OCP Ecuador Uses Prescriptive Maintenance to Accurately Identify Asset Failure and Reduce Maintenance Costs

OCPECUADOR

Reduced Maintenance Costs

25% per year

Lower Spare Parts and Inventory Requirements

extending camshaft life from 20,000 to 50,000 hours

Increased Engine Overhaul

from 16,000 to 19,200 hours, 20% improvement in uptime

CHALLENGE

Improve asset maintenance activities to reduce total expenditure, environmental impact and operational risk.

SOLUTION

Aspen Mtell®, AspenTech's prescriptive maintenance solution, to continuously monitor OCP Ecuador's critical assets for impending failure, using both process and mechanical data.

VALUE CREATED

- Enabled accurate detection of impending asset failure, such as combustion problems, valves, and injector calibration issues, up to 20 days in advance

- Rapidly scaled the solution across 22 main pumps, 5 booster pumps and 4 generators

- Generated a 3X return on initial investment in less than five months

Introduction

Oleoducto de Crudos Pesados (OCP) Ecuador is a midstream oil and gas company that transports, stores and ships crude oil. The company prides itself on providing reliable, safe, efficient and environmentally committed crude oil transportation operations, with a capacity to transport 450-517K barrels/day from the Amazon to the marine terminal in coastal province of Esmeraldas. As the country's production fell, OCP Ecuador was forced to operate its facilities at a reduced capacity (just 30-50% of maximum capacity) while ensuring reliability of spare assets. However, transportation fees and tariffs are typically fixed for pipeline companies regardless of utilization.

The company performed calendar-based and condition-based maintenance activities across its assets installed in remote locations along the 485-kilometer pipeline. This strategy had inherent issues in that it couldn't predict and prevent equipment failures from happening. Faced with a pressure of tightening regulatory requirements, past historical failures, and a goal to exercise control on operating costs, OCP Ecuador decided to enhance its existing maintenance strategy. This fast-tracked project would succeed only if the solution could be implemented in six weeks across 31 crucial assets.

> **"AI-powered Aspen Mtell strengthens our Condition-Based Maintenance (CBM) strategy to extend asset life with superior cost efficiency. Aspen Mtell lowers spare parts and components inventory and provides higher lead time for sourcing."**
>
> —Carlos Adriano, Heavy Crude Pipelines Supervisor, OCP Ecuador

Volatile Markets, Cost Conscious Environment Demand Sound Solutions

Aspen Mtell was selected from a number of solutions for its ability to work with both equipment and process data, provide early and accurate warning of potential issues and deploy quickly at scale. The solution's AI and machine learning capabilities monitor and detect even the slightest changes in asset behavior. Machine learning agents understand 'normal' behavior of the asset and alert users of anomalous behavior.

Aspen Mtell's ability to predict and prevent potential operational disturbances has had great impact at OCP Ecuador by reducing maintenance spend, allocating limited resources efficiently, contributing to a healthier planet and protecting maintenance personnel.

Avoiding a Major Combustion Engine Overhaul

Aspen Mtell predicted an injection problem on a combustion engine 26 days in advance. An early inspection confirmed the breakdown stemmed from a calibration issue and affected five injectors. The alert prevented damage to the piston and injector components while avoiding poor combustion that could lead to emissions. In a similar save, Aspen Mtell alerted of anomalous behavior from the combustion engine during start up. Vibration, lubrication and motor bearing sensors triggered at the same time. Inspection of the oil regulation system indicated that a centrifugal filter valve was closed. This could have resulted in damage to main bearings and connected rod and camshaft bearings requiring a major asset overhaul. Within just a few months of deployment, the impact on maintenance costs and equipment availability has been significant. Engine overhaul, which typically happened every 16,000 hours, has now increased to 19,200 hours, resulting in a 20% improvement in equipment uptime. Increased uptime also meant reducing unnecessary maintenance work—a 25% reduction in maintenance costs per year.

Preventing Booster Pump Damage

Booster pumps located at the pipeline's first station were experiencing a variety of failures that were impacting operations. Aspen Mtell provided insights into key contributing variables and prevented potential issues from arising as much as 20 days in advance. By detecting critical issues which had gone undetected by the company's vibration monitoring system (such as excessive shaft clearance and abnormal increases in fan, motor or gearbox vibrations), Aspen Mtell enabled maintenance personnel to examine problem areas, rectify operations and plan for interventions.

