



Mitigating Corrosion in Refining Operations – A Holistic approach

OLI Systems has a proven reputation in the global Oil & Gas and Chemicals sectors for helping companies overcome the challenges of corrosion. With comprehensive water chemistry expertise, OLI Systems enables customers to simulate field conditions with extreme accuracy to identify and predict at-risk areas for corrosion and other issues. In this study, a Product Application Engineer at CHIMEC S.p.A, enlisted OLI Systems' electrolyte chemistry analysis capabilities as a part of the risk-based assessment to treat and prevent salt deposition and mitigate corrosion risk in Crude Oil refining and upgrading applications.





Industry Trends

Increasing productivity and reliability in the field

From its earliest days, the Chemicals and the Oil & Gas Refining industries have struggled to overcome the challenges of overhead refining corrosion. This ongoing issue poses numerous concerns for chemical companies as well as refinery operators, particularly in today's market as increasing productivity and reliability becomes even more critical to success. Left untreated, corrosion can lead to reduced productivity and production, unplanned operational shutdowns, and profit losses. These outcomes cost companies a considerable amount of manpower, research hours, and capital resources. Unfortunately, many companies lack the water chemistry expertise to rapidly pinpoint and resolve issues in the field.

To overcome this growing problem, chemical companies and refinery operators must enhance their water chemistry analysis capabilities in order to gain comprehensive insight into corrosion-causing pollutants and how to treat them.

Business Challenge

Mitigating corrosion to ensure sustainable operations

CHIMEC S.p.A is dedicated to helping clients maintain peak operating performance by saving energy and improving processes. For almost 50 years, CHIMEC S.p.A has been working with refining and petrochemical companies in 65+ different countries to address problems related to water condensation and corrosion that complicate or impede production. CHIMEC mission is to equip clients with innovative solutions to optimize processes, maximize profits, and reduce both downtime and environmental impact.

In this study, a Product Application Engineer in Process Development & Marketing Dept., was asked by a client to troubleshoot a fouling issue occurring in a Naphtha Hydrodesulphurization Unit caused by huge salt deposition. Salt deposition and under-deposit corrosion usually impact multiple Units—including Crude Distillation', Vacuum Distillation', Fluidized Catalytic Cracking' Overhead sections and Hydrodesulphurization Units' reactors effluent streams—in turn, causing production loss due to unplanned shutdowns needed to restore plant operational efficiency and safety.

Leveraging rigorous modeling and simulation tools

To troubleshoot the problem, CHIMEC engineers first needed to establish a strict analytical protocol to address the fouling built-up issue, by identifying the nature and quantifying the concentration of various corrosion-causing pollutants in each of the Unit' feeding streams. Then, unable to collect the fouling sample to be analyzed, CHIMEC engineers used the OLI System simulation tools and robust thermodynamic framework to accurately predict the quantity and quality of de-sublimated salt. This holistic approach, allowed CHIMEC engineers to propose to the Refiner a solution with a range of options to address the problem in the short and long-term, that avoided plant shutdown and loss of production.

CHIMEC used the extensive OLI Systems water chemistry analysis and modeling capabilities in the OLI Flowsheet: ESP and OLI Studio software platforms to fully resolve their client's issues, with highly accurate and effective simulation predictions.

Solution



“OLI Systems’ rigorous electrolyte chemistry and modeling tools helped CHIMEC mitigate corrosion issues for more than 20 oil and gas companies.”

*Product Application Engineer
CHIMEC S.p.A*

Harnessing electrolyte chemistry insights

CHIMEC decided to adopt a comprehensive OLI Systems solution in order to establish a valuable partnership incorporating cost-effective technologies, in-depth support from OLI Systems experts, and a proven reputation for precision water chemistry analysis.

As a long-time OLI Systems customer, CHIMEC expanded their use of the OLI Flowsheet: ESP as well as the OLI Studio to tackle use cases in the Chemical sector. CHIMEC employed these rigorous capabilities to examine their client's operating environment and, as a result, was able to share key findings to enhance the performance and reliability of their units. According to the CHIMEC Product Application Engineer, “With OLI Systems, we are confident the results we obtain align with what is happening in the field. We are convinced that OLI Systems technologies are best-of-breed.”

“ With OLI Systems, CHIMEC dramatically extended the Unit’ equipment asset life for Refiners; they went from replacing Heat-exchanging banks every six months, to operating for more than 12 months (and counting) with no replacements.

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*Product Application Engineer
CHIMEC S.p.A*

OLI Systems relieves corrosion concerns

OLI Systems modeling and simulation tools enabled CHIMEC to accurately locate areas of salt deposition and corrosion and predict how to resolve each issue.

In testing the chemical conditions of both the aqueous and the hydrocarbon phases, CHIMEC found a massive presence of pollutants—approximately 700 ppm of organic and inorganic chlorides measured in water. Based on these results, it was possible to identify the root cause of the issue, which was present in one of the slops streams feeding the unit, which was in turn hugely contaminated by organic chlorides. Therefore, with an overabundance of chloride pollutants in a particular area of the system, it was possible to quickly identify and analyze the weak point. With this information, CHIMEC engineers utilized the OLI Studio and Flowsheet software suites to understand the salt deposition in each area, creating pH profiles to model the problem in order to determine a suitable chemical treatment.

As a result, CHIMEC was able to increase operational efficiencies by eliminating unplanned shutdowns that were previously required for maintenance and inspections. Additionally, it was possible to dramatically extend Unit’ equipment asset life for the Refiner who had been replacing Heat-exchanging banks every six months, to operating for more than 12 months (and counting) with no necessary replacements.

According to the Product Application Engineer at CHIMEC, OLI Systems technologies delivered high-precision insights that were essential to resolve their corrosion concerns. He commented, “OLI Systems’ rigorous electrolyte chemistry and modeling tools helped CHIMEC mitigate corrosion issues for more than 20 oil and gas companies.”

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