

Evaluation of Corrosion in Steel Reinforced Concrete with Brick Waste

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Abstract : The massive demolition of old buildings in recent years has generated tons of waste, especially brick waste. Thus, a concern of recent research is the use of this waste for the production of environmentally friendly concrete. At the same time, corrosion in classical concrete is a current problem. In this context, in the present paper a study was carried out on the corrosion of metal reinforcement in cement mortars with brick waste. The corrosion process was analyzed on four compositions of mortars without and with 15 %, 25 % and 35 % bricks waste replacing the sand. The brick waste has a majority content in SiO₂, Al₂O₃, FeO₃ and CaO. The grain size distribution of brick waste was close to that of the sand ($d_{\max} = 3$ mm). The preparation method of the samples was similar to ordinary mortars. The corrosion properties of concrete, at different waste bricks concentrations, on rebar, were investigated by electrochemical measurements (Tafel curves and EIS) at 1 and 6 months. The results obtained at 6 months revealed that the addition of the bricks waste in mortar are improved the anticorrosion properties, in the case of all samples compared with the sample with 0% bricks waste. The best results were obtained in the case of the sample with 15% bricks waste (the efficiency was ≈ 90 %). The corrosion intermediary layer formed on the rebar surface was determined by SEM-EDX.

Keywords : EIS, steel corrosion, steel reinforced concrete, waste materials

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