International Journal of Multidisciplinary Research and Development
www.allsubjectjournal.com
Online ISSN: 2349-4182, Print ISSN: 2349-5979
Received: 02-06-2021, Accepted: 17-06-2021, Published: 01-07-2021
Volume 8, Issue 7, 2021, Page No. 18-23

Accessible design: University campus planning review

Asena Feyzanur Kucuk[1], Sahika Ozdemir[2*]
[1] Msc, Student, Graduate Education Institute, Istanbul Istanbul Sabahattin Zaim University, Turkey
[2] Department of Interior Architecture and Environmental Design, Istanbul Sabahattin Zaim University, Istanbul, Turkey

Abstract
Architecture is the state of designing spaces. It is the art and science of building an area with an aesthetic ability by linking the functional requirements with the technical and economic possibilities to facilitate people's living and meet the need for space. In this context, architects; realizes architectural designs with a user focus. In the case of the user, accessibility and spatial accessibility following it come to the fore.
Cities have some essential functions such as shelter, work, rest, and transportation. The same parts are available on the campuses, with the system within itself. Campuses show mixed-use features that students can meet all their needs within short distances. Urban designs should be made for information societies when designing campuses, just like urban planners' approach to cities, and physical accessibility should be prioritized.
This study investigates the problems of individuals with disabilities who are using or using Istanbul Sabahattin Zaim University Halkali Campus access to the campus via the Islamic Economic and Faculty of Education buildings samples and to determine the deficiencies in the current usage and the problems of the disabled individuals.

Keywords: accessibility; transportation; campus design

Introduction
Many definitions and variations of disability are present in the literature today. However, the possibility that one day everyone will become a disabled person is forgotten. Some obstacles that may be encountered in daily life remind the strength of this possibility. For example, even a person's leg pain makes it difficult to walk. Everyone is a potential disability. Therefore, architectural designs should be realized in a user-oriented manner. In the case of the user, accessibility and subsequent spatial accessibility come to the fore.
There are almost 8.5 million disabled people in our country; many problems are seen in reaching from one place to another and when individuals use urban spaces alone without assistance. Therefore, they have difficulty performing their daily activities in the city and participating in society. Thus, making transportation, the physical environment, and its elements (roads, pavements, public buildings, parks, etc.) accessible to people with disabilities, which is the biggest obstacle, is essential in terms of quality of life.
A person with any disability is not disabled in an accessible place. However, with the discourse that a healthy person is disabled in an inaccessible space, it is seen how the architectural arrangements and accessibility of areas affect human life (Scherrer, 2001).
Accessibility, in the most general terms, means not restricting any disabled person's right to access public space and ensuring its usability; that is, schools, hospitals, shopping malls, restaurants, parks, banks, government administrations, offices providing services, etc. It means that everyone can enter every place they go in and out of daily life and participate in public activities (Evcil, 2014).
Physical accessibility; It can be defined as the location and suitability of the physical environment according to the area and bodily condition of the person. Physical accessibility includes the ability of an individual to reach from one point to another in the built or natural environment and to move freely, safely, and comfortably, on an equal basis with other users, without the need for the help of another individual, in the environment and related spaces where he is the user (Sungur and Yildiz, 2013).
Cities have some essential functions such as shelter, work, rest, and transportation. The same parts are also available on the campuses with the system inside. Campuses are areas where students can meet all their needs within short distances. While designing campuses, urban designs should be made for information societies, just like city planners' approaches to cities.
The university campus is complemented by a planned environment for education and learning. It contains buildings, grounds, equipment, and all learning objects. However, using the campus environment is more important than all of this; It can be defined as a large set that increases students' enthusiasm for learning.
In this study, some educational buildings and campus open areas used by disabled individuals were examined within the scope of accessibility. Suggestions were made to eliminate the critical deficiencies so that they could provide more comfortable and easy access. The research consists of three stages. First of all, the literature related to the study area and the subject of the study was collected and examined. In the next stage of the research, necessary measurements and analyses were carried out on the campus to reach the data supporting the study. Finally, to determine the current status of Istanbul Sabahattin Zaim University, technical observations were made on some campus elements. At the last stage of the field studies, the physical spaces and elements (area and building entrances, sidewalks, pedestrian walkways, parking lots, floor coverings, landscaping, etc.)

on the campus and suitable for disabled individuals were measured and photographed.

