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Barrier-Free Elements in Street Design-Case of Indian Cities

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A B S T R A C T

Streets are often the most essential, yet underdeveloped, public spaces in cities. Usual highway design values tend to look at streets as access roads for traffic and assess their performance in terms of speed, delay, throughput, and overcrowding. In reality, streets are the places where we live, work, play, and intermingle. The design and management of an urban street must reflect and contain these varied and challenging uses. The layout and operation of streets can prioritize and improve particular uses for the benefit of all. Streets must accommodate safe travel for everyone, including those with disabilities. Many streets, however, are difficult to access, navigate, and cross, or do not provide adequate accommodations for people who use wheelchairs, have diminished vision or hearing, limited mobility, or even are parents with strollers. Most people will face at least one of these challenges in their lifetime. The inability to create an environment that promotes barrier-free access, as well as total disregard for the unique needs of the disabled, have been the primary causes of handicaps. To date, the focus on matters related to disability and accessibility has been centered around isolated buildings. This study aims to evaluate the present conditions of streets and identify the methods to transform them into socially interactive and barrier-free public places. In this study, the common barriers faced in open public spaces like streets and the need to consult different kinds of pedestrian users while designing a barrier-free public space like streets are discussed.

Keywords: Public Space, Barrier-Free, Streets, Accessibility.

1. Introduction

As per Census 2011, in India, out of the 121 Cr population, about 2.68 Cr persons are 'disabled' which is 2.21% of the total population(Ministry of Statistics and Programme Implementation, 2021). Focused initiatives for the welfare of disabled people are crucial at a time when "inclusive development" is being emphasised as the best path toward sustainable development. This highlights the necessity of improving our nation's statistics on accessibility for people with disabilities.

The term barrier-free design was coined in the 1950s to describe the effort of removing physical barriers from the built environment for people with disabilities. Planning for accessibility helps to create a built environment that is usable by everyone. In addition to providing benefits to people with impairments, limited mobility, or parents pushing strollers, designing for accessibility contributes to the creation of a more comprehensive and mobility-supportive built environment for all users. Cities have failed for far too long to take into account the unique ways that social and physical barriers restrict the participation of people with disabilities in public life. The freedom to access resources in the inner city is only one aspect of the right to public space like streets; it also includes the freedom to alter the city to alter ourselves. One of the most cherished yet underappreciated human rights is the freedom to design and reimagine our personal and public settings.

The phrase "travel chain" refers to the essential components of a trip, from start to finish, including pedestrian access, transportation, and transfer locations. The voyage gets challenging if even one link is difficult to access. It seems logical that individuals with impairments won't embark on a journey until they are sure they can complete it without too much difficulty. People should be able to access all cars, the whole service area, as well as the pedestrian environment, which should be the accessibility goal. All users should have equal access to privacy, security, and safety features. Only by eliminating barriers from all of our streets' sidewalks, roads, and crossroads would this be feasible. By making these enhancements, we are opening up public spaces to everyone, thereby increasing access to places where people can buy, work, and play.

2. Research Objective and Methodology

Streets that are barrier-free/complete provide everyone with a choice of mobility options, allowing all users to travel to and from work, school, and other destinations with the same level of safety and convenience, whether or not they have mobility, vision, or cognitive disabilities. Complete and maintained sidewalk networks, accessible transit stops, properly placed and designed curb ramps, and other accessible designs make it easier for all people to travel and provide a more dignified and aesthetically pleasing built environment. For users with varying levels of mobility, even little design variations can have a significant influence on an intersection's safety and usefulness. Barrier-free elements are typically overlooked yet are very necessary for accessibility for people with disabilities. The state of our streets has an impact on how handicapped persons go about their business in public areas. Planning a city involves creating streets that are lively, entertaining, and accessible.

2.1 Aim and Objectives

Aim: To evaluate the present conditions of streets and identify the methods to transform them into socially interactive and barrier-free public places.

Objectives:

- To analyze and evaluate the present condition of streets in our country.

- To study the impact of barrier-free streets in Indian cities through examples.

- To discuss the benefits of complete streets and recommendations for designing barrier-free streets.

