

VISHWAS

WATER PROOFING & CHEMICAL INC.

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REPAIR & REHABILITATION SPECIFICATION FOR REPAIRING OF EXISTING MINOR BRIDGES AT BIKANER-SURATGARH PROJECT

Project: Minor Bridges at Bikaner-Suratgarh Project NH -15



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Dear Sir,

Subject: Method statement for repair of concrete void/pocket areas and honeycomb areas at Minor Bridges at Bikaner- Suratgarh road project NH-15.

We are pleased to introduce our self **M/s Vishwas Waterproofing & Chemical INC.** The Specialist chemical construction company is professionally managed company for Construction chemicals, Building care products, repair & rehabilitation and Waterproofing of the building & structures.

We “VWC” are committed to provide our client one-stop solution for all the constructive solution specialized product and services in construction chemical and architectural products to the infrastructure estate construction industry. We are focused on customer satisfaction and customer needs offering consulting support and services.

This has reference of undersigned site visit of your above site recently to inspect and discuss the above during the undersigned site visit along with your good self-following areas has been inspected and discussed.

Major Repair of RCC Structure.

Medium Repair of RCC Structure.

Minor Repair of RCC Structure.

Further to the discussion held with you we are pleased to submit our techno commercial quotation undertaking the repair for void/pocket formed in the concrete at Minor Bridges at Bikaner -Suratgarh road project NH-15.

The details provided have been studied thoroughly and accordingly please find the below our specification for your perusal.

1. Introduction:

- The work methodology describes the procedures for carrying out Concrete Repair, damaged and void concrete, repair of large & small cracks at foundation, substructure, superstructure, and expansion joint.

2. Scope:

- The process of solving repaired problems or scope includes repair analysis, design, strategy, material, preparation of work with reference to identified product specification and proper evaluation.

3. Technical Specifications and standards:

Following specifications/standards shall be used for the Repairing of Concrete:

- EN 1504-1 General scope and definitions
- EN 1504-2 Surface Protection system for concrete
- EN 1504-3 Structural and Non- Structural Repair
- EN 1504-4 Structural Bonding
- EN 1504-5 Concrete Injection
- EN 1504-6 Anchoring of reinforcing steel bar
- EN 1504-7 Reinforcement corrosion protection

4. Work Methodology:

4.1 Equipment/Tools

Chisel

Hilti concrete breaker

Saw cutting equipment, blades

Wooden, Steel floats

Wire brush and paint brush of 1, 2 & 4 inch size

Heavy-duty, slow speed drill with spiral mixing paddle

Pressure Grouting Machine

Nozzles

Drill Machines

Mouth/Dust Mask, Hand Gloves, Safety Shoes, Hearing and Eye Protection equipment

4.2 Prior to start of work

- Visual Surveying of honey combed, damaged and delaminated concrete and cracks.
- Dismantling of uncompact / unsound & loose concrete as well as widening of cracks specification.
- Cleaning of repair area as specified in technical specification.
- Checking of all materials as specified.
- Checking of tools & Tackles available at site.

4.3 Category of Defects Identified:

- Spelling of concrete from bottom of slab.
- Minor Cracks/honeycombed /loose concrete and reinforcement exposed and corroded.
- Major Cracks/honeycombed/loose concrete and reinforcement exposed and corroded.
- Any other types identified by QA/QC and Project Manager shall be repaired by best repair procedure recommended by the site in-charge as per requirement.

4.4 Propping and Supporting Structural Members:

- Providing and fixing in position suitable supports in form of steel props & runners so as to carry structure during repairs including necessary battens, planks, breaking, jacking etc. and position, dismantling & removing the same from site after work completion The arrangement shall be strong enough carry the load of structure and to provide relief in the structural members which are to be repaired or strengthened.

4.5 Surface Preparation for Concrete repairs:

- Removal of Laitance, Oil or greasy deposits by mechanical means. Chipping of loose cracked concrete & exposed reinforcement for all depth of loosed concrete by means of machine cutting to regular geometrical shapes after saw cutting the edge including preparation Saturating the so treated surface dry (SSD) condition prior to application to prevent a from the repair material and into the substrate.

4.6 Selection of Repair Materials:

- The strength of repair materials shall always be higher to the strength of the in-situ structure advantage of cementitious repair mortars/concrete is that properties are compatible concrete in terms of modulus of elasticity , co-efficient of thermal expansion, shrinkage permeability (breathability). To reduce the shrinkage of self –compacting concrete. Epoxy resins are excellent binding agent with high tension are chemical preparations the compositions of which can be changed as per requirement components are mixed just prior to application. The product is of low viscosity and can be cracks too.

