EDR Q&As

THE BASICS

What is an EDR? What is its purpose?

An Event Data Recorder (EDR) is a function or device installed in a motor vehicle to record technical vehicle and occupant information for a brief period of time (seconds, not minutes) before, during and after a crash for the purpose of monitoring and assessing vehicle safety system performance. For instance, EDRs may record (1) pre-crash vehicle dynamics and system status, (2) driver inputs, (3) vehicle crash signature, (4) restraint usage/deployment status, and (5) post-crash data such as the activation of an automatic collision notification (ACN) system.

What is the difference between an EDR and a "black box"?

"EDR" is the term NHTSA has coined to refer to the device commonly installed on motor vehicles to record vehicle technical data for a brief period of time in the event of an accident. In contrast, airplanes, trains, and ships use sophisticated recording devices, known as black boxes, that record data continuously throughout the operation of the vehicle, capture much more data than EDRs, and, and in some cases, can record sound.

Where is the EDR typically located within a vehicle? Is there just one, or can a vehicle be equipped with multiple EDRs? Will I pay extra for it?

An EDR typically includes sensors located throughout the vehicle that perform various functions. However, the "brains" of the units are typically located in a well-protected area of the vehicle, such as under the driver's seat, or within the center console. The exact location and type of EDR is left to the discretion of the automobile manufacturer. Usually there is only one central processing unit per vehicle. The cost of an EDR is not a significant factor in the cost of an automobile, and is incorporated in the base price.

Do all types of vehicles have them? If not, what percentage does?

Not all vehicles are equipped with EDRs. Most manufacturers have made the decision to install some EDR capabilities in their current vehicles. It is estimated that about 64% of the 2005 model year passenger vehicles have some EDR capability.

Does the Federal government require them?

No, the Federal government does not require manufacturers to install EDRs.

Does the Federal government regulate them?

NHTSA has issued a regulation to standardize the data collected and recorded by an EDR, in order to enhance its usefulness for safety-related purposes. Beginning with vehicles manufactured on or after September 1, 2010 (generally referred to as model year 2011 vehicles), NHTSA has defined the minimum data set that must be collected if a manufacturer decides to voluntarily install an EDR in their vehicle, along with requirements for the range and accuracy of EDR data. A complete list of EDR data elements covered under the regulation is provided at the bottom of this web page.

Why does the government want to standardize and collect EDR data?
The government is interested in reducing deaths, injuries, and property damage related to vehicle crashes on the Nation's highways. EDRs give government researchers and investigators better information from which to assess how motor vehicles perform in real world events. Using these data, the government can then develop more effective occupant protection and motor vehicle safety programs.

If they're voluntary, what incentive do vehicle manufacturers have to put them in their vehicles?
Manufacturers install EDRs to collect information that can be used to improve vehicle performance in a crash event, thereby enhancing safety in future generations of vehicles. Data collected from EDRs can provide valuable information on the severity of the crash, operation of the air bag, and what deployment decision strategies were used during the event. Also, the data can be used to demonstrate that the vehicle was operating properly at the time of the event, or to help detect undesirable operations that may lead to a recall of the vehicle for repairs.

EDR FUNCTIONALITY QUESTIONS

What information do EDRs record? How frequently is the information collected? How much history is collected?
NHTSA requires that vehicles manufactured on or after September 1, 2010 that are voluntarily equipped with EDRs must record 15 data elements at a minimum in a standardized format. Table I below shows these elements, the minimum frequency for collecting each data element, and how long of a history the EDR must maintain for each data element.

NHTSA does not limit the maximum number of data elements that can be collected. Some voluntarily-installed EDRs are capable of capturing more than the 15 required data elements in Table I. If the EDR is capable of capturing the additional data elements identified in Table II, NHTSA defines the minimum frequency and time interval requirements for those additional data elements.

When does the EDR capture data?
Most vehicle EDRs capture data during a frontal collision, typically those causing visible damage to the vehicle. As a rule of thumb, if the crash is sufficient to cause the air bags to deploy, the EDR data are usually captured.

When does the EDR NOT capture data?
Unless you have a significant event, such as a collision, pot hole or curb hit, the EDR does NOT capture data.

Does the collected data contain any personal identifiers?
The collected data does not contain any elements that could identify the driver of the vehicle. However, the vehicle identification number (VIN) may be required to download any information from the EDR. Other parties, such as law enforcement, could combine the EDR data with the type of personally identifying data routinely acquired during a crash investigation.

How is an EDR different/similar to the control unit that works with my air bags? Is the EDR the same as (or related to) the crash notification system in my vehicle?
EDRs can trace their roots to the installation of air bags in vehicles. For air bags to operate properly in the event of a crash, automobile manufacturers developed control units to detect when a crash has occurred and deploy the air bag, if needed. As the air bag control units became more sophisticated, automobile designers realized data collected from the control units could be used to further improve air bag design. To collect these data, designers increased the functionally of the air bag control unit to permit storage of the data after a crash so it could be downloaded and analyzed later. In most cases, the EDR function is integrated into the air bag control unit.

