

DESIGN OF A CYCLE PATH IN THE PLIEŠOVSKÁ KOTLINA MICROREGION OF SLOVAKIA

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Abstract

At present local municipal authorities have been creating corridors and infrastructure for alternative ways of transport, including cycling. Such arrangements can significantly contribute to road traffic improvement, increasing road safety, creating a healthier environment, and improving conditions for leisure time activities and the economy in the regions of Slovakia. The project deals with the design of a cycle path which will provide a new opportunity for a safe and hazard free transit route for cyclists and pedestrians between the villages in the Pliešovská basin micro region and will serve the residents and general public alike. The project also includes the proposal for public street lighting, thus also enabling the path to be used during evening and night hours, as well as in poor visibility, which will improve safety both for cyclists and pedestrians. The project also includes a design for a resting place equipped with mobiliari, such as the information board, cycle racks, a seating area and traffic signs which in their design and colour will fit harmoniously with the local architecture and in their choice of material will compliment the surroundings.

Key words: cycling, recreation, mobiliari (objects in the public realm), environment

Introduction

Neither our road network system nor cyclists in Slovakia have been prepared for the unprecedented popularity of cycling. Currently cycling presents a danger for cyclists and other road users, in particular, safety issues remain unresolved, in what is referred to as shared traffic by inundating the cities with bicycles. (WWW.UAMKSR.SK). Nowadays developed countries, cities and villages have been creating the corridors and infrastructure for alternative ways of transport, including cycling. (ĽUPTÁK, 2010).

The objective of this paper is a practical proposal for the safe movement of cyclists and pedestrians in an area of interest outside the transport corridor including the planning and architectural design proposal for a rest area fitting with the nature of the locality.

Material and methods

The applied work methods in the terrain research include the mapping of the area of interest between the villages of Pliešovce and Sása, which are considered attractive and are used for cycling, and also demarcation works. In addition, the engineering and geological survey was conducted in order to ascertain the physical and mechanical quality of the bedrock and the findings were used in the design of the cycle path.

On the basis of the research findings the proposal of the route was prepared in accordance with the STN (Slovak Technical Standard) no. 736108 and the methodology according to ĽUPTÁK (2010).

The basic source for the design was the project documentation under the name of "The educational footpath in the Pliešovská basin between Sása and Pliešovce"(SLÚKA, 2009). The proposal also included the design for the recreational mobiliary amenities and public street lighting. The proposals were designed using the software Roadpac, Microstation, Kalkulus and Google SketchUp 3D Design.

Results

The cycle route is located in the south-eastern part of the Pliešovská basin, between the villages of Pliešovce and Sása, in the location called "Na chotári". The route design of the cycle path deals with directional routing, elevation routing and spatial route layout according to the STN 736108 (picture no. 1 and 2). With respect to directional routing, the proposed route starts in Pliešovce village, joining the local road (Obrancov mieru street), it continues towards the watercourse Neresnica, then it runs alongside the river at a distance of at least 10 metres from the existing bank, after that it crosses a small stream Lomniansky potok turning left behind it and finishes by joining the local road (Nová street) in Sása village. The left-hand and right-hand directional curves alternate on the route. There are 13 of them, with radii ranging between 5 and 300 metres. The total length of the route is 1,136 m.

With respect to elevation the route is planned in flat terrain, it has an undemanding smoothly descending profile and the incline range of 0, 13 – 7, 30 %. The 11 altitude curves are designed with the radii ranging from 150 – 15,000 m. The route starts at an altitude of 408.27 MAMSL and finishes at an altitude of 385.48 MAMSL.

