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3. ACCESSIBILITY OF PUBLIC SPACE

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3.1. Public space users

Space accessibility should be considered in the context of its users because accessibility is such a property of an environment that allows those users to use the space in an equal way. From the point of view of public space accessibility, people who benefit from the accessible environment are not only the elderly or disabled persons. It is estimated that up to 30% of society may have permanent or temporary limitations in mobility or perception. These include people moving with the help of assistive equipment, with manual and cognitive difficulties, with hearing and sight impairment or even people with heavy luggage, as well as pregnant women, physically weaker people, or experiencing difficulties in moving. Many of these people do not have the status of a disabled person. Therefore, it can be said that accessibility concerns all of us, but in everyday life its lack is noticed mostly by people with special needs (including individual ones), resulting from the lack of full functionality. The accessibility mainly concerns (MIiR, 2018):

- people in wheelchairs and with reduced mobility;
- blind and partially sighted people;
- deaf and hard of hearing people;
- deaf-blind people;
- people with mental and intellectual disabilities;
- elderly and weakened people;
- people who have difficulties communicating with the environment (also with a lack of knowledge of the language);
- people with unusual height (including children);
- pregnant women;
- people with young children, including prams;
- people with heavy or unwieldy luggage.

Not all universal design beneficiaries are continuously disabled. Space users can have special needs towards moving around only temporarily and after some time they can return to the full capacity.

Planning of accessibility makes life easier for all of society members, in particular for people with special needs, including the disabled. Accessibility can be achieved not only by planning new spaces but also in the way of removing spatial barriers and making rational improvements (e.g. utilizing assisting technologies) to already existing ones. Such actions give many benefits. Accessible public spaces reach with its offer to a greater amount of different space users and are more user friendly and attractive. For many people leading an independent life may be fully conditional on the accessibility of public spaces. Through accessible places, such people have a chance to participate in the social and economic life of the country or local society.

3.2. Design of accessible space

The trend of thinking in terms of planning space accessibility, taking into account people with special needs (including disabled), began only in the 1960s. The first ideas slowly, gradually began to be reflected in new laws over the next 40 years. At first, provisions including rules about applying correct solutions to spatial problems can be found in the United States, Australia and Western Europe. The important thing is that such provisions had started to oblige designers to implement prepared solutions. Earlier, as Ewa Kuryłowicz (2005) describes in her publication about universal design, one had only attempts to organize the space on the basis of an average, unified model of man (Grandjean, 1978). Initially, such theories were studied in the Renaissance, where some prominent individuals as Leonardo da Vinci or Bernini had tried to draw up the ideal proportions of the human body. It is also worth quoting the work of Vitruvius entitled De Architectura libri X, in which he treats, inter alia, about aesthetics, space planning and interior design. He also emphasized the statement that the location of buildings can affect human health and described the canon of human proportions that should be used during the design process. The next breakthrough in this field was made much later by one of the greatest architects of his time Le Corbusier – the creator of Modulor. The next step was the creation of anthropometric models, thanks to which it was possible to develop individual elements of space fitted to people with different characteristics (Ujma-Wąsowicz, 2005). Over time, such patterns have also been developed for people with disabilities.

Universal design is the trend in design that is strongly connected with the ergonomic. The first time this term was used in the 1970's, but the idea was developing since the early 1960's by architect Ronald L. Mace. Initially in North America and later on in Western Europe and other parts of the world (Antoniszczak, 2020). Universal design arose from the earlier barrier-free concepts (Rawski, 2019). Main assumptions of this idea was stated by The Center for Universal Design at North Carolina State University as seven principles (Centre for Excellence, 1997):

1. **Equitable use** (providing the same means of use for all users),
2. **Flexibility in use** (providing a choice in methods of use),
3. **Simple and intuitive** (eliminating unnecessary complexity and providing consistency with user expectations and intuition),
4. **Perceptible information** (using different modes for additional presentation of essential information and increasing its legibility),
5. **Tolerance for error** (arranging elements of design to minimize risk and errors and providing fail-safe features),
6. **Low physical effort** (allowing the user to maintain a neutral body position with minimum fatigue while using the design),
7. **Size and space for approach and use** (independently from user's body size or mobility provide adequate access, reach and use).