Automatic collision notification (ACN) systems and EDRs are separate functions. ACN is a system that can automatically notify a third party (such as a 911 operator or a call center) when a car is involved in a collision. Some cars and light trucks have ACN devices, such as GM's On-Star™ system. Some of these systems use data from the EDR to determine crash severity, thereby helping to ensure an appropriate level of medical response.

How do I know if my current vehicle has an EDR? How do I know if the vehicle I plan to purchase has an EDR?
Many vehicles equipped with air bags have EDRs. Starting in 2005, most car companies have placed a statement in the vehicle owner's manual indicating if the vehicle has an EDR.

Can I elect to have my EDR turned off? Can I take out my EDR? Can my dealer take out my EDR?
In all car/light truck applications that NHTSA knows of, the EDR is an integral part of the air bag control system, and the two functions cannot be separated. If the EDR function were to be removed or turned off, the air bag system would likely be disabled. Dealers and other commercial entities may not make inoperative any device covered by a NHTSA safety standard, including air bags. Furthermore, NHTSA strongly recommends against the vehicle owner disabling any vehicle safety system.

What efforts are being done to standardize EDRs?
NHTSA's EDR rule standardizes voluntarily installed EDRs on all light vehicles equipped with air bags. (Further details are provided in response to the next question). In addition, the Institute of Electrical and Electronics Engineers, Inc. (IEEE) developed standard 1616 for all motor vehicle event data recorders. That is available for sale at their web site, www.ieee.org. The Society of Automotive Engineers (SAE) has also developed a set of recommended practices for EDRs (J1698), which are available from their web site, www.sae.org. SAE is currently working on additional recommended practices.

What are the governments plans to standardize EDRs?
NHTSA's regulation will standardize voluntarily installed EDRs in all light vehicles built on or after Sept 1, 2010. Multi-stage and altered vehicles will have one extra year to comply. The five components of the final rule are:

(1) Requires that the EDRs voluntarily installed in light vehicles record a minimum set of specified data elements;
(2) Standardizes the format in which those data are recorded;

(3) Helps to ensure the crash survivability of an EDR and its data by requiring that the EDR function during and after the front and side vehicle crash tests specified in Federal motor vehicle safety standards;

(4) Requires vehicle manufacturers to ensure the commercial availability of the tools necessary to enable crash investigators to retrieve data from the EDR; and

(5) Requires vehicle manufacturers to include a standardized statement in the owner's manual indicating that the vehicle is equipped with an EDR and describing the purposes of EDRs.

PRIVACY/INFORMATION OWNERSHIP QUESTIONS

Who "owns" the information collected by an EDR?
Ownership of the EDR and EDR data is a matter of State law, and such provisions vary considerably. NHTSA considers the owner of the vehicle to be the owner of the data collected from an EDR. NHTSA will always ask permission from the owner of a vehicle before downloading any information for use in government databases.

Who has permission to download the EDR data from my vehicle?
The owner can give permission to download EDR data. In addition, courts can subpoena EDR data through court orders, and some States collect data under their existing State laws governing crash investigations. For crash investigations conducted by NHTSA, the agency obtains permission from the vehicle owner prior to downloading the EDR data.

Can I download data from my vehicle?
Some vehicle manufacturers have licensed a third party to develop the downloading process tools that permit owners of vehicles to download data from an EDR. Contact the manufacturer of the vehicle for information on tools to download EDR data.

Do police, crash investigators, or my insurance company have access to my EDR's information if I'm involved in a crash?
Courts can subpoena EDR data through court orders, and some States collect data under their existing State laws governing crash investigations. Some insurance policies may have contract terms related to data collection from EDRs.

Can EDR recorded data be used against a driver in our court system?
Courts can subpoena EDR data through court orders, and some States collect data under their existing State laws governing crash investigations. Nearly 100 court cases have used EDR data in the proceedings, showing a willingness to allow EDR data as evidence.

I've heard stories about insurance companies who use similar devices to track driver behavior and issue discounts to policyholders who drive safely. Are these tracking devices the same thing as an EDR? Can the insurance companies access this data, label me as an "aggressive" driver, and use it to charge me higher rates? Conversely, if I'm a "safe" driver, can I use the data to get lower rates?

No, driver behavior tracking devices are not the same as an EDR (contact your insurer for further information on such programs, if available). Some insurance policies may have contract terms related to data collection from EDRs. Those contract terms stipulate how and when the insurance company would have access to the EDR data.

