

# **Mobility for wheelchair bounded people in the city of Cluj Napoca**

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## **Abstract**

*Road safety, especially in the urban area is a beneficial good for the citizens since they represent the most vulnerable part of the traffic system. Furthermore the disabled, elderly people and children are exposed at the higher risk of accident because of their specific mobility characteristics. The aim of this article is to point out the difficulties encountered by a wheelchair bounded person who travels within Cluj-Napoca with the respect to safe mobility. In the case study the situation of a Student was analyzed. He's disability keeps him bounded in a wheelchair but he performs usual daily activities and therefore he needs to overcome the distance between different locations. The analysis considers the modes and means of transport accessible to the Student and then the mobility and accessibility are assessed. The infrastructure condition and the traffic management in the city are identified as having the biggest influence on the disabled people mobility, with major implications on traffic safety. Thus, the inclusion of the disabled people in the community is directly connected to their safe mobility, which needs to be ensured in advanced.*

## **Rezumat**

*Siguranța drumurilor, mai ales în zona urbană este un element benefic pentru cetățeni deoarece aceștia reprezintă cea mai vulnerabilă componentă a sistemului de trafic. Mai mult, oamenii cu dizabilități, vârstnicii și copiii sunt expuși la un risc mai mare de accidentare datorită caracteristicilor lor specifice de mobilitate. Scopul acestui articol este de a arăta dificultățile întâlnite de o persoană în scaun cu rotile care se deplasează prin orașul Cluj-Napoca din punct de vedere al siguranței mobilității. În studiul de caz a fost analizată situația unui Student. Dizabilitatea sa îl leagă de un scaun cu rotile dar el efectuează activități zilnice obișnuite și prin urmare el trebuie să depășească distanța dintre diferite locații. Analiza consideră modurile și mijloacele de transport accesibile Studentului și apoi mobilitatea și accesibilitatea sunt evaluate. Condiția infrastructurii și managementul traficului în oraș sunt identificate ca având cea mai mare influență asupra mobilității persoanelor cu dizabilități, cu implicații majore asupra siguranței în trafic. Astfel includerea persoanelor cu dizabilități în viața comunității este legată direct de asigurarea mobilității lor în siguranță, care trebuie asigurată în prealabil.*

**Keywords:** road transportation, traffic safety, vulnerable road users, means of transportation, authorities.

## **1. Introduction**

Mobility represents the essence of mankind's continuous development, based on the transportation of people and goods on different ways. Road transportation plays a vital role in satisfying the

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mobility needs of modern society. Nowadays, we witness a major road system expansion designed in order to satisfy both economic and social aims of road transportation. *Therefore several important adverse effects are accounted on the urban structures and society, such as vicious and often irreversible cycles of sprawl, automobile mobility, and reduced accessibility* [1, 14].

Accessibility is the first goal of the present sustainable orientation of the urban mobility planning promoted worldwide. Safety and security comes second and then follow the environmental and population health, improved cost-effectiveness of transport and enhancing the attractiveness and quality of the urban area [7].

Social aspects like access to work, education and training, health care and leisure, etc., should be accomplished in conditions of utmost safety. According to the World Health Organization the road traffic accidents are an "epidemic" that causes over 1.3 million deaths and 50 million non-fatal injuries each year on the world's roads [10]. In 2009, more than 35,000 people died in accidents in the European Union, i.e. the equivalent of a medium town, and no fewer than 1,500,000 persons were injured. The cost for society is enormous representing approximately 130 billion euro not counting loses of human lives, which cannot be replaced. The road safety policy of the EU aims at raising the level of road safety, ensuring safe and clean mobility for citizens everywhere in Europe. It should foster equity among road users through focused efforts to improve the safety of more vulnerable road users [6].

