

A Review on Study of CPCC, FBEC & CRSD as Reinforcing Bar

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The concentration of the inlet wastewater of urban sewage treatment plants is much lower than the expected level in the design stage, mainly because of the problems of construction, management and maintenance of the drainage systems. Through investigation of the urban drainage pipelines, primary problems of drainage network damage, local unreasonable elevation design, pipe blockage and drainage system confusion, etc. were found. Combining the local actual situation, some corresponding engineering and management measures and some feasible suggestions for drainage pipe construction, management and maintenance are put forward.

Index Terms— CPCC, FBEC & CRSD

I. INTRODUCTION

Main reasons failure of structures is due to corrosion of embedded steel reinforcement in concrete. Therefore corrosion control of steel reinforcement is a very Important to save the structure, First and foremost for corrosion can be controlled by the good quality of concrete and perfect workmanship. Corrosion reduce the load carrying capacity of structure and also it break down the bond between concrete and steel so anti corrosion bars are required to make the structure durable and lifelong. Anti corrosion bar inform of CPCC, FBEC & CRSD used. [1]

A. Means of Terms.

CPCC- Cement-polymer Composite Coated Rebar

FBEC- Fusion Bonded Epoxy Coated Rebar

CRSD- corrosion Resistant Steel Deformed Rebar

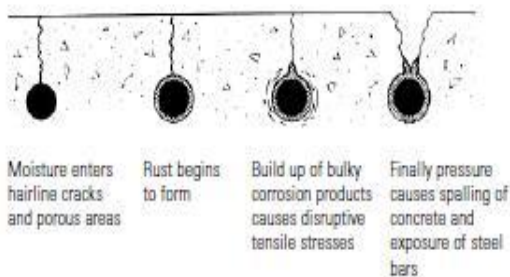


Fig.1 Show the phenomena of steel Reinforcement of MS Bar



II. CEMENT-POLYMER COMPOSITE COATED REBAR (CPCC)

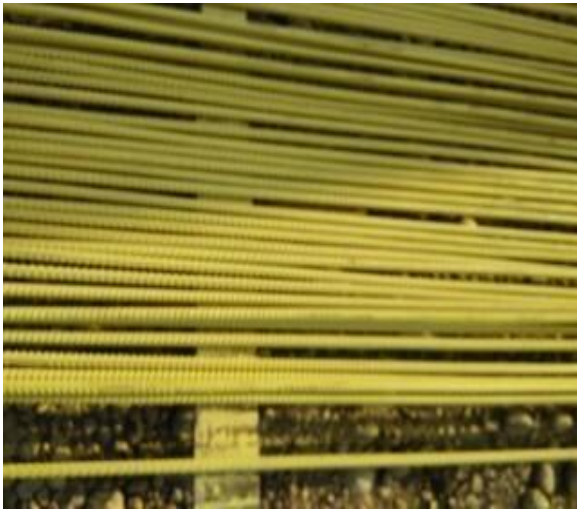
Cement- polymer composite coated rebar consist of De-rusting Solution Alkaline Powder Phosphate Jelly Inhibitor Solution Sealing Solution

S.NO	parameter	Requirement
1.	Pre-treatment and surface reparation	Sand Rubbing to the surface of steel.
2.	Primer Coat	Apply within 4 hours of sand blasting.
3.	Sealer Coat	After prime coat and within 30 minutes of prime coat, this should be given. Thickness 15- microns plus minus 25 microns.
4.	Air curing	Six hours before use in the work.
5.	Continuity of coating	Continuity of coating till the no defects such as cracking, bulging, peeling, no rust mark. Appearing on surface by visually inspected
6.	Adhesion of coating-test	Coated bars are bent at 120° around a mandrel. NO peeling or cracking should be observed on outer radius.
7.	Stacking	Stack bars on buffer material.
8.	Cutting, bending, welding	Coat bars can be cut and bent. Cut ends and weld positions should be treated with same formulation.

The system has been developed mainly as a factory / shop process.

- The main use development of this system is that the base metal of rebar's, contains Electrons which get readily released in corrosive environment leading to oxidation of iron and thereby formation of Ferrous Oxide (II) (rust) as principle deterrent to destroy the steel
- In order to prevent this oxidation a surface coating capable of interacting the released electrons is provided to neutralize the oxidation of iron and make safe the steel.

