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## **SOLUTIONS IMPROVING QUALITY OF LIFE OF PHYSICALLY DISABLED PEOPLE**

**Abstract:** The article concerns the analysis of elimination of technical barriers for people with physical disabilities in one of the social welfare homes in the Silesian voivodeship. The following paper presents original projects created by the staff of nursing home: table for consumption and telephone booth. These solutions influence on improving the ergonomics of everyday consumption for both the physically disabled residents and their attendants, and comfortable and intimate telephone conversation with relatives on the property. This projects have been carried out on the premises of the institution by its workers.

**Key words:** disability, ergonomics, architectural and technical barriers, occupational health and safety, disabled people, ergonomic design.

### **1. Introduction**

Disability is a social problem and not limited to one person. Considering it we primarily should take into account the relationship between human health and society and environment that surrounds it. The concept of a disabled person is such a general concept that it determines different degrees and types of disability. And in turn, it entails differences in the restrictions within motion (movement), which has a direct impact on the specific design solutions. Because of the limitations, disabled people (especially physically disabled) have a number of additional requirements, also specific ones, not occurring among healthy people. Most of these needs can be met by the technique. (PASZKOWICZ M., 2005)

Ergonomics is an interdisciplinary science that learns from the areas that concern man - work physiology, anthropology, psychology,

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occupational medicine, sociology, and also from the fields of technical and organizational fields including technology, organization, machine engineering and architecture.

The main aim of ergonomics is to create a working environment according to the psycho-physical human needs. Humanocentrism, which is the main premise of ergonomics, indicates that the good of man must be superior to the technical and economic criteria.

Ergonomics also is the applied science, which does not limit its activities exclusively to the work process and the elements that compose it. In recent years, ergonomics has also been developed in such areas of human life as leisure, recreation, the world of the child and flat. The literature considering ergonomics is increasingly connected with the ergonomics of older people and disabled people.

Although scientific achievements in connection with the mentioned problems is still increasing, there are still many technical and architectural barriers to elimination especially for people with physical disabilities. This paper deals with the need of elimination of architectural and technical barriers coming from law regulations for the physically disabled people.

Apart from that the paper is an attempt of analyzing some innovative ergonomic solutions that improve the quality of life of people with physical disabilities. So ergonomics is a concept which, in accordance with the principles of ergonomics comes first and adapts to environmental restrictions and mental capabilities of people with disabilities . The presented material is largely based on information from a social welfare home, which is located in the Silesia voivodeship.

## **2. Disability - definitions, concepts, numbers**

There is a problem with obtaining homogeneous, in terms of methodology, data on persons with disabilities in Poland and the European Union. Therefore it is difficult to compare them. Heterogeneity is caused by different definition of disability among the countries. This

diversity refers both to the biological definition of disability and also to determination of the disability in the context of the law.

Data on persons with disabilities legally refer to the obligatory in a country legislation. That's why it is not comparable for each country. (WWW.NIEPELNOSPRAWNI.GOV.PL, 2014)

According to the results of the National Census of Population and Housing from 2011, the number of people with disabilities in Poland amounted to around 4.7 million. According to literature, there are many causes of disability and some of them are naturally linked to the age of people who become disabled. The Central Statistical Office reports that the most common causes of disability measured in the whole Polish population are cardiovascular diseases and damages and diseases of organs responsible for motion. (WWW.NIEPELNOSPRAWNI.GOV.PL, 2014)

According to the World Health Organization including the state of human health, there are three concepts of disability:

- impairment, which means a loss of efficiency or irregularity in the construction and functioning of the organism in terms of psychological, psycho-physical or anatomical;
- disability, which means any restriction or inability – caused by the disability – of conducting an active life in the manner or within the range considered as normal for a man;
- restrictions on the performance of social roles (handicap), which represent a specific person disability resulting from disability or disability that limits or prevents from the full realization of the social role corresponding to the age, sex, and consistent with the social and cultural contexts. (WWW.UNIC.UN.ORG. PL, 2014)

In the Polish legal system there is the definition of disability, which is contained in the Act of 27 August 1997 on vocational and social rehabilitation and employment of persons with disabilities. According to this definition the person with disabilities is a "person whose physical, physical or mental condition permanently or temporarily hinders, restricts

or prevents the fulfillment of social roles, in particular the ability to do the work". (DZ. U. 97,123,776. WITH THE CHANGES, 1997)

The obvious thing is that the reduction or loss of performance of certain social roles is associated with family, occupation, economy or social isolation which in turn is incompatible with the generally accepted rules of coexistence such as the right to life, education, work, leisure and meeting the needs of everyday life. (KOWAL E., 2001)

