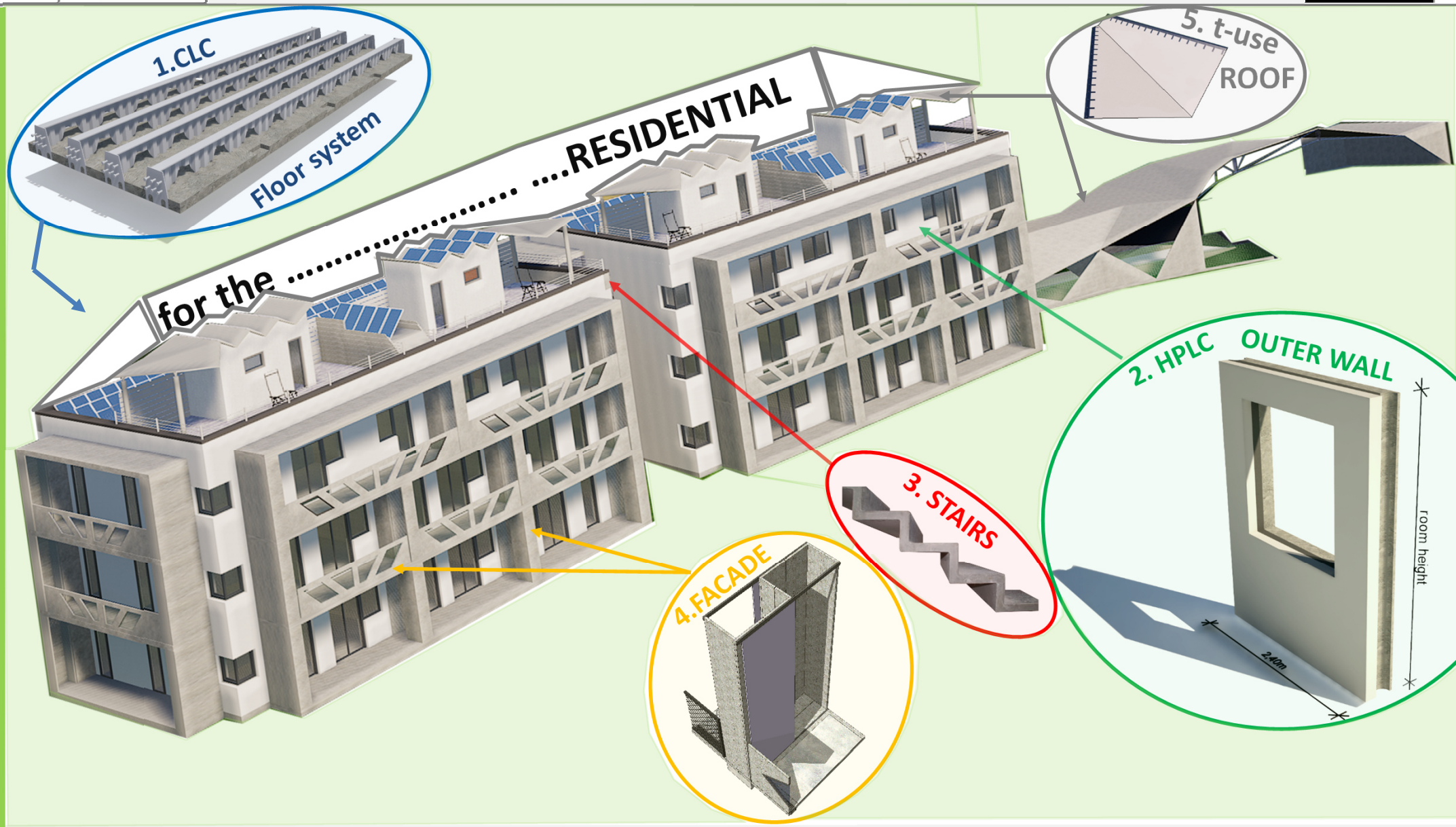
3MCC-residential construction method

high quality-flexible and durable

3MCC
Multifunctional and Modular Mineral Components for Circularity

Structural Design Olipitz



...a mineral-based construction method, resource-efficient and CO2-efficient with BCA

SmartCity
Tagline Goes Here

3MCC
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Structural Design Olipitz

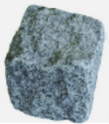
The **3MCC residential construction method** consists of various **high-performance mineral prefabricated elements**. These elements are manufactured as complete prefabrication units in the factory and assembled quickly and easily on-site. Easy assembly also means **easy disassembly**, ensuring true **circularity** and **reusability** of the components. **Short construction** times, the **highest product quality** in manufacturing, and **durability** for multiple use phases characterize the products. The components are very durable and allow for circular construction with minimal material consumption during production. The high performance of the components offers architects maximum **flexibility** and **individual design possibilities**. The components are **multifunctional**, leading to further savings through synergistic effects. **Concrete, steel** in combination, and **UHPC** contribute to material and CO2 efficiency.

Video for a residential building on a hillside: https://youtu.be/bzx10d5TFwM?si=gdL1DHmCWE368B_U

Video for al residential building: https://youtu.be/Lt1zyaZ42LE

1. Floor system:

The **CLC floor system**, including the structurally optimized **LCB ceiling system**, forms the floor slab assembly. Its low **self-weight** of **g1 = 3.25 – 3.80** [kN/m²] for spans of 8 m to 16 m guarantees maximum **flexibility** in the arrangement of **non-load-bearing interior walls**. The intermediate floor allows for flexible distribution of building services from the stairwell core, as well as flexible access via the system floor. The ceiling system, with a self-weight of **g2 = 1.30** [kN/m²], offers optimized airborne and impact sound insulation. The exposed ceiling soffit, forming a concrete core, enables optimized use of **thermal mass** (**BCA** = building component activation) with short response times for heat release. Underfloor heating is installed in the bathroom area. The underside of the CLC elements are crack-free and ready for plastering. **Disassembly** and **reuse** are possible.



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Potential for saving resources and CO2e:

Compared to cast-in-place concrete floor constructions, CLC elements offer savings of **-40%** to **-55%** in **resources** and **-20%** to **-50%** in **embodied energy GWP** in their production for spans of 8 m to 16 m!

Downloads CLC+LCB:

Planning manual german: https://www.olipitz.com/wp-content/uploads/2023/09/Planungshandbuch_Bausystem_CLC_LCB_Vers_01.pdf
Video engl.: https://youtu.be/QWG5Lavddho?si=GJC-ufh5qOmOuS2D
Video german: https://youtu.be/MfUQUuNUtr0?si=WKjRD84EPBJ4OvMo

2. HPLC OUTER WALL:

The multi-layered **mineral outer wall**, with a total **wall thickness** of **d = 39 cm**, has a self-weight of **g1 = 2.50** kN/m² and a thermal transmittance of **U ≤ 0.18** W/m²K. The **prefabricated element** is manufactured in the factory in story-high sections of up to 6 m, including window and door frames, and then dry-laid on a mortar bed on site between the prefabricated columns (d = 15 cm). Minimal finishing work at the butt joints allows for **short construction times**. The structural ceiling-wall junction is created with a continuous, flush-mounted reinforced concrete grid in combination with the CLC element, enabling structurally sound construction of up to 10 stories. The pipe registers for the **wall heating** are factory-installed in the clay panel to optimally utilize the mineral thermal mass. The HPLC outer wall is **demountable** and can be **100% reused**.

