



# A Review of Barrier-Free Design in Built Environment

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**ABSTRACT:** *The design of products or built environments to be used and experienced by people of different ages and abilities without adaptation is reflected as the primary concept of barrier-free design. No doubt the concept of barrier-free design is growing around the world and this idea has expanded towards the scope of inclusive design, which especially extends the definition of barrier-free design by including users who have been excluded by rapidly changing technology, particularly the elderly, aging, and disabled population. This, in the long run, prioritizes the role and value of extreme user groups & disabled people in innovation and new service developments. As most of the buildings are not designed barrier-free old age groups & disabled folks get badly stuck in accessing the building. As a general trend, it is observed that most of the buildings that are not designed barrier-free due to various reasons. This study focuses on the assessment of barrier-free design in a built environment along with a propose approach for the same.*

**KEYWORDS:** *Barrier-free Design, Universal Design, Accessibility, Design for All, Disability, Inclusive Design.*

## INTRODUCTION

A barrier-free built environment enables people with disabilities to move about safely and freely and to use the facilities within the built environment. The goal of barrier-free design is to provide an environment that supports the independent functioning of individuals so that they can get to, and participate without assistance, in everyday activities such as procurement of goods and services, community living, employment, and leisure. (CPWD, 1998). So, in developing, standards/norms for various facilities to buildings, health care institutions, the fundamental principles followed meets disabled people standards for safety, convenience, and usability. Design standards should satisfy everyone who is hindered with the freedom of movement of functioning, unlike a non-disabled person as a result of obstacles put in his way by the design of a building, the choice of hardware and tools, and the planning of external space. (Seshadhri & Paul, 2017) have revealed the importance of design requirements pertaining to barrier-free design including the basic principles of universal design. It is a well-known aspect that “disability” is a critical barrier that weakens the impact of strengths of an individual and a community. “Dis-ability” becomes the obstacle in front of them in utilizing their “Abilities” and exploring the “Opportunities”. (Badungodage & Amirthalingam, 2012) Therefore, looking into various implications of disability has become a major alarm in the time.

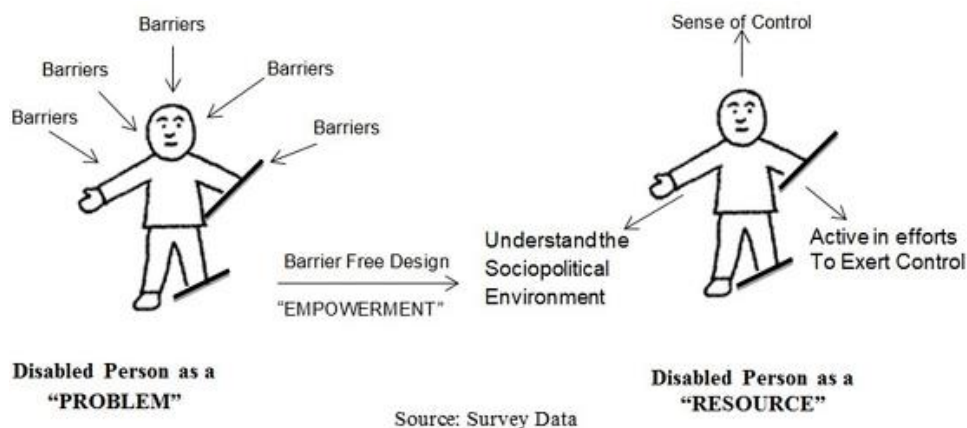
As days pass future society will have more varied and older constructions, and the future will not be won with only more equipment & more intelligent features, but with products and spaces that make life easier. (Rastogi & Paul, 2020) have related the same with the demand and awareness of the intelligent features which are beneficial in terms of usability of the facilities by all. In this context (Mittal, et al., 2020) have contradicted the issues raised by (Rastogi & Paul, 2020) with the fact that there is a lack of efficient handling, which leads to the necessity of standardizing the processes and design requirements (Paul, et al., 2020). And buildings should be designed in such a way that everyone can use them any time irrespective of being able or disabled. Hence, this leads to the much-required consideration of barrier-free designs in the built environment.

