

Mehr.WERT.Pavillon [EN]

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Year of commitment : 2019



999 999 €

GENERAL INFORMATION

This project was awarded the Sustainable Infrastructure Grand Prize of the Green Solutions Awards 2020-21, at both the national and international levels.

The Bundesgartenschau (BUGA; means: Federal Garden Exhibition) 2019 in Heilbronn was for the first time both a garden and an urban exhibition. The newly

built Neckarbogen district, which had already been partially realised by the time the exhibition opened, will henceforth serve as a test bed and laboratory for new urban development scenarios that focus on the highest standards and qualities of living for a socially diverse population in a densely populated central urban environment. In this context, it was deemed necessary and relevant by those in charge to also initiate new thinking regarding resource consumption in construction and to leave behind the current linear throwaway mentality. To this end, the BUGA management, together with the city of Heilbronn and its recycling companies, commissioned the Faculty of Architecture at KIT Karlsruhe, under the leadership of the Chair of Sustainable Building Council, to plan a pavilion that approached the question of resources in a new way. The content of the exhibition inside the pavilion was presented and operated by the Baden-Württemberg Ministry for the Environment, Climate and Energy Economy from April to October 2019. The building proved that it is already possible today to design and realise sophisticated architecture entirely from the materials of the urban mine, and to apply the principles of the circular economy in its construction without compromise.

On the one hand, the pavilion used the existing urban mine as a source of raw materials: all materials used in the project have already gone through at least one life cycle and were either reused or recycled. On the other hand, the pavilion serves as a future sorted material store that can be made available again for future constructions at the end of the exhibition. The materials used for the construction were all selected according to these requirements and joined only with the help of detachable, mechanical connections, so that they can be completely reused or recycled without any loss of value. However, the structure was so convincing that it has now been completely relocated for the time being after the end of the exhibition and will continue to exist for a few more years near its original location - as a material storage facility, social meeting place and physical proof that it is already possible to build in a cycle-friendly manner today.

The pavilion uses four different families of materials to differentiate its main elements in terms of construction and design:

1. The façades and roof are designed with glass panels made from recycled used glass and industrial glass waste. In terms of design, the panels are reminiscent of "foliage" that has been attached to the branches of the structure. The majority is made of MAGNA glass ceramic panels. In their production, glass fragments are melted and combined to form a new type of material that varies in colour and transparency. Products made of recycled glass foam, which are actually used for thermal insulation (Foamglas) or acoustic improvement (Reapor), were also used.
2. The load-bearing structure is largely made of recycled steel taken from a decommissioned and now demolished coal-fired power station in north-west Germany. The main structure is formed by four inclined supports fanning out like trees, connected by the rigid steel frame structure of the shell. The dismantled steel was thoroughly tested, as described below, to ensure and prove the stability of the pavilion. The total of 340 individual parts recovered from the power plant were bolted together on site to form the new supporting structure of the pavilion.
3. All the built-in elements are made of recycled HDPE plastic waste. The chairs were produced by Dirk van der Kooij from the Netherlands using a 3D printing process from plastic household waste. Demonstrations were also held throughout the pavilion's operation to show the recyclability of plastics and to make small elements from supposedly disposable products such as yoghurt pots.
4. The pavilion floor and the landscaping of the garden were designed with various reused and recycled products from mineral construction and demolition waste. The concept follows the idea of "fallen leaves", i.e. areas whose shape and size are reminiscent of those of the façades. For example, bricks made from construction waste by the company StoneCycling were used in it, which, through clever colour combinations of various minerals from the urban mine, bear names such as nougat, aubergine or wasabi. Here, the psychological level of added value is addressed in order to break down internal barriers to recycling. The pavilion stands on foundation stones made by Feess, which are made of concrete with a 100% recycled aggregate content. Merely interlocked with each other by plug-in connections reminiscent of Lego bricks, these foundation blocks can be returned to the manufacturer after use. The majority of the floor was ultimately covered with white ceramic rubble, crushed from old white goods and crockery, demonstrating an alternative to natural gravel.

