Research Activity on Vehicle Recording System

Japan Drive Recorder Committee

Aim of Project

- True accident investigation

- Improvement of vehicle crash characteristic and crash tests regulations in Japan

Research activity

- Committee: research plan

↕

- Working Group: technical discussion

↕

- Experimental tests at JAR1

↑

funds:Ministry of Transportation

Members of the Committee

- Scholars (Professors of University of Tokyo, etc.)
- National Research Institute of Police Science
- Japan Automobile Manufactures Association
- Japan Auto-Parts Industries Association
- Ministry of Transportation

Secretariat: Japan Automobile Research Institute

The Committee

- Committee has just started last month (Feb. 1999)

- Research work will continue up to three years (1999,2000,2001)

Research plan in 1999

- Investigation in the world

↓

- Trial development of recoders

↓

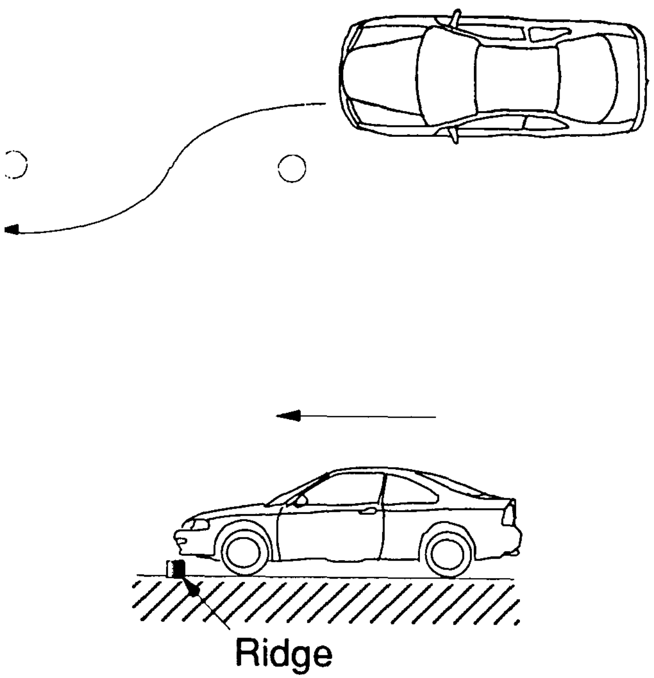
- Driving and crash experiments

↓

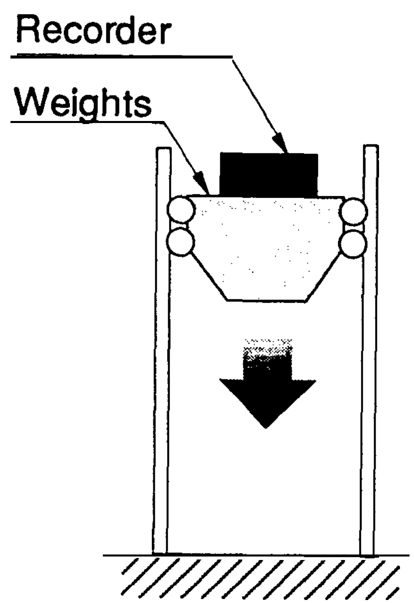
- Pilot run

Driving and Crash Experiments

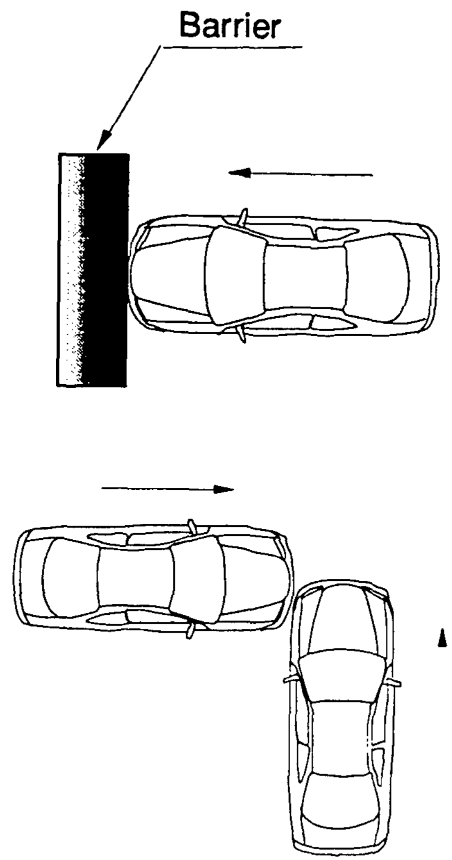
Drive tests



Fall test



Crash tests



Vehicle Recording System

- ADR(Accident Data Recorder)
- DMR(Driving Monitoring Recorder)

ADR system in Japan

- Japanese two makers try to make the ADR now,but those are not true ADR systems.

  1. Kobe Communication Engineering Company
  2. Data Tec Co., LTD

- Japanese makers combine ADR and DMR systems, and those are DMR system mainly.

DMR system in Japan

- Regulations: Ministry of Transportation
  (established in 1967)
- Apply: Heavy trucks (weights 8000 kg over)
  buses and Taxis
- Measure items: Travel speed, Mileage, Time (24 hours)
- Sampling requirements: 500ms, 2Hz
- Crash requirements: Max 120G, Time duration 30ms
- Types: Analog recording or Digital recording systems
- Makers: Over ten Japanese companies

Differences ADR and DMR systems

	ADR	DMR
Aim	Accident analysis	driving management drivers education
Sampling items	a lot of items	3(speed, mileage, time)
Acceleration	mesure	no mesure
Sampling rate	high(2ms)	low(500ms)
Recording time	low(45sec)	high(24 hour)
What is speed	travel speed impact speed reduced speed	travel speed

Japan Drive Recorder Committee

The Comparison of Vehicle Recording Systems

Recorder	A	B	C
ry	DMR + ADR	DMR + ADR	ADR
y	Japan	Japan	Germany
n	20 heavy trucks	300 light and heavy trucks	Berlin police 62, Laidlaw school buses etc
ng	20ms, 50Hz	100ms, 10Hz	2ms, 500Hz
ng duration	20 sec／accident (Max 5impacts)	30sec	before accident 30 sec, after accident15 sec (Max 3impacts)
ration(X)	±2G	±2G	±50G
ration(Y)	±2G	±2G	±50G
rement of angular rotatio	no mesure	gyro	magnetic sensor
of the vehicle	0～200km/h	Depend on speedometer	Depend on speedometer
I of time	year／month／day／hour／min／sec	year／month／day／hour／min／sec	year／month／day／hour／min
of GPS	no	latitude, longitude, speed, time	no
of steering	± 100%	no mesure	no mesure
of accelerator	o- 100%	no mesure	no mesure
ng	ON/OFF	no mesure	ON/OFF
reak conditon	ON/OFF	no mesure	no mesure(possible)
r conditon	ON/OFF	no mesure	no mesure(possible)
onditon	no mesure	no mesure	ON/OFF, High/Low
l light conditon	no mesure	no mesure	ON/OFF
y of driving monitor	raw data	actomatic dailv reootrt svstem	no
tion and analyzing of data	administrator can get data and use analyzing software	Data will be through branch to administration center. Then, administrator conduct analyzing by software.	send back to Germany
		Recorder can measure human pulse and electrical resistance of skin	Driver can erase own accident data

Yank out the plugs of auto snoopers and electronic leashes

WHEN ALLAN Pinkerton, President Abraham Lincoln's bumbling Secret Service chief, set up a private detective agency after the Civil War, he adopted as his logo an open eye and the slogan "We Never Sleep." That spawned the phrase "private eye."

Today the eyes have it. Privacy has fled. The latest intrusion is the "black box," the sensing and diagnostic module that GM has been secretly slipping into 6 million cars in the past decade.

You can call your new model a Cadillac or a Camaro, but what you're driving is the 1999 GM "Snitch." Next year you will have the chance to buy an SUV called the Ford "Big Brother," or the Volkswagen "Bugged Bug." Well-intended to research the causes of crashes and thereby improve auto safety, the hidden spying device records what you may have been doing wrong before a collision — which could have an impact on insurance or criminal liability.

I don't want a car that rats on me. Down that slippery slope of secret surveillance is a car that constantly records my speed, or sneakily tapes my private profanity at the guy who cuts in front of me, or reports me to the FCC for failure to install a cell phone. At the very least, I demand a commercial Miranda warning, as airline pilots have.

You can call your new model a Cadillac, but what you're driving is the 1999 GM 'Snitch.'

Secret surveillance is but one manifestation of a larger abomination: hypercommunication.

Detroit's lust for contact is matched by Wall Street, coming at it from the other end: The exchanges will soon make it possible for customers to make trades at any hour of the day or night. The brokers' motto is the Pinkertonian "We Never Sleep."

The round-the-clock trading — profit-taking pillow talk — will be explained as a necessary adjustment to international market efficiency, not to mention meeting the competitionof the Internet. All that investment for insomniacs time-zones me out.

Like the spy box in your car and the pager on your hip, all-securities-all-the-time is a manifestation of the headlong rush into the abyss of universal contact.

What's so hot about being totally reachable? Where is it written, Thou Shalt Never Be Out of Touch? Doesn't anybody long to be alone anymore? One of these days I'd like to turn on a TV set at an odd hour and see a test pattern. An entire TV generation has never experienced the peaceful patience of a test pattern. Or a message from station management saying simply, 'We're resting."

Hypercommunication is a throwback to the treadmill and we are its new oxen.

Too many of us, getting and spending, have bought the notion that solitary contemplation is anti-social. A century ago, when William Jennings Bryan made 16 campaign speeches in a day, an opponent asked, "When does he think?"

I was offered use of one of the first pagers. At the 1972 Moscow summit, President Richard Nixon wanted immediate access to his traveling staff. When I objected to this electronic leash, Bob Haldeman said privacy was no excuse, so I told him that the sudden beep at belt-level brought on a urinary urgency; he said, "Oh, you have a medical excuse," and I alone am escaped to tell thee.

The desperately in-touch deride as Luddite any reverence for working hours. They insist their own round-the-clock reachability is reversible: "We can always turn off the pager, or the cell phone on safari, or the all-night brokerage; we can disable the car bug." They delude themselves. Once hooked up, they are hooked forever.

Why? Because once a person sinks into an always-reachable state, all fellow-reachables resent any turning-off. Colleagues consider it aggressive rejection; global bosses call it malingering; spouses label it temporary desertion. When you are out of pocket, the world is out of sorts.

Thus conscience — that sense of letting down the always-on side — makes cowards of us all. If powering down does not make us feel impotent, it makes us feel guilty. And that *fin-de-milleniare* guilt at being even momentarily unplugged steals our supposed "right to turn off."

I say: Resist the 168-hour week. Buy unbugged cars and drive incommunicado. Trade during business hours. On vacation, vacate; on the Sabbath, sabb. Treasure those out-of-touch moments. Become a member of the Great Unreached.

WILLIAM SAFIRE is a *columnist for the New York Times. Write to him at the New York Times News Service, 229 W. 43rd St., New York, N.Y. 10036.*

WIRED NEWS updated 3:00 a.m. 4.Jun.99.PDT

GM Watches You Drive

by Lindsey Arent

12:30 p.m. 3.Jun.99.PDT

An in-car surveillance system presently running inside many General Motors vehicles is a significant erosion of personal privacy, critics and consumer advocates said Thursday.