According to the aforementioned act on vocational and social rehabilitation and employment of persons with disabilities in Poland, there are three types (degrees) of disability:

- considerable disability that characterizes a person with impaired "efficiency of the body, unable to work or able to work only in a protected and demanding work, in order to perform social roles, permanent or long-term care and assistance of others in connection with the inability to live independently "

- moderate degree of disability, which characterizes a person with "efficiency of the body, unable to work or able to work only in a protected work or requiring temporary or partial help of others in order to perform social roles";

- slight degree of disability, which characterizes a person with impaired "efficiency of the body, resulting in a significantly reduced ability to work." Such a person is able to work independently without the participation of assisting persons. (DZ. U. 97,123,776. AMENDED, 1997)

Taking into account the clinical criteria or causes of disability, location and extent of damage and also the degree of disability we split the disability into three groups:

- physical disability, which includes people with chronic diseases and damage of internal organs of motion (motor disability);

- sensory disability, which includes people who are deaf and have difficulties in hearing and also blind people and visually impaired people (damages of sensory organs);

- mental disability, among which we distinguish people with intellectual disabilities and those with mental illness. (MOUNTAIN E., 2002)

According to Central Statistical Office (in Polish called GUS), the most common cause of disability are the cardiovascular, locomotor and neurological disorders. There is the relatively lower percentage of people with impaired eyesight and hearing, mental illness and mental retardation in the community of people with disabilities. It however concerns thousands of people with reduced efficiency in everyday functioning, and therefore requires a specific approach in education, labor market and in everyday life. (WWW.NIPELNOSPRAWNI.GOV.PL, 2014)

Studies carried out in Poland by the National Fund for Rehabilitation of Persons with Disabilities and the School of Social Psychology in the period from 1<sup>st</sup> December 2008 to the end of February 2010 showed that the highest percentage - more than 35% of the group - were physically disabled people. Other groups are mentally disabled people (over 14%), intellectually disabled (12%) and people with eye problems (20%) and hearing (7%). (D. Uhlig, 2010)

Elimination of the barriers may be indicated as the main requirement of social integration and the one determining activeness of disabled people. According to the interpretation prepared by the Office of the Government Plenipotentiary for Disabled People in Poland, three types of barriers that make everyday life activities and contacts with other people difficult for disabled people, may be distinguished:

- architectural barriers – including all hindrances that may be found in buildings and their surroundings, that make accessibility of buildings and ability to move freely difficult or even impossible for the disabled, because of technical and constructional solutions or conditions of usage;
- technical barriers – all types of obstacles that arise due to the usage or the unadjustedness of facilities and equipment required in case of different disabilities. Removal of the barriers should

result in making a disable person operating more effectively within the society and his or her more productive functioning;

- communication barriers - different types of limitations that preclude or hinder unhampered transfer of information and/or communication. (WWW.PFRON.ORG.PL, 2012)

Public buildings, such as offices, schools, high education institutions, cultural organisations, recreation centres, restaurants, etc., are still challenging, in scope of their accessibility, for people with physical disabilities. It is often not easy to enter them, and moving around them may be extremely difficult or even impossible.

Constructions without any architectural barriers should be reckon as significant when areas for disabled people are designed. Adequate assortment and assembly of elements, facilities and equipment that enable unassisted usage of spaces are necessary to assure accessibility of facilities by disabled people. In Poland, as well as in other European countries, the number of disabled people is constantly growing. The fact that population of Polish society is ageing is undoubtedly a great challenge for social policies and concepts of economic development of the country in the few incoming decades perspective. (WITKOWSKI J., 2012) Impairment of mobility is getting more and more intensive at different stages of ageing. Thereby, as people get older, their demand for different assistance means of locomotion is growing. At the stage of the advanced senility almost every second person needs a walking cane, twice as likely as younger people of that age need crutches, and three times more likely they use walkers and wheelchairs.(BIEŃ B., 2008)

Thus to support people with physical disabilities, during their everyday routine, it is extremely important to adjust public spaces to their requirements and needs, what generally means elimination of architectural barriers. People with physical disabilities, especially the ones who move on wheelchairs, usually cannot get into different buildings and move freely outside them because of stairs, sharp slopes and high curbs.