Potential for saving resources and CO2e:

Compared to a 45 cm precast hollow-core concrete wall with the same U-value, CLC panels offer savings of **-60%** in **resources** and **-20%** in **embodied energy GWP** during production.

Downloads HPLC:

Video engl.: https://youtu.be/Q50HN1lJWO4?si=lswC0NX_N_DS_azT

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3. UHPC STAIR:

UHPC stair treads have a **thickness of 4 cm** and feature a non-slip surface texture on the walking surfaces. The treads, including the landing, are manufactured in the factory using system formwork, guaranteeing the highest quality and allowing architects to design any type of staircase geometry. Simple joining techniques enable easy assembly and disassembly of the staircase segments. They are available for both **exterior** and **interior** use and are particularly well-suited for visible areas as a **design element**. Railing connections are integrated into the system, and the railing shape can be customized.

Potential for saving resources and CO2e:

Compared to a cast-in-place concrete staircase with a tread thickness of d= 18cm, one saves **-80%** in **resources** and **-40%** in **embodied energy GWP** in production.

Downloads UHPC-stair:

Video german.: https://youtu.be/9KRMIsS80jg?si=9sS7kKduwU4p54l7

Showroom Video : CLC + HPLC + UHPC-stair: https://youtu.be/CnyWrZyidgw?si=Bwjp1fM2ln4HZgk1

4. UHPC FACADEELEMENTS:

These components allow for the **extension of living space** at the facade and are **thermally decoupled**. The **high durability** of the components guarantees **durability** and enables **reuse**.

4.1. walkway- and balcony plates:

The UHPC walkway plate has a thickness of **d= 7 cm** and integrates a continuous **drainage channel** to which the balcony slab is attached. The UHPC balcony plates has a thickness of **d=3 cm** and offers architects a wide range of design options, including flexible opening geometries and shapes.

4.2. Console:

Thermal decoupling is achieved exclusively through the brackets (preferably with cross-sectional dimensions of 30/50 cm height/width) to which the d=7 cm thick walkway plate screwed.

4.3. Angle-wall as a loggia:

Side privacy screens for terraces and balconies, creating a loggia effect, are provided by 3 cm thick, floor-to-ceiling, L-shaped UHPC panels that form a side edge and can simultaneously be designed as individual storage space or seating. They have no structural function and are removable.

Potential for saving resources and CO2e:

Compared to cast-in-place concrete balcony and/or paving slabs, these UHPC slabs can save **-80%** to **-85%** of **resources** and **-40%** to **-70%** of **embodied energy GWP** during production.

5. t-use FOLDING ROOF:

This roof construction, used as a **parking garage roof** or **sauna/pool roof**, consists of simply screwed, folded roof panels with a **4 cm thickness of UHPC**, requiring no additional sealing measures. Roof drainage is integrated into the system via the folded edge. At the high points, the elements are screwed together linearly using simple joining techniques.

Potential for saving resources and CO2e:

Compared to a cast-in-place concrete roof structure, these materials can save **-80%** to **-85%** of **resources** and **-50%** to **-70%** of **embodied energy GWP** during production.

Downloads t-use FOLDING ROOF:

Video german.: https://youtu.be/91zblMbT1yk?si=KvV25t8lzzCR-ttU

Video german.: https://youtu.be/nCy10hqilQY?si=37t7Ws3MEA-_8EYl

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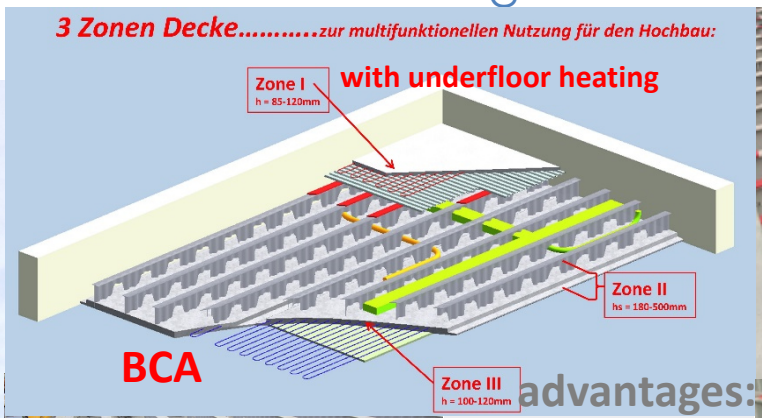
Die 3MCC-residential construction method

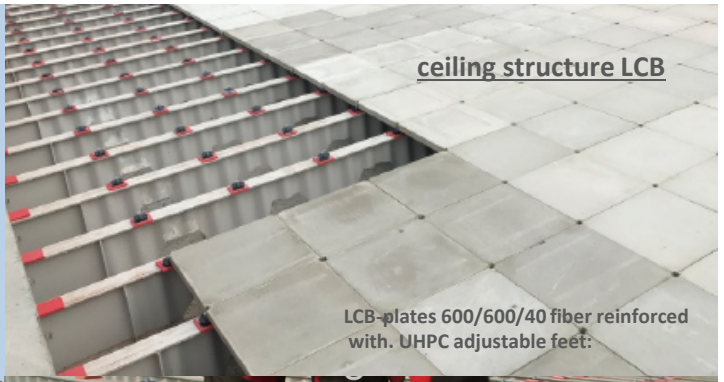
BUILDING CONSTRUCTION

durable, high-performance prefabricated elements from SDO for the circular of the future

1. CLC multifunctional floor system with LCB-ceiling construction

Patentnumber: **AT 517824/ EP 3 144 439**
(EU-Unipatent **+ GB, IR, NO, POL, CH, TR, HU, ESP, HR**)

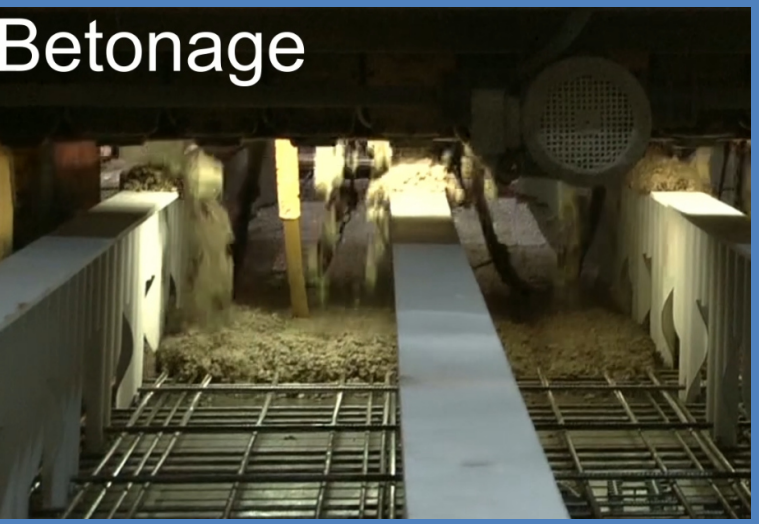




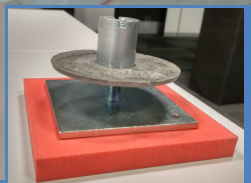
advantages:

