

Precast in the world



Photo ©Loic Gardiol

Marco di Prisco

fib Presidium, Politecnico di Milano

September 2022

PRECAST IN THE WORLD

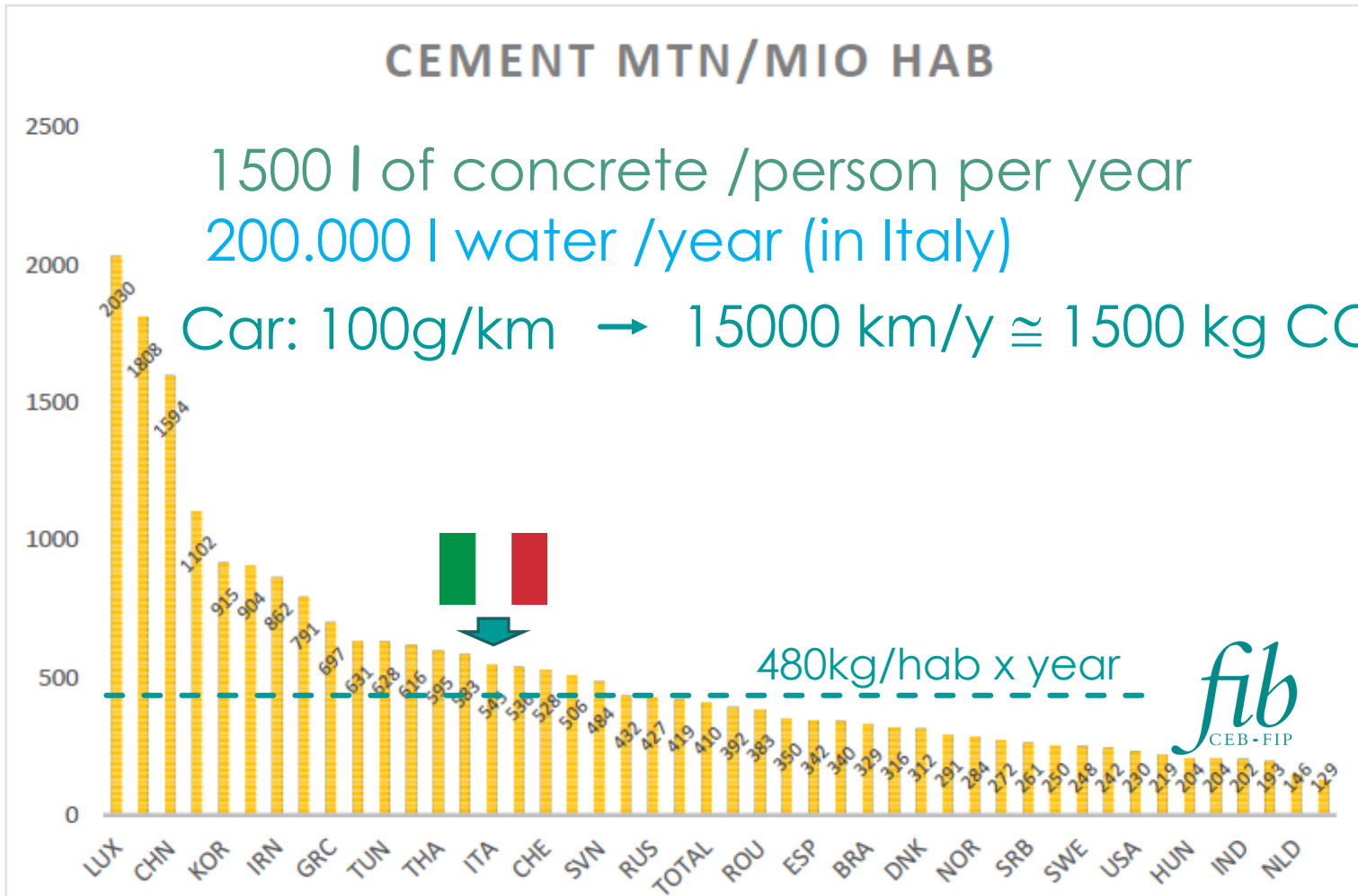
Roma, September 29th

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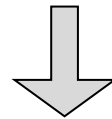
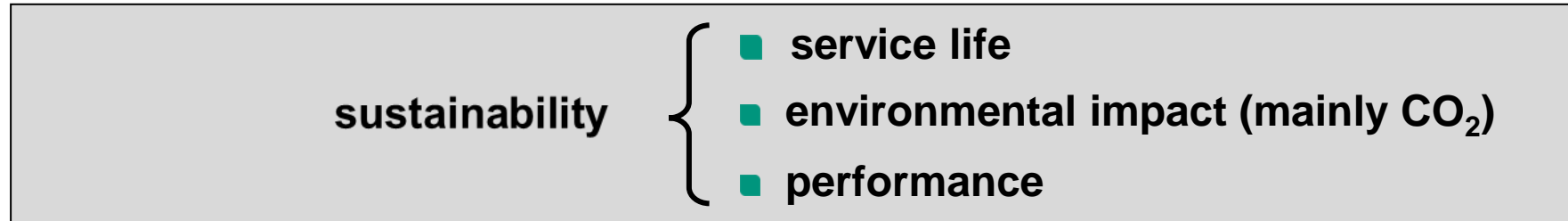