### **3. Elimination of technical barriers basing on the example of a nursing home in the province of Silesia – original projects of employees of the facility**

For the purpose of the paper one of nursing houses located in Czestochowa in the Silesian province in Poland was presented. The analysis focused on presentation of ways to eliminate technical and architectural barriers that people with physical disabilities might have to face there. The building where the nursing house is located, is a multi-storey one, with three floors, and no basement. The building is adjusted to requirements of people with physical disabilities. Except from basic solutions responding to needs of disable residents ergonomic solutions in two original projects were introduced. They enable comfortable usage of facilities by people with physical disabilities.

When the table for the consumption purpose was being designed for the nursing house located in Czestochowa, the account was taken of all the parameters of wheelchairs as well as motion abilities of the residents first of all. The table for consumption was developed by the staff of the described nursing house. It is designed to help serving disabled people using wheelchairs. The table enables easier and more applicative service of people who use wheelchair and who suffer from some manual dysfunctions. Due to the introduced solution the personnel have an opportunity to feed the charges seamlessly, observe them and control the processes of meals' consumption.



*Fig. 1. The table for consumption of meals designed to support servicing of disabled people who use wheelchairs.*

*Source: Materials provided by the staff of the analysed nursing house*

The tabletop is made of a chipboard that was laminated. It is adequately cut off with gauge of 0,025-0,03 m. Edges of the table were finished with special banding. The table's legs are made of stainless steel having a diameter of 0,06 m with possibility of regulation of their height between 0,7 and 0,75m. There are 12 of them. The table is equipped with 2 special fasteners that enable assembly of two elements of the tabletop. When the table was designed special guidelines were taken into account. They are determined by adequate regulations. It is indicated that a person who uses a wheelchair should be provided with a suitable space for the



legs under the table. It should be no less than 0,7 meter high, 0,75m wide and 0,4 m deep. (RĄCZKOWSKI B., 2014)

The shape of the table for consumption designed for the disabled people, who use wheelchairs, was chosen basing on practical observations and experience of the personnel of the described nursing house. Remarks that appeared while working on the project of the table included opinions of people who are directly assisting the charges while meals as well as other employees. Their remarks influenced final design and its implementation. Special attention should be drawn to the shape not of the “outside” part of the tabletop, that enables comfortable accessibility and consumption, but the “inside” one. It is parabolic and it makes it possible for caregivers to observe their charges. Moreover due to the shape of the table, the charges that need help while consumption of meals may be provided with comfortable, proficient and safe assistance.

The phone box is another example of the project that was prepared by employees of the nursing home. It was designed along the lines of British phone booths, taking into consideration different guidelines that make the phone box accessible for people with physical disabilities who use wheelchairs. All the components that are used while phoning (shelves, supports, etc.) as well as the phone itself, are located at the height of 0,8m to 1,2 m with the front ramp. Phoning does not require usage of a digital dial but it is performed with specially marked buttons.



*Fig. 2. The telephone box (the design of the staff of the nursing house).*

*Source: Materials provided by the staff of the analysed nursing house*

When the phone box was being designed the staff of the nursing house also took into account different ergonomic features of a product that influence its users positively. By that all the elements, that evoke positive aesthetic experience, cause some positive attitude, or – what is extremely important in case of a phone box – provide a caller with a feeling of intimacy, are meant.

## **7. Summary**

Limitations and capabilities of people with disabilities are currently the subject of much discussion and analysis. Elimination of

architectonical and technical barriers should enable or appreciably facilitate disabled people while they are performing different types of activities during their everyday routines or while they contact their surroundings. Though, it must be considered, before any initiatives that adjust elements of surroundings to the needs of people with disabilities are implemented, that adequate projects should be prepared before any trials of implementation. They should respect the principles of universal design as well as proposals of optimal, ergonomic solutions. There is also another important issue. The projects should be prepared by a specialist in the area but also other experts, for example in: work and safety regulations, sanitary and epidemiology, fire-fighting, should issue their recommendations.

The nursing house that was presented in the paper can be given as an example of the place where aside from elimination of architectonic barriers, great store is set by elimination of technical barriers. Different activities are aimed at improvement of the quality of life of physically disabled residents. The staff of the nursing house have also been making efforts to ensure aesthetical experiences and feeling of intimacy of the charges. These elements are equally important when ergonomic approach is introduced. This type of attitude towards people with disabilities (including physical disabilities) may indicate that elimination of architectural and technical barriers may be less challenging than elimination of social barriers. Physical disabilities, that are quite frequently accompanying the process of ageing, have become the area of the most spectacular technical and technological achievements recently. Gerontotechnical design – as it is called in literature – is the way to conduct searching for innovation that should be participatory because only invitation of a user to be part of a project team may help to fulfil imperative goals of ergonomics – safety, protection from age and disability discrimination as well as the right to keep autonomy and dignity of life.

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