

The Convergence of Field Service and Asset Maintenance

Bridging the Gap

June 2007

Executive Summary

Aberdeen's research shows that 72% of field service organizations and 67% of Maintenance and Repair (MRO) functions view demand for higher asset uptime and availability as the most significant pressure driving the need for process improvement in their organizations. Best in Class organizations are leveraging best practices like systematically measuring equipment and worker-related performance to post substantially better Mean Time to Repair performance. The findings are drawn from a survey of over 175 field service and MRO professionals.

Best in Class Performance

Aberdeen used five key performance criteria to distinguish Best in Class companies from all other organizations. These key performance indicators (KPIs) are the operational metrics most frequently cited as indicators of balanced service improvement performance. Over the last two years, Best in Class firms reported:

- 8% increase in overall asset uptime – **50% higher than all others;**
- 10% improvement in mean time to repair, the time from first notice of asset failure to completed repair – **twice the industry average;**
- 10% improvement in technician “wrench time” – **almost three times that of all others.**
- 13% increase in completed work orders per week – **twice that of others.**
- 10% decrease in unplanned service incidents – **30% higher than all others.**

“Optimization of preventative and predictive maintenance activities, to make sure we're performing the right maintenance at the right time in the most cost effective way we can, is our key challenge in increasing reliability”

MRO Manager
Large Chemical
Manufacturer

Competitive Maturity Assessment

Survey results show that Best in Class organizations share several common characteristics:

- Leading organizations are **nearly twice as likely** as all others to have standard procedures for planning, forecasting and resource execution;
- Best in Class organizations are **twice as likely** as laggard companies to be using business intelligence and analytics;
- Best in Class organizations are **six times as likely** as the industry average to be using RFID to track and maintain assets.

Required Actions

In addition to the specific recommendations in chapter three of this report, to achieve Best in Class performance, organizations must:

- Integrate service support systems to facilitate better data flow and decision support;
- Accelerate evaluation of remote asset monitoring systems;
- Ensure robust asset history information is collected and maintained to better manage maintenance/service as well as asset lifecycle cost.

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Chapter One: Benchmarking the Best in Class

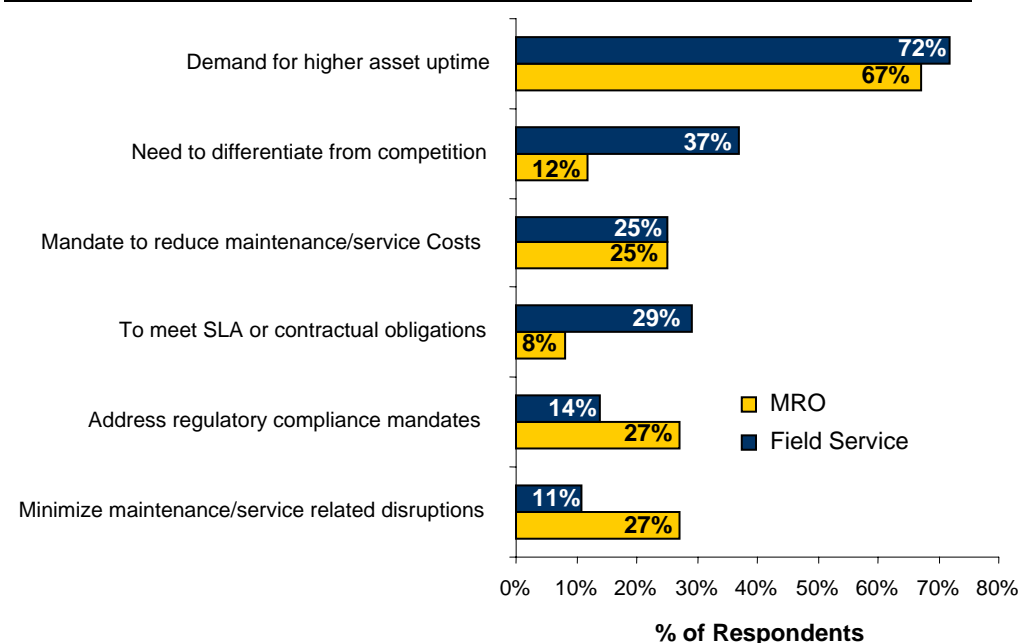
Field service and internal Maintenance and Repair (MRO) professionals identify high asset availability as a top objective. Whether the asset is a critical piece of production equipment, a key customer-facing component of an airline’s ground operation system or an element of a utility’s T&D infrastructure. Increasingly, field service organizations are adopting traditional MRO business processes like Computerized Maintenance Management (CMMS) and Predictive Maintenance strategies while MRO executives are implementing technology solutions and best practices prevalent in field service operations, like mobile solutions, optimized scheduling of technicians and service parts forecasting. The best practices being shared between these organizations have a common goal: meeting an escalating demand for asset uptime and stringent regulatory compliance while minimizing maintenance costs and service-related disruption.