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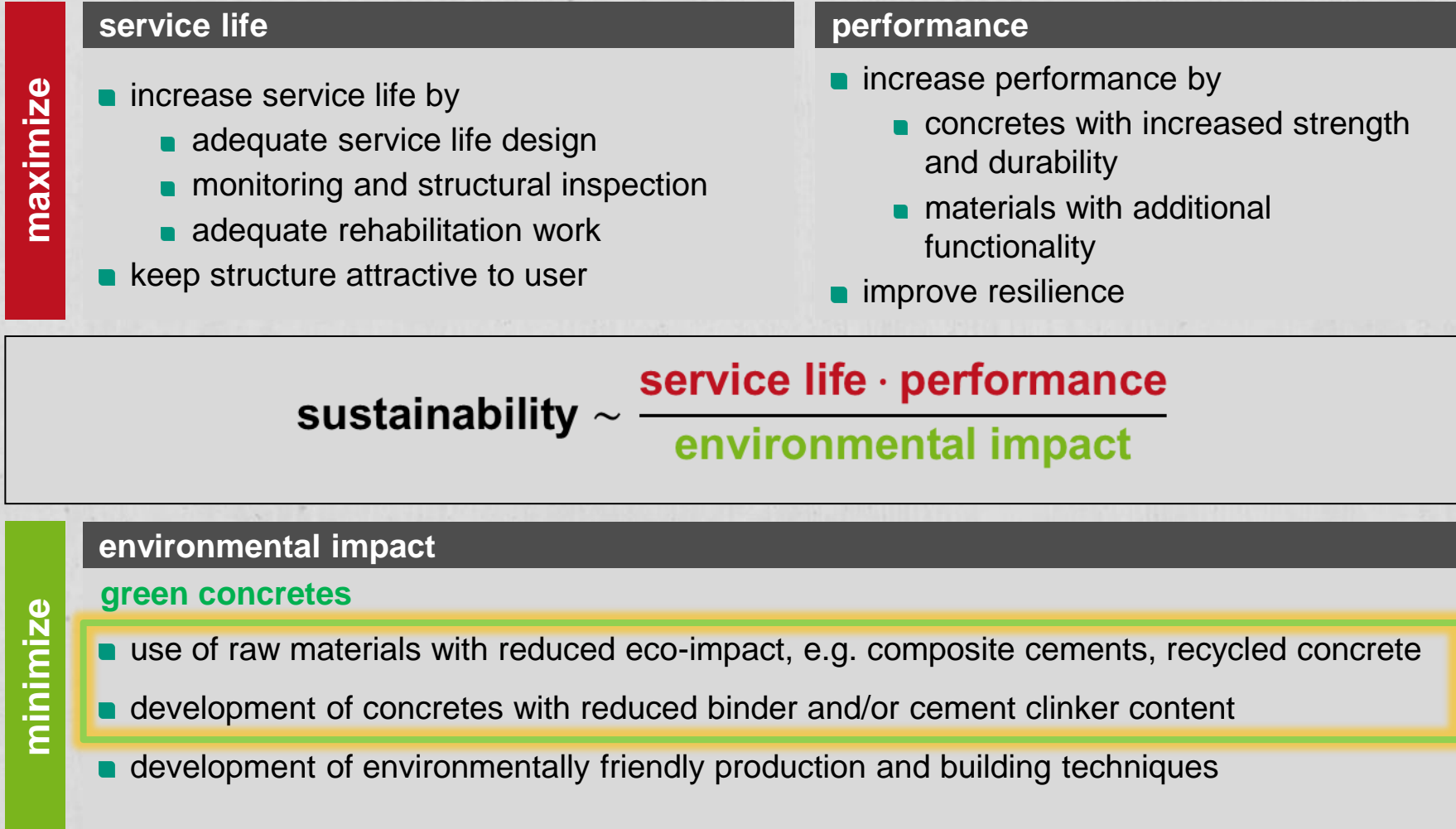


Sustainability related to structural concrete – main effecting parameters



by Harald S. Müller

Sustainability of structural concrete



by Harald S. Müller

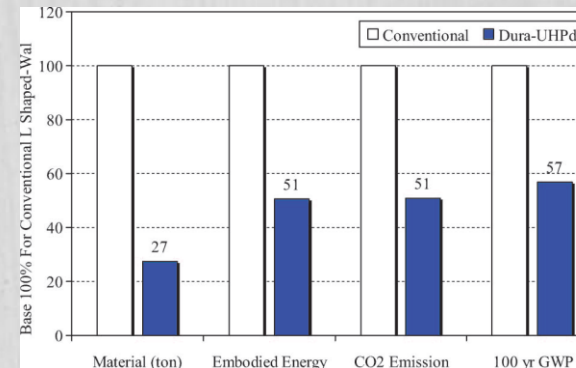
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Why FRC structural solutions should be more sustainable than conventional RC ones?

- less concrete
- less steel
- smaller crack widths
- stiffer response at SLS
- more durable in relation to fatigue loads
- more ductile
- larger specific toughness
- more robust with reference to unexpected load conditions (more resilient)
- lower amount of human workmanship
- higher costs in recycling if steel has to be separated by concrete



(by Voo/Foster, 2010)