2.2 Scope and Limitations:

Scope: The purpose of this research is to give methods and tools for designing streets in various contexts while paying close attention to the unique requirements of each pedestrian community. The study's planned effects include changes to existing roadways and the building of new ones, as well as the public right-of-way.

Limitations: Every urban street is distinct and constantly changing, and every city contains streets in a variety of settings. The multiple demands and activities that take place throughout the day must be intelligently and carefully balanced when designing outstanding streets. While universally putting people first is required, it is crucial to also recognise and address the particular issues that are particular to each location. The ingredients to make a street barrier-free vary depending on the situation of each street typology. Only two Indian live case study examples of street typologies are used in this study. The barrier-free street design idea encompasses much more than this since how the barrier-free notion is emphasised depends on the society, culture, and setting in which we live.

3. Challenges and difficulties faced while walking on India's streets.

Confused sidewalks: Only a small number of Indian streets have sidewalks, and even then they might not be completely accessible. Sidewalks might be present or absent, small, poorly maintained, and occasionally not used for the purposes for which they are intended.

Ups and downs: Sudden changes in levels that are left untreated to preserve the sidewalk/pedestrian infrastructure present difficulties for a variety of pedestrian users, including ladies wearing restricting apparel (sarees), the elderly, small children, and individuals with impairments.

Out of sync: The streets serve as the primary conduits for urban infrastructure services. The placement of electrical equipment such as transformers and poles on the sidewalks to restrict the pedestrian route is the result of a lack of design cooperation between services and mobility. The majority of the sidewalks are constructed on top of drainage ditches, which vary in size depending on the direction of water flow. As a result, some sidewalks are somewhat small, while others are quite large.

Universal accessibility: It is unusual to see someone with specific mobility requirements on Indian streets since Indian roadways are designed with a narrow range of users in mind and entirely ignore universal accessibility.

Priority: In India, road traffic is controlled by the size of the vehicles. Drivers attempt at all costs to navigate their way through the packed streets since the streets are not delineated properly. To prevent being struck by moving automobiles or harmed by sidewalk cracking, constant vigilance is necessary.

Insecure connections: At major junctions, traffic lights do not have a separate signal for pedestrians to cross, and even when they do, cars frequently fail to heed pedestrian crossing signs, causing the latter to wait longer than necessary to cross the road.

Eyes on street: The street is kept alive by a variety of informal activities including street vending, which also improves the pedestrian experience. While serving as eyes on the streets, some sellers are positioned inconveniently and obstruct traffic on the sidewalks.

Quality of surfaces: To provide a safe trip, pedestrian sidewalk pavements must be strong, non-slip, durable, and aesthetically appealing. In India, sidewalks are closed with concrete slabs on top rather than being closed and paved to provide easy access to the sewers and manholes at regular intervals as per international regulations.

Anti-signage: The majority of Indian cities do not have planned standard signage, and those that are there are either in the centre of the sidewalk or do not have adequate space between them and the ground.

Disrespect of environment climate resilience: Climate resilience is disregarded because Indian roadways are not built to endure the water flows of intense monsoon rains, turning them into ponds rather than sidewalks. Storm water drains, which are often located beneath sidewalks, overflow with other trash, creating unsanitary conditions. When they dry, the debris is left in the public area untreated.

Streets can be dirty and ugly: A pleasant streetscape may enhance the pedestrian experience; nevertheless, Indian streetscapes are degraded by the unsightliness of inexpensive concrete facilities (such as flyovers), dangling electrical wires, remains of posters, and invoices on the walls. People still frequently discard their trash on the ground in most Indian cities.

Vegetation: Large trees are positioned along several roadways to provide users with shade on hot days. But regrettably, the majority of these trees are placed right amid the sidewalk or are being built around it, leaving little room for pedestrians to stroll.

