

Shivam Concrete Technology &
Consultancy Pvt. Ltd
(An ISO 9001:2008 Company)

Necessity of Repair and Rehabilitation Of Bridges for BOT Project

A One Stop Solution Provider
For Enhancement of
Serviceability and Life of Structure

Vision & Mission

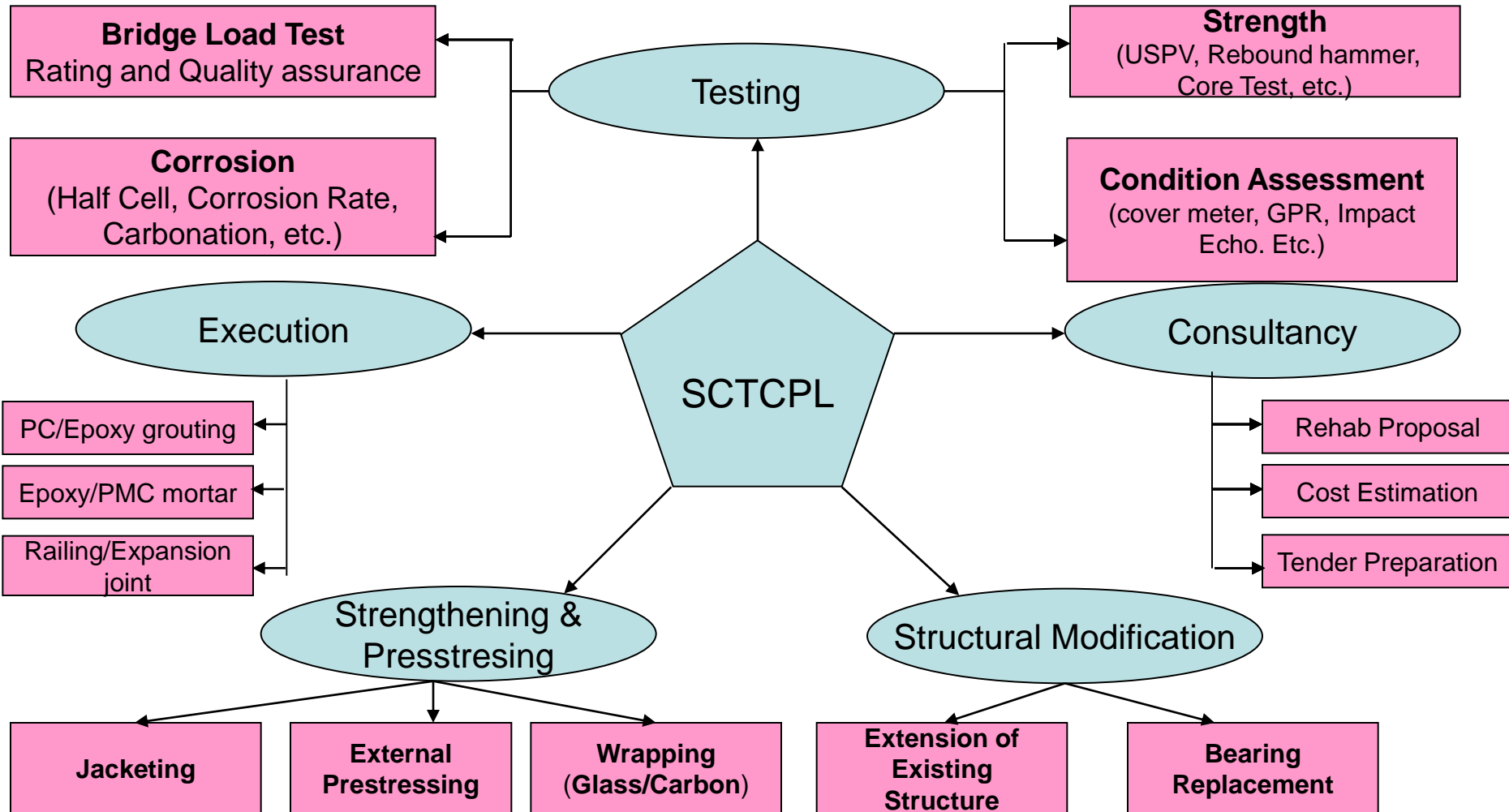
Vision:

To be a leader in providing all possible solution in field of Enhancing Serviceability and Life for all type of structures

Mission:

To satisfy client by providing effective solutions through continuous innovative and faster (In – time) execution of project through strong planning AND being quality conscious

Services Offered



Projects Completed (Rehab)

- **Bharuch – Surat Section, NH 8**
Strengthening and rehabilitation of various bridges for IRB
- **Palanpur to Swaroopganj Section, NH14**
Strengthening and rehabilitation of various bridges for L&T
- **East West Corridor, Package VI**
Rehabilitation of various bridges for DIC – NCC Joint Venture
- **East West Corridor, Package V**
Rehabilitation of various bridges for Jilin - Sadbhav Joint Venture
- **East West Corridor, Package III**
Rehabilitation of various minor bridges for DIC – NCC Joint Venture
- **Surat Manor Tollway project, Package I**
Repair of bridges (Wanki, Bam, Mirchholi, Kha, Rayam, Mindhola, Kaveri, Kharera & Ambica) for Dodsai Private Ltd
- **Surat Manor Tollway project, Package II**
Repair and rehabilitation of existing bridges for LG E&C – Patel (J/V)

