

INNOVATIVE MATERIAL FOR SEGMENT TUNNELS

Olga Rio¹ and Viet Duc Nguyen¹

¹Department of Construction, Eduardo Torroja Institute for construction Science IETcc-CSIC

Address: c/ Serrano Galvache 4, 28033-Madrid, Spain

E-mail: rio@ietcc.csic.es and duc.nguyen@ietcc.csic.es; web page: <http://www.ietcc.csic.es/>

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ABSTRACT

Self-Consolidating Cement Composites (SCCC) is nowadays a matured technology, adapted to many different structural applications. Indeed recently its possibilities by including fiber cocktails are broadened, hence allowing serving incompatible functions concerning the most complex engineering environments. Moreover, concrete industry needs to meet the important issues of cost-efficiency and environment impact by accurately assessing the use of resources also.

The Functionally Graded Material (FGM) concept introduced in Japan in the early 1970s, when applied to SCCC certainly helps to produce customized concrete elements (spatially tailored) in a more cost-efficient way. On the other hand unlike SCCC due to its rheological characteristics, it allows an effortlessly casting of robust FG segments while reducing the design complexity.

In the light of the synergy, a FGSCCC concept is presented and the feasibility of producing linearly compositional gradients applicable to tunnel segments located under sea water areas demonstrated. Equally, the highly-optimized performance of the graded solution has been experimentally proved. Thus, the main paper objective is to introduce the deployed hybrid concept and to illustrate its feasibility for producing FG tunnel segments