

**so concrete®**  
Dreams Made Concrete





## Dreams Made Concrete

So Concrete, an innovative technology company, was founded by Serge Borenstein and Federico Díaz with the intention of fully utilizing the advantages of 3DCP (digital concrete) for its structural and aesthetic possibilities and maximum manufacturing efficiency. At So Concrete, we are firmly committed to the principles of sustainable construction and architecture.

So Concrete technology is based on topology optimization of structures, robotic fabrication, and the qualities of ultra-high-performance concrete, UHPC and UHPFRC. Comprehensive client support in the field of digital concrete is provided by a multidisciplinary team of architects, engineers, experts in building and structural engineering, materials technology, designers, programmers, and robotics experts, supported by partnerships with leading institutions and other industry professionals.

## Factory

The technology and manufacturing center in Prague's Holešovice provides more than 1000 sqm of facilities for the realization of an entire range of serial products and individual projects.

Our portfolio includes elements for standard and demanding building structures, self-supporting façades and interior partitions, urban amenities, and subtle design objects.

We currently have three robotic workstations for robotic fabrication, which enable the production of individual objects up to 3 × 8 m in size.

All services are delivered both locally and internationally. We can set up a robotic workstation directly at the construction site.

So Concrete is a partner for a new era of construction, with high demands for efficient manufacturing optimization, process digitalization, and meeting sustainability requirements.

## Founders

Serge Borenstein, the co-founder of the Karlin Group, develops award-winning projects with high architectural standards and the implementation of modern technologies. He mainly focuses on the revitalization of formerly industrial areas of Prague. He collaborated with the world's leading architect Ricardo Bofill, Baumschlager Eberle Architekten studio, and other prominent foreign and Czech architects, on the urban-architectural transformation of Prague's Karlín into a contemporary urban district.

Federico Díaz is a world-renowned artist, a pioneer in the application of digital technologies and robotic fabrication in art and architecture, on which he has lectured to architects and designers at prestigious institutions such as the Royal Institute of British Architects in London, Columbia University in New York, ETH Zurich and many others.





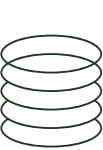






So Concrete platform

So Concrete is a technology platform for construction project solutions built on three core pillars that perfectly combine design, robotic fabrication, and materials engineering.



Design and optimization

Topology optimization addresses the most common engineering problem: how to make a structure strong enough while using the least amount of materials, thereby reducing costs and achieving maximum performance.

Inspired by the efficiency of nature-proven solutions, So Concrete structures can save up to 70% in material compared to the robust monoliths of the traditional construction industry.



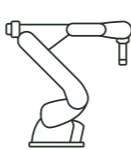
Smart material

Ultra-high-performance concrete (UHPC) and ultra-high-performance fiber-reinforced concrete (UHPFRC), with their advanced mechanical and durability properties, allow the production of fine organic shapes rid of the massiveness of the traditional concrete monoliths.

In collaboration with Master Builders Solutions CZ, we have developed our own unique UHPC and UHPFRC formulation with a strength grade of C130 on proof tests. The mixture enables the realization of products of exceptional aesthetic value and a virtually unlimited range of shapes and finishes of structures.

Material properties

- modulus of elasticity 50 GPa
- bulk density 2 400 kg/m³
- compressive strength 150 MPa
- flexural tensile strength 30 MPa



Robotic fabrication

The benefits of robotic 3D printing and building automation are still minimally applied in the construction industry. Therefore, So Concrete in collaboration with ABB brings to the Czech Republic the most advanced 7-axis robotic fabrication technology primarily using concrete. The structure is manufactured using industrial robots by successive layering of material with almost unlimited possibilities in terms of application directions. We can manufacture extremely complex shapes including cantilevers and vaults at virtually any angle.

Material compliance

Czech Technical Standards ČSN EN 206 + A2 and ČSN P 73 2404 specify the highest strength grade C100/115. For the manufacturing of ultra-high-performance concrete which exceeds the highest strength grade specified by the Standards, we comply with the Technical Standard ČBS 07, classifying the lowest strength grades of C130/150.

The Technical Standards provide extended regulations for the manufacturing and testing of ultra-high-performance concretes, procedures for the design and assessment of structural elements and structures, and regulations for their production and inspection. They apply to the Czech Republic and locally sourced materials. Robotic additive fabrication (3D printing) of UHPC is included in these rules.



Proof tests information

Services



Comprehensive project management

We provide all services accompanying the project realization from the initial analysis to the final installation:

- design
- topology optimization
- structural analysis
- smart material
- robotic fabrication
- transport and assembly
- possibility of on-site robotic fabrication



3DCP technology subcontracting

We make it possible for developers, building engineers, architects, and designers to use So Concrete printed concrete technology for:

- realization of sub-parts of complex construction projects
- production of structural elements
- production of unique design objects



Consultancy and partnership

We are motivated in our development by the democratization and diffusion of digital concrete technology. We offer consulting and partnerships in the field of additive technologies and robotic fabrication to professionals and students of architecture, civil engineering, and robotics.





The ecological and economic sustainability of So Concrete technology is reflected in the manufacturing and life cycle of the building.

01

#### **Design**

high design aesthetics in every element – inspired by the efficiency of nature-proven solutions – technology for functional and beautiful living spaces – possible customization of each product – unlimited reproduction of a chosen design – replacement of heavy human labor with robotic fabrication

02

#### **Economics**

up to 70% material savings – speedy printing of even the most complex shapes – possibility of on-site robotic fabrication – machine-precise material use in terms of surface area and quantity – subtle design with space and energy savings – full utilization of the concrete's advantages for large-scale high-rise buildings

03

#### **Sustainability**

decades of maintenance-free and resource-free use – development of new mixtures and composite materials – minimization of production time and environmental burden – surface treatments that blend in with nature – effective insulating properties of structures – constructions for green walls and roofs, or photovoltaic panels – use of concrete recyclates – minimizing the environmental impact of the product throughout its life cycle (heading towards EDP certification)



**Color fabrication**

Concrete does not have to be just grey. By adding pigment to the concrete mixture, we can achieve a wide range of color shades. Similarly, the aggregate used can determine the final color.





