PLANT ENGINEERING

CFE Media and Technology
Industrial Maintenance Report

March 2020

CFE Media and Technology

Introduction & Methodology

Objective

This study was completed by *Plant Engineering* to evaluate the maintenance practices and strategies currently in place in manufacturing facilities and the effects of maintenance on productivity and profitability.

Sample

The sample was selected from recipients of *Plant Engineering* for whom email addresses were available. Only respondents responsible for maintenance for all or part of their facilities were asked about maintenance strategies, outsourcing maintenance, training, technologies and unscheduled downtime.

Method

Subscribers were sent an email asking them to participate in this study. The email included a URL linked to the questionnaire.

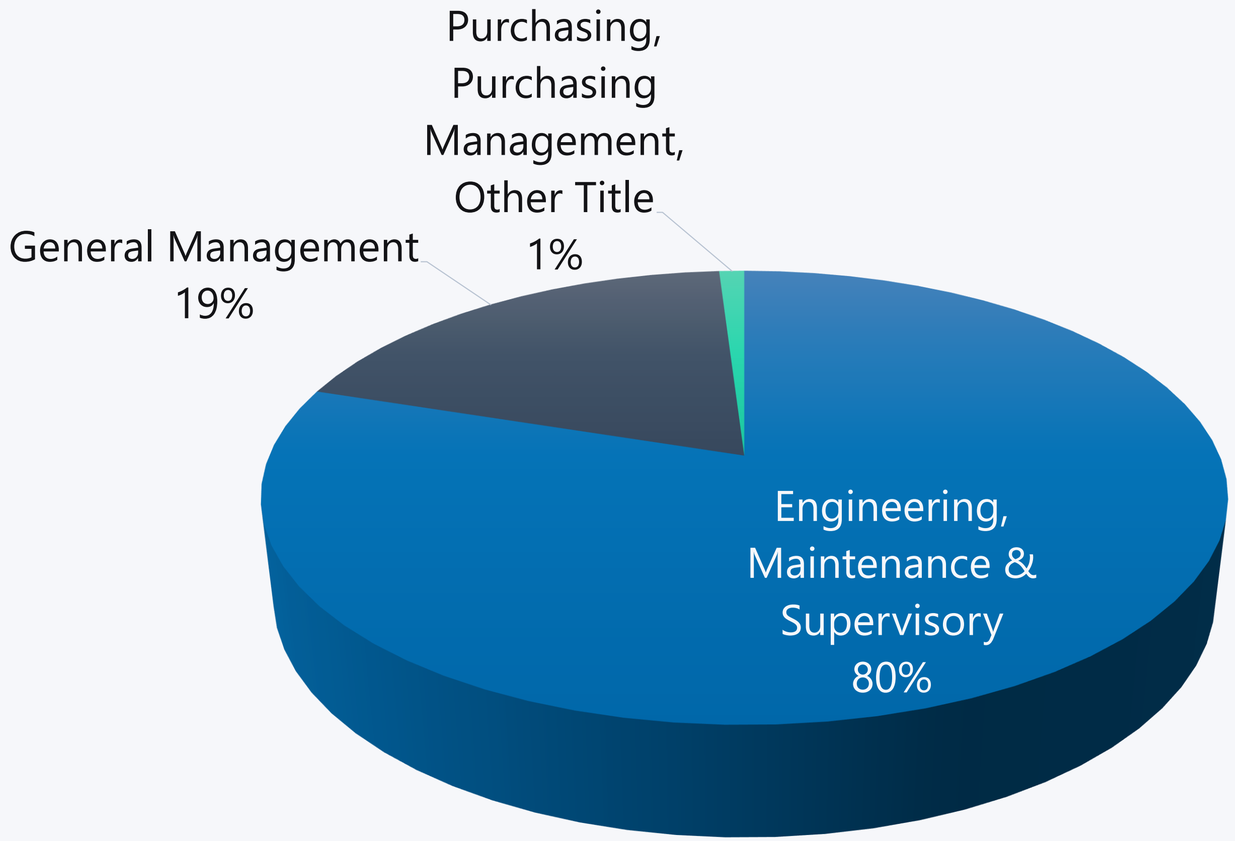
- **Data collected:** January 28, 2020, through February 16, 2020
- **Number of respondents:** 171
  - *Margin of error: +/- 7.5% at a 95% confidence level*
- **Incentive:** Survey participants were offered the opportunity to enter a drawing for a $100 Amazon.com gift card.

Summary of Findings

- **Maintenance strategies:** Seventy-six percent of manufacturing facilities follow a preventive maintenance strategy; 60% use a run-to-failure method and 52% have a computerized maintenance management system (CMMS).
- **Scheduled maintenance:** Forty-eight percent of facilities allocate up to 10% of their annual operating costs to maintenance processes; 39% devote more than 10% of this budget on maintenance. The average facility spends 20 hours each week on scheduled maintenance.
- **Attention to systems:** Production equipment, rotating equipment (motors, power transmission, etc.) and fluid power systems (air, hydraulic, etc.) are the three areas where facilities dedicate the most maintenance support, followed by material handling equipment and internal electrical distribution systems.
- **Outsourcing:** The average facility outsources 20% of their maintenance operations, and the leading causes are lack of time and manpower to dedicate to maintenance and a lack of skills among current staff.
- **Training:** Maintenance teams are mostly trained on basic mechanical (77%) and electrical skills (70%), as well as safety (71%). Other types of training include lubrication (51%) and motors, gearboxes, and bearings (50%).
- **Technologies:** The most common technologies facilities use to monitor/manage maintenance are CMMS (50%), in-house spreadsheets/schedules (47%), and paper records of maintenance rounds (46%).
- **Unscheduled downtime:** The leading cause of unscheduled downtime within respondents' facilities remains aging equipment (34%), followed by mechanical failure (20%) and operator error (11%). Forty-six percent of facilities plan to introduce a new or change their current maintenance strategy and upgrade their equipment in order to decrease unscheduled downtime.
- **Challenges:** The top challenge for improving maintenance at manufacturing facilities is a lack of resources or staff. Other hurdles include outdated technology, a lack of understanding of options/ technologies and the lack of available funding.

Respondent Profile

Primary Job Function

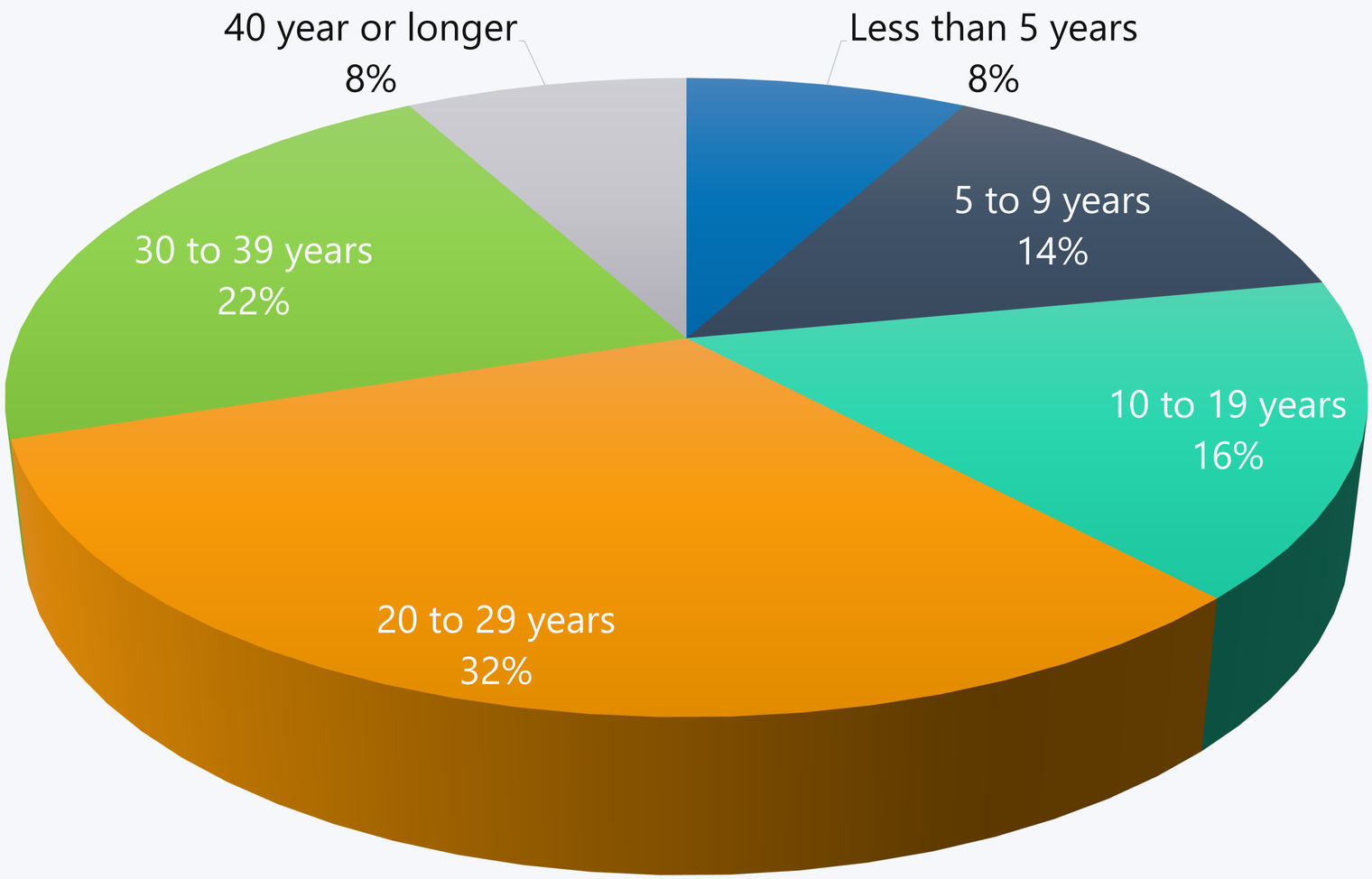


Engineering, Maintenance & Supervisory includes the following job titles: Engineer, Manager, Superintendent, Foreman, Other Plant Engineering/Maintenance title

General Management includes the following job titles: President, VP, Secretary, Treasurer, GM, Owner, Partner, Other General Management title

Q: Which of the following best describes your job title? (n=149)

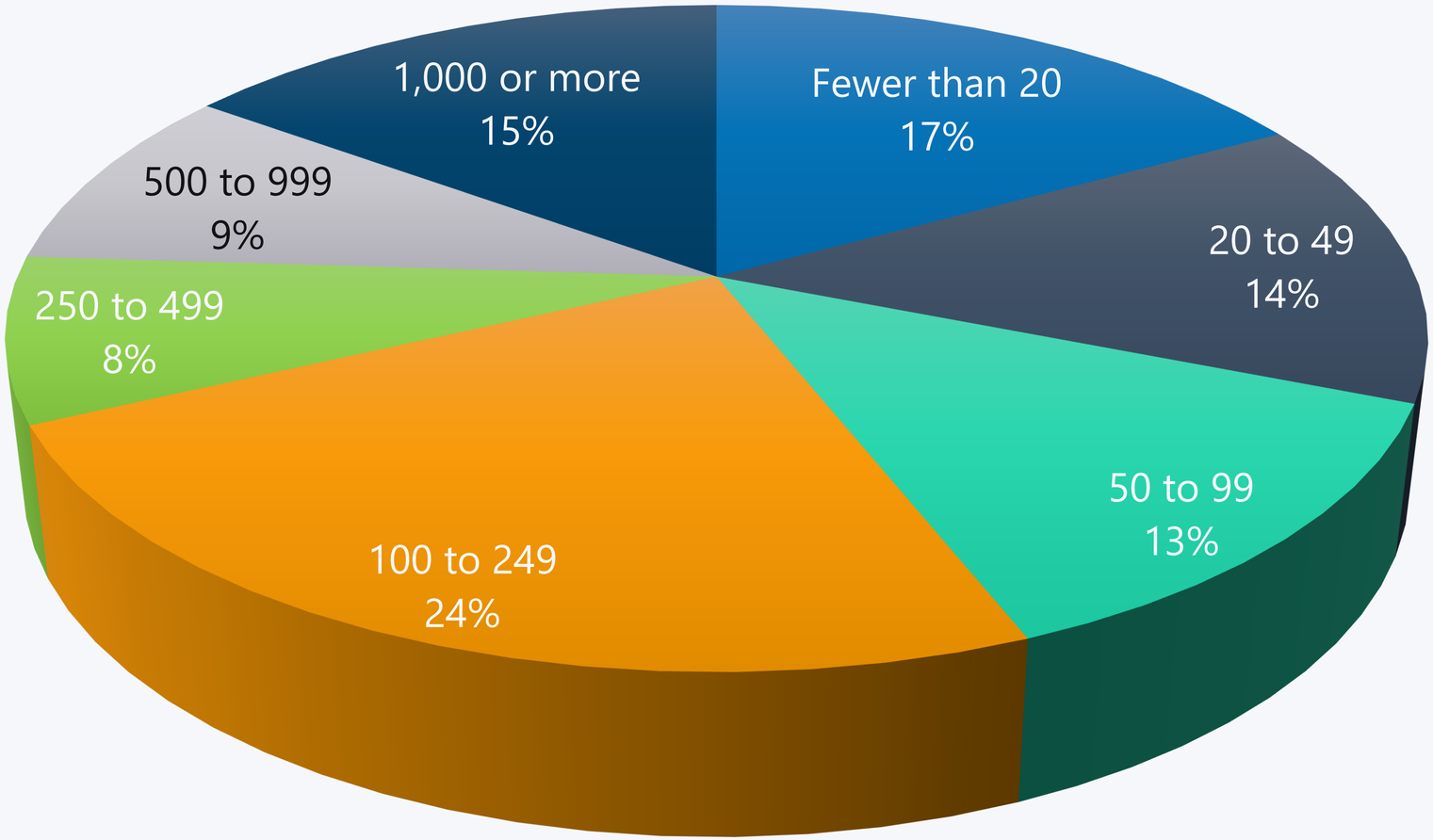
Industry Experience



Average
23 years

Q: For approximately how long have your worked in a plant or engineering-related position? (n=154)

