

Criteria-Based Selection of Cycling Infrastructure: Comparative Analysis of European Guidelines[†]

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Abstract

Determining suitable cycling infrastructure is essential for transport planners in European countries seeking to improve safety, promote sustainability, and encourage active travel. This paper compares national cycling infrastructure guidelines from Ukraine, Hungary, the Netherlands, the United Kingdom, and Slovakia. The analysis focuses on key aspects such as infrastructure selection criteria (traffic volume, speed), threshold values, design flexibility, contextual integration, and safety performance. Although motor traffic volume and speed are regarded as essential parameters in all countries, implementation and thresholds differ significantly. The Dutch CROW manual enforces the strictest separation guidelines, while Ukraine allows mixed traffic even in higher-speed environments. The UK's LTN 1/20 emphasizes contextual design and quality, while Hungary and Slovakia rely on matrix-based methods. The findings highlight the need for standardization and alignment with global safety norms.

Keywords: cycling infrastructure; cycling safety; design guideline; types of infrastructure



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1. Literature Review: Selection of Bicycle Infrastructure Types in Europe

Cycling is increasingly recognized as a sustainable mode offering benefits such as reduced congestion and better air quality. There is significant variation in the design and implementation of bicycle infrastructure across different countries.

Choosing the right cycling infrastructure is essential to make cycling safe and appealing. Across Europe, countries adopt varied approaches to infrastructure selection, often using criteria such as motorized traffic speed, volume, road typology, and cyclist numbers. A core strategy found in European cycling guidelines is the use of threshold values to determine whether mixed traffic, advisory lanes, or segregated paths should be applied [1,2]. By integrating the advantages of each guideline, city planners, engineers, and policymakers can develop extensive bicycle infrastructure plans that are customized to their unique situations. In addition to technical criteria, user behavior and demographic characteristics are increasingly used to inform cycling infrastructure decisions. For example, Zamprogno & Esztergár-Kiss [3] applied cluster analysis to investigate travel behavior patterns and user profiles, which can help tailor infrastructure planning to specific population needs. Furthermore, Albert and Lévai [4] examined school mobility dynamics in Hungary, underlining the importance of infrastructure planning that addresses the mobility patterns and safety of younger users.

The Netherlands sets one of the most stringent examples through the CROW manual, which restricts mixed traffic use to low-speed, low-volume urban roads, thereby prioritizing separated facilities for higher-risk contexts. Both Hungary and Slovakia apply a pragmatic matrix based on speed and volume, while the UK promotes quality criteria outlined in Local Transport Note 1/20, including safety, comfort, and coherence [5]. Ukraine, though newer in its efforts, is developing a framework built on German ERA principles, gradually aligning with broader European practice [6].

Studies confirm that separated cycling infrastructure enhances safety and comfort, especially among vulnerable users such as children and older adults [7,8]. Moreover, the adoption of consistent design principles is critical for interoperability of trans-European routes, such as the EuroVelo network [9]. The diversity in national standards highlights the need for comparative frameworks to harmonize safety and planning outcomes in the EU.

2. Overview of Cycling Infrastructure in Ukraine, Hungary, The Netherlands, The United Kingdom and Slovakia

2.1. Cycling Infrastructure in Ukraine

Ukraine has advanced cycling efforts despite financial and infrastructural challenges. The adoption of a national cycling strategy in 2019 aimed to raise the modal share of cycling to 15% by 2030. Cities such as Kyiv have implemented over 400 km of bike lanes, car-free initiatives, and bike-sharing schemes (Figure 1). However, infrastructure is fragmented, with safety and maintenance concerns. In 2022, cycling accounted for only 1.8% of commuting in Kyiv, and over 1700 road accidents involving cyclists were reported, highlighting critical safety gaps. During the war, bicycles also gained relevance as a resilient and accessible mode of transport, underscoring their strategic value in crises [2,10,11].



Figure 1. Examples of Separated Cycle Path (left) and Bike Lane (right) in Kyiv. Source: Author's own photos (2024).

