

The new road layout presented in this report is a on improvement of existing technical recommendations. It was carried out within an experimental framework and was subject to assessment.



Site before the roadworks



Site after the roadworks

A safer junction as part of traffic-calming scheme

Location and characteristics of the site

The RD925 is a seaside road which links Le Havre to Eu – Le Tréport and goes on to the Somme Department. The RD226 is a local road. The RD925 / RD226 intersection in the town of Criel-sur-Mer is a X-roads junction signalled by stop signs with no left turn bays. The sides of the junction and the directional islands on the minor roads are equipped with kerbs. The RD925 accomodates 10,000 vehicles daily (AADT), of which 8% are heavy lorries (source DDE76 - 2007). The RD226 carries 1,000 vehicles in each direction (source CETENC - 2003).



Scan Régional© - ©IGN Paris - Reproduction forbidden

In October 2003, the CETE Normandie Centre carried out a safety study on this junction. Further to this study, the French Departement of Seine-Maritime decided to redesign the junction.

RACA Roads otherwise to induce calm driving

RACA

Understanding the behaviour of drivers to design roads differently



▲ Accident rate before the road improvement at the junction

Frequent accidents occur at this intersection

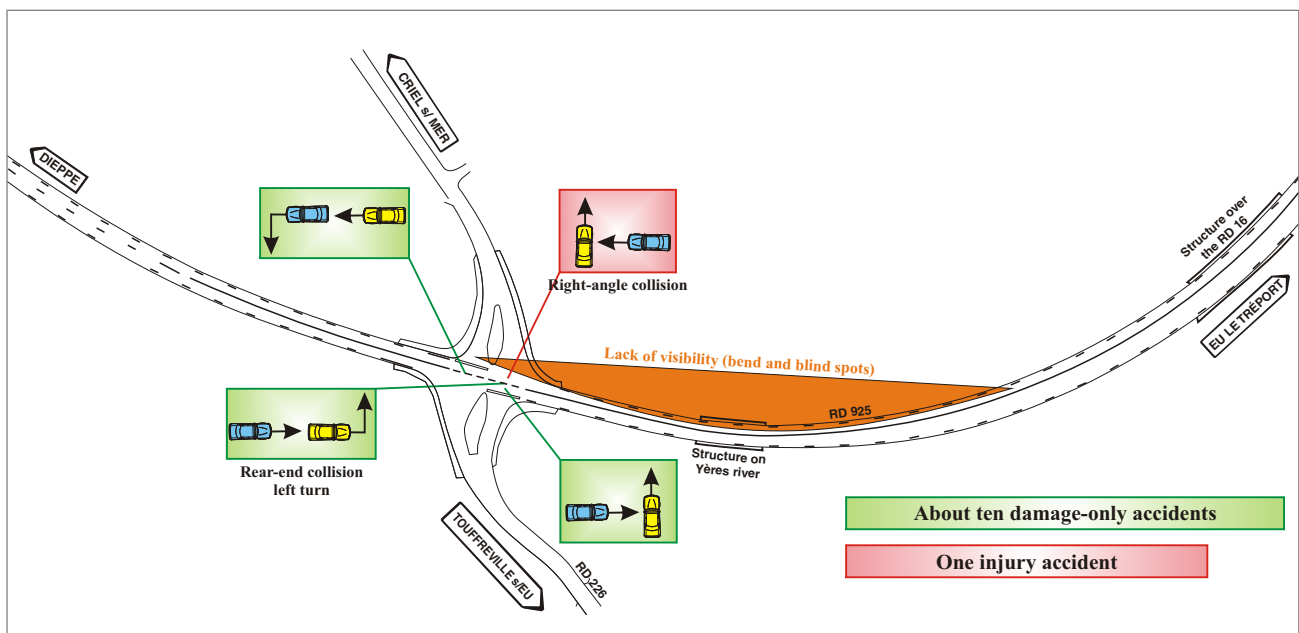
- About 10 damage-only accidents are reported every year:
 - right-angle collisions involving cars coming from Touffreville (there are car fragments in the area around the junction),
 - rear-end collisions on vehicles turning left heading to the RD 226.
- One injury accident between 1997 and 2006. This is a right angle collision on the main road: a user on the Touffreville road stopped at the intersection and let several vehicles arriving from Dieppe pass by. He crossed the RD925 and was hit by a vehicle coming from Eu. Vehicles running on the RD925 from Dieppe to Eu – Le Tréport might had obstructed the view of the oncoming vehicle.