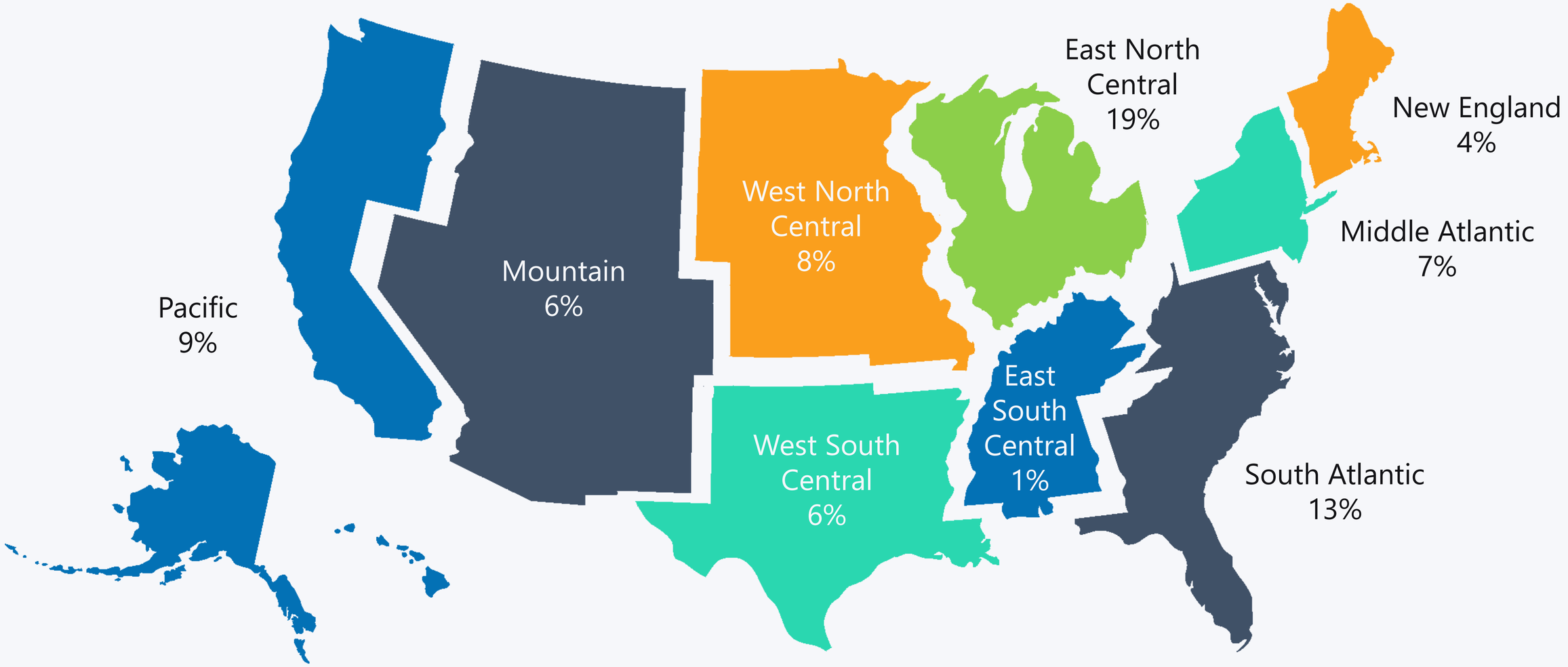
Facility Size by Number of Employees



Average
343 employees

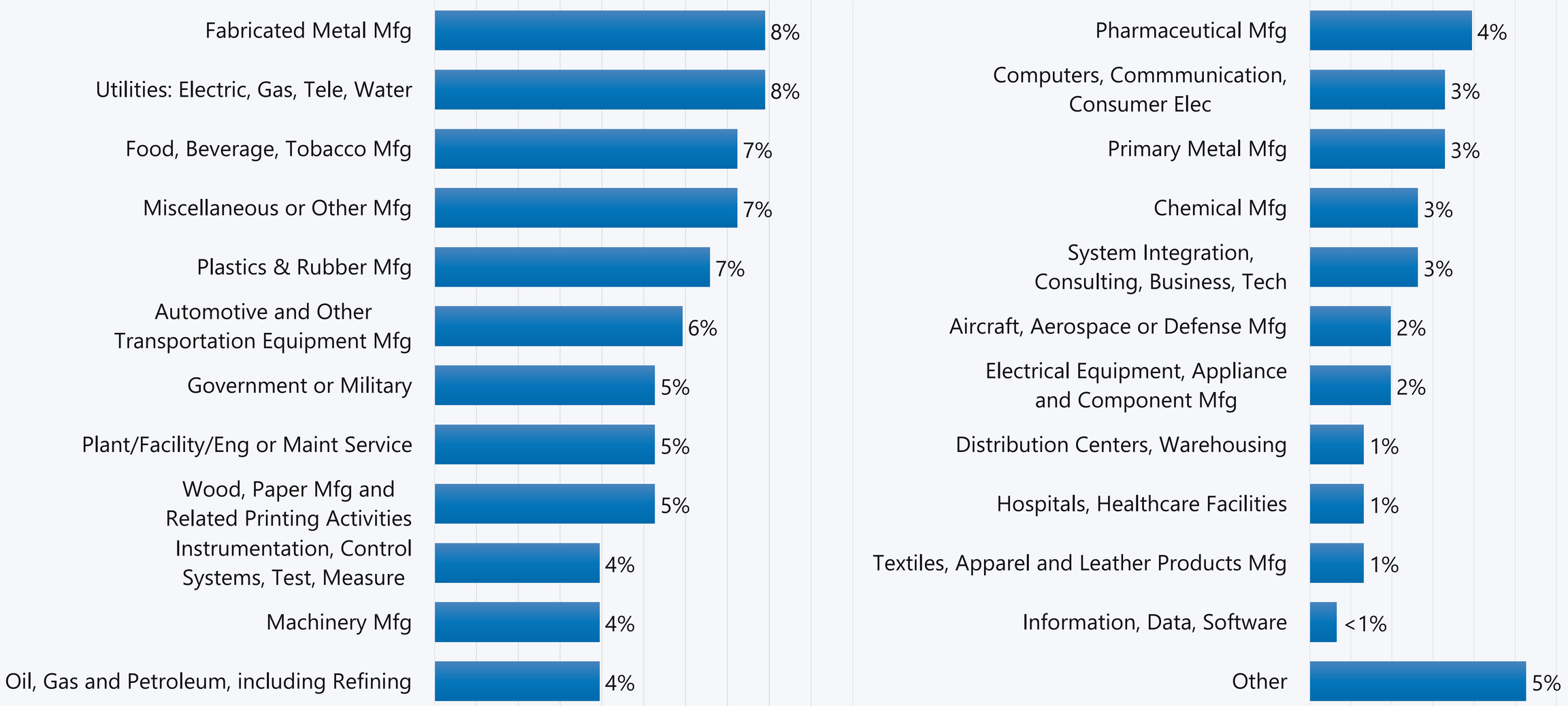
Q: How many people work at your location? (n=151)

Location



22% of respondents are based outside of the U.S.; 4% are based in the U.S. but region is unknown; location is unknown for 1%.

Primary Business Served



Q: What is the primary business at your location? (n=152)

