HOUSE OF COMMONS TRANSPORT COMMITTEE INQUIRY "CARS OF THE FUTURE"

1 INTRODUCTION

Almost all (89%) road accidents involve at least one car driver.[1] Although it is not always the driver who is at fault, they are, nevertheless, the largest single common denominator in road accidents. There are many factors that affect the way drivers use their cars, including the design of the vehicle itself.

Vehicle technology is developing so quickly that the nature of driving will change dramatically over the next decade or so. It is crucial that the implications for driver education, training and testing are assessed, so that they keep pace with the changes in vehicle technology.

A wide variety of technologies have or are being developed to enhance driver and vehicle safety. Some are being built into new vehicles while others are offered as aftermarket products. Broadly speaking, they fall into categories such as:

- Technologies which can be used to assist safer driving, such as navigation systems which guide drivers to their destination, GPS based systems which warn of camera and crash sites, simple driver controlled over-speed indicators and other technologies which monitor safety critical aspects of driver physiology (such as whether a driver is exhibiting symptoms of tiredness).

- Vehicle control technologies such as ABS, traction/yaw control, proximity sensing and various forms of cruise control as well as technologies linked to engine management systems and dual power systems.

- 'Black Box ' technologies are now available to be fitted to vehicles (either selectively or to whole fleets) that can monitor a range of functions, log on-board data logging tracking issues such as driver hours and crash parameters and provide data about the external driving environment.

These developments offer opportunities to influence driver behaviour in ways that will reduce crashes. But it is not always clear whether a particular development will prove helpful or harmful to road safety. For example, devices to warn drivers they are approaching a safety camera could help maintain their awareness of speed, encourage them to stay within speed limits, and warn that they are approaching a stretch of road with a speed-related accident history (this is where cameras are placed). Or they could help drivers to exceed speed limits without being detected by warning them when to slow down for cameras. Those that also incorporate an over-speed warning to alert the driver if they are exceeding a pre-set speed seem more likely to be helpful.

Satellite navigations systems are another example. Arguably they improve safety by providing advance directions to help drivers make decision about lane changes and turns in good time. However, they could increase crash risk if the directions are provided on a small screen or in complex maps which require frequent and long glances away from the road.

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[1] DfT, "Road Casualties Great Britain: 2002"

There is also a potential problem of 'risk compensation with drivers using up safety margins created by new safety technologies.

Intelligent Speed Adaptation

One of the most significant developments is Intelligent Speed Adaptation. This would involve satellites communicating with vehicles to reduce their speed by either advising the driver to do so or by physically preventing the vehicle from exceeding the posted speed limit on the road in question.

The technology can be designed to simply alert the driver to the prevailing speed limit and warn him or her to reduce their speed, or to actively control the vehicle's speed but allowing the driver to switch the system on or off, or to automatically limit the vehicle's maximum speed, whether the driver likes it or not.

As well as enforcing speed limits, a dynamic System could set lower speed limits at dangerous spots, such as sharp bends, or in response to the prevailing conditions, such as fog or ice.

Trials by Leeds University and the Motor Industry Research Association (MIRA)[2] have shown that the technology can successfully reduce excessive speed, particularly in areas where drivers were renowned for being poor at adapting their speed, for example in rural villages. The predicted levels of crash reduction are substantial.[3]

Predicted Accident reductions from ISA in Great Britain

Intervention Level	**Speed Limit System**		
	Fixed	**Variable**	**Dynamic**
Advisory	10%	10%	13%
Driver Select	10%	11%	18%
Mandatory	20%	22%	36% (59% reduction in fatal accidents)

The implementation of this technology is predicted to take almost 20 years, allowing time for further research and development, the development of standards, for the motor industry to produce ISA vehicles and then for the number of vehicles fitted with ISA technology to become a high enough proportion of the overall vehicle parc for mandatory use to be feasible.

An essential step is the production of a digital road map which would contain all of the roads in the UK and their respective speed limits. The Transport, Local Government and the Regions report of their Inquiry into Road Traffic Speed (June 2002)[4] recommended that the government fund the development of a digital road map.

