

INDUSTRIAL MAINTENANCE | 2020

STATUS, TRENDS + FORECASTS REPORT



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ABOUT ADVANCED TECHNOLOGY SERVICES

With a history rooted in continuous improvement and a future driven by technology, Advanced Technology Services, Inc. (ATS) is a leading global solutions provider with over 35 years of proven experience in reliability-centered industrial maintenance and MRO services. Through our technically skilled workforce, standardized processes and smart technologies we deliver reduced downtime, greater productivity and measurable results to many leading process and discrete manufacturers. Learn more how we make factories run better at www.advancedtech.com.

INTRODUCTION

Many manufacturers are challenged with balancing day-to-day responsibilities with data-driven strategies to improve uptime and productivity. It can be difficult to find time for the latter when asset monitoring, preventive maintenance, troubleshooting, and repair demands are unrelenting, and more so when skilled labor is in short supply. But many are finding it is worth the effort. For plants unable to make widespread upgrades, incremental maintenance and reliability improvements to decrease unscheduled downtime are the steppingstones to world-class maintenance.

In early 2020, Plant Engineering magazine and Advanced Technology Services (ATS) partnered to take a fresh look at where manufacturing facilities stand in their maintenance strategies, practices, and goals. Respondents responsible for all or part of their plant's industrial maintenance were interviewed, with topics ranging from their strategic approaches, technology enablers, solution advantages, challenges, training, outsourcing, and plans to reduce unscheduled downtime.

From the revealing findings, study participants and industry peers can gauge how they compare, take heed of lessons learned, and prioritize their maintenance improvement goals to increase uptime, productivity, safety, profitability, throughput and overall equipment effectiveness (OEE).

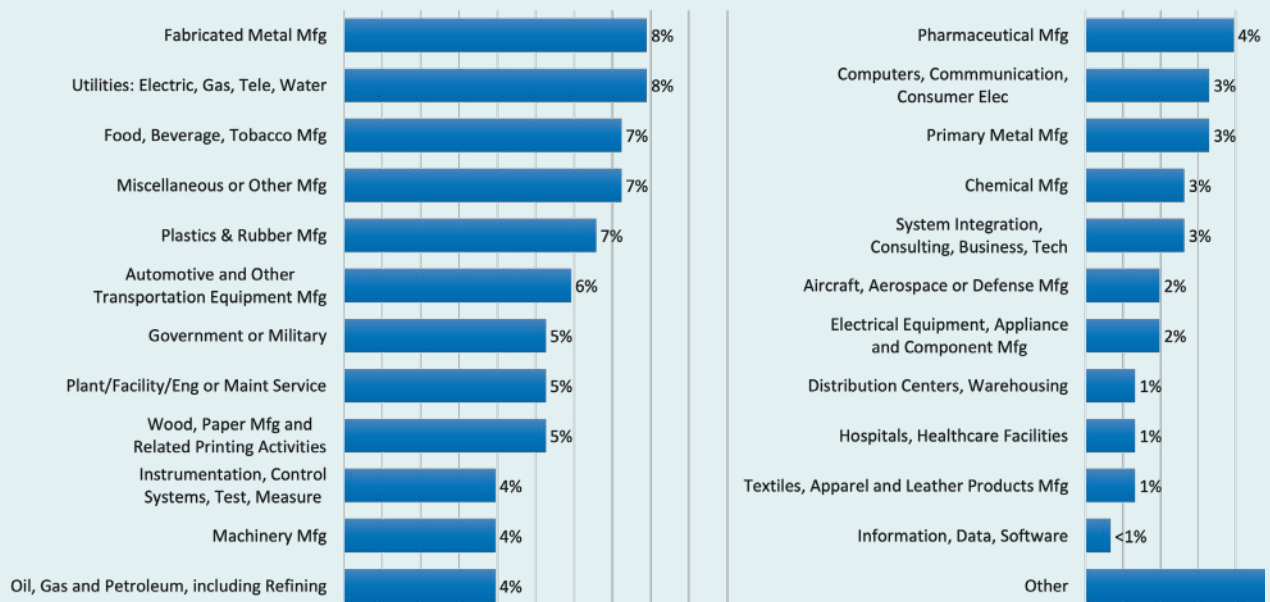


SURVEY METHODOLOGY

Recipients of Plant Engineering magazine responsible for all or part of their plant's industrial maintenance were invited via email to participate in the survey. The answers from 171 respondents were compiled in January and February of 2020. Eighty percent reported having engineering, maintenance, and/or supervisory roles as their primary job function. They average 23 years of industry experience, with 30% having worked in a plant or engineering-related position for more than 30 years. The participants work in facilities averaging 343 employees and approximately three-quarters are situated in the United States. A wide variety of manufacturing sub-sectors are represented as well as utilities, the public sector, healthcare facilities, services, and others.



