Freezing Thawing Resistance of Concrete Incorporating Glass Waste

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Raed Abendeh[1], Khaled Ramadan[2], Rami Haddad[3] & Mousa Bani Baker[1]

1 Al-Zaytoonah university of Jordan, Amman, Jordan

2 Applied Science University, Amman, Jordan

3 Jordan University of science and Technology, Irbid, Jordan

Abstract

Glass waste, which is dumped around the world in huge amounts, can be used as a partial replacement of mineral aggregate in concrete industry. This would not only contribute to reducing pollution extent but also enhancing physical properties and durability of concrete. This article reports the mechanical performance of concrete with different replacement percentages of crushed glass waste of cement or fine aggregates before and after being subjected to standard cycles of freezing and thawing. Mechanical performance was evaluated in terms of compressive and flexural strengths. Furthermore, internal damage extent was evaluated using ultrasonic pulse velocity and dynamic modulus of elasticity. The results (average of six specimens for each test) revealed the feasibility of incorporating glass waste in concrete mixtures for the purpose of improving strength and durability; especially in environments where concrete is being exposed to an effective freezing and thawing cycles.