Es bedeutet eine Einsparung pro m² LCB

- 50% Zeit
- 50% Eigengewicht
- 60% Beton
- 50% Stahl
- 100% Schalung
- 100% Unterstellung
- 50% Stemmaufwand
- 60% Transport



LCB-adjustable pedestal:



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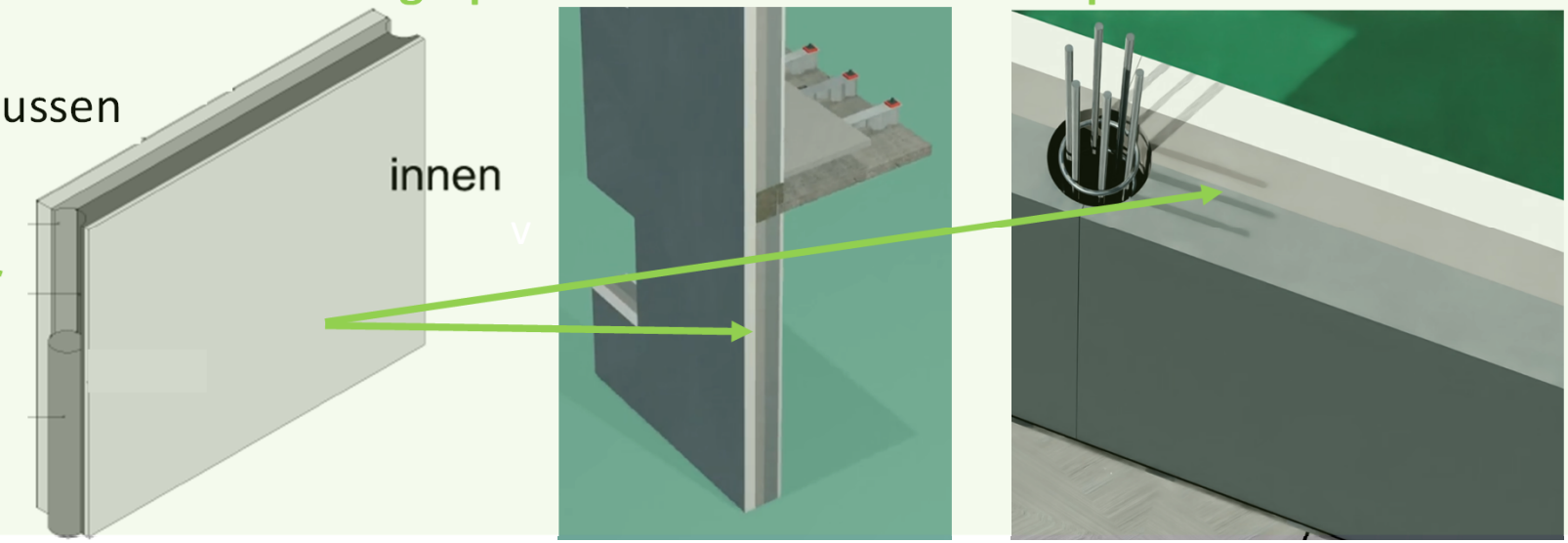
2. HPLC .....a demoutable high-performance outer wall as a prefabricated element

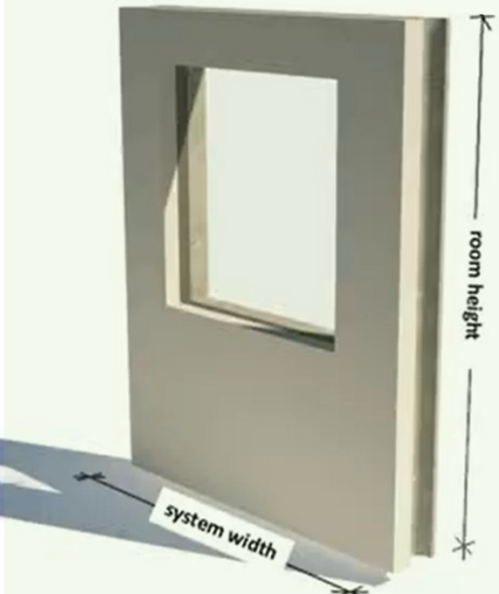
Outer Wall

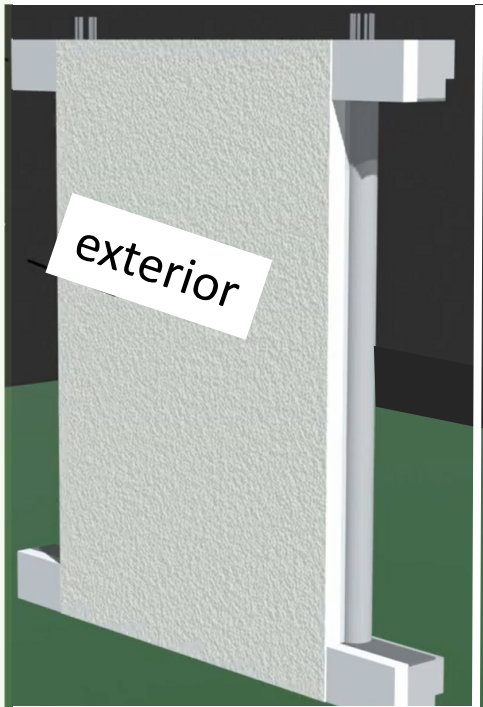
Forschungsprojekt mit FH Kärnten:
FFG-Projectnumber: 900508

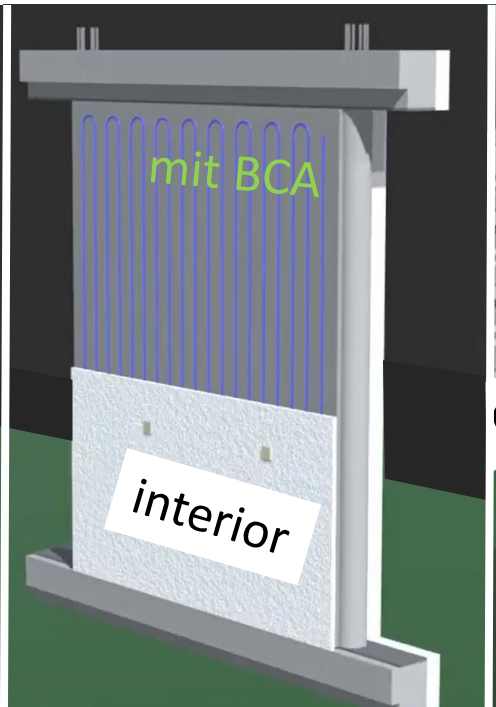
...multi-layered outer wall as a prefabricated element.....

