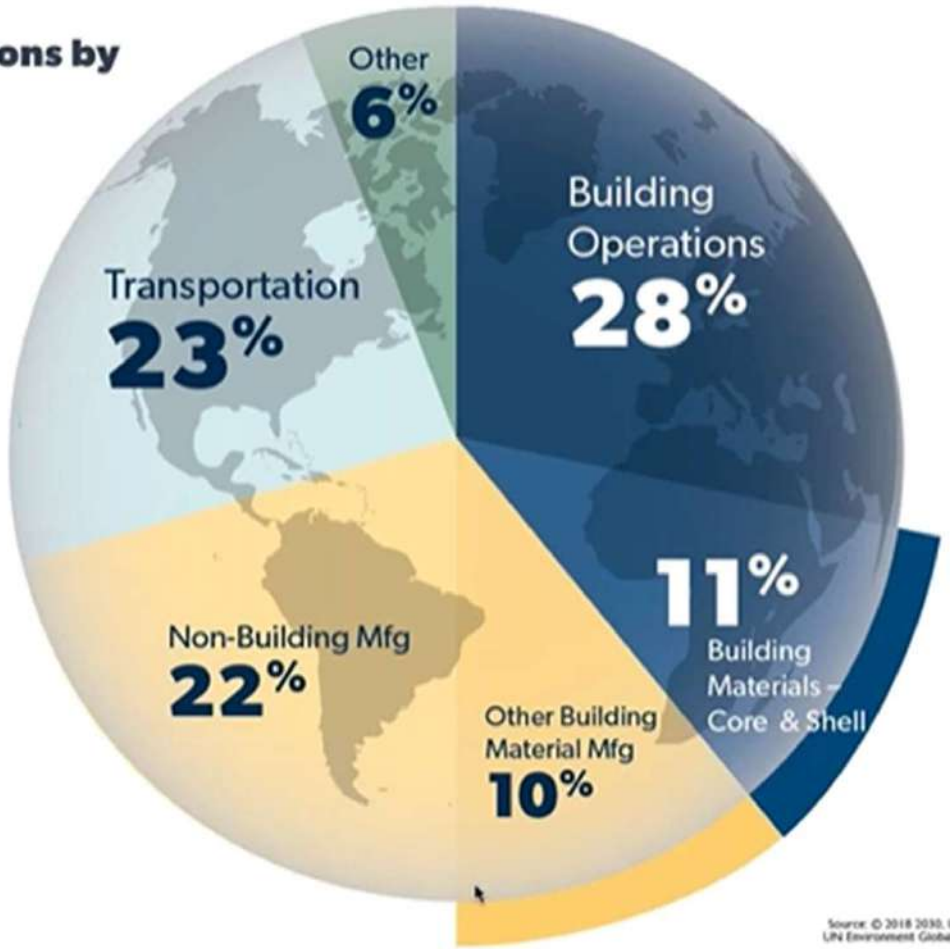
ASSET meet and learn session

Eurodelta Amsterdam
29/11/2024

Total global emissions by sector, 2017



RESOURCEFULL

Meest gebruikte door de mens gemaakte materiaal ter wereld

12.500.000.000 m^3 per jaar

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Nederland: 28 cm → **ook veel**

