

Bikes on public transport



Bikes on light rail, metro, tram and bus

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1 OBJECTIVE

During 2008, the Flemish passenger association *TreinTramBus*, formerly called *Bond van Trein-, Tram- en Busgebruikers*, did an extensive study for the Flemish government in order to look for an ideal way to take bikes on trams and buses of the regional public transport company De Lijn.

The aim of this paper is derived from this former research and is to identify all the possibilities of taking a bike on light rail, metro, tram and bus, and to make an inventory of present examples. We will look at the attachment of the bike on the vehicle, the perception by users, drivers and public transport companies, the pricing, the different regulation and the communication of these systems.

2 CONTEXT

Public transport and cycling are both durable modes of transport: the negative external effects of public transport/cycling, such as traffic unsafety, economic loss caused by traffic jams and environmental pollution, are significantly smaller than those of car traffic.

On the other hand, both public transport and cycling have specific advantages and disadvantages:

- Public transport is faster than cycling but has less density. The pre- and post-haulage is sometimes considerable. In addition, the passenger is dependant on timetables, where the frequency during transfer is determined by the weakest link: a frequent connection makes no sense if there is an un-frequent connection or amplitude at another part of the travel chain.
- Cycling is very suitable for short distances but for longer trips (more than 10km) it's slower than public transport. Cycling scores weaker than public transport when it comes to road safety.

The combination of public transport and cycling can lead to a good complementarity, using public transport for the long-distance part and cycling for the short-distance pre- and post-haulage part.

3 ATTACHMENT

There is a clear evolution on the inside of public transport vehicles to have multifunctional spaces that can serve more than one goal: passengers can sit on folding chairs, there is enough space for wheelchairs, baby buggies, alternatively bikes, or, when it's crowded, passengers can stand up.

Several systems and mechanisms exist for taking bikes along on public transport. Sometimes there is a space for bikes but no specific system to attach them, and the bike has to be held by hand. Inside vehicles, bikes can either be attached horizontally or vertically, with hooks or belts. In other systems, the bike is attached on the outside of the vehicle, be it at the front or at the back, or there can be a separate trailer.

Those attachment systems depend on the classification of transport chains and the type of vehicle:

- On public transport lines with a long-distance connecting purpose, there is a tendency for the bike attachment systems to be more complicated and safer. When there is a long haul with little stops, it's more likely that there is an intervention of the driver.
- In an urban context, such an intervention of the driver is impossible. There is less time to get on or off the vehicle. This means that bike attachment systems in such a context are usually more straightforward.
- Light rail, metro and tram are more stable than buses, they take less sharp curves and have restrictions concerning differences in height. Holding on to the bike while standing is easier on light rail, metro and tram than on buses.

Hereunder is an overview of the main systems. For a non-descriptive overview, check the attached table.

3.1 Bike carrier at the front of the vehicle

Attaching bikes at the front of the vehicle is fairly common in the United States and Canada. There are different versions of such bike carriers and they offer space for two or three bicycles. In the United States, there are over 50 public transport companies with horizontal bike carriers at the front of the vehicle.

This system has obvious advantages:

- The passenger can immediately see whether the bicycle can be taken along.
- There is less walking around, especially when getting in at the front is compulsory.
- The driver has control and supervision over the bike: when a problem occurs, he can intervene and when the bike carrier is full, he sees it immediately.
- Quick and easy loading and unloading of the bike, by the passenger.
- Bicycles on the bike carrier don't take up any space within the vehicle.



Figure 1: buses of AC Transit, California, US



Figure 2: bus of Metro, Minnesota, US

Even though bike carriers at the front of the vehicle are cheap and easy to implement, they are forbidden in Europe because of traffic safety and protection of soft road users. It is feared that if a collision with a pedestrian should occur, the injury would be too severe.

3.2 Bike carrier at the back of the vehicle

Unlike bike carriers at the front of the vehicle, bike carriers at the back of a vehicle can be either horizontal or vertical.

This system has some clear disadvantages:

- The driver can't see the bikes and hence doesn't know whether they are attached securely or not. A camera could be a solution, but this would mean a larger investment.
- The engine of a bus is normally at the back of the vehicle. When the engine needs to be checked or repaired, the bike carrier is in the way.
- When the weather is bad, the bike can get dirty due to splashing mud.

Because of the problem of intervention and the lack of control by the driver, this system is mainly implemented on longer distance lines, like CarPostal coaches from Postauto in Switzerland or the line Nantes-Noirmoutier in France. In England, the system was used for the collective demand driven service of Connect2Wiltshire (Wigglybus), but has been dismissed because the drivers had to intervene over and over: their clothes got dirty and in the mean time, the vehicle and the money inside the bus were without surveillance.



