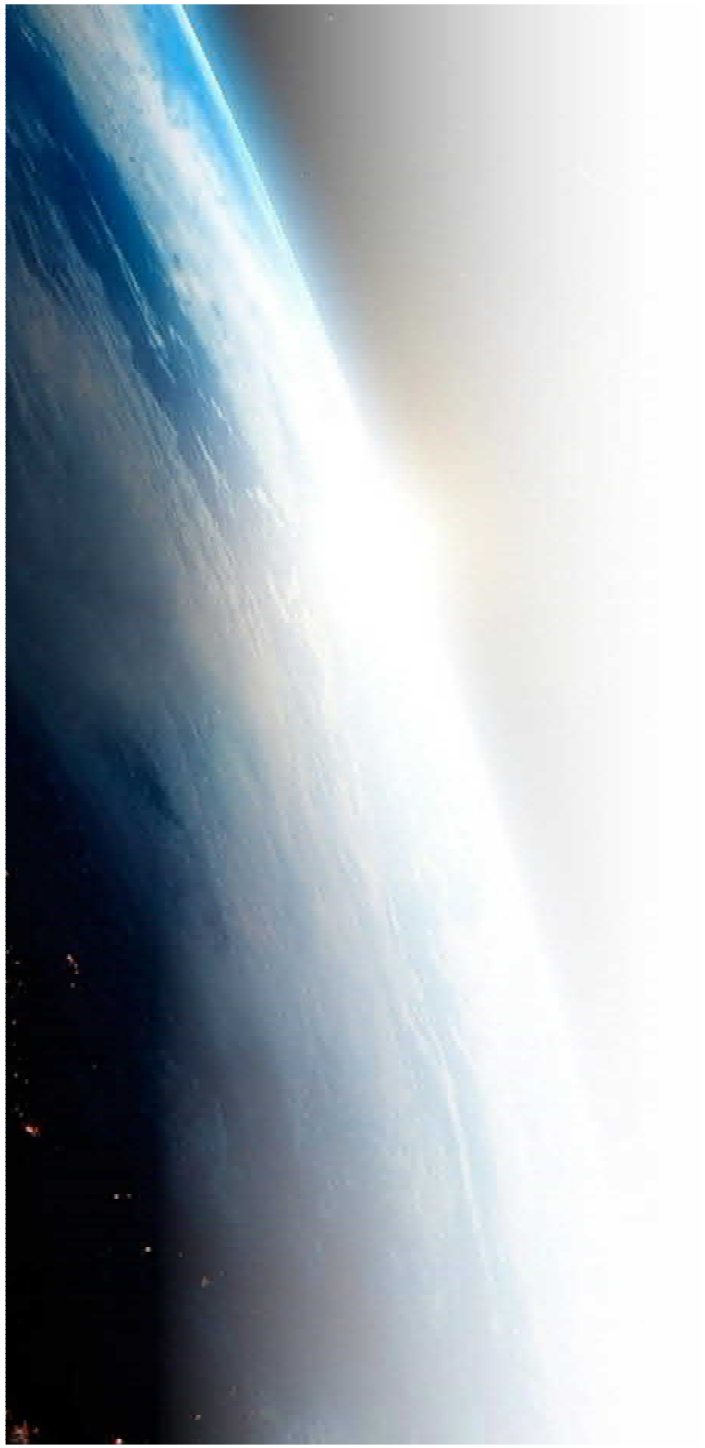

CIRCULAR CONSTRUCTION
PORTUGUESE ROADMAP FOR 2030

MARIA DE LURDES COSTA • GUILHERME A. ASCENSÃO

U.PORTO FEUP ENGENHARIA

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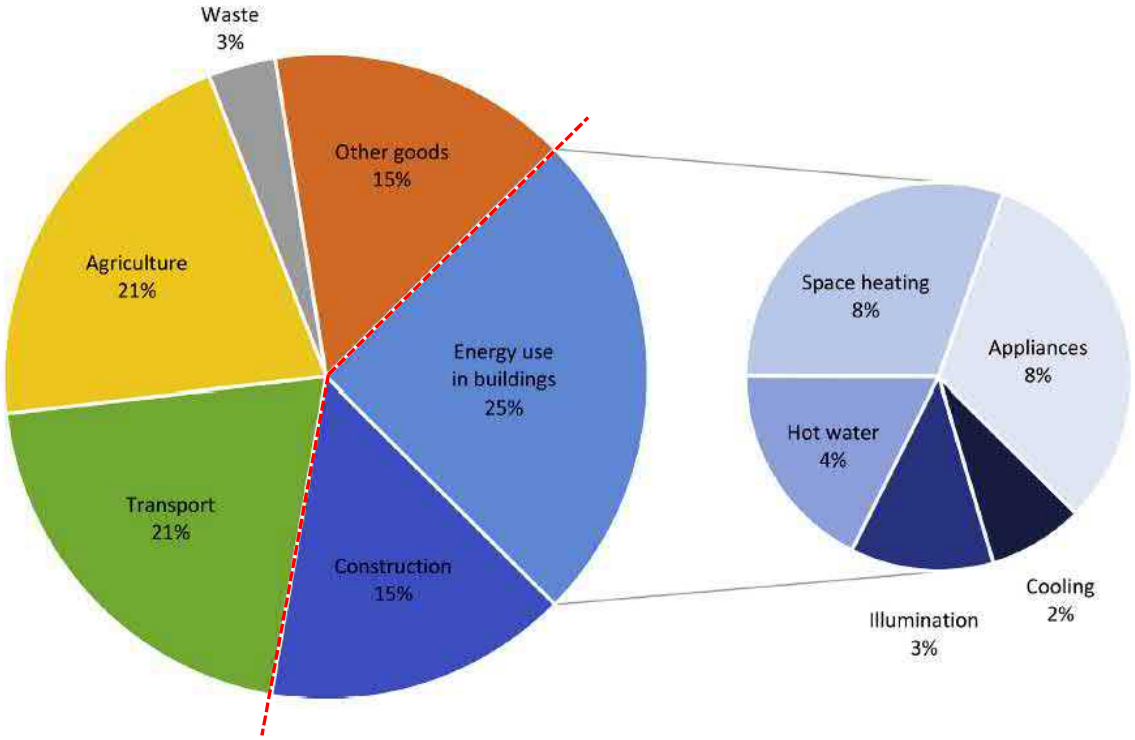
https://www.un.org/sustainabledevelopment/

Decouple economic growth and wellbeing from resource exhaustion and environmental impacts

https://www.un.org/sustainabledevelopment/

Objectives to which **CONSTRUCTION** can contribute

TAKE OVER OUR RESPONSIBILITY



Joensuu, T. *et. al*, (2020). Circular Economy practices in the Built Environment. Journal of Cleaner Production, 124215.

Green house gases per major sectors

Buildings (contruction + use + demolition) ≈ 40%

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CONSTRUCT

WHO ARE WE?

Research Institute of R&D in Structures and Construction, created in 2015, and settled at the Civil Engineering Department of FEUP.

… AND MUCH MORE.

HOME BASIS

Porto, Portugal

Faculty of Engineering, University of Porto

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CONSTRUCT

STRUCTURE

6 Thematic Lines

6 Research Groups

	LABEST	LESE	VIBEST	GEO	LFC	GEQUALTEC
TL1 - New construction materials	•			•	•	•
TL2 - Built historical heritage		•			•	•
TL3 - Safety assessment and seismic engineering	•	•	•	•		
TL4 - Assessment and SHM of energy and transportation infrastructures	•	•	•			
TL5 - Railway infrastructures	•	•	•	•		
TL6 - Efficient and smart construction		•			•	•