RESOURCEFULL

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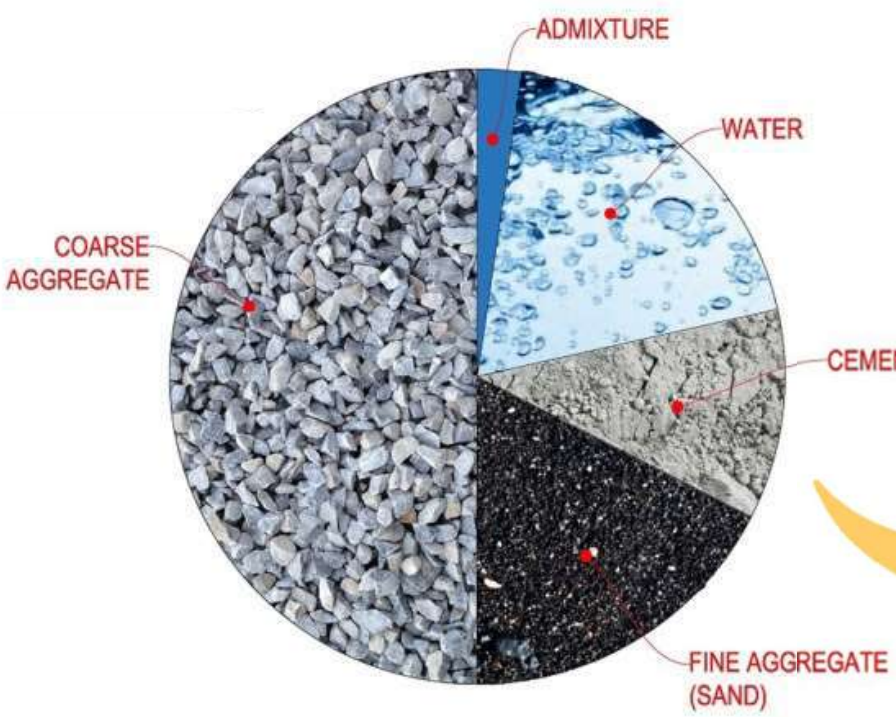
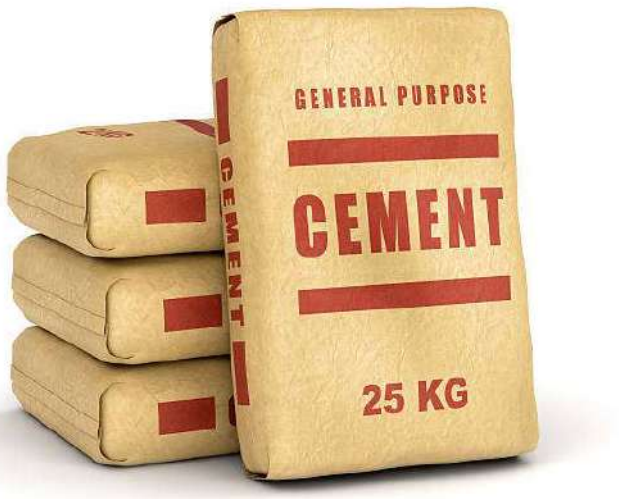
RESOURCEFULL

Beton ⟷ Cement





8 % van de wereldwijde CO_2 emissies

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CEMENT Production Process

A **highly energy intensive** process, producing roughly 0,9 ton of CO_2 per 1 ton of clinker produced.

4.1 billion ton of cement is being produced each year, resulting in a contribution of **8-10%** of worldwide **CO_2 emissions**.

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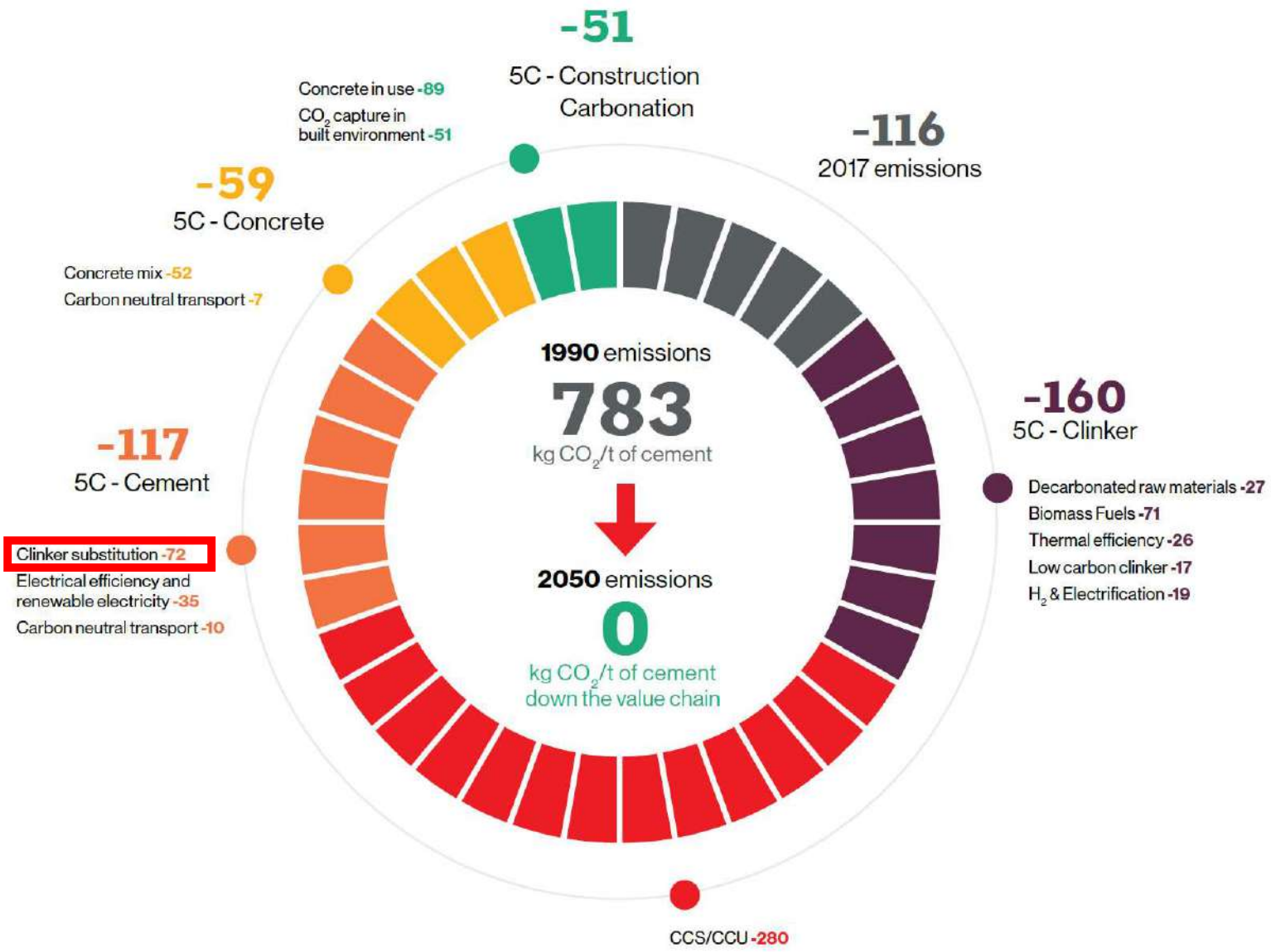
-51
5C - Construction Carbonation
Concrete in use -89
CO_2 capture in built environment -51
-116
2017 emissions
-59
5C - Concrete
Concrete mix -52
Carbon neutral transport -7
1990 emissions
783
kg CO_2/t of cement
-160
5C - Clinker
Decarbonated raw materials -27
Biomass Fuels -71
Thermal efficiency -26
Low carbon clinker -17
H_2 & Electrification -19
-117
5C - Cement
Clinker substitution -72
Electrical efficiency and renewable electricity -35
Carbon neutral transport -10
2050 emissions
0
kg CO_2/t of cement down the value chain
CCS/CCU -280