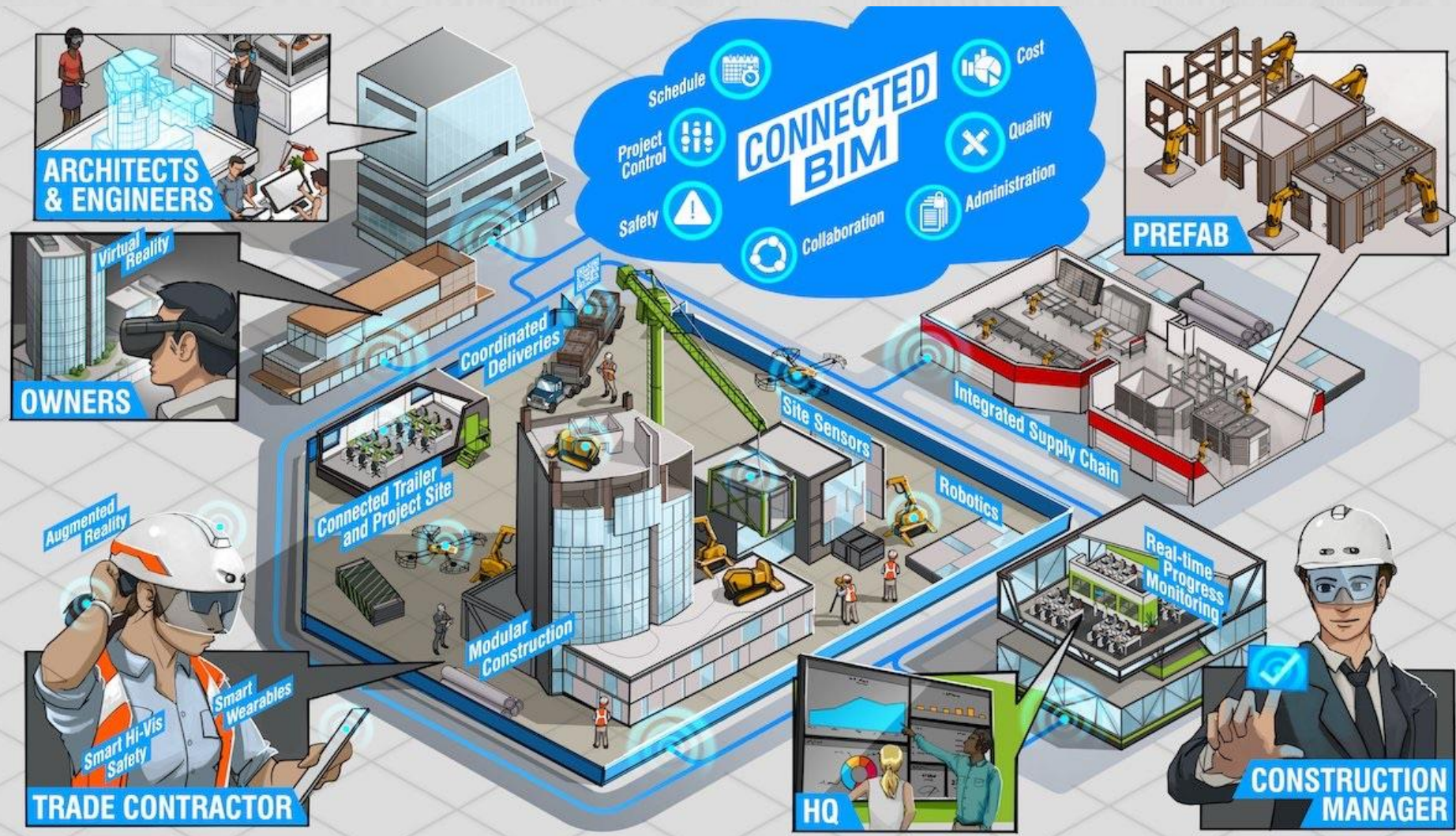




How to implement a climate limit state condition for design at the (structural) component level?

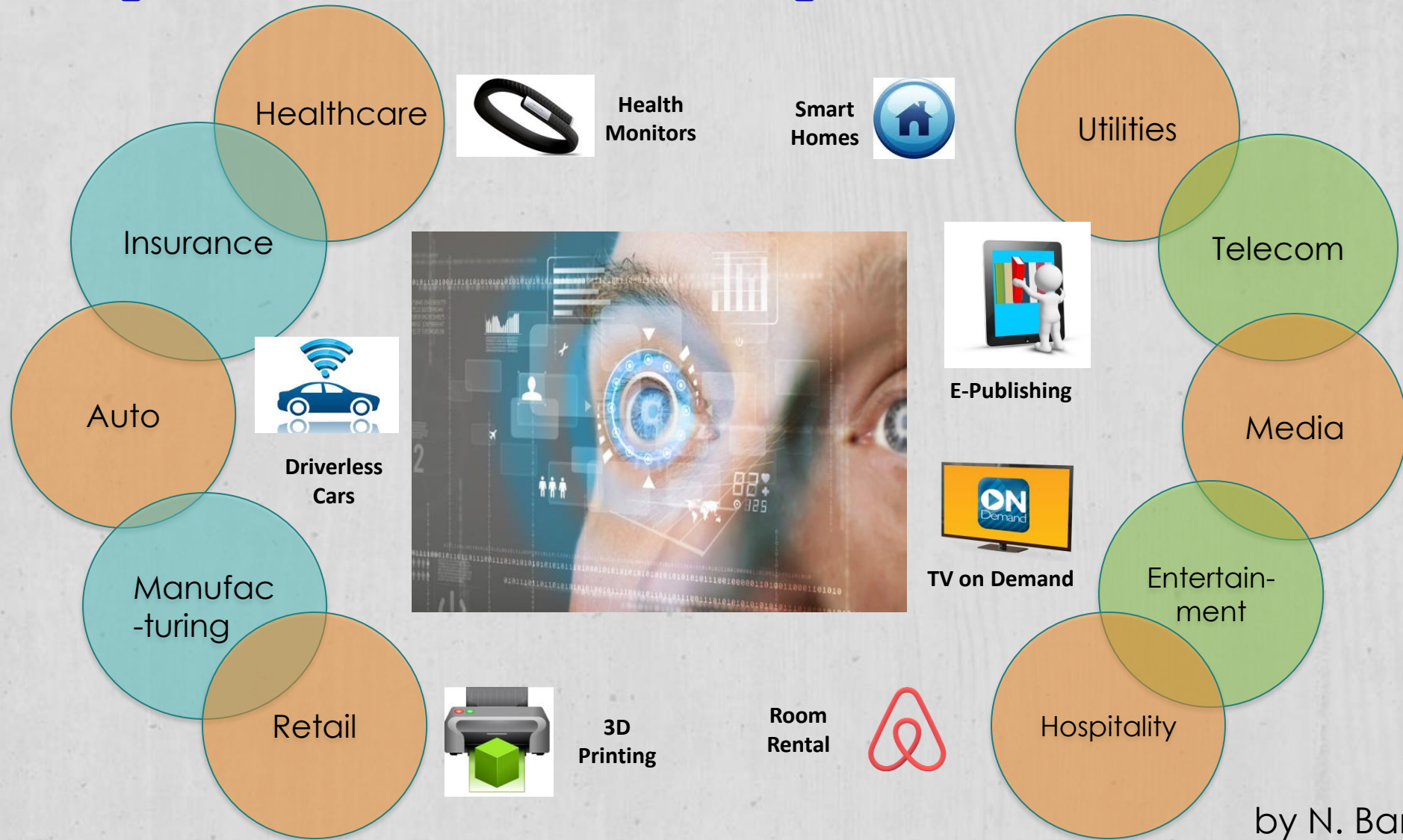
Bild: Baunetz (y/k, Berlin)
<https://www.baunetzwissen.de/beton/fachwissen/skelettbau/grundlagen-der-skelettbauweise-151088>

