THE WILLIAM E. BOEING DEPARTMENT OF

AERONAUTICS & ASTRONAUTICS

... welcomes ...

NORMAN M. WERELEY

UNIVERSITY OF MARYLAND

Oh, My Aching Back! - Protective Aircraft Seat Design Using Magnetorheological Systems

The ability to dissipate energy in vehicle systems, especially with the goal of protecting occupants from potentially injurious vibration, repetitive shock, crash and blast loads, is becoming a critical issue as the cumulative impact of these load spectra on chronic health and acute injury are becoming better understood. Energy is dissipated utilizing a stroking element, such as a hydraulic damper or energy absorber. However, it is difficult to anticipate precisely what range occupant mass an isolation system might be expected to protect, or what vibration and shock spectra the system might encounter. Therefore, adaptation of stroking load is required to enable a system to have sufficient adjustability or control capability to effectively dissipate energy across a wide range of anticipated and even unanticipated disturbances. The goals of this research are threefold: (1) to develop field dependent or controllable energy absorbing materials, especially magnetorheological (MR) fluids, (2) to develop magneto-rheological energy absorbers (MREAs) to enable adaptation of stroking load in order to minimize lumbar loads in the human spine and thereby minimizing the potential for injury, and (3) to protect occupants or payloads from a wide range of vibration and shock spectra, as well as to accommodate a population of occupants of different mass. Applications to crew seating and landing gear in rotorcraft will be discussed. The transition of these protective seat technologies to ground vehicles and high speed boats will also be discussed.

The William E. Boeing Chair's Distinguished Seminar Series brings scholars of national and international reputation who have made an impact in the field of aerospace engineering and beyond. This seminar series will cover a diversity of topics of current interest to those in academia, industry and the general public. It is our hope that these monthly seminars will encourage an exchange of ideas and bring aerospace engineering and science to the forefront.

WILLIAM E. BOEING
DEPARTMENT OF AERONAUTICS & ASTRONAUTICS
UNIVERSITY of WASHINGTON

Monday, February 27, 2017 @ 4:00pm
Electrical Eng. Bldg. Rm 105 | UW Seattle

Visitor RSVP: contact@aa.washington.edu

THE WILLIAM E. BOEING DEPARTMENT OF
AERONAUTICS & ASTRONAUTICS

... Distinguished Guest Speaker ...

NORMAN M. WERELEY
UNIVERSITY OF MARYLAND

Minta Martin Professor and Chair
Dept. of Aerospace Engineering

Dr. Wereley's research interests are in dynamics and control of smart structures applied to helicopters and other aerospace and automotive systems, with emphasis on active and passive vibration isolation, shock mitigation (especially occupant protection systems), and actuation systems. Dr. Wereley has published over 210 journal articles, 16 book chapters, and over 275 conference articles. Dr. Wereley is an inventor on 20 patents and several patents pending. Dr. Wereley is Editor of the Journal of Intelligent Material Systems and Structures and associate editor of Smart Materials and Structures and AHS Journal. He is the recipient of several awards including AIAA National Capital Section Engineer of the Year (2009), AIAA Sustained Service Award (2011), the AHS Harry T. Jensen Award (2011), and the ASME Adaptive Structures and Materials Systems Best Paper Award in Structural Dynamics and Control (2004, 2012). Dr. Wereley is also the recipient of the ASME Adaptive Structures and Material Systems Prize (2012) and the SPIE Smart Structures and Materials Lifetime Achievement Award (2013). Dr. Wereley is a Fellow of AIAA, ASME, SPIE, and the Institute of Physics. He is also a Senior Member of IEEE and a lifetime member of AHS. Dr. Wereley has a B.Eng. (1982) from McGill University and M.S. (1987) and Ph.D. (1990) from the Massachusetts Institute of Technology.

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