

INDUSTRY IN MOTION

UTILITIES, TELECOMS,
OIL, GAS, ENERGY



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MAINTENANCE
ENGINEERING
REPORT 2023

Institution of
MECHANICAL
ENGINEERS



FOREWORD

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COMMUNICATIONS, RS**

The current financial climate is putting even greater pressure than usual on maintenance engineers, with ever increasing demands to reduce both costs and downtime. To better understand how these challenges are affecting the profession, RS partnered with the Institution of Mechanical Engineers (IMechE) to survey its members. While the overall survey included almost 700 maintenance engineers in the UK and Ireland, this report focuses on the responses of 125 participants from the utilities, telecoms and oil, gas and energy sectors. Unless otherwise stated, the figures and statistics included in the five sections refer to answers from these industries alone.

1

MONITORING MAINTENANCE ENGINEERING: UNDERSTANDING THE CONSEQUENCES

Whether it's a sewage treatment plant or a reservoir, a nuclear power plant or an offshore energy platform, the assets that collectively make up the utilities, telecoms and oil, gas and energy sectors are of national importance. We're talking about critical infrastructure that we all rely on. By nature, they are hazardous to people and planet. If they aren't operating as they should, the resultant losses for the companies and for their customers can be enormous.

The engineers that maintain these facilities and the equipment within them are aware of the responsibility. Those who responded to our survey showed repeatedly that they're committed to minimising risks, whether that's in terms of the environment, safety, cybersecurity or downtime.

2

GETTING THE RIGHT SKILLS IN PLACE: MAINTAINING 19TH-CENTURY ASSETS FOR 21ST-CENTURY INDUSTRIES

You continue to work with what you've got for as long as you can. In terms of the water industry, that means nineteenth-century systems and structures. Other infrastructure in the UK has been around for a long time too, so it's the same for many of these sectors – they've got lots and lots of ageing assets. It's the biggest challenge for these maintenance engineers and they're looking for solutions.

3

TELLING THE TRUE COST OF BREAKDOWNS: UTILISING DIGITAL TECHNOLOGIES

While the renewable power companies aren't struggling with ageing assets in the same way that other industries in the utilities, telecoms and oil, gas and energy sectors are, they are facing the similar geographic challenges. It's more difficult and more expensive to get maintenance engineers and supplies to remote locations – and even more so if offshore facilities are involved. In this context, digital transformation is a game changer.

4

COLLABORATING WITH STAKEHOLDERS TO RAISE PERFORMANCE: UPHOLDING STANDARDS

Governance is another major influence on maintenance engineering within the utilities, telecoms and oil, gas and energy sectors. These industries, especially those that are regulated, are highly scrutinised, whether by the public, the media or government organisations such as the Environment Agency and OFWAT, which oversees the water and sewage industries and can impose heavy fines when legislation is breached. Such scrutiny further encourages maintenance engineers to reduce risks, optimise assets and maximise uptime – and makes quality assurance from suppliers an even higher priority.

5

HARNESSING TECHNOLOGY TO IMPROVE EFFICIENCY: BUILDING ON EXPERIENCE

Long before the Industrial Internet of Things (IIoT) and Industry 4.0, there was telemetry via cable and wires. This was widely adopted within the water, telecoms and power industries as it helped them to understand how assets were performing, which they're now trying to address with secure cloud or wireless digital solutions. They are also looking for suppliers to help them maintain this edge. We can help support you on that journey.



MONITORING MAINTENANCE ENGINEERING TODAY

Is there such a person as a typical maintenance engineer? Our survey suggests that some things never change. Engineers remain practical people, focused on keeping the assets in their care in good repair and avoiding outages.

Although it's still an overwhelmingly male profession – 93% of the people in our survey are men – things are changing. For one thing, the profession is getting younger. More than half of the engineers in our survey are Millennials – people born between 1980 and 1994.

According to data from Engineering UK¹, the percentage of people aged between 25 and 34 in engineering roles rose from 23.2% in 2010 to over a quarter in 2021 and they are now the largest single age group in the profession.

"I feel like this is quite a natural progression with very positive implications going forwards," says Lydia Amarquaye, Professional Development and Education Policy Advisor at IMechE.

"Millennials are now reaching key decision-making positions within companies and they're aspiring to make a difference in their organisations as well."

"They've grown up with different technologies and they will be trying to implement some of these in their work to make life more efficient for themselves.

"I think we're going to see the effects of this shift coming through in the way that businesses are conducted, as it plays into management styles. So, I think it is going to be exciting for the industry as a whole."

Dr Moray Kidd is a maintenance engineering academic who teaches tomorrow's engineers and those who come back into education to advance their careers. He says the generational change in the profession is nothing new.

"I'm not sure that this shift is any different to generations before. Nowadays, there's an incentive, certainly in the high-risk industries, such as oil and gas, for very experienced, capable engineers to leave the organisation in their fifties, partly because they will get penalised on their pension if they stay," he says.

"What really surprises me is that organisations struggle to find a way to transfer knowledge so they can benefit from their experience before they leave."

His concerns were echoed by one of the engineers in our main survey who said both manufacturers and contractors were at risk because of engineering's ageing skilled workforce. "The experience that will be lost in the industry in the next few years is huge and there is a large age gap to the next engineers coming through," they added.

However, Kidd is more optimistic: "In education, the numbers coming into the profession are very strong," he says. "That means that the people in the middle – the Millennials, if you will – have a lot of opportunity to make a difference."

He says that the new cohort of maintenance engineers are keen to take advantage of the opportunities presented by technology. "Industry 4.0, specifically for maintenance engineering, has really energised a lot of interest for younger engineers coming into the profession," he adds.

Richard Jeffers, Managing Director of RS Industria, believes the profession is renewing itself. "I don't buy this idea that everyone experienced is leaving and there'll be no one left in engineering in 10 years' time," he says.

"As long as I've been an engineer in a leadership role, I've been told that there's a demographic time bomb when all the engineers are going to retire. And guess what? People retire, but then people come in. I think the pool is being replenished."

Young entrants are "digital natives", Jeffers adds. When they work alongside experienced people you get what he calls "the perfect blend of the digital native and the person who has practical engineering and problem-solving skills."

Evidence of that practical focus can be seen from the fact that just over half of those surveyed have hands-on operational responsibilities, with just a third responsible for maintenance strategy. Equipment reliability and maintenance compliance remain the key job responsibilities.

When it comes to assessing their organisation's maintenance maturity, 67% say it is only at a medium level and only 18% assess it as high. Kidd thinks engineers may be understating their achievements.

"I think in many of these cases they are probably doing themselves a disservice," he says.

"The important question is, how does the maintenance function meet the business' objectives? "Many of these organisations will have suitably qualified and experienced technical expertise, capable of delivering a maintenance strategy, who will drive through what is required," says Kidd.

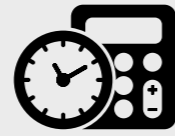
"If you were to visit them, I would guess they are doing some predictive maintenance, they're doing more with data on their critical assets. But they probably feel that they could do better. I would guess they are doing better than they think they are."

This is illustrated by the utilities, telecoms and oil, gas and energy sectors as although less than a fifth rate their organisation's maintenance maturity level as high, they are more likely than average to be using predictive maintenance (50% compared to 38% overall).

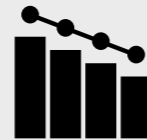
They are also more likely to be seeking accreditation to external standards such as ISO 18000, the international benchmark for radio frequency identification technologies, and protecting themselves from cyber-attacks. This higher level of concern makes sense, says Cruise, as "These industries are responsible for national assets. They are critical. Obviously, they'd be very nervous about cybersecurity – and rightly so."

Overall, more than 8 out of 10 say their maintenance strategy improves cost effectiveness, or supports cost avoidance, and 4 in 10 say it reduces downtime. Other areas of strategic focus mentioned in feedback include adopting lean project management techniques and sustainability.

What are the advantages to your highest priority maintenance strategy?



54%
Cost effective



42%
Reduced probability of failure



40%
Decreases downtime



30%
Efficiency



28%
Cost avoidance



GETTING THE RIGHT SKILLS IN PLACE

In common with most UK business functions, maintenance engineering has a problem with attracting and retaining engineers with the right skills, an issue mentioned by almost half of those surveyed.

Of course, the rise in the number of Millennials in the profession bodes well for the future, but attracting new entrants remains a challenge, says Amarquaye.

“It’s vital to help young people understand what engineers actually do.”

“I was previously an automotive engineer,” she explains. “Even when I was choosing to study engineering at university, I was being asked if I was studying to fix cars. So there’s still a lack of understanding of what an engineer is and what an engineer does.”

But once people know they want to be a maintenance engineer, there remains confusion about the best route into the profession, she adds. Although many are aware of engineering courses in higher education, Amarquaye says more needs to be done to promote apprenticeships, particularly to attract a more diverse cohort of candidates.

“Some people see it as sort of a lesser route into engineering. But, actually, you can go far through an apprenticeship. There are many businesses whose engineering leaders came through the apprenticeship route.”

Amarquaye also urges businesses to engage with higher education to help prepare students for what they will face when they enter the workforce.

“We’re expecting graduates to come into the profession and hit the ground running, without having input from industry,” she adds.

“It’s important they have the right skills for engineering and the right mindset, whether that’s around sustainability, or how they approach problems, but also having all the technical skills that they need to thrive in the workplace.”

Key among those skills is the ability to work with and analyse data, says Jeffers. “I would like to think that the emphasis on the importance of Science, Technology, Engineering and Mathematics (STEM) in the education system is helping in this regard,” he says.

The importance of having role models who can inspire young people – particularly women and people from diverse backgrounds – to become engineers is emphasised by Kidd.

Although the gender balance could be improved, Kidd says the numbers of young people coming

through the higher education route into engineering are “stronger than ever”.

But when the new generation of engineers moves into industry, Botfield says employers must recognise that they have expectations about how the organisation is run.

“Younger people want to work for organisations that are purpose-led.”

“It can’t be words on a wall or words on a page. People need to believe that the company is invested in its purpose, because that’s what attracted them to the organisation. But if they don’t see and feel it being played out, then they’ll quickly want to move on somewhere else. It cannot be superficial.”

Botfield says it’s important that an organisation “stands true to its worth around ethics and integrity. If people can connect to something that’s purposeful, that means something to them, it will motivate and inspire them that they’re making a difference. And that will help to retain talent for longer.”

Throughout the survey, respondents spoke of the challenge of finding people with the right skills and, in many cases, this led them to outsource activities. Six in ten made this decision because too many specialised skills were required, while 42% mentioned lack of skills among staff and 45% of maintenance engineers said they took the step simply because they had reduced headcount. Just over a quarter said the decision was prompted by budget issues.

So, will outsourcing become a growing trend? Within utilities, telecoms and oil, gas and energy, it looks likely, with 21% of respondents in these sectors envisioning a need to outsource in the next 12 months compared to 10% overall. Asked about the perceived benefits of maintenance services, 43% put flexibility at the top of the list.

What’s driving this difference? “It’s quite simple,” says Cruise. “It’s about ageing assets.”

“These industries have lots of ageing assets. They need a wider range of options available to source the parts and make sure that they’re genuine and fit for purpose.”

“The flexibility of outsourcing helps with this. Plus, if for whatever reason the solutions provider cannot get the genuine part, they have the expertise to find a suitable alternative that will work and tick all those other boxes around governance as well.”