The building process tomorrow



by N. Banthia

Digital Innovation: Horizontal Integration



by N. Banthia

Boundaries are Blurring

In the **DIGITAL AGE**, Construction Sector Remains Vertically Integrated



Computer Sciences

- Algorithms
- Models
- Systems
- Networks
- Data
- Security
- Performance
- Robustness



Horizontal Integration

by N. Banthia

Monitoring



by N. Banthia

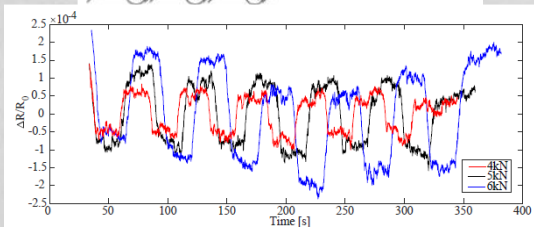
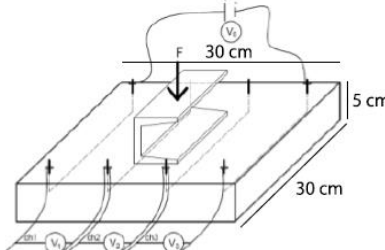
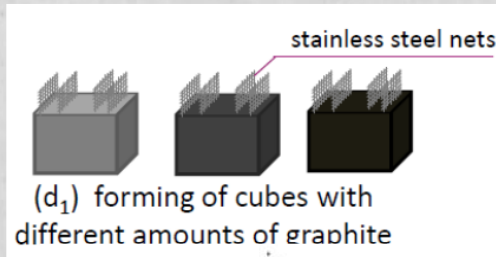


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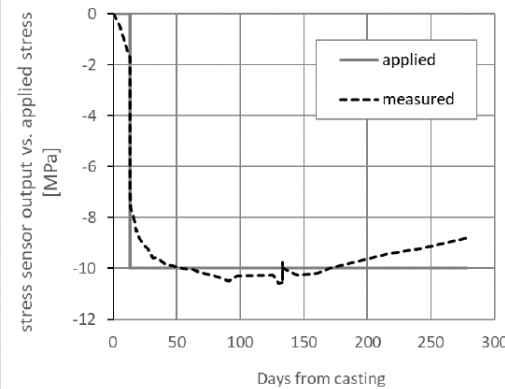
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P2: Smart technologies for safety and security

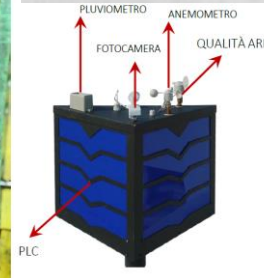


Univ. di Perugia



1. the sensor placed inside a specimen subjected to shrinkage should give a stable nil output;
2. the sensor placed inside a specimen subjected to constant stress should give a constant output equal to the one achieved during short term load test at the same stress level.

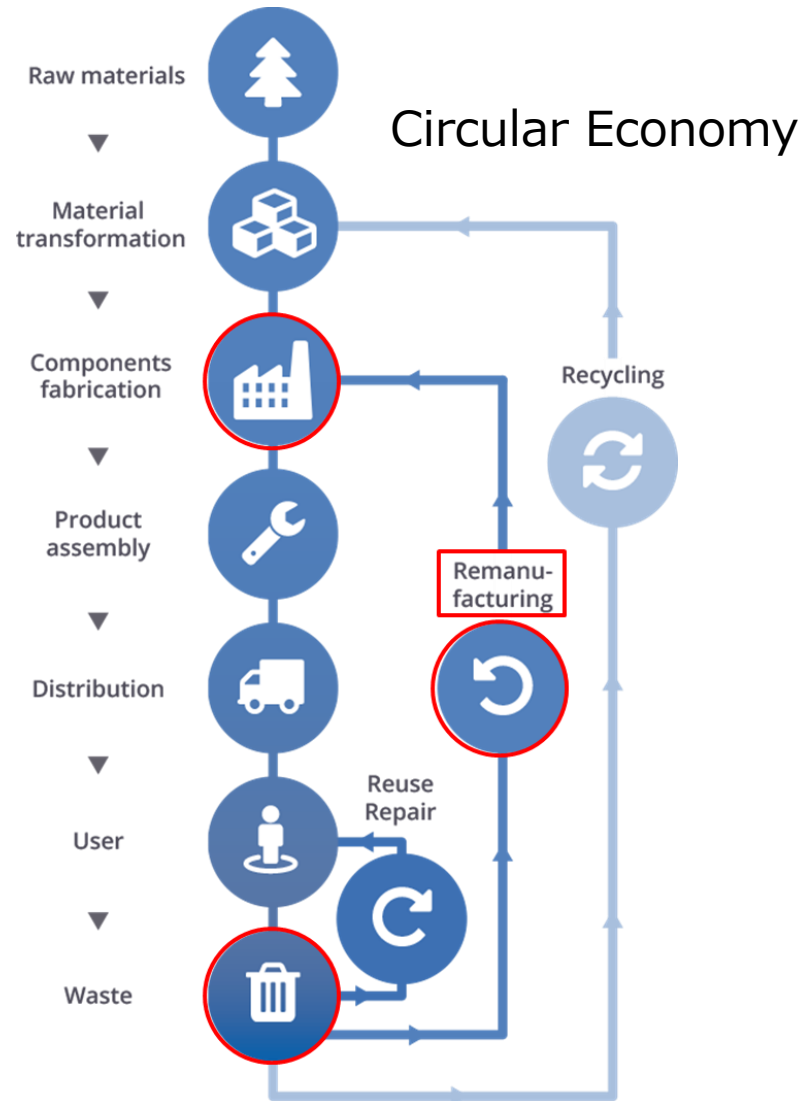
Politecnico di Torino
ST-MicroElectronics



