



MMTC LIMITED, NEW DELHI

(A Govt. of India Enterprise)

ESTATE DIVISION

MMTC/Estate/Over Head Water Tank/18-19

Dated: 16.01.2019

TENDER DOCUMENT

**E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER
TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017**

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

MMTC/Estate/Over Head Water Tank/18-19

Dated: 16.01.2019

Technical BID

Part - I

Start date for Downloading tender document	16.01.2019 From 1700 Hrs
Last date for Downloading tender document	14.02.2019 Up to 1500 HRS
Pre-bid meeting	30.01.2019 at 11HRS
Due date of tender submission (Technical & Price Bid)	14.02.2019 Up to 1500 HRS
Technical Bids opening Date	15.02.2019 at 1100 HRS

Downloaded by:

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Appendix

- 1 Period of completion : 4 Months
- 2 Defect Liability period : One year from the date of Completion
- 3 Earnest Money Deposit : Rs.1,20,000/- (Rupees One Lakh Twenty Thousand only)
 - a) Security Deposit : 5% to be deducted from the Running Bills
 - b) Performance Guarantee : 5% of the Estimated Cost
- 4 Participation fees : Rs 1000/- (Rupees One Thousand Only) (Non-Refundable) incl GST
- 5 Address of site : MMTC Housing Colony, Near Auribondo College, Adchini, New Delhi-110017

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

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Dated: 16.01.2019

TENDER DOCUMENT

MMTC Limited (A Govt. of India Enterprise) invites E-bids under two bid system (Technical Bid & Financial Bid) for E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017 at MMTC Housing Colony, Adhichini, New Delhi – 110017 from well-established and reputed firms having experience in similar type of works. Interested bidders fulfilling minimum eligibility criteria as mentioned in this tender document may submit their bid along with the following set of documents. Self certified scanned copies of following documents are required to be furnished through e-mode in the TECHNICAL BID. However, hard copy of Technical Bid with EMD and Participation fee (Non-refundable) shall be sent in physical mode as well so as to reach the Office of Chief General Manager (E), 2nd floor, Core-1, SCOPE Complex, Lodhi road, New Delhi – 110003 on or before 15:00 hrs of 14.02.2019.

1. Proof of documents for similar nature of works carried out with Govt. Departments / PSU's / reputed Public or Private Organizations etc. in the last three financial years only, i.e., 2015-16, 2016-17 & 2017-18.
2. The estimated cost of the work is Rs 58 lakhs which is based on DSR , MSR 2016 & Market rates
3. Three similar works, each of value not less than 40% of the estimated cost put to tender, or(ii) Two similar works, each of value not less than 60% of the estimated cost, or (iii) One similar work of value not less than 80% of the estimated cost, all amounts rounded off to a convenient full figure, in the last 3 years ending on the last day of the month previous to the one in which the tenders are invited (Similar work should be as per SOQ/work of repair & rehabilitation only).
4. Proof of valid registration with statutory authorities for Works Contract, GST, any other etc.
5. Arbitration cases pending against the bidders, if any, submit details.
6. Whether black-listed/ put on holiday list/ withdrawal of works etc by any clients in the last 5 years, if any. Give details.

7. Copies of annual turn over details for the last three financial years (including Balance Sheet, Income Tax returns, Profit & Loss accounts) certified by Chartered Accountant.
8. Profile of the firm.
9. Copy of PAN Card issued by Income tax Department, Govt. of India and details of GST registrations.
10. Scanned copy of Participation Fee (Non-refundable) in the form of Demand Draft/Pay Order for Rs 1000/- (Rs One Thousand only) in favour of MMTC Limited payable at New Delhi.
11. Scanned copy of EMD in the form of Demand Draft/Pay Order for Rs. 1,20,000/- (Rupees One Lakh Twenty Thousand only in favor of “MMTC Limited” payable at New Delhi.
12. Details of Bank account e.g. Name of Bank, name of branch, type of A/c, along with copy of cancelled Cheque leaf.
13. Duly filled in **e-payment** proforma /format, duly certified by the Bankers to be enclosed. (Annexure-II).
14. Bidder has to fill and submit the Mandatory Information Form (Annexure I), Terms and conditions as agreed (Annexure III), Declaration by the bidder (Annexure IV) and list of similar assignments completed in last three years with the Technical Bids.
15. Proof of financial soundness during the last three financial years and attested copy of solvency certificate issued by the scheduled / nationalized bank.

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

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SPECIAL TERMS & CONDITIONS FOR BIDS TO BE SUBMITTED IN ELECTRONIC MODE

1. For any technical issues difficulties pertaining to the e-Procurement portal bidders are advised to get in touch with the service providers helpdesk:

Vendor's Queries	Contact Numbers	Mail ID
New Bidder Registration (Portal Registration), Vendor's ID/ Profile Activation, Renewal of Vendor's ID.	+91-(79)- 68136 866	info@abcProcure.com
	+91-(79)- 68136 878	
	+91-(79)- 68136 845	
	+91-(79)- 68136 841	
Mr. Abhijeet Goware (Dedicated Helpdesk for MMTC)	+91 9265562826	abhijeet@eptl.in
For Only, Technical Assistance related to e-Tender or e-Auction filling/ submitting (Offsite Team).	+91-(79)- 61200 555	support@abcProcure.com
	+91-(79)- 61200 564	
	+91-(79)- 61200 569	
	+91-(79)- 61200 507	pankesh@eptl.in
HELPDESK TIMINGS: 1000 HRS to 1830 HRS IST (MONDAY TO FRIDAY (Exclusions: MMTC HOLIDAYS))		

2. The bidder shall have valid Class-III Digital Signature Certificate (DSC) (with signing and encryption) issued from licenced Certifying Authorities operating under Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) in India. The details of the licensed CA's are available on www.cca.gov.in wherein details have been mentioned.
3. The bidders shall be asked to register on the e-portal so as to have a valid user id for accessing e-tendering/ e-auction portal of MMTC.
4. For minimum system requirements clients/bidders should be asked to refer to home page of the URL <https://mmtc.abcprocure.com> under tab Download/ Minimum System Requirements-V2.0
5. Bidders shall be advised to print and save bid submission receipt on submission of bids.
6. Non-refundable Participation Fee of Rs 1000/- (Rupees One Thousand Only) and EMD of Rs. 1,20,000/- (Rupees One Lakh Twenty Thousand only) in the form of DD/ Pay order in favor of

“MMTC Limited” payable at New Delhi) in original along with Technical bid portion downloaded by bidders, duly signed and stamped in sealed cover, should reach us in physical form as well on or before the closing date and time of the tender, as a mark of acceptance. The sealed envelope should be super scribed as “Technical Bid of **E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017** having name, address, and telephone Nos. of the bidder. The required enclosures as per tender check-list and financial bid shall be submitted through e-mode only.

7. Please note that the tenders submitted without the requisite Non-refundable participation fee & EMD in the prescribed manner (through Bank Demand Draft/Pay Order in favour of MMTC Limited payable at New Delhi) shall be summarily rejected.
8. The bidders have to quote all inclusive rate i.e. rate shall include VAT, Tax, Cess, & Statutory duties etc except GST. The rates once quoted shall be firm and any subsequent price revision/ adjustment/revamping etc. shall not be entertained during the currency of the Contract and will be valid till completion of the work. As such, the bidders are advised to ensure that their offers are complete in all respect and in full conformity with the tender terms and specifications.
9. **COMPLETION PERIOD:** The estimated completion time under normal circumstances shall be 4 Months after issue of Work Order.
10. The technical bids (Part-I) shall be opened on 15.02.2019 at 1100 hours. The date and time for opening of the Financial bid shall be informed later to the bidders who qualify in the technical evaluation process by phone/email at the address given by them in the Technical Bid.
11. Offer validity: The offer should remain valid for a period of 60 days from the date of opening of Financial bid.
12. Under Public Procurement Policy (PPP) issued by Ministry of Micro, Small & Medium Enterprises, Government of India for Micro & Small Enterprises (MSMEs), a minimum 20% share out of the total procurement of goods and services by Central Ministries / Departments / Public Sector Undertakings are to be made from MSEM. Further out of 20% target of annual procurement from MSMEs, a sub-target of 4% is earmarked for procurement from MSEs owned by Scheduled Caste (SC) / Scheduled Tribes (ST) entrepreneurs. Preference will be given to firms registered with the Ministry of MSME as per guidelines prescribed under MSMEs Act, 2006.
13. In case the party is registered with Ministry of MSME/its authorized agencies, the bidder is required to submit registration certificate and store details in addition to above. The MSMEs parties will be eligible for the benefits as applicable to them under MSMEs Act, 2006.
14. MMTC Ltd. does not bind itself to accept the lowest or any other tenderer and reserves its right to reject / accept any or all the tenders received without assigning any reason whatsoever. Tenders, in which any of the prescribed conditions are not fulfilled by the bidder, shall be summarily rejected. Joint tenders shall not be accepted / considered. MMTC also reserves the right of accepting part or whole of the tender and the bidder shall meet the same as per the tender.

15. Pre-bid meeting: A pre-bid meeting will be held on 30th January 2019 at 1100hrs at MMTC Site Office, MMTC Housing Colony, Near Aurobindo College, Adchini-110017. Interested bidders may attend for queries.

16. For details, please visit www.mmtclimited.com, www.eprocure.gov.in & <https://mmtc.abcprocure.com>

Yours faithfully,

For & on behalf of MMTC Limited,

Chief Manager (Estate)

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

MMTC/Estate/Over Head Water Tank/18-19

Dated: 16.01.2019

INSTRUCTIONS TO BIDDERS - TENDER SUBMISSION PROCEDURE

The bidder shall submit the tender in two bid system. PART – 1 shall be TECHNICAL BID and PART – II shall be FINANCIAL BID.

The bidder shall enclose the following papers, documents with the Bid:

ENCLOSURES TO PART – I (THROUGH E-MODE & PHYSICAL MODE):

1. E-tender documents along with the completion certificates issued by the clients where works have been executed, copies of LOI/award letter/W.O. indicating BOQ's etc of similar nature/type should be enclosed as a proof including works executed in MMTC LIMITED/ DELHI-NCR. **If submitted – tick (yes)**
2. Earnest Money Deposit of Rs. 1,20,000/- (Rupees One Lakh Twenty thousand only in the form of demand draft/pay order in favour of 'MMTC LIMITED' payable at 'NEW DELHI'. The Non-refundable Participation fee of Rs. 1000/- (Rupees One Thousand Only) through DD/ pay order in favour of 'MMTC Limited' payable at 'NEW DELHI' also shall have to be submitted. **If submitted – tick (yes)**
3. Proof in support of valid registration with statutory authorities: self certified copy of Works Contract Tax, VAT, EPF, ESI, TIN, PAN, GST etc. **If submitted – tick (yes)**
4. Certified copy of 'Annual turn-over' for the last three consecutive financial years duly audited indicating Annual turnover, balance sheet, Income tax returns, P&L account etc to be submitted. **If submitted-tick (yes)**
5. Profile of the firm / company including copies of registered partnership deed / proof of proprietorship, memorandum & articles of association etc in the case of a company, as the case may be. The details of manpower engaged by the firm / company may also be indicated including qualified and experienced supervisors. **If submitted- tick (yes)**
6. Proof of financial soundness during the last three financial years and attested copy of solvency certificate issued by the scheduled / nationalized bank. **If submitted – tick (yes).**
7. This is to confirm that in case of acceptance of our tender bid, we do hereby undertake to carry out the said works as per our all inclusive quoted rates under the laid down terms, schedules, BOQs, specifications, drawings etc as per the tender. We also confirm that the work shall be done within the stipulated period as per the terms and conditions of this E-NIT. **If submitted- tick (yes).**

NB:

1. The tender shall be liable for rejection at the discretion of the MMTC Limited, if the party fails to submit any one of the above documents.
2. It should be noted that no price / rate indication directly or indirectly be reflected in any way in the Part – I (Technical Bid).

ENCLOSURES TO PART – II (THROUGH E-MODE ONLY):

1. FINANCIAL BID: B.O.Q. (BILL OF QUANTITIES) in prescribed format DULY FILLED AND SIGNED.

FOR & ON BEHALF OF MMTC LIMITED

**Chief Manager (Estate)
MMTC Limited,
Core-1, SCOPE Complex,
7, Institutional Area, Lodhi Road,
New Delhi – 110003.
Phone: 011-24381338/24381267**

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

MMTC/Estate/Over Head Water Tank/18-19

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GENERAL INSTRUCTIONS FOR THE BIDDERS

1. Technical Bid portion along with EMD & Non-refundable Participation fee in original to be submitted in physical form, if sent by post, shall be through Registered post/ Speed Post. The documents received after due date and time are liable to be rejected.
2. Bidder must fill all the schedules and submit all the prescribed information as per the instructions given in various sections of the tender. Each & every page of the tender document as prescribed must be signed & stamped and submitted in token of complete acceptance thereof. The information submitted shall be complete in all respects. All entries in the tender shall be written in English OR Hindi. The use of Erasers and over writing are not allowed. The bidder shall duly attest & stamp all cancellations, if any, failing which the tender shall be liable for rejection at MMTC Limited's sole discretion.
3. To acquaint themselves with the work, all the bidders are requested to visit the site by contacting the Site Office (Ph. No. 011- 26967412/ 26568829) at MMTC Housing Colony, Adhichini, New Delhi - 110017 on any working day and satisfy themselves.
4. The Earnest Money may be forfeited at MMTC's option in case the bidder withdraws its tender during the validity period.
5. If the bidder deliberately gives wrong information in his tender, MMTC reserves its right to reject such tender at any stage or cancel the contract, if awarded, and forfeit the earnest money/security deposit/any other dues. Canvassing in any form in connection with the tender is strictly prohibited and the tenders submitted by the Contractor who resorts to canvassing are liable to be rejected.
6. The Contractor shall have to execute an agreement with MMTC immediately after issuance of award letter. However, no escalation in rates quoted by the bidder shall be permitted during the currency of the agreement / extended period(s).
7. The Contractor shall not sub-let the contract in part or whole as detailed in the tender /specifications without the written permission of MMTC.
8. All the work shall be carried out as per CPWD specifications/ Descriptions of items of approved Manufacturers, and the terms and conditions given in the tender. The quality consciousness in execution of works is required.
9. Minor modifications if any, as suggested by MMTC/Site In-charge /Engineer- in chief, have to be incorporated and executed without any extra cost.
10. The delegation of job under item no. D 23 shall be in accordance with the requirement of the item as per directives of Engineer-in-charge/Designated officer of MMTC

11. Deviation from the tender conditions is liable for non-acceptance at the sole discretion of MMTC Ltd.
12. The contract or the contract document shall mean and include the work orders/agreement, schedule of quantities, if any, general conditions of the contract, instruction to bidders, if any, the tender document and the acceptance letter issued by MMTC. Any conditions or terms stipulated by the bidder in the tender document or the subsequent letter shall not form part of the contract unless specifically accepted in writing by MMTC and incorporated in the agreement/work order.
13. Letter of award/ letter of acceptance / letter of intent shall mean the intimation by letter / by fax/e-mail to the bidder that the tender has been accepted in accordance with the provisions contained in the letter. The responsibility of the Contractor commences from the date of issue of this letter and all the terms and conditions of the contract shall be applicable from this date.
14. Completion time shall mean the period / date specified in the letter of intent, work order, tender document.
15. The Contractor shall furnish to MMTC, the name, designation and address of his authorized representatives/agent on his behalf. The complaints, notices, communications, reference shall be deemed to have been duly given if delivered to the Contractor or his authorized agent by hand at work site or thru' ordinary post.
16. The bidder should study all the tender documents carefully and understand the conditions and specifications etc. The bidders or his authorized representative should sign & stamp every page of the tender document.
17. The bidders shall remove all debris/wastes etc. wash and clean the floors/areas and hand over the site in a clean and habitable condition after completion of work at their cost.
18. Timely completion of the work is the essence of the contract. Contractor shall submit the work completion schedule. The Contractor can work round the clock for expediting the work. Any delay in execution shall attract penalty apart from any measures as deem fit.
19. All Guarantees as envisaged in the work shall be legally binding and enforceable as per law of the land.