## TYPES OF BARRIERS

There are three types of barriers namely, “Environmental barrier”, “Attitudinal barrier”, “Institutional barrier”.

“Environmental Barriers” are massive constraints for impaired persons in being independent and to empower themselves. It’s the responsibility of the other social segments to remove these man-made built-environmental barriers in order to empower disabled persons and provide them the “Opportunity” according to the “Social” and “Citizenship” models.

“Empowerment” is the value creation of the barrier-free design process. The resulting “Individual Empowerment” is reflected from “Participation” and “Sense of Control” of the disabled person. This approach will transform the image of a disabled person from a “Problem” to a “Resource”. (Badungodage & Amirthalingam, 2012).



**Figure 1: Transformation through "Empowerment"**

“Barrier Free Design” is a universal concept which removes obstacles in a space or product accommodating people with different disabilities (Peterson, 1998). In “Universal Design” the development in the design aspect is a broader part of its concept.

## IMPACT OF BARRIERS ON USERS

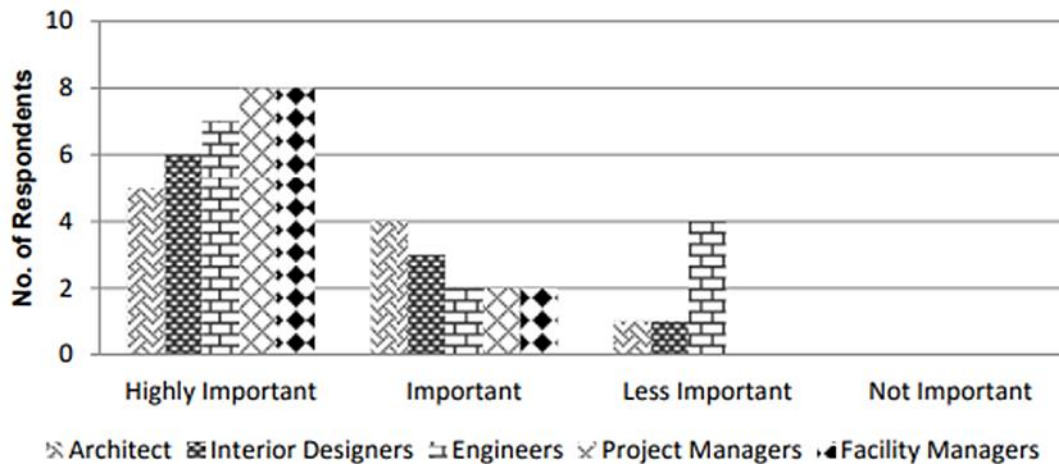
As per a case study, disabled people are really disappointed about the barrier free accessibility in most public buildings that lack barrier free design. They face many hard situations in these places due to high steps, slippery floors, narrow corridors and high counters which really demotivates

them and let them down psychologically. According to (Paul & Seth, 2017), such issues are significant in terms of accessibility in built environment and can be addressed through appropriate innovations and methodologies. It is further analyzed that the importance should be given on disability access by these facilitators in their professional practice.

It is of massive importance as all other design aspects considered in designing. And hence, Barrier Free Design is a Professional responsibility of an Architect. Unavailability of space may confine such designing in most urban locations (Seshadhri & Paul, 2018). Though, appropriate utilization of space to accommodate Barrier Free Design should be incorporated at the very initial stages of a project with reference to circulation and in the advanced stages for detailing of elements in creating Barrier Free Design.”

### BARRIER FREE DESIGN

As per a literature and various surveys from the point of facilitators, the idea of “Prevention” of environmental barriers came out to be as follows.



