



## Promoting Cycling for Everyone as a Daily Transport Mode



Cycling: a daily transport  
mode for everyone

Improving cycling  
culture in cities

Training Reader – 3<sup>rd</sup> PRESTO on-site training session  
Transnational Training in Zagreb, 8-9.12.2010



INTELLIGENT ENERGY  
EUROPE





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## 1. Introduction

The on-site training session in Zagreb was the third PRESTO session out of a series of five training sessions to be run within the project until summer 2011. The event took place on 8 and 9 December 2010 in the Old City Hall of Zagreb, Croatia. PRESTO partners, local stakeholders, urban planners, representative from the industry and bicycle dealers took part in the session. One site visit on foot opened the working session offering a broader overview of existing cycling infrastructure in Zagreb. Participants of this training session in Zagreb had the opportunity to find out best practices and exchange ideas with European specialists on the following topics:

- Integration of cycling with public transport
- Safe cycling campaigns and promotion campaigns
- Cycling in pedestrian areas and shared spaces
- Pedelects promotion

The PRESTO training sessions broadened participants' knowledge on existing good solutions from various European countries as regards the integration of cycling and public transport by means of accessible parking and bike storage facilities at interchange stations (i.e. train stations, bus and tram stops); how to develop sound shared spaces taking into account good public space design, a friendly urban environment and different road users' needs (pedestrians, cyclists, car drivers, public transport); how to promote safe cycling and implement promotion campaigns addressing diverse target groups (children, employees, seniors). The last session focused on the market, regulation and technical aspects of pedelecs.

On the first day, Mr Michał Beim from "Imove - Institute for Mobility & Transport Kaiserslautern, University of Technology" gave a presentation on interchange bicycle stations, making use of numerous good practice (and also some bad examples) across Europe but mainly from German cities and from his home country Poland. 11 trainees took part in the training session. In the afternoon Ms Jo Cleary (Cleary Stevens Consulting, UK) offered an overview of safe and promotion campaigns in the UK and the "Safety in Numbers" campaign supported by CTC, the UK's National Cyclists' Organisation. The presentation featured a number of very good pictures which show how natural, easy and also stylish cycling is. The session was attended by 14 participants. The second day's morning session was devoted to the topic "Cycling in pedestrian areas and shared spaces", in particular to the coexistence of cars and bicycles, as well as to shared spaces in pedestrian areas. The presentation given by Mr Michał Beim was attended by a total of 12 participants. The last session featured a presentation by Mr Eddie Eccleston who gave an extensive overview of regulation and technical aspects of pedelecs. The last session was attended by 7 trainees.

All sessions were also attended by technical representatives of the PRESTO cities of Tczew and Grenoble, as well as two representatives from ADFC Bremen.

The present training reader constitutes a post-meeting compilation of the sessions' contents, discussions and main results. It is to provide a brief but comprehensive summary of this third transnational PRESTO on-site training session in Zagreb. In this way, stakeholders which were not able to attend the sessions can follow up the training.

The reader is a part of a complete on-site training package consisting of the trainers' presentations, an executive summary as an overview of the training and working sessions (available in English, French, German, Italian, Croatian and Polish) as well as further external material related to the presented topics.



## 2. Training programme

### Day 1: Wednesday, 8<sup>th</sup> December 2010

<i>From</i>	<i>To</i>	<i>Topic</i>	<i>Leader</i>
09.00	09.30	Get together, registration and coffee	
09:30	10:00	Opening and Press conference	City of Zagreb, Rupprecht Consult, ECF
10:00	10:15	The PRESTO project: Promoting cycling as a daily transport mode	Rupprecht Consult
10:15	11:30	Site visit – Sightseeing of historical core and the City centre (starting point at Old City Hall)	
11:30	13:00	Site visit (on foot) – Bicycle infrastructure in the City centre area (starting point )	
13.00	14.00	Lunch break (Old City Hall)	
14.00	16.30	Integration of cycling with public transport	Michał Beim University of Kaiserslautern (DE)
16:30	17:00	Summary session	City of Zagreb

### Day 2, Thursday, 9<sup>th</sup> December 2010

<i>From</i>	<i>To</i>	<i>Topic</i>	<i>Leader</i>
09.00	11.30	Safe cycling campaigns and promotion campaigns	Jo Cleary Cleary Stevens Consulting (UK)
11:30	11:45	Break	
11.45	13.00	Cycling in pedestrian areas (shared spaces) (part 1)	Michał Beim University of Kaiserslautern (DE)
13:00	14:00	Lunch break	

14:00	15:00	Cycling in pedestrian areas (shared spaces) (part 2)	Michał Beim University of Kaiserslautern (DE)
15:00	15:15	Break	
15.15	17:30	Pedelecs promotion	Eddie Eccleston (BE)
17:30	18:00	Summary session	City of Zagreb, Rupprecht Consult, ECF





### 3. Bicycle infrastructure and Public Transport

#### 3.1. Topic 1: Integration of cycling with Public Transport

*Michał Beim, post-doc researcher, Imove - Institute for Mobility & Transport Kaiserslautern, University of Technology (Germany).*

The PRESTO project has produced a number of policy guides and fact sheets dealing with cycling infrastructure. They present a coherent digest of the state of the art in cycling infrastructure. Particularly a number of Fact Sheets focus on parking solutions. The training session led by Michał Beim offered an overview of interchange bicycle stations also covered by the PRESTO material.

Integration of cycling with public transport can provide a viable alternative to private car for many medium and long distance journeys. Yet potential of encouraging cycling to and from public transport stops is underestimated, although public transport operators and authorities have changed their approach and more often have undertaken initiatives to create new “Bike & Ride” parking lots, to integrate with public cycle hire schemes etc.

#### The philosophy of public transport

Transport plays a significant role in everyday's life of modern societies. The importance of public transport depends on the model chosen by planners, politicians and citizens. To choose this model they need to answer the question which is often lost in the debate about public transport: **who has used public transport?**

The answer implies the role of public transport in local developments. The world clashes with two visions of public transportation:

- ▶ "something" for the poorest, with a complicated ticketing system (e.g. monthly tickets valid only on weekdays, distinction in price between regular and "express" communication), rare tact, unclear lines running;
- ▶ an essential tool of mobility with a clear system; numerous privileges for holders of season tickets (e.g. family and friends on weekends can travel free of charge) complemented by the integration with bicycles and cars (car sharing).

The modern, successful public transport systems have to guarantee flexibility and coverage of all urban areas. It is very difficult to do that using the classical modes of public transport like buses, trams, metro or suburban rails. The need for flexibility is an impulse to search for new solution. One of them is **integration with bicycles**.

The benefits of integration are not visible only in urban areas. In some cases, like in low populated rural areas it is relatively difficult to ensure satisfactory levels of service. Bicycle usage creates the possibility to extend the influence of public transport. The easiest way is to provide “**Bike & Ride**” parking lots, but in some regions (e.g. Saarland in Germany) a number of initiatives have been undertaken such as bicycle hire schemes for visitors arriving to small towns or villages. These could fulfill mobility gaps caused by the lack or the poor offer of regional or local buses.

Generally speaking, new economy conditions and town planning cause new mobility cultures. As a result of the changes, nowadays more and more journeys are multimodal but yet the meaning of exchange is underestimated. Givoni and Banister (2010) write *“It is the total travel experience that counts and integrated transport must reduce the inconvenience of transfers between modes. Most*

*research and many publications on transport policy advocate sustainable transport, but the priority given to integration has been negligible. Yet integration is one of the most important means to advance sustainable transport and sustainability more generally."*

### Characteristics of cycling to or from public transport stops

The main objective of integration with bicycles is to fulfill the gaps in access to public transport infrastructure, particularly rail.

The time (or distance) to reach public transport depends on the mode of transport. It is assumed that pedestrians are willing to reach the rail station up to 500 m, tram stop up to 400 m and bus stop up to 300 m. The differences are caused by the feeling of stability, speed and convenience of public transport mode.

The average speed of the cyclist is nearly 4 times higher than the pedestrian. Proportionally increases the distance that can be reached at a time but catchment area increases geometrically – 16 times (see fig. 1). Additionally, according to Krygsman et al. (2004) cyclists tend to devote more time to reach PT stops than pedestrians. It all makes the integration with bicycle very attractive for public transport authorities (or operators).

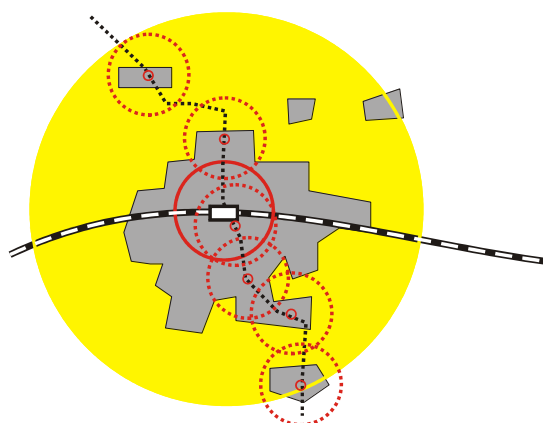


Figure 1  
Catchment area of rail station – walking distance (red),  
cycling distance (yellow) and feeder buses (red, dotted line)  
Source: own compilation

German or Dutch observations bring evidence that the number of passengers cycling to “Park & Ride” stations is only partly depending on weather conditions. Only about 20-40% of cyclists give up cycling to stations during rain or snow.

