

Introduction

TCR Advanced Engineering Private Limited was established in 1999 to provide credible solutions that ensured uninterrupted operation of assets, improved productivity and enhanced safety in compliance with all Quality, Safety & Environmental standards. Located in Vadodara, Gujarat.



TCR Advanced aims to be the best at all that they do -- the goal is to make a positive difference, help clients overcome their challenges, and maximize their success. TCR Advanced has successfully conducted over 8500 investigations and has served over 2000 clients nationally and globally. TCR enables companies across the globe to efficiently manage plant operations and optimize asset integrity. TCR continuously provides innovative solutions that help its clients create an advantage from every opportunity.

TCR Advanced is a renowned leader in advanced technologies, consistently solving critical corrosion and metallurgical challenges for organizations worldwide. With extensive expertise in corrosion, metallurgy, and advisory services, our team has gained profound insights from tackling unique and complex projects. This vast knowledge positions us to effectively address the

increasing demand for innovation in cathodic protection. Building on our technical excellence, we are proud to introduce **TCR Cathodic Protection Solutions**, a dedicated division focused on providing advanced cathodic protection services and solutions. This expansion enables us to deliver world-class corrosion protection systems while also nurturing the next generation of industry professionals.

Why Choose TCR Advanced Cathodic Protection System**1. Unmatched Specialization**

- We focus exclusively on Metallurgy, Corrosion, and Asset Integrity, ensuring unparalleled expertise in these critical domains.

2. Engaged Leadership

- Our senior management is directly involved in the technical and project management processes, ensuring seamless execution and high-quality outcomes.

3. Highly Qualified Team

- Our team comprises seasoned Metallurgists and certified engineers (AMPP, ASME, ASNT, ISO, etc.), bringing specialized knowledge and skills to every project.

4. State-of-the-Art Facilities

- We operate India's largest and only NABL-certified metallurgical testing laboratory, equipped with cutting-edge testing technology to deliver precise, reliable results.

5. Commitment to Timely Execution

- A dedicated, results-driven team focused on the timely completion of projects, always adhering to client specifications and timelines.

6. Proven Track Record of Excellence

- With over 25 years of experience and more than 8,000 successfully completed projects, we have established a diverse and loyal client base, consistently earning appreciation for our exceptional work.

Services we Provide

TCR Cathodic Protection Solutions offers a wide range of specialized services to ensure the integrity and longevity of assets exposed to corrosive environments. Our cathodic protection services are designed to prevent corrosion, safeguard infrastructure, and enhance operational efficiency across various industries. Some of the key services we provide include:

1. Design and Engineering of Cathodic Protection Systems

Customized solutions for pipelines, tanks, vessels, mounded bullets, jetties, offshore platforms and other critical infrastructure, designed to meet industry standards and project-specific requirements.

2. Material Supply for Cathodic Protection Systems

We supply high-quality materials required for cathodic protection systems in accordance with the approved Bill of Quantities (BOQ) and the Client's approved vendor list.

Our range of materials includes:

1. Power Supply & Protection Equipment

1. Transformer Rectifier Units
2. Cathodic Protection Power Supply Modules (CPPSM Units)
3. Solid-State Polarization Cells
4. Spark Gap Arrestors



2. Junction & Monitoring Boxes

1. Test Stations
2. Anode & Cathodic Junction Boxes
3. Monitoring Boxes & Bond Boxes
4. Test Stations for Polarization Cell Installation



3. Anodes for Cathodic Protection

1. Sacrificial Anodes



1. (Magnesium,
2. Zinc, and
3. Aluminium
4. Ribbon Anodes (Mg & Zn)

Notes: available in all sizes and shapes



2. ICCP Anodes



1. IMMO Rod Anodes, IMMO Tubular Anodes, IMMO Ribbon IMMO Wire Anodes, Piggyback Anodes, etc.
2. High Silicon Chromium Iron Anodes
3. Graphite Anodes

Notes: available in all sizes and shapes



4. Cabling & Accessories

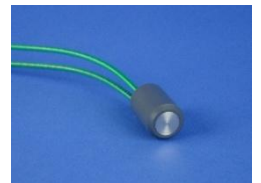


1. Cables (All sizes required for cathodic protection installations)
2. Cad Weld & Pin Brazing Materials
3. Coating Repair Materials, Warning tapes, Glands, Lugs, etc.



5. Monitoring Equipments

1. Potable Reference electrode (Zn ZnSO₄, Cu CuSO₄, Ag AgCl)
2. Permanent Reference Electrode (Zn ZnSO₄, Cu CuSO₄, Ag AgCl)
3. Corrosion Coupon
4. Polarization Coupon
5. Er Probes & Computerise Test Stations &
6. Facilities for Remote Monitoring of CP Parameters.