It can be stated that a given place is accessible if we can get to it easily, whether we are fully functional, move in a wheelchair or with a white cane. The essence of the accessibility of a every space is also influenced by the perception of individual places, i.e. the possibility of seeing them from a distance, as well as the way of the arrangement of various objects inside (e.g. shops, public institutions, etc.). On the other hand, the amount of effort that should be put into moving around a given area directly translates into the comfort of its use. Also, whether the elements of equipment such as benches, litter bins or bicycle stands are located so that they do not interfere with the main communication routes. Another element that is worth paying attention to is the way of overcoming height differences. Designers should consider the need of planning landings for stairs or driveways, and the use of escalators, platforms or lifts when the situation requires it. A suitable amount of resting places as well as safety of a place has big a influence on the comfort of its use. Large enough and well-planned parking facilities are also important. This affects the efficient rotation of vehicle traffic. This directly results in increasing the accessibility of a given space. Other crucial aspects are the number of entrances (preferably clearly visible) to a given space and the level of convenience to access public transport.

3.3. General barriers and guidelines

In order to understand the issue of accessibility planning in the process of designing public places, it is necessary to know what elements constitute obstacles. Such barriers can make it hard to carry out many activities for people with special needs that are very normal for fully functional people According to interpretations of the Office of the Government Plenipotentiary for Disabled People[1], such obstacles can be divided into three categories (eBIFRON, 2012):

[1] Translated name of Polish institution „Biuro Pełnomocnika Rządu do Spraw Osób Niepełnosprawnych"

- **architectural barriers** – means obstacles inside the building and in its direct vicinity, which, due to technical or constructional solutions prevent or hinder the freedom of movement for disabled people,
- **technical barriers** – are those caused by the lack of application or non-adaptation of items or devices appropriate to the type of disability. The elimination of these barriers should result in the more efficient functioning of disabled persons in society and enable them to better function,
- **communication barriers** – are limitations that prevent or hinder persons with special needs from freely communicating and/or transmitting information.

In some sources[2] one can find slightly different definitions of the concept of "architectural barriers". Despite some divergences, their thematic scope is similar, but they are not sufficient in the context of universal design. Initially, the term was used to refer to people with disabilities, identifying them only with people in wheelchairs. Explanations of this expression were also limited to physical obstacles only, so some elements were not taken into account in the context of the meaning of architectural barriers. A. Zając (2012) proposed a broader view at this definition for the project Warsaw Map of Barriers[3]. According to him, any object in public space that causes mobility problems or limits access for any group of users with special needs, as well as the lack of appropriate amenities, can be a barrier. Thanks to the wide range of the topic, such a definition fits perfectly into the idea of universal design.

For this paper, only outdoor places were taken into account, so interior spaces were excluded from the considerations. Thanks to the appropriate recognition of spatial barriers, it is possible to design new, more accessible spaces or improve already existing ones to be more suited for people with different needs. It can be noticed that in many cases outdoor barriers force people to stay in their houses. Design of public spaces requires having in mind that they should be devoid of architectural and technical barriers. Among them are elements mostly related to the technical conditions of sidewalks, their width as well as aspects that refer to overcoming height difference and placement of space equipment (small architecture). It should be taken into account that many users of public spaces can also drive a car or move around by public transport. For that reason, aside from the availability of the vehicles, a very important thing is the accessible design of bus stops as well as special places at parking lots.

Identifying the elements that may constitute barriers is very important in the context of designing accessible spaces. Thanks to this, it is possible to design alternative spatial solutions or accurately transform places that were not created in accordance with the idea of universal design. Therefore, it is important to have a holistic approach that takes into account all users of the space, not only seniors or disabled people. Barriers in public spaces may be related to communication paths, vertical

[2] e.g. Polish Encyclopedia PWN, Wikipedia, niepelnosprawni.pl, Encyklopedia WIEM – zapytaj.onet.pl, mapabarier.sisko.waw.pl

[3] Authors' translation from Polish 'Warszawska Mapa Barier'

communication (moving between different heights), space equipment, and elements related to road infrastructure (Zając et al., 2013). By recognizing them and applying appropriate design guidelines (developed on the basis of anthropometric patterns), one can design a barrier-free space. The table 3.1. below lists typical barriers and spatial solutions that increase accessibility.