### Types of integration

The integration of public transport and bicycles can be done on two main levels: business model and technical solutions (see fig. 2).

- ▶ The business model means the economic (tariff) solutions like free guarded bicycle parking places for commuters having yearly or monthly tickets, allowances for public bicycles etc.
- ▶ The functional integration means special technical solutions like different types of parking places for bicycles, technical solution of bicycle carriage on public transport or various bicycle hire schemes.

These both levels of integration are significant for successful systems.



Figure 2

Travelling by public transport and opportunities for integration with bikes  
Source: own compilation

During the transport chain from home to workplace there are **three main possibilities to integrate bicycle with public transport** (see fig. 3). The most popular is the access by bicycle from home to public transport stops. It requires “Park & Ride” parking lots or bicycle stations.

The trip consisting of bicycle ride from home to public transport stop, bicycle carriage on public transport vehicles and bicycle ride from the stop to workplace requires high capacity of the fleet and is generally the most expensive and unwanted solution for public transport authorities (or operators).

The third solution is to walk from home to PT stop, take the public transport and then use the bicycle to workplace. This way of commuting requires relatively safe and comfortable conditions of bicycle parking at public transport stops. Bicycles stay there most of the time – during off-work hours. The owners have to be convinced of these parking lots.

It has been observed that commuters having two bicycles only exist in countries characterized by advanced bicycle or mobility cultures. One bike for a trip from home to public transport stop and a second one for trips from PT stop to workplace.

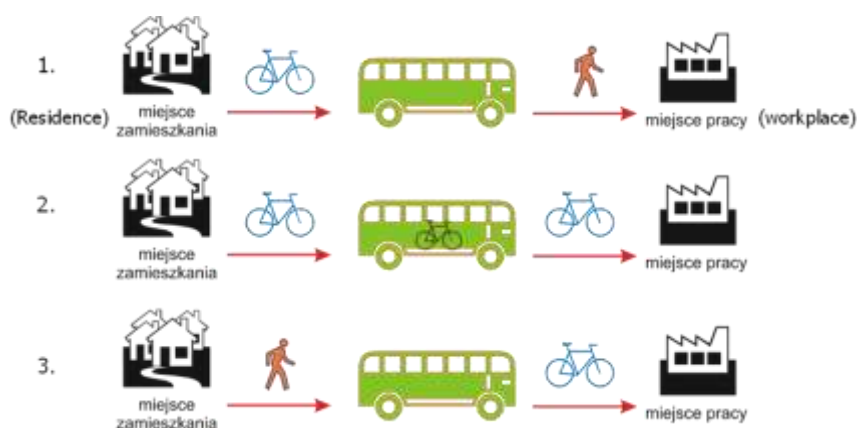


Figure 3

Travelling by public transport and opportunities for integration with bicycles  
Source: own compilation



### a) Bicycle carriage on public transport

The most controversial form of integration of bicycle transport with public transport is carriage on buses, trams or trains. The main problem is space demand in means of transport. Usually there is no place left during rush hours. It limits bicycle carriage to off-peak hours and weekends. As a result bicycle carriage plays a role only for tourism not for daily commuting. This should be an impulse for public transport operators (or authorities) to put more stress on “Bike & Ride” parking lots or bicycle hire schemes rather than on commuters bicycle carriage.

Approaches to carriage of bicycles on PT should be based on local conditions, such as the demand for this type of service and the carrier’s possibility. Following elements of this policy could be highlighted:

#### a) legal conditions:

- ▶ allowing for carriage;
- ▶ carriage only during off-peak hours;
- ▶ carriage only in special situation (e.g. sudden changes in weather);
- ▶ non-carriage;

#### b) way of payment:

- ▶ payment for carriage;
- ▶ free carriage only during off-peak hours;
- ▶ free carriage during whole day;
- ▶ possibility to buy subscription (e.g. monthly ticket for bicycle);

#### c) technical solutions:

- ▶ in the middle of the vehicle;
- ▶ in special luggage storage.

Additional problems are caused by the European law on type approval of vehicles. In the European Union the bicycle racks at bus front panel of urban buses are prohibited. Only bicycle racks on the backside of the bus are allowed. This solution is neither safe (bus driver does not observe bicycle and these could be stolen when the bus stops) nor comfortable and safe (bus driver cannot observe how much time is needed to put the bicycle in the racks). As a result, this solution is used in practice only in regional buses having limited number of stops (see photo 1), barely in urban or suburban buses.



Photo 1

A shuttle bus equipped to carry bicycles. Wittenberg (Germany), 2005.  
Photo source: Michał Beim

## b) Bike & Ride

"Bike & Ride" is a parking lot located near PT stations, which allows you to continue your trip by public transport. This consists of bicycle racks, usually roofed.

"Bike & Ride" solutions have many advantages, the most important of them are:

- ▶ extension of catchment area of public transport stops;
- ▶ low cost of implementation and maintenance;
- ▶ promoting environmentally friendly forms of transport.

But "Bike & Ride" systems, similar to "Park & Ride", have one important disadvantage:

- ▶ they are competitors in relation to the feeder buses, to train or tram stop, making commuting in the opposite direction have poorer access (e.g. from the centre to the suburbs).

Parking lots "Bike & Ride" usually do not provide complete security of abandoned bicycles. They should give possibility to lock the bicycle frame (not only a wheel). Good "Bike & Ride" lots are monitored by CCTV.



Photo 2  
Bike lockers in Grenoble (France), 2009.  
Photo source: Anna Peichert

More advanced and safer version of "Bike & Ride" are "**lockers**". These are special boxes in which each bike is held separately, or a room with electronic access control for a few where dozens of bicycles can be stored. The business model of "lockers" bases on paid usage while the simple "Bike & Ride" parking lots are free of charge.



Photo 3  
"Park & Ride" close to tram stop in Freiburg im Breisgau (Germany) – the roof covers about half the parking spots.  
Photo source: Michał Beim

"Bike & Ride" should be located close to the platform or the entrance to the hall of the station. The place should be easily seen by passengers, services etc. because it reduces the risk of theft and vandalisms. Also the good esthetic of the place improves the feeling of safety.

### c) Bicycle stations as centers of mobility

The most advanced form of integration is **bicycle station**. They are located on main interchange points and they are more than “Bike & Ride”. The main functions of bicycle stations are:

- ▶ guarded, paid bicycle parking (usually most of the parking places);
- ▶ unguarded and free of charge bicycle parking (usually only a few places);
- ▶ information point on cycling, public transport and tourism;
- ▶ ticket machines selling tickets for local, regional and long-distance public transport;
- ▶ bicycle shops and services;
- ▶ other services, especially catering (i.e. café, restaurants);
- ▶ offices of NGO's involved in bicycle transport.

There are different business models of bicycle stations. Usually they are founded by municipalities or public transport operators (or authorities) but the costs of operation and maintenance are covered by parking fees and rentals paid by shops, restaurants.



Photo 3  
A bicycle station located close to main rail station in Kiel (Germany), 2010.  
Photo source: Michał Beim

### d) Bicycle hire schemas

Bicycle hire schemas are increasingly popular and diverse. **Public bicycles** are a mobility service, mainly useful in urban environment for proximity travels. However there are some programs to implement them in rural areas (e.g. SaaRad in Saarland (Germany), project led by the Institute of Mobility and Transport of the Technical University in Kaiserslautern).

Bicycle hire schemas not only establish the flexibility guaranteed by densely located stations, but they remove also three difficulties of daily cycling use: home parking, theft and maintenance of your private bicycle.



There are **four major models** of bicycle hire schemas:

**Traditional**, manual bicycle hire schemas are becoming increasingly rare. They are safe and easy to establish, but the costs to run are high. The flexibility (location of points) is strongly limited, manual identification and manual unlocking (giving) bicycles takes relatively much time. This type of bicycle hire is been still very popular in touristic destinations, in cities as well as in the country.



Photo 4  
Copenhagen model in Copenhagen (Denmark), 2008.  
Photo source: Florinda Boschetti

**“Copenhagen model”**, with coin-operated locking mechanisms (similar to shopping carts). The user has to pay a small deposit by inserting a coin, which is returned if and when the user returns the bicycle to designated bicycle racks. The motivation behind the deposit systems is not theft deterrent (the bicycle is worth significantly more than the deposit), but to avoid damage done by abandoned bicycles and to reduce the expense of employees having to gather bicycle that are not returned. This system requests the milieu of trust; it can be applied only in cities, towns or villages where the vandalism or theft rate is very low. It is the cheapest system of public bicycles.