PRIMARY BUSINESS SERVED



EXECUTIVE SUMMARY

Manufacturers depend on their machines to operate for as long as needed, sometimes 24/7. Because unscheduled downtime is a top challenge for most manufacturing operations, maintenance functions are tasked with maximizing equipment uptime and ensuring sustainable availability, performance, and output quality.

Every plant has its own approach to achieving these goals, and each has its own level of maintenance maturity. Replacing outdated equipment, upgrading maintenance strategies, and training or supplementing personnel are among the methods manufacturers are targeting to decrease unscheduled downtime.

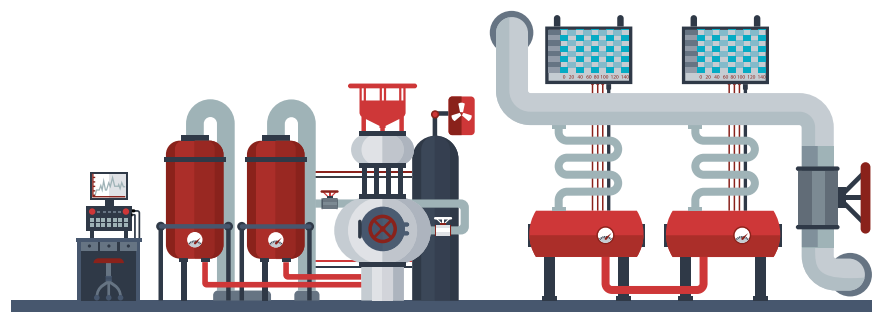
Modern maintenance practices feature advanced machinery, robotics, smart technologies such as sensors, and integrated software, but not every plant is prepared to invest in these opportunities or to properly staff them if implemented. As a result, many manufacturing facilities still rely on preventive or run-to-failure maintenance strategies, and some don't even have a computerized maintenance management system (CMMS/EAM) to consolidate their asset and work activities. Without a suitable asset management system, maintenance teams are reliant on siloed, disparate data captured in spreadsheets and paper-based records.

On the other hand, for those with the forward-thinking strategy, maintenance-related tasks enabled by the industrial internet of things (IIoT) simplify and further automate roles and responsibilities. Using smart machine sensors to collect streaming condition data, portable monitoring tools to gather data, and smart analytics to articulate actionable improvements of the data are just a few examples.

More often than not, organizations already struggling to maintain effective resource and staffing levels also lack the bandwidth to investigate, understand, justify, and leverage the latest innovations. For some, the variety of specialized skills required make it impractical to staff the roles internally.

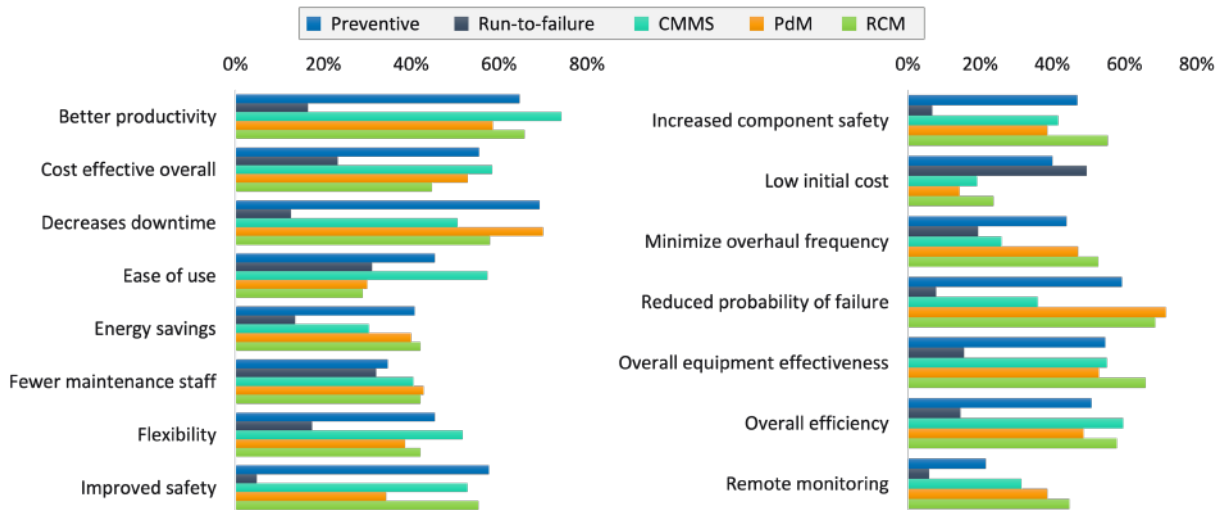
Common strategies to mitigate the skills gap include knowledge capture, training, outsourcing, and contracting skilled technical talent. Valuable tribal knowledge of experienced technicians and engineers, who worked largely through an era when data was not systematically captured or sharable, is lost when they retire if not digitized before they leave. Maintenance training remains an ongoing responsibility considering the perpetually advancing technologies and best practices. Partnering with an outsourced service provider to expand your technical workforce or provide a comprehensive maintenance solution is a growing trend, as it alleviates the time, manpower, and skills management challenges commonly faced internally.

