

## REQUIREMENTS IN DESIGNING SPACES INTENDED TO USERS WITH DISABILITY

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*Summary:* This project represents the most significant elements that one needs to get acquainted with and analyze when designing spaces intended to users with disability. Using different methods and applying effective standards, every space can be adjusted for simple use by persons with diminished physical capacity. The objective of this project is to perceive these features and standards which are vital for this specific design process.

*Keywords:* users with disability, design, specific requirements

### 1. INTRODUCTION

With respect to architecture, which is crucial for complete integration of persons with physical disability into society and all its flows, until recently not much was done in our environment in terms of removing architectural barriers. Architects were not enough acquainted with the problem of physical immobility and were not adequately familiar with the way walking impaired persons live. In that respect the role model would be the legal regulation of Western European countries.

In order to change the described state of affairs it is necessary to get architects acquainted with the notion "diminished physical capacity" and what it means in real life. Furthermore, they need to be made familiar with the categorization of persons with diminished physical capacity, as well as what each individual category entails in terms of architecture. However, in addition to educating architects, it is necessary to define certain legal regulations to secure application of the acquired knowledge to projects, whether it be the construction of new buildings or the adaptation of the existing ones.

Since the dawn of our civilization up until the middle of the 20<sup>th</sup> century, mankind constructed architectural and communal buildings solely for the healthy segment of the population. From the middle 1950s, the problem of physically incapable persons began to be looked upon in a different, more humane way and they began advocating the principle of integrating such persons in society and all social flows as the fundamental principle of their rehabilitation. All eyes were being turned to architecture and architects to remove architectural barriers and in doing so they were expected to pave the road to solving this problem in other spheres of life as well, starting from sociological and economic to psychological, medical and others.

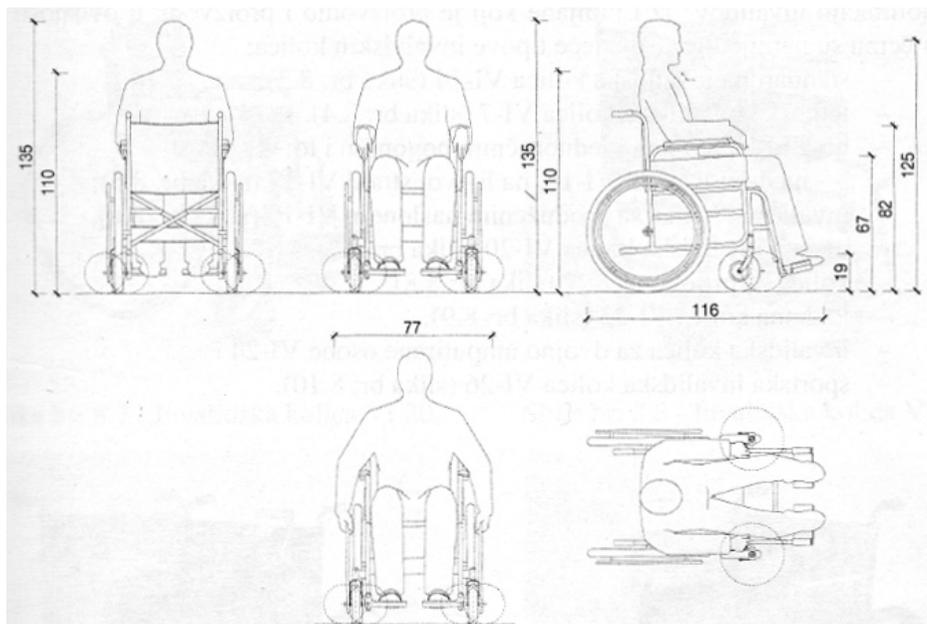
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## 2. WHEELCHAIR AND POSSIBILITY TO MANIPULATE IT

As already noted, the most fundamental obstacle faced by persons with diminished physical capacity on their way to interacting into everyday life are architectural barriers. It is clear that immobile persons confined to wheelchair are those who make up in every sense the most endangered category of persons with diminished physical capacity based on whose disability to overcome certain architectural elements one decides whether those elements are the architectural barriers or not. Thus, the fundamental parameter in design is the wheelchair and the ability to manipulate it by a handicapped person.