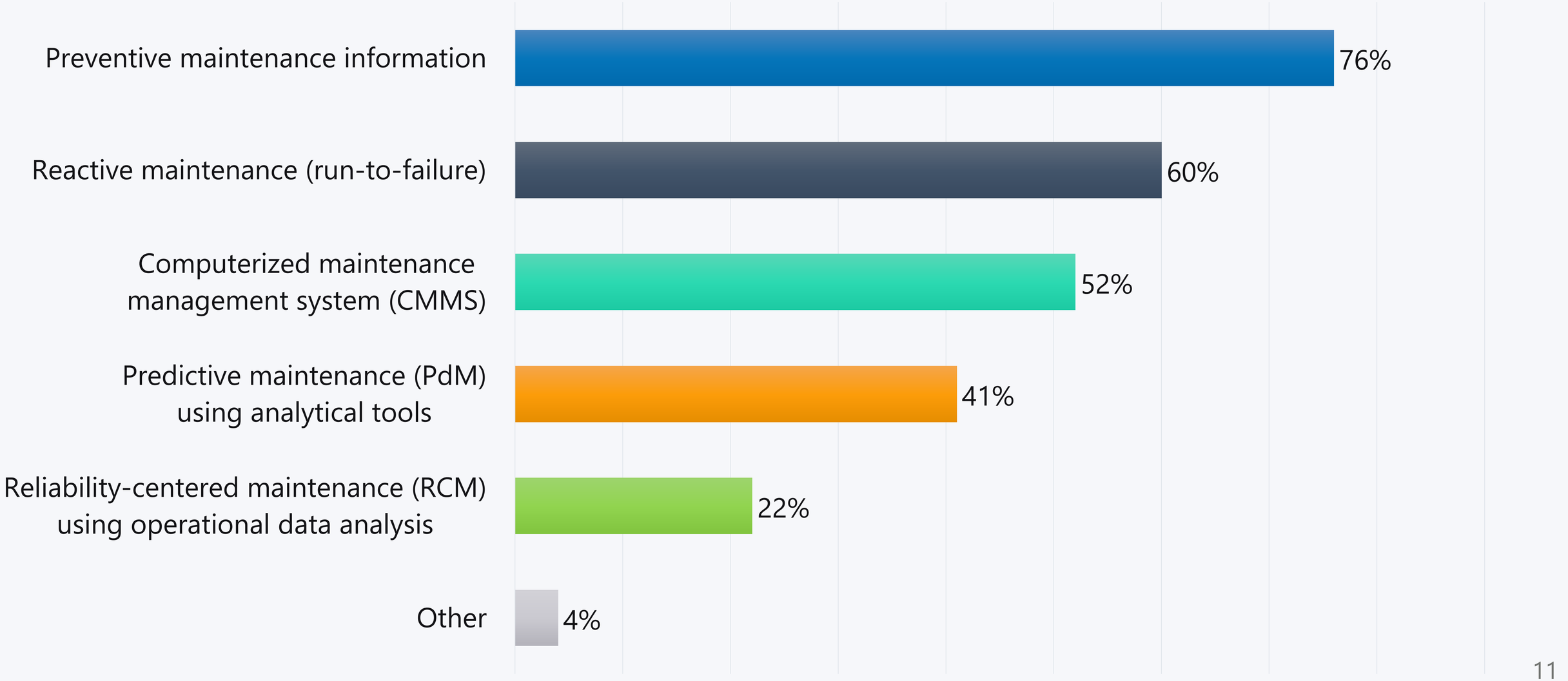
ATS

Industrial Maintenance

PLANT ENGINEERING

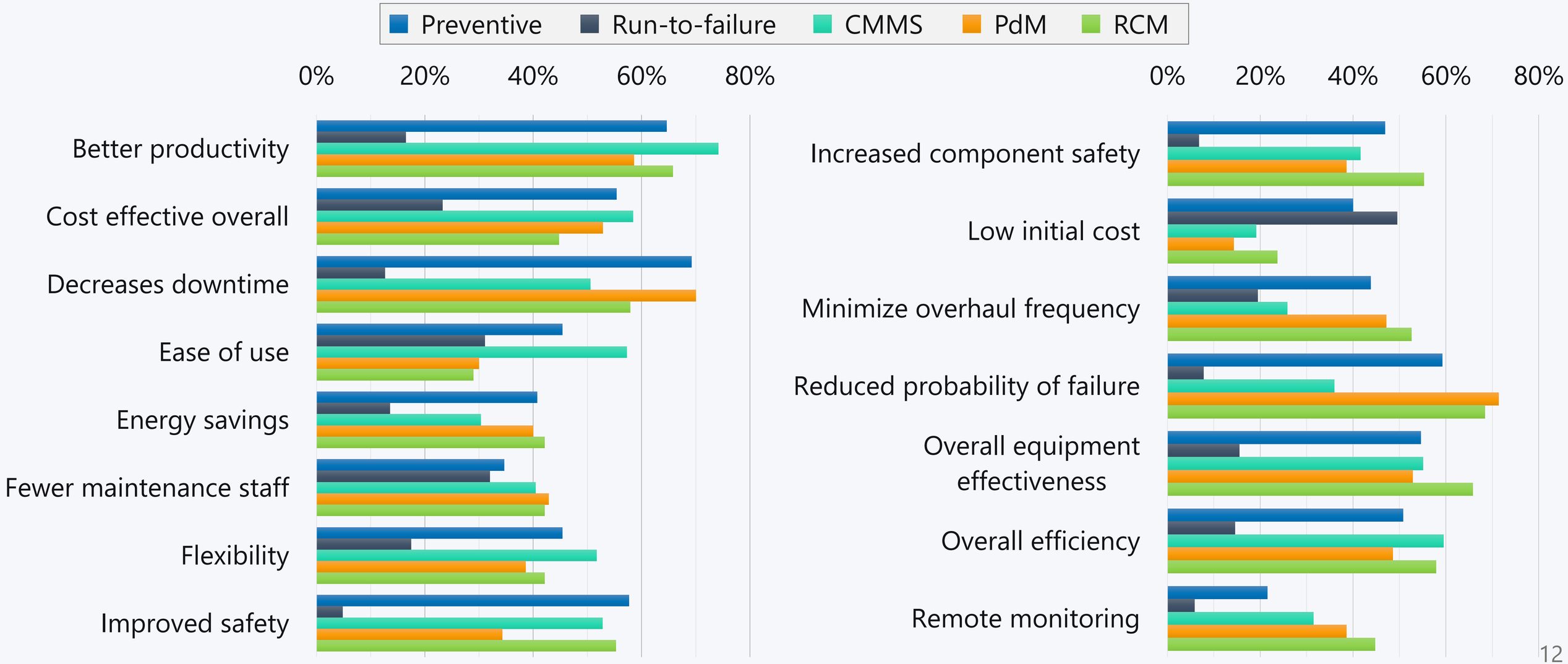
CFE Media and Technology

Maintenance Strategies & Tools in Use



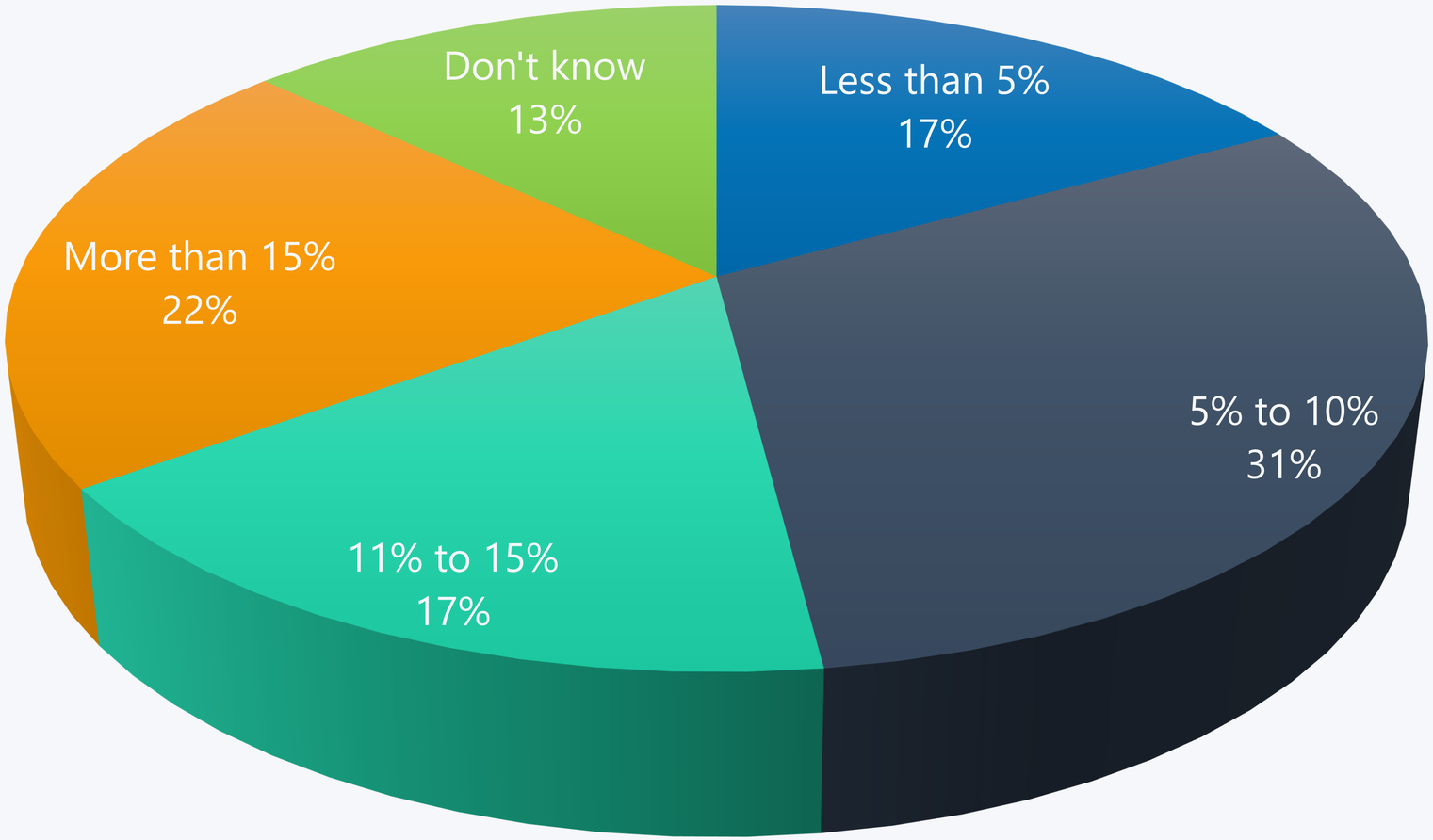
Q: Which of the following maintenance strategies and tools are present within your plant? Check all that apply. (n=171)

Advantages to Maintenance Strategies & Tools



Q: What are the advantages to the maintenance strategies and tools in place at your plant? Check all that apply in each column. (n=130;103;89;70;38)

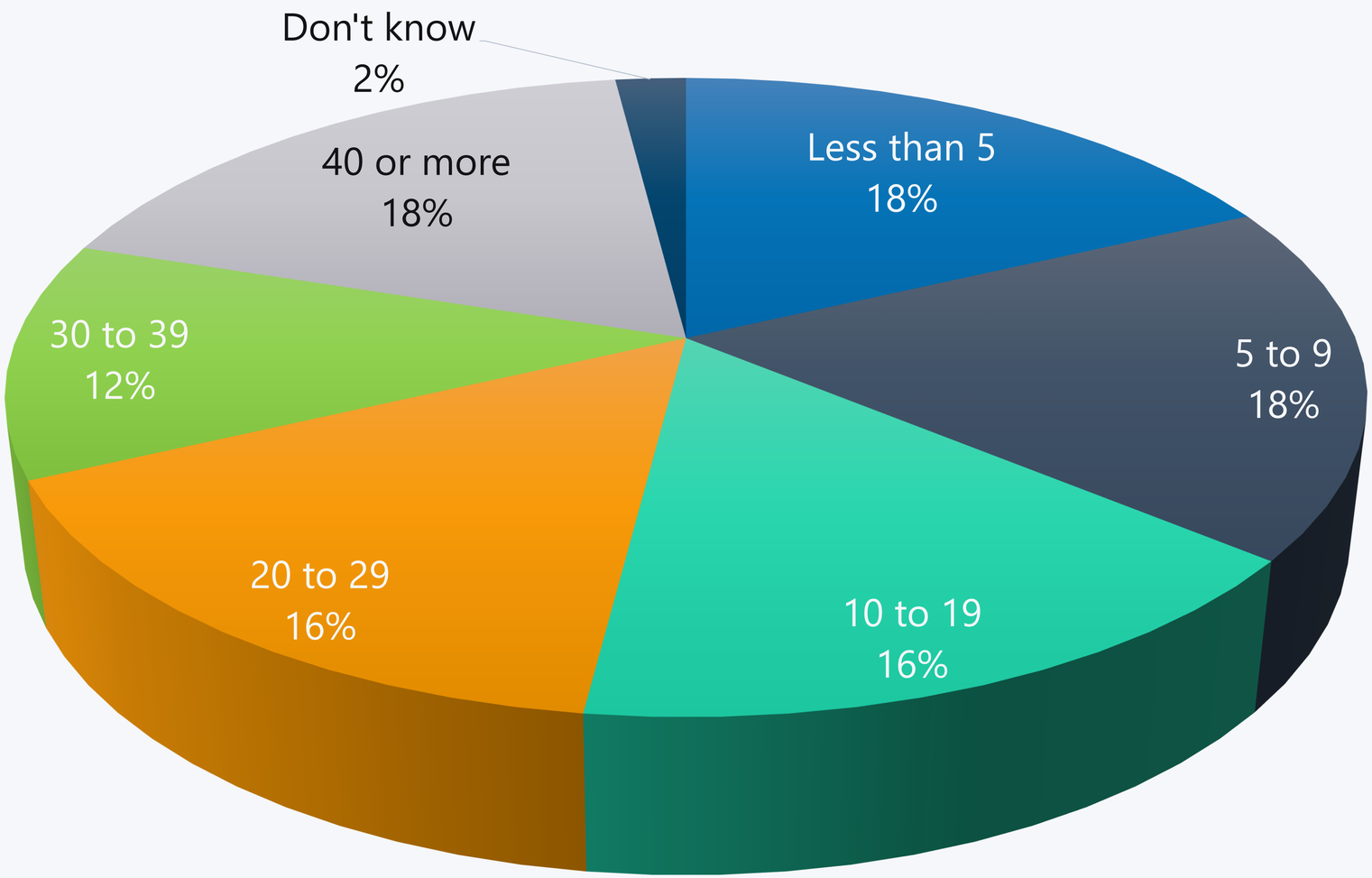
Percentage of Plant's Annual Operating Budget Allocated to Maintenance



Average
10.3%

Q: What percentage of your plant's annual operating budget is spent on maintenance? (n=171)

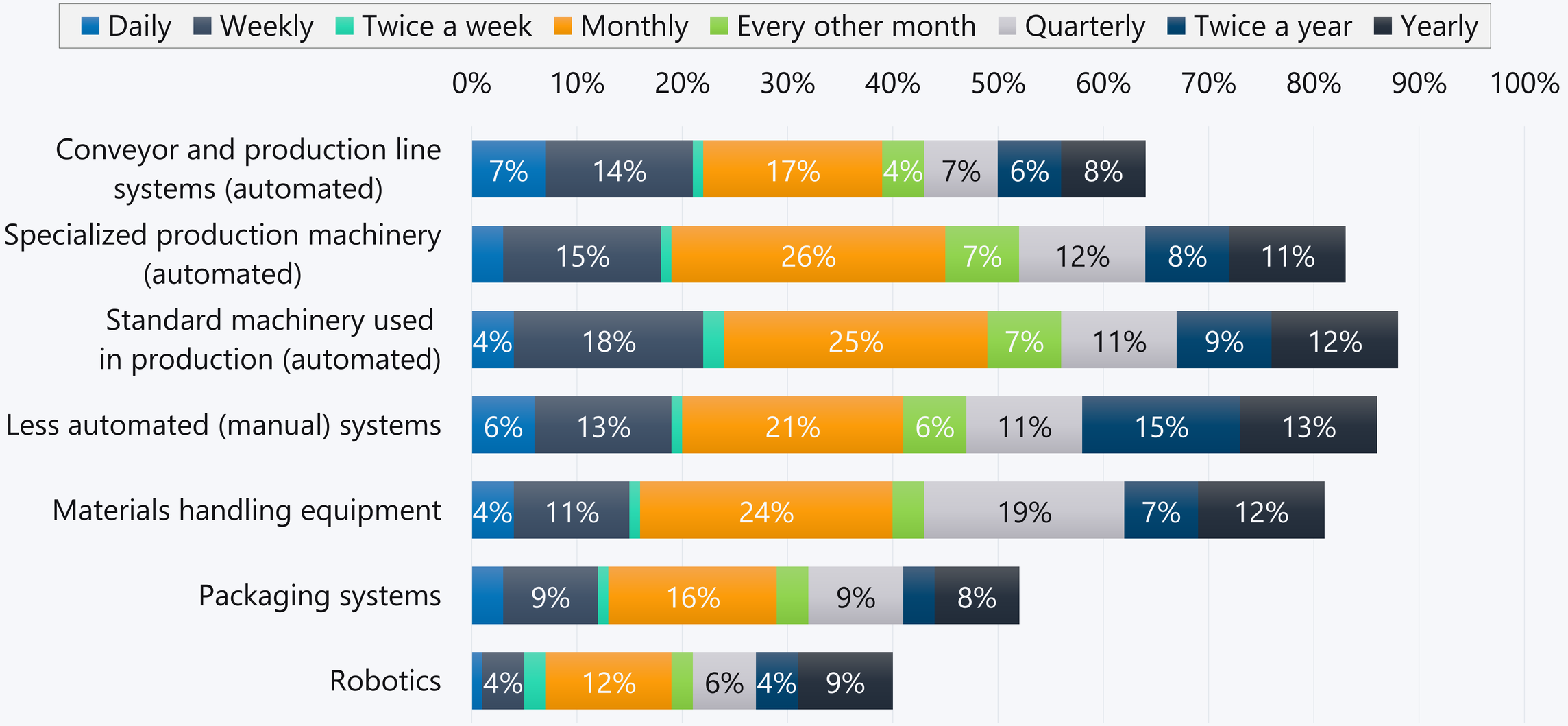
Hours Spent on Scheduled Maintenance Per Week