2.2. Cycling Infrastructure in Hungary

Hungary has increased its investment in cycling infrastructure, supported by national guidelines such as the e-UT 03.04.13:2019/M2:2025 design standard and the Integrated Cycling Planning Guide [12]. The country boasts over 4000 km of rideable routes, with cities like Budapest promoting multimodal connections. According to a 2022 national survey, 16% of trips are made by bicycle. Yet, traffic safety remains a concern: in 2024, Hungary saw 2439 bicycle accidents and 48 deaths. Drivers of motor vehicles were responsible for the majority of incidents, highlighting the need for improved road user awareness and protective infrastructure [13–15].

2.3. Cycling Infrastructure in the Netherlands

The Netherlands has institutionalized cycling through long-term planning, high design standards, and cultural integration, and it is widely recognized as a global benchmark. A modal share of 45% for short-distance travel is supported by more than 35,000 km of designated bike routes. Infrastructure includes segregated lanes, cyclist-priority junctions, and ample bike parking. Comprehensive design guidelines are provided by the CROW manual, which promotes segregation at traffic speeds higher than 30 km/h. Notwithstanding its successes, there were 291 cyclist fatalities in the Netherlands in 2022, indicating that even in developed systems, there are still new safety issues [1,16].

2.4. Cycling Infrastructure in the United Kingdom

The cycling infrastructure in the UK varies greatly between urban areas and the devolved regions. Local Transport Note 1/20 [5], which encourages high-quality bike routes based on five fundamental principles—coherence, directness, safety, comfort, and attractiveness—improves national design guidelines. Regional differences exist in cycling modal shares; the national average is still about 4%, while cities like Cambridge and London have over 20%. Low-traffic areas, segregated bike lanes, and specific junction treatments are examples of infrastructure. Although there are still issues with network continuity and public support, the Gear Change strategy and related funding packages aim to double cycling activity by 2030 [5,17].

2.5. Cycling Infrastructure in Slovakia

Slovakia's cycling infrastructure has progressed notably since the 2015 adoption of the National Strategy for the Development of Cycling Transport and Cycle Tourism. The strategy seeks to integrate cycling into regional and urban transport and recognize it as an equal mode. It aimed to increase cycling's modal share to 10% by 2020 through measures such as financial support mechanisms, appointing cycling coordinators, and requiring cycle path planning in new or renovated roads [18]. Overall, Slovakia follows a systematic approach that combines technical standards, national policy, and local planning to enhance cycling safety.

Table 1 shows the percentage of trips made by bicycle (bicycle modal share) in selected countries. The data reveal significant disparities in cycling modal share, reflecting underlying differences in infrastructure, policy support, and cycling culture across the countries.

Table 1. Modal Share of Bicycles in Selected Countries (2022).

Country	Bicycle Modal Share (%)
Ukraine (Kyiv)	1.8
Hungary	16
Netherlands	45
United Kingdom	~4
Slovakia	6

Figure 2 shows examples of separated cycle paths in the Netherlands, demonstrating safe and dedicated infrastructure for cyclists.



Figure 2. Examples of Separated Cycle Path in the Netherlands. (a) Bidirectional separated cycle track in the Netherlands (Public Domain; photo by PeeWee32) [19]. (b) Separated cycle track crossing a tram line in Rotterdam, Netherlands (© Steven Vance, licensed under CC BY 2.0 [20]).

3. Comparison of Bicycle Design Guidelines in Five European Countries

This section compares the national bicycle infrastructure design guidelines of Ukraine, Hungary, the Netherlands, and the United Kingdom. These guidelines reflect diverse approaches to integrating cycling into national transport systems. While Ukraine and Hungary have recently developed or updated their guidelines, the Netherlands offers the most mature and widely recognized reference framework. The UK's approach emphasizes quality design principles supported by national strategies.

3.1. Ukraine

The DSTU 8906:2019 guideline from Ukraine provides fundamental principles for designing and planning bicycle infrastructure. Though it is only 51 pages long and provides minimum standards, it is based on German ERA recommendations. In cities where the demand for bicycles is rising, it highlights the necessity of standardization and improved safety for cyclists. Despite recent advancements, further effort is required to bring it into compliance with worldwide best practices [2,6].

