Cerema

Improving street design
10 essential principles for safety

collection
Essentiel

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UNE VOIRIE POUR TOUS
sécurité et cohabitation sur la voie publique au-delà des conflits d'usage

Aménager la voirie
10 principes essentiels pour la sécurité

English version

Certu

Improving street design

10 essential principles for safety

Foreword for publications translated into foreign languages

The purpose of translated documents and publications is to pass on to non-French speaking readers the French know-how set out in the original publication, whether this concerns methodologies, tools or best practices. Original publications in French are subject to a checking process, which leads to a Certu commitment regarding their content. English versions do not undergo the same process, and consequently carry no Certu commitment.

In the event of differences between the English and the original French text, the French text serves as the reference.

"A way for all"

Urban road networks are too often designed with the needs of motor vehicle traffic in mind, to the detriment of other users, especially the most vulnerable users. However, with space at such a premium in urban areas, a wide variety of needs from multiple different users, and the need to reconcile often contradictory objectives, contracting authorities and designers are having to come up with ever more complex solutions to deliver an effective, mixed use road network. The term "A way for all – Safety and common usage without conflicts of interest" is used to identify all Certu works which are designed to help decision-makers and technical experts meet this objective, i.e. to ensure that urban roads are both high-quality and shared effectively.

Note on illustrations:

The photographs and drawings contained in this document are included for illustration purposes. All examples should be adapted and modified to suit the context of each location.

Sommaire

Preface

In France, road safety has become a key issue on the national agenda. The President has set a target of reducing the number of deaths on the country's roads to fewer than 3,000 per year. Some two thirds of personal injury accidents take place in urban areas, with a high proportion of these involving vulnerable users. There is therefore substantial room for improvement in this area.

Certu and the Association des Maires de France (French Mayors' Association) have been working together successfully for several years to improve road safety. The AMF and Certu have also been working in partnership with the Direction de la Sécurité Routière (Department for Road Safety) for a number of years.
There are several possible strategies for improving road safety. These strategies are complementary and should therefore be combined. Certu has already published a number of works on this subject.

Vehicle speed is, of course, important and policy in this area cannot be ignored. However, focusing solely on speed is not sufficient. Indeed, a more effective way of influencing driver behaviour is to focus on road network development.

This simple, highly commendable work sets out the basic principles which decision-makers should bear in mind when undertaking urban space redevelopment work with the aim of improving safety.

This guide has been complied with the assistance of several local authority departments. Its primary purpose is to provide all stakeholders with a set of essential rules and actions that will help to improve road safety.

I hope that it will act as a resource for mayors and their technical staff, covering the basic principles on which their actions should be based. This publication also features a number of illustrations. These may be used as a practical basis for debate and discussion, and to encourage gradual changes in the way in which urban spatial development is approached.
The collaboration between Certu and local authorities is undoubtedly a source of added value, both for public policy in general, and for road safety in particular. I would once again like to express my delight at this partnership. I hereby invite local councillors, technical experts and other users to draw inspiration from the recommendations given herein for the common good.

Jacques Pélissard
President of the AMF (French Mayors' Association)

Introduction

Public space and street design can genuinely help to reduce the number and severity of road traffic accidents in urban areas, provided that a few basic principles are followed. If sufficient attention is paid to the needs of vulnerable users, and efforts are made to reconcile different forms of transport for the benefit of all users, then development initiatives can make real improvements to comfort and safety, and can lead to the reappropriation of urban public space.

This global approach to safety improvement is part of the national "A way for all" programme, which aims to promote new practices to manage conflicts of interest between car drivers and other road users. This programme places particular emphasis on the most vulnerable users and looks to promote alternatives to individual motorised vehicles.

In France, the focus has long been on driver behaviour and vehicle safety, too often neglecting the third pillar of road safety: road infrastructure and environment. The challenge now is to adopt an approach that looks beyond safety improvement work. Instead, the focus should be on identifying and rectifying the most hazardous situations and spatial configurations on existing road networks. Development projects should also focus on improving travel safety and avoiding dangerous road layouts. In those countries in northern Europe with the best records, road and street development projects form an integral part of their road safety strategy.

This document is designed for councillors and developers. It provides a summary of current road safety and urban road network development knowledge and expertise. Through an analysis of the most common hazardous travel safety situations and an assessment of proven knowledge in this field, a series of 10 key recommendations has been drawn up to deliver effective improvements in road network developments.

The rigorous application of these recommendations should lead to a substantial reduction in the risk of accidents along redeveloped streets.

These recommendations may only be implemented on a case-by-case basis, however, through the involvement of technical experts with the ability to analyse technical urban street design documentation and adapt its contents to local circumstances.

Furthermore, any action taken can only be truly effective if it is implemented as part of a conurbation-wide, long-term road safety management strategy that involves both local councillors and professionals.

The aim of this publication is to act as a guide for local authorities to implement such a strategy.

Part one provides a brief outline of travel and transport safety issues specific to the urban environment, followed by a more detailed account of the key principles of a travel safety management strategy. Part two then goes on to provide 10 recommendations, along with illustrations, based on this analysis.

Urban design projects and safe travel:
a few guidelines

1.1. What are the travel and safety challenges in urban areas?

This chapter contains data covering daily journeys in an "average" French conurbation, since there is a substantial difference between the figures for the city of Paris and smaller rural towns and cities. The data are taken from the results of so-called "household travel surveys" (see appendices), conducted on a regular basis in large French conurbations.

Five household travel surveys, conducted in Lille, Lyon, Rennes, Rouen and Reims since 2006, all show that car use on weekdays is on the decline. This is the first time that this trend has been seen, since the first surveys were conducted in the early 1960s. At present, however, the data are not sufficiently exhaustive to extrapolate this trend to small and medium-sized towns and cities.

The figures reveal other trends, which can also be seen in other European countries:

• an overall decline in travel [1] (the number of journeys per inhabitant per day), with a particularly sharp fall in car journeys;

• an increase in travel on urban public transport;

• an increase in bicycle use.

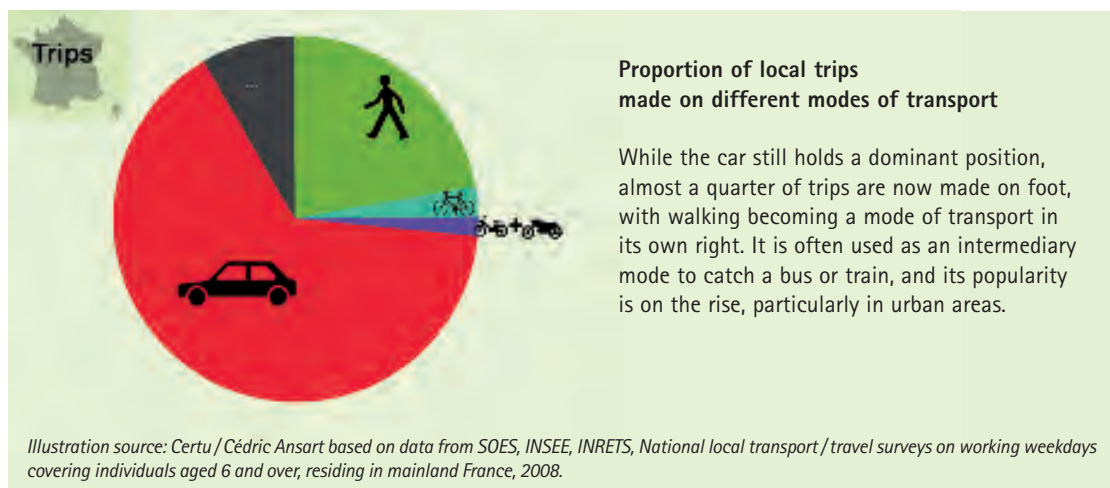While it is too early to talk about a return to sustainable modes of transport, these observations are supported by the findings of other studies, as well as an analysis of the factors that are driving down car use.

What are the most commonly used forms of transport at present?

In the surveys conducted, the car remained by far the most common form of transport. However, the results also showed that walking is a seen as a mode of transport in its own right, and one on which other modes of transport depend – people have to walk to catch public transport, for example.

The last few years have seen a resurgence in more diverse modes of transport in urban areas in France. Public transport networks have been reorganised, walking has become popular again, self-service vehicles have begun to appear and a more diverse range of motorised vehicles have become available, including vehicles with hybrid engines.

These changes in transport practices have led to changes in road safety challenges.

Proportion of local trips made on different modes of transport

While the car still holds a dominant position, almost a quarter of trips are now made on foot, with walking becoming a mode of transport in its own right. It is often used as an intermediary mode to catch a bus or train, and its popularity is on the rise, particularly in urban areas.

Illustration source: Certu / Cédric Ansart based on data from SOES, INSEE, INRETS, National local transport / travel surveys on working weekdays covering individuals aged 6 and over, residing in mainland France, 2008.

1 NB: this trend has been observed in Lyon and Lille, but not in Reims, Rouen or Rennes.

How far do people travel on different modes of transport?

The average length of daily trips in urban areas is shorter than might be expected:
• half of car journeys are shorter than 3.5 km
• the majority of bicycle journeys are shorter than 4 km
• most journeys made on foot are shorter than 1 km.

Discounting the phenomenon of habit, it is therefore logical to conclude that many accidents occur close to the individual's home, in places with which the user is familiar.

What are the most dangerous forms of transport in urban areas?

Overall, there are more deaths and injuries outside cars than inside them in urban areas. In other words, pedestrians, cyclists, moped riders and motorcyclists suffer more personal injury accidents than car drivers or passengers. Interestingly, the use of powered two-wheelers is rising sharply in some parts of the country, despite the particularly high risk that these street users face.