Aberdeen’s latest research shows significant common ground in the pressures driving field service and MRO organizations to optimize their business practices. And while Field Service organizations are more apt to feel direct competitive pressure, both MRO and field service professionals agree asset uptime is the key external driver by a wide margin. Likewise, although MRO executives more often cite regulatory compliance as a strong pressure, both groups continue to struggle equally with maintenance cost containment.

Fast Facts

- Demand for higher asset uptime is a key driver for both field service and MRO firms
- Over the last two years, Best in Class firms have seen an 8% increase in asset uptime, nearly 50% greater than all other firms

Figure I: Key Pressures Driving Asset Maintenance Improvements



Source: Aberdeen Group, June 2007

Maturity Class Framework

To be effective, service organizations must manage their workforce to assure the highest asset availability and uptime within the asset-base they service. Aberdeen used five key performance criteria related to asset performance and workforce productivity, used by both field service and MRO organizations, to distinguish Best in Class companies from Industry Average and Laggard organizations. These key performance indicators (KPIs) are: 1) Asset Uptime, 2) Daily technician “wrench time”, 3) Number of unplanned work orders verses planned activity, 4) Average work orders completed per technician per week and 5) Mean time to Repair. Table I summarizes Aberdeen’s findings and defines Best in Class performance for this study.

Table I: Top Performers Earn “Best in Class” Status:

Definition of Maturity Class	Mean Class Performance
Best in Class: Top 20% of aggregate performance scorers	<ul style="list-style-type: none"> • 88% Asset Uptime • 59% Technician “wrench time” per day • 20% Unplanned vs. planned work orders • 13 Average work orders completed per week per tech • 5 hour Mean Time to Repair.
Industry Average: Middle 50% of aggregate performance scorers	<ul style="list-style-type: none"> • 85% Asset Uptime • 54% Technician “wrench time” per day • 33% Unplanned vs. planned work orders • 11 Average work orders completed per week per tech • 13 hour Mean Time to Repair.
Laggard: Bottom 30% of aggregate performance scorers	<ul style="list-style-type: none"> • 83% Asset Uptime • 49% Technician “wrench time” per day; • 42% Unplanned vs. planned work orders • 8 Average work orders completed per week per tech • 19 hour Mean Time to Repair.

Source: Aberdeen Group, June 2007

Best in Class PACE Model

Achieving Best in Class performance against increasing pressure for higher asset uptime and availability within MRO and service organizations, as shown in Table I, requires a combination of strategic actions, organizational capabilities and enabling technologies that can be summarized as follows (Table 2).

Maturity Framework Key

The Aberdeen Maturity Framework defines enterprises as falling into one of the three following levels of practices and performance:

Best in Class (20%) — practices that are the best currently being employed and significantly superior to the industry norm

Industry norm (50%) — practices that represent the average or norm

Laggards (30%) —practices that are significantly behind the average of the industry

Table 2: Best in Class PACE Framework

Pressures	Actions	Capabilities	Enablers
<ul style="list-style-type: none"> Customer demand for higher asset uptime and availability 	<ul style="list-style-type: none"> Establish and systematically measure equipment and worker-related performance metrics Implement proactive asset monitoring strategies in field service operations 	<ul style="list-style-type: none"> Planning, forecasting and allocation of resources based on historical usage/requirement trends Schedule and dispatch optimization in MRO organization Senior executive in charge of MRO organization Systematic and frequent measurement of MRO performance 	<ul style="list-style-type: none"> Enterprise Asset Management (EAM) Business intelligence/ analytics Remote Product Monitoring RFID technology Mobile Field Service Solution

Source: Aberdeen Group, June 2007

The Best in Class actions in Table 2 show that top performing organizations place a high value on monitoring and measuring both asset and workforce performance. Figure 3 illustrates how those organizations strategically approach the challenges illustrated in Figure 1.

