

Case Study



Coating Project at Tata Steel, Jamshedpur

“Reduced costs and dramatically improved surface through centralized surface management”

Tata Steel, Jamshedpur

Tata Iron and Steel Company is one of the largest companies in India. This company located at Jamshedpur is the best known symbol of India's industrial growth. Tata Steel is backward integrated with owned iron ore mines and collieries. With its competitive advantage in raw material, efficient operation, and its modernization policy, Tata Steel is among the lowest steel producer in the world. It has, over the years, employed state-of-the-art know-how and processes to manufacture a wide range of steel and engineering products as well as minerals and ferro-alloys. Its steel products include HR coils, tubes, bars, rods, structural, strips, sheets and bearings. The steel plant is integrated with activities ranging from mining of raw materials to finished rolling of steel.

Tata Steel has many units to support different process to manufacture steel of different grades in high volume. Each unit has different degree of corrosion protection requirement depending on the nature of process, environmental condition and can be categorized accordingly. So, it needs lot of expertise to evaluate the corrosion behavior of different units/locations/zone and its control through different approach including coatings.

Problem & its cause

Spread out over an area of over 12 sq kms, each department /unit was responsible for the maintenance of their own surfaces and structures. Consequently, multiple painting contractors were involved in Tata Steel for the various departments in the absence of any centralized approach. Also, Paint procurement was not centralized which resulted in various problems as highlighted below.

- Sub- optimal inventory of Paints due to de-centralized procurement.
- Improper utilization of manpower (more than 500 resources used per month).
- Wastage of money in the absence of Proper Planning and a selection of right coating system.
- Despite high expenditure on painting/coating , plant use to look in shabby state
- Absence of any QAP plan/quality check resulted in lot of deviation from the right practice for coating project.
- Lack of qualified and experienced team with the contractors resulted in no improvement in coating durability and corrosion protection



The Solution

Like most engineering operations, a planned systematic approach to a problem results in the best use of time and money. It also results in the least operational down time and the fewest management problems. Corrosion protection, in the form of maintenance painting, is no exception. A properly conceived and planned systematic approach provides long term benefits that reduce corporate expenses and improve the "bottom line. However, this approach was definitely missing at Tata Steel.

JKSC highlighted this approach to Tata Steel management and gave proposal for centralized surface management of the total plant to control the corrosion of structures in the plant, improve the appearance of the plant, and cost control and to ensure the accountability for the surface maintenance jobs undertaken. They therefore decided to build a strategic partnership with an organization that was capable of taking over the surface management of the entire plant.

JKSC was one of the best choices to provide the above solutions for several reasons. Some of them are mentioned below.

- JKSC ability to offer a specialized, comprehensive service for the on-site lining/coating for a wide array of service environments ranging from typical indoor / outdoor applications, to customized high-performance coatings related to immersion service for pipe and tank linings, nuclear exposure, and chemical solutions.
- High Performance coating application in an incredibly fast and efficient manner.
- The ability to identify the corrosion problem and its solution through appropriate selection, application and inspection of coating systems.
- The ability and commitment to deploy state-of the art scaffolding and equipment for quality and safety.
- The ability to mobilize and manage huge resources required for any turkey coating project.
- Highly qualified and technical team in field of coating application. Our coatings specialist ensures that all of your corrosion protection systems are properly applied and operating within specification. They are expert in specialized coatings inspection, laboratory investigation, selection of right coating system, development of asset maintenance program, review of manufacturer proposal, preparation of QAP for coating application, etc.

