New Technologies: NASCAR Safety R&D Center

THOMAS GIDEON, P.E., IS THE DIRECTOR OF SAFETY, RESEARCH AND DEVELOPMENT (R&D) FOR THE NASCAR R&D CENTER IN CONCORD, NC.

In this interview, Gideon discusses the center’s latest safety advances and their potential application to the manufacture of commercial vehicles.

TPS: Please provide a brief description of your professional background and of your position as director of safety, R&D for the NASCAR R&D Center.

Gideon: I was an engineer for General Motors (GM) from 1969 to 2008 and a safety manager for GM Racing from 1997 to 2008. I have been the director of safety, R&D for the NASCAR R&D Center since 2009. In this position, I oversee safety projects that include chassis structure, crash database and safety inspections.

TPS: What specific safety hazards do professional race car drivers face? Do these hazards change as racing vehicles become more streamlined and high-tech?

Gideon: Drivers face the same hazards they have since racing began. The two main hazards are impact and fire. Modern technology allows us to better sense and react to situations.

TPS: What new safety advances have emerged in professional car racing over the past few years? How have such safety advances been incorporated into the manufacture of commercial vehicles?

Gideon: Three safety advances over the past few years are driver restraint, Steel and Foam Energy Reduction (SAFER) barriers and improved cars.

The driver restraint includes a head and neck restraint to prevent basilar skull fractures, a reinforced seat that limits driver movement and a 6-point harness that limits forward movement in frontal impacts.

The SAFER barrier reduces the deceleration forces involved in wall impacts, which in turn reduce the deceleration the driver experiences.

The car has been improved by moving the driver toward the center, giving the interior more volume and a long list of features that are part of the record.

TPS: How successful are those safety advances that have in fact been incorporated into commercial vehicles?

Gideon: Commercial vehicles are different in construction and usage and therefore have different means to protect the driver. Those safety devices include an easy to use 3-point harness and an airbag restraint.

Race cars operate in a much higher velocity of impact and are more likely to be subject to multiple impacts. The higher velocity requires containment seats, head restraints, full face helmets and 6-point restraints.

These safety improvements would work in a commercial vehicle, but no one would drive them. The airbag does not work in race cars for two reasons: triggering sensitivity and multiple impacts.

TPS: Have NASCAR’s SAFER barriers been used on any U.S. highways? If not, are there plans to do so?

Gideon: The SAFER barriers as they exist at a racetrack are not used on highways. The University of Nebraska (UNL), developer of the SAFER barrier, is involved in design of highway protective barriers. More information can be obtained by contacting Dean Sicking of UNL.

TPS: How is the NASCAR R&D Center’s mantra, “Safety, competition, cost management,” implemented into its daily activities?

Gideon: All the activities at the NASCAR R&D Center have safety, competition and cost in our daily work schedule. We have a director of each activity and all changes in car structure, wall design, racing rules and racing procedures must be considered with all three factors in mind.
have safety, competition and cost considered before implementation.

**TPS:** What do you consider to be the NASCAR R&D Center’s greatest accomplishments?

**Gideon:** NASCAR R&D’s greatest accomplishment is improved safety through an integrated process. The process includes state-of-the-art crash recording, a crash database, outside consultants, contracted safety facilities, state-of-the-art fire, safety rule changes and rescue and a medical liaison working together and communicating every week.

**TPS:** What areas of commercial vehicle safety do you believe could benefit from further collaboration with the professional car racing industry?

**Gideon:** Commercial vehicles and racing vehicles have one thing in common, and that is the methods that measure the safety and restraint of the driver/passenger. The crash test dummies and methods to determine injury are constantly being compared to improve understanding of injury criteria and dummy biofidelity. The data we gather with drivers helps the research community better understand human tolerance to impact forces.

**TPS:** What are the NASCAR R&D Center’s goals and objectives for the year?

**Gideon:** NASCAR R&D will continue to develop the vehicle, the restraint and the SAFER barriers.

Thomas Gideon, P.E., is the director of safety, research and development (R&D) for the NASCAR R&D Center in Concord, NC. He was an engineer for General Motors (GM) from 1969 to 2008 and a safety manager for GM Racing from 1997 to 2008. He holds a B.S. in Mechanical Engineering from Ohio State.

**ISO Standard for Pedestrian Impact Test Drives Progress in Safety**

The number of pedestrian leg injuries caused by dangerous car design should be reduced thanks to an ISO international standard defining a new crash test method. According to World Health Organization, road traffic accidents kill more than one million people a year, injuring another 38 million (5 million of them seriously). The death toll on the world’s roadways makes driving the number one cause of death and injury for people aged 15 to 44.


The goal is to provide information on pedestrian safety to consumers and to induce manufacturers to develop vehicles with excellent pedestrian protection.

Sukhbir Bilkhu, chair of the ISO subcommittee that developed the standard, says, “The pedestrian impact test simulates accidents in which a pedestrian is hit by an oncoming vehicle. These accidents represent about 15% of fatal crashes. Thanks to ISO 11096, we will make substantial progress in improving vehicle structure, and in so doing, reducing pedestrian lower-limb injuries.”

The test will assess the most hazardous areas of the bumper, bonnet leading edge and bonnet of each model. This is done by firing dummy body parts at those areas, simulating accidents at 16 kmh and 20 kmh on an adult pedestrian. The data gathered are then assessed, using internationally recognized protocols, and scores are determined for various parts of the crash test.

This work, based on scientific and biomechanical data gathered in collaboration with experts around the world, will be used by International Harmonized Research Activities Pedestrian Safety Working Group and the World Forum for Harmonization of Vehicle Regulations (WP.29), Pedestrian Safety global technical regulation (PS gtr). It is also helping fulfill the aims of the World Trade Organization Agreement on Technical Barriers to Trade.

ISO 11096:2011, Road vehicles—Pedestrian protection—Impact test method for pedestrian thigh, leg and knee, was developed by ISO technical committee ISO/TC 22, Road vehicles, subcommittee SC 10, Impact test procedures, and is available from ISO national member institutes.