

Composite Binder on the Basis of Concrete Scrap

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The object of research is to obtain binders from fragments of destroyed buildings and structures for the production of various building elements. The properties of fractions (0.0–0.16 mm, 0.16–0.315 mm, 0.315–0.63 mm, 0.63–1.25 mm, 1.25–2.5 mm and 2.5–5 mm) obtained from fragments of destroyed buildings and structures were studied. Using known chemical and physical methods, experimental results were obtained on the influence of the fraction size and specific surface area on the degree of hydration of binders during the hardening process. It was found that the amount of alite and belite decreases with the transition from the 0.0–0.16 mm fraction to the 2.5–5 mm fraction. At the same time, the amount of quartz and minerals increases that are characteristic of a large aggregate. The smallest fractions of concrete scrap (pulverized and 0.16–0.316 mm) contain the maximum amount of alite C3S and belite C2S, which can harden when interacting with water, compared to larger fractions. To evaluate the ability to hydraulic hardening, the obtained fractions of concrete scrap were crushed in a laboratory mill to a specific surface area of 316–387 m²/kg. The maximum compressive strength was shown by samples of fractions 0.0–0.16 and 0.16–0.315 mm 6–7 MPa. Thus, the greatest hydraulic activity was shown by powders of two small fractions that hardened both under normal conditions and during steaming. Their compressive strength is 1.5–2 times higher than that of samples prepared from powders of larger fractions.