



TRACKS

FMVSS 214 CHANGES

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By late summer we may see significant revisions to Federal Motor Vehicle Safety Standard (FMVSS) Number 214, Side Impact Protection, go into effect for passenger vehicles. The changes would require all passenger vehicles with a gross vehicle weight rating (GVWR) of 10,000 lb. or less to protect front seat occupants against head, thoracic and pelvic injuries in a vehicle-to-pole test. This test simulates a vehicle crashing sideways into narrow fixed objects like telephone poles and trees. TRC Inc. is available now to perform tests to these impending requirements.

Crash data indicate that 35 percent of all serious and fatal injuries to near-side occupants in side impacts occurred to occupants 5 feet 4 inches or less. The U.S. government believes that the use of both male and female

dummies, instead of just the mid-size male dummy, will better represent the at-risk population. For the first time head injury criteria would also need to be met under the standard. Vehicles would need to meet the injury criteria using the new, second-generation test dummies representing mid-size adult males (ES-2re) and a new test dummy representing small adult females (SID-II_sFRG). TRC Inc. has recently added both of these new dummies into our inventory.

Currently FMVSS 214 requires impacting a stationary vehicle with a moving deformable barrier, both at 27 degree crabbed angles. The proposed revision would increase the need from one to two full scale crash tests, along with the current static crush test requirement on complete vehicle or a body-in-white.

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(FMVSS 214...continued)

With all new regulations and safety standards comes the need for increased testing and development. It may not be possible for your company to acquire additional staffing and spend additional capital dollars for in-house testing. TRC Inc. however, can help you through the use of our state-of-the-art crash test facility. TRC Inc.'s comprehensive facility offers 214 side impact, IIHS side impact, 201-pole testing, 208 rollover testing and all four SAE "J" turn, and industry's best practices for other rollover procedures including soil-trip, curb-trip and corkscrew ramp.



FIRST ANNUAL INJURY BIOMECHANICS SYMPOSIUM

Recently we announced that The Ohio State University is collaborating with TRC Inc. to create a nationally recognized center for trauma research to be named the Injury Biomechanics Research Laboratory.

As part of the development of the Injury Biomechanics Research Laboratory, they are teaming with industry and government to host the first annual *Injury Biomechanics Symposium*.

This symposium attendance is open to all interested in injury biomechanics research, and is intended to stimulate and reward strong research among students and recent graduates. Attendees can expect original biomechanics research in a forum intended to foster communication between developing and established researchers. Additional events will include the keynote address by Dr. Albert King of Wayne State University and a tour of test facilities at the Transportation Research Center.

Abstracts for oral presentations and posters have been received from universities in the U.S. and abroad. Topics include research on: test dummies; brain, neck, thorax, leg and knee injuries; intravascular pressure gradients in the liver; finite element analysis of the spine; Shaken Baby Syndrome; and whip-lash.

Industry partners for this event include: Honda Research Americas, NHTSA's Vehicle Research and Test Center, The Ohio State University's Center for Automotive Research, Columbus Children's Hospital Center for Injury Research and Policy and TRC Inc.

Attendee and additional symposium information can be found at <http://medicine.osu.edu/ibr/> or you may call the marketing department at TRC Inc. at 937-666-2011, extensions 354 or 349.



KEEPING UP THE PACE

On Monday, April 11, 2005, *Automotive News*, Cap Gemini, and TRC Inc., will host a reception and ceremony in Detroit, Michigan to honor the 2005 *Automotive News* PACE (Premier Automotive Supplier's Contribution to Excellence) Award winners.



The *Automotive News* PACE Award is recognized around the world as the industry symbol of innovation, with hundreds of automotive suppliers applying to win this distinguished award. The application process is a valuable opportunity for companies to analyze and improve operations and relationships with key constituents. The winners are selected by a

panel of independent judges consisting of former automotive industry executive. The finalists and honorable mention winners enjoy a noteworthy level of distinction and recognition.

