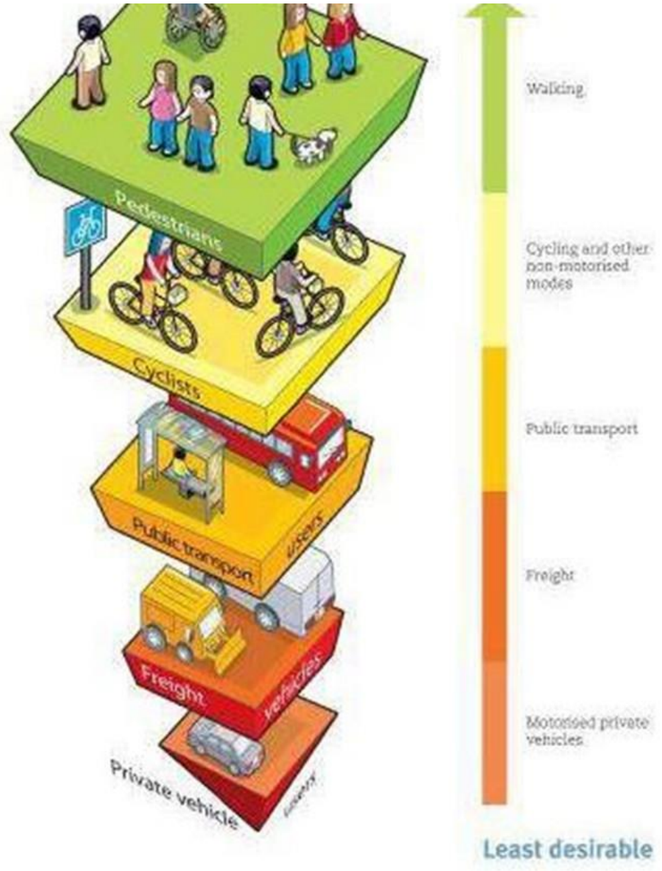


Figure 1: Desired planning in cities

Source: ITDP & MoHUA, 2019

- In India, **transportation** sector accounts for **14% of total GHG** emissions (TERI, 2021)
- Road transport accounts for over 90% of emissions

- On comparing CO2 emissions emitted (gm/passenger-km)

Diesel Car	188.6
BRTS (AC bus)	36.9
2-wheeler	36.5
Metro (in Delhi)	19.7
Walking and cycling	0

Source: Life cycle analysis of transport modes, TERI

- **Pedestrian public spaces**
  - Encroached by motorized traffic
  - 27% of trips by private motor vehicles occupy 75% of RoW (ITDP & MoHUA, 2019)

STUDY AREA- DELHI

- Modal share of work trips
  - 23% of people walk
  - 3% use cars/vans/jeeps
  - 13% use scooters/motorcycles/ mopeds (TERI, 2019)
- Registered vehicles: 11.4 million vehicles (2019); Compounded yearly growth: 6% (Road Transport Yearbook, 2017-18 & 2018-19)
- Number of cars/1000 persons = 424
- Traffic accidents accounted for 39.9% of major causes of accidental deaths in India (National Crime Records Bureau, 2021)
- Number of Traffic Accidents - 4715 in Delhi (2020) (National Crime Records Bureau, 2021)
- 42% of total persons killed in road accidents were pedestrians (Government of NCT of Delhi, 2022)
- Total number of FOBs in Delhi: 90 (2020-21)

Area - 1483 sq. km.