Yours faithfully,
For & on behalf of MMTC Limited,
Chief Manager (Estate)

**E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER
TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017**

MMTC/Estate/Over Head Water Tank/18-19

Dated: 16.01.2019

METHODOLOGIES FOR REPAIRS

PROPOSED LINE OF ACTION

The total scope of repair consists of following types:

For Type 1,

The repairs shall be carried out after fixing the formwork surrounding the element and filling the same with pre-packed dual shrinkage compensated, free-flow, cementitious micro concrete.

For Type 2,

The repairs shall be carried out with dual shrinkage compensated, high strength, single component, pre-packed cementitious repair mortar by hand application and finishing with trowel.

For Type 3,

The cracked sections shall be grouted with low viscous epoxy material under pressure in the prefixed injection ports after sealing the cracks with epoxy mortar.

For Type 4,

The Expansion joint of the building which is exposed i.e. on the external sides and on the roof shall be treated by adhering a high elongation rubber tape across the joint with the help of epoxy adhesive.

For Type 5,

The elements shall be strengthened in axial, flexure and shear using composite strengthening systems involving application of FRP(Fibre-reinforced polymers) systems with epoxy material.

Type 1: Large Area Repairs:

The distressed elements where the area of damage is large viz., beams and columns having damaged area of more than 50% of total surface area or having two sides damaged and Slabs having area more than 1 sq.m. damaged shall be repaired with single component, dual shrinkage compensated micro concrete. The steps involved in application are:

- 1. Surface Preparation.**
- 2. Reinforcement Protection.**
- 3. Application of Corrosion Inhibitor**
- 4. Provision of Shear Connectors.**
- 5. Provision of Additional Reinforcement.**
- 6. Application of Bonding Agent.**
- 7. Refurbishment of damaged area.**
- 8. Curing the Damaged area.**

1. Surface Preparation:

The elements that require repairs shall be identified and marked. The weak dilapidated concrete cover surrounding the elements shall be chipped and removed. The depth cutting of concrete shall extend beyond the longitudinal steel by at least 10mm. The exposed core concrete shall be mechanically abraded to remove all loose material, followed by intense cleaning with clean, potable water to get rid of all organic impurities. Before proceeding further, it is to be confirmed that the concrete affected by carbonation was completely removed.

2. Reinforcement Protection:

The existing steel bars shall be mechanically abraded to remove all loose rust, scales and other corrosion products. The cleaned bars shall be checked for loss of cross section. The bars whose cross sectional area was reduced by more than 25% shall be retrofitted with new bars of same diameter. Both the new and existing bars shall be given anti-corrosive treatment by applying two coats of alkaline rust convertor Feovert followed by two coats of anti corrosive rust passivator IPNet RB (CSIR/CBRI).

3. Application of Corrosion Inhibitor:

The prepared concrete substrate shall be given two coats of bipolar concrete penetrating corrosion inhibitor of MANUFACTURER make EPCO-KP-100 or equivalent make at a consumption rate of 500 ml per sq.m for two coats. The corrosion inhibitor shall be applied to the prepared substrate using brush or knap sack spray to cover the entire area. The first coat shall be allowed to penetrate deeply before applying the second coat.

4. Provision of Shear Connectors:

The damaged area shall be provided with 'L'shaped shear connectors using 8mm diameter HYSD bars. The shear connectors are fixed at a distance of 250mm c/c and at locations as directed by structural engineer. The shear connectors are fixed by drilling holes of 12mm diameter into the concrete up to a minimum depth of 75mm using heavy duty drill machine. The drilled holes are cleared of any loose material followed by fixing with epoxy based anchoring system of MANUFACTURER make EPCO-1010 Grout or equivalent make. The shear connectors are driven into the grouted holes and held for few minutes to make them fix in position.

5. Provision of Additional Rebars:

The reinforcement bars that have lost large cross sectional areas and / or completely corroded shall be replaced or retrofitted with bars of same diameter. For columns the longitudinal reinforcement shall be anchored into the foundation concrete. For beams the longitudinal reinforcement shall be anchored into the connecting columns. The shear reinforcement for the beams shall be provided by anchoring 'U' shaped bars into the slab at required spacing. All anchoring mentioned here are to be done with epoxy anchoring system of MANUFACTURER make **EPCO-1010** Grout or equivalent make.

FIGURES FOR REPAIR OF COLUMNS:

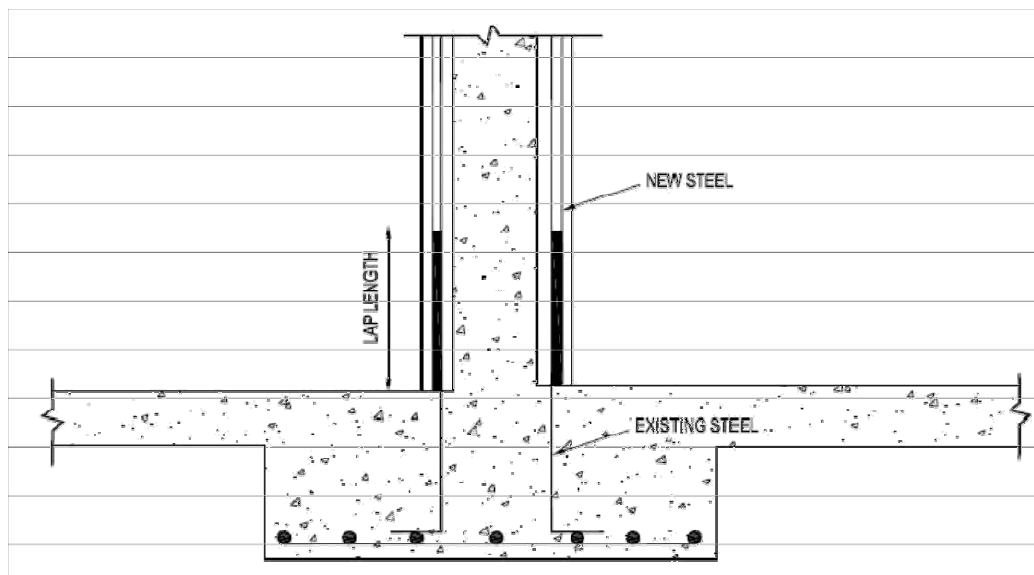


Fig. 1: Tying of the extra steel to the existing rods for a length of lap length

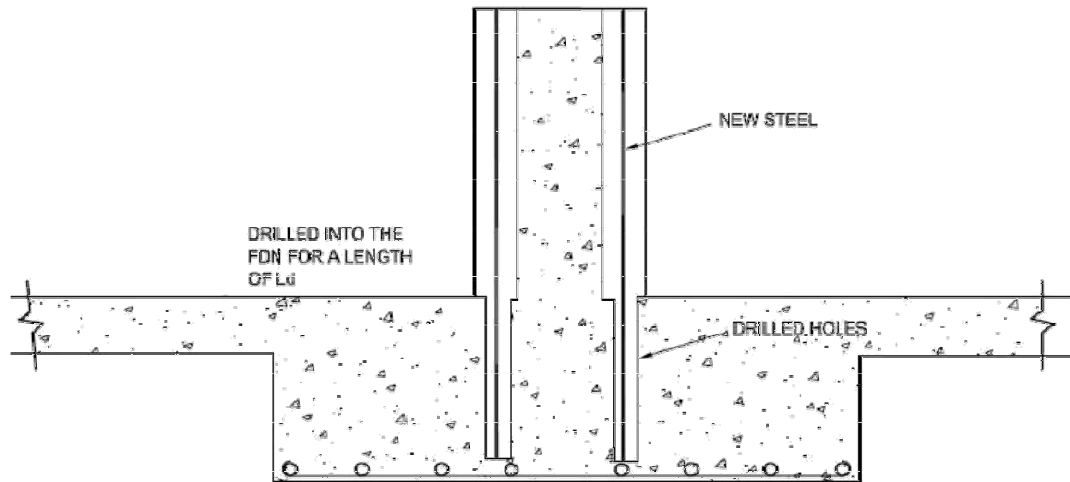


Fig. 2: Anchoring of extra steel by drilling holes in the foundation for a length of development length in tension.

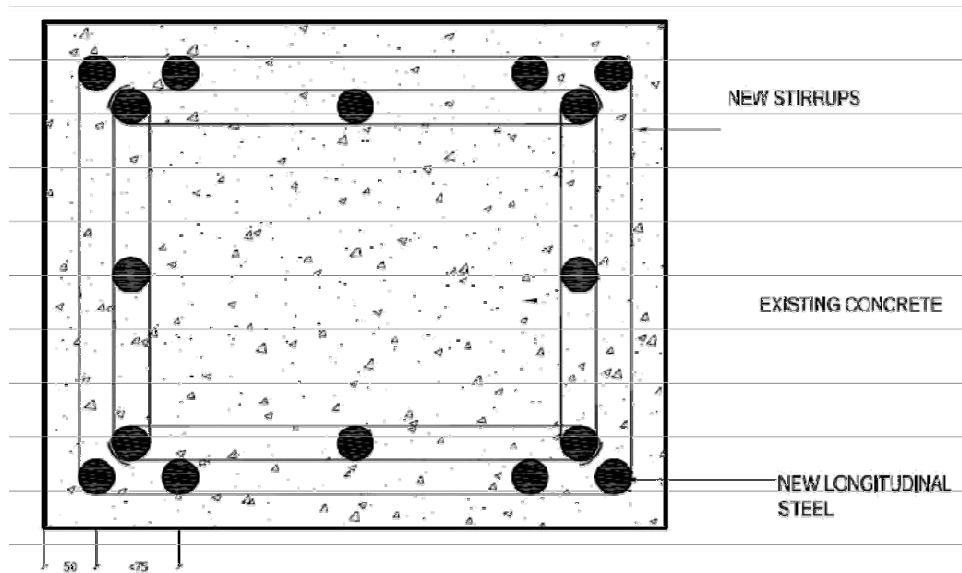


Fig. 3: New column ties in case of number of new bars are less than 12 numbers with the spacing of the corner bar and adjacent bar less than 75mm.

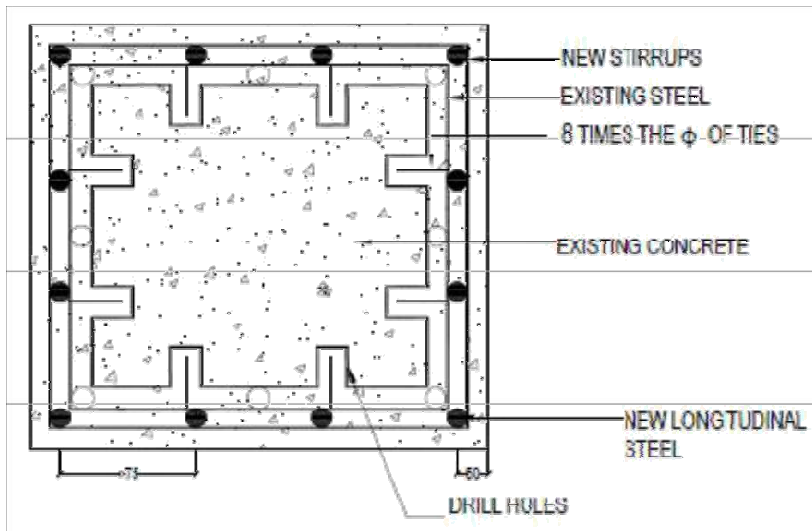


Fig. 4: New column ties with bar anchors in case of
 Number of new bars is more than 12 numbers

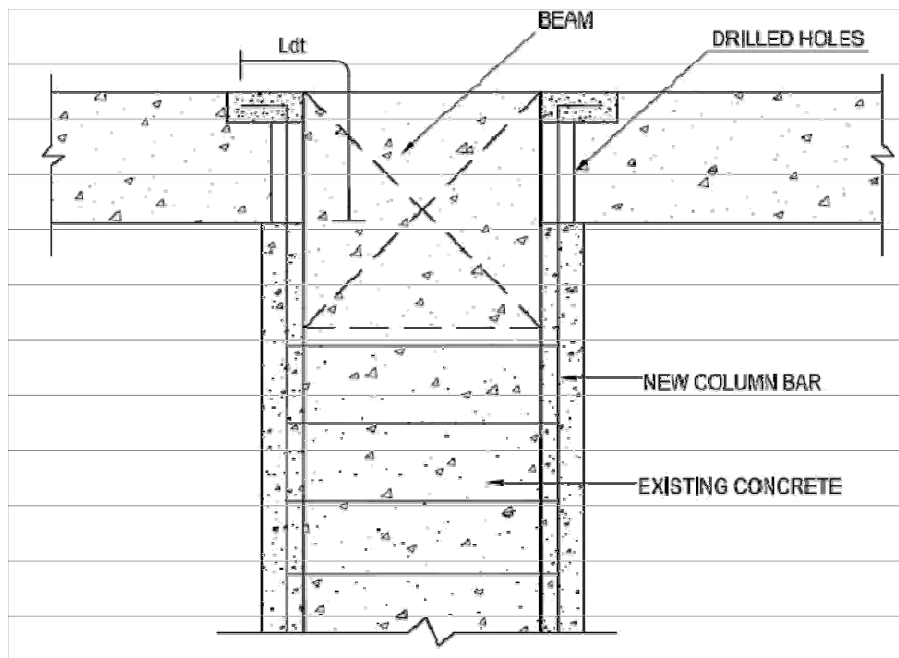


Fig. 5: Arrangement of fixing the column bars at top- discontinuous edge.

6. Application of Bonding Agent:

Since the concrete is found to be contaminated with chloride, it is necessary to provide a barrier to the chloride ions to prevent them entering into the repaired area. Thus the prepared parent substrate shall be provided with two component epoxy based bonding agent **EPIBOND-21-LP** of MANUFACTURER make or equivalent having long pot life by brush. The bonding agent shall be carefully applied in thin layer covering all corners and depressions and avoiding over application. The bonding agent shall remain tacky till the micro concrete is poured.

7. Concrete Refurbishment:

The primed area shall be filled with single component, dual shrinkage compensated micro concrete of MANUFACTURER make **MOLITH-MC** or equivalent make after fixing the formwork as per requirement. The formwork shall be made of either plywood or steel. In both the cases, before pouring of micro concrete all probable leakage points shall be sealed using suitable sealing compound. The microconcrete shall be mixed strictly following the w/p ratio mentioned in the datasheets. The mixed micro concrete shall be poured into the formwork from one side of the formwork while gently tapping the sides of the formwork. The mixed material shall be placed into the formwork within 20minutes from the time of application. A hole of 75mm diameter shall be drilled through the slab to enable pouring of concrete into the beams, slabs and top section of concrete. The concrete filling shall be continued till hole is completely closed. The number and location of the pouring holes shall be decided depending on the distance or area to be covered by microconcrete.

8. Curing of Repair:

The repaired area shall be given a coat of single component acrylic based curing compound **Polycure AC** or equivalent make using brush giving a continuous coat.

Type 2: Small Area Repairs:

The damaged elements with area affected being small viz., Beams and Columns having only one side damaged and Slabs having an area of less than 1 Sq .M. shall be repaired with hand applied, single component, thixotropic mortar **MOLITH PMM** of MANUFACTURER make or equivalent. The steps involved in the application are:

1. Surface Preparation.
2. Reinforcement Protection.
3. Application of Corrosion Inhibitor.
4. Application of Bonding Agent.