This year, 21 companies will compete for awards in four categories, ranging from Product; Product - Europe; Manufacturing Process & Capital Equipment; and Information Technology & Services. The PACE Awards have been a natural tie-in for TRC Inc., as many of the innovations featured are ultimately validated at our proving ground. This sponsorship has also given us the opportunity to support our customers and their efforts in the marketplace by acknowledging their hard work.

Information on the finalists' innovations will be featured weekly in March issues of *Automotive News*. Additional information on the PACE Awards can be found on the web at www.trcpg.com, www.automotivenews.com, and www.us.capgemini.com/pace/ or by calling TRC Inc. at (937) 666-2011, extension 349.



INDUSTRY MEETINGS

SAE's Government & Industry Meeting will be held May 9 - 11, 2005, in Washington, DC. TRC Inc. will be present with leading technical, regulatory and legislative authorities from government, industry and academia as they address the most pressing issues in energy conservation, safety and the environment.

The National Highway Traffic Safety Administration (NHTSA) will host the 19th Enhanced Safety Vehicle Conference in Washington, DC on June 6 - 9, 2005. TRC Inc. will also be there along with representatives from the international automotive

safety community. The conference focus is on reducing highway fatality rates through improvements in crash avoidance, crashworthiness and intelligent transportation systems. The technical sessions will also include discussions on pedestrian safety, biomechanics injury criteria and driver-vehicle safety performance. Along with NHTSA's Garrick Forkenbrock, TRC Inc.'s Bryan O'Harra and Devin Elsasser co-authored a paper to be presented entitled, "NHTSA's Light Vehicle Handling and ESC Effectiveness Research Program."



MONITORING YOUR DURABILITY TESTING

How can TRC Inc. assure you that your testing is being performed both efficiently and accurately? Driving over six million test miles a year on both our proving ground and public roads, we rely on measurable data. For test verification we utilize a Somat-based data acquisition system known as the Testing Parameter Compliance System (TPCS) that can help assure proper correlation of test programs to our customers' driving cycles. Currently the TPCS can support accelerometers, engine speed sensors, wheel speed sensors, engine and transmission temperatures, global positioning sensors, and other customer-specified measurements on a test vehicle and its components. Data is time-stamped and downloaded at the end of every shift and is analyzed by our engineers and technicians. Any vehicle performance issue that may arise can then be relayed directly to our customers for resolution.

Aside from the obvious issues of driver performance, the TPCS has many other uses. Most notably, the ability to identify a major product failure so a resolution can be made before the vehicle hits production.

For example, we detected a clutch slippage and automatic transmission performance problem where the vehicle speed and transmission speed did not properly match up. Additionally, we pinpointed the exact event's location on our test courses that provided additional insight into cause and nature of the component failure. To allow for total confidentiality, as with all of our customer-sensitive data, all stored data is cleared from our records at your predetermined time frame following test completion. If you would like to know more about our TPCS system, see a demonstration, or learn how it could benefit your testing, please call us for your next test.



WE CONGRATULATE and CELEBRATE SAE

1905 - 2005....and beyond. The Society of Automotive Engineers, nka SAE, at 100 years old, is a true cornerstone of the global automotive OEM, shaping a century worth of transportation events, people, and technological advancements. TRC Inc. is proud to sponsor dozens of memberships for our employees in SAE and participate in numerous industry-wide events annually. TRC Inc. wouldn't miss the opportunity to meet with 35,000 of the most influential professionals from the OE and supplier community, so we will be staffing booth 307 at the International Congress & Exposition that will take place April 11-14, 2005, in Cobo Center, Detroit, Michigan.

TRC Inc. staff has contributed to this event through the authoring of papers that will be presented there:

- Paper # 2005-01-0303: "Hybrid III 5th Female Neck Test Rotation Measurement," co-authored by TRC Inc. Virginia L. Watters and Jason D. Jenkins and Denton ATD Inc.'s John D. Below and Paul J. Depinet.

- Paper #2005-01-0397: "Braking of Commercial Vehicles Equipped with Air-Disc Brakes from High Speed - Effects on Stopping Distance," authored and presented by Scott B. Zagorski, and co-authored by Ashley L. Dunn, Transportation Research Center Inc.

