



# Water resistance of clay-based adhesive mortar

Kassem NEJMEH

2020 - 2023

Laboratoire Navier

Supervisors : Emmanuel Keita, Ann Bourgès , Nicolas Roussel

Lionel Bertrand, Joumana Yammine-Malesys

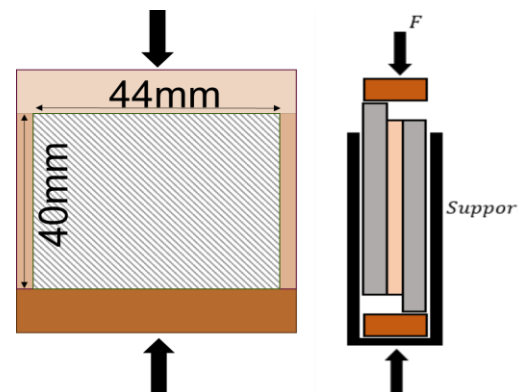
Friday 12 Nov. 2021

# Mortar adhesive for tiles:

- Adhesive:
  - Good mechanical properties
  - Resists water
- Mortar Based on clay material without inorganic binder

	Reference formula SGR
	Mass %
Kaolinite	5-10
Filler and Sand	80-90
Cellulose Ether	≤1
Lime $\text{Ca}(\text{OH})_2$	≤1
Water to solid ratio	15-20

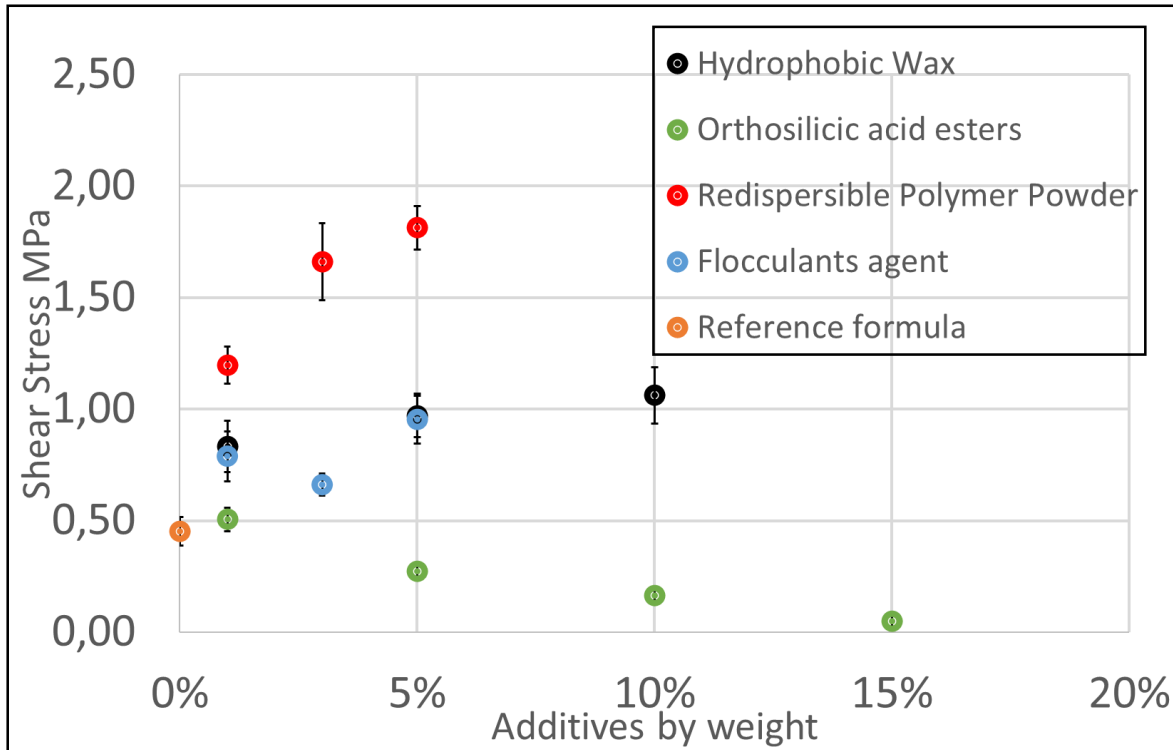
Agent	State
Flocculants agent	Powder
Redispersible Polymer Powder	Powder
Special strengthener based on solvents and orthosilicic acid esters	Dissolved in ethanol
Hydrofobic Wax	Liquid (with water)



