

# **Foundation for Innovation and Technology Transfer**

**(FITT)**

**REF: FT/2024/05/02**

**Date: May 20, 2024**

## **Notice Inviting Quotation**

### **Technical Specifications for Field-scale chemical, mechanical and corrosion tests on structural members of a building**

<b>Sl. No.</b>	<b>Technical Specifications</b>	<b>Quantity/No. of Measurements</b>
<b>1</b>	Measurement of the pH of the concrete on 2 beams/slabs, and 2 columns on each floor of two buildings (total six floors) as per relevant B.S. 5328, ACI 201.2R-92 and ACI-318-99, IS 456:2000, BS 8110.	<b>48</b>
<b>2</b>	Measurement of the Water Soluble Chloride Content in the concrete, as kg per m <sup>3</sup> of concrete, on 2 beams/slabs, and 2 columns on each floor of two buildings to check the risk of corrosion due to present chloride % as per IS: 14959 (Part 2) – 2001, B.S. 5328 Part 1, ACI 201.2R-92, BS 1881 Part 124:1988, BS 8110, IS 456:2000. Also, estimation chloride content/intrusion along cover depth.	<b>48</b>
<b>3</b>	Measurement of the carbonation depth in 2 beams/slabs, and 2 columns on each floor of two buildings to study to see the depth of carbonation as per BS EN 14630:2006, BS EN 13295:2004. The ration of Carbonation depth to cover depth is also to be measured at the same locations.	<b>48</b>
<b>4.</b>	Measurement of Ultrasonic Pulse Velocity on beams/slabs, and columns on each floor of two buildings to indirectly estimate the quality and uniformity of concrete as per IS 13311 (Part-1)-1992, ASTM: C597-83, BS 6089: 1981 and BS 1881: Part 203 and BS EN: 13791; also establishing correlation chart between USPV and other confirmatory test for having estimated in-situ strength of concrete if required.	<b>24</b>
<b>5</b>	Measurement of core concrete strength in 2 beams/slabs, and 2 columns of two buildings by Core Extraction and Testing: Extracting the concrete core samples following the codal provisions; and evaluating the properties (fck value, grade of concrete) in the laboratory from the core samples selected per 456:2000; IS	<b>12</b>

	516:1959, IS 1199:2002; ASTM C-42, without encountering any steel reinforcement from the RCC members covered under the study at specified locations.	
<b>6.</b>	Rebound Hammer Test for determining the estimated compressive strength of concrete and uniformity of concrete in terms of surface hardness as per IS 13311 (Part-2)-1992, ASTM C 805-02, BS 6089:1981 and BS 1881: Part 202, BSEN:13791, also establishing correlation chart between rebound hammer and other confirmatory test for estimated in-situ strength of concrete if required.	<b>24</b>
<b>7</b>	Linear Polarization Test (LPR, Galva Pulse) on 2 beams/slabs, and 2 columns on each floor of two buildings: for analysis of rate of corrosion as well as rate of diameter loss in steel bar due to corrosion in reinforcement as per BRE DIGEST 434.	<b>48</b>
<b>8</b>	Half-cell potential tests in 5 beams/slabs, and 5 columns on each floor of two buildings on RCC members to understand the extent of reinforcement corrosion in terms of probable risk of corrosion of steel bar as per ASTM C876	<b>120</b>
<b>9</b>	Measurement of Resistivity for the determination or estimation of the likelihood of corrosion due to poor quality of concrete, correlation to chloride permeability, determination of zonal requirements for cathodic protection systems, Identification of areas within a structure most susceptible to chloride penetration as per BS EN 12696:2000, RILEM TC-154, AASHTO T277 RCP, AASHTO T259, ASTM C1202 97	<b>120</b>
<b>10</b>	Identification via reconnaissance survey, the appropriate locations for performing the above-mentioned tests through visual inspection for surface damages, cracks, coloration, local weakness, seepage and their damage classifications using a digital camera, magnifying glass, etc.	-
<b>11</b>	Report submission with Interpretation and Recommendation: Preparing and submitting comprehensive report consisting of findings from visual inspection, test data, interpretation of results, conclusions and final repair recommendations along with sketch indicating the location of the test.	-

## **Para 1: Terms and conditions**

**1.1.** Delivery/Execution Period will be 6 weeks from the date of issue of the work-order.

**1.2.** The vendor must have carried out at least 5 similar jobs with all the above listed tests during the last 3 years for Government of India agencies and/or PSUs and/or autonomous agencies under central or state governments. Copies of relevant work orders should be enclosed.

