

THE INFLUENCE OF GRANITE DUST ADDITIVE ON THE PROPERTIES OF CEMENT MORTAR

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Recycling of construction and industrial waste in the production of building materials is considered to be one of the most alternative and promising ways of waste management. Waste, such as concrete rubble, bricks, tiles, construction dust, bulk aggregates, etc., account for about 80-85% of all construction waste and can be reused, especially if the waste itself contains accumulated waste energy. Recycling of construction waste not only reduces the area of occupied land but also reduces the consumption of natural resources [1-2]. One of the construction reusing materials is granite cutting waste. The granite stone preparation process generates a large amount of waste (about 30% of total global production) such as granite rubble of varying sizes, cuts and dust. Due to the enormous amount of waste, environmental hazards and high-performance characteristics, the use of granite stone waste in the cement mortar industry is an excellent alternative to dealing with waste reusing [3-5]. Thus the aim of this work was to determine the of granite cutting waste on the strength properties of concrete and on the formation of hydration products.

The mixtures of modified cement mortals were formed of ordinary Portland cement, three different fractions of sand, granite cutting waste and plasticizer additive (Table 1).

Table 1. The composition of the mixture of modified cement mortar

Mixture	wt. % of components in the mixture					
	CEM I 42.5 N	Fraction of sand			Plasticizer	Granite cutting waste
		0/0.5	0.5/1	1/4		
GCW0	15	20.0	30.0	34.9	0.1	0
GCW 2		19.0	29.0			2
GCW 5		17.5	27.5			5
GCW 7		16.5	26.5			7
GCW 10		15.0	25.0			10
GCW 12		14.0	24.0			12
GCW 15		12.5	22.5			15
GCW 20		10.0	20.0			20
GCW 25		7.5	17.5			25
GCW 30		5.0	15.0			30

It was determined, that the highest compressive strength after 28 days of hydration was achieved sample with 12 % granite dust (24.65 MPa). It is worth mentioning that obtained values match requirements of the EN 13813 standard and samples can be assigned to C25 strength class. The hydration products were characterized by XRD and STA analysis.

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