Main road: brake marks from Dieppe



Main road: brake marks from Eu – Le Tréport



▲ Problems caused by the site

Main road: RD925

- The junction perception is rather poor due to its layout between two curves at the bottom of a hill.
- Traffic volumes are high (10,000 vehicles AADT).
- In the direction of travel Eu – Le Tréport to Dieppe: there is a 450m-long bend with a long curvature. Because of the huge cost the re-engineering of this bend would have generated, it cannot be modified although this road layout is prone to accidents.
- Speeds are not compatible with the site.
- There is also a problem due to the expansion joint across the RD16 overpass; at a speed of 90 km/h or more there is a jerk which may catch non-local drivers by surprise.



Avoidance by the right of a left turning car



Eu – Le Tréport direction : Long right bend

Secondary road: RD226 road Criel-sur-Mer and Touffreville-sur-Eu

- Two cars can lay abreast at the stop line, thus creating mutual obstructions to both drivers' visibility.
- Left-turning drivers feel so unsafe that in order to turn left, they prefer to turn to the right via the RD226 before crossing the junction.
- On 1st July 2003, the opening of a supermarket in the vicinity of the junction area led to an increase in traffic volumes.
- Poor visibility in the direction Eu – Le Tréport (curves + obstructions to drivers' visibility).



RD226 road coming from Touffreville-sur-Eu
Two cars can lay abreast at the stop line



RD226 road coming from Touffreville-sur-Eu
Truncated island used to perform left turns via the right

▲ A safer junction as part of traffic-calming schemes

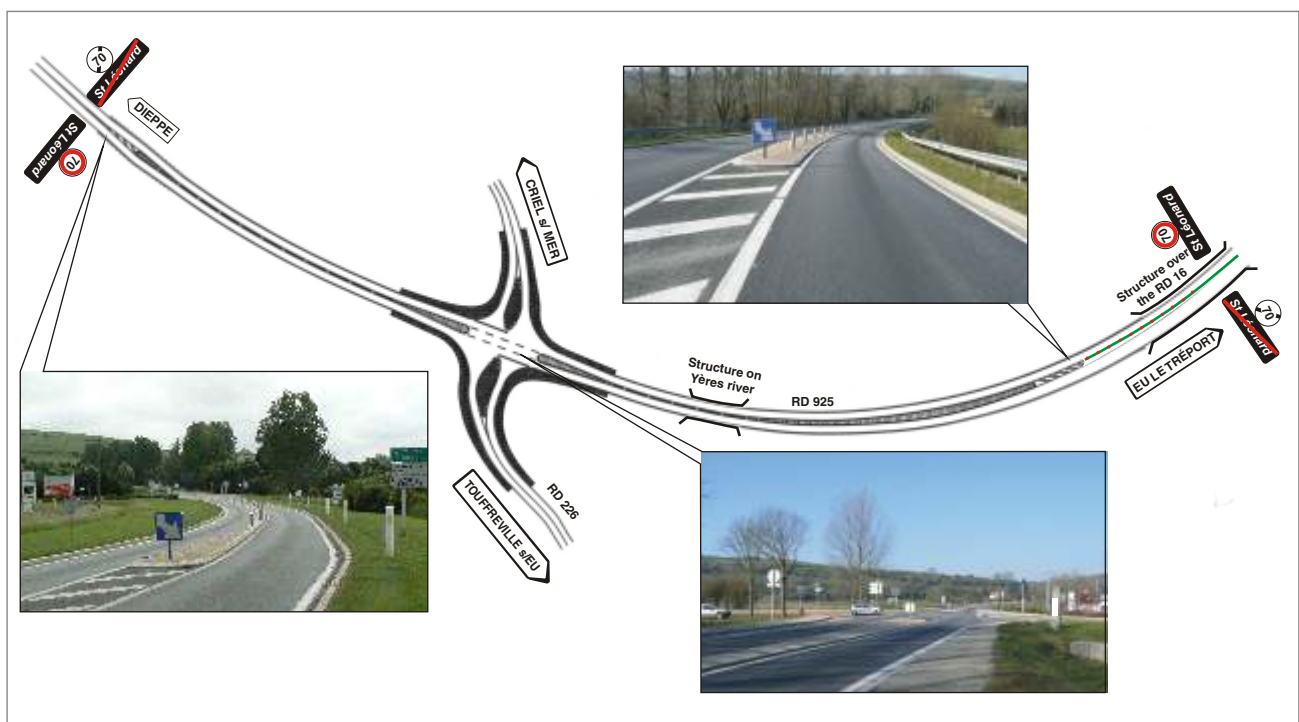
Objectives of the French departement of Seine-Maritime

- Improve the junction perception.
- Reduce speeds.
- Make junction crossings safer.