"The biggest problem is that it appears that these devices were installed without the consumer's consent," said Barry Steinhardt, associate director of the American Civil Liberties Union.

"Clearly, the information will quickly get out of the control of the auto owner," Steinhardt said. "This may be as troublesome for what it portends for the future as what it can do now."

GM said its Sensing and Diagnostic Module (SDM) -- currently installed in hundreds of thousands of cars -- is only used for aggregate crash research, and poses no threat to consumer privacy.

Still, watchdogs are concerned that the latest SDM collects a little too much data for comfort.

The unit records and processes the last five seconds of vehicular data before a collision. The box determines the force of a collision, the speed at which the car was traveling, whether the brakes were applied, and how the airbag fared. The unit also tracks engine speed, the angle of the steering wheel, whether or not the seatbelt was worn, and the position of the accelerator pedal.

Presently, it is unclear exactly who will have access to the data collected and what the information will be used for.

The New York *Times* reported about the device -- and the value of the data culled -- on Saturday, but the device is nothing new.

Since 1974, GM cars equipped with airbags have collected crash data. The SDM is simply a superior version of those earlier diagnostic models, said Bob Lange, a GM engineering director.

"Our view is that the information recorded is the property of the vehicle owner, and we obviously won't collect data without an owner's permission," Lange said.

'When we collect [information] and use it for research data, no one will be able to identify a person or vehicle as being the source of an event. We will honor the privacy concerns that people might have."

With the help of a Santa Barbara firm, Vetronix, GM will develop software and a cable that will unlock the secrets of the box. For a few hundred dollars, consumers will be able to pull the SDM data into a laptop computer.

Steinhardt said that the data will inevitably end up in the hands of police. Further, it could end up being subpoenaed in a lawsuit.

Crash-analysis experts also questioned the box's reliability.

"An inexperienced person might not be able to interpret the data property," said James Stratton, senior crash investigator at the William Lehman Injury Research Center at the University of Miami.

Stratton said that some SDMs produce a series of figures, or a code that might be meaningless without the proper documentation and training. But, he added, the SDM data is far more reliable than that turned up through a typical crash reconstruction.

With humans, he said, "there's more room for error."

Despite the fears of privacy activists, safety industry experts say the box is a giant step forward in vehicle safety and accident investigation.

"Current methods are clearly not as accurate as we'd like them to be. This could ive us better information about how effective restraint systems are," said Adrian Lund, of the Insurance Institute for Highway Safety, a crash research group funded by insurance agencies.

But regulatory questions linger as well.

"Can or should owners be given the option of having the black box installed in their motor vehicles?" asked Lawrence Friedman, chairman of the motor vehicle liability division of the Association of Trial Lawyers of America.

"Are we going to have a state or national law on the books that's going to require the manufacturer to install it, like in aircraft?"

University of California taw school professor Eugene Volokh said that data from the system would probably be admissible in court. 'A reliable program that gives reliable conversion of the data -- that's like bringing in the eyewitness," he said.

That's exactly what makes the unit so menacing, Steinhardt said.

"Its entirely likely that ... legislation will begin to require the installation of various tracking devices on the grounds that cars are a dangerous instrumentality," he said.

Sensing this apprehension, insurance companies aren't exactly gushing over the boxes.

"People may feel they have the right to privacy in their own vehicle," said Donald Griffin, spokesman for the National Association of Independent Insurers, which represents over 600 insurance carriers.

"[The SDM] could reduce fraud -- but it could also cause more lawsuits against insurance companies for using the information."

GM's Lange said he is not concerned that the box might turn consumers off, and that the company's research reveals that car buyers aren't particularly concerned.

But Steinhardt remains skeptical.

The loss of personal civil liberties always begins with the best intentions of our government."

Declan McCullugh contributed to this story.

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[redacted]

>>> **44:Black** Box **for** Automobiles

Hyundai Motor has successfully developed a black box for automobiles. The company plans to install the newly developed device on passenger cars and commercial vehicles (as an option) from 2003, said a company spokesman on May 18. The highly advanced device, developed with an investment of KRW200 million since 1997, has functions similar to those for airplanes. Kim Young-kil, an executive at the company's **R&D** center, said that the device would help to scientifically identify the reasons of auto accidents, thus easily settling disputes between those involved. The device memorizes outside shock, and how the driver operates the steering wheel, brakes and accelerator, among other driving conditions. Currently, Saab of Sweden is selling automobiles with a black box.

SUBJECTS: Korea: Business News;
SOURCE: **Hankook** Kyongje Shinmun, **5/19/99,14;Korea;Korean**

NHTSA DAILY CLIPS
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http://www.nhtsa.dot.gov
Tuesday, June 1, 1999

SUNDAY, MAY 30, 1999, NY Times

Secret Witness To Car Crashes In Black Boxes

As in Planes, Recorders Hold Pre-Impact Data

FRONT PAGE

By MATTHEW L. WALD

Northwest 54th Street in Miami was crowded at 4:30 P.M. on Feb. 7, 1997, and many people saw the three-car collision that killed Detective Robert Vargas. But none of them could help tbe police determine why he died.

The 29-year-old detective, responding in his unmarked car to a robbery call, had what looked to investigators like a relatively minor collision with a Chevy Blazer entering the intersection from his right His year-old Chevy Lumina skidded across the double yellow line into oncoming traffic and was struck head-on by a Mercury Marquis.

Calculating the force of the crash from the skid marks and wreckage, investigators determined that Detective Vargas's air bag could have saved his life.

Why it did not was explained by a witness who never "saw" the crash, but reported many of its details electronically.

A black box about the size of a videocassette under the Lumina's front seat recorded that the air bag had, in fact, deployed when the Blazer struck the first blow more violently than the human analysts suspected. The bag had deflated before the head-on collision, leaving Detective Vargas, who was not wearing a seat belt, unprotected.

The telltale recorder, known as a Sensing and Diagnostic Module or S.D.M., was one of six million quietly put into various models of General Motors cars since 1990.

A newly developed model being installed in hundreds of thousands of G.M. cars this year records not only the force of collisions and the air bag's performance, but also captures five seconds of data before impact. It can determine, for example, whether the driver applied the brakes in the fifth second, third second or last second. It also records the

Continued on Page 14

Secret Witness to Car Crashes Is the Telltale Black Bo

last five seconds of vehicle speed, engine speed, gas pedal position and whether the driver was wearing a seat belt.

Ford has equipped hundreds of thousands of cars with a similar system, and is developing a device to read the data. An industry committee is trying to develop standards for the recorders.

Specialists in car crashes say the devices could revolutionize some aspects of accident research.

The devices could also bring important changes in insurance settlements, crash litigation, automobile design, and even the medical treatment of crash survivors. At the same time, important issues are being raised about who should have access to the data.

"The data from the S.D.M., in future crash litigation, can be the equivalent of DNA in paternity suits and murder cases," said Edward M. Ricci, a lawyer who is currently suing G.M. in a case brought by the family of Jerome Brown, a former professional football player who was killed in his Corvette in a 1992 accident.

Mr. Ricci said the recorder in that car proved that the cause of the crash was the air bag deploying when the car hit a pothole; G.M. disagrees.

But few lawyers or other crash specialists know much about the recorders, whose existence is virtually unknown to the public.

The advanced model, which records the final five seconds of data, was first installed in 1998 Cadillacs sold to rental car companies, but it was done so quietly that even executives at Avis, which buys hundreds of such cars, were unaware of the recorders.

At National Car Rental, a spokeswoman said executives were broadly aware of the system but had never seen any data from a crash.

"I'm sure, potentially, it would be useful," said Veronica F. Valentino, a spokeswoman at National's headquarters in Minneapolis. "I would think it's additional evidence, and if it could be brought into court, would certainly provide an opportunity to look at more information that previously wasn't available."

In many states, rental car companies are responsible for damage done by the cars they own. They have paid millions of dollars in judgments that might have been avoided if crash box data showed the accident was not the renter's fault, some' experts say.

Insurance executives are interested, too. They could lead to better settlements as time goes on," said Donald L. Griffin, an executive at the National Association of Independent Insurers, a trade association that represents 620 insurance companies.

The data could quickly clarify who was at fault, he said, though the industry would have to have more experience with the boxes before deciding whether to rely on them.

Some medical researchers think the boxes could save lives. If ambulance crews could read them on the spot, they could determine whether a crash w&s severe enough to create a likelihood of head injuries, for example.

Some head injuries only become evident hours after the accident, said Dr. Jeffery S. Augenstein, a professor of surgery at the University of Miami who has been working with G.M. to develop the recorders. But the recorders could alert doctors to watch for brain swelling or other symptoms.

Dr. Augenstein, who also has appeared in court as an expert witness in crash cases, said the data would give a better picture of what had happened, but "it will still require interpretation."

"You won't just plug it into a compouter and say, 'You're at fault; you pay $10 million,' " he said.

G.M. has been circumspect about the boxes because it does not want them used in litigation ; in fact, executives are concerned that car buyers could shy away from such cars if they thought the data could be used against them.

The automotive black boxes could be almost as useful as those on airplanes. The National Transportation Safety Board, best known for its plane crash investigations, recommended last year that they be used in cars. But compared with flight data recorders on planes, whose role is defined by Federal law, the automotive versions are hitting the roads in a legal vacuum.

"It is an untested area of law," said Lawrence B. Friedman, a personal injury lawyer in Boca Raton, Fla., and the chairman of the American Trial Lawyers Association's Motor Vehicle, Highway and Premises Liability section.

Massachusetts hopes to establish a pilot program later this year that would analyze data from the devices in G.M. cars involved in fatal crashes and compare the results with conclusions reached by human analysis, to help confirm the electronic recordings. But the state trooper planning the program, David M. Noonan, said that he did not know if he could ask a

A CLOSER LOOK

A Black Box for Cars

The Sensing and Diagnostic Module records data about a car crash when an air bag is deployed or almost deployed. The 1999 version installed by General Motors records the following:

- Whether the driver was wearing a seatbelt.
- Time between impacts in a multiple impact crash when the initial impact does not cause the air bag to deploy.
- Whether the passenger's air bag was enabled or disabled in cars with a cutoff switch.
- Engine speed, vehicle speed. brake status and throttle position during the last five seconds before impact.
- Whether light warning of an air bag malfunction was on or off.
- Length of time the air bag warning light was on.
- When during the crash the sensing system activated the air bag.
- If there were any engine or electrical malfunctions recorded by the car computer up to the time of the crash.
- Maximum change in vehicle velocity in crashes not severe enough to deploy the bag.
- How much the car decelerated and how quickly in a frontal crash.
- Time between the beginning of impact and the maximum change in velocity.

Source: National Highway Traffic Safety Administration

analyzing the data The company has been using the information mostly to refine its on-board safety systems, and wants the information from the newer boxes to show what a typical driver's behavior is in the seconds before a crash. When G.M. learns of a fatal crash involving one of its cars, it attempts to retrieve the recording device.