3.2. Hungary

The e-UT 03.04.13:2019/M2:2025 guideline from Hungary provides an extensive and useful framework for establishing roads that are bike-friendly. It covers user needs across all road categories, planning, safety, and integration into the road network. The guideline is a resilient national planning tool because it places an emphasis on cyclist behavior, environment-based design, and methodical integration into multimodal systems [12,13,15].

3.3. The Netherlands

The Dutch CROW Design Manual is respected throughout the world for its comprehensive and user-friendly methodology. Network hierarchy, junction design, safety, comfort, and maintenance are all addressed in this 2016 update. Strict mixed-traffic thresholds, segregated bike infrastructure, and policy integration at the local and national levels are all encouraged by the CROW guidelines. In cycle planning, it is generally considered the gold standard [1,21,22].

3.4. United Kingdom

The "Gear Change" policy and Local Transport Note 1/20, both of which were implemented in 2020, regulate the UK's strategy. These documents promote safe cycling routes and establish quality standards. Five basic principles are emphasized in the guidelines: coherence, directness, safety, comfort, and attractiveness. In order to comply with European

standards and maintain flexibility for urban improvements, infrastructure selections are frequently made based on traffic volume, speed, and route continuity [5,7].

3.5. Slovakia

Key design principles for cycling infrastructure are provided in Slovakia's TP 085:2020 guideline, with an emphasis on safety, continuity, and integration with urban mobility. Depending on the volume and speed of motorized traffic, it suggests different types of infrastructure, like bike lanes, shared paths, or mixed traffic. The need for a standardized application is highlighted by the fact that, although the guideline is in line with European practices, its implementation differs locally [18,23].

3.6. National Selection Charts

Table 2 demonstrates the Ukrainian national selection chart (DSTU 8906:2019) [6], and Table 3 shows the Dutch selection chart (CROW) [1]. Table 2 shows that motorized traffic volume and speed are useful indicators when choosing suitable cycling infrastructure. Ukraine may apply these factors to suggest different types of bicycle traffic arrangements, including bike lanes or paths, bike and pedestrian paths, or mixed traffic on the road. According to Table 3, the Dutch CROW suggests bike facilities based on a number of variables, such as the type of road, the number of cyclists, the speed and volume of motorized traffic, and the category of the cycle network.

Table 2. Bicycle Facility Selection Chart of Ukraine, authors' own elaboration based on (DSTU 8906:2019) [6].

Street Category	Estimated Speed (km/h)	Number of Lanes	Traffic Intensity (unit/h)	Bicycle Path	Bicycle Lane	Bicycle/ Pedestrian Path	Mixed Traffic/ Roadway
Main roads	100	4–8		+			
Main streets		2–6		+		+	
- Continuous movement							
Main streets	60	4–8	2000–2200	+	+	+	
- Regulated movement							
Main streets of regional significance	60	2–6	800–1600	+	+		
Local residential streets	50	2	400–1200	+			+
Local industrial and commercial roads	40	2	400–800	+			+
Local passages	30	2	800	+			+
Pedestrian streets				+			+

Table 3. Bicycle Facility Selection Chart of the Netherlands, authors' own elaboration based on the CROW Design Manual for Bicycle Traffic [1].

Road Category	Speed Limit (km/h)	Volume of Motorized Traffic (PCU/24 h)	Basic Cycle Network (<750/day)	Main Cycle Network (500–2500/day)	Bicycle Highway (>2000/day)
Residential street	Walking pace or ≤30	<2500	Mixed traffic	Mixed traffic or cycle lane	Bicycle street
Residential street	Walking pace or ≤30	2000–5000	Mixed traffic or cycle lane	Cycle lane or cycle path	Cycle path with priority
Residential street	Walking pace or ≤30	>5000	Cycle lane or cycle path	Cycle path	Cycle path with priority
Distributor road	50 (1 × 2 lanes)	Any	Cycle lane or cycle path	Cycle path	Cycle path
Distributor road	50 (2 × 2 lanes)	Any	Cycle path	Cycle path	Cycle path
Distributor road	≥70	Any	Cycle/moped path	Cycle/moped path	Cycle/moped path

Slovakia recommends various traffic arrangements based on two key criteria: speed limit and traffic volume (Figure 3). Roads in the F1 category have low traffic volumes and low speeds, making mixed traffic feasible. As both volume and speed increase (F2, F3), more specialized solutions such as advisory bike lanes or segregated paths are advised. For high-speed, high-volume roads (F4, F5), fully segregated infrastructure is typically required to ensure safety. Hungary follows a similar strategy, using a criteria matrix to

determine appropriate facility types, including mixed traffic, advisory lanes, and segregated tracks (Figure 4).

