

VeloCity 2007

Bikes on Board!

Edelman, Todd
Green Idea Factory
Korunni 72, 10100 Praha 10, Czech Republic
edelman@greenidea.eu
420.605.915.970
420.222.517.832
Skype: toddedelman

Improving the *on board intermodality (OBI)* part of the public transport (PT) & bicycle intermodal experience creates advantages for cyclists and PT operators alike, with a positive outcome in the areas of road safety, noise and air pollution, fitness and finances. It helps communities eliminate automobiles.

But the regulations and possibilities for on board intermodality vary greatly in Europe and beyond, literally from one town to the next. Both local conditions *and* awareness level of intermodal best practice influence the desire for *and* implementation of solutions.

How can municipalities, PT operators, and local cycling or transport/environmental advocates work together to improve the quality of on board intermodality on urban, suburban, and regional buses, trams, light-rail vehicles and metro systems? While high-quality bicycle parking is the biggest piece of the intermodality puzzle, what are the benefits and unique qualities of being able to bring a bike on board? For every person who is bothered by a bicycle on a crowded metro car, how many others silently appreciate it? Is there a good reason the bicycle rack on bus solution from North America is not used in the EU? What do PT operators already do very well? Do cyclists expect too much? Should they all park their bikes or buy folding bikes and be happy? Do some PT operators feel that when bikes are on board it hurts their bottom line?

What this paper deals with and what it doesn't

I don't discuss heavy rail vehicles (from something like the S-Bahn in Berlin to high-speed trains) and I only talk about North America and Europe.

Public transport and bicycle intermodality is a large area to cover: Bicycle parking, rental bicycles of various types available adjacent to public transport stations, and taking bikes on board vehicles. I focus on the last, as it is one which can be improved considerably with minimal expense. Nevertheless, taking bikes on board is the smallest of all these pieces, due to vehicle capacity issues. But it provides unique opportunities that the others don't. It also frequently annoys public transport operators:

From a well-meaning senior manager at UITP (International Association of Public Transport):

"The world of biking and the world of public transportation are two completely different worlds. And it is not a good idea to put your bike on a bus. Why?"

He continues with some unfortunately misinformed statements, which I will address later, and he interjects this stunner:

"If I come to your home, you would also not want me to put my bike in your living room on the carpet..."

It is that sentence itself – not the fact that I don't have carpet nor a living room – which inspired my focus on the subject of OBI.

Warning! This is not a standard academic paper. That is not my style and I can't fake it. What I do here in large part is give opinions and analysis and back these up with real-world examples of the same or similar things in order to help readers better co-imagine any solutions I come up with.

Definitions

What's OBI? In addition to being the name of one of my canine companions (pet dogs), as well as that of a famous mythological knight, OBI stands for "on board intermodality". "On board" means inside and outside a vehicle. (Think of railway customers in South Asia and Africa riding on the roofs of trains...).

There is a more exact term in regards to buses, coined by Dave Holladay of Cyclists' Touring Club in the UK, which is "bikes with buses". This also means inside and outside, and for me has this nice "togetherness" thing going.

On, in, with... you get the idea. I don't have a perfect term. A European project I am trying to start – and you are welcome to see if your group or organization can become a partner; see info at the end of this paper – is called "BOB", for bikes on board, which is also the name of my presentation and this paper. But in North America BOB can also mean "bikes on buses", describing one particular technical solution.

A brief history and ideas for public transport and bicycle intermodality

Both public transport riding and cycling pre-date automobile driving, and – at least in the urban context, in regards to private cars – they must outlive it. Together. Here's how, in part.

Part I – Evolution towards front bike racks on buses

It is certain that early sustainable transport users combined public transport with cycling. If someone has some photos or other documentation, please let me know. I will start with early attempts in the 1970s.



**San Diego, California, USA – 1976 (from "Bikes with Buses"
A presentation for VeloCity 2001, by Dave Holladay)**

When I was a 13 year-old living in Los Angeles, my father, compelled by high fuel prices, purchased a small VW Rabbit (Golf) Diesel, kind of an unusual vehicle for California at that time. It had a hideous beige paint job and was very loud, plus created golf ball-sized particulate emissions, but was quite a lot more economical in its use of vegetable oil – just kidding – than his late 1960s Volvo.

A little bit further south, propelled as it were by a similar impetus, cyclists and the local public transport company produced a different result.