Average
20 hours/week

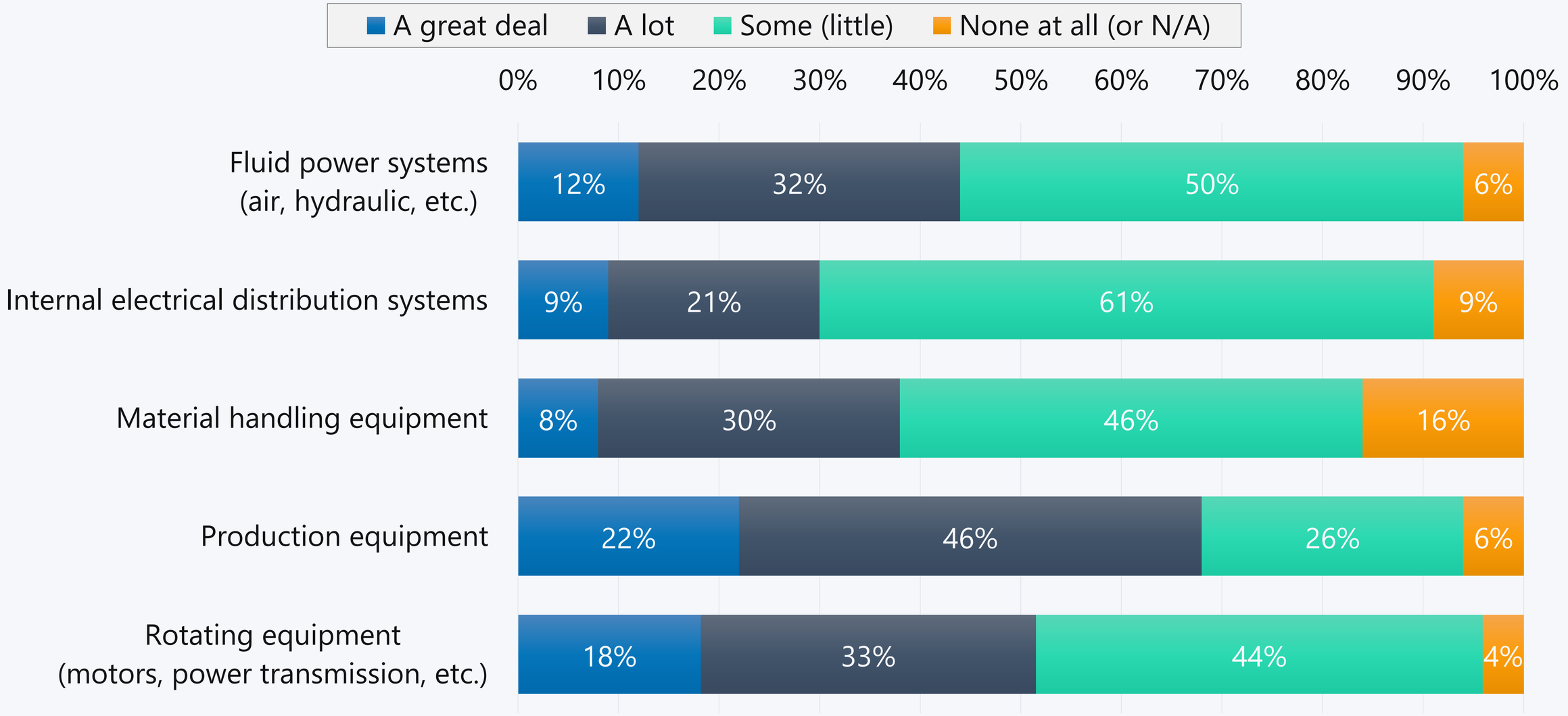
Q: Approximately how many hours per week does your plant spend on scheduled maintenance? (n=171)

Systems Shutdown for Scheduled Maintenance



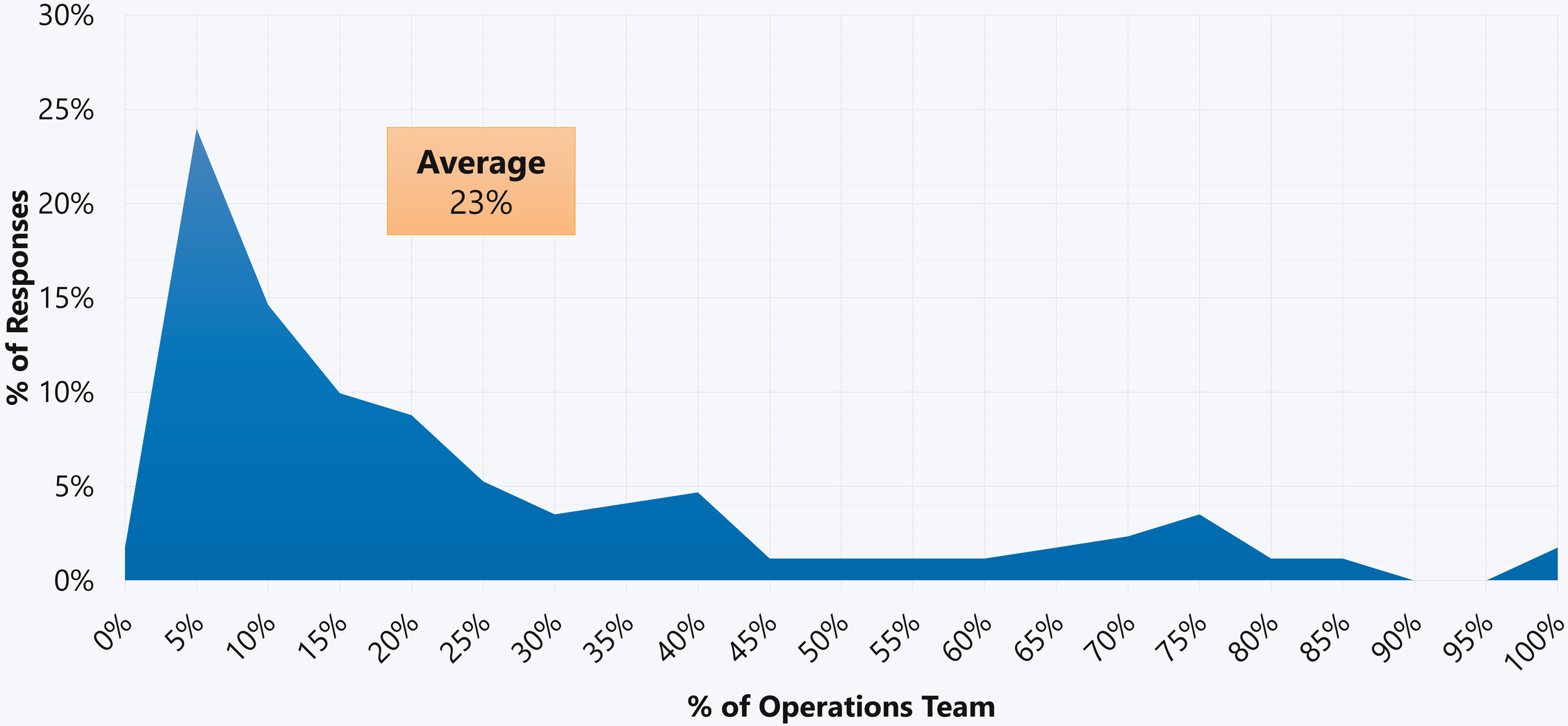
Q: How often are the following areas of your plant shutdown for scheduled maintenance? (n=171)

Maintenance Support



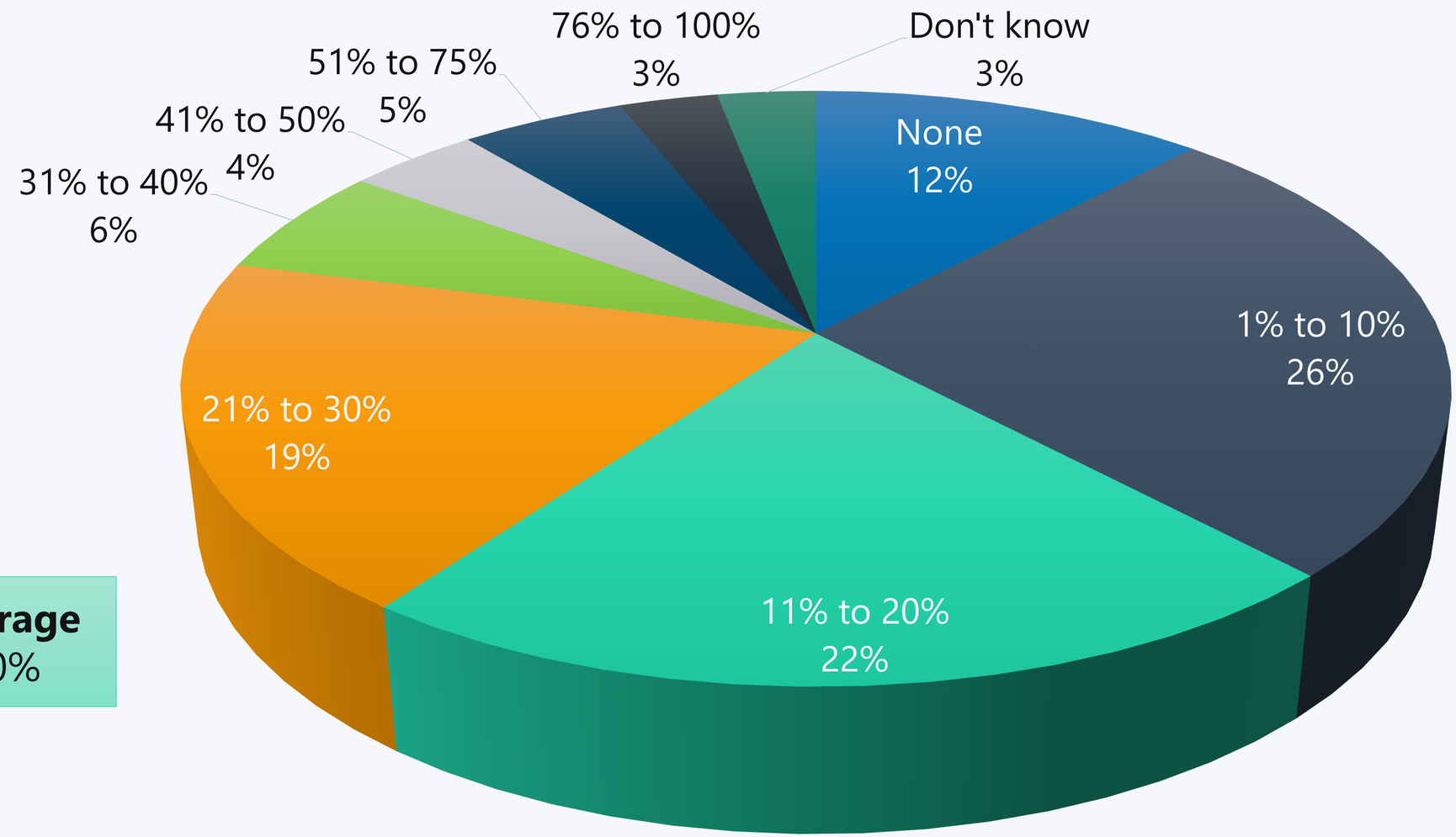
Q: How much maintenance support do the following areas of your facility receive? (n=171)

Percentage of Operations Team That is Part of Maintenance Department



Q: What percentage of your plant's operations team is part of your maintenance department? (n=171)

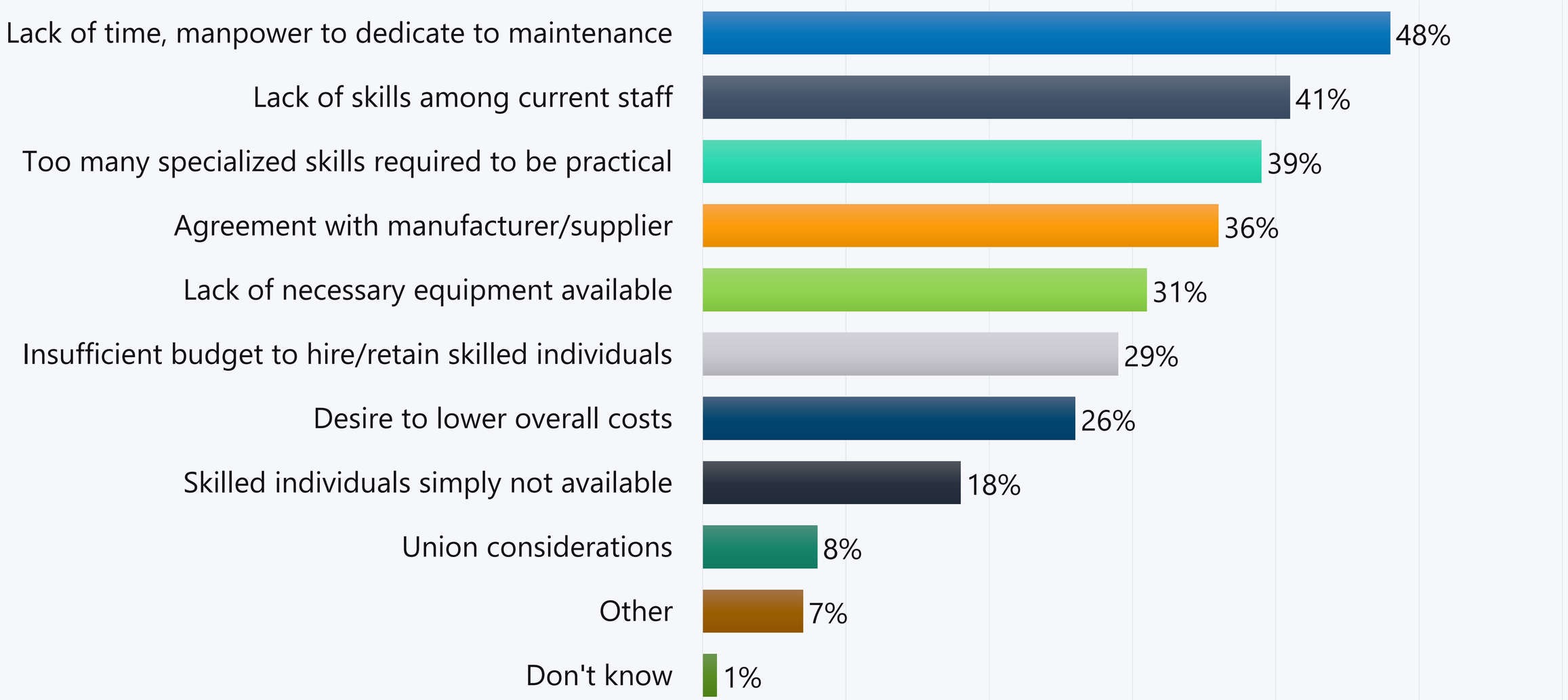
Percentage of Maintenance Operation That is Outsourced