Figure 3: Line Nantes-Noirmoutier, France



Figure 4: Wigglybus in Wiltshire, UK

3.3 Holding the bike by hand

These systems are mostly implemented on light rail, metro and tram. Normally, the amount of bikes per vehicle or carriage is restricted though, and the bike has to be held onto at a certain place in the vehicle. In NordRheinWestfalen (Germany) for instance, bikes are allowed on some buses and trams, but there is no system aboard to attach them.



Figure 5: tram in Lille, France



Figure 6: bus in Köln, Germany

3.4 Attaching the bike within the vehicle

Attaching bikes within vehicles is seen especially in buses; in trams it's rather rare. This system exists in the Netherlands, on a line between Terneuzen and Goes, under the Westerschelde. In buses, the bikes are normally attached in the dynamic space in the middle of the vehicle, facing the back door, where there is

also space for wheelchairs, baby buggies or larger pieces of luggage. The fastening system is usually a belt also used for wheelchairs. The problem of such a system though is that the bike may come loose during sharp curves. For this reason operator De Lijn in Belgium has a system with belts that can be tied.



Figure 7: line Terneuzen-Goes, the Netherlands



Figure 8: new system from De Lijn, Belgium

3.5 Other systems

Besides the above mentioned methods of attaching, there are several other, less common systems:

- Trailers are frequently used, i.e. in the Netherlands, Germany, Switzerland, Austria and Sweden, for transport over longer distances but only for recreational purposes. This system isn't realistic in an urban context and for a normal service, because it requires not only a time-consuming intervention on the part of the driver, but also larger bus stops.
- A separate space inside the bus, like in Chambéry, France, is uncommon and more expensive than allowing bicycles at the dynamic space in the middle of the bus.
- A vertical attachment inside the vehicle, with a hook, is another possibility, but is considered difficult for elderly and/or weaker passengers. Also, more time is needed to stall the vehicle, which makes this system less interesting for shorter distances. Therefore, this system is more common on trains (e.g. in Switzerland) than on buses or trams.



Figure 9: Carpostal Postauto coach, Switzerland



Figure 10: bus in Chambéry, France

4 PERCEPTION

4.1 Users

Public transport users react positively as well as negatively:

Negative reactions are mainly the result of the fear that cyclists will overburden the already overcrowded vehicles, and that the number of seats will diminish. Some people also fear disagreements between other passengers and cyclists, between cyclists and travellers with a wheelchair, or between cyclists and travellers with children's buggies. Others fear that bikes, especially their chains, will damage or stain the interior of the vehicle and the clothes of other travellers. Finally, it is seen as an absurdity that cyclists would ride a bus: cyclists are supposed to be riding their bicycles!

Other public transport users consider the combination of bicycles and public transport as an opportunity. Besides their complementarity, which can help to increase travel speed, other factors may also play a role: bad weather, slopes, a feeling of unsafety in the evening or at night, bike defects, fatigue, infrastructural barriers for bikers, traffic density and traffic unsafety on the road, ... all of which factors can of course also co-occur.

4.2 Drivers

The drivers' reactions are mostly negative. They fear that getting bikes on and off the vehicle will mean more work for equal pay, delays at the stops, ... They also fear that they will be considered liable when bikes are damaged.

In the United States, it was shown that public transport unions as well as individual drivers got a more positive attitude towards the idea of taking bikes on public transport, as they learned more about the system.¹ Therefore, it is important to make it clear to the drivers that they are not expected to intervene, and that they are not liable should any accidents occur. Damage to the bikes should be avoided by using a good fastening system, in which the bikes are firmly held, so that they don't start moving when the vehicle brakes.

4.3 Public transport companies

Public transport companies usually consider the combination of bikes and public transport as a way of attracting extra customers during the off-peak hours. At the same time, they consider it a means of publicity, to boost their public image in the eyes of their customers.

¹ Transit Cooperative Research Program (TCRP), 2005, pp. 21-22.

5 COSTS

5.1 Users

In most cases, taking a bike along on a tram or bus is free. If not, the fee that has to be paid fluctuates between 1€ and 5€ per ride. In that case, most of the time, an extra ticket has to be bought, either a normal ticket, a special bike ticket or a ticket which normally serves another purpose, e.g. a youth ticket.

For more details about the costs per ride, check the table in attachment.

5.2 Public transport companies

The cost for public transport companies remains limited. The cost of installing bike carriers at the front or at the back of buses lies between 500€ and 1000€ per bike carrier. Systems such as hooks or rails at the inside of the vehicles cost less than 500€ per piece.