The photo on the previous page was difficult to use (the bus engine was difficult to access, it originally was coin-operated, and bikes fell off) but was nevertheless popular.

About ten years later in Scotland, the PT operator Cumberland ran buses that had an officially approved space for bikes. This was in the boot of the vehicles. The service faded away around the end of the nineties, and when Disability Access regulations came into effect the boots disappeared. Still, other services in various parts of the UK allowed bikes inside, though not in a standardized way. The opportunity to combine bikes with buses did not disappear, especially on rural and regional services.

At the same something quite interesting was happening back on the other side of the pond, and at the other end of the continent... and which after close to 15 years of success has not travelled successfully to the Old World.

One person’s carbon emissions defeater is another’s shish kebab facilitator. At the beginning of the millennium new solutions for carrying bicycles on buses were developed in the United States. After a few years of trial and error, a standard design for a front-rack carrying two bikes was developed, in large part by the Washington state-based company Sportworks Northwest, which maintains its overwhelmingly dominant position to this day.



San Fernando Valley, California, USA – 2006 (www.Irta.org)

The photo above shows two buses used in Los Angeles operator Metro’s Orange Line bus rapid transit system. This operator has thousands of buses with front racks.

The growth in use of the racks did not happen overnight but was steady, helped in large part by Federal government grants which were targeted on improving bicycling and public transport.



Bike-on- Bus Programmes in 1993...



... and in 2005.

Illustrations courtesy Lisa Falvy of Sportworks, taken from her presentation for VeloCity 2005 “A multi-modal marriage”

Most of the important information about the racks is included in this fact sheet from the U.S. cycling advocacy organization Thunderhead Alliance:

<http://www.thunderheadalliance.org/site/images/uploads/Bikes_on_Buses_Facts_Sheet.doc>. A extensive list of operators which use front bike racks – and indeed lots of information about the whole intermodal picture in the U.S. – is at <<http://www.bikemap.com/bikesontransit>>.

What is also *very* interesting is that to date neither the manufacturers of the racks nor any of the hundreds of operators which use them on thousands of buses has had legal action taken against them. In the United States, considered by most an over-litigious place, this is a miracle.

Or perhaps it is not a miracle. Buses are inherently much, much safer compared to cars on a person-kilometre basis. Their drivers – while not perfect, and some bad apples make local headlines – are professionals.



What many European transport professionals think about bike racks for the fronts of buses. The food is people.

In the mid-nineties and also more recently – through 2005 – a number of public transport operators in Belgium, Poland, Spain and the UK expressed interest in using the Sportworks rack. In Gdansk, Poland a rack was even fitted to a bus. But the attempted pilots didn't get the approval stamp of the national transport authorities.

Why? Frankly, the authorities seemed misinformed. *About what?*

Dwell time – It is perceived that use of the racks will increase it. The video examples here – some of which are slower than how it really happens to order to facilitate education purposes – show that this is not the case. The cities that control public transport authorities need to focus on the real thing that slows down buses which is congestion caused by private automobiles.

The “Shish-kabob effect” – When told of the excellent safety record of racks in North America, European transport experts – some of them cyclists – say that that is because no one walks there. While the pedestrian density of places where buses operate in North America is certainly lower than in Europe, it needs to be said that buses with racks now operate in every major U.S. city, with the exception of NYC. Chicago, San Francisco, Seattle... certainly not pedestrian free, and with lots of other vulnerable road users like cyclists ... whose activity is facilitated by the racks!

Related to this, in 2004 a study was commissioned by the UK Department for Transport. See <http://217.118.128.203/store/report_detail.asp?srid=2743&pid=211>. Racks were purchased, crash dummies were used and the tests indicated that – no surprise – sometimes injuries were increased with the racks.

Wanted: A real cost-benefit analysis – I consider the study flawed in that it was a comparison of buses without racks vs. buses with racks, whereas *it would be much better to compare the real health effects of a city with buses which use racks vs. one where the racks are not used.* In addition, the real world situation in North America has not produced any recorded statistics about any increased danger caused by the racks (and the UK study itself admits that there is a lack of data related to injuries for a device used for over ten years by that time, with nearly a million uses per month in recent years).

My informed guess is that in “cities with racks” more people would cycle AND take public transport and fewer would drive. This means more exercise and cleaner air. This would I think more than cancel out any negative health effects of the racks. It is unfortunate that an objective and appropriate analysis has not been carried out to date.

