

Study of the properties of SCC with quarry dust

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Granite fines or rock dust is a by-product obtained during crushing of granite rocks and is also called quarry dust (QD). This paper deals with using quarry dust as an alternative to fine aggregate (FA) in SCC and reports the strength behaviour and hardened properties of such SCCs. Although in normal concretes, introducing QD increases the water demand, in SCC, it has been successfully used for increasing the deformability and passing ability of fresh concrete. Also, it was noted that by increasing the pouring heights of an SCC, the compressive strength and splitting tensile strength of concrete were unaffected.

Keywords: *Self-compacting concrete, deformability, passing ability, segregation resistance, homogeneity, compaction, strength, fineness, cost saving and pouring heights.*

Self compacting concrete (SCC) can be cast and compacted without the need of any mechanical aid, under its own weight. SCC mixes increase productivity, reduce noise pollution and improve construction quality.^{1,2,4,5}

To be classified as an SCC, the fresh concrete must have the following characteristics namely: acceptable fluidity, high resistance to segregation, right plastic viscosity, and enough deformability.

These characteristics are described by the following properties.

- Filling ability: Ability to fill all the spaces.
- Passing ability: Ability to flow through tight spaces and around reinforcement.
- Segregation resistance: Ability to remain homogeneous during transport and placing.³

Need for quarry dust use

The quarry-fines is a by-product generated while crushing rocks for manufacturing concrete aggregates. Its production is less than 1% of total aggregate production. Because of its high fineness introducing QD in normal concrete increases the water demand and in turn cement content for a given workability and strength needs. However, using quarry dust in an SCC could turn this waste into a valuable material leading to savings in the cost of producing concrete. Earlier research has proved the granite fines could be successfully used to produce SCC.¹⁴

Objectives

The major objectives of this study were:

- To utilise QD as a substitute for river sand or fine aggregate and to study the properties of this SCC in both fresh and hardened state.