We ensure that all supplied materials meet industry standards and project specifications, providing reliable solutions for effective cathodic protection.

3. Installation and Commissioning

Professional installation of cathodic protection systems, our Installation Team is cable of carrying out complex installation such as Jetty Steel Pile CP Installation, all type of Anodes bed like Shallow Horizontal, Shallow Vertical & Deep well Anode bed, Installation of Anodes for Tank Bottom & Tank Internals, Installation of Various type of Test Station, Bond Boxes, Junction

Boxes, etc. Installation of CP TR units, CPPSM Units, Installation of Solar System, Battery bank Back up, etc and ensuring optimal performance from the outset, with commissioning services to verify system integrity.

4. **Inspection and Maintenance**

Regular inspections and preventive maintenance to assess the effectiveness of cathodic protection systems and ensure long-term corrosion control.

5. **Cathodic Protection System Monitoring and Data Analysis**

Continuous monitoring of cathodic protection systems through advanced techniques, providing real-time data and analysis to optimize system performance.

6. **Corrosion Assessment and Surveys**

Detailed corrosion assessments and coating integrity surveys, including potential, polarization, PCM, CIPS, CAT & DCVG surveys, to evaluate corrosion risk as well as coating integrity and determine the best protection methods.

7. **Troubleshooting and Repairs**

Expert troubleshooting of malfunctioning cathodic protection systems, with prompt and efficient repairs to restore proper function.

8. **Retrofitting and Upgrades**

Retrofitting of existing systems with the latest technology and upgrades to improve performance, extend service life, and meet evolving industry standards.

9. **Training and Consultation**

Specialized training for your team on cathodic protection systems and corrosion control practices, along with consultation services to optimize your corrosion management strategy.

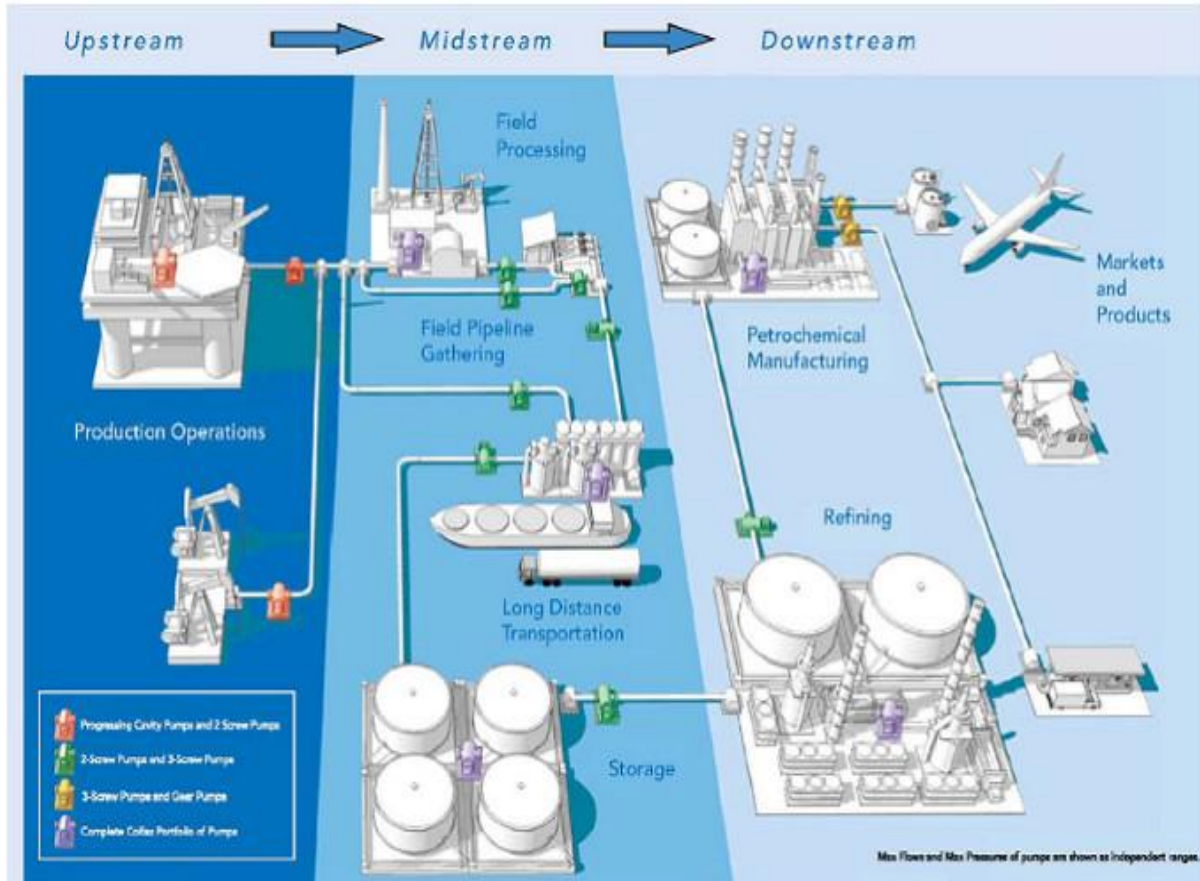
10. **Project Management and Compliance**