"Our interest is in safety research, and we're not going to encourage its use" in other forums, said Robert C. Lange, engineering director of auto safety at G.M. As for other uses, he said, "We are not going to be able to prevent that and control that"

Right now, only G.M. can download and decode data from its own boxes, but that will change within the next few months as software becomes commercially available. G.M. has an agreement with Vetronix of Santa Barbara, Calif., to develop software and a cable that will allow anyone with a laptop to interrogate the box. Vetronix also hopes to begin selling the software, including a proprietary circuit board that decodes the information, in August for a few hundred dollars, according to the company.

"Probably the owners of the vehicles will be the ones who will be ultimate arbiters as to whether such information is retrieved, and if retrieved, how it's utilized," Mr. Lange of G.M. said. But lawyers and others said this was an open question.

As a practical matter, G.M. has already found that if it does not let others, like the police, retrieve the data, it may not get much of the data. Once a car is sold, there is no way for G.M. to know whether that car becomes involved in a serious crash, so no way to know when to try and retrieve the box .

Some engineers wince at the coming legal battles. "Everyone probably is hesitant to open this Pandora's box," said Adrian Lund, a crash expert at the Insurance Institute for Highway Safety.

For the handful of researchers now using them in collaboration with *G.M.*, the data boxes promise a gold mine of information never before obtainable.

Highway safety experts say the information retrieved could change the way air bags and other safety systems are designed.

Air bags are currently made to meet the Government's 30-mile-per-hour. frontal-crash test standard, but data from real accidents could show that the accidents causing the most injuries are at a higher speed or a lower one, or are not head-on collisions. That might lead to new passenger protections.

The recorder is "an invaluable tool," said James E. Stratton, a senior crash investigator at the William Lehman Injury Research Center at the University of Miami School of Medicine, who helped reconstruct the crash that killed Detective Vargas.

The recorder is an almost accidental outgrowth-of the computerization of cars. Air bags already come with computers that measure the "crash pulse," or change in velocity, and calculate whether and when to deploy the bag.

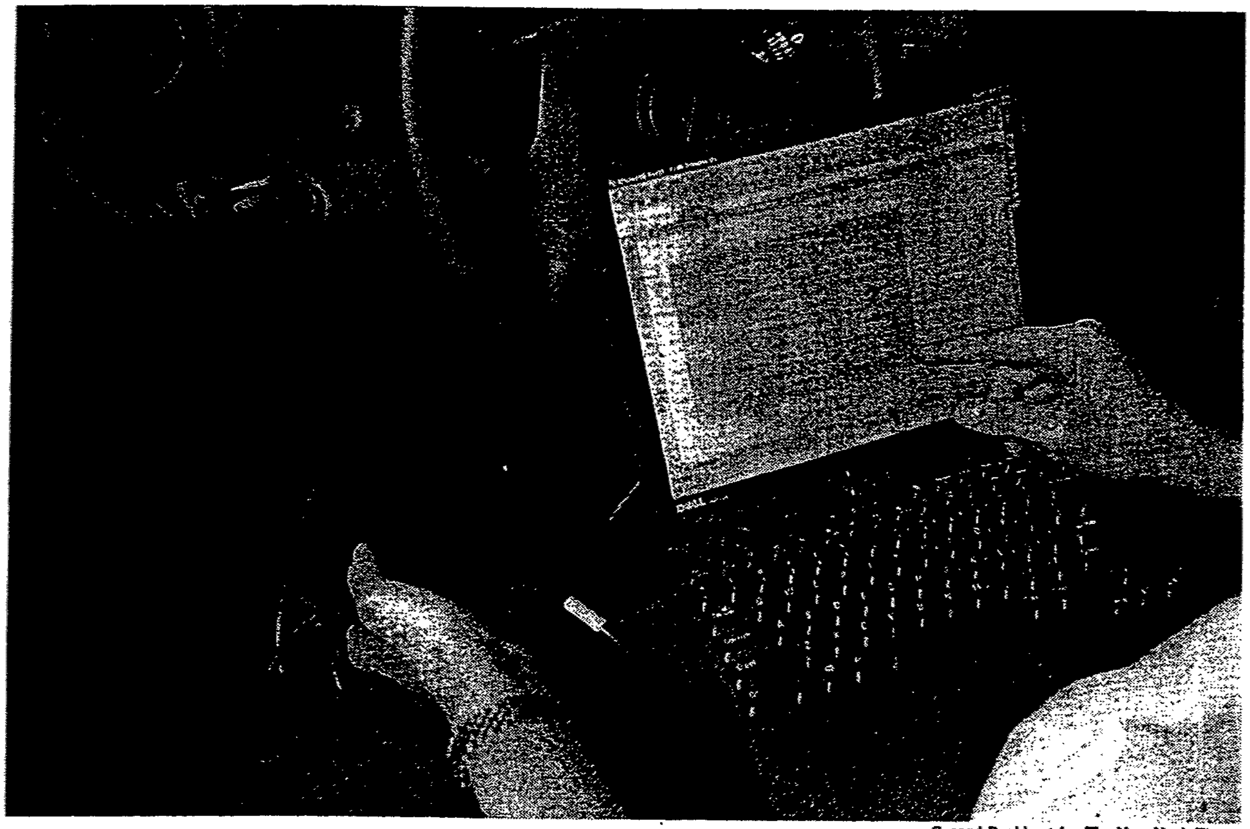
Many cars also have computers that keep track of engine speed, car speed, and the like. G.M.'s innovation Involved adding an inexpensive system that records all this data on a microchip if the car is bumped hard enough, or almost hard enough, to deploy the air bag.

The enhanced recorders are installed on all 1999 Buick Century Park Avenue and Regal models; the Cadillac Eldorado, DeVille and Seville models; the Chevrolet Camaro and Corvette, and the Pontiac Firebird. The company plans to have them on all its vehicles in the 2004 model year.

Trooper Noonan, of the Massachusetts State Police, said, "This has great implications for public safety and public health"

Sometime soon, said Trooper Noonan, in one of the 400 or so fatal crashes that occur in his state each year, two new cars will collide and researchers will have data from both of them, which could show tailgating, speeding, or other signs of bad driving.

Private use is more problematic. A driver charged with speeding or some other violation after a crash might seek to bring his own data to court, to exonerate himself, but Trooper Noonan said it has not been determined if such evidence would be admissible.



Gerard Burkhart for The New York Times

Vetronix of Santa Barbara, Calif., is developing software in conjunction with General Motors that would allow information collected by a car's "black box" to be downloaded onto a laptop computer after a serious accident.

NY TIMES, MONDAY MAY 31 OPED

Essay

WILLIAM SAFIRE

'We Never Sleep'

HARPERS FERRY, W. Va

When Allan Pinkerton, Lincoln's bumbling Secret Service chief, set up a private detective agency after the Civil War, he adopted as his logo an open eye and the slogan "We Never Sleep." That spawned the phrase "private eye."

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Black box car idea opens can of worms

Litigation advantages seen. But privacy issues are big worry.

BY BOB VAN VORIS

NATIONAL LAW JOURNAL STAFF REPORTER

The National Law Journal (p. A01)
Monday, June 14, 1999

The initial buzz that followed the news that General Motors Corp. is introducing "black box" technology into its cars centered on the improvements in safety and crash data that such technology will bring.

Some plaintiffs' and defense lawyers involved in auto crash litigation echo this positive message, saying that they look forward to more efficient, accurate resolution of car-crash liability cases. But others, concerned about how the devices' information will be used in court, fear that these black boxes may turn out to be Pandora's boxes.

"Will this be put to bad use?" asks Larry Pozner, the outgoing president of the National Association of Criminal Defense Lawyers. "Inevitably.

"It starts with We have something that will make life safer' and it ends with We have something to invade your privacy,' " says Mr. Pozner.

Existing technology, some of it developed for use in other modes of transportation, holds out the possibility of truly sophisticated monitoring and recording devices in cars, raising even more privacy issues. Coupled with the Global Positioning System, for example, cars could record exactly where they've been driven. Sensors in the steering wheel and brake pedal could easily be used to show that the driver was weaving or tailgating.

But although some criminal lawyers and privacy advocates are concerned that data collected by black boxes may be misused by law enforcement officers, lawyers involved in litigation resulting from crashes are more optimistic.

Since 1994, sensors in GM cars have captured information that indicates whether or not the driver's seat belt was latched at the time of a crash. This can be critical information in some cases, say lawyers. Seventeen states permit defendants in car

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USA TODAY 6/8/99

Automakers' trunk-release plans

Various automakers' plans to offer trunk-release retrofit kits for vehicles on the road, and for installation of trunk-release systems in new models **(Story, 1A)**:

	Retrofit kit	Model-year cars
BMW	Summer 2000	To be determined
DaimlerChrysler	Summer 1999	To be determined
Ford	To be determined	2000
General Motors	March 1999, $50 installed; 1990 and later models	Family vehicles by 2002
Honda	To be determined	NA
Hyundai	No plans	Since 1998
Mazda	Under consideration	2000
Mitsubishi	Beginning late 1999	2001
Nissan	Year end; for 1990s models	Dealer option later this year
Porsche	NA	To be determined
Saab	NA	2003; select vehicles
Subaru	Summer 2000; 1995-2000 model sedans	2001
Suzuki	Under consideration	Under consideration
Toyota	To be determined	2001; select models
Volkswagen	Under consideration	Under consideration
Volvo	Under consideration	Alternate plan; to be determined

Note: To be determined means the automaker will offer trunk latches but the date and model have not been decided. Source: Expert Panel on Trunk Entrapment, USA TODAY research crash cases to limit damages if they can show that the plaintiff failed to wear a seat belt, according to the Insurance Institute for Highway Safety.

"A lot of trials and a lot of courtroom time is related primarily to the question: Was the seat belt buckled, and did it stay buckled?" says Richard Bowman, of Minneapolis' Bowman & Brooke, GM's primary outside counsel.

Another question that is often critical is how severe the crash was, measured by the loss in velocity, or the "delta V." The rule of thumb is: The more severe the crash, the less the car can be expected to protect the occupants

"Boy, could we put some experts out of work if we give us delta V," says Mr. Bowman.

hos back of page also

Mr. Bowman believes that the added certainty the ne benefit manufacturers, permitting them to defend case performed as intended and to settle cases in which the.

Even some plaintiffs' lawyers agree--at least to the exte help lawyers on both sides evaluate the strength of case of money are spent on discovery and on accident recons

"From a conservative plaintiffs' lawyer's perspective, I co better," says Terrence McCartney, of New York's Rheing P.C.

6 million equipped

All told, since 1990 GM has equipped some 6 million vehicles with the capability to record at least some crash data.

A system that has been installed in GM cars since 1994 records 11 categories of information, including the amount of deceleration, whether the driver was wearing a seat belt, whether the airbag was disabled, any system malfunctions recorded by the on-board computer at the time of the crash and when the airbag inflated. A more sophisticated system installed in some 1999 models also records velocity, brake status and throttle position for five seconds before impact.

Compared with flight data recorders in airplanes, black boxes in cars are fairly rudimentary. Airline black boxes record 150 separate categories of data and include recordings of cockpit conversations for 30 minutes before a crash says Lee Kreindler, a plaintiffs' lawyer and expert on aircraft disaster litigation.