- 1.3.** Consultant/Vendor must be registered and empaneled with any government department for Structural audit or Structural Stability of Structure. Empanelment certificate to be upload along with tender. Proper vendor registration certificate will be considered, and work order or work completion will not be considered.
- 1.4.** Consultant/Vendor must have at least 15 years' experience in a similar type of work. Incorporation certificate to be submitted.
- 1.5.** Consultant/Vendor must have their own equipment in good working condition to perform the aforementioned tests. Self-attested copies of ownership proofs to be provided.
- 1.6.** Consultant/Vendor must submit a copy of legal valid entity either in the form of a Limited Company or a Private Limited Company registered under the Companies Act, 1956. Bidder in the form of JV/consortium, Proprietorship, and Partnership is not permitted. Proof for supporting the legal validity of the Bidder shall be submitted.
- 1.7.** To ensure a timely delivery of the work, Delhi/NCR based Consultant/Vendor will be given preference. GST details and local address proofs are to be submitted for the same.
- 1.8.** Appropriate staging / scaffolding, ladder, boomer lift or equivalent approaching system at required locations will be provided by the bidder without compromising safety.
- 1.9.** After the completion of the tests, restoration of the chipped/cored area (by micro-concreting or other measures) to the initial condition is in the scope of the Consultant/Vendor. Removal of the plaster/surface cover for the required tests is also in the scope of the Consultant/Vendor.
- 1.10.** The vendor shall be responsible for clearing all debris/malba from the site after each day of work.

### Compliance Sheet

Sl. No.	Technical Specifications	Quantity/No. of Measurements	Compliance Yes/No
<b>1</b>	Measurement of the pH of the concrete on 2 beams/slabs, and 2 columns on each floor of two buildings (total six floors) as per relevant B.S. 5328, ACI 201.2R-92 and ACI-318-99, IS 456:2000, BS 8110.	<b>48</b>	
<b>2</b>	Measurement of the Water Soluble Chloride Content in the concrete, as kg per m <sup>3</sup> of concrete, on 2 beams/slabs, and 2 columns on each floor of two buildings to check the risk of corrosion due to present chloride % as per IS: 14959 (Part 2) – 2001, B.S. 5328 Part 1, ACI 201.2R-92, BS 1881 Part 124:1988, BS 8110, IS 456:2000. Also, estimation chloride content/intrusion along cover depth.	<b>48</b>	
<b>3</b>	Measurement of the carbonation depth in 2 beams/slabs, and 2 columns on each floor of two buildings to study to see the depth of carbonation as per BS EN 14630:2006, BS EN 13295:2004. The ration of Carbonation depth to cover depth is also to be measured at the same locations.	<b>48</b>	
<b>4.</b>	Measurement of Ultrasonic Pulse Velocity on beams/slabs, and columns on each floor of two buildings to indirectly estimate the quality and uniformity of concrete as per IS 13311 (Part-1)-1992, ASTM: C597-83, BS 6089: 1981 and BS 1881: Part 203 and BS EN: 13791; also establishing correlation chart between USPV and other confirmatory test for having estimated in-situ strength of concrete if required.	<b>24</b>	
<b>5</b>	Measurement of core concrete strength in 2 beams/slabs, and 2 columns of two buildings by Core Extraction and Testing: Extracting the concrete core samples following the codal provisions; and evaluating the properties (fck value, grade of concrete) in the laboratory from the core samples selected per 456:2000; IS 516:1959, IS 1199:2002; ASTM C-42, without encountering any steel reinforcement from the RCC members covered under the study at specified locations.	<b>12</b>	
<b>6.</b>	Rebound Hammer Test for determining the estimated compressive strength of concrete and uniformity of concrete in terms of surface hardness as per IS 13311 (Part-2)-1992, ASTM C 805-02, BS 6089:1981 and BS 1881: Part 202, BSEN:13791, also establishing	<b>24</b>	

