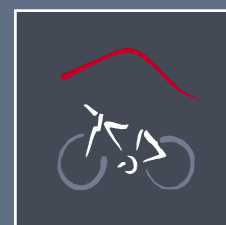
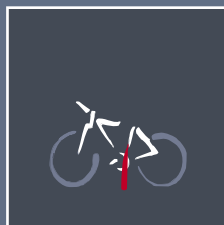


Bicycle parking manual



Title

Bicycle parking manual

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Photo: Pablo Celis

Preface



Where do I park my bicycle?

Regrettably, accessible and satisfactory bicycle parking facilities are sometimes few and far between.

This is due to the fact that, so far, good bicycle parking has been given far too little attention in urban planning. And when

bicycle parking has been included in the planning, not enough account has often been taken of the needs and requirements of cyclists and their patterns of behaviour. The result is often a bicycle parking facility which is not used.

Denmark generally has a good network of bicycle paths, but when it comes to bicycle parking we lag hopelessly behind, especially the Netherlands. They are currently improving and enlarging their excellent bicycle parking facilities. In The Hague, with almost half a million inhabitants, a new facility with space for 14,000 bicycles is being planned at the main railway station!

Denmark is a cycling country, and this should be demonstrated by our bicycle parking facilities, too. Fortunately, town planners and politicians are focusing more on the issue.

Bicycle parking could be a winner

Good bicycle parking facilities may be what persuades commuters to travel by bicycle and public transport rather than jumping in the car. Bicycle parking can contribute to solving the growing problem of congestion. At the same time, public health and the environment are given a boost when we make it more tempting to go by bicycle on a daily basis.

Try looking around near stations, at new residential developments and in other places frequented by cyclists. Hundreds of bicycles thrown together in a complete mess are not a pretty sight – and often a nuisance for pedestrians. It does not have to be like that. On the contrary, good bicycle parking facilities can contribute positively to the aesthetics of the townscape and the urban environment.

Good bicycle parking is closer than you think!

If Denmark can build an Opera house with the best acoustics in the world, it should also be possible to create beautiful and functional bicycle parking facilities to go with it. And even though it may be difficult at stations to establish whether the local authority, the owner of the station or the traffic provider is to blame, proper bicycle parking is in everyone's interest. Of course, it is possible. And, of course, bicycle parking in both new and old residential areas and in shopping districts can be both functional and fit in well with the surroundings.

What to do?

We have invited a group of leading experts to take a look around – also in other countries. We have identified what characterises good bicycle parking. If planners follow a number of simple and basic principles, it cannot go completely wrong.

The time has come to do something about bicycle parking. This manual is intended as a source of inspiration in the future planning and design of bicycle parking facilities. And given the considerable interest which the project has already aroused, we are convinced that the manual will be put to good use.

We look forward to seeing what happens.

Jens Loft Rasmussen
Director
The Danish Cyclists Federation



*Åboulevarden – Aarhus
Photo: Pablo Celis*



Background

Cycling as a means of transport is on the increase in towns and cities, and further growth in the number of cyclists is expected in the coming years. At the same time, a lot is being done at many levels to get more people on their bicycles.

However, not much thought is going into the question of where all these bicycles should be parked when not in use.

Part of the problem is that bicycle parking has not been given the necessary attention in urban planning and area use.

Moreover, no clear guidelines exist as to what constitutes good bicycle parking facilities. This affects the decision-making processes, and the quality of the solutions realised is not impressive.

Anarchic cyclists or useless bicycle parking?

It is a general assumption that cyclists behave like anarchists when parking their bicycles. Many therefore see the creation of orderly conditions in this area as being a question of upbringing.

However, the primary reason why cyclists behave anarchically is that not enough parking spaces are available and also that the location of many of the available parking spaces is not practical. At the same time, many of the stands and racks offered are not good enough.

When the bicycle parking problem becomes acute in the public space, the solutions devised are often haphazard. They rarely solve the problem, but end up as an eyesore in the townscape.

Consequently, the anarchic parking habits continue despite all the good intentions and despite many futile attempts to procure a sufficient number of parking spaces, or just more parking spaces.

Problem not insoluble

The growing chaos and anarchy surrounding bicycle parking make the problem appear insoluble – which, of course, it is not.

First and foremost, bicycle parking must be included in all relevant planning and decision-making processes at the relevant times.

In connection with all building and construction works, conversions, refurbishments, renovations, maintenance and improvement projects and new building works, bicycle parking should be included in the process from the outset. Like other area planning issues.

Local authorities should make demands

As not all developers are aware of their responsibilities in relation to the establishment of bicycle parking facilities, the local authorities must introduce specific requirements.

It is important that the solutions are sound and that they meet a small number of crucial requirements.

- The solutions must ensure that the necessary parking area and number of parking spaces are available.
- The solutions must ensure that bicycle parking facilities are located and laid out in a way that encourages use.
- The solutions must signal order, system and balance.

In other words, the solutions must signal that the town or city and the local authorities, the business and the developer appreciate the fact that many people elect to use their bicycle as a means of transport.

The manual as a guide – how to read

The manual is a reference work divided into three main parts:

- Guidelines and recommendations
- Manual
- Inspiration and useful examples

Start with the guidelines

1. Part 1, “Guidelines and recommendations”, provides an eight-step summary of the most important recommendations for the successful planning and creation of bicycle parking facilities.

Study the manual

2. Part 2, “Manual”, is an in-depth description of all aspects of the planning, construction and running of bicycle parking facilities. The manual is illustrated with examples and photos explaining the various issues, processes and solutions.

Find new inspiration

3. Part 3, “Inspiration”, is a collection of examples (from Denmark and other countries) of effective bicycle parking solutions which support some of the issues described in the manual.

At the back of the manual is an index and a list of references.

Guidelines and recommendations

Part 1 provides an eight-step summary of the most important recommendations for the successful planning and creation of bicycle parking facilities.

In particularly problematic cases, it is a good idea to browse the manual for alternative working methods and possible solutions.

For each step, references are included on where to find further information and inspiration on the subject in the manual.

Moreover, the eight steps can be used as a checklist once you have decided on a specific parking solution and you want to make sure that sufficient account has been taken of the most important elements in the creation of good bicycle parking facilities.

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*Åboulevarden - Aarhus
Photo: Pablo Celis*

Bicycle parking step by step

By following a number of simple and basic principles when planning and creating bicycle parking facilities, it is possible to provide good and forward-thinking solutions.

Here, a number of step-by-step recommendations are provided on how to incorporate bicycle parking into existing developments, squares and market places and into new building and construction projects.

- **Attract attention**

Guidance on how to raise the necessary awareness about bicycle parking.

- **Choose the right location**

Guidance on the location of the bicycle parking facility

and its visibility in relation to the patterns of movement and destinations of cyclists.

- **Outline a solution that works**

Guidance on space requirements and accessibility. How much space does a given parking solution take up? And how do you find a solution which takes account of the needs of specific users?

- **Make sure there are enough racks and stands**

Guidance on how to ensure that the number of racks and stands and facilities meet the current and future demands for parking.

- **Identify the right racks and stands**

Guidance on choice of good racks and stands for va-

rious purposes.

- **Make parking safe**

Guidance on how to design a bicycle parking solution which is safe and secure for cyclists and their bicycles.

- **Consider operation and maintenance**

Guidance on how to ensure that the bicycle parking stays looking good.

- **Spoil the cyclists**

Guidance on choice of design and other facilities. Good design encourages better bicycle parking habits.

There are more than 4.5 million bicycles in Denmark, which calls for good bicycle parking facilities.



*Bicycle parking at Højbro Plads in Copenhagen
Photo: Thomas Kraag*

Attract attention



The road to good bicycle parking is shorter than you might think!

And it comes with lots of benefits!

Parked bicycles which obstruct the pavement for pedestrians, prams and wheelchairs are a growing problem. Overfull bicycle racks which make it difficult to find a space and equally difficult to find and retrieve your own bicycle are also a growing problem.

In most large towns and cities, the bicycle parking problem is generally assuming immense proportions.

However, the solutions are relatively simple. In addition to following the recommendations set out in this manual, it is a question of reserving enough space in the right locations and allocating the necessary financial resources.

But how can you justify investments in bicycle parking when decision-makers do not recognise the problem or find it irrelevant or insoluble?

• Turn bicycle parking into a win-win situation

Many prejudices can be shifted by arguing in favour of bicycle parking in the right contexts and by presenting decision-makers with good examples.

Use the examples in this manual and use the inspirational section to attract the necessary attention to good bicycle parking solutions. Supplement with the arguments set out below.

• Benefits for the town, local authority and society

Seen in a broader perspective, bicycle parking is more than just a functional facility. Bicycle parking comes with a number of benefits in terms of the townscape, the environment and health.

• If the infrastructure is in place, more people will choose to travel by bicycle.

• If more people go by bicycle rather than by car, congestion in urban zones is reduced.

• People become healthier, and the impact on the environment is lessened.

• If bicycle parking is done the right way, the flow of traffic through streets and squares will be improved.

• Proper bicycle parking facilities lead to greater accessibility for pedestrians and the disabled.

• With the right solution and design, bicycle parking can make a positive contribution to the aesthetics of the urban environment and townscape.

In this perspective, bicycle parking is a winning cause.

Politicians, civil servants, traffic planners, architects etc. who embrace this idea will generate goodwill which goes far beyond the "project" itself.

The money invested in bicycle traffic and bicycle parking will be paid back manifold in the form of savings on health care, planning and environmental budgets.

• Benefits for businesses, shops etc.

Good bicycle parking also brings benefits to individual businesses and organisations:

• Good and visible bicycle parking facilities help raise the profile of the business as a modern organisation that takes cycling as a daily means of transport seriously.

• Good bicycle parking facilities can encourage more employees to cycle to work. The more employees that cycle to work, the more healthy, energetic and positive they will be.

• Unit prices

The costs of establishing bicycle parking facilities must be factored into the budget from the start of any building project. And bicycle parking is actually not that expensive. The following rough estimates can be used:

• Bicycle rack installed on existing surfaced area:

EUR 200-300 per bicycle parking space.

• Covered bicycle parking:

EUR 400-500 per bicycle parking space.

• Covered two-tiered rack:

EUR 500-600 per bicycle parking space.

• Enlargement of pavement including 10 bicycle parking spaces – EUR 14,000 corresponding to:

EUR 1,400 per bicycle parking space.

Unit prices are based on empirical data from the City of Copenhagen and estimates obtained from a bicycle rack manufacturer.

All estimated prices are inclusive of installation.



Further information?
– see pages 80-93



"You get the cycling traffic you deserve" - Troels Andersen (Odense Cycle City)

In 1999, Odense was named as Denmark's national city of cycling (Danmarks Nationale Cykelby) by the Danish Ministry of Transport and the Danish Road Directorate. A total of EUR 2,5 million was invested over a four-year period. Massive investments were, among other things, made in good bicycle parking solutions and supplementary facilities for cyclists.

Impressive results

The Odense Cycle City project ended in 2002. The evaluation of the very comprehensive project was presented in 2004, and the results were impressive. The evaluation showed, among other things:

- That the number of cyclists was up 20%
- That just over half of the new cyclists used to commute by car
- That accidents are down 20% due to the greater visibility of cyclists
- That savings of EUR 4,4 million were achieved on the health budget

See and read more about Odense Cycle City on pages 57 and 84.



Bicycle parking as an urban status symbol – Odense Cycle City



*Ozone
Photo: TTS*

Several of Odense's bicycle parking facilities take on a monumental air – this is rack model Ozone from TTS with a built-in "bicycle key".



*Bicycle pump
Photo: Pablo Celis*

Compressed air for cyclists at several bicycle parking facilities in Odense. TTS is a pump manufacturer.



Danish Cancer Society – a modern organisation with focus on cycling

The Danish Cancer Society has prepared an overall plan for bicycle parking at the organisation's main offices in Copenhagen. The plan includes, among other things, replacing old equipment and introducing new and specially designed solutions to raise the status of cycling as a means of transport



*Danish Cancer Society
Photo: Pablo Celis*

Spoiling employees

New, sheltered parking facility with lighting (close to the back door) with easy access. Compressed air has been installed at the parking facility. An area of land has been reserved so that the number of parking spaces can be doubled in step with increasing demand. Sheltering is from Veksø, as is the rack, model NO.



*Logo rack
Graphics: Pablo Celis*

Profiling the business

According to the bicycle parking plan, part of the forecourt in front of the main entrance should be adorned by a number of specially designed bicycle racks with logo.

Choose the right location



Consider carefully where cyclists are most likely to want to park.

Rather than opting for out-of-the-way bicycle parking!

To ensure the efficient use of any bicycle parking facilities, they must be sited correctly.

Bicycle parking facilities must be located close to the route naturally taken by cyclists. They must be visible, with easy access and at a distance from the final destination which is in line with the purpose and duration of the parking.

• En route to the final destination

For cyclists, it is essential that parking becomes a natural part of the cyclist's movement from the general flow of traffic to the destination.

The parking facilities which best fulfil this condition will always be the first to be used.

If you see lots of parked bicycles in a particular place, it is usually because it is a natural place to park en route to the final destination. It may therefore be worth considering whether to establish bicycle parking here.

• Visibility

The bicycle parking facility must be visible to cyclists from a fair distance. The easier it is to spot, the more likely it is that bicycles will be parked within the perimeter of the parking area.

Good signage and directions further enhance the visibility of the bicycle parking facility.

• Access in relation to infrastructure

Access to the bicycle parking facility should be in direct continuation of the flow of traffic followed by cyclists. How to access the parking facility should be clear to those moving with the general flow of traffic, and all visual barriers must be eliminated.

• Distance to the destination

The duration of the parking decides how far cyclists are prepared to walk from the parking facility to their final destination.

If parking is only for a very short time, the distance should be between 0 and 15 metres.

For long-term parking, distances of up to 100 metres are acceptable.

In connection with night or 24-hour parking, it may be more important for cyclists that their bicycles can be secured or locked inside. This means that a longer walk may be acceptable in return for a higher level of security, safety and improved parking comfort.



Further information?
– see pages 27-31



For short-term parking, it must be possible to park the bicycle close to the destination



Photo: Pablo Celis

Quick errands – call for short distance between parking and destination.



For long-term parking, a longer walk to the destination is acceptable only if a slightly better solution is offered



Nørrebro Station – Copenhagen
Photo: Lars Gemzøe

At Nørrebro Station in Copenhagen, spacious parking with good stands has been established some distance from the station, but access from the bicycle path network is hopeless.



Good short-term parking – Main library in Copenhagen

Close to the destination

The main library in Copenhagen attracts many users who arrive by bicycle. The library is situated in a narrow street in central Copenhagen where space is limited.



*Main library in Copenhagen
Photo: Pablo Celis*

About the solution

The City of Copenhagen has decided to allocate space for bicycle parking at the main entrance to the library. The area was previously used for car parking. Each car parking space has been turned into parking for approx. 10 bicycles.

The alternative would have been lots of bicycles parked on their kickstands or resting against the facade to the considerable inconvenience of passers-by.



Visible bicycle parking near Østerport Station – Copenhagen

Visible parking close to the station

Østerport Station in Copenhagen has undergone extensive refurbishment which was completed in 2007. As part of the refurbishment, the City of Copenhagen has created good and visible bicycle parking near the station which offers direct access to platforms via the existing subway system.



*Østerport Station – Copenhagen
Photo: Erik Bølling-Ladegaard*

Cyclists can choose between many different parking options. Racks have been installed on both sides of the bicycle path, and there are several points of access to the platforms.



*Østerport Station – Copenhagen
Photo: Erik Bølling-Ladegaard*



Well-planned bicycle parking near Lindevang Metrostation – Copenhagen

Lindevang Metrostation is an example of how a well-planned layout and the right location can make cyclists use the racks. Arriving from the north, cyclists immediately get a sense of the available spaces.



*Lindevang Metrostation
Photo: Erik Bølling-Ladegaard*

It is easy to see when there are no spaces to be found further ahead, and this means that most cyclists are prepared to park up to 75 m from the station entrance.

The parking option is en route to the destination, and you have already dismounted or slowed down.

However, coming from the south, there are no obvious places to park. Those arriving from the south park their bicycles under the bridge or right in front of the entrance.

Outline a solution that works



Empty stands may be a sign that there are enough stands.

But it may also be a signal from users that the parking solution does not work!

Once the location has been found, the solution must be designed so that it works.

Focus must be on access and room for manoeuvre as well as on the size and characteristics of the area.

It must generally be easy to get around with the bicycle, place it in the stand and proceed on foot. When collecting the bicycle, it must be easy to find and get out.

• Access to bicycle parking facility

There must be direct access to the parking facility. Steep ramps, stairs, doors and other obstacles may mean that the facility is not used.

If an entrance as such is established, it must be at least 2.0 m wide to allow two bicycles to pass each other, also when pushed.

• Manoeuvrability

Internal access paths must be free and wide enough for users to pass each other and to park and remove their bicycles from the stands.

It is recommended that stands be placed at 60 cm intervals. This leaves room for different types of bicycles and bicycles with various luggage carrier systems.

• Required area

Often the available area is not big enough. Lack of space is a particular problem in densely populated inner cities. The choice is then between changing the existing area use or a compact solution. Alternatively, you must try to find other areas.

• Changed area use

First and foremost, you must look at the overall area use for the location. Even though protests often ensue, it may be a good idea to give priority to the establishment of the necessary bicycle parking facilities.

• Compact solutions

With a compact solution, stands are placed more closely together, reducing the area allowed per bicycle.

There is a limit to how compact bicycle parking can be. The closer the stands, the lower the level of parking comfort for cyclists. The risk is that they choose to park elsewhere.

If a compact solution is unavoidable, angled parking is the best way of reducing area use.

With a considerable demand for parking, a two-tier parking solution can be used. But choose stands which can be used by all. See the section on stand types on page 42.

• Use otherwise unused areas

In some developments and urban quarters, certain areas of land are left unused because of their location, shape or size.

Such areas can in certain cases be used for bicycle parking. If these areas do not meet the location requirements, something must be done to attract the cyclists.

Good design, sheltering or a change in the flow of traffic may help.

• Special aspects of large parking facilities

When parking facilities are very large, special efforts may be needed to ensure that the parking spaces in the furthest corners are also used.

One solution is to split the facility up into sections, making those furthest away from the entrance more spacious and supplementing with compressed air, sheltered spaces, anti-theft devices, a drinking fountain or luggage storage.



Further information?
– see pages 32-37



The recommended distance between bicycle stands is 60 cm.



Photo: Thomas Krag

60 cm between the stands is an economical solution, and there is ample space for all types of bicycles. These stands are made by Rambla.



50 cm between stands is not enough!



*Frihedens Butikcenter – Hvidovre
Photo: Mike Bosworth*

With only 50 cm between stands, there is a high risk that only every other stand will be used. This example is from Frihedens Butikcenter in Hvidovre.



Good compact solution when space is scarce.



Photo: Thomas Krag

Angled parking is a good way of fitting in more bicycles. These stands are model NO from Vekso.



Good compact solution for larger facilities



Photo: Mike Bosworth

Two-tier parking with a ramp to ease lifting is a good solution for larger facilities. This stand is from Orion Bausysteme (Germany).



Easy access to parking and stand.

Job Centre Aarhus – South

At Job Centre Aarhus – South, bicycle parking enjoys a prominent position in front of the building with easy access to both facility and stands.



*Job Centre Aarhus – South
Photo: Pablo Celis*



Good manoeuvrability and access at Groningen Station (Holland) with room for 4,500 bicycles



*Groningen Station
Photo: Troels Andersen*

Make sure there are enough spaces



There must be enough stands – rather 10 too many than 10 too few.

Good parking boosts demand. So factor in 25% more stands and spaces for future expansion!

How many bicycle parking spaces are needed in relation to different urban functions such as residential and shopping areas, institutions etc.?

• Municipal parking standards

It is recommended that all local authorities establish a set of bicycle parking standards based on the recommendations in this manual.

Such standards will ensure that the issue is included on the agenda and will be a natural basis for determining parking requirements in individual projects. Where possible, the standards should be supplemented with counts of the number of bicycles parked in any location.

The number of bicycles parked at inferior or non-existent bicycle parking facilities is often considerably lower than the actual demand for parking which materialises once conditions have been improved.

Such standards could be supplemented with a set of guidelines for establishing bicycle parking in the municipality – see “Players and processes” on page 64.

• New buildings

It may be difficult to calculate the demand for bicycle parking spaces in connection with the construction of new buildings. The nature of the building and its target group, its location in the urban structure and in relation to public transport are some of the factors influencing the mode of transport chosen by employees and visitors and thereby also the number of bicycle parking spaces required.

In most situations, the standards indicated in this manual can be used as a starting point – but always leave

room for expansion.

• At existing developments, squares and market places

When bicycle parking spaces need to be established at existing developments or at squares and market-places, observations will provide a clear idea of the number of spaces required.

• At workplaces, institutions etc.

Establishing the necessary number of parking spaces is an important prerequisite for making employees, pupils/students and visitors travel by bicycle.

For offices, institutions and other workplaces, the recommended number of spaces is 0.4 per person.

If distances travelled are great, showers and lockers should also be available.

As a general rule of thumb, the following should be established:

- 1 locker for every 2 bicycle parking spaces
- 1 shower for every 5 bicycle parking spaces
- 1 changing room for every shower

• At public transport terminals

Good bicycle parking facilities at bus and train terminals can contribute to increasing trips combining cycling and public transport. But this requires proper parking facilities near the terminal.

Sheltered parking is preferable, and start by establishing a number of spaces corresponding to 10% of passenger numbers in the morning rush hour (6-9) at bus stops and terminals.

At train stations, the number of spaces should correspond to between 10% and 30% of passenger numbers (no. of train passengers per day).

• At shops and pedestrian shopping streets

People shopping in towns and cities often cycle and will usually park their bicycles using the kickstand, against the shop window or against a wall.

Make sure that you establish – having obtained planning permission – 1-2 bicycle stands in the immediate vicinity of the shop.

At larger shops, supermarkets and shopping centres, the recommendation is generally 1.0 space for every 100 sq.m. of floor area. In densely populated urban areas and especially in the densely populated parts of the capital, the recommendation is 2.0 spaces for every 100 sq.m. of floor area.

• In residential areas and at blocks of flats

The demand for bicycle parking spaces depends on the number of people cycling to different destinations.

In residential areas, the question is how many bicycle-owners there are, and how many bicycles each person has. A growing number of people own more than one bicycle.

For blocks of flats in densely populated urban areas, the norm is 2-2.5 bicycles for every 100 sq.m. of floor area.

For halls of residence, the recommendation is 1.0 space per resident.



Further information?
– see pages 38-41



Good and adequate parking at a bus stop in Odense.



*At Ansgar Church - Odense
Photo: Troels Andersen*



It goes wrong if no account is taken of requirements



*Nykøder School - Copenhagen
Photo: Erik Bølling-Ladegaard*



Good and adequate parking at a block of flats in Copenhagen.



*Parking for residents
Photo: Veksø*



Parking - as we all know it - at a block of flats



*Angelgården - Copenhagen
Photo: Thomas Krag*



Plenty of good bicycle stands - The Municipality of Aarhus as an example.



*Municipality of Aarhus
Photo: Pablo Celis*

Department of Planning and Construction

At the Department of Planning and Construction in the Municipality of Aarhus, a total of 80 good and sheltered parking spaces have been established near the entrance and access roads.

All in all, the facility is used by approx. 150 employees, corresponding to just over 0.5 space per employee.

The sheltering shown is from Veksø, while the stands are model AN - designed by the Office of the City Architect in Aarhus.

Identify the right racks and stands



The stand must not damage the bicycle, and it should be easy to use – it couldn't be simpler.

The various types may be combined to meet differing requirements!

The individual stand should be designed so it offers satisfactory support for the bicycle.

The stand should never cause the bicycle wheel to buckle or in any other way damage the bicycle.

It should be possible to park the bicycle using just one hand, and to lock at least one wheel or the frame to the stand.

• Butterfly racks recommended

The general recommendation is for vertical stands which keep the front wheel of the bicycle wedged in place. The angle of the wedge must ensure that there is support for various tyre widths.

The centre of the wheel and the centre of the rack must be at about the same height.

• Hoop bicycle stands are recommended in special cases

In special cases, stands against which bicycles can be leaned offer a number of advantages over butterfly racks.

Hoop bicycle stands can, for example, be used as structural elements in pedestrian shopping streets without constituting the same sort of physical barrier as conventional stands.

Moreover, it is relatively easy to lock the frame of the bicycle to most types of hoop stands.

• Combinations and adaptation

It must be possible to combine the stands in various ways without creating a messy appearance. The stand must be suitable for small and large parking areas,

and it must harmonise with its surroundings.

Use bicycle stands which are available in both 90 and 45-degree models and suitable for ground or wall-mounting.