This report highlights key research findings about maintenance strategies, challenges, plans, opportunities, and trends. We encourage you to review the full Industrial Maintenance 2020 study [here](#).



PRESENT MAINTENANCE STRATEGIES

ADVANTAGES TO MAINTENANCE STRATEGIES & TOOLS



While the strategies used for maintenance will vary by asset, process, or system, the most-used strategies reported in this survey are generally not considered the most cost effective or reliable. Majorities are still leveraging routine preventive maintenance and reactive or “run-to-failure” strategies in the plant, though this is not unusual for the least critical assets.

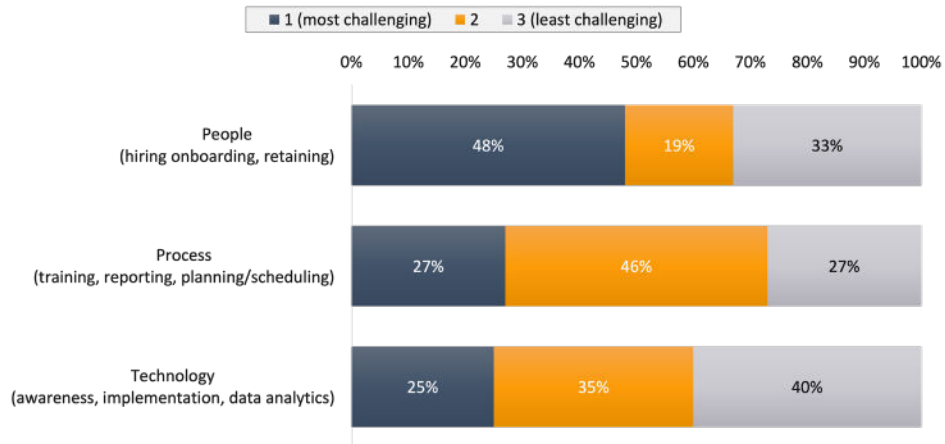
A promising finding is that 41% are incorporating predictive maintenance (PdM) and analytical tools to track asset degradation and schedule maintenance before costly failures occur. Additionally, 22% are benefitting from reliability centered maintenance (RCM) with operational data analytics to help ensure the machines function as needed. These practices are most valuable when applied to highly critical assets.

Surprisingly, only about half of the respondents reported using a CMMS solution. EAM/CMMS software consolidates asset and work order activity and histories, improving condition tracking, work planning, scheduling, and reporting. Use of a centralized, integrated EAM/CMMS system is far superior to siloed spreadsheets or paper-based practices.

The combination of currently used maintenance tools and strategies are delivering numerous operational advantages. For instance, approximately 70% of respondents report that PdM and RCM reduce the probability of asset failure, and PdM and preventive maintenance reduce downtime. RCM is also viewed favorably for improving OEE, overall efficiency, and safety. In terms of software tools, 74% say their CMMS improves productivity and at least half indicate it improves OEE, overall efficiency, safety, flexibility, usability, uptime, and is cost effective overall.

MAINTENANCE AND SAFETY CHALLENGES

CHALLENGES TO CURRENT MAINTENANCE PROGRAM



Current maintenance challenges can be classified into three categories: people, process, or technology. Insufficient availability of skilled labor, a universal maintenance concern, is ranked the most pressing challenge by nearly half of the respondents while another 19% find it moderately challenging. Functions such as hiring, onboarding, retaining, and retirements are part of this ongoing struggle.