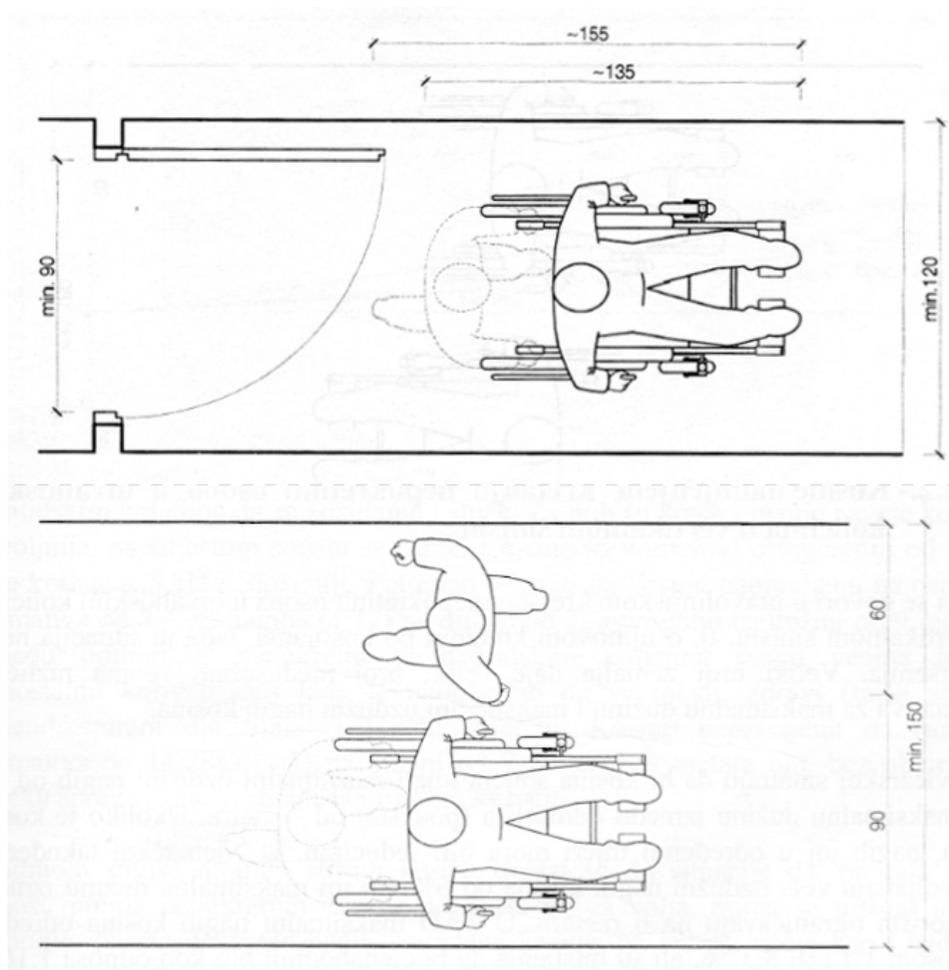
The most common is the standard wheelchair which is used by 90% of the population of disabled users and so this type and size of wheelchair is referential in defining the features of architectural elements which enable its use. This wheelchair is 110 cm long, 66 cm wide, 90 cm high (Figure 1). When folded its width is reduced to 31 cm. It is made of steel tubes covered in nickel. It weighs around 23 kg.



*Figure 1. Measurements of the standard middle-sized wheelchair used by an average sized person*

These measurements need to be strictly adhered to and used as referential when designing certain architectural elements intended to be used by persons with diminished physical capacity.

When it comes to the space needed for communication, one needs to bear in mind that the width of the opening or the door must be minimum 90 cm, and when it comes to the closed communication 120 cm.