Finally, a word about financial barriers. A front bus rack – even the new models which hold three bikes – costs less than a single bus tyre.

Part II, Rear racks on buses

For regional and rural services where stops are further spaced and dwell times increase significantly, or for chartered buses fulfilling a mobility goal for a recreational or sport journey, rear racks are a good solution. Simply put these are not useful in cities, and are not a solution for city buses. (*When bikes cannot go inside a city bus – read on – front racks are needed so the driver and PT passenger-cyclist can see the bicycle, and so the PT-passenger customer cyclist can quickly remove the bike from the vehicle, and so the driver will see what is happening.*).

Following are some examples in recent or current service.



Leipzig, Germany



Zug, Switzerland



Cumbria, UK (using front rack)

Part III, Bikes in Buses (passenger space)

The situation with bikes inside buses is much less of a safety issue and more of possibly inconveniencing the other passengers issue. *Rather than analyse this to death let me just propose a design which I think will work for modern fully- or partly-low floor city buses, with three doors on the side:*

- Central low floor-section of bus is used for prams and wheelchairs only.
- Rear door, whether or not it accesses a low floor section, is for other customers including cyclists.
- Front door is only for “normal” customers.
- Rear section has space for two bicycles within a bay or section with four fold-up seats, or better yet another open section with a few folding seats for combination of passengers, small cargo, bicycles and dogs, etc.
- If bus is so full that bicycles would decrease internal capacity a front rack is also used.

This is just one idea, and can be adjusted to the needs of various operators. At busy times, this bus could carry two bikes, but off-peak, weekends, etc. as many as six, without inconveniencing other passengers. Inside a bus, bikes can hang on hooks or similar equipment – much like on regional trains – or bikes can just stand up if space is an issue. The important thing to do is offer customers a flexible space so they – as adults – can negotiate its best use among themselves and not have to bother the driver. An awareness and educational campaign to facilitate an easy transition to this type of accommodation would be helpful with less intuitive populations.

When a broken chain won't break the chain! Buses in Zurich will carry a non-functional bicycle free of charge, instead of charging half of normal full-fare.

Folding bikes should simply be officially accommodated as small luggage. Is there any need to say more about this?

Part IV, Bikes in Buses (cargo space)

This is an alternative to rear racks for regional and even long-distance buses. *Here is one of the better examples:*



For more details, see <<http://www.flickr.com/photos/bikesontransit/242873585/>>

Part V, Bikes in Trams and Light rail vehicles

The situation with trams and light rail vehicles is quite similar in both North America and Europe, in that it is mixed, with neither area being the intermodal victor. Generally speaking, most light rail vehicles in North America allow bicycles (one of the few exceptions being MUNI, or San Francisco Municipal Railway, where in fact a light rail line replaced a bike with bus service in spring 2007) and in Europe trams generally do not, with some exceptions in cities which don't have metro systems, for example Dresden, Germany and Brno, Czech Republic. Some trams in Brussels allow one bicycle off-peak. The "snel tram" in Amsterdam – a kind of tram-metro system – has a rack for a bike, where it rests on both wheels.

But – as with buses – the important and growing potential for taking bikes on light rail and trams is that the new vehicles are either entirely low floor (in flat cities like Vienna and Zagreb) or partly low floor (hilly Prague) and have significant space inside, especially off-peak. Certain very hilly parts of Prague – my base for now – are only accessible by trams and private cars. The metro takes bikes... but not here. So these people don't ride a bike down the hill, because it is tough for them to get back up. Most just ride public transport (nice, but fewer health benefits for individuals) and some drive. This issue of *mobility insurance* will be discussed shortly.

Opportunity for persuasive, charming people! Trams in Berlin will carry a bicycle at the driver's discretion.

Part VI, Bikes in metro and subway vehicles (and escalators and lifts)

Which city in the United States has the highest population? New York City, of course. And what can you do there? You can take your bicycle on the subway any time of day, for free, in any vehicle. The operator advises against taking it on during peaks, but there is no absolute restriction.

This means public transport customers – including cyclists – are treated as adults, who can negotiate things like this by themselves, without a burden on the operator, rules for a policeman or something to point out and so on. *It works.*

See <<http://www.mta.info/nyct/safety/bike/>>

I lived in Manhattan off and on for over three years but rarely used the "bikes with subway" service. *Why not?* Because riding a bike was free, often faster, healthy... and so on. But it was good to know that I could use the subway. That it was there for me, just in case. This issue of *mobility insurance* will be discussed momentarily.