Total road length- 33,198 km

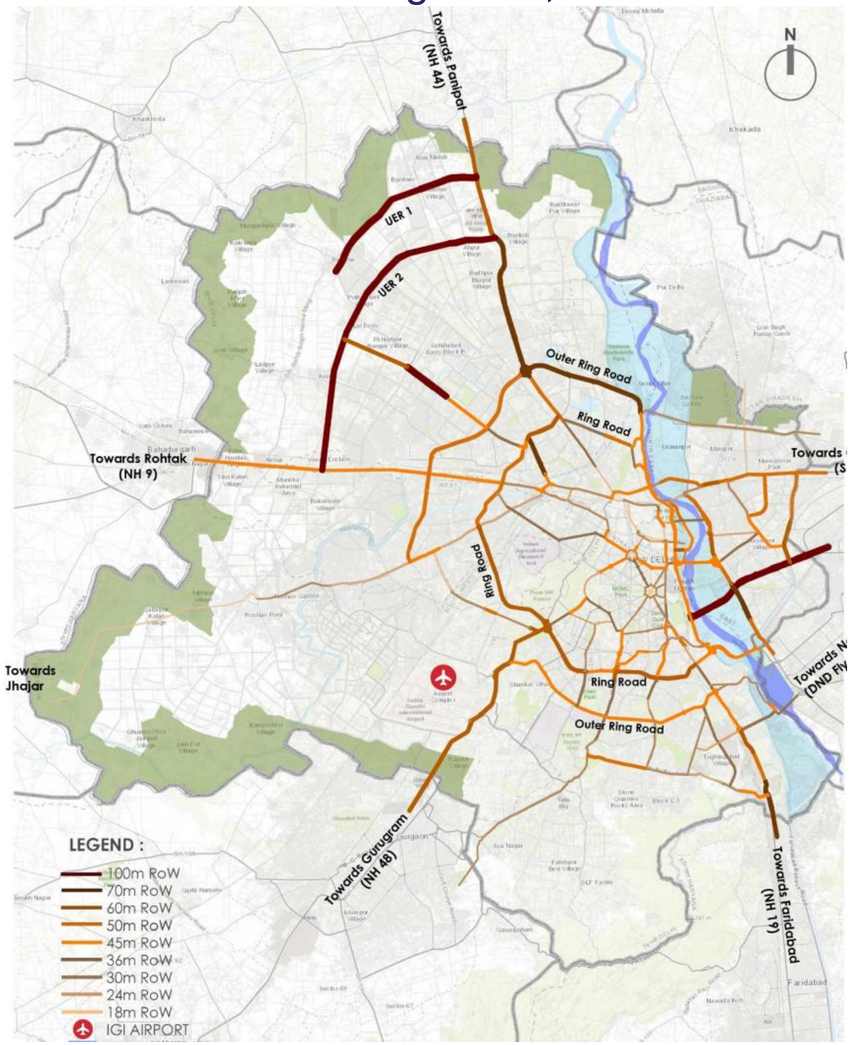


Figure 2: Road network with RoW widths in Delhi

Source: NIUA, 2020

OBJECTIVES

1.To assess the current FOB infrastructure with regard to mobility parameters

2.To understand the perspectives of different groups of society towards foot over bridges in Delhi

LITERATURE REVIEW

- Pedestrian Crossing Infrastructure – FOBs
  - Ensure safety by **reducing conflict points**
  - **Inconvenient:** Increases walking length and effort, Inaccessible for vulnerable users, Costs 20x at-grade signalized crossings
- Across Indian cities, **high budgetary allocations** for FOB construction
- Guidelines related to FOBs
  - UTTIPEC Guidelines, 2009: **shortest possible direct route to cross must be to pedestrians**
  - MPD 2041: pedestrians should remain at grade with comfortable & safe access; Grade-separated infrastructure be avoided

Figure 3: IIT Gate FOB

Source: Authors

METHODOLOGY

Criterion	Azadpur Chowk FOB	IIT Gate FOB	ITO FOB
Geographical spread	North Delhi	South Delhi	Central Delhi
Road Name	Ring Road	Outer Ring Road	IP Marg
Barricading	Open at-grade crossing	Barricading on median with a gap in between	Complete barricading on median
Access to FOB	Ramp and escalators	Stairs and lifts	Stairs and escalators
Nearest public transit	Metro and public bus stop	Public bus stop	Public bus stop

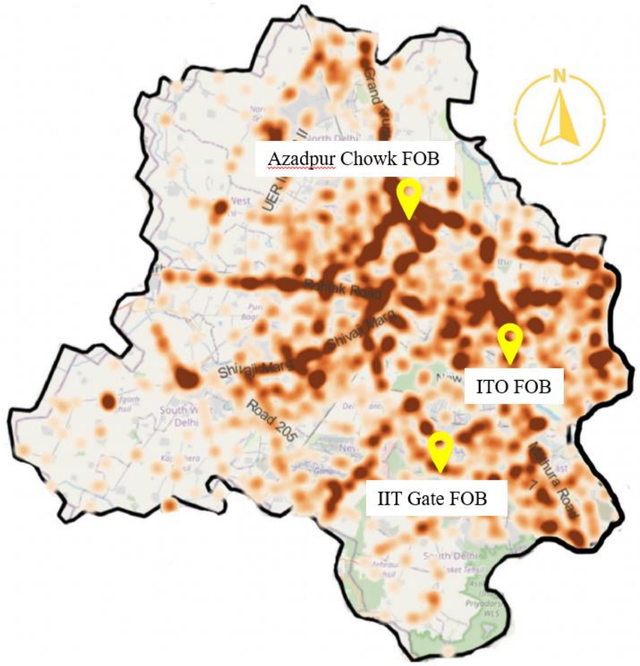
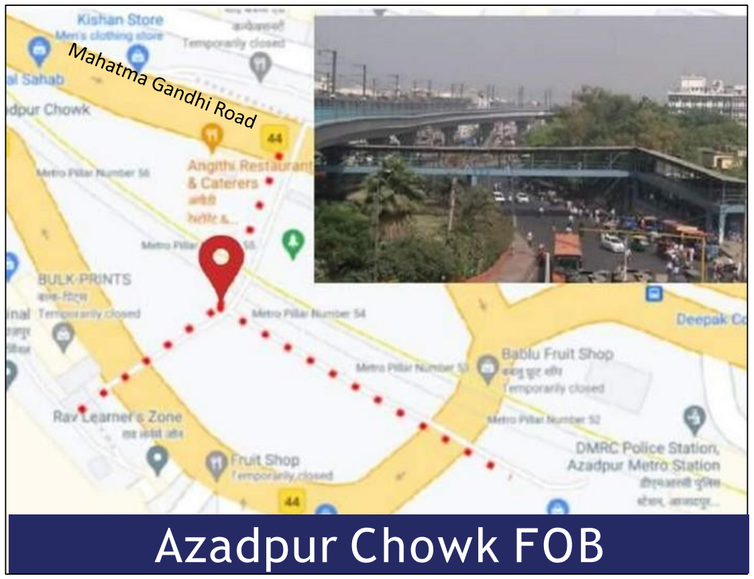