Processes such as training, reporting, work planning, and scheduling are considered a moderate concern by 46%. Technology awareness and application is a lesser maintenance challenge, at least for 40% of the respondents. This could mean they are well prepared or that they are not embarking on challenging technology initiatives.

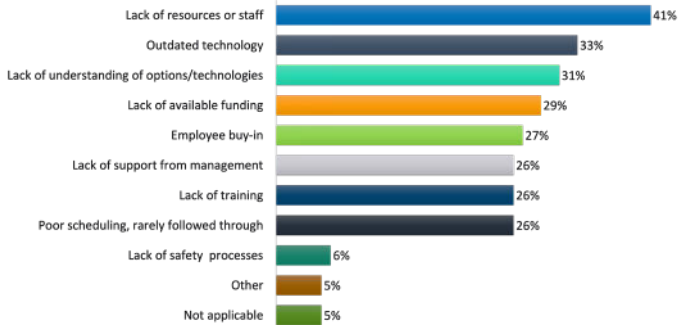
Safety is at the forefront of maintenance objectives. Twelve percent of respondents rate their current safety program as challenging, while 68% categorize theirs as good but acknowledge it should be improved.

CURRENT SAFETY PROGRAM

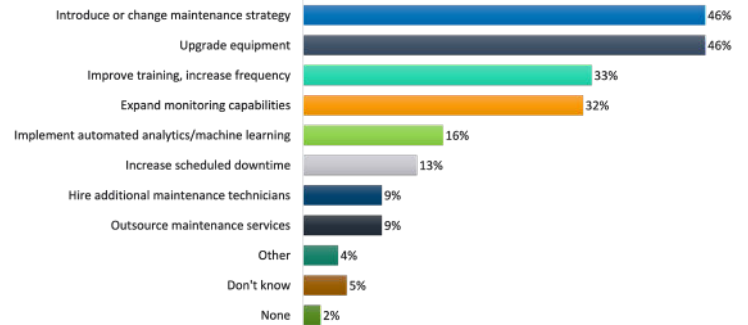


HINDRANCES INFLUENCE UPTIME PLANS

KEY CHALLENGES TO IMPROVING MAINTENANCE



PLANS TO DECREASE UNSCHEDULED DOWNTIME



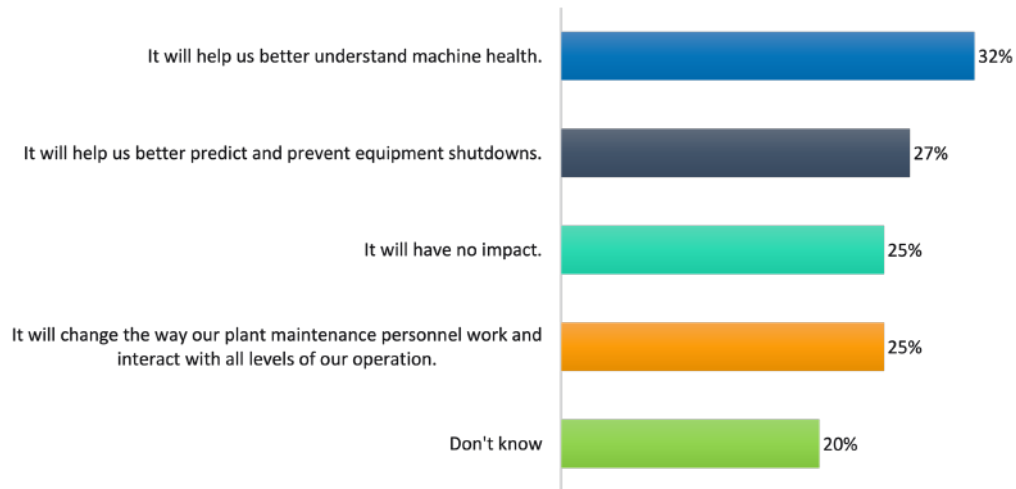
Many of the challenges hindering the ability to improve maintenance relate to people, including their lack of availability (41%), understanding of options (31%), buy-in (27%), training (26%), and management support (26%). At 33%, outdated technology is another prominent concern. Insufficient funding, a challenge for 29%, perpetuates the human and technology issues. Manufacturers need to find ways to overcome or mitigate these concerns to improve equipment availability, productivity, and performance.

