

**LOG OF MEETING
DIRECTORATE FOR ENGINEERING SCIENCES**

SUBJECT: Recreational Off-Highway Vehicles (ROVs) – Meeting requested by the Recreational Off-Highway Vehicle Association (ROHVA) to discuss vehicle handling.

DATE OF MEETING: December 9, 2009

PLACE OF MEETING: U.S. Consumer Product Safety Commission, Bethesda, MD

LOG ENTRY SOURCE: Caroleene Paul, ESME *CP*

COMMISSION ATTENDEES: See attached attendance list

NON-COMMISSION ATTENDEES: See attached attendance list

SUMMARY OF MEETING:

Representatives of the Recreational Off-Highway Vehicle Association (ROHVA) met with CPSC staff to discuss technical issues related to vehicle steering and handling. This meeting was requested by ROHVA in response to CPSC staff's position that the voluntary standard for ROVs should include steering characteristic requirements to ensure that ROVs understeer in a turn.

Mr. Brett Gass, an engineer with Polaris Industries with experience in vehicle dynamics, made a presentation on ROVs and vehicle handling. Mr. Gass made the following points and conclusions:

- The SAE J266 constant radius test is not an accurate predictor of ROV handling
- Tires are a key factor in managing vehicle handling and tires for off-road use are not necessarily suitable for paved surfaces
- An understeer requirement would eliminate many typical tire and driveline configurations for ROVs (such as solid rear axles)
- An understeer requirement may introduce unintended consequences such as poorly designed tires and loss of path following capability
- Oversteer is needed at times for mobility and traction
- Vehicles may be modified to meet paved surface testing specifications but may induce unacceptable off-road performance
- Despite extensive research there is no data or body of evidence to incorporate a federal standard

John Zellner, of Dynamic Research Institute (DRI), made a presentation on understeer and oversteer. Mr. Zellner made the following points and conclusions:

- SAE J670 defines oversteer and understeer
- The tests used to determine understeer and oversteer are steady-state conditions and real-life accidents are transient events

- The handling diagram that CPSC staff provided in its draft comment letter to ROHVA shows an understeering and oversteering vehicle. Both vehicles can be induced to spin-out by transient steer or throttle input
- Soft surface environments are not measurable
- Frantz and Breen (2008) found that novice drivers did not express a comfort level below 5 (on scale of 1 to 10, ascending comfort level) while driving an oversteer vehicle on a closed loop course. There were also no overturns or loss of control.
- NHTSA used over 100,000 data points and logistic regression to correlate SSF to risk of rollover. CPSC's 181 incidents is too small to do similar or meaningful analysis. The 181 incidents have not been sorted by: type of accident, surface type, terrain (grade), vehicle loading, accident mechanism, mis-use factor, operator age and gender, and vehicle make, model, and year.

CPSC staff questioned ROHVA's assertion that an understeer requirement may result in unintended safety consequences and that oversteer is a preferable characteristic in certain off-road conditions. The ROHVA technical representatives cited loss of path capability and poor tire design as unintended consequences of understeer. They also cited the need to spin for mobility as examples of desirable oversteer in a vehicle.

CPSC staff clarified that staff understands severe understeer is not desirable; that is why staff is talking about a range of understeer that is desirable. CPSC staff asked if ROHVA intends to develop a steering requirement.

The ROHVA legal representatives replied that ROHVA does not intend to develop a steering requirement based on lack of data. ROHVA would like to continue dialogue with the CPSC, and if a correlation between oversteer/understeer and accidents/safety emerges ROHVA would want to know about it.

CPSC staff acknowledged that there is a substantial disagreement between the ROHVA and the CPSC staff about the hazards associated with an oversteering vehicle, the need for a steering requirement, and the feasibility of test methods to evaluate steering.

CPSC staff requested a copy of the presentation for the public record. The ROHVA legal representative said that they did not intend to make the presentation available at this time.

MEETING ATTENDANCE RECORD
ROHVA / CPSC Staff – December 9, 2009

COMMISSION ATTENDEES:

NAME	ORGANIZATION	PHONE	FAX	E-MAIL
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