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MECHANICAL PROPERTIES OF CONCRETE INCORPORATING WASTE LIGHTWEIGHT AGGREGATE

^{1,2}**B.A. Herki***, ²**J.M. Khatib**, ²**D. Searle**, ²**P. Georgakis**

¹Soran University, Kurdistan-Iraq. ²School of Technology, University of Wolverhampton,
Wolverhampton, WV1 1LY, UK
e-mail add: b.a.herki@wlv.ac.uk

*Corresponding author

ABSTRACT: Utilising waste polystyrene (PS) in the construction of lightweight concrete will help improve the problem of disposing this solid waste and ecological imbalance that has been caused due to a high demand of normal weight aggregates for concrete in the construction industry. This paper investigates and presents the results of an experimental study on the effects of waste Polystyrene based lightweight aggregate called Stabilised Polystyrene (SPS) in a composite matrix of clay and cement in concrete. The composite aggregate was formed with 80% waste polystyrene which was shredded to different sizes, 10% red clay dust to improve the resistance to segregation and 10% Portland cement. Effects of SPS aggregate on fundamental properties of concrete were investigated. Three series of concrete with three different W/C ratios of 0.6, 0.8 and 1.0 with varying SPS content ratios of 0, 30, 60 and 100% as partial replacement of natural aggregate by equivalent volume were prepared and tested. The properties of concrete investigated in this paper were compressive strength and ultrasonic pulse velocity (UPV) for series one. The results indicate that there is a decrease in compressive strength and UPV with increasing amounts of SPS in concrete. However, acceptable strength is obtained when using high proportions of SPS.