Overview of Heavy Truck Handling Dynamics and Control

Session Code: HTS100
Room Michelin Conference Center - Energy Session Time: 8:30 a.m.

Stability Control systems are now being introduced on commercial vehicles in the U.S., primarily on truck tractors and motorcoaches. Roll stability control (RSC) systems help to prevent rollover crashes and electronic stability control (ESC) systems help to prevent both rollover and directional loss-of-control crashes. NHTSA has been studying the performance and effectiveness of these systems since 2006, and has conducted performance testing on several truck tractors and motorcoaches at the agency’s Vehicle Research and Test Center in East Liberty, Ohio. This presentation will summarize the heavy vehicle stability control research that has been conducted and the agency’s plans for rulemaking.

Organizers - Mehdi Ahmadian, Virginia Tech.

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<tr>
<th>Time</th>
<th>Paper No.</th>
<th>Title</th>
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<tbody>
<tr>
<td>8:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Heavy Trucks Handling, Dynamics, and Control: Past, Present and, Future Mehdi Ahmadian, Virginia Tech.</td>
</tr>
<tr>
<td>9:15 a.m.</td>
<td>ORAL ONLY</td>
<td>Five Years of Research on Heavy Vehicle Roll Stability by the National Transportation Research Center Inc. Douglas Pape, Battelle Memorial Institute; Michael Arant</td>
</tr>
</tbody>
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Planned by Heavy Truck Handling Committee / EMB Land and Sea Group

Tuesday, May 15

HTH Rule Making

Session Code: HTS200
Room Michelin Conference Center - Energy Session Time: 10:30 a.m.

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<tbody>
<tr>
<td>10:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Status of NHTSA Research and Rulemaking on Heavy Vehicle ESC Bob Kreeb, NHTSA</td>
</tr>
<tr>
<td>11:15 a.m.</td>
<td>ORAL ONLY</td>
<td>Federal Motor Carrier Safety Administration’s Update on Onboard-safety systems research priorities Cem Hatipoglu, Federal Motor Carrier Safety</td>
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</tbody>
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Planned by Heavy Truck Handling Committee / EMB Land and Sea Group

Tuesday, May 15

The Role of Suspension and Tires

Session Code: HTS300
The National Transportation Research Center Inc. (NTRCI) organized a team to carry out a multi-year study of heavy vehicle stability and dynamics. The team studied the effects of tire selection, trailer torsional compliance, and suspension design on the tractor-trailer's roll stability. Experiments were conducted with a van trailer, a loaded and unloaded flatbed, a tank trailer, and a longer combination vehicle. The benefits of design changes were compared with those of electronic stability systems, through testing, analysis, and simulation modeling. Vehicle measurements were taken on a tilt table, a kinematics and compliance machine, test tracks, and a public highway. Maneuvers included open- and closed-loop paths ranging from simple curves to aggressive double lane changes. There was also a special study of run-off-road recovery.

Organizers - Mehdī Ahmadian, Virginia Tech.

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<tr>
<th>Time</th>
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<tr>
<td>1:30 p.m.</td>
<td>ORAL ONLY</td>
<td>Mobility of Military Vehicles at TARDEC</td>
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<td>Amandeep Singh, US Army TARDEC</td>
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<tr>
<td>2:15 p.m.</td>
<td>ORAL ONLY</td>
<td>The State of the Art and the Future of New Generation Wide Base Single Tires</td>
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<td>Matthew Barrett, Michelin Americas R &amp; D Corp.</td>
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Planned by Heavy Truck Handling Committee / EMB Land and Sea Group

Wednesday, May 16

Chassis Control Systems

Session Code: HTS400

Room Clemson ICAR - AT&T Auditorium Session Time: 8:30 a.m.

Organizers - Mehdī Ahmadian, Virginia Tech.

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<tr>
<td>8:30 a.m.</td>
<td>ORAL ONLY</td>
<td>Commercial Vehicle Chassis Control Systems</td>
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<td>Daniel Williams, TRW COMMERCIAL STEERING</td>
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<td>9:15 a.m.</td>
<td>ORAL ONLY</td>
<td>Commercial Vehicle Active Safety Systems</td>
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<td>Alan Korn, Meritor Wabco</td>
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Planned by Heavy Truck Handling Committee / EMB Land and Sea Group

Wednesday, May 16

Modeling and Testing

Session Code: HTS500

Room Clemson ICAR - AT&T Auditorium Session Time: 10:30 a.m.