# Architecture

Building structures and products developed for the specific needs of your project.



# Columns

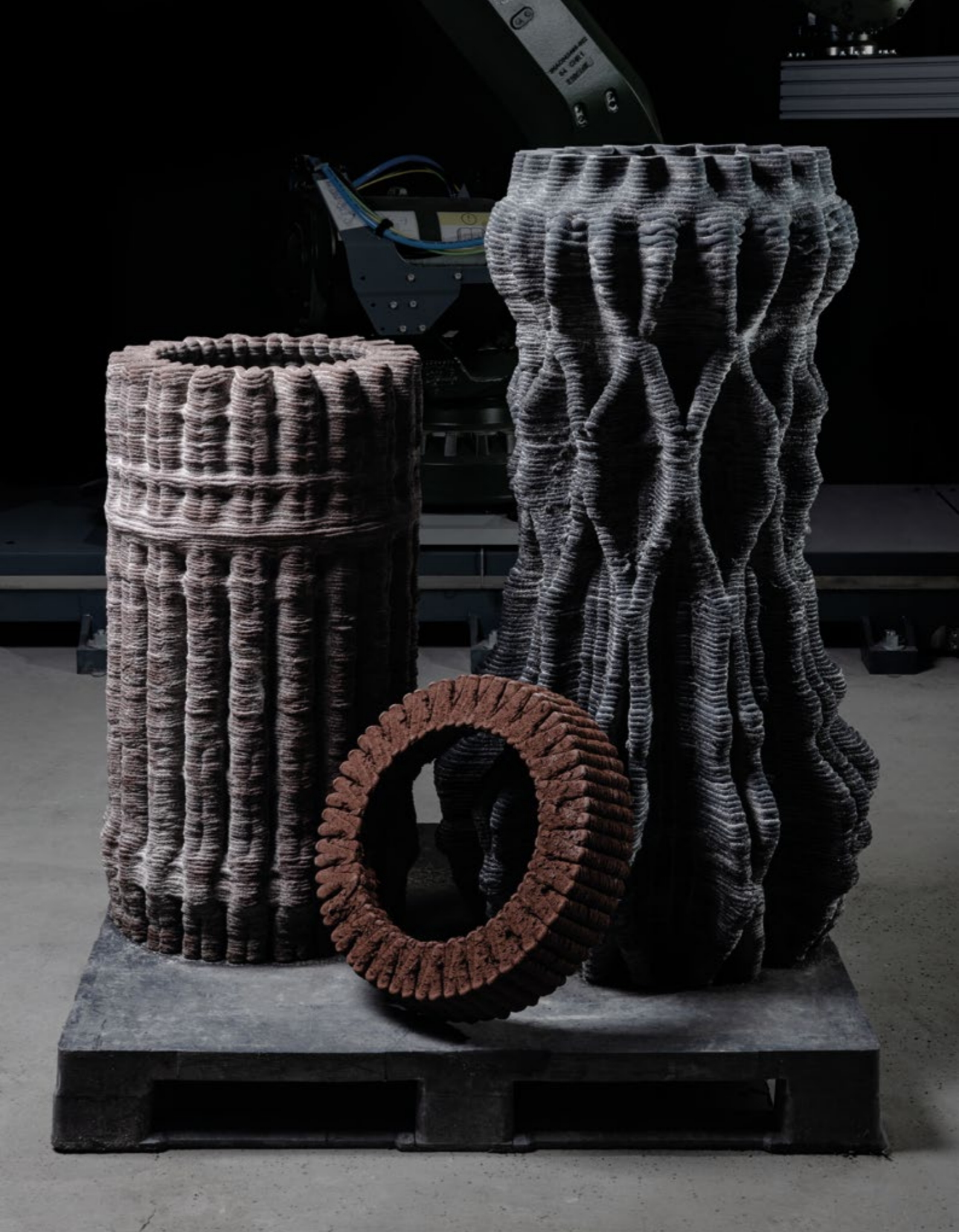
The stylistically diverse range of columns allows architects and interior designers to create unique, previously unrealizable forms of sculptural interiors. The possibilities for concrete column formwork are endless, and designs can be adapted to meet the structural and dimensional needs of the client. By topology optimization, we reduce the total volume of material used.

- Options

  - used instead of conventional column formwork
  - wide range of designs
  - interior and exterior use
  - adaptable dimensions
  - addition of other elements to the product
  - custom manufacture
  - permanent formwork

Parameters

Material	UHPC
Color	variants according to available color swatches
Features	extremely resistant surface against mechanical damage and water





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# Façade panels

Whether you are looking for refined sculptural façade panels or require an advanced adaptive shading system, we have a comprehensive range of stock façade panels for you. So Concrete’s design and robotics team works with architects and structural engineers to provide fully customized solutions.

- complex structures
- UHPC represents a significant reduction in weight and detail aesthetics
- planar and non-planar panels
- topology optimization allows the material to be applied only where structurally necessary, reducing the amount of concrete used and the carbon footprint of the building
- we use concrete milling to create precise, interlocking joints and assembly areas, speeding up the construction phase
- in addition to additive manufacturing, various mold modeling and milling techniques are used to meet almost any custom construction requirement

- Options
- wide selection of stock structures with custom design options available upon request
  - application on external façades
  - custom design of assembly system on request
  - load-bearing façade systems on request
  - use of recycled material

### Parameters

Material	UHPC
Color	variants according to available color swatches
Dimensions	standard panel size 1 × 2 m, other sizes on request
Features	extremely resistant surface against mechanical damage, waterproof, weatherproof



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# Roof systems

A range of prefabricated roof systems is particularly suitable for public transport stops, parking spaces, but also pavilions, and other small buildings such as gazebos and kiosks. The structures are available in 3 basic configurations which vary in size, shape, and number of supporting columns. If our stock range does not cover your needs, we can customize the structure to your requirements.