In 2009, powered two-wheelers accounted for less than 2% of overall traffic – both in urban and non-urban areas – but for 28% of fatal accidents. In urban areas only, however, powered two-wheelers accounted for 37% of accidents where fatality occurred within 30 days (2009 figures). [2]
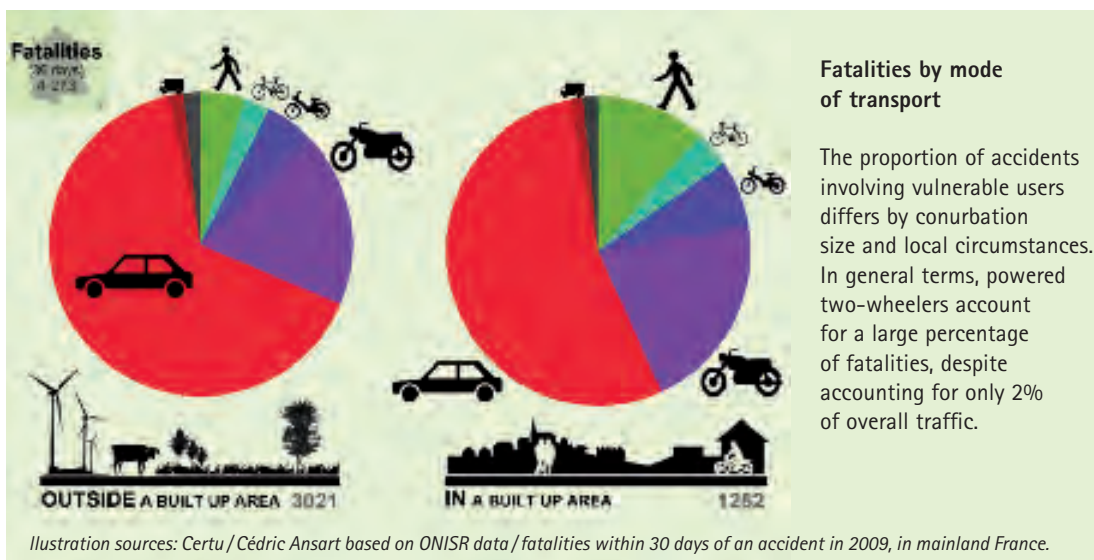
More than one third of all fatal work-related accidents [3] occur on commuter journeys, which also account for more than 15% of all road traffic victims.

In 2008, powered two-wheeler users accounted for 27% of fatalities within 30 days of an accident and 32% of missed working days due to commuter journey accidents. [4]

Are some times of day more dangerous than others?

In terms of numbers, more accidents occur during the day, but this is simply due to the higher levels of traffic at this time.

In general terms, 2009 figures show that almost one third of accidents in mainland France occurred at night, despite the fact that night-time traffic accounts for only one tenth of total traffic volumes. Night-time accidents are not only more frequent, they are also more serious and often fatal, accounting for almost half of all deaths.

Fatalities by mode of transport

The proportion of accidents involving vulnerable users differs by conurbation size and local circumstances. In general terms, powered two-wheelers account for a large percentage of fatalities, despite accounting for only 2% of overall traffic.

Ilustration sources: Certu / Cédric Ansart based on ONISR data / fatalities within 30 days of an accident in 2009, in mainland France.

Recommandations **2**
pour la prise en compte des deux-roues motorisés, Certu, May 2011.

Treated by **3**
the Workplace Accidents/Occupational Illnesses branch, according to the occupational road traffic accident reduction steering committee, "*Mieux prévenir les accidents de trajet*", round table, 9 October 2009, Paris.

According to **4**
Certu / CETE, *Les accidents de la circulation au cours des trajets domicile-travail, État des connaissances pour les deux-roues motorisés, le vélo et le covoiturage,* December 2010.

There are several reasons for this situation. The most common are that average speeds tend to be higher at night, visibility is poorer, drivers are less alert to potential hazards and some drivers are under the influence of alcohol[5].

Figures also show that, when adjusted for equivalent traffic volumes, more accidents occur in late afternoon and early evening than early morning. This is because fatigue and a lack of rest tend to heighten risk.
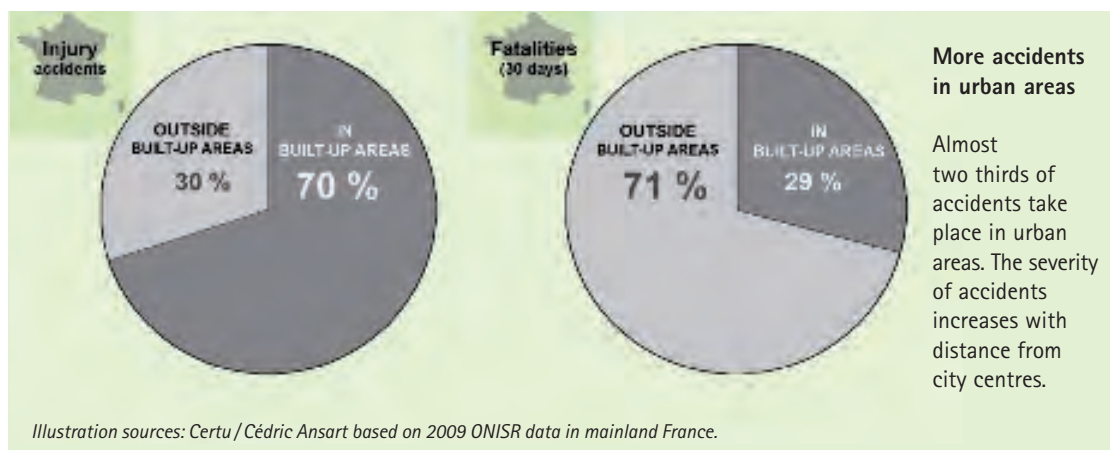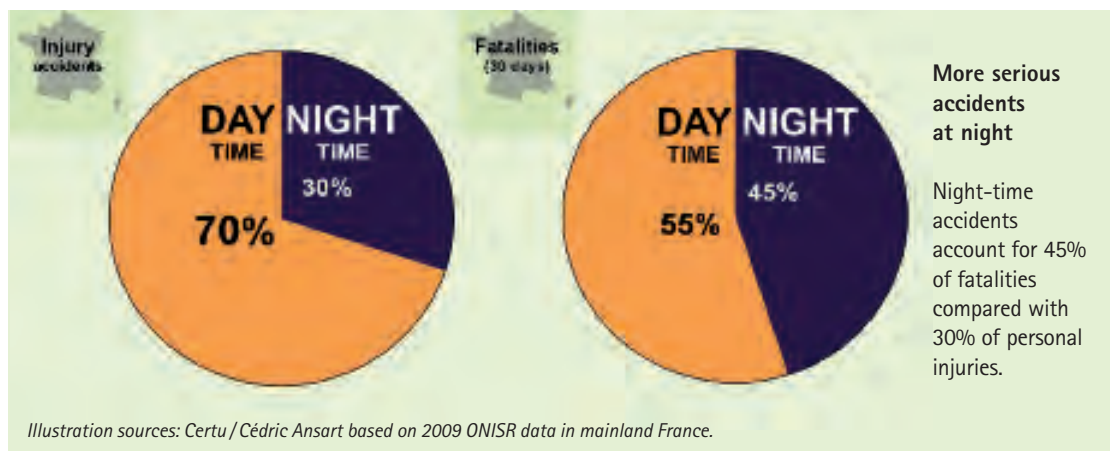
For this reason, it is necessary to:
• take steps to understand and explain this phenomenon at local level (commission dedicated research);
• consider the nocturnal landscape and incorporate perceptions of night-time more effectively into development projects.

Are all accidents the same wherever they occur?

These are substantial differences between accidents that occur in urban and interurban areas. The closer to the centre of a conurbation an accident occurs, the more likely pedestrians are to be involved. In the outer suburbs of cities, meanwhile, collisions between cars are the most common form of accident.
The severity of accidents also increases with speed. Generally speaking, accidents in the outer suburbs are more serious than in city centres.

Are some places more dangerous than others?

An analysis of these maps over a period of several years reveals, however, that accidents are not distributed

More serious accidents at night

Night-time accidents account for 45% of fatalities compared with 30% of personal injuries.

Illustration sources: Certu / Cédric Ansart based on 2009 ONISR data in mainland France.

More accidents in urban areas

Almost two thirds of accidents take place in urban areas. The severity of accidents increases with distance from city centres.

Illustration sources: Certu / Cédric Ansart based on 2009 ONISR data in mainland France.

5   All accidents combined, in urban and non-urban areas, "*in 2006, alcohol was a factor in almost 6% of day-time personal injury accidents. This figure rises to 23% at night, and as high as 45% of fatal accidents.*" ONISR, *Grands thèmes de la sécurité routière en France en 2006,* La documentation française, Paris, 2008, p. 264.

in a uniform manner, but that there are "accident hotspots". The majority of accidents are concentrated on certain major roads or at certain junctions, mainly on the busiest urban roads.

Accidents concentrated along major roads

Personal injury accident location maps show that these accidents are mainly concentrated on major roads and busy routes.

Illustration source: Certu / Cédric Ansart

These accident hotspots are not necessarily located in the areas that local residents consider the most dangerous. The areas around school gates are often seen as particularly dangerous, despite the fact that, in reality, accidents involving children occur across the road network. This simple observation demonstrates the importance of considering safety along entire routes, rather than focusing on specific locations.

