Global perspectives on precast concrete

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LafargeHolcim

LafargeHolcim Facts and figures

~80
countries

~2,300
operating sites

~75,000
employees

27.5
billion CHF net sales

All figures Full Year 2018

The global leader in building materials and solutions

Listed on **SIX** and
Euronext

LafargeHolcim four business segments

Cement	**45,194** employees	**221.9** million tonnes sales volume	**270** operating sites
Aggregates	**9,639** employees	**273.8** million tonnes sales volume	**663** operating sites
Ready-Mix Concrete	**12,800** employees	**50.9** million m^3 sales volume	**1,448** operating sites
Solutions & Products	• Precast concrete • Asphalt • Paving • Dry mortars • Contracting & services		**2.4** billion CHF net sales

All figures Full Year 2018

Innovation

With over 300 researchers working for LafargeHolcim and together with partners throughout our ecosystem, we aim to find and leverage innovations along our entire value chain, from processes to products, from quarry to worksite. In 2018 we launched 94 new products and filed 13 new patent applications.

>300

Researchers working within LafargeHolcim

94

new products launched &13 patents filed in 2018

Ductal is a UHPC for a range of applications in architecture and engineering projects

Ductal® is an ultra-high-performance concrete (UHPC), reinforced with organic, metallic, stainless steel or glass fibers.

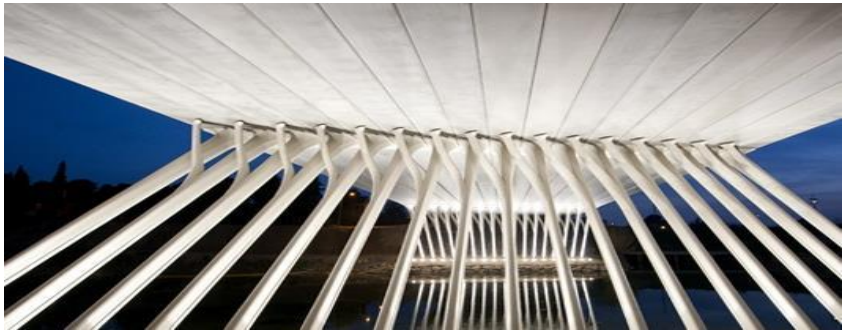
System solution with a range of superior properties: Strength, imperviousness, chemical resistance, freeze-thaw resistance, ductility, aesthetics (Video)

ARCHITECTURE

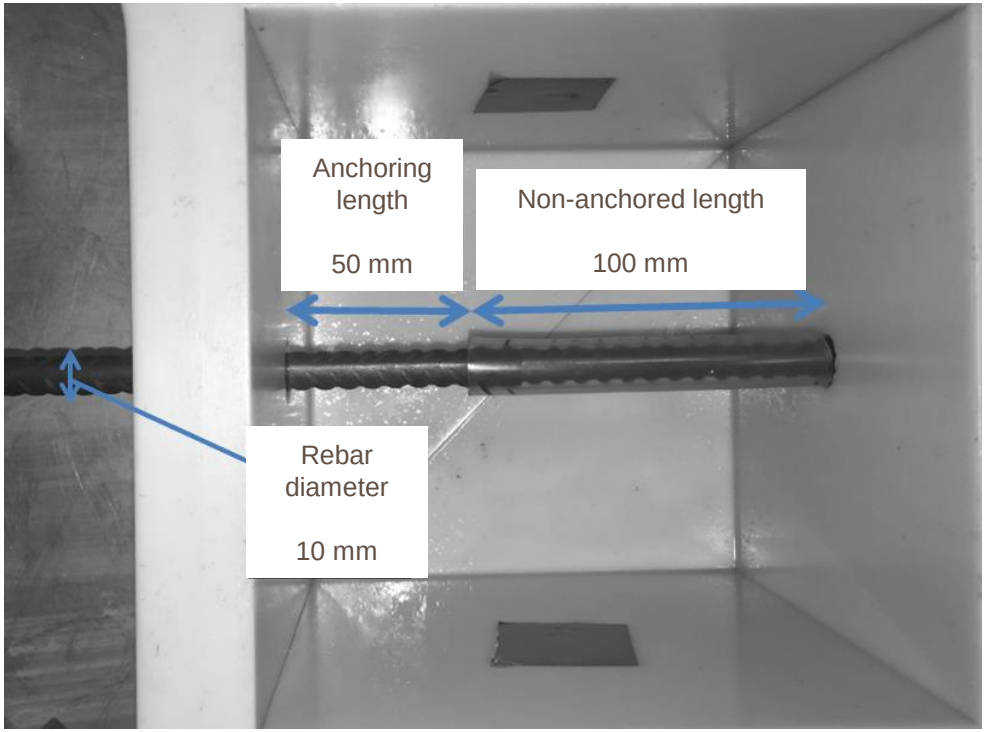
- For rainscreen cladding, custom building envelopes and structural elements