- easy on-site assembly
- structurally optimized for significant weight reduction
- aesthetics following the distribution of internal forces in the structure
- use of UHPC reduces weight and provides excellent weather resistance
- topology optimization and UHPC reduce the carbon footprint of the structure
- optimized for outdoor use
- 3 size variants

- Options

  - can be fitted with displays, advertising lightboxes, benches, urban furniture, photovoltaic panels, WIFI, phone charging, etc.
  - custom shapes and sizes on request

## Parameters

- Material

UHPC
- Color

variants according to available color swatches, possibility of treating the structure with anti-graffiti coating
- Dimensions

  - 8 × 2.5 m
  - 5 × 2.5 m – suitable for car park roofs (can be extended into a modular system by multiplying the width)
  - 3 × 1.5 m – suitable for public transport stops (can be extended into a modular system by multiplying the length)
- Features

extremely resistant surface against mechanical damage, waterproof, weatherproof





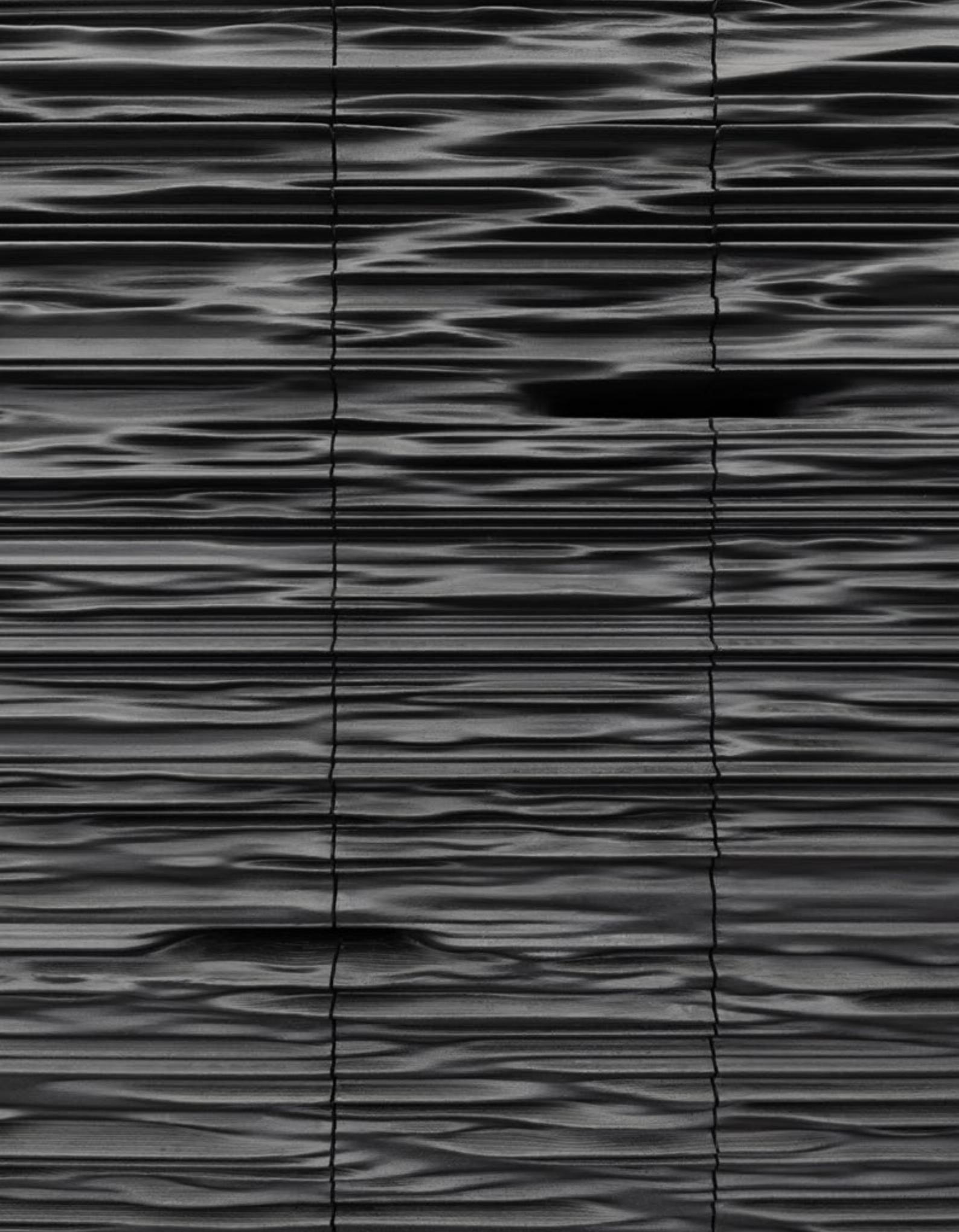
# Cladding panels and interior walls

UHPC allows the manufacture of subtle, elegant wall structures for fixed and movable partitions. Whether the design is regular or highly adaptive, our products prove that concrete in the interior does not represent cold monumentality, but unlimited creativity.