That is the best example from the USA in regards to underground transport as far as I know, and I wish it was one services from coast to coast would emulate.

Europe? Very much a mixed bag, non? YES. Very much so. In 2004, the Barcelona group Amics de la Bici did a survey on bikes and metros (for Western Europe). It is available here: <http://www.ecf.com/files/2/12/13/overview_bicycles_u_trains.pdf>

The survey questions emphasize the whole chain: **Bicycles allowed? Restrictions? Fee? Allowed on escalators and lifts?**

All of these questions need to be asked. It is also good to note that a bicycle is least safe on stairs (because of the effort required) and most safe on lifts (because no effort is required, unless the bike needs to be stood up on its rear wheel to take up less room in a lift.). Lifts take more time of course, and wheelchair users get priority, but I would argue that both a parent with a child in a pram and a parent with a child in a bike seat should get equal priority. Smaller but still adult people find it difficult to take bikes on stairs, and heavily loaded tourist bikes become hell on wheels when the transfer for an intercity train to local underground service is not designed well. Some stations have a little channel to roll a bike up or down stairs, but I think just allowing bikes on lifts is better idea, especially as lifts become more widely implemented.

Chances are that a person who cannot wait for a lift will have a light bike for commuting, and that someone for whom a couple minute wait doesn't matter will be a cycletourist.

When offering suggestions for the redesign of the main train station in Prague I asked the architect about what I called the "lift pathway", which is the entire route by lift from one important point to another. Right now the rules disallow bicycles on lifts, and this is more dangerous. I am repeating myself. I hope I have made my point. But this is something that transport operators can do for **no cost** to make things safer.



Also in Prague, the situation with taking bicycles on the metro just got much better. It went from two bikes for a five-car train, to ten bikes total. There was a test period of nine months or so, and then it became a permanent regulation.

One thing that is important to note is that since bikes are allowed on every car, cyclists have flexibility on the best place to put them, which can benefit other non-cyclist public transport customers.

Part VII, Bikes in other kinds of vehicles, and other situations



Photo by Matthias and Jonas Frey

Rack-railway: The *zahnradbahn* in Stuttgart, Germany has a great solution. A trailer is attached to the end of the two-headed vehicle and bikes go up for free. Right now it only operates three seasons out of the year, but I am not sure why, as going down a very steep hill in winter can be a problem due to ice. *This solution makes cycling possible because it makes public transport use possible, and the other way around, which reminds me that I am going to discuss **mobility insurance** very, very soon.*

See more photos here:

<<http://www.bahnbilder.de/name/galerie/kategorie/Deutschland~Zahnradbahnen~Stuttgart/proseite/52.html>>



The cyclotram in Ostrava, Czech Republic
www.czecot.com

Trams and buses dedicated for cyclists: Here I go again with the Czech Republic but in all fairness to the Devil the big cities are currently very unfriendly for cycling (e.g. in Prague children and university students don't ride to school; the modal share of cycling is in the very low single digits) and none of the metro or train stations have modern bicycle parking. Medium-sized and small cities and towns do much better for cyclists.

But the country has a collection of fine services consisting of a few *cyklobuses* and a couple *cyklotramvaj* (in addition to a short-distance train called the *cyklovlak*). These are vehicles, generally older redundant ones, which have many of their seats removed and replace by hooks and hangers. Seasonally-operating, these are not about *transport* but rather about *sport*... but they do get people out of their cars on which people might normally carry bikes on the roof. Furthermore, when one uses these services they have the option to start and stop a cycling trip in different places – only possible when one has a chauffeur, but a limousine is not public transport! – and also the ability to drink alcohol after the bike ride but before a trip home, without risking killing someone. And who wants to drive after a nice long bike ride, anyway? *Case closed. Please take a seat and relax.*

Bus-stitution: The negative trend in European railways halted for the most part in the early part of this decade, though the under-investment particularly in the new EU states and further east – but also places like Denmark and the UK – was so extreme that it will take years to recover even though some states are spending a high percentage of their transport budgets on railways.

Unfortunately one of the last losers as it were is the Hungarian network. In 2007 and 2008 nearly 100 secondary rail lines – many short and not highly trafficked – will be cancelled for use by passenger railways. Some but certainly not all of these services will be replaced by buses. The trains took bikes in some fashion, but the director of the regional bus company said the buses will not. This will push some people to drive, force others to walk and strand some people, though to be fair the buses will go through some towns whereas the trains were on the periphery in some cases.