As it stands, the respondents are planning a variety of approaches to improve uptime at their plants. Tied at 46% are goals to introduce or change the maintenance strategy and to upgrade the equipment.

Improving the quality and frequency of training is next at 33%. Thirty-two percent of respondents plan to expand their asset monitoring capabilities and 16% intend to implement automated analytics with machine learning (ML) – both of which are IIoT-supported capabilities. Another 13% percent anticipate efforts to increase scheduled downtime, and the intentions to hire more talent internally and to outsource maintenance to a service provider are tied at 9%.

IIoT'S EFFECTS ON MAINTENANCE OPERATIONS

IMPACT OF IIoT ON MAINTENANCE OPERATIONS



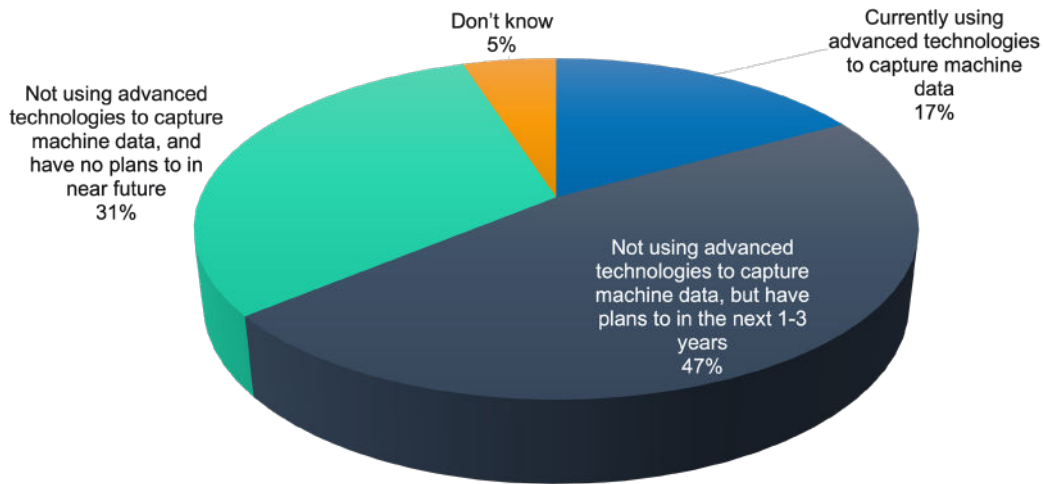
Answers to the question of how IIoT will impact plant maintenance operations reveal that some respondents may still be learning about its potential. Twenty percent don't know what its impact will be and 25% believe it will have no impact. On the other hand, 32% believe it will improve understanding of machine health; 27% believe it will improve the prediction and prevention of equipment shutdowns; and a quarter foresee IIoT influencing how plant maintenance work is conducted and interactions within the organization.

IIoT-based maintenance capabilities are wide ranging, and successful application assumes the use of an integrated EAM/CMMS solution. Machine monitoring sensors and portable condition monitoring tools combined with streaming and smart analytics with ML help to improve PdM and enable prescriptive maintenance (RxM).

Cloud-connected handheld and wearable devices for mobile workers; digital twins of machines and systems for modeling and simulations; augmented and virtual reality for personnel training and consultation; and drones and robotics for safety and efficiency are some additional options. Whether or which of these opportunities are on a manufacturer's radar – and in their budget – varies by company.

MACHINE DATA ACCESS AND APPLICATION

USE OF ADVANCED TECHNOLOGIES TO CAPTURE MACHINE DATA



One of the more prominent IIoT opportunities is wired or wireless equipment monitoring sensors that allow process and condition data to be gathered directly from the machines. The data is then analyzed and applied proactively in PdM work orders.

Seventy-eight percent of respondents are not currently using advanced technologies for machine data capture, though 47% plan to use it within the next 1-3 years. Only 17% are currently benefiting from the capability.