• Special bicycles

The planning of large bicycle parking facilities should generally allow for a parking area without stands.

Such an area can be used by special bicycles (carrier cycles and bicycles with trailers) as well as ordinary bicycles parked on their kickstands.



Further information?
– see pages 42-47



Good bicycle stands for short-term parking



Photo: Pablo Celis

Simple stand with vertical butterfly rack and few anchor points – model NO from Vekso.

The bicycle stand is available in one-sided, double-sided and wall-mounted models and angled at 45 degrees.



Photo: Pablo Celis

Simple vertical butterfly rack with few anchor points – model Sølund from TTS.

The bicycle stand is available in one-sided, double-sided and wall-mounted models and angled at 45 degrees.



Good bicycle stands for short-term and long-term parking



Photo: Vekso

Hoop stand with possibility of securing bicycle - model SH from Vekso



Photo: Vekso

Vertical butterfly rack with supplementary support and possibility of securing bicycle - model KL80 from Vekso.



"Cykelnøglen" (literally the bicycle key) in Odense - simple device with countless possibilities



Photo: Municipality of Odense

The system from TTS in Odense is installed in a hole drilled down into the underlay.

Security is in the form of a wire with an eyelet at one end which is combined with the bicycle's lock. At the other end is a weight, which keeps the wire down when not in use.

The system can be used as a supplement to both butterfly racks and hoop stands.



Useless stands. The stands do not hold the bicycle properly in place, and there is a risk of damage



Photo: Mike Bosworth



Photo: Mike Bosworth



Photo: Mike Bosworth



Photo: Lars Gemzøe

Make parking safe



The parking facility will only be used if it cyclists feel safe and secure.

Safe and secure bicycle parking means that the bicycle is not exposed to vandalism or theft and that you can use the parking facility at all hours of the day and night without feeling insecure.

• Sense of security and location

Whether you feel safe and secure is primarily conditional upon the location of the bicycle parking facility. There must be a steady flow of people, and with good views of the parking facility – both from within and from the outside.

The sense of security can be reinforced by more points of access.

• Access and lighting

Both underground and above-ground parking facilities should include good lighting, good access and short and obvious walkways.

Locate the parking facility near street lamps and supplement with dedicated lighting, if necessary.

• Options for securing bicycle to stand

Locking the frame of the bicycle to the stand is not common practice in Denmark. Even with hoop bicycle stands, which are designed for this purpose, only about 10% of cyclists lock their bicycles to the stand. However, in some situations, it must be possible to secure the bicycle.

Many stands meet this requirement, but some are easier to use than others. The butterfly racks which are generally recommended are unsuitable if this is a prerequisite.

However, this type of stand can be supplemented with other security devices, e.g. "Cykelnøglen" shown on the previous page. The alternative is a hoop stand.

• Lockable bicycle compound

Lockable bicycle compounds, where cyclists may pay a small amount to have their bicycles stored securely and safely, may be a good idea in some cases.

The advantage is that unauthorised persons are prevented from entering the compound. Always ensure that lockable compounds are painted in light colours, with good lighting and more than one point of access.

Visible CCTV cameras or guards may also be used.



Further information?
– see pages 48-51



Lockable and supervised bicycle parking facility in Amsterdam

Locker Zuid – WTC Station

The multi-storey parking facility near Amsterdam Zuid – WTC station is open 24/7, and there are always two guards on duty.



Locker Zuid
Photo: Mike Bosworth

A large and open entrance area is inviting and instils a sense of safety – even at night. Descent and ascent by escalators.



Locker Zuid
Photo: Mike Bosworth

To the right is the guards' office with bicycle workshop and bicycle hire.

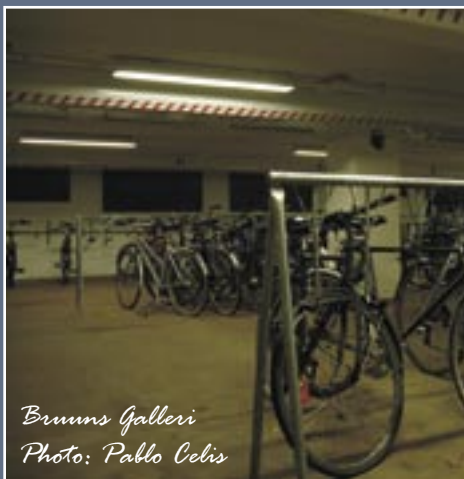


Unsafe and unsatisfactory bicycle parking – Bruuns Galleri in Aarhus

Multi-storey parking

In connection with Bruuns Galleri, a number of bicycle parking facilities have been established, including a multi-storey parking facility.

Signage at the multi-storey parking facility is bad, and the facility is badly located in relation to the entrance to the shopping centre is bad. Moreover, there is only one point of access to the parking facility, and the room itself is not particularly open. Cyclists do not feel safe, and in addition the racks chosen are the unsuitable claw racks.



*Bruuns Galleri
Photo: Pablo Celis*

It could be a lot better!

Despite the poor conditions, the parking facility gets quite a lot of use.

But if direct access had been established from the parking facility to Bruuns Galleri – possibly via a large glass walkway offering views of the shopping centre – the parking facility would have been in a class of its own. The claw racks, of course, need replacing.



Safe and secure lockable bicycle compound

Main railway station in Copenhagen

At the main railway station in Copenhagen, a sheltered and lockable two-tier bicycle parking facility has been established in user-friendly, inviting and light premises.



*Main railway station in Copenhagen
Photo: Thomas Krag*

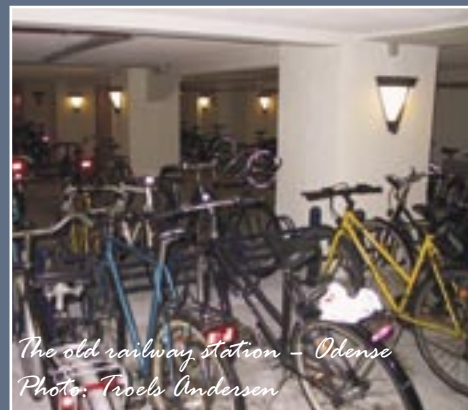
Notice the solution which means that the lower parking deck is set below the access level. This reduces the lifting which it takes to park a bicycle in the upper deck.



Safe and secure parking in basement

The old railway station in Odense

At the old railway station in Odense, a safe and secure parking facility has been established in the basement. It features light colours and good lighting.



*The old railway station – Odense
Photo: Troels Andersen*

The basement parking facility boasts several entrances and exits and straightforward walkways.

The open and well lit room which is in a suitable location relative to the destination attracts users – even at night.

Consider operation and maintenance



The parking facility must function and look good throughout its useful life and whatever the conditions.

• Cleaning

The design and layout of the bicycle parking facilities must facilitate cleaning.

It must be fairly easy to sweep around the stands. Stands which are bolted into the ground at relatively few points are generally easy to clean, and installation is relatively straightforward.

• Maintenance

The sturdier the stand, the less maintenance is required. But there is a limit. The stand should not look too heavy.

• Prevention

It is a good idea to mark the areas designated for parking as it curtails anarchic parking. But always make sure that enough spaces are available first.

• Tidiness

Abandoned and carelessly parked bicycles strewn around the facility ruin the general impression and encourage anarchic parking. Regular tidying-up can help prevent disorder.

• Introduce routines

Introduce regular tidying-up, cleaning and maintenance routines and make sure that any damaged stands are repaired immediately.



Further information?
– see pages 52-53



Simple and cleaning-friendly solution with an air of quality



Photo: Thomas Krag



Bad and non-cleaning-friendly stand which does not encourage good parking behaviour.



Photo: Thomas Krag



Well-maintained bicycle parking – an appealing solution which enhances the overall look of the square



Odense

Photo: Pablo Celis



Badly maintained bicycle parking facility – an otherwise attractive solution totally ruins the look of the square



Rosengårds Allé – Copenhagen

Photo: Erik Bølling-Ladegaard



Display regulations and clear up

Odense Cycle City

In Odense, regulations are displayed, for example in the newly established basement parking facility near Odense Banegårdscenter.



Odense Banegårdscenter

Photo: Erik Bølling-Ladegaard

Users observe the regulations which are displayed, and the basement parking facility is generally tidy.



Odense

Photo: Pablo Celis

Regular clearing-up campaigns are carried out at the city centre. The clear-ups not only enhance the visual impression – they also free up spaces for other cyclists.



Indicate where bicycle parking is permitted, but remember to establish an adequate number of spaces first

Main railway station in Aarhus

At the main railway station in Aarhus, areas where bicycle parking is permitted have been marked. Parking outside the designated areas is illegal, and bicycles may be removed – an initiative which has made bicycle parking a lot tidier.

The Municipalities of Roskilde and Viborg follow similar procedures.



Main railway station in Aarhus

Photo: Pablo Celis



Main railway station in Aarhus

Photo: Pablo Celis



Robust stand requiring a minimum of maintenance, but perhaps slightly "heavy-looking"



DR Byen – Copenhagen
Photo: Finn Ivo Heller



Stands which are too flimsy often require too much maintenance. It does not take much for the stand shown here to break.



Photo: Lars Gemzøe

Spoil the cyclists



Good design and high quality affect our behaviour.

That goes for bicycle parking too!

If you want to solve the problem of bicycles being parked indiscriminately and inexpediently, the appearance of the bicycle parking facility cannot be overestimated.

The design and layout of the facility has a bearing on how and how much it is used.

• Choose good-quality stands

If stands are made from flimsy materials or if they are badly designed, the bicycles will fall over in windy weather.

Both the stands and the bicycle parking facility as a whole should obviously be of a high quality and robust enough to be used. Also in the long term. After several years of use, a galvanised stand will look nicer than a powder-coated one. Paint tends to crack and become worn.

• Design

Generally and for daily use, a simple and easily recognisable stand made from robust and durable materials is recommended. But that does not mean to say it cannot be fancy too.

However, the design should not be so smart as to make it difficult or unclear how to use the stands.

• Visibility and order

A bicycle parking facility should not be hidden away or camouflaged. It should be visible, and it should look good at all times, whether empty, half-full or full of bicycles.

If the design is one which signals quality, balance and order, most cyclists will choose to park their bicycle there. Good design influences our behaviour.

• Street furniture

Some manufacturers offer street furniture in the same design as the stand. Fitting the bicycle parking facility with benches, bollards and litter bins in the same design as the bicycle stands further enhance quality standards.



Further information?
– see pages 54-57



Luxury the discreet way



Photo: Steen Nielsen

Christianshavn – Copenhagen

Luxury does not have to be over the top At Christianshavn, simple and stylishly designed stands go well with the surroundings.

Here you can hardly bring yourself to throw your bicycle against a tree or something else.

The stand is model Classic – Copenhagen from Urban Reflection.



Bicycle stands which can be combined with matching street furniture also reinforce the positive image of the bicycle parking facility.



Photo: Vekspø

The Black Diamond in Copenhagen

At the Black Diamond in Copenhagen, Vekspø's model SHL hoop stand is used.

In addition to the bicycle stands, the area is equipped with, for example, benches, litter bins and plinths in the same design.

The area around the Black Diamond has an air of stylish luxury about it and helps encourage a good bicycle parking culture.



Photo: Vekspø



Photo: Vekspø



Overly designed stands are not always the best!

Indiakaj – Copenhagen

These stands are combined hoop and butterfly stands with supplementary "shelter" for the saddle.

The design is too cumbersome, and not many use the stands as intended.



Indiakaj – Copenhagen

Photo: Erik Bølling-Ladegaard



Indiakaj – Copenhagen

Photo: Erik Bølling-Ladegaard

Manual

The manual is divided into two parts describing:

1. Factors of significance to the establishment and management of bicycle parking facilities – the specific project.

2. Factors of significance to the overall planning of bicycle parking facilities, including a description of the parties and processes involved.

Getting bicycle parking right

Part 1 of the manual looks at factors of importance to the specific design and management of bicycle parking facilities, including size, dimensions and other preconditions for the provision of good bicycle parking solutions.

The structure follows that of “Guidelines and recommendations”.

The path to good bicycle parking

Part 2 of the manual looks at a number of tools and methods for identifying and solving a variety of problems related to bicycle parking.

It can be difficult to identify all the relevant parties which must be involved in the various phases which constitute the ideal process of planning and establishing bicycle parking facilities. Part 2 therefore starts by giving an outline of the relevant parties.

A good bicycle parking plan is a good starting point for ensuring that resources are invested where they make the greatest difference and where a real need exists. The section “Tools and working methods” outlines a number of suggestions for how to draw up a bicycle parking plan.

Some urban spaces and street layouts share a number of characteristics which, in principle, allow for the installation of a number of standard solutions. The section “Physical layout” describes a number of these characteristics, and a number of standard solutions are devised for establishing bicycle parking in typical urban spaces and street layouts.

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*Parked bicycle at Store Torv – Aarhus
Photo: Pablo Celis*

Getting bicycle parking right

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Introduction

In most large towns and cities, randomly and inconsiderately parked bicycles along pavements, in squares and on street corners is a well-known problem.

And even the areas around any designated bicycle parking facilities are often excessively full of bicycles, making it very difficult to get to and from the stands.

The problem is often that there is not enough space for the parked bicycles or not enough bicycle stands.

But inexpedient parking behaviour may also be caused by other factors. What looks like thoughtlessness on the part of cyclists often stems from a number of unsuccessful deliberations in connection with the planning of the bicycle parking solution. It is often seen that:

- the bicycle parking facility is in the wrong place
- the bicycle parking facility is not visible enough
- the bicycle parking facility is not easily accessible
- the bicycle parking facility layout is confusing and messy
- the stands are unsuitable for the intended use
- cyclists do not feel safe parking and collecting their bicycles at certain times of the day or night.

The problems with bicycle parking are first and foremost down to a lack of good solutions. In most towns and cities, the issue of bicycle parking has been neglected and overlooked for years.

In some towns and cities, attempts have been made to solve the problem – over a shorter or longer period of time – by erecting one row of stands after the other.

However, not much thinking has gone into the overall look or the interplay between the layout of the bicycle parking solution and other functions in the urban

landscape.

This approach thereby becomes part of the problem. There are still not enough spaces, and the layout appears confusing and messy.

One of the consequences of the long-standing chaos in bicycle parking is that cyclists have extremely low expectations.

As a result, many cyclists take a very casual and negligent approach to parking their bicycles. Many cyclists simply assume that they will not be able to find a parking space, and automatically devise their own alternative parking solution.

Of course, these explanations in no way excuse such inconsiderate parking behaviour.

As a large majority of politicians and experts want and expect to see increasing numbers of cyclists in large towns and cities in future, it is time that the authorities responsible for providing bicycle parking started to improve the situation.

Fundamental principles

Below follows a review of the principles for good bicycle parking. The crucial factors have been combined into a number of fundamental principles concerning the location and design of bicycle parking facilities. All the principles must be adhered to for your bicycle parking solution to be successful.

• Choose the right location

For short-term parking, proximity to the final destination is essential.

Parking should take place in one single forward movement in which cyclists get off their bicycles, park them and then proceed on foot towards their destination.

Bicycle parking must be visible. There should be no doubt about the function and location of the parking facility. The entrances to and functions of the parking facility should also be visible and easily comprehensible.

• Outline a solution that works

The bicycle parking facility must be easily accessible, and the dimensioning of entrances and the layout must leave sufficient room for cyclists to park and collect their bicycles.

• Make sure there are enough spaces

An adequate number of bicycle parking spaces must be established, ensuring also that capacity is sufficient in peak-load periods.

• Identify the right racks and stands

The central element is the bicycle stand or rack. The stand must be easy to use and must provide satisfactory support for the bicycle. The choice of stand depends primarily on the purpose of the parking.

• Make parking safe and secure

Bicycles must be protected against theft and vandalism, and cyclists must feel secure using the facility at all hours of the day and night.

• Consider operation and maintenance

Bicycle parking facilities should signal tidiness at all times. Tidiness reinforces good parking behaviour.

• Spoil the cyclists

Bicycle parking facilities should radiate balance and quality – this has a positive impact on cyclist behaviour.

After a long period of bicycle parking being overlooked and neglected, it may be reasonable to make an extra effort within this area to tidy things up and to encourage even more people to bicycle.

Below is a description of the principles and the ways in which they can be incorporated into the planning and realisation of bicycle parking solutions.

Close by, sufficient c-



Choose the right location

As a means of transport, the bicycle works best for door-to-door transport.

Cyclists do not like detours or having to move in the opposite direction to reach their final destination. Neither when riding their bicycles, nor when parking them.

Location in relation to destination

Parking must take place in one single forward movement.

When stopping only briefly, the distance between the parking facility and the destination must be a few metres, while it may be slightly longer in connection with long-term parking.

Ideal bicycle parking works like this: You cycle towards your destination; close to the destination you catch sight of a clearly marked bicycle parking facility which is easily accessible and with free spaces. The bicycle is placed against the stand and secured, and the unbroken movement continues on foot towards your destination.

Bicycle parking at stations can be used to illustrate

this principle as the pattern of movement by cyclists from the public traffic areas to the platforms is in most cases fairly obvious. Well-sited bicycle parking facilities ensure that parking becomes an integrated part of this movement.

In many cases access roads and patterns of movement will, however, be so complex that proper mapping is not possible. Cyclists arrive from all corners and continue on foot in all directions. And vice versa when collecting their bicycles, of course.

This is the case at some of the busier stations and in many dense urban areas.

In such cases, a coherent bicycle parking plan for the whole area must be drawn up. A plan which addresses the demand for parking, the rest of the traffic and the functions and aesthetics of the urban space.

Cyclists do not like having to travel too far to park and then having to go back on themselves on foot.

At the Danish Parliament, they know what parking is all about – close by and near the destination.



Bicycle parking at the Danish Parliament

Correct location in relation to destination



Location for short-term and long-term parking

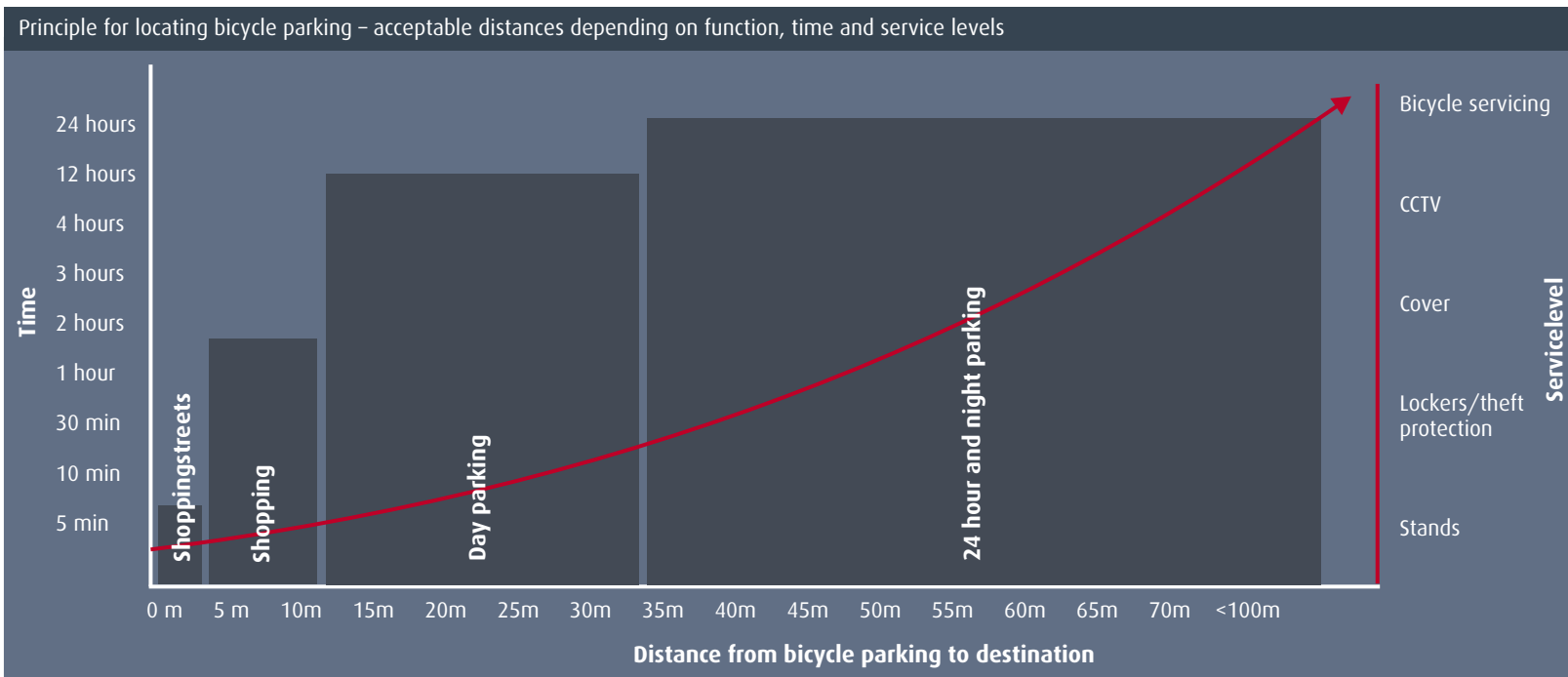
The physical distance permissible between the bicycle parking facility and the destination depends to some extent on the duration of the parking.

In the case of short-term parking for the purpose of shopping – ranging from a few minutes to a maximum of a couple of hours – a distance of 5-10 m is acceptable. In shopping streets it should, in principle, always be possible to park bicycles immediately outside shops.

In particularly busy or narrow pedestrian shopping streets it may be necessary for parking to take place in adjacent streets. Such a solution can be supplemented with the installation of a small number of stands in the street – possibly hoop stands – which can be used for very short-term parking. In this way, the parking of bicycles against shop windows can be avoided or at least limited.



In shopping streets and pedestrian shopping streets it should, in principle, always be possible to park bicycles immediately outside shops.



Location for day parking

Day parking is parking outside workplaces, stations and schools and is for between two and twelve hours.

Ideally, parking should be established as close to the destination as possible. A walking distance of 30-50 m is acceptable – especially if the walk is part of a continuing movement from the bicycle parking facility towards the destination, as described on page 27. Or if the parking facilities are secure and sheltered.

Location for 24-hour and night parking

24-hour parking and night parking can be combined with various service functions such as lockers, CCTV and possibly bicycle servicing.

If parking facilities are particularly good, walking distances of up to 100 m may be acceptable. At the same time, parking must be visible, at a natural point en route to the destination and at street level, and the layout must be clear – also at night.

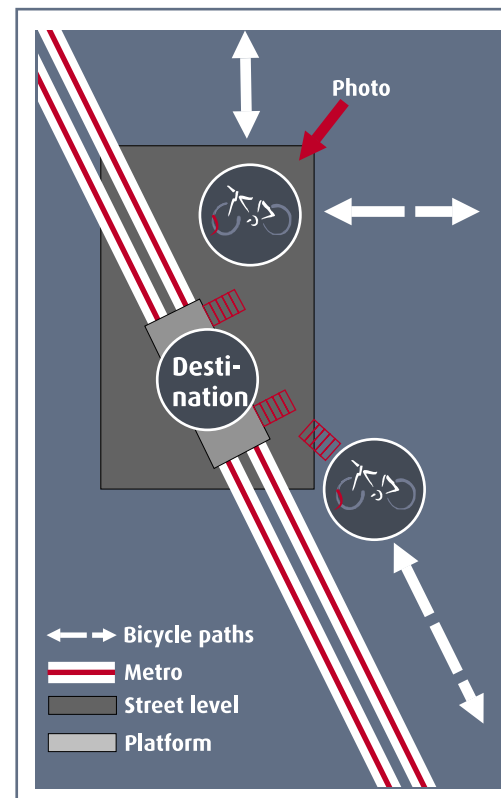
General recommendations

- Generally, parking should be established as close to the destination as possible.
- Parking must be designed and laid out in such a way that cyclists can continue moving towards the destination once they have parked their bicycles.
- In case of several access roads, the parking should be designed to serve the primary access roads.



*Bicycle parking at Flintholm Station
Photo: Astrid Bohn Bosworth*

Attractive bicycle parking solution close to the destination – the facility is located en route to the destination from the bicycle paths in the area and with direct access to the platforms.



This is why bicycle parking works at Flintholm Station.

Visibility of bicycle parking

If people do not know where the bicycle parking facility is, and if it is not immediately visible, it will not be used.

These are two more good reasons why the stands should be located en route to the destination. All else being equal, cyclists are more likely to notice bicycle parking en route to their destination than if it is located on the other side or at a distance away from the destination.

Even hardened and considerate cyclists may face a dilemma when, towards the end of their journey, they see no suitable bicycle parking facility. Not many people have the patience to spend a long time looking.

Invisible bicycle parking is no better than no parking.

