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Cycling routes parameters and user categories

Note by the European Cyclists' Federation and the secretariat

I. Introduction

1. The Group of Experts on cycling infrastructure module (GE.5) agreed at its first session that a discussion paper on the cycling route various parameters and usage categories (e.g. children vs experienced cyclists) should be elaborated for the second session so that these parameters and categories can be discussed in detail with a view to incorporate them as appropriate into the guide for the designation of cycling networks.

2. This document discusses various cycling route parameters in section II. It further provides in section III an overview of used classifications of cycle users at national and international levels, which are linked with classifications of routes or network sections based on different user categories. It is noted for the usage categories that while general principles are similar across different methodologies, details vary. Finally, in section IV, a proposal for way forward is included.

II. Cycle route parameters

3. There can be various parameters considered to determine the comfort and safety level of a cycling route. For this document, international methodologies/standards such as the Level of Traffic Stress Methodology (LTS), the EuroVelo European Certification Standard (ECS), the Cycle Highway Assessment Tool (CHAT), the parameters proposed in the by Danube Cycle Plans (DCP), the report on Geometric design parameters for cycling infrastructure (GDPCI)[1] and Urban Corridor Road Design: Guides, Objectives and Performance Indicators (UCRD)[2] were reviewed.

[1] See further: https://ecf.com/files/reports/geometric-design-parameters-cycling-infrastructure

[2] See further: https://morelive.wpenginepowered.com/wp-content/uploads/2022/07/MORE_D1_2_FINAL_Update20210701.pdf

4. The range of parameters depends somewhat on the scope of a specific methodology. For example:

- LTS is the most limited, considering only the interactions between cyclists and motorised traffic.
- Both ECS and CHAT consider a wider range of infrastructural criteria, as well as connections to public transport, attractiveness, and services along the route.
- Additionally, CHAT puts a lot of consideration on the route directness (both space- and time-wise), and evaluates also the quality of route lighting (because of the daily commuting focus), while ECS takes a look also at the information available about the route, both physically on the route and online.
- GDPCI provides a comprehensive review of geometric parameters across existing standards and guidelines, but only for cycle tracks.
- UCRD provides the widest range of parameters, but only in the urban context.

5. The parameters are often considered in groups. For example, the type of infrastructure together with its width are matched against volume and speed of motorised traffic. The table below presents, as an example, the maximum acceptable volume of traffic for cycling in mixed traffic in function of speed. Different levels of the ECS were compared with the standard proposed by DCP:

Speed limit	*ECS Essential [u/d]*	*ECS Important [u/d]*	*ECS Additional [u/d]*	*DCP proposed standard [v/d]*
30 km/h	No limit	4000	2000	4167
40 km/h	4000	2000	500	4167
50-70 km/h	4000	2000	500	2083
80+ km/h	2000	500	Not allowed	417

Notes: DCP thresholds are defined in vehicles per day, ECS thresholds in units per day (modified version of passenger car units) to reflect the higher impact of heavy traffic on conditions for cyclists. ECS allows higher thresholds for a certain percentage of the route.

6. After review of the existing methodologies, it is proposed that the following parameters are considered:

- volume of motorised traffic,
- speed limit or observed speed of motorised traffic,
- width,
- buffer space to other parts of the road and/or static obstacles,
- surface type and/or quality,
- average/max gradient, slope severity and/or elevation change,
- horizontal and vertical curve radii,
- sight distance,
- presence of obstacles (e.g. kerbs, chicanes),
- volume of cycle traffic,
- volume of pedestrian traffic,
- detour factor (the length of the route divided by the distance as the crow flies),
- number of interruptions and/or time loss,
- crossing quality and/or visibility splays,
- connections with other cycling infrastructure and other transport networks,
- social safety.

7. Depending on the type of infrastructure and the scale of assessment, usually only a subset of the parameters is applicable and relevant. In any case, GE.5 should discuss and agree which parameters it would like to work with and provide recommendations for.

