

Predict the unpredictable

Evolving maintenance from condition-based to predictive – using prescriptive analytics



Companies across multiple industries must take bold steps to optimize their maintenance and operations strategies in an increasingly competitive market. Therefore, having a comprehensive and balanced strategy around asset performance management is no longer a choice.

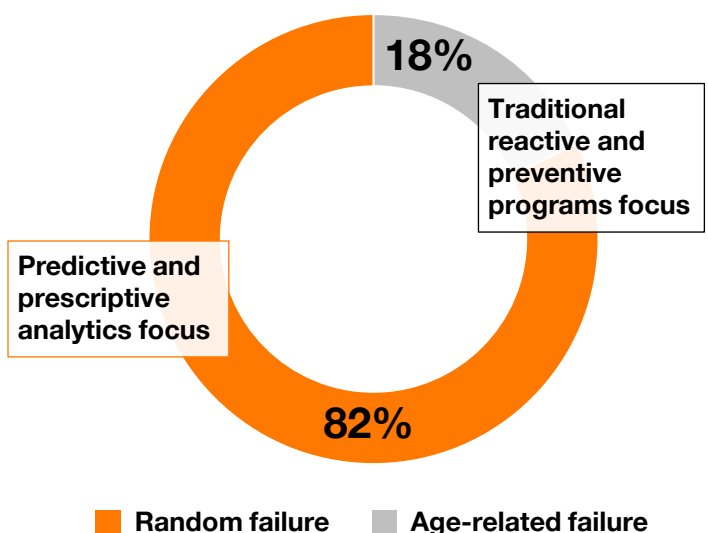
Prescriptive analytics help companies predict what will likely happen by building AI/ML models to provide actionable insights. These models rely on high-quality data from the factory shop floor, enabling OT managers to make more accurate predictions, provide relevant recommendations, and effectively automate processes.

What if you could...

- Anticipate downtime
- Reduce overhauls
- Optimize maintenance planning
- Reduce energy consumption and CO2 emissions

“Preventive maintenance assumes a failure pattern that increases with age or use. Unfortunately, this applies to only 18% of assets. The other 82% of assets display a random failure pattern.”

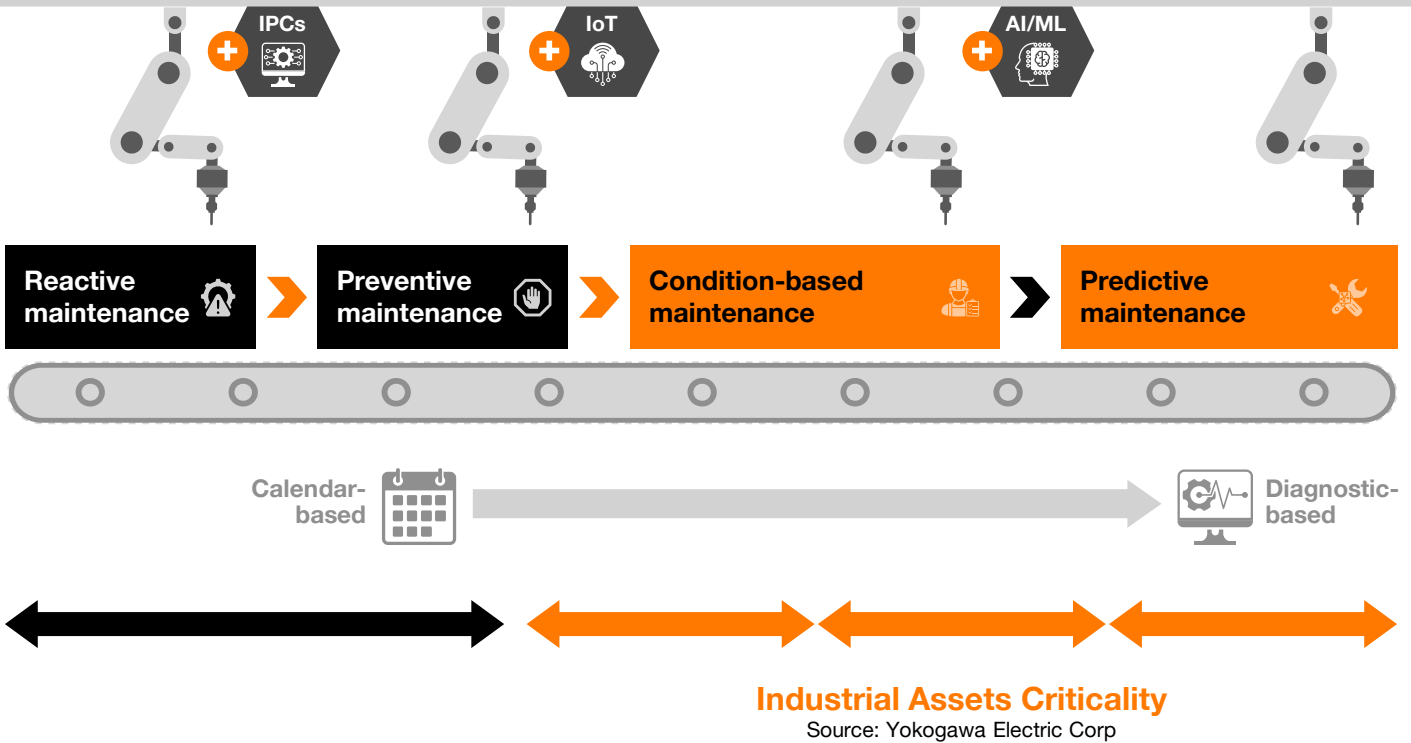
Source: ARC Advisory Group



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Maturity of Assets Performance Management drives transformation strategy

Assets Performance Management (APM) encompasses different levels of maturity driven by the Operations & Maintenance (O&M) strategy and the identified criticality of the industrial assets and processes.



