

EUROMECH-MECAMAT Conference No. 7 (EMMC7)

“Adaptive Systems and Materials: Constitutive Materials and Hybrid Structures”

This international conference was held between the 18 and the 23th may 2003, in the “Villa Clythia” belonging to the CAES of the french “Comité National de la Recherche Scientifique CNRS” at Fréjus (France).

The scope of this EMMC7 conference was about the use of smart materials which permits the conception of some adaptive systems for industrial applications. A special attention was devoted to active and passive controls of damping in structures. The use of this new class of materials (shape memory alloys, piezoelectric ceramics, TRIP steels, ferromagnetic shape memory alloys, ...) implies the development of numerical tools for computer assisted design process.

Complexity of the involved material behaviour requires a deep understanding of strain mechanisms (martensitic phase transformation, reorientation process of domains), the use of accurate experimental techniques and advanced modelling approaches at various scale (micro, meso, macroscopic).

In this purpose, it is necessary to use some coupled calculations connecting different fields of physics such as thermal, electromagnetism, electricity and mechanics of materials ones.

The conference topic gave the opportunity of fruitful discussions between the mechanics of materials community and the specialists of damping or passive control.

The scientific program contains nine oral sessions and one poster session.

- Experimental characterization of the shape memory alloys thermomechanical behavior (two sessions)
- Modeling of the shape memory alloy thermomechanical behavior (two sessions)
- Ferromagnetic shape memory alloys behavior (one session)
- Piezoelectric ceramics behavior (one session)
- Transformation induced plasticity steel behavior (one session)
- Hybrid structures including smart materials as sensor or actuator (one session)
- Adaptive structure for vibration control (one session)
- Poster session.

The conference programm contains 50 lectures. 57 scientists were present and come from 14 different countries: 20 from France, 7 from Germany, 6 from Italy, 4 from Russia, 4 from Finland and 5 from USA...

This scientific programm allows all the participants interesting exchanges on “the state of art” about smart materials and adaptive systems.

In the aim of its publication in the Proceedings of the EMMC7 Conference (EDP Sciences “Journal de Physique IV”) each paper was expertised by two reviewers belonging to the International Scientific Committee and also other specialists.

On that occasion, we will thank them for their very important contribution of the scientific level quality of the Proceedings.

We will also thank: the sponsors of the Conference: Délégation Générale aux Armements (DGA), le Ministère de la Recherche, l'Université de Metz, l'ENSAM, le CNRS, l'Association Française de Mécanique et l'Institut des Microtechniques de Franche-Comté, the members of the organizing committee, the MECAMAT committee for trusting us, EDP Sciences for the Proceedings, The "Villa Clythia" team for his nice help in the material organization,

... and all the participants.

The Co-chairmen,

Christian LEXCELLENT et Étienne PATOOR