Can EDRs record my conversations or a video?
NHTSA does not require EDRs to contain any personal identification information.

Can EDRs tell if I ran a red light?
NHTSA does not require EDRs to contain any personal identification information.

Can EDRs tell if I have been drinking?
NHTSA does not require EDRs to contain any personal identification information.

Can EDRs tell if occupants are wearing their seat belts?
Since knowledge of safety belt use is critical to understanding the operation of the vehicle's safety systems, seat belt use is often captured as an EDR data element. NHTSA has included this as an element that must be collected on voluntarily-installed EDRs beginning September 1, 2010.

Will EDRs be mandated?
At this time, the decision regarding whether to install EDRs in cars and light trucks is up to the vehicle manufacturer. NHTSA's regulation, effective on September 1, 2010, standardizes those EDRs installed voluntarily by the vehicle manufacturer. It also requires vehicles equipped with an EDR to have a standardized statement in the vehicle owner's manual to make owners aware of the presence of the EDR, as well as its purpose and function.

How can I learn what legislation or regulations my State might have concerning EDRs?
Many States are considering legislation to regulate EDR disclosure, data ownership, and other privacy concerns. Some States have already passed such laws. Your State Attorney-General's office can provide you with information on any State regulations affecting EDRs.

ADDITIONAL INFORMATION

Where can I find additional information regarding EDRs?
People interested in additional information and research about EDRs can examine the NHTSA EDR web site at: http://www-nrd.nhtsa.dot.gov/edr-site/index.html

TABLE I – DATA ELEMENTS REQUIRED FOR ALL VEHICLES EQUIPPED WITH AN EDR

DATA ELEMENT	LAYMAN'S DESCRIPTION	RECORDING INTERVAL / TIME[1] (Relative to time zero)	Data Sample Rate Samples per Second
Delta-V, longitudinal	Change in forward crash speed	0 to 250 ms	100

Maximum delta-V, longitudinal	Maximum change in forward crash speed	0-300 ms	n.a.
Time, maximum delta-V	Time from beginning of crash at which the maximum change in forward crash speed occurs	0-300 ms	n.a.
Speed, vehicle indicated	Speed the vehicle was traveling	-5.0 to 0 sec	2
Engine throttle, % full (or accelerator pedal, % full)	Was the accelerator pedal pressed?	-5.0 to 0 sec	2
Service brake, on/off	Was the brake applied?	-5.0 to 0 sec	2
Ignition cycle, crash	Number of times the engine had been started since being manufactured prior to the crash.	-1.0 sec	n.a.
Ignition cycle, download	Number of times the engine had been started since being manufactured prior to downloading the EDR data.	At time of download	n.a.
Safety belt status, driver	Was the driver safety belt buckled 1 second prior to the crash?	-1.0 sec	n.a.
Frontal air bag warning lamp, on/off	Was the air bag system properly working 1 second prior to the crash?	-1.0 sec	n.a.
Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, driver	Time from the beginning of the crash at which the driver air bag begins to deploy.	Event	n.a.
Frontal air bag	Time from the	Event	n.a.

deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, right front passenger	beginning of the crash at which the right front passenger air bag begins to deploy.		
Multi-event, number of events (1,2)	How many crash events? 1 or 2? E.g., sideswipe followed by a head-on crash	Event	n.a
Time from event 1 to 2	Time between two crash events (if applicable)	As needed	n.a.
Complete file recorded (yes, no)	Did the EDR complete the recording?	Following other data	n.a.

[1] Pre-crash data and crash data are asynchronous. The sample time accuracy requirement for pre-crash time is –0.1 to 1.0 sec (*e.g.*, T = -1 would need to occur between –1.1 and 0 seconds.)

Data elements required for vehicles under specified conditions. Each vehicle equipped with an EDR must record each of the data elements listed in column 1 of Table II for which the vehicle meets the condition specified in column 2 of that table, during the interval/time and at the sample rate specified in that table.

TABLE II-DATA ELEMENTS REQUIRED FOR VEHICLES UNDER SPECIFIED CONDITIONS

Data Element Name	LAYMAN'S DESCRIPTION	**Condition for Requirement**	**Recording Interval / Time[1] (Relative to time zero)**	**Data Sample Rate (Per Second)**
Lateral acceleration	Sideways acceleration or force	If recorded[2]	0-250 ms	500
Longitudinal acceleration	Forward/rearward acceleration or force	If recorded	0-250 ms	500
Normal acceleration	Vertical acceleration or	If recorded	0-250 ms	500

