



## ANALYSIS OF ROAD INFRASTRUCTURE IN TERMS OF ITS ADAPTATION TO SERVE PEOPLE WITH DISABILITIES (CASE STUDY FROM POLAND)

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### Abstract

The problem of disability affects more and more people every year. One of the problems in their proper functioning is problems related to their movement. The main purpose of this study is to analyze the road transport system in terms of its adaptation for people with disabilities in Wielkopolskie voivodeship. For this purpose the existing public infrastructure was reviewed in terms of its adaptation to the needs of people with disabilities. On the basis of the research carried out, it was found that the best adapted facilities for disabled people are newly built public buildings. A hospital, as an object that should be the most comfortable for people with disabilities, comes out very poorly and requires mainly surface modernization.

**ANALIZA INFRASTRUKTURY DROGOWEJ POD KĄTEM JEJ PRZYSTOSOWANIA  
DO OBSŁUGI OSÓB Z NIEPEŁNOSPRAWNOŚCIAMI  
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A b s t r a k t

Problem niepełnosprawności z roku na rok dotyczy coraz większej liczby osób. Jednym z problemów w ich prawidłowym funkcjonowaniu są trudności z przemieszczaniem. Głównym celem artykułu jest analiza systemu transportu drogowego w aspekcie jego przystosowania dla osób z niepełnosprawnościami w województwie wielkopolskim. W tym celu dokonano przeglądu istniejącej infrastruktury publicznej w odniesieniu do jej dostosowania dla osób z niepełnosprawnościami. Na podstawie przeprowadzonych badań stwierdzono, że najlepiej przystosowanymi obiektami dla osób z niepełnosprawnościami są nowo wybudowane budynki użytku publicznego. Szpital jako obiekt, który powinien być najlepiej przystosowany dla osób z niepełnosprawnościami, wypada bardzo słabo i wymaga przede wszystkim modernizacji nawierzchni.

## Introduction

According to Polish law, a disabled person is defined as a person who, as a result of a long-term or permanent inability to fulfil social roles, causing, in particular, inability to work, is temporarily or permanently unable to fulfil social roles. Ensuring the accessibility of the public transport system for people with disabilities means having, among other things, adapted rolling stock of railroads, long-distance trains, buses and city buses. In addition, the road and communication infrastructure on which people with disabilities travel should be adapted to their needs. For example, the adaptation for people with disabilities of urban public transport is mainly the replacement of rolling stock with low-floor vehicles and the provision of correct audio and visual information for passengers both inside and outside the vehicle (Raczyńska-Buława, 2017a; 2017b).

It has always been believed that people with disabilities have mobility difficulties that limit them in their daily lives (Lucas, 2004; Dodson *et al.*, 2004). These limitations are considered as accessibility barriers to the use

of transportation systems services (Evans & White, 1998). Very many authors deal with the accessibility of adaptations of buildings, public transport or public infrastructure for people with disabilities (Mace *et al.*, 1991; Donnelly, 2003; Czarnecki & Siemiński, 2004; Wysocki, 2009) as well as the movement of people with disabilities and movement in public spaces (Heiser, 1995; *Improving...*, 1999; Campion *et al.*, 2003; Taylor & Józefowicz, 2012a; 2012b; 2012c; 2012d).

People with disabilities make up 15% of the population and there are more than one billion people worldwide (*Disability Inclusion*, 2021). In Poland, people with disabilities officially constitute more than 3 million, while in reality their number can vary from 4 to almost 7 million (*How Many People...*, 2021). The number of studies referring to people with disabilities on a geographical basis is increasing year by year (Cormode, 1997). This occurs systematically, which is related to population changes and the increasing number of people with disabilities (Skalska, 2004; 2010; Zajadacz, 2015). A large number of studies link people with dysfunctions to the geographical environment (Ostrowska, 1994; Gaines, 2004; Józefowicz, 2014). A very good example is the research on accessible tourism for people with disabilities, where moving is an integral part of the trip (Kaganek, 2009; Midura & Żbikowski, 2005; Buhalis *et al.*, 2006). Facilitated access to transportation services influences the quality of life and, in the case of people with disabilities, additionally contributes to their self-esteem and social participation (Zadrozny, 2009; Furmanek, 2014).

The problem of usability of road infrastructure for people with mobility disabilities was considered by Nwachi and his team (2023). In a similar vein are the following works (Stafford & Baldwin, 2018; Fasina *et al.*, 2020; Ross *et al.*, 2020). They show that there are still barriers among children, the elderly and people with disabilities, limiting their opportunities for mobility and social interaction. It should be remembered that many people with disabilities get around on foot or in a wheelchair (Mogaji *et al.*, 2021; Mogaji & Nguyen, 2021). This does not depend on road infrastructure. Some researchers believe that road infrastructure causes significant exclusion of mobility and difficulties for people with disabilities (Mogaji *et al.*, 2022; Igomy, 2021; Jirgba *et al.*, 2020).

## Purpose and Scope of Study

Among communities, a small number pay attention to the conditions for adapting road infrastructure for the disabled. The purpose of the article is to analyze the road infrastructure in terms of adaptation for people with disabilities. For this purpose, the existing traffic infrastructure was reviewed. Road infrastructure is all elements of the transportation network that are used by means of transport both while they are moving and at rest. Road infrastructure

for people with disabilities refers to the system of roads, sidewalks, pedestrian crossings and other elements that are designed to be accessible and safe for people with different types of disabilities.