TABLE 3.1. Typical barriers and spatial solutions (Source: own elaboration based on Rawski, 2017)

Type	Typical barriers	Solutions
Communication paths	• bad technical condition; • unhardened surface; • uneven or too slippery surface; • too narrow sidewalks; • lack of tactile paving for blind people.	• the transverse slope should not exceed 2%, and the longitudinal slope should not exceed 6% (preferably 5%)(Kowalski, 2010); • the surface should exclude the possibility of stumbling or slipping (Czarnecki & Siemiński 2004); • used materials should be durable and ensure the good technical condition of sidewalks; • tactile surfaces (directional or warning) should be used for the blind in functional places; • main pedestrian ways should be planned straight and turns should be as close to right angles as possible; • the width of the routes with greater traffic in both directions should be at least 200 cm (Kowalski, 2011); • the width of sidewalks should be 150 cm (due to the size of wheelchairs), segments 120 cm wide should not exceed 20 m in length (Kowalski, 2018).
Vertical communication	• lack of ramps or elevators at stairs; • too steep wheelchair ramps; • unmarked lower and upper edges of stairs; • no handrail at stairs; • construction of steps in areas with a slight difference in terrain; • bad technical condition.	• it is good practice to design (if possible) long slight slopes instead of stairs (single steps should be avoided if stairs are necessary); • the flight of stairs should be min. 1.2 m and the first and last step should be marked with a contrasting stripe; • it is recommended to design a 0.5 m wide zone of touch surface (warning field) 0.6 m – 0.8 m before and after the flight of stairs (PZN, 2009); • if the stairs have more than 10 steps, landings should be used; • the recommended height of the steps is 12 – 15 cm and the width is 35 cm; • if the stairs have a height of more than 0.5 m, railings must be applied; • ramps should be applied near the stairs on the main routes; • the usable width of the ramp should be 120 cm; • if the ramp is longer than 9 m, landings should be designed; • at the end and the beginning of the ramp there should be an even manoeuvre area 1.5 x 1.5 m; • on both sides of the ramp, a handrail should be designed at a height of 75 cm and 90 cm, parallel to its surface (Budny, 2009).

Type	Typical barriers	Solutions
Space equipment	• placement of elements within the sidewalks gauge; • insufficient manoeuvring space nearby the devices or lack of that; • badly designed height of usable elements (too low or too high); • wrongly placed or too weak lighting.	• equipment elements should be grouped in rows parallel to the main axis of the path so that they do not narrow its width (NDA, 2002); • information boards should be placed outside the usable width of pavements; • functional parts of devices should be placed at a maximum height of 130 cm (Nowak & Budny, 2008); • useful information should also be written in Braille, and the space in front of it should be marked with the attention field; • fountains should be separated from pedestrian routes by a green belt or by means of warning elements; • parking meters should be positioned so as to be accessible to disabled people (including manoeuvring spaces for wheelchairs).
Elements related to road infrastructure	• narrow bus stops; • bus stops with unpaved platforms; • badly designed bus bays (access to the edge of the platform is impossible); • lack of low curbs; • unspecified passage through the road; • no warning tactile fields at the pedestrian crossings; • pedestrian crossings without refuge islands on two-way multi-lane roads; • lack of parking places dedicated to the disabled.	• car parks should include wider (3.6 m) parking spaces for disabled people; • curb higher than 2 cm should contain a ramp with a maximum slope of 5% (Kowlaski, 2010); • blind and visually impaired people need tactile warning fields against pedestrian crossings (in a contrasting colour and placed along the street) at least 0.5 m wide; • traffic lights should give an audible signal and include buttons activating green light located at a height of 0.9 m to 1.1 m (Wysocki, 2010); • a warning tactile zone along the entire length of the platform should be 30 or 40 cm wide and 80 cm from the edge of the bus stop; • it is recommended to raise the platform to a height of 20 cm to make it easier for people in wheelchairs to board the bus; • the edge of the platform should be marked with a 7 or 10 cm wide contrasting strip (preferably yellow) along the entire length of the platform (Wysocki, 2012); • the bus stop shelter (approx. 150 – 180 cm deep) should be situated from the warning tactile surface min. 80 cm away to allow the passage of a wheelchair.

