Abstract Title: Smart Materials and Structures: State of the Art and Applications

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Abstract

The world of materials is an exciting and challenging field of research since it has always played a dominant role in the evolution of human civilization. The demands from diverse industrial branches (aerospace, automotive, defence, etc.) on much more advanced materials has led to the development of a new generation of materials surpassing conventional structural and functional materials and thus, the era of smart materials has started. Typical smart materials retain the ability to change their physical properties in a specific manner in response to a specific stimulus input.
However, there is still a blurry image over the types and potential applications of smart materials. Moreover, smart materials and structures research includes many technically diverse fields that it is quite common for one field to completely misunderstand the terminology and start of the art in other fields.
The purpose of this study is to better define the smart materials and structures field, its current status and its potential benefits. Results are presented and discussed. Finally, in order to demonstrate the characteristics of one class of smart materials, a numerical example is proposed and results are presented.

Keywords— *Actuators and sensors, piezoelectric materials, shape memory alloys, smart materials*

Professional Biography (100-150 words)

Dr. Nader Ghareeb has completed his PhD in April 2013 from the RWTH Aachen University of Technology in Aachen, Germany. He is now working as an assistant professor in the mechanical engineering department at the Australian College of Kuwait (ACK). His research interest includes modelling and active control of smart structures, multi-body simulation and blast simulation.



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