5. Application of Repair mortar.

6. Application of Curing Compound.

1. Surface Preparation:

Loose, delaminated concrete should be removed until the substrate consists of sound concrete. Where corrosion of the reinforcement exists, continue bulk removal along the reinforcing steel and adjacent areas with evidence of corrosion- induced damage that would inhibit bonding of repair materials. Bulk concrete removal should include undercutting the corroded reinforcing steel by approximately 19 mm. The shape of the prepared cavity should be kept as simple as possible—generally square or rectangular in shape. The edges of the patches should be saw cut perpendicular to the surface to a depth of 13 mm to avoid feather edging the repair material. Mechanically abrade the surface to remove residual dust, debris, fractured concrete, and contaminants that prevent proper bonding. Blowing with oil- free compressed air or alternately, the use of a vacuum, may be appropriate if dust is still present after the blasting. The final surface texture should be rough, with approximately 6 mm amplitude.

2. Reinforcement Protection:

The existing steel bars shall be mechanically abraded to remove all loose rust, scales and other corrosion products. The cleaned bars shall be checked for loss of cross section. The bars whose cross sectional area was reduced by more than 25% shall be retrofitted with new bars of same diameter. Both the new and existing bars shall be given anti-corrosive treatment by applying two coats of alkaline rust convertor Feovert followed by two coats of IPNet RB rust passivato(CSIR/CBRI)

3. Application of Corrosion Inhibitor:

The prepared concrete substrate shall be given two coats of bipolar concrete penetrating corrosion inhibitor of MANUFACTURER make **EPCO-KP-100** or equivalent make at a consumption rate of 500 ml per sq.m for two coats. The corrosion inhibitor shall be applied to the prepared substrate using brush or knap sack spray to cover the entire area. The first coat shall be allowed to penetrate deeply before applying the second coat.

4. Application of Bonding Agent:

Refurbishment:

The primed area shall be filled with single component, shrinkage compensated, fibre reinforced, and thixotropic cementitious repair mortar of MANUFACTURER make MOLITH-PMM or equivalent make. The material with its excellent grab and good binder properties allows application in layers of 50mm in vertical and 25mm in overhead applications. Initially the material is filled into the cavity by hand carefully

compacting the same starting from centre and moving towards the periphery. The final layer shall be troweled to make it in line with the existing concrete surface. The material shall be mixed in quantities that can be consumed within ½ hr from the time of mixing.

5. Curing of Repair:

The repaired area shall be given a coat of single component acrylic based curing compound **Polycure AC** or equivalent make using brush giving a continuous coat.

Since the concrete is found to be infested with chloride, it is necessary to provide a barrier to the chloride ions to prevent them entering into the repaired area. Thus the prepared parent substrate shall be provided with two components, epoxy based bonding agent having long pot life of MANUFACTURER make **EPIBOND-21-LP** or equivalent make by brush. The bonding agent shall be carefully applied in thin layer covering all corners and depressions and

Type 3: Cracked Sections:

The cracked elements without any indication of concrete getting debonded or the core concrete after removal of cover for repair was found to have cracks; the same shall be treated by sealing the cracks with epoxy putty and grouting the same with low viscous epoxy grout. The steps involved in repair of cracks are as follows:

1. Surface Preparation

2. Fixing of Packers

3. Filling of Cracks

4. Grouting of EPCOC-KP-HP-250 -SLV or equivalent make

1. Surface preparation:

Clean the concrete surface, 2 cm on either side of the crack to ensure bonding of sealing materials used to seal the crack. Ideally, wire brushes shall be used to make the surface rough. Where the cracks are already filled with some material or concrete is found to be weak immediately next to cracks, the cracks needs to be opened up completely. In any case opening of crack in the form of V with top width of minimum 10mm and depth of at least 10mm would be very ideal to avoid future problems. Normally, a surface sealing of the crack would not help during the injection process. When the crack is cut open, using suitable tools, the muck and mud deposited over a time shall be removed mechanically.

2. Fixing of Packers:

At intervals, install packers of size 12mm diameter along the crack. For fixing the packer, holes of required diameter are drilled into the concrete up to a depth of at least 100mm. The packers are installed into the drilled hole and mechanically tightened to make them remain fixed. The periphery of the packer shall be sealed with epoxy putty of MANUFACTURER make **Goldbond Adhesive** or equivalent make.

3. Sealing the Cracks:

The opened crack between two packers shall be sealed with epoxy putty of MANUFACTURER make **Goldbond Adhesive** or equivalent make. When mixed, **Goldbond Adhesive** achieves a paste type consistency which can be applied with thin metal piece. The material shall be carefully pressed into the crack to fill the entire depth of the crack and troweled at the top making it in line with existing

concrete surface. The epoxy putty shall be allowed to set completely before initiating the injection process. This would take typically 4 to 6 hours depending on the ambient temperature.

4. Injection of low viscous Epoxy:

Once the epoxy putty is completely set, the fixed packers shall be injected with two component, low viscous epoxy grout of MANUFACTURER make **EPCO-KP-HP-250 -SLV** or equivalent make. The injection process shall be started from the widest part if it is a horizontal surface or from the lowest point if it is a vertical surface. The pressure to be maintained shall be a minimum of 2kgs/sq.cm. Inject in each port or nipple (keeping all others closed except the next immediate one). When the resin starts issuing out of the next port/nipple, close it and continue injection until the pressure can be maintained. After maintaining the pressure for 1 to 5 minutes to allow for total penetration, close the port and then disconnect the pump. Continue the process until all the ports or nipples are similarly injected. The typical advantage of using packers for this injection is that they have a non return valve at the mouth which will not allow the injected grout to flow back.

5. Packer Removal:

The injected packer shall be removed by simply cutting it at the line of concrete. The gap formed shall be sealed with two part epoxy putty of MANUFACTURER make **Goldbond Adhesive** or equivalent make. The putty shall be allowed to cure before any further treatments.

Type 4: Expansion Joints:

The untreated or badly maintained throughout the structure wherever exposed viz., roofs and external walls, shall be treated with high elongation rubber tape adhered to the surface on both sides of the joint with epoxy adhesive. The exposed areas in the interior areas shall be treated with two component polysulphide sealant. The steps involved for application are as under:

1. Joint Preparation.

2. Joint Treatment.

1. Joint Preparation:

The existing shall be cleared of all debris, any filler material etc., using sharp tools to make the joint free. The interior faces of the joint shall be cleaned mechanically to remove remains of previously done treatments. The shoulders of the joint shall be cleaned to remove any loose dust, laitance. Wherever found, the damaged shoulders shall be repaired using prepacked cement mortar to bring it in line with existing shoulder concrete. The depth of the joint shall be adjusted by inserting a bond breaker rod which also prevents the three point contact in case of polysulphide sealants.

2. Joint Treatment:

a) **External Areas:** Mix two component epoxy adhesive of MANUFACTURER make **Goldbond Adhesive** or equivalent make thoroughly following the guidelines as mentioned in its datasheet. Apply the well-mixed adhesive on both sides along the joint on the prepared substrate, preferably with a notched trowel or spatula. Layer thickness should be about 1 -2 mm. The sealing of the joints shall be done by adhering a rubber tape having high elongation of MANUFACTURER make **EPCOFLEX- TP** or equivalent make on the freshly applied epoxy adhesive. For proper bonding of the tape to the substrate, the tape shall be sandwiched between two thin layers of epoxy adhesive. When sealing narrow joints the **EPCOFLEX-TP** or equivalent make should not be bonded along the centre line of the tape. A minimum unbounded width of 20mm is recommended to allow for expansion and contraction. Wipe the edges of the tape with T-50, then place the clean and well-aired tape immediately into the adhesive layer and press well in with a roller. Apply a second layer of epoxy adhesive to sandwich the tape in

between. For very wide joints draw the tape suitably into the joint so that a hollow is formed. Holes punched at the edges provide added anchorage. By warming up the membrane, it can be stretched over slight irregularities of the substrate. The same method can be used in case of corners, cavities, pipe crossing. If individual tapes have to be connected into longer pieces (also T - pieces, etc.) they can easily be welded using a hot air blower.

b) Internal Areas: The internal shall be primed with EPCOFLEX Primer or equivalent make after necessary surface preparation. The primer shall be carefully applied to the internal walls of the shoulders using brush. The primer shall be allowed to dry completely before application of polysulphide sealant. The primed joint shall be filled with two component, High performance, and elastomeric gun grade Polysulphide sealant of MANUFACTURER make **EPCOFLEX** or equivalent make. The mixed sealant shall be placed into the sealant preferably when the temperature is in the middle of the range for the day, within 3 hours after priming but after the primer is tack free. Reprime if placing is delayed. Fill the mixed sealant into gun barrel using a follower plate, avoiding air pockets. Place a paper or a polythene disc separator between the mixed sealant and the follower plate. With the mouth of the barrel positioned over its central hole, press the follower plate down while withdrawing the plunger of the gun. Compact the sealant in the joint and finish the sealant surface slightly concave using a spatula dipped in soap water.

Type 5: Composite Strengthening Systems:

The elements that require strengthening (to be assessed after design) can be strengthened using Fibre reinforced Polymer systems consisting of Glass and Carbon Fibers. The properties of the Fibers and application of the same depends upon the design. The number of plies and spacing shall be based on the design approved by the Engineer in Charge. The various systems involved in the same are as follows:

1. Surface Preparation.

2. Priming.

3. First Saturant Coat & Fabric Layup.

4. Second Saturant Coat.

5. Protective System.

- 1. Surface Preparation:** The Concrete surface shall be abrasive remove to remove laitance and surface contamination. The concrete must be thoroughly cured, free of oils, curing compounds or mould release agents and must be thoroughly dried and free of dust at time of application. Wherever required, the concrete substrate must be repaired using suitable repair mortars with tensile strength equal to or greater

than the original concrete. Any cracks not caused by steel corrosion should be repaired using epoxy resin crack injection. Surface defects in concrete should be made good using **Goldbond 1893 Putty** or equivalent make. Differences in adjacent concrete surface levels must be no more than 1 mm. Concrete surface protrusions such as small projections, grouting lines etc. must be ground flat using concrete planes, disc sanders etc. Depressions in the concrete surface such as a concrete joint must be filled with **Goldbond 1893 Putty** or equivalent make. In case of polygonal shaped cross sections sharp corners must be rounded with a radius of at least 25mm. The larger the radius the better the preparation. Internal concrete angles must be rounded using **Goldbond 1893 Putty** or equivalent make.



2. **Priming:** The prepared concrete substrate shall be primed with two component epoxy based primer of MANUFACTURER Make **Goldbond 1893 Primer** or equivalent make. Only mix as much primer as can be applied within its pot life. Mixed primer should be applied with roller brush. If necessary a second coat can be applied if needed when surface is very porous. **Goldbond 1893 Primer** must be allowed to cure until tack free (overnight curing is common practice). After the priming of the substrate if any further depressions are found the same shall be repaired with **Goldbond 1893 Putty** or equivalent make.

3. **First Saturant Coat & Fabric Lay up:** The **Goldbond 1893 Superwrap** Reinforcement Sheet must be cut before application of Saturant into required sizes as per the design. The number of sheets cut shall be limited to those that can be used in a day. For practical convenience the length of the sheet should be limited to 2m. The primed substrate shall be coated with two component, 100% solids and epoxy Saturant of MANUFACTURER Make **Goldbond 1893 Saturant** or equivalent make using brush. The coated surface shall be wrapped with Unidirectional, Fibre reinforcement sheet (properties shall be based on design) carefully giving required laps as per design. The Reinforcement should be strongly squeezed in the longitudinal direction of the fibers two or three times using a deforming roller and rubber spatula in order to impregnate

the resin into the fibers and to deform the resin coat. For joining strips of fibre sheet, a 15cm overlap length is required in the horizontal direction and 2cm overlap length in the vertical direction. Additional resin must be applied at the overlap location on top of the outer layer of fibre sheet to be overlapped. The adhered Fibre Reinforcement System should be allowed to stand for at least 30 minutes. Any lifting or dislocation that occurs during this period must be corrected using the roller and spatula.

4. **Second Saturant Coat:** The second or overcoat of mixed **Goldbond 1893 Saturant** or equivalent make should then be applied onto the surface of the fibre sheet. The coated surface should be strongly squeezed in the fibre longitudinal direction two or three times with the roller and spatula in order to impregnate the fibre sheet in the same manner as above. In cases where more than one layer of fibre sheet is to be applied, the above application method for **Goldbond 1893 Saturant** should be repeated. The appearance of the **Goldbond 1893 Saturant** material should be translucent blue. The color of the application will be varied due to overlaps and slight thickness variations. Overlap areas should also be translucent. For internal elements, it is advisable to give a protection screed of C: S mortar. For this purpose, sand shall be sprinkled on the second coat of Saturant when it is still tacky. This will act as a mechanical key for protection screed.

5. **Protective System:** The internal elements where composite strengthening has been applied shall be protected with C: S mortar to avoid any damage to FRP system. The same can be done by carrying out the C: S mortar cladding in the ration of 1:4 C: S for the entire element. For external areas Surfaces should be top coated within two days when exposed to direct sunlight or in other cases within one week to assure proper adhesion of topcoat to saturant. Surfaces shall be protected either with the protective mortar/plaster application or with **Monopol-456** or equivalent make.

STRENGTHENING AND RETROFITTING USING FIBRE WRAP

A. Strengthening of Columns Using Fibre Wrap: For Strength and Ductility

The residual strength as obtained from direct or indirect manner is very low and there is no way out to improve the in-situ strength of concrete. The reason of selecting Fibre Wrap lies in the fact that the fibers do not take any axial load and only provide passive confinement to the core concrete, the purpose for which it is used. Thus, it does not interfere with the basic mechanism of concrete column.

CONCEPT:

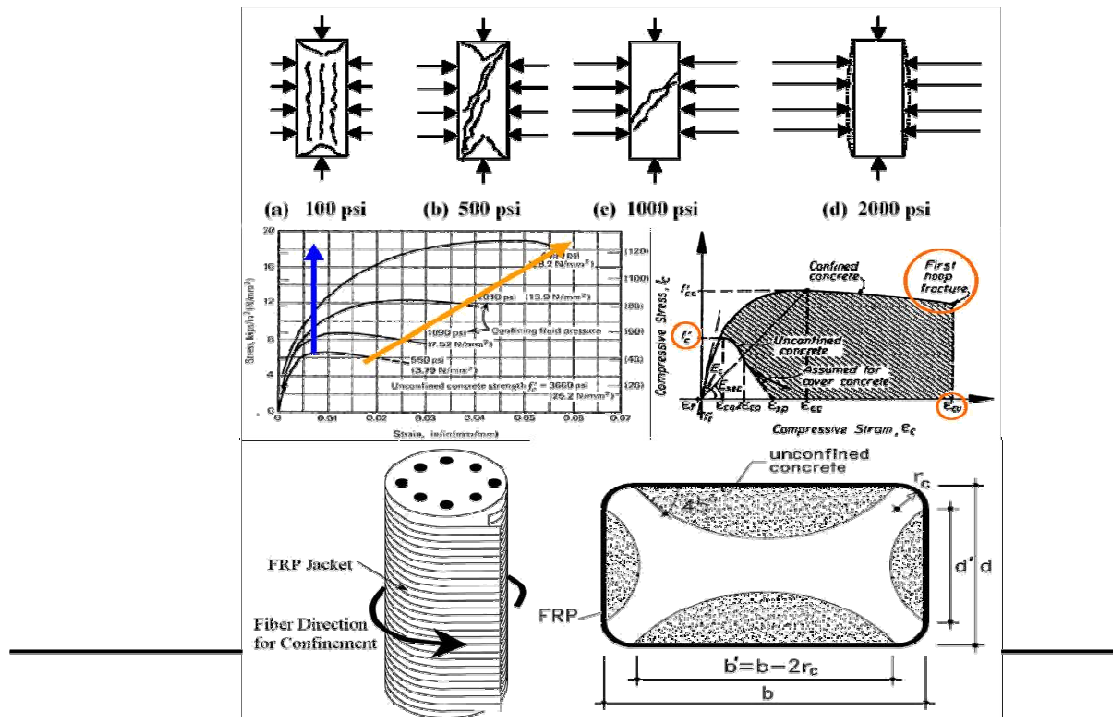
As concrete is uni-axially compressed, Poisson's effect induces transverse strains that result in radial expansion of the concrete.