End-to-end project management (EPIC basis), ensuring timely delivery of cathodic protection systems in compliance with all regulatory and industry standards.

By leveraging our expertise and industry-leading solutions, TCR Cathodic Protection Solutions helps organizations safeguard their assets and achieve long-term protection from corrosion.

Industry we cater

TCR Cathodic Protection Solutions caters to a wide range of industries that require reliable and effective corrosion protection for their critical infrastructure. Our expertise in cathodic protection extends across various sectors, where corrosion poses significant risks to the longevity and safety of assets. The key industries we serve include:



1. Oil & Gas Industries

Offshore platforms, Subsea Pipelines, Well Heads, Cross Country Pipelines, Storage Tanks, Vessels, Mounded Bullets & Plant piping are critical to the oil and gas industry, where cathodic protection is essential to prevent corrosion from harsh environments.

2. Refineries, Petrochemical, Fertilizer & Chemical Industries

Refineries, Petrochemical Plant, Fertilizer Plants, Chemical plants, storage tanks, Vessels and piping systems require cathodic protection to shield against the corrosive effects of chemicals and high-pressure environments.

3. Water & Wastewater Treatment Industries

Infrastructure such as **water tanks, sewer systems, and pipelines** require cathodic protection to ensure long-lasting durability and to avoid leaks and structural damage.

4. Marine & Shipping

Ships, offshore rigs, Ports, Jetties and docks rely on cathodic protection to combat corrosion due to exposure to saltwater and other corrosive elements.

5. Power Generation

Power plants, including **nuclear, thermal, and hydroelectric** plants, use cathodic protection to protect critical components such as **cooling towers, turbine condensers & buried or submerged structure** from corrosion.

6. Mining & Metals

Mining equipment, refineries, and processing plants benefit from cathodic protection to protect equipment and pipelines that transport corrosive materials, extending asset life and reducing maintenance costs.

7. Construction & Building

Reinforced concrete structures, such as **foundations, bridges, and tunnels** utilize cathodic protection to prevent the corrosion of steel reinforcement, ensuring durability and safety.

By providing specialized cathodic protection services to these diverse industries, TCR ensures that critical infrastructure remains protected, operational and free from the damaging effects of corrosion.

Our Resources

To deliver high-quality Cathodic Protection (CP) services, TCR Advanced maintains a robust in-house team of experts and specialized equipment.

Expert Team

At TCR Advanced, we take a multidisciplinary approach to Cathodic Protection, integrating expertise from various fields, including corrosion, metallurgy, mechanical and electrical engineering, civil engineering, chemistry, physics, design, project management, inspection, and safety. Our diverse team provides comprehensive insights into corrosion prevention.

Key Experts

- **Paresh Haribhakti** – Metallurgist, RBI & Reliability Specialist
- **Ketan Upadhyay** – Metallurgist & Reliability Specialist (API 571 & ASME FFS-1)
- **Dr. Pandya** – Corrosion Expert
- **Chiral Patel** – Corrosion / Cathodic Protection Expert
- **Gopul Patel** – RBI Expert & API 580 Certified Professional
- **Nikhil Shabaya** – CSWIP 3.1, NDT Expert & API 510, Level 3 NDT Certified Professional
- **Vaibhav Maru** – NDT Expert & Level 3 NDT Certified Professional
- **Hemant Pradhan** – Design Expert
- **Jagdish Baad** – Foundry Expert
- **Prakash Brahmbhatt** – Maintenance Expert

Specialized Cathodic Protection Equipment

Our state-of-the-art equipment ensures precise diagnostics and effective corrosion prevention.