## Test:

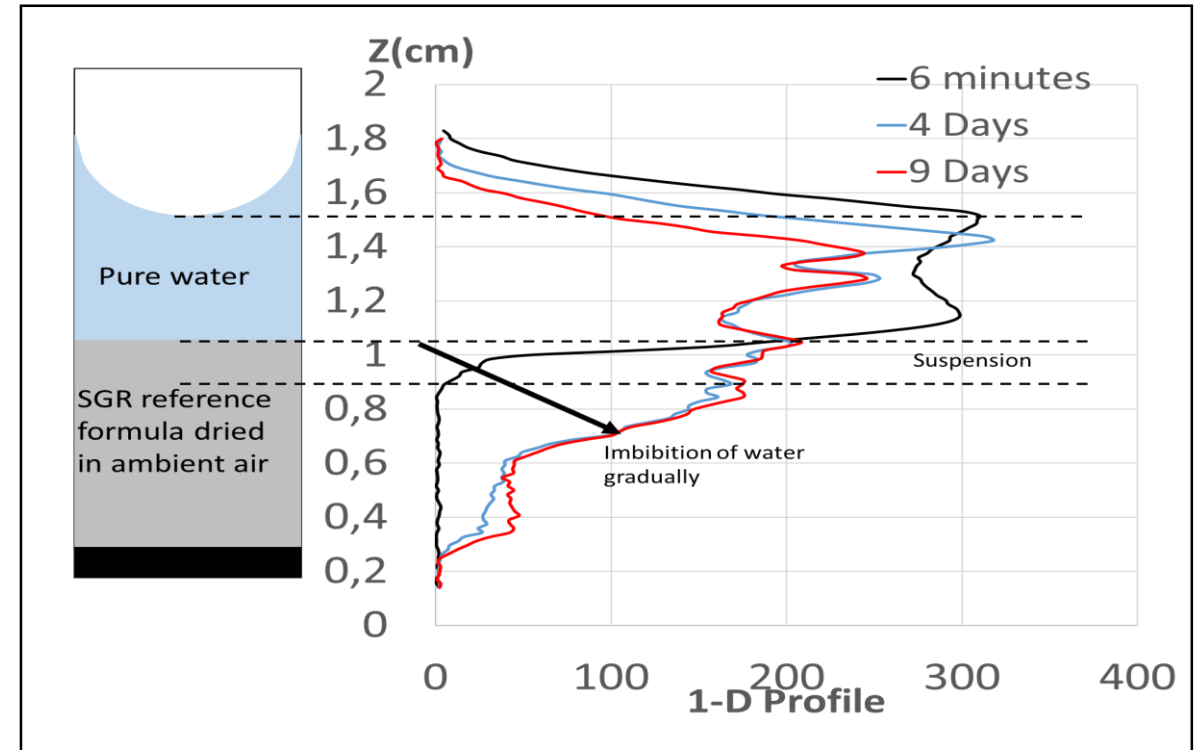
- Two tiles (5x5 cm) with mortar in between.
- Shear test to evaluate the adhesion strength.

# Mechanical Strength



- With additive clayey material are promising materials
- Imbibition of water decreases adhesion strength dramatically

# Water Imbibition



- Imbibition of water gradually to the mortar with the reference formula
- NMR gives the possibility to follow the imbibition of water in clayey mortar

# Perspectives

- Define strategies to delay or prevent imbibition of water
- Understand underlying physical processes in porous media
- Investigations micro-scale to understand the mechanisms behind the differentiation of strength
- Understanding the mechanisms of adhesion of clayey mortar