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ENHANCING THE ACCESSIBILITY OF RAILWAY TRANSPORTATION FOR INDIVIDUALS WITH PHYSICAL DISABILITIES

Summary. The purpose of public mass transport is the general accessibility for all of its users. The lack of (or insufficient adjustment of) the tourist transport infrastructure to the needs of persons with disabilities and seniors is an obstacle to their free movement. The aim of this article is to determine to what extent the railway infrastructure is adjusted to the needs of disabled persons and what problems these persons struggle with most frequently. The aim of this article is to determine and discuss various aspects of disability. The primary research method used in the paper is the *Failure Mode and Effects Analysis* (FMEA), which is a method used to assess the state of adaptation of the station for people with disabilities. The purpose of the tests is to identify existing and potential defects as well as their causes and effects. Research results verify the degree of adaptation of rail transport for people with disabilities and have diagnostic value. Future research should focus on the full usability of transport infrastructure for people with disabilities. The results of the current research have a number of practical implications, mainly for people involved in the transport industry. Building awareness regarding problems related to the mobility of people with disabilities, sensitize to the needs and challenges of such people has significant social implications. This paper has cognitive value for the development of knowledge, science, and quality in terms of adapting transport for people with disabilities. To achieve the study's purpose, the FMEA was conducted on the example of the main railway station in Bielsko-Biała, Poland. Suggestions were also formulated to allow persons with disabilities to use railway transport to a greater extent.

1. INTRODUCTION

The problem of disability is a global social phenomenon. In all countries, including Poland, a growth in the number of people with disabilities is observed. According to the estimation of the World Health Organization (WHO), in the 1970s, persons with disabilities constituted about 10% of the total global population. Statistics confirm that persons with disabilities constitute a significant part of a community [1]. Currently, it is estimated that over a billion people live with a form of disability, which is the equivalent of about 15% of the global population [2].

Persons with disabilities and persons with reduced mobility due to disabilities, age, etc., should have the opportunity to travel by railways with as much ease as other citizens. They should also have equal rights to unrestricted mobility, freedom of choice, and non-discrimination. The European Union is the first and only region in the world where passengers have complete and integrated fundamental rights in

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all types of transport. Their rights are based on the principles of non-discrimination; precise, actual, and accessible information; and quick and adequate support [3].

Access to transport for all people without discrimination based on the state of their health could improve people's quality of life. Transport plays an important role in the economy by facilitating many tasks. It merges various branches of the national economy and contributes to the organization of the life of the entire society. It is constructed in a way that customers using it can choose the transport method that best meets their needs. Transport is understood as the act of moving people and tangible goods from one place to another. Overcoming the space between two points is achieved by using point and line infrastructures and adequate means of transport [4]. Accessible transportation is of paramount significance for individuals with disabilities. Nonetheless, its advantages extend to other passenger categories, such as individuals traveling with young children or those carrying substantial baggage [5].

A division by mode of transport is called a vertical breakdown, while a breakdown by other criteria is called a horizontal breakdown. The railway infrastructure is divided into point and line infrastructures. The point infrastructure is a network of stations, which can be further divided according to their size or specialization into passenger and cargo, junction, intermediate, container, and port stations. Larger stations are usually equipped with handling equipment, warehouses, storage yards, ramps, scales, and peaks. Another element of the linear infrastructure is railroads, which can be divided into public, private, single and double-track, multi-track, main, primary, secondary, and local [6]. Linear elements also include engineering structures—bridges, viaducts, and tunnels [7]. Rail transport involves transporting goods or people using sets consisting of a locomotive and carriages or traction units. The greatest advantages of railways are their speed and high capacity. Thus, they have a valuable role in passenger transport, mainly in high-density areas [8].

The movement of vehicles in a railway transport system is carried out according to a pre-arranged plan that assigns a route in space-time to each vehicle. This is called routed traffic. The traffic plan is prepared in the form of traffic and timetable graphs.

In rail transportation, unlike road systems, unrestricted vehicle flow along the route is not attainable. Consequently, rail transport demonstrates diminished flexibility and heightened susceptibility to perturbations in traffic dynamics. The main characteristics of rail transport are:

- bulk of transport,
- relatively low freight rates for deliveries over medium and long distances resulting from a strong depression of unit costs,
- relatively extensive railway connections that are well-adapted to the location of the main supply and distribution markets,
- a favorable offer from the point of view of transport time, resulting from the high reliability of rail transport and the regularity, frequency, and rhythm of connections,
- specialized rolling stock adapted for transporting various loads with diverse transport characteristics,
- relatively low safety of transporting goods sensitive to shocks and reloading,
- high risk of theft,
- low accident rate, and
- low unit energy consumption and low environmental impact.