If you decide to go down the outsourcing route, Jeffers urges a practical approach. “I have three rules

about outsourcing,” he says. “First, outsource if it’s genuinely cheaper – which is not that often.” “Second, it can be a good way of coping with peaks and troughs in demand. And lastly, it can make sense if you need a specialist skill that you either don’t have, or don’t wish to have, in house.”

Jeffers gives the example of equipment containing hazardous materials which requires specialist engineers who can ensure compliance with strict regulations. Maintaining your own team can be costly and specialists may be hard to recruit, whereas bringing in experts ensures that you get the work done when you need it and to the required standard.

Among the maintenance engineers in our survey who say they are considering outsourcing in the year ahead, the most popular categories were predictive maintenance, energy loss surveys and lubrication services.

“I’m a big advocate of a hybrid approach,” says Kidd. “Most importantly, whatever you do needs to fit the strategic needs of the business. For example, organisations that are specialists in providing services including condition-based maintenance are probably best-placed to take on, or support, the maintenance of high-risk or critical equipment. And so a hybrid approach works really well.”

Whichever route you choose, Botfield says businesses should talk to their suppliers to find out what value they can add.

“It’s important for us to stay relevant as the world moves and business evolves – most businesses want to remain relevant,” she adds.

“Investing the time to talk and have a conversation about what’s keeping you up at night, from a maintenance problem perspective, that’s when we can have great dialogue. And that’s where you can put a solution in place.”

But, outsourcing and partnerships aside, it’s important not to overlook the need to develop in-house talent for the future of the business and the profession, says Amarquaye. The current maintenance engineering community holds the key to the future, she believes.

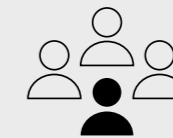
“We don’t know what jobs are going to be available and we don’t know what type of engineers we will need for industry in 10 years’ time,” Amarquaye says.

“But we do know that 80% of the engineers who are in the workforce today will be there 10 years from now. So, we need to make sure that those people are still looked after and invested in. They are the future of the profession.”

What are the factors that have led to you outsourcing?



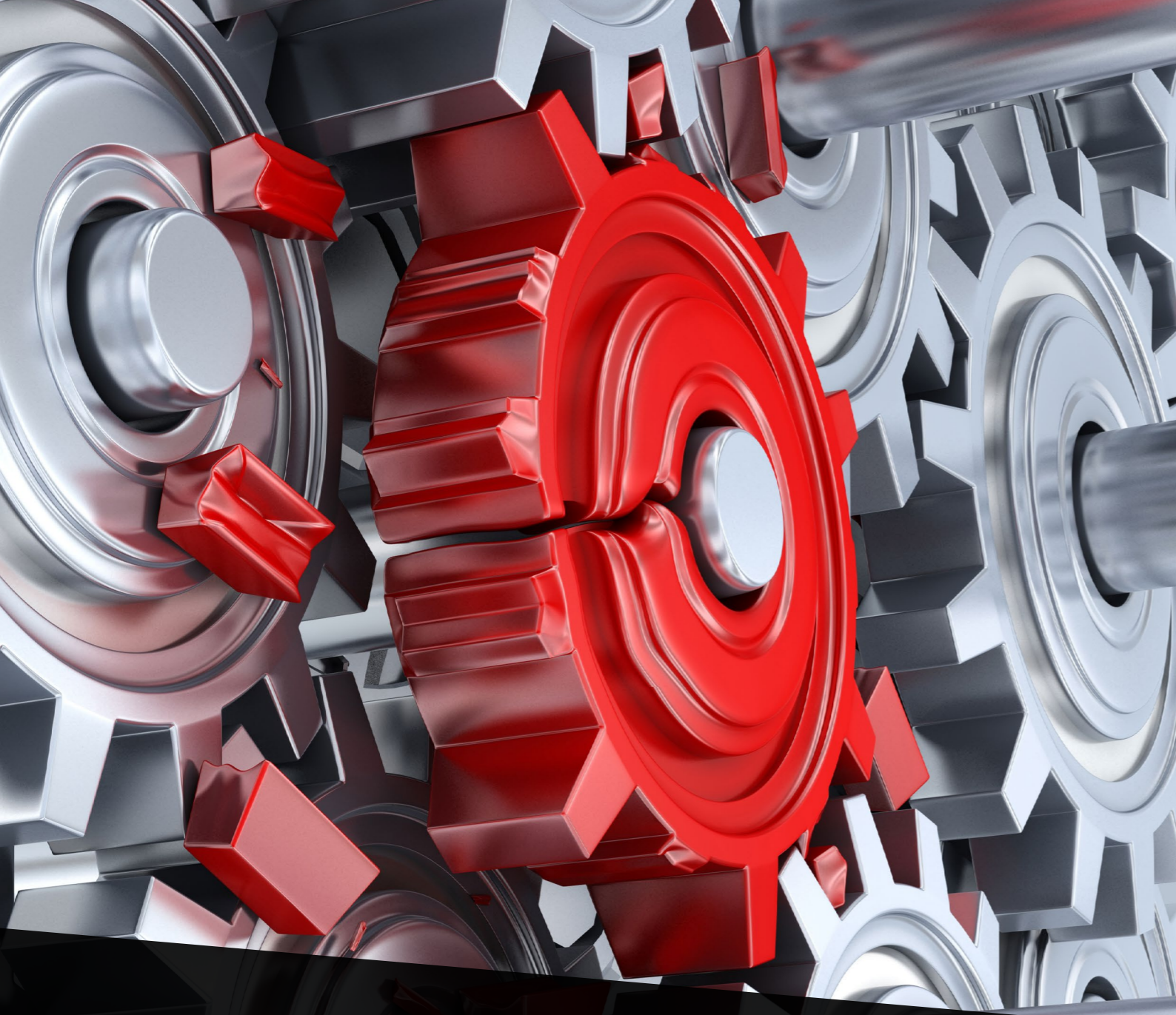
60%
Too many specialised skills required



45%
Reduced headcount



42%
Lack of skills amongst staff



TELLING THE TRUE COST OF BREAKDOWNS

As you might expect, downtime is the biggest challenge facing maintenance engineers in our survey. For the utilities, telecoms, oil, gas and energy sectors, an average of 19.6 hours a week is spent on unscheduled maintenance at an average cost of over £133,000. Scheduled maintenance is scarcely less expensive, costing companies just under 16.6 hours of downtime per week at an average weekly cost of over £112,000.

While the average hourly cost of downtime amongst all survey respondents is £5,121, this figure varies by sector, with the hourly cost of downtime in the fields of utilities, telecoms and oil, gas and energy averaging £6,804.

There are several reasons why it is higher for these organisations, says Cruise. In the regulated industries, for instance, if an asset stops working or engineers need to take it offline to resolve a problem, this may lead to fines from the governing authorities.

The scale of assets and levels of danger involved in maintaining them also makes a difference, as does geography.

“It’s expensive to get resources to remote locations. You’ve got to travel and get your equipment there. You might need to use helicopters for anything offshore.”

Across all the industries represented in the survey, the biggest driver of unscheduled downtime is ageing assets. However, a greater percentage of those in the utilities, telecoms and oil, gas and energy sectors put this in the number one spot (39% as opposed to 28% overall).

This is unsurprising, given the amount of nineteenth- and twentieth-century infrastructure that underpins these industries and the difficulties of replacing assets at scale. “It’s about the length of time these systems have been in existence,” says Cruise, “And although they’re always investing, these organisations can’t just go and replace the whole electricity network or an entire water and waste system.”

Kidd says unplanned maintenance is not a problem that’s going away anytime soon. “Despite working for over 20 years with predictive and condition-based maintenance, this remains a huge challenge,” he says.

“It comes back to resources, the right people, the right number of people and sufficient time and planning. “There’s been a lot of progress in preventative maintenance scheduling, but that’s led to incredibly demanding maintenance schedules.” Kidd says it only takes one breakdown to disrupt planned maintenance and create “a vicious circle” of backlogs. “Even with some of the best maintenance practices I’ve seen, there’s always a horror story at some point where something went badly wrong and needs to be fixed,” he explains.

“That puts additional pressures on already limited resources – and I don’t see that going away anytime soon. Absolutely, there should be an aim to continuously reduce this, but in my lifetime, I think there will always be unscheduled maintenance.”

Maintenance engineers in our survey described the pressures they face with 33% highlighting the effects of inflation and higher costs and 39% continued supply-chain disruption. Declining departmental resource and lack of investment were cited a third.

“We have a limited budget based on the requirement to generate cost efficiencies post-pandemic and there’s limited availability of suitable engineers with appropriate levels of skills, knowledge and experience,” said one respondent to the overall survey.

“We work to a very tight schedule with a lot of planned maintenance work,” said another.

“The maintenance window is very small because of high energy demand.” Consultants PwC say that ageing assets², which are no longer fit for purpose, can have a far-reaching detrimental impact on the profitability of the whole business, as can machinery which is poorly maintained, not operated efficiently, and which suffers from high levels of downtime.

Average
hourly cost
of plant
downtime


£6,804.10

Number of hours
spent weekly
on unscheduled
maintenance


19.6

They recommend creating an asset lifecycle management plan which should include using monitoring and data analysis, challenging workforce practices to ensure asset performance is optimised and maintaining up-to-date and accurate asset registers and maintenance records.

A respondent in our main survey said that persuading engineers of the need to manage assets effectively was hard. "The biggest challenge is embedding modern asset management system thinking into clients' operations as business-as-usual," they said. "Getting our clients to implement solutions regarding asset data information and optimum maintenance strategies is where we find the most challenge."

Kidd agrees. "There's a real issue here about the lack of consideration for lifecycle costing, right from the beginning of the project, through to ageing assets - and being able to quantify that," he says.

But Kidd has a very practical suggestion for engineers managing ageing assets: "Going back to the fundamentals of reliability, if you can reduce the load, then you might be able to extend the reliability and ultimately improve the availability of the asset," he says.

Almost half of organisations in the survey say they plan to upgrade equipment or increase monitoring to reduce unplanned downtime. Four in ten are planning a move to preventative maintenance and 35% want to improve training to tackle the problem.

Over a third do not know what proportion of their annual operating budget is spent on maintenance - of those who do, a similar number estimate that it consumes 5-10% of their budget.

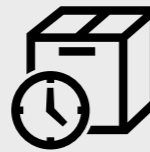
Drivers of unscheduled plant downtime



39%
Ageing assets



20%
Mechanical failure



6%
Lead time to get hold of product



6%
Operator error

**COLLABORATING WITH
STAKEHOLDERS TO
RAISE PERFORMANCE**

Given the challenges facing the economy and businesses of all sizes, it's hardly a surprise that many of the targets set for maintenance engineers are around financial performance.

In the overall survey, the top three Key Performance Indicators (KPIs) used to measure the achievements of maintenance engineers were maintenance cost/replacement asset value, budget adherence and maintenance backlog, all reported by a third or more of respondents.

While 28% were being measured against failure analysis, this rose to 46% for respondents in the utilities, telecoms and oil, gas and energy sectors – making it the most common maintenance KPI for engineers in these industries, followed by budget adherence and maintenance backlog (again at 33%).

Once again, this is because water, waste, communications and power are such critical national services.

“If there's any failure, it puts your lights out, it turns off your taps, it stops your internet,” says Cruise. “It's the backbone of everything we do every day so there are consequential losses.”

So far, so predictable. But more than half (56%) of those surveyed said the data used to measure their performance was not reliable. Jeffers can think of one reason why engineers may mistrust the data.

