11.0 Findings

11.1 Safety

EDRs have the potential to greatly improve highway safety. The degree of benefit is directly related to the number of vehicles operating with an EDR and the current infrastructure's ability to use and assimilate these data.

EDR technology has potential safety applications for all classes of motor vehicles (e.g. light duty vehicles, heavy trucks and buses)

Recorded data from real-world collisions are extremely useful for a variety of purposes including conducting research into various aspects of traffic safety, e.g. evaluating potential countermeasures for collision avoidance, refining occupant protection systems, and monitoring safety systems on the roadway and at roadside.

EDRs may become useful tools in the effort to develop safer cars and reduce traffic-related injuries, by providing reliable data about what happens to a driver, occupants, and a vehicle during pre-crash, crash and post-crash. These data may improve crash investigation, reconstruction, and analysis methodologies.

The use of event data recorders can have considerable preventive effect. Studies of EDRs in Europe and the U.S. have shown that driver and employee awareness of an onboard EDR reduces the number of crashes by 20 to 30 percent, lowers the severity of such crashes, and decreases the associated costs.

11.2 Data Collection

A wide range of crash related and other data elements have been identified which might usefully be captured by future EDR systems.

NHTSA has incorporated EDR data collection in its motor vehicle research databases.

Open access to EDR data (minus personal identifiers) will benefit researchers, crash investigators, and manufacturers in improving safety on our highways.

The stored data are somewhat limited and vary with each manufacturer.

Many late-model vehicles are equipped with OEM installed EDRs. The most comprehensive OEM data set currently available contains longitudinal delta-V recorded in 10 ms increments over a 300 ms time frame, and five one-second snapshots of the throttle position, brake light switch status, engine rpm, and vehicle travel speed prior to the occurrence of a recorded event.

The aftermarket systems vary widely: from devices which record crash pulse data only; to those which record a variety of channels for the precrash, crash, and post crash time interval; to those which capture video and audio as well as acceleration data.

There are few standards for collecting, formatting, specifying data elements, and most other aspects related to EDR data.

SAE J211 appears to be the only recommended practice which applies to EDR data collection. ATAs' TMC is developing recommended practices which apply to EDRs on heavy trucks.

Greater standardization of the data content and method of accessing the stored data might be achieved through organizations such as the SAE or ISO (International Organization for Standardization). Alternatively standardization might be achieved through government regulation.

Currently, data are accessed by a physical connection (cabling) to the EDR unit. Manufacturers are developing wireless connections e.g., using a wireless probe near the crashed vehicle, or by having the on-board device upload the stored data to a central location using a telecommunications link, but such devices are not in widespread production.

There is a need for a system for authenticating and securing event data parameters from all vehicles operating in the highway mode of transportation.

There is a need for training of EDR data collection officials.

11.3 Other Observations

EDRs are being used in many applications.

Research studies addressing the pros and cons of utilizing EDRs in the highway mode have provided objective data and findings useful to understanding the issues involved.

Different EDR systems and information files may be required for cars, vans, SUVs, other lightweight vehicles, heavy trucks, school buses, and motorcoaches.

Data recorders for commercial vehicles might include functionality to act as electronic logbooks for drivers' hours of service.

Recording and power systems need to be rugged to withstand the forces of collision, and to be tamper proof.

Most systems utilize proprietary technology and require the manufacturer to download and analyze the data. There is a need to accelerate commercial (non-OEM) devices to download and present EDR data easily and clearly for all users.

There are unresolved privacy concerns relating to who owns the data, who can access and make use of the information (including leasing, rental, and insurance companies), and who might store individual and anonymous/grouped data on a permanent basis.
In the absence of more specific guidelines data can be obtained with the permission of the vehicle's owner.

Automatic crash notification (ACN) systems integrate the on-board crash sensing and EDR technology with other electronic systems, such as global positioning systems and cellular telephones, to provide early notification of the occurrence, nature, and location of a serious collision.

A proposed method for classifying EDRs would involve categorizing EDRs into two major types: Type I and Type II. Type I EDRs would use a minimal, but essential set of data elements. Type II EDRs would evolve with emerging technologies and may include appropriate data elements that target specific vehicle types.

12.0 Bibliography and References

12.1 Docket and Federal Register Records

Record of the NHTSA Event Data Recorder Working Group
Docket NHTSA-99-5218, Available at:
http://dms.dot.gov

Record of the NHTSA Truck and Bus Event Data Recorder Working Group
Docket NHTSA-00-7699, Available at:
http://dms.dot.gov

Federal Register 63 FR 60270 (Nov. 9, 1998) and 64 FR 29616 (June 2, 1999).