Average
20%

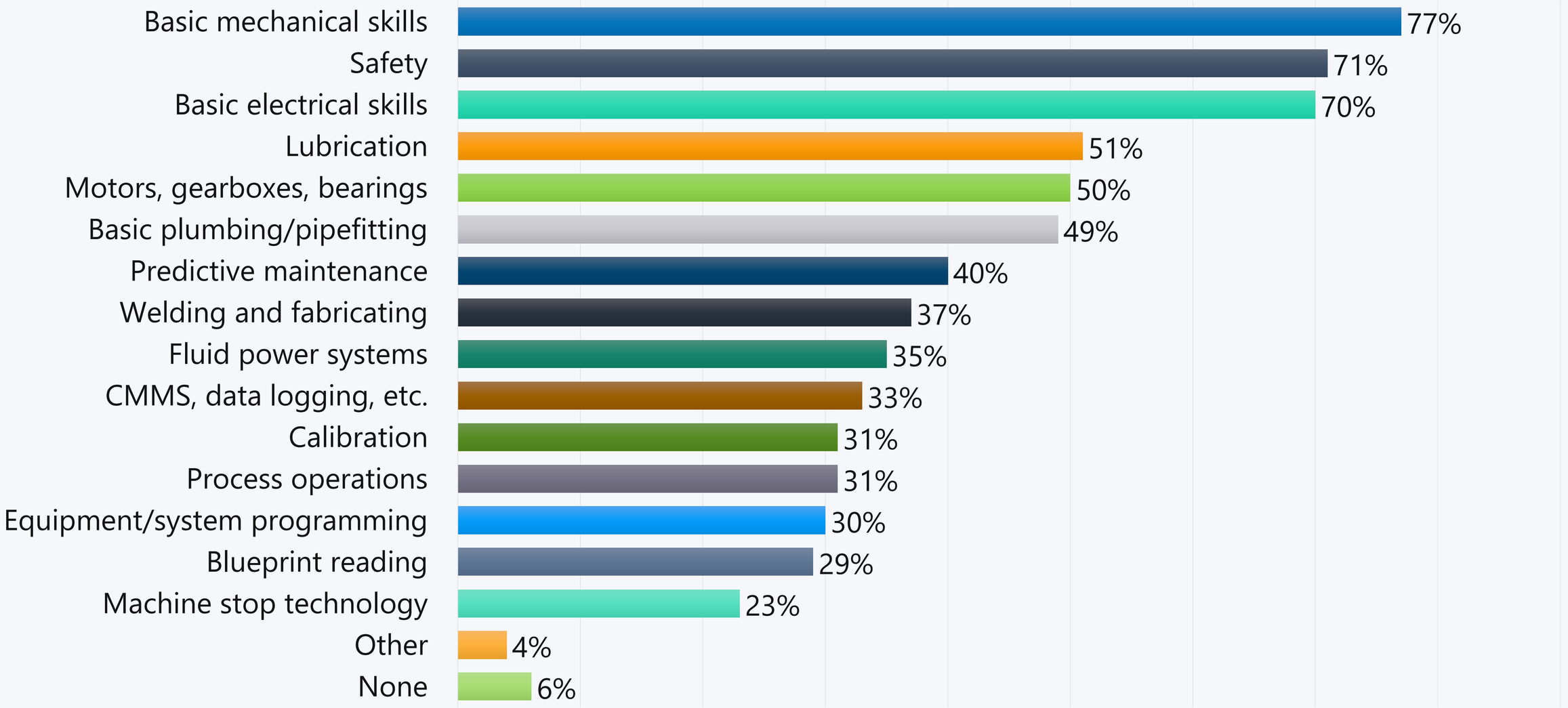
Q: How much of your plant's maintenance operation is outsourced? (n=171)

Reasons for Outsourcing Maintenance Operation



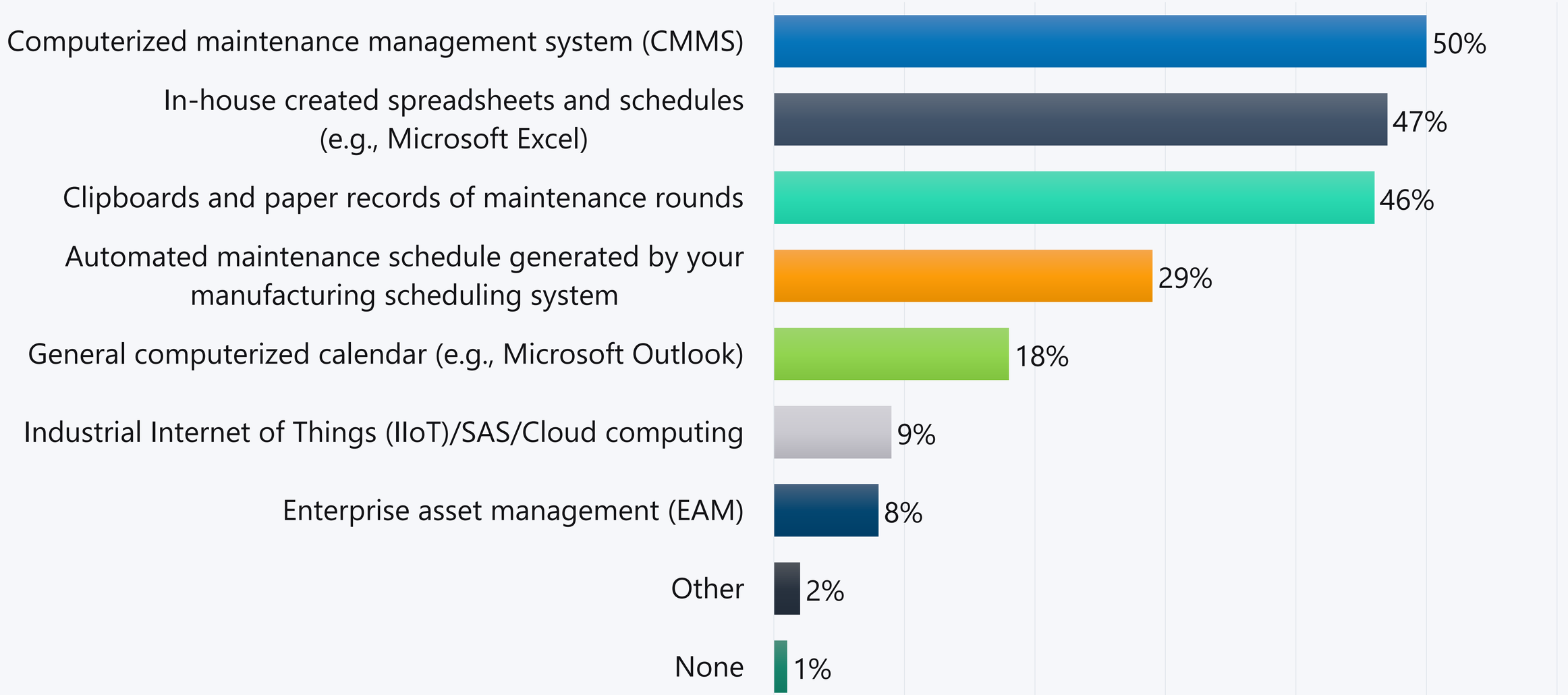
Q: Which factors led to the outsourcing of maintenance operation at your plant? Check all that apply. (n=146)

Training Received by Maintenance Personnel



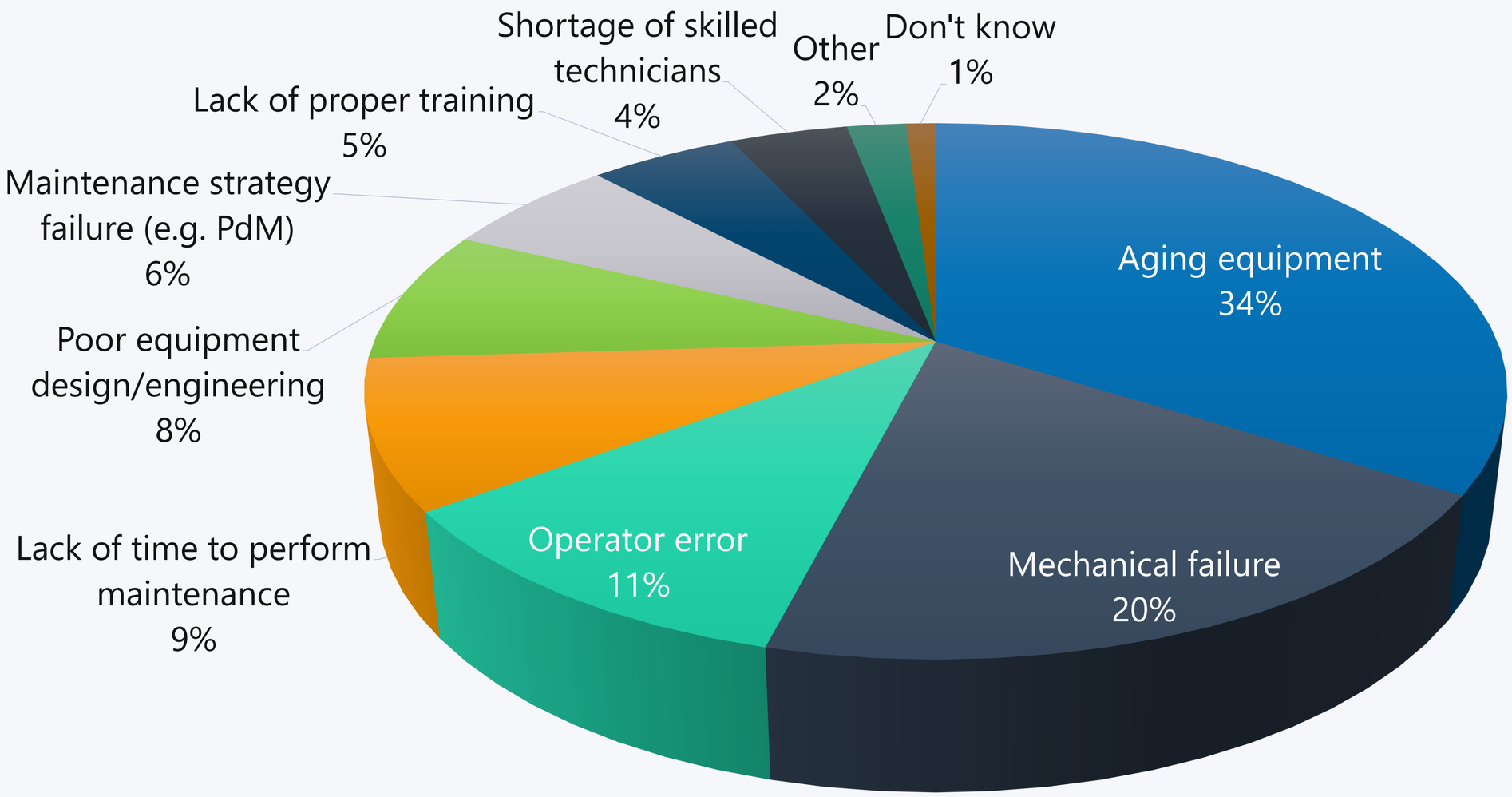
Q: What kind of training does your maintenance personnel receive? Check all that apply. (n=171)

Technologies Used to Monitor/Manage Maintenance



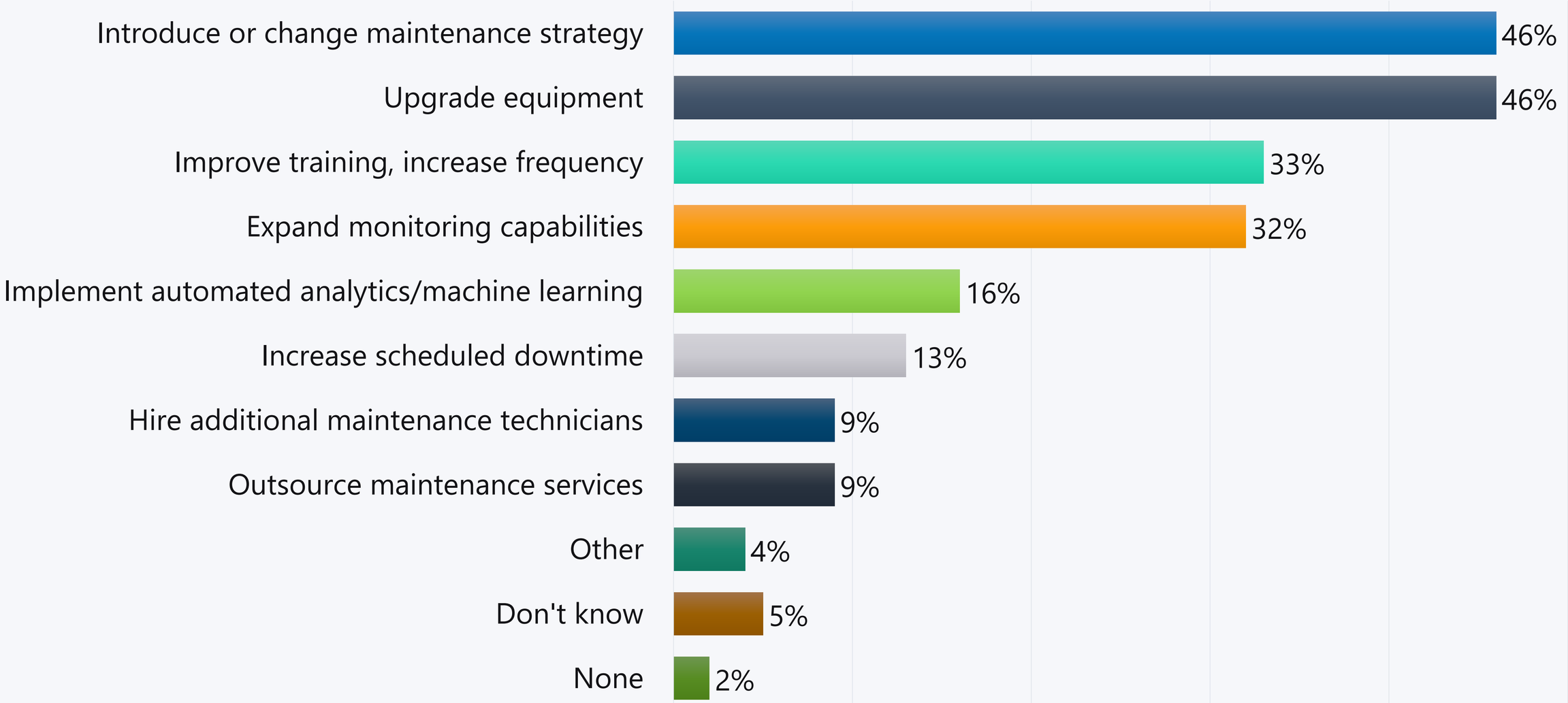
Q: What technologies are used to monitor or manage maintenance within your plant? Check all that apply. (n=171)