2. PERSONS WITH DISABILITIES

The problem of disability is extremely important. Nowadays, people live longer and longer, and with age, the physical and mental fitness of a person deteriorates. Disability, obviously, does not concern only the elderly; it can affect everyone, regardless of age, because there are many causes, ranging from birth defects to accidents to injuries to diseases. When discussing the subject of individuals with reduced physical capabilities, it is worth explaining the issue of disability itself. The most common definition is provided by the WHO, which distinguishes several types of disability. The WHO provides the following definitions [9]:

- Damage or an impairment (impairment) is any lack or abnormality of the anatomical structure of organs and the lack or disorder of mental or physiological functions of the body.
- A functional disability is any limitation resulting from an impairment of the ability to perform activities to the extent perceived as normal for a human being.
- A social impairment or disability (handicap) is a less privileged or less favorable situation of a person resulting from an impairment and functional disability that limits or prevents them from fulfilling roles related to their age, gender, and social and cultural situation.

A disabled person is a person whose health condition hinders or limits their regular activities; in some cases, it even makes it impossible to perform basic life activities. In the past, such people were excluded from society due to their illnesses, but in the era of continuous social changes, general development, and self-awareness, the attitude towards people with disabilities has also evolved: from (once) the isolation and negation of the weaker to integration and normalization, from exclusion from society and confinement in closed institutions to the subjective treatment of disabled persons and the provision of care and rehabilitation for this group. Care was taken to ensure that these people felt good in their society. As a result, these people began to open up more and more, break down barriers, and become professionally and socially active. Today, they increasingly frequently perform a number of roles and tasks, they are not afraid of new challenges, and disability is no longer a taboo topic.

The essence of disability

The definition of “disability” is very difficult to clearly define because it refers to various areas of human functioning. In the European Union, there is no unified definition of “disability.” It often occurs that there are many different definitions in one country, which are formed depending on needs (e.g., for rehabilitation, medical care, or social aid). A disability is any impairment of the body or mind that limits a person’s ability to partake in typical activities and social interactions in their environment [10].

In the life of every person, there are moments of smaller and greater possibilities, as well as physical limitations. Something that is currently easy for us to access may be a barrier that we cannot cross as the years pass. Other than the dysfunctions caused by unfortunate accidents, there are many causes of dysfunction and disability with age [11].

The WHO has introduced the following definitions of “disability,” taking into consideration the health condition of the person [12]:

- An impairment is any lack of functionality, bodily dysfunction, or psychological dysfunction.
- A disability is a limitation of actively living in a way or in a range that is regarded as typical for a person.
- To be handicapped means to have limitations in the fulfillment of social roles. A handicap is a limitation of a specific person as a result of impairments or disabilities that limit one ability to fulfill or make it impossible to fulfill a social role that corresponds to age or sex and is in agreement with social and cultural determinants.

With the same underlying concept in mind, the WHO formulated the definition of a disabled individual as follows: A disabled person is someone who is regarded as having impaired mobility, functionality, or capacity for daily life activities to an extent that hinders their ability to carry out pertinent social roles [13]. Empirical data substantiates that disabled individuals comprise a significant segment of our populace. Furthermore, research findings affirm the prognostication of a growing population within this demographic. Within the sphere of tourism, this cohort’s involvement holds the potential to assume a pivotal role in the realm of rehabilitation and the amelioration of health conditions, encompassing all forms and severities of disability [14]. The legislation pertaining to vocational and social rehabilitation, as well as the employment of individuals with disabilities, stipulates three distinct levels of disability [15]:

- **Mild disability:** This category encompasses individuals whose impairments result in a notable reduction in their work capacity but do not necessitate assistance from others to fulfill their societal obligations.

- **Moderate disability:** This classification applies to disabled individuals who are unable to engage in work, can work only under sheltered conditions, or intermittently require assistance from others to fulfill their societal roles.
- **Severe disability:** This designation pertains to individuals whose dysfunction renders them incapable of engaging in regular employment, restricting them to work within a sheltered environment. They require continuous, full-time care and assistance from others to fulfill their social roles, as they lack the capacity to live independently.

