

**PREVENTION AND MANAGEMENT OF GHOST DRIVER INCIDENTS ON
MOTORWAYS - THE FRENCH EXPERIENCE
THE CONTRIBUTION OF ITS TO IMMEDIATE DETECTION AND OPTIMUM
MANAGEMENT OF GHOST DRIVER INCIDENTS**

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ABSTRACT

Ghost driver incidents are a concern for French motorway companies. The accidents generated, of the frontal collision type, are an anxiety-producing phenomenon for the public. Ghost driver incidents are often deliberate violations. They are performed by elderly drivers who have lost their marks and are not familiar with motorway infrastructure or its rules of use or results from behaviour incompatible with driving (alcohol, drugs). Motorway operators have undertaken the prevention and management of this hazard (geometry, signalling). They are effective but insufficient. The eradication of the phenomenon can only be considered with the development of embedded systems and ITS applications.

KEYWORD

Ghost driver

GHOST DRIVER TRAFFIC ON MOTORWAYS – THE STAKES OF SAFETY

Problem

Motorway operators have all deplored ghost driver incidents with accidents, have become aware of their unexpected nature and have all reacted in their way to prevent and manage such events.

From 1999 to 2003, ghost driver traffic incidents have represented 0.2% of all accidents involving injuries (ASFA source) on the French motorway network, but 4.4% of fatalities for the same period. They caused the death of 11 people in 2004.

	2002	2003	1999-2003	2002%	2003%	%1999-2003 compared to overall figures
Accidents	46	26	218	0,2%	0,2%	0,2%
Fatalities	10	9	57	3,6%	4,0%	4,4%
SI	13	5	58	1,7%	1,0%	1,5%
LI	15	7	99	0,4%	0,2%	0,6%

Excerpt from the “ASFA Safety File – processing of ghost driver accidents data on the French motorway network from 1999 to 2003 »

However the scope of the phenomenon is wider, as the vast majority of ghost driver incidents do not cause an accident. Little information is available on these ghost driver incidents that are “resolved” by themselves ; the systematic data collected by motorway operators show that on average, a ghost driver incident is notified every 1 to 15 days on the network, about 25% of those notified are confirmed and 1 to 3% of the ghost driver alerts result is an accident.

Definition of ghost driver incident

A ghost driver incident is characterized by the circulation of a vehicle against the normal flow of traffic in the lane. It should be noted that this definition encompasses reverses which generally involve drivers attentive to the manoeuvre they are undertaking even if it is dangerous for them and for others.

Overriding factors

In ghost driver accidents, certain factors are more present than in accidents overall, in particular:

- A higher occurrence of ghost driver incidents in open toll sections (presence of interchanges with no toll barriers),
- A significant share of ghost driver incidents occur at night (50 to 60%) probably due to the lesser legibility of interchanges and lighter traffic,
- A higher proportion of drivers with an illegal blood-alcohol level,
- An over-representation of elderly people,
- Drivers with psychological problems or under the influence of medication, drugs or attempting suicide.

THE EXPERIENCE OF FRENCH COMPANIES IN THE PREVENTION OF GHOST DRIVER INCIDENTS

The preventive actions the most routinely implemented at the infrastructure level consist in improving the signage and road markings at the points of choice at the entrance to motorways namely at interchanges.



The B1 no entry sign and J5 directional marker in the diverging area are positioned side by side and arrows are marked on the road.

They also consist in better separating the traffic lanes on the two-way interchange ramps.



Combination of mini GBA and BOA system (at the structural level)



Directional arrows painted on the road

THE EXPERIENCE OF FRENCH MOTORWAY COMPANIES IN MANAGING GHOST DRIVER INCIDENTS

Stakes

On average, vehicles are driven at 130 kph on the motorway, which is a little more than 2 kpm. The speed of vehicles being driven the wrong way is not actually known, but it can be assumed that drivers driving the wrong way are driving more slowly, about 1.5 kpm or 90 kph.

Even if traffic is light, with a density of one vehicle per km for example, each minute, a vehicle driving the wrong way will cross 3 to 4 vehicles representing as many potentially serious likely accidents.

The speed of detection and reaction (alert and information) is thus essential in limiting the risk of accident.

