DUPLICATE

Section – 6

SPECIFICATIONS

(General specifications have been mentioned in drawings and Bills of Quantities)

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Particular Specification for Structural Protection for Reinforced Cement Concrete (RCC) Elements in Legal Department within Townhall Building

1.Subcontractor

The structural protection for identified areas of slab, beam shall be carried by an CIDA (Construction Industry Development Authority) registered subcontractor with grade SP III or above. Also, the contractor shall employ a qualified engineer who is a member IESL (Institute of Engineers Sri Lanka) and has at least five years' experience in structural and water proofing projects in similar nature. The documentary evidence for the experience of previous projects shall be verified by the respective clients of previous projects. The contractor shall submit the list of subcontractors and their experience in similar nature of work. The submissions of Bids without this submission shall be subjected for rejection. The method statement of the structural repairs shall be prepared and certified by a structural engineer having experience in similar projects shall be submitted for the approval of the engineer.

2.Method

Remove all deteriorated plaster and concrete with the prior approval form the client. The RCC elements shall be tested jointly with client to ascertain the quality of the existing RCC material and plaster before removal. All corroded reinforcement shall be removed and new reinforcement shall be introduced.

3.Material

The following or equivalent material shall be utilized for the structural protection of RCC elements. The technical catalogue of all materials shall be provided prior to usage for the approval of the engineer in advance.

3.1 RCC elements (identified areas of slab, beam and window frame)

3.1.1 Surface preparation

Check the quality of the soffit or element surfaces using hand hammer and identify the defective areas initially and loose, unsound and deteriorated concrete layers until the hard core should be removed. All exposed reinforcements must be thoroughly cleaned. Loose rust or any

contamination is removed by abrasive blast cleaning or any other approved method. Before start the rectification, work inspection will be called jointly with the client representative.

3.1.2 Replacement of reinforcement

The portions of steel bars severely corroded require replacement. This is achieved by cutting away the corroded portions which identified jointly and replacing with new bars of the same type and size, either welded or tied to the existing bars with relevant lap length with prior approval.

3.1.3 Application of Zinc rich primer

Zinc rich anticorrosive primer is an epoxy primer having wet film thickness approximately 135 microns and dry film thickness of 40 microns shall be applied on all the reinforcement bars. Apply within one hour on preparation of steel to ensure continues coverage over the total surface area of the exposed steel. The primer chosen should be such that it should good adhesive strength and good adhesion to subsequent repair layers. The technical catalogue of the same shall be submitted for approval by the engineer.

3.1.4 Bonding between existing concrete and repair material.

Epoxy bonding agent shall be applied to the cleaned existing concrete surface and the reinforcements to act as bonding agent between fresh and existing concrete and act as an anti-chloride barrier. The technical catalogue of the same shall be submitted for approval by the engineer. The material shall contain with acid resistant fillers and wetting agent.

3.1.5 Application of concrete repair mortar

Cementitious single component polymer modified concrete repair mortar in overhead and vertical application as layers not exceeding thickness of 15mm. Mix with water with a mechanical mixer as per manufacturers specification and apply immediately after mixing is completed. The material shall be applied and ensure that the thorough compaction around the reinforcement and against the edges of the reinforcement area. The technical catalogue of the same shall be submitted for approval by the engineer. The material shall consist with blended cements acrylic polymers and graded sand.

3.1.6 Application of Glass Fibre Fabric (GFF) and resign for identified area of the slab

Glass Fibre Fabric is a unidirectional sheet designed for the strengthening of structural members against tensile, shear and impact forces. The technical catalogue of the same shall be

submitted for approval by the engineer. Clean the surface out of dust and apply epoxy resin adhesive with high strength high modulus resign coating as bonding agent and allow it to tack with surface. Wrap the GFF sheet over the resign coating without any folding or shrinkage neatly and roll over for good adhesion, required anchorage length and squeezing of epoxy through the GFF sheet.

3.1.7 Protect un-exposed corroded bars.

To prevent the elements from further corrosion and to protect the bars which has been already corroded but has not been exposed yet, migratory corrosion inhibiting capsules introduced to reinstate the passive layer around the reinforcements. Slab panels are inserted with QED Margel VPI 580 vapour phase corrosion inhibitor or approved equalant capsules with one capsule per square meter area or one capsule per linear meter for beams respectively. Then the holes are filled with X- Roc Ultra Patch repair mortar.

3.1.8 Water Proofing

The water proofing sub-contractor should be a registered specialist contractor at the ICTAD in the category of water proofing.

The contractor shall submit a written warranty of at least 5 years to cover on the quality of the material, suitability of the material for the situation and the workmanship including water tightness.

