TRC® TRACKS

TRC's TOY BOX

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Remember when you were seven years-old and went to play at a new friend's house? Can you recall the excitement at the opportunity to get to play with a bunch of new toys? That memory is easy to evoke at TRC Inc. because our proving grounds are like a toy box that just keeps expanding! We really don't mean to brag, but we've got some really cool, new stuff that may just help you get your job done easier, faster, and better!

Topping our new toy list is the robot steering controller for use in the New Car Assessment Program (NCAP) Rollover Procedure for dynamic rollover resistance rating testing. TRC Inc. has been awarded a contract with the U.S. Department of Transportation to conduct this test on a number of vehicles. This dynamic test uses a handling maneuver in which the steering path is similar in shape to a fishhook. The steering controller, or "robot", is used to ensure consistent and accurate performance of the maneuver using a programmed steering profile. Activated by a dual-button switch on an auxiliary steering wheel, this device allows the test driver to instantly relinquish or regain the steering control of a vehicle to and from a computerized robotic system. Dual height sensors mounted on a bearing at each wheel's outboard position are used to accurately determine if wheel lift occurs. The test is performed to determine if at least two inches of wheel lift occurs for two wheel positions while consistently performing the fishhook maneuver at speeds at or below 50 mph.

This controller, designed and manufactured by SEA, Ltd. of Columbus, Ohio, will be easily programmable allowing it to be used for a wide range of handling maneuvers which will provide repeatable and reliable testing and data for both R&D studies and litigation. We expect this new equipment to be here late Spring, so if you have any interest in having TRC Inc. provide you with this type of test support, please let us know as soon as possible so we can get you on our test schedule. We will showcase the steering robot in our booth 307 at the upcoming SAE International Congress & Exposition.

Thanks to a new passenger vehicle-rated Noise, Ride Harshness and Vibration (NVH) course, the original course adjacent to the Vehicle Dynamics Area can now be used by heavier vehicles. Although not new, the roadways are now rated to handle 30,000-pound vehicles. There are seven parallel roads with varying lengths of seam slap; highway edge-warning grooves; a variety of length and height undulations dips, and bumps; surfaces of tar and chip; and three intensities of concrete and granite belgian block courses. Please visit our website at www.trcpg.com for a closer look at these courses.

Speaking of weighty issues, our 2.4-mile Inside Gravel Road now has a weight rating of 80,000 lbs, up from 8,000 lbs. This means that heavy vehicles have yet another course inside the large oval track at TRC Inc. to help prove their vehicles durability performance. Although all of TRC Inc.'s courses have weight limits, we will always evaluate requests for heavier vehicle weights.

TRC has improved our remote visual inspection capabilities with the acquisition of an Olympus Advanced 6mm IPLEX videosope. The IPLEX system is a portable, self-contained imaging system that can digitally record still and movie images. The IPLEX system can be used for non-intrusive inspection and rating of critical vehicle components such as engines, transmissions cases, and exhaust aftertreatment components.

Automotive News PACE™ AWARD

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TRC Transportation Research Center Inc.

We don't mind fooling Mother Nature! For pass-by wind effects on the handling of vehicles of all sizes, we've even created our own North Winds with six crosswind generators (CWGs) on the Skid Pad. Speeds have been clocked at 50 mph for vehicle path lengths from 4 meters (13 ft.) up to approximately 21.3 meters (70 ft.).

SAE WORLD CONGRESS 04

Every new year brings new engineering improvements. This year's best innovations will again be displayed at the SAE 2004 World Congress. The Congress should be densely populated with over 38,000 of your peers, business partners, industry visionaries, technology leaders, and educators from around the world.

TRC Inc. will again help change the face of the industry by co-authoring papers and exhibiting the latest technologies in testing. Displaying our ability to conduct the new National Highway Traffic Safety Administration's (NHTSA) New Car Assessment Program (NCAP) Rollover Procedure will be our new robotic steering controller. It will be used for the conduct of fishhook and other handling tests. Please stop by the TEST Pavilion, booth 307, to view this system and to learn more about our capabilities. We will also have our exciting new corporate image video tapes playing that will show you the latest changes to our facilities and capabilities.

