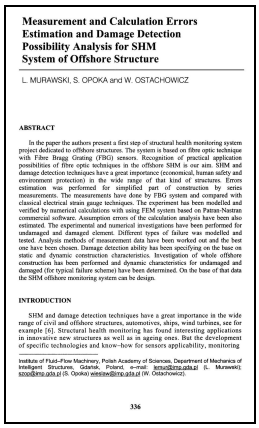

Measurement and Calculation Errors Estimation and Damage Detection Possibility Analysis for SHM System of Offshore Structure

L. MURAWSKI, S. OPOKA and W. OSTACHOWICZ

ABSTRACT

In the paper the authors present a first step of structural health monitoring system project dedicated to offshore structures. The system is based on fibre optic technique with Fibre Bragg Grating (FBG) sensors. Recognition of practical application possibilities of fibre optic techniques in the offshore SHM is our aim. SHM and damage detection techniques have a great importance (economical, human safety and environment protection) in the wide range of that kind of structures. Errors estimation was performed for simplified part of construction by series measurements. The measurements have done by FBG system and compared with classical electrical strain gauge techniques. The experiment has been modelled and verified by numerical calculations with using FEM system based on Patran-Nastran commercial software. Assumption errors of the calculation analysis have been also estimated. The experimental and numerical investigations have been performed for undamaged and damaged element. Different types of failure was modelled and tested. Analysis methods of measurement data have been worked out and the best one have been chosen. Damage detection ability has been specifying on the base on static and dynamic construction characteristics. Investigation of whole offshore construction has been performed and dynamic characteristics for undamaged and damaged (for typical failure scheme) have been determined. On the base of that data the SHM offshore monitoring system can be design.

INTRODUCTION

SHM and damage detection techniques have a great importance in the wide range of civil and offshore structures, automotives, ships, wind turbines, see for example [6]. Structural health monitoring has found interesting applications in innovative new structures as well as in ageing ones. But the development of specific technologies and know-how for sensors applicability, monitoring

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Ключевые слова:

Содержание.