A considerable degree of disability refers to people whose dysfunction makes it impossible to work, those who can work only in a protected environment, and those who require constant and full-time care and help from other people in order to fulfill social roles due to their inability to exist independently.

3. LEGAL REQUIREMENTS FOR RAILWAY TRANSPORT FOR PERSONS WITH DISABILITIES

Year by year, people with disabilities become increasingly active in social life, and this process is undoubtedly fostered by the openness and acceptance of the environment, as well as help from local authorities. In order for these people to move, live, and work freely, it is undoubtedly important to properly adapt transport and infrastructure to the required standards to meet the needs of people with disabilities. Regardless of the type of transport, these people should have access to communication, and this process should be supported by legislative solutions that guarantee the ability of persons with disabilities to move without additional difficulties. Making transport accessible to all people without discrimination based on their state of health could lead to a better quality of life [16].

Therefore, this chapter attempts to identify solutions in the field of rail transport that are guaranteed by the law for disabled persons and how these solutions function in particular types of transport (i.e., international, national, and regional connections). According to Regulation (EC) No. 1371/2007 of the European Parliament and the Council of 23 October 2007 on the rights and obligations of rail passengers, all citizens are entitled to use rail passenger services [17].

There are obviously appropriate procedures required during the transport of a person with disabilities, but they should not be burdensome in any way so that the person does not feel discriminated against. First of all, people with disabilities should be able to use information and messages about the availability of trains, equipment, or conditions in which the journey is to take place, which should be provided in a clear and unambiguous manner. A disabled person has the right to book and purchase a ticket without any additional charges. Point infrastructure—stations and buildings—should also be adapted to the requirements related to the movement of disabled persons, meaning the elimination of physical barriers and functional obstacles and the purchase of new equipment facilitating mobility. There is also no legal basis to require a disabled person to travel with another person. In accordance with Chapter V (Disabled persons and persons with reduced mobility) chap. V. art. 22 of Regulation (EC) No. 1371/2007, station managers must provide free assistance to disabled persons when boarding or disembarking from a train [15]. At unstaffed stations, the railway undertaking should post a notice of the nearest available staffed station. The help of staff, as defined in chap. V. art. 23 of the regulation, includes all efforts to ensure that a person with disabilities has access to the same services on the train as other passengers. The conditions for providing assistance are presented in detail in chapter V. art. 24 [15].

- Assistance is provided subject to prior notification (48 hours) of such need to the railway undertaking, station manager, ticket vendor, or tour operator.
- If no notification has been made, the institutions mentioned above make every effort to provide assistance in a way that allows a person with disabilities to travel.
- Outside the station area, the manager or an authorized person sets points within and outside the station where people with disabilities can announce their arrival at the station or ask for assistance.
- Help is provided when a disabled person shows up at a designated place on a date agreed with the company. The agreed time limit cannot exceed one hour before the departure time of the train or the

time at which passengers are called to check in. If a specific date of appearance has not been set, the person must appear at the designated place no later than 30 minutes before the departure time.

4. ANALYSIS AND ASSESSMENT OF THE ACTUAL STATE OF PREPAREDNESS OF THE RAILWAY STATION IN BIELSKO-BIALA TO THE NEEDS AND EXPECTATIONS OF PERSONS WITH REDUCED MOBILITY

The method used to assess the state of adaptation of the station for disabled persons is the failure mode and effect analysis (FMEA). It is a method of identifying existing and potential defects as well as their effects and causes [18]. There are two types of FMEA: the analysis for the product, where a specific product or its single part is analyzed, and FMEA for the process, where the entire manufacturing process is analyzed [19]. In this article, an FMEA was performed for individual factors:

- railway station,
- access to the platform,
- waiting for the train, and
- boarding/disembarking the train.

The stages of FMEA for the above processes are as follows [20]:

1. Identification of the area of activity and determining which processes are subject to the analysis,
2. Determining the elements of a given process that are subject to assessment,
3. Indicating defects and their causes,
4. Indicating the effects of resulting defects from the point of view of persons with disabilities in a wheelchair,
5. Determining the significance of the defect S, with the assumptions given in Table 1.