**Automatic systems with docking stations.** The stations are equipped with an automatic rental terminal and stands for several bicycles. Users have to be registered. Each user is identified by a card (FRID, chip or magnetic card) and a PIN code. Some systems are open for credit card owners, they do not need to register but the certain amount of money is blocked on the card. After identification the bicycle rack unlock one bicycle. Most of the system has special microprocessors in the bicycle's frame which is responsible for the check-up; broken bicycles are blocked automatically. The business model of bicycles is usually connected with local public transport systems, e.g. monthly tickets' owners have first 30 minutes ride for free.



Photo 5  
Public bike scheme in Stockholm (Sweden), 2008.  
Photo source: Florinda Boschetti



Photo 5  
“Call a Bike” - Public bikes, Deutsche Bahn in Cologne (Germany), 2004.  
Photo source: Michał Beim

**“Call-a-Bike”** is the most advanced bike hire system run by a daughter company of Deutsche Bahn (German Railways). The system is operated in several German cities (e.g. Berlin, Munich, Karlsruhe), but in some of them it is not connected with bicycle racks (docking station). “Call-a-Bike” bases on a system of authentication codes to lock and unlock bikes automatically. The user has to be registered previously to the system and must call a telephone number given on the bicycle (every bicycle has a different number) to give the bicycle's ID. Then receives by voice the 4-digit opening code, which needs to be typed onto the bicycle touch screen to unlock it. Similar procedure applies when returning the bicycle. Smart phone applications simplify this process by obviating the need for calls. Bicycles have to be left on corners of a street, within a certain area. One minute ride costs 0,08 EUR. Steady customers of German Railways (owners of BahnCard) get a reduced price. The system is relatively expensive; producing one bicycle is ca. 1,000 EUR.



## Summary

Integration of public transport and bicycles has a big potential to raising the importance of “ecomobility”. Although in many countries numerous researches or pilot projects are conducted on how public transport authorities (or operators) could improve their existing services and rise the number of passengers by developing new bicycle and public transport services. So far the role of multimodality has been underestimated.

“Bike & Ride”, bicycle stations or public bicycles should be more of interest to public transport authorities (or operators) than to NGO’s, because the main benefits have been achieved by public transport. This integration benefits not only public transport, but represents an important step towards meeting the principles of sustainable transport and a new mobility culture.

The Western European experiences show that the investments in infrastructure for interchange points are usually understated. The demand for bicycle parking lots and the usage of bicycle hire schemas is bigger than it was predicted. This is the reason why public transport authorities (or companies) should be careful with bicycle carriage on buses, trams or trains. The fast growing number of bicycles on public transport vehicles can spoil the reputation of cyclists and discourage passengers from using public transport. At the moment, European regulations prohibit the public transport operators from installing bicycle racks at front panels of buses, which could be the easiest solution.

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## Training conclusions

The participants defined the following conclusions resulting from the training session, the discussion as well as the site visits in Zagreb:

- Prepare legal conditions and introduce standards for cycling infrastructure
- Create parking facilities where people leave their bicycles
- Consider bicycle parking in all new investments (housing, PT stations etc.)
- Do not take away space from pedestrians to create cycling infrastructure, but from cars
- Public bicycle schemes act as gap filler between individual motorized and public transport
- Europe should use good examples and figures from the USA and Canada to abolish the EU law which prohibits bus bicycle carriage systems

## 4. Promotion of urban cycling

### 5.1. Topic 2: Safe cycling campaigns and promotion campaigns

*Jo Cleary, Cleary Stevens Consulting (UK).*

It is appropriate to present these two training topics 'in tandem' as the key to increasing the safety of cyclists is to increase their numbers (as a proportion of the traffic mix), i.e. to promote a significant increase in the use of this mode of travel.

#### Victim blaming safe cycling campaigns are counter-productive



(it is not in itself), and by discouraging those who don't want to look like a human Christmas tree. This is not to say that protective cycling gear is not a good idea for some types of cycling, e.g. off-road mountain biking, and some types of cyclists, e.g. inexperienced riders, especially children.

Cycling safety campaigns in countries that do not have a strong cycling culture lean towards 'victim blaming', in that they place the onus for action to reduce the number of cycling accidents on cycle users, rather than those who pose the greatest risk to them, i.e. motorists. Such campaigns tend to rely heavily on getting cyclists to dress-up brightly at all times, wear protective clothing, e.g. helmets, and ride defensively. These measures are counter-productive in that they lead to a reduction in cycle use by suggesting it is a dangerous activity



#### Safety in numbers

European countries with the highest levels of cycle use also have the lowest levels of cycling-related road casualties, measured as the number of cycle users killed or seriously injured set against the distance travelled by bike per person per year. Put simply, the more cyclists there are, the less chance any one of them will be involved in a traffic accident. This '**safety in numbers**' effect works for three reasons:

- ▶ Drivers grow more aware of cyclists and anticipate their behaviour better;
- ▶ Drivers are more likely to be cyclists themselves;
- ▶ More cycling leads to greater political will to improve conditions for cycling (as more voters are cyclists).

**Cycling is not, in itself, a dangerous activity**, either for users or those who coexist with them. Given a sympathetic environment and appropriate training, cyclists are at low risk of injuring themselves or those around them. By contrast, heavier and faster moving motor vehicles have much greater potential for harming their occupants and those unfortunately enough to come into contact with them in the event of an accident. So, increasing cycle use is good for the safety of other road users too.

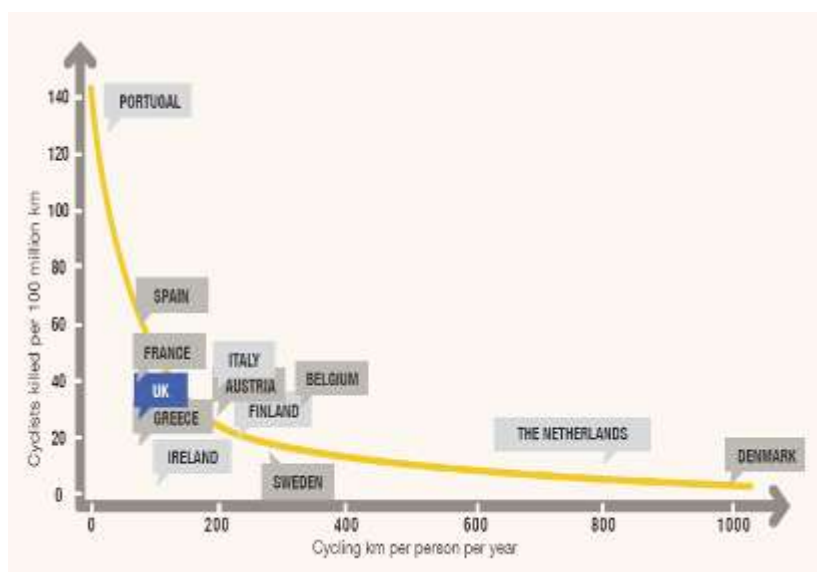


Figure 1  
Cycling km per person per year.  
Source: CTC – Safety In Numbers

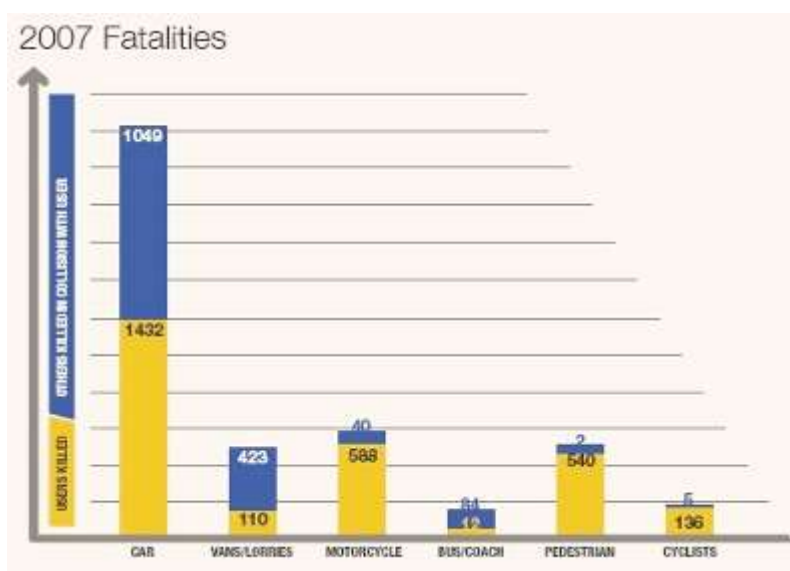


Figure 2  
2007 Fatalities.  
Source: CTC – Safety In Numbers

### Moving from 'cycling is a road safety problem' to 'cycling is a road safety solution'

The most effective campaigns to increase cyclists' safety are those that focus on promoting use of this mode – to a wide range of people – as an attractive, healthy and fun means of getting about that is more likely to lengthen rather than shorten your life! Three important prerequisites have been identified for increasing cycle use. All three are inter-dependent and need to be addressed in a coordinated way:

- ▶ **encouraging safer driving;**
- ▶ **improving the road environment** and making it safer and more welcoming for cyclists;
- ▶ funding schemes that **promote cycling positively and improve rider confidence.**



## Encouraging safer driving

There are two key elements to this:

- ▶ improving driver training with more emphasis on cyclists' needs;
- ▶ improving traffic law enforcement, making endangering and intimidating behaviour unacceptable.