Low-value assets
Not critical

Class 3
Non-process-critical auxiliary assets

Class 2
Process-critical auxiliary assets

Class 1
Core-critical assets

57% of assets

35% of assets

8% of assets

HVAC, fans, belts, blowers

Electric motors, pumps, conveyors, mixers, valves, cooling towers

Centrifugal compressors and pumps, critical reciprocating compressors, driver generators

Medium to low valued assets

Medium to high valued assets

Highest valued assets in the plant

No direction implication on operations and business

No direct implication on operations and business

Critical for operations and business

Their shutdown can affect the operations of the production lines

Critical for some important plant processes. Their shutdown will significantly increase the operations cost

The revenue of the company depends on these assets



1. Reactive:

Traditionally, factories corrected maintenance upon failure with **Reactive Maintenance**. This run-to-failure maintenance strategy causes costly repairs, unplanned production losses, and other unexpected failures that could cause extended equipment damage. Most industrial processes and assets are managed this way today. According to Maintain X, about 80% of industrial plant maintenance managers rely heavily on reactive maintenance.

2. Preventive:

The growth of industrial automation and computational techniques (PLCs, SCADAs, MES, etc.) has changed traditional O&M patterns, requiring **Preventive Maintenance**. Scheduled-based preventive maintenance is the most common method, but this approach does not maximize asset utilization. Likewise, maintenance costs throughout the life of these assets are not optimized, and unexpected failures can still occur.

3. Condition-Based:

As a result, factories are moving from scheduled-based preventive services to **Condition-Based Maintenance**, centered around continuous machine health monitoring leveraging advanced Internet of Things (IoT) and data acquisition technologies, enhancing granularity and visibility of assets' performance. Ultimately, this enables O&M managers to receive triggered alerts and notifications to detect anomalies.

4. Predictive:

Complementing IoT condition-based monitoring tools with a comprehensive set of predictive metrics using AI and ML technologies leads to true **Predictive Maintenance**. It focuses on the 82% of random industrial asset failures mentioned and provides the smart contextualization of data gathered from the factory shop floor. By anticipating diagnosis and early warning detection of equipment problems (compressors, turbines, pumps, gearboxes, etc.), factories can improve asset reliability and performance while reducing overall O&M costs

What about finding even more answers...

What is the remaining lifetime of this industrial asset? What is the optimal time to perform this planned maintenance shutdown? What are the financial effects on the business if we prevent that future failure? Advancing maturity further, an ultimate APM approach leverages deep learning and simulation forecasts beyond the pure IoT/ML technology layers. That is a game changer, although it requires a robust infrastructure and a strong IT/OT integration that provides the right level of interoperability between the different production sub-systems. This is about O&M moving from reacting to the unpredictable to predicting the unpredictable.



Summary

Digital transformation and IT/OT convergence have brought a new paradigm shift where insights gained from operational data can make factories smarter thanks to IoT, advanced analytics, and AI/ML technologies. From a strategic perspective, many industrial companies face challenges integrating these technologies on their transformation journey. Maturing APM is critical to ensure a successful transition toward the digitization of the factory. This approach enables companies to drive operational efficiency while differentiating themselves from their competition through an advanced, secure, and sustainable way of managing their plants.

Traditional maintenance strategies and approaches are still viable, depending on the asset's criticality and industrial process. Nevertheless, new digital enablers like IoT and AI/ML are opening various data-driven use cases. Beyond the traditional O&M teams, maturing APM practices bring transformative business benefits for other OT stakeholders, including the industrial engineering department, quality and control teams, and health and safety executives. Prescriptive analytics can also benefit sustainability and environmental compliance initiatives, worker safety improvements, quality enhancements, and risk management programs.

Why Orange Business?

Orange has 30,000 global experts available to help you deliver a secure digital infrastructure for your industry 4.0 strategy. Orange Business brings expertise to IT and OT as a global digital integrator, communications operator, and service provider, which uniquely qualifies us to support our manufacturing clients on their digital transformation journey. Our business-value enabling services are centered on a personalized outcomes-driven approach. We take care of the complexity so you can focus on your business.

We understand the unique challenges of enabling OT digital infrastructure as the backbone of smart manufacturing operations, always focusing on bringing business value to our clients. Cybersecurity is at the intersection of IT, OT, and the business. Together with you, we protect your digital infrastructure by providing tailored cybersecurity services to support compliance and resilience for your critical assets against cyber threats.

As your trusted IT partner and OT integrator for multinational manufacturers, Orange Business enables smart factories to support future growth and emerging technologies. Our team of experts advises on, deploys, and co-manages state-of-the-art Industry 4.0 solutions with you to align processes and achieve optimal results linked to your business objectives. The outcome is a safer, more productive, efficient, and sustainable smart factory.