Table 1

Determining the **significance** of the defect/FMEA

Severity	Impact of the defect on the user	Scale
Very small	Minimal impact: The person with disabilities does not notice anything, and the defect has no impact on the usage conditions.	1
Small	Minimal impact causing insignificant difficulties.	2-3
Average	The defect causes limited dissatisfaction and small difficulties; the factor is a source of nuisance.	4-6
Meaningful	Blatant difficulties during use.	7-8
Strong	Strong impediments for a person with disabilities.	9
Very strong	The significance of the defect is very strong and threatens the safety of people with disabilities or violates legal regulations.	10

6. Defining the **defect Occurance O** with the assumptions listed in Table 2.

Table 2

Defining the probability of defect occurrence/FMEA

Probability of the occurrence of the defect		Scale
Extremely unlikely	The occurrence of the defect is unlikely.	1
Remote	The number of defects is low.	2-3
Occasionally	The defect occurs sporadically.	4-6
Reasonably possible	The defect occurs repeatedly.	7-8
Very frequent	The defect is nearly inevitable.	9-10

7. Defining the defect Detection D on the stage of planning the journey by a person with disabilities (e.g., at home or on the internet) as shown in Table 3.

Table 3

The definition of the probability of the defect detection/FMEA

Probability of defect detection at the journey planning stage		Scale
Very low	The probability of defect detection at the journey planning stage is very small. A person with disabilities does not know what he/she will find at the railway station or during the journey.	1-2
Low	The probability of defect detection is low. A person with disabilities can guess what he/she will find at the railway station and during the journey.	3-4
Moderate	There is an average probability of the defect detection.	5-6
High	There is a high probability of defect detection.	7-8
Very high	There is a very high probability of defect detection.	9-10

8. Defining the indicator of the risk priority number (RPN), calculated as a product:

$$\text{RPN} = \text{S} * \text{O} * \text{D}$$

After the calculation of the indicator RPN, the processes most endangering the person with disabilities can be identified in a quick way. In turn, measures can be suggested, and at the same time, the safety of railway travel for persons with disabilities can be improved.

FMEA was conducted for the following stages:

- access to the platform and
- waiting for the train and boarding/disembarking the train

The outcomes are presented in Tables 4, 5, and 6. To conduct the analysis, the authors made observations prior to the actual analysis, also assessing the access to the railway station and customer care. However, due to the wide scope of observation for the aims of the article, the authors present only a chosen aspect of the analysis. As early as the stage of access to the railway station, uneven pavement with holes and damaged steps with inadequate ramps can constitute a big obstacle. At the railway station, passenger services (i.e., the lack of adequate equipment, such as too-high counters by the tills and distant or lacking ramps by toilets, restaurants, or pharmacies) can be burdensome.

Table 4

FMEA for the stage of accessing the platform

FMEA for a person with disabilities in a wheelchair								
Process	Element of the process	Defect	Result	S	O	D	RPN	Reason
Access to the platform	Tunnel	Damaged steps	Falling, tripping, collapsing	10	10	1	100	Lack of maintenance and ongoing repairs
		Lack of a handrail	Falling out of a wheelchair	9	10	1	90	Exploitation
		Lack of ramps	Serious injury	10	10	1	100	
		Damaged ramps	Life threat	10	10	1	100	Atmospheric conditions
		Poor light	Difficulties with seeing	7	9	1	63	

		Unsuitable floor/slippery surface	Slipping, collapsing	8	9	1	72	Lack of compliance with current standards for public spaces
		Lack of a marked trail	Difficulties in reaching the destination and a lack of possibilities to use tunnels	5	10	1	50	
		Dangerous elements (e.g., sewage grates)	Blocking wheelchairs and a lack of the possibility of further driving	10	10	1	100	
	Footbridge	Damaged steps	Falling down, tripping, collapsing, or falling out of a wheelchair	10	8	1	80	Lack of maintenance and ongoing repairs
		Lack of a handrail	Threat to life or health	10	7	1	70	Exploitation
		Lack of ramps	Lack of the possibility to use a footbridge (lack of ramps)	10	10	1	100	Atmospheric conditions
		Lack of a marked route	Hindered ability to reach the destination	5	10	1	50	Lack of compliance with the current standards for public spaces
		Poor light	Difficulties with seeing	7	7	1	49	

