

Influence of Bio-Based Admixture on Compressive Strength of Concrete for Columns

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Abstract : Concrete is a fundamental building material, extensively utilized by the construction industry. Problems related to the strength of concrete is an immense issue for the sustainability of concrete structures. Concrete mostly loses its strength due to the cracks produced in it by shrinkage or hydration process. This study aims to enhance the strength and service life of the concrete structures by incorporating bio-based admixture in the concrete. By the injection of bio-based admixture (BBA) in concrete, it will self-heal the cracks by producing calcium carbonate. Minimization of cracks will compact the microstructure of the concrete, due to which strength will increase. For this study, *Bacillus subtilis* will be used as a bio-based admixture (BBA) in concrete. Calcium lactate up to 1.5% will be used as the food source for the *Bacillus subtilis* in concrete. Two formulations containing 0 and 5% of *Bacillus subtilis* by weight of cement, will be used for the casting of concrete specimens. Direct mixing method will be adopted for the usage of bio-based admixture in concrete. Compressive strength test will be carried out after 28 days of curing. Scanning electron microscopy (SEM) and X-ray diffraction analysis (XRD) will be performed for the examination of micro-structure of concrete. Results will be drawn by comparing the test results of 0 and 5% the formulations. It will be recommended to use bio-based admixture (BBA) in concrete for columns because of the satisfactory increase in the compressive strength of concrete.

Keywords : bio-based admixture, *Bacillus subtilis*, calcium lactate, compressive strength

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