



Best practice bicycle safety – improvement fact sheet

Speed differences in mixed spaces with motorised traffic

Overview

In mixed spaces for bicyclists and motor vehicles the **speed differences** between the two transport modes can lead to **safety risks**, especially in **passing manoeuvres**. This is particularly problematic at **rural roads** with **higher posted speed limits** where motor vehicles travel faster, and speed differences are relatively high. Collisions at these occasions often result in **serious injuries** and even **death** for cyclists. It is indicated that a considerable share of accidents between bicyclists and motor vehicles **occurs in mixed spaces** and that these accidents can often be attributed to **drivers violating overtaking rules**.

What is the problem and where does it occur?

At roads with no specific bicycle infrastructure, cyclists are forced to share the road and interact with motorised vehicles. However, the **speed differentials** between motor vehicles and cyclists but also those in **weight** lead to **safety risks** for cyclists, especially in **passing manoeuvres** that can result in serious injuries and **even death of the cyclists** in case of a collision [7, 8]. Moreover, **risk perception** of cyclists is especially high with **dense traffic**, **high speeds of motor vehicles** as well as a **high volume of heavy goods vehicles** present [6]. Higher speed differences are **typically apparent at mixed road sections** and **outside built-up areas**, where the posted **speed limit is higher**, and drivers of motor vehicles travel considerably faster than cyclists [1].

What causes the problem?

Mixed spaces of cyclists and motor vehicles impose safety risks especially at occasions where the difference between the travelling speed of motor vehicles and cyclists is high, e.g., at **rural roads** when **no adequate bicycle infrastructure** is implemented and cyclists are forced to ride on the driveway. Due to differences in speed (and weight) between motor vehicles and bicyclists, which translate into **substantial differences in kinetic energy**, interferences between the two transport modes on the same roads can lead to **serious injuries** if a collision occurs [1]. The **difference between the speed** of motor vehicles and the speed of bicycles is **positively associated** with the **increase of the severity of crashes** and especially at road sections with a **high speed** limit where motor vehicles drive considerably faster than cyclists, the risk of serious injuries and even death for cyclists – as **their vehicles** in contrast to drivers of motor vehicles do **not protect them** – in case of collisions increases [1, 2, 5]. Interactions of motorists and bicyclists at these road sections are problematic, especially during passing manoeuvres at curves due to visibility issues, with **dense traffic** and at **narrow roads** when motor vehicles often do not pass the cyclists with the **needed safety distance** [3].

What is the size of the problem?

The **interaction of motorists and bicyclists**, particularly **during passing manoeuvres**, is cited as **one of the primary causes of bicyclist fatalities** [1], although exact numbers of accidents between cyclists and motor-vehicles at mixed spaces are hardly available. However, [5] investigated 2,934 bicycle-motor vehicle accidents in North Carolina, USA and found that a **considerable high share** of 81.8% of these accidents **occurred in a shared travel lane on a street**, with a roughly equal split between **mid-block-areas** and **intersections**. In addition, [4] reported that of all car-cyclist accidents in Hungary between 2011-2014 (7,920 in total), about **6% of the accidents** (341 in built-up areas, 130 outside urban areas) occurred because car drivers **violated overtaking rules**. Both studies indicate that the **speed differences** between cyclists and motor vehicles at mixed spaces where cyclists are forced to share the road with motor vehicles are **problematic**, especially in passing manoeuvres.

Examples:



Mixed space of cyclists and motorised traffic on a road outside urban area and posted speed limit of 100 km/h on the EuroVelo 6 in Austria [9]



Cyclists and motor vehicles sharing a road section on the EuroVelo 6 in Croatia, with a posted speed limit of 90 km/h [10]

Related fact sheets

SOLUTIONS

- » Strategies
- » Planning principles
- » Overpasses and underpasses
- » Types of facilities: Mixed with motorized traffic and/or pedestrians
- » Separated cycling paths
- » Organisational measures

References and links

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