Metallurgical residue waste piles

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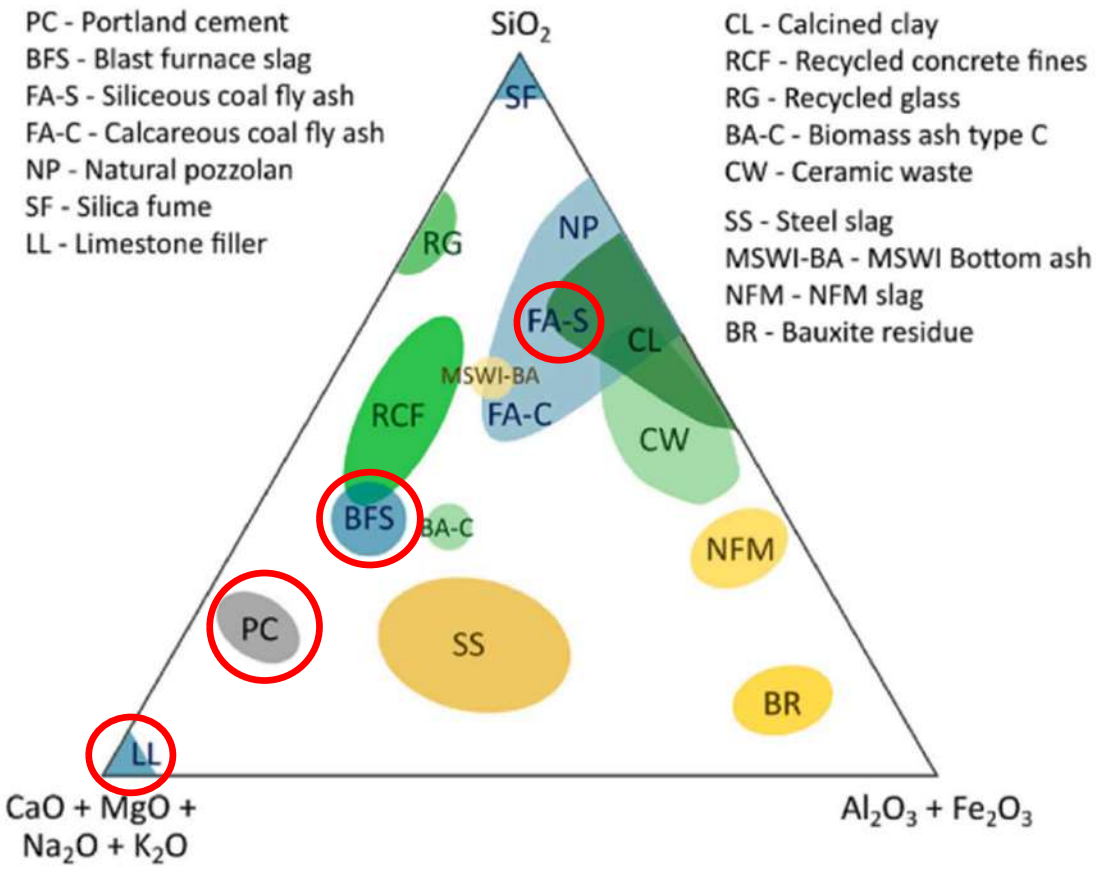
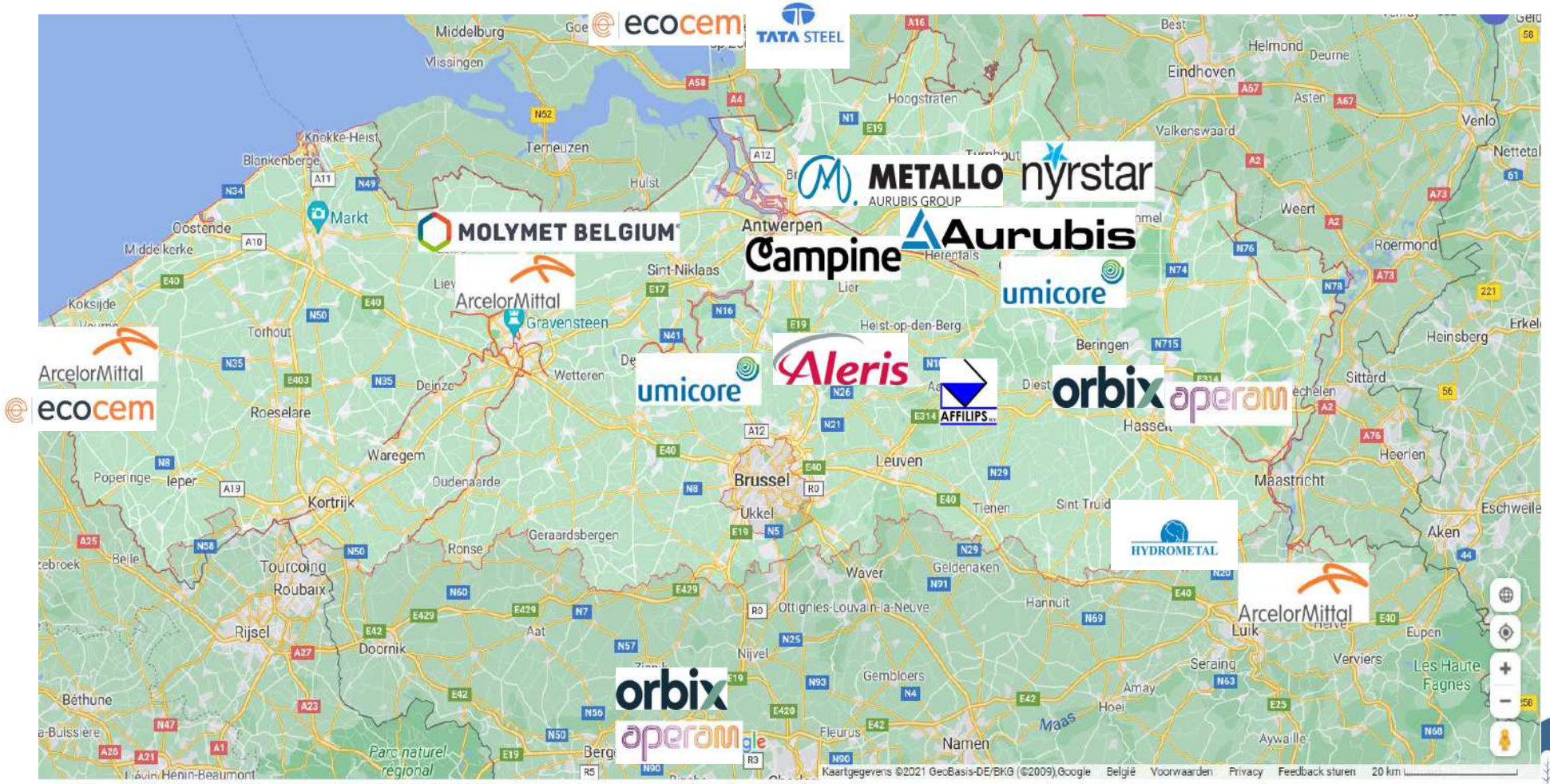


Fig. 1. The chemical composition ranges of common, emerging and future SCMs in a ternary diagram of (earth)alkalis–silica–alumina/iron oxide (in wt%). NFM stands for "non-ferrous metallurgical", MSWI for "municipal solid waste incineration". Commonly used SCMs and fillers are in green shades and emerging SCM sources are in yellow shades. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Slakken uit **Flanders Metals Valley**: ruw ijzer, staal en roestvast staal productie, en non-ferro industrie