8. The table below provides, as an example, the values for the width parameter of uni- and bidirectional cycle tracks:

Parameter	*DCP minimum*	*DCP recommendation*	*CHAT*	*UCRD*
Cycle track width – one way	1.5 m	2.0 m	2.0-3.0 m	1.5-4.0 m
Cycle track width – two way	2.0 m	2.5 m	3.0-4.0 m	2.5-4.5 m

Notes:

- *the width requirements are additionally increased on slopes above certain gradient and in horizontal curves below certain radius;*
- *in addition to the width of the cycle track itself, buffer zones separating the track from other parts of the road and static obstacles need to be considered.*

9. There can be different values assigned to the specific parameter of a given infrastructure type also depending on its role in the network and expected or desired usage. Therefore, before the values are defined, the user and/or route classification approach needs to be agreed.

III. Classifications of users and routes

10. This section discusses several approaches for user classifications so as to provide an overview of existing approaches to GE.5. This overview should then be helpful to serve as a basis for GE.5 to formulate its own proposed approach.

A. Four Types of Cyclists and Level of Traffic Stress (USA)

11. The classification, initially developed for Portland, Oregon, but used widely across United States of America and several other English-speaking countries, includes the following types of cyclists:[3]

- Strong and Fearless: People willing to bicycle with limited or no bicycle-specific infrastructure
- Enthused and Confident: People willing to bicycle if some bicycle-specific infrastructure is in place
- Interested but Concerned: People willing to bicycle if high-quality bicycle infrastructure is in place
- No Way, No How: People unwilling to bicycle even if high-quality bicycle infrastructure is in place

12. Initially, the “Strong and Fearless” were estimated to include 1 per cent of population, “Enthused and Confident” – 7 per cent , “Interested but Concerned” – 60 per cent , “No Way, No How” – 33 per cent . The later surveys demonstrated however, that the share of population identifying themselves with different groups vary between different cities and regions. It should also be noted that the classification is based on the experience of United States of America and might not reflect well the situation in countries with more cycle traffic and better developed cycling infrastructure.

13. The classification of cyclists is linked to a classification of streets. Links in a cycle and street network are assigned to one of four levels of traffic stress (LTS):

- LTS 1. Bicyclists of all ages and abilities

[3] Reference and further links: https://blog.altaplanning.com/understanding-the-four-types-of-cyclists-112e1d2e9a1b

- LTS 2. Most adult bicyclists
- LTS 3. Experienced bicyclists
- LTS 4. Strong and fearless bicyclists

14. The classification is based on the level of segregation, width, number of lanes on the street and the speed of traffic. Notably, traffic volume is not considered, which might make it difficult to use this methodology to evaluate suburban or rural networks.[4]

B. Bicycle Needs Canvas and Bicycle Types (Netherlands)

15. The Netherlands has conducted research aimed at mapping of the needs of cyclists. This research identified four main types of cyclists:

- The 'Everyday Cyclist', someone trying to get to work or school, often under time pressure. They take a direct route and wish to continue cycling undisturbed, wanting to stop as rarely as possible.
- The 'Sports Cyclist', someone doing cycling for sport, including mountain bikers, road racers and others. They tend to cycle in laps or for a long distance, moving very quickly. They sometimes make mistakes or ignore the needs of other road users, which can lead to conflicts.
- The 'Attentive Cyclist', someone who wants to be able to cycle safely, pays attention to the environment, follows traffic rules and signs. They want separation from motorised traffic, infrastructure forgiving errors, good signposting and clear intersections. Many parents with children, disable and elderly cyclists belong to the group.
- The 'Recreational Cyclist', someone cycling for the enjoyment of being on their bike and with others, stopping commonly for food, coffee or at other attractions. They appreciate attractive, but also comfortable route, which does not require much effort or attention to follow.

16. The "canvas" does not provide explicit classification of routes or specific parameters required for different user groups.[5]

17. A somewhat modified version of the canvas was included in the Safer Cycling Advocate Program Best Practice Guide. The guide lists two additional (sub)types of cyclists.