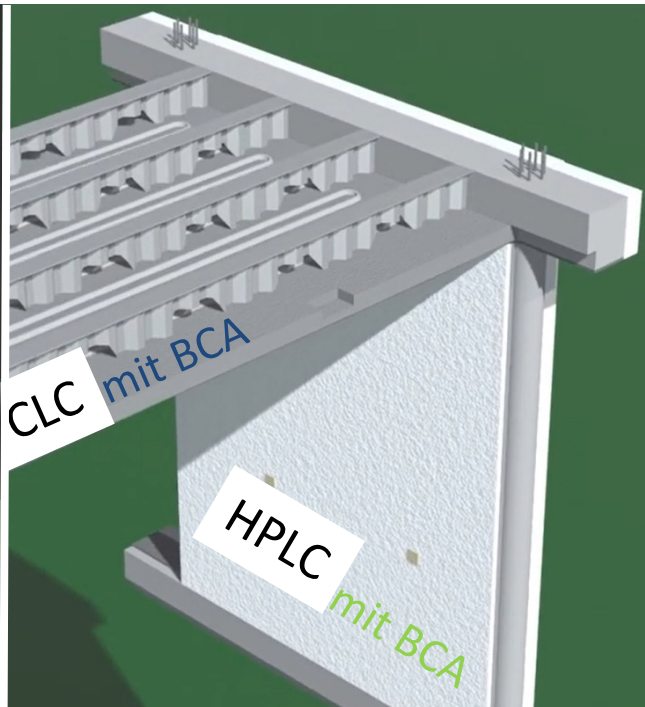


element with window









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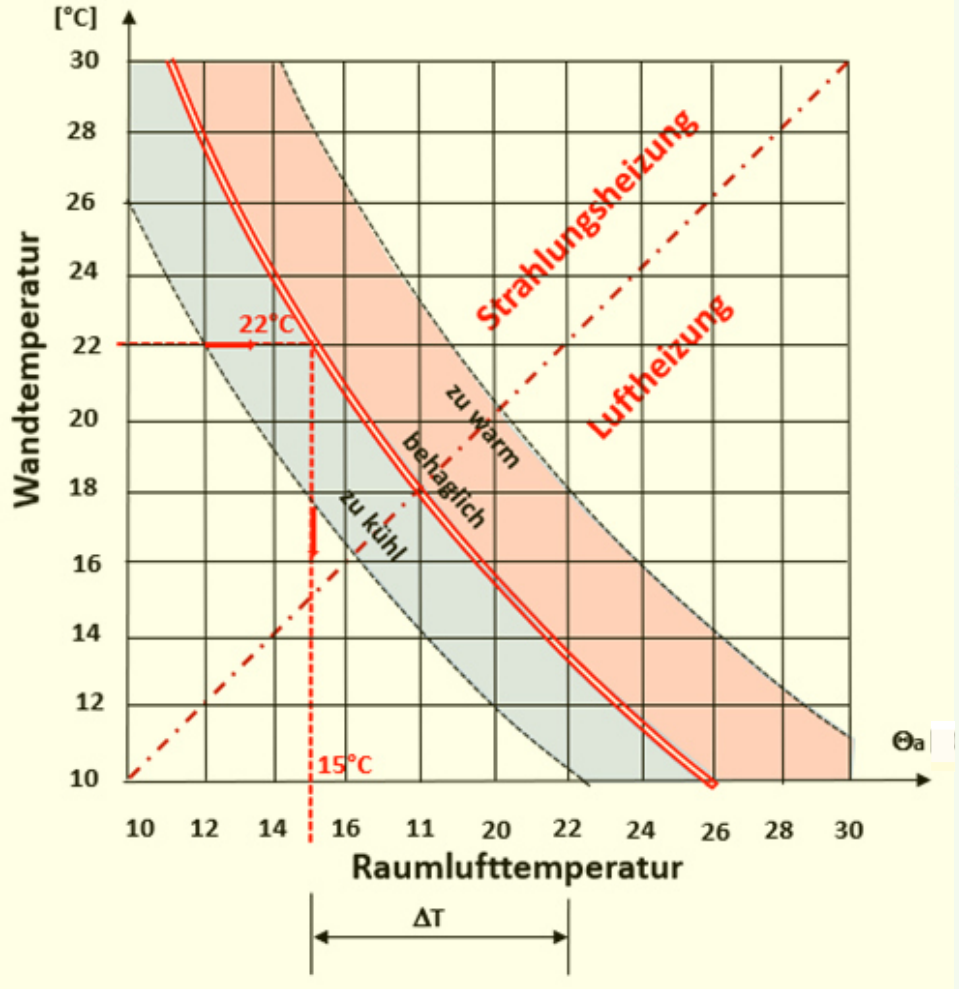
active und passive BUILDING COMPONENT ACTIVATION BCA

PASSIVE: CONCRETE as thermal mass I ACTIVE: Heating/cooling with pipe-register

-25% energy saving with BCA during using phase!

Strahlungswärme anstatt Lüftungswärme

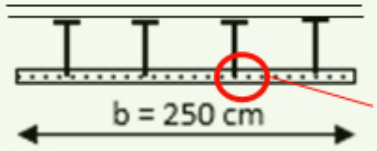
→ Senkung der Raumlufttemperatur Θa



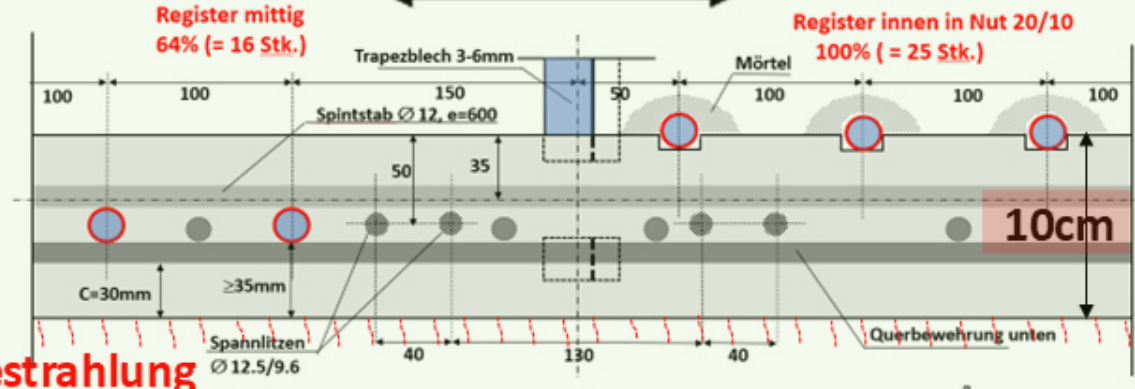
Wirksame Wärmekapazität von Geometrie, Wärmeübergang und Wärmetransport abhängig.

