



Programme FEDER 2014 - 2020



LE FONDS EUROPÉEN DE DÉVELOPPEMENT RÉGIONAL  
ET LA WALLONIE INVESTISSENT DANS VOTRE AVENIR

# Use of biomass fly ash as partial cement replacement in the manufacture of mortars

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Portefeuille de projet

## ECOLISER

MISE AU POINT D'ÉCOLIANTS POUR TRAITEMENT, ÉTANCHÉITÉ ET ROUTES

Budget ULiège  
680.000,94 €

Part FEDER : 40 %  
Part Wallonie : 60 %



### Mise au point d'ÉCO-Liants, pour traitement des Sols, Étanchéité et Routes (ECOLISER)

### Main Objectives

- Improve the mechanical properties of unpolluted soil
- Develop the Eco-binders for the soil treatment, permeability and road construction

01/09/2016-31/08/2020



# Biomass fly ash: characterizations and formulation

## Chemical compositions determined by XRF

	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	MgO	CaO	Na <sub>2</sub> O	K <sub>2</sub> O	P <sub>2</sub> O <sub>5</sub>	LOI	Total
Classical fly ash	49.3	27.7	7.9	1.6	1.4	0.8	4	0.3	6.6	100.4
Biomass fly ash	24.7	5.3	3.2	9.3	25.8	2.3	7.9	4.9	9.7	94.3
CEM I 52.5 N	20.2	4.8	3.3	1.8	64.2	0.3	0.5	0.4	1.1	100

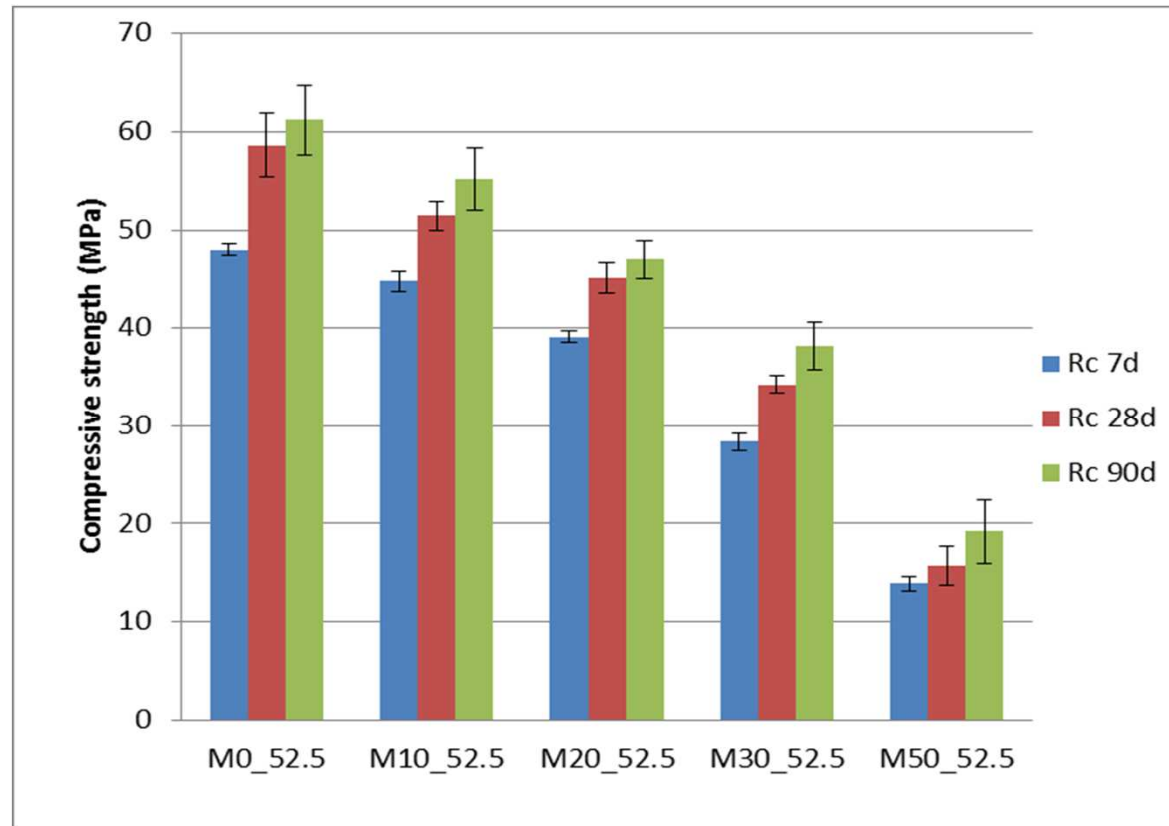
## Compositions of mortars

	<i>M0_52.5</i>	<i>M10_52.5</i>	<i>M20_52.5</i>	<i>M30_52.5</i>	<i>M50_52.5</i>
Sand (g)	1350	1350	1350	1350	1350
Cement (g)	450	405	360	315	225
Biomass fly ash (g)	0	45	90	135	225
Efficient water (g)	225	225	225	225	225
$E_{eff}/(C+B)$	0.5	0.5	0.5	0.5	0.5

Replacing cement by biomass fly ash at different levels (0%, 10%, 20%,30% and 50%)

Same Water/(Cement + Biomass fly ash) ratio

# Mortars with biomass fly ash: Rc



- ❖ Compressive strengths of mortars after 28 days decreased when the substitution of cement by biomass fly ash increased
- ❖ The compressive strength of mortars (M10\_52.5 and M20\_52.5) are around 87.7% and 76.8% of the reference mortar respectively



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# Thank you for your kind attention!

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