

## Production and characterization of self-compacting concrete with the incorporation of thermoactivated recycled cement

### Summary

The primary focus of this research is the introduction of Self-Compacting Concrete (SCC) through the inclusion of Recycled Cement (RC). The initial phase involves the development of Self-Compacting Mortar (SCM) using varying quantities of RC. To ascertain self-compatibility, two experimental tests are employed: the Mini Slump and the V-Funnel Flow Time. For each designated RC percentage, the self-compatibility is meticulously evaluated until a SCM is achieved. Subsequently, a series of evaluations are conducted to analyze the durability and strength characteristics of the SCM. These include immersion water absorption and capillary water absorption for durability assessment and compressive and flexural strength tests for strength characterization.

After that, additional variables into the SCM formulation are introduced, namely fillers such as fly ash and lime filler; these will be incorporated at various percentages. In keeping with the methodology of the original process, the entire procedure from initial composition through to the comprehensive series of self-compatibility, durability, and strength evaluations will be meticulously repeated.

A subsequent process is initiated to develop SCC made with RC, albeit with necessary adjustments of the constituent materials. The focus is evaluating the newly minted SCCs in terms of self-compatibility to ascertain their capacity for self-compaction. A comprehensive set of tests, namely V-funnel, slump flow, T500, and J-ring tests, are deployed to assess self-compatibility. Following this, the study delves into assessing the mechanical strengths of the SCC. This assessment involves conducting tests for compressive and tensile strengths, along with the modulus of elasticity. Durability parameters are also scrutinized through tests such as water absorption, chloride ion diffusion, and carbonation resistance. Parallel to this, another set of tests is conducted on SCCs incorporating RC and different fillers.

The goal is to ensure the optimal performance of the developed RC-made SCC, hence contributing to a greener, more sustainable, and economically viable future in the realm of concrete technology.

### Keywords

Self-compacting concrete, self-compacting mortar, self-compatibility, eco-friendly concrete, concrete technology.



Mini slump test.



Slump flow and T500 test.



Production of SCC.



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