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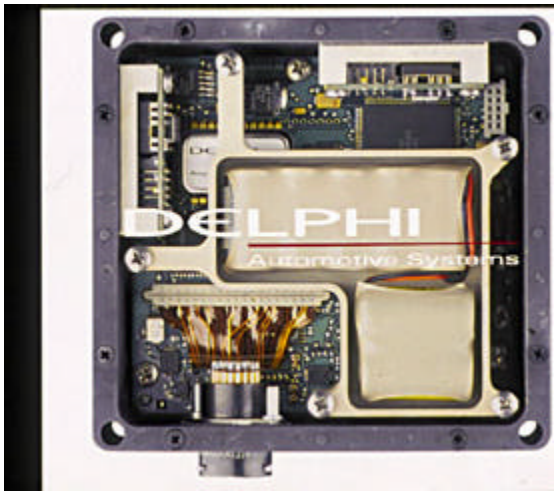

Delphi's second-generation accident data recorder for Indy Racing League cars is lighter, smaller and gathers more information than the model it replaces.

GM Establishes Database for Racing Injuries

New Delphi accident data recorder to be pivotal in research effort

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By Tim Keenan

ORLANDO — While most of the General Motors Racing brain trust was sweating out the final laps of the Delphi Indy 200 at Walt Disney World in late January, at least two GM officials — Thomas W. Gideon and John W. Melvin — were more concerned about the condition of Jaques Lazier and Davey Hamilton.

Long before Robbie Buhl's Oldsmobile Aurora-powered racer passed Eddie Cheever's Nissan Infiniti-equipped car with two laps to go, keeping Oldsmobile's Indy Racing League (IRL) undefeated streak in tact, Messrs. Lazier and Hamilton suffered fractured vertebrae in two separate crashes. They were taken to Orlando Regional Medical center, treated and released.

These incidents came just three weeks after IRL driver Sam Schmidt was rendered quadriplegic from spinal injuries he received in a testing crash at the same track.

Back injuries seem to be the most prevalent maladies for Indy car drivers these days. This is a switch from a dedade ago, when foot and leg injuries were most common. Legendary drivers A.J. Foyt and Rick Mears, still sport metal pins, scars and limps from injuries to their lower extremities.

The switch in the nature of injuries is due largely to more added driver protection at the front of the car.

Mr. Gideon and Mr. Melvin are helping GM establish a database of racing injuries that chassis and safety equipment designers can use to build better race cars and perhaps cut down on back injuries. In the future, Formula 1 and Championship Auto Racing Teams (CART) crash information will be added to the IRL data. The researchers note that information they gather also is likely to improve passenger car safety.

"We tried to model the database after the government database for passenger cars," says Mr. Gideon, safety

manager at GM Racing. "There's no data in the database right now. But we have developed the framework for it to be entered. We're ready to start putting it in."

The database will be uploaded by Wayne State University in Detroit and maintained by the University of Miami in Florida. It will include every scrap of information from a crashed race car's accident data recorder, track-side and in-car video and all medical information about the driver.

GM is spending hundreds of thousands of dollars to fund the research.

"When it's entered, researchers will be able to search by injury type or accident type," explains Mr. Gideon. "These researchers will be looking to understand what happened in these accidents in hopes of preventing the next one."

One of the ways GM will collect this information is with Delphi Automotive Systems' second generation accident data recorder (ADR2). This new "black box" senses and records key vehicle parameters prior to, during and after a racing accident.

The unit is capable of monitoring 10 external sensors that can be placed throughout the vehicle or on the driver. It also measures the rate of yaw in a moving vehicle, plus throttle position and steering angle, synchronizing data-recording activities with a real-time clock to aid in plotting the events leading to an accident.

The unit also features an uninterrupted power supply that allows it to operate even if the vehicle loses power.

The recorder senses and stores the data in memory at a rate of 1,000 samples per second to be retrieved later via a high-speed data link to a personal computer, which is what Mr. Gideon and Mr. Melvin were doing after the incidents during the Orlando race.

"We didn't get to see much of the race," recalls Mr. Melvin.

The new recorder will be on five IRL cars in time for the March 19 race in Phoenix, on half of the field by the Las Vegas race in April and on 70 cars by the Indianapolis 500 in May.

It has many improvements over the previous black box. It's 40% lighter, 45% smaller, offers improved data resolution, has a CAN interface and has an improved internal sensor set that uses a 200-degrees-per-second angular rate sensor and a 500-G accelerometer, both produced by Delphi.

Delphi has been putting accident recorders on race cars since 1993. The information gathered since reveals that human beings are capable of withstanding up to 130 gravitational forces (Gs) as long as they are properly restrained and protected.

"This data shows that people can take more than we once thought," says Mr. Melvin, a bio-mechanics professor at Wayne State who consults with GM on matters of racing safety.

He adds that these measurements have resulted in a number of race car safety improvements. Among the enhancements are higher cockpits with more padding inside the cars to keep drivers' heads in place. Black box numbers also led to crash attenuators and crushable gear boxes at the rear of IRL cars to absorb more energy during impacts.

Many fatal racing injuries occur when a driver's body is securely belted into the car, bucont his head is able to bounce around.

Popular Indy car driver Scott Brayton died May 17, 1996, when he hit the Indianapolis Motor Speedway wall sideways and suffered a fracture at the base of his skull.

"We've seen much more severe side impacts than Scott's with no injury," says Dr. Melvin. "It all has to do with control of the head motion."

A new safety device, likely to debut first in Formula 1 racing, called the HANS (head and neck support) system, keeps drivers' heads in line with their body by strapping their helmets to a stiff collar. The collar is restrained by the shoulder harness.

Other fatal racing injuries, such as those involving Greg Moore, Gonzalo Rodriguez and Jeff Krosnoff occurred when their vehicles turned upside down.

"When a car goes upside down or sideways, or gets in a tree, like Jeff Krosnoff, all bets are off," says Mr. Melvin. "You can't design for that. Indy car crashes tend to be side-to-side.

"This is data you can't get any other way," says Mr. Melvin about the Delphi recorders and the GM-funded database. "We have to have them (recorders) on all of the cars all of the time to get the critical information. It always turns out that more information is better when trying to solve these problems." o