

Statistical Assessment of Lifecycle of Process Plant

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Continuous Annealing and Processing Line (CAPL) produces value added high quality advanced high strength CRCA (cold rolled close annealed) steel of varying thickness in the range of 0.4 mm to 2.3 mm which is mostly used in the automobile manufacturing industries. One of our customers intended to evaluate the useful life of the plant and machinery of a CAPL steel plant. Tata Consulting Engineers Ltd (TCE) was retained as a consultant to carry out a study for assessment of the existing condition of the plant and evaluate the useful life, based on the available data, plant visual inspection, technical discussion with plant operation & maintenance personnel and data/ information collected throughout the project.

The condition assessment of the plant was carried out based on the understanding of the plant operation, maintenance practices, technology adopted and technology supplier's experience and support. Some of the major considerations while making the assessment are as follows:

- The plant being highly automated, real time data was collected and monitored to analyse the condition of the plant
- Significant attention was given in the recent operational practices, maintenance practices, safety compliance, spares management of the plant for better asset condition monitoring.
- Lifecycle Assessment Report had been prepared and finalised by attending number of site visits, conducting meetings with client.

A task force comprising of in-house senior industry experts and engineers having experience in steel plant process and plant operation and maintenance was formed to assess the equipment. Following inputs were analyzed in the assessment of plant life:

- Data/ information provided by the customer
- Data collection from site visit
- Discussion with process, operation & maintenance personnel of the plant
- TCE in-house database
- Benchmarking information

TCE carried out the study comprising main process plant & machineries, auxiliary plants and utilities such as CAPL, recoiling & inspection line, coil packaging line, roll shop, maintenance shop, main plant building, coil transfer car, laboratory, EOT crane, electrical & instrumentation and control system and utility & water system. Key aspects which were analyzed as a part of the assessment were class & type of assets, major & minor shutdown policy of the plant, periodic repairs & refurbishment of the assets, trend of asset performance, major upgrades undertaken since installation, historical trend of decommissioning, quality plan & plant/ equipment safety norms presently practiced, incidence of technological obsolescence keeping in view condition prevalent in the plant.

Based on the approach and information as outlined above, average useful life was estimated for each major equipment and facility of the CAPL plant. As per TCE's past experience four key criteria were identified which could have a major impact on asset's economic life. These key criteria are condition of the equipment, maintenance practices, technology selection and availability of automation system. For each of the key criteria radar chart was developed to demonstrate maturity of each of the plant/ machinery. To rationalize and estimate the impact of the remaining economic life, impact assessment matrix was developed based on weightage attributed on each of the criteria. The data were analyzed based on statistical technique to assess the useful life of each process plant, auxiliary plant and utilities.

Based on the above methodology and analysis, TCE submitted assessment report demonstrating estimated useful life of each key component and major equipment which has helped the customer in their assessment of plant asset valuation.

TCE has capabilities to carryout out similar studies with in-house industry experts and senior engineers. TCE have executed a number of asset reviews on various process plants and equipment/system.