- Options
- geometric patterns ranging from simple and regular to organic
  - installation of glass elements in selected designs
  - adaptation to the exterior, long-term high durability of the UHPC material

## Parameters

Material	UHPC
Color	variants according to available color swatches
Dimensions	panel size up to 2.5 × 6 m, wall thickness 1.5–50 cm
Surface	wide range of patterns (including custom design)
Properties	highly wear-resistant surface
Installation	we are glad to provide assembly or supply the assembly system for expansion joints: precise joints with perfect pattern continuity





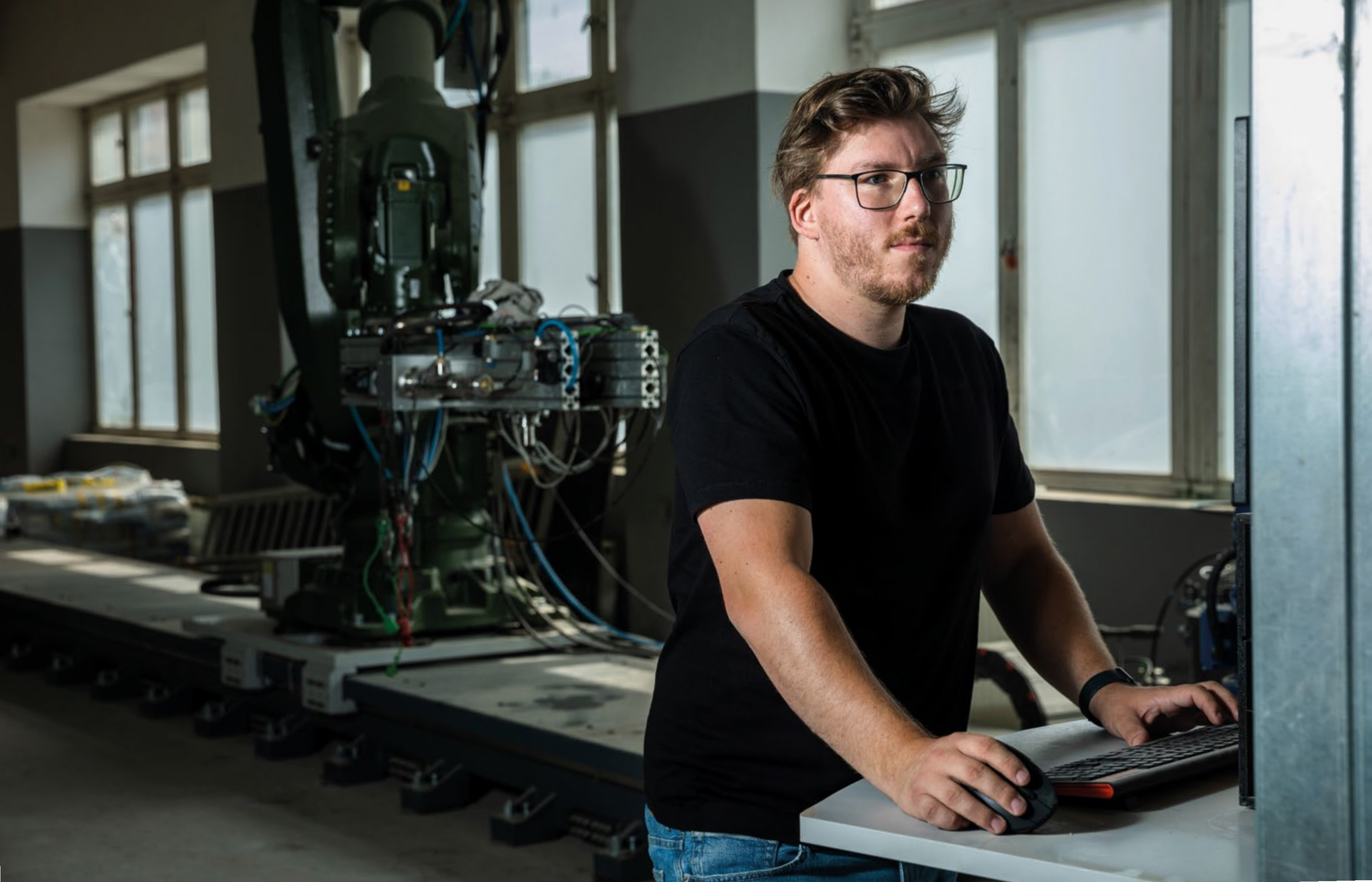
# Modular cabin

The universal modular shape of the cabin allows you to expand the floor space as desired. The individual modules can be interconnected. The floor area of the basic module is 7 sqm. The prefabricated structure made of self-supporting prefabricated parts manufactured by 3D printing from ultra-high-performance concrete, sits on a base plate with strip foundations. The façade of the modular cabin, also made by 3D printing, offers unlimited form aesthetics and color, with the possibility of integrating openings, lighting, or green elements. The cabin can serve as a sauna, storage, garden house, transformer station, or sanitary facilities; it is also possible to add technological equipment such as a toilet, shower, solar panels, batteries for energy storage, rainwater tank, or boiler. In addition to the exclusive appearance and environmental friendliness, the undeniable quality of the cabin is the speed of manufacture – within 5 days.

