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Society of Automotive Engineers (SAE) Annual Congress Review

SAE 2004 World Congress was held in March 8-11, 2004, in Cobo Center, Detroit, Michigan USA, with the slogan, “The premier society dedicated to advancing mobility engineering worldwide.” In the session of Safety Test Methodology (Part 3 of 3, Session Code: B15) that was planned by Occupant Protection Committee / Automobile Body Activity, the presentation of “Proposed Upgrade to Federal Motor Vehicle Safety Standard (FMVSS) 202 – Head Restrains: Methodology and Equipment” by the speaker, Helen A. Kaleto[1], was interesting because this paper proposed modifications and enhancements of the current FMVSS, "Head Restraints." According to her, the current standard which was established in 1971 and last amended in 1998, needs to be supplemented to prevent or reduce the frequency of whiplash injuries which occur as a result of the movement of the head and neck relative to the torso. From the description and comparison of the current requirements and the proposed, it was shown that the proposed requirements enhanced current safety requirements and established new criteria. For the dynamic sled test, one of two test options to evaluate products upon the standard, for example, the current standard requires the head reference line with respect to torso reference line to be less than 45°, while the proposed requires it to be less than 12° for 50th percentile and 20° for 90th percentile of populations. Also, width requirements were newly proposed for the dynamic sled test. For the static rearward moment test, the other method of evaluation, which is preferred by National Highway Traffic Safety Administration (NHTSA), dynamic component tests were added so that criteria for energy absorption, height retention, displacement, backset strength, and dynamic sled were newly introduced, while criteria for head rest location, height, head rotation removal, and dynamic sled were modified. All criteria were accompanied by introduction of test equipment and test description, so that it would be easy to set up a test. The proposed requirements would upgrade the current standard by requiring head restraints to be higher, closer to the head, and be available in front and rear outboard positions. She said that the final rule was expected to be released by Sep. 1. 2004, thus, vehicle produced after sep. 1. 2007 would have to meet this requirement. Until then, either of current FMVSS 202, the Economic Commission for Europe Regulation No. 25 (ECE-25) plus 202A width requirement, or FMVSS 202A (proposed) should be satisfied, which allows to predict modifications to the new requirements and test procedures. She added that the final rule would be a challenge for industry, both from a design and test perspective, which could be a drawback of the proposed requirements. This paper was along the line with other papers in terms of dealing with safety test methodology, and similar to focus on drivers’ safety as same as Patel[2] and Paulitz[3], which was different from Deb, et al[4] that considered pedestrian impact testing and Rehkopf[5] that dealt with material characterization testing.

Another presentation by Biren J. Patel[2], in the same session, identified 11 rollover resistance test methodologies and 9 rollover performance test methodologies in his paper, such as drop test, corkscrew test, ditch test, soil trip, and numerical modeling. It seemed that test methods had not been guaranteed technically so far and needed to be identified

and standardized. The presentation by Dirk Paulitz[3] was about door latch. In the paper, applied force to a door latch during rollover was analyzed based on component analysis of a latch, and vulnerability of door latches to rollover induced loads was tested for several cars. This paper seemed to be a lab oriented study which required strong backgrounds in dynamics. The other two presentations were "Effects of Unloading and Strain Rate on Headform Impact Simulation" by Anindya Deb[4], and "Material Behaviour for Modelling Bumper Impact" by Jackie D. Rehkopf[5]. These presentations addressed head interior and pedestrian impact testing, and material characterization testing and modeling. Throughout the presentations, auditors seemed to be interested in what the speaker said, but not to be bothered to leave and come whenever they wanted to. Some questions asked after each of the presentation sounded planned and serious, and the general impression about the session was that it was quite formal so that it was not in a free mode for both sides (speaker and auditors) interacting during the presentation.

From the exhibition, helmet mounted display which detected head movement by an accelerometer, presented by United States Army NAC (National Automotive Center), was interesting. National Instruments (NI)'s 8-minute presentation/advertisement/tutorial of LabView followed by a lottery was exciting. NI's displace measurement system by vision information from a camera, even for a fast changing displacement, was impressive. VIA Information tools Inc. showed 3D printer that printed a 3D object made of powders, as well as providing a self-balancing two-wheel ride. Vicon Motion System presented the motion capture system that detected motion using light-reflectors as HUMOSIM had. A vision guided robot by Braintech was also interesting and I thought it would be useful in real factories. I enjoyed seeing new techniques/products and experiencing each of them. Compared to the technical session, the exhibition was more exciting, fun, friendly, and experiencing. However, some exhibitors seemed to hesitate to approach people around. I guess it is because they were not marketing people/sales representatives, but engineers. But they were much better at explaining the principle of their products. In general, it was a great experience, and it was special because it is the first professional conference I have ever been to.

Reference

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2. Patel, Biren J., Patrick J. Atkinson, (2004), Toward A Definition of Test Methodology for Rollover Resistance and Rollover Performance, (SAE paper 2004-01-0736), Warrendale, PA: Society of Automotive Engineers
3. Gilberg, Andrew N., Richard H. McSwain, Dirk Paulitz, (2004), Door Latch Vulnerability to Rollover Induced Loads (SAE paper 2004-01-0737), Warrendale, PA: Society of Automotive Engineers
4. Deb, Anindya, Umesh Biswas, Clifford C. Chou, (2004), Effects of Unloading and Strain Rate on Headform Impact Simulation, (SAE paper 2004-01-0738), Warrendale, PA: Society of Automotive Engineers
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