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Road safety issues of EU funded bicycle network projects in Hungary

Emese Mako a*, Erzsebet Hoz b, Daniel Miletics c

^aDepartment of Transport Infrastructure, Szechenyi Istvan University, 1 Egyetem ter, Gyor 9026, Hungary

^bInstitute for Transport Sciences, 3-5 Than Karoly utca, Budapest 1119, Hungary

^cDepartment of Transport Infrastructure, Szechenyi Istvan University, 1 Egyetem ter, Gyor 9026, Hungary

Abstract

Road safety has improved significantly in Hungary between 2007 and 2013. The number of road fatalities had dropped to levels seen 50 years earlier. In the past few years, however, it has started to increase again. Unfortunately, the safety of cyclists is not in the focus of road safety related research activities in Hungary, nevertheless, Road Safety Audits (RSA) are now used more often for cycling infrastructure projects.

A Road Safety Audit; one of the four pillars of road infrastructure safety management, focuses on the identification of safety deficits in road infrastructure projects by performing an independent, detailed, systematic and technical check. Auditing cycling infrastructure projects have recently become more common as a prerequisite for EU-funded projects. As a result, a number of typical cycling safety issues have been collected from several bicycle network development projects in which the authors were involved. The most frequent safety deficits are presented in this paper.

Keywords: road safety, traffic safety, cycling infrastructure, bicycle network, bicycle lane, bicycle path.

1. Introduction

Motorized vehicle-oriented transport planning is still one of the greatest barriers in sustainable transport network developments. Sharing the road often means sharing the sidewalks between pedestrians and cyclists rather than sharing the roadway between cyclists and motorists even if the motorized traffic volume does not require separation of the vulnerable road users. In Hungary, choosing the most appropriate type of bicycle infrastructure is now become a crucial decision making point in the procedure of developing a bicycle road network strategy of a certain municipality.

* Corresponding author. Tel.: +36-96-503-452; fax: +36-96-503-451.
E-mail address: makoe@sze.hu

1.1. Missing bicycle traffic volume data

Since the type of bicycle infrastructure mostly depends on the traffic volume and the speed of the motorized and bicycle traffic, possession of the most accurate and recent data is a significant input of the planning procedure. The designers of a citywide bicycle road network strategy often face the problem of missing data of the bicycle traffic volume of a certain road section. In Hungary the traffic volume is being counted every five years on the state-owned road sections (and there is very rare traffic counting on the road sections owned by the municipalities). In the intermediate years the bicycle traffic volume is estimated by a bicycle traffic volume multiplier stated by the government. This multiplier is decreasing year by year even though the bicycle traffic volume has been increased significantly in the recent years. Nevertheless the counting of the bicycle traffic volume has been stopped in 2008.

2. TYPICAL SAFETY ISSUES AND FINDINGS

2.1. Inhomogeneous network

In the audited EU funded projects, the type of bicycle infrastructure changes often within short distances due to occasional availability of funds for construction and the lack of a well-established bicycle traffic strategy for the city. Consequently, the bicycle network often becomes a mixture of types and designs. From a road safety point of view, transition areas often create conflict situations among road users.

2.2. Two-way bicycle path

In the recent years, the most common bicycle infrastructure type in audited designs has been a two-way bicycle path on one side of the road, mostly shared with pedestrians (Figure 1). From a safety point of view it has turned out to be an undesirable solution since it creates conflicts between the two most sustainable transport modes. In some cases, this type of design lacks crossing facilities and requires unnecessary bypasses from cyclists. This two-way on one side bicycle path should not be applied in densely populated residential areas, however they are more suitable outside built up areas.