- The 'Vulnerable Cyclist' wants a traffic-safe, peaceful cycling environment, where they are not passed by other traffic and even other faster cyclists; infrastructure must be forgiving to allow for errors. They tend to be children, the elderly and disabled people.
- The 'Courier Cyclist' wants to get from A to B very quickly because they cycle under time pressure. They also often require more space. They represent a range of riders, some wearing large backpacks, others using three or four wheel cargo bikes.

18. Those two additional types of cyclists were proposed by Fietsersbond to highlight the current critical design issues, i.e. aging population, and growing segment of commercial cycling.[6]

C. The EuroVelo European Certification Standard

19. The European Certification Standard (ECS), used to survey EuroVelo and other long-distance cycle routes, bases the criteria on three different target groups:

[4] Reference: https://transweb.sjsu.edu/research/Low-Stress-Bicycling-and-Network-Connectivity
[5] Reference: https://rwsduurzamemobiliteit.nl/publicaties/fiets-behoeften-canvas-fietstypen/
[6] Reference: https://safercycling.roadsafetyngos.org/best-practice-guide/

- Regular cyclists – experience in everyday cycling and cycle holidays. Their bicycle and equipment is adapted to remedy certain deficiencies of the route (for example, somewhat uneven surface). Fitness level, cycling skills, physical and psychological condition allow them to deal with up to moderate traffic, situations that are complex (for example, large crossings), require fast reaction or increased physical effort (for example, steep slopes).
- Occasional cyclists – basic expertise in cycling and average physical condition. Lower tolerance for bad surface, traffic, complex situations or steep slopes, but no special needs.
- Demanding cyclists – families with children, people using hand cycles, tandems, cycles with trailers, light cargo cycles (but within the cycle dimensions). Lowest tolerance for motorised traffic, require high quality surface and gentle slopes. Additionally, the variety of cycles included in this group makes cycling most inclusive in terms of both demographics and needs covered, but it also means that they are often unable to deal with obstacles, chicanes, high kerbs or sharp curves.

20. To address the needs of the different user groups, the EuroVelo European Certification Standard defines three levels of criteria: Essential, Important and Additional. While the routes meeting the Additional criteria are the most inclusive and cover the widest demographics, it is recognised that also routes meeting only the Important or even only the Essential criteria attract users and can create a momentum for further developments.

21. In addition to seven infrastructural criteria, the ECS criteria include also services available along the route and its promotion. The ECS "Route Components" criterion levels can be compared to level of traffic stress classification, with Additional intending to cover similar user range as LTS1, Important – LTS 2 and Essential – LTS 3.[7]

D. ADFC Quality Cycle Routes

22. The Allgemeiner Deutscher Fahrrad-Club (ADFC) classifies long-distance cycle paths and awards stars for their quality. Up to five stars are possible, the higher the number, the better the quality offered to cycle tourists on the route. In practice, only routes with 3 to 5 stars are recommended. The classification is based on a point system, where points are awarded or subtracted for meeting or not various criteria.[8]

E. France Vélo Tourisme

23. Developed cycle routes in France are assigned into one of the three difficulty categories on France Vélo Tourisme's website. The names of the categories implicitly indicate the target user groups:

- Je débute / En famille
- J'ai l'habitude
- Ça grimpe.

24. The classification can be also done on the level of specific stages. No explicit criteria for each of the categories are provided on the website as it addresses non expert users. The classification has, however, been inspired by a national manual to define the classification of touristic cycle routes "Cotation de la difficulté des itinéraires de tourisme à vélo", published in 2016, which mainly focused on loops but includes also criterion for cycle routes on page 6.[9]

[7] Reference: https://pro.eurovelo.com/projects/european-certification-standard

[8] Reference: https://www.adfc.de/artikel/adfc-qualitaetsradrouten/

[9] References:
https://www.francevelotourisme.com/itineraire;

F. EU CYCLE Regional cycle network types

25. The integrated Cycling Planning Guide, developed in the frame of the EU CYCLE project, distinguishes three main target groups for regional cycle networks: commuters, tourists, and recreational cyclists. The different networks orientate themselves towards different user groups:

- Functional cycle networks – in the regional context, mostly cycle highway networks, oriented towards pedelec and speed-pedelec users.
- Touristic routes – oriented towards people making multiday trips with bicycle, with overnight stays on the way. Even if the majority of users on a touristic route are short-distance day-trippers, the long-distance tourists are the focus, because they generate most of the income.
- Recreational networks – the category might cover the biggest variety of user requirements. It includes for example:
    - fast cyclists on road bikes, requiring good quality of surface but able to cope with slightly higher volumes of traffic,
    - families with children, for whom the separation from motorised traffic might be the highest priority,
    - mountain bikers, enjoying sections of (stabilised) gravel or varied gradients.

