This document is intended to give a quick guide. The downside is the risk of approximation and incompleteness. For more information please consult the documents referenced in this document

Urban

▷ Certu 2007/12

Obstacles in urban areas

The purpose of this document is to make planners aware of the safety issues relating to accidents that result in a collision with an obstacle in an urban area and to provide a few potential solutions to limit the consequences.

From the concept of "obstacle", the challenges of accidents resulting in a collision with an obstacle in urban areas and the potential recommendations are presented.

Definition of an obstacle

An obstacle can be defined as:

ìAn object or item on the roadside that could provoke a severe enough deceleration to cause serious bodily harm to the occupants of a vehicle that may accidentally leave the road for any reason.î

This definition leads us, for example to consider many common objects in towns as potential obstacles:

- Electricity pylons or telephone poles.
- Streetlamps and light posts
- Large road signs.
- Trees.
- Stone structures.
- Bus shelters.
- Certain parapet ends.
- Vertical structure bases.
- Some street furniture such as large flower tubs or fixed anti-parking structures.
- Any parked vehicle, although the problems caused are different from those for other obstacles.
- Drops and banks.
- Traffic islands more than 15cm high.

Collision on a roadside at 45 km/h.
Source INRETS-MA

The overall challenges of accidents involving obstacles in urban areas

Safety is very important (for more information, see Certu study of 2001:

– in towns, this is about one accident in eight and one death in three (nearly 700 deaths per year);

– the issue of accidents with obstacles is the same as that for accidents with pedestrians.

Two thirds of accidents concern **4 types of obstacles:**

⇨ Buildings and masonry structures: 20% of accidents involving obstacles.

⇨ Poles and supports: 17%.

⇨ Traffic islands and kerbs: 16%.

⇨ Parked vehicles: 14%.

Fatal accidents mainly occur in collisions with **3types of obstacles:**

⇨ buildings and walls: 27f deaths in accidents involving obstacles;

⇨ road igns and all posts and streetlights: 19%;

⇨ trees: 17%.

Two thirds of all deaths involve these three types of obstacle, and even nearly three quarters of deaths in small towns and villages. This mainly concerns objects that do not crumple in a collision with a car and especially a bicycle or motorbike.

Violence of collisions with obstacles depending on speed

A collision with an obstacle is extremely violent, even for a user wearing a seatbelt:

Collision with a bus shelter

Source INRETS-MA

– a collision with an obstacle at 70 km/h is like a 20-metre fall (7th floor):

– a head-on collision can be fatal at 65 km/h;

– a side impact can be fatal at 35 km/h;

Despite speed restrictions in cities, there is still a high number of serious accidents where light vehicles or motorbikes collide with obstacles.

In urban areas, this presents a number of important issues

Speed is often kept at 50 km/h in towns and cities. It is usually easy to slow down or stop in an emergency. But there are some specific factors that together explain this risk to a certain extent:

– traffic with a number of different types of user (cars, public transport, motorised two-wheel, cycles, pedestrians, etc.);

– a high density of objects on the roadside as found in many towns and cities, part of which can become an obstacle;

– high frequency of junctions and therefore multiple manoeuvres;

– littls room for emergency manoeuvres.

The potential gain achievable by extending the use of 30 kph zones remains an ideal.

Recommendations

The safety issues relating to collisions with obstacles warrant some research into specific safety measures intended to avoid this type of accident or at least limit the consequences for users, without reducing safety for other users of public spaces, especially pedestrians and cyclists.

The problem is not simple because of the very natre of urban traffic, which is characterised by a large number of users in a small area. The classic solutions used in inter-urban areas regarding obstacles are usually not suitable.

Rather than looking for standard solutions, it would seem more sensible to define a specific policy. Several paths of action can be taken, as long as they are backed up by research, which is currently still quite rare. It is important to note that the following proposals come directly from accident analysis results:

1°. The proportion of accidents involving a single user is high

with classic factors relating to behaviour - speed, alcohol, tiredness - present in several cases. Excessive speed is very often mentioned. **There is no doubt that reducing speed is a key solution for reducing the number of accidents with obstacles.**

The problems caused by these accidents are such that speed reduction is justified, almost as much as other common issues, such as accidents with vulnerable users.

2°. Accidents are most common on main roads:

It is therefore necessary to **attempt to prioritise these roads.**

3°. Some areas are more often the scene of collisions with obstacles. These should be identified and there should be local discussions on action that needs to be taken.

The most common areas concerned are:

– incoming roads with bends, especially on high-speed roads (often the case with small towns and villages);

– wide roads that often encourage speeding;

– roads on hillsides or slopes and structure bases (especially bridge piers);

– junction areas where there are often multiple collisions with users hitting an obstacle.

These areas **should be identified.**

4°. There are a number of solutions for reducing the consequence of a vehicle leaving the road, aside from those relating to primary safety (limiting accident frequency).

a - General principles: measures can in theory be taken with obstacles themselves. As in open countryside, in decreasing order of importance, it is possible to:

– remove them;

– change them and make them less aggressive;

– move them away to limit the probability of a collision;

– separate them from traffic by putting a less aggressive feature in front of them.