Campus Accessıbılıty and Standards

Every individual should benefit equally from activities and opportunities in a society that can sustain his life. Therefore, all kinds of equipment and services must be accessible and usable by people with and without disabilities, healthy and unhealthy people (Alpagut, 2003) [2]. Although accessibility is generally defined as the access or entry/exit of people with disabilities from one place to another, it is a right that all individuals have. Accessibility is restricted as the accessibility of a site or area by as many people as possible. Therefore, the equality of every individual is essential in the concept of accessibility. Hacıhasanoğlu defined the concept of equality inaccessibility as the ability of any physically disabled person to acquire all the experiences and knowledge gained by a non-disabled person in buildings and environments (Hacihasanoglu, 1990) [5]. Accessibility; is the accessibility of a product, vehicle, service, or environment to as many people as possible. It can also be interpreted as 'suitability for access' through a system or entity. Various legal regulations have been made in the country and abroad regarding the regulation of accessibility in the field of architecture. For example, although Architectural Accessibility foresees TSE standards to make the physical environment usable and livable for the disabled with the additional article made in the Zoning Law in 1997, intensive studies have not been carried out yet in the field of inspection and implementation. As a result, the concepts of accessibility and applicability are handled within the framework of the general regulations, especially considering the disabled and disabled individuals. However, legal regulations should be a helpful guide not only for disabled transportation and access but also for the access of all individuals. To achieve the goal of a healthy urban and structural environment, it is necessary to present the problem as meeting the needs of people instead of defining the needs of the disabled (Alpagut, 2003) [2]. When areas suitable for the disabled are created in terms of architecture, accessible and accessible spaces are possible not only for disabled individuals but also for the elderly, mothers with baby carriages, pregnant women, children, individuals with temporary disabilities, in short, everyone (Belir, 2009) [3].

Pedestrian Walkways

According to the standards, the width of the pedestrian walkway that can be used by the disabled should be at least 150 - 200 cm. The slope of the sidewalk section should be less than 2% (Figure 1), (OZI, 2010) to prevent problems from occurring on the sidewalks, especially for wheelchair users.

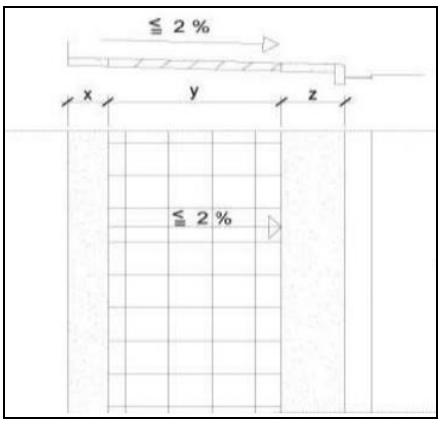

Fig 1: Minimum clear width of the sidewalk and safety strips (Source: ÖZİ, 2010)

The pedestrian path must be at least 150 cm clear so that pedestrians can move freely. In addition to the net size of the pedestrian path, there should be a safety strip of at least 25 cm on the side of the property and 50 cm on the side of the curbstone, including the curbstone. Depending on the width of the road and road groups, the safety strips can be up to 50 cm during ownership and up to 120 cm on the curbside (TSE, 1999b) [11].

In designing the turning areas for horizontal movement on the pedestrian sidewalk, it should be following the necessary dimensions for the wheelchair disabled to make 90°, 180°, 360°, and U-turn (Figure 2), (TSE, 1999a).

