

**EXECUTIVE SUMMARY FOR THE UNDERGRADUATE RESEARCH GRANT:**  
**SPRAYABLE SELF-HEALING ENGINEERED CEMENTITIOUS COMPOSITES**

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Self-healing engineered cementitious composites (ECC) present enhanced durability and structural ability in the event of cracking that a plain concrete and reduces repair costs. The possibility of spraying this material means greater ease in repairs, especially in situations where traditional pours would deem difficult. Hence, the aim of this research was to develop sprayable self-healing ECC mixes.

Two mineral admixtures were used as self-healing agents in the mixes: magnesium oxide (MgO) and crystalline admixtures (CA). The specimens obtained from sprayed panels were pre-cracked, cured under water to accelerate the healing process and monitored over time using a portable microscope to study the filling of the cracks. Several tests were performed to assess the properties of the material after the self-healing (e.g. rapid chloride migration test and water permeability). One of the challenges identified during the study was maintaining the pre-cracking constant in all specimens to avoid adding an additional variable to the analysis. Obtaining sprayable mixes with the high content of PVA fibres commonly found in ECC was also a difficult task.

It was concluded that the maximum PVA fibre content in the mixes that was compatible with spraying was 1.8%. The findings indicate that both MgO and CA led to self-healing behaviour as evidenced by the reduction of the crack widths and the results of several testing methods.