*Figure 2. Door width and communication width needed for the passage of a person in wheelchair and width of the communication needed for the simultaneous passage of a healthy person and a person in wheelchair*

If projected that a communication serves to provide a simultaneous passage of a healthy and a disabled person in a wheelchair, then the communication must be at least 150 cm wide (Figure 2).

The way of walking of a person using sticks and crutches and the space needed for it are shown in Figure 3.

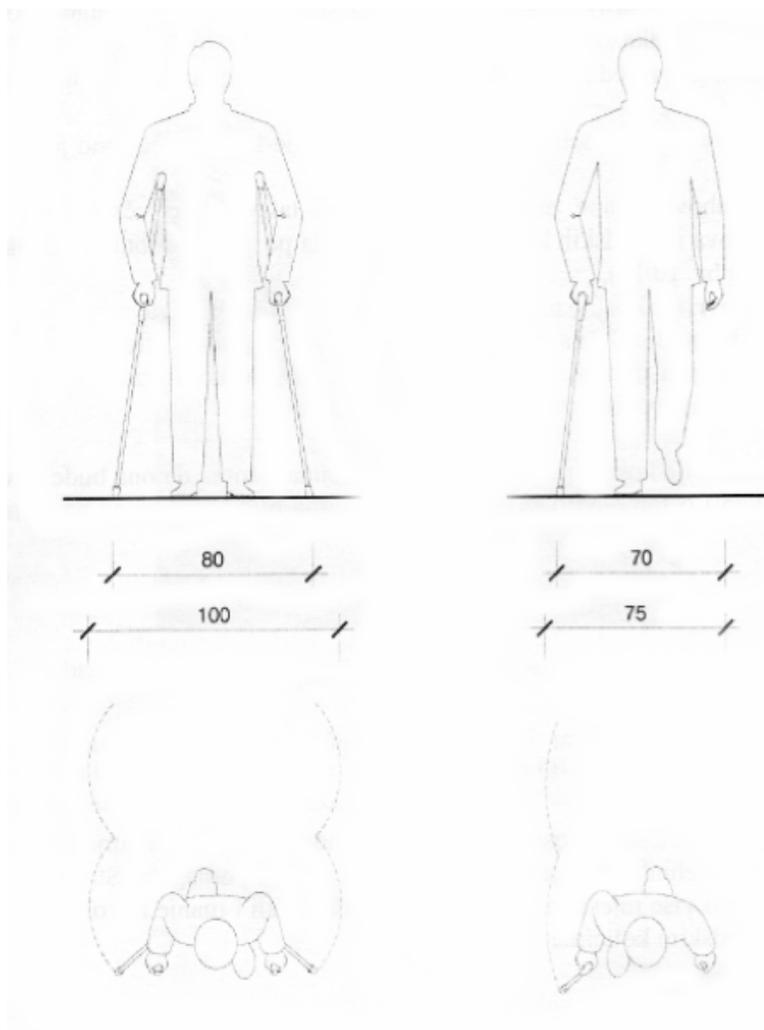


Figure 3. The space needed to facilitate walking of persons using the stick of crutches

### 3. PERSONS OF DIMINISHED PHYSICAL CAPACITY AND BASIC ARCHITECTURAL ELEMENTS

Architectural elements which people use every day and which have their application in almost all public or residential facilities are doors, steps, staircases, dining rooms and toilettes.

When it comes to doors, whether they be single, double winged, revolving, in whatever room it might be installed, its width must not be smaller than 90 cm in order for persons with disability to be able to use it (Figure 4).

