INFRASTRUCTURE/ **NETWORK LINKS**

TRAFFIC CALMING and CYCLING

Overview

On quiet, residential streets, road space can be safely and comfortably shared by all users, without any special provisions for cyclists or pedestrians. The road design must slow down the rare local traffic, by using narrow profiles, speed reducers or both. Such traffic-calming devices must be cycle-friendly in their design. Reduced traffic and local cycling links should be designed into new residential developments.

Background and Objectives

Function

Traffic calming measures create the conditions for mixed traffic, which allow cycling without any specific cycling provisions.

Scope

Mixing cycling with traffic should be the default option for cycling on local residential streets. Traffic calming can be considered on local access roads at low speeds: below 30 km/h inside the built-up area, and 60 km/h outside the built-up area. Traffic intensities should be low: below 5000 pcu/day. This applies typically to residential areas with mainly local facilities.

Implementation

Definition

The main traffic calming measures are narrowing the carriageway and creating speed reduction facilities. This should be done in a bicycle-friendly manner.

Why traffic calming is needed

Street design inducing low traffic speeds is the key to making mixed traffic work. On local residential streets, with little traffic and speeds below 30 km/h, mixing traffic should in principle be possible. But putting up a 30 km/h speed limit sign is generally not enough to ensure low speeds. If nothing is done about street design, cars will tend to drive faster and so endanger pedestrians and cyclists. Imagine a car facing a relatively wide street, empty of traffic and with few pedestrians and cyclists in sight, with few intersections and no pedestrian crossings, possibly one way. In this situation, all visual road information seems to signal that cars can drive full speed ahead. Slowing down to respect a 30km/h road sign takes a conscious effort that feels unnatural. Traffic calming means designing the road in such a way that slowing down seems natural and speeding is made physically more difficult or even impossible. There are two basic options: horizontal and vertical traffic calming devices.

Road narrowing

The most effective way is horizontally **narrowing the road profile**, thus forcing motorists to remain behind the cyclist when there is oncoming traffic. This is possible up to relatively high traffic intensities (up to 500 pcu/h) when there are relatively few cyclists.

- Possible devices are widening the pavement, pavement buildouts at intersections or in mid-section, chicanes[1] and central refuges.

[1] CHICANE: an undulating traffic path, created through pavement buildouts, intermittent parking, sculptures or plantings.

- Parking should be off the carriageway, in parking bays or on estates. Installing diagonal parking bays is a simple way of narrowing the road while increasing parking capacity.

Recommended road width dimensions are either below 3 m or above 3.85 m

- Below 3 m, cars will not usually attempt to overtake cyclists.
- Between 3m and 3.85 cars will often attempt to overtake, but there is not enough space to do so safely.
- At speeds up to 30 km/h, the width can range from 3.85 m (car + bicycle, in case of extremely low intensities) to 4.85 m (bicycle + car + bicycle).
- At speeds up to 60 km/h (outside built-up area), the width can range from 4.5 m to 5.5 m.

When badly designed, street narrowing measures may be uncomfortable or dangerous for cyclists. It is especially important to **create by-passes for pinch points**. Pinch-points are place where the road momentarily narrows, to slow down motorized traffic. In those cases, cyclists should be able to by-pass them in a straight line. The cyclist should not be forced to negotiate the pinch-point together with traffic, which creates a risky struggle for space involving a swerving movement.

Vertical speed reducers

Additional **vertical speed reducing devices** may still be needed, such as speed humps[2], speed tables[3] and speed cushions[4]. These measures increase overall safety. However, they can also be **restrictive for cyclists**, who may be forced to slow down or deviate from their path. We should opt for **cycle-friendly speed reducers**, designed in such a way as to reduce or eliminate the inconvenience for the cyclist.

- The most cycle-friendly devices are those that do not take up the entire width of the road, such as speed cushions or bollards to block car access physically. In these cases, **cycle bypasses** can easily be provided: the design obstructs car speed or car entry, but allows cyclists to continue on a direct route. For comfort, the bypass should have the width of a cycle lane: 1.5 m wide. A width below 1.2 m requires the cyclist to concentrate on avoiding obstacles, to slow down and to lose momentum. The bypass should be clearly marked with a bicycle symbol and appropriate signage.
- In other cases, **cycle-friendly speed reducers** can be put in. Some popular speed reducers take up the entire width of the carriageways, and cyclists have to ride over them, just like cars: speed humps and speed tables (also used for intersections). Basically, these are unattractive and uncomfortable for cyclists. To minimize the inconvenience for cyclists, they should be of sinusoid design, to allow the cyclist to pass with little difficulty.
- Often **cycle-and-bus-friendly speed reducers** can be put in. In urban areas, often buses and cyclists pass through local streets. Bus-friendly speed tables and speed humps also provide comfort for the cyclist. Speed cushions can be designed to allow buses' wheels to drive on both sides, while leaving bypass space for cyclists.

Traffic reduction and alternative routes

Do not count on road design to solve all problems. Sometimes we need to look beyond the street in question and **reconsider the structure of road and cycling networks**. Suppose a local cycle link is considered absolutely vital to the network, but traffic intensity and speed are too high for mixing, but there is no space for cycle tracks or even lanes.

- In such a case, **traffic reduction** should be considered as the first option. Can the road function be downgraded in the road hierarchy, in order to become a 30km/h local access road? Can traffic be deflected to other routes, for instance by creating or adapting a one-way street system, or by closing off car access on to street sections or at intersections, with bicycle bypasses? Can certain types of traffic be restricted, on the basis of weight and

[2] SPEED HUMP: a short rounded hump, spanning the width of the road
[3] SPEED TABLE: a longer hump with a flat space in the middle, long enough to accommodate an entire wheelbase
[4] SPEED CUSHION: a narrow hump, not spanning the width of the road, forcing cars to drive over them with one wheel, but allowing vehicles with a wider axle, notably emergency vehicles, to straddle them and drive along unhindered.

height, in order to increase safety? Can parking space be moved out of the street? Can the road space be reallocated?