PACE Key — For more detailed description see Appendix A

Aberdeen applies a methodology to benchmark research that evaluates the business pressures, actions, capabilities, and enablers (PACE) that indicate corporate behavior in specific business processes. These terms are defined as follows:

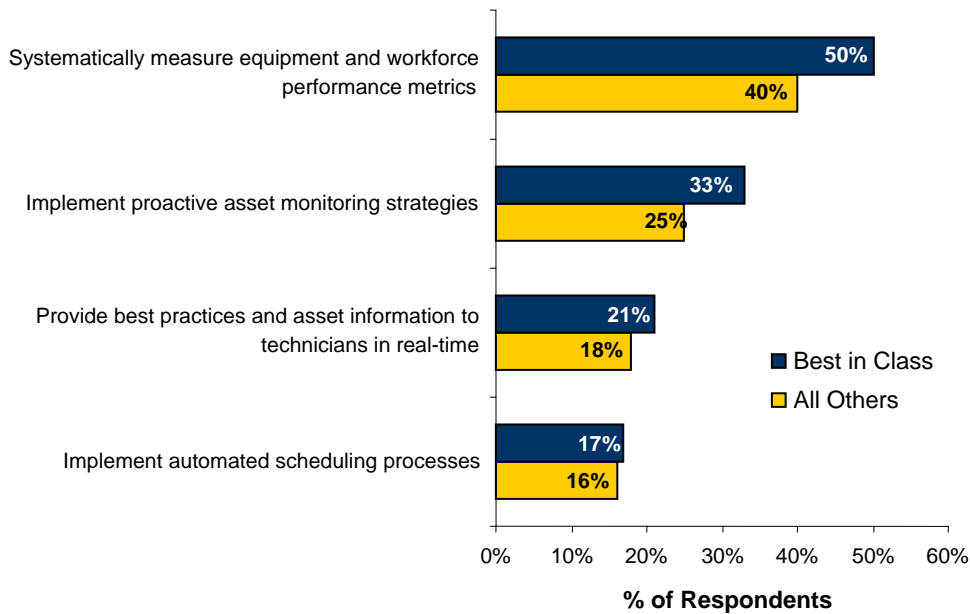
Pressures — external forces that impact an organization’s market position, competitiveness, or business operations

Actions — the strategic approaches that an organization takes in response to industry pressures

Capabilities — the business process competencies required to execute corporate strategy

Enablers — the key functionality of technology solutions required to support the organization’s enabling business practices

Figure 2: Top Strategic Actions for Best In Class Companies



Source: Aberdeen Group, June 2007

To reach Best in Class performance, firms are taking strategic action around assets or equipment and the workforce performing the service. Figure 2 shows that, among these top actions are: 1) implementing systems and business practices to regularly measure both equipment and workforce; 2) proactive asset monitoring to aid predictive maintenance; 3) providing complete asset history and repair information to service technicians at the point of repair in real time and 4) automating the process of scheduling maintenance work.

Aberdeen Insights – Strategy

Information collection, monitoring and distribution, whether it's asset-centered or technician-centered is becoming critical to both field service and MRO operations. Ensuring that the proper information is available at the time and point of service, through deployment of mobile technology, is a key strategy Best in Class organizations are using to address service improvements. Ninety-two percent of Best in Class firms surveyed either have in place or plan to implement systems that will provide technician access to job orders, status, schematics, parts availability via mobile devices.

Chapter Two: Benchmarking Requirements for Success

Analytics, system integration, automation and mobile technology strategies yield significant benefit to MRO and service organizations when those strategies become part of an organization's core capabilities.