BETON → $d_{eff.}$ = 13,2 cm

CLC-Element:



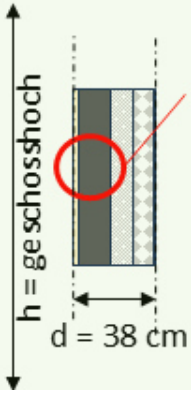
DETAIL:



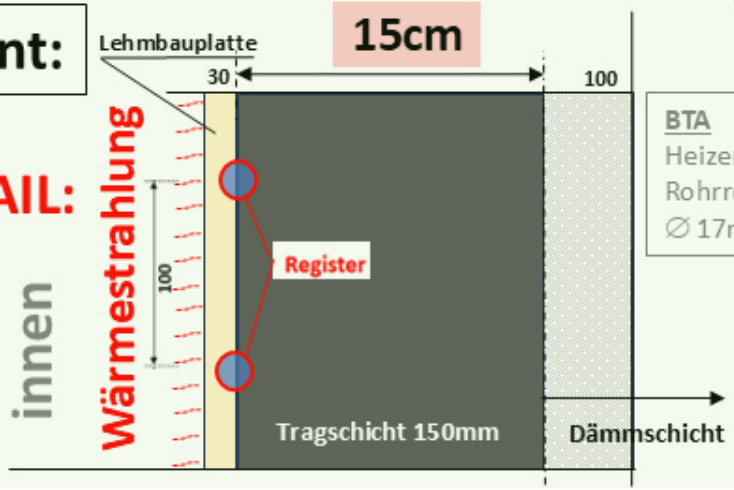
Wärmestrahlung

innen

HPLC-Element:



DETAIL:



BTA
Heizen/Kühlen
Rohrregister
∅ 17mm, e=100m

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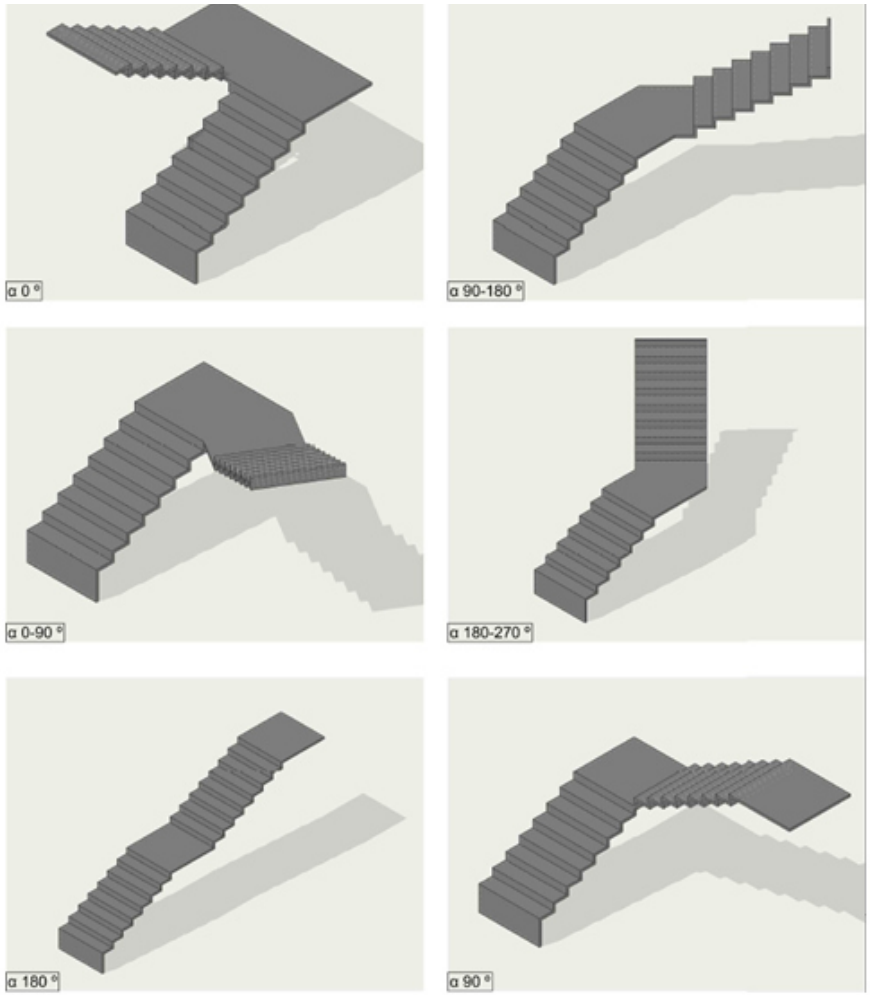
BUILDING CONSTRUCTION

durable, high-performance prefabricated elements from SDO for the circular of the future