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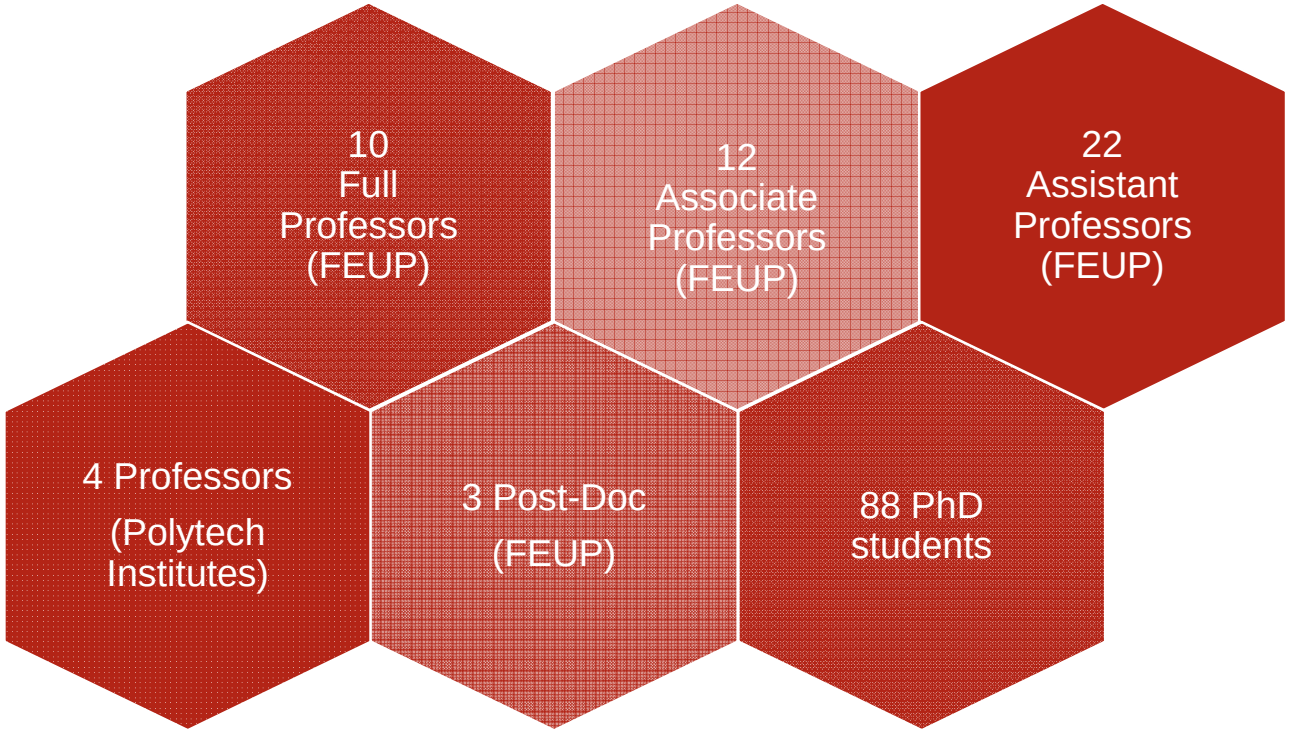
CONSTRUCT

TEAM



APPROACH & GOALS

Preserve
(Rehabilitate and Refurbish)

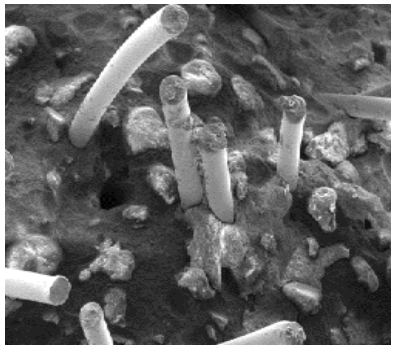
Build Better
(Novel Eco-Materials)

Build for the Future
(Build for Disassembly)

BUILD BETTER

TL1- New construction materials

- Novel eco-efficient building materials
- Upcycling C&DW and other industrial residues
- Alternative raw materials and additions



PORTFOLIO OF PROJECTS

TL1- New construction materials

- **RCD-VALOR** - C&DW in sustainable geosynthetic structures
- **CDW_LongTerm** - Long-term behavior C&DW geosynthetic structures
- **PRCD** - Prevention of Construction and Demolition Waste
- **GEOPROTEC -** New technologies for coastal protection systems with sand confined by geosynthetics




PORTFOLIO OF PROJECTS

TL1- New construction materials

- **GeoSynergism -** Synergic effects in the degradation of geosynthetics
- **HiperSlab** - Structural behavior of HP fiber reinforced concrete slabs
- **UHPGRADE** - Next generation of UHP composites
- **ACTIVESC** - MSW slag in alkali activated materials

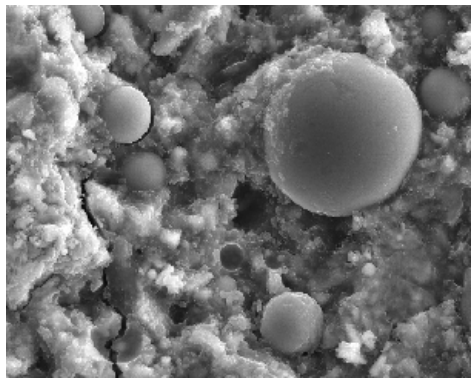



WHAT THE FUTURE LOOKS LIKE

TL1- New construction materials

- Enhanced waste soils & stabilized soils
- Grouts from industrial by-products (ashes and metallurgic slags)
- Geopolimeric grouts for contaminated coastal areas