Projects Completed (Rehab)

- Repair & Rehabilitation work of existing Tapi River Bridge for UP State Bridge Corporation Ltd
- Public Works Department Gujarat State
 1. Flyover to Petrochemical from NH 8 near village Ranoli (Vadodara R&B Department)
 2. Purna River Bridge (Navsari R&B Department)
 3. Auranga River Bridge (Navsari R&B Department)
 4. Tan River Bridge (Navsari R&B Department)
 5. Zerva River Bridge (Vadodara R&B Department)
 6. Aani River Bridge (Vadodara R&B Department)
 7. Orsang River Bridge (Vadodara R&B Department)
 8. Various aquaducts on Ukai & Damang ganga L.B.M.C
 9. Special Repairs to Earthquake affected buildings (Bhuj, Ahmedabad & Bhachau) for Garrison Engineers, Indian Army

Need of Repair & Rehabilitation

- To Sustain bridge for remaining life of BOT project
- Enabling smooth flow of traffic
- To Reduce Total Cost of Ownership (by reducing overall maintenance during life of BOT)
- To Avoid Mishap
- To Reduce Closure of Traffic movement

Factors Leading to Repairs/Rehabilitation

- Lapse during Construction of Bridge
- Wear & Tear .i.e. effect of Aging
- Unattended minor repair i.e. Poor Maintenance
- Damages due to wrong selection of type of repair/rehabilitation method
- Faulty Design
- Damages due to excess loading
- Damage due to Accident

Factors Leading to Repairs/Rehabilitation

- Lapse during Construction of Bridge



Damages due to insufficient expansion joint gap

Factors Leading to Repairs/Rehabilitation

- Lapse in Construction of Bridge



Damages due to wrong placement of Bearings

Factors Leading to Repairs/Rehabilitation

- Wear & Tear .i.e. effect of Aging



Damages of Old Tapi Bridge

Factors Leading to Repairs/Rehabilitation

- Wear & Tear .i.e. effect of Aging



Damages of Old Tapi Bridge

Factors Leading to Repairs/Rehabilitation

- Wear & Tear .i.e. effect of Aging



Damages of Banas Bridge

Factors Leading of Repairs

- Unattended minor repair i.e. Poor Maintenance



Factors Leading to Repairs/Rehabilitation

- Unattended minor repair i.e. Poor Maintenance



Factors Leading to Repairs/Rehabilitation

- Damages due to wrong selection of type of repair/rehabilitation



Factors Leading to Repairs/Rehabilitation

- Damages due to wrong selection of type of repair/rehabilitation



How to Avoid Major Repairs/Rehabilitation

- Taking due care during construction
- Carrying out regular Inspection
- Carrying out repair and rehabilitation initial stage of problem (however the choice of repair/ rehabilitation method shall be conform with expert)
- Testing of inventories of bridges on regular interval
- Consulting the experts before undertaking major repairs and rehabilitation

How to Avoid Major Repairs/Rehabilitation

- Regular Inspection: It shall be carried out once a month or two months.

Following information shall be collected:

- Cracking, Spalling, honeycombing, leaching, loss of material or lamination of concrete members in superstructure, substructure and foundations
- Corrosion of Reinforcement, exposure of reinforcement, corrosion in prestress cable, or structural component
- Settlement, deformation or rotation, instability of structure
- In-situ strength of concrete
- Scouring at foundation
- Condition of expansion joints, bearings

How to Avoid Major Repairs/Rehabilitation

- Testing: testing shall be carried out time to time or when there is doubt regarding structure. Following tests are available:
 - Assessing Strength of concrete: Concrete Core Cutting, Rebound Hammer, Capo
 - Assessing Quality of Concrete: Ultrasonic Pulse Velocity, Ground Penetrating Radar, Impact Echo, Acoustic Emission, Radiography, X – Ray
 - Assessing Corrosion: Half Cell Potential, Carbonation Depth, Chloride Content, PH Value, Covermeter

Structural Repairs

Repair Techniques

- ❖ Replacement of structural components
- ❖ Pressure injection Grouting
- ❖ Polymer Modified Cement Mortar
- ❖ Concrete Overlays
- ❖ Structural upgrades
- ❖ Corrosion mitigation
- ❖ Wrapping

Repair Materials

- ❖ Cementitious grouts
- ❖ Chemical Grout (Epoxy, etc.)
- ❖ Fibre (Glass/Carbon) wrap
- ❖ Sealants
- ❖ Membranes
- ❖ Corrosion Inhibitors
- ❖ Protective Coatings



THANK YOU