4. Benefits of Complete streets

Complete streets are built to accommodate all users, types of transportation, and levels of ability. Based on the specifics of the area, they strike a balance between the requirements of vehicles, pedestrians, cyclists, transit users, emergency responders, and commodities movement. All individuals may move more easily thanks to complete and well-maintained sidewalk networks, accessible transport stations, strategically located curb ramps, and other accessible features that also contribute to a more respectable and attractive built environment. A standardised set of design treatments that are simple for drivers, bikers, and pedestrians should be incorporated into all roadway designs. These treatments should be carefully chosen to account for the many purposes and contexts of different street types across the city, accommodate all roadway users, and encourage predictable and desired travel behavior. Additionally, a good complete street design should consider and balance the numerous uses of roadways as areas for business, transportation, social/cultural activities, and stormwater management(The State of New Jersey, 2017). The city should wherever feasibly coordinate roadway improvement projects to allow for simultaneous completion of related upgrades. This strategy helps to make street project execution more effective, lowers construction costs and disruptions, and ensures that improvements result in a more unified street design. However, whenever there is a chance to make rapid, affordable changes, independent initiatives should also be pursued. It may be a difficult and complex process to incorporate Complete Streets ideas into planning and design processes. Although there isn't a perfect, one-size-fits-all technique to accomplish successful integration, planners, engineers, and politicians may use a number of tools to make the process simple and effective. Adopting a Complete Streets policy is a wonderful place to start if you want to alter the way that transportation is planned. It is only the beginning, though. For the policy to be properly implemented, a lot of work has to be done, and extra steps could be required. For each section of the street network, planners, engineers, and designers have access to a wide range of treatments. A street's functionality, appearance, and feel are the result of several design choices made for each street feature.

5. Initiatives for Barrier-free Street Elements in Indian cities

Banglore and Kochi, two South Indian metropolises, were chosen for the study. It becomes the imposing backdrop of someone's upbringing, the loss of a tree-lined road might be the loss of a beloved location, and a new little house to a young labourer couple from another part of the nation. Projects like the Metro, which extend over many years, have a multifaceted influence on the city. In our nation, neighbourhoods with walkable streets are a result of the nearby metro's construction. These case studies analyse the change that these activities have brought about in the locality.

5.1 M.G.Road Boulevard, Banglore, India

MG Road Avenue once had a lovely boulevard of trees, but with the installation of the metro, MG Road took on a gloomy appearance.Once the civil work and station construction at MG Road were finished, BMRCL undertook to rebuild the MG Road Boulevard. The BMRCL management made the deliberate choice to create the area as an interactive place, making it welcoming, educational, interesting, and approachable to the people, rather than simply duplicating the promenade with bougainvillaea as it was previously. The Boulevard on MG Road is somewhat of a remedy for Bengaluru in the twenty-first century, even if it is a rebirth of the city's once-famous promenade.

Project Timeline (2008-2013): Rajiv Gandhi Rural Housing Corporation and Karnataka Land Army Corporation were given the job of rebuilding. It was determined that March 2012 would be the completion date. When it was discovered that the ground needed to be strengthened because it was unstable, the work was delayed. On September 5, 2012, the new boulevard cost was officially opened. On May 6, 2013, Rangoli Metro Art Center was opened to the public. Art galleries, an auditorium, a children's play area, and a promenade are currently present in this area.
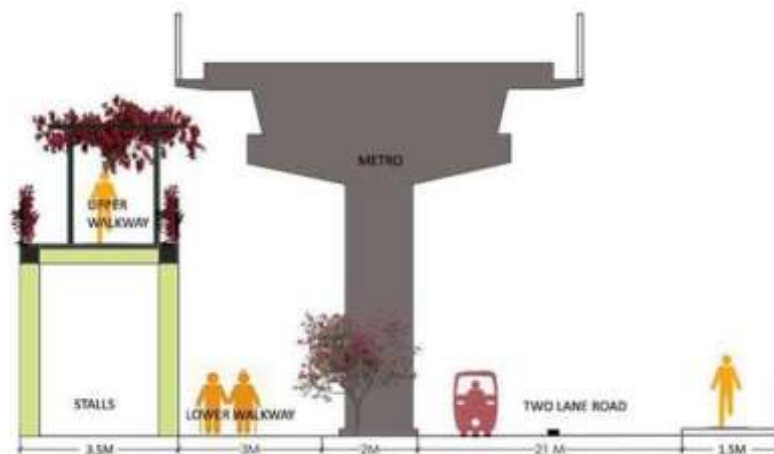

Fig 1.M.G.Road Boulevard sectional view (Source :Author)