Table 5

FMEA for the stages of waiting for the train

FMEA for a person with disabilities in a wheelchair								
Process	Element of the process	Defect	Result	S	O	D	RPN	Reason
Waiting for the train	Platform ramps	Lack of roofs	Hindrance waiting for the train	7	3	1	21	Lack of current repairs
		Lack of space for wheelchairs	Lack of protection from atmospheric conditions	7	3	1	21	Exploitation
		Damaged	Threat to life or health	8	3	1	24	
		Lack of sheds	Lack of shelter	8	2	1	16	Atmospheric conditions and a lack of compliance with the current standards for public spaces
	Aural information	Poor and/or muffled sound	Insufficient information	8	7	1	56	Lack of maintenance and repairs of megaphones
		Lack of aural information	Possibility of misinformation	8	3	1	24	
	Timetables	Poor quality of print	Lack of the possibility to use the timetable	6	9	1	54	Lack of compliance with the current standards for public spaces
		Too-small fonts		6	9	1	54	
		Too high		6	9	1	54	
		Poor light		6	9	1	54	
		Lack of timetables on the platform		6	3	1	18	

Table 6

FMEA for the stage of boarding and disembarking the train

FMEA for a person with disabilities in a wheelchair								
Process	Element of the process	Defect	Result	S	O	D	RPN	Reason
Boarding/disembarking the train	Boarding/disembarking the train	Lack of a ramp to the train	Hindrance while boarding the train or a total lack of this possibility	10	10	1	100	Lack of compliance with the current standards in the public space
		Lack of assistance when boarding	Falling out of a wheelchair	10	3	1	30	
		The entrance to the train is too narrow	Risk of getting wedged	10	4	1	40	Lack of care from the railway management
		Lack of marked routes for disabled persons	Misleading information	9	9	1	81	
	Traveling by train	The train is not adjusted for disabled persons	Hindered journey	10	10	1	100	Lack of compliance with the current standards in the public space
		The door is too narrow	Lack of the possibility to enter the toilets or compartments	10	10	1	100	
		Lack of the possibility to use toilets		10	10	1	100	
		Lack of seatbelts	Risk of wedging	10	10	1	100	
		Lack of handrails	Falling	10	10	1	100	
		Lack of the possibility to touch the assistance button	Falling out of the wheelchair	10	10	1	100	Lack of maintenance and repairs
		Lack of aural and visual information	Being misled	9	10	1	90	

The analysis indicated which elements of particular processes have the highest RPN; these are the elements for which the score is higher than 90 (Table 7).

During the stage of access to the railway station, uneven pavement with holes and damaged steps with an inadequate ramp can create big obstacles. At the railway station, the absence of proper customer care for individuals with disabilities, characterized by inadequate equipment such as overly high counters and long distance without ramps to essential facilities like toilets can pose significant hindrances. The element of customer care was not included in this analysis due to the extensive nature of the research. However, it is worth noting that the authors of the article observed obstacles related to customer care during their research. Persons who want to get to their platform encounter another risk: tunnels and footbridges, on which travelers may encounter many obstacles.

The last process with a very high risk level is boarding (and disembarking) a train. Persons with disabilities are exposed to uncomfortable conditions and many impediments that may threaten their health or even their lives. Such elements include a lack of seat belts, a lack of handrails, narrow doors, or difficult access to facilities.

Table 7

Elements of particular processes of the highest risk level indicators

Process	Element of the process	Defect	RPN
Access to the railway station	Pavement	Holes and uneven surface	90
	Footbridge steps	Damaged	90
		Inadequate (damaged) ramps	100
Access to the platform	Tunnel	Damaged steps	100
		Lack of handrails	90
		Lack of ramps	100
		Damaged ramps	100
	Dangerous elements (e.g., Sewer grates)	100	
	Footbridge	Lack of ramps	100
Entrance and exit from the train	Boarding and disembarking the train	Lack of ramp for the train	100
	Travelling by train	The train is not adapted for persons with disabilities	100
		Narrow door	100
		Lack of the possibility to use the toilet	100
		Lack of safety seatbelts	100
		Lack of handrails	100
		Lack of the possibility to reach assistance buttons	100
Lack of aural and visual information	90		



Fig. 1. The main railway station in Bielsko-Biała –access to the platform, the shed, and the footbridge (the authors’ photography)

If a person in a wheelchair is at the railway station in Bielsko-Biała (Figs. 1 and 2) for the first time, they will not know that the previous effort put in to overcome two steps is not needed because the exit to the tunnel is not possible anyway. The authors of this article analyzed all the disadvantages of the driveway in turn:

- **Condition:** The driveway is fragmented and damaged. If there is even the smallest hole in the driveway, it can be dangerous. In this case, very large pieces of the driveway are missing, which significantly exposes a disabled person to an accident.
- **Inclination of the driveway:** During the observation, an attempt was made to walk down the driveway. For a healthy person, this was a difficult task because the angle of inclination is much too steep.



