World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:14, No:12, 2020

# The Portland Cement Limestone: Silica Fume System as an Alternative Cementitious Material

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**Abstract :** Environmental pollution, along with the depletion of natural resources, is among the most serious global challenges in our times. The construction industry is one of the sectors where a relevant reduction of the environmental impact can be achieved. Thus, the cement production will play a key role in sustainability, by reducing the $CO_2$ emissions and energy consumption and by increasing the durability of the structures. A large number of investigations have been carried out on blended cements, but it exists a lack of information on the Portland cement limestone - silica fume system. Mortar blends are optimized in the mix proportions for the different ingredients, in particular for the dosage of the silica fume. Portland cement and the new binder-based systems are compared with respect to the fresh mortar properties, the mechanical and the durability behaviour of the hardened specimens at 28 and 90 days. The use of this new binder combination exhibits an interesting hydration development with time and maintain the conventional characteristics of Portland cementitious material. On the other hand, it will be necessary to reproduce the Portland Limestone Cement-silica fume system within the concrete. A reduction of the $CO_2$ production, energy consumption, and a reasonable service life of the concrete structures, including a maintenance free period, will all contribute to a better environment.

**Keywords :** binder, cement, limestone, silica fume
**Conference Title :** ICGSBM 2020 : International Conference on Green and Sustainable Building Materials
**Conference Location :** London, United Kingdom
**Conference Dates :** December 10-11, 2020