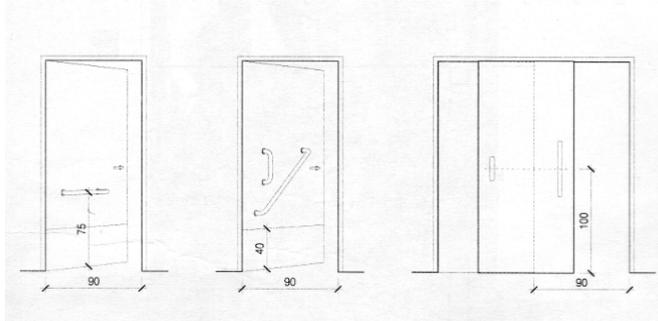


Figure 4. The door suitable to be used by persons in wheelchair

Since persons in wheelchair have very hindered access to pull and push the door wings due to the size of the very wheelchair, the dispositioning of this architectural element merits full attention. Even if a sufficiently wide door is installed in a narrow hall and its opening is directed towards the hall, this door is useless to wheelchair users due to its inability to draw its wings.

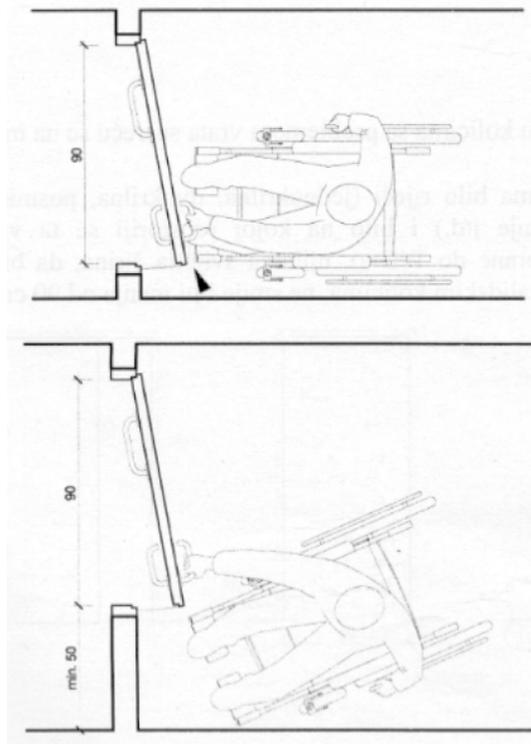


Figure 5. The door of sufficient width, irregular disposition, architectural barrier and the door of sufficient width with regular disposition

Washbasins are the most commonly used sanitary device. Therefore, one needs to pay close attention when installing it. It must be ergonomically designed and have proper dimensions. The upper surface must be horizontal and below the washbasin there has to be free space 65 to 70 cm<sup>2</sup> high so that persons in wheelchair could access it. That means that the standing models and syphons taking up too much space should be avoided. The faucet should be single-handed with ergonomically shaped handle having rounded corners.

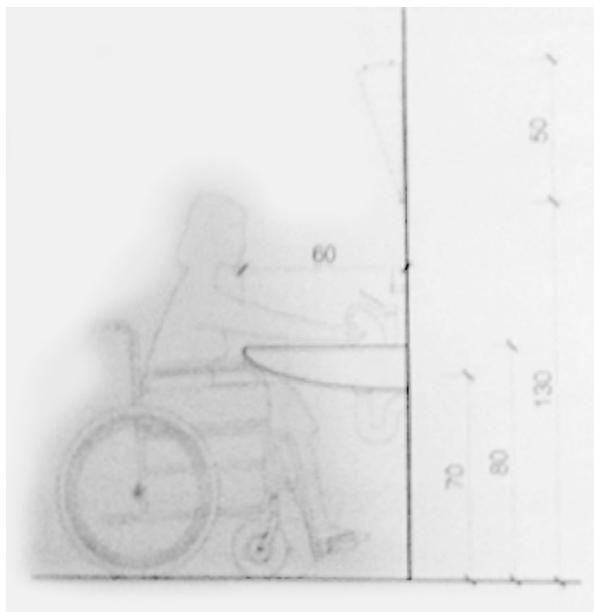


Figure 6. Washbasing suitable for persons in wheelchair

The equipment around the washbasin must also be ergonomically shaped and installed in order to be suitable both to handicapped and healthy persons. Mirrors need to be made in increased size to be suitable both to handicapped persons whose eyes are 125 cm high from the floor and healthy persons whose eyes are 165-170 cm from the floor.