The first step in drafting a well-organised road safety policy is to gain an in-depth understanding of accident rates and statistics across the area concerned. This involves ascertaining whether existing major street design and layout are likely to

cause or result in accidents. The next step is to identify the action that needs to be taken locally, such as redevelopment, specific developments for certain users, speed calming measures and new regulatory or police powers (revision of speed limits in certain areas, traffic reorganisation, penalties for speeding or illegal parking, etc.), specific targeted prevention policies, etc.

How can increasing traffic capacity negatively affect safety?

In cities, many journeys are concentrated around rush hour periods, which last for around one hour in the morning and two hours in the late afternoon.

Junctions play an important role in regulating traffic flows, acting like a valve. In this sense, the roads between two junctions are like pipes. "Widening the pipes" does not resolve the flow rate problem, as the valves are the first points that become saturated. Designing major roads and junctions specifically to deal with rush hour traffic (totalling just 15 hours per week) is extremely expensive. Furthermore, this would lead to roads that are simply too large outside rush hour periods, which is particularly dangerous as it leads to excessive speeds during off-peak times. Similarly, the development of new infrastructures to divert traffic can cause new dangers if the areas around these new infrastructures become urbanised. Solutions of this type quickly reveal their limitations in terms of traffic fluidity and can lead to a vicious circle, whereby the initial improvements observed generally lead to more car drivers using the route during rush hour periods.

1.2. In general terms, what can be done to reduce the number of road traffic accidents in urban areas?

When taken on its own, an individual accident may seem like nothing more than a random occurrence.

In fact, in-depth accident research has revealed that accidents are caused by problems with the traffic system, involving a combination of three elements:
- vehicles;
- individuals (and their behaviour);
- the infrastructure (and its environment).

Research conducted by the Institut Français des Sciences et Technologies des Transports, de l'Aménagement et des Réseaux (IFSTTAR) shows that accidents are the result of a chain of processes, actions and decisions which, together, form a "story". This story is influenced by factors such as the circumstances, characteristics of the vehicles or individuals involved, and the configuration of the environment in which the accident occurs. It is the combination of these elements and factors that can cause a seemingly innocuous journey to end in tragedy.

A detailed analysis of accidents reveals that certain "scenarios" are repeated multiple times and that there are strategies to eliminate some of the risk factors, particularly in relation to the environment in which these scenarios play out. Safety experts use this knowledge to attempt to prevent these "scenarios" from unfolding.

It is our role, therefore, to take action on each of these elements (vehicles, individuals and infrastructure), and the interactions between them, to improve overall safety levels. In short, the technical knowledge needed to prevent accidents is there. It just needs to be mobilised.

Can vehicle safety be further improved?

Car manufacturers have made significant improvements to vehicle safety in recent years, driven both by government demands and research findings. Substantial progress has been made, for example, in braking distances, road-holding capacity, shock absorption and passenger protection. Prior to October 2005, vehicle standards focused primarily on improving occupant safety rather than on protecting non-car-based road users. The decisions made by manufacturers to continually increase vehicle weight and engine power were based on occupant perceptions of comfort and safety. In October 2005, however, the first standards that required manufacturers to comply with pedestrian impact shock limits were introduced. These standards did not cover 4x4 and utility vehicles, however.

Powered two-wheelers are becoming ever more popular in large, congested conurbations, where free parking (legal or tolerated) is often available close to the user's destination for this type of vehicle. However, it remains an extremely vulnerable form of transport, with a high number of severe accidents. There therefore remains substantial room for progress in terms of improving the safety of powered two-wheeler users, particularly in urban areas [6]. However, the potential for making further improvements to vehicle design or user protection systems remains somewhat limited.

The most obvious areas of progress in the long term are improved braking systems and the development of speed limiter systems.

6 In 2006, figures for some 6 large French cities (Nice, Paris, etc.) showed that half of all fatal accidents involved powered two-wheeler users. In 2004, meanwhile, powered two-wheeler users suffered twice as many long-term serious injuries as car users (despite accounting for almost half as few fatal and accident-causing injuries of all severities combined, and despite the fact that there were between one tenth and one thirtieth the number of powered two-wheelers on the road as cars). From a public health perspective, the social cost of these figures is extremely worrying, with powered two-wheelers creating a substantial population of individuals with a long life expectancy but with major disabilities (source: E. Amoros Umrestte, INRETS, 2008).

Cyclists, meanwhile, continue to suffer from poor visibility to other road users both at day and, more particularly, at night. Potentially important areas of progress in this respect include improved lighting and visibility.

A series of other phenomena continue to have a negative impact on travel safety, including factors such as alcohol consumption and speeding.

Is speed a cause of accidents?

Accident risk and severity increase significantly at higher speeds. Speed accentuates risk factors, limiting the driver's field of vision and reaction times, increasing braking distances and aggravating the consequences of an accident due to higher impact speeds, etc.

Although average speeds on a given road may vary only slightly, the consequences of these variations are significant. Observations reveal that where the average speed on a given road increases by 10% (e.g. 55 km/h instead of 50 km/h), the number of personal injury accidents increases by 20%, with the number of fatal accidents rising by over 40%![7] The correlation between speed and accident figures depends, of course, on a range of different factors such as the type of road in question and variations in speed between individual users. However, several studies have revealed that even a small a reduction in average speeds and the elimination of cases

of excessively high speed can lead to often significant reductions in the numbers of accidents and fatalities. Taking action to reduce speed is therefore essential to reduce the number and severity of accidents.

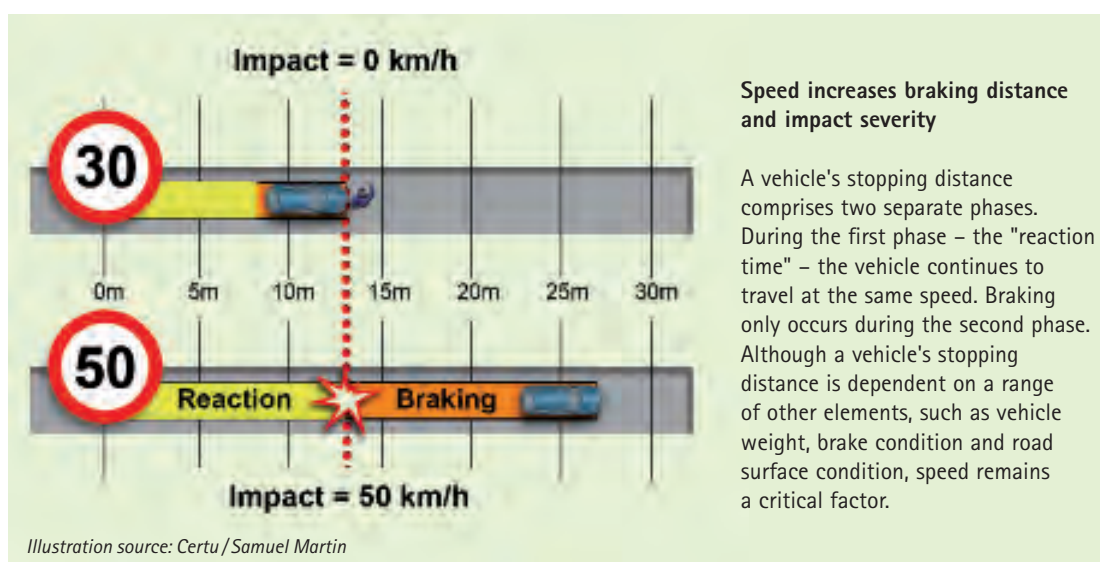## What can be done to influence behaviour?

The "human factor" is, of course, involved in the vast majority of accidents. Several studies have shown, however, that very few accidents are caused by deliberate flouting of driving rules and regulations. In most cases, human error is the root cause of accidents. Indeed, human error is the reason behind inappropriate driver behaviour.

Governments and local authorities are able to influence behaviour in three ways:
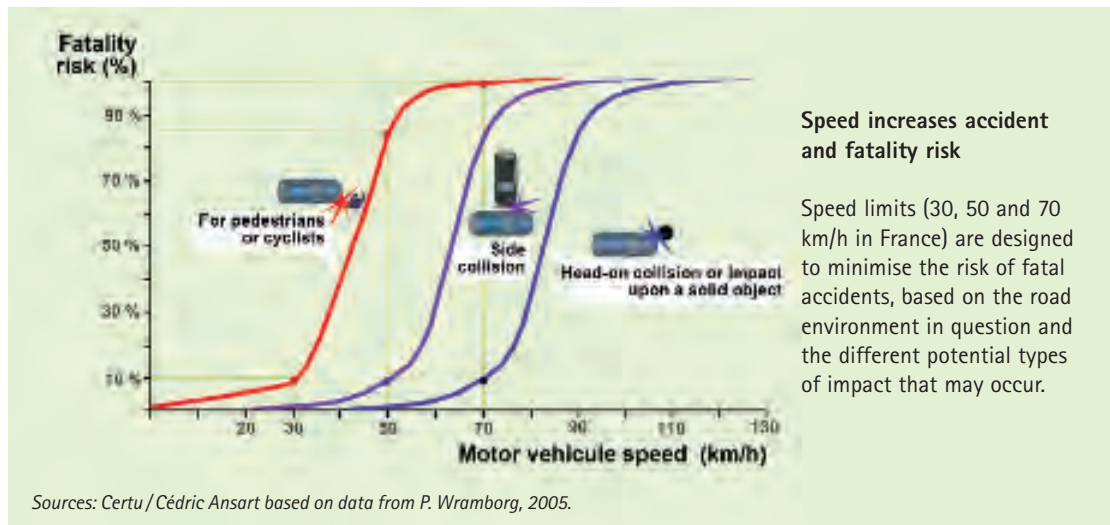• education (information, communication, continuing education, recycling, etc.);
• punitive measures;
• road and street development schemes.