Principles of the redesign of the junction

The idea of a roundabout was rejected out due to right-of-way constraints. The design principles of this at-grade junction are as follows:

- Construction of a central island of a narrow width and provision of kerbs on both sides of the road on the approach to the junction to create a wall effect on the main road.
- Reduction in the through lane width from 3.40 m to 2.80 m between edge markings.
- Reduction in the RD226 entry lane width (at the level of stop lines) with further provision of over-runnable extra widths.
- New layout for turning left bays on the RD925.
- New posted speed limit (70 km/h) on both sides of this junction.
- New administrative status around the road section (Lieu-dit induces 70km/h sections).
- Installation of "J11" signs on the central island in approach to the junction to create another wall effect
- Implantation of cat's eyes elements on zebra markings on the Eu – Le Tréport side.
- Resurfacing of the roadway and re-engineering of the expansion joint across the overpass on the RD16.



▲ The situation after the roadworks

Accident rate

- Three years after the redesign of the junction (opened to traffic in October 2006), no injury accident has been reported. Moreover, according to the local authorities and road operators it seems there are no damage-only accidents on this spot.
- However, brake marks are visible along the road at the beginning of the 70 km/h area in the direction of travel Eu – Le Tréport to Dieppe, at the beginning of the curve



Main road Eu – Le Tréport to Dieppe
Brake marks

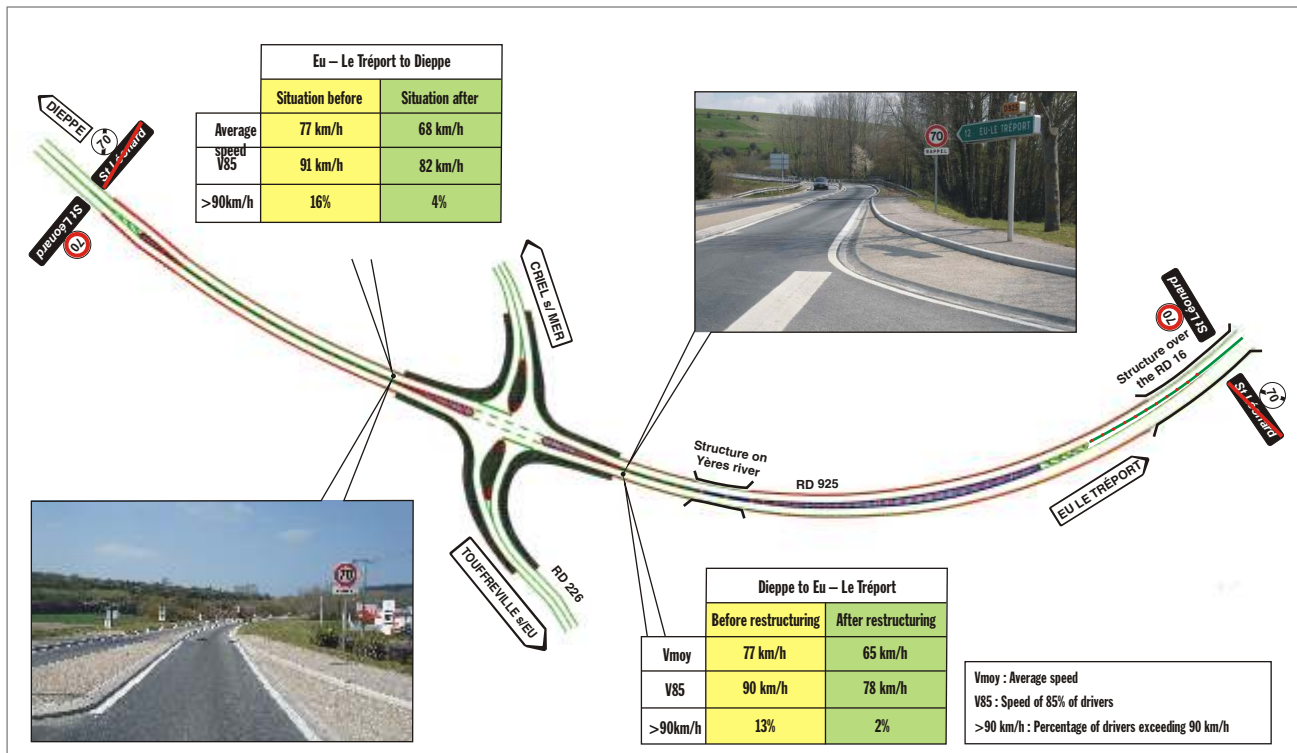
- When looking in Le Tréport direction, there are still some obstructions to drivers' visibility when stopped at the stop line on the RD226 junction.