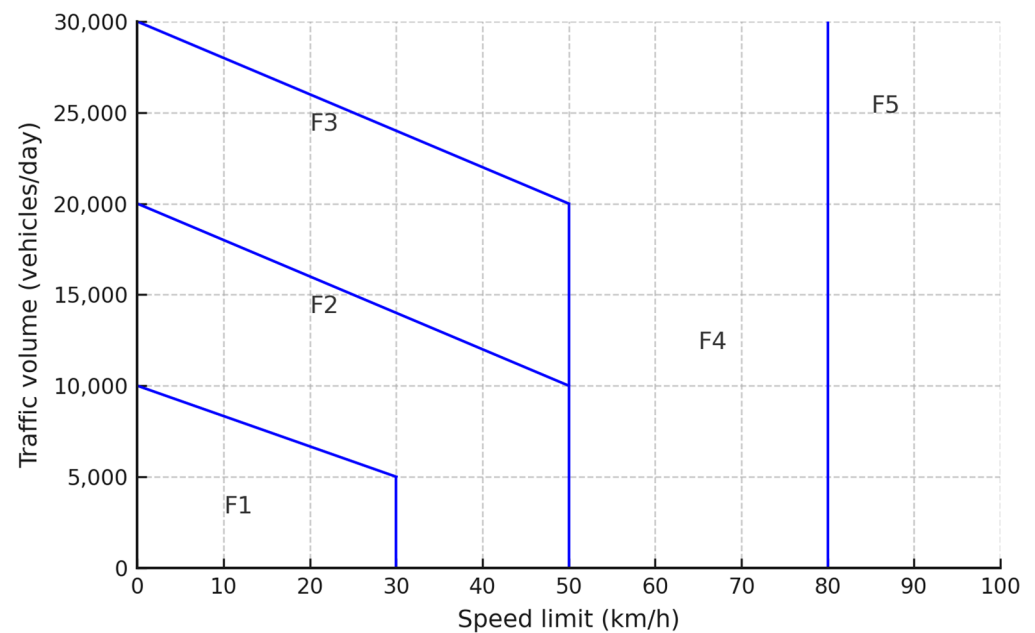


Figure 3. Criteria-based Infrastructure Selection of Slovakia (built-up area) (TP 085) [23], authors' own elaboration based on the methodology and structure presented in the guideline.