Another important difference, says Mr. Kreindler, is that airline black boxes and crash investigations are heavily regulated by the federal government. In contrast, car manufacturers can determine the crash data their products will record. And, most important, there is no provision for investigative authorities to take control of car black box data.

Cars manufactured by Ford keep limited data on vehicle deceleration and airbag

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deployment beginning with the 3 999 models, according to a spokeswoman. Other manufacturers have installed systems to capture different crash data, but none as extensively as GM.

But although GM points to the safety improvements that it believes the additional data will help generate, the company has nut been eager to share the information with plaintiffs' lawyers.

"I have probably had a half-dozen cases with this system in it, and they never disclosed it," says Larry E. Coben, of Coben & Associates, in Scottsdale, Ariz. And while the information is in the plaintiffs' possession, he says, lawyers generally have to cooperate with GM to access the information without destroying it.

According to attorneys who have litigated against GM, only a few plaintiffs' lawyers were aware of the data that can be collected, and there are only a handful of outside experts to turn to.

One of them is Bill Rosenbluth, a forensic engineer who heads Virginia-based Automotive Systems Analysis. As recently as April, he made a presentation to a group of products liability plaintiffs' lawyers about the wealth of recorded data that can be extracted from a car after a crash. The lawyers, who belong to a plaintiffs' information exchange that focuses on auto cases, were generally surprised, he said.

Mr. Rosenbluth said the available data differs among manufacturers and from model to model, and the car makers don't go out of their way to make it easy fur car owners to retrieve the data.

"Many of the manufacturers don't want people like me knowing what's there,"' says Mr. Rosenbluth.

Mr. Bowman, GM's courtroom defender, says that the effect on litigation pales in comparison with the potential fur improvements in auto safety. "Nuts to its effect on litigation," he says.

GM Installs 'BlackBox'onAutos

June 2, 1999

WASHINGTON - The Associated Press via NewsEdge Corporation : General Motors Corp. has a device in many of its new cars that functions like the black box recorder in airplanes: It collects data as a car crashes.

Doctors and government officials say that information can help them better understand how the human body tolerates car crashes. It could then be applied to construct safer cars, improve the treatment of crash victims and write government auto safety standards that would better protect crash victims.

The existence of the so-called auto black box system also is raising sensitive privacy questions about whether such information can be used in litigation.

The most sophisticated version of GM's device, known formally as a sensing and diagnostic module, is in hundreds of thousands of GM cars from the 1999 model year, GM says. It is part of the air bag sensing system on the 1999 Buick Century, Park Avenue and Regal, the Cadillac Eldorado, DeVille and Seville, the Chevrolet Camaro and Corvette and the Pontiac Firebird.

The module will be in almost all GM vehicles within the next few years, the company says.

The module stores information in the seconds before a car sensor identifies a crash and fires the air bags. The data includes the speed of the car, whether the driver was wearing a seat belt, when an air bag deployed and whether the driver used the brakes. It can also determine whether a warning light was illuminated on the dashboard telling an owner to service an air bag.

GM has quietly installed different versions of the sensing system on some cars throughout the 1990s, but the modules have become more sophisticated over time. Their existence became public in a paper written by GM and government engineers and presented at a conference last month.

Up until now, government crash investigators could only take an educated guess at the speed of a car involved in an accident based on evidence at the crash scene.

``Technology allowing vehicle safety researchers tu collect objective data would open the dour to a new generation of understanding," the paper said.

GM is currently the only automaker that makes such data and the tools to recover it available to researchers, the paper said.

Bob Lange, director of engineering safety fur GM, said he wanted tu use the information to better understand the injuries of people of all ages in crashes so that autos could be designed to ``reduce the likelihood of injuries."

GM has been using the technology on Indy race cars since 1992 and it has led to better crash protection fur drivers, Lange said.

``There's an incredible opportunity to improve safety," said Dr. Jeffrey Augenstein of the Crash Injury Research and Engineering Network. Augenstein said if doctors know more about crashes, they can target their treatment of patients, in some cases including checks fur serious injuries they might have missed.

John Hinch, a research engineer at the National Highway Traffic Safety Administration and one of the authors of the paper, said he saw ``lots of potential" in using the module's data. GM hopes to have laptops available so government crash investigators can download data independently of the company by the end of the year.

``If we can understand crashes better, we can have better sensors (in automobiles), better air bags," Hinch said. `` NHTSA can build better (safety) rules and have better information fur consumers."

Insurers also seem to favor so-called black boxes fur cars, in part because it would help them determine who is at fault in accidents. But they say courts will first have to sort through how such devices could be used in litigation and whether they are reliable if contradicted by eyewitness accounts.

Norman Jolly, an attorney who has litigated auto cases, said he has already seen auto companies try to use air bag deployment information stored on a car computer chip as a defense in lawsuits.

He believes companies will nut be able to keep such information private. `'They're going to know if your case has merit, and vice versa," Jolly said.

Ford Motor Co. said a more limited version of the module was on all its 1999 vehicles, but the company is unable to retrieve the data fur customers.

Justice for dangerous drivers?

There is growing public disquiet at what is perceived as a lenient approach to those guilty of causing death and injury on our roads. Poor and dangerous driving have been identified as primary causes of road accidents. TRL is carrying out research, on behalf of DETR, into the way in which bad driving offences are dealt with by the criminal justice system.

The offences relating to bad driving were reformulated in the 1991 Road Traffic Act, to more readily identify and punish dangerous drivers. The earlier offences of Reckless Driving were replaced by "Dangerous Driving" and "Causing Death by Dangerous Driving". These changes were intended to move the emphasis from the drivers' state of mind to the objective quality of the driving. According to the new legislation, a driver is guilty of Dangerous Driving if:

- ❒ the way he drives falls far below what would be expected of a competent and careful driver and
- Cl it would be obvious to a competent and careful driver that driving in that way would be dangerous

This research is examining how the criteria defining these offences are applied in practice, and how bad driving offences are viewed by the agencies involved in the justice system. It examines the extent to which the consequences of bad driving (death or injury) play a part in the decision-making process. At present the

- Cl Causing Death by Dangerous Driving – up to 10 years prison, unlimited fine, at least 2 years disqualification
- ❒ Dangerous Driving – up to 2 years prison, unlimited fine, at least 1 year disqualification
- ❒ Careless Driving – up to £2,500 fine, possible disqualification

There is no charge of Causing Death by Careless Drivirg (except where alcohol or dru;gs are involved). This, togethe with the much higher penalt for dangerous driving where death results, has caused son debate on how far the syste does (or should) focus on tl standard of the driving alon as opposed to the consequence Further argument centres whether the "deliberate" natu of some kinds of bad drivi should attract the highe penalties, or whether t *potential* danger should be t key issue, regardless of t actual consequences.

The objective of the proj is to determine the effect of t 199 1 Road Traffic Act on t procedures that identify, conv and sentence those guilty of ve bad driving offences. T research seeks to ascertain ho the police view bad drivin what is leading prosecutors t select one offence rather tha another, and why courts choos one penalty rather than anothe By examining the whol procedure, from charging t sentencing, as well as carryin out an analysis of sentencin trends and reconviction rate before and after the 1991 A will provide an understanding of how current legislation is being applied, whether there is sufficiently clear guidance on the law and its purpose, and how this affects the choice of penalty.

Part of the study involves "tracking" a number of individual cases, to see how the criteria for determining whether a particular piece of driving was dangerous or careless is applied. Several police forces in both England and Scotland are assisting in this research, as are the Crown Prosecution Service, the Crown Office, the Magistrates Association and a number of Crown Court Judges. By identifying how common features across a number of cases are dealt with, it is hoped to highlight the areas which require further clarification or guidelines. This exploration will seek to identify whether "lesser" charges of for example, careless driving are being brought where a charge of dangerous driving might be appropriate.

In 1996 5,800 people were convicted of Dangerous Driving and 57,400 of Careless Driving. In that year 3,598 people were killed on the roads. *In 382* of those cases someone was charged with Causing Death by Dangerous Driving, and 245 of those people convicted.

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Managing risk with "Black Box" technology

TRL's accident prevention and risk management work is not just limited to providing expert safety advice to those in the public sector. An increasing number of bodies approach TRL with concerns as to their corporate liabilities, increasing insurance and contingency costs, and the commercial worth of their safety strategies. Providing innovative analysis techniques and cost-effective research and consultancy is fundamental to TRL's mission.

One such sector is company car accidents. Many fleet operators have sufficiently largefleetsforrobuststatistical analyses to be undertaken . Installing a suitably tailored commercial vehicle accident database linking accident, personnel and vehicle operations is an approach that ensures that efforts and spending are targeted where the greatest and most cost effective accident reduction is possible.

Many companies consider that, with a high or increasing accident rate, their only option is to instigate driver training. Some firms feel that new technologies may help them - 'black box' journey and accident data recorders are now more widely available and inancially viable for a number

Journey data recorders can record detailed, extensive and objective information concerning vehicle status during complete journeys. Accident data recording devices trigger in the event of a crash, retaining crucial speed, deceleration, rotation and equipment status data for the seconds immediately before and after the impact.