Examples of a range of initiatives aimed at encouraging safer driving in relation to cyclists' needs are contained in the table below.



Road signs in Holland often serve to remind / instruct drivers of their responsibilities towards **cyclists' safety**. Here, turning motorists must give way to riders crossing their path.

**Road user education programmes** should encourage drivers and cyclists not to view each other as competitors for road space.



The UK Highway Code includes rules that instruct / advise drivers **how to deal with cyclists**. Unfortunately, many of these are not well known or understood. This poster aims to help address this knowledge deficit.



**SMIDSY** = “Sorry Mate I Didn’t See You”.  
SMIDSY is a campaign run by the CTC in the UK to try and prevent this being used as an ‘acceptable excuse’ by drivers who endanger cyclists, e.g. by pulling out in front of them.



[www.stop-smidsy.org.uk](http://www.stop-smidsy.org.uk)



Some drivers don’t understand how to treat novel cycle facilities, e.g. the lorry driver in this picture has stopped in the **Advanced Stop Line (ASL)** reservoir at the signal-controlled junction, leaving the cyclist in a vulnerable position in his ‘blind spot’. Driver training and education initiatives need to address such ignorance.

The **London Cycling Campaign** has worked with London bus companies to train drivers how to deal with the increasing number of cyclists and cycling facilities in the capital.



### Improving the road environment

There are four key elements to this:

- ▶ reducing speed limits in urban and rural areas;
- ▶ providing good quality dedicated cycling infrastructure;
- ▶ utilising ‘invisible’ cycling infrastructure, i.e. measures that, while not introduced solely for the benefit of cyclists, nevertheless offer advantages for them, e.g. traffic calming;
- ▶ tackling the threat posed by large vehicles.

Examples of a few of the many types of road environment improvements that can facilitate cycling are shown below.



This **'virtual' roundabout** in a Dutch residential area reduces forward visibility, and thus the speed of motor traffic.

There is growing support for **lower speed limits** where people live in the UK, as well. The '20' refers to mph, equivalent to 32kph.



Here, in suburban Holland, the margins of the road are occupied by **advisory cycle lanes**. Passing motor vehicles may enter them, but are otherwise expected to occupy the relatively narrow central strip.

**Dedicated cycle facilities** are an obvious means of improving cyclists' safety. Done well, as here, they can be of great benefit in terms of offering advantages over alternative busy traffic routes.





They don't all have to be on such a grand scale, of course. A simple exemption from a road closure can open up quiet **back-street routes for cyclists**.

**Lighting** can be an important consideration on off-road routes, particularly where they are relatively isolated from other human activity. Note, too, that the vegetation has been cut back along this corridor to help improve feelings of personal security.



Safety of the individual – from traffic and personal security concerns – is important, but so too is **security of the bicycles** they use. Here, at Groningen rail station, is a state-of-the-art facility which regularly accommodates some 50,000 bikes. Covered, well lit and open to plenty of human surveillance.

Enabling cyclists to circumvent restrictions placed on motor traffic can often create safe and advantageous conditions for cycle users. In many northern European countries cyclists are permitted to **use one-way streets** for motor traffic in both directions.







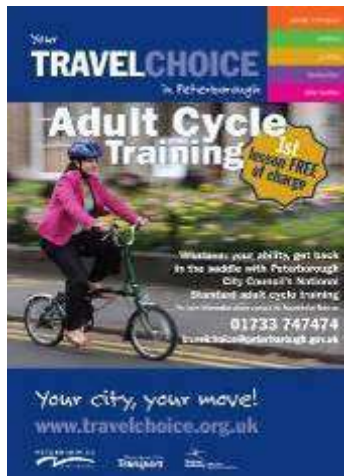
**Invisible infrastructure:** Central Groningen in the Netherlands, with hardly a motor vehicle in sight. The design of the street says “this is a place for people rather than traffic”.

### Promoting cycling

A cycle promotion campaign, encompassing two broad strands of activity, should complement measures to raise drivers’ awareness of cyclists’ needs and physical infrastructure improvements.

- ▶ promoting cycling positively as fun and healthy activity, not one that is fraught with risk and danger;
- ▶ improving rider confidence through good quality cycle training programmes for both children and adults.

Examples of such initiatives are shown below.



The UK Government has invested considerable resources in recent years into developing a **National Standard Cycle Training scheme** for both adults and children.

For children the scheme is marketed as **Bikeability** (<http://www.dft.gov.uk/bikeability/>).





Another cycle safety and competence initiative aimed at youngsters in the UK is the **Bike It** programme, working through families of schools ([www.sustrans.org.uk/what-we-do/bike-it](http://www.sustrans.org.uk/what-we-do/bike-it)).

**Bike Belles** is targeted at developing cycling confidence and competence among women ([www.bikebelles.org.uk](http://www.bikebelles.org.uk)).



A cycle training programme for older citizens in Liechtenstein ([www.lifecycle.cc](http://www.lifecycle.cc)).

An initiative in Holland to enable immigrants to become familiar with cycling for transport.





**Cycling festivals** and fun days help introduce / remind people of the varied attributes of the humble bicycle – it's not just a serious means of transport.

Providing **information** about the ecological / industrial history of the area through which cycle routes pass.



**Bicycle barometer** in Odense. Such high numbers of cycle users reassure people what they are doing is 'OK', and they are 'part of the crowd'.





Radlust means “**The Joy of Cycling**”.

Cycling should be promoted as **something that ‘normal’ people do**. This is widely evident in most parts of Holland as this picture, and those below in this table, illustrate. Here, young lads double up.



A family ride alongside a slow moving bus.

Elegant mother and child mix it with motorists.



Large loads? No problem on a bike.



An example of Dutch cycle chic.



The "Copenhagen Cycle Chic" movement was invented in the Danish capital, but has many followers around the world:

[www.copenhagencyclechic.com](http://www.copenhagencyclechic.com)



This mother has brought a fold-up buggy to transport her child when she needs to leave the bike.



Not enclosed in a metal box cycling is a very sociable and convivial means of transport.



## 5. Shared spaces

### 5.1. Topic 3: Cycling in pedestrian areas (shared spaces)

*Michał Beim, University of Technology (Germany).*

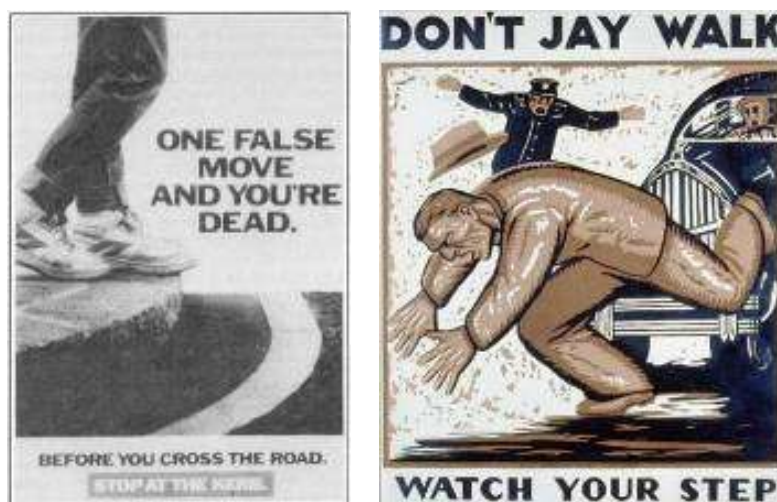
One of the most common mistakes when designing separate infrastructure for cyclists is to treat them as pedestrians. The easiest solution is always “to cut” a part of pavement and “to paint” a cycle way. This way of thinking is – with small exceptions determined by the local conditions – wrong and causes conflicts between the two most environmental friendly transport modes. Sometimes this philosophy of planning has its roots in car oriented traffic planning which has one priority: to eliminate slow traffic from the roadways.

Recently, Western European countries have simultaneously witnessed to a strong return to the classic canons of urban planning thus restoring the primacy of urban planning over road construction. Streets are seen as something more than corridors for transit.

One of the elements of the return of urban planning to its roots is **zonal traffic calming**, with solutions such as zone of 30 km/h, living streets, bicycle streets and “shared space”. The experience of Western European countries, first of all German-speaking countries and Benelux, shows that speed limit creates benefits for all: people living in the zone, road users and for shops and services located on such streets. Usually they are friendlier to cyclists rather than segregated cycle infrastructure, although cyclists do not have so many rights as on cycle ways.

