Xuan Li, J Aeronaut Aerospace Eng 2014, 3:2
http://dx.doi.org/10.4172/2168-9792.S1.004

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Mechanical & Aerospace Engineering
September 08-10, 2014 Hilton Philadelphia Airport, USA

A wireless fatigue monitoring system combined with innovative damage estimation algorithm

Xuan Li
Dalian University of Technology, China

Fatigue has long been a threatening issue for critical structures such as aircraft and railway system, which makes the on-line fatigue monitoring especially essential for these components. In this paper, we have developed an *in-situ* wireless real-time fatigue monitoring system which could provide instant feedback as well as precise fatigue estimation. In this system, the Rain-flow counting (RFC) method is adopted as the core algorithm which quantifies fatigue damages, and Digital Signal Processing (DSP) is embedded as the core module for data collection and analysis. With strain gauge and Polyvinylidene Fluoride (PVDF) sensors, our system could record the strain history of certain structures and provide a quick update of fatigue estimation. In addition, a damage estimation algorithm using Kalman filter has been attached to our system. This algorithm could realize full-scale strain monitoring of structures with data from limited positions. The accuracy of the system and algorithm has been examined with a truss structure under laboratory conditions. With the merits of low cost, high accuracy and great reliability, we believe this wireless fatigue sensing system could be further applied in aerospace engineering, mechanical engineering, civil infrastructures, etc.

Biography

Xuan Li is currently pursuing his MD at Dalian University of Technology. He also works as a research assistant in the Key laboratory of structural monitoring and control for civil infrastructures of Liaoning Province. With several papers published, he has been devoted in the research of Structural Health Monitoring (SHM) covering wireless sensing system, data mining and sensor optimized placement.

milanlx1988@hotmail.com