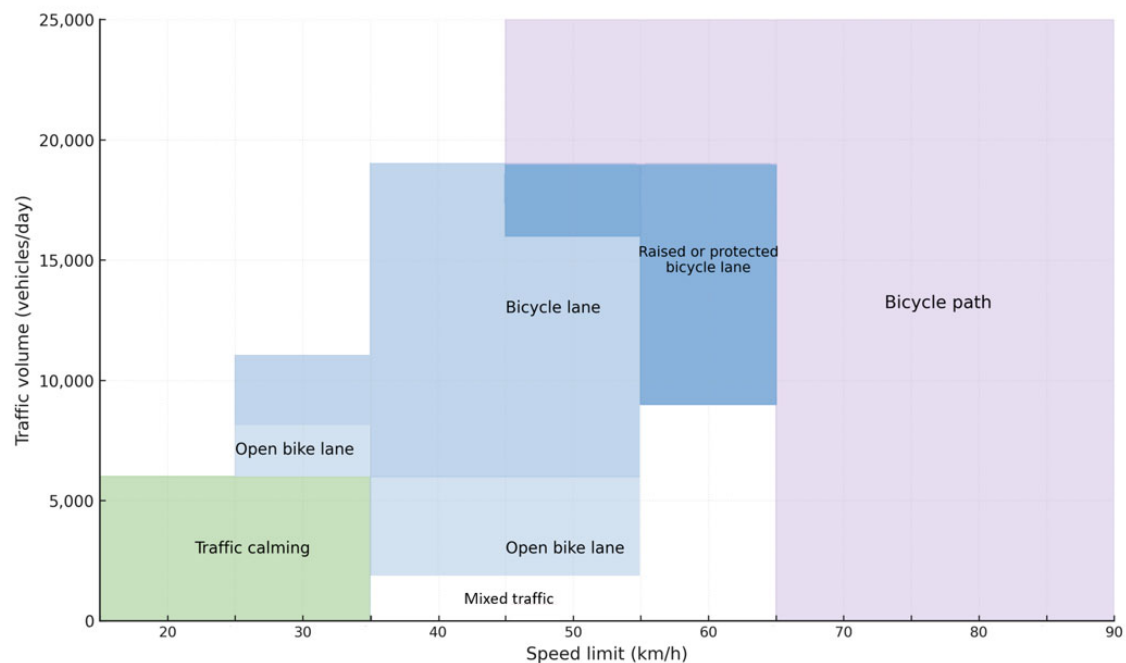


Figure 4. Criteria-based Infrastructure Selection of Hungary (e-UT 03.04.11) [12], authors' own elaboration based on the methodology and structure presented in the guideline.

3.7. Comparative Review of National Selection Charts

Table 4 contrasts national guidelines for choosing bike facilities according to traffic volume and speed. Although all five nations employ these fundamental standards, there are significant differences in their cutoff points. To reduce the risk to cyclists, the Netherlands enforces the strictest restrictions, permitting mixed traffic at speeds of no more than 30 km/h and 5000 vehicles per day. Slovakia and Hungary are more forgiving; they advise segregation over 15,000–20,000 vehicles per day and allow mixed traffic up to

10,000–12,000 vehicles per day. Their strategy strikes a balance between infrastructure expansion and space limitations. The UK prioritizes user comfort and design adaptability over strict regulations by providing flexible, indicative thresholds (such as 6000 vehicles per day). Ukraine exhibits fewer safety precautions and less segregation despite having the highest limits (up to 50 km/h and 19,000 vehicles/day). Overall, the table demonstrates how different priorities are reflected in actual design practices, even though speed and volume are universally recognized as crucial factors: the pragmatic trade-offs of Central-Eastern Europe, the UK's adaptability, and Dutch safety-first policies.

Table 4. Bicycle Facility Selection Criteria Based on Speed and Volume.

Infrastructure Type	Ukraine (veh/day)	Hungary (veh/day)	Netherlands (veh/day)	UK (Indicative)	Slovakia (veh/day)
Mixed Traffic (≤ 30 km/h)	$\leq 19,000$	$\leq 12,000$	≤ 5000	≤ 6000	$\leq 10,000$
Cycle Lane (40–50 km/h)	9000–19,000	5000–15,000	2000–4000	6000–10,000	$\leq 20,000$
Segregated Track (≥ 50 km/h)	> 9000	$> 15,000$	Required	Preferred	$> 20,000$
Cycle Street	-	-	Preferred for > 2000 cyclists	-	-

4. Evaluation of Criteria to Determine Suitable Cycling Facilities

The analysis of the national guidelines demonstrates that motor traffic volume and speed are the primary determining factors for choosing the types of bicycle infrastructure in all five countries. However, substantial variation exists in the threshold values and their application.

The most conservative CROW manual is used in the Netherlands, permitting mixed traffic in urban areas at speeds of less than 30 km/h and 5000 vehicles per day [1]. Only the safest environments are allowed for cyclist-vehicle interaction as a result of this threshold. Beyond 50 km/h or 15,000 vehicles per day, segregation is advised by Hungary and Slovakia using a matrix that also takes road type and connectivity into account [12]. Segregation is advised above these speeds. Slovakia's TP 085 permits mixed traffic up to 30 km/h and 10,000 vehicles per day, and cycle lanes up to 50 km/h and 20,000 vehicles per day [23].