Figure 4: Heat map of fatal crashes in Delhi 2020-21
(Source: Government of NCT of Delhi, 2022)



Azadpur Chowk FOB

IIT Gate FOB

ITO FOB

OBSERVATIONS

COMFORT

- Shade
- Riser/Height of the stair
- Resting/Seating places on FOB

Figure 5: IIT Gate FOB

Figure 6: Broken shade at Azadpur Chowk FOB & ITO FOB

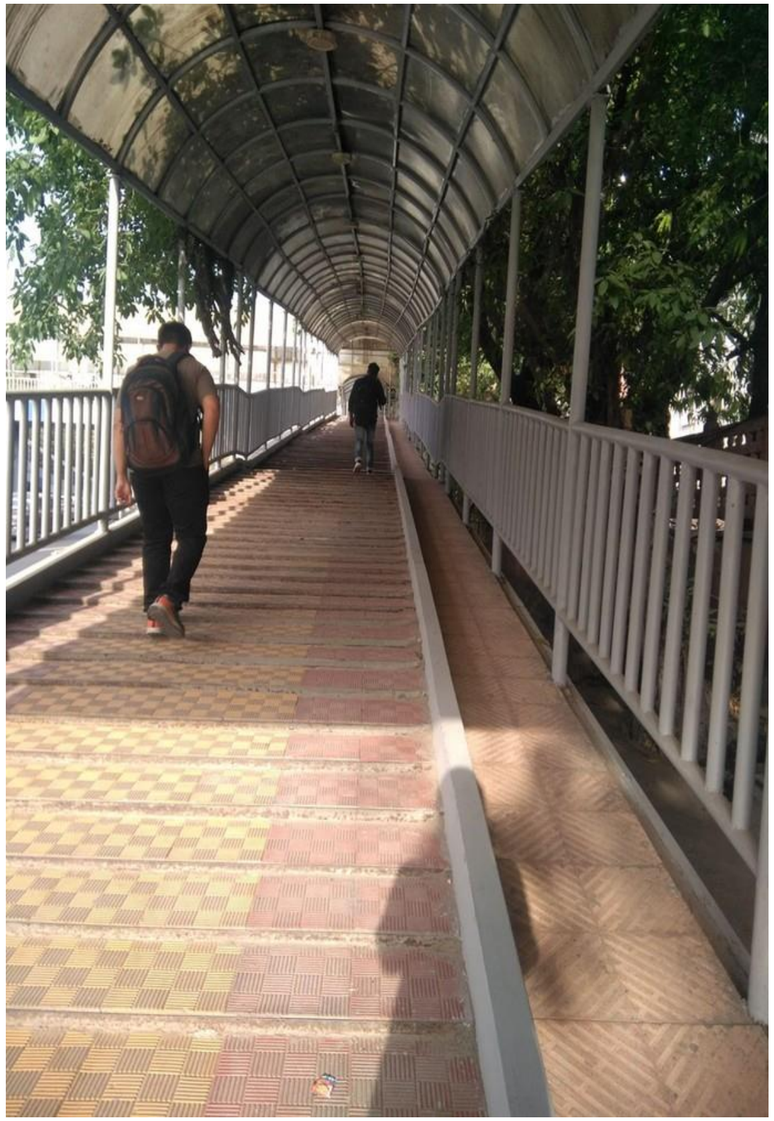


Figure 7: 5 cm riser at ITO FOB

