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THE ERGONOMIC ANALYSIS AND ESTIMATION OF FORESTS ADAPTATION FOR PEOPLE ON WHEELCHAIRS

Introduction

Recreation forest management aims at the leisure facilities for the society as well as ensuring the environmental protection of the forest against degradation. Apart from defining the indexes of recreation capacity of forest, forest adaptation for the recreation needs requires recognizing the preferences of the users and the knowledge in the field of ergonomics, especially anthropometrics. According to the IEA – International Ergonomic Association, ergonomics definite relations between the man and his work, equipment and environment, including work, play and travel (J. Olszewski 1997).

One of the vital issues connected with the forest recreation is to offer the recreation facilities to the disabled. They sustain about 16 % of the Polish society (T. Łobożewicz 2000) and have the same right to enjoy the environment as the other citizens. This right was guaranteed by the legacy in different law files on the August the 1.1997 polish Parliament accepted Card of Substantially Handicapped in which in § 1 pkt 10 was stated that the disabled have the full right to "participate in the public, social, cultural, artist, sport life and recreation with the agreement with their needs and interests". In the bill dated March the 27.2003 about planning and physical development in article 1 bill 2 pkt 5 there is a legacy" in a physical development, the requirements of the environmental protection, the health and security of people and possessions and requirements of the disabled are taken into account".

Among the disabled, especially those moving on wheelchairs, there is a group that comes across a numerous urban and architectonic barriers that appear in forest areas. These barriers are: pedestrian roads with incorrect parameters and in bad technical condition, obstacles on the pedestrian lances such as too steep stairs, foot – bridges without the handrails or 1 – site handrails which are often of the wrong height, too high thresholds of the foot – bridges and also the lack of any information.

The characteristic of the analyzed subject

One of 15 forest areas in Warsaw - Bemowo Forest was – from the ergonomically point of view analyzed. The forest, which area is 513,14 ha, is situated in the North West part of Warsaw in Bemowo and Bielany district and also in State Babice commune. Due to this specific forest placement – in Warsaw and on the border of the city, the forest has status of protection forest (the bill dated 28.09.1991). Simultaneously, it is the forest with the recreation function. This forest includes: two playgrounds equipped with benches, tables, wastepaper baskets, 5 glades for resting with roofing and fire places, a glade for viewing, car park, a didactic foot – path with places for resting, 2 health paths and also a number of foot – paths for walking with benches and wastepaper baskets.

The methodology of work

The methodology of work included establishing the rules concerning ergonomic analysis of adaptation the forest to the needs of disabled on wheelchairs. Then the analysis was verified on one example of the forest and the assembled data was statistically analyzed.

"Vademecum of designer – disabled problems, environment and transport" (L. Schwartz 1991), the bill dated July the 7 1994 building law and "Anthropometrics atlas of people on the wheelchairs" was used to set the rules of ergonomic analyzes of the forest adaptation to the needs of disabled on wheelchairs. The research was done from 2002 to 2004. According to the established methodology, the ergonomic analyzes had 3 levels:

I. accessibility of Bemowo Forest,
II. adaptation of forest's roads (foot – paths showed on information maps at the entrance to the forest),
III. adaptation of tourist equipment for those areas.

Each of these levels was evaluated according to the 4 – scaled class adaptation:

1st – class, very good adaptation (accessibility)

2nd – class, good adaptation (accessibility)

3rd – class low adaptation (accessibility)

4th – class adaptation, the lack of adaptation (accessibility).

- In evaluating the accessibility of forest areas the possibility to commute to the forest by low floor public transport was taken into account and also the condition and technical parameters of communication on the way from the bus stop to the forest and the existence of the car park near the forest. It was accepted that the accessibility of the forest areas rises together with the width of pedestrian roads and the lack of urban barriers. This evaluation was

connected with the need to measure the width of the pavement and identification the barriers of the area. On the basis of this the following classes of forest areas accessibility were distinguished:

- 1st class of accessibility – very good, forest areas to which it is possible to commute by public transport, the roads or pavements to the forests have the minimum width of 2,00 m (urban areas), no barriers.
- 2nd class of accessibility – good, forest areas to which it is possible to commute by public transport, the roads or pavements to the forests have the minimum width of 1,60 m. Although there are a few barriers, it is still possible for disabled on wheelchairs to move through.
- 3rd class of accessibility – low, forest areas to which it is possible to commute by public transport and the road to the forest is 0.90 m wide, numerous obstacles make it impossible for disabled to move (the difference between two levels of area is higher than 2 meters, longitudinal drop of the area is higher than 8 but lower than 10 %, transversal drop over 2%, stairs have the minimum size of 0,90 x 1,30 and the height of 0.12)
- 4th class – the lack of accessibility – forest areas to which there is no access by the low floor people public transport, the road to the forest has the width less than 0.90 m or with a lot of barriers that make it impossible to move on wheelchairs (narrow passages through the gates, steep narrow stairs).