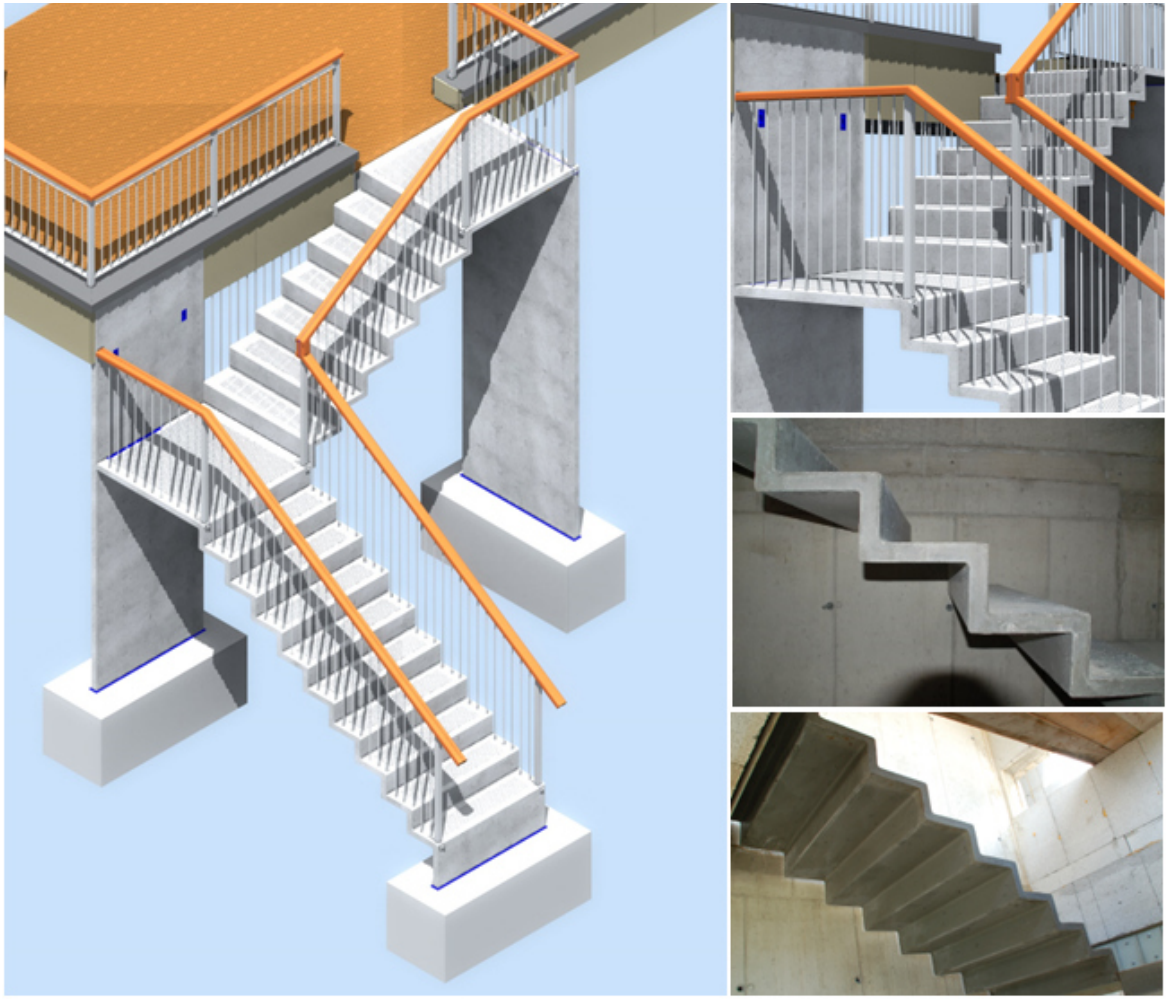
3. UHPC-stair system

for **exterior** and **interior**

high-quality – flexible – durable



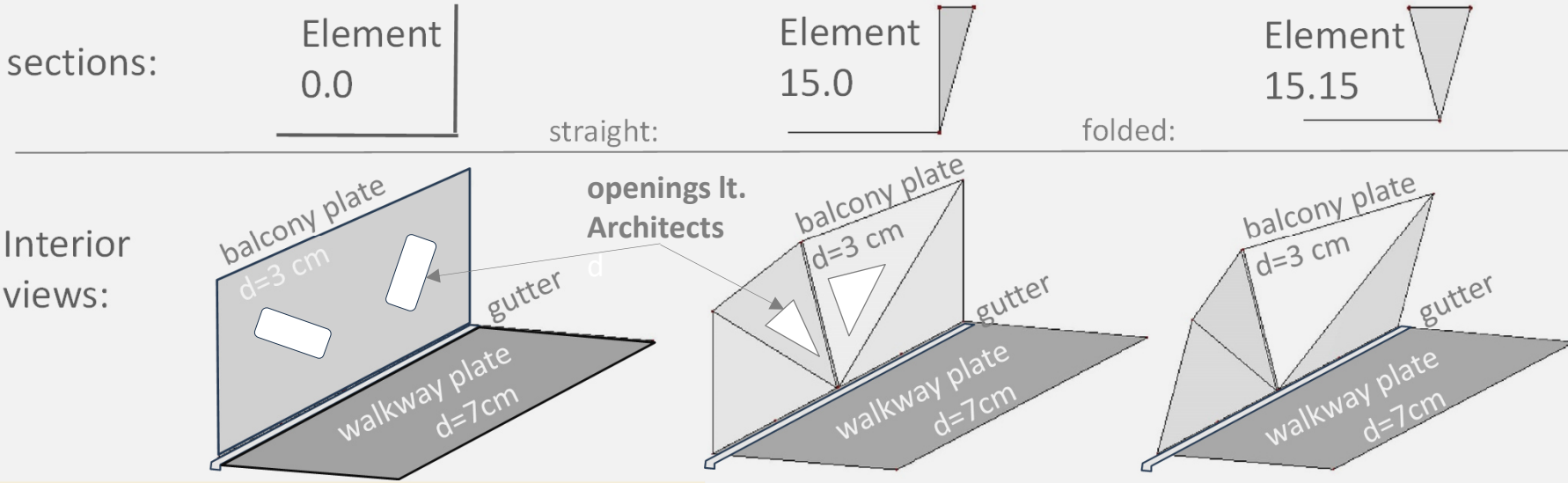
for **residential buildings** **resource-** and **CO2-efficient** and **aesthetically**



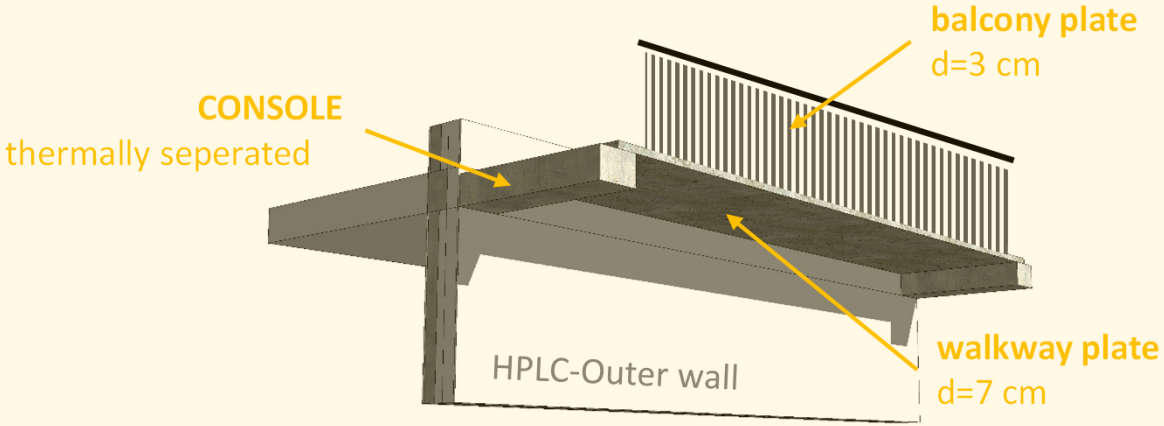
4. UHPC FACADE ELEMENTS

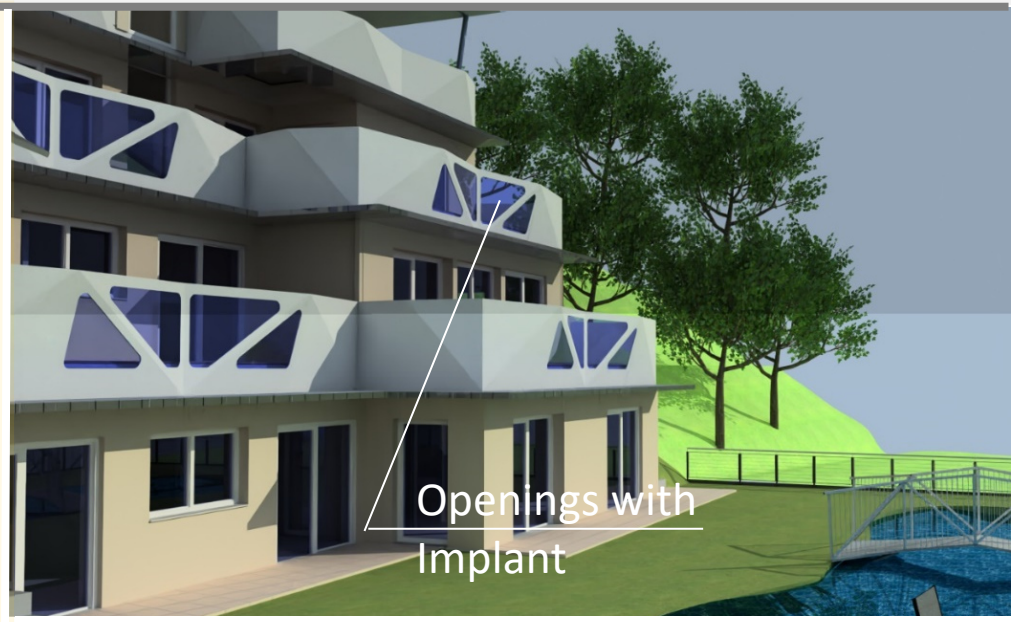
4.1 walkway + balcony

sections:



