Initial investigation on press-formed phosphogypsum products

Villalon Fornes [(1)], dr. V. Doroševas [(2)], dr. D. Vaičiukynienė[(3)], dr. D. Nizevičienė [(4)]

[(1)] Kaunas University of Technology, Faculty of Civil Engineering and Architecture, Studentų g. 48, Kaunas, Lithuania
[(2)(3)] Kaunas University of Technology, Faculty of Civil Engineering and Architecture, Studentų g. 48, Kaunas, Lithuania
[(4)] Kaunas University of Technology, Faculty of Electrical and Electronics Engineering, Studentų g. 48, Kaunas, Lithuania

1. Introduction – Phosphogypsum (PG) is a waste product of the industry of fertilizers (producing 1t of phosphoric acid are obtained 4t of waste PG [1]). The annual global amount of PG which is deposited in the stacks is enormous, about 130 million t, and it increases each year [1]. Just in Lithuania they are produced 2 million tonnes each year, and remains not reused [2]. Radioactivity and harmful impurities contained in PG causes a negative impact to the environment surrounding stockpiles. Therefore, it is crucial to find a useful application for this waste material.
One of the most important sectors to apply PG is in building industry. With this purpose, many authors have improved PG mechanical properties in several ways. The problem is that some of these methods are expensive, as adding Portland-cement to the mixture, employing high pressure press-forming, autoclaving, etc. This study, investigates the basic properties of PG samples by using press-forming and harmful impurities neutralizing additional materials.

2. Experimental – As raw material semi hydrate PG ($CaSO_4 \cdot 0{,}5H_2O$) from the production lines of fertilizer factory *Lifosa* (Kėdainiai, Lithuania) was used. A certain quantity of hydrated lime additive was added. Then the mixture was processed by press-forming and later curing process in wet (or dry) conditions. Therefore, the relations between compression strength and the other three variables (hydrated lime quantity variation from 0 to 5%, press-forming pressure variation from 5 to 20 MPa, and curing conditions variation –wet or dry–) were analysed.

3. Results and Discussion – Dependences between PG compressive strength and the three mentioned variables (quantity of hydrated lime, curing conditions and press-forming pressure) are obtained and analysed.

4. Conclusions – Optimum PG mixture composition and production process was obtained.

5. References

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