Webinar

Eco-efficient Recycled Cement produced from waste cement-based materials

FCT project

EcoHydB – "Eco-efficient hydraulic binders produced from waste cement-based materials"

September 2022

TÉCNICO LISBOA

CERIS : Civil Engineering Research and Innovation for Sustainability

FCT Fundação para a Ciência e a Tecnologia

REPÚBLICA PORTUGUESA

Program:

- 15:00 - Opening
- 15:05 - **Introduction** - EcoHydB presentation and Introduction to Recycled cement

  JA Bogas
- 15:15 - **Microstructure and hydration behaviour of recycled cement**

  JA Bogas
- 15:30 - **Recycled cement thermoactivated at different temperatures**

  Sofia Real
- 15:45 - **Characterisation of the fresh and hardened properties of RC mortars**

  Ana Carriço
- 16:00 – **RC in more sustainable concrete. Towards green concrete**

  Ana Carriço
- 16:15 - **Life cycle assessment of thermoactivated recycled cement production**

  Vitor Sousa
- 16:30 – **Discussion** (Q&A)
- 17:00 - Closure

Introduction

Construction Industry

(EU green deal)

Non-renewable resources

≅ **50% of all extracted material**

economic growth decoupled from the extraction of natural resources

CDW landfill

≅ **35% of EU waste**

≅ **10 Bt/year (world)**

≅ 900 Mt/year (EU)

(≅ **400 Mt/year**, excluding excavated soil and dredging spoil)

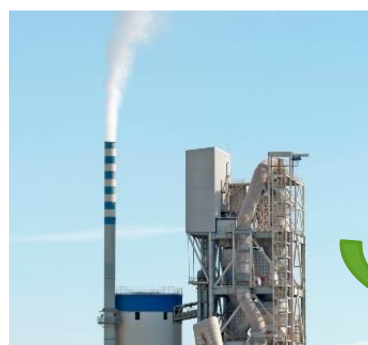
At least 70% CDW reuse

(Directive 2008/98/EC)

Excluding backfilling

GHG emissions

≅ **up to 12% CO_2** from material extraction, manufacturing, construction and renovation products



Less 55% by 2030

Carbon neutrality by 2050

Concrete Industry

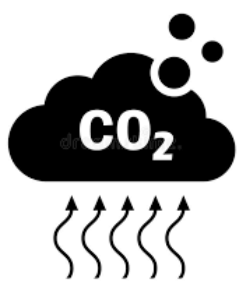
Natural resources

2.4 tonnes per m^3 concrete

CDW Recycling

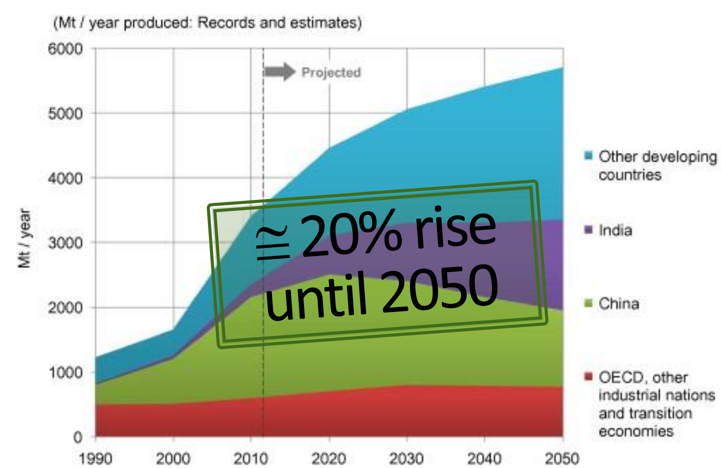
> 30% of CDW

≅ > 150 Mt/year (EU)



GHG emissions

≅ 5- 8% CO_2 from clinker production (>80% of concrete)



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CDW VALUE

Cement Industry

Reuction of GHG emission caps (2.2%/year)

(EU ETS - Emissions Trading System, 2021-2030)

End of free allowances/ heavy fines

Auctioned allowances ≅ 20 €/ t CO_2

≅ 800 kg CO_2/ t clinker

≅ 20% clinker cost

Target (GCCA)

CDW reuse

Less 25% CO_2 (2030) from 2020

Net zero concrete (2050)

- **Alternative cements (9%)**
- Carbon capture (36%)
- Clinker and concrete production efficiency (27%)
- Design efficiency (22%)
- Recarbonation (6%)

EcoHydB - Eco-efficient hydraulic binders produced from waste cement-based materials - 2018

Objectives:

- **Development of a fully recycled low-carbon cement (RC)** from old concrete

- Characterization of RC and its behaviour in cement-based materials

- **Production of a more eco-efficient clinker with waste concrete as raw material** (with at least 20% reduction in CO_2 emissions)

EcoHydB

Tasks:

- **Task 1** - Waste concrete production (selection, characterization, concrete separation)
- **Task 2** - Production and characterization of RC (manufacture, optimization, hydration and microstructure)
- **Task 3** - Mechanical and durability characterisation of concrete produced with recycled low-carbon cement
- **Task 4** - Clinker production with waste concrete as raw material
- **Task 5** - Characterization of concrete produced with cement from the new more eco-efficient clinker
- **Task 6** - Ca rich inorganic wastes as solid sorbents for post combustion CO_2 capture
- **Task 7** - Economic and life-cycle assessment

EcoHydB - Eco-efficient hydraulic binders produced from waste cement-based materials

Site: https://cdwvalue.eu/

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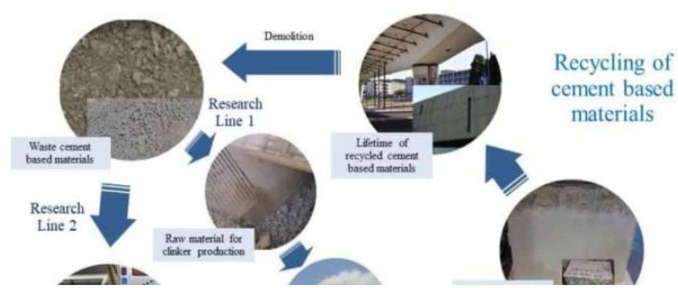
Project EcoHydB

Title: EcoHydB – PTDC/ECI-CON/28308/2017 – Eco-efficient hydraulic binders produced from waste cement-based materials.

Funding: 227.568 k€ (supported by the Portuguese Foundation for Science and Technology – FCT)

Duration: October 2018 – October 2022

Research Team:



- Main description
- Research Team
- Main results
- Publications
- Conferences
- Reports

Thank you for you attention

Fundación Carolina

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