But how does one make bicycle parking visible?

Visibility is not necessarily in the shape of large and

eye-catching signs; it is also a question of how the access roads are designed.

Moreover, it is a question of the layout and design of the bicycle parking facility and of its visual appearance. There must be no doubt about where the bicycle parking facility is and how to get to it.

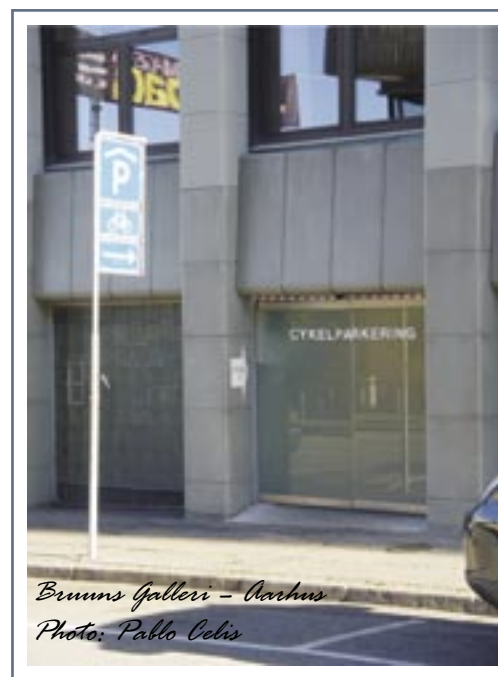
Draw attention to bicycle parking

Many people would probably tend to try to design the bicycle parking facility as discreetly as possible because bicycle parking is by definition ugly and must be concealed.

We recommend an attractive, inviting and visible design which makes signs and other forms of directions superfluous.

Directions

Parking facilities can be located out of the way in relation to the flow of bicycle traffic, and it may therefore be necessary to put up signs well in advance to direct cyclists to the facility.



*Brunns Galleri – Aarhus
Photo: Pablo Celis*

Invisible parking is no better than no parking.

Clear signage at entrance to bicycle parking basement in Holland with 24-hour CCTV.



*Bicycle parking basement in Holland
Photo: Lars Jensen*

Such signs may be supplemented with boards announcing any special services available at the parking facility – protection against theft, CCTV, workshop, water fountain or compressed air etc. A bit like the boards announcing the services available at motorway service stations.

Clear signs at the parking facility must then lead cyclists the last bit of the way down or into the stands.

Underground bicycle parking

An underground parking facility is obviously not visible from the routes generally taken by cyclists.

Special efforts are therefore often needed to draw attention to underground parking facilities in the form of clear signs and distinctive entrances.

Multi-storey parking and automated facilities

As an alternative to underground parking facilities, clearly visible multi-storey parking facilities or automated facilities at street level with clear indications of the services available may in some cases be preferable.

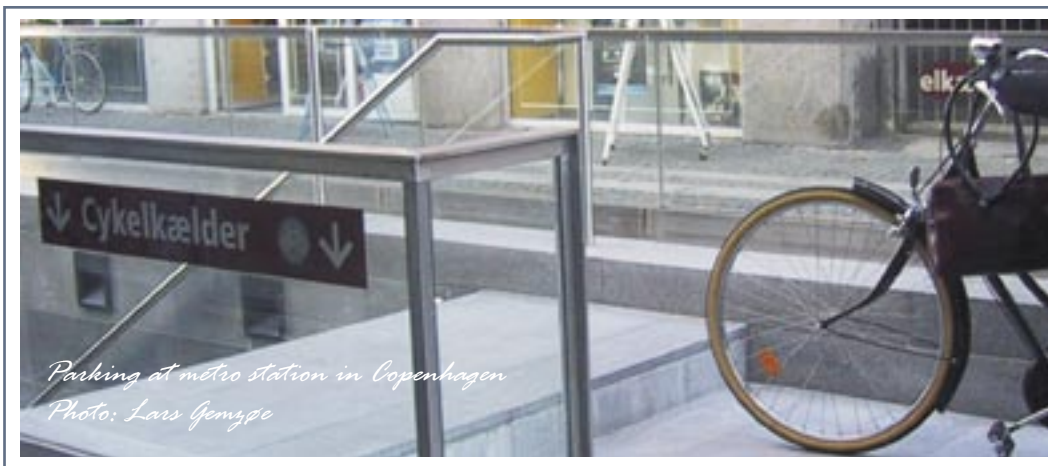
Read more about the advantages and disadvantages of multi-storey parking facilities and automated parking facilities in the section "Compact multi-tier solutions" on page 36.



Photo: Veksø

A very attractive, inviting and visible sign from Veksø.

Less conspicuous sign at entrance to metro station in Copenhagen – and no ramp in sight. An obvious improvement would be to write "Access to underground bicycle parking and platforms".



*Parking at metro station in Copenhagen
Photo: Lars Gemzøe*



*Multi-storey parking facility in Bremen
Photo: Albrecht Genzel*

An alternative to underground parking in Bremen with no need for much supplementary signage.

Bicycle parking can also be monumental – an example from German Josta GmbH.



*Josta Bike Tower
Photo: Josta GmbH*

Outline a solution that works

Accessibility and layout are very important to cyclists parking their bicycles and concern all stages of the parking operation – from the traffic areas to the stand and back again.

Accessibility

Getting from the bicycle path to the parking area must be easy. Access to the parking facility must be easy and straightforward and unhindered by traffic or physical obstacles.

Transverse traffic, visual barriers or ramps, stairs, doors and gates can result in the parking facility not being used.

Bicycle parking should, in principle, be established at street level. In case of level differences, it should be possible to get from one level to the other without getting off your bicycle. The inclination of ramps should not exceed 5%.

Crossovers from access roads to parking facilities must be established so that any curbs are broken by ramps with an inclination not in excess of 20%.



*Bad bicycle parking solution
Photo: Mike Bosworth*

It must also be easy to enter the parking facility with your bicycle. Far too often, entrances become bottle-necks which cyclists have to squeeze through.

It must be possible for two cyclists with their bicycles to pass each other in the entrance, which must be open and inviting. The entrance should be at least 2 m wide.

Placing the bicycle in the stand and securing it must be easy. Clarity of layout and simplicity are keywords. It should be possible to spot any free spaces at a glance and to see how to get to them. It must be possible to use the stands and any security devices provided without having to refer to any instructions.

Similarly, it must also be easy to get to the parking facility to collect your bicycle.

If you have to shift four other bicycles in order to reach your own, you are unlikely to want to park there again.

In locations where compact solutions are called for due to a lack of space, a balance must be struck between the need to be economical with the available

space and the need for comfort and accessibility.

Read more about compact solutions on page 34.

Basic bicycle dimensions

Bicycles vary in size, i.e. the physical dimensions of individual bicycles naturally differ.

However, by dimensioning bicycle parking facilities with reference to the following basic dimensions, it will be possible for most common types of bicycles to be accommodated:

- A bicycle is typically 1.8 m long.
- The handlebars usually sit 1.25 m above the ground, while the saddle of a men's bicycle sits between 90 and 110 cm above the ground.
- The handlebars are normally 0.50-0.70 m across.
- At the pedals, the bicycle is approx. 0.35 m wide.
- The wheels of the bicycle range between 0.3 and 0.7 m in diameter.

Basic bicycle dimensions



- The tyres are 23-60 mm wide.
- A bicycle with a trailer is up to 1.0 m wide and up to 3.5 m long.

Distance between stands

A distance between stands of 60 cm is recommended.

Ordinary and similar bicycles may be placed at intervals of 50 cm, if absolutely necessary. The tendency is that only every other stand is used if the stands are spaced 50 cm apart.

If the distance between stands is increased to 70 cm, the tendency is for extra bicycles to be parked between the stands if there is a shortage of stands.

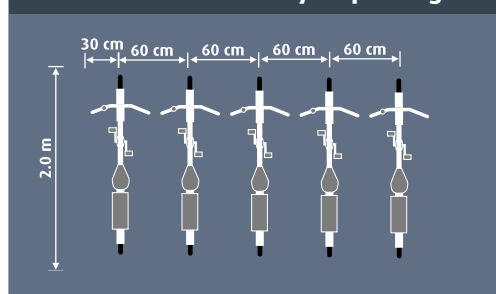
60 cm must therefore be regarded as the standard

which on the one hand takes sufficient account of variations in the sizes of bicycles, while on the other also taking account of the fact that a lack of space and the distance to the furthestmost stands are general problems.

In the layout of bicycle parking facilities, always think about the need to reserve space for bicycles which take up more space than standard-sized bicycles (carrier bicycles and bicycles with trailers).

No stands are needed for the parking of special bicycles. Simply mark the area reserved for this purpose using signs or by means of special surfacing, and offer supplementary ways of securing the bicycles instead of stands. See page 47.

Basic dimensions of bicycle parking area

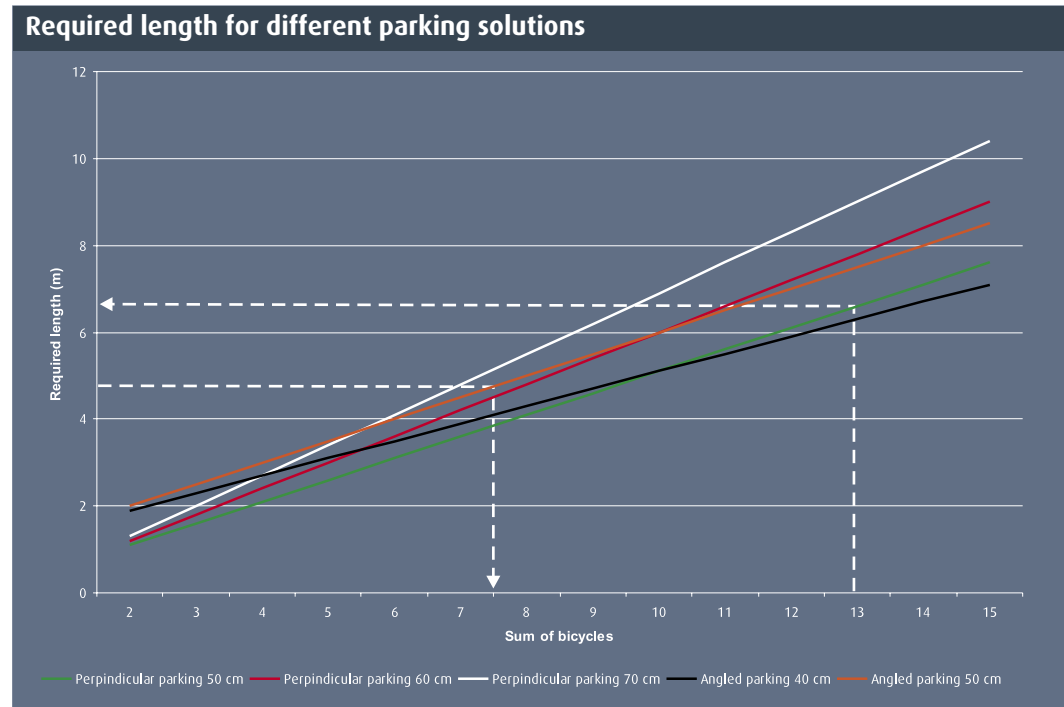


Required length

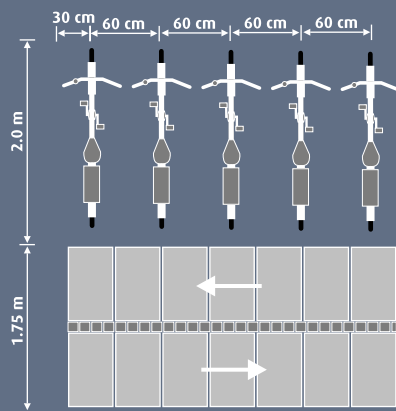
The required length of the bicycle parking area varies according to the type of parking chosen (perpendicular or angled parking) and depending on the distance between stands.

The figure on the left shows the required lengths in connection with various types of bicycle parking solutions for a given number of bicycles.

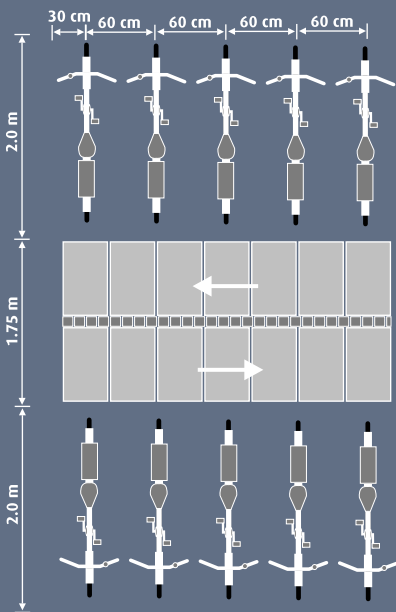
If you know the available length, it is also possible to read how many bicycles can be fitted into the various solutions.



Area requirement for perpendicular parking



Double utilisation of manoeuvring area



Manoeuvring area

Parking and collecting the bicycle from the stand requires some room for manoeuvre.

The overall length of the bicycle parking area (bicycle + stand) is generally calculated at 2.0 m. A manoeuvring area of an additional 1.75 m is regarded as sufficient even with a lot of traffic passing the parking facility and moving around the parking area itself.

Required area

How much space does a bicycle parking facility for 10, 200 or 3,000 bicycles take up?

There is no straightforward answer to this question as a number of variables must be included in the calculation and affect the positioning of the parked bicycles.

With reference to the basic bicycle, stand and manoeuvring area dimensions described above, the formula below can describe the overall area requirement, i.e. the area that must be reserved to ensure that the necessary physical framework is in place for an acceptable bicycle parking solution.

$$\bullet \text{ no. of bicycles} \times 0.6 \text{ m} \times 3.75 \text{ m} = \text{area requirement}$$

An area of 2.25 sq.m. is generally required per parked bicycle. See also the figure showing the area requirements for various solutions on page 36 and the sample calculation on page 69.

Compact bicycle parking

Lack of space is a problem often encountered, and a compact bicycle parking solution may therefore be called for.

There are many different ways of creating a compact parking solution. Below we describe a couple of ways in which the area requirement can be reduced without any noticeable impact on the usability of the parking facility.

Common manoeuvring area

Letting two rows of bicycles share the same manoeuvring area reduces the area requirement to 1.70 sq.m. per bicycle.

Angled parking

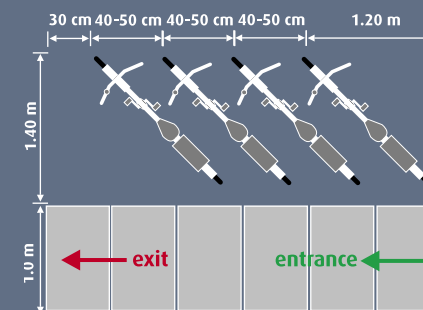
Parking the bicycles at an angle of 45 degrees saves even more space. Angled parking comes with a number of advantages:

- The handlebars are less likely to become entangled, even with little distance between the bicycles.
- It is easier to manoeuvre bicycles in and out when they are parked at an angle rather than perpendicularly.
- A bicycle parked at an angle requires less depth and less manoeuvring area.

The disadvantage of angled parking is often that the stands can be accessed from one direction only.

With angled parking, a distance of 40-50 cm between bicycles is acceptable, while the parking depth can be reduced to 1.40 m.

Angled parking for compact solution



Rule of thumb – area requirement

- Generally speaking, a parked bicycle with manoeuvring area takes up 2.25 sq.m.
- With a double-row parking solution involving a shared manoeuvring area, the area requirement is reduced by 25% to a total requirement of 1.70 sq.m. per parked bicycle.
- With perpendicular parking, an additional saving of 50% can be achieved through two-tier parking.
- An angled parking solution reduces the overall area requirement to 1.0 sq.m. per parked bicycle.
- With an angled double-row parking solution involving a shared manoeuvring area, the area requirement is reduced to 0.75 sq.m. per parked bicycle.
- Finally, for angled parking where the manoeuvring area is also used as a normal pedestrian area, the area requirement can be reduced to 25% of the initial figure, i.e. to 0.5 sq.m. per parked bicycle.
- If a compact solution is required, angled parking is recommended instead of two-tier parking.

With a manoeuvring area of 1.0 m, the area requirement can be reduced to 1.0 sq.m. per parked bicycle.

An angled parking solution involving double parking with a shared manoeuvring area reduces the area requirement to approx. 0.75 sq.m. per parked bicycle.

If the angled parking solution is established on the pavement and against the wall of a building, the pavement becomes part of the manoeuvring area which then does not necessarily have to be included in the parking area. With a distance of 45 cm between bicycles, the area requirement is reduced to 0.5 sq.m. per bicycle.

Compact larger parking facility

A compact solution may also be a good idea in situations where a lot of bicycles must be parked in the same place. The more space that is used per parked bicycle, the longer the distance to the furthest stands.

If many bicycles are parked in the same place, the outermost spaces often do not get as much use as there is too far to walk to the final destinations.

In most cases, special efforts can be made to make the furthestmost spaces more attractive.

They can, for example, be placed in a natural location en route to the destination with clear signage from the road or the bicycle path, or special services can be provided for cyclists at the furthest corners of the parking facility, for example compressed air, theft protection and sheltering.

In each individual case, a balance must be struck between expanding the parking area or creating a compact solution, and thus between comfort and the risk of inconsiderate parking behaviour.

In Odense, the outermost bicycle parking spaces along the pedestrian shopping street are made more attractive with good stands, compressed air and lockers.



Compact multi-tier solution

In principle, for bicycle parking facilities to be successful, they must be established at street level.

However, in some situations, this is simply not possible. In such cases, it is very important for the bicycle parking facilities to be designed with the particular

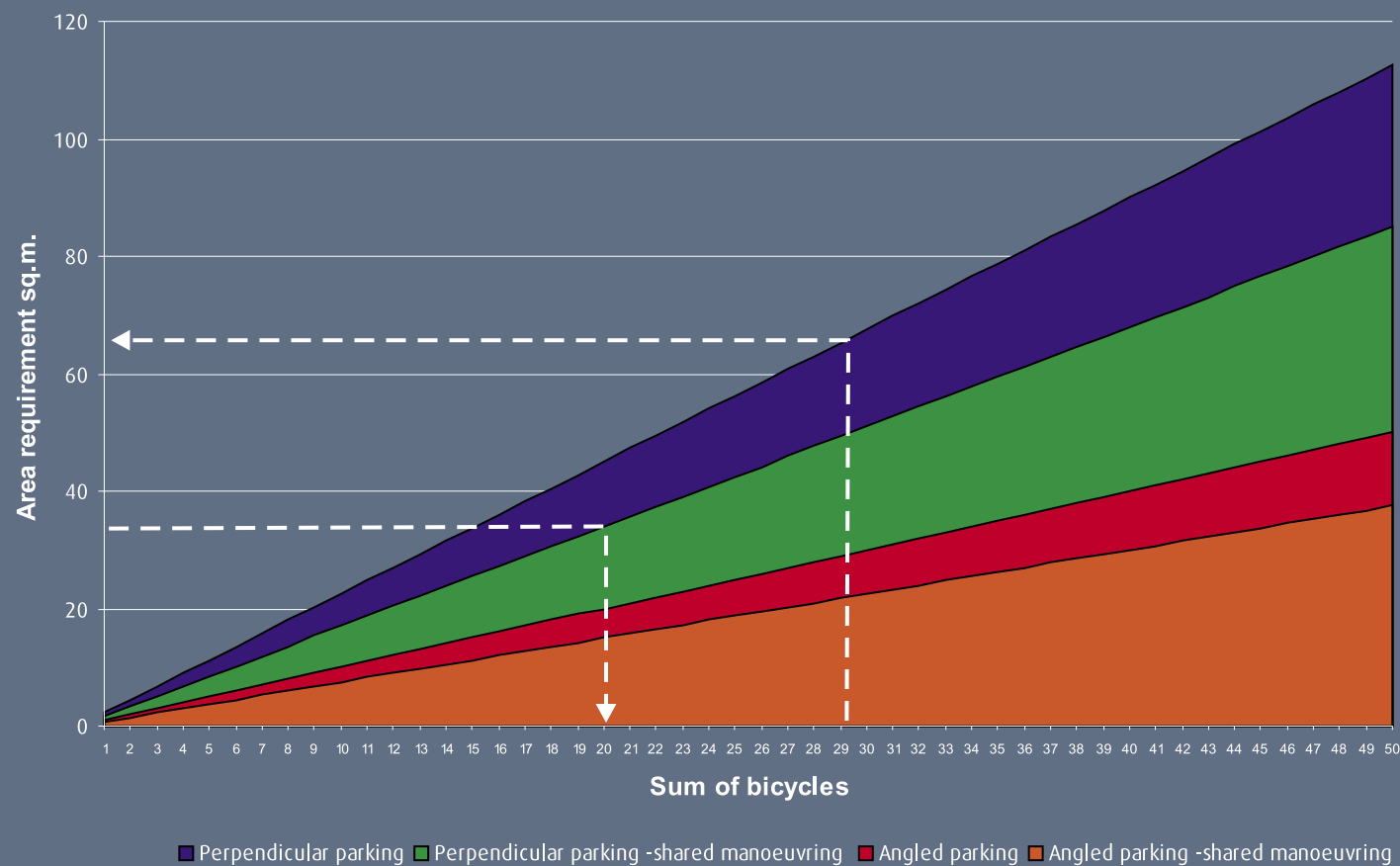
needs of cyclists in mind.

Multi-tier bicycle stands

New two-tier and multi-tier solutions are constantly being developed, but so far most designs appear laborious and intricate. Many cyclists refrain from parking on top. Very few types of multi-tier stands with

hoists can be recommended. These are described in the section on bicycle stands on page 45.

Basic area requirements for various parking solutions



Bicycle parking in basement

A basement parking facility is an option when a lot of bicycles have to be accommodated, for example in urban areas. However, it must be user-friendly, which means that a number of factors must be taken into account.

Underground parking is, in principle, invisible to cyclists, and it requires more than good signage for cyclists to take any notice at all.

Location relative to general access roads is also essential. For further information, see the section on the location of parking facilities on page 27.

If underground parking is chosen, it should be possible to cycle up and down. This requires a ramp with a maximum inclination of 5%.

Automated underground parking

Underground facilities where cyclists place their bicycles in an automated system has the advantage that they can be operated from street level.

If you start experimenting with automated underground parking, the waiting time at hand-in and collection and system reliability are the most important parameters on which to focus.

Multi-storey parking

Multi-storey parking can be used in situations where the demand for parking is high and where space is limited.

The advantage of multi-storey parking facilities is that they are visible to cyclists and can usually be accessed at street level.

When establishing multi-storey parking it is important that there is plenty of space to manoeuvre around with the bicycle and that moving between the various storeys in the building is easy.

Stairs with ramps is a standard solution which is used in many multi-storey parking complexes, but a luxury solution could also be an escalator or a lift with room for bicycle and cyclist. For examples, see page 93.

General recommendations

- The basic area requirement is 2.25 sq.m. per parked bicycle. There are various ways in which more compact solutions can be created if space is limited.
- Always try to find a solution at street level. Parking in basements usually involves problems with accessibility and usability.
- Automated underground parking or multi-storey parking complexes are preferable alternatives to parking in basements.

Multi-storey parking with the right layout is an efficient compact solution.



Bicycle parking at Odense Banegårdssenter - Photo: Troels Andersen

BiceBerg in Spain is an underground and automated system for bicycle parking.



*BiceBerg in Barcelona
Photo: Mike Bosworth*

Make sure there are enough spaces

It can be difficult to stipulate exact norms for when the number of stands is sufficient, and it may be necessary to supplement any calculations with counts and user surveys.

Local authorities should make demands

For as long as no statutory norms exist, the local authorities should demand that private developers establishing bicycle parking facilities comply with the norms which the local authorities apply in their own projects.

Despite the uncertainty which always surrounds normative figures, it is recommended that all local authorities lay down binding norms for the design of bicycle parking facilities in connection with all relevant project types.

The very fact that norms have been laid down by the municipal administration will ensure that the issue is considered in connection with such projects.

Norms for different functions

Establishing norms for the number of bicycle parking spaces at different urban functions is a difficult exercise.

Recommendations based on earlier trials show variations of several hundred per cent between the lowest and the highest norms. With such variations, it is question whether these figures can serve as guidelines at all.

Another factor which makes it difficult to establish norms is that individual urban functions cannot be separated, in terms of the traffic generated, in densely populated urban zones.

In shopping streets, there may be amenities which attract a lot of cyclists side by side with shops, offices and other urban functions which are frequented by few cyclists.

Moreover, the actual number of cyclists for a given urban function will depend on its location within the urban structure and in relation to the infrastructure and public transport network.

Despite these uncertainties, there are many good reasons for trying to calculate normative guidelines for the most typical functions.