Source: Authors

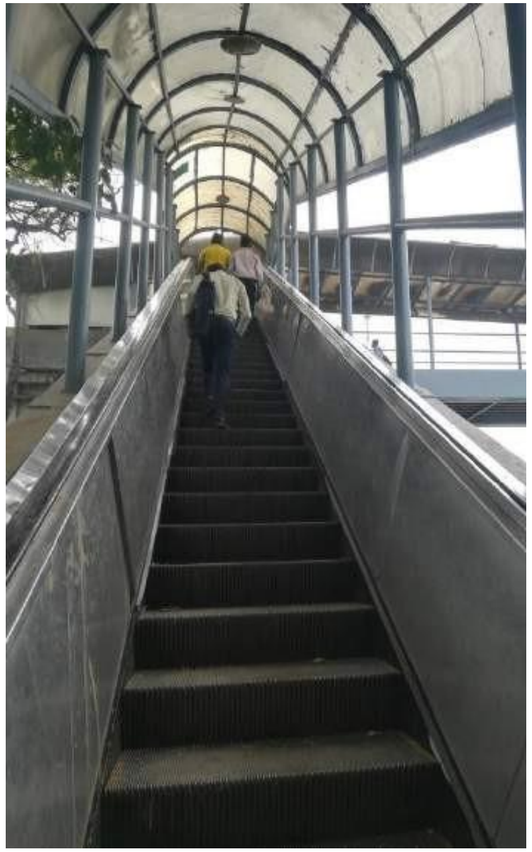
OBSERVATIONS

ACCESSIBILITY

- Escalator
- Lift
- Ramp
- Tactile paving/ tiles

Figure 8: Tactile paving/tiles missing at Azadpur Chowk FOB

Figure 9: Lift at IIT Gate FOB



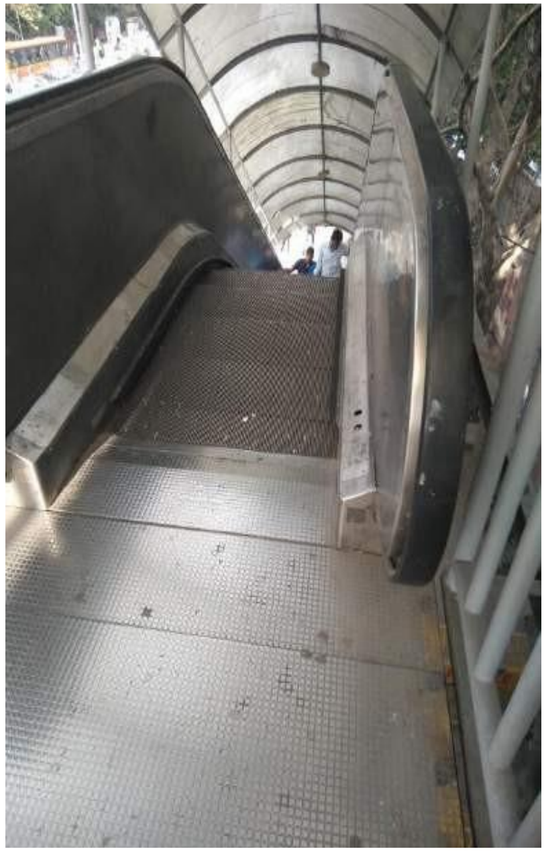


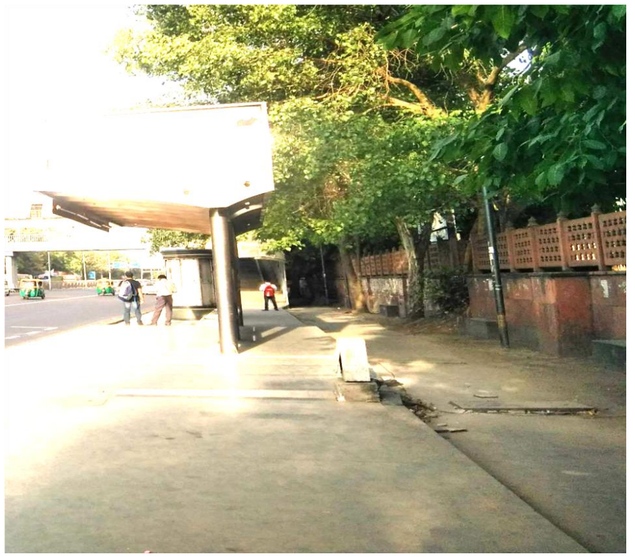
Figure 10: Non- functional escalators at Azadpur Chowk and ITO FOB