4.2 Console





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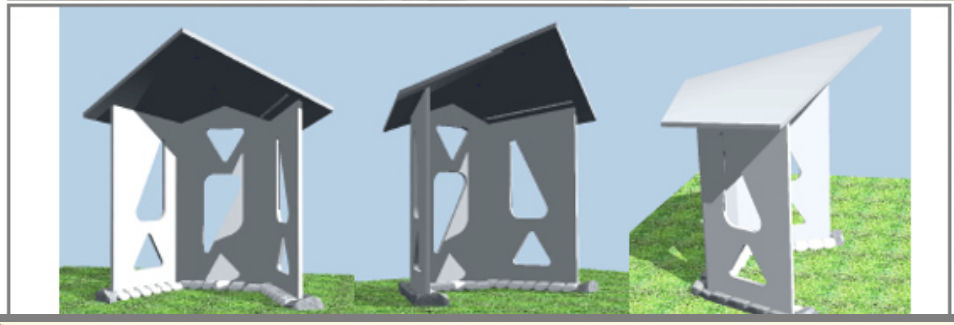
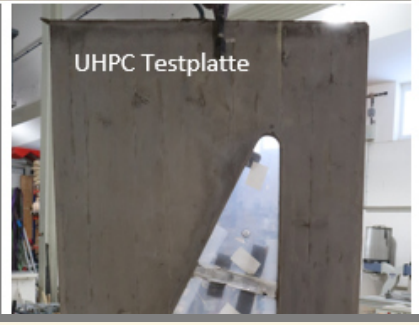
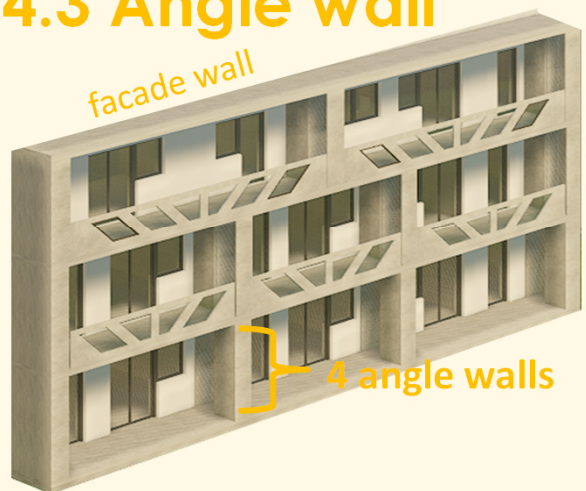
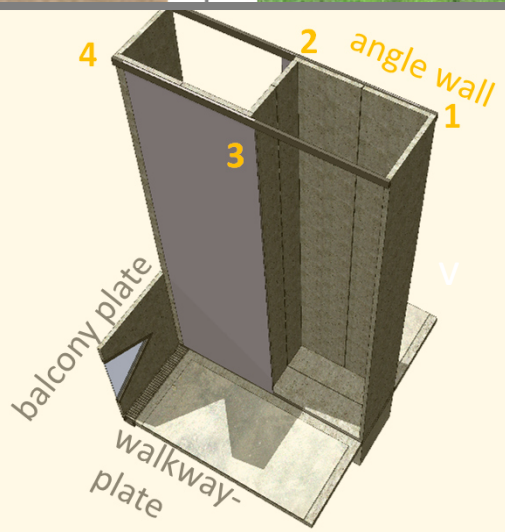
IMPLANT - a method for creating openings in UHPC plates

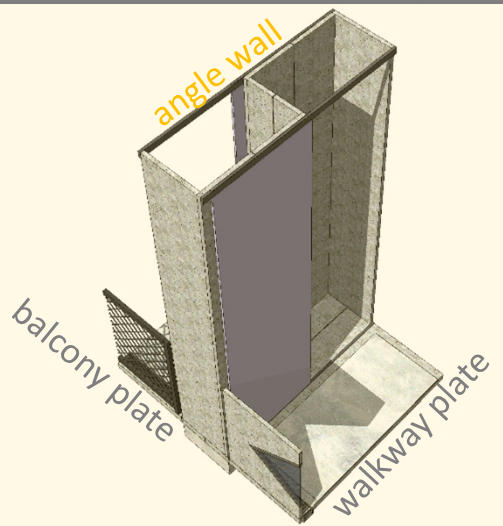


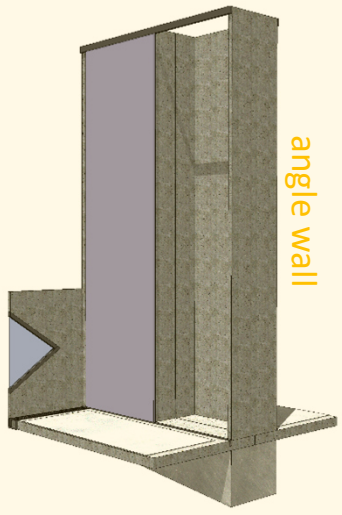


4.3 Angle wall









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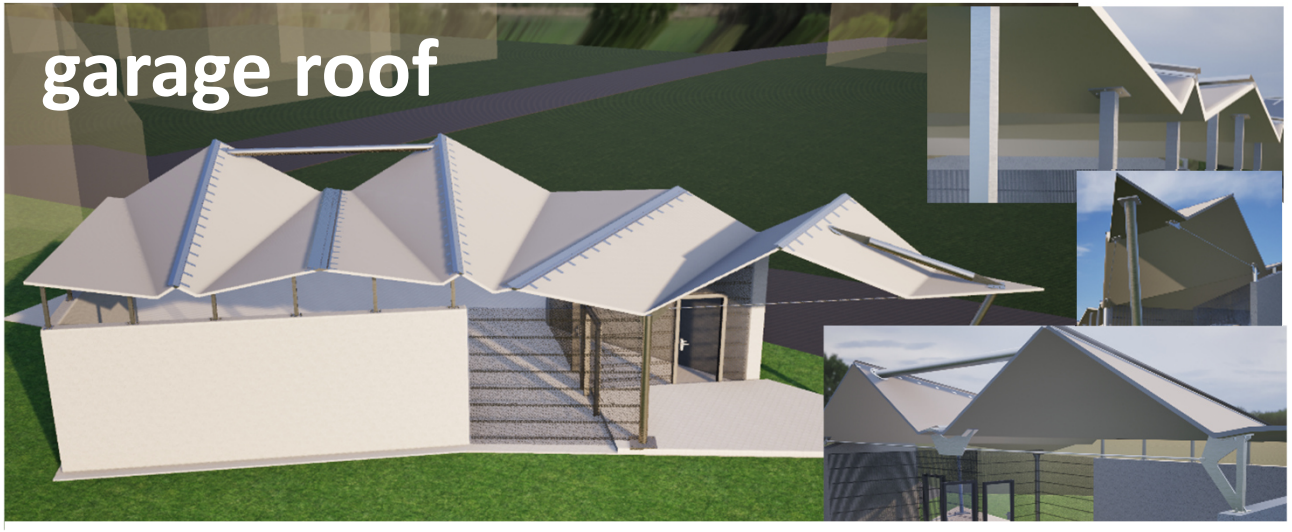
5. t-use **FOLDING ROOF** as shell element with UHPC