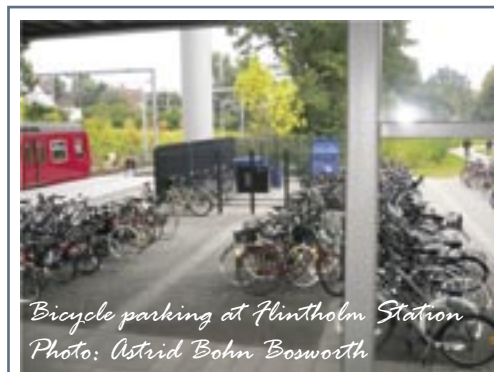
Such guidelines can be used as a starting point for a debate, and they will ensure that the issue is raised at the right time in connection with all relevant cases.

Public transport terminals

Public transport terminals encompass large bus, coach and train stations at one extreme, and bus stops at the other. Common to them all is that they represent places where the bicycle/public transport combination can take place. And there will generally be a certain need to park a number of bicycles close by.

The best method is to base the number of parking spaces on counts, adjusted for the increase in demand which is often spurred by improved parking facilities.

Good parking facilities at stations lead to an increase in demand.



*Bicycle parking at Hlintholm Station
Photo: Astrid Bohn Bosworth*

A lack of stands soon results in chaos. And chaos spreads.



*Christianhavns Metro
Photo: Thomas Kræg*

Stations

A distinction is often made between bus, coach, train and metro stations in residential areas (outbound commuter station), and stations in workplace areas (inbound commuter station).

Bicycle parking facilities at outbound commuter stations are occupied in the morning and vacated in the course of the afternoon and evening. This is a clear example of day parking. The opposite is true of inbound commuter stations where people cycle from the station to work in the morning and return after working hours. At these stations, night parking is a dominant element.

Calculating the need for bicycle parking spaces starts with the total number of passengers using the station.

If 10-30% of passengers cycle from their home to the station, between 10 and 30 bicycle parking spaces are needed for every 100 passengers. Similarly at the other end: The proportion of the total number of passengers that cycle from the station to their workplace equals the number of parking spaces that is needed.

Generally speaking, improved parking solutions boost demand. This is expected to be particularly true of stations.

When the situation changes from insurmountable chaos or just general crowding and lack of spaces to good parking facilities, more people will opt to cycle. The proportion of commuters using their bicycles will increase, and more parking spaces will be needed.

Of course, there are also stations with a mix of outbound and inbound commuters. Here, there will be a mix of day and night parking.

However, you cannot always assume that one type of parking replaces the other. Any overlapping in time requires additional spaces.

The general recommendation is that the number of stands should correspond to 10-30% of passenger

numbers (number of passengers per day). The number should be adjusted to take account of the size of the catchment area.

The Danish State Railways (DSB) carries out regular counts of the number of passengers and the number of bicycles. These data can be obtained from DSB.

Bus stops and terminals

Ordinary bus stops in densely populated urban areas do not usually entail a need for bicycle parking. Bus stops are generally so close together that not many people arrive by bicycle. In the suburbs and more sparsely populated urban areas, bus stops are generally fewer and further apart, and in most cases it will therefore be relevant to establish a number of parking spaces.

The need will vary from place to place and depending on the character of the route and the catchment area.

Start by establishing a number of spaces corresponding to 10% of passenger numbers in the morning rush hour (6.00-9.00) and reserve an area for future expansion. It should be possible to park near the bus stop, preferably with good lighting and under cover.

Retail trade

The extremes are the small local corner shops on the one hand and the large shopping centres on the outskirts of town on the other. In between these extremes are the supermarkets, the high streets and the department stores.

The differences between the demand for parking at these various retail outlets are generally so huge, that norms are in reality of very little help. Bicycle parking requirements in a local high street are very different from those in a shopping street in a city centre.

A number of general recommendations can, however, be made for the slightly larger retail outlets.

In densely populated urban areas and especially in densely populated inner city areas, 2 spaces per 100

General recommendations

- It is a good idea to use manual counts, observations and needs analyses to supplement the suggested norms. See also the section on "Tools and working methods" on page 66.

sq.m. of gross floor area are recommended. In other situations, the recommendation is one space per 100 sq.m. of gross floor area.

Other urban professions

Other urban professions include firms of lawyers and accountants, office buildings etc. Existing norms vary from 6-7 spaces per 1,000 sq.m. of gross floor area to up to 30 spaces per 1,000 sq.m. of gross floor area. As is the case with retail outlets, the tendency is for more spaces in inner city areas than on the outskirts of towns.

As urban professions is a category with considerable variations in the number of square metres per employee, it is sensible to supplement the calculations with figures for the number of employees.

The general recommendation is 0.3-0.4 spaces per 100 sq.m. of gross floor area for urban professions and an additional 0.4 parking spaces per employee.

Education

The most important factor in this category is the age group which is taught at the institution. Institutions for youth education, upper secondary education and higher education seem to top the list with norms for bicycle parking of approx. 80% of student numbers, while the figure for primary and lower secondary schools in some cases is as low as 30-40%.

The general recommendation is 0.4-0.8 spaces per student/employee at universities and colleges and 1.0 parking spaces per pupil as from year 4 in primary schools. To this should be added an additional 0.4 spaces per employee.

Childcare institutions

Special factors must be taken into account at childcare institutions. In addition to bicycle parking for employees, a large proportion of parents deliver their children to institutions by bicycle, using either carrier cycles or trailers.

Many parents would probably like to be able to leave their trailer at the institution, and special areas should therefore be reserved for this purpose.

Amager Strandpark out of season – plenty of space for bicycles.



The general recommendation is 0.4 parking spaces per employee plus an area for parking bicycle trailers and special bicycles.

Recreational areas

It is recommended that the norm for bicycle parking near recreational areas be based on counts of the numbers of parked bicycles during the season.

Numbers of visitors do, by nature, fluctuate with the seasons, and some of the time the parking facilities will be unused.

Perhaps use stand types which can be erected temporarily if too many empty stands out of season would detract from the experience of visiting the place.

The general recommendation is 1-4 parking spaces for every 10 visitors.

Residential buildings and blocks of flats

In areas with single-family houses and terraced housing, people normally park their bicycles on their own plots.

Amager Strandpark in the high season – the number of bicycles is overwhelming.



In residential areas, the need depends on how many bicycle-owners there are, and how many bicycles each person has. A growing number of people own more than one bicycle.

The need for bicycle parking at blocks of flats depends especially on factors such as the location of the residential area within the urban structure, the size of the flats, the age mix of residents and their social status.

For blocks of flats in densely populated urban areas, a norm of 2-2.5 bicycles for every 100 sq.m. of gross floor area is recommended. For halls of residence, the recommendation is 1.0 spaces per resident.

Cinemas and theatres

For cinemas and theatres, a norm of 0.25 parking spaces per seat and 0.4 parking spaces per employee is recommended.

Hotels and restaurants

The number of cycling guests at hotels depends a lot on the location and character of the hotel. Not many guests probably arrive by bicycle at the more exclusive hotels situated in city centres.

A larger proportion of guests probably arrive by bicycle at the youth hostels situated on the outskirts of town.

The same is true for restaurants.

A norm corresponding to 1.0 parking spaces for every 15 guests and 0.4 parking spaces per employee is recommended.

As demand can vary very considerably within this category, the recommendation is to supplement the normative figures with counts and needs analyses.

Sports facilities and sports halls

Sports facilities and sports halls are characterised by the fact that a high proportion of athletes arrive for their training sessions by bicycle.

The highest proportion is seen among young people, while adult “athletes” often choose to drive.

A norm corresponding to 0.6 parking spaces per athlete and 0.4 parking spaces per guest or spectator is recommended.

Offices and industry

The number of cycling employees and visitors is usually pretty constant. The actual need can therefore often be established on a normal working day.

For offices, industry and other workplaces, the recommended norm is 0.4 parking spaces per employee with visitors being included in this norm.

Recommended norms for bicycle parking in relation to function

Function	Bicycle parking norm
Residential buildings and blocks of flats*	2-2.5 parking spaces per 100 sq.m. of living area for blocks of flats. 1.0 parking spaces per student in halls of residence/student flats.
Childcare institutions	0.4 parking spaces per employee and an area reserved for bicycle trailers and special bicycles.
Schools	1.0 parking spaces per pupil from year 4 and 0.4 parking spaces per employee.
Colleges and universities	0.4-0.8 parking spaces per student and 0.4 parking spaces per employee.
Retail trade/shops*	2.0 parking spaces per 100 sq.m. in the capital region and 1.0 parking spaces per 100 sq.m. outside the capital region.
Other urban professions (GPs, dentists etc.)	0.3-0.4 per 100 sq.m. gross floor area + 0.4 parking spaces per employee.
Stations	10-30% of passenger numbers (no. of passengers per day)
Bus stops and terminals	1.0 parking spaces for every 10 passengers in the rush hour (06.00-09.00).
Cinemas and theatres*	0.25 parking spaces per seat + 0.4 parking spaces per employee.
Hotels and restaurants	1.0 parking spaces for every 15 guests + 0.4 parking spaces per employee.
Sports facilities and sports halls	0.6 parking spaces per athlete (on a daily basis) + 0.4 per spectator.
Offices and industry*	0.4 parking spaces per employee.
Recreational areas	1-4 parking spaces for every 10 visitors.

* The norms used are the ones suggested in a memorandum analysing the need for bicycle parking in Copenhagen (Analyse af behov for cykelparkering i København) prepared by Kjærgaard Virksomhedskonsulenter & Thomas Krag Mobility Advice in August 2006. The memorandum was prepared to provide input for the City of Copenhagen's bicycle parking strategy.

Choose the right racks and stands

It is surprising how many types of stands are actually unsuitable for bicycle parking.

Even at newly established bicycle parking facilities, most of the bicycles are sometime parked outside the stands and not within the designated bicycle parking area. Or within the designated bicycle parking area, but using kickstands rather than the stands or racks provided.

The reason for this is almost invariably a poorly designed parking facility or a poor choice of bicycle stand.

The good stand

The individual stand should be designed to offer satisfactory support for the bicycle. The stand should never cause the bicycle wheel to buckle or in any other way damage the bicycle.

It should be possible to park the bicycle using just one

hand, and in some situations also to lock at least one wheel and the frame to the stand.

Appearance and recognisability

A number of different idioms have come to characterise stand designs. Considerable innovation and creativity goes into stand designs, but generally and for daily use, a simple and easily recognisable stand is recommended.

Quality and condition

It is important that the bicycle parking facility should signal tidiness and usability at all times.

In the choice of make, ensure that the stand is robust, that it does not require unnecessary maintenance and that it is easy to keep the stand and the area around it clean and tidy.

Stands which are anchored to the ground at relatively few points are generally easy to clean, and installation is relatively straightforward.

Possible combinations

The stand must allow for different layouts and combinations, for example both one-sided and double-sided parking and perpendicular and angled parking.

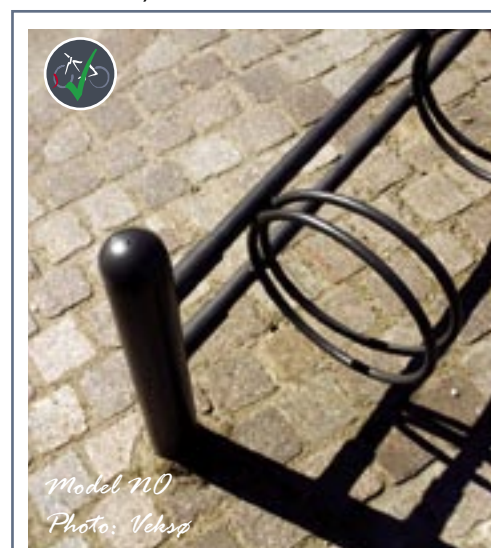
The stand must be suitable for small and large parking facilities, and the stand must harmonise with its surroundings.

The stand can be distinctive and discreet at the same time. On the one hand it should be obvious what the area is for, but on the other hand the parking facility should not detract attention from the surrounding architecture.

The vertical butterfly rack is the most common rack in Denmark and is recommended for a variety of different purposes. Preferably choose racks which come in both 90-degree and 45-degree versions.



The butterfly rack must be wedge-shaped; otherwise it will not fit all tyre widths.



Types of stands

Bicycle stands are available in a wealth of different designs. However, they generally fall within five main categories:

- Vertical butterfly racks
- Hoop bicycle stands
- Claw racks
- Horizontal butterfly racks
- Two-tier stands

Only the first two types of stands are generally recommended.

Vertical butterfly racks

In Denmark, our experience is that butterfly racks with vertical wedge-shaped holders are suitable for most purposes.

At the same time, this type of stand is relatively inexpensive, flexible and easy to maintain and clean. This type of stand is, in fact, becoming more and more widely used. If installed correctly, this stand fulfils the fundamental parking needs of most cyclists if the following requirements are met:

- The centre of the wheel and the centre of the holder must be at about the same height. The angle of the wedge must ensure that there is space for various tyre thicknesses.
- If the solution is primarily to be used by children (schools etc.) the centre of the holder must be lower.
- The ground should slope slightly towards the stand so that bicycles do not “slide” backwards and out of the stand.

Hoop bicycle stands

In special situations, stands against which bicycles can be leaned offer a number of advantages over butterfly racks.

Hoop bicycle stands can, for example, be used as structural elements in pedestrian shopping streets



Butterfly racks with frame support are recommended by the German cyclists association – model from Josta.



Stand with good support – model CST from Vekso.



Bad rack which does not “grip” the front wheel sufficiently well. The stand is model 51 GE from Vekso.



Non-wedge-shaped butterfly rack – only suitable for wide tyres, and ordinary bicycles fall over easily.



Good, high hoop stand with “saddle support” and possibility of securing bicycles along entire height.



Good hoop stand featuring rubber cladding to minimise risk of damage to bicycle.

without presenting the same sort of physical barrier as conventional stands.

Moreover, it is relatively easy to lock the frame of the bicycle to most types of hoop stands.

With higher hoop stands, the saddle can rest against the stand, which is an advantage. The saddle of a large man's bicycle is typically 1 m above ground.

With lower hoop stands, the frame will come into contact with the stand, which may lead to scratching.

Some manufacturers offer hoop stands with wood cladding, which minimises the risk of scratches.

Hoop stands featuring a hole or two brackets are recommended. The hole or the brackets are ideal for securing the bicycle to the stand.

Preferably use stands which prevent the front wheel

from turning. See page 17 (top left).

The disadvantage of frame-holding stands is very varied and not very uniform parking practices, which means that capacity is often not utilised efficiently.

It is rare for two bicycles to be parked against the same stand simultaneously.

Claw racks

Claw racks – designed to grip the handlebars by means of a claw – are not recommended.

You need two hands to position the claw, and this type of rack does not offer very good support. If one bicycle falls over, there is a high risk of a domino effect.

The rack is not suitable for children's bicycles, and the

claw can easily become entangled in gear or break cables etc. when the bicycle is removed.

It is not possible to lock either the wheel or the frame to the rack.

Due to price and ease of installation, this type of rack is, unfortunately, very popular with Danish developers.

Horizontal butterfly racks

The horizontal butterfly rack is often so wide that most bicycles end up leaning over quite considerably.

This can damage the front wheel, especially if the bicycle is knocked or is carrying luggage.

We strongly advise against using any type of horizontal butterfly racks (without supplementary frame supports).

Horizontal butterfly racks are not recommended under any circumstances. This stand type grips the wheel poorly, and there is a considerable risk of the bicycle either tipping or falling over and of damage to the front wheel.



The claw rack is rarely used and is not recommended.



Two-tier stands

Two-tier stands are often used when large numbers of bicycles must be accommodated in very little space.

One of the disadvantages is that it can be difficult to lift the bicycle up to the top level.

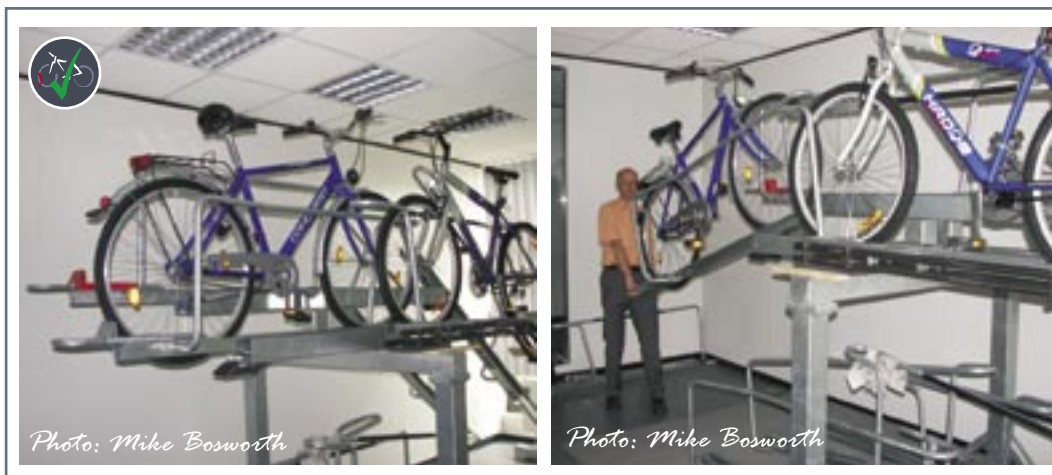
However, a number of manufacturers offer solutions aimed at alleviating this problem, either in the form of supplementary ramps or a gas cylinder lift to help raise the bicycle. With such features, it becomes possible to use the top tier.

Moreover, the bottom tier can be established below street level, which reduces the height and the lifting height to the top tier.

Two-tier solutions are not a pretty sight in the townscape, but are acceptable if covered or enclosed. Two-tier solutions should only be used where all other street-level solutions have been studied and rejected.

Standless parking

It is not always expedient to erect a maximum number of stands or racks.



German two-tier stand from Orion with ramp system to facilitate parking on the top tier.



Acceptable stand for two-tier bicycle parking solution from TTS. Access to the top tier is facilitated by a ramp which guides the bicycle into place and minimises lifting; at the same time the bottom tier is slightly sunken.

Experience shows that cyclists will park their bicycles in neat rows if other bicycles are already parked neatly.

Standless parking is being used increasingly, among other things in Copenhagen, and is a relevant solution where the need for parking fluctuates a lot, where the need is moderate and where enough space is available, but not enough financial resources.

It is important that the standless parking solution is

Standless parking can work well when sufficient space is available, but may also quickly become congested with bicycles parked haphazardly.



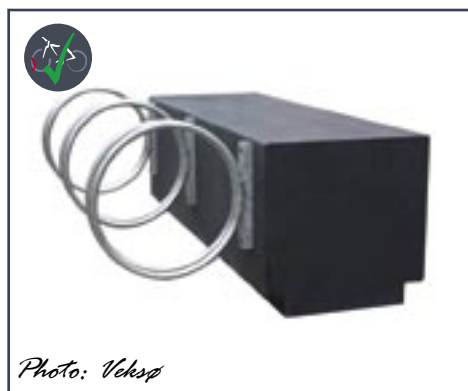
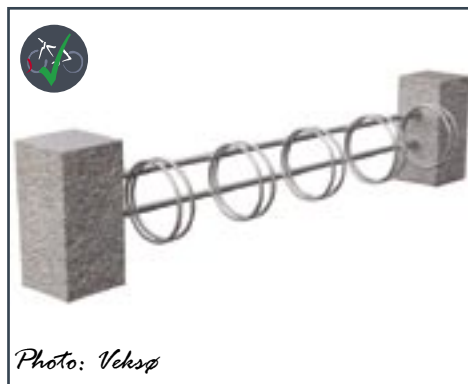
designed with a number of physically delineating elements. Otherwise, the area around the parking facility may soon become one big mess of bicycles.

Moreover, it may be a good idea to provide some shelter so that bicycles do not fall over in strong winds.

Temporary bicycle stands and racks

Temporary bicycle stands or racks can be used in connection with major events, concerts etc. entailing a temporary need for bicycle parking.

Temporary bicycle stands for locations where there is a temporary need for bicycle parking. The stands shown are from Vekspø and are supplemented with a bench.



So far, relatively few manufacturers in Denmark offer temporary bicycle parking solutions.

Cover

Cover can be established as a supplement to most bicycle stands and racks.

Top: Good shelter with lighting from Odense. Bottom: Shelter supplemented with glass sides to protect against strong winds.



The cover protects the bicycles against the wind and the weather and is recommended in particular for long-term parking.

Solutions with covered sides also help prevent the bicycles from falling over in strong winds, but may on the other hand look a bit heavy in the townscape. Covered solutions with transparent sides may look lighter, but may also attract vandals.

The choice of cover must be based on individual assessments of the specific parking requirements and the aesthetics of the urban space concerned.

Supplementary locking

In Denmark, the general picture is that only the most expensive bicycles are secured on a regular basis.

Even where stands are provided to which it is easy to secure the frame, this is only done very rarely.

One explanation could be that it is too much hassle having to carry an extra wire lock for your bicycle.

However, most bicycles have a fitted lock, and it is therefore recommended that supplementary devices be provided for securing bicycles in the form of chains or wires attached to the bicycle parking stands.

Supplementary locking – Bicycle key

There are a number of ways in which bicycles can be secured to the stands. Some of these require the use of an extra lock, while other solutions are integrated with the normal lock fitted on bicycles. For example, TTS offers a system for securing bicycles using the fitted lock. The system consists of a pipe which is bored into the ground and secured to the surface.

The solution was developed by Odense Cycle City and is in use throughout Odense.



When the bicycle key is not in use, a weight ensures that it stays in the cylinder.



The bicycle key can, for example, be combined with conventional butterfly racks.



When the bicycle key is used, the weight adjusts the length of the wire and maintains tension.



The bicycle key is inserted into the existing lock on the bicycle, thereby dispensing with the need to carry an extra wire lock for the bicycle.

Make parking safe

Bicycle theft is a well-known problem for many. In Denmark, approx. 75,000 bicycles are stolen each year.

Given the extent of the problem, it is important to offer secure parking to ensure that people are not deterred from cycling for that reason.

The bicycle parking solution must make it possible for cyclists to secure their bicycles to the stands, or to park the bicycles in lockable compounds.

The significance of protection against theft increases with the duration of the parking.

In addition to protection against theft, it is also a question of personal safety. It must be possible to move

around the parking facility at all hours of the day or night without fearing for one's safety.

The parking facility must therefore be well planned. There should always be several entrances to and exits from a bicycle parking facility and not too far to walk.

If the parking facility does not meet these fundamental requirements, it is unlikely to be used.

Surveillance

Surveillance increases both safety and security. Surveillance can be indirect in that the bicycle parking facility is clearly visible from streets that carry a lot of traffic. This type of surveillance is the most important, and at the same time the cheapest way of making cyclists feel safe, while at the same time protecting bi-

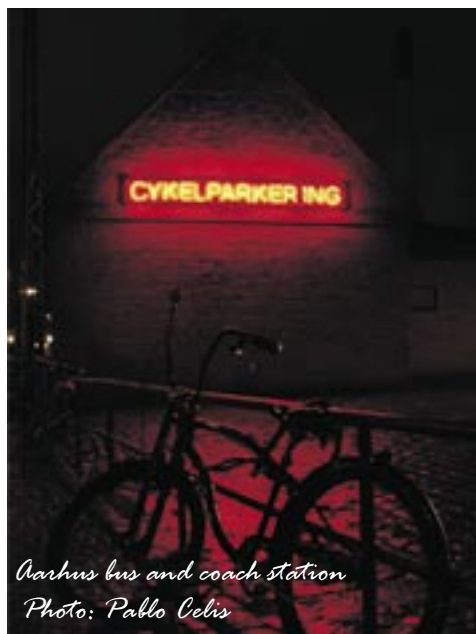
cycles against theft.

Manned bicycle parking is another option. This type of surveillance is typically used in multi-storey and underground parking facilities.

Permanent manning of bicycle parking facilities is not a common phenomenon in Denmark, but in for example Germany, Switzerland and the Netherlands, this solution is more widely used. Here the manned facility is combined with, for example, a repair workshop and kiosk.

The installation of CCTV is another possibility. Video surveillance has gradually become widely used and accepted as an effective way of preventing theft, vandalism and muggings.

Safe parking in the daytime, but unsafe at night.



*Aarhus bus and coach station
Photo: Pablo Celis*

Safe, secure and open bicycle parking facility underneath Odense Banegårdscenter where music is played at all hours of the day and night.



*Odense Banegårdscenter
Photo: Municipality of Odense*

Lockable bicycle compound

Total protection against theft can, in principle, only be provided by locking the bicycle away in a bicycle locker or a room to which only the owner has access.

This not only protects the bicycle from theft – bicycle parts and other accessories are also protected.

An advantage of this type of storage is that cyclists can safely leave, for example, their jackets and bicycle helmets with their bicycles.