“I'm not surprised that there is a lack of confidence in the quality of some of the underpinning data,” he says. “Most plants under-report operator-induced failure and over-report maintenance failure because, if they call the technician out, it must be a maintenance problem, even though the cause of the problem could be, for example, using damp card in the packing line, which is clearly not a maintenance problem.”

Of course, the choice of KPIs is often down to the department which is the main stakeholder for maintenance. In our survey, 67% said Operations was their main stakeholder while 41% named Health & Safety.

Kidd says KPIs often reflect organisational boundaries as no one wants to be measured on things that are outside their scope of control.

“Definitions can become a bit hazy. A metric like Availability is a very crude measure and that leads to discussions about confidence around what are the definitions, how is the data gathered, how is it analysed and how is it used to improve performance?”

“I think we've set ourselves up for failure on reliability when it comes to KPIs because the metrics we have created are very basic and there's a lot of room for misunderstanding – it's a real challenge,” Kidd adds.

Whoever sets the KPIs, Emma Botfield, RS's Managing Director, UK & Ireland, says collaboration with other teams is critical and should not just be confined to key stakeholders like Operations and Health & Safety.

In today's complex organisations, with multiple interdependencies, it's essential to collaborate with teams that provide direct support to maintenance engineers, like procurement, she adds.

From drawing up contract agreements that ensure maintenance has essential supplies when they need them, to effective supplier management, the role of procurement teams in supporting maintenance engineering goes well beyond sourcing parts, vital though that is.

In our survey, just over a quarter said procurement had a high level of involvement in negotiations about costs and requirements with suppliers. Six in ten said procurement had only a medium level of involvement. Botfield says that's not the best way to improve efficiency.

“The survey tells us that businesses are coping with a myriad of operational challenges, whether that's skill shortages, supply chain, raw materials or energy costs.”

“We work with lots of businesses from many different sectors across the UK and Ireland and the challenges are very similar. And I get the sense that there's a lot of firefighting because of the geopolitical environment and its effect on supply chains,” she says.

“I think businesses need to partner with suppliers to take a joint strategic view of where value can be added.

If you can take the time to step back and think more holistically, that's when you can start to solve problems with trusted supplier partners that will reduce the need for firefighting.”

Botfield says, at its best, collaborating with a supplier is like consulting your GP. “They don't just give you a solution. They try and diagnose what your problem is first, what's causing you the pain. “And that's where a real trusted supplier can work with you because it's not about a transaction. It's about understanding what you are trying to achieve and where are your pain points and jointly solving them to deliver the best value for money for your organisation.”

Engineers in our overall survey agreed that suppliers need to be aligned to their customers' business goals. One said suppliers should show “commitment to our success” while another emphasised the importance of “communication and engagement”.

In the overall survey, product availability was rated the single most important requirement that maintenance engineers expected from suppliers but tellingly given the need for sustained reliable performance in their sectors, quality assurance was rated most important in the utilities, telecoms and energy, oil and gas industries (28%). This ranked second in importance across all industries (18%).

What is most important for a supplier to deliver?

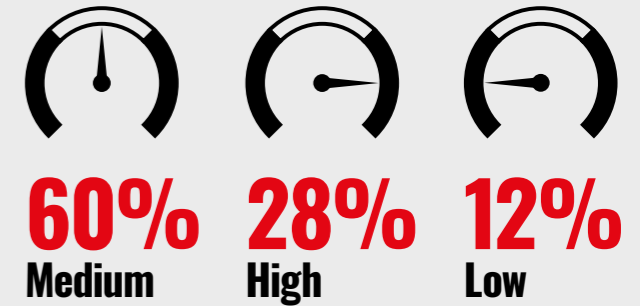
 **28%**
Quality assurance

 **14%**
Responsiveness

 **14%**
Availability of product

 **14%**
Delivery

Extent procurement is involved to agree supplier requirements



Maintenance KPIs in place

 **46%**
Failure analysis completion

 **33%**
Budget adherence

 **33%**
Maintenance backlog/work order completion rates

HARNESSING TECHNOLOGY TO IMPROVE EFFICIENCY



There's plenty of evidence that technology can improve maintenance engineering. In a study by consultants McKinsey, one company's condition-based maintenance system – which used data from Industrial Internet of Things (IIoT) connected devices and a historical service database – cut downtime and parts costs by almost a third³.

And our survey confirms that technology is making a difference. More than 9 out of 10 firms said they were using Computerised Maintenance Management Systems (CMMS) or Enterprise Asset Management (EAM) to monitor and manage maintenance.

But, encouraging though that was, just over half confessed to still using Excel spreadsheets and roughly a quarter relied on paper records. So how to explain this apparent tech contradiction?

"I don't think that's a maintenance problem," says Jeffers. "I think it's indicative of poor integration between different technology platforms and the fact that the Microsoft desktop suite is designed to be super-easy to manipulate data.

"Quite often the fastest and cheapest way to manipulate data into reports is to use Excel," he says. "There's a difference between using Excel for reporting and forecasting – which I would suspect a lot of people do – and using Excel to manage the maintenance workflow, which I doubt many really do.

"There's an awful lot of CMMS platforms out there at a variety of price points and it's rare to come across a factory that has no CMMS platform. There are not many people out there who have nothing but Excel."

In many ways, Jeffers argues, digital technology is already ubiquitous across maintenance engineering, so much so that people tend to take it for granted. "IIoT, digital transformation and Industry 4.0 are terms the average operational maintenance person doesn't use," Jeffers says. "They're not shopfloor buzzwords. People talk about these new developments like they're a revolution, when in fact it's an evolution, because there's a lot of good automation in factories and there has been for a long time.

"A customer told me they had a policy of not using the Cloud. I said, do you use Office365? They said yes – well that's on the Cloud. But if you ask people if they collect data from their machines and use that to make decisions, a lot more would say yes."

This helps to explain why, in the overall survey, only 16% of survey respondents say they use IIoT and just 18% are planning a digital transformation. Among those working in utilities, telecoms and oil, gas and energy sectors, however, 30% answered yes to the latter question.

The geography of infrastructure encourages an embrace of digital technologies, says Cruise: "If you've got fifty wind turbines out in the North Sea, for example, the cost to go and mend those is astronomical. It's critical to know what's going on."

Many of these organisations have a strong foundation of earlier technologies. "With telemetry, they were investing early on when plants were built," continues Cruise, "so they have sensors in place."

The top three condition monitoring techniques used within the utilities, telecoms and oil, gas and energy sectors are vibration, current monitoring and oil analysis. These were also the top three techniques in the overall survey, but use of them is higher in these industries at 54% compared to 44% for vibration, 50% compared to 43% for current monitoring and 46% compared to 38% for oil analysis.

The most common response to "How do these technologies impact asset health and performance?" was "Better understand asset health", but again the figures were far higher for the utilities, telecoms and oil, gas and energy sector respondents than average (82% as opposed to 68%). Once more, this can be attributed to key characteristics of these industries, including history, geography and scale, and the corresponding desire to improve predictability and minimise downtime.

Engineers identified another benefit of condition monitoring as human rather than technical, with more than a fifth of respondents saying it changed the behaviour of employees and how they manage assets.

Kidd says that's just what should happen. The more operators, as well as engineers, understand about how a machine operates, the fewer chances there will be for operational and maintenance errors.

It's an illustration of how the benefits of condition monitoring technology are not purely financial, he adds.

"There is also a big prize around sustainability," he says. "Energy monitoring provides a real opportunity to look at the impact of assets on the environment."

"By understanding the energy efficiency of a machine, we can add environmental considerations to the traditional calculations that companies make around uptime". "With high energy costs, the payback time of improved energy efficiency is now much quicker."

The increased take up of condition monitoring has been helped by a dramatic reduction in the cost of monitoring devices, says Jeffers. "The cost has plummeted, and we are able to apply better data science to analyse what monitoring is telling us," he adds.

But not every organisation will be able to get the most from the technology, Jeffers cautions:

“All the condition monitoring and data science in the world won’t help you if your culture is one of being reactive and firefighting.”

“The businesses that are doing well out of new tech are the ones that were doing well anyway, because they’ve got the right management processes.

Businesses that are trapped in a reactive cycle are not going to benefit because they don’t have the right mindset and ways of working.”

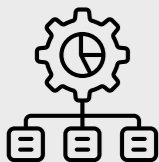
Technologies used to monitor or manage maintenance



54%
In-house excel spreadsheets



49%
Computerised Maintenance Management System (CMMS)



43%
Enterprise Asset Management (EAM)

How do Condition Monitoring techniques impact plant and asset performance?



82%
Better understand asset health



54%
Better predict failure



22%
Change the behaviour of employees and how they manage assets

Sources

- Engineering UK**
Trends in the engineering workforce
https://www.engineeringuk.com/media/318305/trends-in-the-engineering-workforce_engineeringuk_2022.pdf
- PWC**
Asset lifecycle management
<https://www.pwc.co.uk/services/consulting/operations/asset-lifecycle-management.html>
- McKinsey**
Establishing the right analytics based maintenance strategy
<https://www.mckinsey.com/capabilities/operations/our-insights/establishing-the-right-analytics-based-maintenance-strategy>

CONCLUSION: MAINTAINING MOMENTUM

MAINTENANCE ENGINEERING FACES MULTIPLE CHALLENGES IN THE YEAR AHEAD.

But the thing that comes across clearly from our survey is that maintenance engineers are practical people, they’re problem-solvers with an eye on technology to help them keep ageing assets in use – even in the face of cost pressures and supply disruption.

As Jeffers points out, the increase in the number of Millennials in the profession will lead to what he calls “a multi-generational blend” that will combine expertise and innovation, setting up organisations for success in a fast-changing world.

Recruiting the right people will continue to be a challenge, but by demonstrating their commitment

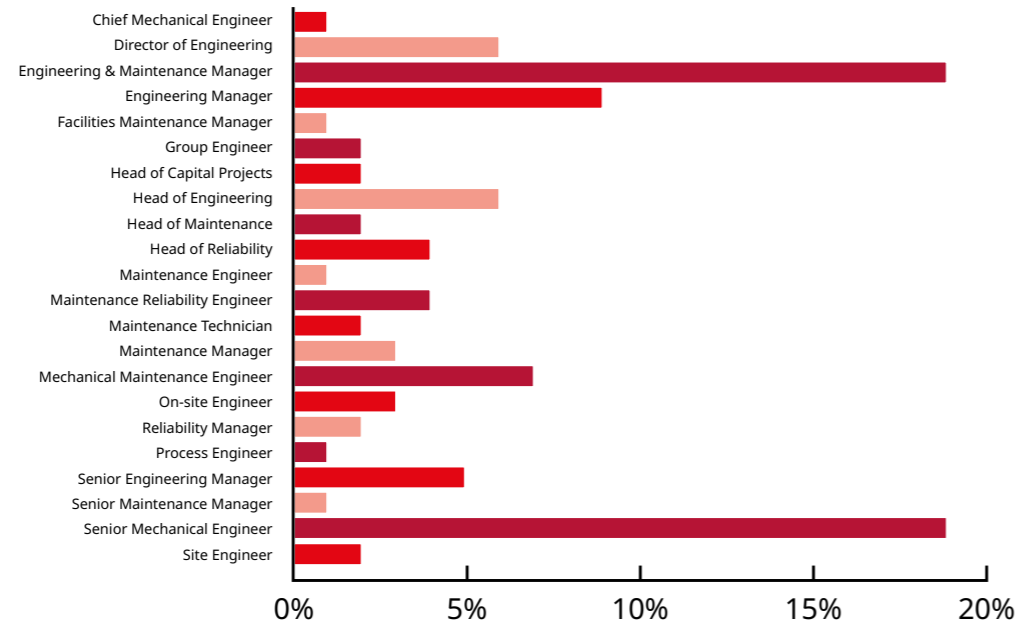
to core principles, companies will be able to attract good people. And, as Amaruaye says, today’s maintenance engineers hold the future of the profession in their hands.

