

Improving Cycling Infrastructure for people with disabilities

Home Location: Novo Brdo

Participants:

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Introduction

As part of the Bike Access summer school in Ljubljana, we worked on improving cycling infrastructure for people with disabilities. Our project involved four students from three different universities: Maciej Mazurek (University of Krakow, Faculty of Economics), Blaž Kozejc (University of Ljubljana, Faculty of Chemistry), Uroš Mitrović and Silvija Blagojević (University of Belgrade, Faculty of Geography). Our group was required to analyze and enhance the accessibility and condition of cycling infrastructure at four specific sites: Home location Novo Brdo, the workplace in the Vič Industrial Zone, the Vič-Rudnik Health Center, and the Tobačina Administrative Office. Our aim was to find the simplest route that would connect these points and thus enable people with disabilities and other cyclists to move more easily through the city.

Methodology

We started our summer school with presentations on cycling in Ljubljana, cycling infrastructure and in general the accessibility of Ljubljana for disabled people. Additionally, we met Primož Jeralič, a paralympic cyclist which was an eye-opening experience that allowed us to see the cityscape through the eyes of disabled person. Riding in wheelchairs and specialized bikes designed for people with disabilities, we felt first hand all the bumps, the inclines, and the moments of triumph when accessible paths aligned seamlessly. This was all part of the **introductory phase** where we learnt some very valuable things that were going to be the basis of all our further work.

The next phase was **field work** which was separated into two parts, first we had to do the **route assessment** - we needed to decide on the best possible route that we were going to take. Our idea was to take the route that we agreed on went through back streets where traffic was moderate and that people with disabilities were more likely to use. In designing the route we took advice from our college from University of Ljubljana since he is an experienced cyclist and also native to Ljubljana. The second part of the field work was on Tuesday, where we thoroughly **cycled through routes** that we previously decided on, noting existing infrastructure, road conditions, and potential obstacles. Using **QField**, we recorded our observations, marking every spot we thought was challenging and needed improvement and **creating the problem map** that we would later use for further analysis and developing solutions. We also took many photos of the good and bad practices.

After field work, the map from QFields was imported into **QGis**, which was the main software we used for analysis and map development. In QGis we marked main problems in the area. We also developed a **SWOT** analysis and after clearly seeing the condition and prioritizing the problems we decided on key spots in the area that we should find solutions for and improve on. For visualization of the proposed solutions we used QGis, where we developed a solutions map, but we also used AutoCAD for precise drawings of the problematic cross sections, as well as Google Earth for finding alternative solutions.

Analysis and Key Findings

As previously mentioned, after collecting data from the field work using QFields, we transferred all of the data, including photos into QGis and analyzed the information collectively. Some of the criteria we took into account were:

- the existence of cycle tracks and their width;
- cycle track material, type and maintenance;
- steep slopes, curbs, steps and other obstacles on cycling tracks;
- missing, incorrect or unclear signalisation;

- missing or inadequate bicycle parking spaces;
- conflict with motor traffic and crowded areas;
- visibility;
- shades.

Based on this we identified common problems across different routes. Prioritization was based on severity and impact.

To further develop the problem we created a swot analysis:

Strengths	Weaknesses
<ul style="list-style-type: none"> ● Existing cycling tracks ● Short distance ● Tržaška street infrastructure ● Slow moving traffic in Rožnaja Dolina 	<ul style="list-style-type: none"> ● No parking space ● Bad signalisation ● Slopes and track surface ● Railway under pass ● Uphill ● Traffic
Opportunities	Threats
<ul style="list-style-type: none"> ● Cesta na Vrhovce ● Cesta v Rožna Dolina ● Flat terrain ● Lower speed limit ● Shade ● Tibilska st. sidewalks could become cycling path 	<ul style="list-style-type: none"> ● No cycle tracks ● Conflict with motor traffic ● Width of the track ● Bus stop ● Drainage canals

Key Problems

Most common issues related to cycling accessibility that we encountered were:

Uneven surfaces: Many of the bike paths we took had issues such as potholes, gravel, or cobblestones, also, uneven sidewalks that are used as cycling paths especially in residential streets.

Lack of accessible ramps or railway underpasses: Since the workplace location was on the other side of the railroad people would have to go through very narrow underpasses in order to get to the other side. Many of these underpasses are not adequate, and were badly constructed ramps that present a challenge even for experienced cyclists.

Lack of sloped curbs: Without ramps or sloped curbs, wheelchair users, those with walkers, or people using mobility aids face barriers. They cannot easily transition from the road to the sidewalk or vice versa.

Narrow cycle lines: Most of the cycle paths are very narrow and are far away from the standard of 1.5 m, such as the once on Cesta na Brdo.