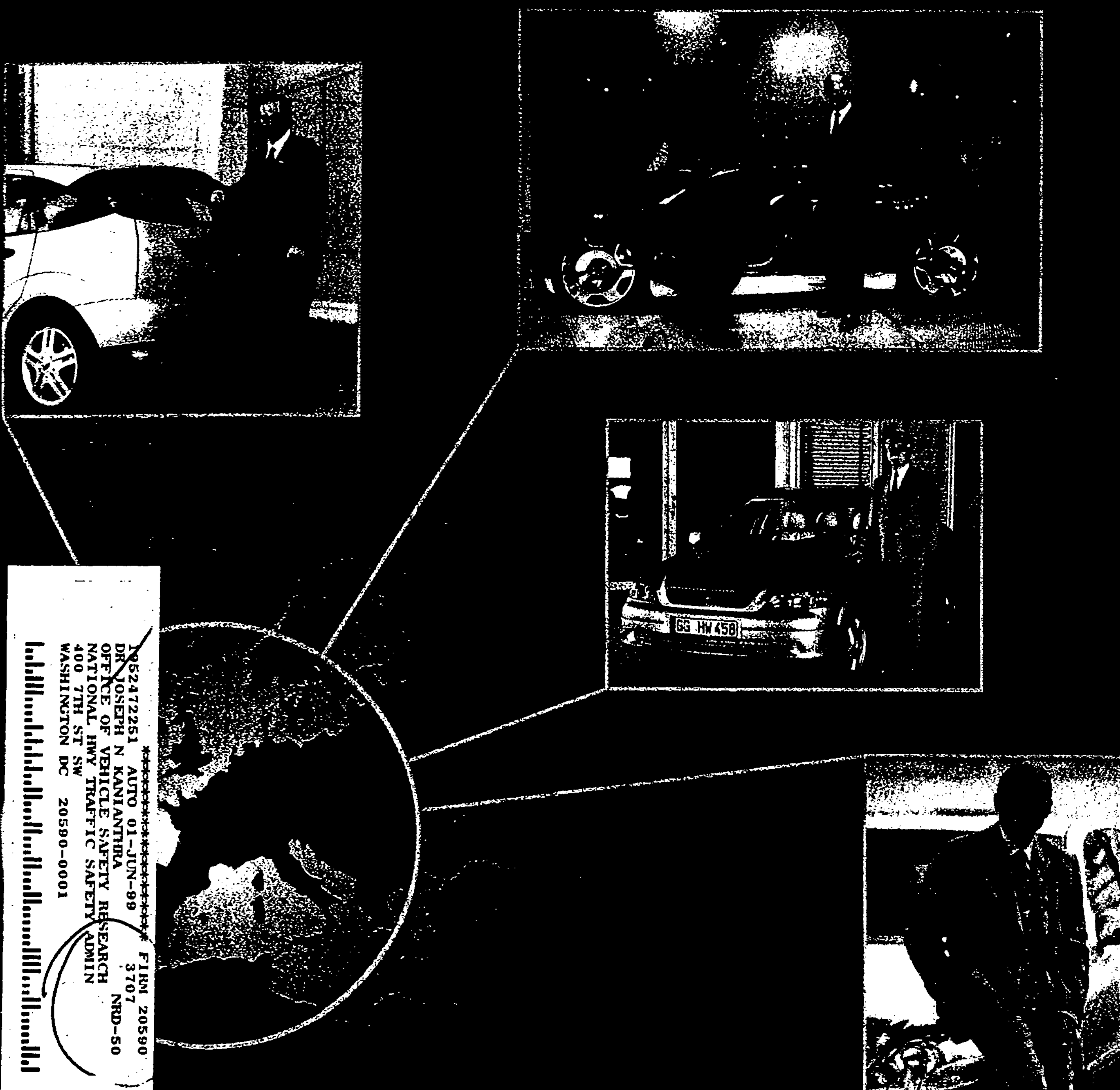
In some instances, accident data recorder units have been linked to significant reductions in fleet accident rates. TRL is interested in the scale of this reduction, whether the effects are sustained and can be targeted at particular vehicles or drivers, and whether the driving behaviour and accident rate of private motorists would be similarly affected.

TRL has long experience in comparing new technologies and continues to study the human factors associated with the driving task particularly in respect of the various influences on safety. "We are in a unique position to independently appraise corporate fleet accident problems, recommend suitable safety measures and measure the subsequent effects," says Paul Forman.

Contact: Paul Forman 0890

JUNE 199[illegible] EUROPEAN GLOBAL VEHICLE DEVELOPMENT

automotive engineering international



SAE INTERNATIONAL

Indy racecar crash analysis

General Motors' Motorsports Safety Technology Research Program investigates Indianapolis-type racecar crashes using an on-board recorder.

The investigation of automobile crashes for the purpose of understanding the various factors involved in occupant injuries has allowed for the development of countermeasures for injury mitigation The methods of organizing and cataloging the variety of information collected from such investigations of highway crashes in the U.S. were formalized in the 1960s and 70s. During that time, computerization of the databases became viable and coding methods were developed to allow categorization of crash conditions, vehicle damage, and occupant injuries with codes that could be searched and retrieved by a computer. That capability greatly expanded the ability of researchers to analyze mass accident data statistically.

In 1991, during the planning of the GM Motorsports Safety Technology Research Program (MSTRP) it was concluded that there was a need for a similar methodology to enhance the collection of racecar crash data. The goal of the MSTRP is to improve the safety of both racecars and passenger cars through the application of crash protection research methods. The program is primarily focused on Indianapolis-type (Indy-type) racecar crash investigation. The study of these crashes has proven to provide an almost laboratory-like setting due to the similarity of the cars and relative simplicity of the crashes (predominantly planar crashes involving single car impacts against well-defined impact surfaces). There are many dissimilarities between crashes with passenger cars and those with racecars such as construction of the chassis, configuration of the cars, driver position and protection systems, driver demographics (almost exclusively. males less than 50 years old), and the fact that the cars always are traveling in the same direction. However, emphasis in the MSTRP has been on determining the crash forces acting on the driver by measuring the vehicle decelerations as near to the driver as possible. Thus the link from the racecar to the passenger car is the human occupant. An understanding of the crash forces and injury outcomes with the racecar driver can be of great value in future passenger car designs after sufficient work is done to transform the knowledge from the racecar to passenger Car setting. This transformation requires careful investigation and study to discern the basic principles that can be distilled from the information. Application of the knowledge to the passenger car **may not only** affect vehicle design, but also crash-test dummy design, injury criteria, and regulations.

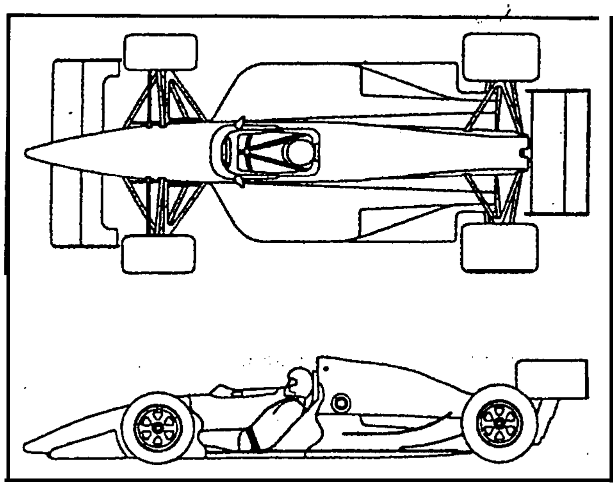


Figure 7. The Indy-type racecar is a single-seat, open-wheeled, open-cockpit, mid-engined vehicle with a carbon fiber/aluminum honeycomb composite chassis.

Table 1. Distribution of major deceleration impacts (202 cases).

Impact direction	Cases (%)
Front	3.1
Right-front	1.6
Right-side	37.0
Right-back	1.6
Back	12.4
Left-back	9.6
Left-side	34.0
Left-front	2.0

Investigation of highway crashes results in data that typically consist of a description of the accident scene and conditions at the time of the crash; estimates of the vehicle trajectories and speeds; a description of thenature of the impact and the exterior damage to the vehicle; a description of the damage to the interior of the vehicle, including possible occupant contact points; and detailed information about occupant injuries. Usually, these items are not determined at the scene, but rather a day or so after the crash.

Investigation of Indy-type racecar crashes allows for some significant differences in methodology in comparison to highway crashes. In contrast to the highway driver population, the Indy-type racecar driving population is well defined, being limited in any one season to about 50 drivers. Similarly, if a crash during a race occurs, its location is also well defined and limited to one of 20 or fewer tracks. The structural designs of all the Indy-type racecars are similar and controlled by the sanctioning bodies. There is often video coverage of the vehicle crash trajectory and vehicle impact attitude from various perspectives. Given the tight space for an Indy-type racecar driver and the mandatory and universal use of multipoint belt restraints, there are no questions concerning driver position and restraint use at the time of a crash. All of these factors present significant advantages in conducting an investigation, and in the accuracy and detail of data when compared to a highway crash investigation.

The Indy-type racecar that is the subject of this study is a singleseat, open-wheeled, open-cockpit, mid-engined car with a carbon fiber/aluminum honeycomb composite chassis known as a tub (Figure 1). The driver's compartment is a narrow, tightfitting tunnel with a form-fitting seat that is steeply reclined (up to 45” from vertical), positioning the driver's arms and legs horizontally. The required restraint system consists of double 75-mm (3-in.) wide shoulder belts connected to a 75-mm (3-m) wide lap belt and double rearward-facing 50-mm (2-m.) wide antisubmarining straps. A head restraint pad supported by the chassis structure behind the seat is also required. The sides of the cockpit are high and extend well above the shoulders of the driver, usually up to the sides of the head.

There are noteworthy structural features related to the crash performance of these cars in the front, side, and rear. The front of the car has a narrow tapered cone called a nosecone. It is required by the sanctioning bodies to pass an axial impact test for energy absorption and impact force control in frontal crashes. The sides of the car feature composite housings called sidepods, which contain the radiators for the engine cooling system and other auxiliary equipment. They are wide structures because they also house aerodynamic tunnels for the creation of downforce on the car. Although they are not required to pass a dynamic impact test like the nosecones, the sidepods serve as protective structures for side impacts by providing a degree of energy absorption and force control. Because of the single-seat configuration, with the driver on the centerline of the car, the driver receives maximum benefit from the sidepods regardless of which side the car is impacted. In contrast to the front and sides of the Indy-type racecar, the rear structure consists of a mounted engine/gearbox, which, in the past, has not been designed for force control or energy absorption. The

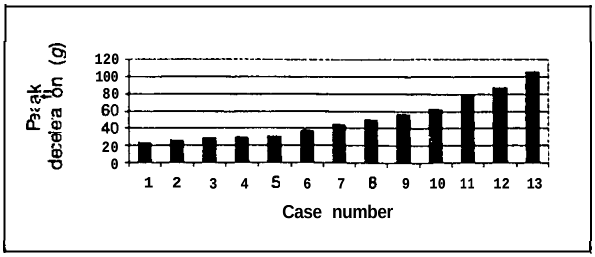


Figure 2. Frontal impact peak decelerations.

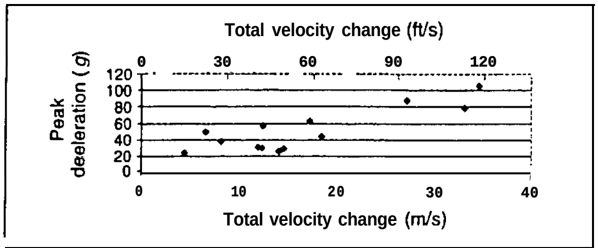


Figure 3. Frontal impact peak decelerations versus total crash velocity change.

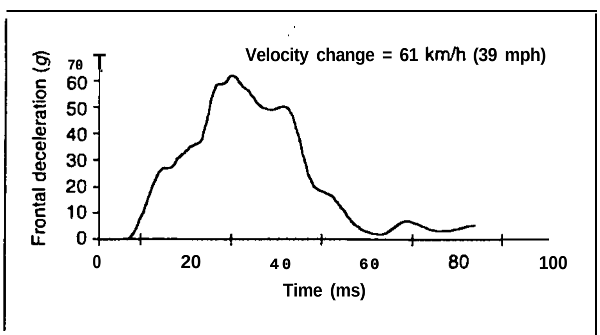


Figure 4. Severe frontal impact deceleration-time history.

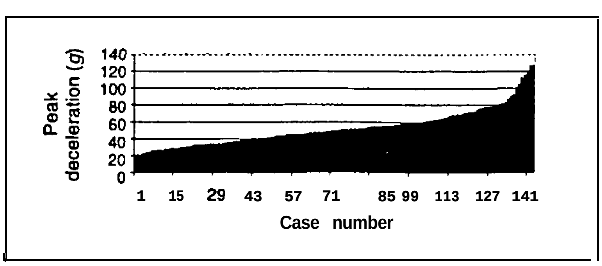


Figure 5. Side impact peak decelerations.

composite chassis ends in front of the engine with a fuel tank between the rear of the cockpit and the engine. The engine and transmission are structural units and carry rear suspension loads to the chassis.