[2] User trials with intelligent speed limiters; Behavioural Research in Road Safety: Tenth Seminar: DTLR
[3] O Carsten, "Intelligent Speed Adaptation", University of Leeds, Proceedings of RoSPA 67th Road Safety Congress, "Safer Driving: the Road to Success", March 2002
[4] The Transport, Local Government and the Regions Report, "Road Traffic Speed", June 2002

Employers

Vehicle technology offers excellent opportunities for employers to monitor the driving of their staff who drive for work, identify high risk drivers or journeys and take appropriate action to reduce these risks. The HSE, with DfT, have published a Guide, "Driving at work"[5], that states *"health and safety law applies to on-the-road work activities … and the risks should be effectively managed within a health and safety system*". There are a number of products which can be used to help drivers, and fleet operators, evaluate their performance and reduce risks.

Journey Data Recorders (JDRs)

These can record information about how the car is driven, from the tachograph (if fitted), speedometer, rev counter, fuel flow meter and brakes. The information can be downloaded for analysis to highlight drivers who are not driving safely or economically. Some systems include dashboard warning lights to alert the driver if they are driving dangerously or uneconomically. Case studies have shown that they can help to reduce both costs and incidents and improve fuel consumption. [6]

Accident Data Recorders (ADRs)

The 'black box' well known in the investigation of aircraft incidents, is now being fitted to cars and other vehicles to find out why and how an incident happened. They record incident information such as acceleration, braking and movement of a vehicle before and during an accident. Research in the Netherlands[7], which assessed whether drivers who know they are being monitored and who receive feedback from the information collected, change their driving behaviour, found a reduction in accident risk of about 20% on average, although the effect varied considerably between the different vehicle fleets. Research in Great Britain found that the use of ADR's in nine different fleets with a total of 341 vehicles[6] over a 12 month period reduced incidents by 28% and costs by 40%. The project

More work is needed to establish consensus about what managers and drivers need to know to be able to assess/monitor driving behaviour. However, given that 20 deaths and 250 serious injuries occur every week in road accidents in accidents in which someone was at work at the time[5], action by employers to reduce these crashes could substantially reduce death and injury on the road.

Vulnerable Road Users

The crash tests developed by the European Enhanced Vehicle Safety Committee Working Group 17 and the EURONCAP programme have helped to substantially improve the design of cars so they cause less severe injury to pedestrians and others. It was extremely disappointing that the EC decided against a Directive which would have required new cars to meet these tests. This would have saved an estimated 2,000 lives and 18,000 serious injuries annually on EU roads. Instead, the EC has approved a directive that will require by 2005 new cars to pass less stringent tests developed by the motor industry.

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[5] HSE, "Driving at Work", September 2003, INDG382
[6] Driver Safety: Monitoring; Fleet Safety Forum, Brake
[7] Wouters & Bos: Traffic accident reduction by monitoring driver behaviour with in-car data recorders: Accident Analysis & Prevention: Vol 32, No 5

In-Car Child Safety

An area has progressed very slowly is the introduction of the ISOfix system for child car restraints. ISOFIX is intended to make fitting child seats into cars quick and simple. ISOFIX points are be built into cars at the point of manufacture and child seats will have ISOFIX fitting points so that they can be simply plugged into the points in the car. This is an essential development because many people find it difficult to fit chid seats correctly, and surveys consistently find that a high proportion of child seats are not fitted securely. ISOFIX is designed to solve all these problems. At least one ISOFIX seats is already available in the UK, but it has to be tested and approved for specific models of car. The ultimate aim is that any child car seat will fit any car.

Conclusion

Vehicle technology is, and always will, rapidly develop and change. It offers many opportunities for influencing the way we drive. Over the next two decades it seems certain that the nature of cars, and hence the nature of driving, will change fundamentally. In particular, the long term development of Intelligent Speed Adaptation offers very significant opportunities for influencing drivers' choice and use of speed, and thereby significantly reducing deaths and injuries.

However, it is crucial that the implications for driver education, driver training and driver testing are assessed and understood, so that training and testing regimes can be adapted to the changes, and so that drivers understand the benefits and limitations of new car technology.

There is a strong case for a comprehensive review of the potential effects on driver behaviour and crash risk of individual technological developments and of the change in cars overall, perhaps undertaken by a suitable centre of excellence such as Qinetiq, TRL, MIRA or a major university department.

It seems that the vehicles themselves will do more and more of the driving and decision-making. The science fiction of the driver being little more than a passenger in a fully automated car is on its way to becoming science fact.