FEVR Black Box recommendations

The use of black boxes to reduce road death and injury and carbon emissions should be a priority for the United Nations and all national governments.

All national governments should introduce legislation to require and regulate their use. Early action is required, in order to ensure that the opportunity offered by the proliferation of electronic devices in motor vehicles is not lost.

All devices should meet the minimum technological standards required to achieve the benefits set out above. As a first priority, black boxes should be required in vehicles driven by

- young or novice drivers
- all public sector agencies, including emergency services and police services
- business (including commercial vehicles, public transport vehicles, company cars) and by individual employees while at work
- international aid project drivers

Like the vast majority of other road safety measures, black boxes are not self-enforcing (speed humps are a rare exception). To be effective, drivers need to know the recorded data will be used to assess the safety of their driving, the need for the trip, and/or logic of the route choice. Transport supervisors and parents have a key role to play in ensuring black boxes are effective.

'What gets measured gets improved'

BP (British Petroleum) use in-vehicle monitoring systems (IVMS) to improve company road safety in Pakistan. The black box records - distance driven, start and end time, average speed and time above speed limit, acceleration and deceleration and the highest speed for each trip. In addition drivers are trained in defensive driving.

Over a four year period IVMS with driver training reduced incidents by 96%, from 46 in 2001 to only 2 in 2005. The company reduced the annual costs of incidents by $100,000 and maintenance costs by $30,000, saving $520,000 over four years.

Taking into account equipment and training costs, the benefit to cost ratio was 8.67:1, with a net saving to the company of $115,000 a year.

Source: Shaw, K.D. (2005) Transporting people and equipment safely: the journey to zero incidents, Conference of the International Association of Oil & Gas Producers, Cairo 29-30 November 2005

Useful websites

VERONICA project:
http://www.siemensvdo.com/aboutus/projects/veronica/documentation/documentation.htm
US National Highway Traffic Safety Administration (NHTSA)
Black box website: http://www-nrd.nhtsa.dot.gov/edr-site/dataformat.html
Insurance Institute Highway Safety: www.iihs.org/research/qanda/edr.html
DriveCam: http://www.drivecam.com/
Road Safety International: http://www.roadsafety.com/teen.php

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(3) Norwich Union Direct (2006) "Pay As You Drive" Insurance: The Complete Guide, Norwich Union
(4) Harris Technical Services (nd) EDR Case Law, http://www.harristechnical.com/cdr5.htm accessed 070220
(5) Litman, T.A. (2002) Implementing Pay-As-You-Drive Vehicle Insurance: Policy Options London: ippr (The Institute for Public Policy Research)
(6) Gaventa, J. (2005) Policing Road Risk: Enforcement, Technologies and Road Safety Occasional Research Reports, London: PACTS (Parliamentary Advisory Council on Transport Safety)
(7) Schmidt-Cotta, R-R., Steffan, H., Kast, A., Labbett, S., Brenner, M. (2006) VERONICA: Vehicle Event Recording based on Intelligent Crash Assessment; Project Final Report, European Commission Directorate General for Energy and Transport (DG-TREN)
(8) NHTSA EDR Working Group (2001) Event Data Recorders - Summary of Findings by the NHTSA EDR W Group NHTSA National Highway Traffic Safety Administration
(9) German, A. and J.-L. Comeau, B. Monk, K. McClafferty, P.F. Tiessen, J. Chan (2001) 'The Use of Event Data Recorders in the Analysis of Real-World Crashes, Proceedings of the Canadian Multidisciplinary Road Safety Conference XII; June 10-13, 2001, London, Ontario
(10) ECMT/OECD (2006) Speed Management OECD
(11) IIHS (Insurance Institute Highway Safety) (2006) Q&A: Event Data Recorders

This briefing sheet is produced by RoadPeace, UK's national charity for road crash victims, on behalf of the European Federation of Road Traffic Victims (FEVR) for the first UN Global Road Safety Week in April 2007, dedicated to young road users. It is sponsored by Dean and Sarjit Jagroop in memory of their only son Andrew, a 21-year old law graduate, killed whilst waiting at a bus stop on a pavement near his home in London, by an unlicensed and uninsured teenage driver who lost control when speeding downhill, mounting the pavement and hitting Andrew. The learner driver, who was driving, unsupervised, a car taken without permission, thus illegally, pleaded guilty to 'Driving without due care and attention' in a Magistrates' Court, after the Crown Prosecution Service stated that there was insufficient evidence regarding the speed to charge him with 'Causing Death by Dangerous Driving'. A black box in the driver's car would have provided this evidence.