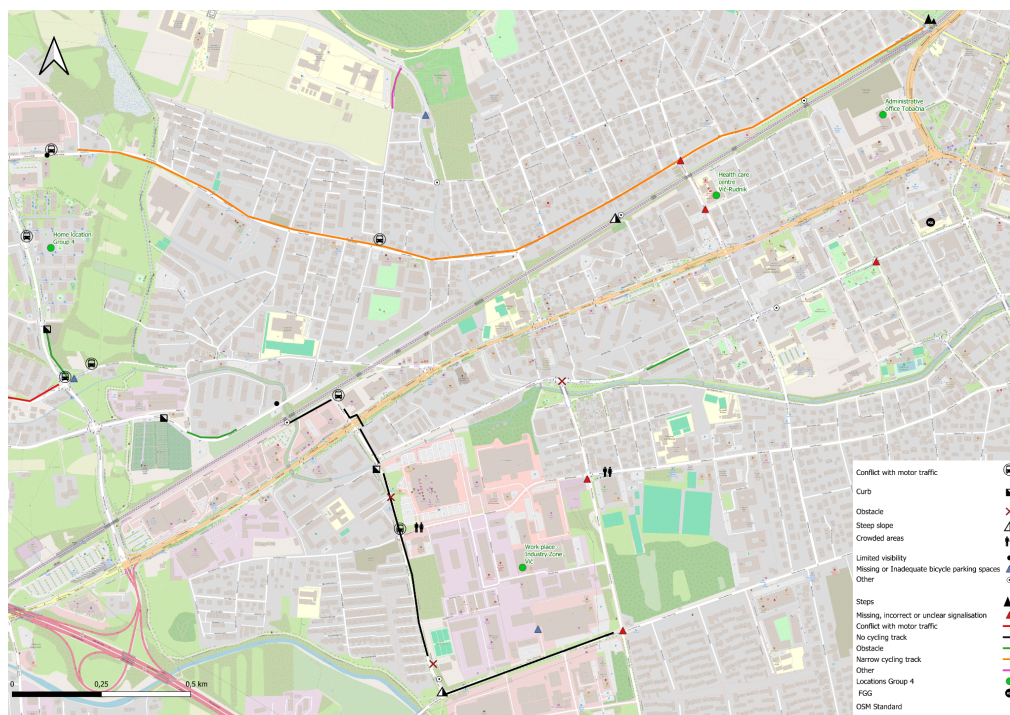
Intersections with poor visibility and/or heavy traffic: most of which we found near the workspace location and home location.

Obstacles (parked cars, traffic signs, potholes): Obstacles disrupt the flow of cycling paths. Wheelchair users, adaptive cyclists, or those with visual impairments must navigate around them. They create physical and mental stress and may force detours or cause collisions.

Bad signalisation on the cross sections (Fajfarjeva street): Unclear or missing signage confuses cyclists. People with cognitive disabilities or visual impairments rely on consistent signals. Wrong turns, missed crossings, or unsafe maneuvers can occur.

Non-existent cycling paths in Cesta v Mestni log and Tibilisijska streets: Lack of dedicated cycling paths means cyclists must share space with motor vehicles. People with disabilities face heightened risks—especially if motor traffic is heavy.

Very few resting and parking places: Insufficient resting spots along cycling routes limit opportunities for breaks that people with disabilities may need more frequently. And also lower the chance of using the bike if there is no place to park.



Problem map (created using QFields & QGis)



Some of the problems we noticed.

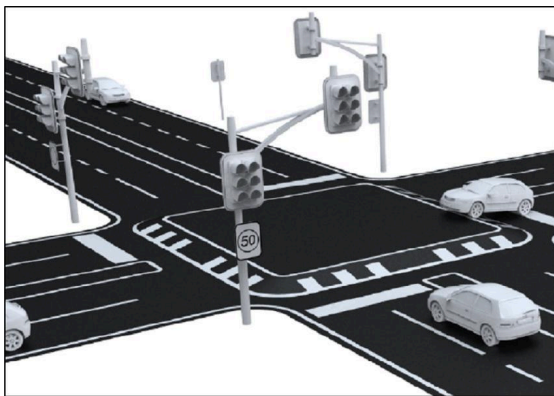
Proposed Solutions

Based on the key problems we developed a set of ideas that can be used for improvement of the cycling routes, such as:

- **Creation of Dedicated Cycle Tracks:** New cycling lanes should be constructed in areas where they are currently missing.
- **Improve signalisation:** Coloring the cross sections and adding bike boxes on cross sections.
- **Elevating cycling path:** Most of the cycling paths should be elevated to the height of the sidewalk.

- **Road mirrors:** To improve visibility road mirrors should be installed at the points of railway underpasses.
- **Asphalt the cycling paths:** Some of the cycling paths are
- **Elevate the cross section (Dutch cross section):** Cross actions should be elevated, where possible to lower speed of the traffic and increase safety for cyclists.
- **Traffic separation and lower speed limit:** For narrow bike lanes we propose separating bike lanes from sidewalks and lowering the speed limit to 30 km/h.
- **Drainage canals:** Drainage canals should be positioned closer to the center of the road to avoid their placement on the cycling path.
- **Adapting the ramps:** Ramps should be built to facilitate access to inaccessible passages for people with disabilities, so that they have the corresponding drop and if it is necessary to turn to allow a wider arc.
- **Parking spaces and rest areas:** Install bicycle parking stations at the industrial zone and healthcare facilities

Some of the solutions we proposed:



Additional solutions would be education, awareness and community engagement, conducting workshops for cyclists, pedestrians, and drivers to raise awareness about sharing the road, promoting respectful behavior and understanding and involving people with disabilities in planning and decision-making.

Conclusion

To conclude there are cycling paths for regular cyclists, most of the paths are very badly maintained, but very few are accessible for people with disabilities since the existing lines are not wide enough, have many curbs and obstacles and are not properly signaged. The biggest problems were noticed in the workplace area in industrial zone Vič and near the home

location. Home location is uphill which can be challenging for people with disabilities, elderly and children. Besides problems with infrastructure there is also lack of awareness for adapted cyclists. By implementing our recommendations, we can create a more inclusive and safer cycling environment.