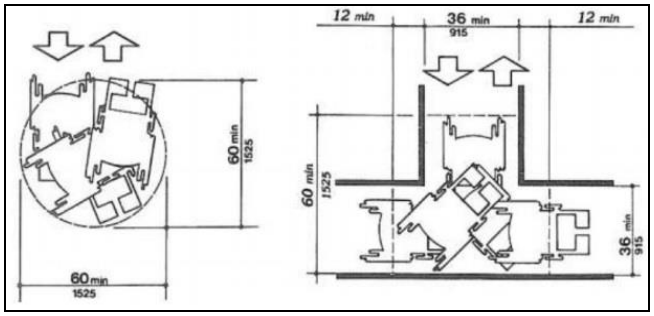

Fig 2: Wheelchair turning area (Source: ADA, 2010)

The pavement of the pedestrian path should be anti-slip and facilitating walk around, steps on the roads, etc. In addition, underground installation maintenance hole covers on the road surface should not protrude; sudden level changes, uninterrupted, continuous, or the same ground level should occur (TSE, 1999a).

For the trees on the road to be noticed by the visually impaired individuals, trees, shrubs, etc. it is recommended to surround the obstructions with a vital element, one of the optical surface elements, and to place grids or pebbles that have color contrast with the environment at the bottom of the trees (OZI, 2010).

Depending on the width of the pedestrian road, the trees to be planted on the side of the road must comply with TS 8146, as well as electricity, traffic sign poles and ornamental plants, flower beds/pots, pedestrian guardrails, etc. The facilities should be placed evenly in a strip with a width of at least 75 cm and a maximum of 120 cm along the pedestrian path, including the curbstone (TSE, 1999b) [11].

If there is a level difference at the property border of the pedestrian road, a guardrail should be built between the road and the landscape (TSE, 1999a).

Parking lots and Entrances

The disabled parking lot should be as close as possible, not far from the building entrance, and should be integrated with a safe way to access the building, allowing enough space to get on and off the car. These parking lots should be appropriately marked and allocated for the disabled. In addition, 5% of the total parking space, including at least one parking lot, should be reserved for disabled vehicles (TS 9111).

According to the standards, there should be a parking area of 4.00 meters wide and 6.00 meters long, with 2.50 meters of the vehicle and 1.50 meters of evacuation area at a maximum distance of 30 meters from the entrance. Non-slip material should be used on the floor, and a different color material should be used to indicate the entry and exit. Parking lot entrance and exit areas should be arranged with

a ramp not exceeding 8%. In addition, information signs such as location, emergency, and the city should be placed in visible places for disabled people.

The entrance door must be at least 91.5 cm wide. Thresholds should not be made at the entrance doors. However, if there is an obligation to make a threshold, the height of the point should not be higher than 1.9 cm for sliding doors and 1.3 cm for other entries. For wheelchair users, sills should be chamfered, and rubber sills should be preferred. When insulation is required, automatic insulation on the doors or a bristle broom should be applied to the door's lower edge. Opening external doors (standard with hinges) should not require more than 37.8 N of force. Revolving doors should be avoided. If there is a revolving door, there must be a typical door next to it (TSE, 1999c).

Attention should be paid to the arrangement of the main entrances of the buildings as accessible. It should be preferred that disabled people use these entrances, which everyone uses. On the other hand, if alternative accessible doors are to be used, these entrances should be marked on the accessible route with signboards and directed. There should be sufficient maneuvering space in front of this accessible entrance door, and the door should comply with the accessibility regulations. Guiding signs should be arranged from inaccessible entrances to this alternative entrance, and it should be ensured that these entrances are always open (OZI, 2010b).