Sr. No.	Equipment Description	Make - Country	Quantity
1	Portable Cu-CuSO ₄ Reference Electrode	Mc Miller / Borin - USA	2
2	Portable Ag-AgCl Reference Electrode	Mc Miller / Borin - USA	2
3	Portable Zn-ZnSO ₄ Reference Electrode	Borin - USA	2
4	High Impedance Multimeter	Rishab / Fluke	1
5	High Impedance Clamp Meter	Rishab / Fluke	1
6	Cable Pipe Locator with A-Frame	Radio Detection	1
7	Holiday Detector	Reputed	1
8	Pin Brazing Machine	Safe Track / BAC	1
9	Cad weld Mold (Horizontal)	Cad weld / Eresco	2
10	Cad weld Mold (Vertical)	Cad weld / Eresco	2
11	GX Data Logger	Mc Miller - USA	1
12	DCVG Survey Equipment	DCVG - UK	1
13	GPS-Based Current Interrupter (40 Amp)	Kriston System	4
14	4-Pin Soil Resistivity Meter	Mc Miller	1
15	Megger	Reputed	1
16	Flange Tester	Mc Miller / Tinker	1

With our expert team and cutting-edge equipments, TCR Advanced is committed to delivering the highest standards in corrosion prevention and Cathodic Protection solutions.



Profile: Chiral Patel

With over 20 years of comprehensive experience in corrosion prevention, I have developed a specialized focus on **Cathodic Protection**, **Corrosion Inhibitors**, and **Protective Coatings**, while contributing to the **Plant and Pipeline Integrity Management System**. Throughout my career, I have had the opportunity to collaborate with leading Oil & Gas PSUs, Petrochemical Plants, Refineries, and prominent consultants in India and Qatar (Middle East).

Academic Qualifications:

- **MBA – Marketing**, B. K. School of Management, Gujarat University, Ahmedabad, India
- **P.G. Certificate – Corrosion Control Engineering**, University of Manchester, Manchester, UK
- **P.G. Diploma – Corrosion Technology**, M.S. University, Vadodara, India
- **B.Sc. - Chemistry**, Sardar Patel University, V.V. Nagar, India

Key Skills and Expertise:

1. **Plant / Pipeline Integrity Management System**: Extensive experience in ensuring the integrity and longevity of plant and pipeline systems.
2. **Cathodic Protection**: Expertise in the **Estimation, Design, Supply, Construction, Testing, Commissioning, Post-Commissioning Survey (CAT, CIPS & DCVG), Operation & Maintenance, Rehabilitations, and Performance Audits** for Cathodic Protection systems.
3. **Corrosion Inhibitors, Scale Inhibitors & Biocides**: In-depth knowledge in the application of corrosion inhibitors, scale inhibitors, and biocides in water treatment for cooling towers, boilers, and chillers.
4. **Protective Coatings & Painting**: Proficient in **surface preparation, application and testing** of protective coatings and paints to prevent corrosion.
5. **Project Management**: Extensive experience in the **full project lifecycle** from initiation to planning, execution, monitoring, controlling, and closing projects efficiently and on time.
6. **QMS, EMS & OHSMS Implementation**: Knowledgeable in implementing **Quality Management Systems (QMS), Environmental Management Systems (EMS), and Occupational Health & Safety Management Systems (OHSMS)** to enhance organizational efficiency and compliance.

Career Summary:

I have a **proven track record** in the design, installation, commissioning, and maintenance of Cathodic Protection systems, ensuring the protection of critical infrastructure in various sectors. Additionally, I have successfully managed complex projects while ensuring the effective application of corrosion inhibitors in industrial water treatment programs and protective coatings in corrosive environments.

As an advocate for **safety** and **quality**, I am committed to the highest standards of performance, compliance, and continuous improvement in every aspect of my work. My expertise in both technical and managerial aspects of corrosion prevention and infrastructure protection positions me as a **strategic asset** to organizations focused on enhancing operational efficiency and asset longevity.