This increase in transverse strain results in volumetric expansion.

By confining the concrete using a continuous FRP jacket, the fibers resist the transverse expansion of the concrete. The effect of confining pressure provided by wrap is to induce a tri-axial state of stress in the concrete which thus exhibits superior behaviour in both strength and ductility than concrete under uni-axial compression.

Since, FRP jacket acts to contain damaged sections of concrete; the maximum usable strain level in the concrete is limited only by the ultimate strain obtainable in the FRP jacket and not by concrete crushing.

To increase the effectiveness of wrap, the sharp edges of the rectangular sections must be rounded.



As the budgetary provisions to be made for this item of work are substantial, it becomes mandatory to highlight the advantage we will get compare to any other method.

These are:

1. FRP is extremely light weight and thus do not increase the mass of the structure.

2. It does not add significantly towards the stiffness of the structure. Thus FRP does not change the basic behavior of the structure.
3. FRP does not practically consume any free space as there is no increase in dimension of columns.
4. As compared to any other materials maintenance cost for FRP wrapping is negligible.
5. Application method is very simple.
6. As compared to any other materials labor cost for FRP wrapping is very low thus the cost of project will be reduced.
7. The columns and beams, after FRP wrapping can be plastered again, thus retaining the original look of the structure, which is not possible with other methods.
8. FRP wrapping can be done with minimum required free area without disturbing the usage of the structure.
9. All codes, ACI440R.02, CEB-FIP bulletin 14, EuroCode8, Japanese code, allow the use of FRP for low grade concrete as the confinement action is more prominent for lower grade of concrete than for higher grade of concrete.
10. Due to the orthotropy built in by the fiber orientation, the wraps essentially provide only confinement without interfering with the axial load which is taken completely by concrete column.
11. The FRPs have extremely good corrosion resistance, which makes them highly suitable for marine and coastal environments.
12. As compare to other methods no drilling of holes is required.

B. Slabs Strengthened using Fiber Reinforced Polymer (FRP) wrap for flexure

Glass or Carbon FRP is a cost-effective system for strengthening concrete floors and decks or correcting design and construction errors that have lead to excessive deflection and sag in the slab. The case history below highlights one such application. Among the advantages of Fiber Reinforced Polymer (FRP) for strengthening slabs are:

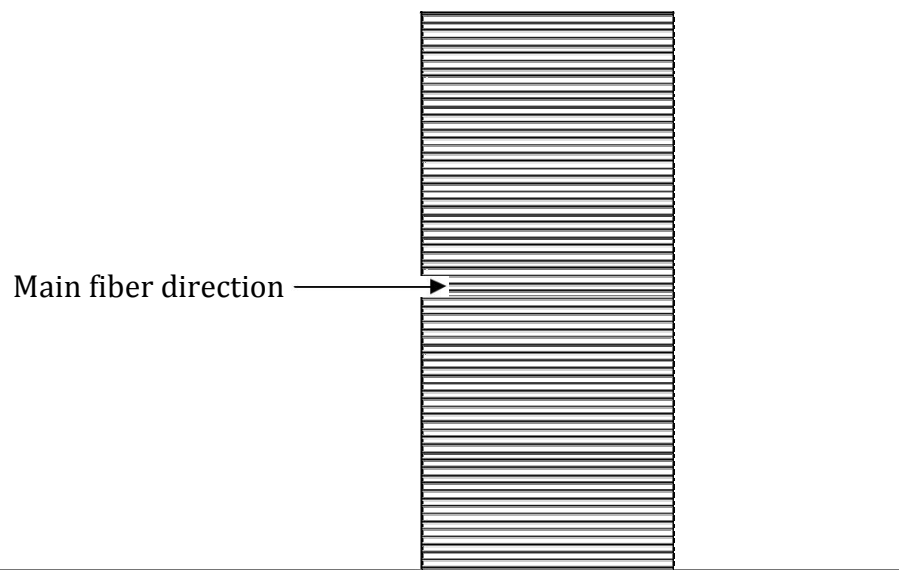
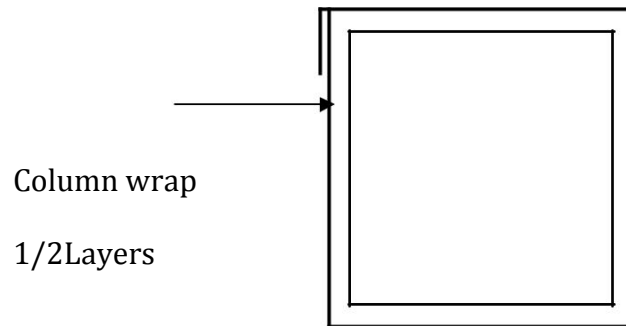
1. Increased flexural strength for both positive and negative moment regions in the slab
2. Increased slab stiffness and reduced deflections at service loads
3. Reduced crack widths for enhanced durability
4. Covering a fraction of the slab surface with FRP may be sufficient for strengthening the entire slab

5.No reduction in overhead clearance is caused by application of FRP (e.g. in parking garages)

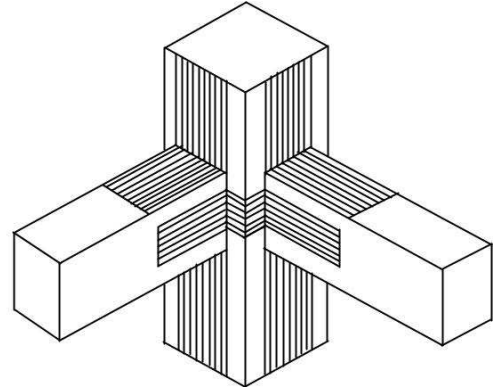
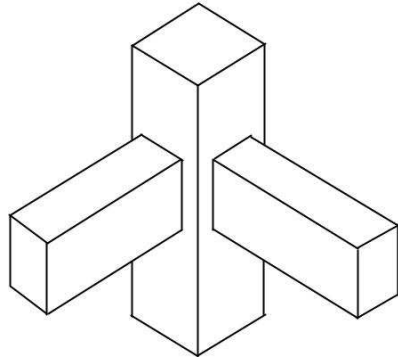
6.Lower cost for FRP compared to strengthening with conventional methods (e.g.epoxy injection in cracks).

Glass or Carbon FRP is very effective in repair and strengthening of slabs and decks. Because the moment capacity of the slab or deck is the couple resulting from the tensile and compressive forces, FRP can be applied to the tension face of the beam to increase the tension force. In most cases, the deck or slab has sufficient compressive strength and does not require strengthening. However, if needed, FRP can also be added to the compression face of the beam as a part of strengthening and repair.

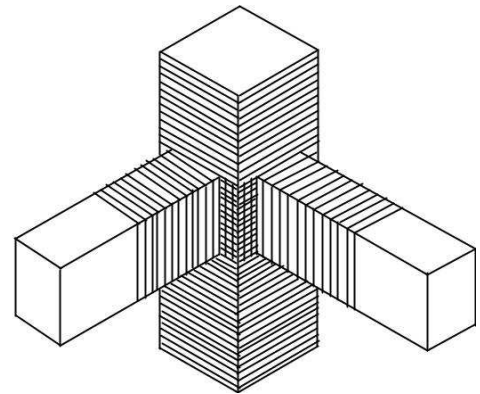
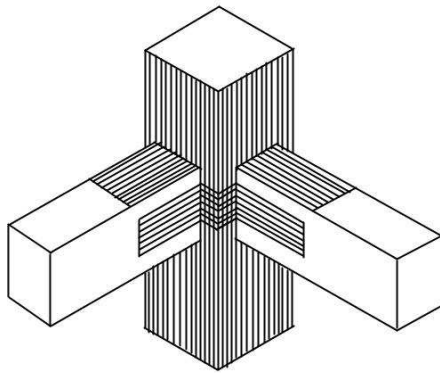
SKETCHS FOR FIBRE LAYUP:



Beam-Column and Beam-Beam overlays



Beam-Column and Beam-Beam overlays



Upright fibers at corner Portion

Wrapping of beam and column

Material Specifications

The specifications for the materials to be used for the repair shall be as follows:

1. **Anti-corrosive Primer for Rebar's:**
 - A) **Alkaline Rust Convertor**

Thoroughly clean the rusted steel and apply one coat of alkaline rust convertor in 2 coats with an interval of 6 hours between the coats

Specification for Alkaline rust converting primer.

The alkaline rust converting primer shall be organic polymer based & shall be free from mineral, and phosphoric acid & chromic acids.

Base	Organic (Water based acid free)
pH	7.5 to 8.5
Specific Gravity	1.04 to 1.10
Nature	Dark Brown
% Solids	Minimum 10 %
Flash Point	N.A.
Properties	Shall pass minimum 400 alternate immersion cycles of 2 minutes cycles in 3.5% NaCl solution at room temperature.

B) Followed with application of 2 coats of epoxy phenolic IPNet-RB (CSIR/CBRI) at an interval of 12 hours between the coats.

Specification for Anti corrosive IPNet RB coating.

Anti – corrosive coating to the exposed reinforcement.

Applying two coats of IPNet-RB (Interpenetrating polymer with epoxy / phenolic base) manufactured under technical license from Central Building Research Institute (C.B.R.I.) , Roorkee to exposed corroded bars and to new reinforcement.

Specifications :

After application of rust converter (FeoVert) and air curing for minimum 6 hours apply two coats of the formulation given below by brush with time interval of min. 9-10 hours between the coats.

IPNet-RB Part-A (resin component) & IPNet-RB Part-B (hardener component) in equal proportion by volume.

Methodology:

1. The mixing shall be done in a clean plastic container. The component shall be mixed thoroughly for 3-4 min. and allowed to remain in the container for another 2-3 min.
2. The mix shall be consumed within 30 min. and only such quantity as can be used within 30 min. shall be mixed at a time.
3. The application shall be by brush. The 2nd coat shall be applied after 12 hours.
4. The 2nd coat when tacky, dry sand with silt content not more than 3% shall be sprinkled so as to provide a rough finish. An air curing period of min. 10 hours shall be ensured after the top coat before any subsequent treatment.
5. All instructions from the manufacturers regarding the use of the product, storage, health precaution of workers, cleaning of tools etc. shall be followed.
6. After 2 hrs. The surface to be slight touched with dry brush to remove loose sand grains.

Typical Properties

Base	Epoxy Phenolic
System	2 component system
Pot Life	45 min for 1 ltr mix at 25°C
Coverage	5-7 sq.mtr/ltr/coat on steel

DFT	60 microns per coat
Adhesion (ASTM-D-4541)	2.5 N/mm ²
Pull out test (IS-2770 (Part 1))	Passes
Salt Spray Test ((ASTM-B-117)	Passes 720 hrs min

2. Bipolar Concrete Penetrating Corrosion Inhibitor (CPCIA)

The corrosion inhibitor CPCIA shall have a proven track record in Indian condition and shall reduce the corrosion significantly and have established / published results about the efficiency. The dosage 500 ml per sq.mtr. The product shall be applied to the entire repaired plus normal concrete area to prevent corrosion activity in future.

Typical Properties

Concrete penetrating corrosion inhibitor upon addition / application into the concrete matrix inhibits the corrosion process. C.P.C.I. need not be in direct contact with the steel. They migrate over a considerable distance by virtue of its bipolar inhibition mechanism property (B.I.M) to provide protection to the steel. Non-migrating corrosion inhibitors are specifically excluded from this specification.

The C.P.C.I. shall be free from nitrite, chromates phosphates & other toxic elements.

Application	Surface application : Minimum 4 sq. mt / lt.
Base	Water based organic corrosion.
Nature	Colourless slightly Hazy liquid
Toxicity	Non toxic
Specific Gravity	1.02 to 1.07
Flash Point	NA (Water Based)
pH	Minimum 10

Corrosion Rate Reduction (Coulombs)

The reduction in rate of corrosion shall be minimum 40% of the control specimen as per IIT evaluated results.

Tropical Compatibility:

Material shall have evaluated test reports indicating significant reduction in corrosion rate after minimum of 90 thermal cycles at 60°C followed by 8 weeks of accelerated corrosion.

The inhibitor shall be non-toxic & safe to plant and human life.

- 3. Anchor Material for Rebar fixing & Shear connectors: EPCO 1010 Grout** The high performance epoxy system fixing and anchoring compound shall be a two components

Typical Material Properties:

Nature	Grey thixotropic paste
Relative density:	1.60

- 4. Bonding Agent for Concrete:** The structural grade bonding agent shall be a two component, solvent less epoxy resin based. It shall be formulated to meet the requirement of ASTM C881. The Bonding agent shall exhibit minimum open time of 6 hours and shall exceed the tensile strength of concrete in terms of its adhesive bond strength. It shall be fully compatible with **MOLITH** Range of repair mortars.

Typical Properties:

Nature	Grey viscous dispersion
Compressive Strength:	65 MPa at 7 Days
Tensile Strength:	25 MPa at 7 Days
Adhesive bond strength to concrete:	> 2.5 MPa
(ASTM D4541) (Substrate failure)	
Slant Shear bond Strength:	>11 MPa
(BS 6319, Part 4)(Concrete failure)	
Pot life:	2 Hours at 25°C
	1 Hour at 40°C

Overlay time (Open time):	6 Hours at 25°C
	4 Hours at 40°C
Full cure:	7 days

5. Microconcrete for Encasement: The dual shrinkage-compensated, cementitious microconcrete shall be a high flow, single component cementitious formulation. The repair microconcrete shall have compressive strength minimum of 25 MPa at 3 day and 40 MPa at 28 days. The repair mortar shall not require polymer bonding agent as primer.

Typical Properties

Nature	Grey powder
Water/powder ratio, by weight:	0.14
Fresh wet density:	2250 kg/m ³
Compressive strength:	10 MPa at 1 Day
(ASTM C109, 7cm cube)	20 MPa at 3 Days
	30 MPa at 7 Days
	40 MPa at 28 Days

6. Patch Repair Mortar for small repairs: The dual shrinkage-compensated, cementitious patch repair mortar shall be a single component mortar modified with fibers. The repair mortar shall exceed compressive strength of 35 MPa at 7 day and 45 MPa at 28 days. The repair mortar shall not require polymer bonding agent as primer and shall be thixotropic consistency, capable of applying 50mm thick in single layer.

Typical Properties

Nature	Grey powder
W/P ratio, by weight:	0.16
Fresh wet density:	2250 kg/m ³
Compressive strength:	15 MPa at 1 day

(ASTM C109, 7cm cube)	25 MPa at 3 days
	35 MPa at 7 days
	45 MPa at 28 day

7. **Curing Compound** The non-degrading membrane forming curing & sealing compound shall be an acrylic resin based formulation. The product shall comply with ASTM C 309 Class B. The product shall exhibit water loss not more than 0.55 kg/m² in 72 hours when tested as per ASTM C156. The product shall form non-degrading abrasion resistance film which shall also exhibit capability as primer for subsequent protective coatings or bituminous overlays.