Source: Authors

OBSERVATIONS

SECURITY

- Lighting on the FOB
- Security Guards
- Presence of street vendors



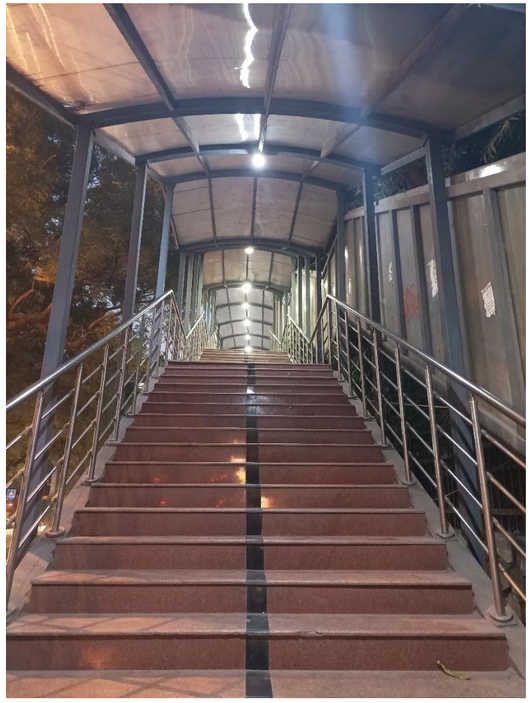


Figure 11: Lights on the FOB at IIT Gate

Figure 12: Guard at ITO FOB

Figure 13: Street vendors at Azadpur Chowk FOB

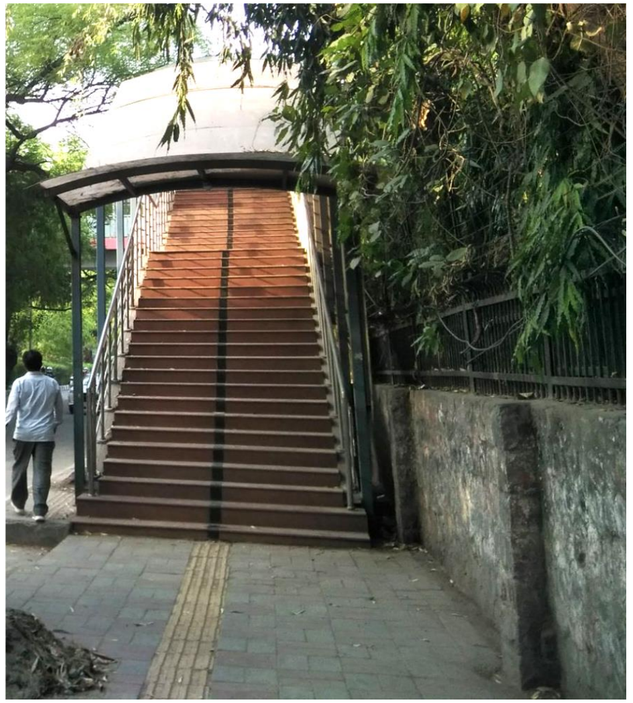


Figure 14: Empty stretches at ITO & IIT Gate FOB

Source: Authors

OBSERVATIONS

CONNECTIVITY

- Public amenities
- Signage about FOB
- Nearest Public transit stop

Figure 15: Signage about IIT Gate FOB

Figure 16: No signage at the entrance of Azadpur Chowk FOB

Figure 17: Bus stop at the foot of IIT Gate FOB

Source: Authors

SCORING OF THE FOBs

- Indicators: **comfort, accessibility, security, & connectivity** (ITDP, 2013; Arellana et al, 2022; Gao et al, 2022; Jafari et al, 2022)
- **13 sub-indicators**; based on equal weights each measured and scored through **on-site observations**
- Sociological aspects of pedestrians studied by conducting primary surveys for a sample of 20 at each FOB through questionnaire

S. No.		Azadpur Chowk	IIT Gate	ITO
Comfort				
1	Shade	75	100	75
2	The riser of the stair	0	25	100
3	Resting/ seating places on FOB	0	0	0
	Total score (x)	75/300	125/300	175/300
	Average score (x/3) (out of 100)	25.00	41.67	58.33
Accessibility				
4	Escalators	50	0	50
5	Lift	0	100	0
6	Ramps	75	0	0
7	Tactile paving/ tiles	0	0	0
	Total score (x)	125	100	50
	Average score (x/4) (out of 100)	31.25	25	12.5
Security				
8	Lighting on the FOB	50	75	75
9	Security Guards	0	0	75
10	Presence of street vendors	75	25	0
	Total score (x)	125/300	100/300	150/300
	Average score (x/3) (out of 100)	41.67	33.33	50.00
Connectivity				
11	Public amenities	0	0	0
12	Signage about FOB	0	25	0
13	Nearest public transit stop within 500 m	100	100	100
	Total score (x)	100/300	125/300	100/300
	Average score (x/3) (out of 100)	33.33	41.67	33.33

UTILISATION RATE

- Measured in three 10-minute time intervals by manual counting taken at peak hours during weekdays
- At Azadpur Chowk observations were taken from 8:50-9:20 am, at IIT Gate from 9:00-9:30 am, and at ITO from 17:00-17:30 pm
- Pedestrians crossing using FOB and crossing at grade, categorized as users and non-users respectively

	Azadpur Chowk		IIT Gate		ITO	
	User	Non-user	User	Non-user	User	Non-user
	95	154	6	5	84	0
	80	148	5	5	103	0
	42	134	4	7	91	0
Average	72	145	5	6	93	0
Percentage of usage	**33.2%**		**46.9%**		**100.0%**	

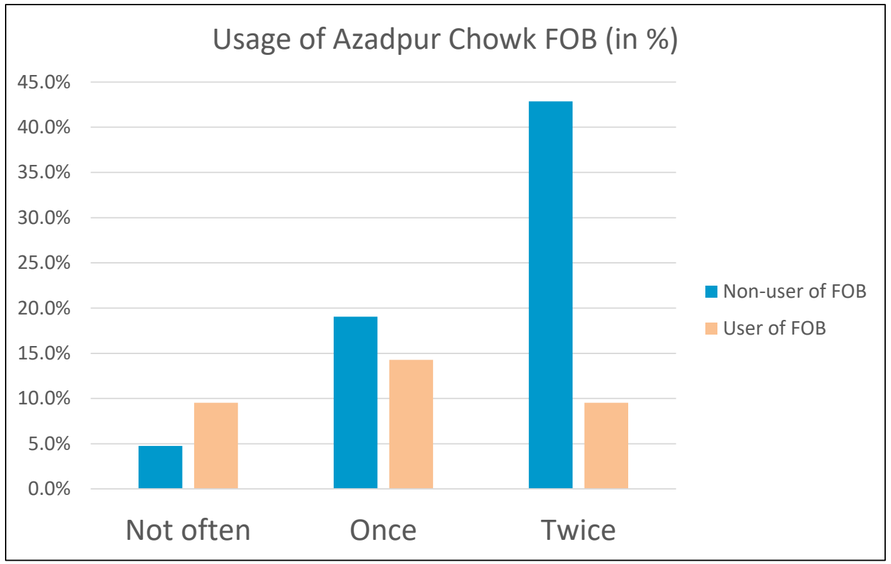
Figure 18: Road characteristics at Azadpur Chowk, IIT Gate, and ITO