Information and Direction Signs

Signs used on pedestrian roads should be simple, easily understandable, and visible from afar. These markings are simple and straightforward symbols, in contrast,/contrasting color with the ground color, in bloom following international standards (TS 7248; ISO 3864), green/white for safety and security, yellow/black for warning/danger risk, prohibition, stop, danger. And red/white for an emergency, blue/white for information, easily visible and adequately illuminated. At the same time, a helpful addition should be made for the visually impaired (TSE, 1999a).

The design of the symbols should be as simple as possible and should not include details that are not directly related to the meaning of the message. Since it is difficult for the visually impaired to use visible information, information and signs must be made tangible or perceptible by touch. In these information signs, there should be relief letters, numbers, strengthening the sound of data for the hard of hearing, and walking strips and arrows on the walking floor, separate from the ground texture, information should be visible for the hearing impaired (TSE, 1999a).

Indoor Horizontal and Vertical Circulation

The ideal width in the corridors is 180 cm. In addition, radiators and fire alarms, etc. in the halls. Equipment can be embedded. Thus, the danger rate in the corridors is reduced. Disabled students can use wheelchairs, walkers, crutches, etc. Since they use vehicles, measures that will prevent their use in halls should be avoided. The ideal width for a wheelchair user is 0.75 m. If another person uses the chair, the perfect length is 1.75 m. The ideal width is 1.20 m if a wheelchair user goes side by side with another student and 1.50 m if two wheelchair users go side by side.

Stairs should be positioned vertically and close to the entrance for easy access. Since visually impaired people perceive precise forms more efficiently, the rounded staircase type should be avoided. There should be no protrusions on the steps as this will cause danger. Piers maximum 180 mm., minimum 280 mm. should be. Different colors or different textured (anti-slip) surfaces can be used at the beginning and endpoints of the stairs, as they are dangerous at the nose of the steps. There should be handrails that continue along the two arms of the stair, on both sides. The railing must be continuous. The opening between the barriers should not be too broad. Handrails should be easily grasped by the hand. The bar should be started slightly ahead of the start of the ladder, pointing to the beginning of the ladder. In cases where the width of the stair is more than 3.00 m, a railing should be made again in the middle. Bars should preferably be made in yellow (Figure 3).

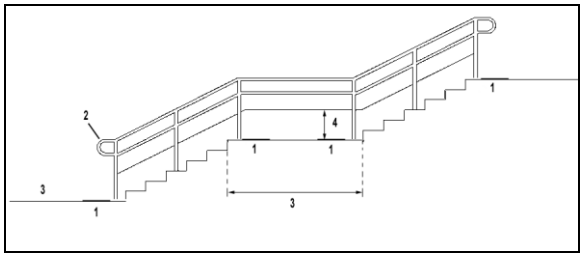

Fig 3: Bars. 1-Stimulating surface, 2-Minimum 30 cm, 3-Shelter, minimum 150 cm, 4-Protection bar, maximum 45 cm high from the base of the step (Source: TS 9111)

An unobstructed access route should be provided from the building entrance where elevators can be accessed. Level differences on this route should be arranged appropriately, and ramps should be provided next to or to steps and stairs. The minimum acceptable net size of existing elevator cabins allowing a single wheelchair user is 95 cm x 140 cm. Smaller cabinets should be replaced with a new ones. If an existing elevator door cannot be changed to 90 cm in width, the minimum acceptable net width should be 80 cm. The minimum allowable cabin dimensions in new elevators are 120x150 cm. Call and control buttons 90 cm and preferably 110 cm. should be placed within the height limits of a maximum of 137 cm. Signs on control panels in elevators should be embossed and provided using the Braille alphabet. A complimentary audio information system should be provided. When the elevator doors are opened, the car floor must be at the same level as the floor (Acceptable level difference is ± 0.6 cm). Inside the cabin, grab bars at 85 cm - 90 cm height from the ground (TS 9111- Accessibility Requirements in Buildings).