## Methodology of the Study

The study was conducted in 2021 in northern Greater Poland, using two cities of different sizes as examples: Piła, which has about 74 thousand inhabitants, and Złotów, which has about 18 thousand inhabitants (*Population*, 2021). The study analyzed the road infrastructure in the vicinity of ten public places, which are most often used by people with disabilities. These places include: hospital, pharmacy, shopping center, supermarket, railroad station, swimming pool, bank, post office, gas station and Social Security Office. The following criteria were taken into consideration when adapting the sites for people with disabilities: curb adjustments and roadway surface quality ratings. Parking amenities for persons with disabilities in terms of signage for parking spaces and distance from the building were also considered. The site was also checked for ramps, access ramps, platforms, outdoor elevators to allow a person with a disability to get into the building and an overall rating of the accessibility of the site for persons with disabilities. In the study, the authors analyzed road infrastructure and its adaptation to persons with disabilities.

Sites were rated on the following scale from 0-1, where 0 means not adapted and 1 means adapted. Stanislaw Staszic Specialist Hospital in Pila and Alfred Sokolowski County Hospital in Zlotow were selected for evaluation. The next facilities were pharmacies: Sokal Pharmacy at the Stanislaw Staszic Specialist Hospital in Piła and at 8 Norwida Street in Zlotow. Next object was bank PKO at Aleja Piastów 2 in Piła and bank PKO in Złotów at Norwida 5 St. Next post office at Aleja Wojska Polskiego 36 in Piła and post office at Aleja Piasta 4 in Złotów. The next object of the study for infrastructure assessment was a supermarket in Piła at 4 Doctor Drygas Street and a supermarket in Zlotow at Norwida Street. A supermarket in Piła at 4 Artura Grottgera St. and a swimming pool in Zlotow at 4 A Norwida St. were also included in the study. Petrol stations were chosen as those located at 102 Powstańców Wielkopolskich Street in Piła and the petrol station in Złotów at 2 Szpitalna Street. The next objects examined were ZUS in Piła and ZUS in Złotów. The last study sites were Galeria Kasztanowa in Piła and Galeria Aura Park in Złotów as well as the railway station in Piła and the railway station in Złotów. The sites most frequently used by people with disabilities were considered when selecting sites for the study.

## Results of the Study

The evaluation of accessibility of public infrastructure for people with disabilities in Złotów and Piła in the selected 10 facilities most frequently used by the community is quite good. The worst adapted object in Złotów is the railroad station. As a public facility used for public transport it should provide special conditions for the disabled. The Alfred Sokolowski County Hospital is also very poor in the assessment of the adaptation of the facility in Złotów. As the facility most frequently visited, especially by disabled people, it should be adjusted and meet all the evaluation criteria. In Piła, the worst adapted facility is Sokal Pharmacy at Stanisław Staszic Specialist Hospital. The infrastructure at the hospital is in very poor condition, the surface is cracked, which makes it difficult to enter the facility. The best adapted facilities for disabled people both in Złotów and in Piła are supermarkets, shopping malls, swimming pools and petrol stations. These facilities meet all the evaluation criteria and allow people with disabilities to freely get to and move around the facilities. The assessment of facilities for people with disabilities is presented in the tables 1 and 2. Recorded in the table 0 means no adaptation 1 object adapted.

Table 1

Assessment of accommodations for people with disabilities

Criteria	Hospital		Pharmacy		Bank		Post Office		Supermarket	
	Piła	Złotów	Piła	Złotów	Piła	Złotów	Piła	Złotów	Piła	Złotów
Adjusting curbs	1	0	0	1	1	1	0	1	1	1
Assessment of road surface quality	0	0	0	1	1	1	1	1	1	1
Adaptation of the parking lot for persons with disabilities in terms of: a – marking of parking stalls b – distance from the facility	1	0	1	1	1	0	1	1	1	1
	1	0	0	1	1	0	1	1	1	1
Slopes, ramps, ramps, platforms, external elevators allowing access to the building for disabled people	1	1	1	1	1	0	1	0	1	1
Accessibility of facility adaptations for persons with disabilities	1	1	1	1	1	0	1	1	1	1
Total	5	2	3	6	6	2	5	5	6	6

Source: own study.

Table 2

Assessment of accessibility of facilities for people with disabilities – continued

Criteria	Swimming pool		Gas station		Social security office		Shopping mall		Railway station	
	Piła	Złotów	Piła	Złotów	Piła	Złotów	Piła	Złotów	Piła	Złotów
Adjusting curbs	1	1	1	1	1	1	1	1	1	0
Assessment of road surface quality	1	1	1	1	1	1	1	1	1	0
Adaptation of the parking lot for persons with disabilities in terms of: a – marking of parking stalls b – distance from the facility	1	1	1	1	1	1	1	1	1	0
	1	1	1	1	0	1	1	1	1	0
Slopes, ramps, ramps, platforms, external elevators allowing access to the building for disabled people	1	1	1	1	1	1	1	1	1	1
Accessibility of facility adaptations for persons with disabilities	1	1	1	1	1	1	1	1	1	1
Total	6	6	6	6	5	6	6	6	6	2

Source: own study.

## Summary

On the basis of the conducted research, in selected places in Złotów and Piła there is a high availability of parking spaces for the disabled, which, however, still requires improvement due to poor signposting or their location at a considerable distance from the destination. The best accessible infrastructure is found near supermarkets, swimming pools, gas stations and shopping malls. The least accessible are hospitals, banks and railroad stations, especially in smaller towns, such as Złotów.

The biggest problem for people with disabilities are unadopted curbs and poor road surface, especially potholes that a wheelchair must navigate. People with disabilities also have problems finding an adapted parking space for them and driving from the parking lot onto the sidewalk. In addition, it is very common for parking lots to be located far from public places.

Implementing changes in infrastructure requires long-term actions, which involves not only improving the existing infrastructure but also changes

in legislation, so that in the long run the infrastructure is adapted to the needs of people with disabilities and does not have architectural barriers preventing people in wheelchairs and with mobility problems from reaching the bus stop safely.

Translated by the Authors

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