Key Elements of Street Design

The boardwalk is accessible for wheelchair users and is large—likely half as wide as MG Road. Public restrooms are available. The brand-new boulevard features two levels, one at street level and the other elevated. Mostly used for walking is the raised portion. Cariappa Park is located on one side of the elevated path, and the main MG Road and the lower level of the boulevard are located on the opposite side. A few enclosed exhibition halls, an amphitheater, and a playground are located on the lower level of the boulevard. Additionally suitable for kids with special needs, the playground. Additionally, there are semi-open kiosks where handicrafts are advertised and sold. There are plants and a few garden statues made of metal, cement, etc. between the boulevard and MG Road. Boulevard includes spaces for artistic activities and workshops throughout the 500m long and 30m wide hub, as well as sculptures and installations by art school students that will be changed every six months.

Figure 2 .(a) Lower walkway (b) Upper walkway (Source;Author)

5.2 Panampilly Nagar Walkway, Kochi, India

The first pilot project to be conducted to reclaim streets and abandoned areas and promote walking and cycling in Kochi is called Urban Place-Making via Street Design and Canal Front Development along Shihab Thangal Road in Panampilly Nagar, Kochi. The location was presented as the backyard of a posh neighbourhood called Panampally Nagar. After the Streetscape was put into place in 2016, the area changed into a key travel hub for Panampilly Nagar inhabitants and the city as a whole. The successful completion of the Kochi Metro Rail Limited's pilot project inspired its engineers and designers to pursue comparable endeavours there.

Fig.3 (a) Before Transformation of street (b) After transformation of street (Source:Kochi Metro Blog)

Street before Transformation

1. Used as an anauthorised parking area and garbage dump.

2. Led to pollution of environmental and water (canal) resources.

3.Perceived as backyard of Panampilly Nagar.

Street after Transformation

1. Transformed into an area for recreation and leisure.

2.Reduction in pollution rate and initiation of rain water harvesting.

3. Reuse of existing structure and in corporation of existing plantation.

4. Increase in price of properties in the area.

6. Recommendations for implementation and coordination of barrier-free streets

Be consistent across plan components and modalities: A compliance plan complies with laws and standards for the creation, adoption, and execution of integrated plans, programmes, and policies.

Coordinate with the plans of other jurisdictions and levels of government: A coordinated plan for disability-inclusive development aligns vertically with federal, state, and regional plans and horizontally with the plans, priorities, and forecasts of neighbouring jurisdictions.

Respect all relevant anti-discrimination laws and regulations: A compliance plan complies with laws and standards for the creation, adoption, and execution of integrated plans, programmes, and policies.

Comply with applicable anti-discrimination laws and mandates: A compliant plan meets the requirements of mandates and laws concerning preparing, adopting, and implementing integrated plans, programs, and policies.

Be transparent in the plan's substance: All goals, objectives, policies, activities, and major plan maps are rationally justified in a transparent plan. It explains each recommendation's "what, how, and why.".

Use formats that go beyond paper: In addition to a traditional printed document, a plan that extends beyond paper is prepared in a web-based format and/or other accessible, user-friendly formats. Websites for planning may be used to include and inform the public and other stakeholders about the plan.

7. Conclusion

Cities require planning that acknowledges the complete involvement of each individual in the built environment and the fact that participation enables individuals to sculpt their surroundings to suit their own requirements. Due to their lack of information, expertise, and abilities, handicapped people really suffer the most from their exclusion from the planning process. This increases the likelihood that their requirements won't be taken into account during urban development, which further contributes to the deterioration of their living conditions. An inclusive design process based on three categories—functionality (designing to include all types of people), contextual sensibility (harmonising with the surroundings), and the impact of fairness—should be used to address these problems in order to "reduce social and human impact on the most vulnerable members of society." Municipalities should run campaigns to educate and increase public understanding of the value of involvement in the planning process for the growth of the city in order to achieve an inclusive planning process. Working groups tasked with creating municipal plans and strategies, as well as outlining designs for squares, streets, and parks, etc., must involve handicapped persons and the whole community that will be directly impacted by such planning in addition to such a strategy. The projects for smart cities are taking into account solutions for inclusive design, and if efforts to involve handicapped persons in the planning process were successful, they would feel included.

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