Leading Cause of Unscheduled Downtime



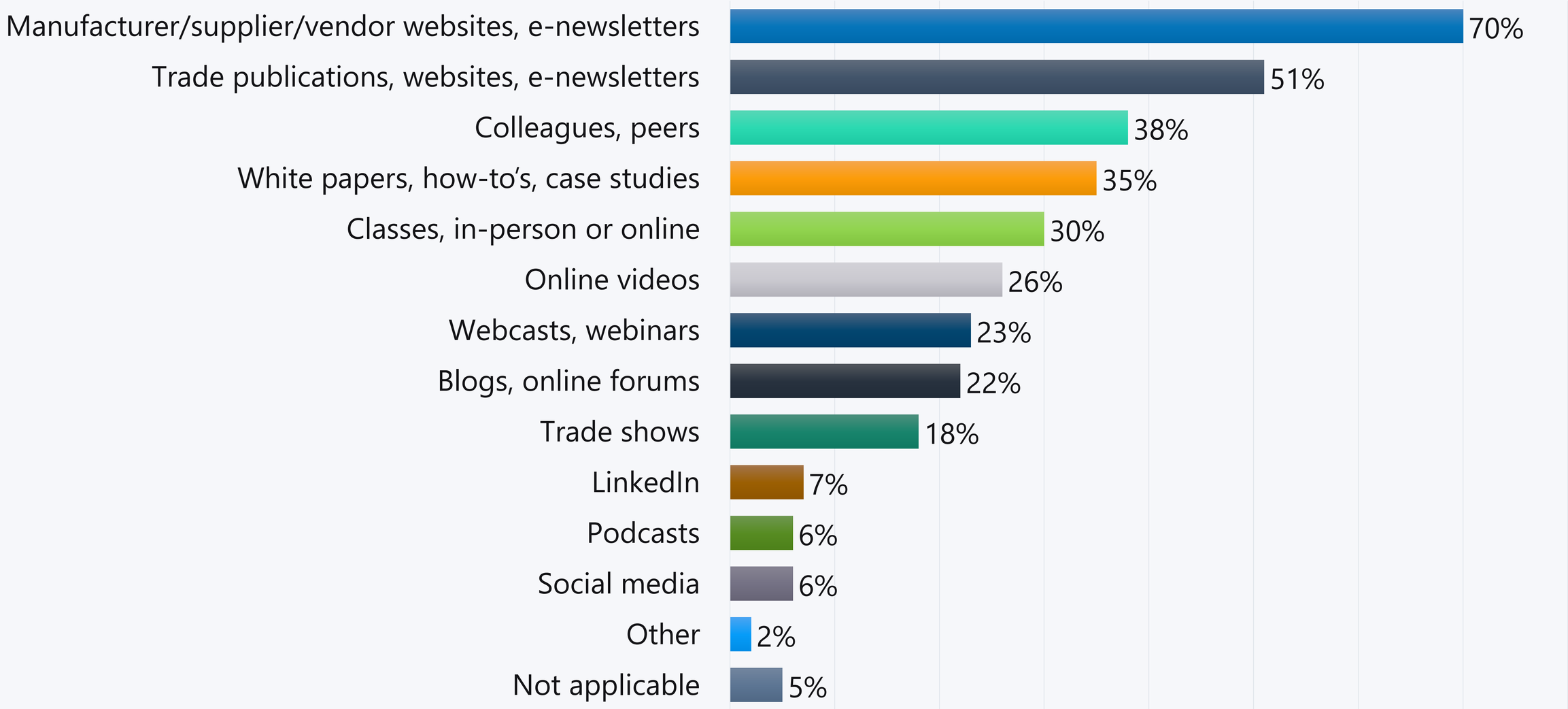
Q: What is the leading cause of unscheduled downtime in your plant? (n=171)

Plans to Decrease Unscheduled Downtime



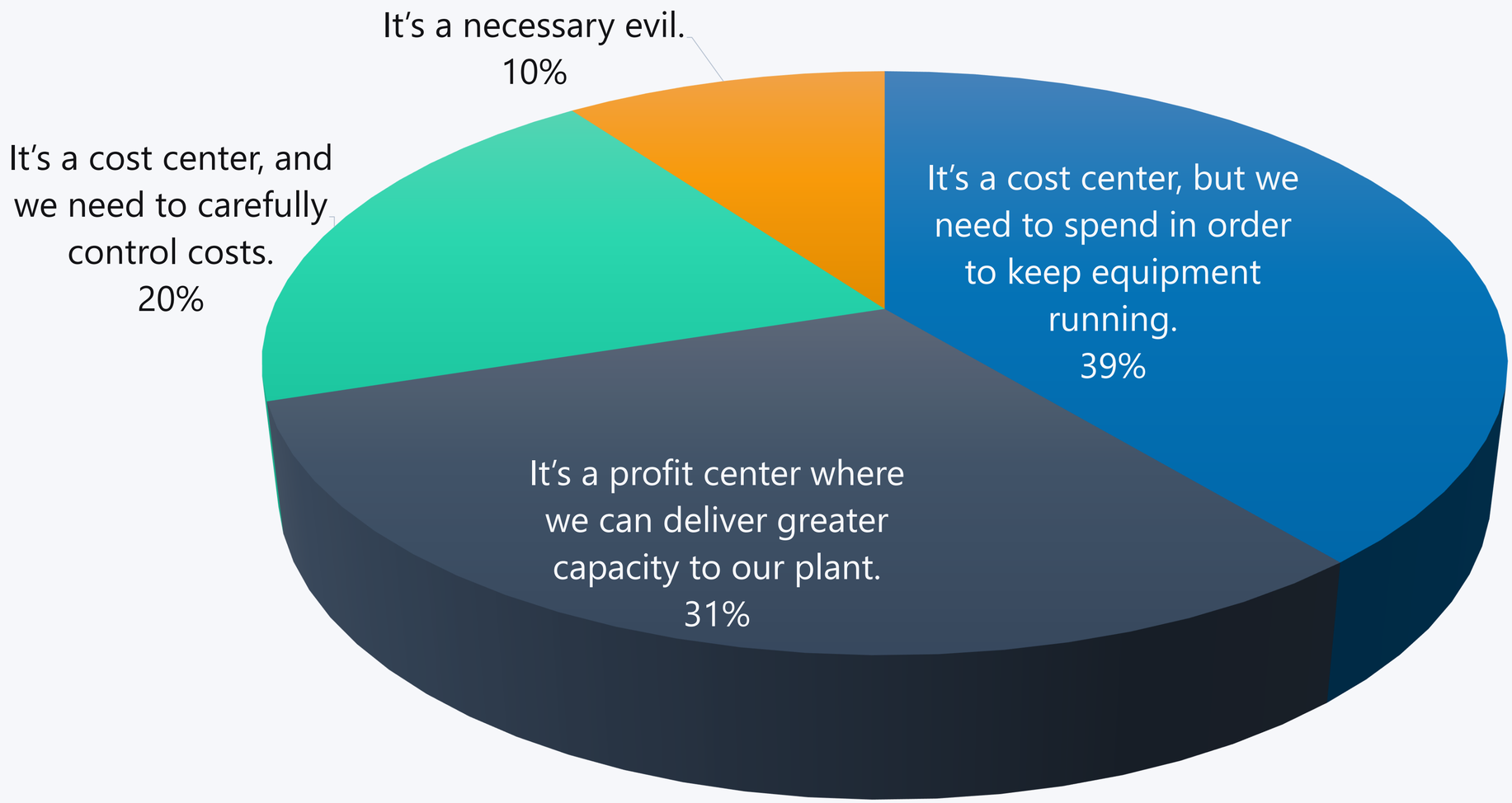
Q: How do you plan to decrease unscheduled downtime in your plant? Check all that apply. (n=171)

Sources for Proper Maintenance Management



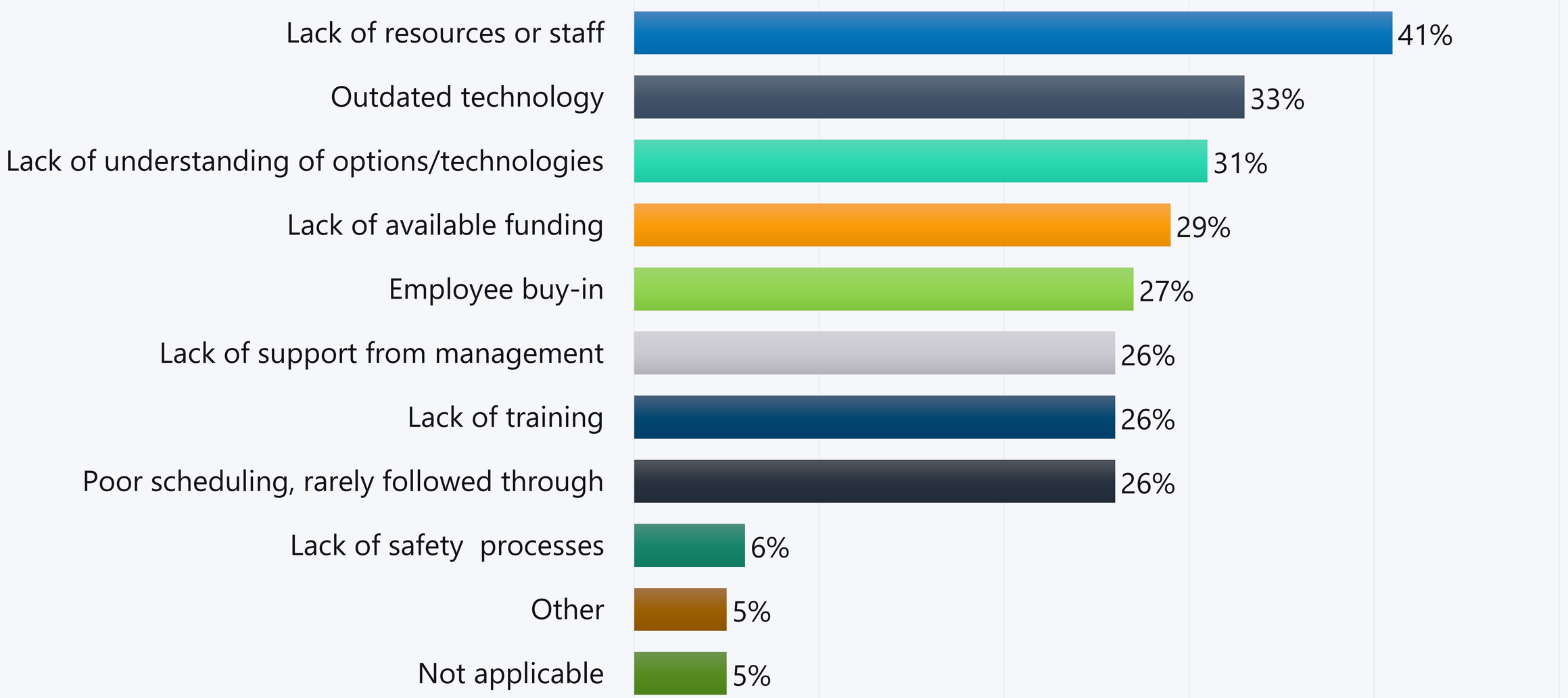
Q: Where do you go to get the information needed for proper maintenance management? Check all that apply. (n=171)

