

Earth-based adobe bricks from Greenlandic sediments reinforced with discarded fishing nets

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Bachelor of Engineering in Architectural Engineering

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Sustainable building in extreme environments



Aim of project

Earth-based adobe bricks from Greenlandic sediments reinforced with discarded fishing nets

Greenland

- Lack of infrastructure
- Most construction materials are imported

Local materials

- Beneficial
- Environment friendly
- Fishing nets can be recycled



Photo: Qalut Vonin

Adobe bricks

Adobe bricks

- Air dried
- A simple and inexpensive production
- Materials are recyclable and available in large quantities
- Better hygrothermal performance

Pieces of fishing nets

- Can persist in the marine environment for long periods
- Synthetic materials can be removed



Adobe bricks

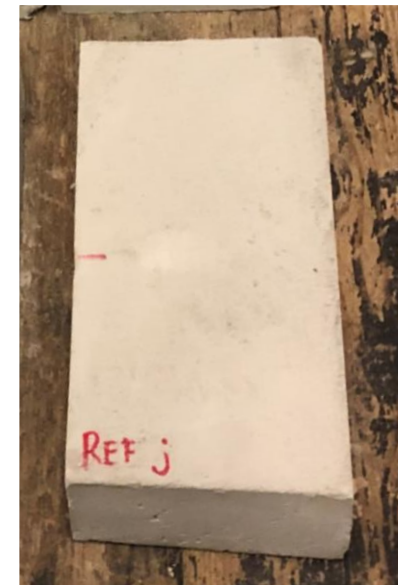
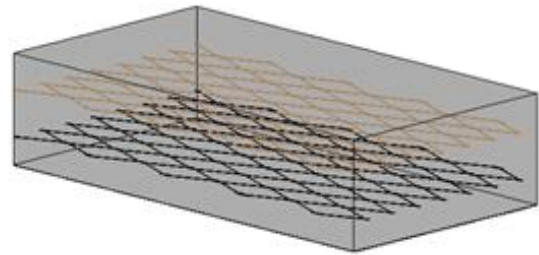
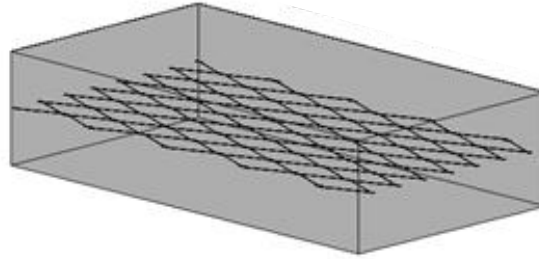
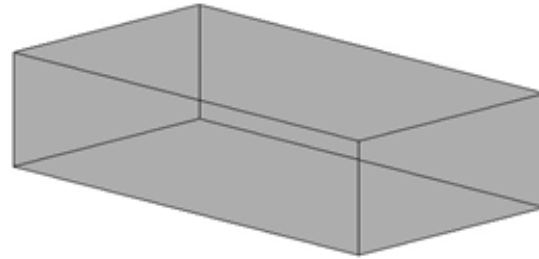
225 · 108 · 55 mm³

3 different series were made:

