

# Achieving Cycle Friendly Infrastructure

John Franklin

Paper presented at Cycle Friendly Infrastructure Conference,  
University of Nottingham,  
16th April 2002 (repeated 27th June 2002)

## Basic requirements

The 5 key requirements for cycling have already been discussed. A route for cycling can only be considered to be to a high standard if it meets all of these criteria.

However, to the 5 standard requirements, I would add a sixth: **Dignity**. Cyclists should be accommodated as a respected mode of travelling with as much right as anyone else to a decent journey. To provide for cycling on what space may be left after meeting the needs of other vehicles, from whatever funds remain, and to expect cyclists to be grateful for whatever they get is not acceptable. Cyclists deserve to be treated with dignity and to receive full professional commitment to their needs.

## Current practice

Over the past couple of decades, cycling policies have been dominated by the provision of cycle 'facilities'.

First, a definition: A 'facility' is something that facilitates, or makes easier, an action. Something that makes cycling harder cannot be a cycling *facility*. Yet there is a view amongst many cyclists that much of what is being provided today falls more into the category of 'difficulties' than something that really assists cycling.

And while we're looking at definitions, see what the dictionary says about 'cycling'. An important thing to note is that cycling is about **riding** a bicycle, not taking it for a walk. I will say no more about the 'Cyclists dismount' sign and the broader message that it conveys, except that it is a curiously British phenomenon that no other country seems to require.

## Road-side paths

The lowest level of accommodation for cycling is the shared footway, which is widely unpopular with cyclists and pedestrians alike. It meets none of the six Requirements for cycling.

Why direct cyclists from a broad, unproblematic road like this onto a rickety footway alongside all the garden walls?



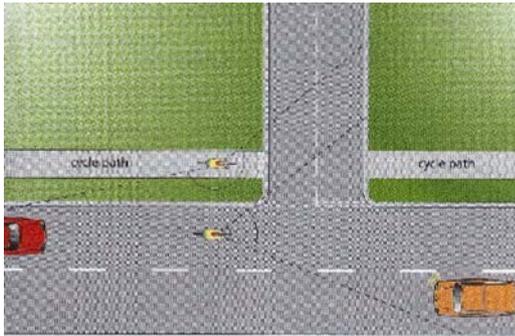
Is a 1m strip that wiggles around the lampposts really easier for cycling than a wide, 30 mph road with little traffic and no parking?

It is unfortunate, I believe, that so much cycle planning assumes that cyclists are some form of 'rolling pedestrian'. This is not the case. Cyclists travel around 5 times faster than pedestrians, and in towns much closer to the speed of motor traffic. Cyclists cannot turn on the spot, move sideways or stop suddenly – 3 characteristics on which a lot of pedestrian safety depends. In fact, cyclists have very little in common with pedestrians and deserve not to be treated as such.

Only one step up from the shared footway, at least in urban areas, is the road-side cycle track. This may be some people's 'ideal' way to accommodate cycling, but they, too, have long been unpopular with many cyclists and for good reason, for they and shared footways usually introduce much more danger than they remove.



It is not traffic per-se that causes conflicts for cyclists, but crossing, turning and weaving movements..



A cyclist using a road-side path experiences crossing and turning movements much more often than a cyclist on the road. Road-side paths of any kind put cyclists on the periphery of the traffic system, well away from where most drivers look. The full onus for taking care is on the cyclist, yet exercising that care can be very difficult, for the cyclist has to look through a much greater angle for conflict. This requires much movement of the head, and is greater than most people can manage.

If a crash does occur, it is more likely to be serious than a road crash, for collisions take place at 90°, when the cyclist receives the full force of the other vehicle.

On the road, the cyclist can use positioning and listening to reduce the angle through which concentration is needed to less than 90°, which can be done by eye movement alone and therefore more easily and quickly. Positioning may also be used to good effect to ensure that the cyclist is seen, and to solicit the essential co-operation with other road users on which safety depends..



Visibility of following traffic is very difficult for this cyclist and the only way to be safe is to stop at every junction. Most people simply take the chance.

Low-standard shared footways are particularly dangerous at junctions. In Britain already a number of cyclists have died at road junctions when riding on footways.

