

OSKAR VON MILLER FORUM

Press Release

High performance materials made of concrete

A lecture by Martina Schnellenbach-Held, University of Duisburg-Essen, on June 22, 2017 at 6:30 p.m. at the Oskar von Miller Forum

Concrete is a material that has been used successfully and in a variety of ways for centuries. The development of construction methods using reinforced concrete and pre-stressed concrete has enabled us to construct buildings and supporting structures that achieve ever-greater heights and spans. The development of high-performance concrete and ultra-high performance concrete (UHPC) has achieved strength levels that actually make it possible to replace steel with concrete in special applications. Given the considerable disadvantages of steel, such as a great tendency to corrode, high electrical and thermal conductivity and low resistance to high temperatures, current research is investigating approaches to manufacture machine components made of ultra-high performance concrete.

Today, increasing demands are being placed on the functionality of materials. Concrete should not only be able to bear greater loads but also to take on additional functions – thermal insulation, sound insulation, fire protection, etc. To provide these functions, a high-performance aerogel concrete (HPAC) was developed at the Institute of Concrete and Masonry Structures at the University of Duisburg-Essen in cooperation with the Institute of Materials Research at the German Aerospace Center (DLR) by embedding fused-quartz aerogel granules into UHPC matrices. This material meets the requirements of the Energy Conservation Ordinance (ENEV) in single-shell applications even using comparatively small component thicknesses accommodating construction-relevant compressive strengths.

Martina Schnellenbach-Held will present this new HPAC material that offers excellent structural properties and load-bearing capacity. In addition, she will describe the research conducted to develop appropriate concrete formulas and a concept for manufacturing concrete cogwheels and roller bearings.

About

After earning her degree in civil engineering, Univ.-Prof. Dr.-Ing. Martina Schnellenbach-Held worked as a structural engineer in building engineering and civil engineering and as a project, group and construction manager in building construction for Philipp Holzmann AG at its Düsseldorf headquarters. She was a professor at the Institute of Concrete and Masonry Structures at the Technical University of Darmstadt from 1997 until 2004. In 2004, she declined an appointment for a professorship in concrete and masonry structures at the TU Berlin.

She has been head of the Institute of Concrete and Masonry Structures (University of Duisburg-Essen) as a professor since April 2004. The Institute's testing hall is unique in Germany given its large equipment and testing instruments. She is a member of several national and international committees and professional associations and of the Expert Committee for the Reinforcement of Concrete Components of the Deutsches Institut für Bautechnik (DIBt). She has authored more than 150 publications in national and international journals, conference transcripts, report portfolios and books.