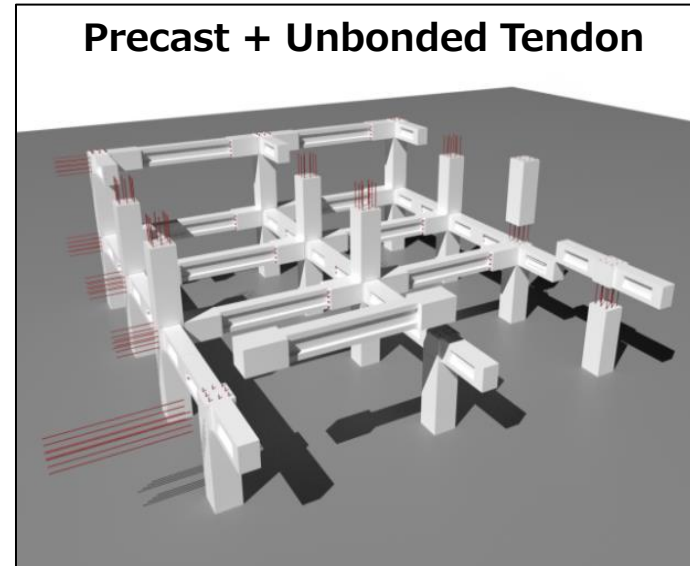
Manini S.p.A.

2. Future envisioned by Model Code 2020

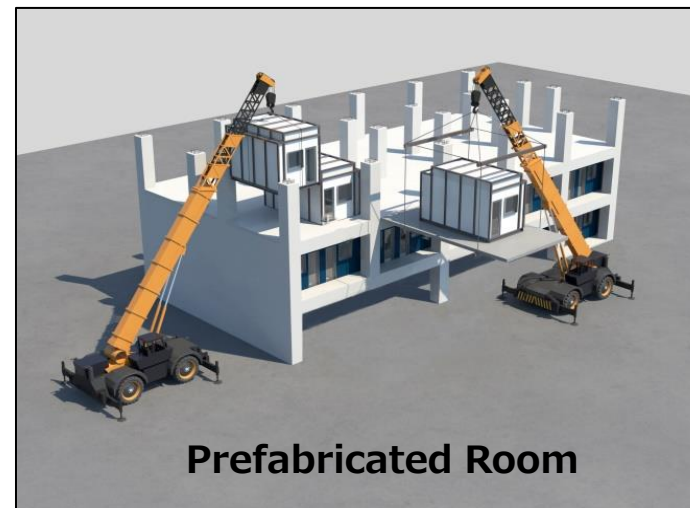
2.3 Multi-cycle concrete structure



<https://www.remanufacturing.eu/about-remanufacturing.php>



Consolis



by A. Kasuga

KEY: Minimizing CO₂ emissions and cost

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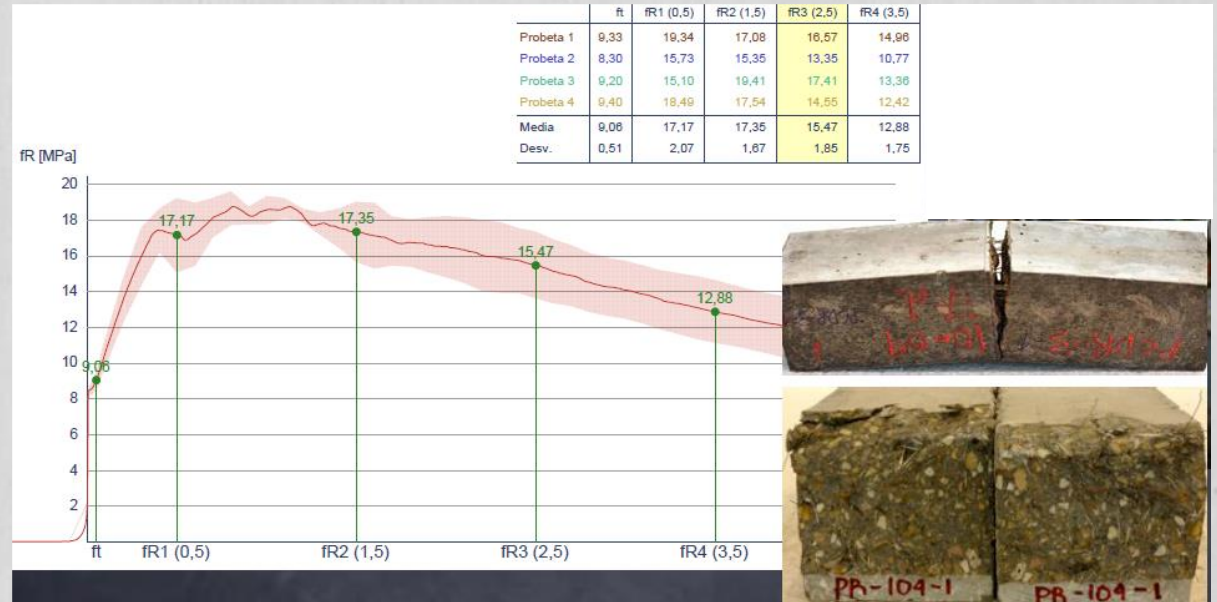
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Methods of construction have surprisingly barely evolved (Photo: © Tom Mundy, ETH Zürich).