The challenge of maintenance backlogs, and of recruiting and retaining suitably qualified people, will test the mettle of maintenance engineers.

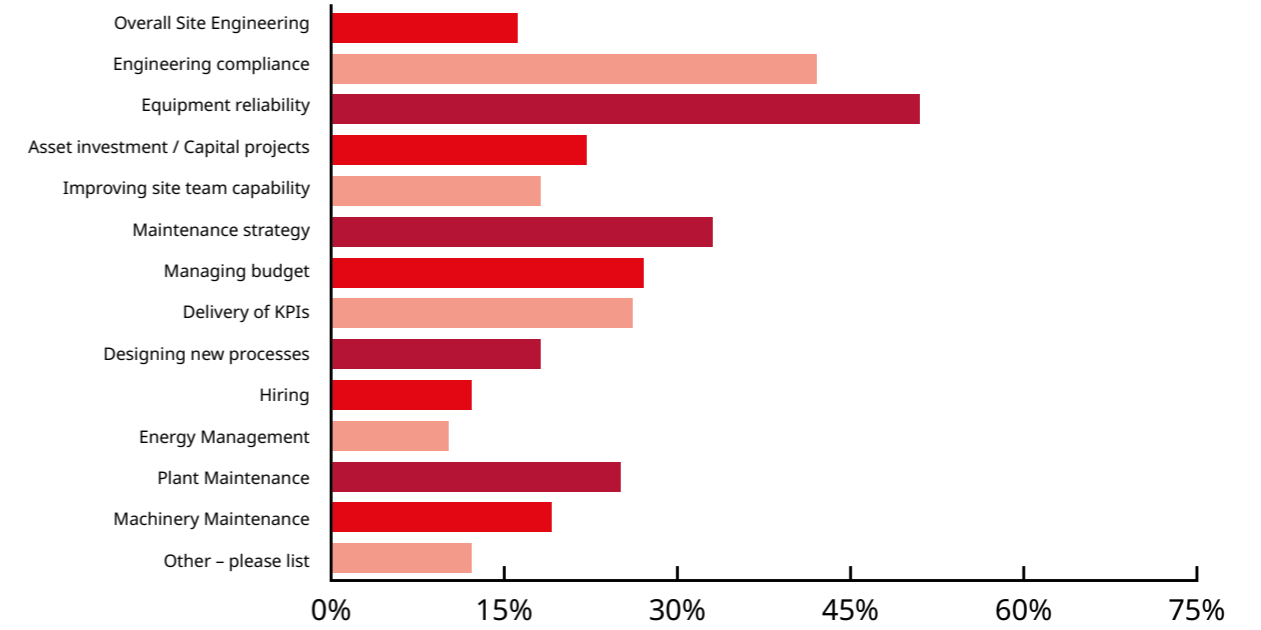
But their pragmatic approach will see them embrace digital transformation – even if they don’t choose to call it that. They will engage suppliers to help them meet new challenges and, above all, they will continue to tackle downtime and improve process efficiency wherever they can.

RS has expert advisers available to talk through the challenges at hand and discuss how we can help organisations like yours. If you would like a conversation, please [click here](#) and complete the form.

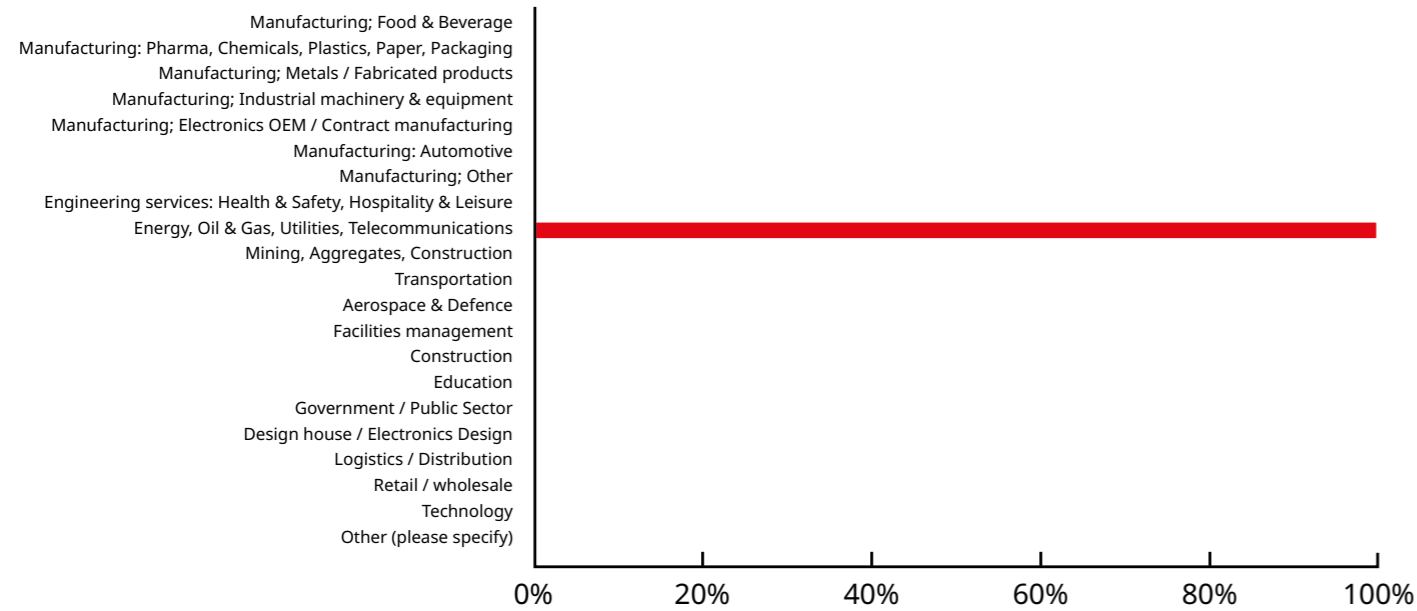
Which of the following best describes your role?



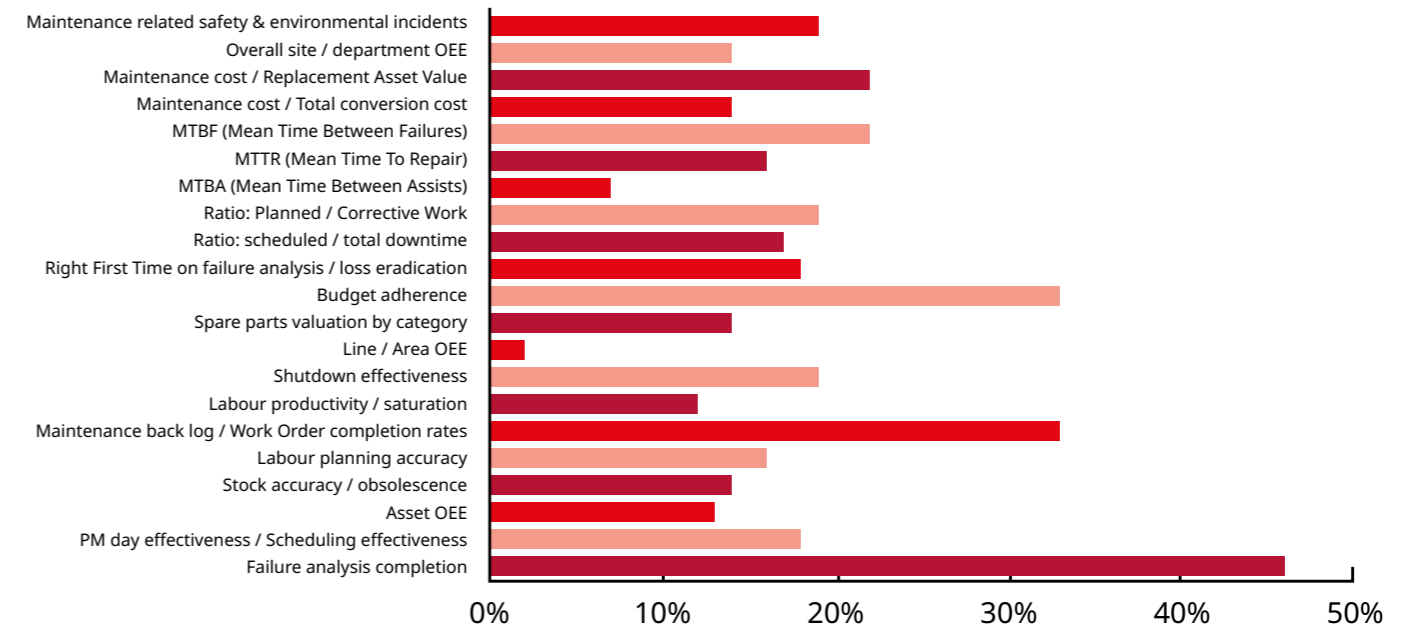
What are you responsible for in your role?

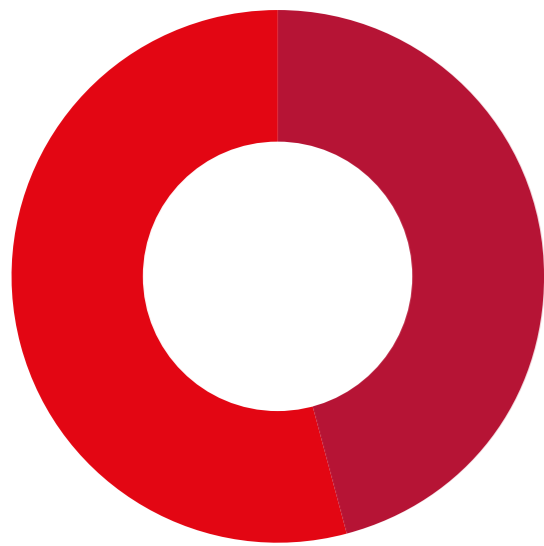


Which of the following best describes the sector your company operates in?