#### The philosophy of traffic planning in context of zonal traffic calming

Traffic calming zones are part of a change in transport planning philosophy. The old paradigm of transport planning, in which the traffic flow was the highest value, has been subject since the 1980s to a strong public critique. The critique consists – first of all – of road users’ safety, especially non-motorized ones, and – secondarily – of the need to ensure a good quality of life. In many countries in Western Europe various initiatives have been overtaken to reduce the number of accidents, as well as to make traffic acceptable to residents.



Figures 1 and 2

British (early 1990s) and American (1937) posters warning about walking on roadway.

Source: British Government and Works Progress Administration

## Urban planning and transport management

The introduction of traffic calming zones, first of all pedestrian zones or shared space, should be preceded by an observation of traffic. It should be conducted on street level (fig. 3) and on local (town district) level (fig. 4). The analysis of the function and location of buildings especially – how the ground floor of buildings is being used (e.g. shops, offices, etc.) is very important. Traffic calming should be adjustable to urban functions.

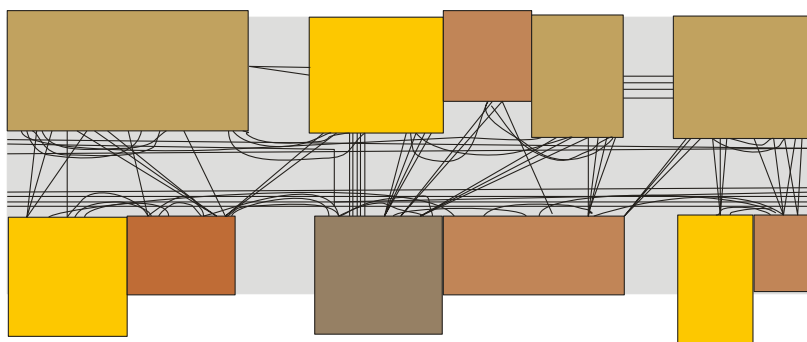


Figure 3  
Representation of pedestrians' behaviours on a street.  
Source: own compilation, Michał Beim

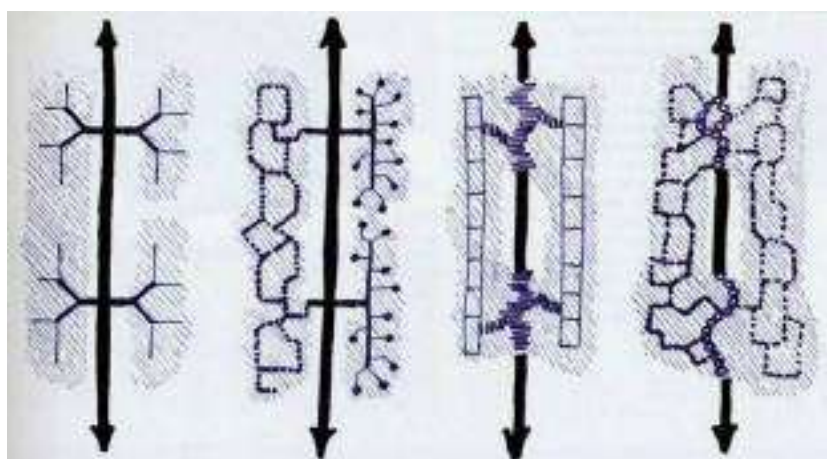


Figure 4  
Archetypal approaches to traffic calming in district with a trough road:  
from priorities for car traffic to places where car-drivers have to behave like visitors.  
Source: Bertolini et al. 2006

### Different forms of traffic calming

Various forms of traffic calming have been developed in Western Europe since the late 1970s. The most popular are pedestrian zones, limited speed zones and living streets. The newest forms of traffic calming are cycling streets and shared space.






	Limited speed zone "tempo 30"	Living street	Cycling street	Shared space	Pedestrian zone
Signpost					
Access of vehicles to the area	all	all	only cyclists (exceptions by signs may be allowed)	all	only pedestrians (exceptions by signs may be allowed, also for cyclists)
Maximal speed [km/h]	30	7 or 20	30 cars have to adjust speed to cyclists	50	7 or "pedestrian friendly"
Priority at intersections	priority to the right or defined by signs	priority to the right or defined by signs	priority to the right or defined by signs	priority to the right	priority to the right
Parking	general rules or only on signed places	only on signed places	general rules	general rules	not allowed
Priorities for users	general rules	pedestrians on whole zone	cyclists on roadway	equal rights	pedestrians on whole zone
Designed pedestrian crossings	yes / no	no	yes / no	no	-
Design principles	division between pavements, roadways etc.	smooth form of division between pavements, roadways, no separate cycle infrastructure	division between pavements, roadways etc.	no divisions	no divisions

Table 1

Legal conditions of various forms of traffic calming - most popular solutions. Some countries have different legal conditions (e.g. living streets in Austria are closed to car traffic with exception of inhabitants living on the street, visitors or communal services).

Source: own compilation, graphic: wikicommons based on German law.

### a) Limited speed zones

The limited speed zones are one of the oldest forms of traffic calming. They were first introduced in Switzerland in the 1970s, known as “**tempo 40 km/h**” zones. Then in Buxtehude (Germany), in 1983 as “**tempo 30**”.

The idea quickly spread to Germany alone and within German speaking countries, then in other European countries. In 1989 Switzerland introduced the “tempo 30” zone to its legal system – they converted “tempo 40” into “tempo 30”. Currently, limited speed zones cover significant areas in cities. **In Berlin, in mid 2010, 78% of the street network was covered; in Vienna, 53% and in Zurich 75%.**

Sometimes, especially in city centers or in the area where many public transport stops are located, more restricted speed limit zones are being introduced, e.g. “**tempo 20**” or “**tempo 10**”.

Primarily, introduction of traffic calming was depending on physical restrictions like speed bumps, etc. The higher driving culture allows for the introduction of limited speed zones without these restraints.



Photo 1

“Tempo 10” in Pirmasens (Germany). Photo source: Michał Beim

### b) Living streets

The idea of living streets (“woonerf”) comes from the Netherlands. They had been developed slightly earlier than the limited speed zones were in Germany. They are characterized by a slightly different philosophy: the main goal is not only to improve safety, but to **give space to people**. In Holland legislation was written in 1988, quickly spreading through the country and other Western Europe countries. The first country to adopt this solution in its legal system was Switzerland. It was before the Netherlands. It should be noted that living streets in each country have different restrictions. The most common are the Swiss solutions: parking only in designed places, speeds up to 20 km/h, and priority for pedestrians.

The living streets were archers for shared space philosophy.

### c) Cycling streets

Cycling streets were introduced in German law in 1997. They are special limited speed zones (up to 30 km/h), where cyclists have additional rights like possibility to ride in pairs; car traffic (when allowed) has to adjust speed to cyclists and cannot disturb cyclists (e.g. to overtake or force higher speed of cyclists).

Cycling streets are usually an efficient and cheap alternative to cycleways construction. They are especially popular in Kiel (a city in Northern Germany).



Photo 2

Intersection of two cycling streets in Kiel (Germany). Photo source: Michał Beim

#### d) Shared space

Shared space is more the philosophy of public space planning than a road design concept. In contrary to other forms of traffic calming, shared space has only one aim: integrated use of spaces. It causes the lack of standards for technical solutions. Solutions and design of shared space are always a result of the discussion among traffic engineers, urban planners and experts from other fields with users of public space (inhabitants, shop owners, people working in the area).

Generally, shared space removes the traditional segregation between motor vehicles, pedestrians and other road users. Conventional road priority management systems and devices - such as kerbs, lines, signs and signals - are replaced with an integrated, people-oriented understanding of public space, thus walking, cycling, shopping and driving cars become integrated activities.

The results of shared space (interpreted as a philosophy of design) could be “naked streets” (without any architectonical barriers like in the town of Bohmte) or various solutions with architectural elements, barriers like: bollards, curbs, cycle racks. The *conditio sine qua non* to name the result of shared space is public acceptance (consensus) of the implemented solution!

The success of shared space comes from the perception of risk. Every user has to observe the street and the behaviors of other users. She/he cannot behave routinely because the road situation makes such feelings unsafe. Drivers, pedestrians and cyclists are more alert and fewer accidents may occur. The need for permanent observation is simultaneously the biggest disadvantage. Two groups in particular are affected: blind people - who cannot observe, and children - who are not aware of speed and distances.

The first shared space areas in Europe were introduced between 2004 and 2008 during the European Shared Space Project – a part of the Interreg IIIB-North Sea Programme (more on [www.shared-space.org](http://www.shared-space.org)).