UHPFRC for precast wind tower tubular shafts

Ecoventia



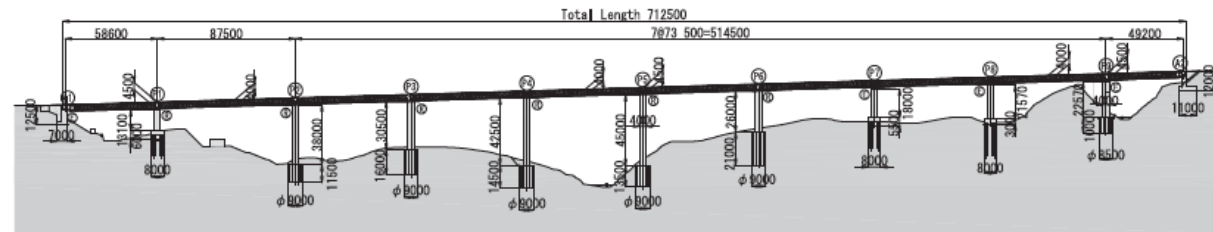
by J.C. Lancha

To design with Concrete Zero-CO₂ emission

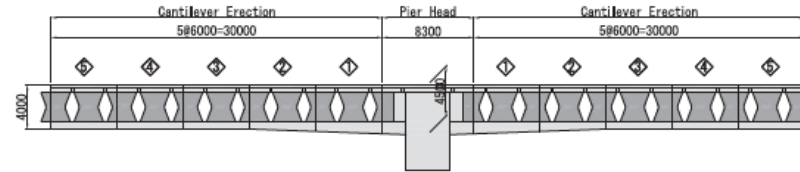
Takubogawa Bridge

by A. Kasuga

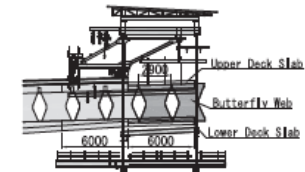
Side View



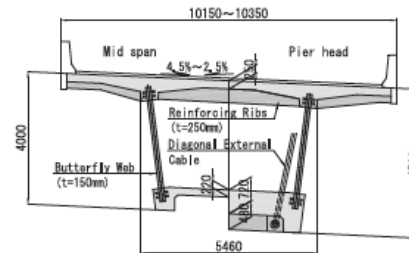
Segment Arrangement



Cantilevering Erection



Cross Section



Butterfly Web Panel

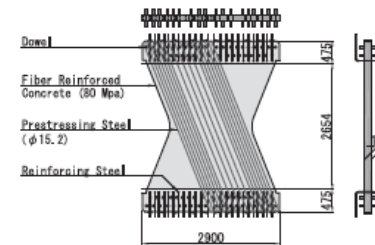


FIGURE 2 Drawings

Retrofitting (Special Case)



UHPC-BEAM AS STRUCTURAL PRODUCT FOR SHEAR STRENGTHENING OF BRIDGES (CoBeam)