Responsibility for education lies primarily with central government.

Local authorities and associations can still play an important role in this area, however, by running local information and awareness campaigns, involving local stakeholders in travel safety improvement programmes and targeting specific local problems.

Illustration source: Certu / Samuel Martin

Speed increases braking distance and impact severity

A vehicle's stopping distance comprises two separate phases. During the first phase – the "reaction time" – the vehicle continues to travel at the same speed. Braking only occurs during the second phase. Although a vehicle's stopping distance is dependent on a range of other elements, such as vehicle weight, brake condition and road surface condition, speed remains a critical factor.

Speed increases accident and fatality risk

Speed limits (30, 50 and 70 km/h in France) are designed to minimise the risk of fatal accidents, based on the road environment in question and the different potential types of impact that may occur.

Sources: Certu / Cédric Ansart based on data from P. Wramborg, 2005.

Each municipality has its own specific problems, ranging from school locations and high levels of bicycle use to particularly dangerous junctions. Targeted local awareness campaigns are therefore a particularly effective strategy, especially where there is detailed information about local accident rates and statistics, a joint assessment of the situation is conducted, and the target users are clearly identified. Many municipalities have launched successful campaigns of this type, with the support of user associations and educational experts. These municipalities have been able to develop a range of campaign tools that are tailored to their specific situation, communicating with users through press articles, consultation programmes, demonstration stands, educational packs and educational events held during official development openings.

Communication and awareness campaigns are at their most effective, however, when combined with other safety improvement strategies and programmes such as punitive measures and development work.

Are punitive measures effective?

Sanctions are, of course, never popular. They can be made more effective by combining them with education and awareness campaigns.

Punitive measures have proven to be especially effective when they focus on speed, blood alcohol level and seatbelt-wearing.

Checks and sanctions can have a major impact on behaviour. In France, for example, the introduction of automatic speed checks has demonstrated the success of properly targeted punitive measures. Just four years after the first speed cameras were installed, excessively high speeds were all but eliminated and the number of road deaths fell by 40%[8].

What effect does street design have in reducing accidents?

Accident research has revealed that road infrastructure and the surrounding environment is a contributing factor in almost half of deaths.
In this sense, design plays a major role in how road users behave. Pedestrians, cyclists, moped riders, motorcyclists and car drivers all have their own specific practices, both as user groups and even as individuals. However, all of these users adapt their behaviour based on their understanding of the situation, the type of road in question, how busy the street is and how it is configured.
Furthermore, it has been proven that certain types of configuration can lead to inappropriate user behaviour. An excessively wide carriageway, for example, can encourage drivers to travel too fast, while drivers may be surprised to see a pedestrian crossing a road in a non-urban area.
Similarly, experience has shown that certain types of development work can help to reduce accident risk significantly, while others lead to a reduction in accident severity.

1.3. What rules need to be followed when developing road networks?

The majority of French laws and regulations covering road network development are grouped together in the Road Traffic Code, the Highway Code and the Local Authorities Code. These are supported by other laws, regulations, inter-ministerial instructions, decrees and standards. A summary of the most recent of these is given below, covering the following aspects:

- police powers;
- road signage;
- accessibility for people with reduced mobility;
- the promotion of cycle lanes;
- traffic-calming zones (30 zones, pedestrian-priority zones, pedestrian areas);
- speed hump standards.

While compliance with legislation is mandatory when developing road networks, this legislation does not go far enough in terms of improving travel safety.

Local police powers, regulations and enforcement in the French Local Authorities Code

Mayors have substantial powers to improve travel safety within their municipality. Articles L 2213-1 to L 2213-5 of the French Local Authorities Code give mayors extensive police powers over traffic and parking.

In conurbations with more than 100,000 inhabitants, the mayor must act in accordance with the urban transport plan (PDU). These police powers cover the entire road network, including:

- local roads and rural routes
- privately owned roads on which traffic is permitted to travel
- national and departmental roads located within the conurbation.

The mayor has the power to ban certain types of vehicle or all traffic on certain sections of road, and to strengthen prohibitions or limits imposed by the French Highway Code. In particular, the mayor may impose lower speed limits to take account of specific hazards. The mayor has the power to decide – by issuing a formal order – on the location of conurbation boundary signs.

The mayor is also responsible for coordinating works affecting the ground below public roads, connecting roads and, subject to the powers of the prefect, busy major roads. He/she is obliged to erect signage to warn users of road works and to inform users of any unexpected or accidental obstacles in the roadway at the earliest opportunity.

As a public official with police powers, the mayor has the authority to draft reports into offences and infringements of regulations.

The mayor may play a role in the enforcement and penalty process, in accordance with the national and departmental strategy. Furthermore, as part of the department road safety action plan, the mayor may be formally included in the departmental road enforcement plan drawn up annually by the prefect, in conjunction with the public prosecutor.

Depending on his/her relationship with the national police force, a mayor may request that a specific road enforcement plan be drawn up for his/her municipality. This plan will focus on issues drawn from local observations and objectives:

- speed;
- parking, particularly around schools;
- drink driving;
- failure to wear a seatbelt or helmet;
- engine revving by motorcyclists;
- mobile phone use;
- atmospheric or noise pollution.

Road maintenance in the French Local Authorities Code

The mayor [9] is responsible for maintaining all urban roads. In more general terms, he/she is responsible for user safety and ensuring that all roads are passable, along with maintaining lighting, sweeping carriageways and removing obstacles. The mayor is also responsible for keeping the roads open in winter.

Road signage in the French Highway Code

The regulations covering road signage remain very strict. With the exception of a few experimental schemes, all signage must comply with the provisions of the French Highway Code.

The provisions governing cases where road signage is required – e.g. to give instructions, or to inform users about which roads are open to public traffic – are set out in the order of 24 November 1967, amended (article R.411-25 of the French Highway Code).

The order to erect signage must be issued through a formal regulation, at the initiative of the authority with the relevant police powers, and must set out its scope of application where this differs from the general instructions outlined in the French Highway Code. The signage must comply with the relevant regulations in all cases. Signage falls under the responsibility of the authority in charge of road services (article L.411-6 of the French Highway Code).

The aforementioned order of 1967 and the associated inter-ministerial instruction covering road signage are amended on a regular basis. Unless otherwise specified, these amendments come into force no later than 10 years after the publication date of the corresponding order.

Accessibility for people with reduced mobility under the French law of 11 February 2005

The French law on "equal opportunity, participation and citizenship for handicapped people" states that: "*a continuous transport chain – including the built*

environment, roads, public space development, transport systems and intermodal changeover facilities – is required to provide full access for disabled people and people with reduced mobility."

From 1 July 2007, a requirement was introduced stipulating that development work in public spaces and the whole of the road network open to general traffic in built-up areas and, outside built-up areas, parking areas, public transport stops and emergency phones must be carried out in such a way as to ensure said road networks and public spaces are accessible to disabled people with as little assistance as possible.

These provisions apply when creating new roads or amenities or carrying out works whose effect is to change the structure or bed of the roadway or redevelopment, refurbishment or resurfacing work on roads, existing paths and public spaces.

Furthermore, since 23 December 2009, each municipality has been required to draw up a road accessibility and public space development plan, at the initiative of the mayor (or, where applicable [10] the president of the intercommunal cooperation authority).

The order of 15 January 2007 sets out the technical and geometric rules that apply to roadway development work (pavement lowering, tactile strips, etc.).

Cyclists in the French law on air quality

French law 96-1236 of 30 December 1996 on air quality and the rational use of energy, which is now incorporated into article 228 of the French Environment Code, states that:

"*when urban roads, with the exception of motorways and dual carriageways, are built or redeveloped, cycle routes, in the form of cycle lanes, paths or tracks, shall be developed, according to the needs and constraints of traffic. The development of these cycle routes must take account of guidelines laid down in the urban transport plan (PDU), where one exists.*"

9   Or the president of the intercommunal structure.

10   If it is responsible for road networks.

Traffic-calming zones (30 zones, pedestrian-priority zones, pedestrian areas) in the French Highway Code

The law has recently been changed (decree of 30 July 2008) to improve space-sharing arrangements and encourage the use of environmentally friendly modes of transport.

The French Highway Code now demands that 30 zones and pedestrian-priority zones be introduced in a manner consistent with enforced speed limits. It also imposes two-way cycle lanes on all roads located within traffic-calming areas.

In pedestrian-priority zones, parking is now only allowed in designated parking areas.

In pedestrian areas, motorised vehicles are not permitted to park on the carriageway.

Where exceptions are made for certain types of traffic (e.g. delivery vehicles), these must travel at walking pace, and authorisation must be given by municipal decree.

A little-known standard: speed humps

There are many different types of safety scheme and device available to local authorities. While some of these are the subject of recommendations, some, such as speed humps, are governed by standards.

French decree 94-447 of 27 May 1994 states that speed humps must comply with the relevant standards. This decree includes an appendix which sets out the technical conditions under which they may be installed.

Speed humps are governed by standard NF P 98-300, which covers round-top and flat-top speed humps. This standard sets out:
- the scope to which it applies;
- the geometric characteristics of speed humps;
- installation restrictions;
- the conditions under which they may be installed;
- the signage that must be erected.

