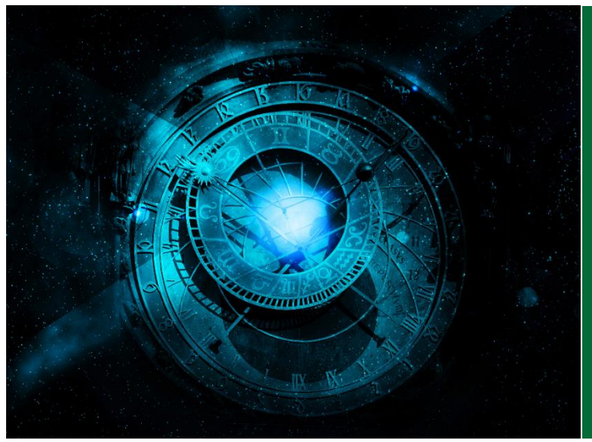
Advancing asset management

Deloitte.



A challenge

Organizations with large capital asset and facility portfolios often retain maintenance programs with ever-growing budgets and substantial backlogs. Traditionally, these maintenance programs can frequently be reactive to failures or executed at pre-planned time intervals, leading to unplanned shutdowns and inefficient use of resources. The following challenges were identified in several studies[1, 2] on the efficacy of scheduled maintenance and mean time between failure methodology:

1. **Only 11% of asset failures are time-based and can be mitigated with planned maintenance**
2. **89% of failures may occur at random without the monitoring of condition-based data**
3. **50% of all time-based maintenance is ineffectual**

These and other challenges with traditional maintenance programs can severely limit an organization's ability to properly maintain, enhance, or replace its assets over time. Predictive maintenance can help substantially reduce maintenance costs versus time-based maintenance strategies, allowing decision makers to re-prioritize available funds to enhance the overall portfolio.

[1] *Reliability-Centered Maintenance, Nowlan and Heape*

[2] *ARC Advisory Group's Enterprise Asset Management and Field Service Management Market Study*

Overview and benefits

Management of assets and facilities is getting increasingly more difficult as federal, state and local government, and private entities balance new construction required to continue economic and business growth against repair, replacement, or disposal of aged and failing infrastructure. Predictive maintenance can help these entities achieve substantial cost savings, allowing decision makers to maintain current assets and deliver new ones. Through intelligent monitoring and failure prediction of facilities and equipment assets, the following benefits can be realized:

Reactive maintenance
(also, Corrective maintenance)
Assets fail before being maintained. (Unplanned production shutdowns)

Planned maintenance
Systems are maintained at fixed time intervals to ensure continuous availability. (Inefficient use of resources)

Condition based maintenance
Systems are maintained based on simple rules using equipment information. (Simple rules, not very precise)

Predictive maintenance
Systems are maintained before failure but run as long as possible without interruption. (Efficient use of resources and minimal, planned shutdowns)

Benefits

According to a study by the US Department of Energy[3], the following average results were achieved by different companies that initiated a functional predictive maintenance program:

- **10 times** return on investment
- **20-25%** increase in production
- **30-40%** overall savings opportunities
- **35-45%** reduction in downtime
- **70-75%** elimination of breakdowns
- **25-30%** reduction in maintenance costs

An enterprise solution

Large organizations often possess numerous, disparate data sources with inconsistent metrics for evaluating their assets. The first step to gaining insights from this data is to conduct a broad assessment to identify sensible maintenance goals, measure effectiveness, and enhance data capture abilities, as applicable. Once this data is organized and equipment provides critical performance information, the volume of data can be harnessed by identifying the performance trends that historically led to failures and alert personnel before they occur. As these predictive insights are implemented, effective cybersecurity controls and organizational change management are required to maintain data security and facilitate long-term adoption.

