

Accepted Manuscript

Corrosion resistance of steel embedded in sulfoaluminate-based binders

Maddalena Carsana, Fulvio Canonico, Luca Bertolini

PII: S0958-9465(16)30495-4

DOI: [10.1016/j.cemconcomp.2018.01.014](https://doi.org/10.1016/j.cemconcomp.2018.01.014)

Reference: CECO 2983

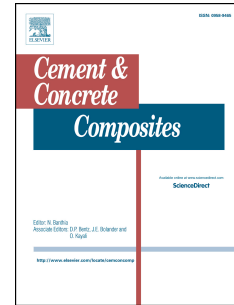
To appear in: *Cement and Concrete Composites*

Received Date: 1 September 2016

Accepted Date: 29 January 2018

Please cite this article as: M. Carsana, F. Canonico, L. Bertolini, Corrosion resistance of steel embedded in sulfoaluminate-based binders, *Cement and Concrete Composites* (2018), doi: [10.1016/j.cemconcomp.2018.01.014](https://doi.org/10.1016/j.cemconcomp.2018.01.014).

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Corrosion resistance of steel embedded in sulfoaluminate-based binders

Maddalena Carsana^{a,*}, Fulvio Canonico^b, Luca Bertolini^a

^(a) Politecnico di Milano, Department of Chemistry, Materials and Chemical Engineering
“G. Natta”, via Mancinelli, 7 – 20131 Milan, Italy

^(b) Buzzi Unicem, Via L. Buzzi 6, Casale Monferrato (AL), Italy

(*) Corresponding author

e-Mail address: maddalena.carsana@polimi.it (M. Carsana)

Abstract

The use of new binders for structural concrete raises questions about the durability of reinforced concrete structures. Calcium sulfoaluminate cement (CSA) has become in recent years an environmental-friendly alternative to ordinary Portland cement (OPC), but the protection capacity of concrete in relation to the corrosion of embedded steel reinforcement needs to be studied. This paper describes a study on the corrosion behaviour of carbon steel embedded in concrete made with CSA-based binders. It was shown that the pore solution of sulfoaluminate concrete was enough alkaline to passivate embedded carbon steel rebars. Compared to traditional Portland and Portland-limestone cements, CSA cement led to higher carbonation rate of concrete, but to lower corrosion rate of steel in carbonated concrete, likely due to higher electrical resistivity. Corrosion rate was negligible up to 95% RH at 20°C. Blending of CSA and OPC cements improved steel passivity and concrete resistance to carbonation.

Keywords: Sulfoaluminate cement, Passivation, Corrosion, Carbonation, Pore solution.

Download English Version:

<https://daneshyari.com/en/article/7883948>

Download Persian Version:

<https://daneshyari.com/article/7883948>

[Daneshyari.com](https://daneshyari.com)