Typical Properties:

Nature	Clear/white liquid
Flash point:	30oC
Dry film appearance:	Clear or white
Loss of Water (ASTM C156):	< 0.55 kg /m ²
Drying time (ASTM C309):	45 mins at 25°C

8. **Crack Sealing:** The high strength non-sag epoxy compound shall be complying with ASTM C881. It shall be formulated to achieve adhesive bond strength with concrete substrate exceeding the inheriting tensile strength of concrete substrate; with compressive strength in excess of 60 MPa at 7 days.

Typical Properties:

Nature	Grey viscous paste
Pot life:	90 Minutes at
25°C	45 Minutes at 40°C
Tack free time:	7 Hours at 25°C
	2 Hours at 40°C
Compressive strength:	40 MPa at 24 Hours
(ASTM C579)	60 MPa at 7 Days

Adhesive bond strength to	
Concrete (ASTM D4541):	> 2 MPa
(Substrate failure)	

9. Crack Injection: The two-component epoxy injection resin shall be a low viscosity resin system having viscosity less than 350 cps at ambient temperatures. The injection resin shall be high strength and shall develop compressive strength in excess of 55 MPa at 1 day & 65 MPa at 7 days. The product shall exceed 55 MPa in flexural strength at 7 days and shall exceed 15 MPa in slant sheer bond strength. The product shall have minimum pot life of 30 minutes at ambient temperatures. The injection resin shall comply with ASTM C881. The injection resin must have pass rating for shrinkage test as per ASTM C 881 and shall be impermeable.

Typical Properties

Nature	liquid
Pot Life:	50 Minutes at 25°C
	30 Minutes at 40°C
Tack free time:	6½ Hours at 25°C
Compressive Strength:	65 MPa at 24 Hours
(ASTM C579)	70 MPa at 7 Days
Flexural Strength:	45 MPa at 24 Hours
(ASTM-D-790)	55 MPa at 7 Days
Tensile Strength (ASTM D638):	18 MPa at 7 Days
Shrinkage, (ASTM C881):	Passes
Full Chemical Cure:	7 Days at 25°C

10. (External): The external side shall be treated with sealing system consisting of rubber tape having elongation exceeding 600% and shore A hardness of 80 with epoxy based material as adhesive. The combine system shall be capable of providing watertight seal. The tape must have tensile strength, exceeding 4 MPa and resistance to cracking.

Typical Properties:

Hardness, Shore A (ISO 868):	80
Tensile strength (DIN 53504 S2) :	> 6 N/mm ²
Elongation at break (DIN 53504 S2):	600%
Compatibility with bitumen:	Compatible
UV resistance	No tears

(Internal): The internal shall be sealed with two-component, high performance polysulfide formulation having weathering resistance to ultraviolet rays. The product shall exhibit shore A hardness of 25 and have movement accommodation factor of

25%. The sealant must comply with the performance specifications as laid in BS: 4254 and ASTM C 920. All the joints must be primed using compatible primer for the substrate. Sealant application shall be carried out, strictly in accordance with Manufacturer's recommendations. The typical properties of the system are:

Typical Properties:

Nature	Grey viscous paste
Solid content:	> 99%
Movement Accommodation Factor:	± 25%
Shore A hardness (full cure):	25 at 25°C
Application temperature range:	5°C to 40°C
Pot life:	> 60 Minutes at 25°C

Resistance to ozone:	non-crack
Service temperature:	-30 to 80°C

11. Glass Fibre for Strengthening: The glass fibre used for axial strengthening of Columns shall be Unidirectional fabric having the following properties:

Typical Properties:

Technical data of fibre:	E-Glass, 900
Modulus of elasticity:	73 kN/mm ²
Tensile strength:	3400 N/mm ²
Total weight of sheet:	900 g/m ² in main directions
Density:	2.6 g/cm ³
Ultimate Strain %:	4.5
Thickness for static design wt / density	0.342 mm
Safety factor for static design:	1.5 (recommended)
	(Manual lamination / woven product)

12. Carbon Fiber for Strengthening: The carbon fiber for shear strengthening of beams shall be unidirectional, High tension Carbon Fabric having the following properties:

Typical Properties:

Technical data of fibre	230 gsm	430 gsm
Modulus of elasticity	240 kN/mm ²	240 kN/mm ²
Tensile strength	3800 N/mm ²	3800 N/mm ²
Weight of C fibre (main direction)	200 g/m ²	400 g/m ²
Total weight of sheet	230 g/m ²	430 g/m ²
Density	1.7 g/cm ³	1.7 g/cm ³
Ultimate Strain %	1.55	1.55
Thickness for static design wt / density	0.117 mm	0.234 mm
Safety factor for static design		
(Manual lamination / UD-product)	1.2mm (Recommended)	

13. Primer for FRP system: The primer for composite strengthening system shall be a two component low viscous epoxy based system solids. The product should have adhesive bond strength to concrete more than 2.5 Mpa when tested according to ASTM D4541 and having 100% volume of tensile strength of greater than 32 Mpa when tested according to ASTM D 638. The product shall have the following properties.

Typical Properties:

Nature:	Free flowing liquid
Volume solids:	100 %
Mixing ratio, by weight:	100 (Base): 100 (Hardener)
Coverage:	4 to 5 m ² /kg
Pot life:	40 Minutes at 25oC
Tack free time:	4 Hours at 25oC
Over coating time	
With Goldbond 1893 Putty:	Fresh (within 60 minutes)
With Goldbond 1893 Saturant/Goldbond 1893 SA:	After tack free, but with in 48 hours of application
Adhesive bond strength to Concrete (ASTM D4541):	> 2.5 MPa (Concrete Failure)
Tensile strength (ASTM D638):	> 32 MPa

14. Saturant for FRP System: The Saturant for FRP System shall be a two component, epoxy system having 100% volume of solids that permits adhesion of a light weight sheet with the concrete. The Saturant when cured with fibre sheet, produce a high performance composite system for use in external strengthening of structures. The Saturant shall achieve a

compressive strength of 40 MPa at 1day and 60 MPa at 7 days when tested according to ASTM C579. The material shall have the following properties.

Typical Properties:

Nature:	Liquid
Volume solids:	100 %
Mixing ratio, by weight:	100 (Base): 100 (Hardener)
Pot life:	30 Minutes at 25°C
	15 Minutes at 40°C
Coverage	0.8 to 1.0 kg/m ²
Setting time:	5 Hours at 25 °C
Over coating time:	On setting
Full cure:	7 Days
Compressive strength:	> 40 MPa at 1 Day
(ASTM C579)	> 55 MPa at 7 Days
Tensile strength (ASTM-D-638)	> 23 MPa
Flexural strength (ASTM-D-790)	> 43 MPa

- 15. Epoxy putty for Profiling:** The putty for profiling of concrete surface before FRP system is the concrete smoothing material for use with the Composite strengthening System. It is 100% solid, non-sag paste epoxy resin material. The putty shall have the following properties:

Typical Properties:

Nature	Grey paste
Mixing ratio, by weight:	100 (Base): 100 (Hardener)
Coverage:	2 kg/m ² at 1mm thickness
Pot life:	6 0 Minutes at 25oC

Setting time:	1 2 Hours at 25oC
Over coating time:	On setting
Compressive strength:	> 30 MPa at 1 Day
(ASTM C579)	> 50 MPa at 7 Days

16. Protective System for Exposed vertical Faces: The protective coating system for concrete a single component, high build, elastomeric, crack-bridging, and acrylic coating applied at an average thickness of 225 microns DFT in two coats. The product shall be applied on suitably primed substrate using suitable acrylic primer. The product must be crack-bridging high elongation type. The system shall exhibit excellent bond strength with the substrate at least exceeding 1.5 MPa, when tested as per ASTM D 4541. The product shall have anti carbonation properties and excellent resistance to ingress of water, water soluble ions like chloride and sulphide. The product shall have excellent UV resistance and exhibit breath ability by virtue of water vapor permeability. The cured coating shall resist dust pick up and growth of fungus. The coating shall be available in wide range of colors. The coating shall be washable with excellent durability. The typical properties of the system are:

17. Protection System for Roof: The protective system for roof is a single component acrylic based coating system shall form a seamless elastomeric waterproofing membrane for exterior below-grade or between-slab applications.. The typical properties of the system are as under:

Aliphatic elastomeric coating primer Properties:

Base	Aliphatic Acrylate
Nature	Clear
Adhesion (ASTM-D-4541)	2.5 N/mm ²
Elongation	1/8" Passes
Water absorption	Nil
Hydrostatic Pressure	Can withstand upto 8 kg/cm ²

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

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SCOPE OF WORK:

1) The main contractor/successful bidder shall be responsible for execution of the work as per CPWD specification/ requirements of the item as per sound engineering practices. For operation of Item No D-23 the agency shall engage a Third Party Agency (TPA), who shall be engaged with the prior approval of MMTC who shall satisfy themselves about the credentials of the third party responsible for the following .

- To provide services to MMTC for monitoring complete quality of the work being executed by carrying out inspections, laboratory testing, quality audit, verification of site records and any other means required in this connection. Inspection of construction equipments deployed by the contracting agency in order to assess their suitability for the work.
- To deploy required experienced/qualified Technical Personnel on the site for TPA & QA to ensure that quality on the work is maintained as per provision of relevant IS codes and specifications of work.
- To provide laboratory facilities for sampling and testing, field-testing facilities and survey equipments etc. during the course of execution as mentioned in the bid document. To carryout NDT as and when required.
- To provide services for review of design and suggestions for various sections considered for the work as and when needed. To sort out any Technical issues arisen/ before during the course of execution of the work as envisaged in structural audit report including NDT of foundation members and to give proper suggestions on ensuring longevity.
- Reporting, documentation, quality certification etc.
- To issue "Certificate of Completions and Acceptance" as regards satisfactory quality of work at each RA bill/final bill, based on inspections.
- The consultant's representative shall verify and sign all the important registers and site records such as Cement Register, Steel Register, Cube Testing Register, Level Books etc. pertaining to work maintained by the contractor's representative.
- In case of any disputes pertaining to work during execution between the Client and Contracting Agency, consultant's representative shall participate at site in joint measurements etc. for verification.

2) The TPA has to perform the work of Third Party Inspection and Quality Assurance of the work/project to ensure the quality control and quality assurance of the entire work.

This may be detailed as

- Ensure quality services acceptable to industry standards, codes of practice and job specifications.
- Materials compliance verification and inspection.
- To ensure that materials duly approved by the competent authority/EIC are used in the work
- Quality and acceptability of Materials and workmanship
- Inspection of the Work at appropriate times.
- Verifications of work in progress with respect to adherence to plans and specifications/drawings.
- Laboratory testing of construction materials and test samples. Associate with work tests being carried out by Contractor and undertake additional tests as necessary to assess the quality of material and products.
- To ensure that all laboratory tests as laid down in the specifications are carried out at appropriate time and materials failing to conform to the required specifications are promptly rejected and removed from site.
- All materials, components, items including partly fabricated assemblies, process items shall be identified with proper numbering, marking labels, tags etc. It shall be ensured that the identification is maintained either on the item or its record traceable throughout storage, fabrication, storage and installation stages. Third Party Inspection agency shall be responsible for maintaining test result, reports, test certificates, which shall indicate the item details (such as batch no., lot no., date of receipt) and also the inspection status, i.e. "Under inspection", "Inspected", "Found OK" and "Inspected-Rejected". The documents shall act as product identification and traceability records.
- QA Program includes elements such as:
 - Document control
 - Tender and contract control
 - Calibration/verification of measuring and testing equipment
 - Non-conformance system with follow-up
 - Preventive action, Corrective action
 - Quality audits

PERSONNEL:

1) Only Experienced personnel shall be deployed at the work. Fresher personnel shall not be allowed.

2) The TPA shall have to submit necessary evidence/supporting documents to the Engineer-in-Charge for his approval as regards qualification and experience of the personnel deployed for the work while commencing the task.

3) Minimum number of key personnel and technical assistants for engagement in work shall be as approved by the Engineer-in-Charge of the project.

4) Above personnel shall be approved with their names by the Engineer-inCharge, before employing them in work. This selection will be made on the basis of nature and quantum of work. The personnel so approved shall only be allowed to work on the site.

5) The Site Engineer/ Manager will be overall in charge of all the project work and he shall have to keep in contact with the MMTC or their authorized representatives for successful completion of the assignment including day to day interactions. He should be available as and when called by MMTC representatives.

6) No changes in approved technical personnel shall be made by the consultant without approval from the Engineer-in-Charge.

TPA:

The main contractor/successful bidder may enter into an arrangement with TPA for execution of Item No D-23 in letter and spirit. The payment under Item No D-23 shall be released to the main agency on pro rata basis. The (TPA) shall realize the payment in this respect from the main agency. MMTC shall not be responsible for any disputes between the contractor and the TPA. MMTC shall at its discretion monitor the operations/work execution through its designated officer.

Performance Guarantee:

Performance Guarantee in the form of bank guarantee as envisaged in Point No 17, of the General Terms & Conditions equivalent to 5% of the tendered cost shall be furnished by the main agency. To stand guarantee for longevity of the work done the PG shall be released only after completion of ten years from the date of completion of the work.

PG furnished in the form of bank guarantee shall be renewed periodically by the agency with/without the demand raised by MMTC. The main contractor/successful bidder shall be wholly responsible for keeping the BG alive at any point in time up to ten years from the date of completion of the work During the pendency of 10 years, if the bidder fails to extend the BG before the date of expiry, MMTC reserves the right to invoke/encash the bank guarantee without any communication/notice in this regard..

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

MMTC/Estate/Over Head Water Tank/18-19

Dated: 16.01.2019

GENERAL TERMS & CONDITIONS

1. The work shall be executed for OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, at MMTC Housing Colony, New Delhi - 110017.
2. The quantities mentioned in the tender are approximate. The running payment shall be made on the basis of actual work executed. Variation in the quantities, if any, shall not vitiate the contract.
3. The Contractor shall normally have to make his own arrangement for storing/deploying the materials, manpower, water etc required for the works. However, if available, a flat shall be allotted for storing of materials and manpower on payment of Use and Damage charges as fixed by MMTC.
4. The electric power requirements for the project shall be borne by the Contractor. All T&P required for execution of work shall be arranged by the agency at his own cost & risk. MMTC shall stand indemnified from damages/risk to life and property due to mishap caused/made to cause by the agency connected with inappropriate handling carelessness, faulty equipment brought by this agency. An indemnity bond to this effect shall be submitted by the agency at the time of award of the work. This shall find mention in the Indemnity bond as described at Sl No 33 / Page 58-59 of the document.
5. **A) Payment:** The payment shall be made on actual work executed as per the approved rates based on actual measurement.
 - Running payments shall be admissible based on actual work done/ measurement at site
 - Contractor to note that No Running Payment shall be admissible if the value of work done is less than Rs 500000/-.
 - The contractor shall submit his/her monthly bills in triplicate to the Third Party Agency (TPA), who after due verification, scrutiny, recommendation and processing, will forward the same to MMTC, Corporate Office for further necessary action. The payment shall be released after necessary deductions. The payment amount will be released through e-payment system only in the bank account of the contractor.

B) TERMS FOR PAYMENT:

- Payment of bills, which are ready in all respects, shall be made within 3 weeks of receipt of bill at MMTC.

- Any clarification/correction/modification, if required, in the bill will be sought from the contractor/supplier/service provider within 1-2 working days from the date of submission of bills in MMTC and same shall be re-submitted after making required corrections, to MMTC within the next 2-3 working days except in exceptional circumstances. In this case, the date of receipt of bill at MMTC will be the date on which the corrected bill, ready in all respects, is resubmitted by the vendor in MMTC,CO.

- In case of any disagreement between MMTC and the contractor/supplier/service provider on any part of the bill, such part may be severed from the rest. Payment against agreed and admissible part can be processed as per laid down procedure, while the disputed part can be dealt as per contract provisions viz. conciliation, dispute resolution, arbitration as mentioned in the tender.