4.7 Minor Repair: - Aggregates exposed or minor honey combing and cracks.

- Making “V” groove of 25 mm all along joints and cracks developed surface.
- Filling “V” groove of 25 mm *25 mm all along construction joints and crack developed surface RENDEROC S2- shrinkage controlled; polymer modified cementitious mortar of Fosroc.
- Material completion of Conbextra EP-10(M) grouting. Drilling holes of required depth & dia, fixing the aluminium nozzle 10 mm dia with FOSROC make Renderoc Plug including all tools & tackles required for grout. Injecting low viscosity material (EP-10), in the ratio of resin and hardener by grouting pump at a pressure @ 2.5 Kg/ cm² or as instructed by Elc through nozzle. After 24 hours completion of grouting, cut the nipples and seal it with polymer-modified mortar as per specifications given. All scaffolding arrangement will be provided by client at all required height free of cost.
- Providing and mixing and applying over reinforce bars zinc anti rust corrosive agent as per specification and direction of engineer in charge.
- Providing and applying a single coat of approved make Epoxy Resin based bonding agent NITOBOND EP of Fosroc make over concrete surface make complete in all respect as per manufacturer’s recommendation.
- Providing and applying a layer of RENDEROC HS -Extra- shrinkage controlled ,polymer cementitious high grade mortar of Fosroc Make for minimum thickness of 10 mm make complete respect as per manufacturer’s specification.
- Repaired concrete surfaces form a temporary membrane; this will retain sufficient moisture for effective curing to take place. Application of **Concure WB** eliminates water curing, minimizes risk of drying shrinkages, cracks and dusty surfaces.

4.7.2. Medium repair – Minor defects/honeycombed/loose concrete and reinforcement exposed

- Removal of loose concrete and cleaning the same.
- After the removal of loose concrete the above TYPE-1 procedure shall be followed.
- Making “V” groove of 25 mm* 25 mm all along construction joints and crack developed surface RENDEROC S2- shrinkage controlled; polymer modified cementitious mortar of Fosroc.
- Material completion of Conbextra EP-10(M) grouting. Drilling holes of required depth & dia, fixing the aluminium nozzle 10 mm dia with FOSROC make Renderoc Plug including all tools & tackles required for grout. Injecting low viscosity material (EP-10), in the ratio of resin and hardener by grouting pump at a pressure @ 2.5 Kg/ cm² or as instructed by E/c through nozzle. After 24 hours completion of grouting, cut the nipples and seal it with polymer-modified mortar as per specifications given. All scaffolding arrangement will be provided by client at all required height free of cost.
- Providing and applying a single coat of approved make polymer based bonding agent Nitobond AR of Fosroc make over concrete surface make complete in all respect as per manufacturer’s Specification.
- Providing and applying a layer of Renderoc HS Xtra- shrinkage controlled, polymer cementitious high grade mortar of Fosroc make for minimum thickness of 10 mm make complete respect as per manufacturer’s specification.
- Finish the surface with the help of trowel or by hands and make surface as rough not smooth.

4.7.3. Major Repair: - Major defects/honeycombed /loose concrete and reinforcement exposed (depth 20 mm)

- After removal of loose concreting and shuttering including strutting propping etc. and removal of horizontal fins etc. using ply/steel plates/steel mould by providing suitable gap to between two layer of application on vertical surface to avoid de- lamination of the repaired material concrete surface.
- First cement and sand to be mixed thoroughly in dry conditions Polymer latex to be mixed with water thoroughly and to be added in the dry mix of cement and sand to get workable mix for application to prepared concrete surfaces in thickness of 20mm to 50mm. The top surface to be finished smooth using mild steel mala after the mortar is finished in line, One bag of cement 50kg (work output) - 0.105 Cum Consumption of polymer latex 7.50kg - 0.105 Cum

Application Procedure for Injection Grout:

- Identify the construction joint and mark the line of construction joint in situ as well as sketch on
- All the vertical wall construction joints shall be grouted in a pattern at an interval of every 500mm
- The grout constituents shall be cement, water mixed with non-shrink polymer grout (Cebex 100) per bag of cement. Grouting procedure are as below:
- 14 mm dia MS nozzles of suitable length shall be fixed after drilling (1/2 depth of wall using single component rapid setting mortar Renderoc plug.
- Cement slurry mixed with grout admixture i.e. non-shrink Polymer water proof grouting grams per bag of cement.
- The mixed slurry type of thin (18-22 Liter per bag) consistency shall be pumped through without choking.
- After the injection operations are over, the MS nozzle shall be shield off with single component mortar and will retail/cut to level using Hexa Blade as per site requirements.
- The injection grouting shall be proceeding from one to another end.

5. Testing

NDT (Rebound Hammer & UPV) test shall be conducted on repaired surface to confirm the acceptability Assurance

- MTC of all materials being used
- Ensure the repairing material used as per the approved methodology/plan.
- Ensure the repairing shall be done as per the joint inspection and record.

6. Safety

Concrete repair mortars are hazardous materials and should be treated as such job site safety practices the following where applicable:

Applicable material safety data sheets (MSDS) should be on hand • Machinery and equipment used must have the correct safety guards and warnings in place.

- a. All workers will wear full PPE's protective at working site jacket, helmet, safety goggles etc.
- b. First aid box will be available at site.
- c. Safety officer /supervisor will carry out inspection of the job site daily as regular that safety precautions have been taken as set out in the risk and hazard assessment.

10. ENCLOSURES

- RENDEROC S2
- CONBEXTRA EP 10 (M)
- RENDEROC HS XTRA
- NITOBOND EP
- ZING PRIMAR
- NITOBOND AR
- CEBEX 100
- CONCURE WB