3.4. Good practices

Following design guidelines developed by ergonomics specialists is necessary for designing accessible spaces, but often such guidelines are intended to ensure only minimal functionality of individual places. Respecting legal requirements alone is currently not sufficient to design fully accessible spaces. Therefore, the important aspects of this process are the experience and knowledge of the designers themselves. The search and study of realizations that take into account the needs of people with different abilities expand the range of design solutions for every professional. As a result, designers can be able to provide higher-level accessibility – not only for security but also for the functionality of the places. Selected examples of good practices that show how to approach accessibility design in public spaces will be discussed below.

FIG. 3.1. **Beach in Bondary near Siemianówka reservoir with accessible feature (Source: photos by K. Rawski, 2018)**

As recreational areas, beaches are places that, due to their natural structure, are inaccessible to many people with special needs, in particular for wheelchair users. As shown by the example of one of the Turkish beaches (Fig. 3.1), it is possible to develop the area in such a way that there are additional platforms and ramps enabling easy access to the water. Another example is the device presented below (Fig. 3.2) located on one of the playgrounds in Warsaw. It has been constructed so that it can be used by people who are moving using various aids (including wheelchairs).

FIG. 3.2. Accessible platform and carousel on the playground (Source: WEB-1)

Another good practice related to the design of small architecture is a picnic table with a reserved space for a person in a wheelchair (Fig. 3.3). Thanks to this, such a person will not be excluded from joint participation in a meal or rest.

FIG. 3.3. Accessible picnic table with space for wheelchair (Source: WEB-2)

The relevant issue that was raised in the previous considerations was also the accessibility of public transport. However, in addition to the proper arranged space – the width of the platform, the marking of its edges, and the location of the bus shelter, it is also important to ensure that such a place is properly lit after dark (Fig. 3.4).

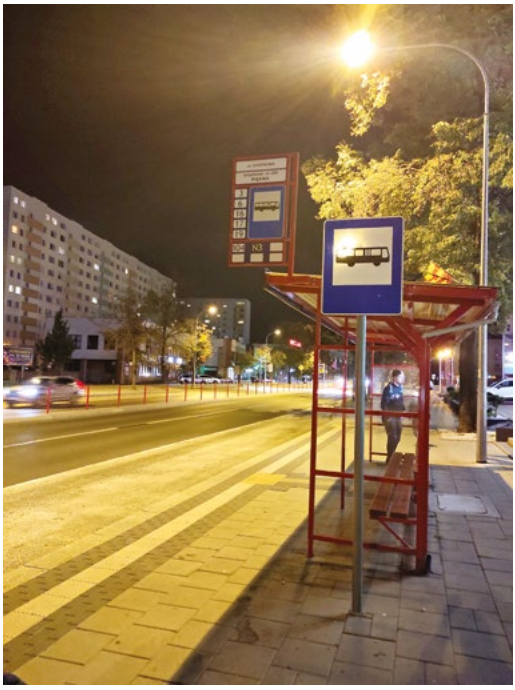

FIG. 3.4. **Well illuminated bus stop at night with tactile surface (Source: photos by K. Rawski, 2020)**

3.5. Summary

There is a noticeable increase in the awareness of the needs of people with various abilities related to their functioning in public spaces. Thanks to this, one can notice a gradual change in the surroundings, in particular in public buildings, as well as in the generally understood urban space. One can also find many places that require further transformations so that they can be freely used by such people. But still there are many remedies which solve the problem only partly for economic reasons (Kowalski, 2013).

Good practices included in this publication show that a properly designed communication system and compliance with the appropriate guidelines (contained in the law and literature of the subject) results in planning a well accessible space. Making public space more accessible contributes to improving the quality of life for people with different abilities and that have mobility problems with normal everyday functioning.