6. The quantities given under the Bill of Quantities are those upon which the approximate estimated cost of work are based but they are subject to alterations, omissions, deduction and additions and not necessarily show the actual quantities of work to be done and can be increased or decreased at the discretion of the Engineer. However, the consequent variation in the total contract value will be limited to 20%. The rates quoted shall be firm for such variation. In case the variation results in the total contract value exceeding the prescribed percentage, the revision of rates, if any, shall be applicable only for that portion of contract carried out in excess of the permissible percentage.

7. **EXTRA ITEMS/SUBSTITUTED ITEMS:** In respect of any Extra/Substituted Items ordered to be executed, the rates payable shall be derived as follows:-

7.1 If the rates for the additional, altered or substituted works are specified in the contract for the work, the contractor is bound to carry out the additional, altered or substituted works at the same rates, as specified in the contract.

7.2 If the rates for the additional, altered or substituted work are not specifically provided in the CONTRACT for the work, the rates will be derived from the rates for the similar class of work as are specified in the CONTRACT for the work. The opinion of the MMTC as to whether or not the rates can be reasonably so derived for the item in the contract will be final and binding on the contractor.

7.3 If the rates for altered, additional or substituted work which cannot be determined in the sub-clause (1) & (2) above same shall be worked out on

the basis of the market rates for materials, carriage, and labour for the work by adding 10% as Contractor's profit which will be inclusive of incidental charges and overhead costs. For the purpose of coefficient for labour, wastage and material shall be adopted from the CPWD analysis of rates/standard schedule of rate as decided by the MMTC. If the items does not exist in CPWD analysis of rates/ standard schedule of rates, the coefficient for labour wastage and material shall be adopted as per standard engineering practice and the decision of MMTC in this regard shall be final and binding on the contractor.

7.4 Approved extra items shall be accorded as per CPWD pattern. Written approval of the Engineer-in-charge/Officer-in-charge shall be obtained before execution of the items. The Contractor will ensure necessary precautions during the execution of works & will not create any obstacles to the inhabitants of flats situated in and around the colony and also shall make good the installation damages, if any, during the execution.

8. Drains, pipes, cables, overhead wires and similar services encountered in the course of the work shall be guarded from damage by the contractor at his own cost, so that they may continue in full and uninterrupted use to the satisfaction of the Engineer or his representative thereof and the contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services. Should any damage be done by the contractor to any mains, pipes, cables or lines (whether above or below ground), the contractor shall make good or bear the cost of making good the same without delay, to the entire satisfaction of the Engineer or his representative.
9. The period of work contract shall be 8 Months counted from the day of issuance of the Work Order. Time is the essence of the contract. If the Contractor fails to execute or complete the work within the stipulated time or within the time agreed or extended period if any, of the contract as approved by CGM (E&A). MMTC Ltd shall levy a penalty for delayed completion which shall be Rs. 1000/- (Rupees Thousand only) per day of the delayed period subject to maximum of 10% of the contracted amount. MMTC Limited shall have the right to deduct such amount from any amount due to the Contractor. The incomplete work, if any, will be got done by MMTC at the risk and cost of the Contractor by MMTC. The decision of MMTC Limited regarding extension of time with or without levy of penalty shall be final & binding on the Contractor.
10. The bidders shall deposit Rs. 1,20,000/- as EMD by Demand Draft/Pay Order in favour of MMTC Ltd payable at New Delhi. The earnest money of the successful bidder will be retained as interest free security deposit. The

earnest money of the unsuccessful bidders shall be refunded without any interest after award of work to the successful bidder.

11. **Defect Liability Period** – The amount towards the defect liability will be deducted & retained from the payment @ 5 % of value of work done, till the sum along with the sum already deposited as earnest money amounts to defect liability @5% of the tendered work. The same shall be refunded to the Contractor on completion of the defect liability period which shall be 12 months from the date of issuance of completion certificate /virtual completion of the works during which the Contractor shall be responsible for removal of defects to the satisfaction of MMTC, failing which action as deemed fit including forfeiture of security deposit/defect liability period amount shall be contemplated by MMTC at its sole discretion.

12. **COMPLIANCE WITH LABOR/INDUSTRIAL LAWS:**

The contractor is responsible for compliance with the following under this contract:

12.1 The contractor shall have his own PF Code No. with the RPFC as required under employees PF & Misc. Provision Act, 1952.

12.2 It shall be the sole liability of the contractor (including the contracting firm/company) to obtain and to adhere by all necessary licenses/permissions from the concerned authorities, as provided under the various Labour Legislations including the Labour License obtained as per the provisions of the Contract Labour (Regulation & Abolition) Act, 1970.

12.3 The contractor shall discharge obligations as provided under various statutory enactments including the employee's provident fund and Miscellaneous Provisions Act, 1952. the Employees State Insurance (ESI) Act, 1948, the Contract Labour (R&A) Act, 1970, the Inter-state Migrant Workmen(Regulation of Employment & Conditions of Services) Act, 1979, Minimum Wages Act, 1948, Payment of Wages Act, 1936, Workmen Compensation Act, 1923 & other relevant acts, rules and regulations enforced from time to time.

12.4 The contractor shall be responsible for required contributions towards PF, pension, ESI or any other statutory payments to be made in respect of workers employed for work under the contract and the personnel employed for rendering services to MMTC and shall deposit these amounts on or before the prescribed dates. The contractor shall submit the proof of depositing the employee's and employer's contributions. The contractor shall also be responsible to pay any administrative /inspection charges thereof, wherever applicable, in respect of the personnel employed by him

for the work of MMTC. The contractor shall submit for verification of relevant records/documents by MMTC, as asked for.

12.5 The contractor shall be solely responsible for the payment of wages and other dues to the personnel deployed by him latest by 7th of the following month in the premises of MMTC in the presence of MMTC officials. MMTC reserves the right to check periodically the documents related to the payment of applicable wages made by contractor to his/her personnel so engaged. The contractor shall be directly responsible and indemnify the company against all charges, dues, claims etc. arising out of the disputes relating to the dues and employment of personnel deployed by him. The contractor shall indemnify MMTC against all losses or damages, if any, caused to it on account of acts of the personnel, if any, deployed by him/her.

12.6. The contractor shall ensure the regular supervision and control by the contractor himself or his supervisor on the personnel deployed by him/her for the works and necessary direction should flow from the contractor/supervisor for the workforce for undertaking the contractual obligations.

13. CONTRACTOR TO PROVIDE EVERYTHING NECESSARY

The Contractor shall provide everything necessary for the proper execution of the work according to the intent and meaning of the drawings, schedule of quantities and specifications taken together & same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from and if the Contractor finds any discrepancies therein he shall immediately and in writing refer the same to MMTC Limited whose decision shall be final and binding.

The Contractor shall supply, fix and maintain at his own cost, for the execution of any work, all tools, tackles, machineries and equipments. and all the necessary centering, staging, planking, timbering, shuttering, shoring, pumping, fencing, boarding, watching and lighting by night as well as by day required not only for the proper execution and protection of the said work but also for the protection of the public and safety of any adjacent roads, streets, walls, houses, buildings, all other erections, matters and things and the Contractor shall take down and remove any or all such centering, planking, timbering, strutting, shoring etc on all occasion as required or when ordered so to do and shall fully reinstate and make good all matters and things disturbed during the execution of works to the satisfaction of the MMTC Limited / Engineer-in-Chief.

14. EVALUATION OF BIDS :

The bids will be evaluated on the parameters fixed for eligibility criteria and the bids of such bidders who do not fulfill the eligibility criteria as mentioned in the Special Terms & Conditions for E-Tender will not be considered for opening of the Financial Bid.

- 14.1. Only those offers shall be evaluated which are found to be fulfilling all the eligibility and qualifying requirements of the tender both technically and commercially.
- 14.2. The bidder must have the work experience for executing similar type / nature of work during the last 3 (three) preceding years preferably for public sector undertaking / Government establishment or reputed private establishment. Proof of the satisfactory performance from the previous employer to be provided.
- 14.3. MMTC reserves the right to accept any tender or reject any tender or all tenders without assigning any reason whatsoever.
- 14.4. The technical assessment of the bid will be carried out by a Committee which would involve past experience documents / credible balance sheet of the firm. The Committee shall have the right to qualify / disqualify the bids as per its / their analysis.
- 14.5. The evaluation of the offers shall be made as package carrying all the items based on the unit rates quoted for the approximate quantities as per Financial Bid. The Financial bid evaluation of the L-1 bidder shall be determined based on the unit rates of all the items.
- 14.6. The lowest 'Acceptable' tender shall be considered further for conclusion of contract.

15. LIQUIDATED DAMAGES:

- 15.1 MMTC reserves the right for termination of the contract at any time by giving one month written notice if the services are found unsatisfactory and also has the right to award the contract to any other agency at the cost, risk and responsibility of the Contractor who is awarded the work contract in the first place and any excess expenditure incurred on account of this will be recovered by MMTC from the Security Deposit or pending bills or by raising separate claim on the Contractor.
- 15.2 The MMTC will have the right to forfeit the security deposit amount, whole or part thereof or deduct whole or part of the security deposit against payment of amount due to MMTC by way of any loss or damage caused to or would be caused to / suffered by the MMTC by reason of any breach of contract or if any of the terms and conditions contained in the agreement or by reason of Contractor's failure to perform the agreement. The decision on

the amount of penalty would be that of MMTC & cannot be contested by the Contractor.

- 15.3 Any damage to the existing structure / property, appliances, furniture & fixture and fittings etc. during execution of the work contract, shall be made good immediately on the spot by the Contractor at his own expense.

16. AGREEMENT

The successful contractor will be required to duly sign an agreement as may be drawn up to suit local conditions and shall pay for all stamp and legal expenses, incidental thereto. The rates quoted by the bidders shall be valid during the currency of the agreement and no escalation is permitted /considered till the completion of the work awarded.

17. PERFORMANCE GUARANTEE:

- 17.1 The Contractor/successful bidder is required to submit a Performance Guarantee as per prescribed Performa (Annexure VI) on an appropriate value of stamp paper within a period of 7 days from the date of written notification of award (Letter of Intent) to be made to the bidder, calculated at the rate of five percent (5%) of the tendered cost.
- 17.2 The Performance Guarantee will be issued by a scheduled commercial bank other than by any Co-operative bank or Gramin bank. The bank must have net worth of at least Rs. 500 crore and capital adequacy ratio of 9%.
- 17.3 Keeping in view their net worth/NPS/Profitability, bank guarantees issued by Nainital Bank Ltd. and Dhanalaxmi Bank shall not be accepted.
- 17.4 In case of Performance Guarantee from a foreign bank situated outside India, the Bank Guarantee must be issued through any of the Indian Scheduled Commercial bank other than a Co-operative bank or Gramin Bank or Nainital Bank or Dhanalaxmi bank, preferably in the city where MMTC's office is located, fulfilling the criteria of net worth and Capital Adequacy Ratio as above.
- 17.5 Performance Guarantee shall be valid for a period of ten years from the date of completion of the work. All expenses, commissions and interests related to issuance and surrendering of the Performance Guarantee, accrued to the bank, shall be at the sole cost of the bidder. The bidder, who has caused and delivered the Performance Guarantee, shall not be entitled to put forth any claim for accrued interests thereon. The Performance Guarantee amount shall be available, if invoked, at the counters of bank in New Delhi within banking hours on the date of presentation. PG furnished in the form of bank guarantee shall be renewed periodically by the agency with/without the demand raised by MMTC. The agency shall be wholly responsible for keeping the BG alive at any point in time up to ten years from the date of completion

of the work. During the pendency of 10 years, if the bidder fails to extend the BG before the date of expiry, MMTC reserves the right to invoke/encash the bank guarantee without any communication/notice in this regard.

- 17.6 Failure of the Contractor/successful bidder to comply with the above requirements shall constitute a sufficient ground for the annulment of the award and forfeiture of the EMD.

18 Bidder's confirmation to read as:

- 18.1 This is to confirm that in case we are considered, we do hereby undertake to carry out the said works as per our all inclusive quoted rates under the laid down schedules, BOQs, specifications, drawings etc in the tender. We also confirm that the works shall be done within the stipulated period as per NIT. We shall give our best and make all efforts for the said works.
- 18.2 The NIT/ tender form/ terms & conditions which is/are downloaded from the website(s) has not been changed or corrected in any manner. I understand that only the conditions and readings as appearing in the original uploaded form will be treated as valid. For checking the form and the conditions and the readings used by me in the tender submitted will be compared and confirmed with the original uploaded at MMTC &/or Govt. websites. If there are any changes/ corrections in the NIT/ tender form/ terms & conditions, my tender is liable to be rejected as per the discretion of MMTC Ltd.
- 18.3 I/We hereby confirm that, all the terms and conditions specified in this NIT/ Tender Form are acceptable to me/us. I/We further confirm that all the required details have been furnished in the appropriate places and if this Tender form is incomplete in any respect on my/our part, then the same is liable to be rejected at the discretion of MMTC Ltd.
- 19 The DVAT / (TDS) as applicable will be deducted from the bill(s) of works done, by the Contractor. Payments only for the executed work shall be made according to the terms and conditions of the tender. It is reiterated that the quoted rates are inclusive of all taxes ,duties, octroi, levies, work contract tax, transportation etc. and will remain firm till the completion of the works/contract. The VAT, TDS or any other statutory duties, taxes shall be deducted at source as per rules from the running bill/bills by the MMTC Limited. Income Tax at the prevailing rates as applicable from time-to-time shall be deducted from Contractor's bills as per Income Tax Act.
- 20 The bidders are requested to submit an attested copy of the PAN Card, TIN No., GST no. and fill up the Vendor e-payment form of MMTC. The payment/refund shall be made subject to issue of Vendor code number of the Contractor as all payments/ refunds by MMTC will be done through e-payment mode only.

- 21 No payment for 'mobilization advance' shall be made under this contract and the Contractor has to mobilize his own resources for the works. The payment amount shall be released on running bill/bills.
- 22 The Contractor shall depute competent Supervisor for day to day supervision, coordination, liaison and other works etc. The representative of the Contractor shall attend regular/required meetings to expedite the works and sort out difficulties, if any. The Contractor is responsible for progress of works and also for hurdles, if any, in the progress of works attributable to the Contractor.
- 23 ORDER OF PREFERENCE: In case of ambiguity in description of item in the Bill of Quantities/General Conditions/Special Conditions/letter of award, the following order of preference shall prevail:
- 23.1 Details in the Letter of Award/Agreement along with statement of Agreed Variations and its enclosures and any corrigendum/addendum/Bill of Quantities/ Specifications/ Special Conditions/General Conditions of contract.

24 **TERMINATION OF THE CONTRACT:**

In the event, Contractor fails to execute the work with due diligence or expeditiously or shall refuse or neglect to comply with any orders/ instructions given to him in writing within the scope of the work order or shall contravene the provisions of the work order, MMTC may give notice to the Contractor in writing, calling him to make good the failure within such time which may be deemed reasonable, but not exceeding 30 days & in default, MMTC without prejudice to its right under the work order, may rescind or cancel the work order, holding the Contractor liable for damages and MMTC shall have the option and be at liberty to get the balance /unexecuted work done through some other agency at the risk and cost of the Contractor. The cost so incurred along with damages as decided by the MMTC, shall be recoverable from the dues payable to the Contractor for the work executed under the work order or any other of his dues payable by MMTC.

25 TERMINATION FOR INSOLVENCY:

MMTC may at any time terminate the works order by giving written notice to the Contractor, without compensation to the Contractor, if the Contractor becomes bankrupt or otherwise insolvent as declared by the Competent Court provided that such termination will not prejudice or affect any right or action or remedy which has accrued or will accrue thereafter to MMTC.