These figures are typical of the relative risk of road-side paths, as shown by research in more than 11 countries, but they do not seem to be widely known.



Road-side paths	
Relative risk	
Road	1
Cycle track, with traffic	2 - 3
Cycle track, against traffic	3 - 11
Footway	7 - 11

Several European countries have changed their policies on these kinds of facility in recent years, primarily because of bad safety records. For example, the police in Germany led campaigns to allow cyclists to avoid urban cycle tracks, and last year Brandenburg state issued instruction against building any more. France has removed the obligation to use cycle tracks and Belgium is to declassify two-way tracks as particularly dangerous.

It is therefore of concern to many of us that some UK local authorities are going in the opposite direction and making shared footways and road-side tracks the foundation of their cycling policies.

Even away from junctions low standards cause problems. This slide illustrates two:



A cyclist was badly hurt riding into this sign support, barely visible at dusk. No-one would build a road without adequate clearances, but for some reason it is acceptable to place structures, and dark ones at that, right up to or even within a path for cyclists.

Secondly, the absence of a verge between cycle path and road places on-coming cyclists within inches of traffic in the opposite direction – much closer than is the case riding on a road, and if cyclist or road user veers off course, there is every likelihood of a fatality. Yet at night cyclists are easily blinded by even dipped headlights and this can affect cycle control.

### Away from roads

Cycle paths away from roads can be more useful, especially for leisure or where they open up new routes, but design limitations abound.



Bad visibility has been a common cause of cycle path fatalities but very few paths have the kind of sightlines that one can take for granted on roads.

Standards in other countries are frequently higher than in Britain – for example, the 4.5m X distance in Britain compares with 10m in Sweden, more than 20m in the Netherlands and standards as for a road in the USA. But even our low standards are commonly not met.

Sharp bends are frequently associated with bad visibility and are especially common where footpaths have been redesignated at minimum cost.

The UK minimum radius of 6m – also frequently not met – compares with 15m in Sweden, 32m in the USA and 100m under some circumstances in the Netherlands.



The Romans recognised the need for a bow's length clearance aside their highways to give warning of others, but cyclists are often not deemed to require any such warning. Vegetation comes not just up to, but sometimes, over the path edge reducing width, visibility and safety. Cycle paths generally require more frequent maintenance and cleansing than roads, but they rarely get it.



A common gripe with cyclists is poor surfaces and upstands. Cycle paths should *not* end with dropped kerbs, but should arrive at road level and there should be a perfectly flush join back from the junction itself. Again this is normal practice in road building and was common, too, in the cycle paths of the 1930s. Once more, there seems to be confusion between design for cyclists and design for pedestrians.

Another common complaint is barriers, too often erected even before there is evidence of abuse. Many roads suffer from inappropriate use but such stringent controls would never be imposed. This type of response is also a very British phenomenon.



Finally, this scene shows a good feature that is common on paths abroad but rare in Britain – the centre line. Discipline on cycle paths is poor and head-on collisions between cyclists have resulted in death and serious injury. Centre lines are needed every bit as much on cycle paths as on roads, as are other frequent reminders to keep left.

Indeed, it is most important that cyclists ride according to a single and consistent set of rules, wherever they ride. In Britain, that set of rules is, of course, the Highway Code. All parts of any cycle route should expect, and facilitate, those rules to be followed. Alas, this is frequently not the case.

## Cycle lanes

Cycle lanes are now to be seen in many towns.

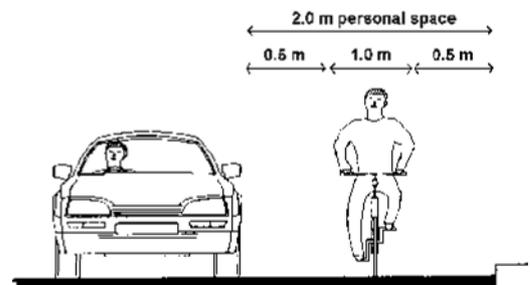
One of the most important needs of cyclists is personal space, from the points of view of both comfort and safety.

The moving width of a cyclist is around 1.0m at elbow height.

On a free-flowing road the astute cyclist will ride about 0.5m from the kerb at the same level.