#### e) Pedestrian zones

Pedestrian zones (also known as car-free zones) are areas of a city or town reserved for pedestrian use only and in which some or all vehicle traffic in general is prohibited. The first purpose-built pedestrian street in Europe was the Lijnbaan in Rotterdam, which opened in 1953. The first pedestrianized shopping centre in the United Kingdom was in Stevenage in 1959, but the literature presents examples of pedestrianised streets constructed before World War II, e.g. Limbecker Straße in Essen. The main aim of pedestrian streets is to establish comfortable and safe conditions for walking, shopping and meeting.

Access of vehicles (independent on the type: bicycle, cars, trams, buses) usually disrupts pedestrian movement. There are many examples where vehicles are allowed on the most popular pedestrian zones, e.g. in Mannheim or Freiburg (both in Germany). The common solution is speed limit for cyclists – up to 7 km/h (pedestrians' speed).



Photo 3

Cycle parking is not allowed in this part of pedestrian zone in Freiburg im Breisgau (Germany), but the rules are usually broken. Photo source: Michał Beim



### Traffic calming as new quality of urban spaces

Geometric solutions for roadways design, so called: “urban floor” and “urban furniture” in the street, are crucial for the impact on driver’s psyche who gets subconsciously careful if the prospect of a long and wide road is not opened before him. Elements of “small architecture” give the street a different scale. Street design may cause that drivers will feel like a “tolerated intruder” in the social space of the city. There is a great range of solutions to choose from, depending on the desired effects and the nature of the place (Wesołowski 2008).



Figure 5

An example of introduction of new quality of public spaces – pedestrian area.

Source: Bertolini et al. 2006



Figure 6

An example of introduction of new quality of public spaces –speed limitation (“tempo 30”).

Source: Bertolini et al. 2006



Photos 4 and 5

“Begegnungszone” (living street) in Sankt Gallen (Switzerland) called as “city lounge”

Photo source: Andreas Bernhardsgrütter ([www.begegnungsyonen.ch](http://www.begegnungsyonen.ch))

## Main conflicts and problems in traffic calming

### a) Where traffic calming could be applied?

There are no special limitations to the application of traffic calming solutions. It was common practice to reduce speed in residential streets and on narrow, inner-city streets, but good results have caused a change in the approach to traffic calming.

Some German cities have speed limits (30km/h) on inter-district roads. The city of Berlin is taking into account the city wide “tempo 30” zone. There should be only some exceptions on some main roads, up to 50km/h or more on inner-city motorways.

In Gleinstätten the shared space was applied on federal road B74.

Public transport’s speed limitation is the main question. There are various experiences: limits are valid for public transport (Basel, Switzerland), buses can ride faster on normal roadways (Kaiserslautern, Germany), trams can ride faster on segregated lanes (Munich, Germany).



Photo 6  
Tempo 10 in Pirmasens (Germany)  
Photo source: Michał Beim

### b) Pedestrians and cyclists – differences as a source of problems

Main differences between pedestrians and cyclists come from the significant distinctions in speed, braking distances and curve radius when there is a need to turn.

Additionally, a problem is represented by different behaviors. Cyclists usually behave more “officially”: their movements can be better predicted than pedestrians’ ones. Pedestrians like to walk in wide groups, when they are with family or friends. Cyclists usually go maximally in pairs.






			
	20 km/h →	11 m →	10 m ↘
	7 km/h →	~1,5 m →	1,5 m →

Figure 7

Cyclists’ and pedestrians’ behavior: speed, braking distance (in emergency case, with reaction time) and curve radius.  
Source: own compilation, Michał Beim

### c) Deliveries

Deliveries and service vehicles can also spoil the quality of pedestrian zones. This negative influence can however be reduced, e.g. by automatic bollards, time restriction (free access only in some hours), design of special parking places only for deliveries and service vehicles.

### d) Breaking the law, understanding the law

There are two sources of rule breaking in traffic calming: low awareness of new traffic laws (the signs are relatively new) and premeditated behaviors. Firstly awareness raising campaigns are very important then traffic enforcement. Otherwise the public acceptance for traffic calming could be very limited.



Photos 7 and 8

Information about living street in Wissembourg (France) and confusing information displayed by a "living street" sign in Dopiewo (Poland).  
Photo source: Michał Beim

### e) Speed bumps

Some car traffic restraints could be dangerous for cyclists. The worst are metal speed bumps. They are slippery and glancing surfaces may disturb cyclists' balance.



Photo 8

Dangerous speed bumps for cyclists.  
Photo source: [www.saspeedbumps.co.za](http://www.saspeedbumps.co.za)



### Case study – Bahnhofplatz Konstanz

This case study presents the method of traffic calming introduction in Bahnhofplatz in Konstanz. The city of Konstanz (83.700 inhabitants) is located in Southern Germany on the Swiss border. The city borrows many examples of best practice from Switzerland. Switzerland is well known as a country with very good experience in urban planning and transport management.

The project of the conversion of Bahnhofplatz, located close to the main railway station, aims to improve the safety of non-motorized traffic and to establish a new quality of life in the area. The project was done by the Institute for Mobility & Transport of the Kaiserslautern University of Technology and the City of Konstanz. The Project leader was Mr Sascha Baron ([sascha.baron@imove-kl.de](mailto:sascha.baron@imove-kl.de)). All graphics presented in this chapter come from the final report (Haag, Baron, Boullie, 2010) or publication (Baron, Menzel 2010).

The first stage was the state of art analysis:

#### ► identification of urban subzones

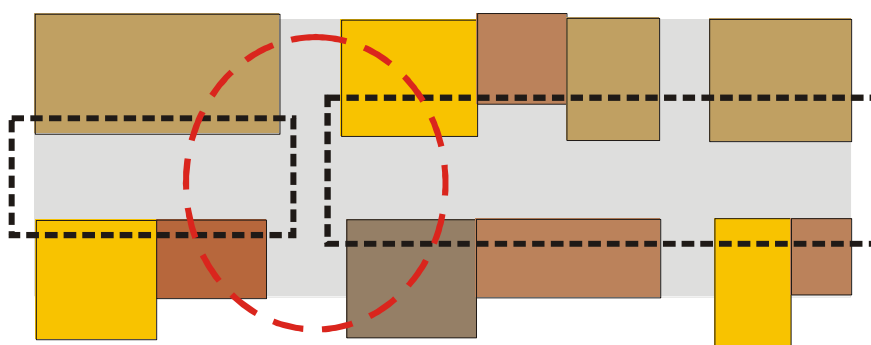


Figure 8  
An example of identification of traffic subzones.  
Source: own compilation based on Haag et al. 2010

#### ► identification of functional subzones (supplies, public transport, taxis)

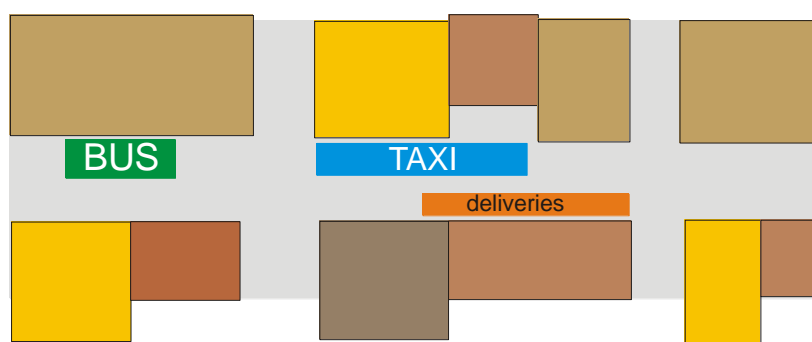


Figure 9  
An example of functional subzones.  
Source: own compilation based on Haag et al. 2010

► **pedestrian and cyclists behaviors** (especially crossing the streets)

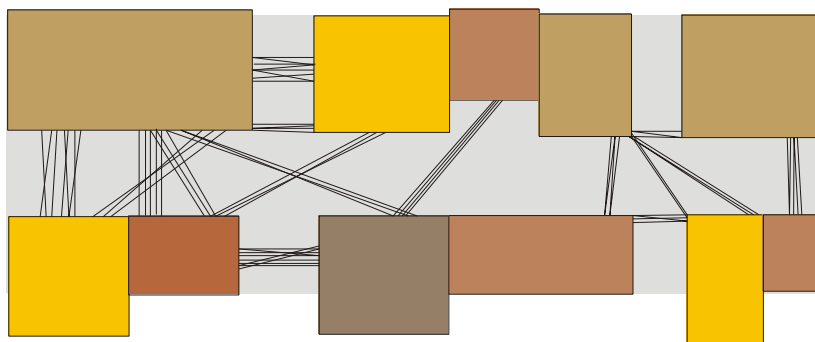


Figure 10

An example of pedestrians' and cyclists' behaviors analysis.  
Source: own compilation based on Haag et al. 2010