The risk of theft is also significantly reduced in compounds which you pay to use. Access to lockable multi-storey and underground parking facilities may include automatic registration of users by national insurance card.

In this way, users are identified, and this may be enough to deter thieves, vandals and muggers from even entering the compound.

Underground bicycle parking

Underground bicycle parking facilities pose a particular problem from the point of view of safety and security for cyclists.

The entrances to underground parking facilities must be inviting and well lit, offering easy access and only short distances to walk; otherwise the facility will not be used.

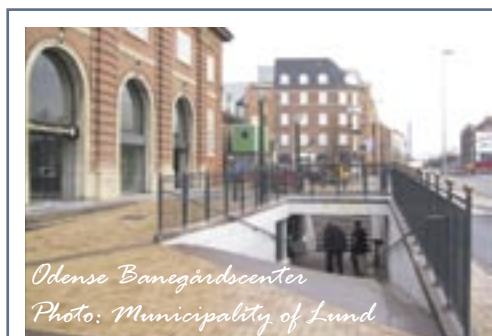
Underground parking facilities are obvious places for thieves to strike. Here, they can force a lock open without being disturbed and walk off with the bicycle. Underground parking facilities should therefore be lockable and with users-only access. Either by means of a key system or a magnetic card.

At the metro stations, the underground bicycle parking areas double as subways to the metro and are thus quite busy. In combination with CCTV this seems to be sufficient for people to generally feel quite safe.

Safe and open bicycle parking solution above the railway lines into the main station in Aarhus, also at night.



Open and safe multi-storey parking facility with panelling which lets in light.



Attractive entrance to light and brightly decorated bicycle parking basement.



A bicycle locker is the most effective way to protect against theft.

However, underground bicycle parking can be problematic from the point of view of safety. Examples have been seen in areas with blocks of flats where bicycles parked in basements with two entrances are vandalised more often than bicycles in basements with only one entrance.

According to the locals, the explanation is that vandals consciously go for the basements with two doors as they can then flee through the back door if anybody enters through the main door.

But of course, it is more important that users should feel safe than it is for their bicycles to be protected against vandalism. The most important thing therefore is that cyclists should be able to get out fast.

Underground parking facilities should therefore always have more than one entrance/exit.

Securing of bicycle to stand

The risk of theft can be reduced if the stand is designed so that the frame of the bicycle can easily be secured to it. It must be possible to secure the frame and at least one wheel to the stand. In this case, it is not possible to protect against theft of bicycle parts, but you can reduce the risk of the whole bicycle being stolen.

Many hoop stands are suited for this purpose, but a wide range of other stands and racks are also available which feature supplementary security devices, cf. page 47.

Automatic bicycle parking

Automatic bicycle parking solutions are a good alternative to the underground parking facilities which leave users feeling unsafe.

The principle behind automatic bicycle parking is that bicycles are delivered – against payment – to a facility which then automatically parks the bicycle underground.

In principle, this type of parking facility safeguards 100% against theft. Often you can also place your helmet and jacket in these facilities. Automatic parking facilities can be accessed at street level and can be established in a good and visible location with good lighting at night.

Bicycle parking close to the platforms at Bickenbach Station in Germany ensures natural surveillance thanks to all the passers-by.



Train passengers can either secure their bicycles to stands or place them in bicycle lockers.



Supplementary features

Various features can be added to make bicycle parking more safe and secure.

- At Odense Banegårdssenter, for example, music is played in the basement at all times.
- Existing street lighting around squares can be used to make bicycle parking safer.
- You can supplement the parking facility with a large number of other functions such as a workshop, 24-hour kiosk and snack bar to attract a bit of life to the area.

- Assault alarms can be installed at short intervals in multi-storey and underground facilities.

- Entrances can be designed with separate doors for bicycles and cyclists so that you have to have taken a bicycle in to be able to take one out again.

Of course, this would not prevent hardened thieves from taking an old bicycle in and walking out with a new one, but it would reduce the number of cases of more spontaneous theft. See also the example from NS Fiets – Schiedam (The Netherlands) on pages 90 and 91.

Use existing lighting to make bicycle parking safer.



Alternative way of protecting bicycle against theft! – This is a solution from BikeTree.



Consider operation and maintenance

The bicycle parking facility must signal quality and tidiness throughout its lifetime. In other words, it should never be in a state of disrepair. Lack of cleaning and sweeping, graffiti and abandoned bicycles create a dilapidated air.

Once a bicycle parking facility has been established, it is often not long before abandoned bicycles start filling up the stands. Something must be done about this, as chaos will otherwise soon ensue.

In these cases, two things can be done:

- Prevention
- Clearing-up

Prevention

The best way of ensuring orderly bicycle parking is prevention. For example, by establishing schemes where the parking of bicycles outside the marked areas is not permitted.

Such schemes may be introduced for a particular location or be extended to comprise a larger geographically defined area. Bicycles parked outside the marked areas can be handed over to the police. However, such schemes should only be introduced once a sufficient number of parking spaces has been established.

In Roskilde, Odense and Aarhus, such schemes have been introduced around the train stations. Other towns have extended such schemes to include pedestrian shopping streets and bus and coach stations.

Parking scheme in Viborg

In Viborg, bicycle parking behaviour was causing such problems that the local authorities, in collaboration with the Danish Cyclists Federation, decided to introduce a geographically defined parking scheme.

In the town centre, cyclists must park their bicycles within areas clearly marked with white lines and bicy-

cle symbols. Bicycles parked outside these areas are removed by equipment stores assistants. The police has approved the scheme, but is not otherwise involved.

The experience gained with what started as a trial is positive. The marked areas have a positive effect on cyclist behaviour. Very few bicycles need to be removed.

Clearing-up

If clearing-up of the bicycle parking facility is required, a method can be used whereby stickers are attached to the parked bicycles. The stickers announcing the

clearing-up campaign must be removed by the owner within a given notice period, otherwise the bicycle is removed.

A notice period of between two and four weeks within which the sticker must be removed is generally recommended.

For such an operation to be implemented, an agreement must be made between the local authorities in question and the police concerning the removal of bicycles.

In central Viborg, a bicycle parking scheme has been introduced which means that bicycles must only be parked within the marked areas. This scheme has resulted in a considerably tidier townscape.



*Bicycle parking in Viborg
Photo: Ole Bust*

Bicycle clearing-up campaign in Copenhagen

In the City of Copenhagen, an annual bicycle clearing-up campaign is implemented under the name of Cykelgribben (literally the bicycle vulture).

All bicycles at a given location are marked, and after a period of five weeks all bicycles still carrying an unbroken sticker are removed.

Bicycles which are in a decent condition are left with the lost property department, while old wrecks are scrapped.

In 2005, more than 3,500 bicycles were marked with the Cykelgribben sticker at Vesterbro in Copenhagen.

The Cykelgribben clearing-up campaign in Copenhagen



A total of 1,500 bicycles were removed, 120 had been reported stolen, 500 were put up for sale and the rest were scrapped.

Not a single owner contacted the lost property department to get his or her bicycle back in connection with the campaign.

The clearing-up operation coincided with the establishment of 300 new bicycle parking spaces which was followed by a campaign to improve the parking habits of cyclists.

Cleaning and maintenance

Stands with few anchor points facilitate cleaning and tidying-up around the stands. In special cases where the stands are always full, or where the type of stand or other factors make sweeping difficult, a leaf blower or blower can be used.

Regular clearing should be established by the local authorities.

Maintenance should include inspections to identify broken or damaged stands, and a routine for checks and immediate repairs must also be established. The anchor points must also be checked and maintained.

Scrapping arrangement

One reason why many bicycle stands and bicycle parking facilities are often full of abandoned bicycles is that there is nowhere nearby where you can get rid of your old bicycle.

If you look up scrap merchants in the yellow pages on the Internet and search for Greater Copenhagen, the nearest hit is in Bylderup-Bøv in southern Jutland!

If you do not have a car, it is impractical having to deliver your old bicycle to one of the few scrap merchants around. Some, but not all, recycling centres accept bicycles.

Each year, the local authorities – or at least the larger local authorities – devote considerable resources



Restored bicycles are put to good use in Senegal.

to campaigns and the clearing-up of abandoned bicycles. Some of these resources could instead be used to establish depots where people could get rid of their old bicycles without breaking the law.

As a supplement – and perhaps not such an insignificant incentive – a scrapping scheme could be introduced under which owners receive DKK 100 per bicycle handed in for scrapping.

Perhaps the best bicycles could be restored and donated to the third world.

Spoil the cyclists

If the manual's fundamental principles concerning the location and design of bicycle parking facilities are followed, it will constitute a huge improvement on the current state of affairs.

However, we still need the icing on the cake, the final details that signal balance and quality.

This is a signal from the developer or the local authorities that cycling as a mode of transport is valued, and that there is a desire to promote cycling.

Quality is good design combined with good functionality.

The signals conveyed by the design and layout of the parking facility will positively influence how and the extent to which it is used.

Good design influences our behaviour.

Stands and racks

The stand or rack is the central element, and as such it must primarily be functional. See the basic requirements of a good stand on page 42.

Regardless of design, it must be possible to repeat and combine the stand, and it must be suitable for varying compact solutions.

Standard or special design?

The choice may be between standard solutions which are repeated from one location to another, and special solutions which are developed specifically for a particular location.

Both types of solutions entail certain advantages and disadvantages.

The standard solution is usually cheaper, and another advantage is recognisability. Cyclists recognise the look and know how to use the type of stand which is used repeatedly.

On the other hand, some urban locations may call for specially designed solutions which add a certain look to the location.

Fortunately, a wide range of good standard stands and racks are available from Danish and foreign manufacturers which in terms of their design would be suitable for most urban locations. And this manual provides inspiration on the choice of stand and design.

The risk of commissioning a specially designed stand is that it may be overdesigned and unsuitable for the intended purpose.

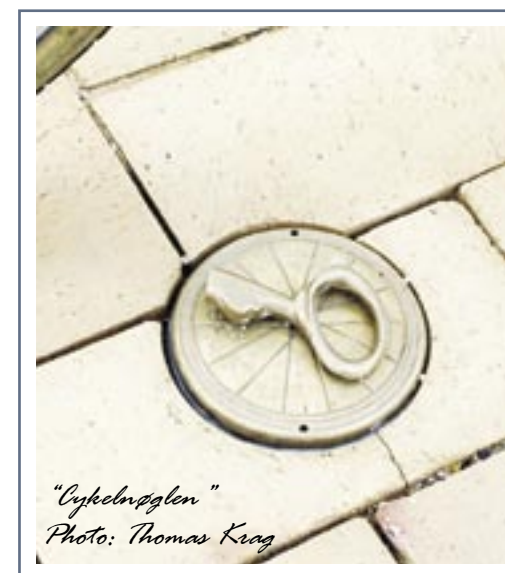
If special stand or rack designs are called for, the bicycle stands and racks described in this manual may be used as a starting point. Further work may then go into the design from there, without reducing functionality. See an example from the Danish Cancer Society on the opposite page.

The stand should be tested, and the local branches of

An interesting and unconventional stand signalling quality and attitude as regards its interplay with the surroundings.



The little extra which makes all the difference.



the cyclists federation can be involved in developing the stand or rack.

Matching urban furniture

Some manufacturers offer urban furniture in the same design as the stand.

Matching the bicycle parking facility with benches, bollards and litter bins in the same design as the bicycle stands further enhances quality standards.

Some manufacturers make bicycle stands combined with benches, which is a good solution where there is little demand for parking and where there is no desire to see empty stands giving the impression of an unused area without a purpose.

Beautiful and classic stand from Veksø



Good quality and special designs enhance bicycle parking and encourage better parking behaviour.

Danish Cancer Society – specially designed stands with good functionality.

As part of a bicycle parking plan for the organisation, the Danish Cancer Society commissioned the design of a special stand featuring its logo. In the design process, the primary focus was good functionality. The hoop stand is a modified SHL stand from Veksø with logo, while the design of the other stand is based on a conventional butterfly rack in the shape of the society's logo.



CyclePod stand

A sculptural and eye-catching stand which is also space-saving. Also available for shops with ads on the umbrella.



TTS – Triangel/Falco stand

Really good design is both about functionality and some indefinable extra which makes you feel that you using your bicycle is appreciated.



Interplay with the surroundings

As an alternative to specially designing a bicycle stand, you can use the surroundings to add an air of exclusivity to your bicycle parking solution.

CBS as an example

Bicycle parking facilities have been established on both sides of one of the Copenhagen Business School's distinctive buildings at Frederiksberg.

On one side the parking facility has been established in connection with the school campus in a grove of red oak and newly planted hedges. On the other side, the parking facility is integrated into a paved system which also features large beds of lavender.

Both parking facilities are integrated and in harmony with their surroundings, and it is clear that they have been planned as part of the overall landscaping.

Moreover, attention has been given to detail, and the finish is satisfactory.

The bicycle parking facilities are obviously part of an overall prestige project. There is plenty of space and no compromises have been made with regard to quality.

The landscape architect is Marianne Levinsen, see www.mariannelevinsen.dk.

The school's address is CBS, Solbjerg Plads 3, 2000 Frederiksberg.

The bicycle parking facilities can be seen from Howitzvej and P. Andersens vej, and from the green bicycle path winding through the campus.



Bicycle parking as an integrated solution in front of the Copenhagen Business School.



Bicycle parking in conjunction with beds of lavender and benches, an integrated solution at Copenhagen Business School.

As a hallmark

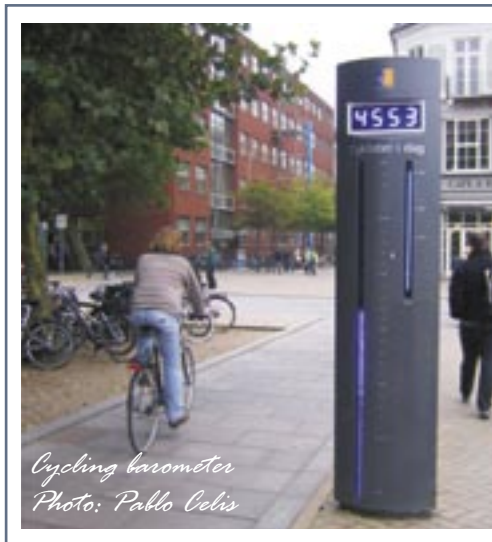
A municipal design policy is an effective way of raising the status of bicycle parking. In addition to the choice of stands, the design policy should also include a choice of materials for supplementary facilities for cyclists. In this way, synergies can be achieved.

Odense Cycle City as an example

Odense has a design policy for cycling which covers the choice of stands and the design of supplementary facilities.

In addition to good bicycle stands in standard models, a number of bicycle stands and supplementary features have also been specially developed.

The design line and the colours used are the same for signs, maps, compressed air facilities and other facilities for cyclists, and the result is a city which clearly signals care for cyclists – and huge numbers of citizens use their bicycles every day.



*Cycling barometer
Photo: Pablo Celis*

A cycling barometer raises the standard of the square and creates focus on cycling.



*Signage in Odense
Photo: Pablo Celis*

Good and attractively designed signage raises the profile of the bicycle parking facility.



*Parking at pedestrian shopping street
Photo: Pablo Celis*

Parking at the end of the pedestrian street where compressed air has been installed to attract cyclists.



*Luggage storage
Photo: Pablo Celis*

When parking your bicycle at the end of the pedestrian shopping street, it is also nice to be able to store one's luggage, bicycle helmet etc. so that you have your hands free to shop.

The path to good bicycle parking

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Introduction

The path to good bicycle parking follows two tracks. One track concerns the principles described in the previous section. The other track concerns the processes and tools for developing and realising bicycle parking solutions.

The next three sections attempt to answer the following questions:

- What are the processes involved in realising bicycle parking – and which parties are involved?
- How do you provide a coherent basis for the planning and further expansion of bicycle parking solutions? And how are specific bicycle parking projects initiated?
- How can you – based on typical street layouts and urban spaces – design the most expedient bicycle parking facilities?

Players and processes

Bicycle parking must be part of the process from the outset of all projects where this is relevant. Both when it comes to functional changes and adjustments and in connection with new building work and refurbishments.

Many of the problems which we face today stem from the fact that bicycle parking has been overlooked, neglected and excluded from most development and decision-making processes in connection with building and construction work.

The lack of attention means there is no budgeting for bicycle parking, and that planners do not allocate land for this purpose.

Far into a project process – perhaps not until the project is nearing completion or not even until it is completely finished – do planners realise that neither funding nor land has been reserved for the necessary bicycle parking facilities. They then end up having to somehow find some money in the operating budget

and a bit of unaccounted-for land somewhere. This is not good; in fact it is a recipe for disaster.

Haphazard solutions are bad solutions and reinforce the anarchic parking behaviour which contributes to cyclists having such a bad reputation. At the same time, the bicycle parking problem will appear insoluble. Any many people give up.

Parties involved

A precondition for a successful process is, of course, that all parties involved should be aware of the fact that they actually have a role to play. And secondly, they should know the rules of the game.

Establishing good and ample bicycle parking spaces in connection with any development starts with a good planning basis.

The planning basis should – in addition to the more traditional physical requirements – outline a set of clearly defined rules governing the involvement of the various parties.

A kind of who does what and when? And more specifically who is responsible for deciding on and establishing the bicycle parking facility?

Roughly speaking, the parties involved are the local council, an authority (technical department), a developer and a planner.

In some cases, the developer is also the planner. The authority is always the local authority. The planner is the company, section or department in charge of project planning.

Copenhagen Opera House – an example of what happens when it goes wrong!

The new Copenhagen Opera House is an example of what goes wrong when bicycle parking is omitted from the plans.

The contrast could hardly be sharper between the due care for which the developer is so famous and the extremely haphazard bicycle parking solutions established just before the handover of the gift to the Danish people and the Royal Danish Theatre.

Just before the new opera house was occupied, attention was drawn to the fact that no bicycle parking spaces had been established. The developer just managed to devise a last-minute solution. It is obvious that bicycle parking was not part of the original budget and that not much thought went into where bicycles should be parked.



*The Copenhagen Opera House
Photo: Erik Bolling-Ladegaard*

At the Copenhagen Opera House we have to live with the contrast between a building which is truly magnificent in every detail and a bicycle parking solution which is both haphazard and inadequate.

The town or city council decides

The local council adopts district plans, bicycle action plans, parking norms etc. on the basis of the budgets applicable from time to time. The local council is therefore very much responsible for ensuring that bicycle parking makes it onto the political agenda.

In public areas, politicians can exert direct influence on the design of the bicycle parking facility, while they can regulate the parking standards applicable to private land on the basis of a set of guidelines concerning the establishment of parking areas within the municipality.

Technical department is the authority

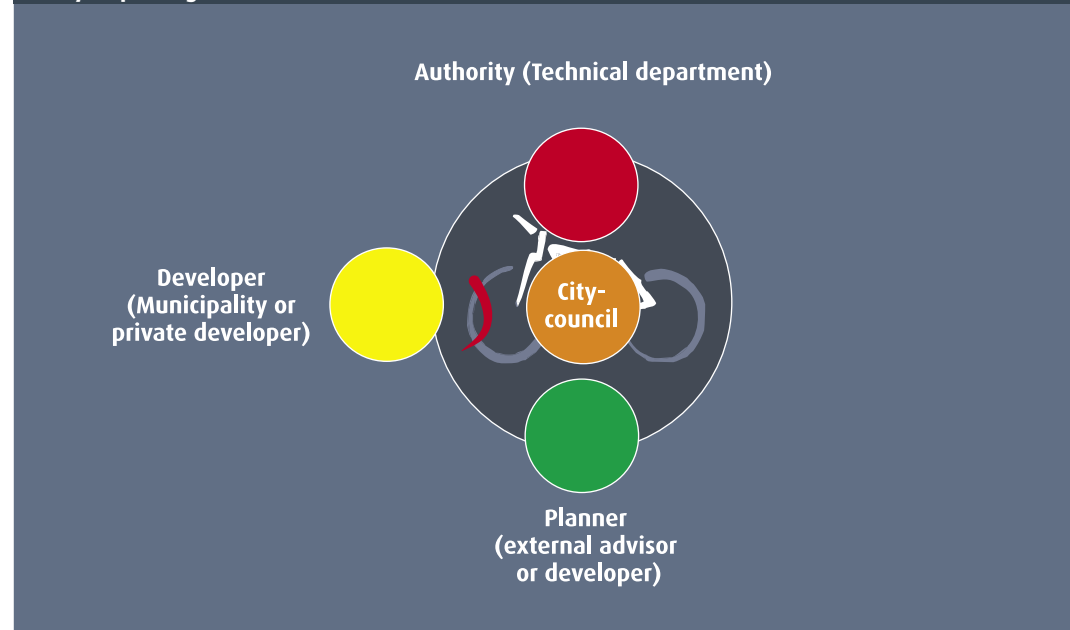
The municipal technical departments handle cases pertaining to district plans, planning permissions and other plans which may involve requirements for the establishment of bicycle parking facilities.

Developer and planner execute

The municipality often acts as both developer and planner, but those roles may also be played by a private developer.

If no municipal bicycle parking norms have been laid down, it is up to the developer and planner to jointly decide on the number of spaces and the design of the parking facility based on the rules applicable from time to time.

The parties involved and their relative influence on the planning process surrounding the establishment of bicycle parking



When is bicycle parking required?

Requirements for bicycle parking facilities can only be made in connection with projects which are subject to the building regulations.

Building regulations

The purpose of the building regulations is, among other things, to ensure the quality of buildings and unbuilt areas, and also to ensure that a satisfactory number of parking spaces are established.

The Danish building regulations from 1995 include only a general requirement concerning the establishment of a suitable number of parking areas in connection with the construction of new buildings or major refurbishments of, for example, blocks of flats and commercial buildings.

A suitable number of parking spaces is usually determined by the local council based on recommendations from the technical department. The recommendations are often prepared in collaboration with the

The building regulations only stipulate a suitable number of bicycle parking spaces. At the Jem & Fix DIY store, this requirement has been translated into four unsuitable stands. You can be too economical!



*Jem & Fix
Photo: Pablo Celis*

building inspectorate and the planning office of the road administration and vary a great deal from one municipality to the next.

However, some municipalities have translated "a suitable number" into guidelines or norms for the number of bicycle parking spaces which must be established in connection with, for example, residential areas, commercial properties and institutions.

Other municipalities are in the process of developing such norms. However, far from all municipalities have guidelines as such for the number of bicycle parking spaces that must be established in connection with different types of urban functions.

It is strongly recommended that all municipalities prepare such rules.

When is bicycle parking required?

Requirements for bicycle parking facilities can only be made in connection with projects which are subject to the building regulations.

The building regulations from 1995 lay down provisions concerning bicycle parking in connection with the construction of new buildings and major renovations of, for example, blocks of flats and commercial buildings.

The building regulations are published by the Danish Enterprise and Construction Authority.



The building regulations contains the following provisions:

2.1.3 Parking areas

Subsection 1. Adequately sized parking areas must be reserved for residents, employees, visitors, customers, suppliers etc. to be able to park cars, motorbikes, mopeds etc. within the perimeter of the property.

Subsection 2. The exact proportion of the land area that must be reserved for parking and when such parking must be established is determined by the local council and must appear from the planning permission.

Processes involving bicycle parking

The municipalities can only demand that bicycle parking be established in connection with construction work on municipal land or on private land which is covered by planning or official regulations.

The municipality can regulate bicycle parking on either private or public land through:

- district plans
- planning permissions.

District plans

If a building project is subject to district planning, a new district plan must be adopted and perhaps an addendum to the municipal plan. And then any requirements concerning bicycle parking must be set out in the district plan.

The technical departments stipulate the requirements and act as the controlling body. Depending on the complexity of the parking facility, the control function is divided between the building inspectorate and the section of the municipal road administration which is responsible for the district plan.

In the district plan, both the descriptive and regulating sections must include relevant text which can ensure that the bicycle parking facility has the requisite number of spaces and is properly designed.

If the municipality has a set of guidelines governing numbers and the design of bicycle parking facilities, it is the section of the municipal road administration responsible for the district plan which must ensure that the number of parking spaces and their location ensure good accessibility and suitability for the purpose of bicycle parking.