JKSC Swung into Action

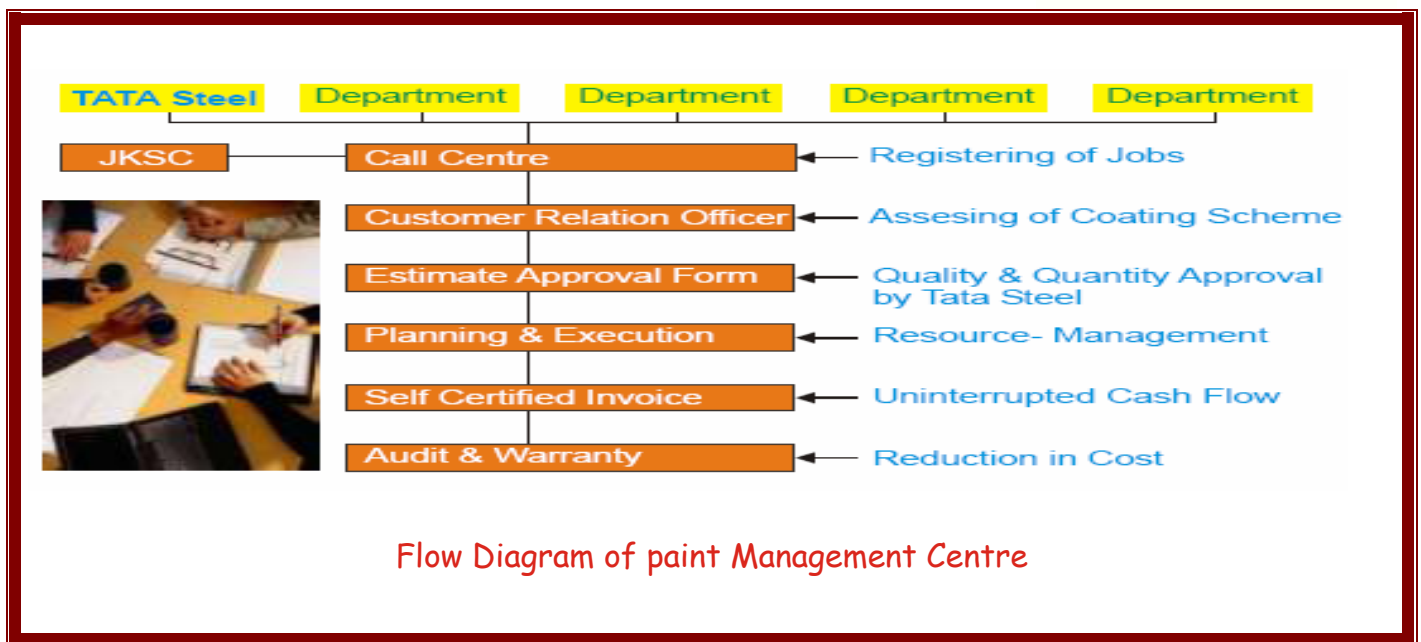
JKSC partnered with the steel company to assign priorities to different kind of jobs, fix the rates for each job and put in place stringent Service Level agreements to ensure that each job was done to the customers' satisfaction.

On being awarded the contract, JKSC took the complete coating responsibility for a start to finish service. Our experts had surveyed the area of concern, performed corrosion and coating assessment, submitted a report of our findings, prepared specification and recommendations and budget estimates, and submitted a final report of the project.

After thorough survey of the site and agreements between both the parties, the next step was mobilization of expert manpower and resources to Tata Steel Plant to actually execute the coating job and to set a bench mark in the field of coating application. JKSC within short time period mobilized approximately 300 trained, and, where necessary, Certified resources. State-of-the-art equipment was deployed, and resources were trained to be able to conform to TATA Steel's stringent quality requirements.

Responsibility to keep the whole plant corrosion free in quite a demanding environment was a challenge and required lot of right approach and proper planning to identify the area of concerns, prioritizing, and completing the site in minimum time to avoid any production losses to our customer. Call centre was setup within Tata Steel plant to bridge any communication gap with customers, and to register any job related to coatings whenever required by Tata Plant. Once the job is done to the satisfaction of the end user (customer department) all information relating to the job (start and end date of job, kind of surface preparation applied, the guarantee period, the kind of coating applied) is stored in a knowledge repository.





This approach was found very successful and very apt to our customer requirement. Our Expert audits various sites on regular basis and submits its finding/suggestions to manager in- charge for corrosion protection. On the basis of it, priority is given to locations on the basis of severity of corrosion and other requirements. Also, few locations are exposed to severe conditions but given very limited time for repairing/maintenance during shutdown.

So Priority is given to such plant when ever shut down takes place and it is commitment of JKSC to complete the job with thorough surface preparation and right coating application within limited time frame by mobilizing huge team and resources.

JKSC Professional Approach in Managing Paint Centre

For the systematic approach to maintenance painting to be successful, the following information and procedures was developed in Tata Steel.

A comprehensive inventory of paint able items

This was one of the most tedious, difficult, and time consuming tasks to be done and needed a reasonably complete itemization of what is to be coated. This was best done by subdividing a plant or facility into subsections on the basis of building, floor, operating area, etc. Each subdivision used to require further subdivision until a small enough area is obtained. In this way plan for painting each subunit was defined in a way to avoid any confusion or bottleneck during actual execution work.

Coating condition assessment

It was made mandatory to assess coating condition for each of those items while conducting the inventory of painted items. The assessment provides a standard grading evaluation of the coating and gives fair indication on kind of surface preparation and coating to be carried out.

Prioritization

After developing the inventory and assessing the coating condition of different locations/structures, maintenance painting prioritization schedule were made and preference was given to the location which require immediate action to combat any further deterioration.