	force			
Delta-V, lateral	Change in sideways crash speed	If recorded	0-250 ms	100
Maximum delta-V, lateral	Maximum change in sideways crash speed	If recorded	0-300 ms	n.a.
Time maximum delta-V, lateral	Time from beginning of crash at which the maximum change in sideways crash speed occurs	If recorded	0-300 ms	n.a.
Time for maximum delta-V, resultant	Time from beginning of crash at which the maximum change in combined front/side/vertical crash speed occurs	If recorded	0-300 ms	n.a.
Engine rpm	How fast the engine was running.	If recorded	-5.0 to 0 sec	2
Vehicle roll angle	How quickly did the vehicle rollover?	If recorded	-1.0 up to 5.0 sec[3]	10
ABS activity (engaged, non-engaged)	Did the ABS work?	If recorded	-5.0 to 0 sec	2
Stability control (on, off, engaged)	Was the electronic stability control on or off, and if on, did it operate?	If recorded	-5.0 to 0 sec	2
Steering input	What steering operations occurred in the 5 seconds preceding the crash?	If recorded	-5.0 to 0 sec	2
Safety belt status, right front passenger (buckled, not buckled)	Was the right front passenger safety belt buckled 1 second prior to the crash?	If recorded	-1.0 sec	n.a.
Frontal air bag suppression switch status, right front	If there was an on/off switch for the right front	If recorded	-1.0 sec	n.a.

passenger (on, off, or auto)	passenger air bag, how was it set? On/off/automatic?			
Frontal air bag deployment, time to n^{th} stage, driver[4]	If a driver air bag deploys in more that one stage, how long did it take to deploy in each of those stages?	If equipped with a driver's frontal air bag with a multi-stage inflator.	Event	n.a.
Frontal air bag deployment, time to n^{th} stage, right front passenger[4]	If a right front passenger air bag deploys in more that one stage, how long did it take to deploy in each of those stages?	If equipped with a right front passenger's frontal air bag with a multi-stage inflator.	Event	n.a.
Frontal air bag deployment, n^{th} stage disposal, driver, Y/N (whether the nth stage deployment was for occupant restraint or propellant disposal purposes)	If the driver air bag has multiple stages and not all stages were needed to protect the driver in the crash, did the unused charge get automatically disposed following the crash?	If recorded	Event	n.a.
Frontal air bag deployment, n^{th} stage disposal, right front passenger, Y/N (whether the nth stage deployment was for occupant restraint or propellant disposal purposes)	If the right front air bag has multiple stages and not all stages were needed to protect the passenger in the crash, did the unused charge get automatically disposed following the crash?	If recorded	Event	n.a.
Side air bag deployment, time to deploy, driver	Time from the beginning of the side impact crash at which the driver side impact air bag	If recorded	Event	n.a.

	begins to deploy.			
Side air bag deployment, time to deploy, right front passenger	Time from the beginning of the side impact crash at which the right front passenger side impact air bag begins to deploy.	If recorded	Event	n.a.
Side curtain/tube air bag deployment, time to deploy, driver side	Time from the beginning of the side impact crash at which the driver side impact head protection air bag begins to deploy.	If recorded	Event	n.a.
Side curtain/tube air bag deployment, time to deploy, right side	Time from the beginning of the side impact crash at which the right front passenger side impact head protection air bag begins to deploy.	If recorded	Event	n.a.
Pretensioner deployment, time to fire, driver	If so equipped, when in the crash event was the slack removed from the driver seat belt assembly?	If recorded	Event	n.a.
Pretensioner deployment, time to fire, right front passenger	If so equipped, when in the crash event was the slack removed from the right front passenger seat belt assembly?	If recorded	Event	n.a.
Seat track position switch, foremost, status, driver	How far forward was the driver seat positioned?	If recorded	-1.0 sec	n.a.
Seat track position switch, foremost, status, right front passenger	How far forward was the right front passenger seat positioned?	If recorded	-1.0 sec	n.a.
Occupant size	What size	If recorded	-1.0 sec	n.a.

classification, driver	occupant was the driver air bag system trying to protect? E.g., adult male vs. small female driver?			
Occupant size classification, right front passenger	What size occupant was the right front passenger air bag system trying to protect? E.g., adult vs. child occupant?	If recorded	-1.0 sec	n.a.
Occupant position classification, driver	Did the air bag system sense that the driver was seated too close to the air bag?	If recorded	-1.0 sec	n.a.
Occupant position classification, right front passenger	Did the air bag system sense that the right front passenger was seated too close to the air bag?	If recorded	-1.0 sec	n.a.

[1] Pre-crash data and crash data are asynchronous. The sample time accuracy requirement for pre-crash time is –0.1 to 1.0 sec (*e.g.* T = -1 would need to occur between –1.1 and 0 seconds.)

[2] "If recorded" means if the data is recorded in non-volatile memory for the purpose of subsequent downloading.

[3] "vehicle roll angle" may be recorded in any time duration, -1.0 sec to 5.0 sec is suggested.

[4] List this element n-1 times, once for each stage of a multi-stage air bag system.

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