1.4. What can be done at local level to make urban travel safer?

There are several basic principles that may be applied at local level to improve urban travel safety. While development work can be carried out to rectify particularly hazardous situations, any urban development project must have travel safety concerns at its core. First of all, it is essential to identify the most hazardous road layouts in the local area. The next step is to ensure that any development project rectifies these situations and that it does not have a negative impact on travel conditions; indeed, the aim is to improve travel conditions.

The 10 recommendations given below provide a basic framework for substantially reducing injury-causing road traffic accident risk and ensuring that all users are able to take greater ownership of the roads.

In order to achieve these goals, local authorities are advised to introduce a long-term road safety policy.

A number of successful schemes, both in France and abroad, have shown that several conditions need to be met to ensure that this type of local road safety policy is both effective and sustainable in nature:

Introduce a safety management system

This involves appointing a "road safety" manager, to lead a dedicated team and/or employ the services of experienced, external road safety professionals. This person may be tasked with proposing local action plans to the mayor, managing local accident prevention campaigns or overseeing development projects.

Improve projects: introduce quality assurance for street projects

Whenever a new road or public space development project is introduced, an external expert should always be called upon to assess the project from a road safety perspective. This external expert should be tasked with giving a "second opinion" on road safety at various stages of the project, from the planning to execution phases. This type of arrangement is already widely used in other countries, and successful experiments have already been conducted in several French conurbations. The French government has introduced a quality assurance mechanism and safety audit templates for analysing road development projects on its own network (SETRA's CSPR grids).

10 key principles
for safer urban travel

1. Identifying most appropriate speed for each urban road

2. Ensuring adequate visibility

3. Making sure that all users can read the situation

4. Reducing excessively wide carriageways

5. Identifying the most appropriate management system for each junction

6. Reducing excessively wide junctions

7. Ensuring that all junctions meet at right angles wherever possible

8. Developing short, safe pedestrian crossings

9. Encouraging bicycle use and improving cyclist safety

10. Clearly marking the boundary of the urban area

Road, junction and square requalification or development projects are complex process, with the quality and uses of public spaces and requiring special attention. One of the key aspects of road safety improvement is to change user perceptions of roads, so that they are treated more like "streets". This complexity is further exacerbated by the variety of different ways in which roads are used, and the sheer number of often conflicting development objectives. As such, any development project requires the input of multiple stakeholders with a range of different skills and expertise. Such projects require multi-disciplinary teams, which are able to take the needs and concerns of all users and local residents into consideration.

In order to ensure that development projects truly reflect the safety needs of different modes of transport, these needs must be taken into account as early as possible in the life of the project. In an ideal world, urban planning documents (where these exist) should play a key role in the construction of a genuine urban strategy, in which all users can travel safely, regardless of the size of the municipality in question. The following list of issues highlights the inextricable link between travel safety and urban planning:
● the location of public facilities and services;
● access to different modes of transport from different neighbourhoods;
● public transport service (services and transport link locations should be decided upon when a new neighbourhood is created, rather than as a corrective after-thought);
● the development of major roads and the capacity to accommodate through traffic;

● the characterisation of the road network;
● the urban landscape created through the density of the built environment, alignments, etc, and its consistency with the real-life uses and functions of public space.

The 10 recommendations outlined below are designed to help eliminate the main accident risk factors associated with development. Following these basic principles – either when analysing and assessing an existing road or designing a requalification projects – will deliver safer travel for all and therefore improve quality of use.

This does not, of course, mean that accidents will be eliminated altogether. However, there will certainly be fewer and less serious accidents. It will also encourage calmer travel in general and will enable the most vulnerable users to take greater ownership of public spaces.

These 10 recommendations are intended to act as basic principles. Judgement is required when applying these recommendations. Action should only be taken when there is certainty that this action will improve an unsatisfactory situation. Action should not be taken simply for its own sake. Instead, it should be taken in response to specific issues, and should be done carefully to avoid upsetting the delicate balance of certain situations. These recommendations should also be applied in a multi-sector manner, which takes account of the overall situation, searches for cross-disciplinary responses and considers the specific needs of the local situation.

1 Identifying the most appropriate speed for each urban road

Urban roads go from wide shop-lined avenues to residential streets. These roads fulfil multiple functions, including through traffic, connecting traffic and local service traffic. These roads also have to accommodate varying degrees of HGV and bicycle traffic, and are dotted with pedestrian crossings, etc. It therefore goes without saying that speeds on these roads vary, according to the configuration in question.

Indeed, it is speed that governs the relationship between users, local quality of life and user safety, particularly for the most vulnerable users. At a speed of 30 km/h, for example, both cars and bicycles are able to co-exist successfully, and pedestrians are able to cross the road safely. In general terms, speed restrictions and limits are insufficient in isolation. Street design is required to make reduced-speed traffic both effective and credible.

In this sense, some towns and cities have successfully introduced a speed hierarchy system across their networks. On some major through-traffic roads, vehicles are permitted to travel at 50 km/h, whereas all other streets have been redeveloped as traffic-calming zones, 30 zones, pedestrian-priority zones, pedestrian areas, etc. Some sections of major through roads, where local life is particularly busy, have also been redeveloped with this same objective in mind. In time, an estimated two-thirds of the road networks in these conurbations will have been redeveloped as traffic-calming zones.

Application

It is important to organise speed and traffic measures on a large scale, rather than on a street-by-street basis. First and foremost, a network hierarchy should be drawn up (road hierarchy map, elements of the urban transport plan, etc.). A traffic calming master plan should be drafted, identifying those streets that should remain at 50 km/h, and those which, over time, should be redeveloped as traffic-calming zones. This document should specify the desired speed and most appropriate status of each road, act as a general coordination plan, and be used to schedule future redevelopment work.

Tools

- *La gestion de la vitesse en milieu urbain*, in *Techni.cités*, Certu, off-print no. 128, 23 April 2007, 8 p.
- *La sécurité routière dans les plans de déplacements urbains : approche et méthode*, Certu, 2004, 136 p.
- *Sécurité des déplacements en agglomération : guide méthodologique*, Certu, 2007, 122 p.

Pedestrian Area | **Pedestrian-priority Zone** | **30 Zone**

30 km/h section | **50 km/h street** | **70 km/h urban road**

Decisions about the way in which individual roads are used and their intention are made at conurbation level
The speed limit on each street must be consistent with the configuration of the roadway, the local context and the development of the road in question. However, decisions about speed limits and road statuses are also made at conurbation level, with a maximum speed of 50 km/h only permitted on major routes.

Photo sources: Certu / Cédric Ansart

2 Ensuring adequate visibility

Seeing and being seen is an essential factor in avoiding accidents for all types of road user, be they car drivers, moped riders, motorcyclists, cyclists or pedestrians.

In urban areas, however, there are many obstacles that can hinder visibility between users. Some of these are directly linked to the layout of the environment, and to buildings in particular. Other obstacles are caused by poorly organised occupation of public space, such as parking, advertising, street furniture, vegetation, household waste, safety barriers, etc.

Users must be sufficiently visible to each other that each has enough time to react and adapt their behaviour accordingly (see recommendation 6). This is especially important in and around areas where vehicles meet other vehicles or pedestrians, particularly at junctions and pedestrian crossings. Care must be taken, however, to ensure that too much excessive visibility does not lead to an increase in speed!

Application

Assess each pedestrian crossing, road section and junction to ascertain whether the visibility triangles are sufficient.

The visibility distances required depend on the speed of travel on the road in question (see diagrams in recommendation 5).

Tools

• *Guide des Carrefours Urbains*, References, Certu, 2010, 180 p.

**Seemingly innocuous objects such as street furniture,
signs and parked cars can become visibility hazards**
Identify visibility obstacles and take action to ensure that all users are able to see other from a sufficient distance.

Photo sources: Certu / Cèdric Ansart

3 Making sure that all users can read the situation

The "legibility" of a road and its environment refers to the extent to which a particular location "*gives all users [...] a quick, easy to understand and accurate image of the nature of the road and its environment, its uses, likely or possible movements by other users, and the expected behaviour of the user in question (speed, direction, loss of priority, etc.)*" [11].

Car drivers, for example, need to know almost instantly that they have entered a residential area or are close to a school, so that they can adapt their driving style accordingly.

The priority rules must also be clear and consistent with the user's perception of the street and its junctions, otherwise the user is less likely to comply with these rules.

Excessively restrictive signage or safety mechanisms will not be taken seriously if the expected behaviour is inconsistent with the image of the environment as received by the user. A more sensible approach is to develop the space in such a way that the user is able to come to this understanding independently, i.e. without the need for special signage or safety mechanisms.

Application

Practical experience and in-situ observations can reveal those situations where the messages that users receive contradict their expected behaviour, and development work can then be carried out the remedy these situations. An effective approach is to use the "fresh perspective" technique, which involves assessing the situation from the viewpoint of a passing car driver, or of other users such as pedestrians, passers-by, etc.

Tools

● *Paysage et lisibilité de la route – Éléments de réflexion pour une démarche associant la sécurité routière et le paysage*, SETRA, 2006, 24 p.

11 According to SETRA / CETU, *Sécurité des routes et des rues*, 1992.

Landscaping and road surfacing are used to mark out specific uses
A change in the road surface and the presence of small plot with a tree show users that they are approaching a complex junction.

This junction with a narrow street is marked by a change in the road surface
In this example, a different road surface is used to mark a junction with a narrow street, which would otherwise be difficult to spot.

