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CYCLING DESIGN

BEST PRACTICES



2023

Cycling Design Principles

Cycling infrastructure design is a very complex and articulated subject that aims to create quality infrastructure in every street and for every type of user. Below are five design principles that must always be respected when designing new cycle paths.



Cohesion

Cycling as a means of transport means going by bike from anywhere to everywhere! A cohesive infrastructure ensures a uniformed network. These networks must consider multimodal transport. Thus, the grid of bike lanes has to reduce the number of crossings and provide links and link alternatives among origins and destinations.



Directness

In order to make the most efficient balance between distance and time, it is essential to minimize detours for cyclists. To achieve this, it is necessary to reduce bends, prioritize the cyclist in traffic lights, and make exclusive/separate bike lanes. The goals of these strategies are to reduce journey times and guarantee less physical effort, making cycling a competitive transport alternative.



Safety

Good cycling infrastructure design must guarantee both social and road safety. It is necessary to reduce stress and the exposure to pollutants and noise to assure personal health on the road, and specially to attract new people that are interested in cycling, but still concerned and fearful of the conditions. To achieve this, bike lanes work better when they are not parallel to main busy roads, but in neighbourhood low speed streets. In addition, bike lanes that are physically separated from the roads will make cycling safer. To minimize the risk of collision, it is also crucial to build tunnels and bridges for intersections with busy traffic and high-speed roads.



Comfort

Looking for comfort is a human instinct. The goal of cycling policy is to make cycling a pleasant experience. To address this, planners have to consider that cyclists are the starting point of the strategies and infrastructure: Normally, bikes have no suspension system, are human operated vehicles, and require a balancing act. To guarantee a comfortable situation, it is imperative to minimize stops and nuisances in the network. Also, it is essential to make smooth pavements that reduce the vibration and height difference. And finally, to avoid the anxiety of getting lost and optimize the wayfinding, a good and intuitive signing system is necessary.



Attractiveness

It is well known that an aesthetically pleasant and good quality-built environment boosts the cycling activity in an area. This consists of creating green and open areas, in which streets are quiet and well maintained. The presence of vegetation and water attracts cyclists. Therefore, it is imperative to avoid unpleasant conditions when planning infrastructure, such as congested and polluted streets that worsen the safety and health perception.

Practical Recommendations

01

Width of Cycle Infrastructure

The width of cycle infrastructure can vary depending on the typology and space available. The minimum width for one-way cycle path is 1.50 m, while for two-way lanes it is 2.50 m. The best option would be to never go below 1.25 m for one-way roads, except for critical cases and for short stretches. The ideal width of bidirectional cycle paths would be 3.00 m to ensure comfortable use for cargo bikes which are bulkier than traditional bicycles.

02

Type of Cycle Infrastructure

There is not one typology of cycle infrastructure that is perfect for all contexts. Usually there is a tendency to use cycle lanes in urban areas where space is scarce and where it is easier to apply traffic calming tools to allow street sharing. In extra-urban areas, the one-way or two-way cycle path separated from vehicular traffic is preferred, both because the space available is greater and to ensure greater comfort for those who pedal, away from traffic.

03

One-way vs Two-way

In urban areas where there are numerous intersections and turns, it is advisable to use one-way cycle lanes because they are easier to use and safer. In extra-urban areas where intersections and crossroads are much less frequent, it is possible to provide bidirectional cycle paths.

04

Avoid Conflict between Vulnerable Users

One of the most common mistakes is to design infrastructure by putting the most vulnerable road users in conflict. Cyclists and pedestrians have very different space and speed needs, and it is important to guarantee maximum comfort and maximum safety for both users. Cycle infrastructure should not be designed at the expense of pedestrian mobility but at the expense of motorized mobility, adopting traffic calming and road sharing solutions if it is not possible to create separate infrastructure.

05

Highlight Cycle Crossings at Intersections

Road junctions are critical places for the safety of cyclists due to the risk of collision with motor vehicles. It is therefore advisable to highlight the route of the cyclists through the use of horizontal signs and coloured paint (red or green) in order to induce the drivers to raise the level of attention and prevent accidents.

Practical Recommendations

06

'Bike-box' at Traffic Light Intersection

The "Bike-box" is a space dedicated to bicycles located at the traffic light intersections, in front of the stop line for motorized vehicles. The "Bike-box" increases the safety of cyclists because it makes them more visible and allows them to clear the intersection before other vehicles.

07

Traffic Lights Dedicated to Cyclists at Intersections

To minimize the risk of accidents at crossroads, it is advisable to install a traffic light system dedicated to bicycles. For example, the green light dedicated to cyclists starts a few seconds before the green light for cars, allowing cyclists to anticipate the turning manoeuvre to clear the intersection.

08

Bicycle Parking: Racks, Velostations & Biciboxes

In addition to the infrastructure that is useful to move around cyclists, it is also necessary to provide safe parking places to avoid thefts. There are three types of bicycle parking that adapt to the various needs of the user: the arched frame-locking racks must be widespread throughout the urban area; The velostations must be installed in correspondence of large attracting points or interchange nodes, favoring intermodality; The biciboxes are used to guarantee maximum safety for medium-short term parking of valuable bicycles.

09

Signing System with Directions, Distances and Travel times

To make it easier to use the bicycle for urban travel, it is a good idea to install vertical signs to indicate distances, destinations and travel times. In this way, even if the user does not know the city, they can find their way around more easily and know in advance how long it will take to reach the destination.

10

Bike Sharing Services

Bike sharing is a fundamental service to encourage cycling and intermodality among city-users. There are different types of bike sharing: public or private, free flow or station based, electric and/or muscle. According to Italian and European experiences, bike sharing works best in cities with more than 200,000 inhabitants.

Key Resources

Cycling for healthier and more inclusive communities

Case stories from around the world showing how cycling is being made more accessible to vulnerable groups in cities



SAFE BICYCLE LANE DESIGN PRINCIPLES

Responding to Cycling Needs in Cities during COVID and Beyond

GLOBAL ALLIANCE OF NGOs FOR ROAD SAFETY



Global



Street



Design



Guide



Global Designing Cities Initiative

SAFER CYCLING ADVOCATE PROGRAM

BEST PRACTICE GUIDE



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Geometric design parameters for cycling infrastructure



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