

PERFORMANCE CHARACTERISTICS OF CEMENT PASTE WITH WASTE GLASS

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In several countries waste glass causes environmental problem: most of it is stockpiled, some is recycled into the packaging stream again. Being amorphous and containing relatively large quantities of silicon and calcium, glass is pozzolanic or even cementitious in nature when it is finely ground. (C.Shi and K.Zheng, 2007). Along the technological development, the ability to ground the glass to particle size less than 100 μ m gives possibility to control alkali – silica reaction in glass concrete, therefore making this material as one of the possible cement substitutes and giving solution for dumped waste glass and reduction of CO₂ into atmosphere by decreasing cement volume in produced concrete. In present research glass cullet (flint, amber, green) and special glass (borosilicate and lead) chippings were ground for 40 minutes in laboratory planetary ball mill Retsch PM400 into powder. Ordinary Portland cement CEM I 42.5N was applied as binding agent. Cement in mixes was substituted with waste glass at level of 20% and 30%. Sieving, laser diffraction and x-ray analysis, specific surface area tests were made on glass particles. Compressive and bending strength, cracking and shrinkage tests were performed in order to observe the difference of used glass and level of cement replacement on the performance characteristics of cement pastes.

References

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