# ABSTRACT

As water is becoming a limited material day-by day, there is an urgent necessity to undertake study work relevant to saving of water in building concrete and in constructions. Curing concrete helps to build the microstructure and pore structure of the concrete, which increases its durability and performance. The use of self-curing admixtures is very important from the point of view that saving of water is a necessity every day. Keeping importance to this, an attempt has been made to construct self-curing concrete utilizing water-soluble Polyethylene Glycol as the self-curing agent. The function of a self-curing chemical is to minimize water evaporation from concrete, therefore increasing the water retention capacity of concrete when compared to conventionally cured concrete. Work is often done in regions where there is a significant dearth of water and the use of water cure is not economically possible. In Pakistan, structures are seldom set on fire since, due to economic constraints, it is extremely difficult to dismantle and rebuild them. Because the construction industry wants to renovate it, it is vital to examine the fundamental qualities of concrete so that the industry may analyses the remaining properties of concrete and decide whether to renovate or demolish. The present experiment concerns the application of self-curing agent viz., polyethylene glycol (PEG) of molecular weight 400 (PEG-400) for doses of 0%, 0.5%,1% and 2% by weight of cement added to mixing water in the concrete. At standard age, compressive strength, density, and appearance of conventional and self-cured concrete mixtures of M30 grades were studied in comparison at 28 days. The thermal behaviour of controlled and optimized self-curing concrete was examined at higher temperature levels of 200°C, 400°C, 600°C, 800°C, and 1000°C and heating time of 6 hours on the compressive strength, density, and appearance of controlled and self-curing concrete. It was found that 0.5% dosage of PEG-400 by weight of cement was optimum for M30 grade of concrete for achieving maximum strength of 47.87 MPa without compromising workability that was achieved slump 70 mm. The compressive strength of controlled self-curing concrete decreases by up to 38.17% and the compressive strength of optimized self-curing concrete decreases by up to 15.56% when the temperature is raised to 1000 °C. The loss of compressive strength in controlled self-curing concrete is 22.61% greater than that of optimized self-curing concrete. The density of controlled self-curing concrete decreases by up to 4% and the density of optimized self-curing concrete decreases by up to 3.6% when the temperature is raised to 1000 °C. The loss of density in controlled self-curing concrete is 0.4% greater than that of optimized self-curing concrete. In appearance it was discovered that the color of the self-

curing concrete changes slightly, whereas the color changing grey to brown and cracks in controlled self-curing concrete are greater. It is concluded that self-curing technique would beneficent concrete properties against fire resistance.