Experience of Chiral Patel in the field of Cathodic Protection

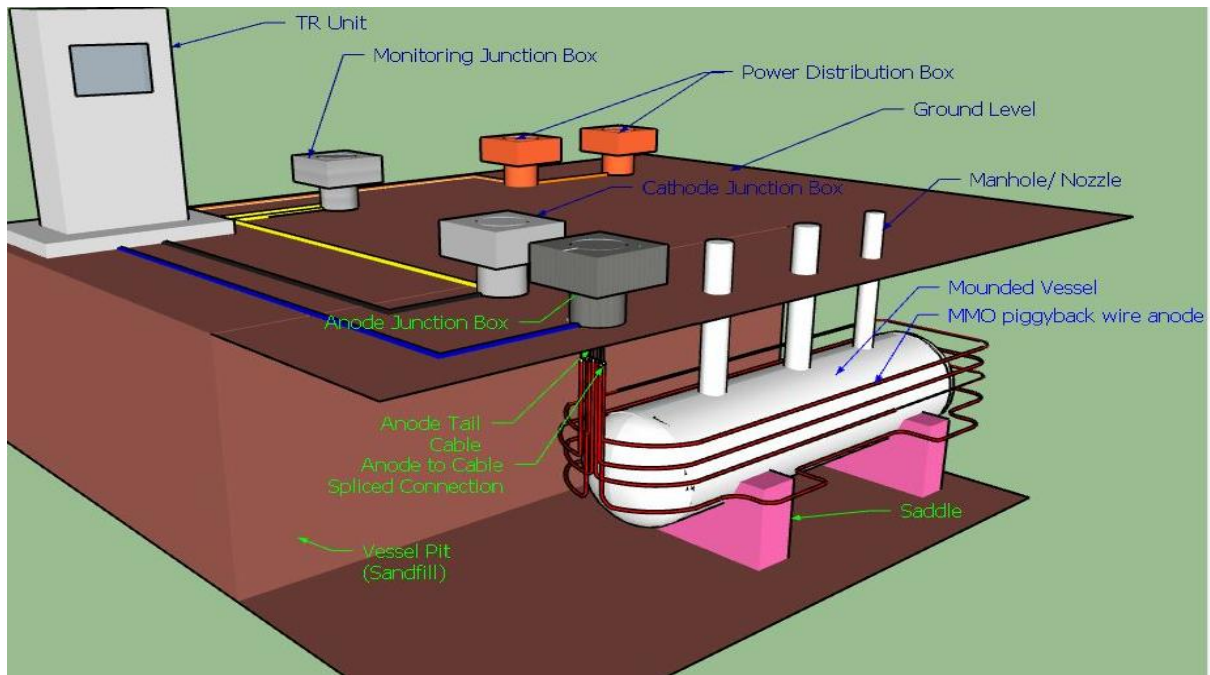
(in his capacity with his previous employer for a Prominent client)

1. Cathodic Protection works for Mounded Storage Vessels.

Had work with client like BPCL, HMEL, IOCL, HPCL for providing impressed current cathodic protection system of a Mounded Bullet. Some key projects were as per the following

- EPIC Projects for Impressed Current Cathodic Protection system for Mounded Bullets at Bitoni in Madhya Pradesh & Pune in Maharashtra Plant of BPCL (Bottling Plant). **Client: BPCL, Contractor: Febtech Mumbai, CP Contractor: SARK EPC Projects Pvt Ltd.**
- EPIC Projects for Impressed Current Cathodic Protection System for Mounded Storage Bullets at HMEL Bhatinda Plant. **Client: HMEL, Contractor: Febtech Pune. CP Contractor: SARK EPC Projects Pvt Ltd.**

Example of CP system Layout for Mounded Storage Vessels (as per Below).



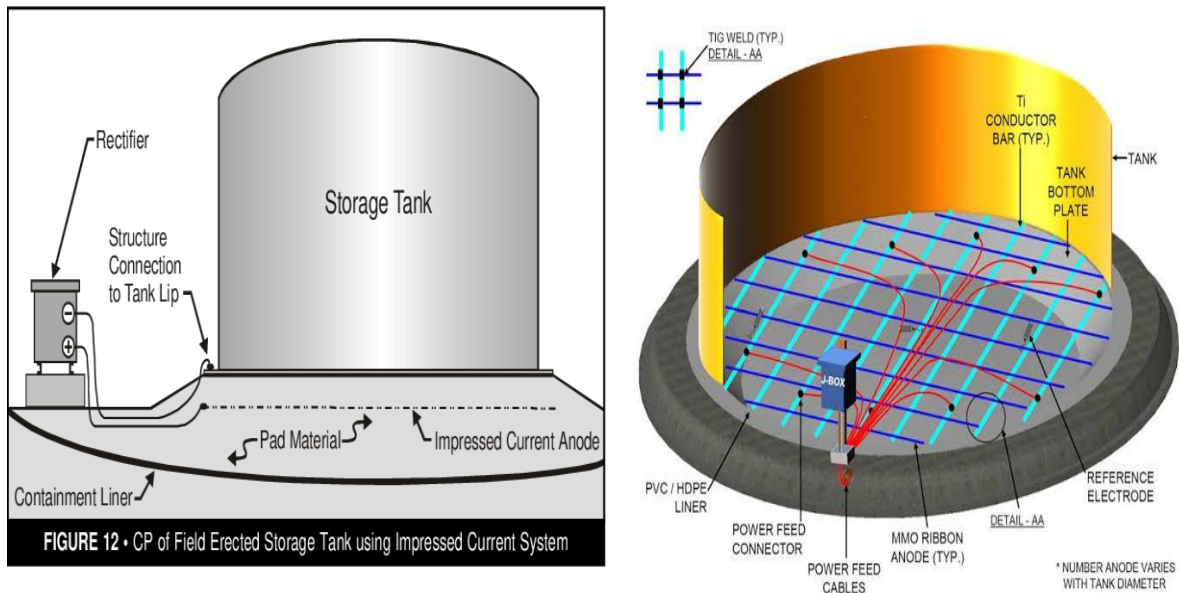
2. Cathodic Protection works for Tank Bottom.