The following technical papers at the 2004 Congress have been co-authored by TRC Inc. engineers and staff:

Derivation and Validation of a New Analytical Model for a Multi-Axle Articulated Vehicle
co–authored by Ashley L. Dunn, Transportation Research Center Inc.

A Study of Jackknife Stability of Class VIII Vehicles with Multiple Trailers with ABS Disc/Drum Brakes
co–authored by Scott Bradley Zagorski – Transportation Research Center Inc.(TRC Inc.) & Gary J. Heydinger – The Ohio State University (Ohio State).

Closed Loop Steering System Model for the National Advanced Driving Simulator (Written Only — No Oral Presentation)
Mohamed Kamel Salaani, TRC Inc.; Gary J. Heydinger, Ohio State; Paul A. Grygier, National Highway Traffic Safety Administration (NHTSA).

On-Center Steering Performance Measures
Mohamed Kamel Salaani,TRC Inc.; Gary J. Heydinger, Ohio State; Paul A. Grygier, NHTSA.

Derivation and Validation of a New Analytical Model for a Multi-Axle Articulated Vehicle
Ashley L. Dunn, TRC Inc.; Gary J. Heydinger, Giorgio Rizzoni, and Dennis A. Guenther, Ohio State.

Application of the Extended Kalman Filter to a Planar Vehicle Model to Predict the Onset of Jackknife Instability
Ashley L. Dunn, TRC Inc.; Gary J. Heydinger, Giorgio Rizzoni, and Dennis A. Guenther, Ohio State.

You may have noticed Ashley (Al) Dunn's name referenced on several of the aforementioned papers. A recent graduate of The Ohio State University, Dr. Dunn was awarded the 2003 Society of Automotive Engineers (SAE) Myers Award for Outstanding Student Paper entitled "New Model for Simulating the Dynamics of Pneumatic Heavy Truck Brakes with Integrated Anti-Lock Control."

NEW FUEL INTEGRITY CRASH TEST REQUIREMENTS

TRC Inc. is prepared to perform the upgraded U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) FMVSS 301 rear and side impact tests. The changes are expected to help reduce the chance of post-crash vehicle fires, saving between 8 to 21 lives annually.

The changes include a new high-speed, moving barrier rear crash test at 50 mph, instead of the previous moving barrier crash test at 30 mph. The new rear crash test is an offset test in which the crash forces are directed on 70 percent of the rear of the vehicle, rather than striking the entire rear portion of the vehicle. Also, the new rear crash test uses a lighter deformable barrier which is more representative of a typical vehicle's front structure.

Additionally, the changes affect the FMVSS 301 side impact fuel system integrity test. The change eliminates the use of a flat rigid barrier striking the test vehicle straight from the side at 20 mph, and incorporates the side fuel system integrity assessment into the 33.5 mph FMVSS 214 Side Impact test.

Manufacturers will be given until Model Year 2009 for full compliance with the new rear impact requirements and until Model Year 2005 for full compliance with the new side impact requirements. The regulation applies to all passenger cars, light trucks, sport utility vehicles and buses weighing less than 10,000 pounds. TRC Inc.'s Impact Laboratory is ready to conduct these tests to assess the performance of your fuel system!

KEEPING PACE WITH THE INDUSTRY

There's nothing quite like being appreciated and recognized for outstanding effort. On March 8, 2004, recipients of the 2004 Automotive News PACE Awards will be announced at an awards ceremony at the Detroit Opera House. PACE is an acronym for Premier Automotive Suppliers' Contributions to Excellence. The PACE Awards honors automotive suppliers who have embraced innovation or adapted and reinvented themselves to meet the demands of the orginal equipment manufacturer customer. Twenty-three finalists are in the running for a 2004 *Automotive News* PACE Award. TRC Inc. has been a primary sponsor of the PACE Awards for the last three years. The awards are a natural tie-in for TRC Inc. as many of the innovations featured are ultimately validated at our proving ground. This also gives us the opportunity to support our customers and their efforts in the marketplace by acknowledging their hard work. Additional information on the PACE Awards may be found on the web at www.trcpg.com, www.automotivenews.com and www.cgey.us.com/pace or by calling us at (937) 666-2011.

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