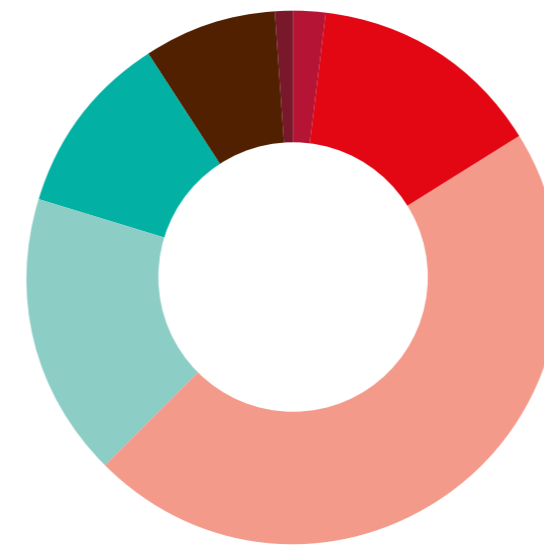
Maintenance KPIs in place





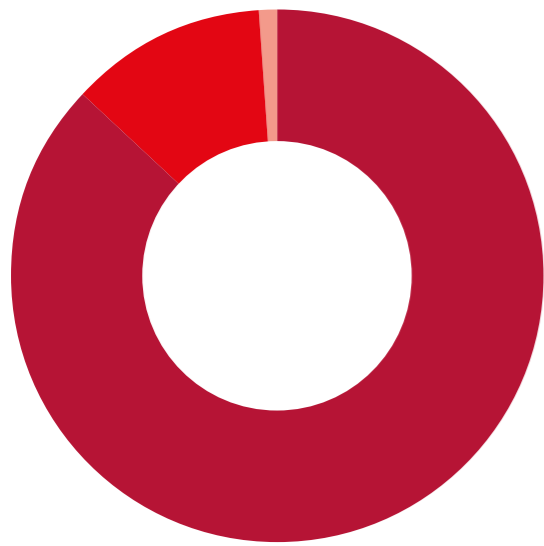
Job role

46% Leaders
54% Operational



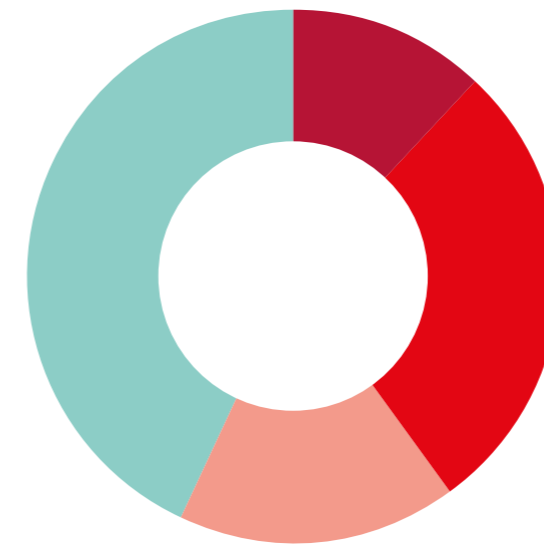
Which of the following best describes your age?

2% 16-24 years
14% 25-34 years
46% 35-44 years
17% 45-54 years
11% 55-64 years
8% 65+ years
1% Prefer not to say



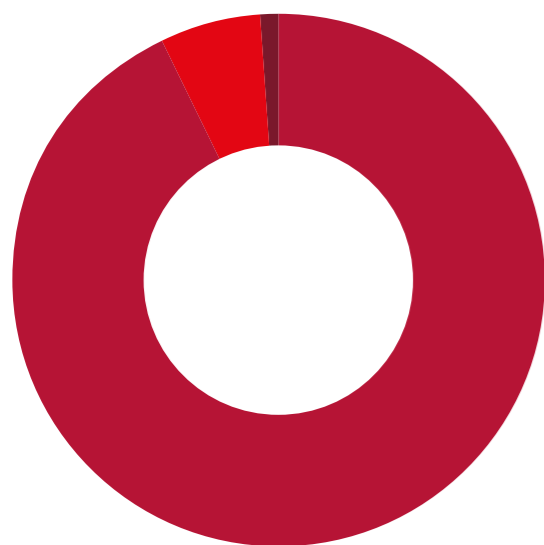
Which one of the following best describes the organisation where you work?

87% Private sector
12% Public sector
1% Charity / Not for Profit



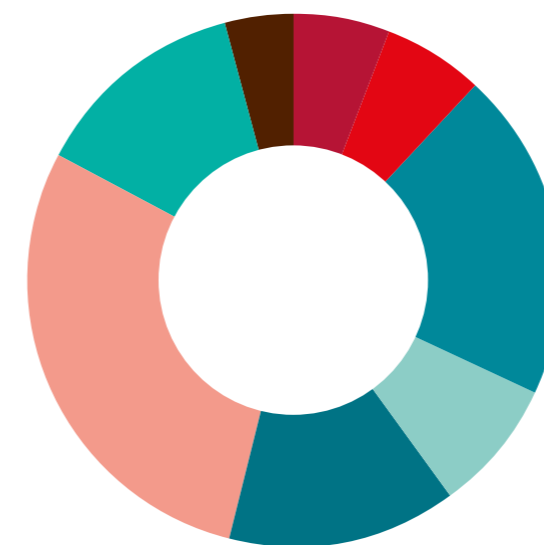
How many years have you worked in the maintenance engineering industry?

12% 1-4
28% 5-9
17% 10-14
43% 15+



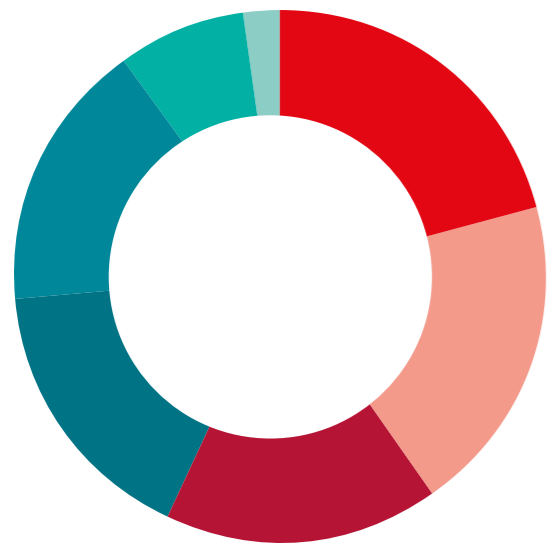
How do you identify?

93% Male
6% Female
1% Prefer not to say



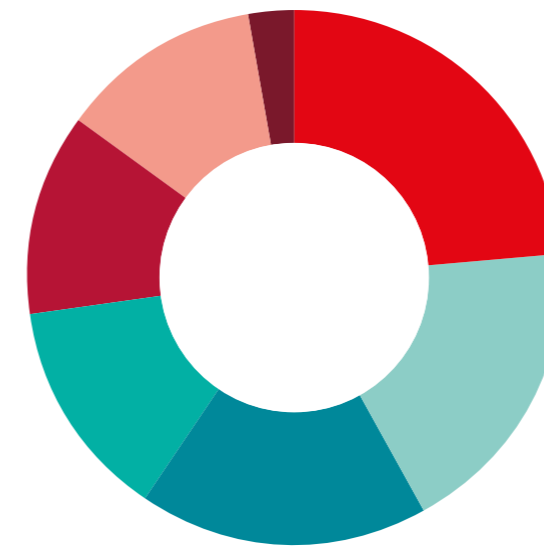
Approximately how many employees are there across all the locations in your company, in the country you are in?

6% 1-10
6% 11-49
20% 50-99
8% 100-249
14% 250-999
29% 1,000-9,999
13% 10,000+
4% Don't know



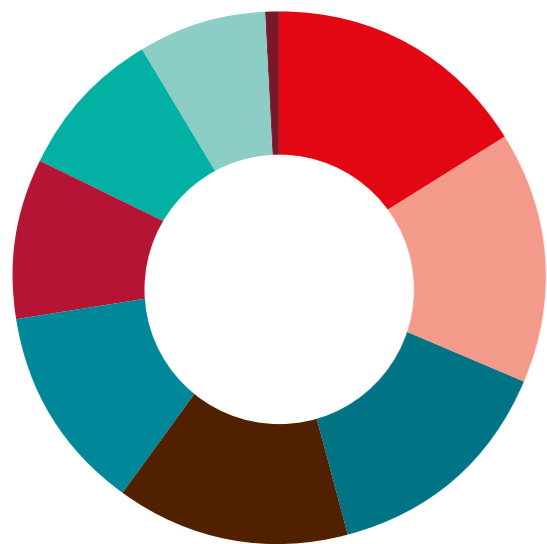
Challenges for maintenance in the next 12 months

- 42% ■ Attracting and retaining talent
- 39% ■ Supply chain disruption
- 34% ■ Declining department resource
- 33% ■ Investment
- 33% ■ Inflation & higher costs
- 16% ■ Energy management
- 4% ■ Other



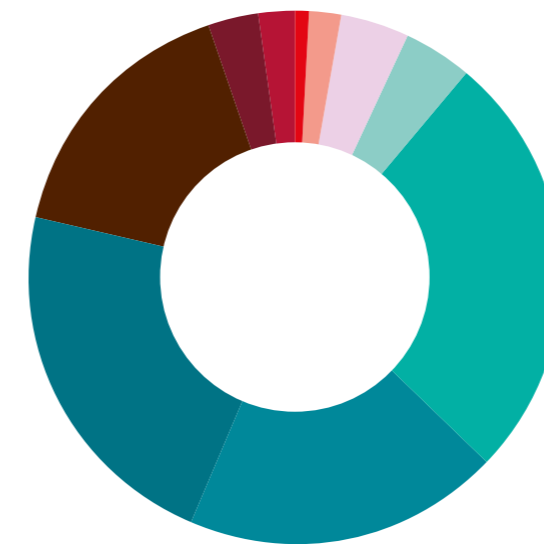
What are the advantages to your highest priority maintenance strategy?

- 54% ■ Cost effective
- 42% ■ Reduced probability of failure
- 40% ■ Decreases downtime
- 30% ■ Efficiency
- 28% ■ Cost avoidance
- 28% ■ Better productivity
- 6% ■ Other (please specify)



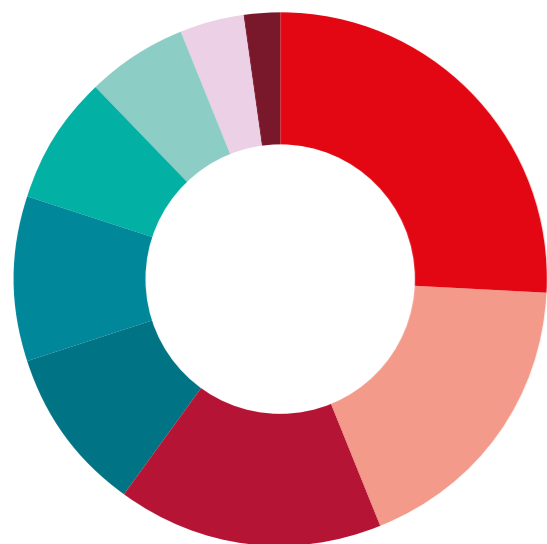
Company strategies in place

- 53% ■ Energy management
- 50% ■ Predictive
- 48% ■ Accreditation to external standards
- 46% ■ Cyber Security
- 41% ■ Energy management
- 32% ■ Planned
- 30% ■ CMMS
- 26% ■ Reactive (run-to failure)
- 2% ■ Other (please specify)



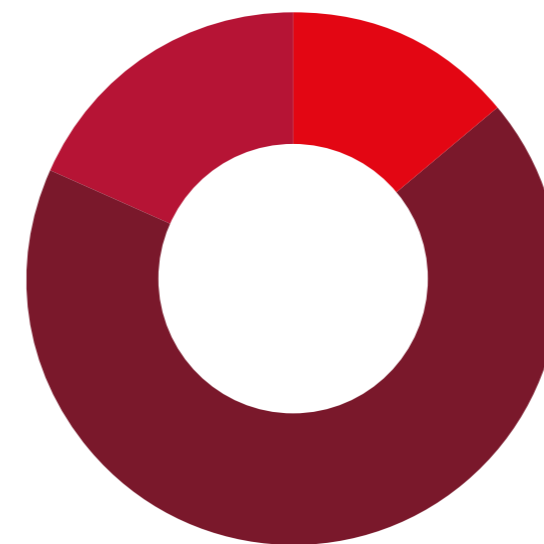
How reliable is the data you are currently measured on?