Attitude Towards Maintenance



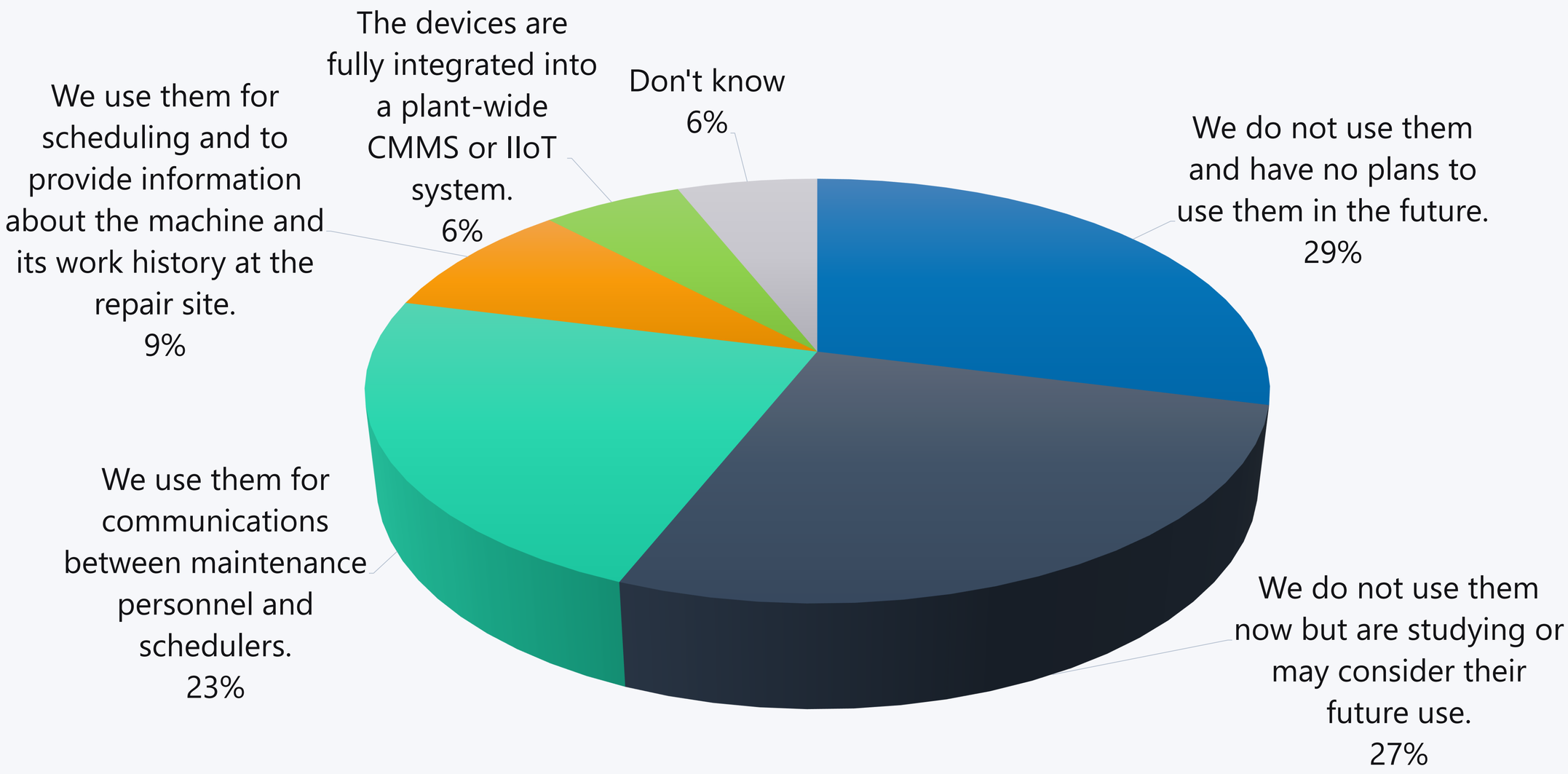
Q: Which of the following statements best describes your attitude toward maintenance? (n=171)

Key Challenges to Improving Maintenance



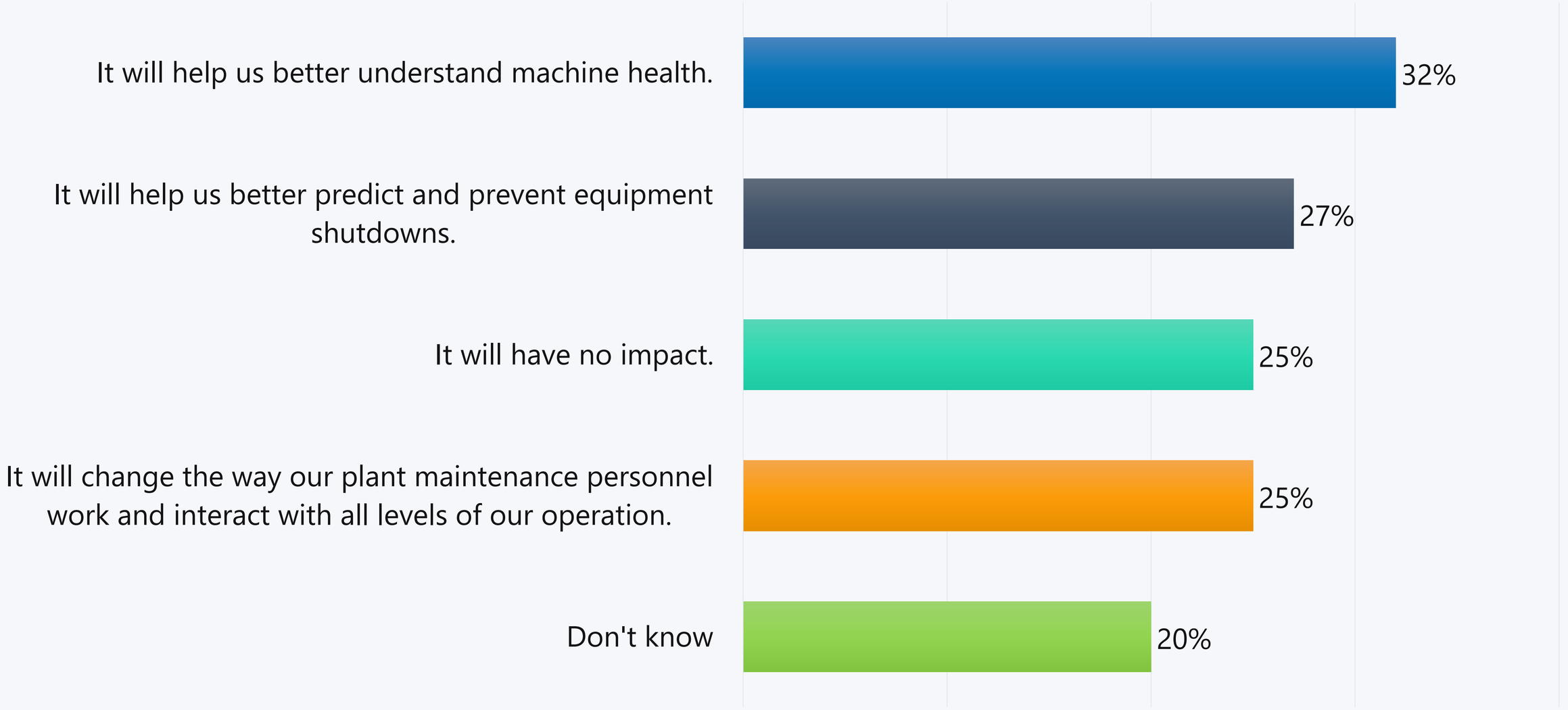
Q: What are the key challenges for improving maintenance at your facility? Check all that apply. (n=171)

Use of Handheld/Mobile Devices for Maintenance



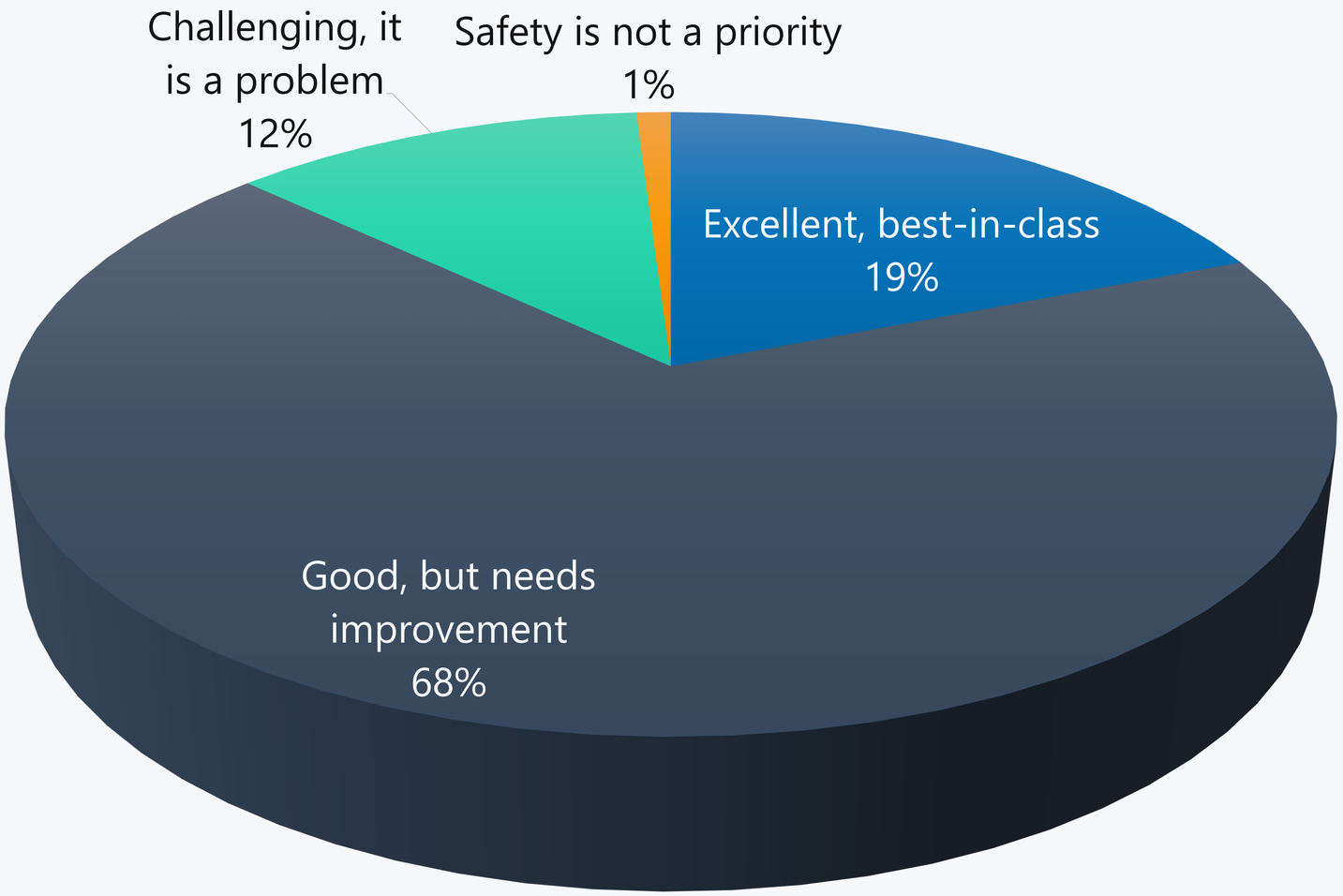
Q: To what extent is your plant using handheld/mobile devices for plant maintenance? (n=171)

Impact of IIoT on Maintenance Operations



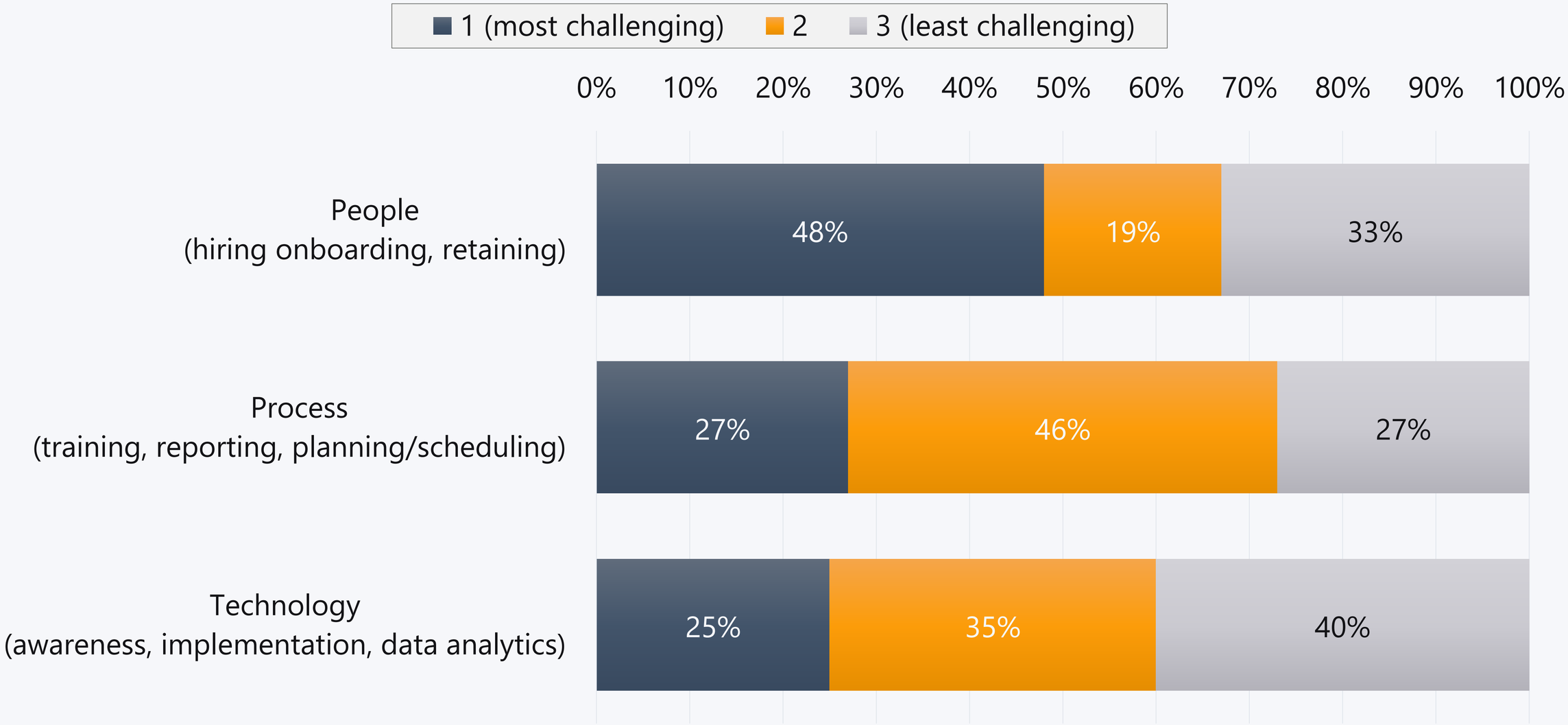
Q: How will the Industrial Internet of Things (IIoT) impact plant maintenance operations? Check all that apply. (n=171)