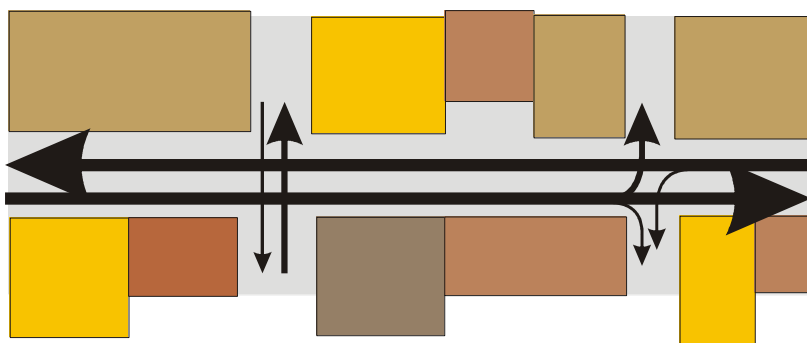


Figure 11

An example of pedestrians' and cyclists' direction analysis.  
Source: own compilation based on Haag et al. 2010

► **analysis the daily transport demand** (number of pedestrians, cyclist, car drivers, car passengers, public transport users and vehicles)

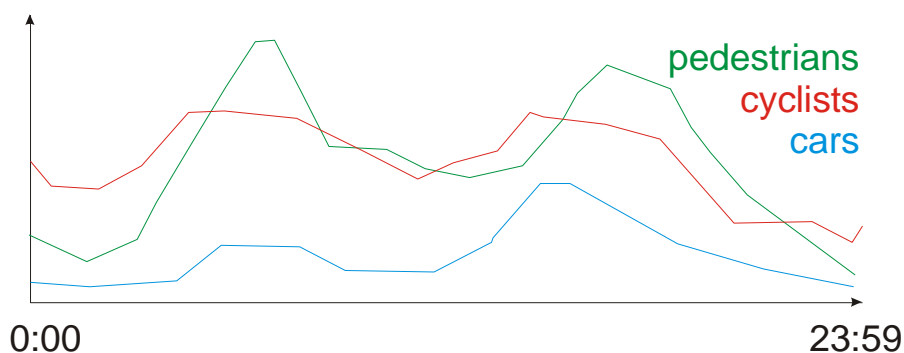


Figure 12

An example of traffic analysis: pedestrian traffic volumes.  
Source: own compilation based on Haag et al. 2010

► **analysis of collisions**

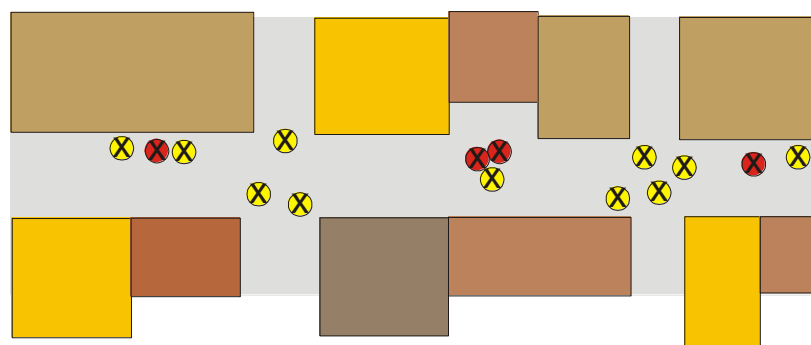


Figure 13  
Accidents analysis.  
Source: Haag et al. 2010

The second stage was the first step public consultation – “a call for ideas”. The objectives of the consultation were the following:

- to involve all user groups;
- to layout the state of art – the results of traffic examination;
- to create possibilities for co-operation between the city, the users and interest groups;
- to listen to the users’ expectations and to their ideas, etc.

The next step was the preparation of possible solutions and analysis of their influence on traffic, environment, social relations and aesthetics. It should take into account that better quality for pedestrians or cyclists results in higher pedestrian or cycling traffic.

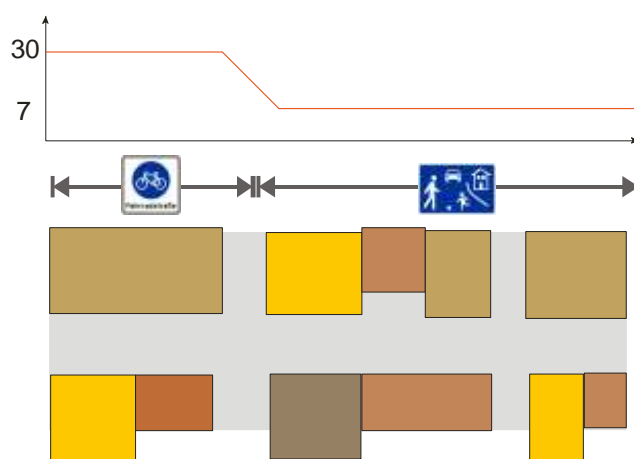


Figure 14  
Possible solutions for traffic calming, Bahnhofplatz, in Konstanz. The last drawing presents the status quo solution.  
Source: Haag et al. 2010

In the case of Konstanz shared space was not designed, but this had not been excluded during the public debate. According to the controversy, a solution to the blind people’s problems was important to be found out. This should be present in every traffic calming concept. Planning a system of tactile paving is also very important (a system of guiding rows and rivets) using the city’s standards.

Next steps in the future:

- ▶ political decision – a choice of one solution;
- ▶ architectural competition with strong public participation in the jury;
- ▶ realization (construction works);
- ▶ systematical evaluation;
- ▶ possible improvements.

## Conclusions

In the design of traffic calming the most important is a good analysis of the state of art. It cannot be limited only to traffic analysis. More important is recognition of the urban conditions like usage of buildings, especially ground floors (shops, other services). Additionally, it should take into account public opinion. It is nearly impossible to fulfill expectations of all groups of users. They are usually contradictory: car drivers are interested in traffic flow, inhabitants in high quality of life, pedestrians in subjective expectation of safety, cyclists in accessibility to these zones. Public consultations – independent of knowledge – bring transparency to the planning process.

There is a wide range of legal solutions which could be applied to traffic calming – “tempo 30” zones, living streets, shared spaces cycle streets. Every solution causes different transport behaviors and different responsibility of users. General effects are similar: lower emissions, quieter streets, less accidents, better public spaces. The application of these solutions needs, first of all, to take local conditions into consideration.

Pedestrian areas present a different problem – they are by definition closed to vehicles, with some exceptions like time for deliveries. The goal of these restrictions is to create an extremely good milieu for pedestrians. Introduction of free access for cyclists is usually perceived as spoiling pedestrians’ comfort. Generally, the municipalities should try to open pedestrian zones to cyclists, even though under time or speed restrictions (e.g. max. speed 7 km/h).

Introduction of traffic calming always needs to be supported by design and awareness campaigns. They should give new quality to urban spaces and create more responsible road use.



Photo 15  
Different types of traffic calming in Esslingen (Germany):  
pedestrian zone, “Tempo 20”, living street.  
Photo source: Michał Beim



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## 6. Pedelects

### 3.2. Topic 4: Pedelec promotion

*Eddie Eccleston, (Belgium)*

The PRESTO project has produced a policy guide and a fact sheet dealing with regulation, technical aspects and promotion of pedelecs (electrically assisted bicycles). The presentation led by Mr Eccleston covers European market's potential, the products, laws and regulation according to standards and EU legislation.

#### Electric Bikes in the EU

There are no exact statistics available for the production, sales, import and export of electric bicycles in the European Union. As for EU sales however, there are various estimates. The European Union is now the second largest market in the world after China. In 2010 sales were estimated at 1 million units (1 million electric bikes = € 1.5 billion turnover. 20 million conventional bikes = € 8 billion turnover). The Netherlands are in the phase of "early adopters" (Rogers' theory). In 2015 pedelecs will represent 25 to 30% of market share.

#### Potential user groups

Electric bike has high chance of becoming popular throughout Europe because wide of the variety of potential user groups. Today, these are mainly seniors (65+) and commuters. But, the average age of buyers is decreasing. Targeted promotion of pedelecs should address potential users as follows:

- a) **Car drivers.** It is said that innovation is accepted if cost-benefit analysis is positive. Nowadays costs of car usage are increasing and some problems such as congestions, pollution and public health are deteriorating the quality of life in cities. Therefore, electric bikes are particularly appropriate for convincing die-hard car drivers. Moreover electric bikes encourage reconsidering mobility behaviour. In conclusion, there are real opportunities to convince car drivers of benefits of electric bikes.
- b) **Commuters.** Commuters opt for the car rather than for the bike as soon as they have to travel more than 7 kilometres. The average speed of an electric bike is 24 km/h, compared with 17 km/h on a traditional bike. Since electric bikes make rides easier (no transpiration) and quicker, commuter trips up to 15 km one way are within reach. Employers can incite their employees to use a pedelec for commuting, for instance by participating in existing tax incentive schemes such as allowances for commuting by bike or company bikes, by including pedelecs in mobility plans or by leasing pedelecs.
- c) **Parents and shoppers.** Carrying a child and/or full shopping bags on a bike can be quite arduous. Pedelecs solve the problem of carrying weight, whether it concerns a child in a seat on the rear carrier, bags on the front and/or back of your vehicle, a trailer, etc. Manufacturers begin to develop specific pedelecs for this purpose, for instance carrier cycles with pedal assistance or electric cargo bikes. Pedelecs also allow parents and shoppers to avoid parking problems in town.