With a strong emphasis on user experience and route quality, the UK suggests flexible thresholds that emphasize a context-sensitive approach [5]. Ukraine allows mixed traffic even at 50 km/h and with over 9000 vehicles per day, indicating higher risks [6]. These thresholds represent the various nations' levels of institutional maturity, police aspirations, and traffic behavior. The vulnerability of specific groups, such as school-age children, further underscores the need for cautious application of thresholds. Hungarian accident data shows recurring patterns of child involvement in crashes [24], supporting the case for segregated infrastructure around schools and residential areas.

Despite acknowledging similar risks, countries' mitigation strategies vary greatly, according to comparative analysis (Table 4). Hungarian, Slovak, and Ukrainian practices demonstrate compromises between feasibility and cyclist protection, whereas Dutch and British guidelines prioritize safety. Therefore, standardizing threshold values and utilizing performance indicators more widely could promote safer riding conditions throughout Europe.

5. Conclusions

The criteria used for selecting facility types were the primary objective of this study's comparative analysis of cycling infrastructure guidelines in Slovakia, the Netherlands, Ukraine, Hungary, and the UK. Despite the fact that all five countries rely on motorized traffic volume and speed, their suggested thresholds diverge significantly.

Under most circumstances, the Netherlands, with its highly developed cycling culture and infrastructure, advocates for strict separation. The UK places a strong emphasis on

comfort, coherence, and design quality. While Ukraine is still developing, it represents significant strides toward instituting safe cycling infrastructure, while Hungary provides a structured but flexible guideline.

The results indicate that infrastructure selection criteria, particularly those regarding speed and volume thresholds, need to be further harmonized. By learning from the Netherlands' and the UK's experiences, nations like Ukraine can gain from implementing stricter regulations. In the meantime, the matrix-based approach used by Slovakia and Hungary offers a helpful template for nations looking for scalable solutions.

In order to support a safer, more cohesive approach to cycling infrastructure planning, future efforts should concentrate on creating pan-European benchmarks and encouraging knowledge exchange.

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References

1. CROW Platform. *Design Manual for Bicycle Traffic*; CROW: Ede, The Netherlands, 2016. Available online: <https://crowplatform.com> (accessed on 23 May 2025).
2. Adriazola-Steil, C.; Pérez-Barbosa, D.; Batista, B.; Luke, N.; Li, W.; Bray Sharpin, A. *Safe Bicycle Lane Design Principles: Responding to Cycling Needs in Cities During COVID and Beyond*; World Resources Institute: Washington, DC, USA, 2021.
3. Zamprogno, M.M.; Esztergár-Kiss, D. Applying cluster analysis for the investigation of travel behavior and user profiles. *Period. Polytech. Transp. Eng.* **2024**, *52*, 362–371. [CrossRef]
4. Albert, G.; Lévai, Z. Research on special phenomena of school mobility, through the example of Dunabogdány. *Period. Polytech. Transp. Eng.* **2024**, *52*, 423–436. [CrossRef]
5. Department for Transport. *Cycle Infrastructure Design. Local Transport Note 1/20*; Dep. Transp.: London, UK, 2020.
6. Technical Committee 'Roads and Transport Facilities' (TC 307). *DSTU 8906:2019—Planning and Design of Bicycle Infrastructure. General Requirements*; Ukrainian Research and Training Center for Standardization: Kyiv, Ukraine, 2020.
7. Aldred, R.; Watson, T.; Lovelace, R.; Woodcock, J. Barriers to investing in cycling: Stakeholder views from England. *Transp. Res. Part A Policy Pract.* **2019**, *128*, 149–159. [CrossRef] [PubMed]
8. Kazemzadeh, K.; Ronchi, E. From bike to electric bike level-of-service. *Transp. Rev.* **2022**, *42*, 6–31. [CrossRef]
9. European Parliament. *The European Cycle Route Network EuroVelo: Challenges and Opportunities for Sustainable Tourism*; Directorate General for Internal Policies, Policy Department B: Structural and Cohesion Policies—Transport and Tourism: Brussels, Belgium, 2009. [CrossRef]
10. Ingul, D. *Draft Roadmap for the Use of Hydrogen in Ukraine in Road Transport*; UNECE: Geneva, Switzerland, 2021.
11. Kyiv City State Administration. Oleksandr Hustieliev: The Network of Streets with Bicycle Infrastructure is Expanding—A Bike Lane Has Been Installed on Akademika Biletskoho Street. 2021. Available online: https://kyivcity.gov.ua/news/oleksandr_gustelyev_merezha_vulits_iz_veloinfrastrukturoyu_rozshiryuyetsya_na_vulakademika_biletskogo_vlashtuvali_velosmugu/ (accessed on 26 May 2025).
12. Hungarian Public Road Nonprofit Ltd. *e-UT 03.04.13:2019/M2:2025—Kerékpározható Közutak Tervezése [Design of Bicycle-Compatible Public Roads]*; Hungarian Public Road Nonprofit Ltd.: Budapest, Hungary, 2025.