Fig. 2. Stairs and driveway in the tunnel at the main railway station in Bielsko-Biała (the authors' photography)

The Regulation of the Minister of Infrastructure dated April 12, 2002, regarding the technical conditions that buildings and their locations should meet, Section 70 [21], constitutes a significant component in the analysis of technical conditions concerning the gradient of ramps in tunnels. This regulation provides comprehensive guidelines regarding the permissible range of gradients that can be applied in the design and construction of tunnels. Pertinent information on these criteria can be found in Table 8, which illustrates the recommended values for the gradient of ramps in tunnels in accordance with the aforementioned regulation, thereby providing a foundation for further analysis in the areas of design and infrastructure safety.

Table 8

The maximum inclination of the ramp for specific conditions of its use

Height difference	Ramp located outside (without roofing)	Ramp located inside the building or outside under a roof
up to 0.15 m	Max. slope 15%	Max. slope 15%
0.15 m – 0.50m	Max. slope 8%	Max. slope 10%
over 0.50 m	Max. slope 6%	Max. slope 8%

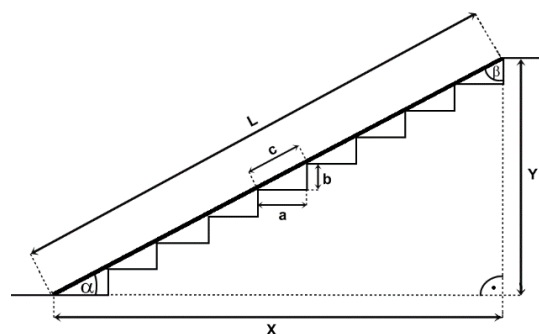


Fig. 3. Ramp on the stairs

For height differences exceeding 0.5 m outdoors (Table 8, Fig. 3), the maximum gradient should be 6% according to the regulation. However, in the observed case, the gradient exceeds this limit, reaching a calculated value of 47% (the calculations were performed by the authors but are not presented here).

due to space limitations). Such a steep ramp gradient is deemed unacceptable, and a ramp of this nature should not be located in a public area.

5. CONCLUSIONS AND RECOMMENDATIONS

A disabled person arriving at the main railway station in Bielsko-Biała may encounter many difficulties. In order to look for solutions to diagnosed problems, it is possible to use another qualitative tool: a tree diagram, also known as a systematic diagram, tree analysis, analytical tree, or hierarchy diagram. A tree diagram is a novel management planning tool that illustrates the hierarchical arrangement of tasks and subtasks necessary for accomplishing an objective.

Below is an example showcasing the application of a tree diagram (Fig. 4) to address the issues in this area, specifically the adaptation of timetables to the needs of individuals with disabilities. One suggestion is to prioritize hanging timetables at lower levels and increase their font size. This modification would enhance accessibility for people with disabilities, ensuring that essential information is prominently displayed in easily visible locations, thereby reducing the need for extensive search efforts and mitigating challenges related to reading timetables.

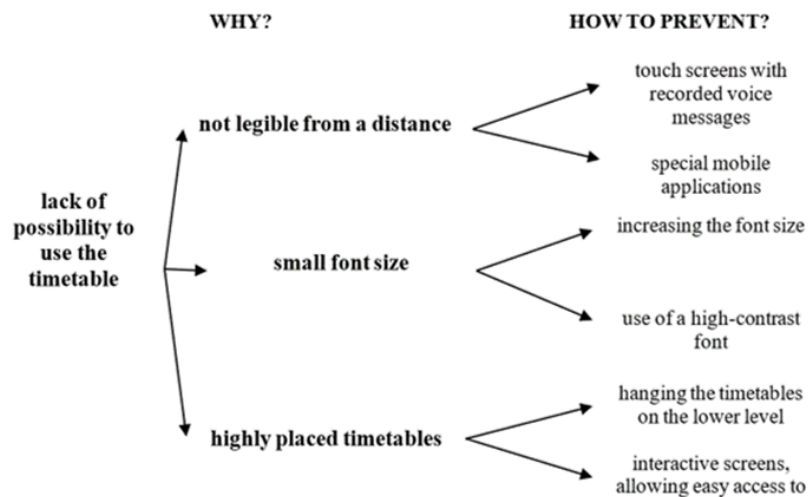


Fig. 4. Tree diagram: Searching for a solution to problems with timetable visibility