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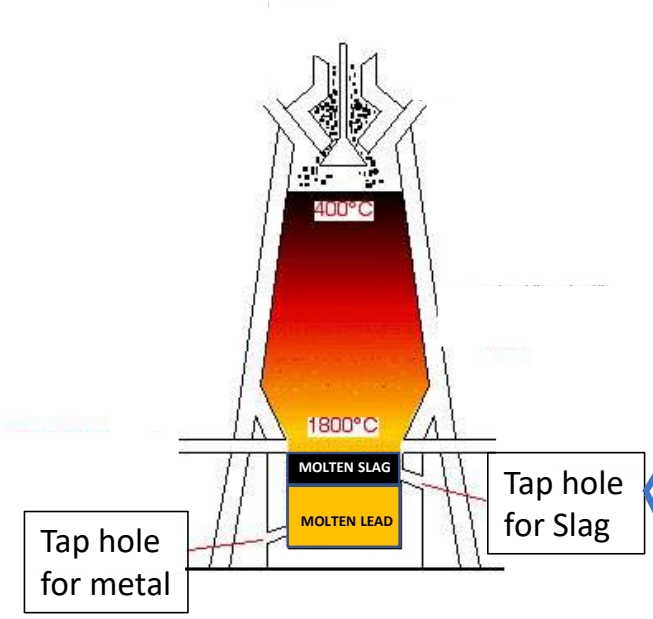
Slak?



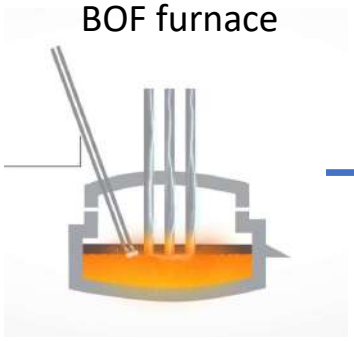
Slag pot cooling

Breaker

Slagstones

Slagsand

Electric arc BOF furnace



Slag granulation

Granulated slag

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Staal slak

From slag to stair

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Your engineering partner for low carbon concrete

1

Pre-treatment and analysis

Chemical analysis
Mineral analysis
Crushing/grinding
Sizing and seperation
Thermal processing

2

Binder development

Alkali activation
Cement replacement
Acid activation
Carbonatation
Mg-cement
Ceramics

3

Product development

3D-printing mortar
Acid resistant mortar
Floor screed
Ready-mix concrete
UHPC
Bricks

4

Performance testing

Aggregate testing
Workability
Strength testing
Freeze-Thaw
Carbonatation

5

Scale - up

Industrial implementation
LCA
Waste legislation
Building legislation

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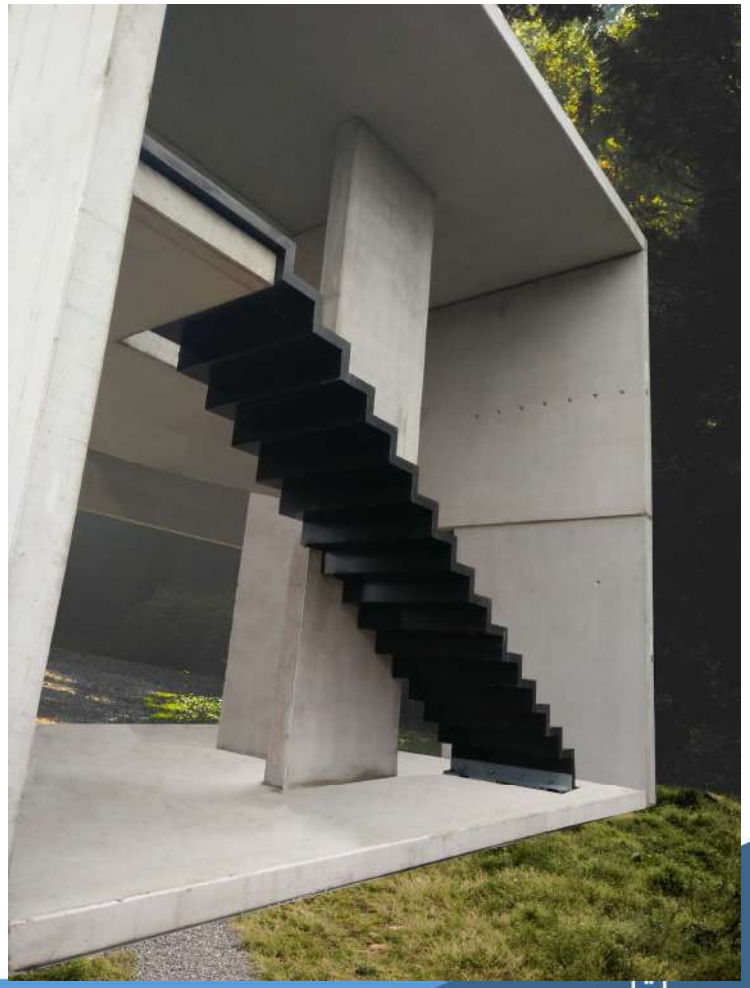
Water granuleren van slak