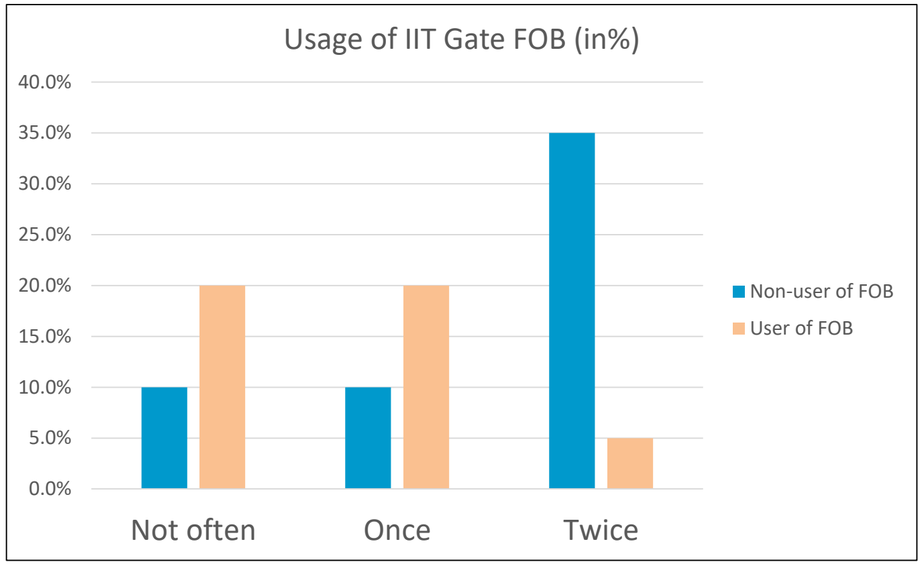
Source: Authors

CHARACTERISTICS OF USERS OF FOB

Usage in a day

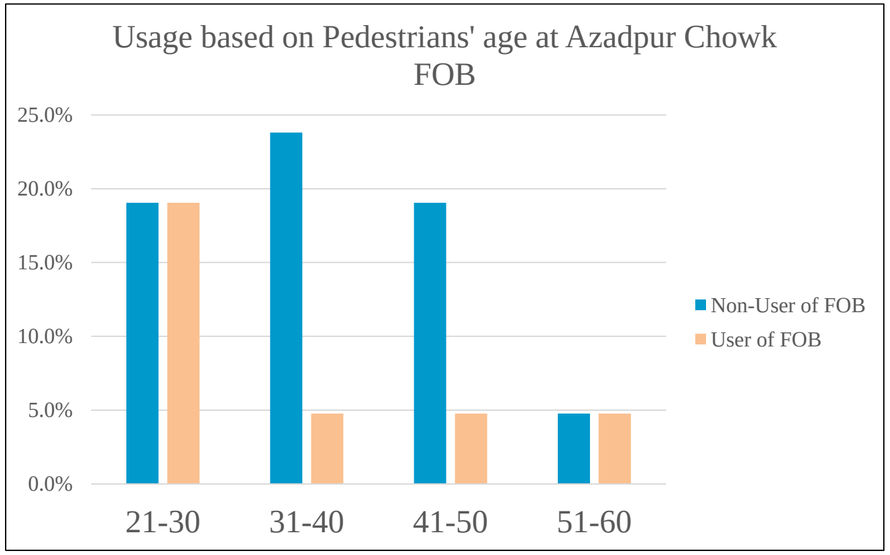
If the pedestrians have to cross a road more than once in a day they would prefer at-grade crossings