The anthropometry of Indy-type racecar drivers was documented by an MSTRP study in the early stages of the program. In general, the average driver is similar to the 50th percentile male of the general population. The age for a driver ranges from 25 to 50 years with an average of 34.

Many of the basic aspects of investigating racing car incidents (crashes) were already in place, in some form or another, with the sanctioning bodies for Indy-type racecar racing, the United States Auto Club (USAC), the Championship Automobile Racing Teams (CART) and, since 1996, the Indy Racing League (IRL). These include incident reports from track observers, photographs of crash damage to the vehicle, and injury information from the medical teams.

The package of data being gathered for the MSTRP consists of sections with general information, car deformation, crash description, driver information, driver injury, photographic coverage, and an overall summary. The general information section contains data on the race event, racecar type, track type and conditions, crash classification, and comments. The car deformation is indicated on a drawing of an open-wheeled racecar. The crash description has an overall drawing of the track and a place for a detailed sketch of the incident site. Information consists of the anthropometry and posture of the driver, restraint type, and initial post-crash status and treatment. The driver injury section contains detailed injury information as determined by a medical team. The photographic coverage section documents the existence and location of thevarious photographic records of the car, the incident site, car kinematics (video), and any other photographic records (such as still photographs of the impact by track-side photographers). The summary sheet ‘contains subsets of the data in the other sections for quick review.

The most specialized revision of standard crash investigation coding methods involves vehicle damage. Highway crash investigation studies use the Collision Deformation Classification (CDC) method for this purpose. ‘The CDC uses a seven character alphanumeric code to describe the crash force direction (using clock directions), general area of damage, specific horizontal or lateral area, specific vertical or lateral area, type of damage distribution, and a damage-extent code. The CDC method was taken and specialized for the Indy-type racecar case and driver injury coding was added to the investigation records., Both the Abbreviated Injury Scale (AIS) code used in highway crash investigation, and the ICD9CM discharge diagnosis code used by hospitals, were recorded for each driver injury.

The goal of the MSTRP database is to move from individual physical files, containing the information outlined above, to a completely computerized database with all the information stored in a form that can be easily searched by computer. That phase of the work is presently in progress.

The most unique feature of the MSTRP Crash Investigation Study is the use of an onboard crash recorder to measure vehicle chassis crash decelerations. Early in 1992, it was determined that an impact recorder was the only way to obtain accurate information on the deceleration-time histories and peak deceleration levels associated with an Indy-type racecar crash. The recorders were first installed in Indy-type racecars in May 1993, at the Indianapolis Motor Speedway, and were used in increasing numbers of cars throughout the remainder of the 1993 season. In 1994 and 1995, the recorders were installed in virtually every Indy-type racecar in every race of the season and, since 1996, have been in every IRL racecar. The preferred location for the recorders is mounted on the floor of the car, below the driver's knees. This puts the recorder as near the driver as possible while remaining accessible and easy to install. The recorder is attached with four bolts to provide a rigid coupling to the car chassis.

The chassis deceleration data from a crash is routinely filtered by a low-pass, 100-Hz, four-pole, Butterworth filter that is part of the IST EDR3 analysis package. This filter was chosen as one that corresponds to an SAE Channel Class 60 filter, which is commonly used to process vehicle chassis decelerations in automotive crash testing. This allows the rigid bqdy motion of the chassis to be characterized and, by inference, the motion experienced by the highly restrained driver. It should be understood that this estimated whole-body deceleration is only a lower bound on the decelerations experienced by the body segments of the driver. Since there are no force-limiting belts or extensive crushable interior components restraining the driver, the actual decelerations will always be higher than the measured rigid body decelerations of the chassis due to less-than-perfect coupling of the driver to the car. To emphasize the biomechanical significance, only those crash recordings that had a peak deceleration greater than 20 *g* were analyzed.

The direction of impact to the car depends on the attitude 'of: the car at the instant of impact and the pre-impact motions of the car (especially rotations). As a result, the point of impact and the direction of impact can vary greatly. The impact directions, in terms of principal direction of deceleration for the 202 incidents, have been categorized (Table 1). The categories were designated as front, side, or back. The front category was defined as predominantly forward deceleration with significantly less or no lateral deceleration while the side category was defined as piedominantly lateral deceleration with significantly less or no forward deceleration. The back category was defined as predominantly rearward deceleration with significantly less or no lateral deceleration.

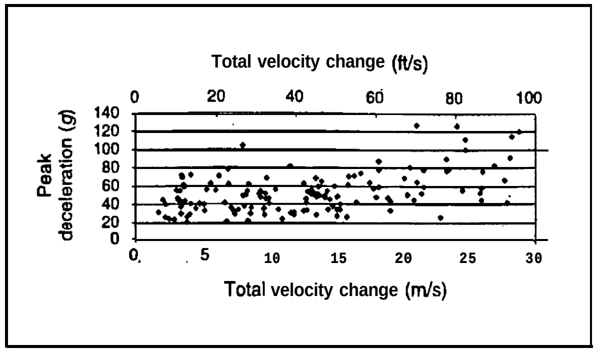


Figure 6. Side impact peak decelerations versus total crash velocity changes

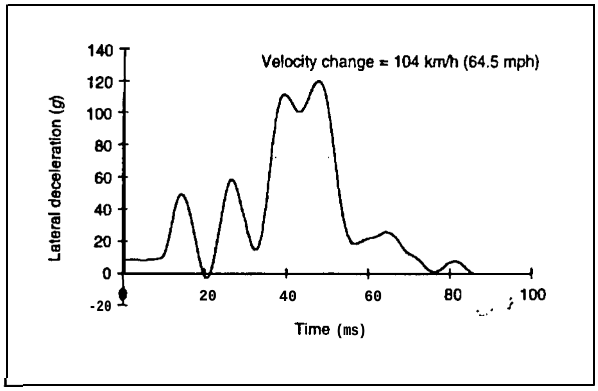


Figure 7. Severe side impact crash deceleration-time history

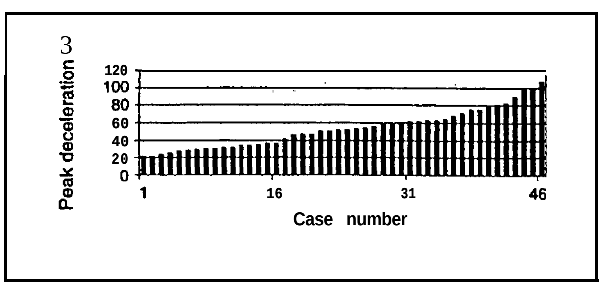


Figure 8. Rear impact peak decelerations.

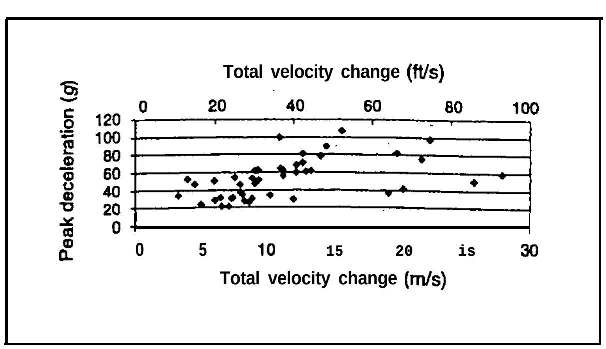


Figure 9. Rear impact peak decelerations versus total crash velocity change.

Over half the frontal crashes had peak decelerations above 40 *g* and the mean peak deceleration for the 13 cases was 50.7 g (Figure 2). Four of the cases (31%) had peak decelerations above 60 g and three of those four had total velocity changes greater than 24 m/s (80 ft/s) (Figure 3). Figure 4 shows the time-history of a severe frontal crash.

As shown in Figure 5,105 (73%) of the 143 total cases classified as side impacts had peak decelerations above 40 *g* with 41 cases (28%) above 60 *g* and 7 cases (5%) above 100 *g*. The mean peak deceleration was 53.3 *g*. The mean total velocity change for the side impacts was 12.6 m/s (41.4 ft/s) (Figure 6). Figure 7 shows the timehistory of a severe side impact.

As shown in Figure 8, 30 of the 46 cases (65%) had peak decelerations above 40 *g*, with 17 cases (37%) above 60 *g* and 6 cases (13%) above 80 *g*. The mean peak deceleration was 53.3 g, and the mean total velocity change was 11.6 m/s (37.9 ft/s) (Figure 9). Figure 10 shows the time-history of a severe rear impact.

The'data presented in this article represent a new source of information on the tolerance of the human body to whole-body deceleration. The combination of accurate recording of the chassis decelerations and relatively tight coupling of the driver torso to the chassis provides a unique opportunity to study the biomechanics of injury to a living human under high-severity crash conditions with time durations near the range of severe highway crashes. A typical 50 km/h (31 mph) frontal barrier crash of a passenger car has a duration of about 100 ms, while human volunteer sled tests are usually conducted at low deceleration levels and have much longer durations. The mean values of peak decelerations for all three directions of impact in this study were over 50 *g*. The highest recorded human volunteer sled exposures were 40-45 *g* peak decelerations reported by Stapp in 1970.

The extremely high deceleration levels recorded in this study provide significant insights into protection of the chest, particularly in side impacts. Specifically, it does not appear that chest-acceleration-based criteria for injury prediction, as currently required for injury assessment in federally regulated crash testing, have validity. The 60-g resultant spinal acceleration limit commonly used for frontal crash testing was obviously exceeded in many of these crashes. The chassis deceleration level exceeded this limit *in 62 (30.5%)* of, the cases in the study. Sled-testing simulations of frontal crash&, with the Indy-type racecar configuration of a reclined seating position and sixpoint restraints, produced peak Hybrid III dummy spinal resultant accelerations on the order of 1.5 times the peak chassis deceleration. Similar dynamic amplification factors would also occur in side and rear impacts. The sled tests showed that chest deflections with the double shoulder belts produced peak values below the commonly used limit of *50 mm (2 in.).*

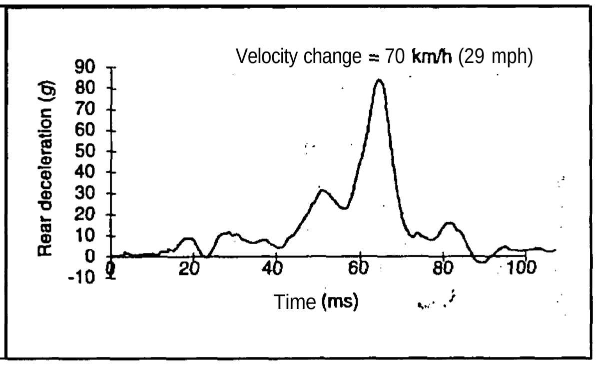


Figure 10. Severe rear impact deceleration-time history.

The side impact injury assessment criterion of TTI(d) (Thoracic Trauma Index) limited to 85-90 *g* for the average of the rib and spinal lateral peak accelerations would also seem to be exceeded in many of the side impact cases without chest injury. In fact, even without consideration of dynamic amplification, the chassis accelerations exceeded the 85-g limit in 11 cases without chest injury. The 130-*g* pelvic acceleration limit for side impact, on the other hand, may have been confirmed to some extent by the hairline pelvic fracture mentioned above for the case of 127-g peak deceleration.