26 ARBITRATION:

In case the bidder is Govt. Dept/Public Sector Undertaking , Settlement of dispute will be followed as per the following clause

“In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises(CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/ Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such dispute or difference shall be taken up by either party for resolution through AMRCD as mentioned in DPE OM No 4(1)/2013-DPE(GM)/FTS-1835 dated 22-05-2018.

In case the bidder is not a Govt department / Public Sector Undertaking, Settlement of dispute will be followed as per the following clause:

- i. In case the bidder is not a Govt department / Public Sector Undertaking, Settlement of dispute will be followed as per the following clause: ii) “Any dispute or difference whatsoever arising between the parties out of or relating to the construction, meaning, scope, operation or effect of this contract or the validity or the breach thereof shall be settled by arbitration by a sole arbitrator to be nominated by Chairman and Managing Director (CMD) of MMTC. The Arbitration Act 1996 shall be applicable to the arbitration under this clause. The parties to the dispute will share equally the cost of arbitration as intimated by the arbitrator.

The seat of arbitration shall be New Delhi

JURISDICTION CLAUSE: The parties hereto agree that any matter or issues arising hereunder or any dispute hereunder shall be subject to the exclusive jurisdiction of the courts of Delhi only.

27 FORCE MAJEURE:

If at any time during the existence of this contract either party is unable to perform in whole or in part any obligations under this contract because of war, hostility, military operations, civil commotions, sabotage, quarantine, restrictions, acts of God and acts of governments, fires, floods, explosions, epidemics, strikes or any other labor trouble, embargoes, then the date of fulfillment of any obligations engagements shall be postponed during the time when such circumstances are operative. Any waiver/Extension of time in respect of the execution of work shall not be deemed to be waiver/extension of time in respect of the remaining work to be executed.

“If operation of such circumstances exceed one month, either party will have the right to refuse further performance of the contract in which case neither party shall have the right to claim eventual damages”

The party which is unable to fulfill its obligations under the present contract must within 15 days of occurrence of any of the causes mentioned in this clause shall inform the other party of the existence or termination of the circumstances preventing the performance of the contract with supporting documents to the effect of force-majeure issued by the government/Competent Authority.

28. Increase /Decrease in Work :

The MMTC reserves the right to increase or decrease the scope of the Work on any or all items or to change the nature of the Work involved in any or all items or to completely delete any items of the Work under the Contract. The Contractor shall not be entitled to claim for loss of anticipated profits, for mobilization of additional resources, or for any other such reason on account of these changed orders. The Contractor is bound to carry out any items of work necessary for the completion of the Work even though such items of work may not be expressly described in the Contract Documents.

29. Separate Contracts

MMTC reserves the right to award the work fully or into parts or other contracts in connection with the Works awarded. The Contractor shall give other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work, and shall properly connect and coordinate its work and their work. If any part of the Contractor's work depends on proper execution or results upon the work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer-in-Chief /Site-In-charge any defects in such work that render it unsuitable for such proper execution and results. Its failure to inspect and report shall constitute an acceptance of the other Contractor's work as fit and proper, except as to the defects which may develop in the other Contractor's work after execution of the work.

30. Cleaning of Site

The Contractor shall properly clean the Site as the work progresses and shall remove all rubbish and debris from the Site from time to time as is necessary and as directed by the Engineer-in-Chief / Site In-charge. On completion, the Contractor shall ensure that the premises and/or Site are cleaned, surplus materials, debris, sheds etc removed, areas under floor cleared of rubbish, gutters, drains cleared, doors and sashes eased, locks and fastenings oiled, keys clearly labeled and handed over to the Site in-charge so that the whole is left fit for immediate occupation or use and to the satisfaction of the Engineer-in-Chief / Site-In-charge. If the cleanliness of the Site is not completed to the satisfaction of the Engineer-in-Chief / Site-In-charge, the same shall be got done from a specialist housekeeping agency and the cost would be recovered from the Contractor.

31. Insurance against accident or injury to Workers:

The Contractor shall be responsible for the safety of Contractor's property, materials, all employees or workmen engaged by them or their Sub-Contractors in connection with the Work and shall forthwith report to the Engineer-in-Chief / Site-In-charge any incidence of accidents causing damage to property or injury to personnel, however and wherever caused in the Works, and shall make adequate arrangement for rendering all possible aid to the victims of such accident. Contractor shall be obliged to pay any compensation to the employees or workmen employed by the Contractor in the execution of the Work, in accordance with the Workmen's Compensation Act or any other Statute as may be applicable. The Contractor shall continue such insurance during the whole of the time till such workmen are employed by them or the Sub-Contractors on the Works.

32. SAFETY REQUIREMENTS -

NOTE - To be strictly followed and implemented at Site.

- 32.1 The Contractor alone shall be responsible for compliance with respect to any safety measures as may be required by law or may be prudent as per the accepted industry practice with respect to the works to be executed under this Contract, under any statutory provisions including but not limited to those specifically provided under the Building and Other Construction Workers (Regulation and Employment) Act, 1996.
- 32.2 The Contractor shall be responsible for providing constant and adequate supervision of the Work to ensure compliance with the provisions of laws relating to safety and for taking all practical steps necessary to prevent accidents.
- 32.3 The Contractor shall be liable to follow all rules, regulations, generally accepted safety standards as per the best practice in the industry, whether written or not. The Contractor shall also be liable to do all that is necessary and prudent in the construction industry whether or not mandated in any law or this Contract. The Contractor shall incorporate in their operation the requirements of all the "Safety Codes" issued by the Bureau of Indian Standards, National Building Code 2016 and regulations of local Authorities. Where the requirements of BIS Codes, National Building Code and regulations are duplicated by local Authorities, the more stringent regulations shall be deemed to apply.
- 32.4 All consequences, damages or losses arising by reasons of any violation of safety norms as specified in the Contract shall be met by the Contractor. The Contractor shall be bound to pay compensation to the persons for the injuries sustained or death owing to neglect of the safety precautions. Should

any claim proceedings be filed against the MMTC the Contractor hereby agrees to indemnify the MMTC against the same.

33 **Indemnity:**

The Contractor & the TPA shall indemnify, defend and hold and keep indemnified, the MMTC from and against all actions, suits, claims costs, liabilities and demands brought or made against the MMTC in respect of any matter or thing done or omitted to be done by the Contractor or any of his Sub-Contractor(s) or their employees, workmen, representatives, agents, servants or suppliers in the execution of or in connection with the Work or the Contractor's or Sub-Contractor's performance under this Contract and against any loss or damage to the MMTC in consequence of any action or suit being brought against the Contractor or any of his Sub-Contractor(s) or their employees, workmen, representatives, agents, servants or suppliers for anything done or omitted to be done in execution of the Work and the Project coordination services under this Contract, including but not limited to meeting the Project milestones, non-compliance with the applicable laws and regulations of the government and local authorities, not obtaining the relevant licenses and permits, infringing any patents rights and specifically regarding use, storage and disposal of hazardous materials. The obligations of the Contractor under this clause shall survive the termination or expiry of this Contract.

34 **FRAUD PREVENTION POLICY:**

1. Commitments of the Bidder(s):

(a) The Bidder(s) shall be bound to take all measures necessary to prevent Fraud and Corruption while dealing with MMTC. They agree and undertake to observe the principles/provisions as laid down in "Fraud Prevention Policy" of MMTC(Full text of which is available on MMTC's website at www.mmtclimited.com during their participation in the tender process, during the execution of contract and in any other transaction with MMTC.

(b) The Bidder(s) shall not, directly or through any other person or firm, offer, promise or give or otherwise allow any of MMTC's employees any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

(c) The Bidder(s) shall not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications in the bidding process.

(d) The Bidder(s) shall not commit or allow any employees of MMTC to commit any offence under the relevant provisions of IPC/Prevention of Corruption Act: further the Bidder(s) will not use improperly or allow any employee(s) of MMTC, for purposes of competition or personal gain or pass on to others, any information or document provided by MMTC as part of the business relationship, including information contained or transmitted electronically.

(e) The Bidder(s) shall not instigate third persons to commit offences/activates outlined in Fraud Prevention Policy or be any accessory to such offences.

(f) The Bidder(s) if any possession of any information regarding fraud/suspected fraud, hereby agree and undertake to inform MMTC of same without any delay.

- (2) Disqualification from tender process and exclusion from future contracts: IF the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Clause 34(1) or “Fraud Prevention Policy” of MMTC in any other form such as to put their reliability or credibility in question, MMTC other than taking recourse available under law, shall be entitled to disqualify the Bidder(s)/Contractor(S)/Buyers(s)/Vendor(s) from undertaking any transaction with MMTC and/or declare the bidder(s)/contractor(s) ineligible to be awarded a contract either indefinitely or for a stated period of time.
- (3) Damages: If MMTC has disqualified the Bidder(s) from the tender process prior to the award of during execution according to Clause 34(2), MMTC shall be entitled to demand and recover from the Contractor liquidated damages of the Contract value .or the amount equivalent to Performance Bank Guarantee.

35 **HOLIDAY LISTING:**

“Notwithstanding anything contained in this agreement, MMTC’s policy for Holiday-Listing of an Agency mutatis mutandis applies to this agreement and in the event, the agency(s) while discharging its obligations under the Agreement or otherwise, come(s) within the ambit of the said policy, MMTC at its sole discretion reserves the right to suspend/discontinue dealings or take any curative measures with the agency(s) in accordance with the policy in force“.

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

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MMTC/Estate/Over Head Water Tank/18-19

Dated: 16.01.2019

LIST OF APPROVED MANUFACTURERS:

The construction chemical/ Fibres to be used shall be of approved brand. The approved brands are as follows:

1. Krishna Conchemm Products Ltd.
2. Sika
3. Chembond
4. Hilti / Fischers
5. BASF
6. Dr. Fixit
7. FOSROC
8. ROFF
9. Sunanda Speciality Coatings Pvt Ltd
10. CICO
11. S P Concare Pvt Ltd.
12. Paints and polish: Asian, Berger, ICI, Nerolac
13. Oil Bound/Dry Distemper: Berger, Asian, Nerolac
14. White Portland Cement: Birla White, JK Cement,
15. Ordinary Portland Cement: L&T, Vikram, Birla, Ambuja, ACC, JP
(Conforming to IS 269)
16. Putty: Birla Putty
17. Reinforcement Bar (TMT/ Structural Steel): Tata/Sail/Rashtriya ISPAT Nigam, kamadhenu etc

Any material of other brand not mentioned above shall be used after getting written approval from the retrofitting/ structural repair consultant.

Note:

The Contractor shall provide samples of materials before undertaking the work for the approval of the MMTC.

1. Samples of all materials and other articles required for use on the work shall be got approved before the starting of work. Material to be used shall be tested as and when required from the accredited laboratories or Govt institutions like IIT etc. For all the repair materials, the test shall be carried out in accordance with the product data sheet supplied. Final decision to reject any material shall rest with the MMTC/EIC/Consultant.

(Stamp & Signature of Bidder & Date)

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

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MMTC/Estate/Over Head Water Tank/18-19

Dated: 16.01.2019

To
The General Manager (E), MMTC Limited,
Core-1, SCOPE Complex, Lodhi Road,
NEW DELHI.

Ref Tenders No.: **MMTC/Estate/ Over Head Water Tank /18-19**

Dear Sir,

I/we, the undersigned certify that I/we have carefully gone through and clearly understood the terms & conditions of the tender document, the work requirements and undertake to comply with them.

I/we further undertake to execute and complete the works as per tender's terms and conditions and the bids submitted by us. We have signed and sealed every page of the tender document (technical bid) as token of our acceptance of all the terms and conditions of the tender.

I/we enclose herewith non-refundable participation Fee of Rs. ----- () and the Earnest Money Deposit (EMD) of Rs. ----- () by demand draft/pay order/banker's cheque No. ----- dated ----- drawn on ----- favouring MMTC LIMITED and payable at New Delhi.

I/we also undertake to abide by all the labour laws/acts including minimum wages etc and to deposit due amounts to Provident Fund authorities and pay ESI contributions and applicable service tax etc. for the workers to be employed by me/us on regular basis. I/we will be responsible for death and injury, if any, caused to the workers while working and for the behaviour & conduct of the workers. I/we certify that no criminal/income tax/service tax /black listing case are pending against my/our firm/company.

My/our offer includes component of applicable wages to my/our workmen provident fund, statutory charges, ESI contribution, taxes, duties, royalties, octroi levies etc. but excludes applicable GST, if any. All the statutory payments along with GST, if applicable will be paid by me/us to concerned authorities on due dates/time and I/we understand that the GST component, if applicable, shall be reimbursed to me/us with monthly bills on actual basis and

production of documentary proof of all deposits with concerned authorities for the previous month.

My/our offer shall be valid for a period of 60 days from the date of opening of the Financial Bid.

Thanking you,

Yours faithfully,

Signature:
For M/s:
Date:
Name:
Address:

Seal of Contractor/Tenderer

Mandatory Information of Bidder

Company Name	:	
Registration Number	:	
Registered Address	:	
PAN NO. / TAN NO./ GST	:	
Name of Partners / Directors	:	
City Name	:	
Postal Code	:	
Company's Establishment Year	:	
Company's Nature of Business	:	
Company's Legal Status	:	
Company Category	:	
Contact Details	:	
Contact Name	:	
Designation	:	
Date Of Birth	:	
Correspondence Email	:	
Phone	:	
Mobile	:	

Signature of the bidder: _____

Name:

Designation:

PROFORMA for e-payments

Details to be furnished by Vendor on Customer Letter Head

1 Vendor Code											
2 Customer Code											

(Details to be given by MPMC)

We agree for e-payments & submit details as under:-

The Banking/Account details are as furnished below:

(A) In case you have an account with HDFC Bank Please provide the following details, so that we can transfer funds through RTGS/NEFT mode:-

1 Bank Account No.																							
2 RTGS IFSC Code																							
3 NEFT IFSC Code																							
4 Bank Name																							
5 Bank Branch Name																							

**TERMS AND CONDITIONS AS AGREED
(On Company's Letter Head)**

- a. This is to confirm that in case we are considered, we do hereby undertake to carry out the said works as per our all inclusive quoted rates under the laid down schedules, BOQs, specifications, drawings etc in the tender. We also confirm that the works shall be done within the stipulated period as per NIT. We shall give our best and make all efforts for the said works.
- b. The NIT/ tender form/ terms & conditions which is/are downloaded from the website(s) has not been changed or corrected in any manner. I understand that only the conditions and readings as appearing in the original uploaded form will be treated as valid. For checking the form and the conditions and the readings used by me in the tender submitted will be compared and confirmed with the original uploaded at MMTC &/or Govt. websites. If there are any changes/ corrections in the NIT/ tender form/ terms & conditions, my tender is liable to be rejected as per the discretion of MMTC Ltd.
- c. I/We hereby confirm that, all the terms and conditions specified in this NIT/ Tender Form are acceptable to me/us. I/We further confirm that all the required details have been furnished in the appropriate places and if this Tender form is incomplete in any respect on my/our part, then the same is liable to be rejected at the discretion of MMTC Ltd.

Signature _____
Name _____
Designation _____
Company/Firm _____

Date _____

Place _____

ANNEXURE IV

DECLARATION BY BIDDER

I hereby declare that:

Our Company/firm has not been blacklisted/banned/barred/terminated on account of non performance by any Central/State Government Department/quasi government Agencies/ Public Sector Undertaking/Govt. Authority.

Signature _____
Name _____
Designation _____
Company/Firm _____

Date _____

Place _____

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

-

MMTC/Estate/Over Head Water Tank/18-19

Dated: 16.01.2019

GENERAL CHECK LIST OF GUIDANCE FOR SUBMISSION OF OFFER

Bidders are also requested to duly fill-in this general check list. The check-list, signed and stamped on each page by the person(s) signing the tender may be submitted along with the Technical Bid Part-1 of the tender and also ensure that all details/documents have been furnished as called for in this tender.

