

A.14 Corner Radii

Key Principle

The minimum radius of curvature for the path followed by cyclists using the road should be 6m. Where cyclists need to turn sharply (e.g. when leaving the carriageway at a cycle gap) this may be reduced to 4m.

Design Guidance

Background

The following guidance may be applied to any situation where cyclists must markedly alter their course of travel. Designers should assess the following factors to decide whether the radius of any particular corner (including bends on roads and cycle tracks) is an issue for cyclists.

- *Projected cyclist design speed*

Except at junctions or where other safety issues apply, the basic premise should be that cyclists should be able to manage corners without a loss of speed and hence momentum. This is particularly true for commuter or strategic routes favoured by fast, confident cyclists where the design speed should be 20mph. On downhill stretches, a higher design speed may be necessary.

Manual for Streets:

6.4.7 Where cycle-specific facilities, such as cycle tracks, are provided, their geometry and visibility should be in accordance with the appropriate design speed. The design speed for a cycle track would normally be 30 km/h (20 mph), but reduced as necessary to as low as 10 km/h (6 mph) for short distances where cyclists would expect to slow down, such as on the approach to a subway. Blind corners are a hazard and should be avoided.

- *Usable width of carriageway or cycle track*

Whilst cyclists may try to use all of the available width to reduce the tightness of a bend, they may be constrained from doing so by other traffic. The kerb radius employed should, therefore, be no less than the smallest one a cyclist is capable of following.

- *Sightlines around the corners and bends*

The ability of a cyclist to interact safely with other traffic, including pedestrians, depends on the sightlines available. These affect the ability to maintain momentum, anticipate the actions of others and, if necessary stop in time.

- *Superelevation, skid resistance and surface characteristics*

Under normal circumstances no form of superelevation is required to assist a cyclist's progress around a bend. However, this does not mean that negative camber is acceptable. Cross-fall provided for

drainage purposes on a curve should create a positive camber under all circumstances. It is important to ensure that the surface has adequate skid resistance especially where cyclists turn onto ramps at speed tables etc. The presence of leaves, standing water or ice, other surface defects, gratings or slippery road markings can also make corners hazardous and should be addressed through suitable maintenance regimes.

On-carriageway routes

Cyclists are generally well catered for in the design of all-purpose roads in terms of corner radii at junctions and horizontal alignment on links.

The minimum radius of curvature for the path followed by cyclists should be 6m. Where cyclists need to turn sharply, for example when entering or leaving a side road junction that has been narrowed as part of a traffic calming measure, this may be reduced to 4m providing it does not bring cyclists into conflict with vehicles coming in the other direction.

Where very tight kerb radii are provided, for example where cyclists need to turn into a gap created at a road closure, the gap into which they turn should be widened so that the radius of their path is at least 4m. This will enable them to maintain their balance while ensuring that they do not have to pull out into the carriageway to follow this radius.

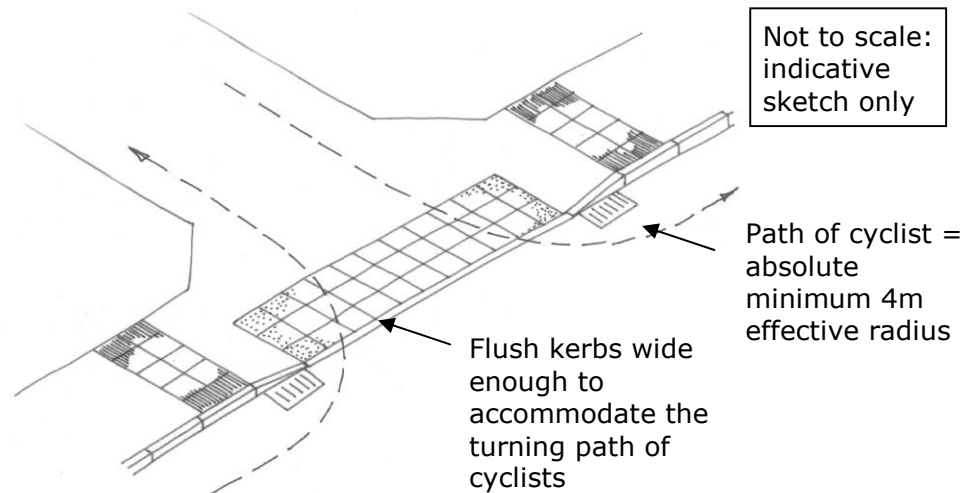
In common with motor vehicles, tight radii at corners and junctions will tend to reduce the speed at which cyclists are able to manoeuvre. Where a road, or a cycle track, is bounded by walls or hedges, the sharpness of a bend may also reduce a cyclist's forward vision and affect both stopping sight distances at junctions and bends and intervisibility between other vehicles or pedestrians (see [B04 Junction and Forward Visibility](#)).