- Or perhaps an **alternative cycling route** can be found? Often a pragmatic trade-off needs to be made between directness, comfort and safety: a less direct mixed-traffic route may be preferable to a more direct but also more dangerous route, at least if the detour is acceptable and does not risk simply discouraging cyclists. Or a new shortcut on a dedicated cycle track may be created, for instance through a park or creating a cycling bridge.

The **UK provision hierarchy for cyclists**[5] tells cycle infrastructure designers always to consider traffic reduction and speed reduction as the first options. Only where these are ruled out should they consider junction treatment and reallocation of road space. And only as a last resort should they consider cycle lanes and cycle tracks. This is a matter of principle: pedestrians and cyclists should have the possibility to use street and road infrastructure with the greatest degree of safety and comfort and as little obstacles as possible. Other arguments given are the wider community benefits of traffic reduction and traffic calming, and greater cost-effectiveness.

	Provision hierarchy for cyclists (UK guidance)	
Consider first	Traffic reduction	*Would a reduction in traffic volume or exclusion of specific vehicle types improve conditions sufficiently?*
	Speed reduction	*Would speed reduction improve conditions sufficiently?*
	Junction treatment, hazard site treatment, traffic management	*Would traffic management improve conditions sufficiently?*
	Redistribution of the carriageway (bus lanes, widened nearside lanes etc.)	*Would bus lanes or widened nearside lanes be sufficient?*
	Reallocation of the carriageway to cycle-specific facilities	*Would cycle lanes (or cycle tracks created by carriageway narrowing) be sufficient?*
Consider last	Off-carriageway cycling facilities	*Would cycle tracks be sufficient?*
Note: the design might be a combination of measures		

Source: DfT (Department for Transport) – LTN 1/04 – Policy, Planning and Design for Walking and Cycling.

Cycle-friendly new residential developments

In new urban developments, traffic calming is to be considered as integral to **permeable urban design** and **sustainable land-use planning**.

- In **residential neighbourhood developments**, traffic calming should be integrated in the urban design at an early stage. The lay-out of the road network can combine low-traffic areas and cycling bypasses into a coherent network. A system of traffic cells, combined with cycle bypasses is a very effective way to give the advantage to sustainable traffic modes: motorized traffic can only use a restricted number of entries and exits and drive in loops, while cyclists (as well as pedestrians and public transport) can cross at many points on direct routes. However, road widths should be able to accommodate cars and cyclists. A preliminary cycling design audit for any important new development, involving cyclists, is a way to detect such issues in advance.
- More fundamentally, traffic calming should be an integral objective of **traffic management and land-use planning**, which has a crucial, long-lasting structural impact on traffic and modal split. Traffic management tools include road pricing and parking management. Land-use policy should favor mixed-use urban development to reduce trip

[5] DfT (Department for Transport) – LTN 1/04 – Policy, Planning and Design for Walking and Cycling. http://www.dft.gov.uk/consultations/archive/2004/ltnwc/ltn104policyplanninganddesig1691 - consulted 31.08.2009.

distances: segregating land-use functions has been steadily increasing trip lengths, which diminishes the scope for cycling and walking.

- **Urban design** for large-scale urban extensions should **first lay out coherent cycling and walking networks** and then fit around it a road network for motorized traffic. Traditionally, first a coherent road network is defined, and cycling and walking provisions added on. If we consider cycling and walking as primary urban modes and car access as secondary, the traditional designing process should be reversed[6]. In the same way, the public transport network should be defined before the private traffic network.

Cycle-friendly vertical and horizontal speed reduction (image source: D. Dufour)

Road point closure with bollard or cycle bypass (image source: T. Asperges)

Considerations

Strengths

Traffic livability. Apart from their benefits for cycling, traffic calming measures are generally popular with inhabitants of residential areas. They are perceived as increasing livability and the quality of the local environment in terms of safety and noise reduction. Often, there are co-funding opportunities of cycling and walking infrastructure with public space improvement programs.

Reclaimed public space. In terms of traffic, mixed traffic redresses the balance between motorized traffic on the one hand and walking and cycling on the other: sharing the road space. But beyond traffic concerns, there is also a wider community benefit: sharing public space. By slowing traffic speed down and eliminating the need for infrastructures that segregate modes, the traffic function of the road becomes less prominent, and it becomes more attractive for non-traffic uses: children's play, strolling, and social encounters. Traffic space is reclaimed as public space and it can be better integrated into high-quality streetscape design.

Cycling visibility. Speed reducers or obstacles with generous, highly-visible bypasses strengthen the cycling network's visibility and demonstrate cycling's competitive position towards motorized traffic.

Weaknesses

Risks of uncomfortable design.

[6] EU project PROMISING – 2001: *Measures to promote cyclist safety and mobility*, Deliverable D2

- Narrow profiles at 60 km/h (outside the built-up area) are not really comfortable or safe for the cyclist.
- Narrow bypasses can be uncomfortable or even unsafe for cyclists: risk of hitting an obstacle).
- Badly designed speed humps can be uncomfortable, especially pre-cast models that do not have an adequate sinusoidal profile, or that become unstuck.

Alternative options

CYCLE STREETS for main cycle routes on residential streets.

CYCLE LANES (OR TRACKS) when road traffic is intense.