Stability Control systems are now being introduced on commercial vehicles in the U.S., primarily on truck tractors and motorcoaches. Roll stability control (RSC) systems help to prevent rollover crashes and electronic stability control (ESC) systems help to prevent both rollover and directional loss-of-control crashes. NHTSA has been studying the performance and effectiveness of these systems since 2006, and has conducted performance testing on several truck tractors and motorcoaches at the agency's Vehicle Research and Test Center in East Liberty, Ohio. This presentation will summarize the heavy vehicle stability control research that has been conducted and the agency's plans for rulemaking.

Organizers - Mehdī Ahmadian, Virginia Tech.

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Stability Control systems are now being introduced on commercial vehicles in the U.S., primarily on truck tractors and motorcoaches. Roll stability control (RSC) systems help to prevent rollover crashes and electronic stability control (ESC) systems help to prevent both rollover and directional loss-of-control crashes. NHTSA has been studying the performance and effectiveness of these systems since 2006, and has conducted performance testing on several truck tractors and motorcoaches at the agency’s Vehicle Research and Test Center in East Liberty, Ohio. This presentation will summarize the heavy vehicle stability control research that has been conducted and the agency’s plans for rulemaking.

Wednesday, May 16

Control and Testing

Room Clemson ICAR - AT&T Auditorium

10:30 a.m. ORAL ONLY Assessment of Ride in a Heavy Commercial Truck using Numerical Simulation Methods and Correlation with Test Results
Arvind Kumar Jain, Ashok Leyland, Ltd.; Sathish Madaswamy, Commercial Vehicle Manufacturer; Sudarsanam S, Venkat Srinivas, Ashok Leyland, Ltd.

11:00 a.m. ORAL ONLY A New H2/H Multi-Objective Based Optimal PI controller for Rollover Control
Jian Zhao, Jilin Univ.; Saied Taheri, Virginia Tech.

11:30 a.m. ORAL ONLY Remote Measuring and Analysis of a Variety of Vehicular Field Data Obtained Unobtrusively from an Over-the-Road Tractor
Edwardm Dewitt, Navistar Inc.

Planned by Heavy Truck Handling Committee / EMB Land and Sea Group

Wednesday, May 16

Control Discussion

Room Clemson ICAR - AT&T Auditorium

10:30 a.m. ORAL ONLY Active Steering of Heavy Goods Vehicles
David Cebon, Univ. of Cambridge

11:00 a.m. ORAL ONLY Objective analysis of the stability of an extra-legal weight tractor trailer combination during a rapid air loss (RAL) event
Jeffery Anderson, Michelin; Ryan J. Pawlowski, Michelin Americas R & D Corp.

Planned by Heavy Truck Handling Committee / EMB Land and Sea Group
3:00 p.m. ORAL ONLY Predictive Vehicle Stability Control with Tire Force Saturation Management
Justin H. Sill; Beshahwired Ayalew, Clemson Univ.

3:30 p.m. ORAL ONLY Methodologies for Heavy Truck Ride Correlation between Subjective and Objective Assessments
Sathish Madaswamy, Commercial Vehicle Manufacturer; Venkat Srinivas, Ashok Leyland, Ltd.; Anandhakrishnan Baskaran, Anandha Krishnan Baskaran; Sudarsanam S, Ashok Leyland, Ltd.

4:00 p.m. ORAL ONLY Roll Center Measurement of Heavy Trucks for Optimization of Cabin Handling Perception
Venkat Srinivas, Sudarsanam S, Ashok Leyland, Ltd.; Anandhakrishnan Baskaran, Anandha Krishnan Baskaran

4:30 p.m. ORAL ONLY The Comparative Testing of a Single and Double Ride Height Control Valve Suspension Control Systems
Shane Richardson

Planned by Heavy Truck Handling Committee / EMB Land and Sea Group