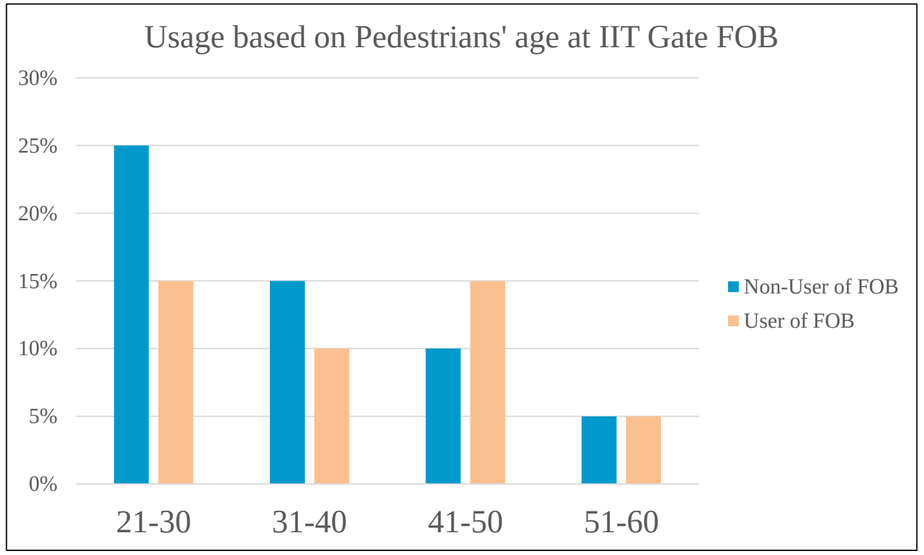




Age of pedestrian

Users in the age bracket of 21-30 years used FOBs more

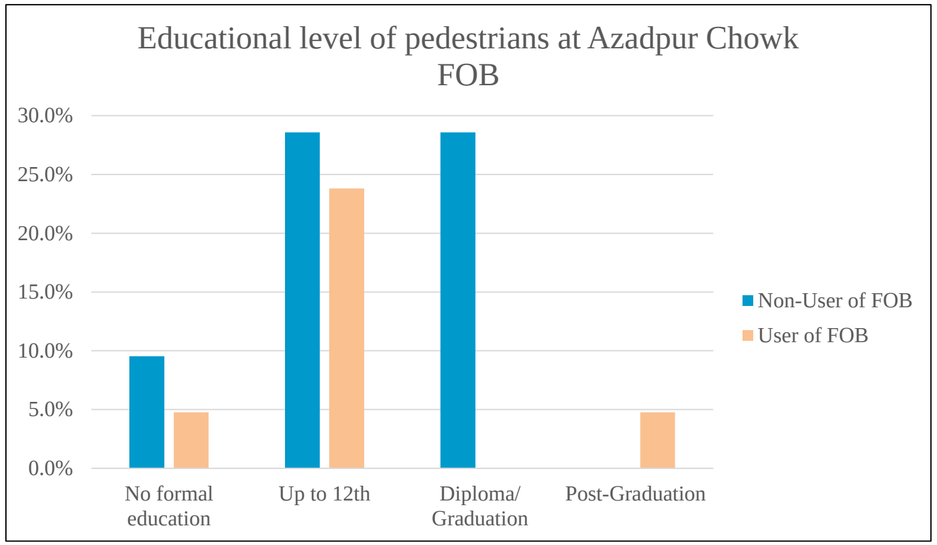


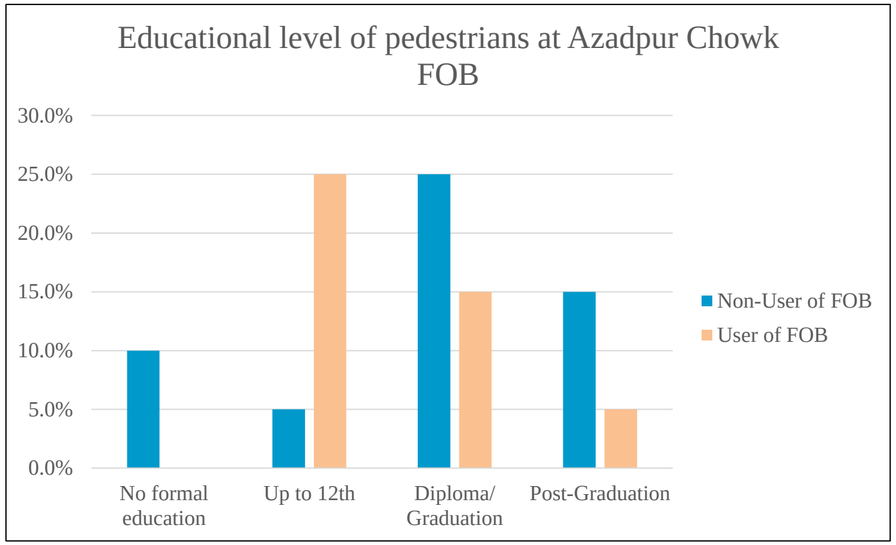


CHARACTERISTICS OF USERS OF FOB

Educational level

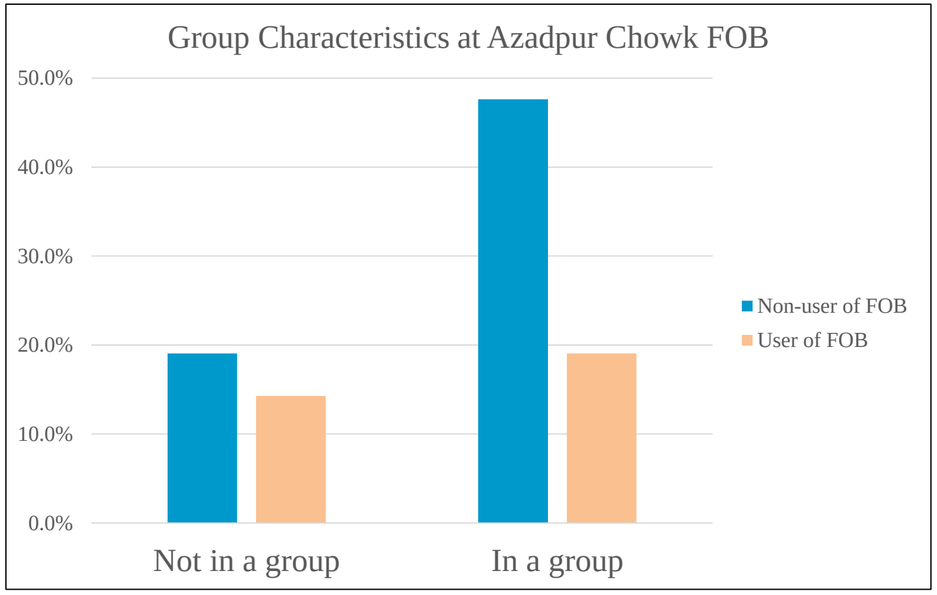
Higher educational level of a pedestrian did not play a factor in choosing FOB