## **2. Disabled people in Romania**

In Romania there are 690.469 people with disabilities registered at "The National Authority for Persons with Disabilities". Most of them, around 673.360, are not institutionalized [13]. They have the same rights like everyone else to live, work, travel etc., and that's why they need help to get integrated in our society. In 2005, through a government decision, there were established several objectives concerning disabled people: promoting social integration as active citizens able to control their lives, improving institutional and administrative capacity at national level, providing access to the social services, strengthening public-private partnership, promoting quality services delivery that responds to the individual needs, accessible physical environment, information, transport and housing, correlation of protection system for both disabled child and adult [8]. Although the social system seems to be adapting at the European Union standards, the reality shows that a huge number of disabled people remains neglected. In order to offer them support we must identify the difficulties that they encounter in public spaces because ensuring their mobility and accessibility represents the only chance to perform day to day activities and to adapt to a normal life in the society. "The National Authority for Persons with Disabilities" has classified ten deficiencies: physical, somatic, auditory, visual, mental, psychological, associated, HIV / AIDS, rare diseases, deafness-blindness, with different levels of manifestation. In order to support the disabled, current legislation imposes some specific rules for civil buildings and urban spaces adaptation by norms [11] for the following deficiencies: mechanical and motor of the limbs, eyes and hearing. Mechanical and motor limb deficiencies refer to people that encounters difficulties in walking, wheelchair bounded and impaired limb movement.

The Romanian Highway Code specifies that a physically disabled person may attend the driving license exam for category A and/or B only if he possesses a vehicle adapted to his infirmity [15]. Cars can be tailored to the disabled person needs according to the specified regulations of The Romanian Auto Registry. Mobility and accessibility needs are the same for every human being, regardless of their physical condition. In our opinion, there is a special category among disabled, the wheelchair bounded people who present usually only physical deficiencies. In order to offer them a chance to live, work and perform the most common daily activities it is important to analyze the mobility and accessibility difficulties that they encounter while traveling into public spaces and

to get actively involved in solving them.

### 3. Urban mobility

Road traffic includes vehicles and pedestrians in both active and passive phase. The human factor has a significant involvement as a part of the traffic system because of the direct influence in traffic, according to Figure 1, and for being the creator of both vehicle and road. Furthermore, their participation as a decision factor in creating and managing the traffic ensures people a major role in the traffic system. Thus they must understand the safety problems of every category - drivers (individuals, employee, employer, business man, police officer or firefighters in a mission, etc.) or vulnerable users such as riders of motorcycles/mopeds, cyclists and pedestrians. A special attention should be given to users that present an intrinsic "fragility" (e.g. elderly, young children, the disabled), whatever their role in traffic (pedestrian, driver, passenger) [6].

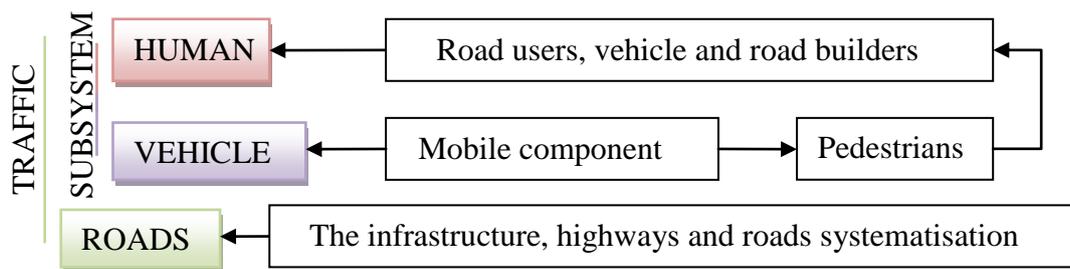


Figure 1. Road traffic components [2]

Nowadays the symbol of a big city is an impressive airport but the most important element offered by a sustainable city is the safe mobility. At the moment, a city represents more than a suite of its urban functions, architectural style, sport and leisure facilities, hospitals or shopping centers it is a framed array of the mobility within the area and the accessibility to these objectives. The necessity of a suitable transport development, traffic management and traffic safety in the city stand as a very important job for the authorities. They have to come up with sustainable solutions that help environment preservation, air pollution and noise level reduction [9].