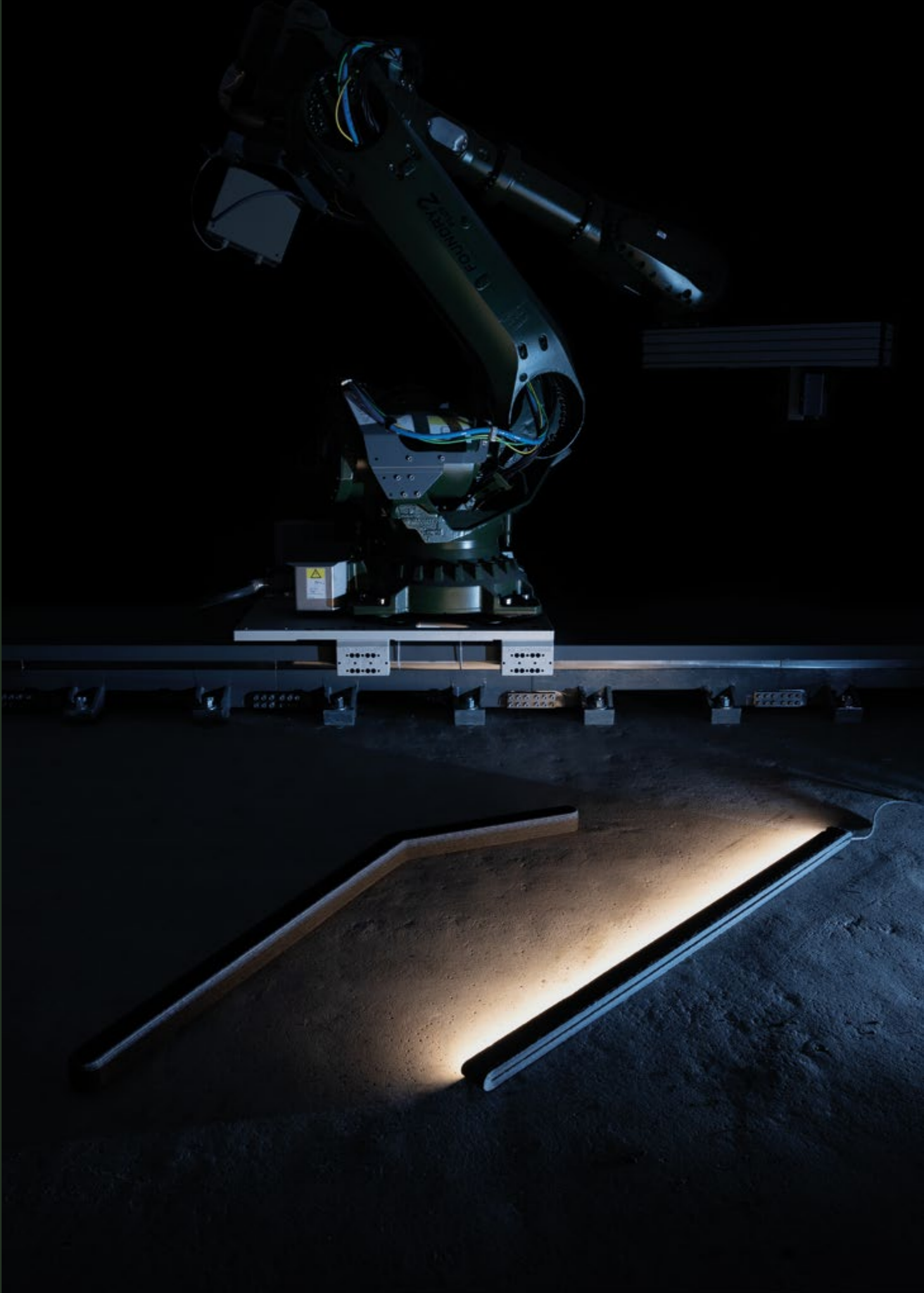
### Parameters

Design	So Concrete
Technology	So Concrete
Location	anywhere
Completion	within 5 days at any time
Dimensions	5.0 × 2.5 × 2.6 m (basic module)
Material	UHPC C130, UHPFRC





Limited Edition Design  
by Authors



# Vessels

Design by  
Bára Škorpilová

So Concrete’s diverse range of interior vessels comes in a variety of designs for home and office.

- unique design, made possible by additive manufacturing, brings an extraordinary sculptural element to the interior
- lower objects weight compared to conventional materials thanks to UHPC

## Options

- extensive catalog of ready-made designs and an unlimited range of custom shapes
- clients' own designs can be realized in a range of similar designs and different sizes
- sizes from shallow 5 cm to 150 cm vessels
- maximum diameter of 60 cm
- heavier vessels can be equipped with castors for different floors
- outdoor use on request

## Parameters

Material	UHPC
Color	variants according to available color swatches
Surface	various surface textures and ornaments; embossing on request
Features	highly durable weather and chemical-resistant surface



# Lighting systems

Design by  
So Concrete

So Concrete’s line of design luminaires ranges from simple linear shapes to more complex structures, mimicking the plant’s growth. Custom manufacture to client design also allows for vector shapes and non-planar luminaires with complex topologies.

Selecting from So Concrete’s range or designing your own luminaire will complete the final atmosphere of your interior.

- Options
- interior use
  - wide design range
  - fully programmable LED light sources (color, animation, etc.)
  - ceiling suspension or wall mounting (with LEDs facing the wall or the room)
  - mounting hardware for floor lamps
  - custom mounting
  - basic range available in variants:
    - simple LED strip (luminaire width is 3.5 cm)
    - double LED strip (luminaire width is 6 cm)
    - both variants include linear luminaires (length 60 cm or 120 cm) and L-shaped luminaires (length 70 cm or 140 cm)

