

Media communiqué

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Empa-scientist Urs Meier honored with international Fellowship-Award

Award for Empa Bridge Monitoring Technology

For his pioneering efforts in the use of carbon fiber reinforced polymers in civil engineering structures, the ex-director of Empa, Urs Meier, has been honored with an international «Fellowship-Award». The International Society for Structural Health Monitoring of Intelligent Infrastructure (ISHMII) awarded the prize at the end of 2007 for the first time to four researchers in total – from China, Japan, the USA and Switzerland.

“There is never just a single person behind such a distinction,” says Urs Meier, modestly. “There is always an institute that had faith in the development work and the scientific personnel who played their part in it too.”

The Fellowship Award of the International Society for Structural Health Monitoring of Intelligent Infrastructure (ISHMII) is therefore not just recognition of his work alone but far more that of an Empa team effort. The organization has long been involved in research and development programs in the field of monitoring civil engineering structures, and this will remain a focal point in future too. Currently scientists drawn from several Empa laboratories are working together in an interdisciplinary fashion in the Adaptive Material Systems Research Program on new monitoring systems and technologies. Much of this work still is based on innovations initiated by Urs Meier.

No bridges without monitoring

It was in 1996 that Meier, together with his then scientific staff and doctoral students, for the first time replaced several steel cables on a bridge with carbon fiber reinforced polymer (FRP) composites. An FRP bundle has a diameter of five to seven millimeters and consists of 400,000 individual carbon fibers. Because such cables were being used for the first time, when they installed the new system on the Stork Bridge in Winterthur, Switzerland, Empa scientists had to simultaneously provide a method of monitoring them too. „The Winterthur town council was thrilled to give us permission to fit their bridge with CRP cables for the first time in the world, but only if we took full responsibility!“ comments Meier wryly.

This meant naturally that a suitably novel monitoring system had to be developed too, since for example the conventional strain-gage based measuring techniques could not be used because of the very large lateral pressure near the anchoring points of the FRP cables. Meier had the idea of inserting single optical fibers into the carbon bundle to act as sensors which would then provide the required data on the state of health of the cable to the monitoring system. He approached Empa’s Electronics, Metrology and Reliability Laboratory

under the leadership of Urs Sennhauser and was able to take advantage of the expertise of Philipp Nellen, Rolf Broennimann and their colleagues in the field of fiber optic sensors. This expertise was then successfully applied to Meier's civil engineering application. The system has proven its worth over the last ten years, providing long-term practical experience which is of great future importance to Empa.

Empa is organizing the next international conference

Advances in the world of civil engineering continue, of course, and in future too it will be necessary to develop systems for the monitoring the health of structures. To promote and establish such efforts and to encourage the exchange of expertise at an international level are therefore the primary aims of the ISHMII, which was, founded in 2003. To this end the technical association organizes a conference every two years, the next being held from July 22nd to 24th 2009 at the ETH Zurich – under the chairmanship of Urs Meier.

Further information

Prof. Urs Meier, Tel. +41 44 823 41 00, urs.meier@empa.ch

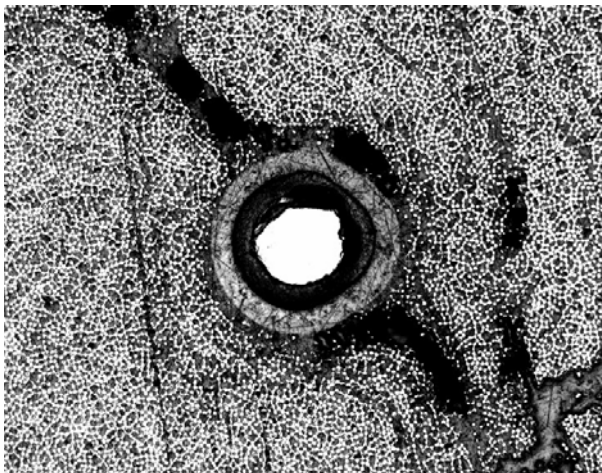
Homepage of the International Society for Structural Health Monitoring of Intelligent Infrastructure (ISHMII):
www.ishmii.org



The prizewinners: Empa Fellow Urs Meier (left) with the three other award recipients, Jan-Ming Ko of the Hong Kong Polytechnic University, Emin Aktan of Drexel University (USA) and Yozo Fujino of the University of Tokyo together with (middle) Aftab A. Mufti, ISHMII President.



FRP cable with fiber optic sensors in the middle



A fiberoptic sensor (white point, diameter 5 microns) surrounded by carbon fibers, imaged using a scanning electron microscope.

