Efficiencies of Different Techniques to Protect Rebars Against Corrosion

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Abstract

Corrosion of steel reinforcement is considered one of the major causes of reinforced concrete deterioration. In the last few decades, researchers studied many different rebar protection techniques against corrosion. Three famous techniques were considered in this research, which are rebars protective coats, sacrificial anode and impressed current. Rebars protective coats are the most used technique in small projects. They are produced with different trade names according to the manufacture. On other hand, sacrificial Anode technique is recommended for aggressive environments. Finally, impressed current technique is usually used for large and corrosion sensitive structures. The aim of this research is to compare the protection efficiency of each of these three techniques. In order to achieve that goal, two experimental programs were carried out; the first program measured the protection efficiency in terms of rebars mass loss using sixteen lollypop samples. The program tested the efficiency of two types of protective coats, three types of sacrificial anodes besides the impressed current using two concrete grades. The second program measured the protection efficiency in terms of loss in structural capacity using six (100x100x1500mm) concrete simple beams. Only one type of protective coating is used besides the impressed current technique. In both programs, all samples were tested using accelerated corrosion test and results were compared to the control samples. Programs results showed that impressed current is the most effective protection technique because it prevents the corrosion completely. On other hand, the efficiency of sacrificed anode technique depends on the activity of the anode material and finally, the efficiency of protected coats dependents on material base of the coat.

International Journal of Engineering and Advanced Technology (IJEAT) 2019, December

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