- Paper #2005-01-0413: "Development of a Heavy Truck ABS Model," Brian Zaugg, Dennis A. Guenther, Gary J. Heydinger, The Ohio State University; Ashley L. Dunn, Scott B. Zagorski, Transportation Research Center Inc., and Paul Grygier, National Highway Traffic Safety Administration.

- Paper #2005-01-0395: "Vehicle On-Center Directional Sensitivity," Mohamed Kamel Salaani, Transportation Research Center Inc.; Gary J. Heydinger, The Ohio State University; and Paul A. Grygier, National Highway Traffic Safety Administration.

Others active as organizers and chairpersons for technical session activities include Janice K. Cooper, Mark Heitz, and Kenneth W. Webster II.

This year brings TRC Inc. staff special recognition for its efforts in the form of the Arch T. Colwell Merit Award to Garrick J. Forkenbrock and Dr. W. Riley Garrott, National Highway Traffic Safety Administration; and TRC Inc.'s Bryan C. O'Harra and Mark Heitz, Transportation Research Center Inc. Their paper, "An Experimental Examination of J-Turn and Fishhook Maneuvers That May Induce On-Road, Untripped, Light Vehicle Rollover," was written and presented at the SAE 2003 World Congress. This award annually recognizes the authors of papers of outstanding technical or professional merit presented at a meeting of the Society or any of its sections during the calendar year.



KEEPING THE RUBBER SIDE DOWN



Good things happened on our highways between 1992 and 2002 that resulted in the decrease of fatal large truck fatal crashes by 29%, and in the decrease of fatal passenger vehicle crashes by 23%. Those figures are astounding, and you, the designers, manufacturers and regulators of the automotive industry, are to be congratulated for being the primary catalysts. With such improvements, one has to marvel toward the future for advancements in vehicle stability control systems, tires, suspensions, brakes, steering systems, fluids, sensors and warning systems.

Trucks ship freight and must be able to do it rapidly and safely. In addition to concerns for human safety, payloads can range from mangos to magnetic resonating instruments, all of which need to be transported very carefully. TRC Inc. can help determine the effects of heavy-duty vehicle handling, dynamic and control systems in numerous ways. Some applicable International Standards Organization (ISO) tests on our register include:

ISO 3888 lane change and ISO 4138 steady-state-circular test procedures are commonly used to evaluate the following:

Maximum lateral acceleration — affected by suspension compliance, camber changes resulting from body roll, tire design and pressure, lateral weight transfer and steering gradient.

Roll stiffness (body roll angle per unit of lateral acceleration) — affected by vertical center of gravity, spring rate, location of roll center and anti-roll bar stiffness.

Steer gradient (understeer/oversteer) — affected by steering and camber changes resulting from suspension compliance and body roll, tire design and pressure.

ISO 7401 lateral transient response (step, pulse, and slalom steering maneuvers) test procedure is commonly used to evaluate the following:

Yaw response — affected by vehicle moment of inertia, steer gradient, body roll rate, vertical center of gravity, steering and camber changes resulting from suspension.

Body roll rate — affected by location of roll center, vertical center of gravity, compliance of tires and suspension, and roll stiffness added by anti-roll bars.

Lateral acceleration response — affected by vehicle moment of inertia, steer gradient, body roll rate, vertical center of gravity.

TRC Inc. can develop a proprietary testing matrix, provide qualified test drivers and perform mechanical inspections, build-ups and repairs. Capabilities include:

- Rental and installation of safety outriggers, roll over protection systems, and anti-jackknife restraints.
- Rental and installation of load frames and ballast.
- Rental and installation of instrumentation to record the following parameters: Yaw Rate, Roll Rate, Pitch Rate, Roll Angle, Lateral Acceleration, Longitudinal Acceleration, Vertical Acceleration, Steer Angle, Steer Torque, Vehicle Speed, Global Position, Temperatures, Force, Pressures.

Our extensive test facilities are available to help you perform your testing on-time in a confidential environment.