It was accepted also that the existence of the car park near the forest areas means that the accessibility is one class higher.

- In evaluating of <u>forest's roads adaptation</u> the condition and technical parameters of particular foot – paths shown on the information maps at the entrance to the forest were considered. It was taken into consideration that the accessibility of particular parts of foot – path rises together with the width of the road and lower transversal drop and the lack of natural barriers. The accessibility of the certain points was evaluated according to the following rules:

- 1st class adaptation is very good – the minimum width is 1,80 m (according to the technical parameters of wheelchair), transversal drops are 2%, no natural barriers.
- 2nd adaptation good – the road is minimum 1,40 m wide, transversal drops from 2 to 6 %. Obstacles on the way enable disabled to move on wheelchairs.
- 3rd class adaptation is low – the minimum width of the road is 0,85m, transversal drops form 6 to 10%. Existing obstacles on the way enable disabled to move on wheelchairs.

- 4th class – lack of accessibility – the width of the road is lower than 0,85 m, transversal drops higher than 10 %, too narrow passages ex. through the gate or posts preventing from entering the forest, long steep stairs.

- In evaluating the adaptation of tourist equipment such as tables with benches, foot – bridges in order to manage the forest the adaptation of this equipment to anthropometrics data of disabled was taken into account.

In evaluating the accessibility the tables with benches for the needs of disabled the following classes were distinguished:

- 1st class very good adaptation – the lower height of the table is 60,7cm; the distance from the edge of the table to its leg is minimum 60 cm. This makes it possible to disabled to move on wheelchairs using these tables.
- 2nd class good adaptation – the lower height of the table is minimum 60,7 cm, the distance between the edge and leg of the table is 60 cm, there are natural obstacles in the surrounding, although it is possible to overcome them without any help form others.
- 3rd class low adaptation – the lower height of the table is less than 60,7 cm, the distance between the edge of the table and its leg is less than 60 cm, there are obstacles between the table and the bench. It is not possible to overcome them by the disabled on wheelchair.
- 4th class – lack of adaptation, it is not possible to use the table by the disabled person.

In evaluating the adaptation of viewing foot – bridges the following classes were distinguished:

- 1st class – very good adaptation, no architectonic barriers.
- 2nd class – good adaptation – there are some barriers but they don't make it impossible to use the foot – bridge.
- 3rd class – low adaptation – using the foot – bridges is possible only with the help of other people.
- 4th class – lack of adaptation, the existing obstacles make it impossible to use the foot – bridges.

Results

After analyzing the adaptation of forest areas to the needs of disabled on wheelchairs the following results were obtained:

The first part of the analyzes that aimed at accessibility of forest areas proved that the forest has good accessibility.

The evaluation of forest's roads to the needs of those moving on wheelchairs is presented on the following diagram (Fig.1):

