

Preface

Today, the analysis of experimental vibration is necessary in order to calculate the natural frequencies of a system, a structure or a mechanism, and the response to the expected excitation. In this way it can determine whether a particular system, structure or mechanism will fulfill its intended function. In addition, the results of the dynamic loadings acting on a structure can be predicted, such as the dynamic stresses, fatigue life and noise levels. Hence his usefulness can be maximized and maintained. From the analysis it can be seen which structural parameters most affect the dynamic response so that if an improvement or change in the response is required, the structure can be modified in the most economic and appropriate way. The methods also made important great strides. Indeed, the vibratory analysis is not one simple complementary tool. It is the base of many powerful techniques which make it possible for example to probe the structures or the interior even of materials during their service, to detect the defects and the damages and to follow their evolution in real-time, ... the vibratory analysis is in particular today present in the various branches of industry of aeronautics at the car while passing by machining, maintenance or civil engineering, which made of this special issue a need.

This scientific topic leading industrial and academic researcher's community, concerned by experimental vibration analysis, has taken positive steps in recent years to develop more comprehensive and rational procedures for dynamic assessment and it was therefore considered appropriate to bring together all the original research paper that has been presented in the 4th colloque "Analyse Vibratoire Expérimentale". Modal analysis, vibration-based condition monitoring, damage detection and localization, experimental/numerical combined approach, physical experiments with advanced computational methods investigations, and their various engineering/industrial applications are included in this MATEC Web of Conferences proceeding. Accordingly, all the papers on Experimental Vibration Analysis have been included in this MATEC Web of Conferences proceeding after completing a careful and rigorous peer-review process by the scientific committee.

Although these papers do not make an exhaustive treatment of all of the experimental vibration analysis topics, they reflect different interesting issues that have constituted important points of concern for researchers in this area.

I trust that this document will contribute to disseminate the current trends and topics of interest in this fascinating and fast growing area, that it will be a valuable tool in your research and professional activity and invite you to join our Community.

Roger SERRA

MATEC Proceeding editor