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# a d v i s o r y

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### **DATA FROM BLACK BOXES POTENTIALLY USEFUL BUT ACCESS STILL IS LIMITED**

Nearly every new passenger vehicle can measure and store information about what happens during some crashes. Much of the stored information is directly related to airbag deployments. Some so-called black boxes, or event data recorders (EDRs), store information about what happens before a crash as well as during it. Because data captured by EDRs may be useful to insurers, the Institute published a previous *Advisory* (No. 25, Sept. 1999). Since then interest in EDRs has been growing, especially as some automakers have begun to make the means available for others to access the data.

#### ***Potential uses of EDR data***

EDRs are basically extensions of airbag crash sensors. During a crash the sensors measure vehicle decelerations and/or velocity changes, and these data are used in computational algorithms to determine whether the airbags need to be deployed. Data from the crash sensors, together with information such as time of airbag deployment, often are recorded, mainly for use by auto manufacturers in product liability lawsuits. Some automakers have expanded the data that are collected by recording information such as vehicle speeds before impact, brake and accelerator functions, and information about whether the safety belts were buckled.

Data from EDRs potentially are useful to highway safety researchers, police accident investigators, insurance adjusters, and others because they can provide more reliable information than can be obtained through traditional crash investigation techniques. Some EDR data also may be useful in determining culpability. For example, there were no witnesses or evidence to indicate how fast a vehicle had been going when it crashed on an icy road in Massachusetts last January, killing the passenger. EDR data established the driver had been speeding, and she was charged with vehicular homicide. In another case in Florida, EDR data proved a driver charged with vehicular homicide had *not* been speeding, and he was found not guilty.

#### ***Limitations on using EDRs***

Useful as EDR data may be to insurers and others, there are limitations. Most new passenger vehicles don't have full-fledged EDRs. Their recorders capture only the more limited data from airbag crash sensors, and only the manufacturers of the vehicles can download the data. The main exceptions have been General Motors vehicles manufactured since 1995, most of

*Standardizing  
both the data that  
are captured by  
EDRs and how  
these data are  
retrieved would  
greatly advance  
the usefulness  
of the devices.*

which have EDRs that can be accessed using a commercially available device made by Vetronix Corporation. As of March 2003, this company's device also can download data from the EDRs in popular Ford models including the Crown Victoria/Mercury Marquis, Taurus/Mercury Sable, Lincoln Town Car, and Windstar.

The most advanced EDRs are in 1999 and later General Motors models. These capture vehicle speed, engine speed, brake status, and throttle position, starting five seconds before impact. During the crash, more information is recorded — time from impact to frontal airbag deployment, time from impact to maximum velocity change, status of the driver safety belt, and more. The EDRs in Fords don't record information before an impact begins, but they do capture data on vehicle decelerations during impact plus some data related to frontal airbag deployment and safety belt use.

In most cases, the information that can be downloaded is from frontal crashes only. Exceptions are Ford Taurus/Mercury Sable models, from which it's possible to use Vetronix equipment to download data on side impacts. Information about rear impacts isn't available, but General Motors says one of its 2004 models will come with an EDR that captures "data for all directions."

The Institute has downloaded data from four General Motors models and one Ford after 40 mph frontal offset crash tests. The EDRs in these cars accurately recorded precrash speeds, airbag deployment times, and belt use. They also recorded vehicle decelerations during the crashes, but the EDRs in two of the five cars stopped recording before the crashes were over.

The National Highway Traffic Safety Administration (NHTSA) has encountered problems trying to access data from vehicles involved in real-world crashes. The agency purchased 50 retrieval devices for use in crash investigations conducted as part of the National Automotive Sampling System and attempted to download data from about 650 crashes during 2002. In about 15 percent of these cases, the EDRs either didn't record all of the data or, in some cases, didn't record anything.

The Insurance Corporation of British Columbia (ICBC), which also uses EDR data, has encountered other problems. In one case, a very high vehicle speed was recorded before a crash. This confused investigators because it didn't mesh with other evidence pointing to a low-speed impact. ICBC investigators later determined that a wheel of the crashing vehicle had left the ground and, spinning rapidly in the air, mimicked the high speed recorded by the EDR. Now ICBC, which used to download data from as many crashed vehicles as possible, has scaled back its retrieval efforts. Perhaps this shouldn't be surprising because EDR data aren't a panacea for resolving conflicts that might arise when trying to establish liability. Culpability in many (probably most) crashes can be established without these data. In other cases, EDR data might not provide sufficient information to resolve conflicts. Still, these data do promise to improve available information about crashes.

A key question is, who has access to the data? EDRs and the data they store belong to vehicle owners. These data have been accepted as evidence in court and sustained on appeal. However, access to EDR data may be problematic for the more numerous crashes that don't involve litigation — especially crashes for which police or insurers are interested in assessing fault. Insurers might be able to gain access to the EDRs in their policyholders' vehicles, but this typically wouldn't cover access to data in the other vehicles involved in two-vehicle collisions.

### ***Standardization of data and access is needed***

NHTSA has decided not to open rulemaking to consider requiring EDRs, saying it isn't needed because automakers are headed in this direction voluntarily. The agency did request comments on EDRs in October 2002, and the Institute responded by advising NHTSA to develop standards for what data are recorded and how they're accessed. At a minimum, standard data should include information on vehicle speed immediately before a crash, throttle position, belt use, whether the driver was braking, whether antilocks activated, longitudinal and lateral vehicle acceleration during impact, velocity change over time, and time of airbag deployment. Routinely collecting such information from all crashes and making it readily available would greatly increase the usefulness of the devices, the Institute told NHTSA. The National Transportation Safety Board, American Insurance Association, National Association of Independent Insurers, and others also have asked NHTSA to take the lead in setting standards.

The Institute of Electrical and Electronic Engineers formed a working group to help set standards, and the Society of Automotive Engineers has convened a working group toward standardizing EDRs. Achieving standardization would greatly advance the usefulness of these devices as suppliers of supplementary information for use in crash investigations.