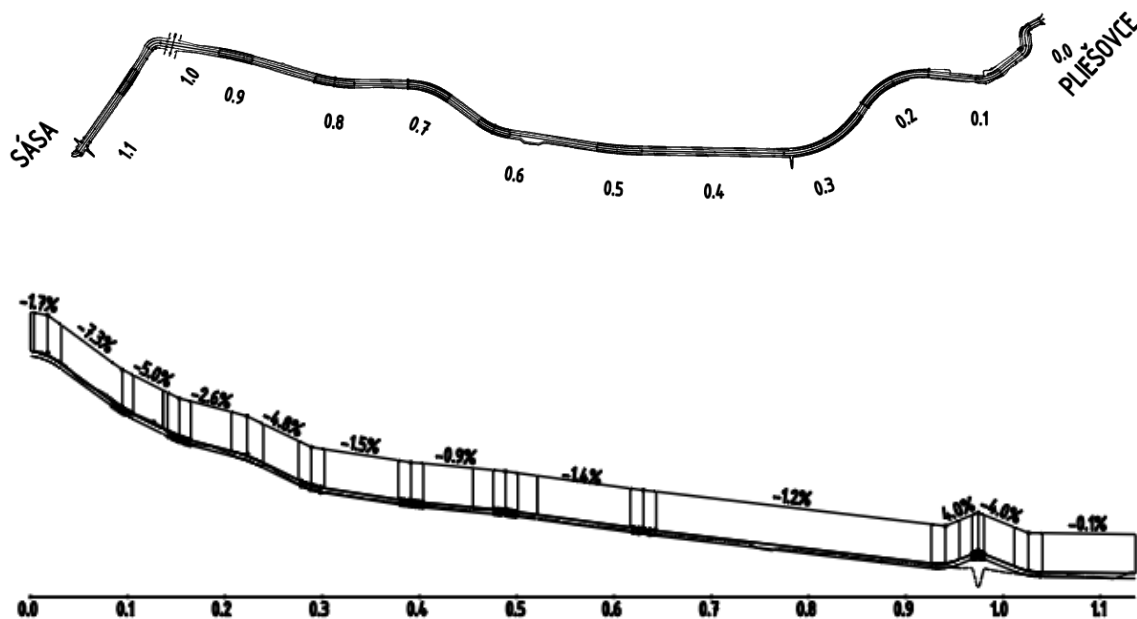


Fig. 1: Situation and longitudinal profile of proposed cycle path

As for the spatial layout, the proposed unobstructed width of the cycle path is 4.25 m, of which the road is 3.0 m widening in the directional curves and in the sections with longitudinal incline above 4.0 %. The width of the shoulder verges reinforced with aggregates is to be 0.50 m on the left and 0.75 m on the right to allow for lighting to be installed. The transverse incline of the road is 2 % in the direction of the embankment; the proposed centripetal incline is 2.0 % in the directional curves. The surface of the path is designed to be tarmac with an overall thickness of 500 mm. The cycle path construction is shown in picture no. 2. According to an engineering and geological survey the bedrock is made up of gravel clay and clay of medium plasticity, which are deemed as suitable under certain conditions, but sometimes even unsuitable as the underlying base for the road. Based on the survey recommendations lime stabilization of the road surface (the active zone up to 300 mm depth) is proposed,

The inclines of the road slopes are designed to be excavated (in the ratio) 1:1.5 and in the embankment in the ratio 1:2. Drainage is provided by crosswise and lengthwise draining. Crosswise drainage is secured due to the crosswise incline of the road. Lengthwise drainage in the excavation is provided by an open triangular drainage ditch and paved curb drainage piping with a pothole in three short sections. Lengthwise drainage is completed by drainage objects, which are three culverts with direct inflow/inlet. The cycle path intersects the small watercourse – Lomniansky potok (stream). The original bridging is provided by a wooden footbridge laid on concrete pillars. The old footbridge is to be removed and replaced with a steel arch-shaped prefabricated construction made of corrugated steel sheets known as MultiPlate, with a width clearance of 7.40 m, the overhead clearance of 2.48 m with the proposed volumetric flow rate $Q_{100} = 36,0 \text{ m}^3 \cdot \text{s}^{-1}$. A double-sided metal safety handrail will be installed on the bridge.