Case Study

Within the scope of the study, campus accessibility was examined physically. Elements in the campus area, are evaluated by taking into consideration the standards published by various institutions such as TS 9111 Rules for Arrangement of Buildings for Disabled People, Accessibility for the Disabled, and Design Guide for a Barrier-Free Environment. The purpose of choosing the Faculty of Education Building and the Islamic Studies Center Building selected within the scope of the study is that they are the last educational buildings in the campus planning.

Investigation of Campus Open Spaces in Terms of Accessibility

Campus entrances, walkways, parking lots, information and direction signs, and urban furniture (seating elements, trash cans) are considered open space elements. It has easy access to the bus stops on the sides of the examined entrances, allowing all disabled and non-disabled individuals who prefer to use public vehicles to access the area on foot. Both of the campuses, as mentioned above, entrances share a vehicle entrance and a pedestrian entrance. However, students are not allowed to move around the campus by vehicle, except in extraordinary circumstances. Width dimensions of the entries are sufficient. Since there is no slope in the entrance area, the ramp is not arranged. There should be a warning surface for visually impaired individuals on the road from the parking lot to the entrance area (Figures 4).

Fig 4: Entrance A and B

The widths of the walking paths in the campus are in variable sizes and are above the required length of at least 150 cm. In this direction, the movements of the wheelchair disabled individuals comply with the standards for their 90, 180, and 360 degree turns. In addition, the ground materials used on the roads comply with the standards. Differences in elevation from the flooring on the walking paths constitute a risk factor for wheelchair users and visually impaired individuals. Although warning signs are placed in some places to separate the road and greening areas from each other, a border should be laid along with the green space with a different color or texture from the ground material. To provide adequate drainage on the roads, necessary longitudinal or transverse slopes were given, and water gutters and grates were used. Some of the gratings used are dangerous as they are placed in walking areas (Figure 5).

Fig 5: On-Campus Pedestrian Walkways

Some obstacles on the roads (trash cans, stairs, ramps, signs, landscape, etc.) are not surrounded by sensible surface stimuli and do not have color contrast. For example, at the beginning and end of the stairs, there should be a warning surface 60 cm deep and 30 cm from the last step; otherwise, visually impaired individuals will not notice the staircase. This may pose a danger to visually impaired individuals. Unfortunately, no guidelines consist of tangible warning surfaces to help find the road direction on the walking paths in the area for the visually impaired. In this parking area, there is a handicapped parking lot reserved for the vehicles of disabled individuals. There is a disabled sign in the parking lot, a directional disabled sign, or an accessible parking sign on the ground. The parking lot is illuminated at night. It is also an excellent solution to position the disabled parking lot close to the campus entrance (Figure 6).

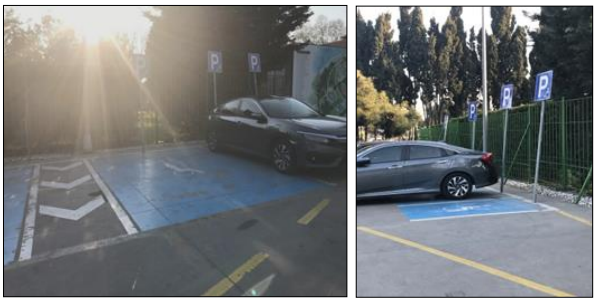

Fig 6: Disabled Parking Lot in Parking Lot 1

Direction, information, and warning signs used in the Halkalı campus are insufficient, and not all of them are illuminated. There are no embossed signs and audible warning signs for visually and deaf and hard-of-hearing individuals. Entrances of all buildings, parking lot entrances, and exits are indicated with signs. The fonts are large enough to be read (Figure 7).

Fig 7: Direction and Information Signs on Campus

Since the height dimensions of the seating elements are 45 cm and the width dimensions are 30 cm, they are suitable for standards. For wheelchair users, the availability of free space around the benches provides ease of transfer. There are no support arms for individuals to hold on to during the transfer.
The existing trash cans are fixed in their places on the side of the walkway so that they do not hinder the movement of the individual. The waste bin elements with suitable heights are accessible on the walking paths and are helpful for the use of the disabled person. The fact that the garbage bins, which are insufficient numbers in the area, are made of different colors and textures provide convenience for users to be easily perceived by the visually impaired.