Dr. Hermann Weiher

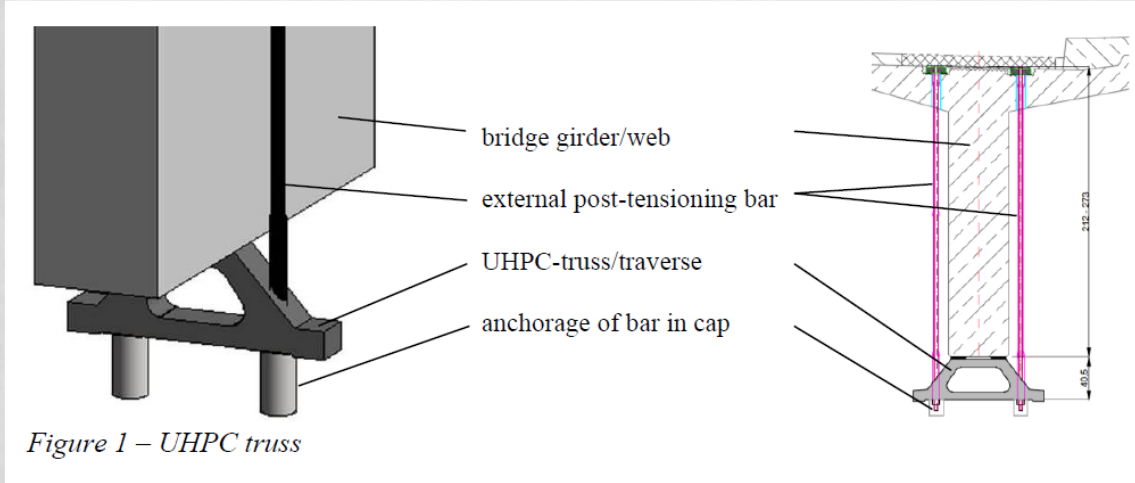


Figure 1 – UHPC truss



Figure 5 – specimen after demoulding

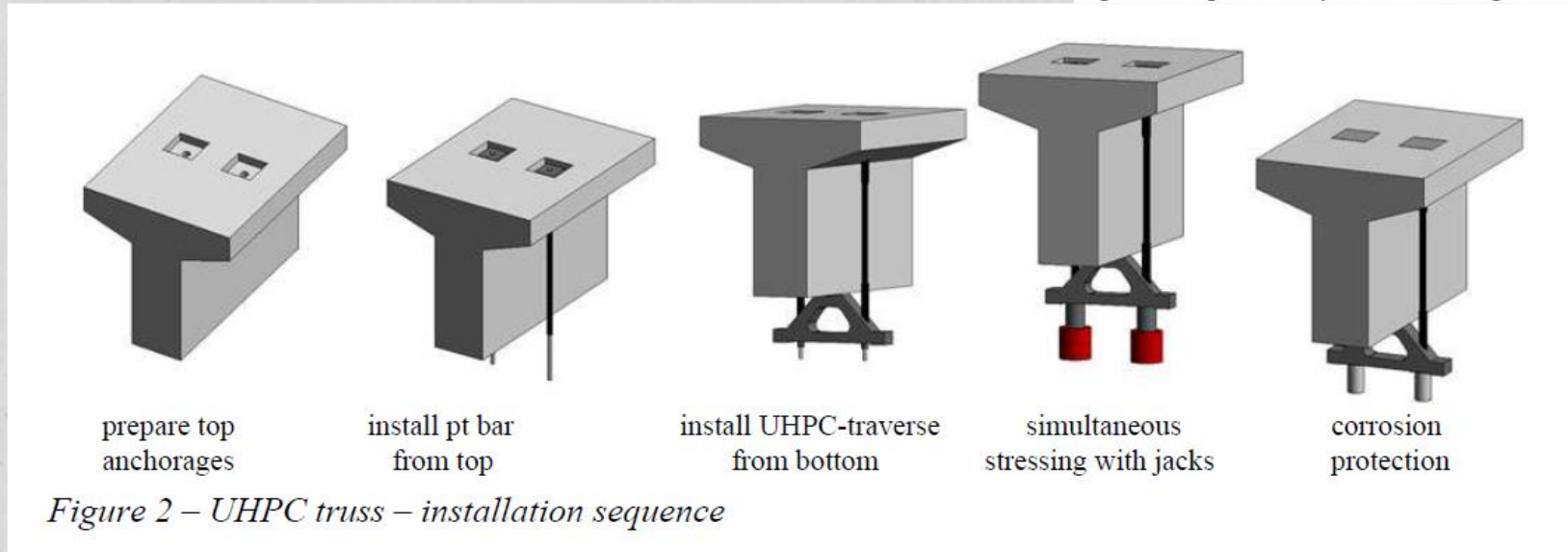


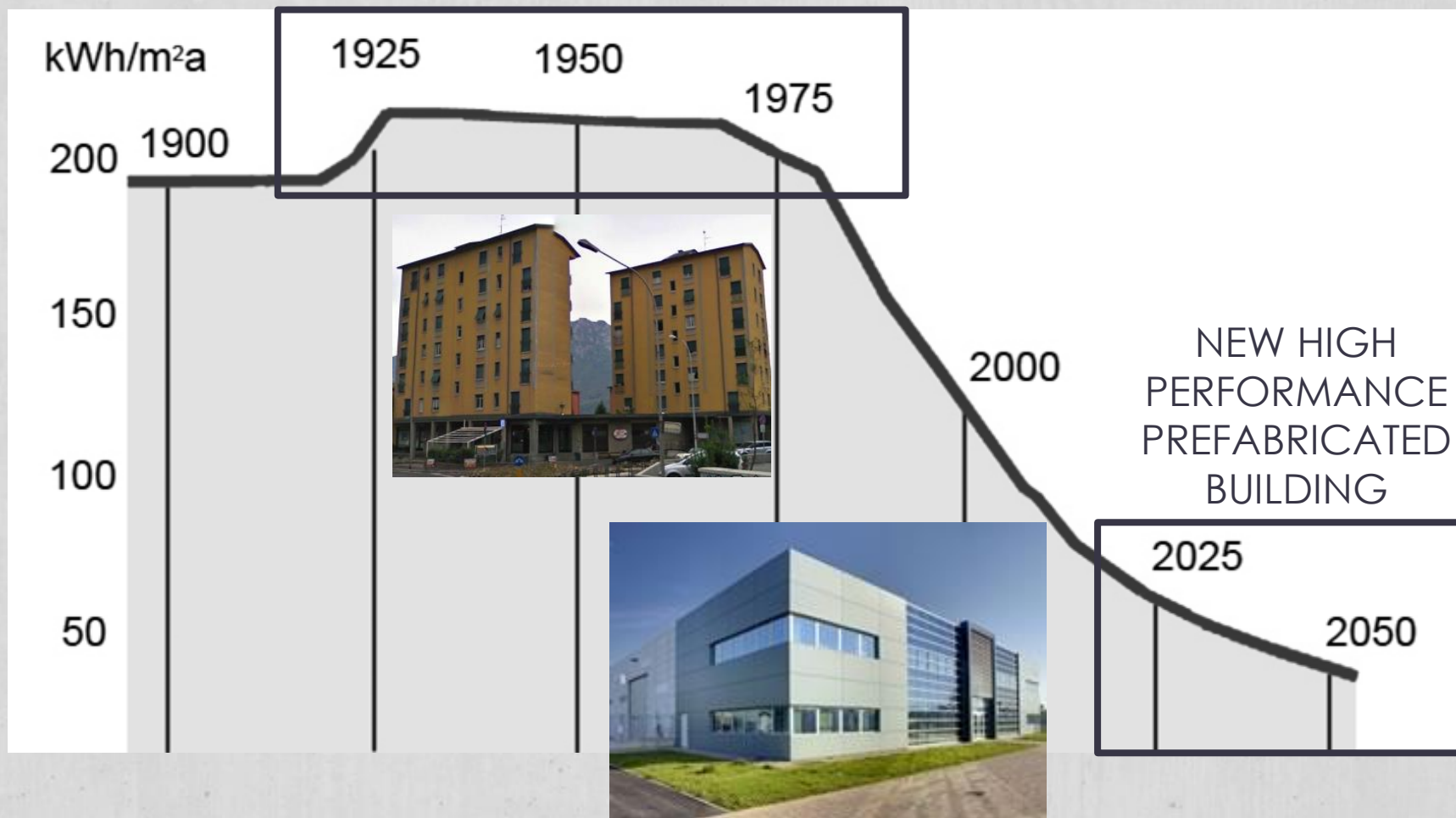
Figure 2 – UHPC truss – installation sequence

