Review Paper on Corrosion Prevention of Reinforcement in RCC works using Admixture and Anodes

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Abstract; **This paper provides a review of some of the progress in the area of corrosion prevention of reinforcement in RCC works using optimum quantity of Admixture and Anodes with experiments.Existing studies have shown that the rate of corrosion in concrete beams in which anticorrosive admixtures used is reduced at greater extent.Experimental studies will be carried out to select optimum quantity of admixture,effectiveness of anodes in corrosion prevention.**

Index Terms**; Admixture,Anode,Fiber reinforced polymer**

1.INTRODUCTION :-

Concrete is a versatile composite material which has been used over century in the construction area due to its economical ecological and technical advantages. But the corrosion of steel reinforcement bars in the concrete is a longstanding global problem being faced by many technical Engineers which causes damage to concrete structures. In case of adverse environments, numerous structures have life experienced unacceptable loss in safety or serviceability far earlier than expected due to corrosion of reinforcing steel bars and therefore there is need for corrosion prevention.

Corrosion is mainly caused by the chloride intrusion (Passage of aggressive chloride ions form marine environments, deicing salts, and use of chloride contaminated aggregates) and carbonation. When chloride ions react with steel, corrosion products such as rust is formed which involves a substantial increase in volume which results in expansion of the concrete and thus spalling and delamination of concrete takes place, so it is necessary to stop the corrosion at the initial stage itself, so that the life of the structure is improved which indirectly reduces the maintenance cost using either Admixture or anodes.

2.LITERATURE REVIEW :-

Varenyam Achal et al (2012) have presented the experimental investigation of corrosion prevention of reinforcement using microbially induced calcite precipitation. (MICP). The effectiveness of MICP in reducing reinforcement corrosion is investigated. The result showed that bacterial treated RC specimens reduced the corrosion rate four times more than the control specimens. MICP is a selective microbial plugging process in which microbial metabolic activities promote precipitation of calcium carbonate in the form of calcite. Microbial mineral precipitation technologies have been successfully demonstrated for the consolidation of sand columns; the repair of limestone monuments, and to some extent, the remediation of cracks in concrete. More-over, microbially induced precipitation has been investigated for its potential to improve the durability of construction materials. Considerable research on carbonate precipitation by bacteria has been done by sing ureolytic bacteria such as sporosarcina pasteurii.

Corrosion current density measurement showed that MICPs play an important role in reducing the

current in RC specimens. Pullout strength was enhanced and mass loss of the reinforcing bar was reduced due to MICP. Industrial pollutants such as CSL can be used as a nutrient source to grow bacterial cells and curing medium.

Varun Kumar Kand, Mini K.M. (2017) Studied on corrosion resistance in concrete by mineral admixture addition and FRP (Fibre Reinforce Polymer) wrapping of reinforcement bars.

Hence, the steel reinforcement bars are to be protected from corrosion so that the structure remains safe. In the present paper, modifications are done for steel using Fiber Reinforced Polymer (FRP) wrapping and the concrete is modified by doping with Zeolite and Micro Silica. Corrosion is mainly caused by the chloride intrusion (passage of aggressive chloride ions from marine environments, deicing salts, and use of chloride contaminated aggregates) and carbonation. The effect of mineral admixtures like nano- silica, nano calcium carbonate, micro-silica and micro zeolite on water absorption are studied out in controlling the corrosion. The effect of silica fume on CNT based cement composite was carried out by K.M. Mini et. Al which also shows reduced water absorption and thus can reduce corrosion. The effect of different inhibitors like fly ash, zeolite, diatomite, leaf-extract of morindalucida, imidazoline based inhibitors, high volume fly ash, nano-calcium carbonate etc is studied and concluded that all the inhibitors are good at resisting corrosion when compared to the normal traditional concrete without any admixtures.**Nimrat Pal Kaur** conducted a study on CFRP as active protection of corroded steel rebar embedded in FRP wrapped concrete by using non-destructive monitoring techniques. Less and Adeli investigated the structural behaviour and corrosion resistance of hybrid FRP wrapped steel reinforcement bars in advantages and disadvantages of hybrid bars. In case of steel modification, CFRP (Carbon Fibre Reinforced Composites) and GFRP (Glass Fibre Reinforced Polymer) sheets are wrapped around the steel bar which acts as a secondary reinforcement (barrier) for the passage of water.

Mengna Yan at al (2018) studied on corrosion prevention of reinforcement. The most commonly used corrosion inhibitor is nitrite corrosion inhibitors, of which the effective anticorrosion component is the free nitrite ion existing in the concrete structures. However, the free nitrite ion existing in the concrete structures can improve the corrosion resistance by repairing and reforming the passive film. The free nitrite ion reacts with ferrous ions on the surface of steel and oxidizes divalent iron ions into stable trivalent iron oxide, the composition of the passive film. Due to the nitrites used as corrosion inhibitor, the mineral admixtures and nitrites are often applied in reinforced concrete structures at the same time. These cement-based materials combined with mineral admixtures and nitrites can not only improve concrete properties but also prolong the service life of structures.Corro Guard-Admix is a admixture for reinforcement bars embedded in concrete, offers higher corrosion resistance due to inhibitors added it.

3.FUTURE WORK :-

Many guidelines are reviewed regarding this topic,all these topics requires further research.Experimental study will be carried out on the strength of concrete and corrosion of reinforcement.Experimental study will be carried out for the effect of admixtures on the strength of concrete and effect of saline water on the strength of concrete. The experimental work will be carried out to find the optimum quantity of admixture to be used.Experimental work will be carried out on use of anodes and its effectiveness in corrosion prevention.

FIG 1 .EXPERIMENTAL WORK

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