

2019 Federal Garden Show: Pavilion Made of Recycled Materials

KIT Department of Architecture Presents Building Entirely Made of Secondary Raw Materials



The Mehr.WERT.Pavillon at the 2019 BUGA in Heilbronn consists of reused and recycled materials. (Photo: 2hs/Zoöey Braun)

Natural resources become scarcer. At the Federal Garden Show (BUGA) 2019 in Heilbronn, Karlsruhe Institute of Technology (KIT) shows how existing resources can be used sustainably for construction purposes. Students, researchers, and teachers of the KIT Department of Architecture designed and built a pavilion from recycled and reused materials. On May 2, 2019, 14.00 hrs, the Mehr.WERT.Pavillon will be opened officially by Baden-Württemberg State Minister for the Environment Franz Untersteller and Wilfried Hajek, Mayor and Senior Planning Officer of the City of Heilbronn.

The pavilion is part of the Mehr.WERT.Garten (which may be translated by Added.Value.Garden), a joint project of the Baden-Württemberg Ministry of the Environment and the waste management facilities of the city of Heilbronn. "We seized the opportunity and created a pavilion at BUGA Heilbronn that illustrates which resources contained in our waste may be used for the construction sector," Minister Franz Untersteller says.

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The pavilion demonstrates innovative and reasonable use of recycled resources. All materials used in the project have already passed one lifecycle at least and will be separated from each other after the disassembly of the pavilion at the end of the show. No adhesives, foams, paints or other impregnation substances are used. "Sustainable architecture has to be attractive and relevant. In the construction sector in particular, rethinking is possible, because here circular economy can be established today already. We only have to want it and to do it," says Dirk E. Hebel, Professor for Sustainable Construction at KIT.

For the construction of the pavilion, the team used various groups of materials for the structure, facade, floor, and furniture: the load-bearing structure is completely made of reused steel originating from a dismantled coal-fired power plant in North Rhine-Westphalia. "Apart from a precise visual inspection to detect potential damage of the elements, we tested the steel for tensile strength, elasticity, resilience, and chemical composition together at our laboratories and the KIT Research Center for Steel, Timber, and Masonry," says Karsten Schlesier, who conducts research in the Sustainable Construction Group of KIT. The façade consists of recycled glass which was processed further to two different construction materials: glass ceramics based on molten transparent white or green bottle glass and foam glass, a light, but stable insulation material.

The floor of the pavilion as well as the landscape design of the garden combines various mineral materials: crushed concrete and tiles of various grain sizes, broken porcelain, directly reusable bricks, and waste-based bricks, i.e. bricks made of mineral building rubble. The furniture and internal constructions are made of various plastic materials. For the counter, the architects used recycled white cotton and denim fibers, the worktop consists of recycled cutting boards. Stools and chairs were printed three-dimensionally using plastic household waste.

The building was designed jointly by students of KIT and its Sustainable Construction (Professor Dirk E. Hebel), Load-Bearing Constructions (Professor Matthias Pfeifer), and Building Technology (Professor Rosemarie Wagner) groups. "The Mehr.WERT.Pavillon uses materials from the existing urban mine, but also represents a stock of materials that will be available for reuse again after the federal garden show," says Felix Heisel, who coordinates the research activities of the Sustainable Construction Group.

Information on the “Mehr.WERT.Pavillon“ Project

The project is managed by the waste management facilities of the city of Heilbronn, the Ministry of the Environment, Climate Protection, and the Energy Sector of Baden-Württemberg, and the Bundesgartenschau Heilbronn 2019 GmbH. The pavilion was designed by Lisa Krämer, Simon Sommer, Philipp Staab, Sophie Welter, Katna Wiese, Felix Heisel, Karsten Schlesier, and Professor Dirk E. Hebel of KIT's Sustainable Construction Group. Professor Rosemarie Wagner, Construction Technology Group, assisted in static form-finding. Planning, static calculation, and construction of the pavilion were accomplished by the Büro 2hs Architekten und Ingenieur PartGmbH. The test engineer was Professor Matthias Pfeifer of KIT. The object was built by AMF Theaterbauten GmbH, electrical and illumination systems were planned by Udo Rehm/FC-Planung GmbH. Other project partners are GreenCycle GmbH, Der Grüne Punkt – Duales System Deutschland GmbH (DSD), and SER GmbH.

More information on the Mehr.WERT.Pavillon:

<http://nb.ieb.kit.edu/?cat=49>

More information on Mehr.WERT.Garten:

<https://mehrwertgarten.um.baden-wuerttemberg.de> (in German)

Being “The Research University in the Helmholtz Association,” KIT creates and imparts knowledge for the society and the environment. It is the objective to make significant contributions to the global challenges in the fields of energy, mobility and information. For this, about 9,300 employees cooperate in a broad range of disciplines in natural sciences, engineering sciences, economics, and the humanities and social sciences. KIT prepares its 25,100 students for responsible tasks in society, industry, and science by offering research-based study programs. Innovation efforts at KIT build a bridge between important scientific findings and their application for the benefit of society, economic prosperity, and the preservation of our natural basis of life.

This press release is available on the internet at http://www.sek.kit.edu/english/press_office.php.

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This year's **anniversary logo** recalls the milestones reached by KIT and its long tradition in research, teaching, and innovation. On October 1, 2009, KIT was established by the merger of its two predecessor institutions: the Polytechnic School and later University of Karlsruhe was founded in 1825, the Nuclear Reactor Construction and Operation Company and later Karlsruhe Research Center in 1956.