Had extensive working experience both domestic & International with client like HPCL, Gail – Pata, NRL, Dangote Refinery, Qatar Energy (Previously QP). for providing impressed current cathodic protection system to protect Tank bottom (external Soil side) Some key projects were as per the following

- Cathodic Protection works for plant piping, vessels internal, External and Tanks internal, External for Visakh Refinery Modernization Projects (VRMP) SRU & SFU Blocks (EPCC-7 Package) **Client: Petrofac & Owner of Asset HPCL – India – CP Contractor: SARK EPC Projects Pvt Ltd.**

- Cathodic Protection works for 151 Nos of Various diameter of Tanks bottom, for Tank Farm inside Dangote Refinery **Client: Chemi tech & Owner Dangote – Nigeria. CP Contractor: SARK EPC Projects Pvt Ltd.**
- Worked as Project Engineer for EPIC New CP system of tank bottom plate for two numbers Diesel Tanks **Client: Madina group for NDIA Project, Qatar, CP Contractor: Peninsular Petrotech Engineering W.L.L.**
- Worked as Project Manager for EPIC of Cathodic Protection system for JTF Water Tanks in Dukhan Fields, **Client: Qatar Petroleum, CP Contractor: Peninsular Petrotech Engineering W.L.L.**
- Worked as Project Engineer for New Cathodic Protection System for Tanks T5050 & T5051 in Halul Island. **Client: Qatar Petroleum (Offshore Project), CP Contractor: Peninsular Petrotech Engineering W.L.L.**

Example of CP system Layout for Tank Bottom (GRID type) (as per Below).

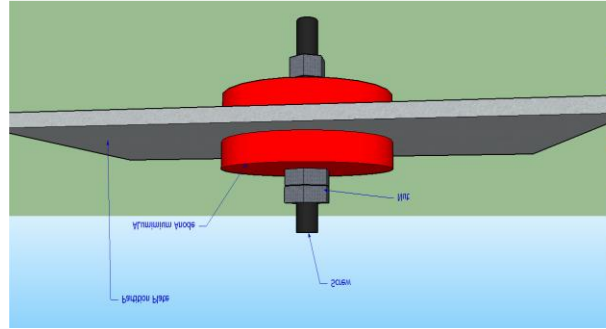
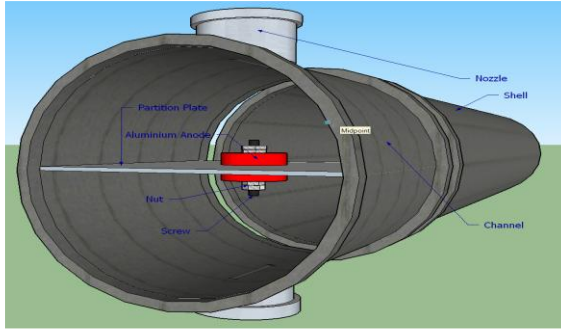


3. Cathodic Protection works for Heat Exchanger.

Had working experience with client like HPCL for providing Sacrificial Anode cathodic protection system to protect Heat Exchanger Some key projects were as per the following

- Cathodic Protection works for plant piping, vessels internal, External and Tanks internal, External for Visakh Refinery Modernization Projects (VRMP) SRU & SFU Blocks (EPCC-7 Package) **Client: Petrofac & Owner of Asset HPCL – India – CP Contractor: SARK EPC Projects Pvt Ltd.**

Example of CP system Layout for Heat Exchanger (as per Below).

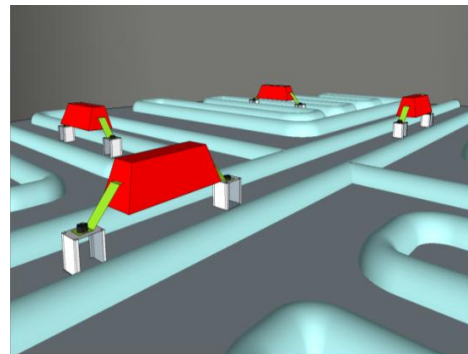


4. Cathodic Protection works for Tank Internal & Vessel Internal.

Had extensive working experience both domestic & International with client like HPCL, NRL, Qatar Energy (Previously QP). for providing impressed current as well as Sacrificial Anode cathodic protection system to protect Tank Internal (Internal Water / Electrolyte side) Some key projects were as per the following