- 26% ■ 5
- 22% ■ 7
- 19% ■ 6
- 16% ■ 8
- 4% ■ 4
- 4% ■ 3
- 3% ■ 9
- 2% ■ 2
- 2% ■ 10 - extremely reliable
- 1% ■ 0 - not at all reliable
- 0% 1



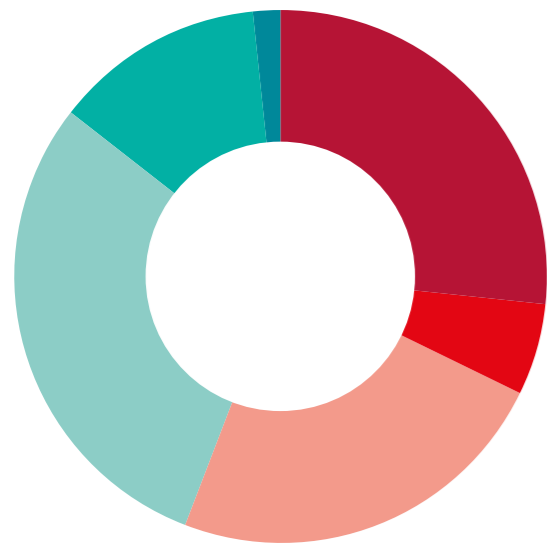
Highest priority strategy

- 26% ■ Planned
- 18% ■ Predictive
- 16% ■ Accreditation to external standards
- 10% ■ Energy management
- 10% ■ Cyber Security
- 8% ■ CMMS
- 6% ■ Reactive
- 4% ■ Reactive (run-to failure)
- 2% ■ Other



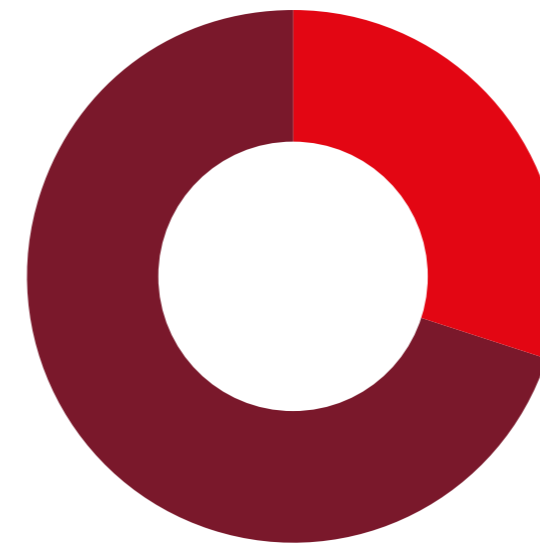
Level of maintenance maturity in your business for managing facilities and assets

- 67% ■ Medium
- 18% ■ High
- 14% ■ Low



Technologies used to monitor or manage maintenance

- 49% ■ In-house excel spreadsheets
- 10% ■ Computerised Maintenance Management System (CMMS)
- 43% ■ Enterprise Asset Management (EAM)
- 54% ■ Paper records
- 23% ■ Industrial Internet of Things (IIoT)
- 3% ■ Other



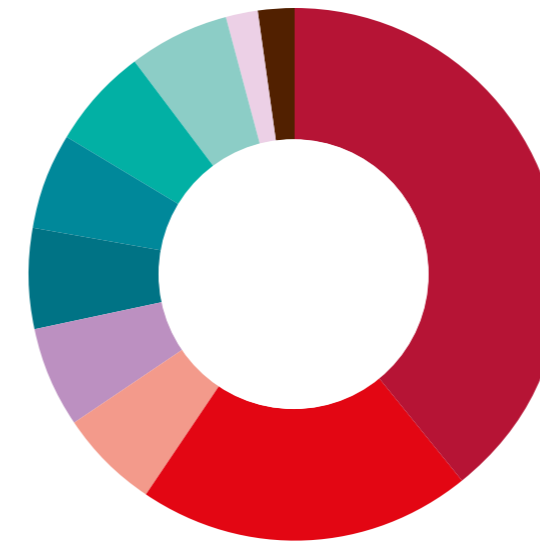
Is your company planning a digital transformation of your maintenance assets and facilities?

- 30% ■ Yes
- 70% ■ No



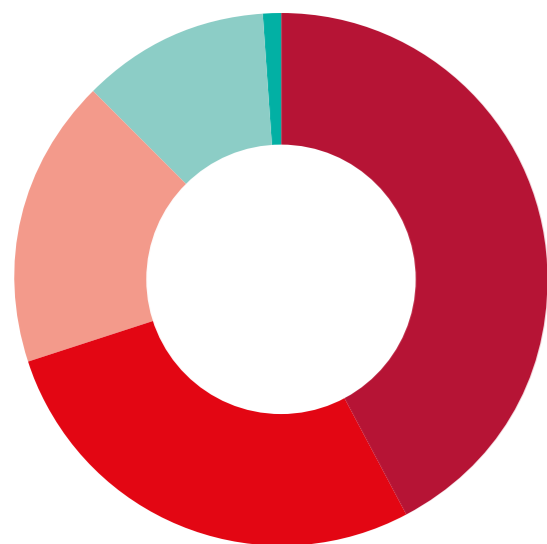
Types of Condition Monitoring techniques used

- 42% ■ Vibration
- 54% ■ Current Monitoring
- 38% ■ Oil Analysis
- 50% ■ Thermography
- 46% ■ Ultrasonics
- 34% ■ Ultrasound
- 7% ■ Other



Drivers of unscheduled plant downtime

- 39% ■ Ageing assets
- 20% ■ Mechanical failure
- 6% ■ Lead time to get hold of product
- 6% ■ Operator error
- 6% ■ Lack of skills
- 6% ■ Reduced operational budget
- 6% ■ Maintenance induced failure
- 6% ■ Obsolescence
- 2% ■ IT
- 2% ■ Other



How do Condition Monitoring techniques impact plant and asset performance?

- 82% ■ Better understand asset health
- 54% ■ Better predict failure
- 34% ■ Change the behaviour of employees and how they manage assets
- 22% ■ Increased asset uptime
- 2% ■ Other



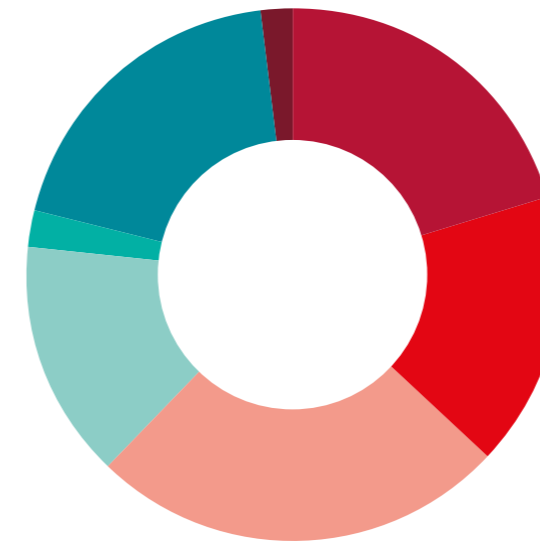
Number of hours spent weekly on scheduled maintenance

- 13% ■ Less than 6 hours
- 30% ■ 7-13 hours
- 11% ■ 14-23 hours
- 19% ■ 24 hours+
- 19% ■ Don't know
- 7% ■ Not applicable



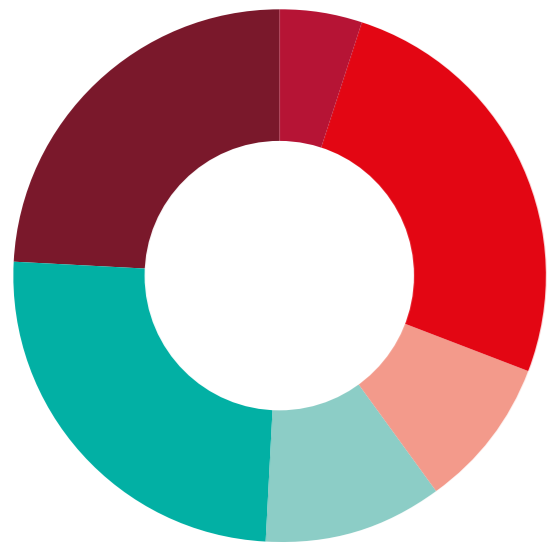
Number of hours spent weekly on unscheduled maintenance

- 17% ■ Less than 6 hours
- 8% ■ 7-13 hours
- 30% ■ 14-23 hours
- 17% ■ 24 hours+
- 21% ■ Don't know
- 7% ■ Not applicable



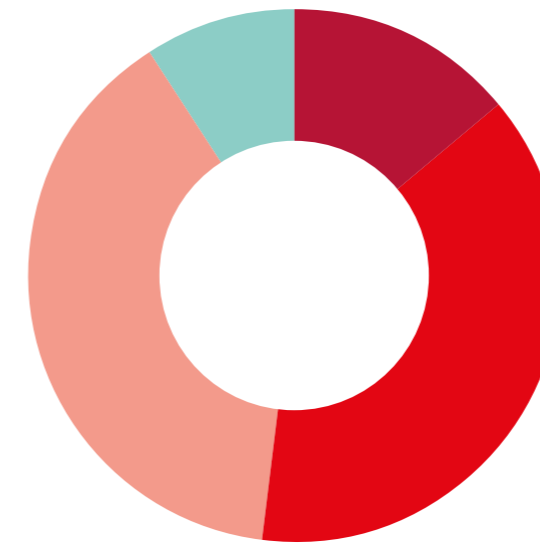
How do you plan to decrease unscheduled downtime in your plant?

- 43% ■ Upgrade equipment
- 35% ■ Widen monitoring capabilities
- 53% ■ Improve training
- 30% ■ Introduce preventative maintenance strategy
- 5% ■ Change maintenance strategy
- 40% ■ Increase scheduled downtime
- 4% ■ Other



Average hourly cost of plant downtime

- 5% ■ Less than £500
- 26% ■ £501-£2,000
- 9% ■ £2,001-£5,000
- 11% ■ £5,001-£10,000
- 25% ■ £10,000+
- 24% ■ Don't know



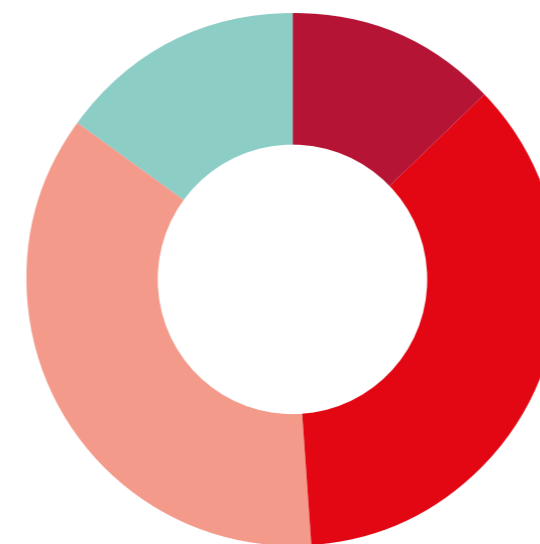
Maintenance support for fluid power systems