In case of a normal, horizontal attachment of the bike on the inside of the vehicle, one should consider that nowadays, trams and buses have a lot more multi-functional, dynamic spaces than they used to. Those dynamic spaces can be used for bikes, but also for children's buggies, and there is room for three folding chairs. This means a supplementary cost to allow bikes on the bus is infra-structurally non-existent. When simple systems for fastening bikes are applied, such as belts, they cost less than 200€ a piece. The personnel expenses for maintenance are also manageable.

6 REGULATION

In order to avoid conflicts among passengers, or between passengers and staff, as well as to ensure the travellers' comfort, regulations have been created to restrict the free entrance of bikes into vehicles or buildings. These limitations are sometimes, though not always, translated into a clear set of rules. Even though these restrictions are often logical and well-considered, public transport companies need to avoid *too* many rules, so that there is no confusion about what's allowed and what's not.

The most common restrictions can clearly be divided into three categories: infrastructural restrictions, time restrictions and subjective restrictions.

6.1 Infrastructural restrictions

Not every vehicle, nor every infrastructure, is equally well-equipped for taking along a bike. Sometimes, only a limited number of bikes per vehicle is allowed, or stalling bikes is limited to a few places in the vehicle or carriage. The most common infrastructural restrictions are:

- no cycling on platforms
- no bikes allowed on escalators or in elevators
- bikes allowed only in certain vehicles
- only regular bikes allowed, no tandems, tricycles, unicycles, electrical bikes or bikes with wheels of more than a certain diameter
- a specific place in the vehicle to stall the bike

- a limited number of bikes allowed
- the passenger needs to stay with his/her bike.

6.2 Time restrictions

Because vehicles are often overcrowded during rush hour, and because public transport companies want to avoid conflicts caused by this, bikes are often not allowed during peak hour. In European countries, bikes are usually allowed from 9 a.m. until 4 p.m. and then again from 6 or 7 p.m. onwards. Sometimes, bikes are allowed only during the evening rush hour, when traffic is less dense than in the morning. (Check the table below.)

Such restrictions immediately show the main purpose of taking a bike along on public transport: more often than not, those systems are not suited for commuter traffic. This *recreative reflex* is seen on the weekend, when bikes are always allowed.

	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Brussels, Belgium	Green	Red	Red	Red	Green	Green	Green	Green	Green	Green	Red	Red	Red	Green
Lille, France	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
NordRheinWestfa- len: AVV, Germany	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Green
NordRheinWestfa- len: VRS, Germany	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
NordRheinWestfa- len: VRR, Germany	Red	Red	Red	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Rotterdam (metro), the Netherlands	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Green
London metro, UK	Green	Green	Red	Red	Red	Green	Green	Green	Green	Green	Red	Red	Red	Green
Washington metro, US	Green	Red	Red	Red	Red	Green	Green	Green	Green	Green	Red	Red	Red	Green

Table 1: time restrictions with other public transport companies

These time restrictions offer some protection against conflicts between ordinary travellers and passengers with a bicycle, but they do not prevent every possible disagreement. Sometimes, buses or trams are crowded even during off-peak hours (e.g. some weekend lines, student commuters on Sundays, big events).

6.3 Subjective restrictions

Unlike the above mentioned – objective – criteria, there are also several subjective restrictions, such as “priority to ordinary passengers”, “priority to travellers with a wheelchair and travellers with children’s buggies”, or “according to the driver’s judgment”. Those are mainly behavioural rules that cannot be measured.

6.4 Self-regulation?

The whole issue can also be looked at from another point of view, based on the question: “will a passenger with a bike hop on just any bus?” The answer to this question is obviously no. In Düsseldorf, for example, where bikes are allowed on all public transport vehicles, we hardly saw any bikes on metro, tram or bus. Both metro and tram were of an older type, not easily accessible, and the bus is probably slower than a bike in the city during rush hour. In Köln, on the other hand, where there is also a tram, but more of a light rail type, we saw up to five cyclists per carriage.

7 COMMUNICATION

The systems for taking a bike on public transport are communicated to the public by means of flyers and publicity on the website. On railway platforms or in shelters at bus/tram/metro stops, this information is sometimes repeated.

Vehicles in which bikes are allowed, usually have a bike logo on the door, alternatively the number of bikes allowed is also mentioned. Within the vehicle or carriage we then notice yellow-black bike logos on the floor, on the spot where the bike has to be stalled.



Figure 11 shows a yellow timetable board for Die Bahn. It lists various train services with their departure times and destinations. A small bicycle logo is visible on the board, indicating bike-friendly services. The board is divided into sections for different routes and services.

