



Thursday, May 26, 2011
Oak Ridge Chapter of ASM International's
Awards Night

“Improved Understanding of Helmet Impacts and Head Injuries using Combined Rotational Motion Theory”

Mr. Dave Halstead Research Scientist/Faculty and Director of the University Of Tennessee College of Engineering, Sports Biomechanics Impact Research Laboratory

For many years rotational accelerations have been considered as being responsible for the most damaging type of tissue distortion given a similar energy input compared to linear accelerations yet the mechanics and measurement methods have been poorly understood. Dave Halstead, participating in a research group, replicated helmet damage from a case study and found a required impact velocity that resulted in less than 80g's. Given the current knowledge in the field about the risk of brain injury, an impact of that magnitude should not have resulted in the injuries. By incorporating shoulder impact, the presence of large inbound rotational accelerations prior to the impact followed by large outbound rotational accelerations post impact were discovered. The impact was 80g's in magnitude but the combined inbound and outbound rotations were in excess of 12,000 radians per second squared. Additionally further experimentation showed that the linear event did not always correlate to the peak rotational time. This is a critical finding in the understanding of brain injury as almost every event involves the head in motion, to some degree, prior to impact, followed by the post impact kinematics. The timing of these events must be explored further. The effect of this combined rotational motion theory must be modeled. Dave will present the details of this study.

Speaker Bio

Dave is currently a Research Scientist/Faculty and Director of the University Of Tennessee College of Engineering, Sports Biomechanics Impact Research Laboratory. Dave performs research, testing and data review as part of the injury reduction efforts of the University of Tennessee Engineering Institute for Injury and Trauma Prevention where he is a Principle Scientist. Dave is a member of the Industrial Engineering faculty at UT.

Dave is also Technical Director for the Southern Impact Research Center, LLC. SIRC offers consultation in the areas of product design, testing and evaluation, risk management, litigation support and quality systems. SIRC's international customer list includes companies like Adams USA, Bell, Nike, XFL, Specialized and others. SIRC also designs and builds product test systems. Dave is the holder of several product patents and serves on several committees.

Registration (Guests Welcome!)

<http://www.discoveret.org/orcasm/events.html>

Cost: \$20 for dinner

Students: Free if RSVP; \$5 if RSVP late

RSVP by noon on Tuesday May 24th

Contact: Melanie Kirkham

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Rothchild's Conference Center

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Thursday, May 26th Schedule

5:30 pm– Social Hour

6:30 pm– Dinner

7:30 pm– Awards and Talk