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TECHNOLOGY TOOLS

Black Box Technology and its Implications for Auto Insurance

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When the term black box is used, the first thing that often comes to mind is an aircraft's flight data recorder. These devices are the focus of aircraft crash investigations because their recovery provides invaluable insight into the factors that contributed to the mishap. Today, there are numerous black box technologies, referred to as event data recorders, or EDRs, that also can provide significant information about what happened in a car crash.

GM is the first manufacturer to allow the general public to access and retrieve EDR information from its vehicles through the use of the Vetronix Crash Data Retrieval (CDR) System. Ford is following suit with several of its more popular models. The data that can be downloaded from an EDR on select GM models includes status of driver seat belt usage at the time of the accident; longitudinal or forward post-crash velocity changes at 10 millisecond increments for the first 150 to 300 milliseconds after a collision; and pre-crash information regarding vehicle speed, engine speed, percent throttle, and braking status at one second intervals for five seconds prior to impact.

In general, this information is processed and stored by the vehicle's air bag or restraint control module. This module recognizes when a collision event occurs and determines if the event is severe enough to warrant the deployment of the vehicle's air bag or other restraint system protections. It is important to note that EDR information is available even when the air bag does not deploy in a collision. For example, in a near-deployment event, the data recorded is temporarily stored for 250 ignition cycle counts (or approximately 60 days of normal use). As a result, EDR information is available in more than just high-severity, high-exposure cases. Should a collision be severe enough to warrant the deployment of an air bag, the data is permanently stored and cannot be overwritten.

As shown above, the Vetronix CDR System is a peripheral connected to a PC's serial port. The PC is loaded with proprietary Vetronix software.

Desktop Analysis Technology

Injury Sciences of San Antonio, Texas, offers a product called WrExpert; an engineering-based, claim evaluation technology that provides users insight into accident and injury causation. This web-based technology can import EDR information harvested by the Vetronix CDR System and subsequently transmitted over the Internet. WrExpert analyzes the EDR information to provide greater insight into not only what happened to the vehicle from which the data was harvested, but also what happened to the other vehicle and its occupants.

WrExpert is a complementary technology to EDR systems because EDR technology: 1) has sensitivities to non-frontal collisions that must be carefully evaluated; 2) cannot derive point and angle of impact; and 3)

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cannot independently assess accident implications to the other vehicles and their occupants. For these reasons, EDR information will continue to be an important supplemental source of data in the investigation of a claim, but will not replace traditional sources such as collision repair estimates and vehicle photographs. With a vehicle's collision repair estimate and damage photographs, WrExpert can determine impact severity to both vehicles involved in a two-car collision and injury potential to each vehicle's occupants, as well as supplement accident causation analyses with point and angle of impact assessments.

This technology can be routinely employed to significantly reduce loss costs by accelerating and improving the accuracy of auto claim evaluations.

The Vetronix CDR System is capable of downloading crash data from GM auto, pickup, van, and SUV models dating back to 1996. The next releases of this system will also harvest data from select 1994 and 1995 GM models, as well Ford's 2000-2001 Taurus and Mercury Sable, 2001 Crown Victoria and Mercury Grand Marquis, 2001 Windstar, and 2001 Lincoln Towncar.

With the addition of these Ford models and earlier year GM models, approximately 15 percent of all private passenger vehicles on the road will have harvestable black box information. Furthermore, because of the significant market share held by GM and Ford, the percentage of vehicles on the road with EDR systems accessible by the Vetronix System is expected to increase by 2 to 3 percentage points with each new model year, without the addition of any other manufacturers or new Ford models. This translates into about a 30 percent chance that at least one vehicle in an accident involving two passenger vehicles will have an EDR that can be harvested by the Vetronix System. Accordingly, this percentage is expected to increase 4 to 6 percentage points with each new model year.

Easy Data Retrieval

Data retrieval is a straightforward process that can be accomplished in five to 10 minutes if the vehicle is not structurally compromised in a fashion that makes the harvesting portals inaccessible. Training for data retrieval only (but not data interpretation) can be accomplished easily in an hour.