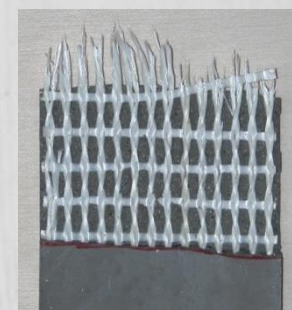
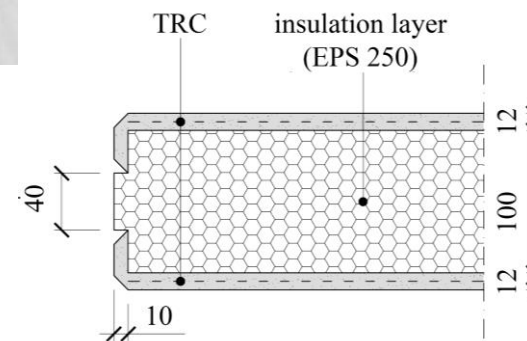
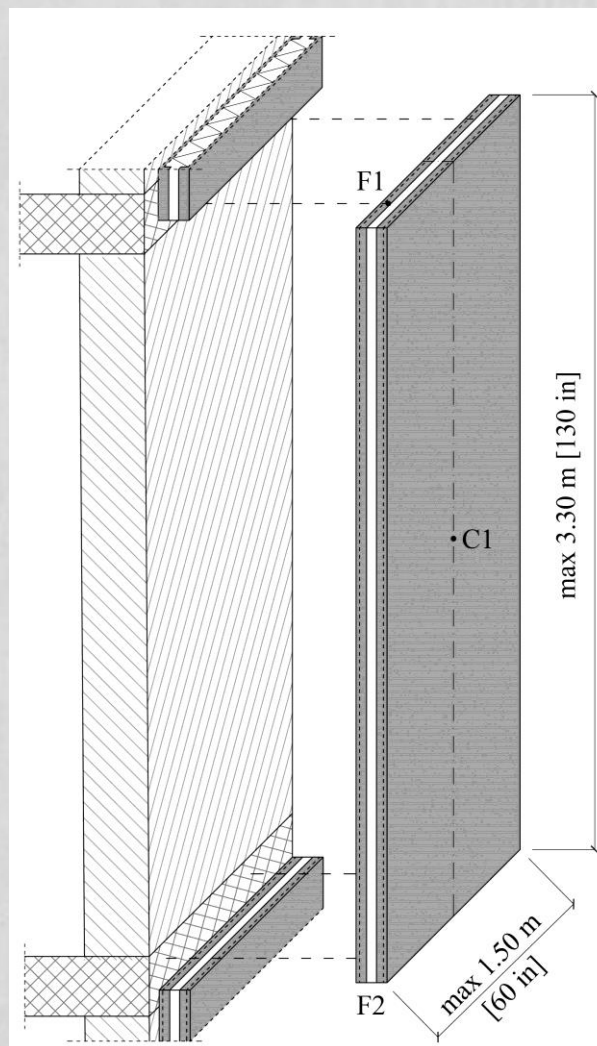
Isarbrücke Bad Tölz



Figure 13 – installation of top anchorage and mortar for UHPC-truss contact to girder

ENERGY RETROFITTING OF EXISTING BUILDINGS






TRC

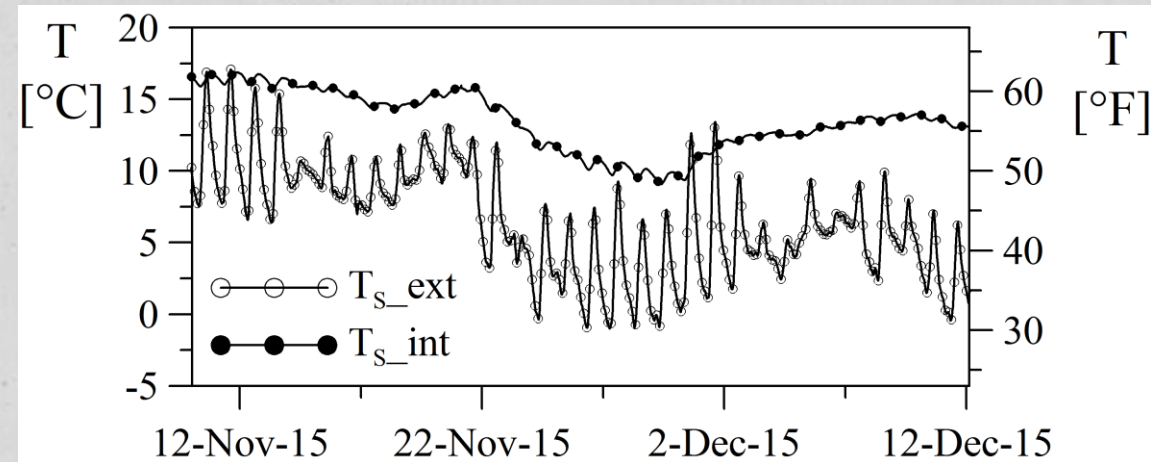


EPS

EASEE – monitoring of the Italian demo building



$U_{pre} = 0.83 \text{ W/m}^2\text{K}$

 $U_{post} = 0.27 \text{ W/m}^2\text{K}$
 (-68%)



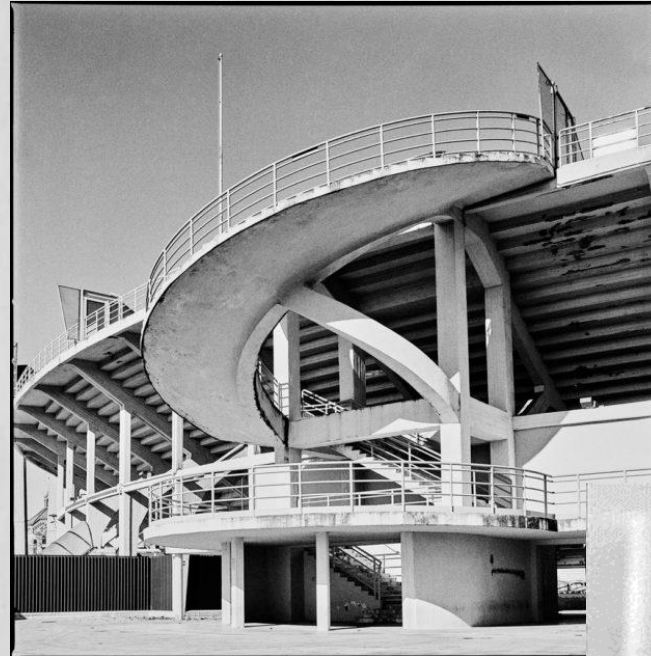


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New Nervi laboratory
at Politecnico di Milano



Thank you
for
your attention!

What to demolish,
what to
redevelop?

