



# DUAL CIRCULAR USE OF DREDGED SEDIMENTS AS SAND AND BINDER REPLACEMENT IN MORTARS AND CONTROLLED LOW-STRENGTH MATERIALS (CLSM)

Presented by: Ali  
HUSSAN

Enseignant chercheur à Builders  
Ecole d'ingénieurs, Epron, France

Equipe projet :  
Nassim SEBAIBI (Builders)



# BUILDERS ÉCOLE D'INGÉNIEURS (COORDINATOR)

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**Who we are:** Builders École d'Ingénieurs is a French engineering school with strong expertise in **civil engineering, construction materials, and circular economy**. The school is actively involved in applied research, innovation projects, and close collaboration with industry and public authorities.

## Our strengths:

- Applied research in **cementitious materials and eco-materials**
- Proven experience in **circular construction solutions**
- Strong background in **life cycle analysis, sustainability, and innovation projects**
- Close links with regional actors (local authorities, construction sector, infrastructure owners)

## Role in ECIV project

- Project coordinator (Normandy region)
- Scientific and technical lead
- Interface between research, industry, and territories

<https://builders-lab.fr/>



# PROJECT RATIONALE & DUAL INNOVATION

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## Context and challenge:

- Strong pressure on **natural sand resources** in construction
- Urgent need to **reduce clinker and binder-related CO<sub>2</sub> emissions**
- Large volumes of **dredged sediments** available locally (ports, waterways)

**Project concept:** This project explores a **dual valorisation pathway** for dredged sediments:

1. **Replacement of natural sand** in mortars and CLSM
2. **Partial replacement of mineral binders** after suitable activation of sediments

This dual approach maximises circularity while remaining technically and industrially realistic.

## Key objectives:

- Reduce virgin sand consumption
- Reduce clinker-based binder demand
- Demonstrate technical feasibility at **pilot and pre-industrial scale**
- Create a transferable circular model for ECIV regions



# TECHNICAL FEASIBILITY, ACTIVATION & DEMONSTRATION

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**Is it possible to replace both sand and binder?** Yes – under controlled conditions:

- **Sand replacement:** sediments used directly as fine material after conditioning
- **Binder replacement:** sediments used as **supplementary or reactive material**
  - ✓ Mechanical activation (grinding, fineness optimisation)
  - ✓ Thermal or thermo-mechanical activation (low-temperature)
  - ✓ Chemical or alkaline activation (for geopolymers or hybrid systems)

## End applications

- Non-structural mortars (masonry, repair, rendering)
- Controlled Low-Strength Materials (CLSM) for:
  - Trench backfilling
  - Underground infrastructure
  - Void filling and reversible construction

## Pilot & pre-industrial demonstrations (Normandy)

- Pilot batches produced with industrial partner
- On-site application of mortars and CLSM
- Monitoring of fresh, mechanical, durability and environmental performance



# CONSORTIUM STATUS & ACADEMIC PARTNER SEARCH

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## Already secured partners (Normandy)

### • Industrial construction partner (BTP):

- Pilot-scale and pre-industrial demonstrations
- Real construction and infrastructure applications

### • Port authority partner:

- Supply of dredged sediments
- Contribution to regulatory and operational feasibility

## Academic partners we are looking for

### 1. LCA & durability partner

- Life Cycle Assessment of construction materials
- Durability and long-term performance

### 2. Activation & binder-replacement partner

- Sediment activation techniques
- Geopolymers, hybrid binders, SCMs

## Why join this project?

- Clear industrial pathway and real pilots
- Strong circular economy and decarbonisation impact
- Access to ECIV funding
- High visibility at European level



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# Thank you for your attention

## Contact

Builders École d'Ingénieurs

1 Rue Pierre et Marie Curie, 14610

Épron, Normandie, France,

[ali.hussan@builders-ingenieurs.fr](mailto:ali.hussan@builders-ingenieurs.fr)

[nassim.sebaibi@builders-ingenieurs.fr](mailto:nassim.sebaibi@builders-ingenieurs.fr)