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BLACK BOXES FOR SAFER, GREENER TRAVEL

A FEVR[1] briefing sheet to mark the first UN Global Road Safety Week 23-29 April 2007, dedicated to protecting young road users

In 2005, 1.3 million people were killed in road crashes, more than 3500 each day. Over 40% of those killed will have been under the age of 30 and will only have lived half of their life at most. Road deaths are predicted to increase further - by 60% before 2015, with 90% of this increase occurring in low and middle income countries. A simple, cheap and increasingly available technology – Event Date Recorders (EDRs) or 'Black Boxes' - could dramatically reverse the escalating problem of road death and long-term disability. The same technology could also take pressure off the planet by reducing fuel consumption and carbon emissions. Greater use of black boxes would prevent many crashes and make driving greener.

Photo of a fatal crash in London, where black box evidence of extreme speed helped to secure the conviction of the young driver for the serious charge of 'Causing Death by Dangerous Driving'.

What are black boxes?

Black boxes or EDRs are used to improve safety by monitoring how cars are being driven. There are different types of black boxes and they are used for different purposes. At their most basic, they record changes in speed, acceleration and direction of travel. Some use this information to activate safety devices such as airbags and anti-locking brakes. Others, installed after manufacture, use the information for driver training, crash reconstruction and crash prevention. Fleet managers use after-market black boxes to reduce the costs of crashes to businesses. Parents in North America and insurance companies in Europe use them to protect young drivers.

> *'People drive perfectly when their supervisor is riding with them. This device allows the supervisor to stay in that front seat all the time.'*
>
> Larry Selditz, Road Safety International

Vehicle data just before and after a crash, about a minute total, is all that is needed for crash re-construction and prevention. For driver training and supervision, black boxes can provide continuous records. They can also incorporate automatic crash notification ('e-Call') using global positioning systems (GPS) to alert the police and emergency services to the occurrence of a crash, its location and potential severity.

Black boxes are small and very cheap relative to the savings they can achieve. At around €250-400 for types installed by parents and insurance companies, they cost about the same as a basic satellite navigation system. It has been estimated that installing a black box in every passenger car in Europe would pay for itself within three years in terms of lives saved and casualties prevented (1).

[1] European Federation of Road Traffic Victims

RoadPeace
dedicated to supporting road crash victims

RoadPeace

helpline
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www.roadpeace.org

What are the benefits?

1 Reducing road crashes

There is evidence that drivers who know that their cars have black boxes drive more cautiously. Case studies from Europe and the US show that the number of crashes can be reduced by 20 to 30 percent (2). Crash severity is also reduced.

The evidence for black boxes

- The Berlin Police Department reduced crashes by 20% overall and by 36% during rescue trips. As a result, all Berlin Police radio patrol cars use EDRs. A similar trial in Vienna led to the use of EDRs in all the city's police cars.
- In the mid-nineties, a Europe-wide programme studied the effect of different types of EDRs in fleets in Great Britain, the Netherlands and Belgium. The overall crash rate fell by 28% and costs by 40%.

In addition to reducing casualties and costs, data from black boxes helps to eliminate disagreements with employees. EDRs used in connection with fleet management have helped fleet operators or their insurers to identify unrealistic itineraries or timetabling and so reduce risk-taking. Black boxes could also prevent crashes by helping mechanics to identify vehicle damage or malfunctions during regular maintenance.

In the UK, black boxes are part of a new type of insurance targeted at young drivers. A large component of the premium costs varies according to the time of day and type of road, reflecting the especially high crash risk of young drivers at night. The Norwich Union's 'Pay-As-You-Drive' insurance pilot reduced crashes among participating young drivers by 20% (3). Part of the crash prevention effect of EDRs comes from encouraging more careful and smoother driving.