26. A specific example of a recreational network is the node network. The manual also notes that specific routes or their sections can combine multiple functions. For example, touristic routes can form a backbone for recreational networks, and in agglomerations corridors connecting city centres with suburbs often combine all three functions.[10]

G. Cycle Highway Assessment Tool

27. Cycle Highway Assessment Tool was developed in the frame of the CHIPS project (Cycle Highways Innovation for smarter People Transport and Spatial Planning) to evaluate the maturity level of cycle highways. 22 categories are considered, with each of them divided into 4 criteria level, from very basic to European benchmark.[11]

H. Essential elements for consideration by GE.5

28. To work out its own user or route classification, which is required for defining the values for infrastructure parameters, GE.5 may wish to consider interaction between:

- cyclists and motorised traffic,
- cyclists, taking into account their number and types of cycle they use such as conventional cycle, pedelec, speed pedelec, cargo pedelec *(note that the cycle categories may need to be adjusted pending the discussion of the cycle definition),*
- cyclists and pedestrians,
- cyclists and environment (obstacles, quality of surface, risk of run-off-road accidents).

29. GE.5 may also consider the following route classification:

https://www.velo-territoires.org/wp-content/uploads/2022/02/00_Cotation-difficultes-iti-de-Tourisme--vlo-rfrentiel-national_20160322.pdf.

[10] Reference: https://projects2014-2020.interregeurope.eu/eucycle/library/

[11] Reference: https://cyclehighways.eu/plan/what-kind-of-cycle-highway-to-plan/three-step-approach.html; https://cyclehighways.eu/fileadmin/user_upload/academies/Presentations/Leuven_10.2018/20181010-CHA5-3a-CH_Assessment-v-BC.pdf

Level 1: infrastructure covering the most basic user needs. It can be applied in case of external constraints (lack of space, mountainous area, heritage protection, etc.) if the expected usage is not high. If not possible to meet level 1 requirements, one should always look for another solution (for example, mixed traffic instead of cycle track).

Level 2A: infrastructure addressing the needs of majority of (conventional) cycle users, including children and elderly, sufficient for most typical cycle routes.

Level 2B: infrastructure suitable for fast pedal-driven vehicle users (for example road cyclists or speed pedelec users). Comparing to level 2A infrastructure, level 2B requirements assign higher priority to geometric parameters and segregation from pedestrians than to segregation from motorised traffic.

Level 3: infrastructure suitable for high volumes of cycle traffic and all users, including children, elderly, speed pedelec and extra-wide cycles users. This is the equivalent of a cycle highway in most guidelines and can be considered the aspiration level for main, future-proof functional cycling connections.

IV. Way forward

30. GE.5 may wish to agree on developing tables for the subsequent meeting with parameters and their values depending on user/routes classification for specific type of infrastructure.

31. GE.5 may wish to discuss a template for the tables based on the drawing presented below.

Type of infrastructure: …… [e.g.] cycle track			
User/route classification / **Parameter**	**User/route class 1** **[e.g. Level 1]**	**User/route class 2** **[e.g. Level 2A]**	**User/route class ….**
Width			
Buffer space ….			
Surface type and/or quality			
…….			

32. As indicated in sections II and III of this document, for the draft tables with proposed values to be developed, GE.5 needs to agree on:

(a) Types of infrastructure for which the tables need to be developed

(b) List of parameters to be covered under each type of infrastructure, and

(c) User or route classification or both for which different parameters values would be assigned for the same type of infrastructure.