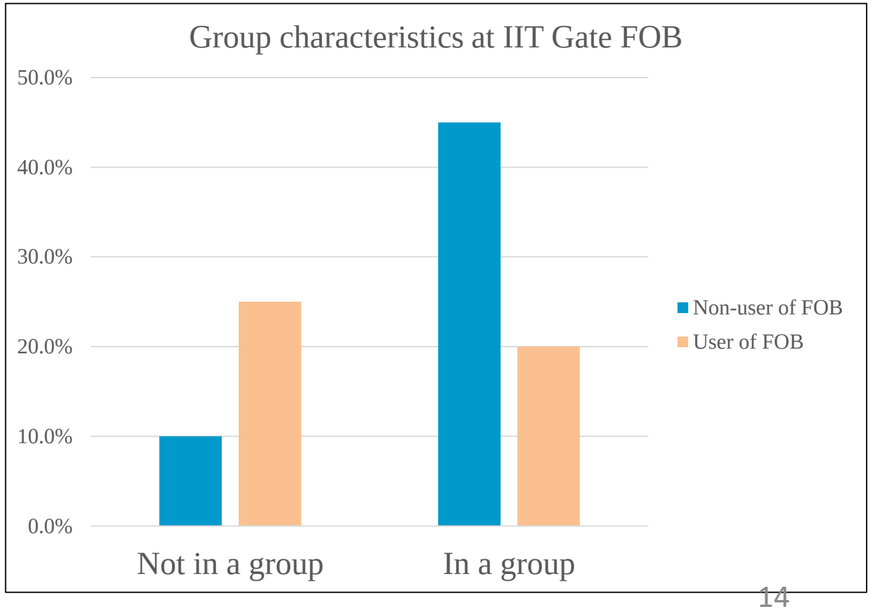




Group characteristic

Group of pedestrians chose riskier behaviour as they chose at-grade crossing over FOB, a group more visible to incoming traffic





PREFERENCE OF PEDESTRIANS BASED ON GENDER

	Female Pedestrian	Male Pedestrian
First Preference	Lighting	Security Guards
Second Preference	Security Guards	Lighting
Third Preference	CCTV	CCTV

	Female Pedestrian	Male Pedestrian
First Preference	Escalators	Escalators
Second Preference	Ramps	Lifts
Third Preference	Lifts	Ramps

Preference for security measures

- It was observed that males do not consider lighting on FOB as important in comparison to females
- Last preference is CCTV cameras as it is perceived to only help after an incident

Preference for accessibility measures

- Escalators were considered most important. Secondly, ramps were considered more accessible compared to lifts as lifts are considered secure by female pedestrians

RECOMMENDATIONS

Maintain infrastructure

- Functional escalators and lifts
- Shade roofing for thermal comfort
- Lighting on FOB for security
- Visible signages about FOB crossing
- Install resting/ seating places

Universal design

- Tactile paving/tiles and auditory signages
- Separate street lights at height of pedestrians
- Public amenities
- FOBs with cycle ramp such as at ITO FOB

Road Design

- Wide table-top at-grade crossings with signals
- Continuous footpath with 3 zones - frontage, pedestrian, & furniture zone
- Shallow pedestrian underpass midway below street level
- Improvement for motorized transport: enforcement of speed limits, traffic-calming measures, etc

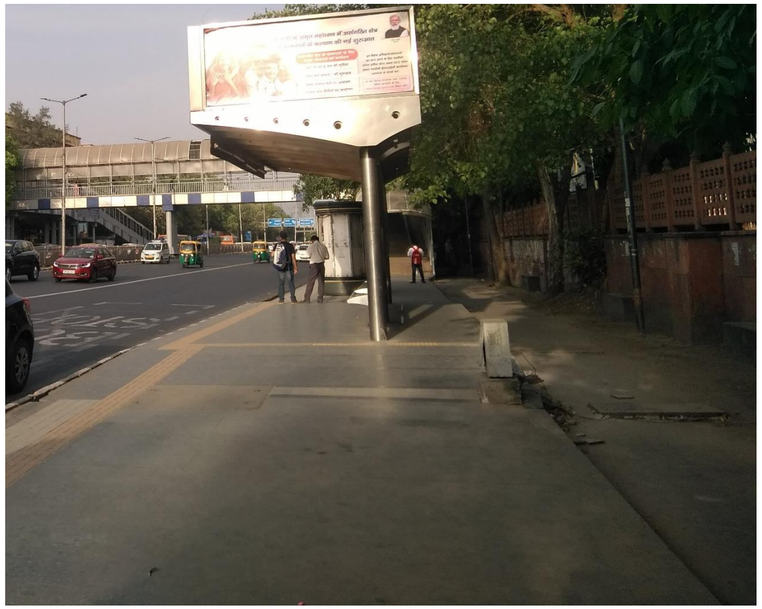


Figure: 19: Public amenities should be provided around FOBs

THANK YOU

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