- Further pre-stressing and reinforcing steel, in concrete during service life, are exposed to an alkaline environment and this necessitates introductions of a top coat which should be compatible to primer and alkaline environment for steel. [2]



Cement-polymer Composite Coated Rebar (CPCC)

III. FUSION BONDED EPOXY COATED REBAR (FBEC)

Fusion bonded epoxy coated rebar consist of

No.	parameter	Requirement
1.	Cleaning of bar	Bars are first rubbed and cleaned from surface contamination such as oil, grease etc. by chemical process before shot blasting.
2	Pre-treatment and surface preparation	The reinforcement bars are cleaned by shot blasting or grit blasting to white or near white stage. After the surface preparation the cleaned bars are heated up the temperature 230° c in preset heaters..
3.	Coating	Hot bars are then fed to the coating booth, where the epoxy powder is sprayed electro statically.
4.	Curing and Cooling	After the coating Coated bars are then cured and forced cooled by water spraying to enable handling and testing.
4.	Continuity of coating	The adhesion of the coated bars is continuing till the surface of bars is fully coated. and it can be checked by the bending of the bar.
5.	Testing of performance of rebar	Various other tests are performed in laboratory like chemical resistance, short spray, resistance in continuance boiling water, abrasion resistance and impact resistance etc. these are conducted on every batch of production.
6.	Handling & Stacking	Fusion Bonded Epoxy Coated Bars require padded contacts during transportation, stacking, handling and till the concreting is done.
7.	Cutting, Bending & welding	The cut ends, welded spots and handling damagers are required to be repaired with special liquid epoxy compatible with the coating material as per specification of the coating agency.

Fusion bonded epoxy is basically 100% solid finely ground fused powder particles, which applied on the bars when heated when heated; melt to form a continuous adherent film to prevent from corrosion.

- There is no passive ting primer film provided in case of FBEC rebar's
- This coating introduces a medium of weakness in the path of an intimate bond between rebar and alkaline concrete.
- Extensive investigation carried out on 40 bridges in Florida Key in USA has revealed that disbandment can occur easily in the FBEC rebar's which lacked passive action layer of ferrous oxide (II) and is a precursor to corrosion.
- Higher co- efficient of Thermal Expansion of fusion bonded epoxies imposes large thermal stresses in epoxy coating leading to its early failure. [3]



Fusion Bonded Epoxy Coated Rebars (FBEC)

IV. EPOXY COATS THE REBAR IN THE FOLLOWING MANNER

- Melts
- Flows
- Gels
- Cures
- Cools
- Adheres as coating

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Table 1 Mandrel Diameter for Bend Test Requirements (Clause 8.3)

Bar Diameter, mm	Mandrel Diameter, mm
(1)	(2)
6	60
8	80
10	100
12	100
16	125
18	150
20	150
22	200
25	200
28	225
32	280
36	280
40	400
45	450
50	500



Epoxy coats rebar

S No.	Parameter	Requirement
1.	Surface preparation	Bars are cleaned from surface contamination such as oil, grease etc. by chemical process by shot blasting.
2	Pre heating and surface preparation	After the surface preparation bars are heated by the induction heater at temperature between 225-245°C.
3.	Fusion bonded epoxy coating	The steel is to be coated is passed through powder stream on conveyor the powder particle uniformly wrapped around surface
4.	Cooling and testing	The bars are cooled by passing through a water tunnel and testing with a holiday detection device.
4.	Continuity of coating	The adhesion of the coated bars is continuing till the surface of bars is fully coated. and it can be checked by the bending of the bar.

V. CORROSION RESISTANT STEEL DEFORMED REBAR (CRSD)

- Resistance to corrosion can be made by the formation of initial layer of protective oxide or rust. (Hypo oxides). Unlike common rust on normal rebar the CRSD rust is passive, tenacious and self-renewing.
- The protective oxide is fine textured, tightly adherent and act as a barrier to moisture, oxygen, carbon dioxide, sulphur dioxide and chloride effectively preventing further corrosion.

- 1) Reinforcing Bars with Improved Corrosion Resistance:
- 2) Stainless Steel Bars
- 3) Galvanized Steel Bars
- 4) Epoxy-Coated Reinforced Bars[5]

VI. CONCLUSION

Due to the attack of chemical on Steel develop cracks which are the first sign of destruction. The damage due to corrosion is serious effects upon the mechanical properties of concrete structure. One the corrosion of reinforcement starts under the loaded structure. The stresses acting on it increase and the ultimate and finally the structure failed. The loss due to corrosion is very heavy. To produce the durable concrete and resist the harmful effect of aggressive environment. Most economical and better method to provide the anti corrosion resistance bars.

REFERENCES

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