- Cathodic Protection works for plant piping, vessels internal, External and Tanks internal, External for Visakh Refinery Modernization Projects (VRMP) SRU & SFU Blocks (EPCC-7 Package) **Client: Petrofac & Owner of Asset HPCL – India – CP Contractor: SARK EPC Projects Pvt Ltd.**
- Worked as design engineer for Sacrificial anode Cathodic Protection for Walnut Filter vessels. **Client: M/s Total for Kharir Development Project, Yemen, Consultant: ENPPI & Vessels Manufacture: M/s Paramount Ltd, CP Contractor: Mitcorr Cathodic Protection Pvt Ltd.**
- Worked as Project Manager for EPIC of Cathodic Protection system for JTF Water Tanks in Dukhan Fields, **Client: Qatar Petroleum, CP Contractor: Peninsular Petrotech Engineering W.L.L.**
- Worked as Project Engineer for EPIC for cathodic protection system for sewage treatment plant tanks within Dukhan fields. **Client: Qatar Petroleum, CP Contractor: Peninsular Petrotech Engineering W.L.L.**

Example of CP system Layout for Tank Internal (as per Below).

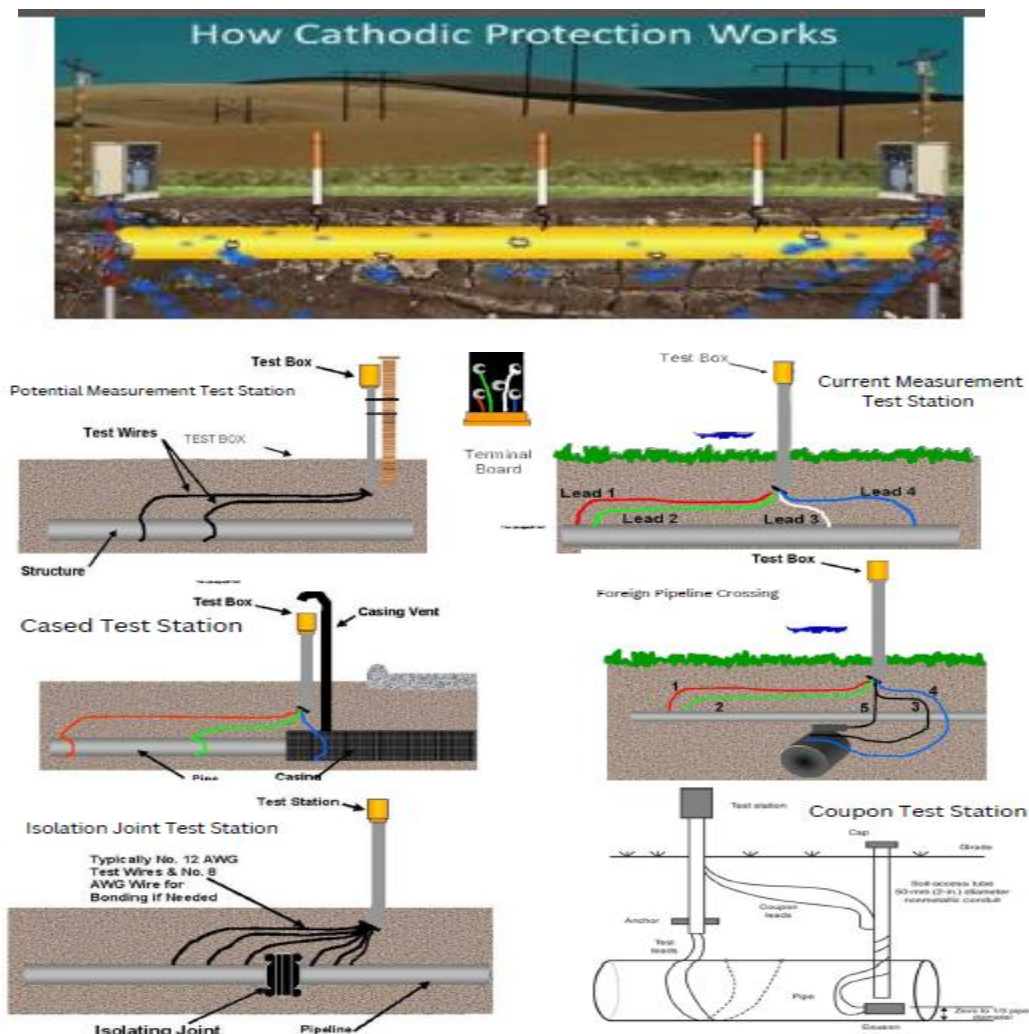


5. Cathodic Protection works for Cross Country Pipelines.

Had extensive working experience both domestic & International with client like HPCL, GAIL (India) Limited, Qatar Energy, (Previously QP), PETCO Sudan. for providing impressed current as well as Sacrificial Anode cathodic protection system to protect the cross country pipelines. Some key projects were as per the following