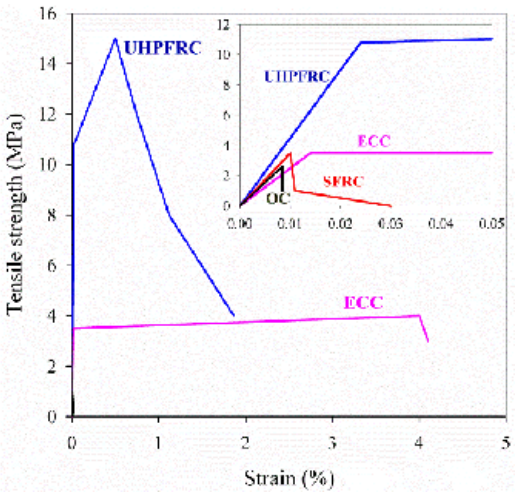


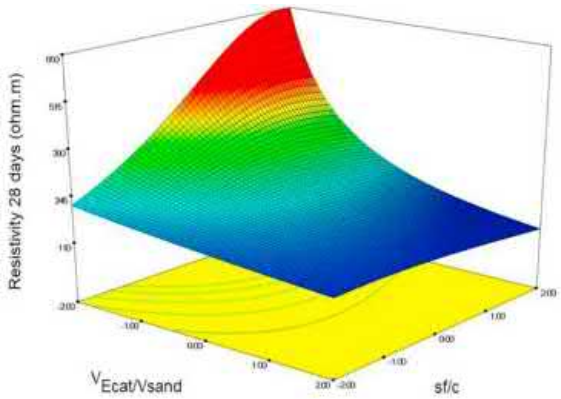



WHAT THE FUTURE LOOKS LIKE

TL1- New construction materials

- Alkali-activated concrete for transport infrastructure (steel slag)
- Vibrated and self-compacting waste-based concretes
- Advanced fiber reinforced materials (UHPFRC; ECC)



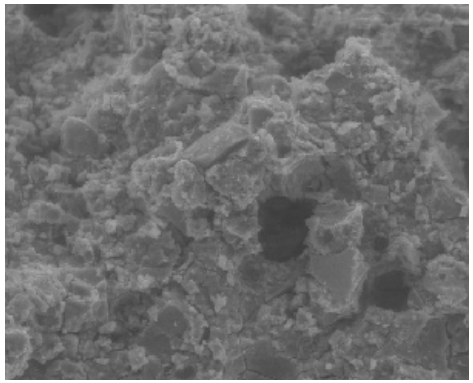


WHAT THE FUTURE LOOKS LIKE

TL1- New construction materials

- Durability of C&DW based building materials
- Chemical stabilization of industrial waste streams
- Novel geosynthetics for extreme environments

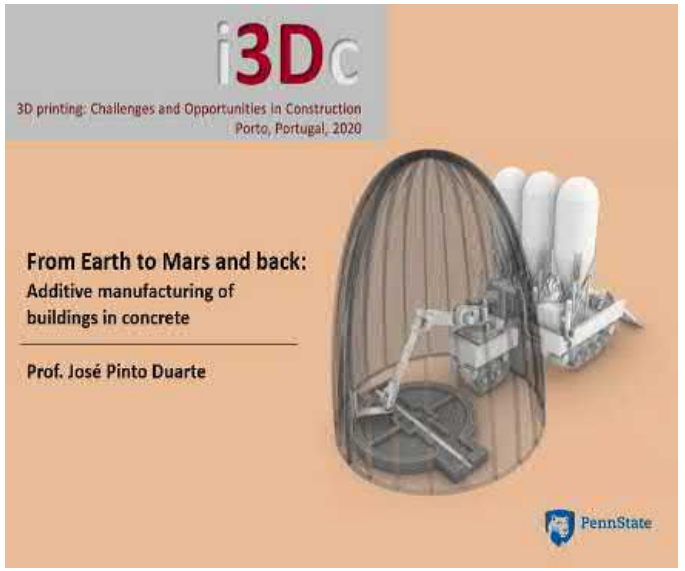


WHAT THE FUTURE LOOKS LIKE

TL1- New construction materials

- Digital fabrication (3D & 4D printing)



www.fe.up.pt/~i3dc/

WHAT THE FUTURE LOOKS LIKE

TL1- New construction materials

- **Circular Economy** in construction
  - Pre-demolition audits
  - Novel construction materials
  - Building (de)construction support tools
  - Standardization

… AND PUT IT ALL INTO ACTION.