When travelling around a blind bend, cyclists often take up a position near the kerb. Because of this, and their narrow profile, they are not so easily noticed by following motorists. In such cases, measures should be taken to reduce the hazard to cyclists.

Leaving/Joining the carriageway

The horizontal alignment of an off-road cycle facility should provide the necessary stopping sight distances within the alignment of the path and the sight distances in motion (forward visibility) within the adjacent margins. Where this is achieved, corner radii only become an issue where cycle tracks rejoin the carriageway or meet other cycle tracks or footpaths.

Cycle tracks should normally bring cyclists to the carriageway at 90 degrees to the kerb in order that they may easily see traffic approaching in both directions (this is not necessary if the cyclist is safely discharged into a cycle lane). The right-angled arrangement will cater for turning manoeuvres onto or leaving the carriageway. In these circumstances the minimum effective radius should be 4m.



Every effort should usually be made to achieve routes, on or off-road, which do not require cyclists to reduce their speed. However, where two cycle tracks meet and it is neither practicable nor desirable to allow cyclists to maintain their design speed (for reasons of safety in the presence of other users) the effective radius may be reduced to a minimum of 4m. Where two cycle tracks meet, the corners of junctions between cycle tracks should be chamfered by at least 2m by 2m to accommodate the path of the turning cyclist. In open sites a tight layout such as this should be avoided whenever possible as both cyclists and pedestrians will cut the corner when conditions permit.

Where circumstances do not permit the creation of a radius on the corner, for example when converting an existing path to shared use, it may be appropriate to reduce the speed of cyclists at or before the corner where forward visibility is restricted. Similarly, where site constrictions mean that desirable corner radii are not achievable, particular attention should be given to re-siting obstacles, such as barriers, posts, etc. which might otherwise lie unseen around a corner. If it is not possible to remove the hazard, measures may be needed to warn cyclists or reduce their speed on the approach to the corner.

In some cases, it may be appropriate to introduce corners or bends to reduce cyclist speed to minimise conflicts. Such techniques should be only used where absolutely necessary and appropriately designed

References

[Policy, Planning and Design for Walking and Cycling](#) – Local Transport Note 1/04, Public consultation Draft, DfT 2004

[Adjacent and Shared Use Facilities for Pedestrians and Cyclists](#) – Local Transport Note 2/04, Public consultation Draft, DfT 2004

[Manual for Streets](#) DfT, Communities & Local Government 2007

[Cycling England Gallery](#) pictorial examples

[London Cycling Design Standards – A guide to the design of a better cycling environment](#) (Sections 3.4, 3.5, and 3.6) TfL 2005

[Lancashire - The Cyclists' County](#) (pdf - 5.45Mb) (Section 3) – creating pleasant road conditions Lancashire County Council, 2005

[CTC Benchmarking – Best practice case studies](#)

Other references

[National Cycle Network – Guidelines and Practical details, Issue 2](#) Sustrans 1997

[Cycle Friendly Infrastructure - Guidelines for Planning and Design](#), Bicycle Association et al 1996