Data management
Assess current data landscape and identify KPIs and metrics for analysis

Predictive analytics
Harness abundant data to create insights in digestible and actionable form

Change management
Engage and train personnel to better manage the maintenance program

Cyber security
Maintain data and maintenance scheduling security

[3] *Operations & Maintenance Best Practices: A Guide to Achieving Operational Efficiency", Federal Energy Management Program, U.S. DOE*

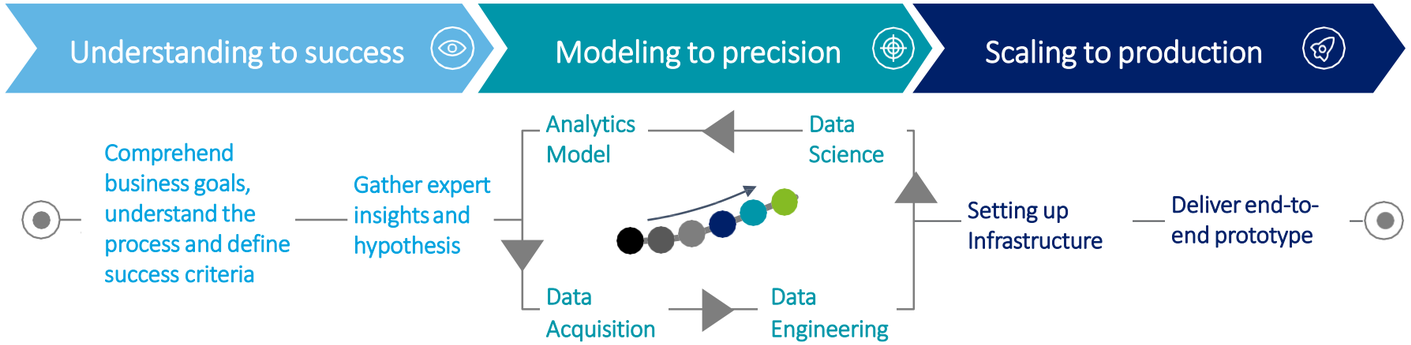
Delivering data-driven insights with predictive maintenance

Our experience

Deloitte has significant experience advising **public sector agencies and private firms** in the analysis, selection, and implementation of **predictive maintenance** solutions. We have also collaborated with leading technology companies to provide integrated, cross-functional solutions:

- ✓ **Power tool manufacturer** – Predictive failure modeling
- ✓ **Department of Defense**– Asset monitoring and tracking system implementation, risk management framework for cybersecurity controls
- ✓ **US food service manufacturer** – IoT solution implementation
- ✓ **Oil & gas refinery –** Asset monitoring and predictive maintenance implementation
- ✓ **Property & facilities services –** Maintenance dashboarding and data analytics
- ✓ **Industrial manufacturer –** Asset monitoring and tracking system implementation
- ✓ **Automotive manufacturer** – Big data analytics platform implementation for anomaly detection

High-level approach



Clarify project objectives and achieve stakeholder's alignment

- Understand business needs and objectives
- Kick off workshop with Deloitte and client team
- Define KPIs for success and quality measures
- Perform gap analysis on existing hardware and software infrastructure
- Gather insights and hypothesis

Development and testing of the analytical models

- Collect and understand limits and reliability of the available data
- Select, cleanse, and structure data
- Construct, test, and select the stage model with the appropriate tools
- Evaluate stage model quality and revise model as required
- Implement an offline prototype

Implementation of the tested system in production

- Design required hardware and software infrastructure
- Engineer the data ingestion and processing
- Upscale the scoring model into an end-to-end implementation
- Design and implement a functional and user-friendly interface
- Define long-term strategy

Our capabilities

Deloitte is investing in the following innovations that can enable advanced predictive maintenance solutions for large portfolio and asset managers.

Motion-E

Asset insights

Assesses the operational impact of critical asset failures and track segments, enabling asset managers to shift from scheduled to selective maintenance of critical assets

Asset foresight

Predicts with high levels of accuracy, potential asset failures to prompt pre-emptive maintenance and avoid incidents occurrence

NGIN

Next Generation Infrastructure

Asset management solution

Helps businesses enhance the way assets are handled and achieve asset management goals tailored to the company's maturity level

Data & information management

Enables businesses to determine their information management strategy and identify the governance and core elements to reach their goals

Contact us

Our Deloitte Infrastructure & Capital Projects team is ready to help your organization get started today!

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