- EPIC Project for Impressed Current Cathodic Protection System for Vijayawada to Dharmapuri Pipeline (VDPL) **Client: HPCL, Consultant: Worley Parsons, CP Contractor: SARK EPC Projects Pvt Ltd.**
- Worked as Project Engineer for Cathodic Protection Works 2011 for Gas Processing Facilities, Gas Operation, Mesaieed **Client: Qatar Petroleum, CP Contractor: Peninsular Petrotech Engineering W.L.L.**
- Worked as Project Engineer for SACP of Portable water pipelines within Dukhan Fields. **Client: Qatar Petroleum, CP Contractor: Peninsular Petrotech Engineering W.L.L.**
- Worked as Design Engineer/ Site Engineer for SACP Works of 48" Dia 145 Km DVPL 2, Spread 1 from Dahej to Sherpura Cross Country pipeline Project. **Client: GAIL (India) Limited, Consultant: Suez Tractable & P/L contractor: Punj Lloyd Limited, CP Contractor: Mitcorr Cathodic Protection Pvt Ltd.**

Example of CP system Layout for Cross Country Pipeline (as per Below).



6. Other Projects like Well head cathodic Protection, Jetty Steel Piles, Monitoring & Maintenance Projects, Survey projects like CIPL, DCVG etc.

Had extensive working experience both domestic & International with client like Adani, Ras Gas, Qatar Gas, HPCL, GAIL (India) Limited, Qatar Energy, (Previously QP), PETCO Sudan. for providing impressed current as well as Sacrificial Anode cathodic protection system to protect the structures like Well Head Cathodic Protection System, Jetty Steel Piles Cathodic Protection System, Monitoring & Maintenance Projects and Survey Projects like CIPL, DCVG etc. Some key projects were as per the following

- Monitoring & Maintenance of All the Cathodic Protection Assets (plant piping, vessels internal, External and Tanks internal, External) of various plants like DTA, DTA-PCG, SEZ, SEZPCG, MTF, C2 Complex, IIR & IDC Plant of J1, J2 & J3 of Reliance Refinery – Jamnagar. **Client: Reliance Industries – India, CP Contractor: SARK EPC Projects Pvt Ltd.**
- EPIC Projects for Impressed Current Cathodic Protection system for Steel Piles (Jetty) of VLCC – Adani Ports, Mundra, Gujarat. **Client: Adani Ports, Contractor: COMACO, CP Contractor: SARK EPC Projects Pvt Ltd.**
- Worked as Project Manager for EPIC of Cathodic Protection system for Waste Water Injection Well Casings (RLIC 18 & 19), **Client: RasGas Limited, CP Contractor: Peninsular Petrotech Engineering W.L.L.**
- Worked as Project Manager for Cathodic Protection work for Facilities under Gas Operation, Mesaieed **Client: Qatar Petroleum, CP Contractor: Peninsular Petrotech Engineering W.L.L.**
- Worked as Project Manager for Monitoring & Maintenance of Cathodic Protection System at Mesaieed Wharves (Port - Jetty). **Client: Qatar Petroleum, CP Contractor: Peninsular Petrotech Engineering W.L.L.**
- Worked as Project in Charge for Monitoring & Maintenance of Cathodic Protection System of Pipelines at Hazira Region. **Client: ONGC Ltd., Mumbai Region, CP Contractor: Mitcorr Cathodic Protection Pvt Ltd.**
- Worked as Project in Charge for Installation of 4 Nos of 48 meters deep well Anode beds, 1 Nos TR Unit, 4 Nos of ALJB & 4 Nos of CLJB at Utran, GGL, Sarabhai, Kadi and 28 Nos of 7.6 Kg Mg Anodes on Various pipelines under RPNHQ Gail, Vadodara. **Client: GAIL (India) Limited, CP Contractor: Mitcorr Cathodic Protection Pvt Ltd.**
- Worked as Project Coordinator and later as Site Engineer for CIPL-DCVG Survey for pipelines under RPNHQ, Vadodara. Total pipeline length for CIPL Survey 345 Km. Total Pipeline length for DCVG survey 115 Km. Physical verification of pipeline by measuring Ultrasonic Thickness Measurement at 12, 3, 6 & 9 o Clock position at 92 Location. And 142 square meters of Patch repaired was also carried out by using “Denso” Make tape at all Coating Breakdown Location on various pipelines. **Client: GAIL (India) Limited, CP Contractor: Mitcorr Cathodic Protection Pvt Ltd.**

Example of CP system – Sacrificial Anode Installation for Jetty Steel Piles (as per Below).