District plans – from district plan to local plan

Organisation and parties

-  Authority (the municipality)
-  Developer (municipal or private)
-  Planner (external consultant or the owner)
-  Town/city council

Process and parties

-  Initiation of district plan - Preliminary meeting
 -  The authority informs the developer of the required number of bicycle parking spaces and their location. The municipal road administration is the acting authority.
-  Preparation of district plan
 -  The authority checks that the requirements concerning bicycle parking are included in the district plan, including that the parking facility is indicated on the map of the district plan and mentioned as a section under traffic conditions. The municipal road administration is the acting authority.
-  Public consultation and final adoption of district plan
 -  A public consultation phase is required before the district plan can be adopted by the town/city council. This allows the public in general to lodge any objections to the plan and to point out if bicycle parking has not been taken into account sufficiently.
-  The developer and/or planner prepares local plan/planning application with reference to the district plan which is submitted for approval by the authorities.
-  Consideration of local plan/planning application
 -  The authority checks that all district plan requirements are contained in the local plan/planning application, and that the number of bicycle parking spaces and the quality of these spaces meet the requirements. The municipal building inspectorate is the acting authority.
 -  In case of doubt as to the number of bicycle parking spaces and the layout of the facility, the building inspectorate forwards the plan or the application to the municipal road administration which clarifies whether the requirements are met.
-  Final approval of local plan/planning application

A typical

In the Municipality of Næstved, a new district plan had to be adopted in connection with the establishment of a new Netto supermarket in an industrial area.

The developer was a private investor, and the planner and executor was also an external contractor paid by the developer.

Who was responsible for bicycle parking?

In this case the municipality was fully responsible for ensuring that bicycle parking was taken into account.

However, bicycle parking was not incorporated into the project from the outset because the municipality did not, at the time, have any guidelines or any policy concerning the establishment of bicycle parking facilities within the municipality.

If the responsible municipal employees in the technical department (road administration and building inspectorate) are not used to working with issues relating to cycling, there is a considerable risk that bicycle parking is overlooked when no rules or norms have been adopted within this area.

In addition to a proper bicycle parking facility, the municipality should, of course, also have ensured proper access to the area from the overall network of roads and bicycle paths.

First proposal for a district plan for the establishment of a Netto supermarket

As can be seen from the map, no areas have been reserved anywhere for bicycle parking. A bicycle path runs along Vordingborgvej, but in the district plan the municipality has not considered access to the area for cyclists and pedestrians.

A typical example of an omission which was, however, corrected following a critical revision of the plan.

District plan with no account being taken of bicycle parking.



Final proposal for a district plan for the establishment of a Netto supermarket.

As can be seen from the revised map, direct access from the bicycle path along Vordingborgvej to the area was subsequently added.

Moreover, an area of land near the supermarket was reserved for bicycle parking. However, the district plan did not stipulate the number of bicycle parking spaces required.

District plan following review from the point of view of cyclists with areas reserved for bicycle parking and access.



Planning permissions

Planning permission must be obtained if you want to erect a new building, add an extension or convert a property.

It is only in connection with major conversions or extensions that the parking requirement, including the required bicycle parking, must be reassessed.

The municipality considers planning applications and decides whether planning permission can be granted.

Applications for planning permission and notifications concerning construction work must therefore be submitted to the municipal technical department.

In connection with projects which are subject to the Building regulations, bicycle parking may have to be incorporated into the project in line with the municipal recommendations and guidelines.

In such cases, the controlling body is usually an architect, designer or engineer from the building inspectorate.

Planning permissions – from application to completion

Organisation and parties

-  Authority (the municipality)
-  Developer (municipal or private)
-  Planner (external consultant or the owner)

Process and parties

-  Application for planning permission
 -  The developer should consider whether the project entails a need for additional bicycle parking facilities.
-  Approval of planning permission
 -  The authority checks whether the conversion or extension entails a need for more bicycle parking spaces, for a change of location or access to the existing bicycle parking facility. The municipal building inspectorate is the acting authority.
 -  In case of doubt as to the number of bicycle parking spaces and the layout of the facility, the building inspectorate forwards the planning permission to the municipal road administration which clarifies whether the project entails a need for the bicycle parking facility to meet additional requirements.
 -  Required adjustments to the bicycle parking facilities are submitted to the developer, and the requirements must be met before the development is occupied.
-  Developer starts construction
-  Developer announces completion of construction
-  Inspection of completed development
 -  The authority checks that the development meets the terms set out in the planning permission. The municipal building inspectorate is the authority.

Can functionality requirements be made?

There are limits to what a municipality can demand of private developers concerning the specific design and functionality of bicycle parking facilities.

However, such requirements are relevant as it is not enough that a sufficient number of bicycle parking spaces is, in principle, available. The parking spaces must also be accessible and practical to use.

There are quite a few examples of developers having erected unsuitable bicycle stands which actually cannot accommodate the number of bicycles for which they are designed.

When it comes to the functionality of the bicycle parking facility, developers are presented with far fewer requirements.

Only the Municipality of Hvidovre has adopted a set of guidelines addressing the issue of functionality.

However, it is generally recommended that developers should meet certain requirements in terms of both the number of bicycle parking spaces and the functionality of the facility.

Guidelines for bicycle parking

All municipalities are advised to draw up a set of guidelines concerning the number of bicycle parking spaces and layout.

A set of municipal guidelines concerning bicycle parking should as a minimum contain the following elements:

- Norms concerning the number of parking spaces.
- A set of provisions for insertion into district plans and building permissions.
- A set of guidelines concerning the layout of bicycle parking facilities.
- A set of guidelines concerning the physical design of stands.

Use the example and recommendations on the right and supplement them in line with local requirements and particular problems within the municipality.

If possible, always involve the local branches of the Danish Cyclists Federation in the laying-down of guidelines for bicycle parking.



Recommendations concerning contents of bicycle parking guidelines - Norms

The bicycle parking guidelines should clarify which norms the municipality wants to apply in connection with new building projects.

Use the norms outlined on page 41 of this manual as a starting point. In connection with specific projects, the norms should always be followed up by actual counts.

The norms should be binding and may be divided into different norms for different zones within the municipality (city/town centres, suburbs and countryside).

In addition to the norms, it is suggested that the following text be included in the bicycle parking guidelines:

§1. Purpose

Subsection 1. The guidelines contain provisions for the administration of the requirements set out in current building regulations with respect to bicycle parking areas at buildings and developments in the Municipality of [].

Subsection 2. These provisions are guidelines for the determination of bicycle parking requirements in connection with the handling of planning permissions and the consideration of district plans.

§2. Scope

Subsection 1. The guidelines should be applied in connection with the planning of new buildings or extensions, in connection with conversions and changes in the use of existing buildings and in connection with the consideration of applications for such projects.



Recommendations concerning contents of bicycle parking guidelines - Provisions for district plans and planning permissions

• Planning permissions

When granting planning permissions for major construction projects, it is suggested that a memo be attached setting out the recommendations concerning bicycle parking listed below, including the guidelines in the two adjacent boxes, as well as a catalogue of ideas and examples of recommendable types of stands. Feel free to use the examples on pages 42-47 of this manual.

• District plans

It is suggested that the following text be included in the provisions of the district plan:

Bicycle parking must be established in accordance with the Municipality of []'s guidelines concerning the establishment of bicycle parking spaces. The quality of the bicycle stands and racks must be good in terms of materials and suitability, and the stands and racks must be designed in such a way as not to damage the parked bicycles.



Recommendations concerning contents of bicycle parking guidelines - Bicycle parking layout

As regards the layout of bicycle parking facilities, it is suggested that the following text be included in the bicycle parking guidelines:

• *Parking should be established as close as possible to the final destinations of cyclists.*

• *Parking should be established in a visible location, preferably well lit and possibly monitored.*

• *Parking should preferably be covered.*

• *Parking should preferably be established at street level.*

• *Long-term parking solutions should be in the form of lockable bicycle sheds/multi-storey parking solutions.*

• *Long-term parking solutions should allow for the storage of helmets/kit.*

• *Long-term parking may be combined with supplementary facilities such as bicycle workshops, drinking fountains, toilets and compressed air.*



Recommendations concerning contents of bicycle parking guidelines - Stand and rack design

As regards the design of bicycle parking facilities, it is suggested that the following text be included in the bicycle parking guidelines:

• *Wheel-supporting racks must be in the form of vertical butterfly racks.*

The angling of the clamps should be such that the racks can accommodate bicycles with all ordinary types of tyres. Installation of the racks at an angle ensures more space around individual bicycles.

• *Stands supporting the frame of the bicycle should be stable. The distance between the hoops should be at least 1 m, allowing two bicycles to be parked at each hoop, one on either side.*

• *Stands which grip the handlebars are not recommended.*

• *Horizontal butterfly racks which support only the bottom section of the wheel are not recommended either.*

• *All bicycle stands must allow cyclists to secure their bicycles.*

Tools and working methods

Below follows an outline of a number of tools, methods and approaches which can be used by municipal planners or engineers wanting to establish guidelines for good bicycle parking facilities.

Bicycle parking plans

Ideally, you should start by drawing up an overall bicycle parking plan like other traditional traffic plans. A bicycle parking plan provides a technical foundation for the long-term prioritisation of bicycle parking.

A bicycle parking plan must, for example, be prepared on the basis of a mapping of the municipality's infrastructure (main routes taken by cyclists, public transport terminals etc.) and important destinations for cyclists.

A bicycle plan should, as a minimum, contain the following three elements:

1. Status for bicycle parking, including mapping of existing facilities and known needs for bicycle parking.
2. Mapping of existing and future infrastructural elements of significance for bicycle parking (cycle routes, important destinations etc.).
3. Identification of future bicycle parking structure.

Moreover, the bicycle parking plan may be supplemented with the following elements:

- a design manual for bicycle parking
- a strategy for clearing-up and maintenance
- a strategy for signage and directions to main bicycle parking facilities
- an information strategy for communicating what the municipality has to offer in the way of bicycle parking facilities

- a rate of implementation for the realisation of the plan

Status on bicycle parking

Mapping existing bicycle parking facilities and known needs can provide an overview and an indication of where existing bicycle parking facilities are either adequate or insufficient.

Or where – in relation to important urban functions – bicycle parking is totally lacking.

A status for bicycle parking also involves registering other factors which may be causing problems with parking. For example:

- unsuitable types of stands
- unsuitable layout of bicycle parking facility

Mapping needs

The need for bicycle parking can to some extent be gauged by the number of parked bicycles.

Daytime demand is best registered between 10 am and noon, while nighttime demand should preferably be registered between 9 pm and 6 am.

When counts are done, it is recommended that pre-printed maps of the area be used, possibly supplemented with an indication of the purpose of parking (shop, station etc.) and duration (short-term and/or long-term parking).

The registration should comprise a count of both the number of bicycles parked and the number of stands. GPS may be used for registration.

It is recommended that a clear-up be done prior to the count so that all abandoned bicycles are removed.

Also, it is recommended that counts be done at different times of the week and year to obtain the most precise picture of the bicycle parking situation.

Occupancy rates

Once the count of parked bicycles and stands has been completed, the occupancy rates for the bicycle parking facilities can be calculated as follows:

$$(\text{no. of bicycles} / \text{no. of stands}) \times 100\%$$

The occupancy rate expresses the immediate surplus or deficit of bicycle parking spaces.

Variation in occupancy

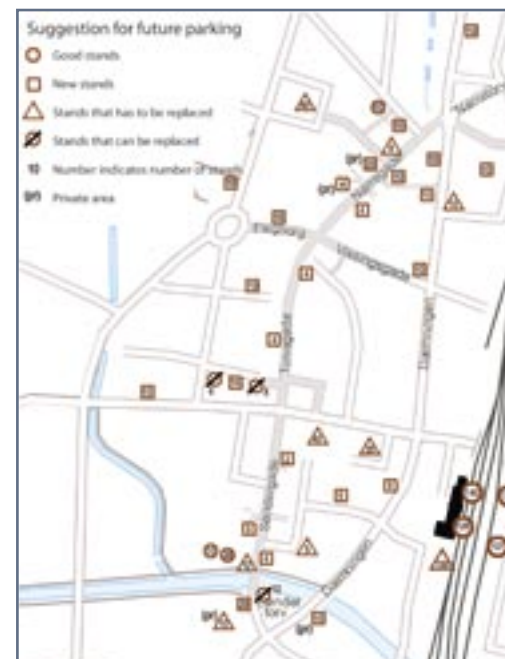
If obvious differences are observed in the occupancy of central and peripheral spaces, this should be included in the registration.

Such variation provides an indication of how good or bad the layout of the bicycle parking facility is.

At many of the large stations in Copenhagen, occupancy rates of 250% are, for example, seen nearest to the entrances, while occupancy rates stand at only 10% for the spaces which are the furthest away.

Such registrations are important when you come to consider how the occupancy rates for the existing spaces can be evened out through changed and improved accessibility, signage and other means of increasing visibility.

Or whether the spaces furthest away should be removed, relocated or made more attractive, for example through covering.



An example of a method for mapping and registering the need for bicycle parking and a proposal for future facilities in the Municipality of Vejle. The survey is prepared by Thomas Krag Mobility Advice – October 2004.

Registration of parking facility standards

In addition to the number of parked bicycles and stands, the types of stand and their condition should also be registered. Are they fit for use? And are the stands the right ones for the given type of parking?

Often a number of hopeless stands have been installed, which in reality means that the facility is unfit for use and therefore no good.

Such registration is therefore an obvious way of systematically replacing bad stands (especially horizontal butterfly racks and claw racks) and defective stands.

User surveys

Unfortunate bicycle parking may also be attributable to bad habits among users.

Some people park their bicycle right in front of the

entrances to shop where it is clearly in the way of customers going in and out. Other people park their bicycle so that it blocks the way for the 4-5 bicycles which are parked correctly in the stand.

However, many cyclists can also be seen conscientiously trying to get their bicycle into or out of a stand which is very difficult to get to and use.

In other words, users behave in different ways, but their behaviour may also be influenced if, through user surveys, you are able to identify their behaviour and deduce their needs.

Questionnaires can be used to shed light on the question of why cyclists park in the way that they do.

Respondents will often have to think about their own parking habits, and publicising findings can make

users look more critically at their own behaviour.

Mapping of traffic hubs

Most cyclists usually move along the municipal network of bicycle paths. The main routes in the municipality are therefore a good starting point for identifying the most important destinations for traffic, both existing and future ones.

In this way, you can gain an impression of the places where large numbers of cyclists can be expected to need to park their bicycles.

Many main destinations will, however, not be situated along the municipal network of bicycle paths, which calls for a further investigation of local needs. The local branches of the Danish Cyclists Federation are always happy to assist in identifying parking needs.

Identification of future bicycle parking structure

A plan for the future bicycle parking structure which addresses the issues of service levels and the sizes of individual parking facilities is a good way of communicating the municipality's visions for bicycle parking to citizens and politicians.

The plan for the future bicycle parking structure must be based on the status for bicycle parking and the geographical mapping of existing and future important destinations.

Within this framework, a number of bicycle parking standards can be pointed out which can be applied to the key destinations.

Use the bicycle parking norms in this manual to estimate the expected demand for parking spaces and thereby the required size of individual parking facilities.

When pointing out standards, the following aspects should, as a minimum, be considered:

- choice of stands
- need for covering
- need for lockable facility
- need for manning
- need for supplementary services

Long-term parking will often require a higher level of security and sense of safety, while short-term parking requires accessibility and proximity.

Detailed plans

Once the plan for the development of bicycle parking is in place, the next step is to make detailed plans for the individual bicycle parking facilities.

Is there space enough?

A detailed plan must ensure that an area can accommodate the volume of parked bicycles determined on the basis of the bicycle parking plan or on the basis of a specific target or assessed demand.

Moreover, the plan must ensure that individual parking facilities are located and laid out in a way which ensures that they are used.

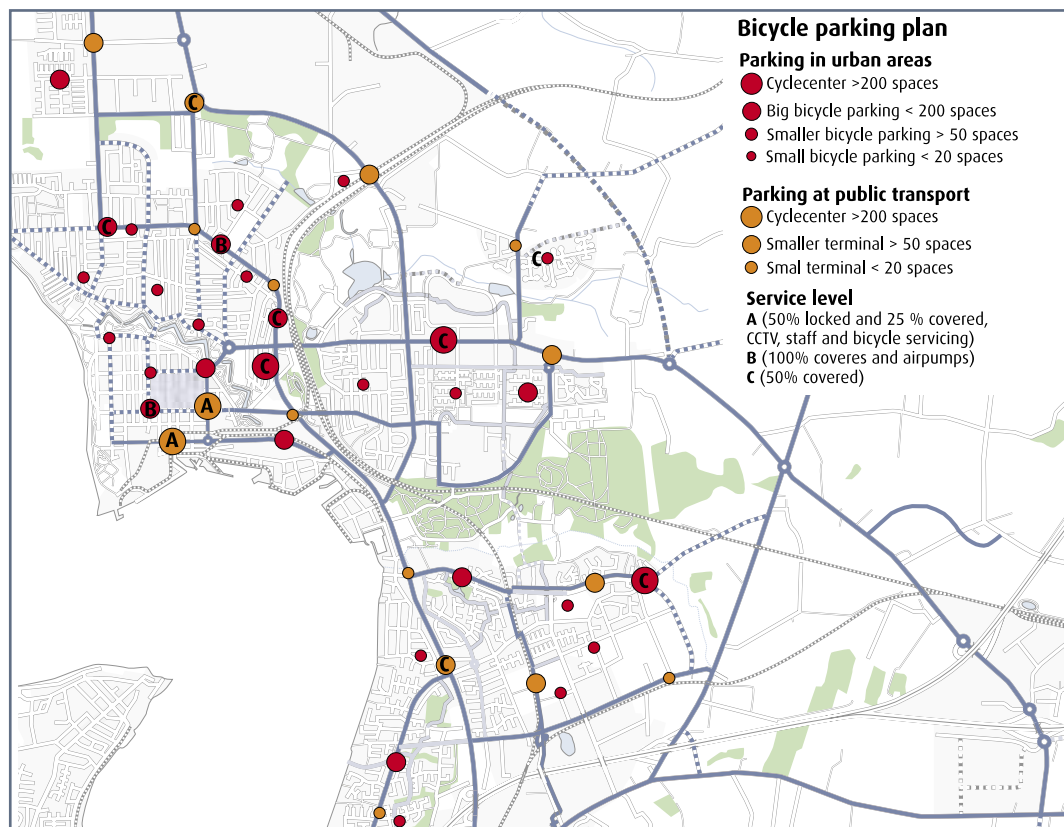
Volume studies

For large-scale parking facilities, i.e. facilities with several hundred bicycle parking spaces, volume studies can be used to identify space-related problems and possibilities.

The purpose of volume studies is to get an overview of how much space is taken up by a given function and to relate this area requirement to the existing circumstances. This includes taking a look at the existing area use, i.e. areas which are already allocated for other purposes.

If, for example, you need to establish parking for 400 bicycles, and only 100 sq.m. of land is available, it would appear that you have an insoluble problem on your hands. 0.25 sq.m. per bicycle is not realistic.

An example of a bicycle parking plan which addresses the issues of important traffic hubs, the number of bicycle parking facilities and service levels.



Volume studies are also a way of initiating a discussion of area based on different, but realistic premises.

As an exercise, you can take an alternate look at premises and area requirements.

Every time the premises change, account should be taken of the fact that various degrees of compactness of design entail both advantages and disadvantages. Advantages in the form of saved space and disadvantages in relation to use.

Volume studies should – in addition to ensuring space for the facility as such – also ensure the allocation of space for future expansion of the bicycle parking facility.

In the section on accessibility and area requirements on page 32, the basic preconditions for undertaking volume studies are described.

Main station in Aarhus – an exercise

Let us assume that there is a desire to improve bicycle parking at the main station in Aarhus.

At the main entrance to the station, a total of 170 parking spaces have been established. A count undertaken in 2005 showed a need for 500 parking spaces. If adding, for example, 20% for the additional bicycles which improved conditions will often attract, there is an overall need for 600 parking spaces in front of the main entrance.

Based on the assumptions described on page 32, you can quickly visualise the possible solutions which would be realistic in connection with an expansion of the bicycle parking facility at the main station.

If the area required for every parked bicycle is 2.25 sq.m. including manoeuvring area, an area of approx. 1,350 sq.m. must be reserved.

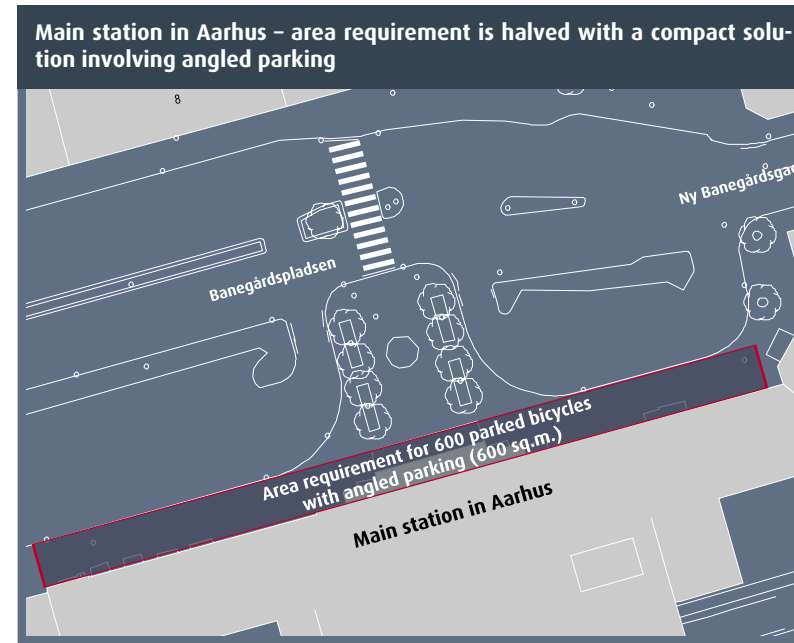
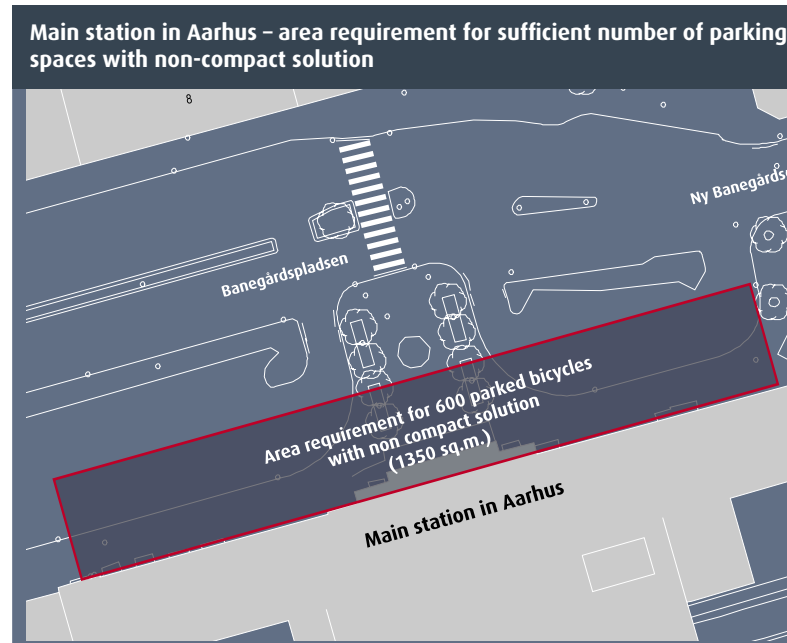
As can be seen from the outline below, establishing

a non-compact solution would be a relatively impossible task unless the entire arrivals area was used for bicycle parking.

With a compact solution involving angled parking, the picture becomes a bit more realistic. Still, all existing pavements would have to be included, which would mean a change in area use.

The exercise illustrates the area requirement for bicycle parking, and in this particular situation there is probably no avoiding one or more compact solutions or a change in area use.

Underground, automatic parking facilities or a multi-storey parking facility could solve a lot of the parking problems at the main station in Aarhus. See examples on pages 81 and 87.



Physical layout

Bicycle parking will very often have to be established in an existing urban space or along an existing street. In other situations, a street profile or the layout of an existing urban space will have to be changed.

Whatever the situation, a number of general principles should be applied in the physical layout of the bicycle parking facility.

Below follows a number of tips and ideas as to how bicycle parking can be laid out, both in existing and new urban spaces and along existing and new street layouts.

Layout in urban space

The location of bicycle parking facilities in the urban space is an issue to which Danish town planning has largely failed to address.

The siting is often decided by chance and by where it has been possible to squeeze in a few rows of stands.

No account has usually been taken of the degree of visibility or whether bicycle parking could be used as an active element in the furnishing of the urban space.

Until now, bicycle parking has been something which had to be done as quickly as possible and preferably somewhere else and by somebody else.

Bicycles are parked all the way around the square Kultorvet behind bollards and benches, but they are hardly visible from the open space in the middle of the square.



*Kultorvet - Copenhagen
Photo: Erik Bølling-Ladegaard*



*Kultorvet - Copenhagen
Photo: Erik Bølling-Ladegaard*



Rather than seeing the location of bicycle parking as an insurmountable problem, it should be seen as an opportunity to add new qualities to the urban space.