References

1. Antoniszczak M. (2020) *Wpływ ruchów społecznych na rozwój projektowania uniwersalnego*, Formy, nr 4/2020 [Online] https://formy.xyz/artykul/wplyw-ruchow-spolecznych-na-rozwoj-projektowania-uniwersalnego [Accessed: 8.10.2020]
2. Budny J., (2009) *Dostosowanie budynków użyteczności publicznej – teoria i narzędzia*, Stowarzyszenie Przyjaciół Integracji, Warszawa
3. Centre for Excellence in Universal Design, 1997, *The 7 Principles of Universal Design*, [Online] http://universaldesign.ie/What-is-Universal-Design/The-7-Principles/ [Accessed: 11.10.2020]
4. Czarnecki B., Siemiński W. (2004) *Kształtowanie bezpiecznej przestrzeni publicznej*, Difin, Warszawa
5. eBIFRON NUMER 1/2012 - ABC osoby niepełnosprawnej, *Bariery do pokonania*, [Online] http://www.pfron.org.pl/ebi/poprzednie-wydania/numer-12012-abc-osoby/pomoc-osobie-niepelnos/53,Barierydopokonania.html [Accessed: 21.09.2016]
6. Grandjean E. (1978) *Ergonomia mieszkania, aspekty fizjologiczne i psychologiczne w projektowaniu*, Arkady, Warszawa
7. Kowalski K. (2013) *Planowanie dostępności – polskie uwarunkowania prawne i praktyka*, Niepełnosprawność – zagadnienia, problemy, rozwiązania. Nr I/2013(6). s. 77
8. Kowalski K. (2010) *Projektowanie bez barier – wytyczne*, Stowarzyszenie Przyjaciół Integracji, Warszawa
9. Kowalski K. (2011) *Planowanie dostępności – prawo w praktyce*, Stowarzyszenie Przyjaciół Integracji, Warszawa
10. Kowlaski K. (2018) *Włącznik – projektowanie bez barier*, Fundacja Integracja, Warszawa
11. Kuryłowicz E. (2005) *Projektowanie Uniwersalne. Uwarunkowania architektoniczne kształtowania otoczenia wybudowanego przyjaznego dla osób niepełnosprawnych*, Warszawa, Stowarzyszenie Przyjaciół Integracji, s. 20–40
12. Ministerstwo Inwestycji i Rozwoju (2018) *Program rządowy „Dostępność plus"*, Warszawa
13. NDA (2002) *Building for Everyone: Inclusion, Access and Use*, National Disability Authority, Dublin
14. Nowak E., Budny J. (2008) *Mieszkanie dostępne dla osób z dysfunkcją narządu ruchu*, Stowarzyszenie Przyjaciół Integracji, Warszawa
15. Polski Związek Niewidomych (2009) *Osoby niewidome i słabo widzące w przestrzeni publicznej*, Warszawa
16. Rawski K. (2017) *Public space without architectural barriers as friendly and accessible for people with disabilities*, Teka Komisji Architektury, Urbanistyki i Studiów Krajobrazowych PAN, 45–52
17. Rawski K. (2019) *Postawy społeczne wobec osób niepełnosprawnych a projektowanie przestrzeni dostępnej*, Architektura Krajobrazu, 1/2019, s. 34–51
18. Ujma-Wąsowicz K. (2005) *Ergonomia w architekturze*, Wydawnictwo Politechniki Śląskiej, Gliwice, s. 23–28
19. WEB-1: bo.um.warszawa [Online] photo of Maksymilian Chołuj Retrieved from: bo.um.warszawa.pl [Accessed: 10.10.2020]

20. WEB-2: havinghome [Online] Retrieved from: http://havinghome.com/ [Accessed: 10.09.2020]
21. Wysocki M. (2010) *Projektowanie otoczenia dla osób niewidomych. Pozawzrokowa percepcja przestrzeni*, Wydawnictwo Politechniki Gdańskiej, Gdańsk
22. Wysocki M. (2012) *Standardy dostępności dla miasta Gdyni*, Gdynia
23. Zając A. P. (2012) *Miasto barier. Bariery architektoniczne na podstawie projektu Warszawska Mapa Barier*, Instytut Socjologii UW, SISKOM, [online] http://mapa-barier.siskom.waw.pl/wp-content/uploads/2012/05/Zajac_bariery_architektoniczne_KMS2012.pdf [Accessed: 12.10.2020]
24. Zając A. P., Dębska M., Kowalski R., Pietrzyk P., Rak. A., Zakrzewski M. (2013) *Diagnoza głównych barier architektonicznych w przestrzeni publicznej Warszawy* – Raport *SISKOM*, SISKOM, Warszawa