Patentnumber: **AT 521553** / **EP 19749331.5** / **KSA 521421191** / **VAE P6000168**/2021

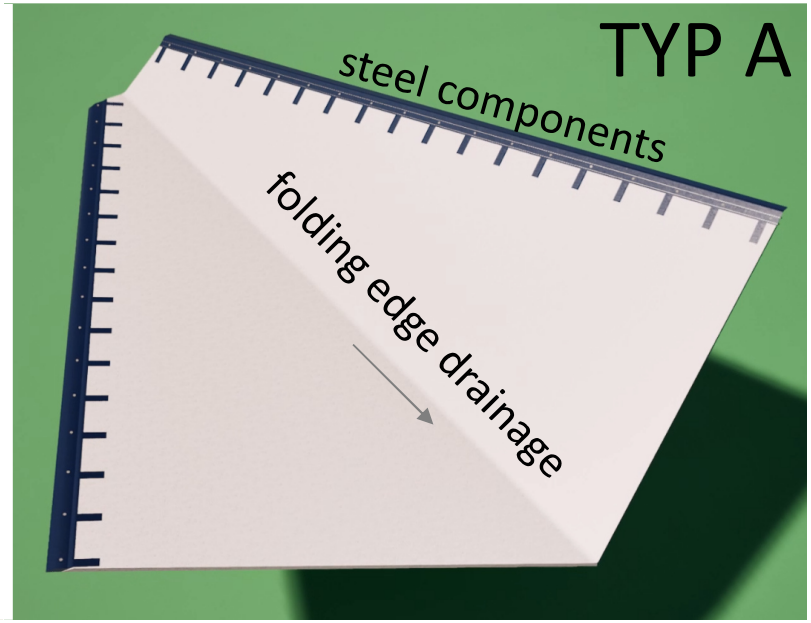
for roof elements in residential buildings

canopy

garage roof



park roof



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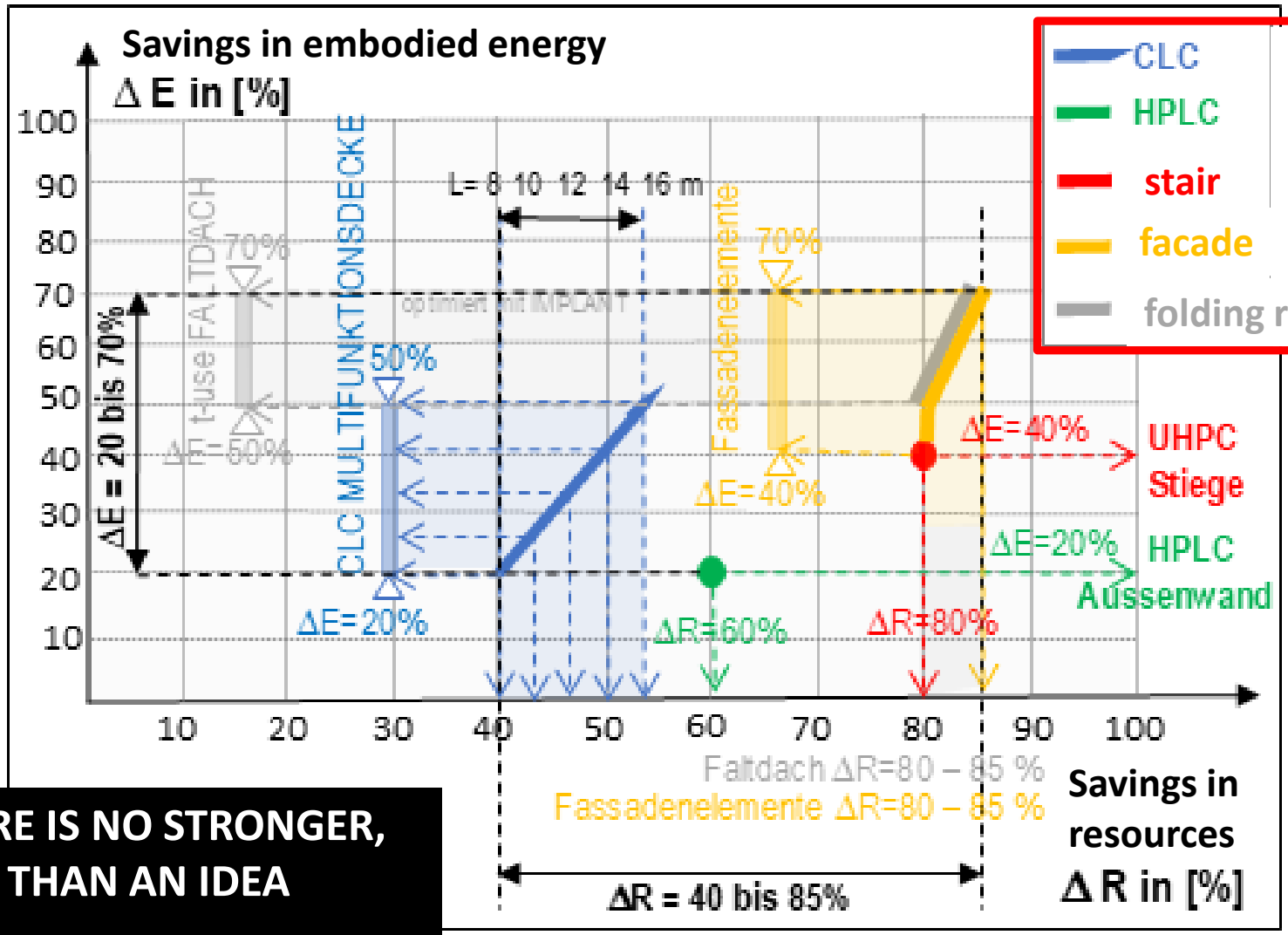
Energy-saving potential of components in 3MCC residential construction in terms of embodied energy E and material resource R compared to cast-in-place concrete construction



	ΔR	ΔE
CLC	40-55%	20-50%
HPLC	60%	20%
stair	80%	40%
facade	80-85%	40-70%
folding roof	80-85%	50-70%

savings:

-resource:

ΔR = 40 bis 85%

-embodied energy:

ΔE = 20 bis 70%

-red energy:

ΔE = 25%

THERE IS NO STRONGER, THAN AN IDEA

WHOSE TIME HAS COME