Water granuleren van slak

UHPC op basis van loodslak



Sandwich paneel op basis van Zink slak

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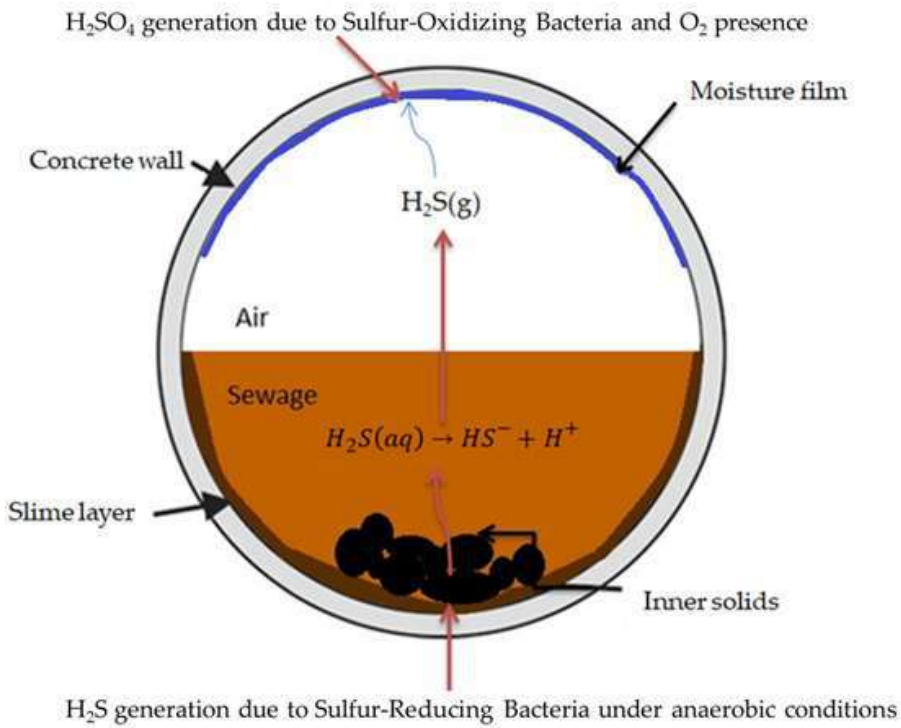
Sandwich paneel op basis van zink slak

Eco-beton klinkers: waterglas GGBFS-Fillinox

Buizen: geopolymeer op basis van slak en vliegas



Marine concrete

Development of 3D printed sea dike reinforcement and water breaking elements.

