



Hinweise für die Planung von Veloschnellrouten („Velobahnen“) in Städten und Agglomerationen

Indications pour la conception d'itinéraires cyclables rapides (véloroutes) dans les villes et les agglomérations

Guidelines for the planning of fast cycling routes (cycle highways) in cities and agglomerations

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Summary

Context

The expected traffic growth in the urban agglomerations presents some challenges for traffic planning. Especially as the expansion of motorised and public transport infrastructure is increasingly reaching its limits. One approach is to shift the increasing motorized traffic to more compatible means of transport such as bicycles or e-bikes. This however requires more attractive infrastructure for cycling. Thus, so called fast cycling routes are increasingly being developed throughout Europe. The Netherlands, Denmark and Germany in particular have played a pioneering role here.

In view of the international examples, the expectations regarding the quality and the benefits of fast cycling routes (also known as cycle highways) are often very high in Switzerland. Authorities, planners and lobby organizations alike see them to be a central and high-quality element for the promotion of cycling.

So far there has been little research on the topic. This gap is to be concluded with the research paper SVI 2014/006 "Guidelines for the planning of fast cycling routes ("cycle highways") in cities and agglomerations".

Research objectives and proceedings

This research project brings the expectations together with the concrete spatial and juridical conditions in Switzerland. It gives answers on how to satisfactorily implement fast cycling routes – especially taking into account design and planning issues and juridical questions in dense urban areas. This includes the definition of geometric design elements (such as design speed, sight distance, lane width, curve radiuses, junction design etc.) as well as rulings for the right of way, the amendment of traffic lights and the integration into the road space (road markings, signalization, sign-posting etc.).

The results are to be understood as indications for the planning and design of fast cycling routes in cities and agglomerations.

The research work was divided into the three phases: analysis (1), development and definition (2), research report and fact sheet (3). The analysis consists of a national and international literature research, the synopsis of current experience and finally in-depth empirical surveys. Guidelines for the planning and design of bicycles routes in cities and agglomerations then were developed based on the results from phase 1 and input from international experts.

Results

Definition, target groups, function

Fast cycling routes are the highest quality connections in the cycling network of an agglomeration or region. In analogy to high-ranking roads in motorized traffic, they are to form the highest network level.

Fast cycling routes are attractive, safe and fast. They link important targets with high potential, especially for commuters. An important factor for commuter transport is time, or speed. In addition, commuters are not a homogeneous group. Therefore, cycling routes must be attractive and safe for all types of stakeholders.

The basic traffic-planning functions of fast cycling routes are primarily connecting (urban districts or other traffic generating areas) and transit (by offering a bypass). In dense urban areas their function is also to collect and combine individual transport needs.

The term fast cycling route (“Veloschnellroute“) is derived from the nomenclature of the VSS (organisation for research and standardisation in the field of road transportation) and the FEDRO (federal roads office). In some regions of Switzerland other terms such as „Veloschnellverbindung“ (fast cycling connection), “Velobahn” (cycle highway) or “Pendlerroute” (commuter route) are established. These terms can continue to be used if they serve the purpose of promoting high quality fast cycling routes as described in the research paper.

Fast cycling routes are based on the following basic principles:

Basic principles

| | |
|----------------------------------|--|
| Location / potential | Fast cycling routes connect important commuter targets with a high potential. They mainly lie within urban agglomerations . |
| Infrastructure | The appropriate cycling infrastructure is defined depending on the available space and the way the surrounding structure is used. |
| Geometric design elements | Space and cycling potential determine the dimensions of geometric design elements. |
| Design | Fast cycling routes are optimally integrated into their specific surroundings . Fast cycling routes are highly self-explanatory . |

Location and potential

Fast cycling routes are mainly located in the agglomeration belt, the suburbs and urban districts. This is due to the connection of high-potential targets (e.g. residential areas and workplaces), which are located here. According to considerations in the literature, the desired minimum length is generally 5 km and the maximum length around 15 - 30 km. Practice however shows that they can also be shorter or longer depending on the local situation. Experience in the Netherlands also shows that approx. 5 - 15% of the motorized commuters change to cycling if a fast cycling route is constructed.

Infrastructure

Cyclists can be integrated into the traffic system in two ways: either separated from the rest of the traffic or mixed with other means of transport. The appropriate form varies depending on the available space and the way the surrounding structures are used. In general cyclists prefer segregated cycle facilities. The following types of infrastructure are primarily suitable for fast cycling routes:

- cycle paths (one-way and two-way) and cycle tracks
- bike streets (currently being tested in Switzerland)
- wide bike lanes with a solid line
- roads which are free of motor vehicles (or where only very few motor vehicles are permitted)

Standards and geometric design elements

In the dense urban areas space is a key limiting factor for the design of fast cycling routes. In the less dense (rural) areas the low bike traffic volume or potential is more important. The best design solution must therefore be found in accordance with spacial conditions and traffic volume. In the following, some important standards and geometric design elements from the research paper are briefly summarized:

Design speed

The design speed on the open route should be at least 30 km/h. At junctions the design speed should be at least 20 km/h.

Widths

The width of the cycling infrastructure can be defined as "normal width" and "optimal width". The necessary width in the respective situation can be determined by means of the so called relevant passing cases (situations in which bikes overtake or encounter each other) and the desired traffic quality (Level of Service LOS). It is determined for each section of the route.

In the case of bidirectional cycle paths, the width varies between 3.20 m and 4.00 m depending on the situation. One way cycle tracks vary between 2.00 m and 3.00 m. Wide bike lanes should be at least 2.20 m wide.

The research paper specifies the procedure to determine the appropriate width precisely. Furthermore it shows the LOS grades in connection with bike traffic volume and width of the infrastructure.

Intersections and crossings

Intersections can influence the perceived quality of fast cycling routes. Therefore bicycles should be prioritized at crossings and junctions on these routes.

In some cases, however, the right of way can not be given or traffic lights are necessary. The average time losses by stopping and waiting should not exceed 15 seconds (outside urban areas) and 30 seconds (in the city). The following measures can reduce or avoid waiting times for cyclists at traffic lights (list not exhaustive):

- constant green for cyclists
- multiple green phases for cyclists
- early detection of cyclists (with prioritisation if possible)
- green wave for cyclists

Urban integration and design

The design of the fast cycling routes serves as a connecting element. It should bring together the different requirements and functions and give a good overall picture. A certain recognition factor and a (uniform) regional appearance are essential as a means of communication. Furthermore, good design also contributes significantly to the actual and felt safety. This applies both for cyclists on a fast cycling route as well as for pedestrians in the same road space. The design of a fast cycling route should therefore follow a concept. This typically involves the entire road space with all structures and uses. Various design elements (such as road markings, lighting, lateral boundaries, furniture, signaling) can be used to make fast cycling routes as self-explanatory as possible and to optimally integrate them into the street or the surrounding area.

Planning and evaluation of fast cycling routes

Planning and evaluation of fast bicycle routes is carried out according to the basic requirements ("attractive", "safe" and "fast"). This research paper specifies the quality requirements in detail. Ideally a fast cycling route fulfils all criteria excellently. According to the principle of proportionality however, it is always necessary to balance the possible impact and the size of the intervention (property, costs and effects on other transport users). This research paper offers a systematic approach to do this.

Adaptation proposals for standards and laws

Fast cycling routes can be implemented without adapting the existing Swiss laws and standards. The research paper, however, shows a certain need for modification concerning the approval of bike streets, the Swiss signaling regulation (SSV), bike lane widths (norms SN 640 201 and SN 640 262) and the basic cycling norm SN 640 060.