Investigation of Islamic Economics Faculty Building in Terms of Accessibility

The width of the building entrance door is suitable. But when entering the building, it is necessary to apply force because the door opens outwards and is heavy. For this reason, it is not a suitable entrance for disabled people, even if there is room for maneuver at the gate. In addition, there are no directional signs at the building entrances.
It has been observed that the corridors examined in the building do not pose a problem for the disabled, they provide the necessary dimensions, and natural lighting is used.
When the stairs in the building are examined with the standards; The dimensions of the stairs are suitable. It has positive features in terms of its close positioning with the building entrance door, the selection of appropriate materials, and the use of non-slip strips of different colors than the stairs. Rotation of the railing along the staircase is applicable as per the standards. There should be a grab bar on the wall where there is no railing. The size of the landing is sufficient. Before the stair steps begin, there is no stimulating/sensing surface on the floor.
When the elevator in the building is examined in line with the standards; We see that the dimensions are adequate, but there is no grab bar inside. There is also a space in front of the elevator to make maneuvering space.
There are many informative and guiding signs inside the building and at alternative entrances and exits. However, as per the standards, there are no large fonts and no audio system for visually impaired individuals.

Examining the Faculty of Education Building in Terms of Accessibility

The width of the building entrance door is suitable. However, when entering the building, it is necessary to apply force due to the heavyweight of the doors. For this reason, it is not a suitable entrance for disabled people, even if there is room for maneuver at the gate. In addition, there are no directional signs at the building entrances.
The width of the building entrance door is suitable. However, when entering the building, it is necessary to apply force due to the heavyweight of the doors. For this reason, it is not a suitable entrance for disabled people, even if there is room for maneuver at the gate. In addition, there are no directional signs to the building entrance at the building entrances.
It has been observed that the corridors examined in the building do not pose a problem for disabled individuals; they provide critical dimensions.
When the stairs in the building are examined with the standards; The dimensions of the stairs are suitable. It has positive features in terms of its close positioning with the building entrance door, the selection of appropriate materials, and the use of non-slip strips of different colors than the stairs. Rotation of the railing along the staircase is applicable as per the standards. There should be a grab bar on the wall where there is no railing. The size of the landing is sufficient. Before the stair steps begin, there is no stimulating/sensing surface on the ground.
When the elevator in the building is examined in line with the standards; We see that the dimensions are adequate, but there is no grab bar inside. There is also a free space in front of the elevator to make maneuvering space.
There are many informative and guiding signs inside the building and at alternative entrances and exits. However, as per the standards, there are no large fonts, and there is no audio system for visually impaired individuals.

Conclusıon

The primary purpose of the design is to ensure that all buildings and their immediate surroundings are accessible to people with disabilities and mobility impairments.
Campuses are defined as the reflection of academic villages established in a green area in a green space in the city or outside of the town. Various activities are carried out not only for education but also for socializing and integrating with society.
This research aims to determine the physical barriers faced by the disabled in the Halkalı campus of Istanbul Sabahattin Zaim University and show what needs to be done.
The fact that the two entrances and exits examined in the campus are close to the bus stops and that access to the school is provided on flat land without a ramp or ladder has a positive feature. Furthermore, for the disabled people who will come by car, it is taken into account that the car parks are close to the entrance and exit of the building. Therefore, since the necessary conditions are provided in the car parks, the car parks are also sufficient and accessible in this context.
Car park widths are sufficient. A particular parking area is reserved for the disabled, and signs and directional signs are positioned on the ground, indicated with the international disabled symbol, to direct the disabled individual.
The dimensions of pedestrian walkways and sidewalks are sufficient. However, even if the material selection is appropriate, the fact that there are elevation differences in places restricts the movements of the disabled. In the roads separated by green areas, there are no warning guides, contrast, and phosphorescent strips, and there are no walking strips for the visually impaired on the sidewalks and walking paths.
The reinforcement elements used in the campus are placed in the area correctly and in sufficient numbers. Of these elements, the majority of the seating units are of adequate height. In addition, garbage bins are positioned on walkways and sidewalks, as they should be, without narrowing the road.
Information and direction signs on campus have been distributed in sufficient numbers. However, audible or embossed texts were not used for the visually impaired, and large fonts were not used for the mentally disabled.
With the results obtained, suggestions were made for some of the shortcomings of the campus in question;