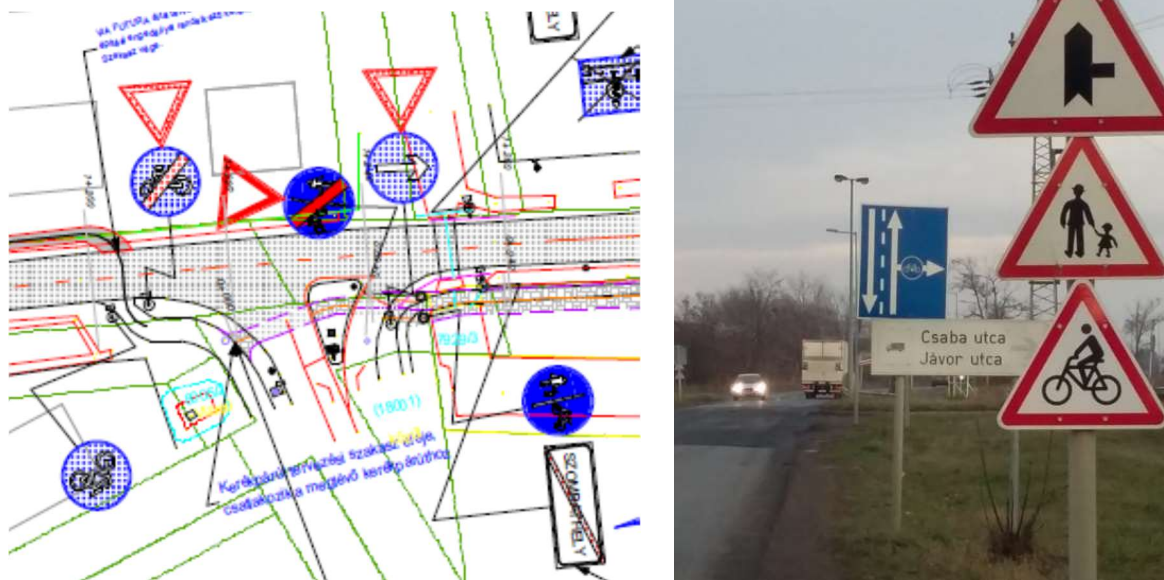


Fig. 1: Two-way bicycle path changing road side unfalely

2.3. Bicycle Chevron markings (Sharrows)

Bicycle chevron markings are applied too frequently and often unnecessarily, even in residential streets with very low traffic volumes (Figure 2). One of the reasons behind this is that these are low-cost measures which can be applied on longer sections, hence receive financial support from EU-funded programs.

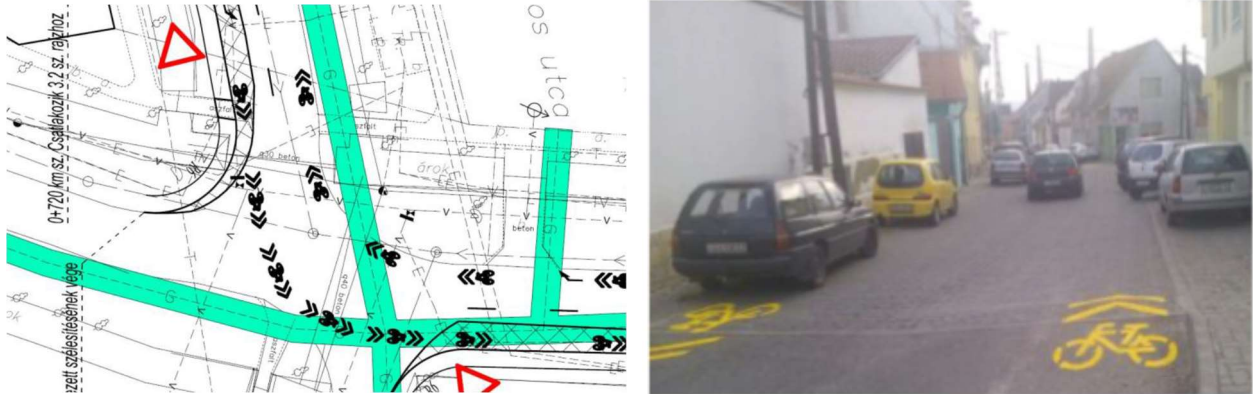


Fig.2: Bicycle chevron markings

2.4. Bicycle lanes

Bicycle lanes maintain a better level of visibility of the cyclist and reduce the likelihood of vehicle/bicycle accidents at minor road crossings. Bicycle paths tend to allow for right turn hook accidents and other issues concerned with loss of visibility. Bicycle lanes are rarely applied in Hungarian cities (except Budapest), although they offer much more direct accessibility for cyclists at road crossings (figure 3).