Time	Service	Destinations
11:28	8	Köln 14:15 - Siegburg/Bonn 14:34 - Limburg Süd 15:00 - Frankfurt(M) Flughafen Fernbf 15:22 - Frankfurt(Main)Hbf 15:40
13:49	RE 1	NRW-Express
10125		Köln Hbf 14:42 - Düsseldorf 15:21 - Düsseldorf Flughafen 15:28 - Duisburg 15:37 - Dortmund 16:15 - Hamm 16:40
14:00	14:02	euregiobahn
		Aachen West 14:07 - Herzogenrath 14:18 - HZ-August-Schmidt-Platz 14:23 - Alsdorf-Annapark 14:30
		euregiobahn
		Stolberg Hbf 14:13 - Zugteilung in Stolberg Hbf 14:23 - RB 8919 - Eschweiler 14:28 - Weisweiler 14:28

Figure 11: timetables of Die Bahn with bike logos



Figure 12: metro in Brussels, Belgium, outside

In some cases, for instance in Lille, publicity in the vehicle itself campaigns for and promotes the use of bicycles in combination with public transport.



Figure 13: metro in Brussels, Belgium, inside



Figure 14: communication in tram, Lille, France

8 ROLE OF BIKES ON URBAN PUBLIC TRANSPORT

The role of bikes on urban public transport can be significant but it depends on the classification of the transport chain and the type of vehicle.

Rail vehicles like light rail, metro and tram are stable, spacious and normally easily accessible. These types of vehicles often connect places, which means the combination with bikes is complementary, where the bike is used for pre- or post-haulage. Buses on the contrary are less stable, less spacious, less accessible and often fulfill transport in certain districts of cities, in addition to the main lines operated by the rail vehicles. This means biking instead of taking the bike on the bus is often the smartest choice.

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Place		Vehicle				Attachment								When					Cost				Description		
Country	Region / Town	Coach	Metro	Tram	Bus	Inside				Outside				Always	In season	Off-peak	Counterpeak	Only on the weekend	Only Sundays / holidays	Free	Extra ticket (regular)	Extra ticket (bike)	Extra ticket (special)	Price	Remarks
						Hand	Belt	Carrier horizontal	Carrier vertical	Separate space	Indicated	Carrier vertical	Carrier horizontal back												
Belgium	Flanders: coastal tram			x		x								x							x		2,00 €		
Belgium	Antwerp: Lillobridge				x				?					x									€ -	Dismissed	
Belgium	Brussels		x	x		x								x									€ -		
Belgium	Walloon provinces				x				?								x						€ ?		
Netherlands	Amsterdam		x	x		x								x									x	1,00 €	
Netherlands	Cycletours	x																					x	Variabel	
Netherlands	Veluwe				x		x								x								x	5,00 €	Dismissed
Netherlands	Rotterdam: RET		x			x									x								x	€ -	
Netherlands	Westerscheldetunnel				x		x							x									x	2,20 €	
Luxemburg	Luxemburg city				x	x								x									x		
France	Lille			x		x								x									x	€ -	
France	Maubeuge-Fourmies				x				?														x	€ -	On some buses
France	Orléans			x		x									x									€ ?	Maximum 4 bikes
France	Nantes-Nourmoutier	x																						€ ?	On 5 buses
France	Calvados				x				?					x										€ -	
France	Gironde																						x	3,00 €	When enough space in luggage area

Place		Vehicle				Attachment								When					Cost				Description				
Country	Region / Town	Coach	Metro	Tram	Bus	Hand	Belt	Inside				Outside				Always	In season	Off-peak	Counterpeak	Only on the weekend	Only Sundays / holidays	Free	Extra ticket (regular)	Extra ticket (bike)	Extra ticket (special)	Price	Remarks
								Carrier horizontal	Carrier vertical	Separate space	Indicated	Carrier vertical	Carrier horizontal back	Carrier horizontal front	Trailer												
France	Bordeaux			x		x								x							x						
France	Annecy	x													x								x			5,00 €	
France	Chambéry				x					x	x	x		x													
France	Strasbourg			x		x										x						x				?	
France	La Rochelle	x													x											?	
France	Rouen				x	x																				?	
Germany	Aachen				x									x									x			5,00 €	
Germany	Berlin		x	x		x								x									x			Variabel	
Germany	RegioRadler	x								x				x	x								x			Variabel	
Germany	SBG Radbus	x											x		x									x		3,00 €	
Germany	Bike bus Bentheim					x										x								x		1,20 €	Aims at tourists
Germany	NordRheinWestfalen		x	x	x	x									x									x		3,50 €	
Germany	Bielefeld			x	x										x									x		1,20 €	
UK	London		x														x	x				x				- €	Not in deep sections of the subway
UK	Wigglybus Kennet				x								x									x				- €	Dismissed
Switzerland	Carpostal	x											x										x			3,71 €	
Switzerland	Geneva				x	x									x								x			?	
Switzerland	Zürich			x	x										x									x		?	
Switzerland	Sankt-Gallen															x									x	1,85 €	