It is assumed that a more serious approach will be taken in future to the layout of bicycle parking facilities and to the siting of such facilities along streets and in squares.

Once a decision has been made to establish bicycle parking facilities, the next question is where in a given urban space.

Should it be hidden away in a discreet location, or should it be out in the open and visible from all sides?

Basically, it should not be a question of either-or, but of both-and. Moreover, the degree of visibility and incorporation into the scene depend on the specific site and thereby on a number of spatial, aesthetic and functional parameters.

These parameters are explained in further detail below.

Visibility and discretion

If cyclists have to look hard for a bicycle parking facility, they often end up parking their bicycles more or less arbitrarily.

Bicycle parking facilities must be visible to cyclists. However, they should not necessarily leap to the eye of other road users.

Signage is good and may be necessary in some places. However, it is better for the parking facility to be clearly visible from the access roads used by cyclists.

The square Kultorvet in Copenhagen is a good example of the marriage of visibility and discretion.

Cyclists approaching from the streets leading into the

square immediately catch sight of the bicycle parking spaces along the sides of the square. Pedestrians crossing the square do not notice the parked bicycles which line the square behind benches and other types of street furniture.

This is close to the optimum balance between discreet location and visibility from the point of view of approaching cyclists. See also the description of Kultorvet on page 82.

Spatial parameters

Rather than seeing bicycle parking as an element which can only be incorporated into the urban space with difficulty, it should be considered whether it could serve a number of space-creating and space-dividing functions.

Bicycle parking may perhaps even add new qualities to the space?

It can be done quite simply. For example by means of a low wall with benches on one side and bicycle stands on the other.

Bispetorvet in Copenhagen. The square is divided by a wall. On the outside slow-moving traffic and bicycle parking. On the inside benches and open spaces.



Aesthetic parameters

There are many ways in which bicycle parking can be incorporated as a natural element in the townscape.

Whatever the solution, it is always a good idea to clearly delineate the bicycle parking area. This can be done through a different type of surfacing to that used on the surrounding area, by means of a low kerb, a

line, bollards, a fence or wall.

The delineation of the bicycle parking area is a signal that this is where you can park your bicycle – not outside. The clearer this message is communicated, the better. Bicycle parking that works is in itself an aesthetic bonus for the townscape. It is recommended that bicycle parking be accepted and located wher-

ever bicycles are to be found, even in the historical parts of town.

Here, one should aim for simple, carefully thought out and timeless designs which meet the needs of cyclists, but which do not steal attention from the architecture and the history of the place.

The Krystalgade-Fiolstræde intersection in Copenhagen. Paving stones become cobbles where bicycles are parked.



*Krystalgade – Fiolstræde in Copenhagen.
Photo: Erik Bølling-Ladegaard*



*Town Hall Square – Copenhagen
Photo: Erik Bølling-Ladegaard*



*Teglårdsstræde
Photo: Erik Bølling-Ladegaard*

Town Hall Square – Copenhagen The stands are placed on a traffic island that separates slow-moving and fast-moving traffic. Teglårdsstræde in Copenhagen. Kerbs and surfacing mark the area where parking is allowed.

Functional parameters

If it is difficult to make bicycle parking attractive, for example because it has to be located relatively far from cyclists' destinations, it may be worth considering adding a number of cycling-related functions. These may take the form of compressed air, parti-

cularly good protection of bicycles against vandalism and theft or covering.

A wider aim of establishing bicycle parking as a multi-functional area is to foster a positive attitude to bicycle parking as an urban function. Bicycle parking

should not be regarded as a necessary evil, but as an element signalling healthiness, environmental consciousness and a town or city keen on sustainable transport.

Extra equipment such as free compressed air and security devices can make the outermost spaces more attractive.



*Compressed air in Odense
Photo: Erik Bølling-Ladegaard*



*"Cykelnøglen" in Odense
Photo: Erik Bølling-Ladegaard*

Layout in typical street layouts

Below follow a number of ideas and recommendations for standard solutions which can be used to establish bicycle parking along typical street layouts.

The solutions can either be incorporated into existing street layouts or as part of new street layouts.

Avenues

Avenues are characterised by having a wide planted area.

However, the width of the planted area can vary quite a lot, the narrowest planted areas being only 1 m wide.

1 m is not enough to establish bicycle parking.

This is due to the fact that, for safety reasons, a zone

of 50 cm along the road must be kept clear of fixtures.

Similarly, a zone of 30 cm must be kept clear between the bicycle parking facility and any neighbouring bicycle path.

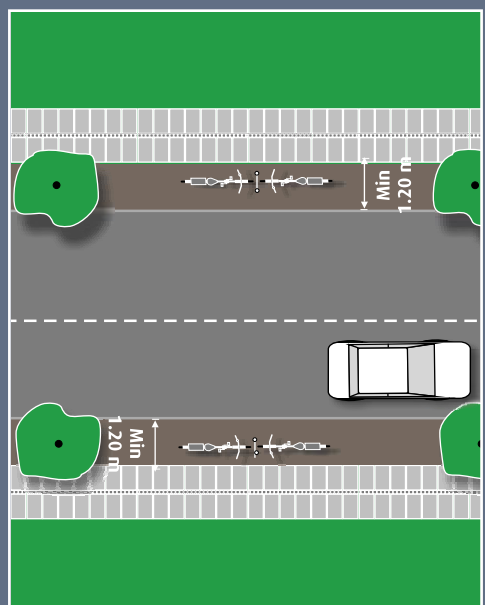
The establishment of bicycle parking along avenues therefore requires a planted area which is at least 1.20 m wide. This is enough to establish one row of longitudinal parking.

If the planted area is at least 1.90 m wide, angled parking can be established as there is no bicycle path along the avenue.

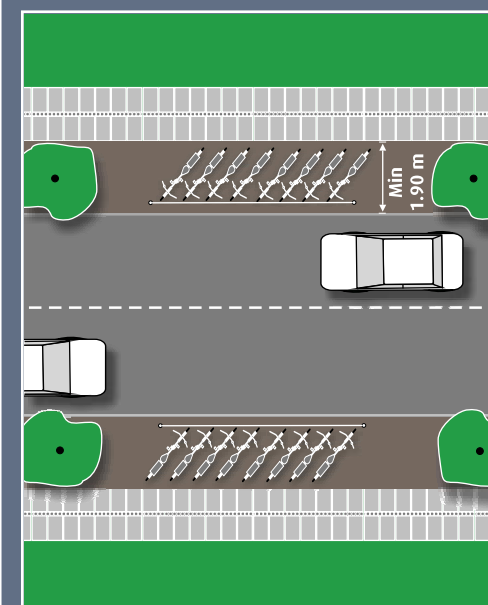
For avenues with bicycle paths, the planted area must be at least 2.20 m wide for angled parking to be established.

For a perpendicular parking solution to be established along avenues, 60 cm must be added to all minimum widths in the shown examples.

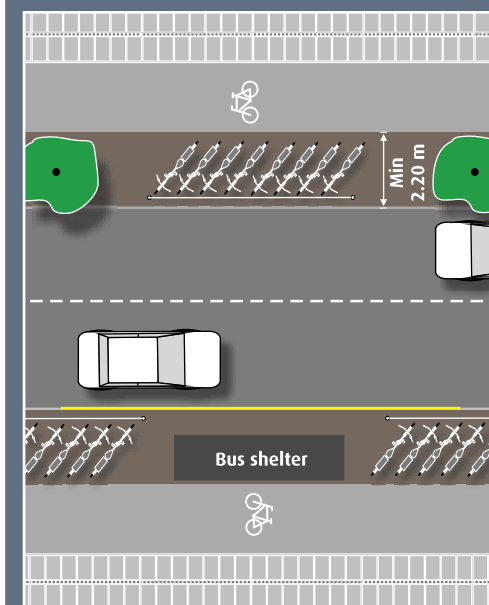
Parking lengthwise along avenues



Angled parking along avenues



Angled parking along avenues with bicycle



Streets around blocks

Most bicycles parked in streets around residential blocks are parked on kickstands or against the walls of buildings. Both methods take up a lot of space along the outside wall of the building, while the area around the blocks often appears disordered.

Angled parking along walls

However, most roads around residential blocks have enough space for establishing angled parking on wall-mounted stands. The advantage of this solution is far better utilisation of the area for parking and a neater

and clearer use of the street.

Use the 10-metre rule

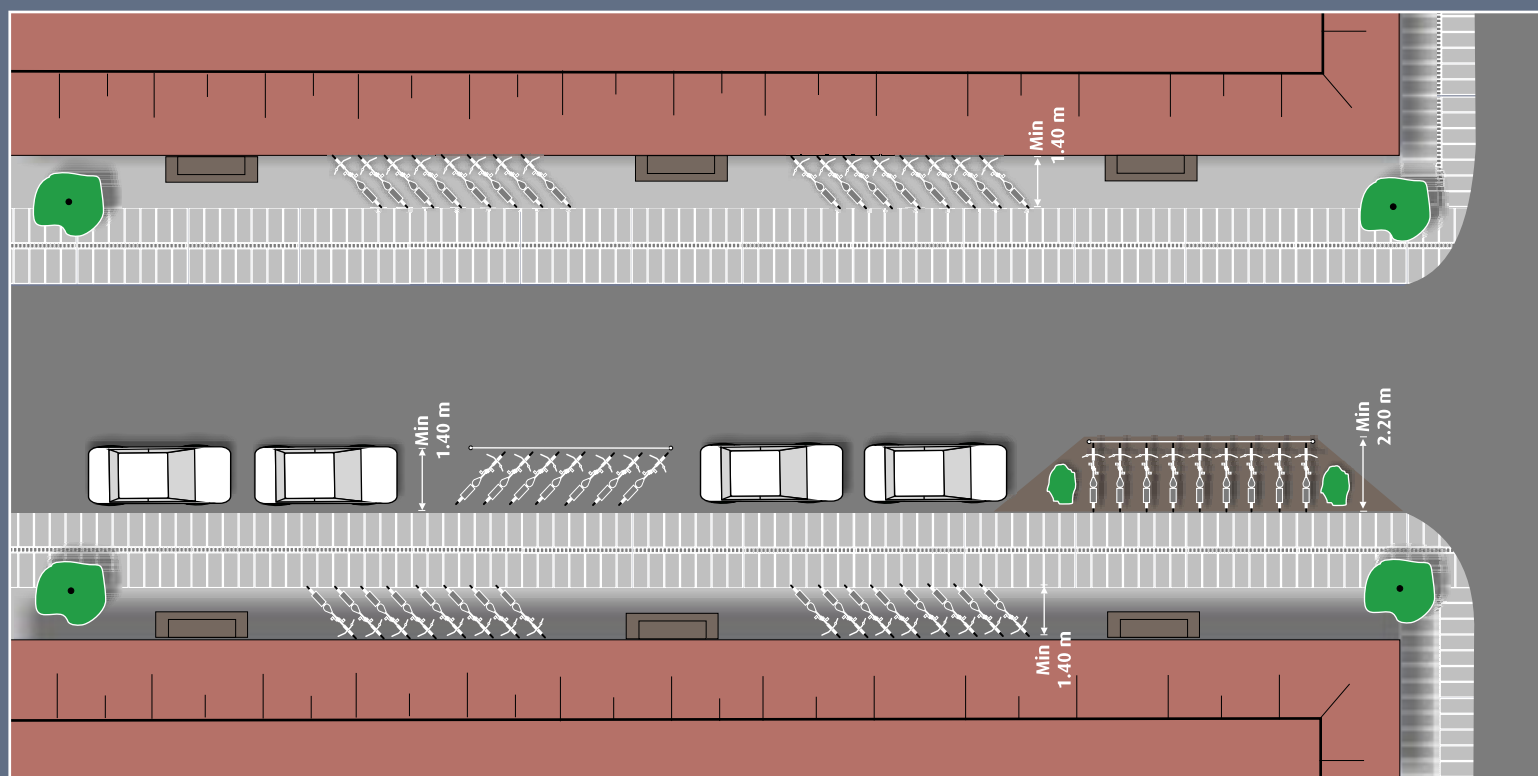
According to the Danish Road Traffic Act (Færdselsloven), vehicles must not park closer than 10 metres from a road junction in order to ensure a good over-view. It is possible to use these 10-metre stretches for bicycle parking. If used for perpendicular parking, there is no problem in using a solution that involves stands for ten bicycles. However, the solution does mean that the kerb/pavement is extended the last 10 metres towards the intersecting road.

Use existing parking spaces

Most streets around blocks have car parking along the street. A number of these parking spaces could easily be converted into bicycle parking. If angled parking is chosen, it is possible to have eight bicycle parking spaces for each car parking space.

If two adjoining car parking spaces are used, the number of bicycle parking spaces can be increased to 20 as a further 2.0 metres, which are used by cars for manoeuvring, become available.

Principal parking solutions on streets around blocks



Environmental streets

Environmental streets are streets where through traffic and high speeds are discouraged and where high priority is given to the street environment and pedestrians.

Streets with a high environmental profile are often designed with a number of speed-reducing measures such as humps, road narrowing and raised areas.

Streets with a high environmental profile cannot be directly related to any special problems concerning

bicycle parking as street layout and the various functions of the development along the street can vary a great deal.

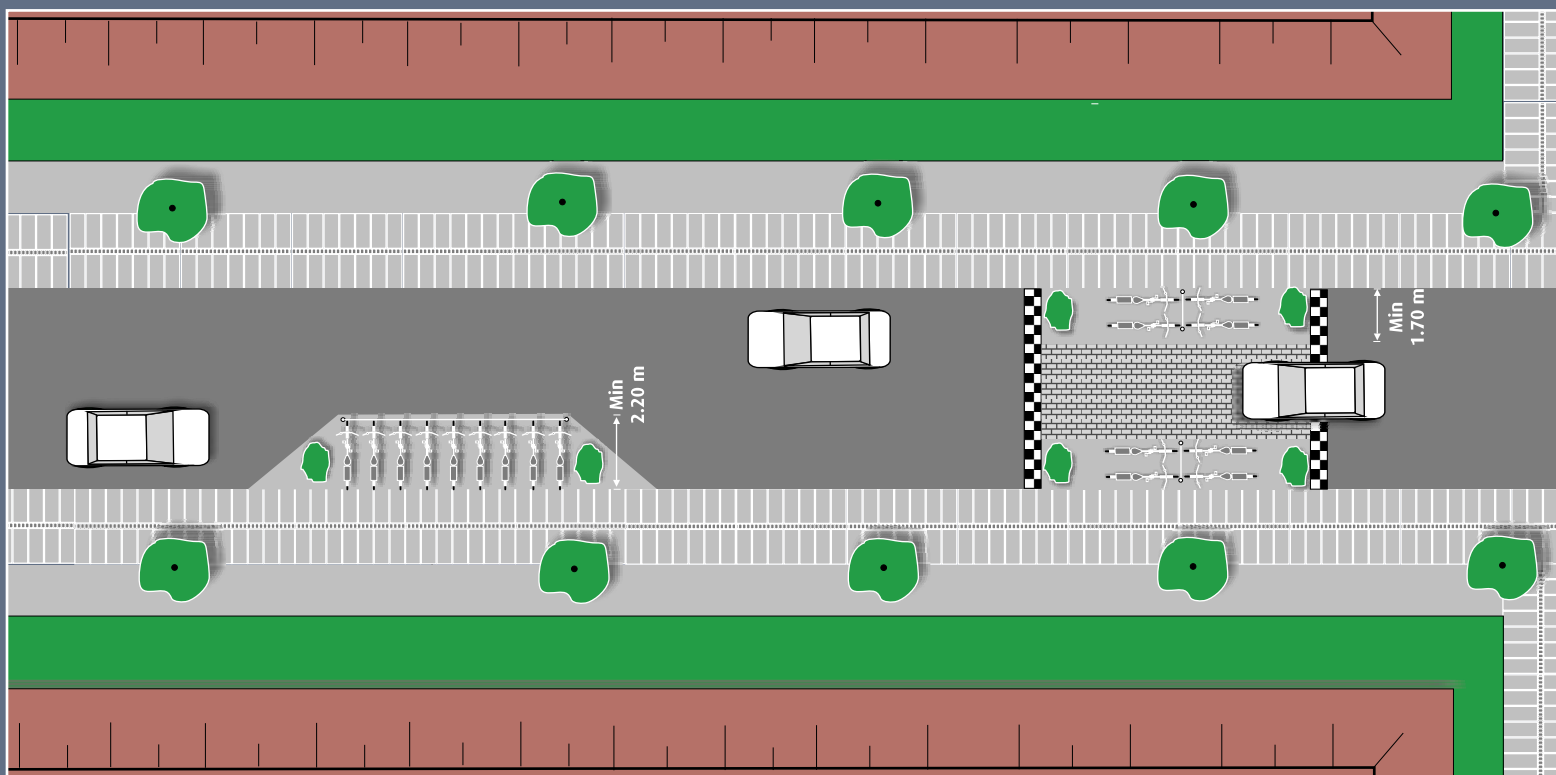
However, there are a number of thoroughfares with a high environmental profile in dense urban areas where the ribbon development is a mixture of residential and business, and where there is a distinct need for bicycle parking.

On such stretches it makes sense to integrate bicycle parking as part of the overall traffic scheme. For

example, it is possible to use single-sided lane narrowing for bicycle parking, just as a double-sided lane narrowing on a raised surface can be used for the same purpose.

There are many different ways in which bicycle parking can be incorporated into traffic schemes, and in most cases it is only the planner's imagination that sets the limits.

Principal parking solutions for environmental streets



Pedestrian street

Bicycle parking on pedestrian streets is a problem in many places. If bicycle parking facilities are not made available, bicycles will to a greater or lesser extent be placed against shop windows or parked using their kickstands.

This will often look messy. Moreover, the randomly parked bicycles will be very inconvenient for pedestrians.

If bicycle parking is not desired on pedestrian streets,

ets, it is possible to compensate by providing good parking facilities along the adjoining streets, possibly combined with lockers for luggage etc.

Ideally, however, there should be parking facilities for bicycles on pedestrian streets, and this can often be achieved without spoiling the overall street design.

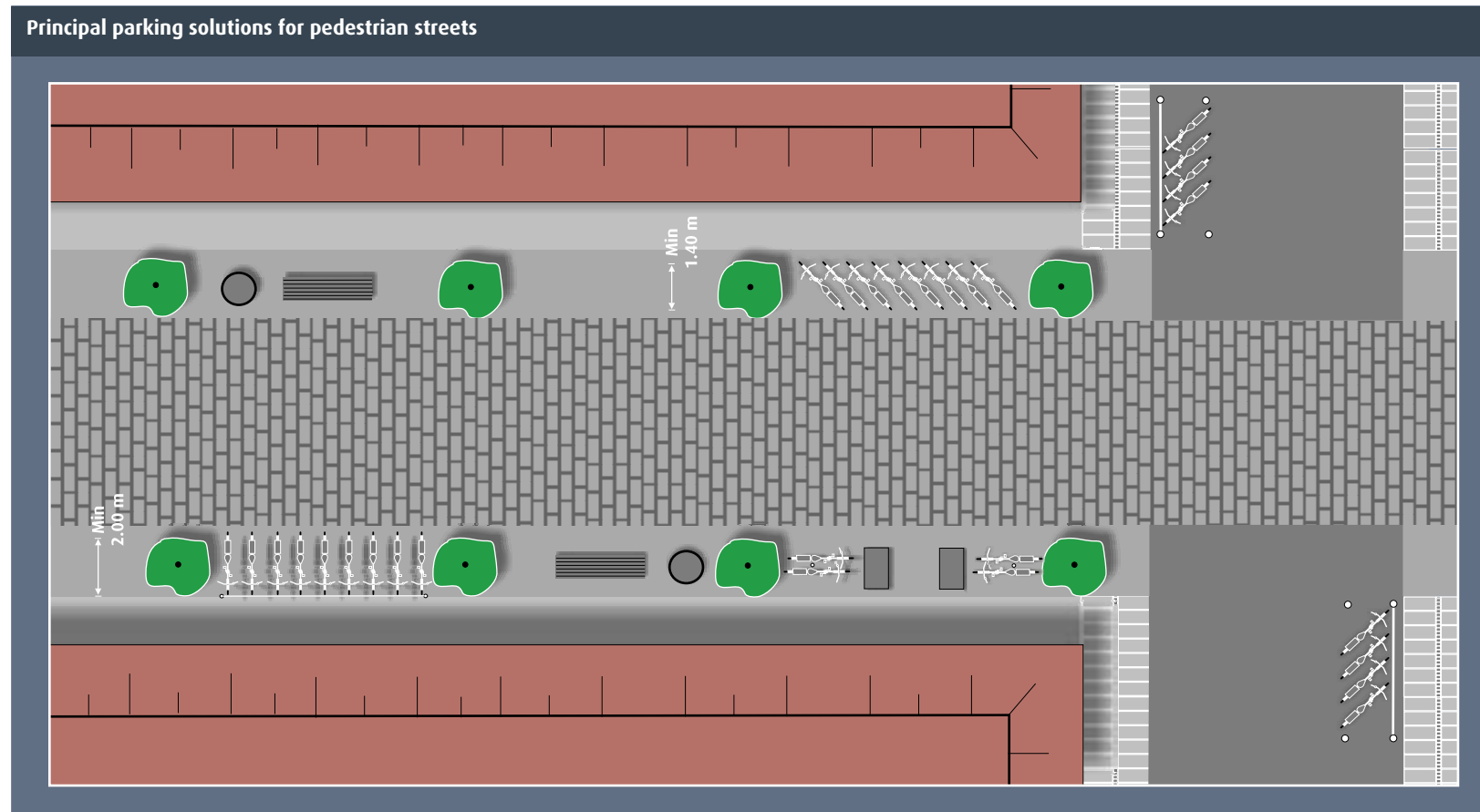
It is recommended that a row of hoop bicycle stands be installed in pedestrian shopping streets. The advantage of hoop stands is that they encourage cyclists to park their bicycles in continuation of the row of bi-

cycle stands when all the stands are occupied. And the stands have the same barrier effect as ordinary stands when they are not being used.

Alternatively, the local authority or the local retailers' association can have a special stand designed with ads. The shops can decorate the stand with their logos or boost their profiles by offering bicycle parking for shoppers.

The stand can also be used by the shop as a delineating element on the pedestrian street.

Principal parking solutions for pedestrian streets



Parking street

Usually, car parking is established as angled parking at an angle of either 60, 45 or 30 degrees.

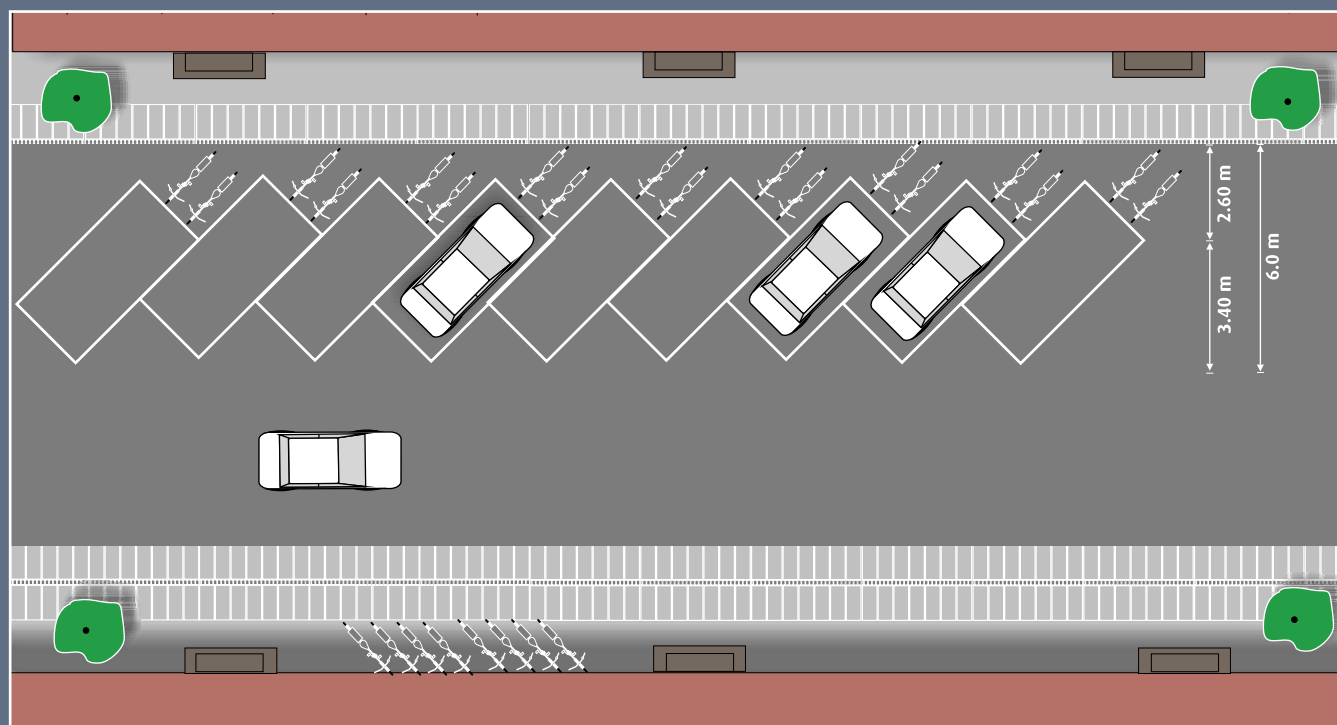
Angled parking results in “wasted areas”, which are then useful for bicycle parking.