Even if the multi-use space regulation in the Third Railway Package was in effect – this is new European Union regulations on railway travel. It was approved but will be sorted out this year, maybe – which would make it a requirement that every train takes bikes, would have no effect on this case when a bus permanently replaces a train, or even a temporary replacement, as these issues are not yet mentioned in the pending legislation. I think this is a major omission, but hopefully something changes during the sorting out period.

That said, we already know about all the solutions possible for the regional bus operator, and I hope they change their minds about bikes.

Mobility Insurance

Finally, we will talk about the right policy for the public transport customer who cycles. But I think we have said nearly everything we need to say.

So here are some images on the subject...and just a few words...the bike and the bus represents any intermodal situation where parking or bike share is not the best option...



Stayed out later than you planned....
<<http://taleswapper.blogspot.com>>



Bridge designed without cyclists in mind....
<<http://www.flickr.com/photos/rideyourbike/>>



Thunderstorm on your commute...
<<http://www.flickr.com/photos/suslik/>>



Reindeer on Strike
<<http://www.flickr.com/photos/psd/>>

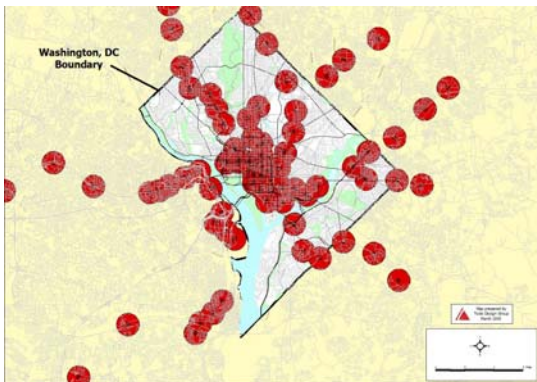


Likely vandalism...
<<http://www.flickr.com/photos/dshot/>>

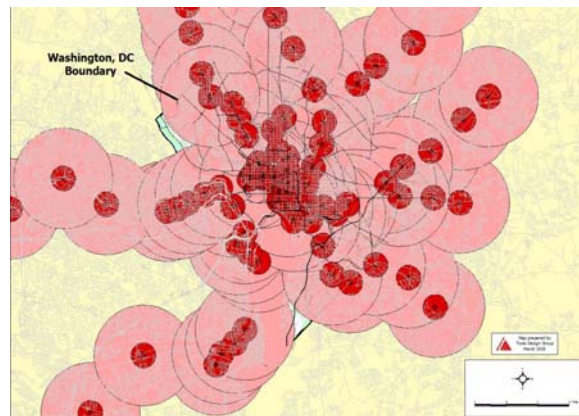
Conclusions, further thoughts, things to keep in mind:

- **Funding opportunity!** We are planning to apply for a STEER grant from the European Commission Intelligent Energy Europe programme, for a project called “Bikes on Board” The main goal is improving the on board part of the public-transport & bicycle intermodal experience, with an emphasis on knowledge-sharing, marketing and low financial investment in technical solutions. If your organization is interested in being a partner, let us know immediately and we will send you more information. **The next deadline for STEER is 28.9.2007.**
- The **early experiences** in the USA show that even an imperfect system can work when it combines two individually great solutions, and inspired by necessity... and of course we find ourselves in the same situation today, or perhaps a worse one, an evaluation which is influenced by a much higher awareness of the global environmental situation.
- **European experts need to be honest with themselves** about the informed reasons they are against the front racks. Could it be anti-American snobbery? After all, Europeans have certainly exported more good solutions than they have imported. How to prove snobbery?
- **Public transport operators** need to be convinced that improving OBI will improve their bottom line, and the **municipalities and regions** in which they operate need to make OBI a requirement when tendering or during contract negotiations, or when making decisions about government-owned services.
- **A chain is only as strong as its weakest link**
- **Public transport and cycling, together, is a sustainable, desirable and appropriate system for cities and towns which are designed to reduce the need for mobility (and cars!).**

Appendix – How cycling increases reach of public transport:



Typical 400m (1/4 mile) walking distance to bus stops



Typical 4.8 km (3 mile) cycling distance to bus stops

Images from “Multi-modal marriage” by Lisa Falvy for VeloCity 2005