

Media Release

Dübendorf, March 16, 2006

ETH professor appointed head of new laboratory at Empa

«As an engineer I can play a part in society»

“I see it as my mission to understand and describe the mechanics of innovative materials and material systems, allowing them to be transformed into new and useful products.» This is the mission statement issued by Prof. Dr. Edoardo Mazza, who since January 1st has been at the helm of Empa’s new laboratory of Mechanics for Modelling and Simulation.

Edoardo Mazza was born in 1969 in Tirano, just on the Italian side of the Swiss-Italian border, as he notes. He decided quite early that he wanted to study mechanical engineering sciences in Zurich. What attracted him to Zurich was this city’s «international flair»; what he hoped to gain from engineering was a broad «culture». He concluded his time at ETH by graduating in engineering, with conspicuous success: his doctoral thesis on the mechanics of micro-structures was awarded the ETH Medal.

Dedicated to research and teaching

As the initial part of his academic career ended in 1997, Mazza moved into industry. His first appointment was as a group leader at Alstom Power, in charge of the development of steam turbines. Although there were «also research opportunities» and he «enjoyed himself enormously working in industry», he returned to ETH Zurich in 2001, as an assistant professor in mechanics. He preferred, as he states emphatically, to be committed to «engineering research» as a professor than to pursue a career in management. He then had four years to show what he was capable of, until 2005, when the board of ETH appointed him Associate Professor of the Department of Mechanical Engineering and Process Technology. His duties include the delivery of one basic and one specialist lecture every semester, and he enjoys good relationships with his students and doctorate supervisees.

In his research work, Mazza’s «daily bread», as he puts it, his activity consists of finding solutions to engineering problems in continuum mechanics (i.e. the mechanics of ductile bodies). Once the mechanical properties of a material have been characterized experimentally, computer models for the simulation of structures and components can be derived.

ETH professorship and Empa head of department

Edoardo Mazza has had contacts with Empa over a number of years. In projects dealing with turbo machines such as turbines and motors he joined forces with the Empa Center for Non-Destructive Testing in order to analyze the mechanical integrity of the components used, investigating whether these components are negatively affected with respect to their mechanical reliability and function. For three years now one of his PhD students has been working at Empa in the area of electro-active polymers (EAP), which are plastics that change shape when an electrical current is passed through them. An exchange of ideas between Empa, the management of ETH and Mazza finally gave rise to the idea of combining his professorship with a new Empa laboratory tailored to his specialism. And this is what happened as, on 1st January 2006, he took up his new appointment. The laboratory name «Mechanics for Modelling and Simulation» expresses the value that Mazza places on mechanics. It is a fundamental discipline of the engineering sciences, and, he explains, he wanted to use «this cultural treasure», namely the knowledge obtained from mechanics, to determine the mechanical laws of new materials through experimentation and theoretical approaches. The reliability and functionality of components and structures could then be optimized with these models.

Two-year plan of departmental expansion

Edoardo Mazza intends to take advantage of Empa's close links with industry and the opportunity of collaborating with experts in the field of materials development and characterization to carry out successful research with real-life relevance. He has already identified various «fields of play» at Empa for his research group, in three main areas of activity: The first of these concerns the mechanical integrity of materials and structures with respect, for example, to components designed for high-temperature applications, or for use in high-performance switches and in nano- and micro-systems technology. Another field is the contributions made by his team to the functionality and reliability of innovative material systems and intelligent structures, plus – thirdly – Mazza's research into the mechanical properties of soft organs in the human body. His tissue modelling, which is based on data collected in the course of open surgical operations on such organs as the liver, is useful for the diagnosis, simulation and planning of surgical interventions. The formation of his Mechanics laboratory is set to be complete by the end of 2007. Each field of research focuses on experimental approaches, thus ensuring that the formation phase covers new equipment for experimental examinations.

Edoardo Mazza will also be taking on, as of mid-2006, the management of Empa's research program into adaptive material systems. «I am particularly looking forward to taking on this challenge, convinced as I am of the importance of the objectives that have been set by the current program manager Prof. Urs Meier.» Mazza will also investigate these subjects in greater depth in his research group. He is thinking in particular of the challenges presented by the modelling and simulation of

adaptive material systems; he is already working successfully in this field with the Empa Materials and Engineering laboratory under Giovanni Terrasi.

For further information:

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His new mission lets Edoardo Mazza view the future with optimism.