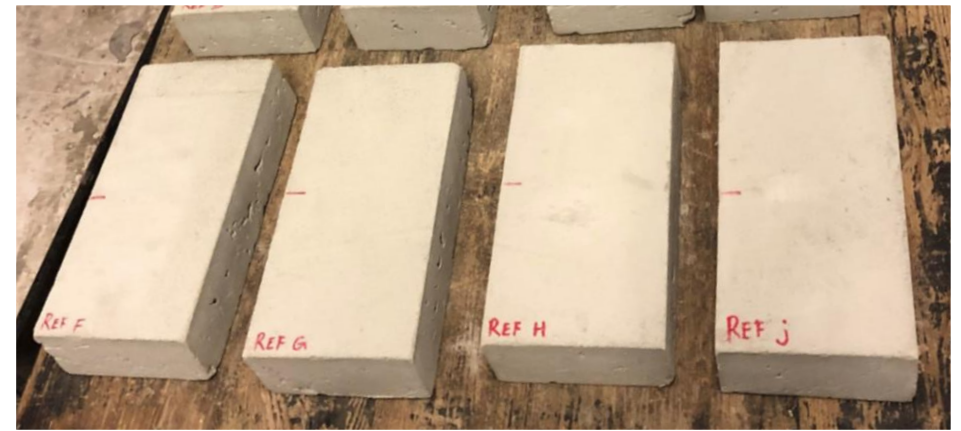
- REF
- 1 Fishing net
- 2 Fishing net

Experimental tests

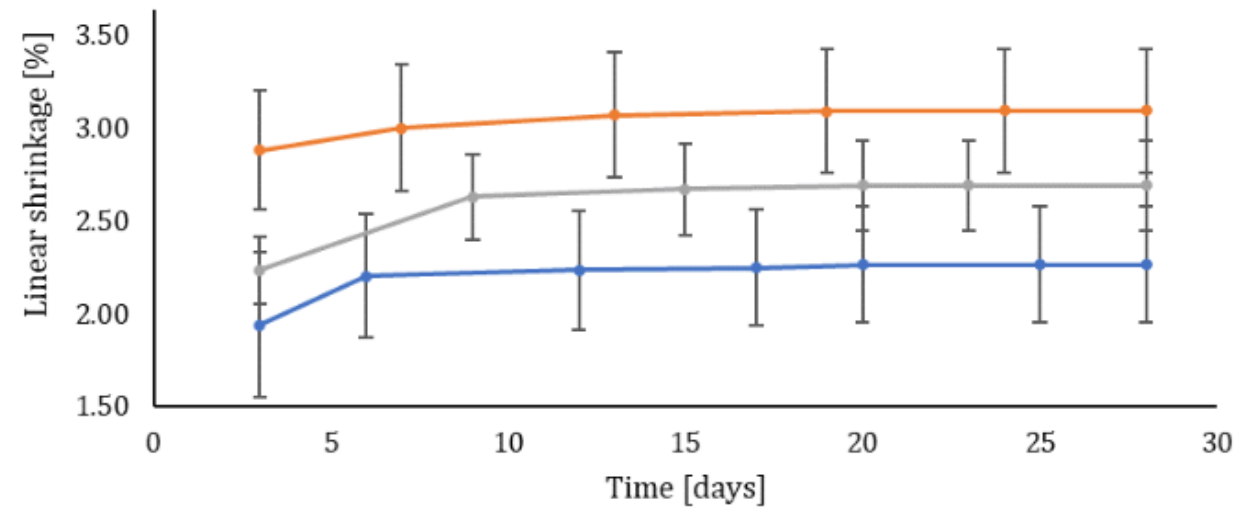
- Linear drying shrinkage
- Density
- Mechanical strengths
- Hygrothermal performance