The lack of internal organ damage in the chest for the side impacts is remarkable. Factors that may influence such successful outcomes include lack of intrusion; uniform support of the body from the feet to the head; thoracic containment by the tight, wide, double shoulder belts; and significant load paths around the chest through seat/chassis contact with the pelvis and shoulder. The combination of no direct intrusion into the chest, coupled with stable loading of the pelvis below the chest and the shoulder above the chest, means that chest deformations other than inertially induced deflections are minimized. The hairline fractures in the shoulder and pelvis of the 127-g side impact case are evidence of these load paths. The existence of a shoulder load path is made possible by the stabilizing influence of the shoulder belts. Additionally, the tight, wide, shoulder belts serve to constrain the fore/aft deflection of the chest due to side loading and may serve to keep the internal organs from moving excessively within the rib cage. Cadaver-based side-impact studies. would predict that aortic ruptures would have occurred in many of the side impacts in this study. While it is true that all of the drivers were physically fit athletes, they were not, in general,. extraordinarily, strong or conditioned to impact like football players.

Five and a half years of investigation of Indy-type racecar crashes have provided a number of insights into the dynamics of racing car crashes. What began as a pro gram to investigate racing car crashes to improve the safety of racing cars has had the additional benefit of providing new information on the tolerance of the human body to crash decelerations. The data on chassis deceleration call into question the use of thoracic spinal acceleration in injury assessment, particularly in side impacts. Subsequent study of these crash conditions using instrumented test dummies and mathematical models will pro vide even greater insight into the tolerance of the humanbody to impact loading as well as into ways to improve protection for both racing drivers and passenger car occupants.

Information was provided by **John Melvin,** Kenneth Baron, William Little, and Thomas Gideon of General Motors Corporation and John Pierce of Kestrel Advisors, Inc.

Interesting? Circle 9
Not interesting? *Circle 10*

EDR and Privacy Issues – Volkswagen's Position

Event Data Recorder

Event data recorders are devices proposed to be installed by automobile manufacturers into new motor vehicles prior to their delivery to dealers for resale to consumers. Such devices are proposed to record both accident related data objectively measuring the accident vehicle's performance as well as accident relevant data solely within the control of the driver or other occupants of the accident vehicle. Among the latter may be the speed at which the vehicle was operated at impact, whether or not seatbelts were worn by the driver or other occupants, the direction of the impact, turn signal operation, brake application, steering wheel position and other similar data indicating whether or not the driver caused or contributed to the accident. In some instances the data objectively measuring vehicle performance may also be used to affirm or rule out the possibility of a vehicle malfunction.

Use of the EDR Data

The data collected by EDRs may be used for multiple purposes, among them accident research preparatory to new motor vehicle safety regulations, improved accident performance of motor vehicles undertaken by the automobile companies, law enforcement and use of the data as evidence in litigation designed to assign liability to vehicle operators, automobile manufacturers or entities responsible for the construction and maintenance of highways.

Right to Privacy

Federal and in many instances state statutory law, with certain exceptions, prohibit the disclosure of any document to any person or another agency except with the written consent of the person to whom the record pertains. The purposes of these statutes are to protect the individual against infringing upon his or her rights to privacy as agencies embark upon data collections for multiple purposes. Certain private businesses are similarly regulated by federal and/or state law, i.e. the credit reporting industry.

The extent to which a vehicle owner has a right to privacy regarding EDR data depends in Volkswagen's view on whether or not the data identifies the individual person or event, or whether or not the individual person is deemed to have given his or her consent to the use of the data in the manner proposed.

Data Identifying the Individual

It is Volkswagen's position that irrespective of how any particular data relating to the accident is proposed to be used, if it permits identification of the individual person tied to the accident, that person should be advised of its proposed collection and use regardless of whether or not the law requires it. Volkswagen is committed to respect the privacy of its customers and it will not invade a realm of privacy, which is generously drawn, unless the vehicle owner or occupant has consented to that incursion of privacy. Volkswagen also recommends that the Working Group retain a law firm with constitutional expertise to conduct research in an attempt to identify the historical origins and the constitutional parameters of the right to privacy under state and federal constitutional law.

Data Not Identifying any Individual

The right of the individual person to be protected against unreasonable invasions of his or her private realm is implicated significantly less by data which is not individualized by the identity of the owner, driver or occupant. The collection or presentation of non-individualized data remains useful for the purpose of research preparatory to the development of new motor vehicle safety regulations and improved vehicle safety performance without raising the privacy concerns previously discussed. Nonetheless, even in this context, Volkswagen recommends that the purchaser of a vehicle equipped with an EDR device be fully informed of the nature of the data collection which is being undertaken, and the use which is made of the data. Furthermore, unless compelled by government regulation, Volkswagen would want to extend to the prospective purchaser the option of purchasing a vehicle with or without an EDR device.

Maintenance of the Integrity of the Data Collection Process and Program

Volkswagen believes that it is necessary to protect the integrity of the data collection process by addressing as early as possible issues of accuracy of the data, quality control, privacy concerns and use of the data in order to avoid creating the impression among vehicle owners that “big brother” in concert with the auto industry has the ability to aid law enforcement or influence private rights of action filed in a court of law. We therefore recommend that a data collection program be implemented in phases in order to allow the public to be educated about the laudable purposes of such a program. Volkswagen believes that the first phase should focus on the use of non-individualized data in conjunction with research supporting new or improved safety systems and regulations, research that the government conducts jointly with the industry. As the public becomes educated about the value of such research and as privacy concerns are discussed and subordinated to the laudable public purposes, data collection and use could be expanded into other areas.

The Issue of Ownership of the Data

The issue of ownership is closely intertwined with the issue of the scope of the rights to privacy that the constitution allocates to the individual in our society. Volkswagen recommends that we defer to the legal research which inevitably needs to be undertaken in preparation for addressing potentially explosive public concerns for privacy and the idea of “big brother” looking over each citizen’s shoulders when a motor vehicle accident occurs.

D.5 MEDICAL RELEASE STATEMENT

Ordinarily, the NASS contractor and the NHTSA make arrangements with local hospitals to obtain medical injury information without compromising hospital policy on data release. If hospital policy requires a patient release, the researcher will attempt to obtain a signed release from the patient. The release assures the patient that the medical information obtained will not be compromised by release of personal identifiers. An example of a medical release statement is given below:

> "I, ________________________ hereby authorize the release of the necessary medical information from my medical records at (name of Medical Institute1 to provide for the identification of the initial injuries sustained in the motor vehicle crash in which I was involved.
>
> This information is to be released only to authorized employees of (name of contractor1 who are conducting motor vehicle traffic crash research for the United States Department of Transportation, National Highway Traffic Safety Administration, under the National Accident Sampling System, Contract (DOT - Number).
>
> I understand that no names, addresses, telephone numbers, or any other means of identifying me with the motor vehicle crash or injury data will be associated with the hard copy case report. Medical reports will be maintained for no longer than thirty (30) days after the date of this release by the (name of contractor Before the National Highway Traffic Safety Administration (NHTSA) enters the hard copy case report into a public storage file, the medical report will be removed and may be used confidentially by the NHTSA as part of a clinical study of traffic crash injury consequences. At the end of three years, the report will be destroyed by the NHTSA storage facility clerk.
>
> ________________________________ ______________"
>
> patient's signature date

Region I, One Congress Street, Suite 1100 (CAA), Boston, MA 02114-2023. Region I'S technical support documents are available for public inspection during normal business hours, by appointment at the Office of Ecosystem Protection, U.S. Environmental Protection Agency, Region I, One Congress Street, 11th floor, Boston, MA and Division of Air and Hazardous Materials, Department of Environmental Management, 291 Promenade Street, Providence, RI 02906-5767.

FOR FURTHER INFORMATION CONTACT: Ian D. Cohen, (617) 918-1655.

SUPPLEMENTARY INFORMATION: For additional information, see the direct final rule which is located in the Rules section of this Federal Register.

Authority: 42 U.S.C. 7401 et seq.

Dated: May 6, 1999.

John P. DeVillars,

Regional Administrator, Region I.

[FR Doc. 99-13029 Filed 6-1-99; 8:45 am]

BILLING CODE 6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[MA-67-7202b; A-1-FRL-6346-7]

Approval and Promulgation of Air Quality Implementation Plans; Massachusetts and Rhode Island; Nitrogen Oxides Budget and Allowance Trading Program

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The EPA is proposing to approve State Implementation Plan (SIP) revisions submitted by the States of Rhode Island (RI) and Massachusetts (MA). The revisions consists of adding a regulation entitled, "Nitrogen Oxides Allowance Program," and a consent agreement to the RI SIP and a regulation entitled, "NO_x Allowance Program," to the MA SIP. The consent agreement in Rhode Island establishes alternative NO_x reasonably available control technology (RACT) requirements for four boilers. The RI and MA regulations are part of a regional nitrogen oxides (NO_x) emissions cap and allowance trading program designed to reduce stationary source NO_x emissions during the ozone season in the Ozone Transport Region (OTR) of the northeastern United States. These SIP revisions were submitted pursuant to section 110 of the Clean Air Act (CAA).

In the Final Rules section of this Federal Register. EPA is approving the States' SIP submittals as direct final rules without prior proposal because the Agency views these as noncontroversial revisions and anticipates no adverse comments. A detailed rationale for the approval is set forth in the direct final rule. If no adverse comments are received in response to these actions, no further activity is contemplated in relation to this proposed rule. If EPA receives adverse comments, the direct final rule will be withdrawn and all public comments received will be addressed in a subsequent final rule based on this proposed rule. EPA will not institute a second comment period. Any parties interested in commenting on this action should do so at this time.

DATES: Written comments must be received on or before July 2, 1999.

ADDRESSES: Comments may be mailed to' Susan Studlien, Deputy Director, Office of Ecosystem Protection (mail code CAA), U.S. Environmental Protection Agency, Region I, One Congress Street, Suite 1100, Boston, MA 02114-2023. Copies of the State submittals and EPA's technical support documents are available for public inspection during normal business hours, by appointment at the Office of Ecosystem Protection, U.S. Environmental Protection Agency, Region I, One Congress Street, 11th floor, Boston, MA. at the Division of Air and Hazardous Materials, Rhode Island Department of Environmental Management, 291 Promenade Street, Providence, RI 02908-5767, and at the Massachusetts Division of Air Quality Control, Department of Environmental Protection, One Winter Street, 8th Floor, Boston, MA 02108.

FOR FURTHER INFORMATION CONTACT: Steven Rapp, (617) 918-1048 or at Rapp.Steve@EPAMAIL.EPA.GOV.

SUPPLEMENTARY INFORMATION: For additional information, se8 the direct final rule which is located in the Rules section of this Federal Register.

Dated: May 6, 1999.

John P. DeVillars,

Regional Administmtor, Region I.

(FR Doc. 99-13027 Filed 6-1-99; 8:45 am]

BILLING CODE 656040-U

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA-99-5737]

Federal Motor Vehicle Safety Standards

AGENCY: National Highway Traffic Safety Administration (NHTSA), DOT.

ACTION: Denial of petition for rulemaking.