Specific landscaping and design are used to mark the start and end of 30 zones
Here, the boundaries of the 30 zone are clearly marked with specific development and landscaping. The use of highly visible and consistent marking for 30 zone boundaries throughout a neighbourhood helps users to understand that they are entering or leaving a traffic-calming zone.

Photo sources: Certu / Cédric Ansart, CETE

4 Reducing excessively wide carriageways

Reducing the available road surface generally leads to a reduction in speed.

However, the capacity of an urban road network to accommodate traffic flow is determined by the capacity of its junctions rather than by the width of the carriageway in straight sections of road. As such, there is very little point in maintaining excessively wide carriageways, in terms of both the number of lanes and the overall width of the road.

As well as improving safety, reducing carriageway width also frees up land for other uses. In particular, this new space can be allocated to environmentally friendly modes of transport (pedestrians or cyclists) or local resident activities (plots of land, school exits, etc.).

50 km/h streets

The ideal configuration is to have a single lane travelling in each direction. Wide urban roads with two or more lanes in each direction are particularly dangerous, as they combine two key risk factors: high speeds (especially during off-peak times) and long pedestrian crossings.

Outside large conurbations such as Paris, which are organised around a system of wide boulevards, multiple-lane avenues and boulevards should be the exception rather than the rule. The level of traffic on these roads is rarely sufficient to justify the need for roads of this type and extensive junctions.

Many towns and cities have, quite rightly, redeveloped their multiple-lane roads into single carriageways. By doing so, they have reduced the number of accidents on the most dangerous roads by half or even two-thirds, despite very little change in overall daily traffic volumes.

Traffic-calming zones

Except in areas of particularly heavy bus traffic, an existing two-way carriageway can comfortably be reduced to a width of 4.8 metres. At this width, two light vehicles can still pass each other slowly.

Where these types of road are excessively "linear" in nature, various mechanisms can be used to break up the steady flow of traffic, such as alternating parking spaces or protruding pavements that act as pinch points.

Tools

- *Le profil en travers, outil du partage des voiries urbaines*, References no.89, Certu, 2009, 184 p.
- *Chicanes et écluses sur voiries urbaines – Le guide*, Certu, 2012, 85 p.

Vic-la-Gardiole, conception : Atelier Sites

Narrower roads encourage drivers to travel at lower speeds
On this road in the centre of Vic-la-Gardiole, the carriageway used to cover almost the entire area between the buildings on either side. Following development work, the carriageway is now much narrower, and is designed to encourage drivers to travel at slower speeds. There is also more space available for local resident use.

Photo sources: Atelier Sites Ceoncepteur

5 Identifying the most appropriate management system for each junction

Should the largest road have priority at a junction? Should priority on the right be used? Should "stop" or "give way" systems be used? Are traffic lights or roundabouts preferable? The decision about which junction management system to use is especially complex as there are many different factors in play. These include the type of traffic concerned, the capacity of the junction, the speed of travel, the layout of the environment, visibility, etc.

Three-stage traffic lights, for example, are generally suited to junctions used by high numbers of both vehicles and pedestrians, particularly for four-way (or more) junctions. These should be left in three-stage mode at all times, including at night.

The consistency of the route, good reciprocal visibility and approach speed are all key factors that will impact safety and must be considered when selecting the most suitable management system. Roundabouts and mini-roundabouts are widely recognised for their safety benefits. Indeed, these are the safest of all junction management systems. Roundabouts successfully diffuse any potential conflict and force all vehicles to slow down. Where used appropriately in an urban environment, roundabouts can deliver genuine safety improvements. And the smaller the roundabout, the safer it is. For safety reasons, single-lane entry and exit points are preferable to multiple lanes.

50 km/h streets

An analysis should be conducted to determine the appropriate management system for junctions, and in particular those junctions used by fast-flowing heavy traffic. Where necessary, the possibility of requalification work should be investigated. The construction of roundabouts can deliver genuine safety improvements on these types of road.

The use of priority on the right systems should be approached with caution, especially where this is a common source of accidents at local level. It is not necessarily appropriate to convert all priority on the right junctions to "stop" or "give way" junctions, especially on smaller and less busy roads, and in smaller conurbations. Giving priority to a particular road can encourage drivers to approach the junction at an excessively high speed.

Traffic-calming zones

Priority on the right is the management system used in most cases in these zones. This system forces drivers to slow down as they approach each junction.

Tools

- *Guide des carrefours urbains*, References, Certu, 2010, 180 p.
- *Guide de conception des carrefours à feux*, Certu, 2010, 83 p.
- *Carrefours à feux avec îlot central : une solution pour les forts trafics d'échange*, Certu, 2008, 54 p.
- *Les Mini-giratoires* (download), Certu, 1997, 19 p.
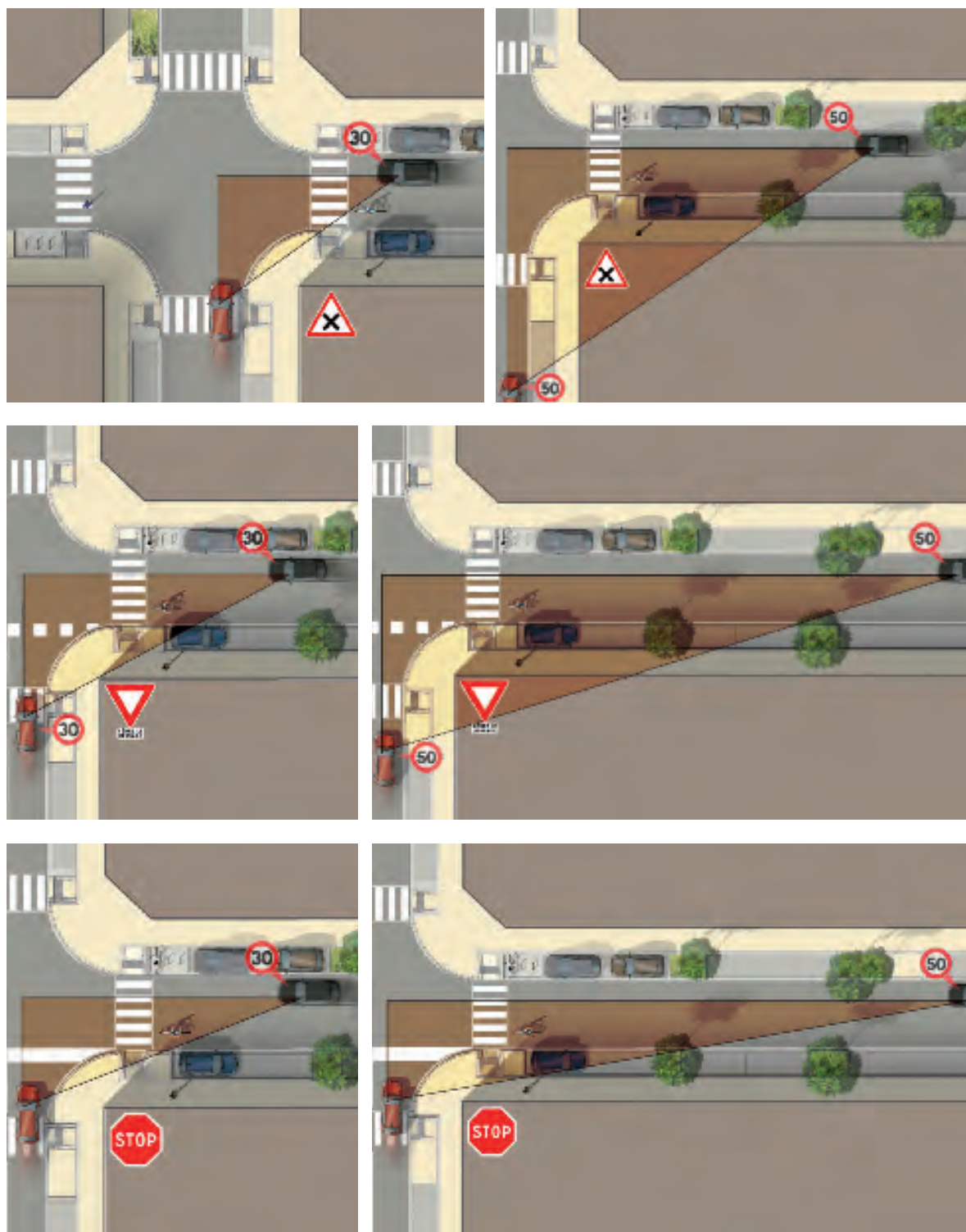
Sufficient visibility is required at junctions in order for users to anticipate approaching vehicles and react accordingly
The triangles shown here represent the area which must be kept clear in urban areas to ensure that two vehicles are able to see each other and react accordingly. The size of this area depends on the priority system at the junction and the approach speed.

Illustration sources: Certu / Cédric Ansart

6 Reducing excessively wide junctions

Excessively large junctions can have a negative impact on safety in many different ways. Wide junctions can encourage drivers to travel at excessive speeds, while pedestrians crossing these junctions are faced with multiple hazards at the same time.

Faced with ever-increasing road traffic volumes, it is unrealistic to expect traffic to continue flowing smoothly during rush hour periods by developing wide junctions. Furthermore, wide junctions can become dangerous during off-peak times and are extremely expensive to build and maintain. Developers and decision-makers therefore need to accept that road infrastructures, and particularly junctions which act like the "valves" of a network, will naturally limit capacity during rush hour periods.

Furthermore, the fact than an occasional oversized vehicle passes along a particular road is not a sufficient reason to build excessively wide roads and junctions. These exceptional oversized loads can easily be managed with developments that can be adapted to suit their needs when the occasion arises (extra tolerance, mountable delineators, removable barriers, etc.).