Several improvements are proposed to address the aforementioned challenges by alleviating the incongruence of rail transport infrastructure with the needs of individuals with disabilities. These enhancements include:

- **Installation of two elevators at the station footbridge:** Constructing elevators at the station footbridge, situated near the bus station and Stefan Okrzeja’s St. (located on the opposite side of the railway station), would greatly facilitate accessibility for individuals with disabilities. A wheelchair user could effortlessly utilize the elevators, traverse the footbridge, and, upon reaching the other side, access the sidewalk leading directly to the railway station. This solution, despite incurring higher construction costs compared to a ramp, is more logical. Notably, constructing a ramp on the footbridge would present significant complications due to its height, making it challenging to maintain an appropriate slope for safe passage, especially under winter conditions. Hence, elevators present a more viable solution.
- **Modernization of the platform surface:** The significant problem of poor platform surface conditions necessitates renovation efforts to ensure safety and accessibility.
- **Renovation of the tunnel:** The tunnel is another facility that poses potential hazards to the health and even lives of disabled individuals due to its inadequate condition. The complete removal of

existing ramps, which are currently unusable, is imperative. Instead, installing elevators in place of the ramps, as implemented in other railway stations, is recommended.

- **Provision of a mobile ramp for independent boarding:** Inadequate provisions for disabled passengers accessing trains is a prominent issue. Not all trains are equipped with barrier-free facilities, making entry challenging for wheelchair users. A mobile ramp with adjustable height, suitable for various train types, should be provided to address this problem. This would offer travelers comfort during entry and, most importantly, ensure their safety by eliminating the need to manually carry wheelchairs onto the train.
- **Adaptation of trains to accommodate individuals with disabilities:** While not every train requires a complete replacement, it is essential to provide a minimum standard of travel comfort and safety for disabled passengers. Such adaptations include the installation of seat belts in all trains. Additionally, widening the train doors (the current 0.5-m width is insufficient for wheelchair access) would allow entry into compartments and toilets.
- **Implementation of route markings:** The absence of route markings guiding individuals to the railway station is observed in Bielsko-Biała. This lack of guidance often leaves first-time visitors uncertain of the correct path to their intended destinations. Marking routes indicating the safest pathway to the railway station would greatly benefit individuals with disabilities, as well as mothers with strollers, providing clear guidance and enhancing accessibility.

The progress of modern society in the era of general economic and infrastructural changes increasingly recognizes the needs of people with disabilities. These people want to take an active part in the life of society, and they want to work, learn, and travel. Regretfully, many public utility facilities still do not meet the required standards for barrier-free access for people with disabilities to function freely. This article attempted to identify to what extent railway infrastructure is adapted to the needs of people with disabilities and what problems they struggle with most frequently. Based on the conducted research, it can be concluded that the railway station in Bielsko-Biała still has many deficiencies that make it difficult for people with disabilities to function freely.

The biggest obstacles include a lack of adjustments to some facilities of the building of the railway station to the needs of persons with disabilities, a lack of an appropriate ticket window enabling people in wheelchairs to purchase tickets comfortably, timetables in poor locations, difficult (if any) access to toilets inside the building. Other obstacles are the access to the platforms, station passage, and tunnels that are not properly adapted to the needs of the persons with disabilities. Boarding (and disembarking) trains, during which wheelchair users are not secured in any way (lack of seat belts), may also pose a problem. A number of changes and modernizations should be introduced in order to facilitate the usage of rail transport for people with disabilities.

In conclusion, this article sheds light on the current state of railway infrastructure in terms of accessibility for people with disabilities, with a specific focus on the Bielsko-Biała railway station. The identified deficiencies and obstacles highlight the pressing need for improvements to ensure barrier-free access and inclusive transportation for individuals with disabilities.

Regarding various challenges, such as inadequate facilities, limited platform accessibility, and the lack of safety measures during journeys, it is evident that significant changes and modernization efforts are required to meet the needs and aspirations of people with disabilities in the realm of rail transport. Future research should prioritize the implementation of comprehensive accessibility standards, strategic infrastructure modifications, and enhanced safety measures to foster an inclusive and equitable transport system for all passengers.

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