The mirror must be wide as much as the washbasin and long (tall) around 100 cm. It must be installed so that it touches the upper edge of the basin. The flaw to this solution is that items that are left on the basin often block the view of the mirror for persons in wheelchair. Thus, another solution is often used, where the mirror is installed on the wall with provision to rotate around the lower horizontal. In this case, the mirror is attached to the wall at usual height, and the shift of its incline is carried out by means of the handle installed below it (Figure 6).<sup>2</sup>

The washbasin mount must be ergonomically designed, must not have sharp edges and must have a contrasting color relative to the background.

<sup>2</sup> Fejzić E., *Osobe umanjениh tjelesnih sposobnosti i arhitektonske barijere*, , Arhitektonski fakultet u Sarajevu i informativni centar za osobe sa invaliditetom "Lotos" Tuzla, Sarajevo 2001., pg.157

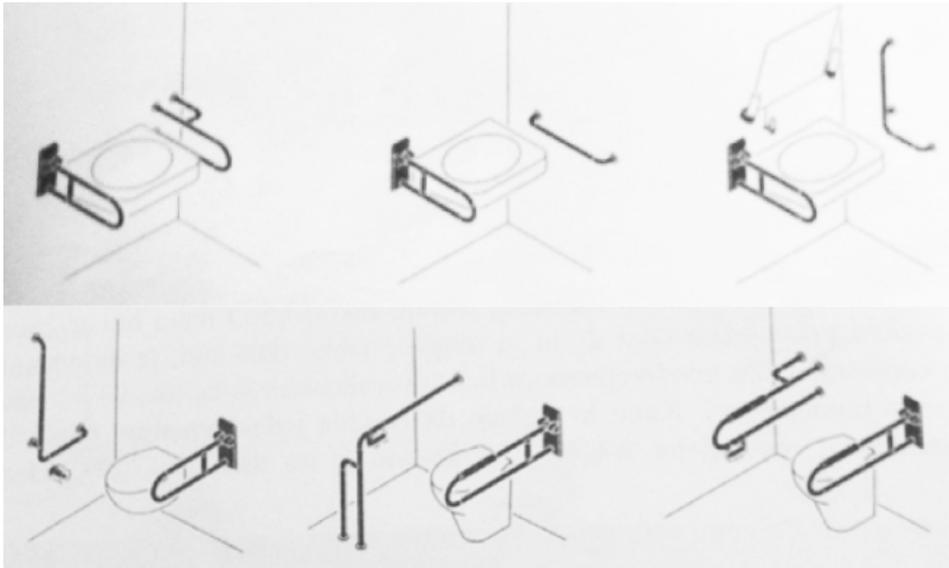


Figure 7. Several ways to install the washbasin mount and three different positionings of the toilet mount