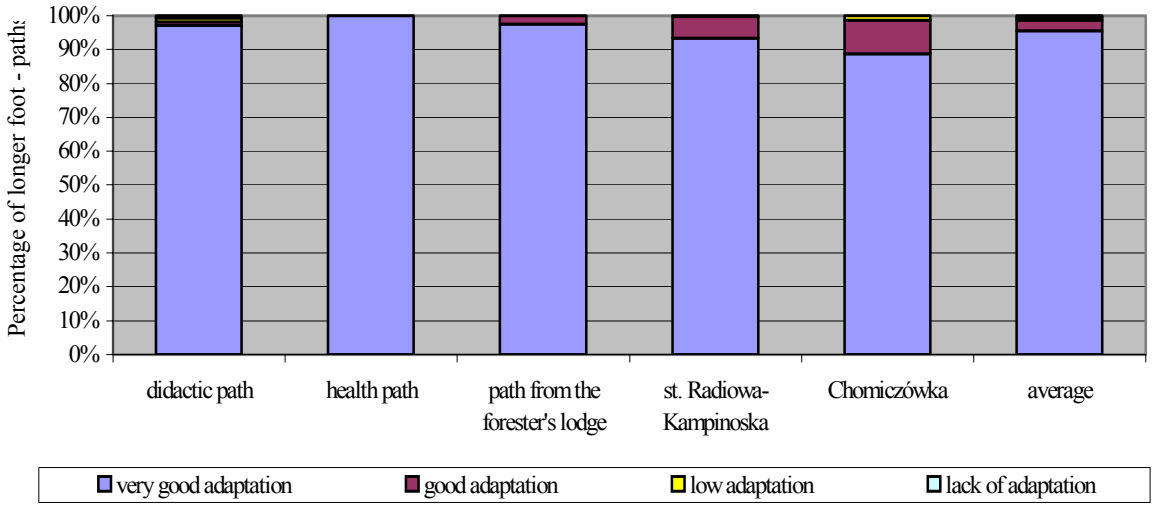

Fig.1. Evaluation of forest's roads adaptation to the needs of disabled moving on wheelchairs

According to the presented diagram almost every foot – path in 90 % was qualified to the 1st class of adaptation for disabled (average 95,5%). The only foot – path in Chomiczowka in 88,5 % belonged to the 1st class of adaptation. On the didactic foot – path 0,70% of its length belonged to the 4th class of adaptation. Thus it wasn't adapted to the needs of moving on wheelchairs.

The evaluation of table's adaptation to the needs of moving on wheelchairs is presented on Fig.2. According to the diagram there are only 3 places in which there is equipment belonging to the 1st class of adaptation. This equipment is situated on the didactic foot – path, glades for resting, in dep. 4f and 4 l. In 5 places there is equipment from the 3rd class of adaptation (low). On average 82,8% of equipment belongs to the 3rd class of adaptation, 10,3% in the 1st class and 6,9% in the 2nd.

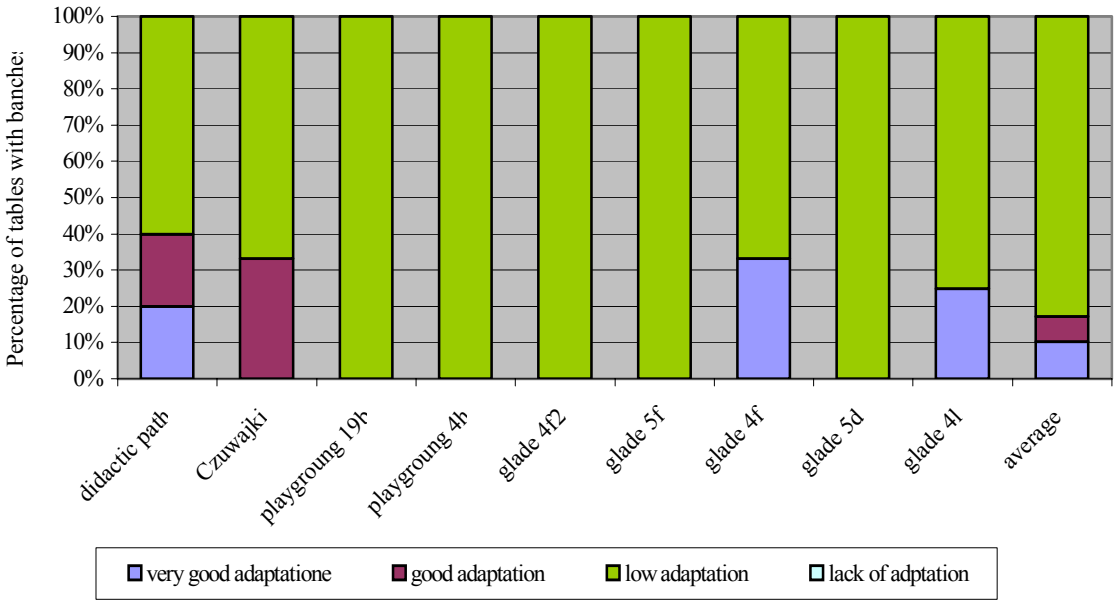

Fig.2. The evaluation of tables and benches adaptation to the needs of moving on wheelchairs

Conclusions

The achieved results lead us to the following conclusions:

1) The analyzed method gives us the objective opinion of adaptation the forest to the needs of disabled on wheelchairs.

2) The area of research was characterized to have a good communicative accessibility which was the result of the car par existence that made it possible to disabled to get to the didactic path instead of rest please. The road was specific to its low adaptation. It was necessary to find a place for the car park.

3) Bemowo forest is characteristic of its very good adaptation of the foot – paths but at the same time of the low adaptation of the recreation equipment. This means that while planning and realizing the tourist management the needs of disabled on wheelchairs are neglected.

4) The elaborated method should be expended to the preferences of the disabled on wheelchairs.

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