The Vetronix CDR System is a peripheral device that connects to a PC loaded with Vetronix software. Once the software is activated, the CDR System is plugged into one of two available ports on the vehicle. One port is the diagnostic link connector or OBD II port found under the dashboard. This port is universal across all vehicles sold in the U.S. since 1996 and data can be harvested from this port using a single, standard cable. Should this port or its connections to the air bag or restraint control module be compromised, the data can be harvested directly from the module storing the data using a cable compatible with the storage module.

To harvest information from an EDR system, the vehicle need not have power. In these cases, the CDR System can be powered from another vehicle using the cigarette lighter adapter, portable AC/DC power units, or traditional power outlets using an adapter. With alternative power sources, the air bag or restraint control module can be removed from the vehicle and stored for subsequent data access.

The harvesting of EDR information by the Vetronix System does not erase the information in the data storage module but will advance the ignition cycle count. In other words, the same EDR information related to an accident event can be harvested multiple times by parties with different interests, unless ignition cycle count limits are exceeded by the harvesting activity for stored near-deployment data.

Clarifying Data Ownership

The emerging consensus regarding the ownership of black box data is that the owner of the vehicle owns the data. This position is held by NHTSA and the Center for Economic Justice in Austin, Texas. Arguably, insureds have a duty to grant access to EDR information, as they are contractually bound to cooperate with an insurer's investigation of an accident. This duty is critical to the prevalent use of EDR systems.

Under the construct of the owner of the vehicle's owning the data, EDR information is privileged in a civil proceeding and the owner of the privilege may waive the privilege. Also, the data is protected in a criminal proceeding under the Fifth Amendment, and these protections can only be waived by the accused. Under these constructs, however, interesting positions may be argued if the vehicle, or its EDR parts, have been replaced or essentially repurchased by an insurance company. In such instances, does the ownership of the data follow the ownership of the vehicle or part? While ownership issues are being clarified, some still require further development.

Public perceptions of EDR information provide additional insight into the potential accessibility and utility of EDR systems. Recent household surveys by the Insurance Research Council indicate that the public is generally in favor of using EDR systems to facilitate the investigation of an accident and determine fault. Conversely, the surveys indicate that the public is opposed to using GPS and EDR systems to monitor mileage and driving habits for the determination of insurance rates.

Given the substantial benefits that can be derived from EDR systems, specific contractual provisions, and perhaps incentives (e.g., waived deductibles, reduced rates), may be placed in insurance policy language to clarify exactly how the data will be collected and used in the investigation and evaluation of accidents and any potential civil proceedings that might ensue. Until such time, existing public perceptions and existing constructs of data ownership suggest employing protocols to obtaining EDR information similar to those employed to obtain an individual's medical record.

Significant Benefits

Near-term benefits to the insurance industry will be primarily in the areas of casualty claim evaluations and liability determinations. Studies conducted by Injury Sciences involving nearly two dozen different auto insurance carriers have shown that the use of technical or science-based analyses regarding injury

causation (without black box data) early in the evaluation of a casualty claim reduces loss costs related to opportunistic claiming by 30 to 70 percent. Additionally, these studies have shown that claims benefiting from this information are resolved quicker with less overall effort and, consequently, expense.

Clearly, black box data can augment these results and add demonstrable benefit in the areas of liability determination. As an example, only a few modest reductions in loss costs because of comparative/contributory negligence issues in just a few policy limit claims will justify investment in these analysis technologies.

Longer-term, EDR technology may enhance a carrier's pricing strategies as it accumulates data which demonstrate casualty claim costs are lowered for those insureds who drive vehicles with harvestable EDR information. Claim costs should be reduced further because numerous studies have shown that the mere presence of EDR technologies have reduced crash rates and costs. Alternatively, should data begin to demonstrate that, for the same severity of impacts, certain vehicles have greater repair costs, pricing can be adjusted based on this crash test data. Currently, the primary, but limited, source of this information is the Insurance Institute for Highway Safety.

Black box and other complementary technologies can provide insight into accident and injury causation in auto claims that was formerly unobtainable without expending thousands of dollars on forensic expert evaluations and waiting for months. Today, this technology can be routinely employed to significantly reduce loss costs by accelerating and improving the accuracy of auto claim evaluations. Additionally, these complementary technologies allow the auto insurance industry to develop data and strategies that could profoundly improve its underwriting and pricing models. As with any technology, the ultimately successful solutions will require responsible, accurate, and consistent capture, interpretation, and utilization of the data. Or, in other words, a careful look inside the black box. ▲