On the route section 0.580 – 0.595 km the design includes a proposal to build a 3-metre wide rest area for pedestrians and cyclists. The rest area will be equipped with the mobiliary (objects in the public realm), such as an information board, bike racks, seating and a signpost in keeping with the landscape of the locality. It is intended that the cycle path will be used in a practical way and at the same time it will blend in with the surroundings. Three types of seating are proposed, which are evenly distributed within the whole area. The dominant feature is covered seating with an information board and bike rack for 4 bicycles. There is a plain bench – seating with a rack for 2 bicycles and on the other side seating with a signpost and a rack for another 4 bicycles. The proposed objects are alike in their design and chosen material so that they meet the requirements for a rest area on the cycle path with the use of bike racks and simple assembly and maintenance (picture no. 3). The installation of the objects in the public realm comprises of removing soil to the required depth, construction of concrete foundations under the load-bearing walls (thickness 300 mm, minimum depth 870 mm), masonry of

concrete load-bearing walls from boarding blocks and their stone cladding onto which the wooden mobiliary structures will be installed using lumber wood.

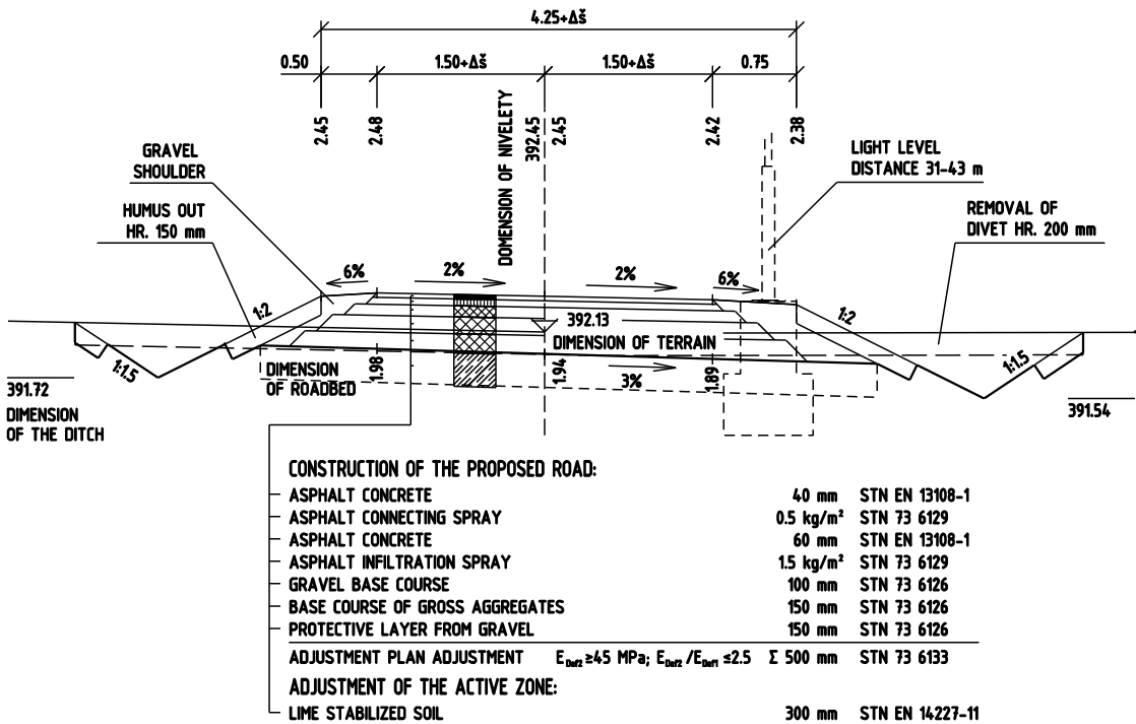


Fig. 2: Typical cross section of proposed cycle path



Fig. 3 Recreational mobiliary of the proposed cycle path

One element of the proposed cycle path between the villages of Pliešovce and Sása is also public street lighting, which will enable the use of the cycle path during the evening and night hours and also in poor visibility. The building of 33 steel masts mounted in concrete foundations and the construction of underground cable routing is proposed on the widened right-hand shoulder of the road. The summary draft budget for the overall construction was calculated to be 502,346 EUR including VAT, the partial budgets for the individual building objects are summarized in table 1. The construction will be funded from the European Structural and Investment Funds from the operational programme

Integrated Infrastructure. The implementation is currently in the stage of legislative building approval (building permit).