Current Safety Program



Q: How would you rate your current safety program at your plant? (n=162)

Challenges to Current Maintenance Program

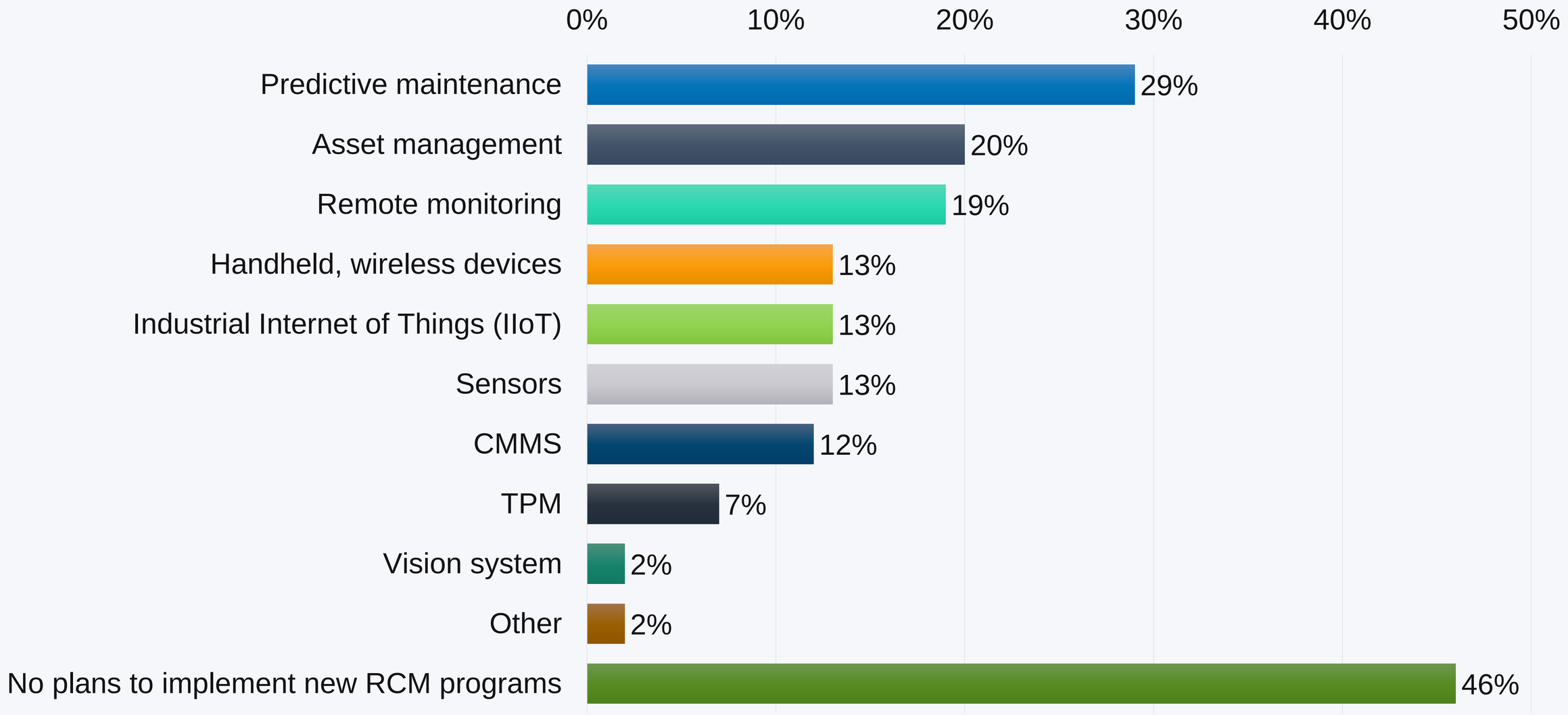


Q: Rank in order, the parts of your maintenance program you struggle with: [Most challenging (1) to least (3)] (n=161)

Areas of Maintenance Process that Need Improvement

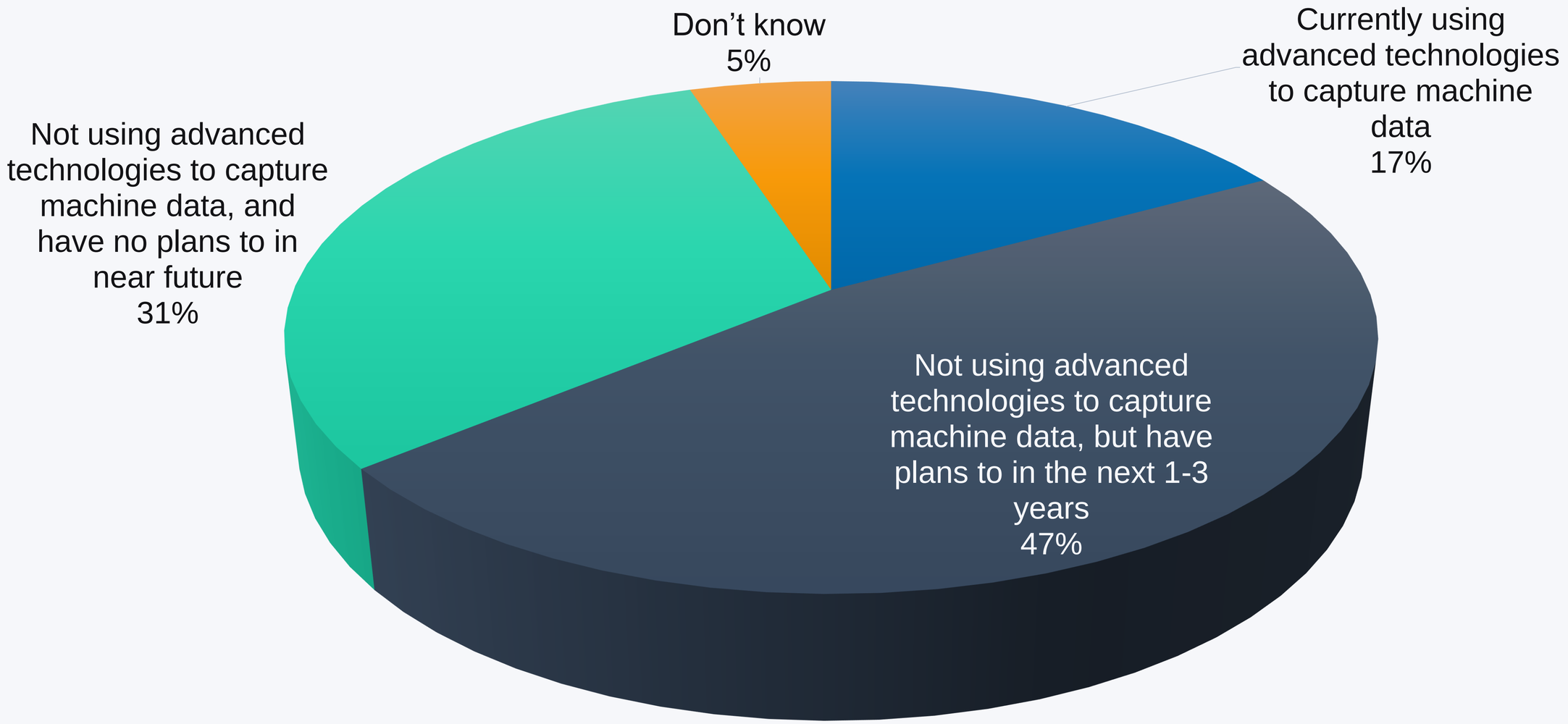
Q: Is there a need at your company and/or plant to improve maintenance processes and ownership? If needs improvement, what specifically? Check up to three (3) options below. (n=162)

Reliability-Centered Maintenance Programs



Q: Does your plant leadership have plans to implement new reliability-centered maintenance programs? If so, what are the planned programs based on? Check up to three (3) options below. (n=162)

Use of Advanced Technologies to Capture Machine Data



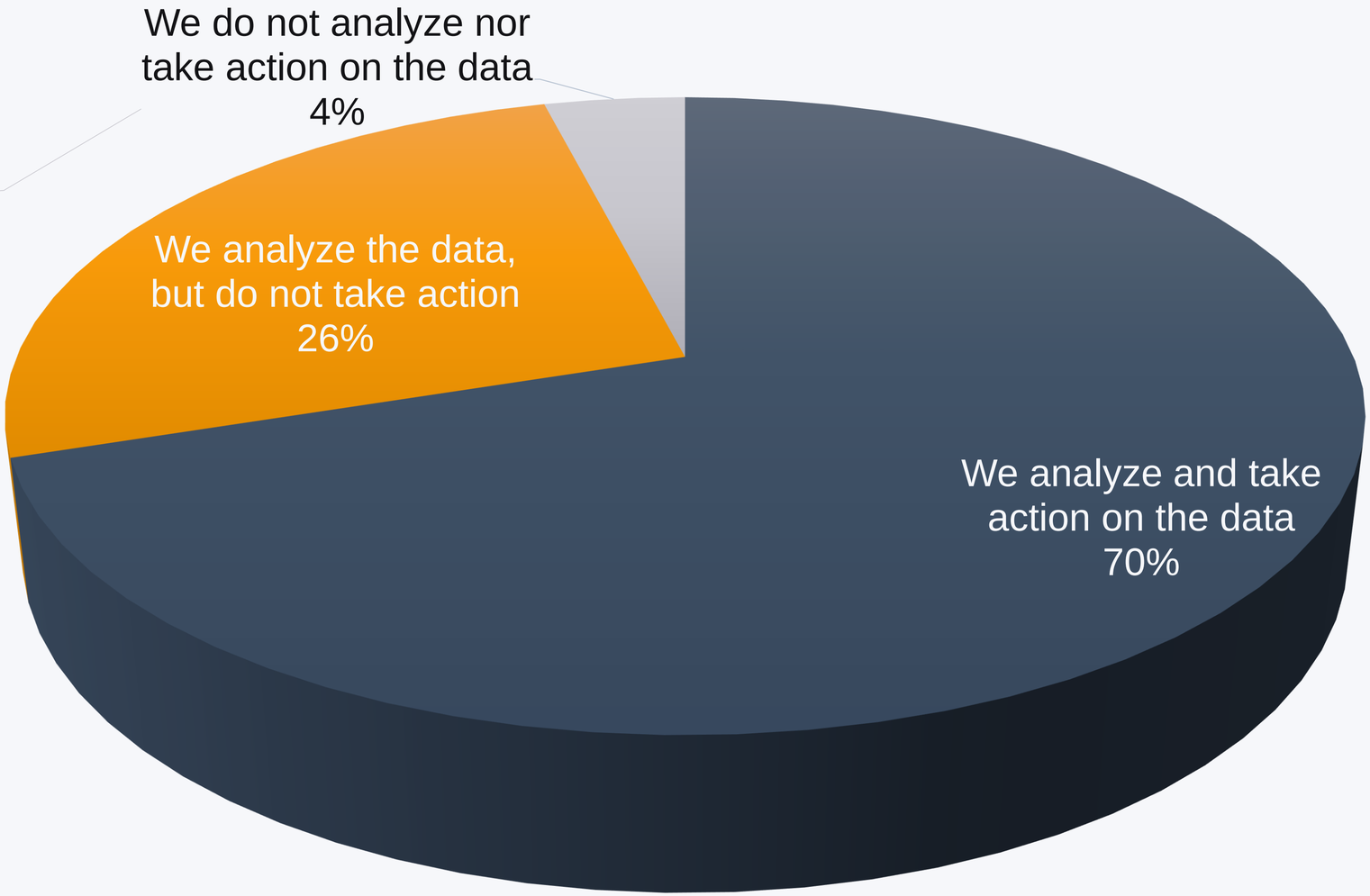
Q: Are you currently using any advanced technologies to capture machine data? (n=162)

Advanced Technologies in Use

Advanced technologies being used to capture machine data (verbatim responses):

- AgCommand
- Automated environmental reporting
- Bearing monitors
- Bentley
- BMS
- BMS trending
- DCS
- DCS systems
- Delta-V
- Displacement monitoring
- FactoryTalk
- Fully-automated
- Gracesense
- Iconics
- Ignition SCADA
- IIoT
- In-house network
- Infrared
- Inspections
- IoT
- Linknet
- Machinery health monitoring
- OEM remote monitoring
- Online runtime
- Online temperature monitoring
- Online vibration monitoring
- Operational technology
- PI historian
- PIE
- Predictive maintenance
- Process monitors
- Reporting and historian
- Rockwell Software
- SKF
- Some remote monitoring
- Temperature monitoring
- Thermal
- Tridium
- Two IBA servers as historians
- Ultrasound
- Vibration (x2)
- Vibration monitoring (x3)
- Vorim
- Wonderware

Use of Machine Data Captured



Reason: Time restraints *(n=1)*

Q: Do you analyze and take action on the machine data being captured? (n=27)

PLANT ENGINEERING

CFE Media and Technology

Industrial Maintenance Report

March 2020

Sponsored by ATS www.advancedtech.com | 855.834.7604

CFE Media and Technology