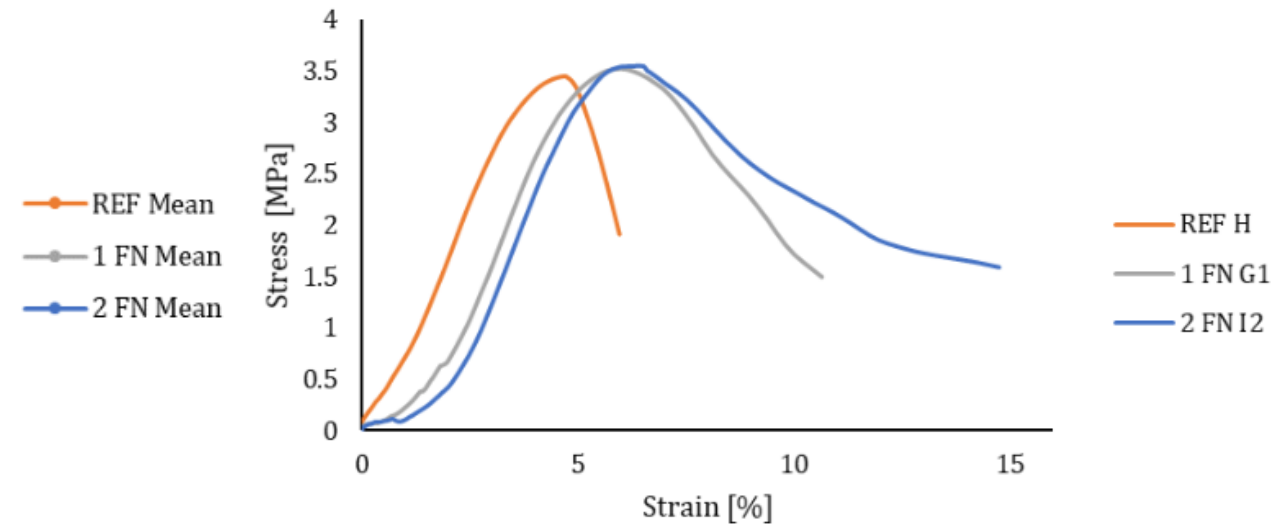
Results



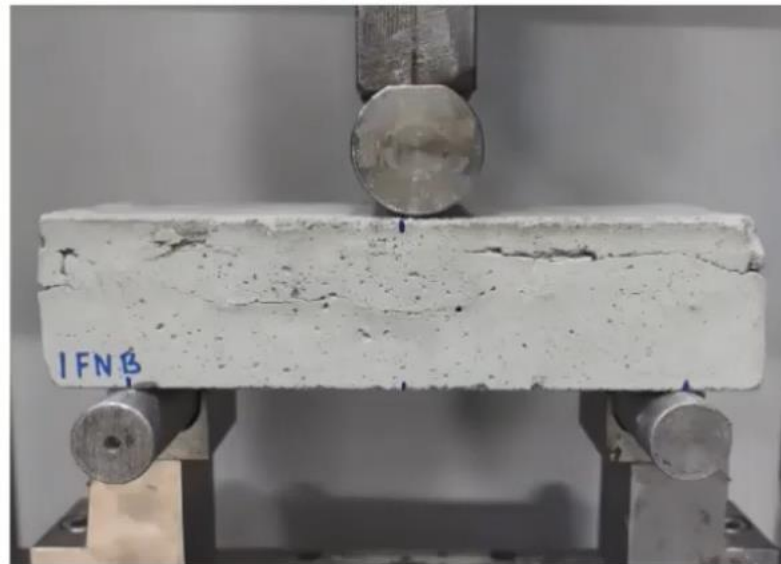
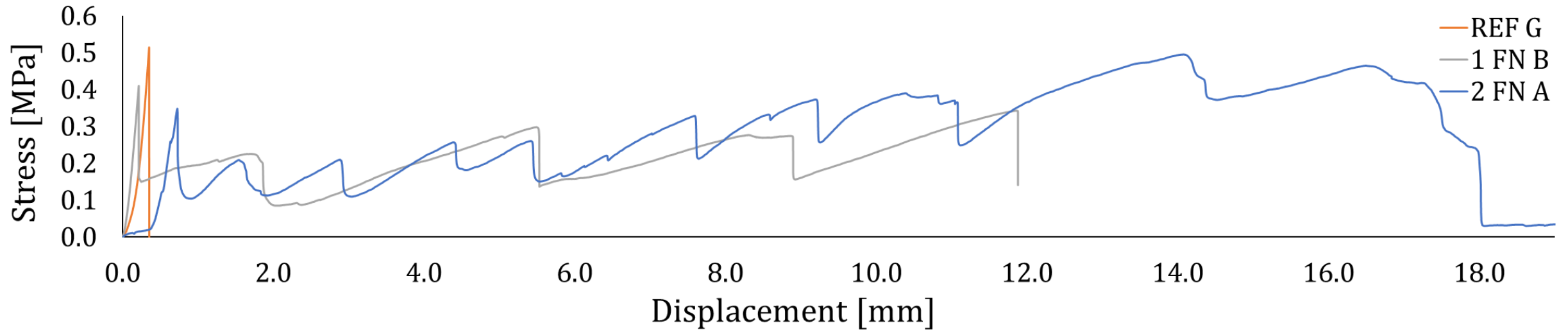
Linear drying shrinkage