Immediate ghost driver’s detection and driver’s alert systems

Hereafter are different ghost driver’s alert systems, with or without detection, that are not mutually exclusive:

Systems without detection (signalling)	Systems with detection	
	Detection system	Ghost driver’s alert system
<ul style="list-style-type: none"> • Conventional signalling • Reinforced signalling • Luminous signalling (diode panels) • Light barriers (light poles) 	<ul style="list-style-type: none"> • Doppler Radars • DAI (video) • Loops 	<ul style="list-style-type: none"> • Luminous signalling (diode panels or flashing lights) • Light barriers (light poles) • Sound alarm

Today, we do not know how to evaluate the impact of these devices on drivers whose attention is deficient. These systems are undoubtedly not 100% efficient in preventing ghost driver incidents, but they at least allow the immediate detection of the phenomenon with an alert to the Command Post, which is essential for best reacting and ensuring the safety of other drivers.

Procedures and measures set up for immediate confinement

For any ghost driver alert, operators trigger confinement procedures with the closure of toll barriers, tunnels and motorway access (barriers combined with information panels at access points) in the direction of the concerned area.



Activation of Access information Panels (AIP) and closure of access with barriers for immediate confinement.

An emergency stop that maintains all the manual or automatic toll lane barriers closed (credit card, change, remote toll lanes). This system requires a software adaptation, the transaction occurs but the barrier stays down, and the lane assignment light remain unchanged. This operation also activates a flashing “traffic jam” light signal upstream from the toll barrier by GSM to slow down drivers nearing the toll barrier. Toll attendants are provided with a brochure to give to drivers indicating the cause of the disruption.

Informations Sécurité

L'Autoroute Blanche

Véhicule à contresens : pour votre sécurité nous fermons le péage.

Un véhicule circulant à contresens vient de nous être signalé.
Pour votre sécurité, nous sommes contraints de fermer ce péage le temps de localiser et d'arrêter la voiture concernée.
Durant cette attente, qui ne devrait pas excéder quelques minutes, ne descendez pas de votre véhicule.

Merci par avance de votre compréhension.

Immediate closure by the Toll Supervisor of the toll barriers concerned (specific to ATMB)

The limits of the solutions in place

The speed with which information is broadcast, and its accuracy on the presence of a ghost driver is essential in managing this type of incident, whether internally, or directed at the highway police or drivers present on the network (message on remote-controlled variable message panels, information relayed on the 107.7 FM radio station with a Traffic Announcement safety message).

The operator has implemented confinement but this does not protect vehicles driving inside the confined area.

These vehicles only have access to information by radio, VMP that is generally not very accurate as to the positioning of the vehicle driving the wrong way, resulting in a possible uncontrolled reaction to this message.

THE CONTRIBUTION OF EUROPEAN ITS HANDLING THIS PROBLEM

Several research orientations can be considered:

- vehicle / infrastructure communication with the identification of a ghost driver incident, alert transmitted to the driver and behaviour to adopt following this alert (find a refuge, U-turn, immediate stop, etc.),
- vehicle / vehicle communication coupling the alert with information transmitted directly to other vehicles in addition to the CP (VMP, radio, GPS, etc.) in particular on the location of the vehicle driving the wrong way.

An invitation to tender on these topics has been launched European-wide: “the safety of ghost driver, their detection and their management” “GO-SAFE” project (GhOst driver SAFETy, detection and management). Another project has been selected within ERTICO program as CVIS project.

CONCLUSION

The problem of ghost driver incidents is complex due to the drivers concerned. These drivers are not highly aware of the alerts provided by signalling, even reinforced signalling. An infrastructure and signalling designed with a concern for legibility and simplicity can certainly limit the number of ghost driver incidents. It is essential to include the “ghost driver” concern in the design of infrastructure, in particular as regards their geometry.

When ghost driver incidents cannot be avoided, their rapid detection is essential to prevent potential accidents with the immediate broadcast of information to network users.

Users, whose protection is a primary objective for each motorway operator, also have a role to play in combating ghost driver incidents. The training of users in motorway

driving in order to limit ghost driver incidents, but also in how to react in each situation, is also an important factor.

After having done their utmost with regard to the infrastructure itself, and having improved the perception, legibility and understanding of signalling and messages by drivers, subsequent developments will concern:

- improving communication between vehicles and infrastructure and triggering an immediate alert to the other vehicles,
- information and training of targeted populations that are “at risk” and are often the cause of ghost driver incidents, actions to deploy by the administrations with the support of motorway operators,
- training drivers on the behaviour to adopt in the presence if a ghost driver alert