

The Consultant

An Engineering and Investigations Newsletter

May 2003

SEAL Corporation

Vol. 23 No. 2



Tools of the Trade: Onboard Vehicle Data Recorders

Most people have heard of aircraft voice and flight data recorders, commonly referred to as "black boxes." We usually hear on the news about data retrieved from these black boxes to assist investigators when an aircraft crashes. Auto manufacturers have data recording technology that has become more prevalent over the last decade. From the mid-1990's to present, it has become more common for most, if not all current model vehicles to be equipped with some type of data recorder.

Some data recorded has been standardized while other data is manufacturer specific. Selected data may be useful to analyze accidents during reconstruction, such as velocity, seat belt switch, brake switch, and air bag deployment. Sensors are utilized to wake up the system to record data during events. Other data on mechanical equipment performance is also recorded, some for EPA emission control monitoring.

During the mid-1990's, a connection called an OBDII (Onboard Diagnostic Link) was standardized within

the auto manufacturing industry. Manufacturers have their own proprietary equipment to download and analyze the data for internal purposes. Diagnostic tools for mechanic use during repair are available. There is some limited public availability of interface scan tools suitable for retrieving data of interest to accident reconstruction.

Several years ago, SEAL obtained a scan tool that can be connected to the OBDII or direct to the

air bag module for GM products. It is manufactured by Vetronix and called a Crash Data Retrieval (CDR) tool. With software upgrades, other domestic manufacturers can also be accessed - Ford was added in the last few months. Data is stored in the onboard vehicle computer in hexadecimal code. This tool can download and help interpret selected portions of the hexadecimal code. Common parameters included are velocity, brake switch, air bag, RPM, seat belts, and time. Graphs depicting data are provided. Code content, analysis, and interpretation must be evaluated in context of known factors relating to the

(Continued on next page)



Crash Data Retrieval
(CDR) equipment.

SEAL Corporation
12785 State Hwy. 64E
Tyler, TX 75707-5333
Tel: 903.566.1980
Fax: 903.566.4504
seal@tyler.net
sealcorp.com

1.800.624.0905
SEAL Service Center



System Engineering And
Laboratories Corporation
is an independent
testing laboratory,
forensic engineering and
investigative
consulting firm.

Tools (Continued from Page 1)

event. Face values of direct translation of the code may be misleading when not taken in context. Therefore, some codes require specialists to interpret.

The tool SEAL Corporation possesses covers some limited GM makes and models during the early 1990's. After the mid-1990's, most GM make and model data recorders can be read. This year Vetronix announced that the Ford CDR Update is available. The updated software includes expanded vehicle coverage for select 2001 to 2003 Ford vehicles, as well as expanded vehicle coverage for select 1994 to 2003 GM vehicles. SEAL has developed contacts in the industry with specialists who can

download and/or interpret other hexadecimal data on most, if not all recent model vehicles so equipped. This service may not be economical for smaller cases/projects. If you have need of this type service, please inquire at the SEAL Tyler office with make, model and year of manufacture.

For further information on the CDR, please visit the Vetronix crash data retrieval webpage at www.vetronix.com/diagnostics/cdr/. For additional articles on the CDR, please visit the National Highway Traffic Safety Administration (NHTSA) site at www-nrd.nhtsa.dot.gov/edr-site/.



Laser Weapons Research - MIRACL

In addition to failure analysis and forensic engineering, SEAL Corporation performs services for various government and industry groups. For example, we have just completed our second contract in support of the U. S.

Army High Energy Laser Systems Test Facility (HELSTF) at the White Sands Missile Range. The work included consulting with regard to hazardous chemicals and laser fluid supply systems, valves, and components for the

MIRACL laser, which stands for Medium Infrared Advanced Chemical Laser.

Within the last few years, the laser weapons research activity within the Department of Defense has advanced rapidly precipitated by the development of the Air Force's Airborne Laser. The Army and Navy are also working on high energy laser systems that have the capability of producing megawatts of energy on target. Targets may be missiles, aircraft, or incoming artillery shells.

