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INTERNATIONAL CENTRE FOR MECHANICAL SCIENCES

COURSES AND LECTURES - No. 334

**STOCHASTIC APPROACH TO FATIGUE:
EXPERIMENTS, MODELLING
AND RELIABILITY ESTIMATION**

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PREFACE

Fatigue fracture of engineering materials has been recognized as an important cause of failure of such engineering structures as: aircrafts, vessels, road vehicles, cranes etc. However, fatigue is a very complicated process that is difficult for accurate description and prediction. Because of the inherent randomness found in fatigue data it is no doubt nowadays that a fatigue of real materials should be regarded as a random phenomenon and analysed by use of the stochastic theory. Today, the stochastic approach to fatigue is perceived as important and challenging task in mechanics and structural/mechanical reliability.

The CISM course and the presented volume of the lecture notes have been intended to summarize the latest achievements in stochastic modelling and analysis of fatigue. The lectures cover all main aspects of fatigue, namely: methodology of stochastic modelling of fatigue, tools for characterization of random fatigue loads, physical and mechanical aspects of stochastic fatigue crack growth, basic stochastic models for fatigue and the estimation of fatigue reliability of specific structural systems. The proposed lecture notes should be of interest to engineers and researches in industry and at universities who want first-hand information on the present status and trends in this rapidly developing field of engineering science.

Finally, I wish to express my thanks to the authors for their efforts in presenting the lectures and preparing the manuscripts for publication. In this context I additionally would like to thank Dr. I. Rychlik and Mr. Mats Frendahl from the University of Lund (Sweden) for their kindness in undertaking the arduous task of preparing the last, camera-ready, version of the lectures of Prof. Bolotin. Of course, many thanks are also due to CISM for its hospitality and excellent organization of the course.

Kazimierz Sobczyk

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