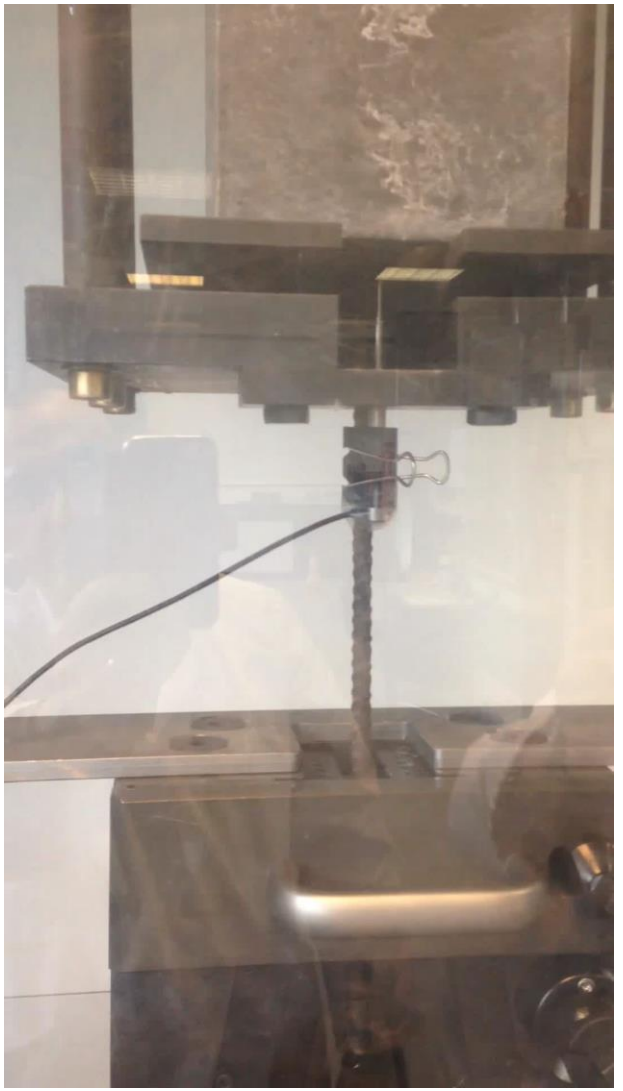
ENGINEERING

- Bridge solutions, buildings and hydraulic structures



Ductal has very high adhesion strength, allowing for minimal rebar anchoring lengths