The aim of the pavilion was and is to discuss important questions of future building and the associated use of resources with decision-makers from politics, building planning and implementation, and to develop new innovative concepts, applications and methods from this, both in practice and in teaching.

Data Reliability

Self-declared

Sustainable Development

Attractiveness :

The Mehr.WERT.Pavillon combines aesthetics and research in a unique way and follows the conviction that sustainable architecture has to be breathtakingly beautiful to be accepted, loved and cared for in the long run. During the 6 months of the exhibition, we had daily questions from interested visitors about the overall theme, as well as about specific materials and contexts, most of them starting from the beauty of the project and/or a specific material surface. Due to the great success of the project, the city administration has in the meantime moved the pavilion to a permanent and public location within Heilbronn. In this respect, we can justifiably claim that the pavilion is also a truly sustainable contribution to today's architectural debate.

Well Being :

The Mehr.Wert.Pavillon serves as a laboratory and test run for future construction projects as well as construction processes. The aim is to discuss important questions of building and the associated use of resources with decision-makers from politics, construction planning and execution, and to develop new innovative concepts, applications and methods from this, both in practice and in teaching. The aim of the paradigm shift is a new understanding of architecture that combines climate protection, sustainability, resource conservation and well-being in the built environment.

Social Cohesion :

Already today, 75% of the European population lives in urban areas, and the trend is rising, with increasing specific living space requirements. It is therefore no coincidence that we are experiencing an incipient change in mentality and a growing sense of injustice within our society, which sees its livelihoods threatened by climate change, resource scarcity and the littering of our environment. In this discussion, our built environment has a key role to play. It must be considered both as a future supplier of raw materials - as a new mine: the urban mine - and as a storehouse of materials.

Preservation / Environmental Improvement :

Construction alone is responsible for 39% of our CO₂ and other greenhouse gas emissions, 50% of primary energy consumption, 50% of primary raw material consumption and 36% of solid waste generation, according to the latest European Union surveys. A paradigm shift in the way we design, construct and manage our built environment is long overdue - and the Mehr.WERT.Pavillon proposes a feasible way forward and validates it in a beautiful and demonstrative way.

Resilience :

Circular construction understands the built environment as a storehouse of materials and presupposes the appropriate handling of these elements, which manifests itself above all in the development and application of new joining technologies, the design of deconstruction instructions and in a radically new

understanding of the roles of all actors in the construction industry. In this respect, the resulting definition of the circular economy also reaches decidedly further than the common understanding of the term in Germany as part of waste management. Instead of aiming to close the cycle at the end of the use phase and thus reduce waste, a circular economy should prevent the generation of waste at the beginning of the life cycle through innovation and design. In this respect, we understand the circular economy as a self-recovering and renewing economic system whose premise is the preservation of the highest possible utility and monetary value of its materials and products in closed material cycles.

Responsible use of resources :

The pavilion is holistically planned and constructed and complies with the currently prescribed framework of building regulations. In this way, it provides vivid, unique, innovative and comprehensive answers to the most important questions of the building industry of the 21st century. Within these questions, the pavilion covers a broad spectrum of architectural scales: On the material level, it addresses the question of what resources will be available for future generations through urban mining and the circular economy. Particularly with regard to the direct reuse of building elements, the pavilion is not only innovative, but groundbreaking, as - to our knowledge - this has not yet been done within the German building code. On the level of construction, it proposes solutions for connecting materials and components in such a way that the buildings of today are the material depots of the cities of tomorrow. And at the urban design level, the pavilion serves as a case study to explore data integration, material registers and an integrated planning approach. As an educational and instructional demonstrator as part of the Federal Horticultural Show programme and programmed by the Baden-Württemberg Ministry for the Environment, Climate Protection and the Energy Sector, the pavilion shows the more than 2 million visitors and industry players the challenges of today's building industry and offers practical and concrete alternatives to the status quo.

