

## **Mixing sequence effect of Cement composites with carbon fibres**

### **ABSTRACT**

Carbon fibres are widely recognised as reinforcement materials that effectively control cracks in concrete structures. Nonetheless, these fibres do not disperse uniformly inside the cement matrix, disrupting the mixture homogeneity. To address this concern, this study investigated two distinct mixing sequences of cement composites with carbon fibres. Two mixing sequences were investigated including the addition of fibres after cement (ACCF) and the addition of fibres before cement (BC-CF). The surface topography of carbon fibres and the engineering properties of the cement paste were also examined. Consequently, carbon fibres in cement composite produced lower flowability due to the surface roughness. The AC-CF specimen demonstrated the highest hardened density at 28 days with 2679.22 kg/m<sup>3</sup> followed by BC-CF and the control specimen with 2386.08 kg/m<sup>3</sup> and 2278.36 kg/m<sup>3</sup>, respectively. The AC-CF specimen also had the highest compressive strength at 28 days with 69.91 MPa, followed by BC-CF and the control specimen with 65.92 MPa and 63.20 MPa, respectively. Further, the flexural strength of the AC-CF specimen exhibited the highest strength with 10.86 MPa, followed by BC-CF and the control specimen with 9.35 MPa and 9.17, respectively. The fibre dispersion in AC-CF was also superior to BC-CF. Therefore, it can be concluded that the best mixing sequence is the addition of fibre after cement (AC-CF) because it had better fibre dispersion and engineering properties compared to the addition of fibre before cement (BC-CF).