It is a rule of thumb that other drivers typically give a cyclist as much clearance as the cyclist rides from the kerb, another 0.5m.

Adding these up, a cyclist normally commands some 2m of personal road space.



Put in a cycle lane and the circumstances change. There are now two traffic lanes where otherwise there would only be one and lane discipline comes into play.

Many motorists will now drive up to the lane marking, which also becomes a boundary to their concentration.

For a cyclist to receive as much personal space as without the cycle lane, the lane itself must be at least 2m wide.

It is a common complaint of cyclists that they receive less clearance from motor vehicles when a cycle lane is present. Lanes narrower than 2m progressively decrease comfort and increase risk. 2m is the recommended width for cycle lanes in countries such as the Netherlands and Sweden; in Germany new lanes are sometimes 3m wide.

In Britain, not only are lanes of 2m almost unknown, but councils seem to be vying with each other to build the narrowest lane. Lanes of this kind of no positive benefit whatever to cyclists, and they lead to numerous problems.

Narrow lanes encourage drivers to overtake cyclists in places where it is not safe to do so.

At times of adverse weather, such as strong wind and driving rain, cyclists need more space for safety, but the lane markings do not allow this and overtaking drivers are less likely to give room.

At any time, the draught and suction from high-sided vehicles is a problem, but especially so if such a vehicle passes as close as this type of lane encourages.

Most disturbing, however, are the increasing reports of aggression from motorists towards cyclists who, reasonably, do not want to prejudice their safety by riding so close to the kerb. In this respect, narrow cycle lanes increase risk even for those cyclists who normally face few difficulties on busy roads, and are causing some cyclists to avoid certain roads in a way that traffic never has.

Position on the road is by far the most important influence a cyclist has over his or her safety. Adding a cycle lane stripe restricts a cyclist's freedom of movement, requiring a lane change to exert influence on others. Lane changing is not something that most cyclists are good at – many people just move out and hope for the best.



Nowhere is good positioning more important than at junctions. Two of the commonest crash types are the driver who overtakes a cyclist and then cuts in front to turn left; and the driver who emerges from a side road into the path of a cyclist.

Both of these hazards are exacerbated by cycle lanes, directing cyclists into the very places where risk is greatest.

Similarly, continuing a cycle lane up to a roundabout encourages bad practice in positioning that puts a cyclist more at risk.

The main benefit of cycle lanes is as a means of filtering past congested traffic. Filtering is never a risk-free manoeuvre, but the dangers can be less obvious with a cycle lane than without. Since the dawn of motoring, cyclists have been well advised to keep clear of car doors and many injuries have resulted when this advice has not been followed.





This hasn't, alas, stopped some councils marking cycle lanes immediate adjacent to parking areas – the combination of parked cars, narrow lane and high-sided vehicle here is a clear disaster waiting to happen. In the Netherlands, a 1m protection zone is required by parking bays – why not here?

However, few people seem yet to have realised that a similar danger exists along nearside cycle lanes.

If the lane is narrower than about 2m, it is virtually certain that a cyclist would be hit by an opening door, yet it is on this side that passengers take less care. I know of 5 cases where cyclists have been hurt in such circumstances, sometimes seriously.



### Key points

Let me summarise some key messages.

- Cyclists needs have little in common with those of pedestrians.
- Cycle lanes and other segregated facilities are often advocated by the wish to attract new cyclists, but the majority of cycle facilities require *more* skill and *more* experience to be used safely, not less.
- And low-standard facilities invariably require more skill than high-standard ones.
- I have no doubt that bad facilities are worse than none.

Yet it is a valid point that we don't have space on most of our crowded city roads for 2m cycle lanes.

- Fortunately, most cyclists don't want cycle facilities per-se, but routes fit for cycling.
- And most cyclists believe that the most important routes are the roads.

Given the constraints of space and money in urban areas, I believe that measures to assist road sharing are also the most pragmatic way forward, and the one most likely to achieve high standards.

Indeed, it is of great concern to most cyclists that not only is so little being done to make it easier for cyclists to share the roads, but the introduction continues unabated of features, such as roundabouts, free-flow lanes and centre islands, that make cycling more difficult. No amount of separate facilities removes the need to get the roads right, and it is on this that I believe local authorities should be concentrating.