2 Proving responsibility for crashes and crash damage

Black boxes can provide accurate, objective and reliable data about what happened during a crash. Such data would reduce arguments over facts and lead to fairer trials, protecting the interests of crash victims, vehicle owners and drivers. It would help to speed up court and insurance proceedings.

In several North American court cases, EDR evidence has been decisive in establishing innocence or guilt. It has been used to secure convictions in cases of dangerous driving and hit and run cases, and to prove actual speeds contrary to witness testimony. In an important recent case the black box showed that a driver who killed two teenage girls had been travelling at 103mph in a 30mph speed limit one second before the crash and at 114mph four seconds before. A defence expert had argued that the defendant had been travelling 57mph and the state's expert had estimated a minimum speed of 80-98mph (4). In another case EDR evidence was used to exonerate a driver when brake failure had caused the crash. EDR data would also help deter insurance fraud, benefiting all insured drivers.

3 Reducing distances travelled and thus climate change

Fleet management and insurance policies using black box data potentially help to reduce distances travelled, which also reduces casualties and emissions. A study of the potential effect of distance-based passenger car insurance in Los Angeles, USA, estimated that the distances driven would be reduced by nearly 5% and congestion by nearly 10%, partly by discouraging unnecessary driving and driving during the rush hour when more crashes occur (5). Smoother driving improves vehicle fuel consumption and reduces CO2 emissions.

4 Improving medical response and rescue time

EDRs could be coupled with an automatic crash notification system, such as the proposed 'e-Call'. This would reduce emergency response times and improve outcomes for crash victims. Rescue and medical service providers could improve their efficiency and reduce their costs. It has been estimated that automatic crash notification on its own could reduce road deaths in Europe by 10% (6).

Black box data could help rescue teams and medical staff to more accurately assess injury severities by showing what happened during a crash. This is especially important where victims are unconscious. A study in Germany showed that about 4% of urban crashes and 12% of rural crashes resulted in victims being trapped and/or unconscious and unable to call for help (7).

5 Improving the evidence base for road safety

Black boxes could increase the quantity, accuracy and reliability of evidence for crash investigations and make it available in less time. In an appropriate regulatory framework, black box data could be accessed by police, crash investigators, car manufacturers, road safety researchers and insurance claims assessors.

Traditional methods of crash investigation have always had a high degree of uncertainty. In recent years, the increasing use of Advanced Braking Systems technology (ABS) to prevent wheels locking has eliminated valuable skid-mark evidence. Change in speed is the most important measure for crash reconstruction, but this evidence is available in less than 40% of crashes investigated (8). When the information is available, EDRs have shown that traditional methods can underestimate the speeds leading to crashes by 50% (9).

> *Motor vehicle black boxes speak for the victim. They tell the truth in a way that nothing or no one else can.* Thomas Kowalick, IEEE

Who uses them/where are they in use?

64% of 2005 model passenger cars sold in North America have a black box. This will increase to 85% by 2010 (10). 'After-market' black boxes are being introduced through the car insurance market.

Vehicles made by General Motors, Ford, Isuzu, Mazda, Mitsubishi, Subaru, Suzuki and about half of Toyotas have EDR equipment built in. Some automakers, mainly German and Korean, but some Japanese, do not put EDRs in recent passenger vehicles (11).

Why are they not used more?

A legal framework is needed to encourage the use of black boxes and ensure legitimate access to the data. This in turn requires standards for the technology.

North America is ahead of Europe in this respect. By 2011, all EDRs installed by manufacturers will be regulated to ensure that the devices can be used for automatic crash notification, crash investigation and the analysis of safety equipment performance. Drivers will be informed that their cars are equipped with black boxes which can do these things.

In 2006, the pan-European VERONICA project (Vehicle Electronic Recorders for Intelligent Crash Analysis) established the basic requirements for EDRs that would support emergency, road safety, legal and insurance objectives. The working group recommended an EC Directive as the way to secure the benefits of EDRs, In the meantime, it suggested that progress could be made at the national level - through the insurance industry focusing especially on younger drivers.