## Parameters

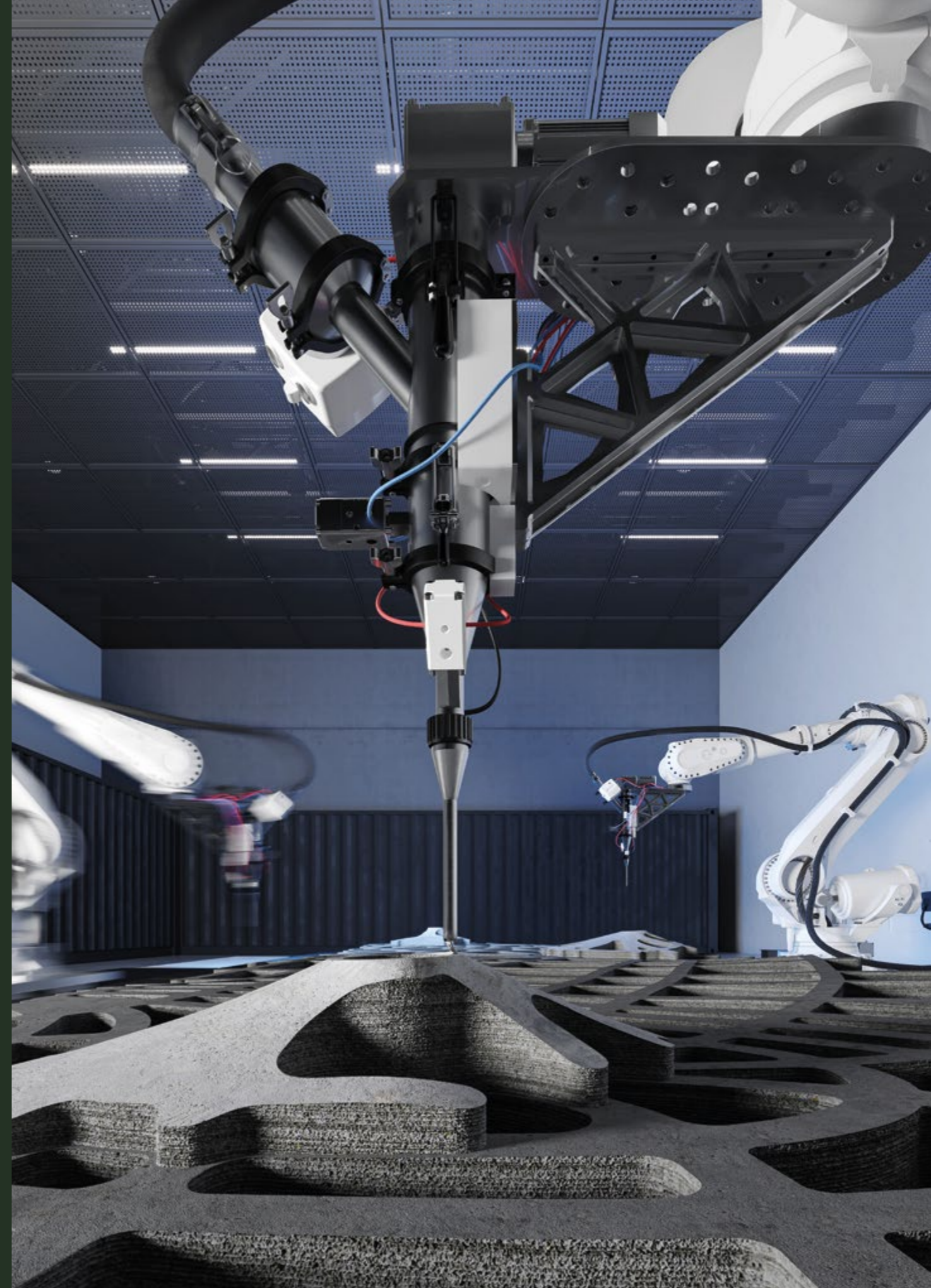
- Material
- UHPC
- Color
- variants according to available color swatches
- Surface
- the outer surface is available with a natural 3D printed relief or a smooth milled surface
- Variability
- fully customizable curve-based vector design – design your own luminaire with a few clicks (on request)
- Features
- highly wear-resistant surface





## Projects

We develop and install UHPC architectural objects using seven-axis robotic fabrication. From subtle design objects to mass structures.



# Tram Stop

The Výstaviště Tram Stop in Prague is a full-fledged construction of urban transport infrastructure and demonstrates the possibilities of using So Concrete technology in the field of urban furniture. The stop is covered with Plexiglas, which protects passengers not only from the weather but also from direct sunlight thanks to its gradient surface. With a length of eight meters, the shelter provides space for four times more passengers than a standard-sized tram stop. The design of the tram stop utilizes the natural principles of the internal forces' distribution, pressure and tensile stress, in the structure. The resulting design is not only unique but above all, maximally efficient.

2022





# Ventilation Blanka – Heraldic

2020

Cladding panels for the Blanka Tunnel ventilation structure in Prague. Precast concrete panels are used as cladding on a cylindrical reinforced concrete structure that provides ventilation of the Bubeneč Tunnel – a part of the Blanka tunnels system in Prague. The surface of the cladding elements is a work of art that involves a unique carving technology using a mixture of sand and oil with the help of a robotic arm. A complex, segmented, convex relief with heraldic motifs was achieved. A total of 176 pieces of atypical prefabricated panels were produced from self-compacting concrete with a width of 1,322 mm and a height of 2,350 mm. The thickness varies from 75 mm to 175 mm, given the convex shape of the panels and the complexity of the relief.

Winner of the 2020 ČBS „EXCELLENT CONCRETE STRUCTURE“.





# Vases

Author's collection of vases by designer and architect Bára Škorpilová made with So Concrete technology.