Zero Cement mortars that are sea water resistant.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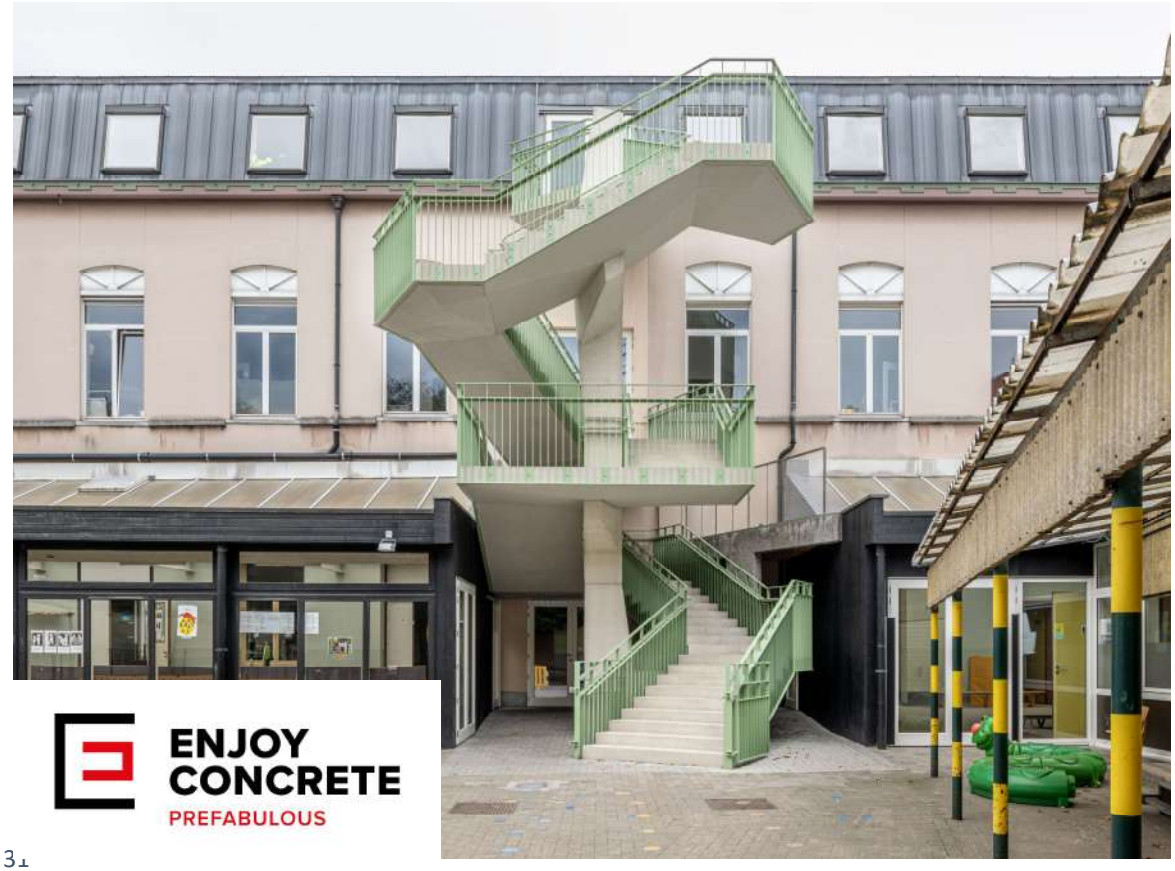
Trap uit ecobeton

- Zelfverdichtend beton C45/55
- Hybride Klinker-GGBFS-Fillinox
- 20 u ontkistingstijd (22 Mpa)