SUMMARY: In this document, we deny a petition for rulemalcing submitted by Marie E. Birnbaum, a private individual. The petitioner asked us to initiate rulemaking to require passenger cars and light trucks to be equipped with "black boxes" (data recorders) analogous to those found on commercial airliners. We agree with the petitioner that the recording of crash data can provide information that is very valuable in understanding crashes, and which can be used in a variety of ways to improve motor vehicle safety. However, we are denying the petition because the motor vehicle industry is already voluntarily moving in the direction recommended by the petitioner. Further, we believe this area presents some issues that are, at least for the present time, best addressed in a non-regulatory context.

FOR FURTHER INFORMATION CONTACT:

For non-legal issues: Mr. Clarke Harper, Chief, Light Duty Vehicle Division, NPS-11, National Highway Traffic Safety Administration, 400 Seventh Street, SW, Washington, DC 20590. Telephone: (202) 366-2264. Fax: (202) 3664329.

For *legal issues:* J. Edward Glancy, Office of Chief Counsel, NCC-20, National Highway Traffic Safety Administration, 400 Seventh Street, SW, Washington, DC 20590. Telephone: (202) 3662992. Fax: (202) 366-3820.

SUPPLEMENTARY INFORMATION: We received a petition for rulemaking from Marie E. Bimbaum, a private individual, asking us to initiate rulemaking to require passenger cars and light trucks to be equipped with "black boxes" (data recorders) analogous to those found on commercial airliners, The petitioner stated that the purpose of the devices would be to record speed and possibly other data in order to (1) improve public safety by encouraging responsible driving, and (2) provide records of pre-crash speed and possibly other information. Ms. Birnbaum stated that this pre-crash information would work to improve driver accountability through better crash investigation, enforcement and adjudication.

We note that we received Ms. Birnbaum's petition just after we had denied another petition making essentially the same request. price T. Bingham, a private individual, had asked us to initiate rulemaking to require air bag sensors to be designed so that similar information is recorded during a crash and can be read by crash investigators.

In responding to Mr. Bingham's petition, we noted that the safety community in recent years has shown considerable interest in the concept of crash event recorders. Such recorders can, in conjunction with air bag and other sensors already provided on many vehicles, collect and record a variety of relevant crash data. These data include such things as vehicle speed, belt use, and crash pulse.

While we agreed with Mr. Bingham that the recording of crash data can provide information that is very valuable in -understanding crashes, and which can be used in a variety of ways to improve motor vehicle safety, we nonethless denied the petition. One reason for denying the petition was the fact that the motor vehicle industry is already voluntarily moving in the direction recommended by the petitioner. Another was our belief that this area presents some issues that are, at least for the present time, best addressed in a non-regulatory context.

We issued our denial of Mr. Bingham's petition on November 3, 1998, and published it in the November 9, 1998 edition of the Federal Register (63 FR 60270). Ms. Birnbaum's petition was dated November 7, 1998.

After reviewing Ms. Birnbaum's petition, we conclude that our reasons for denying Mr. Bingham's petition are also applicable to her petition. A full explanation of those reasons is provided in our November 9, 1998 Federal Register notice, which we incorporate by reference.

The November 1998 notice included a discussion of ongoing work in this area by NHTSA's Motor Vehicle Safety Research Advisory Committee (MVSRAC). The agency noted that MVSRAC had set up a working group on event data recorders under the Crashworthiness Subcommittee and that the first meeting of the working group had taken place in October 1996. Since publication of the November 1998 notice, another working group meeting has been held, and a third meeting is planned for this summer. The Event Data Recorder Working Group is considering a wide variety of subjects related to crash event recording devices and anticipates producing a report by the end of calendar year 2000.

Minutes of the Event Data Recorder Working Group meetings are being placed in the public docket. The public may access these materials via the Web. The Docket Management Web site is at "*http://dms.dot.gov*". You should search for Docket number 5218.

For the reasons discussed above, we are denying Ms. Birnbaum's petition for rulemaking.

Authority: 49 U.S.C. 30162; delegations of authority at 49 CFR 1.50 and 501.8.

Issued on: May 27, 1999.

L. Robert Shelton,

Associate Administrator for Safety Performance Standards.

[FR Doc. 99–13895 Filed 6-1-99: 8:45 am]

BILLING CODE 4910-59-P

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA–98–4422]

RIN 2127–AE22

Federal Motor Vehicle Safety Standards; Seat Belt Assembly Anchorages

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation.

ACTION: Withdrawal of proposed rulemaking.

SUMMARY: This notice withdraws a proposed rulemaking action to amend Federal motor vehicle safety standard No. 210 Seat Belt Assembly Anchorages. The proposed amendment would require that the lap belt angle for rear adjustable seats be measured in the rearmost adjustment position. However, the agency has determined that the proposed amendment may reduce vehicle safety and affect some front adjustable anchorage locations.

FOR FURTHER INFORMATION CONTACT: For technical information: Mr. John Lee, Office of Crashworthiness, NPS–11, Telephone (202) 366-2264. FAX number (202) 493-2739, Mr. Lee's e-mail address is: jlee@nhtsa.dot.gov.

For legal information: Mr. Otto Matheke, Office of Chief Counsel, NHTSA, (202) 366-5263 Fax number (202) 366–3820.

Both may be reached at: National Highway Traffic Safety Administration, 400 Seventh Street, SW, Washington, DC 20590.

SUPPLEMENTARY INFORMATION: Federal motor vehicle safety standard (Standard) No. 210 Seat Belt Assembly Anchorages specifies performance requirements for safety belt anchorages to ensure their proper location for effective occupant protection and to reduce the likelihood of the anchorages' failure in a crash. The requirements of the standard apply to passenger cars, trucks, buses and multipurpose passenger vehicles (MPVs). The standard sets zones within the vehicle where the anchorage must be located. The anchorage for a lap belt or the lap portion of a lap/shoulder belt is required to meet a minimum and maximum mounting angle. The standard also sets minimum strength requirements.

On December 4, 1991, NHTSA published a notice of proposed rulemaking (NPRM) to amend the lap belt angle measurement procedure for adjustable rear seats of Standard No. 210. The current procedure measures the angle from the seat aligned with the seating reference point. The proposed procedure measured the lap belt angle with the seat in the rearmost adjustable position. The intent of the amendment was to establish a more easily identified seat position for measuring the lap belt angle of the moveable rearward seats. The agency believed the seating reference point may not have been an adequate reference point for these rearward moveable seats.

The agency received five comments to the NPRM. All were opposed to the proposal as written. One commenter, Ford Motor Company (Ford), stated, "* * * the proposal may reduce vehicle safety, by requiring that anchorages be located in positions that produce a flatter lap belt angle than is ideal when the seat is adjusted to a forward adjustment position. Ford suggest that anchorages for rear adjustable seats be located from the hip point of the template when the seat is in the middle of its adjustment range." Ford also stated, "* . . an 16 month leadtime would be insufficient if anchorages were to be relocated as proposed."

Ford, Chrysler, Toyota and GM were concerned about the proposed wording of S4.3.1.1(b) in which "* . * a line 2.5 inches forward of and 0.375 inches above the seating reference point * * *" is replaced by "* . * a line from the seating reference point to the contact point of the belt with the anchorage * * *" would be a substantial rulemaking. The change could affect the dummy kinematics during Standard No. 208 testing as well as the anchorage location at front adjustable seats, not just the rear adjustable seats. Chrysler stated, "As

MVSRAC WORKING GROUP EVENT DATA RECORDERS
MEMBER LIST
July 13, 1999

Name	Company	Phone	Fax	Company Address	e-mail
David Bauch	Ford	3 13 322-3884	313 390-5144	Advanced Vehicle Tech #3, 2A149 Rm 2122, Mail Drop 3010, Ford Motor Company, Dearborn, MI 48121	dbauch@ford.com
Robert Cameron	VW	20 1 894-6245	20 I 894-5498	Volkswagen of America, 600 Sylvan Ave, Englewood Cliffs, NJ 07632	Robert.Cameron@vw.com
John Carney	Worcester	508 83 l-5222	508 83 l-5774	Worcester Polytech. Institute, 100 Institute Rd, Worcester, MA 01609-2280	jfc@wpi.edu
Charlie Gauthier	NASDPTS	703 734-1620	703 734-1868	1604 Longfellow St, McLean, VA 22 10 1	
Alan German	Transport Canada	613 993-3609	613 991-5802	Road Safety and Motor Vehicle Regulation Directorate; Transport Canada; PO Box 8880; Ottawa Postal Terminal; Ottawa, Ontario, Canada K1G 3J2	GermanA@tc.gc.ca
Kathleen Gravino	DaimlerChrysler	248 576-36 13	248 576-79 18	CIMS 483-05-10; 800 Chrysler Drive, Auburn Hills, MI 48326-2757	kmg15@daimlerchrysler.com
Martin Hargrave	FHWA	202 493-33 11	202 493-34 17	FHWA, HSR-20, Turner Fairbanks Highway Research Center, 6300 Georgetown Pike, McLean, VA 22 10 l-2296	martin.hargrave@fhwa.dot.gov
John Hinch	NHTSA-R&D	202 366-5 195	202 366-5930	NHTSA, NRD-01, 400 7" St SW, Washington, DC 20590	john.hinch@nhtsa.dot.gov
Thomas Kowalick	Click, Inc.	9 10 692-5209	910 695-1566	560 East Massachusetts Ave, Southern Pines, NC 28387	kowalick@pinehurst.net
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Lori Niro	Honda	937 645-8856	937 645-6344	Honda R&D Americas, Inc., 21001 State Route 739, Raymond, OH 43067-9705	lniro@oh.hra.com
	TRB			Transportation Research Board, NRC, 2 101 Constitution Ave, Washington DC 204 18	
Jeya Padmanaban	AAAM	650 94 I-5304	650 941-2132	35 Sylvian Way, Los Altos, Ca 94022	jeyap@aol.com
Vernon Roberts	NTSB	202 314-6483	202 3 14-6406	NTSB, HS-I, 490 L'Enfant Plaza East SW, Washington, DC 20594	robertv@ntsb.gov
Wilbur C Rumph	Blue Bird Bus	912 822-2368	912822-2471	Blue Bird Body Co.; PO Box 937; Fort Valley, GA 3 1030	
Brian Shaklik	Navistar	219 428-3205	219 428-3501	Navistar Technical and Engineering Center, 291 I Meyer Rd, Fort Wayne, IN 46801	Brian.Shaklik@Navistar.com
Greg Shaw	UVA	804 296-7288	804 296-3453	WA Auto Safety Lab, Charlottesville, VA	cgssw@virginia.edu
Sharon Vaughn	NHTSA-NCC	202 366-1834	202 366-3820	NHTSA, NCC-30.400 7" St SW, Washington, DC 20590	svaughn@nhtsa.dot.gov

EDR MEETING # 3; June 9, 1999; Washington DC		
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TOM KOWALICK	Click INC.	910 692 5209
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ART CARTER	NHTSA	202 366-5669
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BOB CAMERON	VW	201 894 6245
SHARON Y. VAUGHN	NHTSA, NCC-30	202-366-1834
David J. Bauch	Ford	313-322-3894
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