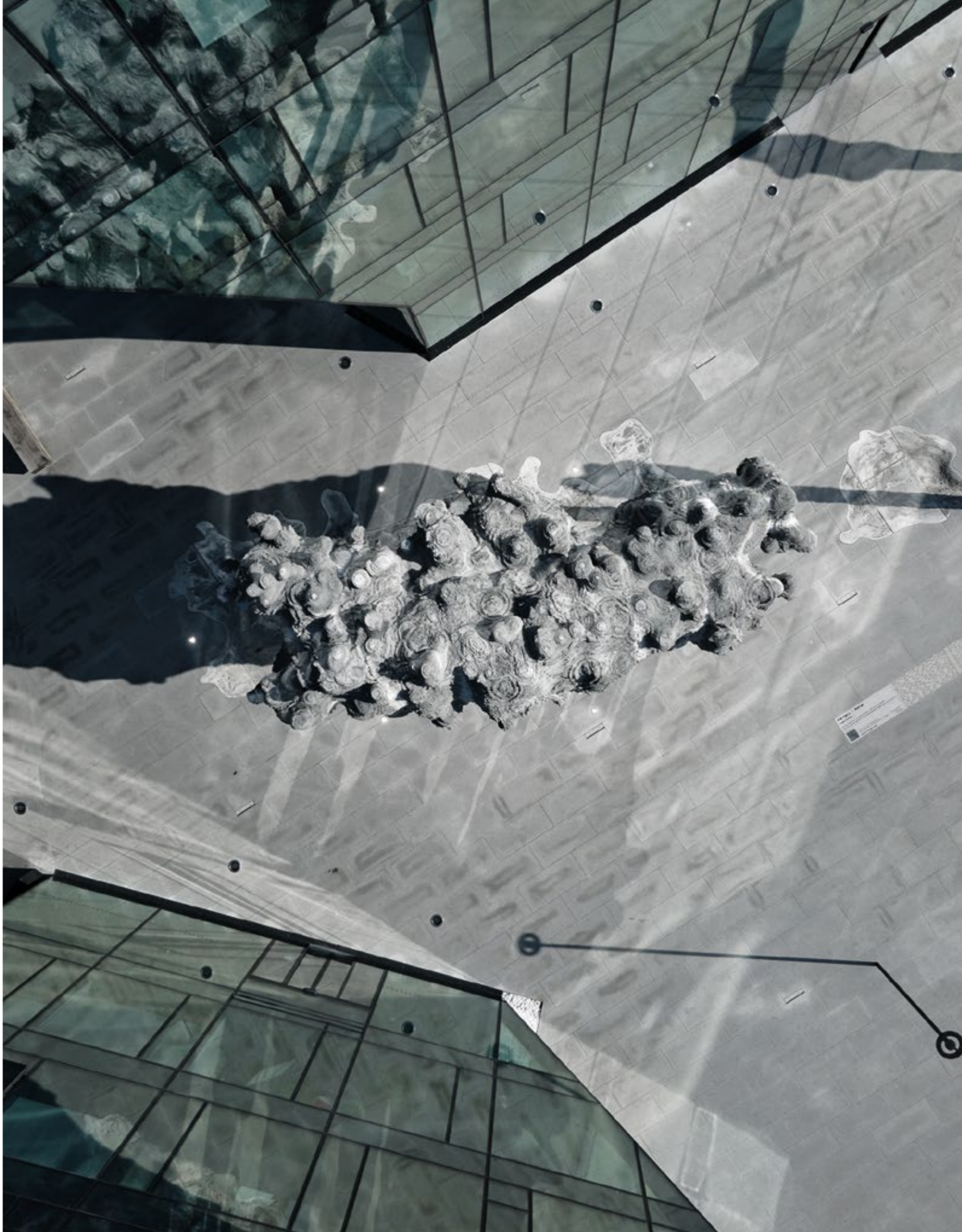
2022



# Aerial

Like most of Federico Díaz’s outdoor objects, the Aerial sculpture references its location. The objects, created for the piazza of the Bořislavka Center, evoke the history of the site, through which the original merchant trails led toward the Prague Castle. The form resembling natural rock formations, petrified trees, or an arrangement of underground stalagmites, embodies the passage of time. The sculptural object Aerial was created using So Concrete technology.

2021





# Bořislavka Relief Wall

2021

Three dark-colored relief walls are the dominant interior elements of KKCG’s office space in the Bořislavka Centre. The linearly articulated walls made of cast concrete segments are anchored into the steel structure. The segments, divided by an expansion joint, form a coherent shape. They create a unique impression in the interior, where the construction itself becomes an aesthetic artifact. The wall of the top office floor has a more subtle character, with the inset piece being a non-standard element of the relief.





# Installation "Larger than Life"

Daramis' Prague Marina Nova development project will feature not only a complex of new buildings but also a public space in the form of a memorial garden honoring the extraordinary personality of Tamir Winterstein. The Memorial Garden will provide the residents of Prague 7 with a place to rest, relax and play while commemorating Tamir's invaluable contribution to the development of the Holešovice Marina district, as well as his visionary ideas and unique personality. The centerpiece of the site will be a set consisting of a supersized chair, stool, and lamp, symbolizing Tamir's everlasting presence. The individual elements are manufactured using the UHPC robotic fabrication at So Concrete's workshop and supplied to Daramis including the engineering, sampling, fabrication, and on-site installation.