Application

Creating tightly controlled junctions and adjusting the size of roundabouts to suit the vehicles that most commonly use them can help to keep speeds down.

Tools

- *Guide des carrefours urbains*, References, Certu, 2010, 180 p.
- *Transports exceptionnels et aménagements de voirie en milieu urbain*, Certu, 2001, 38 p.
- *Logiciel Giration* – Définition, calcul et dessin d'épure de giration, Certu / CETE Est
- *Logiciel Girabase* – Calcul de capacité de carrefour giratoire – Certu / SETRA
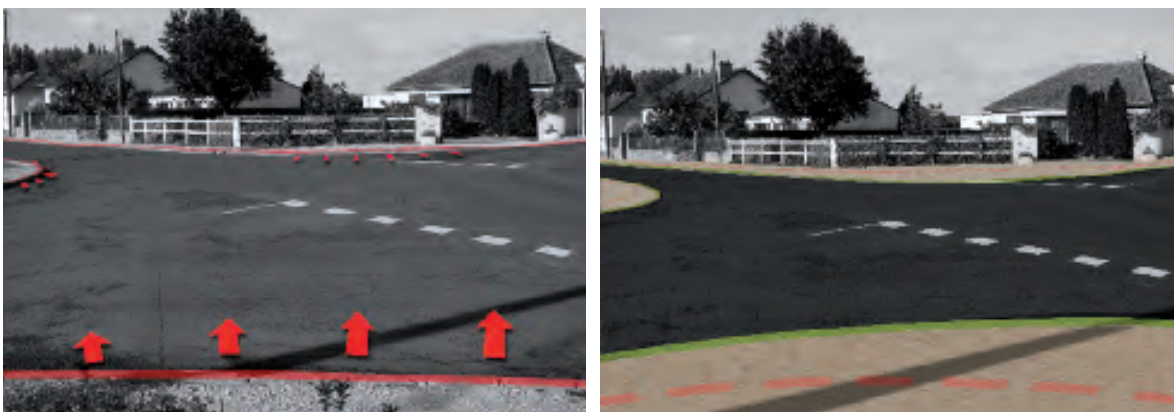
Reducing carriageway width and adjusting roundabout sizes are effective ways of encouraging calmer, slower traffic and providing pedestrians with shorter, safer crossing points.

Bremgarten, conception : Landplan

In this example, calming measures have been introduced on the approach to the junction. The carriageway width has been reduced to make room for the entrance to a restaurant and a bus stop, and to provide school children with a safe pedestrian route.

At this narrow junction, a pavement has been constructed and the road surface raised to create a continuous pedestrian route, in accordance with the French accessibility law. A pinch point has also been constructed to follow the line of the building.

Road surfacing measures are an effective way of calming traffic at junctions

Photo sources: Certu / Cédric Ansart (top), CETE Est (middle), CETE Nord-Picardie (bottom)

7 Ensuring that all junctions meet at right angles wherever possible

Particular care and attention must be paid to how junctions are managed when the roads concerned do not meet at right angles. This type of configuration leads to poor visibility in the vehicle's "blind spots" and makes it more difficult for the driver to carry out visual checks. It can also lead to more "head-on" rather than "side-on" impacts between users, with more severe consequences.

One solution to this particularly dangerous type of junction is to change the course of the roads (if space allows) so that they meet at an angle closer to 90 degrees. Another solution, which can help to make a junction more perpendicular, is to construct a roundabout.

50 km/h streets

Changing the course of the roads at various points can help to make a junction less dangerous. If this is not possible, the priority system can be used to limit the risk.

Traffic-calming zones

This recommendation also applies to traffic-calming zones, but a more flexible approach should be adopted.

Tools

- *Guide des carrefours urbains*, References, Certu, 2010, 180 p.
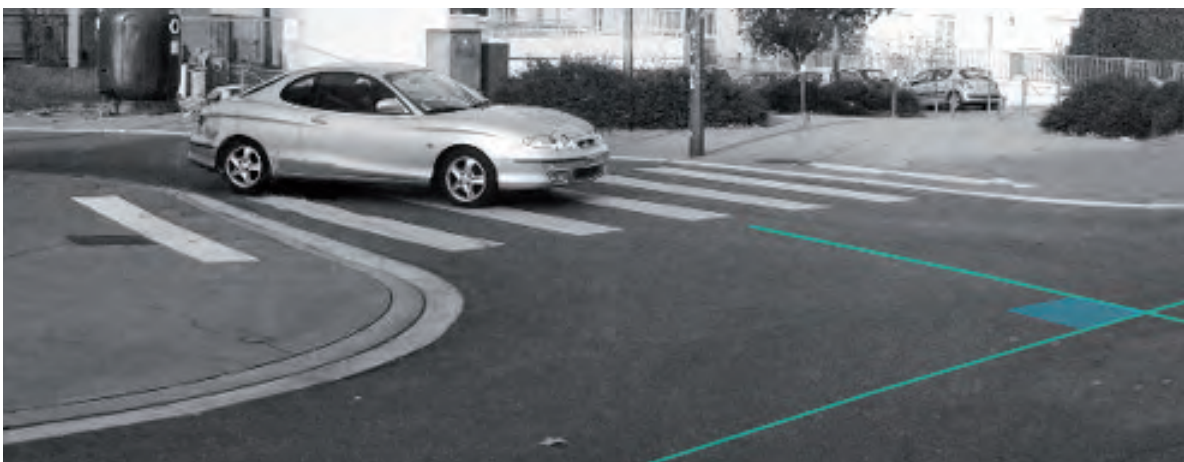
Ensuring that junctions meet at right angles can help to improve user safety

Illustration sources: Certu / Cédric Ansart

8 Developing short, safe pedestrian crossings

In urban areas, pedestrians account for almost 20% of serious accident victims, and 30% of fatalities (2009). The majority of fatal accidents involving a pedestrian take place when the pedestrian is crossing the carriageway and of these, the majority occur away from junctions. A parked or stopped car blocking motorists' view of the pedestrian further increases the risk. This situation can be improved with relative ease by following three simple objectives: improve reciprocal visibility between users, shorten excessively long pedestrian crossings and reduce vehicle speeds.

Pedestrian crossings are not compulsory but, where they are created, they must comply with road signage rules. Road users must follow the rules of the French Highway Code in relation to these crossings (pedestrians must use a crossing if one is located within 50 metres). In general terms, the use of crossings should reflect pedestrian practices. The crossing should be created perpendicular to the carriageway to keep the crossing distance (and hence the risk exposure time) to a minimum.

In order to improve visibility and shorten the crossing distance even further, a kerb build-out can be constructed on, say, a 3 metre section of roadside parking.

If this is not possible, then parking should be prohibited in a 5 metre area preceding the pedestrian crossing to improve visibility.

50 km/h streets

The principles outlined above apply on these roads. On especially wide two-way roads, the risk becomes substantially higher for crossings of 8 metres or longer with no refuge, or on roads with three or more lanes. In such cases, kerb build-outs and pedestrian refuges in the middle of the carriageway can help to reduce the risk substantially. A refuge of at least 2 metres is recommended, to accommodate pushchairs and bicycles. However, French accessibility standards state that, where a refuge exceeds 1.5 metres in width, tactical paving strips must be installed.

Traffic-calming zones

In general terms, pedestrians enjoy high levels of safety in traffic-calming zones. Pedestrian crossing markings on the carriageway are generally inappropriate for this type of zone, as these restrict pedestrians to crossing the road at 50 metre intervals, rather than encouraging them to take full ownership of the space.

However, for less confident pedestrians (people with reduced mobility, children), speed reduction developments can be combined with suggested crossing points, without necessarily using formal "pedestrian crossings".

Possible examples may include raised road surfaces, different coloured road coverings, etc. The aim is to ensure that each crossing point is clearly identified for its intended users (children, guide dogs, etc.).

Tools

- Guide des carrefours urbains, References, Certu, 2010
- "*Zones de circulation apaisée*" factsheet series, Certu
- "*Les cheminements des personnes aveugles et malvoyantes*" factsheet series, Certu

Champagnole, avenue de la République, conception : Egis – Aménagement

The pedestrian crossing is clearly visible in advance
The location of these crossings is based on a combination of local practices and opportunities. Located by the entrance to a local building, and with a bicycle parking stand in front of the crossing, pedestrians have improved visibility and are able to anticipate the actions of other road users more effectively.

Illustration sources: Certu / Cédric Ansart

9

Encouraging bicycle use and improving cyclist safety

The growing popularity of bicycle use is not causing an increase inaccident risk. In fact, this growing popularity goes hand-in-hand with improved safety for cyclists, where the conditions are right. There are several measures that may be taken to improve the safety and comfort of cyclists, including cycle lanes (a dedicated lane on the carriageway for use exclusively by cyclists), cycle paths (a separate carriageway located alongside the road), and traffic-calming zones.

In terms of safety, there is no particular type of cycle-friendly development that can be considered "safer" than any other. The right choice can only be made through a thorough analysis of the situation. One-way sections pose a particular hazard to cyclists, especially where other users behave illegally and often dangerously to avoid a lengthy detour. In such casescontra-flow cycling are often an effective and low-cost solution. As the majority of accidents involving cyclists take place at junctions, junction development and surfacing measures can also help to improve safety.

70 km/h roads

Building entrances are generally limited on this type of road, as are junctions. Due to the substantial differences in speed between user types, bicycle traffic often needs to be separated from vehicle traffic via dedicated cycle paths located away from the main carriageway, or "green lanes". In all cases, special attention should be paid to points where the dedicated lane ends and cyclists are required to rejoin the main vehicle traffic carriageway.