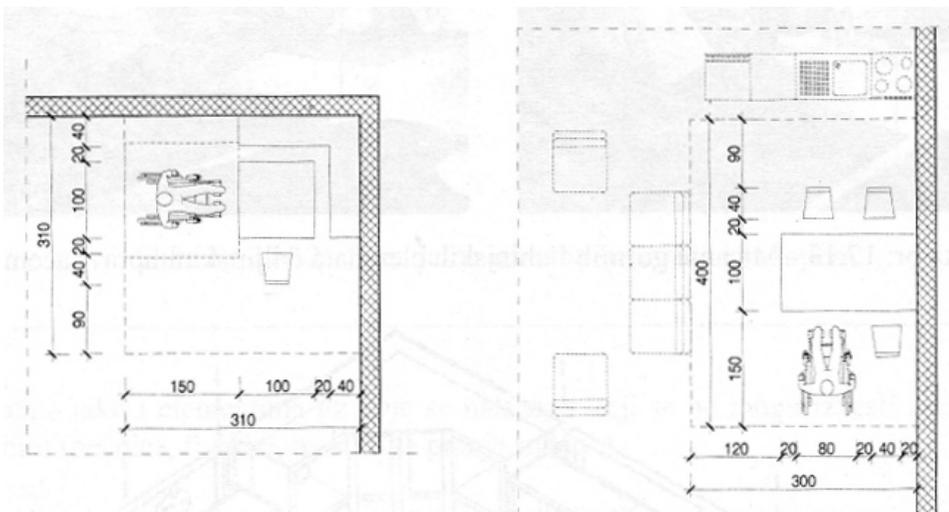


Figure 8. The dining room as defined by the German normative DIN 18025 Teil 1. The left part of the drawing portrays the dining room on its own and the right portrays the dining room integrated into the living room and kitchen.

Toilet bowls intended for persons with diminished physical capacity do not have standardized measurements nor shape. When repositioning from the wheelchair to the toilet bowl, persons apply three different techniques and there exist three different options to install the handle to the toilet bowl (Figure 7). In addition to the above mentioned, it is desirable that the washbasin should be positioned laterally relative to the toilet bowl and easily reachable, the distance between them should be at least 95 cm allowing for the easy access to them and leaving enough space for possible assistance to the handicapped user by the third party. Alongside the installed equipment, the alarm bell should be mounted as well. Size of the space intended for dining depends on the number of persons by the table, the layout of furniture and the space used to move along. The dimensions are given in normatives and shown in Figure 8. When planning, one needs to account for the pathways that persons use to move along, and so it is necessary to plan how many doors, light switches need to be installed, as well as consider the auxiliary items such as magnetic door shutters. All switches, handles, window frames, machine usage, phones, paper roll holders, elevator management etc. must be mounted in the height of the outstretched or lightly bent arm.<sup>3</sup> Nowadays technology has made headway and there are lots of auxiliary items with which designers need to get acquainted with. Unfortunately, the relevant literature is difficult to obtain and does not keep abreast of the modern technologies. Therefore, this subject merits closer attention so that designers could get familiar with the possibilities of solving the problems concerning walking and functioning of persons with certain types of disability.

#### 4. CONCLUSION

According to Article 1 of the Universal Declaration of Human Rights, all human beings are born free and equal in dignity and rights. In order to achieve this objective, all societies should celebrate differences within themselves and strive to secure that persons with disability enjoy the same degree of human rights: civil, political, social, economic and cultural as recognized by various international conventions, European Union Agreement and various national constitutions. The matter of inclusion into architectural and design areas is relatively new even though the problem of availability is not. It is as if a part of society was excluded in the first half of the 20th century. In addition to design of new buildings, the issue of remodelling and revitalization of the existing buildings, especially those under protection of the state is very important. It takes promotion and development of the new social model or social policy which would lead to different perception and understanding of persons with disability, that is perception of these persons as active participants who are entitled to equality. Therefore, this project represents but the beginning and the first step in dealing with the matter of accessibility and in a wider sense inclusive areas and design within different spatial entities of the modern city. The subject of inclusion is architectural to a great extent and does not relate only to overcoming barriers when moving, but this technical field is expected, by removing architectural barriers in a wider sense, to provide for all independent use of public as well as residential space.

<sup>3</sup> Neufert E., *Arhitektonsko projektovanje*, Građevinska knjiga, Novi Sad, 2002., p.560

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## ZAHTJEVI U PROJEKTOVANJU PROSTORA NAMENJENIM INVALIDNIM KORISNICIMA

**Rezime:** *Ovaj rad predstavlja najznačajnije elemente koje je neophodno upoznati i analizirati pri projektovanju prostora koji su namenjeni invalidnim korisnicima. Koristeći različite metode i primenjujući propisane standarde, svaki prostor je moguće prilagoditi za jednostavnu upotrebu od strane osoba sa umanjenim telesnim sposobnostima. Cilj rada je spoznaja ovih karakteristika i standarda koji su od ključne važnosti za ovo specifično projektovanje.*

**Ključne reči:** *invalidni korisnici, projektovanje, specifični zahtevi*