#### 3.1 The traffic in the city of Cluj-Napoca

The traffic in the city of Cluj-Napoca, the most important city in Transylvania, represents a delicate subject due to the great amount of traffic generated by its very important urban functions – academic, administration, medical, commercial and leisure attractions. The road transportation represents the most important way of traveling in this city. Cars are by far the most used mean of transport because they offer independence and great accessibility for people, since they are allowed almost everywhere in the city. But the intensive car usage generates traffic jams, accidents and pollution. Other transportation modes are available such as public transportation, motorcycles and mopeds, bicycles and walking. They reduce the effects of traffic congestion and improve the quality of life, but provide a high exposure to accidents for their so called "vulnerable road users". Furthermore the children, the elderly people and the disabled people are the more exposed categories.

Recent investigations on the urban mobility and accessibility in Cluj-Napoca have been conducted [4]. The results highlighted several possibilities to improve the two aspects [5].

### 3.2 Wheelchair bounded people mobility

Wheelchair bounded people have the right of a normal life. The majority of people in this disfavored condition could get all forms of education and training, jobs, sports and leisure etc. But accommodating their wheelchair dependency requires additional mobility and accessibility analysis. In order to ensure them the possibility to perform usual daily activities it is important to identify the difficulties they encounter while moving into public spaces.

The means of transportation available for this people, manually or motorized (A or B driving license category) allow them to travel individually are listed below and illustrated in Figure 2:

- ✓ manually operated or powered wheelchair
- ✓ electric scooter
- ✓ wheelchair tricycle
- ✓ private car adapted to the infirmity according to the specified regulations of R.A.R.

There is also possible to use public transport in Cluj-Napoca, because vehicles are tailored for wheelchair bounded people use.



Figure 2. Wheelchairs and other suitable vehicles

### 3.3 A Case in Cluj-Napoca

To understand the possible obstacles encountered by a wheelchair bounded person travelling in the urban public area, we have considered the situation of a student from the Faculty of Civil Engineering, in Cluj-Napoca. We assume the following facts: the Student lives in the University Campus in the 2<sup>nd</sup> Dorm, he attends his classes in 4 several buildings, one of them is located nearby the Campus and the others in the city centre, and he is usually purchasing the groceries and other goods from the nearby shopping centre. We assumed that his physical condition requires therapy sessions at the Recovery Hospital located near the Campus. In the following pictures are illustrated the locations where the Student must travel in an ordinary weekday and the parking facilities (★) if available.

There are several locations within *the University Campus area* that the Student usually needs to reach as illustrated in Figure 3 and listed below:

- (A) the Dorm - where he is living
- (B) the 3rd building of Faculty of Civil Engineering - where he attends some of his classes
- (C) the Recovery Hospital – where he is going often for the therapy sessions
- (D) Shopping Center – where the Student buys the groceries.

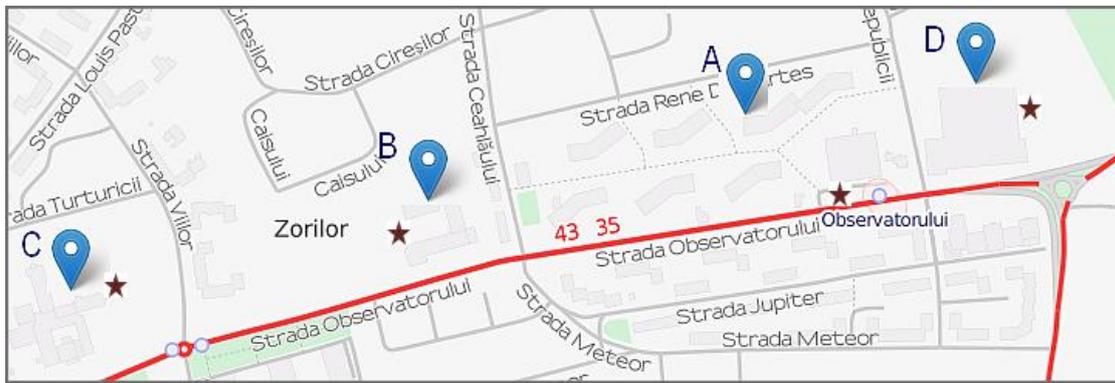


Figure 3. Locations in the University Campus area. Source [12]

Those objectives that the Student needs to reach *within the Campus* area determine the following possible routes:

- (A) Dorm → (B) 3<sup>rd</sup> building of Faculty of Civil Engineering
- (A) Dorm → (C) Hospital
- (A) Dorm → (D) Shopping Centre.