Surface preparation, usually by blast cleaning or power tools is the most labor intensive part of any painting operation. Hence, scheduling was done for the maintenance painting operations either to minimize the costs of surface preparation or to renew a paintable surface before it deteriorates to the point that it requires extensive surface preparation.

Selection of the appropriate coating system

Selection of an appropriate coating system were made depending on exposure environment, corrosion resistant requirement, surface constrains etc. This lead to application of right system at right place , otherwise great mismatch was observed earlier in absence of right specification

Correct Practice during surface preparation/Coating application and Inspection

Work was carried out under supervision of coating experts/Nace certified inspectors to avoid any error while surface preparation/coating application etc. Any deviation if found, was immediately corrected to leave no chance of premature coating failure. This approach resulted in excellent coating durability and there are many locations which are not painted for several years but are still in very sound condition.



Fig: Coating applied to badly corroded structures

Quality and regulatory compliance

JKSC ensured that the work is done correctly and in conformance with the specification. Also, JKSC work activities were in conformance with regulations regarding worker safety and environmental protection. The level of inspection and surveillance ranges from a very thorough inspection to spot checking for quality and worker protection and environmental oversight.



Fig: Structure painted at Tata Steel in 2004

Introduction of New Coating System

It was found that there is need to introduce very high performance coating system for certain location as normal coating product may not suffice the need in longer run. Certain coating systems that were introduced includes polyurea product, ceramic based coatings, Very high temperature resistant paint (upto 1200 degree Celsius) etc to benefit our customer by obviating the need of frequent repainting/touchup, shut down etc.

Before selecting any product, testing of products was done in lab and actual condition and evaluated on the basis of various parameters. For example, there was a case of repeated failure of paint system in LD spray chamber due to very high substrate and surrounding temperature (more than 1000 degree Cel.) After doing through study of different system, a product was selected and tested in actual condition for 8 months. It was found that coating system had performed really well with considerable resistance towards heat when compared to other HR Paint systems. Similarly, lot of experiments and trials was done on ceramic based products to use it in highly demanding environment. Also, our technical staff gives regular presentation on specialized coating to update our customers on current technologies and their advantages.

This initiative added much required life and durability to many of Tata Steel's structure. Many of their locations were coated with these specialized product and are performing nicely even after many years of their application.

Benefits and Outcome

Cost Saving

- Expenditure on surface maintenance was reduced by **as much as 60%**.
- Manpower Reduction by **60%** through proper resource management
- Coating life was increased significantly **through** proper assessment of surface condition and applying suitable coating scheme. It was beneficial as they need not require frequent repainting /touch up jobs which may otherwise affect their productivity.

Better Productivity

JKSC's professional, planned approach and deployment of state-of-the-art equipment and processes along with expert team ensured that any coating job must be completed within minimum timeframe and in compliance with all the safety as well quality norms. It was found that area covered through coating at most of the location was almost **double than what Tata Steel used to get in past in comparable periods**. It resulted in improvising their efficiency as they need not give extra time for coating before starting the unit.

Improved Surface Management

Surface management was improved by creation of a consolidated observation chart from extensive documentation. A single window view into the kinds of jobs going on, the due date for the next maintenance job at a particular site and other such reports ensure better management of surfaces across TATA Steel.

- JKSC Coating Services has achieved dramatic improvements in the durability of coating systems, cost control, quality improvement at Tata Steel,
- Our approach have enabled us to perform at the highest levels in safety, quality and professionalism in the industry and to become a more efficient and effective partner with Tata Steel

Fewer administrative problems:

- **Manpower related-** JKSC has mechanized the paint application process to such an extent that the manpower required to do the job **has been reduced by 60%**.
- **Procurement related-** Due to centralized purchasing and prior agreement upon the kind of coatings required for each kind of job.

The plant looks well maintained.

Right approach, right coating selection, right application and right inspection enabled us to increase the longevity of paint systems and overall appearance of plant improved dramatically.

Awareness on New Coating developments

Regular presentation on new coating systems and their benefit made large impact on creating awareness on these products. It resulted in application of coating segments such as polyurea or ceramic epoxy for the first time at Tata Steel. The life expectancy of these systems was high and long term cost benefit was considerable. Also there is Periodic review with TATA Steel management for improvement of the system and knowledge sharing.

Conclusion

The coating project at Tata Steel is one of the prestigious projects we had done for our clients. Expertise and Experience applied in this project execution have set a example for other companies in similar field .The techniques and approach have enabled us to perform at the highest levels in safety, quality and professionalism in the industry and to become a more efficient and effective partner with our clients.