**Figure 2: Need to Prevent Disability Barriers in Proposed Buildings**

The highest number of professionals (68%) recommends that “Prevention” of barriers is highly important, 26% recommends as important and 6% recommends as less important according to the above survey data chart. In Colombo, a proposed building has to gain initial approval from the UDA in the “Planning Approval Stage” for basic building regulations, fire regulations, traffic impact assessment and accessibility standards. Also a “Certificate of Conformity” is issued after a building is constructed to check whether there is any deviation from the approved plan. The approval for occupation to a building and trade license is only provided after these two certificates are achieved. “Accessibility for Disabled” has been considered a vital part in “Planning Approval Stage” due to its capability to reduce dependency and to improve inclusiveness. The construction of ramps along with steps, accessible toilets, lines on pathways and accessible corridors/pathways for wheel chair users. Along with that all the impaired persons could be employed in the ground floor of building or provision of lifts to be given to ensure “Individual Empowerment” which strongly leads to intrapersonal, interactional and behavioural empowerment of disabled persons.

## **BUILDINGS ARE NOT DESIGNED BARRIERS FREE**

The disability access provisions impact on the aesthetics of the building and the cost of removing disability barriers. These could be reasons for different levels of practice in their professional practices. Many think that the impact depends on the skill of the designer while few complain it has a marginal or high disturbance to the beauty. It could be said that it is a mode of setting, a situation of equity in a built environment, in a use of product or in a lifestyle. It is an important aspect in the field of design as designers are there to create “user friendly” environments or products. Therefore, the point that people with disabilities are in the category of “User”, cannot be overlooked. Including these in the design process without harming its beauty is the skill of the designer.”

Many think that the cost of removing accessibility barriers is a highly important factor and Facility Managers recorded the highest number of complaints in this category. It is essential to provide barrier free access in public buildings/ interiors. It is more of a social need rather than a cost benefit. (Mittal, et al., 2019) related the aspect of barrier free design same with the value-adding aspects which can be driving force in improving the social indicators of the built environment. Henceforth it is a highly important social need and the cost incurred on this is highly justifiable. On the other hand, if the designer can include barrier free design from the preliminary stage, the cost incurred specifically on this will be significantly less.

## **PROPOSED APPROACH**

As the research basically revolves around the barrier-free or the universal design and thus followed quantitative data analysis which were more controlled and less interpretive. Followed research papers, journals, etc. producing contextual real-world knowledge about the behaviours, social structures and beliefs of a specific group of people. These sources were secondary data that were collected by someone else, and the collected data were usually descriptive data that were gathered by observations. As this topic could be more understood by the past experiences and keen observations done by studies & researches, going for quantitative analysis is the right decision and could be reliable approach as data could be similar more or less under various conditions and could be closely related to real-world values for barrier free design.

For getting quantitative data various types of materials were analyzed which included books, various research papers and journals which talked about the barrier free design or universal design, its principle, applications, users, etc.

## **CONCLUSION**

Through the above data we can conclude that if participation and sense of control gets improved then ultimately a disabled person can act as a productive resource to the society. “Barrier Free Design” in built-environment proves an optimistic relationship with empowerment of physically incapacitated persons. Hence creating proper ramps, hand railings, suitable floor finishes and other barrier free techniques should be paid greater attention which will empower the persons with disabilities in legs in accessing public buildings. Also, most disability development programs in the country still emphasis on rehabilitating, donating, medicating and making the disabled persons passive receivers. “Equity in Planning” acts as a critical need in attaining the empowerment goals for incapacitated persons through Barrier Free Design. Also “Accessibility Audit” is a major

strategy lacking in the existing building regulation system. Regular practice of barrier free accessibility should be done to empower physically disabled persons as it improves the quality and quantity of productive individuals in the nation. Hereafter the value system has to be altered consequently and planning process should be encompassed in the development agendas as the addition of empowered incapacitated persons which fortifies the main stream in the advancement of activities.

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