- 14% ■ Very frequent
- 38% ■ Frequent
- 39% ■ Sometimes
- 9% ■ None



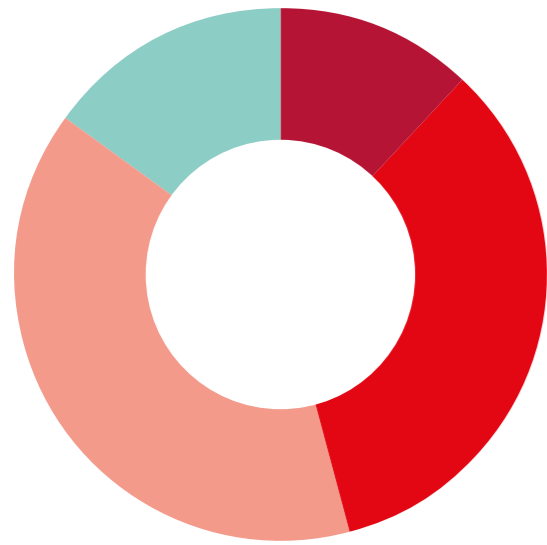
% of annual operating budget spent on maintenance processes

- 10% ■ Less than 5%
- 31% ■ 5-10%
- 10% ■ 11-15%
- 16% ■ More than 15%
- 34% ■ Don't know



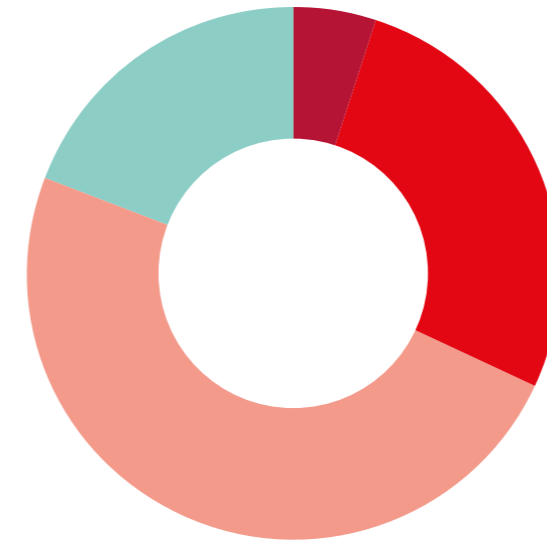
Maintenance support for material handling equipment

- 13% ■ Very frequent
- 36% ■ Frequent
- 36% ■ Sometimes
- 15% ■ None



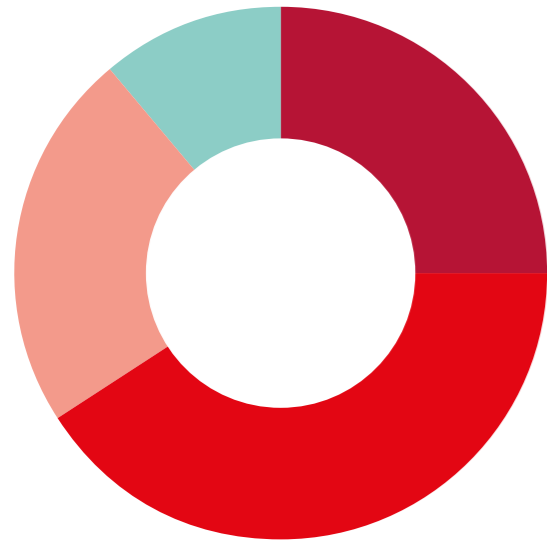
Maintenance support for plant automation systems

12% Very frequent
 34% Frequent
 39% Sometimes
 15% None



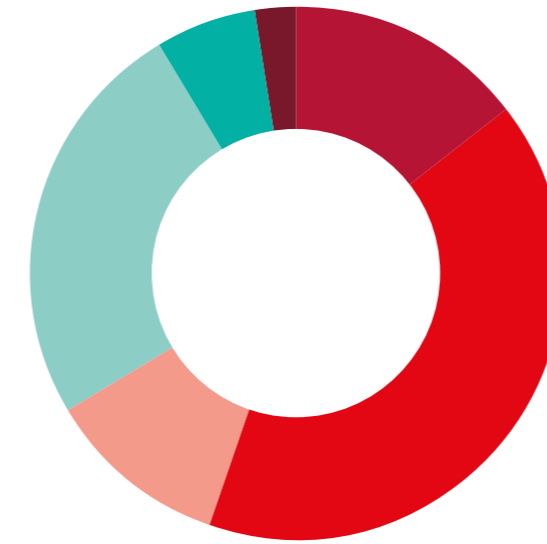
Maintenance support for buildings

5% Very frequent
 27% Frequent
 49% Sometimes
 19% None



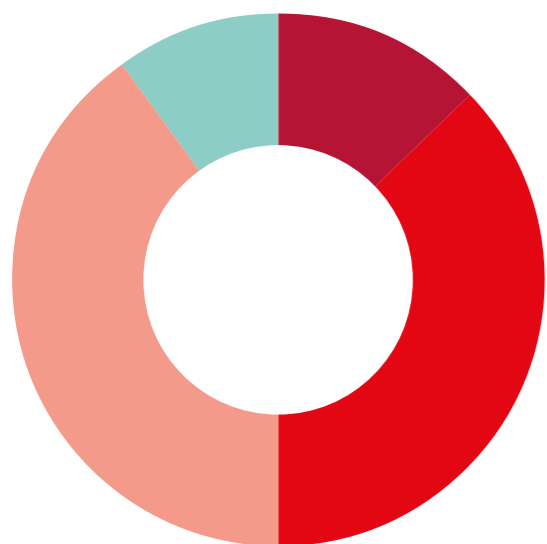
Maintenance support for rotating equipment

25% Very frequent
 41% Frequent
 23% Sometimes
 11% None



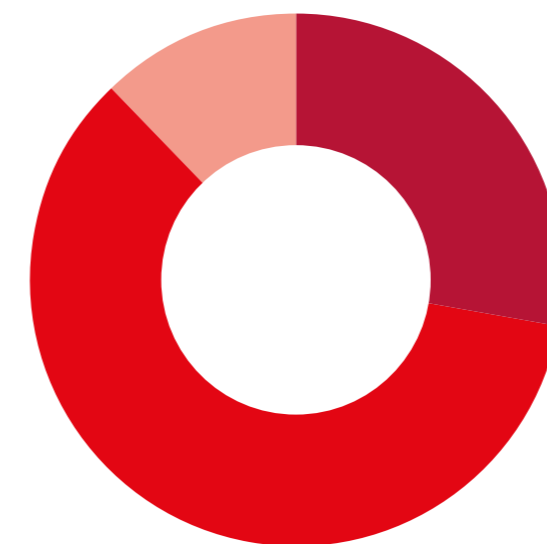
Department functions of main stakeholders

24% Operations
 67% Health & Safety
 18% Finance
 41% Procurement
 10% IT
 4% Other



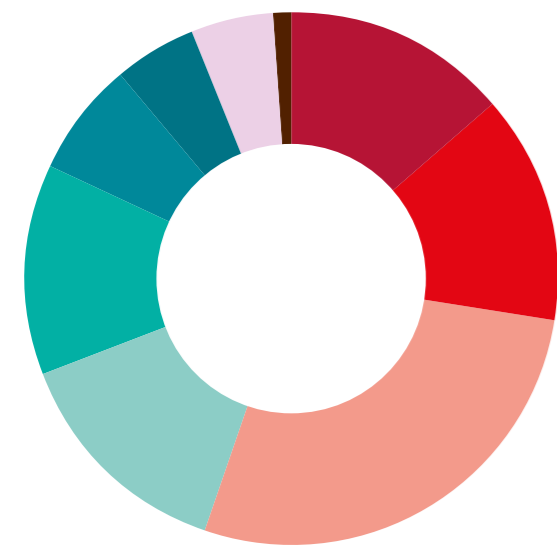
Maintenance support for energy management

13% Very frequent
 37% Frequent
 40% Sometimes
 10% None



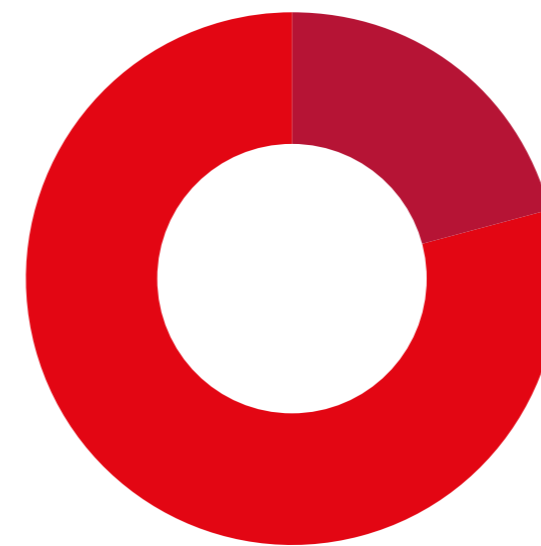
Extent procurement is involved to agree supplier requirements

28% High
 60% Medium
 12% Low



What is most important for a supplier to deliver?

- 28% Quality assurance
- 14% Responsiveness
- 14% Availability of product
- 14% Delivery
- 13% Technical support
- 7% Price
- 5% Service Solutions
- 5% Innovation
- 1% Other



Outsourcing in the next 6-12 months?

- 21% Yes
- 79% No



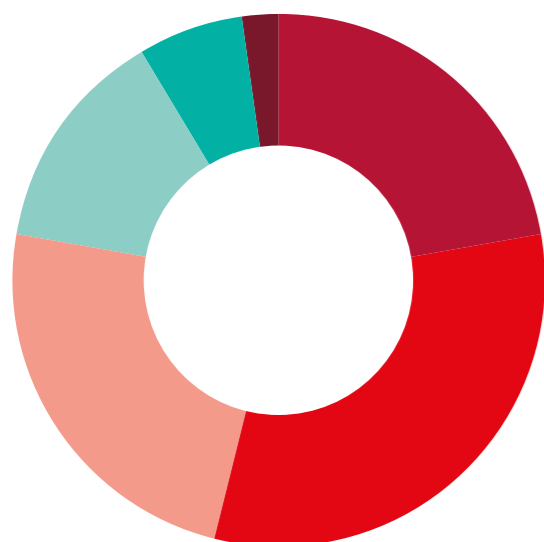
Do you outsource any maintenance services?

- 62% Yes
- 38% No



Which of the following would you consider outsourcing?

- 30% Predictive maintenance technology
- 30% Energy loss surveys
- 40% Lubrication services
- 10% Mobile condition monitoring
- 10% Reliability services
- 10% Other



What are the factors that have led to you outsourcing?

- 42% Too many specialised skills required
- 60% Lack of skills amongst staff
- 45% Reduced headcount
- 26% Budget
- 12% Lack of talent
- 4% Other



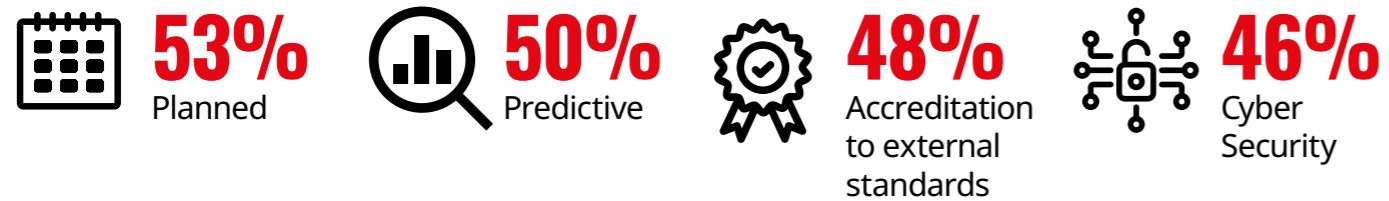
What are the main benefits to using a maintenance service?

