

## Facade Renovation at Berlin University of the Arts

---

“Heritage-compliant renovation of a 1960s exposed-aggregate facade using carbon-reinforced precast concrete panels (Carbonbeton)” (UdK Berlin) Hardenbergstraße 33, Berlin, Germany

### Executive Summary:

Traditional steel-reinforced concrete façades in mid-century heritage buildings often degrade through reinforcement corrosion, cracking, and moisture ingress, which in turn accelerates spalling and energy losses. Carbon reinforcement (Carbonbeton / carbon-reinforced concrete) enables significantly thinner, lighter, corrosion-free façade elements by reducing cover requirements and material demand. This project at UdK Berlin (Hardenbergstraße 33) uses prefabricated exposed-aggregate (Waschbeton) façade panels as a low-disruption, heritage-compatible renewal strategy, pairing architectural fidelity with long service life and improved building-physics performance. The project is documented publicly as a “Sanierung der Fassade mit Carbonbeton” reference by Beton- und Naturstein Babelsberg (BNB).

### Project Background

The UdK Berlin building at Hardenbergstraße 33 is a prominent educational and cultural facility in Berlin-Charlottenburg. Like many 1960s modernist concrete façades, the original envelope concept faces typical aging mechanisms: cracking, weathering, local delamination, and durability risks driven by moisture and urban exposure.

The renovation approach leverages Carbonbeton principles—carbon reinforcement embedded in a cementitious matrix—to provide durability without corrosion and enable slimmer precast solutions than conventional steel-reinforced alternatives. Carbonbeton is broadly described as a composite of carbon reinforcement and fine concrete, enabling reduced material usage because carbon does not corrode (and therefore does not require thick concrete cover like steel).

### Publicly documented project reference:

BNB (Beton- und Naturstein Babelsberg GmbH) lists this façade renewal explicitly as a project: “Universität der Künste (UdK) – Sanierung der Fassade mit Carbonbeton” and provides photo documentation of the renovated façade in exposed-aggregate finish.

.  
<https://bnb-potsdam.de/projekte/universitaet-der-kuenste-udk-sanierung-der-fassade-mit-carbonbeton/>

# HITEXBAU GmbH

Innovative Carbon Grid Reinforcement

## Location

Building: Berlin University of the Arts (UdK Berlin) - Hardenbergstraße 33 location

Address: Hardenbergstraße 33, 10623 Berlin, Germany

District: Charlottenburg (Berlin)

Setting: Dense urban environment with typical façade stressors (pollution deposition, wind-driven rain, temperature cycling).

Facade appearance (documented): Exposed-aggregate (Waschbeton) panel aesthetic consistent with the existing architectural language; publicly shown in BNB photo documentation.

## Scope (project outline)

- Condition assessment and removal / isolation of degraded façade zones (as required by existing substrate condition).
- Fabrication and installation of carbon-reinforced precast façade panels (architectural concrete / exposed aggregate).
- Prefabricated assembly strategy to reduce site time and operational disruption (typical advantage of precast renewal; project images show completed façade surfaces).

## Objectives

**Heritage-compliant appearance:** preserve the modernist façade rhythm, panel grid, and exposed-aggregate visual texture.

**Durability upgrade:** eliminate the dominant steel-corrosion failure mode by shifting to carbon reinforcement.

**Material efficiency:** exploit carbon reinforcement's corrosion resistance to reduce cover requirements and enable slender elements (principle-level benefit of carbon-reinforced concrete).

**Low disruption logistics:** prefabrication and staged installation to keep a high-use university building operational. (Project execution strategy—confirm final phasing and access constraints in project documentation.)

Project data:

- Panel thickness: ~6 cm
- Reinforcement: two layers of **HTC 34/34-80**

## Methods and Materials

### 1. Precast Carbonbeton façade elements:

**Concept:** thin architectural precast panels reinforced with carbon grids to provide tensile capacity without corrosion risk, enabling durable, lightweight façade renewal. Carbonbeton as a system is widely described as enabling reduced material demand due to eliminated corrosion cover requirements.

**Finish:** exposed aggregate (Waschbeton), matching the existing façade identity.

### 2. Installation strategy:

- Prefabrication off-site (panel casting, curing, quality control, storage) with on-site mounting (scaffold / crane logistics depend on site constraints).
- Staged approach typical for occupied buildings

### 3. Why carbon reinforcement here (engineering rationale):

- **Corrosion resistance:** carbon does not rust, avoiding expansion-driven spalling that often governs steel RC façade deterioration.
- **Slender construction potential:** thinner elements reduce dead load and simplify handling/anchors, especially valuable in renovation constraints.
- **Service life / maintenance:** reduced corrosion-driven interventions over lifecycle (frame this as expected benefit; final durability design should reference exposure class + detailing).

## Challenges and Solutions

**Heritage constraints:** strict aesthetic matching solved via exposed-aggregate precast replication and controlled factory finishing.

**Urban logistics:** limited laydown and crane windows → prefabrication + phased delivery strategy (confirm actual logistics plan).

**Durability vs. minimal thickness:** carbon reinforcement addresses the corrosion constraint that typically forces larger concrete cover in steel RC.

## Outcomes

The UdK façade rehabilitation demonstrates measurable structural and environmental gains through the use of 2 × HTC 34/34-80 carbon grids in 60 mm precast panels compared to a conventional ≥120 mm steel-reinforced alternative with double welded mesh.

# HITEXBAU GmbH

Innovative Carbon Grid Reinforcement

**Project quantities (estimated):** 300 panels (3 × 3 m), Total façade area: 2,700 m<sup>2</sup>

**Material Efficiency:** CRC concrete mass: ≈ 389 t, Steel-RC reference mass (120 mm): ≈ 778 t, Concrete saved: ≈ 389 t

**Reinforcement Efficiency:** Carbon grids (2 layers): ≈ 1.16 t total, Steel mesh reference (2 welded meshes): ≈ 16.3 t total, Reinforcement mass saved: ≈ 15 t

**Embodied Carbon Impact (A1-A3):** Concrete-related CO<sub>2</sub> reduction: ≈ 77 tCO<sub>2</sub>e, Avoided steel reinforcement CO<sub>2</sub>: ≈ 14 tCO<sub>2</sub>e, Total CO<sub>2</sub>e reduction (excluding carbon grid impact): ≈ 91 tCO<sub>2</sub>e

**Engineering Impact:** 50% reduction in panel thickness (120 mm → 60 mm), Significant dead load reduction, Elimination of corrosion-driven deterioration, Extended service life with reduced maintenance demand

This project confirms that carbon-reinforced precast façade systems can deliver structural performance, durability, and measurable carbon savings while preserving architectural heritage.

## Conclusion

The UdK Berlin façade renovation confirms the performance and sustainability advantages of carbon-reinforced concrete in heritage rehabilitation.



By replacing a ≥120 mm steel-reinforced solution with 60 mm panels reinforced with 2 × HTC 34/34-80 grids, the project achieved:

- ~50% thickness reduction
- ~389 t concrete savings
- ~15 t reinforcement reduction
- ~91 tCO<sub>2</sub>e reduction (A1-A3, excluding carbon grid production)

The result is a lighter, corrosion-free façade system with extended service life, delivered while preserving the original architectural character.