50 km/h streets

Each case must be studied on its own merits. Generally speaking, on urban 50 km/h roads with regular junctions, it is preferable to use cycle lanes located on the main carriageway rather than separate cycle paths, as the latter will cause additional risk at junctions and outside building entrances. Cycle lanes also help to improve reciprocal visibility.

Traffic-calming zones

Normally, vehicle speeds in these areas are sufficiently low to allow cyclists and other vehicles to coexist with few or no problems. Indeed, two-way cycle lanes are now used in all such zones [11]. However, there may be individual cases where special development work is required, for example on a steep incline, or based on the layout of the space, the type of traffic concerned, or where a speed limiting device requires such development. In most cases, however, this additional work will not be necessary.

Tools

● See French law on air and the rational use of energy (art. L 228-2 of the French Environment Code)
● *Recommandations pour les aménagements cyclables*, References, Certu, Lyon, 2008, 107 p.
● *Recommandations pour les itinéraires cyclables*, References, Certu, Lyon, 2005, 99 p.
● "*Vélos*" factsheets, Certu

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[11] Unless different arrangements are made by the authority with police powers.

Cycle lane

Cycle path*

Two-way cycle lane

Cycle waiting area at traffic lights

"Green lanes" in urban areas

* Here, the cycle path is on the pavement; the path must be clearly identifiable and detectable by visually impaired users.

Comfort and safety are the key criteria to consider when choosing between cyclist-friendly developments

Photo sources: CETE, Certu / Thomas Jouannot

10 Clearly marking the boundary of the urban area

Not all small and medium-sized conurbations in France have clearly marked boundaries where road users must reduce their speed from 90 km/h to 50 km/h once they enter the urban area. However, speed restriction is an important safety factor, as these major roads are where the majority of accidents occur.

In some conurbations, there are clear signals in the environment to mark the boundary of the urban area itself, while in other conurbations the situation is less clear. Densely-packed buildings located close to the roadside and frequent junctions can encourage road users to adapt their behaviour. However, where the road network is poorly organised, or where there are rundown neighbourhoods and few building entrances, road users have fewer clues and signals. Local authorities must therefore take these concerns into consideration when setting their urban planning, land management and urban facility and transport policies, to deliver a set of public policies that are consistent and closely linked.

Using the urban environment as inspiration, public space development work can also be undertaken to clarify the point at which "roads" become "streets". There are no "standard" solutions in this area, and there are various different and interesting ways in which this issue has been tackled throughout France. These successful examples should be used as inspiration in the design of developments that meet the specific needs of individual sites. Generally speaking, there are three stages on a route into an urban area:
- the approach to the urban area;
- the official boundary itself, as indicated by a sign;
- the gradual transition to a more urbanised environment.

Application

A key stage of the deliberation process involves selecting an appropriate method of signalling the boundary of the urban area, and identifying the different stages of the inbound route. One key factor is to ensure that the official boundary sign is located in the correct place, as determined by the surrounding environment.

There are also discussions to be had about the overall speed limit policy. In some cases, it may be appropriate to introduce a 70 km/h speed limit on the section of road approaching the boundary, and to install specific developments in this vein. In all cases, a sudden drop from 90 km/h to 30 km/h with no transitional phase is out of the question.

First and foremost, any public space development work should be designed and planned in a multi-disciplinary way.

Tools

- *L'aménagement d'une traversée d'agglomération, Une démarche de projet*, References, Certu, 2010, 144 p.
- "*Petits aménagements de sécurité*" factsheet series, Certu/SETRA, downloadable

The key challenges are to ensure that all users have their own space and that the boundary of the urban area is clearly identifiable

Photo sources: Certu (top), CETE NC (middle), CETE Est (bottom)

Bibliography

Legislation and regulations (non-exhaustive list)

The French Highway Code;
The French Road Traffic Code The French Urban Planning Code;
The French law on air and the rational use of energy (art. L 228-2 of the French Environment Code);
The French law on equal opportunity, participation and citizenship for handicapped people;
The French Local Authorities Code;
The French inter-ministerial instruction on road signage.

In-depth resources covering general safety issues

The French Environment Minister's "road safety" portal: http://www.securiteroutiere.gouv.fr/

Observatoire National Interministériel de Sécurité Routière (ONISR)
ONISR (the French national inter-ministerial road safety observatory) publishes an annual summary document containing "key accident research figures" and a series of detailed analyses covering "major road safety topics".

Certu produces regular articles outlining the latest road safety and road traffic publications.
One such example is Certu's collection of downloadable **factsheets**, entitled **"Savoirs de base en matière de sécurité routière"** (road safety fundamentals). These factsheets provide a brief overview of the basics that stakeholders need to understand the situation and take action.

Resources covering local travel safety issues

The information covering local road safety issues is taken primarily from an examination of **road-traffic accident and injury reports** (in French, BAACs) based on incident reports produced by the police. Raw data, specific tools and dedicated bodies may be consulted and used to reveal specific local issues and identify an action plan.

Each departmental planning department has its own **technical road safety** unit which acts as a departmental observatory for road safety, conducting in-depth analyses, disseminating its findings and helping to assess action taken.

Departmental road safety action plans (in French, PDASRs) are drawn up on an annual basis, at the initiative of the prefect. These provide an overview of all actions taken across the department. They are both consultation documents and tools to help coordinate projects run by different stakeholders. The departmental prevention committee is responsible for this consultation process, as well as for preparing the PDASR and assessing its results.

Road safety units (in French, MSRs), set up via local partnerships, ensure that the necessary resources are in place for local actions, provide support to victims and their families, and act as citizen information points. They are also key centres for discussion and exchange.

Resources for introducing a safety monitoring mechanism

The first step in introducing a road safety monitoring mechanism is to set up a dedicated team.
The earlier safety considerations are taken into account, the easier it will be to deliver an effective overall strategy.

Safety, urban planning and travel

Any discussion about urban planning and travel should be guided from the outset by the need to improve user safety in public spaces and neighbourhoods. It may be possible to limit or expand the use of a particular mode of transport, or develop a particular residential neighbourhood or business district, provided that the planned changes deliver sufficient user safety and that any negative side-effects are

anticipated in advance. There are a number of fact-sheets and guides to provide assistance in this respect. See, for example, "*La sécurité routière dans les plans de déplacements urbains : approche et méthode*", Certu, 2004, 136 p. or "*Sécurité des déplacements en agglo-mération: guide méthodologique*", Certu, 2007, 122 p.

Local communication and awareness campaigns
As behaviour plays an important role in safety, it is essential to raise awareness of safety issues and concerns among all road users. This may be done through regular communication about local issues, or in conjunction with a specific development project. School children, users and user representatives and associations may also be made aware of local issues. See Certu online portal.

Resources covering development

Development projects have a range of different objectives to meet, and these objectives must be clearly defined before any attempt to design a solution is made. The following guides, factsheets and websites (non-exhaustive list) are designed to help decision-makers and developers identify the key issues, challenges, organisational methods, processes, recommendations, obligations and responsibilities in relation to a particular project:

Websites
"*Une voirie pour tous*" ("A way for all")
This project has produced an extensive and varied collection of content, including a dedicated website, dossiers and a series of factsheets which may be downloaded from the Certu website.

Factsheet series
(downloadable from the Certu website)
● "*Savoirs de base en sécurité routière*", down-loadable Certu factsheets
● "*Petits aménagements de sécurité*" factsheet series, Certu/SETRA, downloadable
● "*Les cheminements des personnes aveugles et malvoyantes – recommandations pour les aménage-ments de voirie*" downloadable Certu factsheets
● "*Aménagement pour les vélos*", downloadable Certu factsheet series

● "*Stationnement des vélos*", downloadable Certu factsheet series
● "*Deux-roues motorisés*", downloadable Certu factsheet series
● "*Zones de circulation apaisée*" downloadable Certu factsheet series

Works available to buy
from Certu's online store
● *Comprendre l'espace public pour mieux programmer son aménagement, approche sensible*, Dossiers, FNCAUE, Certu, 2007, 166 p.
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Foreword for publications translated into foreign languages

The purpose of translated documents and publications is to pass on to non-French speaking readers the French know-how set out in the original publication, whether this concerns methodologies, tools or best practices. Original publications in French are subject to a checking process, which leads to a Certu commitment regarding their content. English versions do not undergo the same process, and consequently carry no Certu commitment. In the event of differences between the English and the original French text, the French text serves as the reference.

Improving street design
10 essential principles for safety

How to deal with a particularly dangerous intersection? Do streets invite motorists to behave appropriately? Are they safe for cyclists and pedestrians?
This work is intended for counsellors and planners who are regularly faced with these issues. It presents in summary form the essential knowledge that must be mastered in order to provide each type of user with the conditions making for safe travel.
It provides an update on major issues concerning travel and safety in urban areas, and shows how, by following a few basic principles, the improvement of public spaces can help reduce the number and severity of traffic accidents in urban areas.
It calls on policy makers and their staff to reconsider the layout and operation of the road network for which they are responsible, from the standpoint of travel safety issues. It also aims to provide them with key information, useful as part of public space redevelopment projects.
Balancing the most common accident situations in urban areas against proven knowledge of road safety has led to the selection of ten key recommendations to effectively improve travel safety in urban areas.

Understanding and preventing risks - Developing new infrastructures - Energies and climate - Managing existing infrastructures
Impact on health - Mobility and transportation - Sustainable regions and natural resources - Sustainable cities and buildings