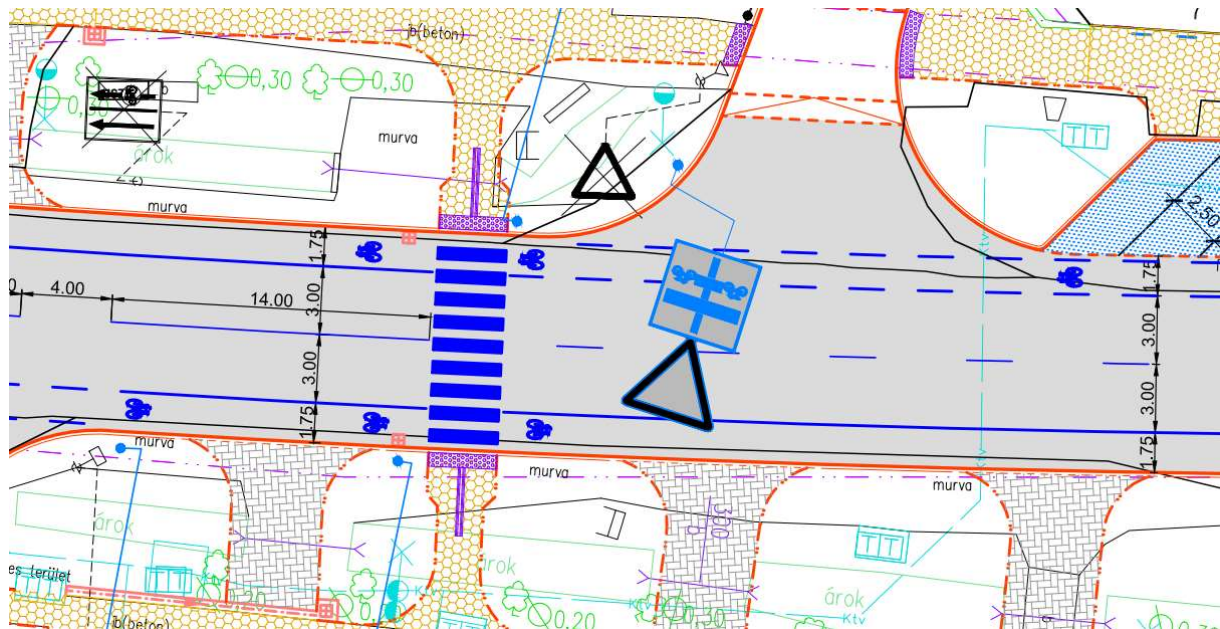


Fig. 3: Good design of a bicycle lane in the city of Acs (Source: Kulonut Engineering Office)

2.5. One-way streets with contra-flow bicycle traffic

In the city of Budapest numerous one-way streets are open for contra-flow bicycle traffic. Despite the fact they create a much more direct link for cyclist in a one-way street area, they appear to be barely applied by the road authority of the city. In a recent road safety analysis these infrastructure type has turned out to be safe, there were barely no bicycle accidents found in one-way streets with contra-flow bicycle traffic in Budapest (figure 4).



Fig. 4: One-way streets with contra-flow bicycle traffic in Budapest (Source: Centre for Budapest Transport)

2.6. Railway crossings

Railway crossings are crucial points in the rail and road network. Cyclist traffic at existing urban railway crossings were also the focus of road safety inspections in the last years. While motorist traffic was controlled by flashing lights and barriers in most of the cases, cyclist infrastructure and control varied over a wide range. One of the typical problems was by-passing the labyrinth fence (figure 5). Another was waiting between the tracks and the barrier. A third problem is shown on figure 4, where cyclists ride in the opposite direction on a one-way bicycle path. Control devices are provided only for cyclists riding in the correct direction and so violators (both cyclists and pedestrians) cannot see the flashing red signal. Based on the experiences with separated bicycle paths, separated barriers are recommended at railway crossings.



Fig. 5. Cyclist is by passing the labyrinth fence (a), cyclist usually ride in the opposite direction (b)

2.7. Bicycle/pedestrian bridge railing

Bicycle bridges provide crucial links in the bicycle network system by joining areas separated by barriers like water flows, railways, motorways etc. Bridges are costly elements of the transportation network, therefore implementation of shared bicycle and pedestrian bridges is mostly reasonable. The elements of a bicycle/pedestrian bridge are supposed to suit the needs of all users (including cyclists, pedestrians, wheelchair users, skaters, baby carriages etc.).

Based on the experiences of road safety audits completed by the authors, bicycle bridges are often handled perfunctorily in the road designs creating unsafe conditions for cyclists after construction.

Cyclists' centre of gravity is higher than pedestrians', this is the reason why railings at bicycle bridges supposed to be higher than the ones at solely pedestrian bridges. This aspect was neglected in several projects inserting bicycle network elements into the existing pedestrian network (figure 6)



Fig. 6: Low railing on an existing pedestrian bridge to be assigned as a bicycle/pedestrian bridge

Cyclists' speed level is significantly higher than pedestrians' speed, therefore the geometry of the fence and the shape of the fence's elements have an influence on the outcome of a cyclist crash. Rounded shapes suit well the design theory of forgiving roads, while rectangle shaped and peaked elements carry higher risk (figure 7).



Fig. 7: Rectangle and peaked fence elements of a planned bicycle/pedestrian bridge in Hungary

3. Conclusions

Using Road Safety Audits, this paper investigates the most common road safety deficits of bicycle infrastructure designs occurring recently in Hungary. Bicycle infrastructure has developed rapidly in the last 20 years in the country, however, certain safety concerns have been identified by means of RSAs. Despite these safety issues, it has to be acknowledged that cycling is widely supported by city governments and used as a daily transport mode.

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