Structural Health Monitoring of Ship Structures

Erkan Oterkus(erkan.oterkus@strath.ac.uk), Selda Oterkus
University of Strathclyde

Abstract

Marine environment is one of the harshest environments in the World and can cause substantial damage to ship structures in the form of fatigue, corrosion, etc. Such damages can jeopardise the safety of ships which might yield significant human and financial loses. Hence, it is essential to continuously monitor the ship structures, so that necessary actions can be taken before catastrophic failure occurs. A sophisticated structural health monitoring (SHM) can be used for this purpose. In this presentation, we will demonstrate such a tool as a combination of two novel methodologies of our time; iFEM [1,2] and peridynamics [3-5]. iFEM processes the collected discrete strain data from sensors located at different parts of the ship structure and converts this data into a continuous data in terms of displacements, strains and stresses. By using this data, a decision can be made regarding the health and safety of the ship structure. Therefore, iFEM can be an invaluable tool for the diagnosis element of SHM system. On the other hand, peridynamics can serve as the prognosis element of SHM system, so that by using peridynamics, we can make future predictions about how a damage can evolve and how much time it can take for it to reach a catastrophic damage state. During this presentation, we will provide some background information about iFEM and peridynamics and show how they can be used for the analysis of ship structures.

References

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Biography

Dr. Erkan Oterkus is an associate professor at University of Strathclyde, Glasgow. He is also the director of newly established PeriDynamics Research Centre (PDRC).

Dr. Selda Oterkus joined the department of Naval Architecture, Ocean and Marine Engineering at University of Strathclyde as an assistant professor in August 2015. She is also the vice-director of PeriDynamics Research Centre (PDRC).