



Sustainable Civil Engineering Structures and Construction Materials 2016, SCESCM 2016

## Valorization of the crushed dune sand in the formulation of self-compacting-concrete

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### Abstract

In this paper, the crushed dune sand and limestone filler were using as mineral addition in the formulation of self-compacting concrete (SCC), for that a comparison was carried out on their effect on the properties and behaviour of SCC in a fresh and hardened state. The results of the mechanical tests showed that there is a light difference between the concrete containing limestone filler or crushed dune sand. Moreover, the SCC containing crushed dune sand presents a better behavior at the shrinkage than the SCC with limestone filler.

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Peer-review under responsibility of the organizing committee of SCESCM 2016.

*Keywords:* SCC; crushed dune sand; limestone filler; compressive strength; shrinkage.

### 1. Introduction

The self-compacting-concrete (SCC) makes a new family of concrete and a new technological step in civil engineering. it is very fluid concrete whose putting in place without vibration, it has several advantages so much at the environmental level, technological that economic which interests the industrialists more and more [1-3]. It is essential that the self-compacting-concrete preserves its stability and ensures a perfect homogeneity; these two contradictory properties are ensured by the employment of superplastifiant and the incorporation of the mineral additions as binary or ternary blended cement in their compositions [3-7]. The aim of this study is to valorize the crushed dune sand ( $D_{\max} \leq 80 \mu\text{m}$ ) in order to use it like a mineral addition in the formulation of self-compacting-

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concrete. In this work, incorporation was made for the limestone filler and crushed dune sand producing by crushing the western dune sand in the formulation of the SCC in order to evaluate their effects on the properties fraiche and hardened of these concretes. This document carried out a comparison on the effect of limestone filler and crushed dune sand in term of behavior on the fresh states, compressive strength, loss mass, and free shrinkage of these concretes.

## 2. Materials and experimental method

### 2.1. Basic materials

#### 2.1.1. Cement

The cement used is Portland cement composed CPJ CEM II / B resistance real Matine 425 bars under the trade name.

#### 2.1.2. Additions

- Limestone fillers are type calcaire according to norm (NF P 18-508 1995a).
- The crushed dune sand coming from crushing dune sand which is on the level of Taghit, wilaya of Bechar (Algeria), the maximum coarse aggregate of crushed dune sand does not exceed  $80\mu\text{m}$ . it has high content of quartz silica [8].

The results of DRX analysis carried out on the sand of Taghit and limestone fillers are presented graphically on Fig. 1. It was noticed a peak of approximately 100 % of silica with crashed sand and calcite for limestone fillers which translated the predominance of  $\text{SiO}_2$  and  $\text{CaCO}_3$ , the others revealed elements present at small percentages.

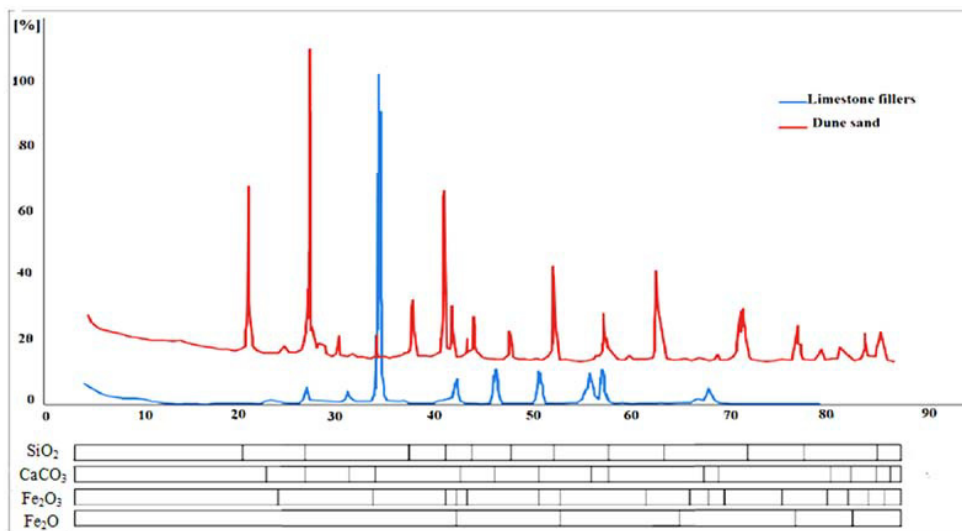


Fig. 1. DRX analyze of limestone filler and dune sand.

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