Obstructions to drivers' visibility towards Le Tréport

Speed measurements before and after the redesign of the junction

- Traffic speeds were measured in both directions at the exit of the junction.



Measurement results

- In the direction Dieppe to Eu- Le Tréport, the average speed and V85 have dropped by 12 km/h.
- In the direction Eu- Le Tréport to Dieppe, the average speed and the V85 have dropped by 9 km/h.
- The average speed was 77 km/h in both directions. After the works it has dropped to 68 km/h and 65 km/h according to the directions of travel.
- This new design led speeds over 90 km/h to decrease considerably. As a matter of fact, the number of drivers running over 90 km/h was divided by 5.

Comments

- The decrease in speed is 10 km/h on average. It must be pointed out that during this period, the average speed of light vehicles decreased by about 1 km/h on a national level.
- The objective of reducing speeds was met thanks to the combination of two measures : installation of B14 road signs (posted speed limited is then 70 km/h) and redesign of the junction (reduction in the lane width, provision of kerbs, wall effect). It seems that this new junction layout is in concordance with the new posted speed limit.

Observations

The increased safety of this junction is a perfect example of the concept “roads otherwise to induce calm driving”

- Adaptation of existing technical recommendations in right-of-way constraints.
- Reduction in approach and crossing speeds at the junction.
- Redesign of the cross-section in a safety objective: wall effect, reduction in the lane width, installation of a narrow central island and provision of kerbs on the roadsides.

The departement of Seine Maritime has met his targets

- A safer junction thanks to reduced speeds.

Three years after work finished, the result is satisfying

- No injury accidents. As far as damage-only accidents, the gendarmes are hardly ever called out. The increased time to cross the junction with the creation of a left turn lane has no negative results yet.
- Drivers, road authorities and managers, the police and the elected representatives are satisfied.
- Noticeable decrease in speeds.

There are still some matters of concern to be aware of

- Some brake marks have been observed at the beginning of the 70 km/h section.
- Visibility is obstructed when looking at the direction Eu – Le Tréport (vertical signalling, drainage features, railing and vegetation).
- Problems related to night visibility supposedly solved by the provision of cat's eyes on roadside kerbs.



RD925 direction from Dieppe to Eu - Le Tréport



RD925 direction from Eu - Le Tréport to Dieppe

This report is part of a collection entitled "Roads otherwise" available on Sétra websites: intranet: <http://intra.setra.i2> et internet: <http://www.setra.developpement-durable.gouv.fr>

The aim of this series is to gather on-site experiences.
The author and the Administration's liability does not apply on this document.

Project group "Roads otherwise to induce calm driving"

Sétra/CSTR/DSC
Antoine OSER - Tél: +33 (0) 1 46 11 33 30
E-mail: antoine.oser@developpement-durable.gouv.fr

CETE Normandie Centre - Infrastructures for Multi-Modal Transport Departement (DITM)
Pole of Competence and Innovation (PCI) Accident studies, assessment of road improvements and new equipments and tools, measurements of driving behaviours (A2EMC)
Olivier MOISAN - Tél: +33 (0) 2 35 68 88 56
E-mail: olivier.moisan@developpement-durable.gouv.fr

Authors and technical information

Olivier MOISAN - olivier.moisan@developpement-durable.gouv.fr
Olivier BISSON - olivier.bisson@developpement-durable.gouv.fr

The following people contributed to the studies:

Guy DUPRE - guy.dupre@developpement-durable.gouv.fr
Cécile TARRON - cecile.tarron@developpement-durable.gouv.fr



People in charge of the roadworks

The departement of Seine-Maritime
Road Management
Philippe CHAUVIN - Tél: +33 (0)2.32.81.87.11
E-mail: philippe.chauvin@cg76.fr



Réseau
Scientifique
et Technique du
MEEDDM

Pictures courtesy: CETE Normandie Centre - DITM

Director of the publication: Philippe REDOULEZ
Published with the kind permission of the Council of the Manche Department
Artwork: Jean-Yves LEBOURG - CETE Normandie Centre
This document may not be sold. Total reproduction is copyright free.
Prior permission must be sought from Sétra for partial reproduction.
© 2009 Sétra