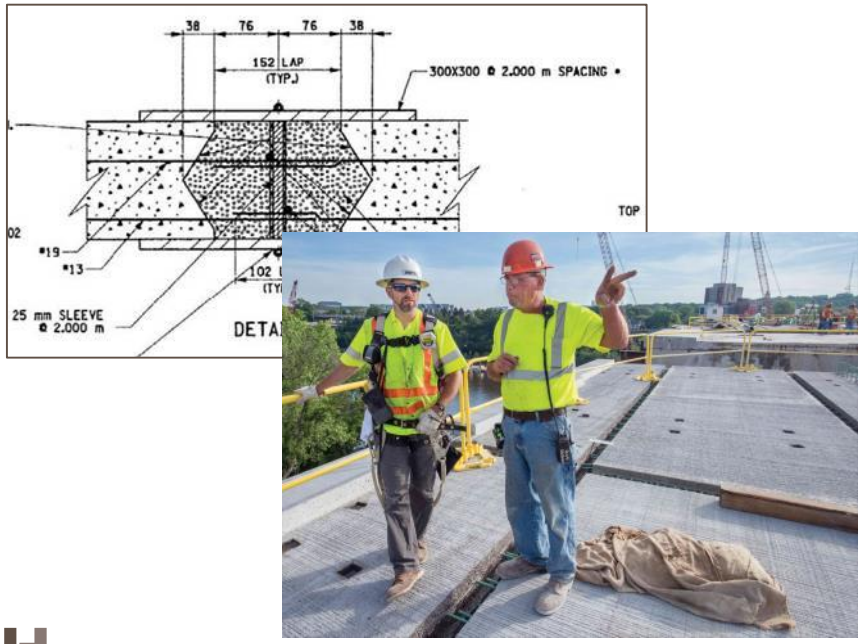




Precast projects or existing constructions can meet highest seismic requirements with Ductal

Precast Bridge Deck Joints

- Combination of precast bridge decks and cast in place Ductal
- Superior bonding characteristics, ductility and strength offer a unique solution to join precast elements in high seismic zones



Pier Jacketting

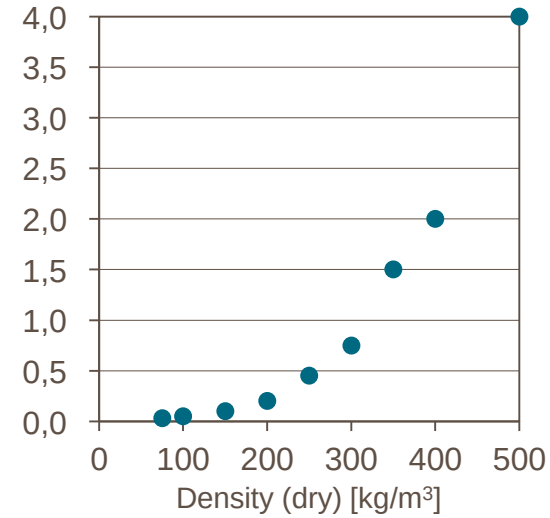
- Seismic retrofit existing bridges and structures
- Ductal provides exceptional high seismic deformation capacity using a thin jacket

Airium is a breakthrough thermal insulation technology

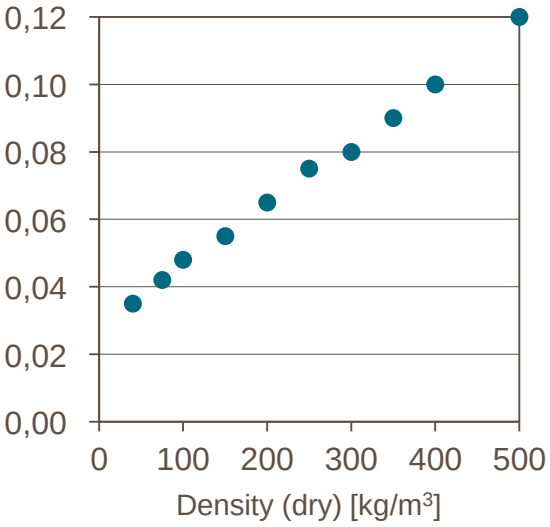
AIRIUM
Insulation Redefined

- Airium is a top-tier mineral insulating foam technology
- The mineral foam is the result of a homogeneous mix between a slurry and an aqueous foam
- Airium is a range: depending on the density, different properties can be achieved between insulation performance and structural resistance

Compressive strength [N/mm2]



Lambda [W/Km]



Today, the 5 first mastered applications of Airium are:

AIRIUM
Insulation Redefined

Low density < 100 kg/m³

‘Blockfill’ – Filling of concrete Blocks

Attics

Mid-density ~100-500 kg/m³

Walkable Roof Terraces

Prefabricated wall elements

Groundfloor / sub-screed insulation

Airium is an opportunity for precast concrete producers in Block Fill or Wall Systems

AIRIUM
Insulation Redefined

Block Fill

What is it?