SEAL Corporation has its roots in laser research based on the development of the Airborne Laser Laboratory in the 1970s and 1980s. The Airborne Laser Laboratory was successful in shooting down aircraft and missiles and has since been retired and placed in the Air Force Museum at Wright-Patterson Air Force Base. The new airborne laser will be installed in a highly modified Boeing 747 and will be capable of maintaining a holding pattern over a combat zone and providing the capability of destroying SCUD type missiles as they are launched from a particular missile launch area. The missile would be destroyed in its launch phase thereby causing it to fall back into the area from which it was launched. Within the next few years, laser weapons will be a reality. SEAL Corporation is proud to have been a part of this technological development in the past years and pleased to have been involved in the more recent work performed at White Sands Missile Range.

For more information, visit www.airforce-technology.com/projects/abl/.



Life Safety Code

HEADLINE NEWS

February 2003 R.I. Nightclub Fire Kills at Least 54 - "WEST WARWICK, R.I. - A nightclub erupted in flames during a pyrotechnics display at a rock concert, killing at least 54 people and injuring more than 150 as mobs of concert-goers frantically rushed to escape the raging fire."¹

February 2003 Chicago Nightclub Stampede Kills 21 - "Hundreds of screaming guests rushed the exits of a crowded nightclub Monday after someone used pepper spray or Mace, and at least 21 people were crushed to death or smothered in the panic," officials said."²

¹ Associated Press.
Yahoo News. 2003

² Associated Press.
Yahoo News. 2003

These headlines read like the infamous Coconut Grove Nightclub incident of 1942, where 492 people lost their lives in a theater which caught fire. This incident is one of the premises for the NFPA 101 Life Safety Code. Other incidents that helped to develop NFPA 101 are:

1903: Iroquois Theater, Chicago (602 killed)
1911: Triangle Shirt Waist Factory Fire, New York (145 killed)
1942: Coconut Grove Night Club, Boston (492 killed)
1980: MGM Grand Hotel, Las Vegas (85 killed)
1990: Happy Land Social Club, New York (87 killed)

In most of these incidents, the lack of adequate exits were the primary reason for the fatalities. The examples above show how the multiple loss of life can occur when you have a large number of people inside a space, and with few avenues for escape.

The Life Safety Code primarily deals with ensuring that large crowds can safely escape from a building in an emergency such as a fire. Hence it addresses alarms, stairs, exit doors, stair rails, hallway widths, fire ratings, accumulation of combustibles, etcetera. The code was written for the different types of building uses, and the requirements were established to ensure protection measures were commensurate with the hazards. The Code establishes the number of doors, which way they should open as well as the widths of the doorway openings and exit hallways.

One of the most negligent acts an operator of a nightclub or other crowded occupancy can do is to lock exit doors

when the building is occupied. In the mad rush to escape (in an emergency) the converging corridors become a death trap for the occupants when people collect as a mass of bodies pushing their way to perceived safety.

Many times doors are locked for security reasons, panic hardware on a door can provide security as well as a means for escape, as long as it is not locked while the building is in use. Sometimes it is because the egress paths are blocked or improperly identified and lighted so that they are not effective in evacuating large numbers of people.

The NFPA Life Safety Code is a book of lessons learned, and is generally more conservative than most other building and fire codes. Some municipalities have adopted the Life Safety Code, but many times existing buildings are granted exemptions. Nobody should allow doors without panic hardware, doors that open inward or other building features which violate the Life Safety Code in older buildings that house large occupancies. The potential for massive loss of life is much greater and greatly outweighs the cost of retrofitting the egress path. The lessons learned in the previous multi-fatal incidents must not go in vain.

SEAL Corporation has Engineers and Fire investigators that have experience with inspecting, testing and determining whether a building can and does meet the NFPA Life Safety Code.