The available bus lines are 43 and 35 and the bus stops are also indicated. The short distances that the Student needs to cover allow him to use any of the vehicles presented above: manually operated or powered wheelchair, electric scooter or private car.

The locations within *the city centre area* where the Student usually needs to travel are illustrated in Figure 4 and listed below:

- (E) the main building of the Faculty of Civil Engineering, located on Gheorghe Baritiu Street - where the Student attends most of his classes
- (F) the laboratory of hydraulics, LH, across the street
- (G) the 2<sup>nd</sup> building of the Faculty of Civil Engineering - where he attends some of his classes
- (H) the administration services, located on the Daicoviciu Street – where he needs to get in order to accomplish several administrative tasks
- (I) university store - where he can buy books and other supplies
- (J) university library – where he can rent books.

The numerous objectives that the Student needs to reach within the downtown area determine the following possible routes:

- (E) central building of the Faculty of Civil Engineering → (F) LH, hydraulic laboratory
- (E) central building of the Faculty of Civil Engineering → (G) 2<sup>nd</sup> building of the Faculty
- (E) central building of the Faculty of Civil Engineering → (H) Administration offices
- (E) central building of the Faculty of Civil Engineering → (I) University store
- (E) central building of the Faculty of Civil Engineering → (J) University library.

The short distances between the locations of activities allow the Student to use any of the following vehicles: manually operated or powered wheelchair, electric scooter or private car.

The analysis here is not taking into account the accessibility or how the student is moving inside the buildings. But a recent study [16] in five major libraries in the city of Cluj-Napoca presents the issues regarding the accessibility and services for the disabled. The Technical University library is among these and the results rank it on the last position with no facilities for the disabled accessibility in the building of the library.

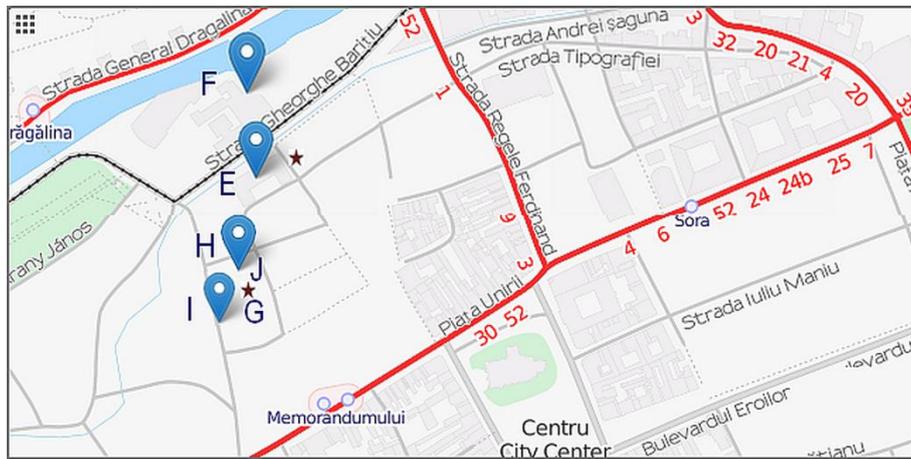


Figure 4. Locations in the city centre area. Source [12]

There are also routes that cover long distances, e.g. (A) Dorm→ the downtown area (E). The daily trips of the Student, regardless the mode he uses, are going to be analyzed. For a more conclusive result we considered the short distance urban mobility, covering a length less than a kilometre and the long distance mobility. The analysis of the short distance mobility of the Student will be presented first.