- 43% Flexibility
- 36% Cost effective
- 25% Overall efficiency
- 24% Overall equipment effectiveness
- 21% Better productivity
- 20% Reduced probability of failure
- 17% Decreases downtime
- 6% Other

Challenges for maintenance in the next 12 months



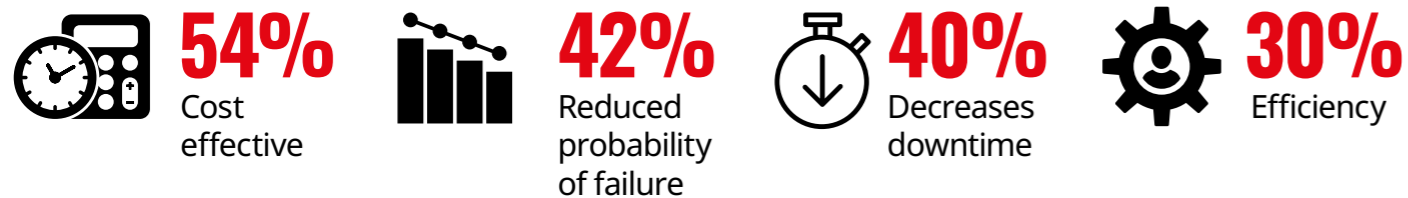
Company strategies in place



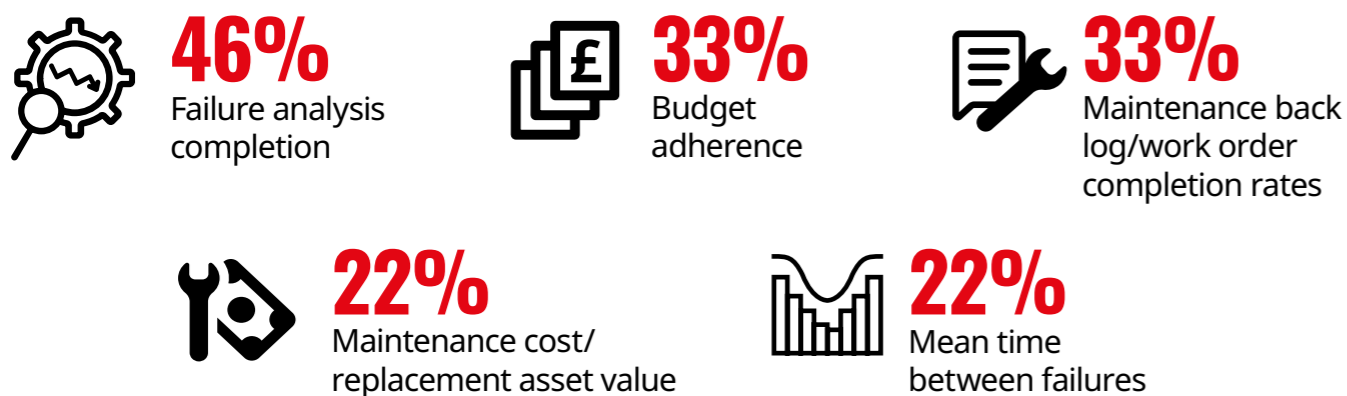
Highest priority strategy



What are the advantages to your highest priority maintenance strategy?



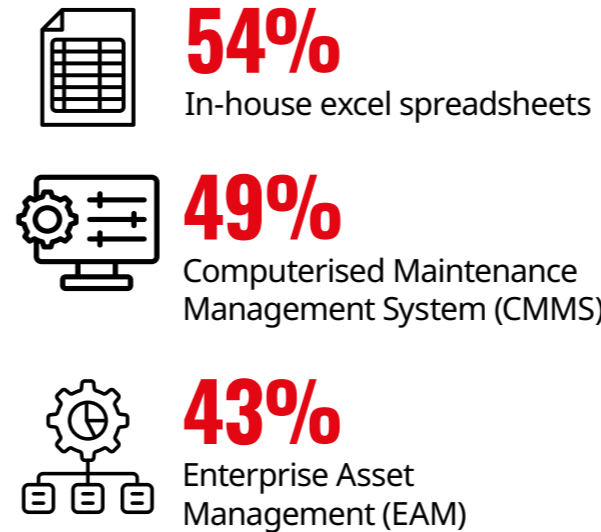
Maintenance KPIs in place



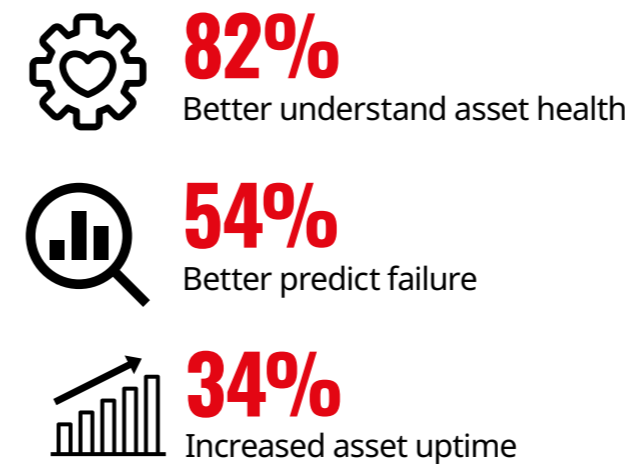
How reliable is the data you are currently measured on?



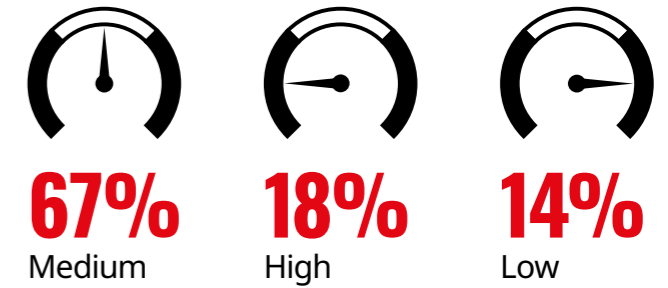
Technologies used to monitor or manage maintenance



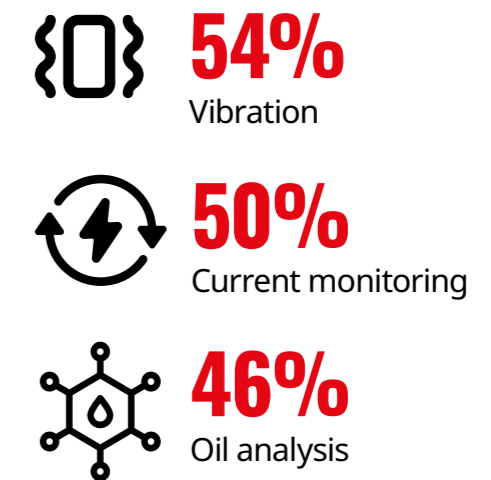
How do Condition Monitoring techniques impact plant and asset performance?



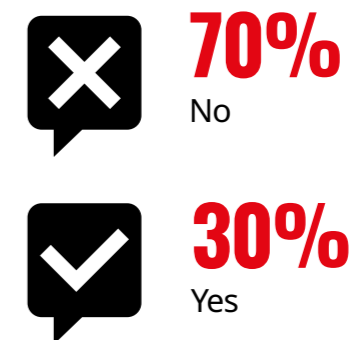
Level of maintenance maturity in your business for managing facilities and assets



Types of condition monitoring techniques used



Is your company planning a digital transformation of your maintenance assets and facilities?



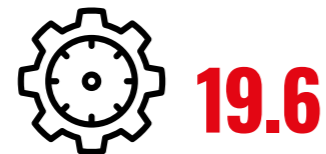
Drivers of unscheduled plant downtime



Number of hours spent weekly on scheduled maintenance



Number of hours spent weekly on unscheduled maintenance



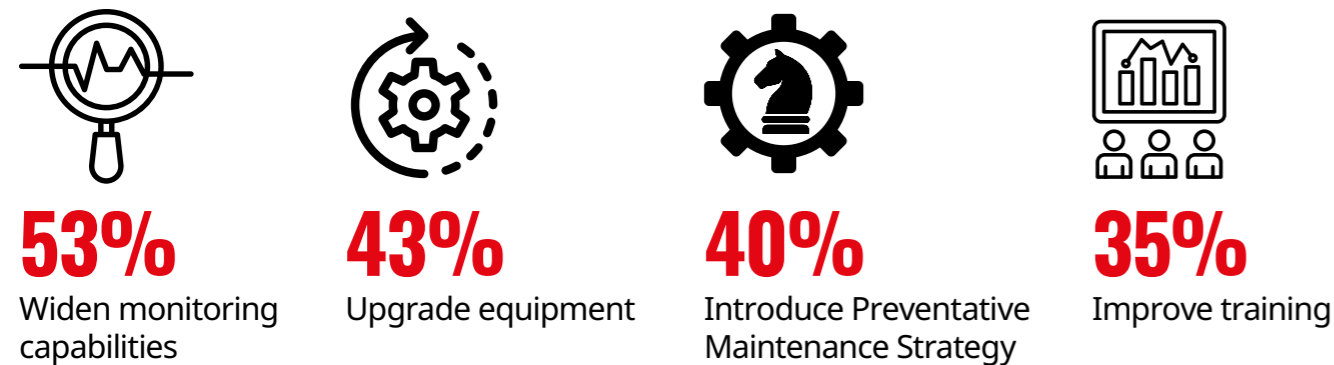
Average hourly cost of plant downtime



Percentage of annual operating budget spent on maintenance processes



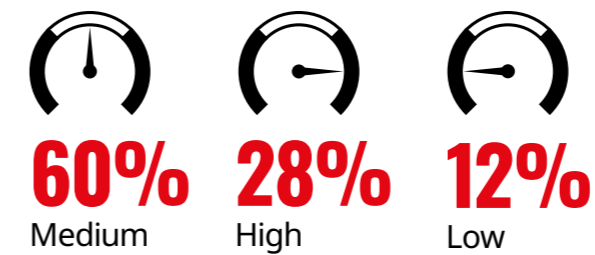
How do you plan to decrease unscheduled downtime in your plant?



Department functions of main stakeholders



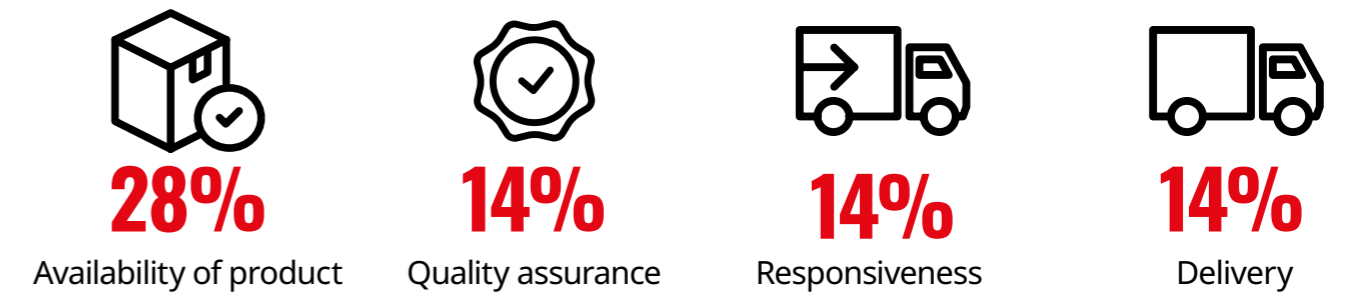
Extent procurement is involved to agree supplier requirements



Outsourcing in the next 6-12 months?



What is most important for a supplier to deliver?



What are the factors that have led to you outsourcing?



Which of the following would you consider outsourcing?



What are the main benefits to using a maintenance service?