***Did you know that?***

**Cycling employees  
are less off on sick  
leave.**

- d) **Professional groups with lots of short trips.** Home delivery is becoming fashionable again. Grocers, bakers, butchers, fishmongers, etc. redevelop this service to the customer in an attempt to distinguish themselves from their competitors and to improve their customer relations. Lawyers, bankers, real estate agents, doctors and couriers are also putting pedelecs in use to make their professional trips faster, more reliable and enjoyable. Fleets for hotels, companies, tourist businesses, local councils, etc.
- e) **Emergency services, civil servants, politicians.** Ambulance bikes, Police bikes, Bikes for firemen, Postal services, Civil servants & politicians: no effort, so no sweat, no getting out of breath, good for image.
- f) **Seniors (65 +).** In 2008, 17.1% of the population in the EU-27 was aged 65+, that is 84.6 million people (source: Eurostat). Many of them become less mobile as they age. As a result of failing strength and a deteriorating condition, they are no longer capable of cycling. Pedelecs allow this age group to remain mobile and fitter for a longer time. The Dutch report “Electric Cycling: market research and exploration of prospects” shows that 89% of the 65+ people who own a pedelec, use it for recreational trips, 68% for shopping and 47% for visiting. In conclusion: electric bike keeps 65+ mobile, independent and socially active!
- g) **People with health problems.** The Swiss study « Evaluation d’impact sur la santé Promotion du vélo à assistance électrique » (Evaluation of the impact on health of the promotion of pedelecs) concludes that pedelec use helps to prevent cardiovascular diseases, hypertension, diabetes type II and colon cancer. As a result, pedelec use helps to reduce the general cost of the health system.
- h) **Tourists.** Cycling tourism in Europe is becoming increasingly popular. Hills and mountains accessible to everybody. The importance of tourism use of pedelecs for their acceptance as a utilitarian means of transport should not be underestimated. Many people have their very first pedelec experience during their holidays. Once they have been introduced to the vehicle and “felt” it, an interest may start to grow. Furthermore, tourism makes pedelecs visible.







Potential user groups.  
Photo source: ETRA

### How to push electric bikes?

In “Diffusion of Innovation”, Everett Rogers defines diffusion as “the process by which an innovation is communicated through certain channels over time among the members of a social system”. From this theory, Rogers concludes that there are two major ways to encourage the spread of an innovation:

- a) **Mass media:** fast diffusion of innovation among large group.
- b) **Opinion leaders:** trusted, helpful to get rid of resistance and apathy.

Today, raising awareness on pedelecs through mass media is happening: CNN, BBC, The New York Times, The Frankfurter Allgemeine, etc. a lot of major television stations and newspapers have reported on the trend of electric bicycles. Sometimes, celebrities are involved to attract media attention. Another successful tactic to get the press is to invite journalists to try out pedelecs with a view to writing a report. Convincing people to ride a pedelec is a determining factor in the diffusion process that should not be underestimated. This can and is being done in many different ways.



“Biking is Green” event during European Mobility Week 2010,  
European Parliament esplanade in Brussels (Belgium)  
Photo source: ETRA

The aim is to present electric bikes as useful part of a bigger plan:

- ▶ Switch to electromobility;
- ▶ Energy saving and energy efficiency;
- ▶ Combatting climate change;
- ▶ Improving air quality.



In conclusion, (Electric) cycling can be part of the solution for pollution, traffic congestion, lack of road safety, noise, health problems, and climate change.



Photo source: ETRA

### The products

Rules of compliance for non “type approved” EPAC electric power assisted cycles: The power output must be no more than 250 watt. The motor can only assist the cyclist no “*twist and go*”. The motor must cut out at 25 km/h this product will not require type-approval.



What to look for when choosing a pedelec and why: Frame; Forks; Rims; Wiring; Sensor type and position; Access to service items; Batteries.

Full details on technical aspects of pedelecs can be found in the PRESTO policy guide on “[Electric bicycles](#)”.

### Batteries

There are various types of batteries: Li-ion, Ni-MH, Ni-CAD and LEAD ACID.

- a) **Li-ion Battery: LITHIUM-ION.** 600 charges. Very much lighter. No memory effect. Not as sensitive to temperature. Some charging issues. More expensive. This type initially must be



charged to the full then discharged to completely empty three times. This will register to the battery: what is full and what is empty.

- b) **Ni-MH Battery: NICKLE METALHYDRID.** 20 cells x 1,2v = 24 Volt.  $P = 24V \times 11 \text{ Ah} = 250 \text{ Watt}$ . 500 charges. Has a memory effect. Not as expensive as Li-ion. This battery type is not good for some countries. Due to temperature restrictions both hot and cold.
- c) **Ni-CAD Battery:** Nickle cadmium. Poison inside. Has a memory effect.
- d) **LEAD ACID Battery:** Very heavy. Short life span. Good indicator of a low quality bike.

UN regulations on transportation of batteries say **do not post** batteries.

### EU Laws and Regulations

Full details on all legislation governing pedelecs and E-bikes are in the fact sheet "[Regulations](#)". Main sources are:

- ▶ Type-approval legislation and CEN standards;
- ▶ Machinery Directive & EMC Directive;
- ▶ Battery transport;
- ▶ Battery Directive.

Directive 2002/24/EC deals with type-approval of two or three-wheel motor vehicles:

	Pedal assisted bicycles	Pedal assisted bicycles
Speed	Motor automatically cuts out at 25 km/h	Motor assists beyond 25 km/h
Motor	Motor output up to 250 w	Motor output + 250 W
Definition	bicycle	bicycles that can be propelled by the motor itself mopeds
Subject to:	<ul style="list-style-type: none"> <li>• NOT subject to moped &amp; motorcycle type-approval</li> <li>• subject to EN 15194</li> </ul>	<ul style="list-style-type: none"> <li>• subject to moped &amp; motorcycle type-approval</li> </ul>
Obligations for rider	<ul style="list-style-type: none"> <li>• No further obligations for rider</li> </ul>	<ul style="list-style-type: none"> <li>• Lot of obligations for rider: helmet, insurance, number plate, driver's license, age limit, etc.</li> </ul>



## Battery transportation

One of the major risks associated with the transport of batteries and battery-powered equipment is short-circuit of the battery as a result of the battery terminals coming into contact with other batteries, metal objects, or conductive surfaces. Therefore, their transport is subject to very strict rules, which have been internationally harmonised. Main rules are as follows:

- ▶ Battery must be tested: UN Manual, Part III, subsection 38.3.;
- ▶ Specific procedures related to handling, packing, labelling and shipping;
- ▶ In-house handling & packing ⇒ trained “dangerous goods advisor”;
- ▶ Or contracting out to specialist company;
- ▶ Dangerous Goods Note;
- ▶ Rules apply to road and airfreight.

More information on Directive 2006/66/EC, also known as the battery directive can be found in the PRESTO fact sheet “Regulations”.

## 7. Impressions from the Training

Training session 1: Trainer Michał Beim



Training session 2: Trainer Jo Cleary







Training session 3: Trainer Michał Beim



Training session 4: Trainer Eddie Eccleston







## 8. Participants from outside the Consortium

Name	Institution	Country
Marek Utkin	City of Warsaw	Poland
Randy Neufeld	SRAM Cycling Fund	U.S.A.
Rolf Scholtz	Deo	U.S.A.
Igor Buser	SKM	Slovenia
Vesna Bončina	Regional Environmental Center	Croatia
Ksenija Vidović Voberger	ODRAZ	Croatia
Damir Belščak	BIM d.o.o.	Croatia
Željko Čičak	Marko-projekt d.o.o	Croatia
Marijana Prevendar	City of Zagreb	Croatia
Dubravko Kolar	Krapina-Zagorje County	Croatia
Darko Grac	MUP	Croatia
Dijana Šunjić	PUZ, I. Police Station	Croatia
Marko Bilušić	City of Zagreb	Croatia
Stjepan Kelčec Suhovec	City of Zagreb	Croatia
Sanja Dunjko	Councilor member for the City district Donji Grad	Croatia
Anica Drmić	Service for the Local Self-Administration.	Croatia
Ljupko Šimunovič	Fakultet prometnih znanosti	Croatia
Joško Fabris	BIKER	Croatia
Daniel Valkonić	BIKER	Croatia
Jasmina Nađ	City of Zagreb	Croatia
Ivana Mourić	City of Zagreb	Croatia
Nevenka Preradović	City of Zagreb-c.o. Energy, Environment Projects & Sustainable Development	Croatia
Mladen Gledec	ISIP-MG d.o.o	Croatia