In towns and cities, the available space limits this type of solution.

It is also useful to provide good visibility of any obstacles day and night.

However, before choosing a solution for a type of user, **it is necessary to make sure that the effects of the solution do not worsen the situation for other categories.** For example, it would be confusing to put crash barriers in front of trees if that encouraged drivers to think they were on a fast road and therefore speed up when in fact they are crossing a densely populated urban area with vulnerable users.

b - There are many objects standing on the roadside that could become obstacles and thus require different approaches, depending on requirements, the users concerned and where they are. **Different actions are therefore required depending on the type of obstacle.** All require in-depth analysis of the environment concerned. Implementation of such action first requires an understanding of the safety problem by those involved.

concerned: city technical departments, network managers (electricity, telecommunications), public space planners, architects, etc. Then the implementation of the most urgent actions can form part of a project that is specific to each party.

c - On a technical level, there are several classic solutions required during project design or on a service level: this involves limiting the number of obstacles or moving them from the immediate roadside. Other obstacles can be changed in shape: e.g. the ends of certain structures on fast roads can be adapted with a slightly inclined area limiting the risk of blockage.

The following examples are given to illustrate this subject, without being exhaustive:

Electricity pylons or telephone poles / streetlamps

- bury lines, fix them to walls;
- look at lighting systems with a view to limiting the number of light points;
- choice of multi-function supports;
- move poles away as much as possible at bends.

Signage

Carry out research into standardising signage, especially regarding the road sign master plan (grouping signs together, etc.) with a view to removing unnecessary signs and poles.
Avoid over-large supports, avoid having post bases too close to the roadside on main roads, use shock-absorbing supports for some signs (D42)

Advertising boards

This is an unnecessary obstacle. Maintain restricted advertising areas (Law of December 29 1979 relating to advertising hoardings) and look as flexible supports as possible.

Trees

Have a choice of species with a trunk diameter that suits the type of road. Avoid aggressive protection of plants (for example heavy concrete or metal covers) and maintain a minimum distance between the plant and the roadside (depending on the type of road).

d - Two other important points are worth paying attention to because they can provide significant developments in the short term.

The first concerns restraining devices in uban areas

Restraining devices are structures for limiting the consequences of leaving

street, especially for the motorised user. In urban areas, there are two types of major risk:

– on the one hand, risks relating to certain street features justify the use of anti-collision systems with users driving in opposite directions. This is the case, for example, of some very busy roads, with a winding and/or sloped trajectory;

– on the other hand, potential risks relating to the presence of an area of activity close to the road where a vehicle leaving the road would have serious consequences: a school on the outside of a bend, a public service with a large number of pedestrians close to the roadway, a factory with sensitive product, etc.

It should be noted that any system used must be agreed, standardised, certified or authorised by the Direction de la Sécurité et de la Circulation Routières (DSCR - Directorate for Road Safety and Traffic).

The use of metallic safety barriers which are often found on inter-urban roads is usually poorly suited to dense urban areas, especially as there are usually problems installing them in accordance with recommendations (and due to the use of underground space). Wooden or concrete devices are also available. The main problem is gauging the efficiency of these devices.

A recent Certu survey showed that nearly half of all devices used were poorly suited to requirements: badly situated, dangerous ends, etc.

Systematic upgrading or adaptation of curent devices is to be recommended with the following priorities:

– removing these can be dangerous, especially the ends of safety barriers and links between different devices;

– improving the restraining capacity of devices not suited for major risks such as a car falling onto a railway line.

The development of new facilities adapted for the town is also preferable. These devices should meet the restrictions of specific types of collision, e.g. collisions at 50 km/h, while taking other road users into account, especially so as not to be a nuisance to or dangerous for pedestrians and cyclists or users of motorbikes and mopeds. Furthermore, they meet specific standards of urban aesthetics. Finally, it is also useful to question the usefulness of some safety barriers, which are often installed as a universal solution for dealing with obstacles where they can in fact be obstacles themselves (poorly positioned, unsuitable type of barrier, etc.).

The second area of possible innovation is development of **making obstacles fragile.**

The basic idea is to add a system that makes an obstacle's basic component less rigid when hit.

Today, some contries use shock-absorbing supports on a large scale for signage and lighting which can absorb the energy of a vehicle in a 100 km/h collision without causing serious injuries.

In France, the possibility of using such systems depends on the DSCR's authorisation request.

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Associated subjects

- Speed and road operation in urban areas
- Safety and hierarchy of urban roads
- Controlling speed through design
- Project safety audit

Bibliographic references

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- NF EN 1317 (1 - 6): restraining devices
- NF EN 12767: structures accommodating passive-safety highway equipment.

The series of documents "Basic Road Safety" formed part of the MPSR project "Road Safety Management and Practices" by by RST working groups managed by Certu for urban areas and by Sétra for interurban areas.
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These sheets can be downloaded from the following web sites:

- Certu (http://www.certu.fr)
- "DSCR road safety "job portal" (http://securite-routiere.metier.i2)
- Sétra (intranet: http://catalogue.setra.i2 and Internet: http//catalogue.setra.equipement.gouv.fr).

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