Blocks filled with a low density Airium™ (70 to 150 kg/m3), injected into any block in a precast environment

What benefits? (e.g. FR)

- Increased carpet area: +4%
- -10% heating/ cooling costs vs hollow blocks
- Fully fire resistant
- Lower CO_2 and 100% recyclable
- No additional soundproofing layer


Fabtherm 1,1


Fabtherm 1,8


Kosmo city

SW / Wall Systems

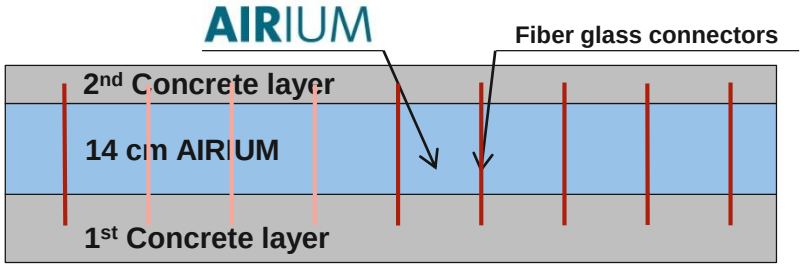
What is it?



Airium™ with a low density (100 to 180 kg/m3), is injected into any type of Double or Sandwich wall design within a precast environment.

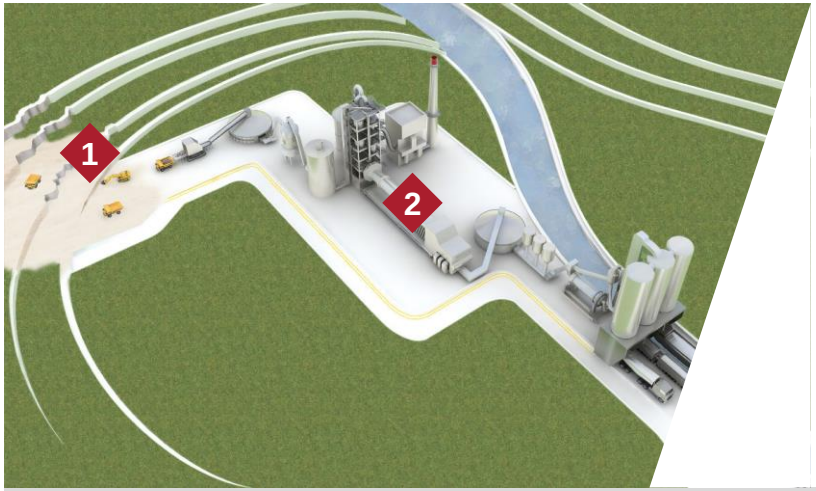
What benefits? (e.g. AUS)

- Recyclable
- “Fully Mineral” (Safe, long-lasting, healthy)
- Fire resistance
- Lower CO_2 footprint



Solidia cement is a low CO_2 solution for precast paver and block products

SOLIDIA®



From the cement plant …

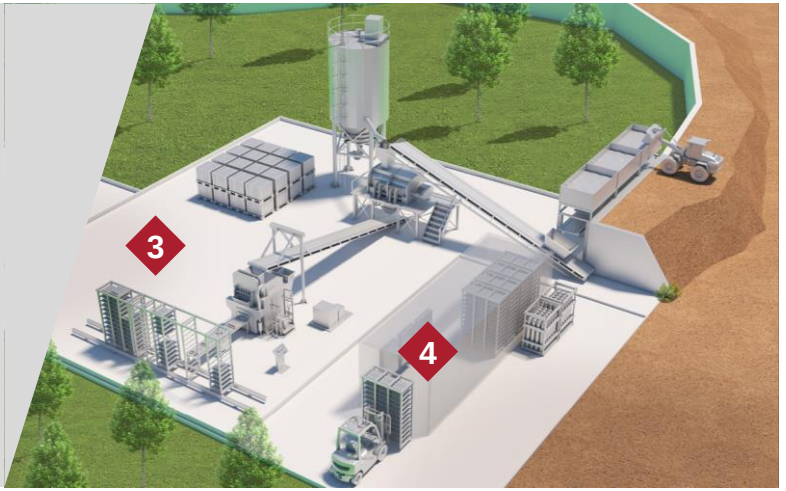
1. Same raw materials as OPC but with lower limestone content, reducing CO_2 emissions from decarbonation.
2. Produced in normal kilns at only ~1250°C resulting in lower fuel emissions.