13. Abelovszky, Z.; Berencsi, M.; Casagrande, J. Making Hungary a Cycling Country. EuroVelo for Professionals. 2023. Available online: https://pro.eurovelo.com/news/2023-08-08_making-hungary-a-cycling-country (accessed on 23 May 2025).
14. MTI. Hungary's Bicycle Path Network to Be Almost 15,000 Kilometers by 2030. Hungary Today. 2021. Available online: <https://hungarytoday.hu/hungary-bicycle-path-cycling/> (accessed on 23 May 2025).
15. Infostart. Here Is the Latest Accident Statistics—These Are Hungary's New Deadly Roads. Infostart. 2023. Available online: <https://infostart.hu/belfold/2023/05/25/itt-a-friss-baleseti-statisztika-ezek-magyarorszag-uj-halalutjai> (accessed on 23 May 2025).
16. Van der Zee, R. How Amsterdam Became the Bicycle Capital of the World. The Guardian. 2015. Available online: <https://www.theguardian.com/cities/2015/may/05/amsterdam-bicycle-capital-world-transport-cycling-kindermoord> (accessed on 23 May 2025).
17. Department for Transport. *Gear Change: A Bold Vision for Cycling and Walking*; Department for Transport: London, UK, 2020. Available online: <https://assets.publishing.service.gov.uk/media/5f1f59458fa8f53d39c0def9/gear-change-a-bold-vision-for-cycling-and-walking.pdf> (accessed on 23 May 2025).
18. Ministry of Transport, Construction and Regional Development of the Slovak Republic. *National Strategy for the Development of Bicycle Transport and Cycling in the Slovak Republic*; Ministry of Transport: Bratislava, Slovakia, 2015. Available online: <https://www.enviroportal.sk/dokument/narodna-strategia-rozvoja-cyklistickej-dopravy-a-cykloturistiky-v-sr> (accessed on 23 May 2025).
19. PeeWee32. Bidirectional Separated Cycle Track in the Netherlands (Photograph). Available online: https://commons.wikimedia.org/wiki/File:Fietspad_PeeWee32.jpg (accessed on 11 November 2025).
20. Vance, S. Separated Cycle Track Crossing Tram Line, Rotterdam, The Netherlands (Photograph). 2011. Available online: https://en.wikipedia.org/wiki/Cycling_infrastructure#/media/File:Cycle_track_with_a_yield_sign_and_a_tram_is_currently_crossing_the_cycle_track.jpg (accessed on 11 November 2025).
21. Buehler, R.; Pucher, J. Cycling to sustainability in Amsterdam. *Sustain. J. Environ. Sustain. Issues* **2010**, *21*, 36–40.
22. Van Ommeren, K.; Ruffino, P. *The Dutch Approach to Bicycle Mobility: Retrofitting Street Design for Cycling*; Dutch Cycling Embassy: The Hague, The Netherlands, 2017.
23. Slovak Road Administration. *TP 085: Design of Cycling Infrastructure*; Slovak Road Administration: Bratislava, Slovakia, 2020.
24. Ötvös, V.; Temesi, K.T.; Krizsik, N. Analysis of children's road crashes in Hungary. *Period. Polytech. Transp. Eng.* **2025**, *53*, 58–66. [CrossRef]

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