Of course, this was a key recommendation of *Cycle-friendly infrastructure*, which said that solutions for cycling should follow this hierarchy.

If proper attention is given to the needs of cyclists, then resort to the last option should be rare indeed. The needs of cyclists can almost always be met more satisfactorily through the first three options.

Unfortunately, too many councils seem to be choosing to follow this hierarchy in reverse order.

### Hierarchy of solutions

- Traffic reduction
- Traffic calming
- Junction treatment and traffic management
- Redistribution of the carriageway – without segregation
- Cycle lanes and cycle tracks

## Sharing the roads

So where should resources be directed?

First some general principles:

Increase personal space for cycling, but without segregation. Lane width is particularly crucial – not too wide to encourage high speeds but not so narrow as to squeeze the cyclist. Where there is more than one lane in any direction, the nearside lane could be made wider than the others. Unfortunately, in some places the opposite is happening and lanes are being made narrower to squeeze more in.

Parking controls can be used to give cyclists more room. Some people feel nervous about passing long lines of parked cars.

Simplify junction design, tighten the geometry and minimise speed differentials between cycles and other vehicles. Reduce conflicting movements and protect the vulnerability of cyclists. They shouldn't have to ride between lines of traffic to go ahead, as is the case when there are left-turn only lanes. Of course, this may have consequences for capacity, but then one of the best ways to maximise people capacity is to get more people on bikes.

Thirdly, design to discourage fast or aggressive driving and to reinforce the message that roads are a shared resource. The most helpful action would be for national Government to tame the ferocity of modern cars, to make them better suited for sharing the roads.

There are some types of facility that can be very useful in assisting cyclists. The most successful are those that enable shorter or quicker journeys, or the convenient by-passing of difficult junctions.



But there are also a number of specific features that mitigate against cycling and which cannot be left unaddressed by any pro-cycling policy.



Roundabouts are widely disliked by cyclists, whose vulnerability is well proven.



Free-flow left turns at these and other junctions require cyclists to ride contrary to the rules of the road to protect their safety and are unacceptably threatening to most people.

However, there has not yet been found any segregated solution to roundabouts short of grade separation on the scale of Stevenage.

Roundabouts can, however, be made less threatening by removing free-flow lanes, changes to the geometry and through the installation of traffic signals.

Positive advice to cyclists on the vehicular cycling techniques that alone are successful in minimising risk would also be helpful. However, the continuing trend to add new roundabouts by default on busy roads is quite incompatible with making the road environment less threatening to cyclists and pedestrians.



The increasing use of centre islands, build-outs and other squeeze points on busy roads is also incompatible with a pro-cycling policy. Even vehicular cycling cannot always counteract the real increases in risk that these bring about. In the past few years, these devices have become some of the most disliked features of our roads.



Again, there is no cycle facility solution here, but where the intention is to assist pedestrians in crossing the road, the use of a zebra crossing could be an option that might be better for all concerned.

Feedback suggests that most forms of physical traffic calming cause some cyclists difficulty. The benefits of humps and speed tables are often negated by discomfort to cyclists and modern car performance. Even 20 mph zones can be uncomfortable for cycling if traffic is repeatedly braking and accelerating.



Rumble strips are not only uncomfortable but can be dangerous if encountered at even moderate speed. The advice to leave at least a 0.75m gap to each side for cyclists is rarely heeded.

Raised gateway devices are also more keenly felt by cyclists than other road users.



More generally, the condition of road surfaces is of particular importance to cyclists.

In many towns, spending the same money on road maintenance would be of greater assistance to more cyclists than the provision of off-road paths.



Road works should also accommodate the safe and convenient passage of cyclists, and not expect them to dismount. Lane width and the timing of traffic signals are critical matters to be considered.



#### **In conclusion:**

- Follow the Hierarchy of Solutions
- Use special facilities more sparingly, and only where they bring genuine benefits that cannot be obtained without.
- Give priority to assisting cyclists to use the principal cycling network that we already have – the roads.
- Please don't add new problems to those that already exist.

*John Franklin*  
*john@lesberries.co.uk*  
*www.lesberries.co.uk/cycling*  
(A pdf version of this paper is available at this site)