### 3.3.1 Covering short distances

♿ Travelling by non-motorized operated wheelchair is possible on short routes but it may be difficult in some areas because of the road surface elements. For example, a steep longitudinal slope requires a considerable physical effort from the Student. Using a non-motorized operated wheelchair may also be difficult for him on certain sectors because of the irresponsible speeds of cars and damaged road surface. Thus, for safety reasons using the sidewalk is recommended. On the other hand, the access on/off the sidewalk is hampered by poor condition or lack of access ramps in the direction of travel. There are even recent restorations visible on the sidewalk but without any border adjustments to the needs of disabled people. In addition to those problems, drivers are not aware of possible non-motorized vehicles movement on the sidewalk, usually blocking the access on the ramps by illegally parking in front or even on the ramps. Otherwise, the Student should be very careful when crossing the streets because the traffic management measures are poor. Some examples for the situations mentioned above are shown in Figure 5 and Figure 6. Overall, the Student travels at very low speed and manoeuvrability and he needs to overcome many obstacles. He is travelling under low safety conditions and reduced comfort and thus the non-motorized wheelchair remains the best option for very short distances, or transit from personal car or bus to a nearby location.



Figure 5. Ramp issues



Figure 6. Obstacles on the sidewalk

♿ Travelling by a powered wheelchair or electric scooter ensures a shorter travel time because they allow achieving top-speeds around 8 km/h on the roadside. It is recommended that the Student chooses less travelled streets whenever possible and always keep on the first lane. He also must be aware of the potential obstacles on the road: drains, gutters, parked cars that may start or open the left door suddenly and the road surface itself. Few examples of difficulties encountered on these routes are pictured in Figure 7.



Figure 7. Obstacles on the road [3]

It is mandatory for the Student to check the vehicle equipments every time, especially if the electrical signalling of the scooter works. For safety reasons, he has to increase the vehicle visibility on the road, so that other road users may spot it from a considerable distance. It is imperative that he is acquainted with the traffic rules and follows them, so that his trip will be completed under optimum conditions of accessibility, safety and comfort. For example, he always has to give right-of-way to other vehicles when he enters the car traffic flow and to be very careful with pedestrians and cyclists, especially when crossing their dedicated paths.

### 3.3.2 Covering long distances

The longest distance that the Student needs to cover is on the way between the (A) Dorm and the city centre area. The sloppy terrain and the high traffic on the way to the city centre area limit the

modal choice of the Student. He may travel by car or by buss.

♿ The Student may choose to travel with his own vehicle. In this case he may choose independently the route but he has to consider the parking possibilities. Civil Engineering Faculty provides quite few parking places for the city centre buildings due to their location in the dense built up historical area as they can be seen in figure 4. Around the Campus there is a dedicated parking lot for the students that live in the Dormitories. There are also private parking lots provided at the 3<sup>rd</sup> building of the Faculty, at the Hospital and the Shopping Centre (figure 3). He could get periodical subscription for a parking place inside the Campus and next to the Faculty buildings. Special places assigned for disabled people are not marked down, even though the norms impose that at least two places should be assigned in this case. First time when such a request would be made there is no doubt that the academic staff will make the changes accordingly.

♿ In order to get from the Dorm to the downtown area and back the Student may choose the more environmentally benign mode of public transportation. The buss number 35 is available. One of the bus stations is located across the street from the Dorm. The other one in the city centre is more remote form the faculty buildings but not further than a ten-minutes travel. Both bus stations are pointed out in Figure 8. All the buses on this line are properly equipped for easy access of disabled people and the bus drivers chooses carefully the place to stop whenever they encounter wheelchair bounded people in the bus station.



Figure 8. The bus route from the campus to the city centre. Source [12]

#### 4. Conclusions

As a result of the case study we noted that people with disabilities are not perceived as active citizens and that the communities show few preoccupations for their integration. According to National Authority for Persons with disabilities statistics only 20% of all public buildings are adapted to the disabled people needs [13]. The integration of disabled people could be dramatically improved, considering that most of them are suitable for work but lack of accessibility keeps them

away. Meanwhile, unemployment benefits for this group may cease to be paid and invested for long-term actions that would help facilitate access to public space.

Furthermore, the mobility and accessibility of the disabled people in Cluj-Napoca area are limited by the infrastructure condition, the traffic management and lack of dedicated facilities since they are not perceived as active users in the urban traffic. The results will be presented to the authorities and hopefully, on the City Hall agenda, a specific program concerning this disadvantaged category of citizens is going to be introduced. Authorities, traffic specialist, academics and medical staff should be co-opted in an integrated program for analyzing the problems this people face when travelling in the urban area and start improving the capital problems.

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