Before deploying Aspen Mtell, these issues would have been identified only during a less frequent overhaul in most cases, resulting in extended maintenance times. In addition, Aspen Mtell's ability to identify different failure modes on a single piece of asset provided OCP Ecuador's maintenance staff confidence that the solution could be adopted for wider use more quickly.
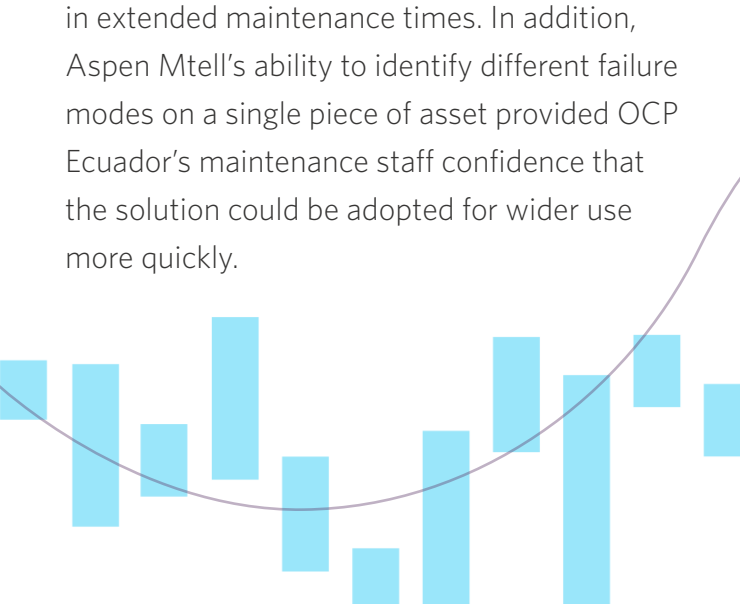
Reducing CO Emissions Through Better Monitoring

Aspen Mtell detected an increase in the charge air temperature and stalling at four of the company's main engines. Because increases in air temperature can lead to bad combustion and higher carbon monoxide (CO) levels, this was a critical "find" by Aspen Mtell.

A field inspection based on the alert resulted in removing the engine's motor from service due to water leakage. Aspen Mtell prevented excessive damage of the engine, helped improve combustion and avoid further carbon monoxide emissions.

Improving Maintenance Culture

Prior to deploying Aspen Mtell, reliability teams followed conventional maintenance practices and performed routine maintenance. Using Aspen Mtell, OCP Ecuador's data science teams worked in collaboration with subject matter experts and reliability teams. Aspen Mtell's ease of implementation meant that the company's superusers could be trained quickly. Alerts were quickly reviewed and validated, resulting in less wasted maintenance and more advance time to plan crucial maintenance activities. Extending equipment life also resulted in reduced spare parts and inventory. For example, spare parts guidance for camshaft improved from 20,000 hours of life to 50,000 hours. Timely review and management of alerts from Aspen Mtell and its easy integration with existing maintenance practices are key to OCP Ecuador's success.

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Conclusion

As the midstream industry grapples with increased regulatory oversight and volatile environment, cost savings are more important than ever. Prescriptive maintenance solutions, such as Aspen Mtell, enable reduced maintenance costs, provide greater asset reliability and improve process safety.

With three times the initial investment returned in less than five months, OCP Ecuador is planning to scale Aspen Mtell to protect 13 additional assets in the near future and plans to scale across the enterprise in the coming years.
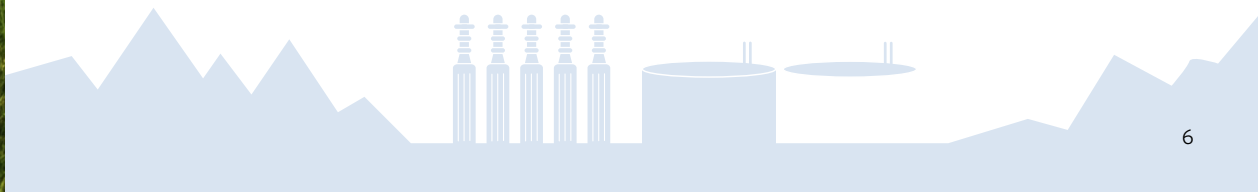
About Aspen Technology

Aspen Technology, Inc. (NASDAQ: AZPN) is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance lifecycle. Through our unique combination of deep domain expertise and innovation, customers in capital-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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