12.2 Symposia Records

Transportation Safety and the Law
April 25-26, 2000
The National Transportation Safety Board hosted this symposium to discuss the conflicts between the growing need for data to improve transportation safety and the industry's concern about the use of those data in regulatory actions, law suits, and criminal prosecutions. The symposium brought together knowledgeable participants from government, industry (all transportation modes) and the legal community to examine the problems regarding the collection of data for crash prevention, including during crash investigations, and the privacy concerns of those being investigated. Ideas were exchanged to help create a context in which safety data can be gathered while the legitimate rights of all concerned are protected. Although no specific recommendations were identified, many suggestions were presented. There was general agreement about the need to collect additional information to advance safety.

The proceedings from the symposium can be viewed in their entirety at:
http://www.ntsb.gov/events/2000/symp_legal/default.htm

International Symposium on Transportation Recorders
May 3 - 5, 1999
The National Transportation Safety Board held a symposium on issues related to the use of recorded information to improve safety in all modes of transportation. Topics included the use of recorded information for crash investigations and routine performance monitoring, the privacy, proprietary, and union issues associated with recorded information, and the future recording requirements and capabilities.

The following 16 papers and 4 posters are applicable to EDRs in general:

Papers:

1. Smiths Industries Flight Data/Cockpit Voice Recorders [.htm] [.pdf], Jeffrey L. Brooks
2. An Autonomous Data Recorder for Field Testing [.htm] [.pdf], Joseph A. Carroll, Michael D. Fennell
3. Reducing Highway Deaths and Disabilities with Automatic Wireless Transmission of Serious Injury Probability Ratings from Crash Recorders to Emergency Medical Services Providers [.htm] [.pdf], Howard Champion, J.S. Augenstein, B. Cushing, K.H. Digges, R. Hunt, R. Larkin, A.C. Malliaris, W.J. Sacco, J.H. Siegel
4. Recording Automotive Crash Event Data [.htm] [.pdf], Augustus Chidester, John Hinch, Thomas C. Mercer, Keith S. Schultz

5. Proactive Use of Recorded Data for Accident Prevention [.htm] [.pdf], Ed Dobranetski, Dave Case
6. On-Board Recorders: The "Black Boxes' of the Trucking Industry [.htm] [.pdf], Les Dole
7. Digital Audio Recorders Life Savers, Educators, and Vindicators [.htm] [.pdf], Matthew Durkin
8. Transportation Event Recorder Data: Balancing Federal Public Policy and Privacy Rights [.htm] [.pdf], Gregory L. Evans
9. Security of Recorded Information [.htm] [.pdf], Lindsay Fenwick
10. Future Video Accident Recorder [.htm] [.pdf], Mike Horne
11. Proactive Use of Highway Recorded Data Via an Event Data Recorder (EDR) to Achieve Nationwide Seat Belt Usage in the 90th Percentile by 2002 [.htm] [.pdf], Thomas Michael Kowalick
12. The Contribution of Onboard Recording Systems to Road Safety and Accident Analysis [.htm] [.pdf], Dr. Gerhard Lehmann, Tony Reynolds
13. Transportation Recorders on Commercial Vehicles [.htm] [.pdf], Paul Menig and Cary Coverdill
14. The Benefits of Vehicle-Mounted Video Recording Systems [.htm] [.pdf], R. Jeffrey Scaman
15. On-Board Recording for Commercial Motor Vehicles and Drivers: Microscopic and Macroscopic Approaches [.htm] [.pdf], Neill L. Thomas, Deborah M. Freund
16. A Vision of Future Crash Survivable Recording Systems [.htm] [.pdf], Michael H. Thompson

Posters: Posters are available in HTML (default) or PPT format. Graphics have been included, whenever possible, in the HTML version, but PPT will have the higher-quality image and requires a PowerPoint viewer.

1. Accident Reconstruction/Simulation with Event Recorders [.htm] [.ppt], Kristin Bolte, Lawrence Jackson, Vernon Roberts, Sarah McComb
2. Seat Belt Event Data Recorder (SB-EDR) [.htm] [.ppt], Thomas Michael Kowalick
3. Mobile Accident Camera [.htm] [.ppt], John J. Mackey, Christopher J. Brogan, Edward Bates, Stephen Ingalls, Jack Howlett
4. The Benefits of Vehicle-Mounted Video Recording Systems [.htm] [.ppt], R. Jeffrey Scaman

The proceedings from the symposium can be viewed in their entirety at:
http://www.ntsb.gov/events/symp_rec/symp_rec.htm

12.3 Research Projects

Perceptions of College Students Regarding Utilization of Transportation Recorders in the Highway Mode, Thomas Michael Kowalick, 651 pgs.;
http://leyte.sandhills.cc.nc.us/research/recorders.pdf

12.4 Bibliography

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