RECYCLED WASTE GLASS IN CONCRETE: A REVIEW

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It is not an exaggeration to say that glass has been essential for modern society due to its unique properties. However, every year millions of tons of glass are produced, and according to United Nations worldwide, the annual total of solid waste is estimated to be approximately 200 million tons and about 7 % of it is made up of glass. Furthermore, the glass recycling rate worldwide was only 21 % in 2018, meaning most glass waste ends up in landfills. Due to the nonbiodegradable nature of glass, it can negatively affect environmental sustainability. Additionally, manufacturing glass requires significant energy since silica must be melted at high temperatures for tens of hours to produce; hence, simply dumping glass in landfills is a massive waste of energy. Therefore, it is becoming prevalent to recycle glass waste by sorting and cleaning and melting it to re-produce glass products. However, this process can consume an unfavourable amount of resources, making it not worth the effort. Hence, throughout the last few decades, researchers have conducted many studies to incorporate glass waste into concrete as either fine or coarse aggregates and as a pozzolan. The goal of this review paper is to gather, discuss and analyse the information on the previous experimental investigations done on the properties of waste glass concrete in terms of mechanical properties (compressive strength, tensile strength, flexural strength, and stress-strain behaviour), physical properties (density, workability, and drying shrinkage), durability (moisture absorption, permeability, and chemical resistance), and functional properties (thermal insulation, acoustic insulation, and fire resistance).