In the solution shown – and in addition to the normal space requirements for the parking bay – an additional 1.0 m has been allocated at the end of the bay.

This layout enables two bicycle parking spaces to be established, positioned at a 45 degree angle relative to the pavement.

This arrangement can also be achieved with other types of angled parking, but, generally speaking, it is not advisable to establish bicycle parking with angled parking that is much less than 45 degrees relative to the pavement.

In such cases, manoeuvring a bicycle in and out will be too troublesome.

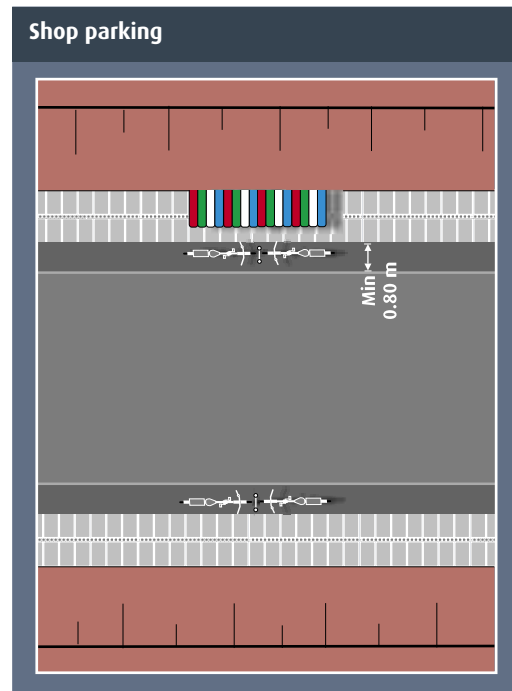
Using surplus areas with 45 degree angled parking

Shopping street

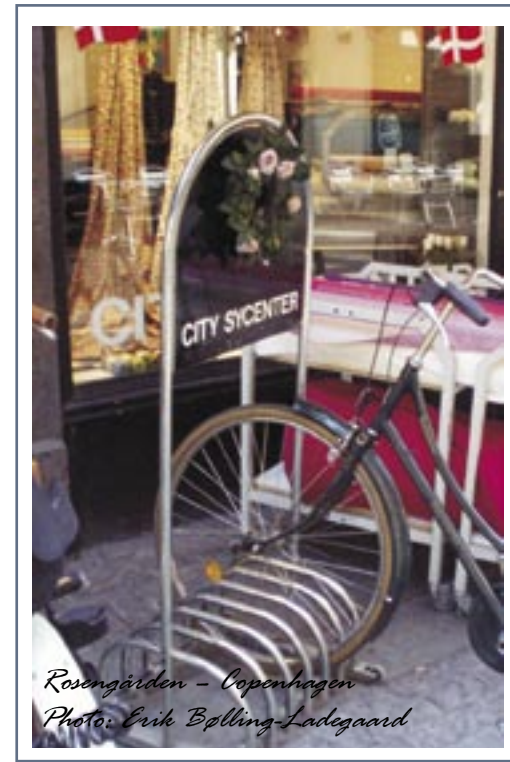
Bicycle parking on shopping streets is characterised by cyclists wanting to place their bicycle as close as possible to the entrance of the shop they are visiting. The bicycle is often parked using its kickstand or up against the shop facade.

Often there will be adequate space for a bicycle stand which can accommodate two bicycles parked lengthways. Two spaces will in most cases be sufficient to meet the needs of small shops with many brief customer visits.

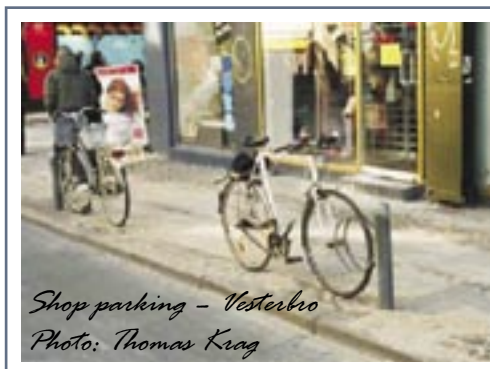
Establishing a combined bicycle parking facility on the highway will probably not be used by shoppers and can therefore not be recommended as a solution for shop parking.



Moveable logo stand for shop parking.



Traditional shop bicycle stand.



Single stands for shop parking do not occupy much space.



2+2 stand for shop parking when space allows.

Inspiration and good examples

In connection with the work on this manual, we have come across a large number of good solutions as well as many examples of the various problems posed by bicycle parking. These problems each illustrate in their own way the application of the basic principles of good bicycle parking which we have described in the manual.

The manual is useful if you are at your desk and working with bicycle parking, but it can also be a great help to leave your office and see how things are in real life.

Therefore, in the last part of the manual, we have decided to show a number of good examples of both Danish and foreign bicycle parking solutions.

Each example is described briefly and supplemented with information about where they can be seen and where it is possible to find additional information

about the respective projects.

Enjoy the tour!

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*German thoroughness
Photo: Mike Bosworth*

Small parking facility

Barcelona – (Spain)

As in other Mediterranean countries, there is a limited number of bicycles on the streets in Spain. Motorbikes and mopeds dominate, and bicycles definitely have the lowest priority in the traffic.

For every 10 bicycle stands, there are about 50 parking spaces for motorcycles and mopeds.

Nevertheless, there are several places in Barcelona where the parking issue has been addressed through the establishment of automatic, underground parking facilities that save space and offer maximum security

for bicycles. The automated parking facility conceals between 26 and 96 bicycles underground without any problem.

On a study trip as part of writing this manual, it was possible to confirm that the facility is well-designed and operates satisfactorily.

A more detailed description of the facility viewed on the study trip can be found in an appendix to the manual.

The report (in danish) can be found at www.cykel-parkering.info.

For more information about the facility, contact the manufacturer at:

ma-SISTEMAS, s.l.

Carretera Nacional 330

Polígono Charlé, Calle 2ª

22700 Jaca (Huesca)

Email: ma-s@biceberg.es

Bicebe



Biceberg in Barcelona

Photo: Mike Bosworth

Inspiration

Medium-sized parking facilities

Kultorvet – Copenhagen

The square Kultorvet in Copenhagen is part of the city's pedestrian street system. It is a rectangular square which you cross diagonally.

The square is lined with an educational institution, shops, offices and restaurants. The shape of the square is emphasised by benches, bollards and litter bins along its four sides. The bicycle stands are discreetly placed behind this street furniture.

During the summer months, the centre of the square is filled with outdoor restaurants, which highlight the diagonal thoroughfare.

Despite the intense level of activity and the many traffic destinations, there is relative harmony in the square, and the parked bicycles neither jar the view nor obstruct the traffic.

The number of parked bicycles normally matches the number of stands.

Further information can be obtained by contacting:

City of Copenhagen

Centre for Traffic
Njalsgade 13
2300 Copenhagen S.

Kultorvet in Copenhagen – discreet and attractive bicycle parking.



*Kultorvet – Copenhagen
Photo: Mike Bosworth*

Egå Gymnasium – Aarhus

The upper-secondary school Egå Gymnasium in Aarhus boasts groundbreaking architecture – and the layout of the bicycle parking follows the rest of the building's detailed design. The County of Aarhus was behind the project, which was designed by CUBO architects.

Basement bicycle parking.

Bicycle parking has been placed in the building's basement. However, entry is at the same level as the access road where, from the local network of bicycle paths, you go in through a gate which automatically opens and provides access to the bicycle parking. From the basement, there is direct access to the gymnasium's foyer.

All bicycles have stands

The layout of the bicycle parking facility is simple and was incorporated from the outset of the project. Small signs near the main entrance prohibit bicycle parking and help to support the good bicycle parking culture.

Further information about the project is available from:

CUBO architects – www.cubo.dk.

The school can be found at Mejlbysvej 4, 8250 Egå – Aarhus.



Photo: Pablo Celis

Egå Gymnasium is a very striking and well-designed building which also incorporates a bicycle parking facility.



Photo: Pablo Celis

The entrance to the bicycle parking facility is clearly marked.



Photo: Pablo Celis

By pressing the entry button, the gate to the parking facility opens automatically.



Photo: Pablo Celis

The basement bicycle park is light and attractive with ample space and good stands.



Photo: Pablo Celis

The area in front of the school is kept free of bicycles with simple signage – and it works.

Large parking facility

Odense Banegårdscenter

At Odense Banegårdscenter, a shopping centre at the city's main railway station, it is possible to park your bicycle in a secure basement bicycle parking facility with CCTV for a small charge. There is space for 250 bicycles.

The basement bicycle park is light and spacious with open passages. Music plays round the clock and ensures that the basement facility never feels unsafe, and during night hours it is well lit.

In addition to the attractive surroundings, the centre offers luggage storage in lockers, water fountains and a toilet which can only be used by people placing their bicycles in the secure parking facility.

The parking facility can be accessed by renting an electronic key card.

For further information, please contact:

Odense Cycle City

Natur, Miljø og Trafik

Nørregade 36-38

5000 Odense C

Email: info@cykelby.dk



*Odense Banegårdscenter
Photo: Troels Andersen*

Open and safe access to basement parking – with CCTV, floor and wall lighting as well as drinking fountains for thirsty cyclists.



*Odense Banegårdscenter
Photo: Troels Andersen*

It is possible to lock your bicycle in the secure bays.



*Odense Banegårdscenter
Photo: Troels Andersen*

Ample space between the stands ensures they are easy to use and popular. Here there is 60 cm between the

Næstved multi-storey bicycle parking facility

The approx. 9,000 residents of Markkvarteret, a district which is relatively isolated in terms of its bicycle and footpaths, have for many years been demanding better access to the city centre and the main railway station.

The Municipality of Næstved therefore established an attractive pedestrian and bicycle bridge to connect the remote district and also built a three-storey bicycle parking facility.

At street level there is secure bicycle parking as well as a small workshop. The second level also offers secure parking, while at roof level there is free parking for bicycles. In all there are 336 lockable bicycle parking spaces and 78 ordinary parking spaces on the roof.

"The little workshop" is leased out to a bicycle mechanic. The tenant's job is to carry out tricky repairs for commuters, assist with parking bikes, administer the rental of parking spaces and hire out bicycles.

In addition, there are plans to introduce a company bicycle scheme whereby companies located in Næstved can have a bicycle standing in the building which is available for employees living outside the city who choose to travel into Næstved by bus or train. This means the bicycle can be kept securely overnight and looked after by the person manning the workshop.

Bicycle parking costs:

1 month – EUR 4

6 months – EUR 15

Key deposit – EUR 8

Further information about the project is available from:

The Municipality of Næstved

Technical and Environmental Administration
Brogade 2
4700 Næstved



*Næstved Pedestrian and Bicycle Bridge
Photo: Anders Gedde Petersen*

Næstved pedestrian and bicycle bridge offers all the cyclists in one particular district easy access to the railway station and the rest of the town. A secure parking facility with a service workshop has been established beside the bridge.



*Næstved Bicycle Bridge
Photo: Municipality of Malmö*

On the roof, a conventional bicycle parking solution has been established with Vekso stands – model NO.



*Næstved Bicycle Bridge
Photo: Municipality of Malmö*

Two-tier parking has been installed at ground level with stands from Steelco, Præstø. Panelling along the sides of the building ensure pleasant lighting.

Højbro Plads – Copenhagen

In 2007, the City of Copenhagen improved bicycle parking at the square Højbro Plads.

The layout of the areas around Amagertorv and Højbro Plads was changed to create space for bicycles, and the project involved setting up new bicycle stands on the areas between Højbro Plads and Amagertorv. At the same time, the number of stands on the western side of the square was increased.

Prior to the refurbishment, almost the entire square was used for bicycle parking despite there being a marked path across the cobbles. Now a two-lane asphalted path has been established instead of the cobbled paving, and this has introduced a real sense of structure.

Further information can be obtained by contacting:

City of Copenhagen

Centre for Traffic

Njalsgade 13

2300 Copenhagen S.



Højbro Plads with new bicycle stands – established in beautiful harmony with the surroundings.



Bicycle parking at Højbro Plads after refurbishment with a new, two-lane bicycle path



Bicycle parking at Højbro Plads with cobbled-stone passage before refurbishment, not an easy square to pass by bicycle.

Bremen – (Germany)

Bremen is considered one of the most bicycle-friendly cities in Germany – the first cycle path network was established as long ago as 1897.

Bremen was the first city in Germany to establish a manned bicycle parking facility at the railway station in 1982.

Bremen also has a bicycle parking plan. Since the plan was published in 1993, the city has taken a targeted approach to setting up good parking facilities – especially parking for bicycles in connection with public transport.

Moreover, Bremen has also taken over a number of multi-storey car parks and converted them into bicycle parks.

Further information can be obtained by contacting:

City of Bremen

Der senator für Bau, Umwelt und Verkehr
Michael Froemming
Email: Mocuba@UMWELT.Bremen.de



*Shop parking
Photo: Wilhelm Hamburger*

The hoop bicycle stand – the Sheffield stand – is used extensively throughout the city.



*Street parking
Photo: Wilhelm Hamburger*

Car parking spaces have also been taken over in Bremen and replaced with bicycle parking.



*Parking at the swimming baths
Photo: Wilhelm Hamburger*

At one of the large swimming pool complexes, a sufficient number of bicycle parking spaces have been estab-



*Parking at bus stop
Photo: Wilhelm Hamburger*

Parking in connection with public transport is of a high standard in Bremen.



*Multi-storey bicycle parking facility
Photo: Albrecht Genzel*

A large parking facility has been established at the main railway station with workshop and bicycle hire.



*Multi-storey bicycle parking facility
Photo: Albrecht Genzel*

The parking facility is on several storeys which are accessed via stairs and ramps for the bicycle.



*Multi-storey bicycle parking facility
Photo: Albrecht Genzel*

In the multi-storey parking facility, a good two-tier system from German manufacturer Josta is used.

Mass parking

Multi-storey bicycle parking facility – Amsterdam (Holland)

This facility must be regarded as something of a tourist attraction in Amsterdam. The sight of thousands of bicycles parked at several levels dominates the townscape at Amsterdam Central Station.

The facility, which is owned by the Municipality of Amsterdam, was built in 2001 as an emergency solution and with a calculated lifetime of five years, while plans for a new multi-storey parking facility inside the station were realised.

Initially, the emergency solution was met by protests from Hotel Ibis, which was worried that it would block

A monument, a tourist attraction and a really good bicycle parking solution.



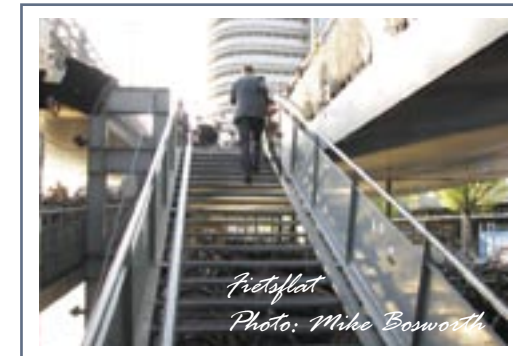
the view of the harbour front from the hotel rooms on that side. However, the hotel has now changed its stance because the facility attracts a lot of attention to the hotel – and the city in general.

The facility was designed to hold 2,500 bicycles, but it is not known how many are actually parked there as the bicycles are packed so tightly that it takes several minutes to get your bicycle out.

Bicycles may be parked at 'Fietsflat' for 28 days. The bicycle must carry a sticker showing the date on which it was parked.



No cycling on the ramps.



You can walk your bicycle up the stairs.



Bicycles are parked incredibly close together.

Lund Cycle City – Sweden

In the university town of Lund in Sweden, more than half of the citizens use their bicycles for trips under 2 km. This entails a strong demand for good bicycle parking facilities.

The Municipality of Lund has been developing its bicycle parking facilities for some time, and a small number of large centres have been established, for example at Lund Station, where the demand for bicycle parking is enormous.

At the station, a large, manned two-storey parking facility has been established inside the terminal with direct access to the local bicycle path network.

Lund has generally devised many interesting covered bicycle parking solutions in connection with public transport terminals and also at minor bus stops.

Further information about Lund Cycle City is available from:

Municipality of Lund

Tekniska Förvaltningen

Gatuchef Håkan Lockby

Byggmästaregatan 4,

222 37 Lund

Email: tekniska.forvaltningen@lund.se



*Parking scheme in Lund
Photo: City of Copenhagen*

Lund has banned bicycle parking in some squares.



*Multi-storey parking facility.
Photo: City of Copenhagen*

Bottom level of the two-storey parking facility.



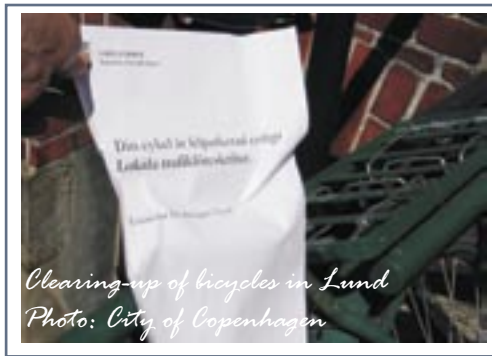
*Multi-storey parking facility.
Photo: Pablo Celis*

CCTV in collaboration with the municipality and the police.



*Multi-storey parking facility.
Photo: City of Copenhagen*

The top floor of the station is used for bicycle parking.



*Clearing-up of bicycles in Lund
Photo: City of Copenhagen*

Parking bans at selected locations are followed up by clearing-up campaigns in Lund.



*Parking with CCTV
Photo: City of Copenhagen*

Descent to well-monitored underground parking facility at Lund Station.

Malmö Station – Sweden

In the cycling city of Malmö, 29% of all trips are made by bicycle.

As many as 40% of trips to and from work are made by bicycle.

A large share of the trips to and from work involve a combination of cycling and public transport, and in Malmö there is a very considerable demand for good and ample bicycle parking spaces at public transport terminals.

The demand for parking spaces is particularly high at Malmö Station, and the local authority has there-

fore decided to establish a very unconventional solution in the form of a pontoon bridge for bicycle parking.

The pontoon bridge is connected with the network of bicycle paths via ramps and provides direct access to the station platforms.

Further information about the system is available from:

Municipality of Malmö

Gatukontoret

Leif Jönsson

Email: leif.jonsson@malmo.se

At Malmö Station the considerable demand for parking has been solved by establishing a pontoon bridge near the platforms.



*Parking on pontoon bridge
Photo: Lars Gemzjö*

NS Fiets – Schiedam (Holland)

NS Fiets is a subsidiary of Nederlands Railways (NS) and is responsible for all bicycle parking facilities at stations in the Netherlands.

The overall philosophy of NS Fiets is that the parking facilities must function as entrances to the stations, not as appendices.

This principle is central to the NS Fiets philosophy. Commuters known to the shop owner can just walk their bicycles through the bicycle shop and through to the parking area reserved for them. If necessary, they can at the same time talk to the shop owner about any repairs required or buy any bicycle accessories they may need.

Other subscribers and day customers must place their bicycles on a rail at one of the two access control channels and produce their subscription card or a chip card, and only once the gates open can they enter the parking area reserved for them.

The card must be used again to exit the parking area – with or without your bicycle.

The advantages of this system are that:

- bicycles are safely parked in an area which is basically protected against theft
- commuters can park without producing ID
- no cash is involved, and the system can handle at least two subscribers and/or users simultaneously.

Further information about the system is available from:

NS Fiets

Jan Van de Kraats

Email: vandekraats@ns.nl

www.ns.nl



Entrance with two main doors, one leading to the manned parking area, and one to the free and unmanned parking area.



The subscription card is read by the system via a sensor.



There are two gates at the entrance to the parking facility, a high one to walk through and a low one for the bicycle.



Parking is in two-tier systems with hoists.

Station – Basel (Switzerland)

In the 1990s, Basel had a problem. The square in front of the station was one large traffic terminal with bus stops for several bus services and with six platforms for a variety of tram lines. And people were everywhere – as were bicycles.

The municipality decided that all parked bicycles should be removed from the square, but this meant that a good alternative had to be found for the cyclists.

As a result of considerable political determination and despite the heavy trams and their platforms etc., a decision was made to invest in a large underground bicycle parking facility immediately beneath the square.

The design problems involved in the large-scale underground facility were considerable, but they were gradually solved, and an architect was involved to create an indoor environment which should be inviting and light and instil a sense of security.

The facility, which accommodates 1,400 bicycles, opened in 2001 and cost CHF 11 million to build.



Underground parking in Switzerland
Photo: Mike Bosworth

Sockets for recharging electrical bicycles are also available.

The facility consists of two areas, both with CCTV – a free area with 750 spaces and a pay area with 650 spaces which is manned 24/7.

In addition to these 1,400 parking spaces, 25 large lockers with space for two bicycles each and 288 small lockers for bicycle gear can be used by inserting a coin in the door.

Moreover, the facility offers special spaces for bicycles with trailers, reclining bicycles and tandems, a number of sockets for recharging electrical bicycles – and bicycle hire, cafés, toilets etc.

The area is also used by pedestrians and skateboarders who pass below the square.

But now a new investment is called for – the 1,400 spaces are not enough.

Membership cards for the pay area, both monthly cards and one-year cards, have long since sold out.



Underground parking in Switzerland
Photo: Mike Bosworth

Even large bicycles are accommodated.

Further information about this solution is available from:

Baudepartment des Kantons Basel-Stadt

Hochbau- und Planungsamt

Att. Barbara Auer

Rittergasse 4

4001 Basel



Underground parking in Switzerland
Photo: Mike Bosworth

Europe's best bicycle parking facility in Switzerland?



Underground parking in Switzerland
Photo: Mike Bosworth

The two ramps from the square above provides direct access to the bicycle parking facility.

Locker Zuid – Amsterdam (Holland)

The bicycle parking facility close to Amsterdam Zuid-WTC station is a good example of Amsterdam's Locker system of manned bicycle parking facilities.

The multi-storey parking facility is open 24/7 and is always manned by two attendants.

The facility is inviting and light, and in addition to 2,500 parking spaces, it offers:

- bicycle repairs
- bicycle hire
- a coffee corner
- toilets

Access to this underground parking facility is via escalators or normal stairs.

These are well signposted at street level. Once you have come down the entrance ramp, you place your bicycle in a free stand.

Cyclists who do not have a membership card issued by the Municipality of Amsterdam and an approved sticker on their bicycle must pay the attendant. The same applies to other services such as toilets and bicycle repairs.

All bicycle stands are 'OPTIMA' Model 155, two-sided, two-tier systems manufactured by Jan Kuipers Nunspeet. This type of stand is very easy to use as a gas cylinder system assists users in lifting the rail with the bicycle.

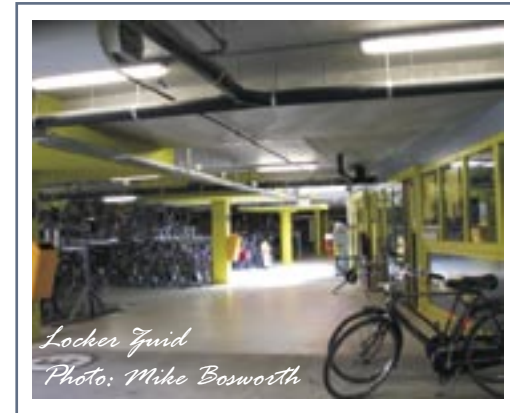
Further information about this solution is available from:

Gemeente Amsterdam

Dienst Infrastructuur Verkeer en Vervoer
Att. Ronald Henriks
Nieuwevaart 5-9
1018 Amsterdam



Locker Zuid
Photo: Mike Bosworth
The entrance area is light and friendly and very inviting – notice the glass roof construction.



Locker Zuid
Photo: Mike Bosworth
The parking facility in the basement is manned and also has a bicycle workshop (visible on the right).



Locker Zuid
Photo: Mike Bosworth
Access is via escalators – cycling down them is not recommended!



Locker Zuid
Photo: Mike Bosworth
Most of the parking is in two-tier systems, and occupancy is good.

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Further information about this solution is available from:

The Danish Cyclists Federation – Copenhagen
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The manual can also be downloaded from www.cykelparkering.info

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