Testimony / Feedback

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Governance

Disposal companies of the city of Heilbronn, Ministry for the Environment, Climate Protection and Energy Sector Baden-Württemberg and Bundesgartenschau Heilbronn 2019 GmbH

Holder Type : Regional Authority

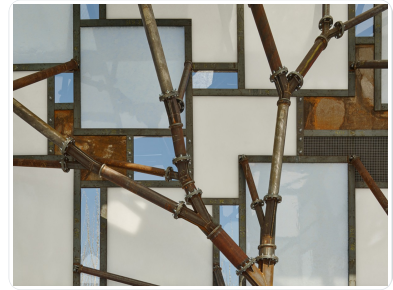
Sustainable Solutions

Direct reuse of steel in structural engineering

Description :

The steel pipes of the supporting structure already have a life behind them as pressure pipes in a former coal-fired power plant. Their removal was carried out as part of dismantling measures. After determining the steel quality, the pavilion structure was planned on the basis of this inventory. In this way, the load-bearing structure could be realised largely from reused elements. The construction consists of four identical, asymmetrically inclined tree structures that support an elevated cube of an irregular façade grid. All connections are detachable so that complete dismantling and reconstruction can take place.

- Promotion of cultural/ historical identity
- Circular economy
- Waste management
- Low-carbon materials/ infrastructure



Landscaping and horticulture with materials from the urban mine

Description :

Various mineral materials are used in the soil: concrete and brick rubble in various grain sizes, directly reused clinker bricks and bricks consisting of mineral building rubble. The intermediate surfaces are formed as a water-bound layer of broken porcelain. Broken plates and cups from production rejects and recycling yards are ground for this purpose and applied as a single-variety soil layer.

- Promotion of cultural/ historical identity
- Circular economy
- Waste management
- Low-carbon materials/ infrastructure



Recycled glass facade and roof

Description :

The translucent façades consist mainly of glass ceramic panels. This is a product that is made from 100 percent recycled glass. The raw material sources here are rejects and misproductions of industrial and bottled glass. The cullet-shaped, differently coloured glass waste goes through a special sintering process and is thus fused into new sheets. In the process, the colour and shape of the glass fragments is preserved and an individual, special aesthetic is created.

- Promotion of cultural/ historical identity
- Circular economy
- Waste management
- Low-carbon materials/ infrastructure



Photo credit

Project details Mehr.Wert.Pavillon

Concept and design: Lisa Krämer, Simon Sommer, Philipp Staab, Sophie Welter, Katna Wiese, Karsten Schlesier, Felix Heisel, Dirk E. Hebel, Professorship for Sustainable Building, KIT Karlsruhe

Execution planning and stability: 2hs architects and engineer PartGmbB Hebel Heisel Schlesier with Lisa Krämer and Simon Sommer

Structural form-finding: Prof. Rosemarie Wagner, Professorship of Building Technology, KIT Karlsruhe

Test engineer: Prof. Matthias Pfeifer, Karlsruhe

Executing company pavilion: AMF Theaterbauten GmbH, Udo Rehm / FC -planung GmbH, Gebr. A. & F. Hinderthür GmbH, Kaufmann carpentry and joinery GmbH, GrünRaum GmbH

Project and event sponsors: Waste Management Companies of the City of Heilbronn, Ministry for the Environment, Climate Protection and Energy Sector Baden-Württemberg and Bundesgartenschau Heilbronn 2019 GmbH

Project financing: GreenCycle GmbH, Der Grüne Punkt - Duales System Deutschland GmbH (DSD) and SER GmbH

Project partners pavilion: AMF Theaterbauten GmbH, Deutsche Foamglas GmbH, Glas Trösch GmbH, Hagedorn GmbH, Heinrich Feess GmbH & Co. KG, Magna Naturstein GmbH, Schröder Bauzentrum GmbH, DeFries, Smile Plastics, SPITZER-Rohstoffhandelsgesellschaft, StoneCycling, Studio Dirk van der Kooij

Contest

Reasons for participating in the competition(s)