Up to 30% lower CO_2 emissions in cement production

… to the Precast plant

3. Precast products are produced using traditional raw materials and the same equipment.
4. Solidia precast products are cured with CO_2 and not with water, in dedicated curing chambers, permanently binding the CO_2 in the concrete material.

Total CO_2 footprint up to 60% lower than OPC



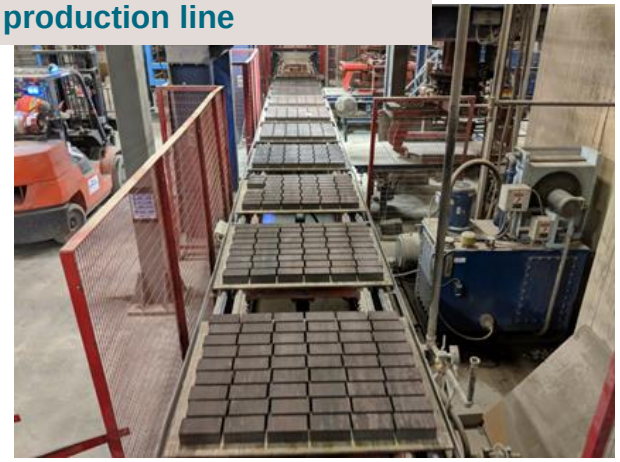
Solidia products have unique properties and can bring operational benefits to precast operations

SOLIDIA®

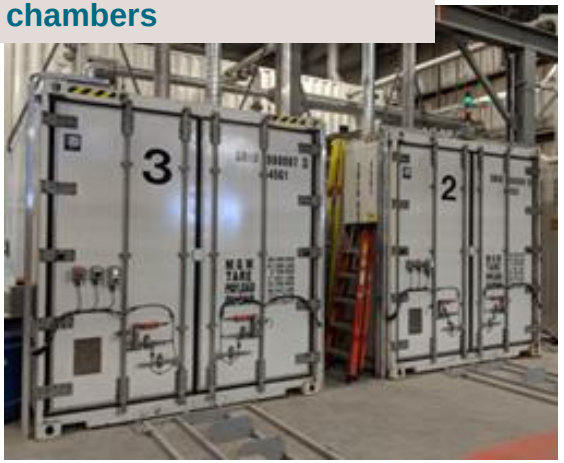
Main Product Benefits for Precast Operations

- Full concrete strength in under 1 day, reducing stocks in precast operation
- Increased productivity from less clean out time
- Cost savings in white cement and admixtures
- Low efflorescence and more vibrant colors

Standard precast production line



Dedicated CO_2 curing chambers



Finished paver with improved properties


LH
ACCELERATOR
Building Innovation Together
www.lh-accelerator.org

LH ACCELERATOR

- Multi-Corporate Start-up Accelerator, formed by leading multinationals in their space LafargeHolcim, China Communications and Construction Company (CCCC) and SIKA
- Seasons of the LH Accelerator:
  - #1 completed in 2018, >300 applications out of which 10 start-ups selected
  - #2 on-going in 2019 program, >250 applications, 12 start-ups selected
- Challenges jointly formulated Countries to select start-ups

 **CONCRETE 2.0** Enhance the properties of cement-based materials beyond the core value of structural integrity	 **CONSTRUCTION WASTE** Rethink the design and process of making and delivery cement and concrete for avoiding, minimizing, reusing the waste from quarries to building sites	 **REAL TIME QUALITY CONTROL** Monitor, test, evaluate and adjust the quality of materials across the supply chain	 **CO2 NEUTRALITY** Use new construction materials and/or measure, track and develop options to move towards neutrality	 **REAL TIME PRODUCT DEMAND FORECAST AT SITE** Develop and apply accurate, real time prediction of demand for product quantities and types by job site	 **MONITOR PERFORMANCE** Monitor performance characteristics of concrete delivery at construction sites and in prefabrication	 **AUTOMATION** Increase use of automation to infrastructure (e.g. ports) and to related construction projects as painting	 **INFRASTRUCTURE & BUILDINGS** Develop and use software models / digitalized visualization of the construction phases in infrastructure (such as roads and bridge) and building projects

LafargeHolcim