

Effectiveness of corrosion inhibitors in contaminated concrete

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Abstract: Four types of corrosion inhibitors (calcium nitrite at two dosages, calcium nitrate at three dosages and two organic inhibitors at their recommended dosages) were evaluated at five different levels of contamination, i.e., 0.8% chloride; 0.8% chloride plus 1.5% SO₃; seawater; brackish water; and unwashed aggregates. Concrete specimens were used to assess the effect of corrosion inhibitors on the compressive strength of concrete and reinforcement corrosion. The results indicated that the corrosion inhibitors investigated in this study did not adversely affect the compressive strength of concrete. Furthermore, calcium nitrite was efficient in delaying the initiation of reinforcement corrosion in the concrete specimens contaminated with chloride, while both calcium nitrite and calcium nitrate mitigated the corrosive effects of chloride plus sulfate salts or sea water. In the concrete specimens prepared with brackish water or unwashed aggregates, all the inhibitors were effective in reducing the rate of reinforcement corrosion. The type and dosage of corrosion inhibitor were observed to be dependent on the nature and level of contamination. 2002 © Elsevier Science Ltd. All rights reserved.