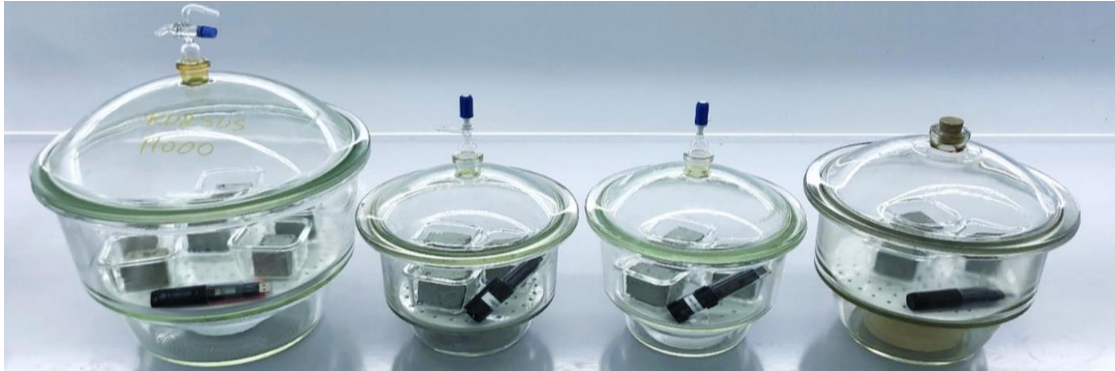
Compressive strength



Results Flexural strength

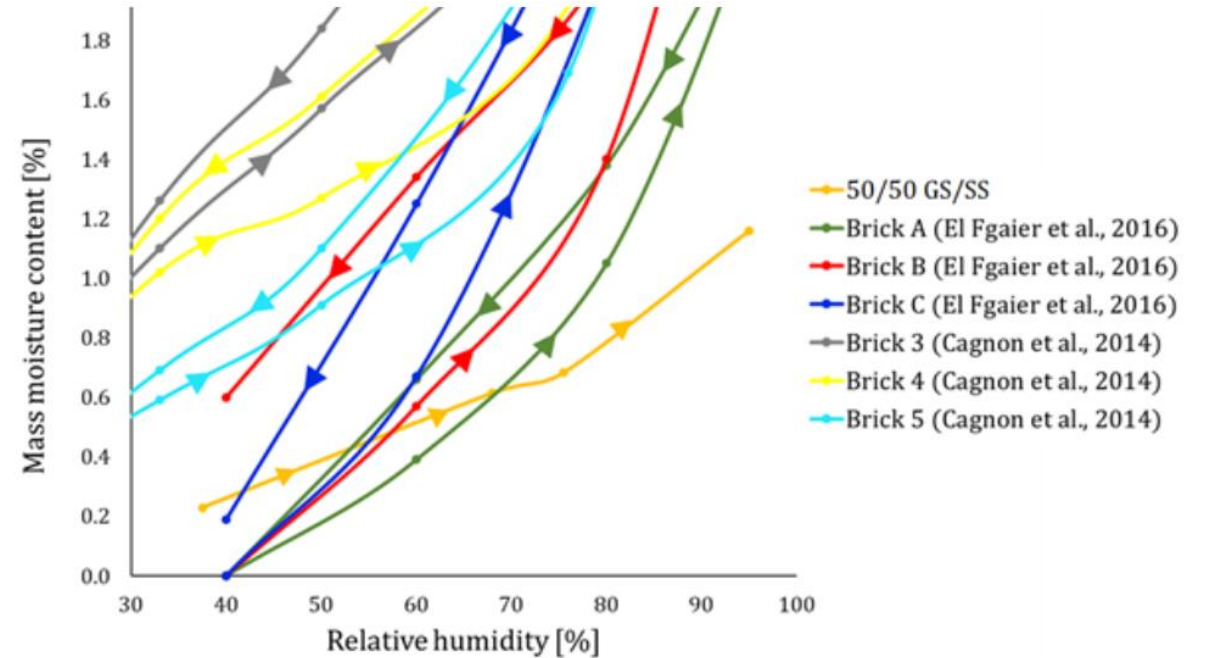


Hygrothermal performance



Saturated solutions	Expected RH [%]	Actual RH [%]
MgCl ₂ ·6H ₂ O	33	37.5
Mg(NO ₃) ₂ ·6H ₂ O	53	68
NaCl	75	75.5
KNO ₃	93	95

Specimen	Clay fraction [%]	Silt fraction [%]	Sand fraction [%]
Brick A	6	89	5
Brick 3	23	31	46
Brick 4	29	33	38
Brick 5	38	27	35
50/50 GS/SS Mean	13.81	31.04	55.15



- High compared to fired clay bricks
- Desorption properties needs to be investigated