

Incorporation of Coarse Rubber Aggregates in the Formulation of Self-Compacting Concrete: Optimization and Characterization

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Abstract : Concrete material suffers from a relatively low tensile strength and deformation capacity is limited. Such defects of the concrete are very fragile and sensitive to shrinkage cracking materials. The Self- Compacting Concrete (SCC) are highly fluid concretes whose implementation without vibration. This material replaces traditional vibrated concrete mainly seen techno-economic interest it presents. The SCC has several advantages which are at the origin of their development crunching. The research is therefore to conduct a comparison in terms of rheological and mechanical performance between different formulations to find the optimal dosage for rubber granulates. Through this research, we demonstrated that it is possible to make different settings SCC composition having good rheological and mechanical properties. This study also showed that the substitution of natural coarse aggregates (NA) by coarse rubber aggregates (RA) in the composition of the SCC, contributes to a slight variation of workability in the fresh state parameters still remaining in the field of SCC required by the AFGC recommendations. The experimental results show that the compressive strengths of SCC decreased slightly by substituting NA by RA. Finally, the decrease in free shrinkage is proportional to the percentage of RA incorporated into the composition of concrete. This reduction is mainly due to the improvement of the deformability of these materials.

Keywords : self-compacting concrete, coarse rubber aggregate, rheological characterization, mechanical performance, shrinkage

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