

## Tramway Clearances

On this page you will find guidance on the clearances within the tramway system, and also between the tramway and other parts of the highway. For information on electrical clearances [click here](#). In addition, clearance diagrams for a variety of situations can be found [here](#).

The guidance below is in line with best practice:

- Adequate lateral clearances should be provided to allow trams to pass one another on adjacent tracks, or between trams and other road vehicles on adjacent carriageways, as well as between trams and fixed structures, to allow for the presence of people.
- These clearances should be developed from the Swept Envelope as defined below and should consider any additional allowances for pedestrians, cyclists and other road vehicles.
- Where a system uses a variety of trams, the effects of different kinematic envelopes need to be considered.
- In terms of clearances where a high-sided vehicle is on a cambered road adjacent to a tramway, the clearance between the top of the vehicle and the higher parts of a tram could be less than the clearance at ground level.
- Where tramways cross Local Authority boundaries to include more than one local Highway Authority, the tramway system should seek consistency across its network regardless of the different Highway Authority preferences.

### Definition of Swept Envelope

The tramway path (the area reserved for a moving tram in its environment) is derived from the SE by adding the minimum appropriate clearance.

The definition of the Swept Envelope (SE) is based upon the kinematic envelope as defined below:

*Previously the UK tramway guidance used the term Developed Kinematic Envelope (DKE), rather than Swept Envelope. Although the terms are mutually interchangeable and represent the same practical effects, use of this term SE will help to give better consistency with European practice. It is recommended that the term SE is used in place of DKE.*

### Tram Static Envelope

The tram static envelope is that formed by the maximum cross-sectional dimensions of trams to be used on the tramway and, where applicable, their loads when at rest on straight and level track.

It should not include driving mirrors where these are designed to deflect as with other road vehicles.

However, clearances to fixed highway obstructions will still need to be considered.

## **Dynamic Envelope**

The dynamic envelope is the tram static envelope enlarged to allow for the maximum possible displacement of the tram in motion with respect to the rails on straight track.

The dynamic envelope should take into account tram suspension characteristics and allowances for tolerances in the maintenance of trams, including wear.

The effects of end-throw and centre-throw of trams on curved track are not included, and are disregarded in the development of the dynamic envelope.

## **Kinematic Envelope**

The kinematic envelope is the dynamic envelope enlarged to allow for the permitted tolerances in track gauge, alignment, level and cross-level and the dynamic and static effects of track wear.

The kinematic envelope is speed dependent.

The kinematic envelope is developed to take into account all the possible effects of curvature, including super elevation of the track, and end and centre throw of the tram.

## **Swept Envelope (SE)**

The swept envelope (SE) is speed dependent like the kinematic envelope, but is unique to the particular location at a given speed.

Over-generous methods of calculation of the SE should be avoided, as they may mislead other road users as to which parts of the highway are safely accessible to them and may create unnecessary design constraints.

The effects of high centre of gravity in low-floor trams and of independently rotating wheel sets may also need to be considered.

The enlarged SE of a tram in a credible degraded condition (such as suspension failure) should not exceed the normal SE plus the clearance to any fixed object or the established SE of a tram in an adjacent track. This should allow a tram to be recovered, albeit at reduced speed, without it coming into contact with structures or other passing trams.

## **Clearances Between Trams**

The clearances between the SEs of two adjacent trams should be not less than the following:

- 100 mm without centre traction poles, and
- 600 mm with traction poles between the two SEs (but at least 100 mm from the face of the nearest side of a pole to each SE).

The above clearances are minimum clearances up to 2100 mm above ground level. At heights above 2100 mm, reduced clearances may be acceptable and should be agreed with the Infrastructure Owner and the Operator.

In sections where there is insufficient clearance for traction poles, attaching OHLE to buildings can be considered.

## **Clearances Between Trams and Structures**

The clearances between an SE and other highway features or fixed structures should be as follows:

- 100 mm to an isolated obstruction in the centre of the carriageway or on a side reservation, 200 mm to the edge of a traffic lane,
- 300 mm to a kerb (where pedestrians are excluded), and
- 600 mm to a continuous obstruction in the centre of the carriageway or on a side reservation, for example walls or lengths of guard railing etc.

The above clearances are minimum clearances up to 2100 mm above ground level and where circumstances permit, appropriate greater clearances should be adopted. At heights above 2100 mm reduced clearances may be acceptable and should be agreed with the Infrastructure Owner, Operator and Highway Authority.

The above clearance distances should take into account pedestrian movements in the provision of adequate clearances between the SE and any structure or pole.

## **Clearances on Highways**

Traffic lanes used by trams and other large vehicles, such as buses, coaches and heavy goods vehicles should normally be 3650 mm wide for a two-lane carriageway.

Lane widths that are shared between trams and other road vehicles will probably be dictated by the needs of the latter.

A minimum lane width should be 3250 mm unless agreed with the relevant Highway Authority /Authorities.

The overall layout within constricted urban areas may benefit from a detailed assessment of lane widths actually required depending on the classes of traffic that are to use each lane, for example buses only, but taxis may be allowed to use bus lanes.

The Road Vehicles (Construction and Use) (Amendment) (No.6) Regulations 1995 – (<http://www.legislation.gov.uk/ukxi/1995/3051/contents/made>) - permit vehicles up to 2550 mm wide on a highway, and mirrors can be outside of this measurement so the effective overall width of such a vehicle can be as much as 3000 mm. This may need to be considered where there are traffic lanes adjacent to those used by trams.

The widths of the lanes used by trams are based on a tram having an overall width of 2650 mm. Where narrower trams are used, the recommended lane widths for sole use by trams may be reduced and where wider trams are used, the recommended lane widths might need to be increased.