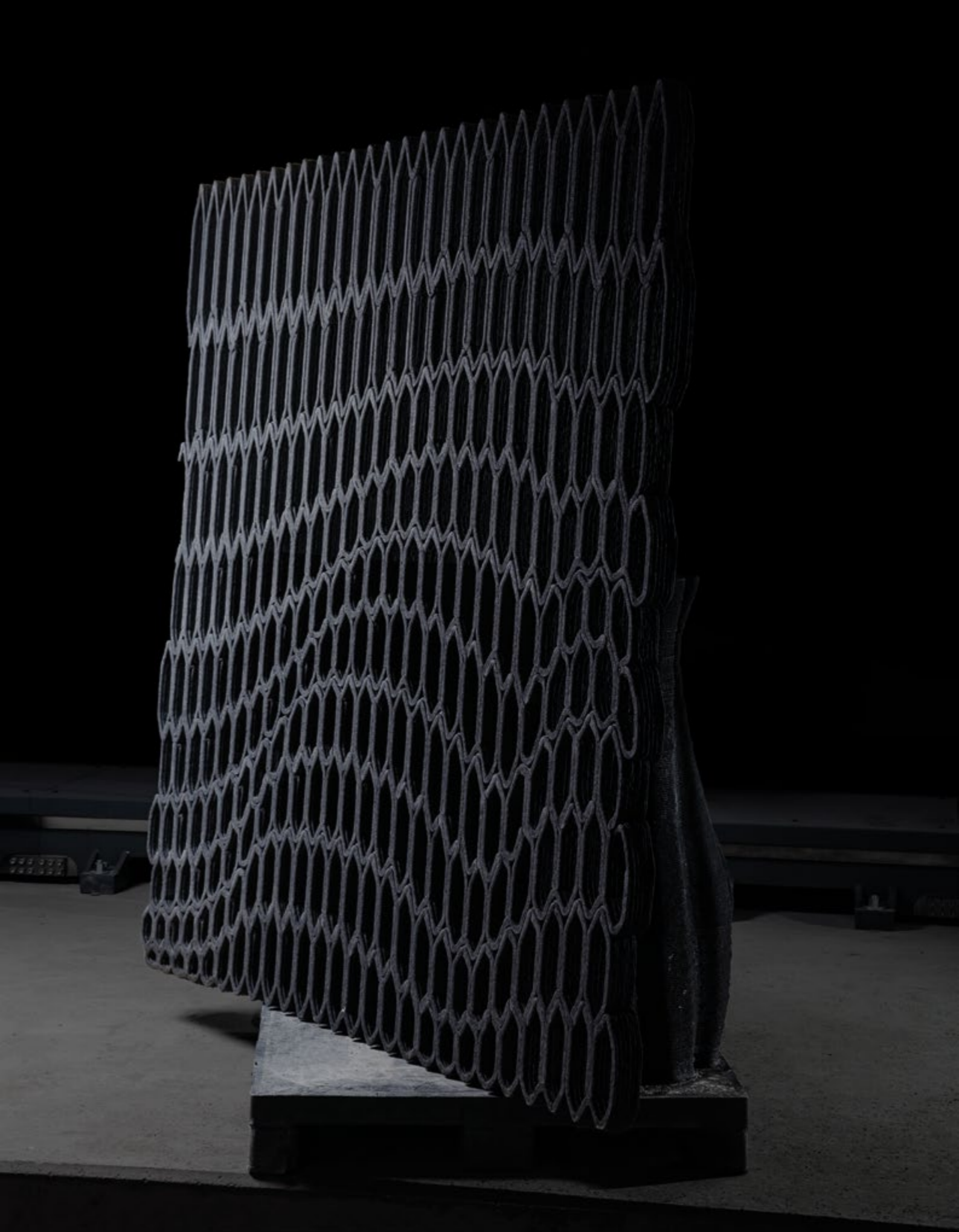
2023



# German School

The extension project of a historic school building. Its conservation and transformation are part of a unique revitalization project of a large complex in the countryside at the site of the defunct village of Jabloneček near Ralsko. The project is being prepared in cooperation with the architectural studio Formafatal.

2023





# Central European Forum Olomouc (SEFO)

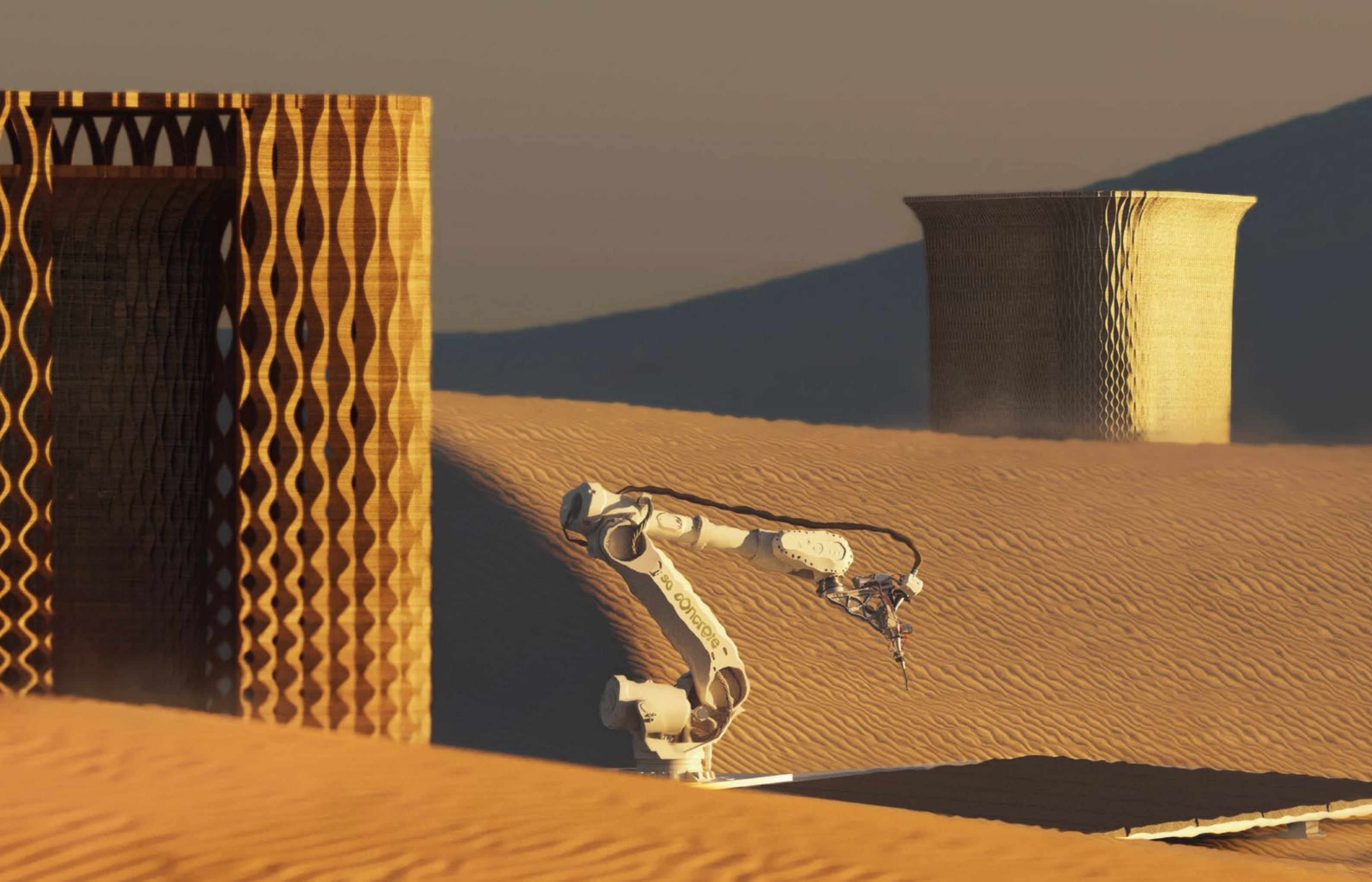
Sampling and testing the suitability of 3DCP technology for the realization of the large-scale Central European Forum Olomouc (SEFO) project. The study of the planned fine art exhibition for the Olomouc Museum of Art was designed by architect Jan Šépka.

Photo: Šépka architekti archive













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