- Guiding lines should be made throughout the campus for the visually impaired. This will make it easier for visually impaired individuals to reach the campus area, find directions within the campus, and protect themselves from dangers.
- The varying heights of the curbstones used in landscaping and pedestrian walkways should be removed and painted with any contrasting color so that they can be easily recognized.
- For the urban equipment to be easily seen and accessed easily, the surroundings or the equipment themselves should be arranged in different colors and textures.
- The number of information and direction signs should be increased, and care should be taken to ensure that their contents comply with national and international standards.
- Embossed and audible warning signs should be used for visually and hearing-impaired individuals.
- A door or photocell door that can be applied as little as possible should be selected at the building entrances.
- In line with the research mentioned above, results and recommendations; Regardless of the physical strength of people, designs should be developed to develop their social, cultural, economic, and personal capacities and activities and protect and maintain their continuity. It should be considered that the physical environment should be designed to meet the needs of everyone, and an accessible physical environment for everyone should be designed. As a result, disabled people are a part of the life we live, and they can never be isolated from this life. Therefore, the deficiencies in the existing structures should be eliminated, and environmental obstacles should not be added to the problems faced by the disabled due to their disabilities. Otherwise, this situation may cause problems in clinging to life and reaching the goals of the disabled individual.

References

1. ADA, Standards for Accessible Design, Department of Justice, Code of Regulations (2010) (http://www.ada.gov/business/accessiblemtg.htm).
2. Alpagut, Y. Determination of accessibility criteria for all users in public housing exteriors. Master thesis, Istanbul Technical University, Institute of Science and Technology, Istanbul,2003.
3. Belir, O. Architectural Accessibility Guide, Foundation for the Disabled,2009.
4. Evcil, A.N. Design for Everyone Universal Design, Boğaziçi Publications,2014.
5. Hacihasanoglu A. I. A capacity determination method in general hospitals. PhD thesis, Istanbul Technical University, Institute of Science and Technology, Istanbul,1990.
6. OZI (T.C. Prime Ministry Administration for Disabled People). Disability Education: Basic Research on How Society Understands Disability.C. Prime Ministry Administration for Disabled People Publications, Ankara (2010a) (http://www.ozida.gov.tr).
7. OZI (T.C. Prime Ministry Administration for Disabled People). Accessibility Basic Information Technical Manual for Local Governments, T.C. Prime Ministry Administration for Disabled People Publications, Ankara (2010b) (http://www.ozida.gov.tr).
8. Scherrer V. Accessibility for All, Seminar Notes, OFD Publications, Istanbul, 2001, 38-42.
9. Sungur Ergenoglu A, Yildiz S. For Turkey Without Barriers: Where Are We on the Road? Current Situation and Suggestions, Sabancı University Press, Istanbul, 2013.
10. TSE, TS 12576. Urban Roads - Structural Measures and Design Rules of Markings on Streets, Avenues, Squares and Roads for Disabled and Elderly People, 1999a.
11. TSE, TS 8146. Urban Road and Square Afforestation Rules, 1999b.
12. TSE, TS 9111. Rules for Arrangement of Buildings for Disabled Persons to Residence,1999c.