



Speeding up Cycling through special Infrastructure

Introduction

As any other transport user, cyclists value short travel times, direct connections, safe and pleasant environment for their trips. Provision of comprehensive and carefully planned bicycle infrastructure is paramount for high cycling modal shares. A key element is increasing the average travel speed of cyclists, which is influenced by different infrastructural and traffic-related obstructions. Such an increase can be achieved through reduction of waiting times at intersections, better surfaces and the minimization of detours, and segregation from motorised modes.

Measures to speed up cyclists

The following measures are instrumental in accelerating bicycle traffic:

- Improvements of the cycle path surface
- Removal of obstruction in areas of cycle paths
- Reduction of detours, e.g. by installing dedicated infrastructure (e.g. bridges, tunnels)
- Opening of one-way streets for two-directional bicycle use
- Opening of dead-end streets for bicycles
- Creation of special bicycle only areas and streets
- Opening of bus lanes for bicycle use
- Adaptation and use of disused railway/tram lines

In addition, special emphasis needs to be given to the design of intersections. These represent the major obstacles for bicycles to move uninterruptedly, and can even generate safety problems (due to shortcomings with regard to construction and/or regulation). Increasing cycling speed at intersections (with or without traffic signalization) is particularly

important for high average speeds and steady flows. For this reason, waiting times must be reduced or entirely avoided. Apart from giving priority to cycle traffic on main routes through policy or physical measures, further optimizations are possible at signalised intersections.

Examples of such improvements in the traffic signalization are:

- Longer green times for bicycles
- Automatic demand-driven green traffic lights (via detection)
- Setting lesser waiting times for the bicycle traffic
- Cycle-friendly coordination of several subsequent signalized intersections, in a so-called “green wave”



Nijmegen (NL) Photo: Jeroen Buis, 2007



National and International Concepts to Improve Cycling Speed

To promote cycling and fully take advantage of its potential, cycle express routes or cycle highways can be seen as a new element in urban infrastructure, aiming at modal shift from car to bicycle for daily commuting.

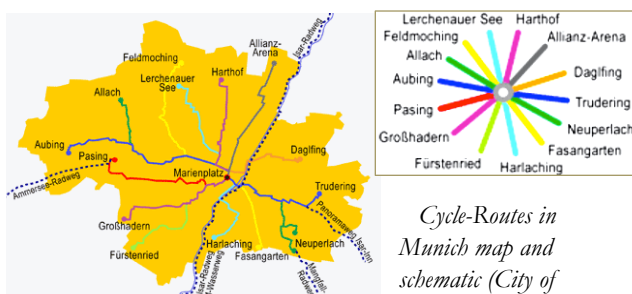
Similar to the system of highways, bicycle fast lanes are created to achieve shorter travel times through a constant speed. The goal is to provide an improved cycling infrastructure, which is particularly focused on the daily needs of commuters (seen as the user group with the highest potential for car substitution). Other user groups such as children and leisure bicyclists can also benefit.

The following paragraph gives an overview of planned or realized concepts for improving the speed, user-friendliness and comfort of bicycle traffic in urban and suburban areas.

1. Veloroutes of Munich, Germany

Veloroutes play a major role in cycle network planning of different cities. Munich (Germany) has implemented *veloroutes* as part of its mobility concept for a greener city. The example shows how it is possible to reach all areas of the city on a bicycle in a fast, safe and comfortable manner.

Munich established a city-wide cycle network, with 14 main cycle routes in a star-shaped and three in a ring-formed configuration. Furthermore, there are secondary routes connecting the various city districts. The planners tried to realise the routes offside the main car-used streets with a high quality surface, an effective illumination and an extensive signposting system of 350 km. (City of Munich, 2007)



2. Fast Cycle Routes in Houten, Netherlands

In the early 1970s, the city of Houten established a comprehensive cycle infrastructure by adapting the built environment. Instead of mixing different modes, the idea was to segregate motorized and non-motorized traffic. Houten, created a high bicycle share by providing a fast and secure cycle network with high quality infrastructure. (V&W, 2009; Kalle, 2011)



Mainlines in the city centre (left), a two-level roundabout (center) and the main cycle axis in the area "Castellum" (right) (Kalle, 2011)

As a part of the traffic congestion reduction program "Fiets filevrij" (drive bicycle without congestion), the sub-project "fietsssnelweg" (Bicycle-Fast-Routes) was launched by the local authority. The city created a high quality cycle network in the region of Twente, connecting and providing access to several closely linked cities. The planned connection of cycle infrastructure presents a high quality standard with the planning-targets **Directness / Attraction / Comfort / Safety / Connection** and help in the prevention of an increase in the number of cars. (Bicycle Research 2010)



Map of the cycle freeway F35 connecting different cities (Region of Twente 2009)