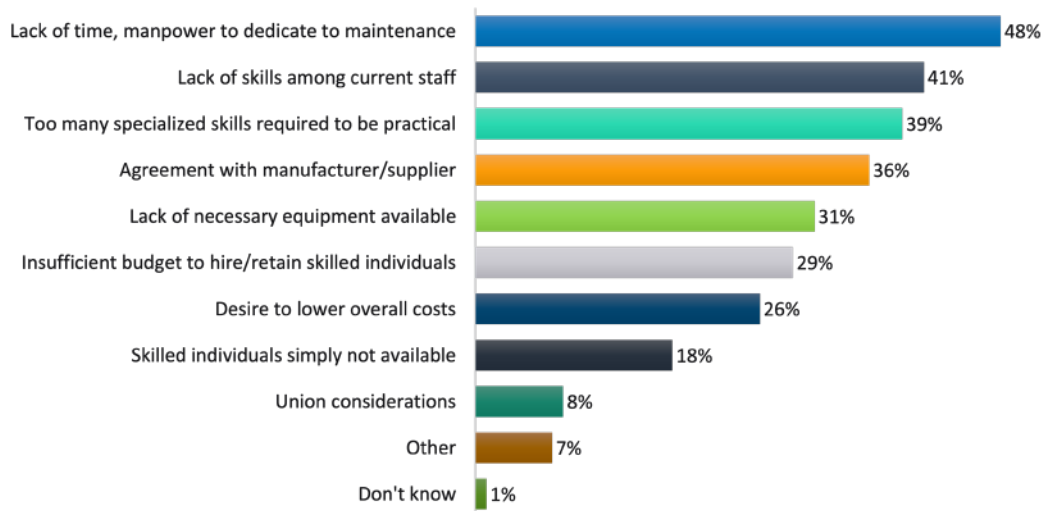
For companies that are capturing machine data, 96% say the data is analyzed, but only 70% proceed further by taking action. Four percent do not yet analyze nor act on their captured machine data, primarily due to time constraints.

USE OF MACHINE DATA CAPTURED



PARTNERING WITH A MAINTENANCE PROVIDER

REASONS FOR OUTSOURCING MAINTENANCE OPERATION

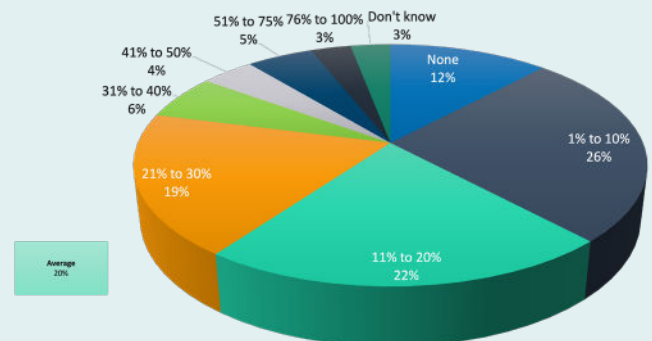


Manufacturing plants are increasingly relying on trusted external partners to supplement their technical workforce with highly trained and properly skilled maintenance professionals. In some cases, companies are outsourcing maintenance completely. Of the survey respondents, 3% report that 76%-100% percent of their plant maintenance operation is presently outsourced. At the other end of the spectrum, 12% use no maintenance outsourcing. The study found the average rate of outsourcing is currently 20%.

When asked which factors led to maintenance outsourcing, the most common reason given was the lack of time and/or manpower to dedicate to maintenance (48%). Just over 40% cite a lack of skills among current staff. Nearly 40% consider it impractical to staff all the various specialized skills required, while 18% assert that skilled individuals are hard to find.

Costs are a related concern – nearly 29% have insufficient budgets to hire or retain skilled personnel and 31% lack the necessary equipment. Having properly trained, skilled, and equipped personnel is essential to ensuring a safe, productive, and reliable workplace.

% OF OUTSOURCED MAINTENANCE OPERATION



ADVANCING INDUSTRIAL MAINTENANCE

“The perception of industrial maintenance is finally shifting from a cost center to a profit center, and rightly so. For it is maintenance that keeps critical assets operating reliably, performing efficiently, and producing quality goods. Transitioning from reactive and preventive maintenance to predictive and proactive practices, aided by IIoT-enabled technologies, can significantly reduce unscheduled downtime and increase operational performance and OEE.

Our goal at ATS is to partner with manufacturers ready to benefit from higher performance metrics through our ownership of the maintenance function or to fill their needs for an expanded technical workforce. It gives them peace of mind knowing they can focus on core competencies while their equipment is overseen by highly skilled experts, adept with the latest maintenance, reliability, and safety best practices and leading predictive technologies.”

Jeff Owens, CEO

Advanced Technology Services, Inc.

To view the entire 2020 Maintenance Study, [click here](#). For information about how your maintenance operations can be improved now and long-term, go to www.advancedtech.com or call 855-834-7604.

