



ReHouseit

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ReHouseit

WE RESHAPE  
THE NATURE  
OF SPACES.



# problems

## industrial wastes

AGRO-  
INDUSTRY

**2 mln**  
tons of sansa annually  
produced in Italy <sup>1</sup>

**50%**  
of the total weight of olives  
entering the production <sup>1</sup>

HEAVY-  
INDUSTRY

**4 mln**  
tons of steel slag  
produced in Italy <sup>2</sup>

**15%**  
of the total weight  
of steel produced <sup>2</sup>

MINING-  
INDUSTRY

**50%**  
of the extracted stone materials  
is considered waste <sup>3</sup>

  
Exploitation of mineral waste  
is slowly increasing <sup>3</sup>

## OPERATIVE TEAM



Riccardo Frezzato  
**COO**



Nicolò Verardi - *CEO*



Marco Benvenuti  
**CTO**



# Ferrosialate Geopolymer Binder (Na/Al=1) and 3D Printing

*Work performed with the precious help of **GeoMits** and **Ingessil***

# GEOPOLYMER BINDER

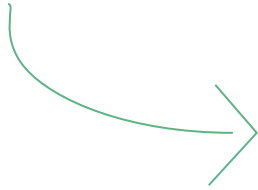
A man is shown from the chest up, his face and shirt covered in a mix of bright yellow, green, and pink powders. The background is black, with large, billowing clouds of yellow powder on the left and pink powder on the right. The overall effect is one of vibrant, multi-colored dust or powder.

ORGANIC WASTE

INORGANIC WASTE

## SEVERAL TRIALS ON SPIRAL SHAPES

*Spiral vase*





STANDARD 4X4X16 cm  
SPECIMEN...BUT PRINTED!



OUTSIDE



INSIDE





**Shrinkage:**  
-0.5 mm  
(40X40x1000 mm)

**Density:**  
0.850 g/cm<sup>3</sup> (28 days)

**Compressive strength:**  
10 MPa (28 days)

# PULL OFF TEST



2 Layers  
6 Layers

Concrete slab



Cohesive superficial rupture:

**0,5 MPa**

NO LAYERS DETACHMENT

6 Layers



Cohesive superficial rupture

NO LAYERS DETACHMENT

2 Layers





## STANDARD SPECIMEN

**Density:**  
1,1 g/cm<sup>3</sup> (28 days)

**Compressive strength:**  
16 MPa (28 days)

## CONCLUSIONS

1. 3D printing using ferrosialate geopolymer binders is possible;
2. Printing definition is incredibly good;
3. Pull off tests fail at the surface between the plate and the specimen.

### To improve...

1. Mix design to achieve better mechanical properties;
2. Printing parameters to get closer to standard specimen mechanical properties.