MATERIAL IDENTIFICATION USING MIXED NUMERICAL EXPERIMENTAL METHODS

Material Identification Using Mixed Numerical Experimental Methods

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Edited by

H. Sol Faculty of Applied Sciences, Free University of Brussels, Belgium

and

C.W.J. Oomens Mechanical Engineering Department, Eindhoven University of Technology, The Netherlands



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PREFACE

Euromech 357 took place in the nice authentic monastery 'Rolduc' in Kerkrade, Holland. The objective was to bring together researchers to present their latest advancements in the relatively new domain of <u>Material</u> properties identification by <u>Mixed</u> Numerical Experimental <u>Methods (MMM)</u>.

MMM are a modern and increasingly powerful way to determine the values of unknown parameters in a numerical model by observations made on real physical test structures. Starting from the measurement of output values (like displacements, stresses, velocities, vibrations,...) of the real physical test structure, MMM try to update parameters in the numerical model in such a way that the computed observations match the experimental observations. It was shown clearly at the colloquium that the combined use of numerical analysing tools and sophisticated measurement techniques has created an extra degree of freedom for the design of experiments and has led to new approaches for material characterisation. The colloquium was attended by 39 participants coming from 12 different European countries.

We had 23 oral presentations on the different topics of the above mentioned sessions. Each presentation was followed by an intensive discussion. Due to the informal atmosphere and the limited number of participants, the discussions were very lively and fruitful. The opportunity to continue to discuss common problems after dinner in a reserved place was also offered to the Euromech participants. This opportunity and the fact that the monastery was isolated (nobody could escape!) created an excellent platform for discussions and personal contacts.

The second day, a poster session was organised in the evening. The goal of the posters was to serve as a starting point for discussions for those participants who could not give an oral presentation. (The number of presentations was limited in order to create much time for discussions).

As a result of the final discussion the last day, a permanent research group MMM was created for which 16 participants offered active co-operation. The main goals of the Research group MMM are to offer a permanent discussion platform, to write lecture notes on some important common topics and to organise workshops (possibly an other Euromech colloquium) in the future.

The common important scientific conclusion of the colloquium was that the necessary demand for success of MMM is a very accurate numerical model of the experimental set-up and a sufficiently accurate constitutive model to describe the material behaviour. Moreover, the experimental observations have to contain sufficient information to be enable to estimate the parameters. The question is which criterion can be used for this decision and how observability can be improved. Other topics were the weighting of different types and numbers of observations and the way to perform a sensitivity analysis of the experimental set-up. The research group MMM will work out an in depth analysis of these statements.

Hugo Sol, Cees Oomens

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