The water proofing material shall confirm to relevant British, Euro or ASTM specifications.

4.Structural Stability Report

The contractor shall submit a report certified by a qualified structural engineer assuring that the selected method of improvements in quality and quantity shall provide the required regain of strength of the selected RCC panels with a detail calculation. The materials selected under above category shall be used and the analysis shall prevail with the technical and mechanical parameters of the same technical catalogue.

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Particular Specification for Corrosion control approach

All steel structures shall be sufficiently and adequately protected from Corrosion / rusting and anti-corrosion system shall be as per International standard ISO 12944 or and ISO 9223. All shall refer to the Corrosivity Zones and be aware of the Loss of metals as specified in same. All shall refer to the Corresponding Corrosion zones and specified Minimum DFT (Dry Film Thickness) of the total paint Film. Engineer reserves the right to increase the DFT as per situational analysis.

Surface preparations

All ferrous Iron members shall be cleaned to ISO SA 2.5 surface standard Rz 40-70 Microns and free of all rusts and oils and contaminations. All Hot dip galvanized metals shall undergo Pre Chemical cleaning process Caustic cleaning / acid pickling / water rinsing and Fluxing prior Hot Dip galvanizing For Electro Galvanized Tubes and Box bars available in the market shall be free of Oil / Grease and contaminations by fresh water washing and using oil cleaners and Detergents. In Coastal areas surface contamination Salt Sea Breeze water soluble layers shall be fresh water washed and cleaned prior paint applications.

Selection of Coatings

As Colombo City is Sunny / Hot / Sea Coastal and Monsoonal Rains and preference will be given for Protective and marine Coatings and all concerned shall be responsible to obtain Engineers approval an submit Product Data sheets and safety data sheets

Here is good guidelines for selections

Primer coat for Marine City Conditions and dry hot temperatures of 100- 120 C

1) Product shall be of reputed Brands with availability of product data sheets to support the performance and volume solids preferred over 55%

2) Primers (1st coat) shall be suitable for applying DTM Direct to Metal of Ferrous and Nonferrous (Including GI) and guarantee adhesion.

3) Re-coatability is an essential criterion to prevent (Long Overcoating maximums) to prevent Inter-coat detachments

4) Surface Tolerance capability should be ideal for Sire applications

5) Per coat DFT above 75 Microns DFT to 200 Microns DFT without sagging

6) Each coat to have different colour code for Inter coat identification

7) Pot Life of Epoxy resin and Hardener shall be having higher period say 3 Hours

8) No need to use sweep blasting of Zinc coat or No need use Etching primer (Phosphoric acid) or adhesion promotion etching which burn reduce the Zinc coat .

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Intermediate coat cum Priming coat for Marine City Conditions and dry hot temperatures of 100- 120 C

1) Product shall be of reputed Brands with availability of product data sheets to support the performance and volume solids preferred over 60%

2) Good Build up properties and Good adhesion.

3) Re-coatability is an essential criteria to prevent (Unlimited or Very Long Overcoating maximums) to prevent Inter-coat detachments

4) Surface Tolerance capability should be ideal for Sire applications

5) Per coat DFT above 75 Microns DFT to 150 Microns DFT without sagging

6) Each coat to have different colour code for Inter coat identification

7) Pot Life of Epoxy resin and Hardener shall be having higher period say 3 Hours

8) Good protections from Mild chemicals / and other corrosive external elements.

Finish coat cum Coatings for Marine City Conditions and dry hot temperatures of 100- 120 C

1) Product shall be of reputed Brands with availability of product data sheets to support the performance and volume solids preferred over 54%

2) Good Build up properties and Good adhesion.

3) Re-coatability is an essential criteria to prevent (Unlimited or Very Long Overcoating maximums) to prevent Inter-coat detachments

4) Good colour retention / Good colour retention / for site applications

5) Per coat DFT above 55 Microns DFT to 60 Microns DFT without sagging

6) Each coat to have different colour code for Inter coat identification

7) Pot Life of Epoxy resin and Hardener shall be having higher period say 3 Hours

8) Good protections from Ultra-Violent Radiations and Mild chemicals / and other corrosive external elements .

Low solid products should be avoided as to achieve the Total DFT within 3 – 4 Coats.

For all purposes it is prudent to obtain certificate for all skilled paint applicators from Paint Manufacture's Training program as to achieve expected performance criteria. They should be knowledgeable to execute the correct procedures and should be able to read understand and execute the product data sheets and manufacturer's recommended procedures as approved the CMC Engineer.

Procedure to check and measure the DFT on the metal of the paint thickness should be a important responsibility for the advantage of all parties concerned. Please specify the agreed procedure.