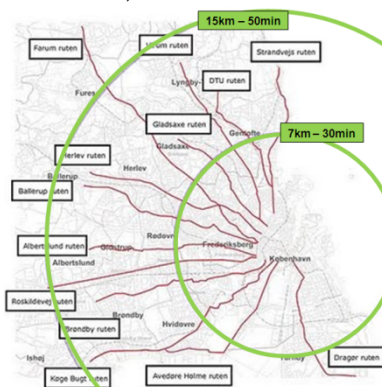
From concept to execution: Route-design (Region of Twente, 2009), grade separated junction of the cycle route F35. (Gerdemann, 2011)



Example of Cycle-Express-Route in Nijmegen-NL (SVT, 2009; SOAB, 2010)

3. Cycle Highways in Denmark

Various Danish cities, including Copenhagen, Aarhus and Odense, plan to create fast cycle routes to improve the quality of cycling. The primary target is a modal shift of car users to bicycle, for their daily trips ranging from five up to 20 kilometres. Besides the measures for quality improvement, there are special ones to increase cycling speed. Prioritized and demarcated routes will be integrated for a direct connection between important areas in the city. (Bicycle Research, 2010)



Example of new infrastructure in Copenhagen – Map and Photomontage to Nørrebrogade-street (copenhagenize.com and Gerdemann 2011)

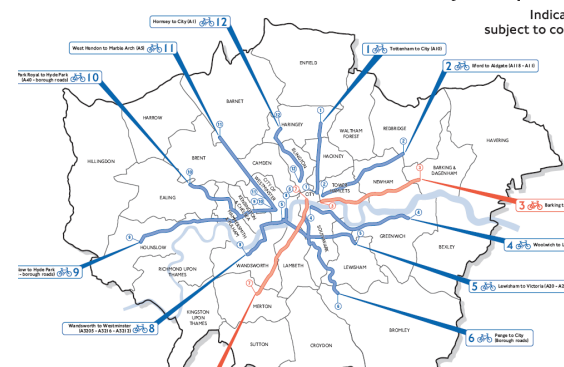
4. Cycle Superhighways in London

London is making big efforts to realize its cycle masterplan prepared in 2004. As one way to increase cycle usage, city planners want to connect the peripheral areas of London with the city centre by installing 12 “Cycle Superhighways”. The public private partnership (PPP) financed by Barclays, is up to 15 km long routes (“Barclays Cycle Superhighways” – BCS), will be integrated in the tight public space. In addition, the system aims to bundle large flows of bicycles with the lowest possible detour. Moreover, the infrastructure is distinct (through signalisation and coloured surface) and designed to promote daily bicycle use. (City of London, 2010)



Cycle Superhighways

Indicative routes subject to consultation*



Cycle Superhighway in London - two concepts, one realized route and the network of the BCS realized routes in red (inhabitat.com- BCS)



Summary and Recommendations for the Use of Infrastructure to Speed up the Bicycle

The bicycle express routes illustrated in this document aim at fast, safe and attractive cycling connection in and between urban and suburban areas, by creating dedicated high quality cycle routes.

Several European cities and metropolitan regions are currently working on planning or implementing of various measures to promote bicycle use. The high comfort and the reduction in average travel time for cyclists contained in current plans will establish a viable alternative to common, daily car-use.

Especially on urban main bicycle corridors, express routes represent a high potential for the future. With the aid of special infrastructure, like prioritized intersections, increased width, high quality surface it is possible to decrease the travel time for cyclists.

The following tentative list of recommendations for the installation of such bicycle express routes. The recommendations are drawn by surveying European examples:

- High quality surface material
- Direct connection between important origins and destinations of trips, thereby avoiding long detours and high gradients
- High level of safety on routes and intersections
- Intuitive and easy use of the infrastructure
- Optimized infrastructure for social safety by using sufficient lights and open-spaced tracks
- Well dimensioned infrastructure to enable cycling at a continuously high speed (also for speed > 25 km/h)
- Customized bicycle route with priority at intersections or a minimum waiting time at signalized intersection
- Sufficient distance from moving and parked motorized traffic
- Continuous and consistent character of the track (e.g. same material, same width)
- An ideal cycle track would be of width $\geq 3.5\text{m}$ (for bidirectional track) and $\geq 2.0\text{m}$ (for a one way track)

- Planning in an enlarged urban area ($\varnothing \geq 15\text{ km}$), in order to offer an alternative to car commuting trips (connection to suburban tourist routes is possible)
- Additional services for improving the cycle climate and the increased use of bicycle express routes (e.g. removal of dirt and snow on cycle tracks – maintenance, links with public transport, sufficient cycle parking space at destinations, public awareness campaigns, providing natural shade through trees in hot climates)



Concept-sketches of the Bicycle Express Routes in the Netherlands (Region of Twente, 2009)

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