Tab. 1: Construction costs by construction objects

stavebný objekt	cena
cycle path	332 916,50 EUR
street lighting	80 754,50 EUR
recreational mobiliári	4950,70 EUR
Summary without VAT	418 621,70 EUR
Value Added Tax (VAT)	83 724,34 EUR
Summary with s VAT	502 346,04 EUR

Discussion

The transport connection between the villages of Pliešovce and Sása is currently provided by the road II/527 and the road III/2467. As this is the only transport link between the two villages, it is used both by cyclists and pedestrians presenting a safety risk for both groups due to the risk of traffic collisions with motor vehicles. Some cyclists and pedestrians use, weather-permitting, a marked cycle route which leads along an unpaved grassy footpath which runs parallel to the proposed cycle path. The proposed cycle path will provide a new opportunity for the safe and hazard free transport for cyclists and pedestrians between Pliešovce and Sása villages when commuting to primary school, to work and for leisure and recreational activities by the river Neresnica, with appropriate links to local roads in both villages.

The proposed cycle path is a joint path for cyclists and pedestrians serving the residents' and public needs, with car traffic being excluded, except in the event of emergency giving access to rescue services. The road safety will be ensured in accordance with the regulations and instructions of the administrator – the local council. In the winter season the administrator will keep the road clear by providing snow removal and road gritting in accordance with the requirements of the river Neresnica's administrator.

By installing public street lighting the safety of cyclists and pedestrians will increase even in poor visibility conditions and allow the cycle path to be used during night hours.

The building of the rest area with its recreational equipment will enhance the stay in the pleasant natural environment next to the adjacent river. The recreational mobiliary objects due to the chosen material and colour will fit harmoniously with the local architecture and will compliment the surrounding natural environment.

Conclusion

The construction of the transport recreational infrastructure for tourists enhances not only the conditions for recreational activities, but it can also significantly improve the traffic situation and road safety on roads also used by tourists.

The specific proposal design for a cycle path making accessible two neighbouring villages in the Pliešovská basin micro region is a good example of that. It will ensure safe and hazard free transport for cyclists and pedestrians, whilst simultaneously providing them with an additional benefit in the form of a cycle ride or walk in a pleasant natural environment.

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Souhrn

V současné době obce vytvářejí koridory a infrastrukturu pro alternativní druhy dopravy, včetně cyklistické. Taková řešení dopravní a rekreační infrastruktury mohou významně přispět ke zlepšení dopravní situace, bezpečnosti silničního provozu, zlepšení životního prostředí, zlepšení podmínek pro rekreační aktivity obyvatel nebo zlepšení hospodářské situace regionů Slovenska. Projekt se zabývá návrhem cyklostezky, která poskytne novou možnost bezpečné a bezkonfliktní bezmotorové dopravy pro cyklisty a chodce mezi zájmovými obcemi mikroregionu Pliešovská kotlina a bude sloužit potřebám obyvatel obcí i veřejnosti. Součástí projektu je také návrh veřejného osvětlení, které umožní užívání veřejné komunikace i ve večerních a nočních hodinách a za snížené viditelnosti, čímž se zvýší bezpečnost cyklistické a pěší dopravy. Předmětem projektu je také úprava odpočinkového místa a jeho vybavení odpočinkovým mobiliářem s infotabulí, stojany na kola, posezením a dopravním značením, které svým designem a barevností harmonicky zapadají do místní architektury a svým materiálovým provedením doplňují okolní prostředí.

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