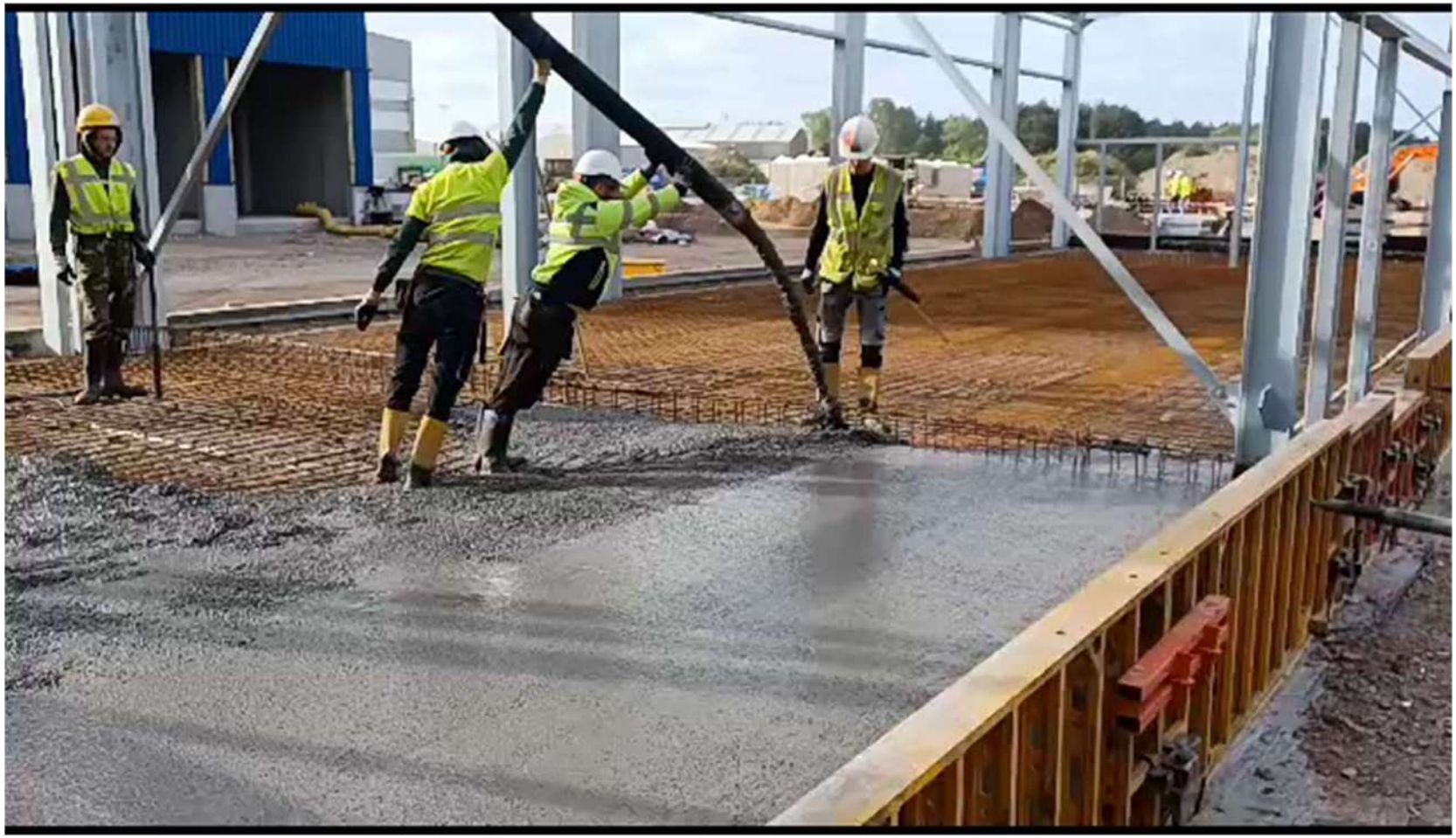
ENJOY CONCRETE
PREFABULOUS

Slenk Tondelier: zerocem GGBFS

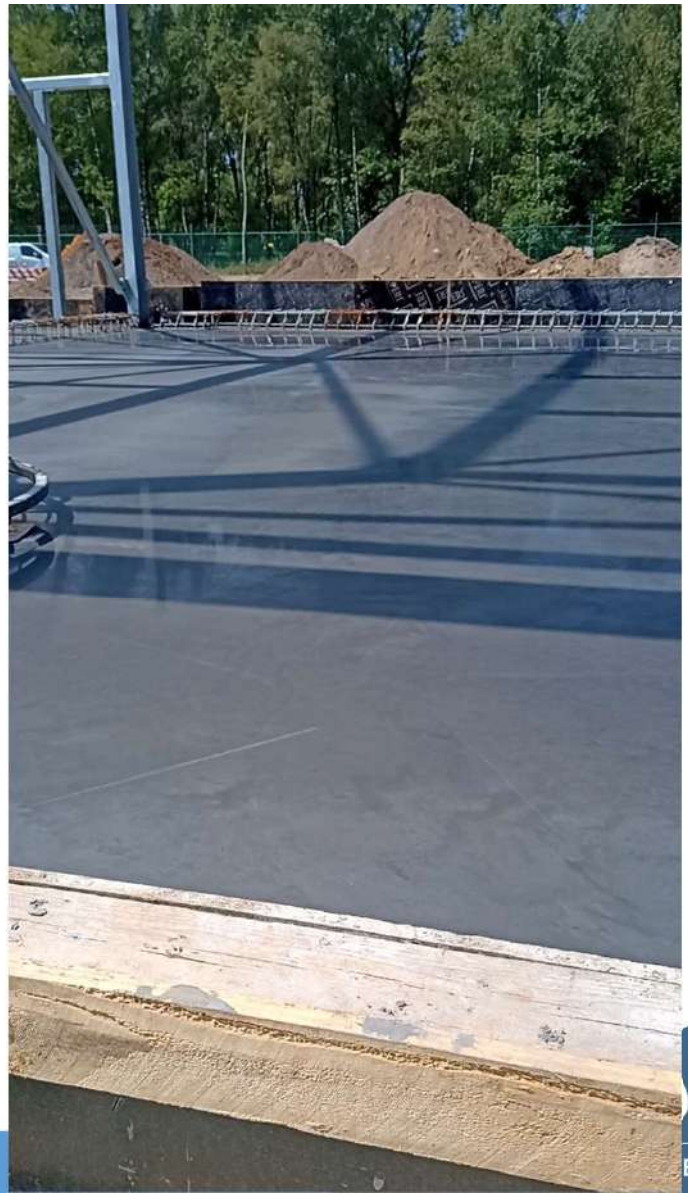
Slenk Tondelier: AC Materials

Polished floor based on copper slag

Polished floor based on copper slag



Polished floor based on copper slag



Ceramics made with steel slag and red mud

Self levelling floors based on steelslag

Self levelling floors based on steelslag

Dry screed

- In Flanders each year +/- **450.000 m³ of dry screeds** (chappe) to cover 6,75 million m² of floors
- This results in an average CO_2 footprint of **9 kg CO_2/m² of screed**
  ⇒ or a total footprint of **60.000 tons of CO_2 every year**
- Screeds is a **non-structural, non-reinforced** layer which is subjected to **environmental class EI**
  ⇒ Perfect for fast innovation
- We developed a low impact screed **< 1,5kg CO_2/m²** with the goal to valorize 80.000 of steel slag as binder

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Building a greener future, together