COLLABORATIVE LABORATORY

CECOLAB- R&D+I Interface Association

Support the transition from linear to circular economy by:

- Transfer knowledge and technology to the market
- Create scientific and qualified jobs
- Assuming Portugal's leadership and position in EU

ecolab CIRCULAR ECONOMY ASSOCIATES

Companies & Corporations

AQUITEX · BLC3 CAMPUS DE TECNOLOGIA E INOVAÇÃO · lipor · MOTA-ENGIL · RAIZ · TMG GROUP

Universities

universidade de aveiro · UNIVERSIDADE CATÓLICA PORTUGUESA · 1290 UNIVERSIDADE D COIMBRA · Universidade do Minho · UNIVERSIDADE NOVA DE LISBOA · U.PORTO

Interface Institutions

ISQ · LNEG

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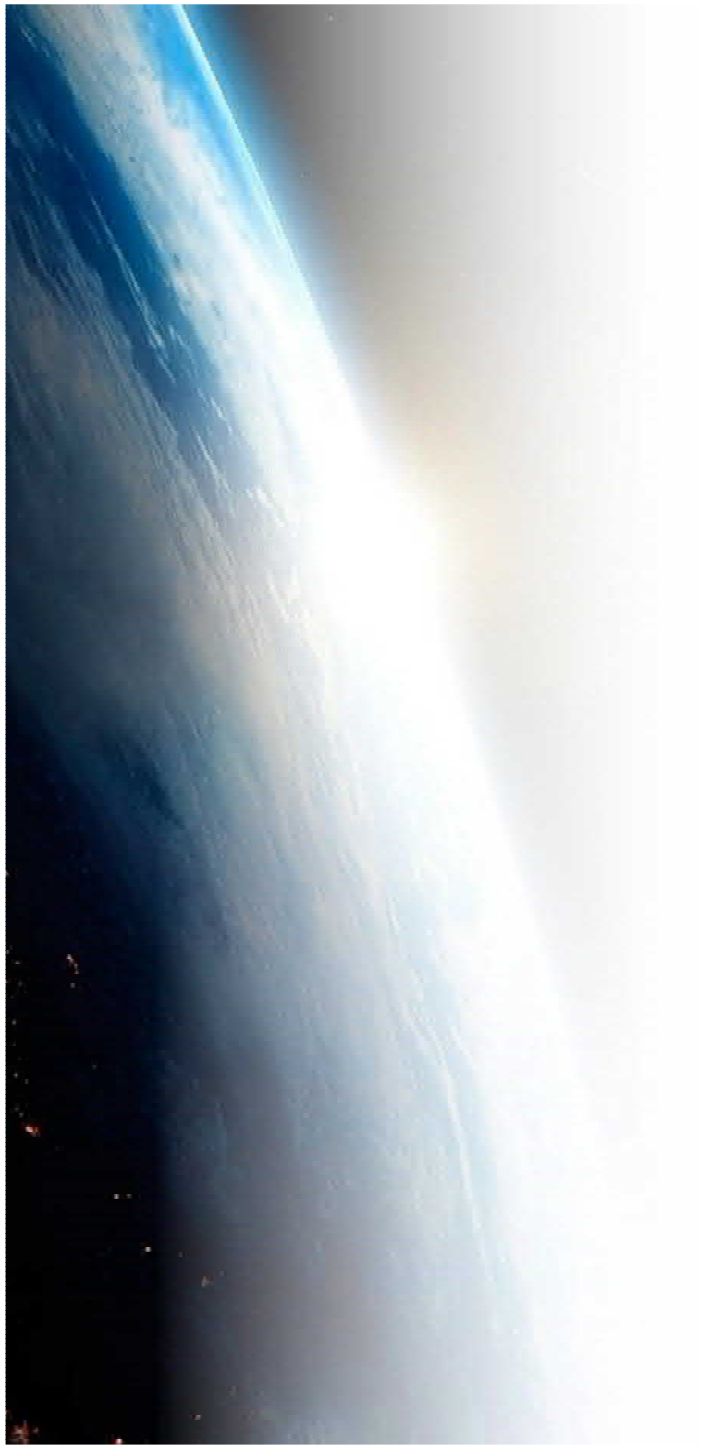
cecolab CIRCULAR ECONOMY INNOVATION FOCUS

- Forest
- Agroindustry
- **Construction**
  - ➢ Reduce raw materials consumption
  - ➢ Upcycling CD&W and secondary mineral resources (mining residues and tailings)
- Urban residues
- Water efficiency
- Manufacture industry
- Servitization

VISIT US ON

www.cecolab@pt



THANK YOU!

LET'S STAY IN TOUCH

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