



CUSTOMER CASE STUDY

AVEVA™ PI System™ creates smooth sailing for Caterpillar's marine operations

Caterpillar - www.caterpillar.com

Industry - Infrastructure, utilities

Goals

- Use technology to reduce costs, fuel usage, and risk
- Eliminate data silos and foster information sharing across marine operations
- Help customers enter the digital age in ways that make sense for them

Challenges

- Large, complex ships and other assets that can be difficult to control and prone to error
- Constant variability in weather and ocean conditions
- Data silos on individual vessels limited cross-fleet knowledge sharing

Results

- Hundreds of thousands of dollars in cost savings from reduced downtime and fuel burn
- Increased ability to schedule maintenance and move toward predictive maintenance
- Gave customers the tools they need to comply with changing regulations and unexpected events

Solution

- AVEVA PI System

As a leader in heavy equipment, Caterpillar knows that the bigger the machine, the bigger the problem it creates when something goes wrong. A wire failure can take down a shipboard crane; oil leakage can disrupt the steering system; a fatigued propulsion system can stall out. Any of these might take a vessel offline and send technicians flying all around the world to fix the problem. Because there is such a diversity of original equipment manufacturers in the marine industry, Caterpillar needed to provide asset intelligence services beyond the scope of CAT equipment. AVEVA PI System allowed the organization to do just that and save hundreds of thousands of dollars in the process.

Welcome to the age of smart iron

The marine space has been slow to embrace the digital age but that's changing, and Caterpillar is leading the way. The company's ships and other marine vessels have long been equipped with digital monitoring equipment, but the data produced stayed in a silo on board and was not utilized to its full potential. Once the company adopted AVEVA PI System, it didn't take long for things to begin changing for the better.

Vessel owners and operators discovered tremendous opportunities for operational improvement and savings within their untapped data. Caterpillar now helps customers capitalize on the new era of smart iron with CAT Asset Intelligence, powered by AVEVA PI System, which puts every critical onboard asset into one whole-vessel conversation. A vessel is more than just an engine, and the success of one onboard asset often depends on the success of many others. Caterpillar calls its approach, "whole-ship monitoring." In other words, thanks to AVEVA PI System and CAT Asset Intelligence, vessel owners and operators can now see asset data in context. That means no more useless data stuck in silos.

"Our customers have fleets that are mixed. They don't want six different tech platforms and services."

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Rob Bradenham
Global Sales & Business Development Manager, Caterpillar

Navigating the sea of data

A major challenge of asset intelligence in the marine space is filtering out operations data "noise." Unlike Caterpillar's land-based operations, marine operations come with a stunning variability of conditions from ocean currents to wind speeds. How does Caterpillar turn the wealth of raw data from assets in the field into actionable information that customers can actually use? This is where AVEVA PI System and CAT Asset Intelligence come in. Caterpillar employs PI Servers on board, and on shore, along with PI connectors to connect data sources with unprecedented efficiency. This setup enables Caterpillar to help customers predict and avoid problems before they cause downtime.

"We want to take our partnership with our customers to the next level and allow them to get more value out of the investments they've already made."

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Rob Bradenham
Global Sales & Business Development Manager, Caterpillar

Take, for instance, the RORO Operators: gigantic shipping vessels, powered by Caterpillar diesel engines, which ferry cars, tractors, and other wheeled cargo from one end of the world to the other. Fuel makes up nearly 70% of the RORO's lifetime cost. One of the greatest obstacles to the fuel efficiency of these maritime behemoths is the humble barnacle – marine growth on the vessel's hull. It's not a machine problem, but it can wreak havoc on operations if not addressed at the right time. Caterpillar uses AVEVA PI System to identify opportune times to remove barnacles without disrupting operations. This seemingly simple change saves the company about \$450,000 per vessel, per year.

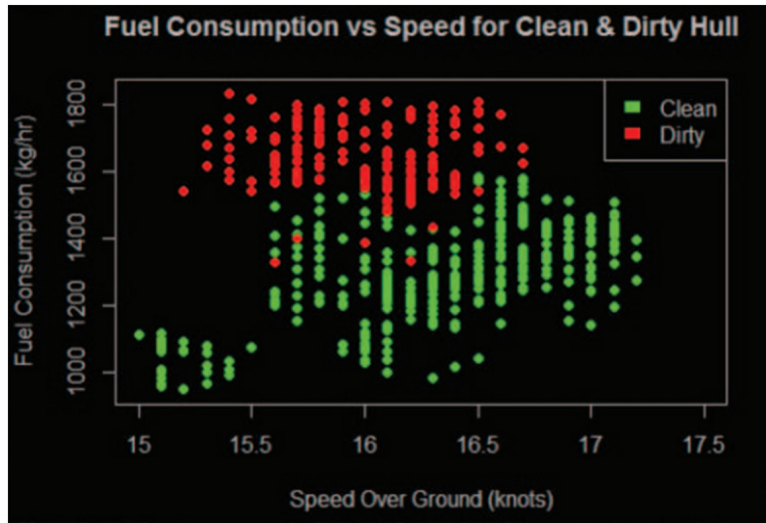
Smoothing the waters with smart maintenance

When it comes to big machines like marine vessels, every interaction with the equipment introduces the possibility that something could go wrong. AVEVA PI System allows Caterpillar to determine whether a vessel or other asset needs maintenance without ever having to touch it. This approach minimizes risk while reducing costs and avoiding equipment failures and unnecessary maintenance. Caterpillar is also moving toward predictive and condition-based maintenance, empowering engineers to identify emerging problems and the likely causes of those problems before they require costly downtime.

"We avoided all the headaches, the firefighters, the overtime heroes, the night and weekend rates, the 'just go to the airport and get a ticket, I don't care how much it costs type things.'"

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Rob Bradenham
Global Sales & Business Development Manager, Caterpillar



AVEVA PI System allows Caterpillar to identify the fuel burn of a clean hull versus a dirty hull

In 2018, for instance, a cruise liner, powered by Caterpillar’s large, medium-speed diesel engines, seemed to have one cylinder increasing in temperature at a greater rate than the other cylinders. Using AVEVA PI System and Caterpillar’s asset intelligence software, fleet advisors identified the abnormality, addressed the problem in a preventative manner, and saved about \$10,000. “We didn’t have technicians flying around the world,” says Bradenham. “We avoided all the headaches, the firefighters, the overtime heroes, the night and weekend rates, the ‘just go to the airport and get a ticket, I don’t care how much it costs’ type things.”

In addition to reducing operating costs, and optimizing efficiency, CAT Asset Intelligence services also help customers reduce safety and compliance risk, which is no easy task. A vessel may be in operation for 50 years and retrofitting an old vessel to meet new regulations is a significant investment. Using AVEVA PI System and CAT Asset Intelligence software allows Caterpillar to untangle the complex interrelations of variables at work on the overall vessel, whether that vessel is a new, integrated and data-rich cruise ship, or 40-year-old tugboat.

Applying analytics to data sourced from the many different parts of a vessel allows Caterpillar to bring its customers a personalized suite of solutions to meet new regulations, optimize performance and efficiency, and maximize revenue from customer assets. Caterpillar is embracing the age of smart iron with a single guiding question in mind: “How do we add value not just on the scope of supply that we sold the customer,” says Bradenham, “but on everything else that’s critical to the customer?”

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