EMD Rs. _____ (Rupees _____ only)	Amount (Rs.): by way of Demand Draft/ Banker's Cheque/ Pay Order /FDR in favour of MMTC Limited payable at N Delhi	DD/BC/PO No. : Date : Issuing : Bank	
Participation Fees cost Rs. _____ (Rupees _____ only)	Amount (Rs.) : by way of Demand Draft/ Banker's Cheque/ / Pay Order in favour of MMTC Limited payable at N Delhi	DD/BC/PO No. : Date : Issuing : Bank	
Annual Turn over (Audited Balance Sheet - Trading, P & L account / copy of Income Tax Returns TDS for any of the years mentioned herein in accordance with NIT).	Year	Amt (Rs.)	List of document enclosed
	2015-16		
	2016-17		
	2017-18		
Proof of financial soundness and solvency certificate duly certified by bank.			
Work Order Value for the work executed (Copies of qualifying similar work orders - executed along with completion	1.Work Order No. dated.....issued by M/s _____ 2. 3. FY2015-16	Work Order Completion value Rs. Work Order Completion value Rs. Work Order Completion value Rs.	

certificates or any other proof certifying the executed value of the work as per NIT).	1.Work Order No. dated.....issued by M/s_____	Work Order Completion value Rs.
	2. 3. FY2016-17	Work Order Completion value Rs. Work Order Completion value Rs.
	1.Work Order No. dated.....issued by M/s_____	Work Order Completion value Rs.
	2. 3. FY2017-18	Work Order Completion value Rs. Work Order Completion value Rs.

DESCRIPTION	YES / NO (In all the Blank space below please fill either Yes or No only)	REMARK
Company profile, Power of Attorney / Authorization on Company's letter head in favour of person who has signed the offer.		Please enclose the self attested document such as Declaration of proprietorship or Partnership deed or power of attorney etc.
Work Contract Tax GST PF code No.		Enclose the self attested copy of registration certificate
ESI code No. TIN No. Sales Tax No. PAN No.		Enclose the self attested copy of registration certificate.
Whether blacklisted / put on holiday list of any Central /State Department, PSU's and Major Institutional / Industrial establishments		
All the documents furnished are readable / legible.		Please ensure filling the tender in readable / legible form.
Original tender / Bidding document submitted		Please submit the complete tender document.
Validity of offer up to 60 days from the date of opening of Price bid.		Please certify

<p>All documents submitted signed on each page by authorized person.</p>		<p>Please ensure : signing of each page of tender.</p>
<p>All corrections properly attested by the person signing the bid.</p>		<p>Please ensure : signing the correction, if any.</p>

Name & Signature of Bidder

PERFORMANCE BANK GUARANTEE

Bank Guarantee No. ___ dated ___

MMTC Limited

Dear Sirs,

1. WHEREAS, MMTC Limited, having its registered office at Core - 1, SCOPE Complex, 7, Institutional area, Lodhi Road, New Delhi - 110003 India (hereinafter called 'the MMTC') have entered into Contract No. ___ dated ___ (herein after called 'the CONTRACT') for _____ with M/s. (name)_____ address _____ (hereinafter called the 'XX').
2. AND WHEREAS the 'XX' under the CONTRACT is required to furnish a Security for the performance of the CONTRACT and MMTC has agreed to accept the Bank Guarantee in lieu of security deposit of the said sum of Rs. _____
3. AND WHEREAS at the request of the 'XX', we, _____ Bank, _____(address), hereby irrevocably and unconditionally guarantee and undertake to pay to the MMTC, immediately on demand up to and not exceeding the sum of Rs. ___ payable by the 'XX' in the event of failing to perform any or all their obligations under the CONTRACT. The decision of the MMTC that the 'XX' has failed to perform all or any of its obligations under the CONTRACT shall be conclusive, final and binding on us.
4. We, _____ Bank, undertake to pay the amount demanded by the MMTC not exceeding the sum of Rs. _____ only without any demur, delay, protest and without any reference or recourse to the 'XX' notwithstanding any dispute raised by 'XX' in any suit proceedings relating there to pending before any court or tribunal our liability under these presents being absolute and unequivocal. The payment shall be made to the MMTC across the Counter of the bank on the same day of receipt of invocation of this Bank Guarantee.
5. NOTWITHSTANDING anything to the contrary contained hereinabove, liability under the Guarantee is restricted to Rs. _____. Our Guarantee shall remain in force until ____ (___date).

6. All your rights under the Guarantee shall be forfeited and we shall be relieved and discharged from all liability there under unless a claim under the Guarantee is made on our Bank in writing on or before____(Expiry date).
7. Your letter of Demand in writing may be presented to the Bank by Registered Post or in person and the same shall be binding on us.
8. This guarantee comes into force forthwith.
9. We further agree that MMTC shall have the fullest liberty without our consent and without effecting in any manner, our obligations hereunder to vary any of the terms and conditions of the delivery or extend time of performance by the said "XX" from time to time or to postpone for any time or from time to time, any of the powers exercisable by MMTC against the said "XX" and to forbear or enforce any part of the terms and conditions relating to the said CONTRACT and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said M/s "XX".
10. The liability of the Bank under this Guarantee shall be discharged on receipt of Rs. ____ only by MMTC.
11. We _____ (Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of MMTC Limited in writing.
12. This guarantee will not be discharged due to change in the constitution of the Bank or the said 'XX'.
13. We have the power to issue this Guarantee in your favour under the Charter of our Bank and the undersigned has full power to execute this Guarantee under the Power of Attorney granted to him by the Bank.

SIGNED AND DELIVERED THIS ____ DAY OF _____

Yours faithfully
For and on behalf of
____ Bank
(Address)

(Banker's Seal)

PART-II

FINANCIAL BID

E-NIT FOR STRUCTURAL REPAIRING/ RETROFITTING WORK OF OVER HEAD WATER TANK IN MMTC HOUSING COLONY, ADHICHINI, NEW DELHI - 110017

-

MMTC/Estate/Over Head Water Tank/18-19

Dated: 16.01.2019

Item No.	Description	Qty	Unit	Amount
A	Preparatory & Enabling Work			
A1	Providing and fixing double scaffolding system (cup lock type) on the exterior side, up to seven story height made with 40 mm dia M.S. tube 1.5 m centre to centre, horizontal & vertical tubes joining with cup & lock system with M.S. tubes, M.S. tube chollies, M.S. clamps and M.S. staircase system in the scaffolding for working platform etc. and maintaining it in a serviceable condition for the required duration as approved and removing it thereafter .The scaffolding system shall be stiffened with bracings, runners, connection with the building etc wherever required for inspection of work at required locations with essential safety features for the workmen etc. complete as per directions and approval of Engineer in-charge .The elevational area of the scaffolding shall be measured for payment purpose .The payment will be made once irrespective of duration of scaffolding.	1281.77	Sqm.	
A2	Providing, erecting, maintaining and removing temporary protective barricading/screens of 1.8 m in height made in panels with each panel having minimum 40x40x6 mm size MS angle frame with minimum 24 gauge thick G.I corrugated sheet or suitably stiffened plane G I sheet fixed on one side of the frame. Such panels shall be interconnected to each other with nuts and bolts, fixed to ground firmly, at about 2 m spacing for the work duration as required by the Engineer in charge. (The rate shall cover applying at least one coat of paint of desired shade over existing paint or red-oxide zinc chromate primer).	91.61	Sqm.	

A3	Providing and erecting external safety Net or opening 75x75 in addition vertical fisher net arrester on the first floor or vertically throughout to prevent debries failling while execution of work to hold / absorb the debries stone impact and during the entire period of work. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor and removing after completion after complete work. etc. complete.	1281.77	Sqm.	
A4	Providing, erecting, maintaining and removing temporary protective screens made out of specified fabric with all necessary fixing arrangement to ensure that it remains in position for the work duration as required by the Engineer-in-charge.	1281.77	Sqm.	
B.DISMANTLING & DEMOLISHING				
B5	Carefully tapping with light hammer the hollowness/ De-bonded plaster and chipping the same with chisel after demarking and cutting the boundary grooves by electric cutting machine including removal of debris	20.88	Cum	
B6	Breaking carefully the loose concrete of distressed member without damaging existing stornng concrete by means of sharp means of sharp means of sharp chisslewhich should tempred regularly of high frequancy low impact hammer is used, cleaning the surface by water jet pressure pump at 4 to 5 kg/ sqcm pressure to remove chlorides and loose particles, air drying the surface etc. The work should be carried out with all the safety measures like helmet , safety belt and adequate labour insurance under the supervision of qualified supervisor. (The damaged ceiling / concrete will be measured) etc... complete	879.51	Sqm	
B7	Demolishing cement concrete manually/ by mechanical means including disposal of unserviceable material within premises at a suitable stacking location at ground level including all lead & lifts as per direction of Engineer-incharge without disturbing the other structural elements.	1	Cum	
C	STRUCTURAL REPAIR WORKS			
C8	Cleaning the existing reinforcement with hammer tapping and wire Brush/ rotary wire brush , fixed to hand drill machine, making the surfaces free form loose corrosion material, dirt scalling etc. complete. Applying two coats of polymer based alkaline rust converting primer confirming to ASTM-B 117 by means of paint	527.71	Sqm.	

	brush, liberally all over in two coats of 1 hour between the coats, The product should convert the rust into a stable organo metallic complex molecule layer, this should also act as primer for further treatment of steel etc. complete. The work should be carried out with all the safety belt and adequate labour insurance under the supervision of a qualified supervisor. (The damage ceiling/ concrete all be measured) etc. complete.			
C9	Anticorrosive treatment to Reinforcement application of two coats of IPNETRB (CBRI known how) on exposed reinforcement in two coats with time intervals of minimum 4 hours between each coat. The application shall be by brush, Application is allowed to dry for further treatment. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of a qualified supervisor. (The damage ceiling / concrete all be measured) etc. complete.	527.71	Sqm.	
C10	Providing and applying two coats of concrete penetrating hi-tech corrosion inhibition mechanism inhibits corrosion of steel in concrete at the poles, cathode & anodic simultaneously on concrete surface which is prepared earlier. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of a qualified supervisor. (The damage ceiling/ concrete all be measured) etc. complete.	351.81	Sqm.	
C11	Providing encasement to columns/beams/pardi etc. with free flow high strength non shrink micro concrete M-35 using single component cement micro concrete shrinkage components and added with 100% by weight saturated dry stone aggregate, water cement ratio shall be maintained properly as per manufacturer's specifications to achieve dense solid mass, prepared micro concrete shall be poured properly as per in prefixed holding boards slurry tight formwork properly aligned to required size and shape and well oiled air bubbles, if any shall be removed by tapping the boards, removing the boards after 24 hours and curing the micro concrete thoroughly for 14 days cost inclusive of shuttering, curing etc. complete. (Excluding reinforcement and preparation of damaged surface).	19789.03	kg.	

C12	Making up lost section of concrete / mortar with thixotropic repair mortar is one component thixotropic dual shrinkage compensated fiber reinforcement formulation for structural members. Build up section by hand packing as per manufacturers specification , applied by mean of hand glouse by expert applicator, the rehabilitated surface should be free from air gaps, voids should be in line with existing requiried line and line with existing surface, including curing, cleaning the area etc. complete. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualifed supervisor etc. complete.	12368.15	kg.	
C13	Providing and applying 15 mm thick polymer mortar to load carrying R.C.C member in two layers in proportion of 1:5:15 by weight polymer of approved quality and make, cement and wash quartz sand with required W.C. ratio for desired floating, curing after initial setting time etc. complete.	439.76	Sqm.	
C14	Providing and Fixng Shear connectors of 8mm dia. HYSD steel with two component, styrene & cement free, epoxy-acrylate fixing and anchoring compound supplied in self mixing Cylinder-in-cartridge form that avoids site mixing using standard sealant applicator gun after drilling holes of 12mm diameter to a minimum depth of 100mm at required locations, inclusive of all material, manpower and equipment.	880.00	Nos.	
C15	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level.	879.51	kg.	
C16	Providing and applying approved epoxy resin EPI Bond of Krishna conchem or equivalent before polymer plaster/ concrete to have the perfect bond between old concrete and new concrete/ polymer plaster surface confirming to ASTM-C- 882-87 using nylon brushes scaffolding labour etc. complete.	439.76	Sqm.	

C17	Drilling and fixing Teflon perforated nozzles in RCC member, including drilling 14 mm dia. 50to 100mm deep holes in structural members at in cle the intervals of 600 mm in staggared manner of as directed by the consultants in RCC structural elements. Clean the holes by air blower prior to fixing nozzles. fixing of nozzels in cleaned holes. external end of nozzles to be machined to receive outlet of grouting gun. nozzel is fixed by means of epoxy by means of epoxy sealent to ensure complete sealing . cure the system for min. 12 hours. the work should be be carried out with all the safety measures like like helmet, safety belt and adequate labour insurance under the supervision of qualifed supervisor. etc complete	1760.00	Nos.	
C18	Injecting low viscosity garde epoxy grout by pressure by epoxy or grouting pump and compressor. Mixing :- Materail components DR BECK 505C + EK 411 HARDNER + SOLVENT 100:50:50 weight batching. Grouting:- fill the grouting gun with resinmix, maintain disered pressure at exit (7 to 10 kg /Cm 2) by monitoring presure gauge at exit . Grout the material through prefixed nozzles in the structural elements till its refusal. seal the nozzel with epoxy sealent (EPCO 10 10) after the refusal . Moniitor lakages through other nozzles while grouting and sael them as per the requirement. Repeat the process all the nozzels. complete the poeration at pot life of material , grouting is continued to all the nozzles from bottom to top and not from top to bottom . cleaning the gun and accessories:- clean the gun ans accessories (Valves, pipes and other fixtures) with T- 60 thiner/ or equivellent of dr. fixit , krishna chemical, sunanda etc. The work should be helmet , safety belt and adequate labour insurance under the supervision of qualified supervisor etc. complete.	176.00	Kg.	
C19	Providing and applying protective coating to inside surfaces of water tanks with food grade epoxy stearate coating. Application of food grade epoxy stearate coating confirming to CFTRI & Haffkins certifications in two coats etc complete as per direction of Engineer in charge	257.22	Nos	
C20	Drilling and fixing 8mm,10mm,12mm,16mm, re-bars with 'Fischer/Hilti' system and chemical, etc. Steel to be paid separately.			
(i)	12mm dia bars	88.00	Nos.	
(ii)	10mm dia bars	44.00	Nos.	
C21	Providing and applying Heavy Duty Acrylic Elastomeric decorative Exterior Waterproof & Protective coating at all height with carbon resistant property of approved brand and shade composed of high quality acrylic	1954.47	Sqm	

	emulsion polymer in approved shade to be applied in following stages with Five monsoon period guarantee			
D	FINISHING& MISC. WORKS			
D 22	Removing any kind of debris including loading in truck and conveying day to day basis to approved dumping point i.e @ urban / industry loading spreading etc. complete with all leads and lifts (lead 52 km).	11.00	Trip	
D 23	Third party supervision of retrofitting works to ensure execution of work strictly as per specifications as detailed in the CPWD specifications and/or nomenclature of the items to ensure quality execution of works as per sound engineering practices including quality control, third party accreditation of work executed from ISO accredited agencies in the field of retrofitting works and providing guarantee bond for longevity of the finished work (Retrofitting) as envisaged in the structural audit report/scope of work as per the directions of Engineer-in-charge/designated officer of MMTC.	LS	One Job	
	GRAND TOTAL			

Note: 1. GST will be paid extra as per prevailing norms on producing the original Challan for payment made to the GOI against the said tax.