	correlation chart between rebound hammer and other confirmatory test for estimated in-situ strength of concrete if required.		
<b>7</b>	Linear Polarization Test (LPR, Galva Pulse) on 2 beams/slabs, and 2 columns on each floor of two buildings: for analysis of rate of corrosion as well as rate of diameter loss in steel bar due to corrosion in reinforcement as per BRE DIGEST 434.	<b>48</b>	
<b>8</b>	Half-cell potential tests in 5 beams/slabs, and 5 columns on each floor of two buildings on RCC members to understand the extent of reinforcement corrosion in terms of probable risk of corrosion of steel bar as per ASTM C876	<b>120</b>	
<b>9</b>	Measurement of Resistivity for the determination or estimation of the likelihood of rebar corrosion due to poor quality of concrete, correlation to chloride permeability, determination of zonal requirements for cathodic protection systems, Identification of areas within a structure most susceptible to chloride penetration as per BS EN 12696:2000, RILEM TC-154, AASHTO T277 RCP, AASHTO T259, ASTM C1202 97	<b>120</b>	
<b>10</b>	Identification via reconnaissance survey, the appropriate locations for performing the above-mentioned tests through visual inspection for surface damages, cracks, coloration, local weakness, seepage and their damage classifications using a digital camera, magnifying glass, etc.	-	
<b>11</b>	Report submission with Interpretation and Recommendation: Preparing and submitting comprehensive report consisting of findings from visual inspection, test data, interpretation of results, conclusions and final repair recommendations along with sketch indicating the location of the test.	-	

### **Submission Requirements:-**

Interested companies or individuals should submit their proposals by **03-06-2024 (5 pm)** .

Proposals should include:

- Worker profiles highlighting qualifications, experience, and expertise
- Adherence to the terms and conditions
- Cost breakdown including any additional expenses.

## **Evaluation Criteria:-**

Proposals will be evaluated based on:

- Qualifications, expertise, and experience of the workers, and the terms and conditions.
- Alignment with the project's objectives and requirements.
- Cost-effectiveness and value for the proposed work.
- Previous delivery by company for similar projects earlier.

**Two separate sealed envelopes to be submitted for technical and financial bid (clearly labelled as “technical bid” and “financial bid”) respectively.**

**Last date of submitting the bids will be 03-06-2024 by 5 pm\_\_\_\_\_**

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## **General Tender Terms & Conditions:**

01	Please quote prices for FOB New Delhi, inclusive of all taxes and duties.
02	Quote should be in Indian Rupees for agents of Indian manufacturers, or in foreign currency, for agents of foreign manufacturers, and needs to be valid for at least three months.
03	Attach all the technical literature and a list of similar installations done in India per the given terms
04	Mode of payment for purchases in foreign currency through wire transfer on delivery. Only bank charges within India are payable by FITT, IIT Delhi, all bank charges outside India are the responsibility of the seller. For purchases in INR, payment is on delivery.
05	<b>Two separate sealed envelopes to be submitted for technical and financial bid (clearly labelled as “technical bid” and “financial bid”) respectively.</b>
06	<b>Due date:</b> The tender has to be submitted off-line before the due date. The offers received after the due date and time will not be considered.
07	<b>Preparation of Bids:</b> The offer/bid should be submitted in two bid systems i.e. Technical bid and Financial bid. The Technical bid should consist of all technical details along with

	<p>commercial terms and conditions. Financial bid should indicate item wise price for the items mentioned in the technical bid.</p> <p>Note: -Comparison of prices will be done ONLY on the bids submitted for the Main Equipment/Technical specifications and anything asked as ‘Optional’ in the specs is not to be included for overall comparison.</p>
08	<p><b>Acceptance/ Rejection of bids:</b> The Committee reserves the right to reject any or all offers without assigning any reason.</p>
09	<p><b>Pre-qualification criteria:</b></p> <p>(i) The terms and conditions mentioned in PARA 1 along with the technical specifications. Documents indicating the same shall be enclosed.</p> <p>(ii) Bidders should attach self-attested copies of proof of ownership of equipment. This may be in the form of original payment receipts, AMC contracts, etc. issued either by the OEM themselves or their authorized vendors.</p> <p>(iii) Non-compliance of tender terms, non-submission of required documents, lack of clarity of the specifications, contradiction between bidder specification and supporting documents etc. may lead to rejection of the bid.</p> <p>(iv) The vendor must have carried out at least 5 similar jobs with all the above listed tests during the last 3 years for Government of India agencies and/or PSUs and/or autonomous agencies under central or state governments. Copies of relevant work orders should be enclosed.</p>