Case Study: Tube Lines - Moving from Reactive to Proactive Maintenance

Tube Lines is charged with maintaining one of the world's oldest and largest mass transit railways – the London Underground. Five years ago, when City officials outsourced maintenance to the public-private partnership, Tube Lines found itself struggling with outdated technology to support a mass transit system used daily by millions of passengers.

To improve the safety and reliability of the London Underground, Tube Lines began one of the largest European asset management implementations, a pilot technology program standardized around a group of integrated best-in-class systems that became the foundation for tracking and maintaining asset performance. By using a common EAM backend system and linking it to maintenance technicians through a variety of mobile devices, Tube Lines can generate a complete 360-degree view of asset lifecycle across the 207 miles of track, 251 trains, 110 stations, 227 escalators, 71 lifts and 2,395 buildings it maintains. In addition to eliminating an outdated paper-driven work order system, technicians are able to provide accurate and timely information to aid decision-making. This has enabled Tube Lines to make a marked improvement in the ratio of preventive to corrective maintenance, enabling them to fix assets before they break and impact customers.

Tube Lines has transformed business processes in preventive maintenance, spare parts inventory tracking, remote equipment monitoring, root cause failure analysis tracking and asset auditing and condition assessment with its best-in-class system. Results have been shown from across the system as well. Better tracking of spare parts has reduced costly overstocking. Daily work order distribution to technician has been reduced from 13 steps to two across the maintenance technician workforce. Tube Lines entire business has begun the shift from reactive to proactive mode. Now that the pilot has proven successful across a third of the organization, plans call for rapid deployment "We're not firefighting anymore, says Capes, "We now have a single source of truth around asset performance."

About Tube Lines:

Tube Lines is responsible for the maintenance and upgrade of the infrastructure on the Jubilee, Northern and Piccadilly lines. London Underground is responsible for operating the Underground, for employing drivers and station staff, for ticketing and fares, and for the Tube's safety regime. The Tube Lines consortium consists of two shareholders - Amey and Bechtel. They bring together some of the most experienced providers of business services with specialist skills in the rail industry, including track and signal renewals, plus project and operational mgmt. They are providing some of the best project and operational managers from around the world to work on the modernization of the Tube system. Amey owns two-thirds of Tube Lines' business and Bechtel one third.

Fast Facts

The Best in Class are:

- Twice as likely as all others to have standard procedures for planning, forecasting and resource execution.
- Twice as likely as laggards to systematically measure service/maintenance performance
- Twice as likely as laggards to use business intelligence and analytics.
- Six times more likely than industry average firms to be using RFID to track and maintain assets

Tube Lines Quote

"We had more than 500 separate systems including PC-based spreadsheets, databases, and more to track more than 15 asset areas. No one had a 360 - degree view of asset performance"

Martyn Capes,
Technical Manager,
Tube Lines.

Competitive Assessment

Survey respondents that fell into one of three categories – Laggard, Industry Average, or Best in Class — displayed characteristics in five key categories: (1) process (policies and practices that use historical data to forecast part and resource demand); (2) organization (the right level of executive oversight of service and MRO operations); (3) knowledge (providing real-time access to asset service and cost information throughout the value chain); (4) technology (selection of appropriate tools and intelligent deployment of those solutions); and (5) performance management (ability of the organization to measure the benefits of technology deployment and use the results to further improve key business processes).

Table 3: Competitive Framework

	Laggards	Average	Best-in-Class
Process	Planning/forecasting/allocation of resources based on historical usage/requirement trends		
	45%	56%	63%
	Spare parts forecasting, planning and logistics execution processes		
	33%	48%	50%
	Scheduling and Dispatch Optimization		
	36%	35%	58%
	Standardized enterprise-wide procedures for planning, forecasting and execution of resources		
	27%	33%	50%
Organization	Senior executive in charge of MRO organization		
	42%	54%	58%
	Unified field service and internal MRO oversight		
	30%	33%	46%
Knowledge	Location-enabled asset tracking in field service		
	36%	29%	42%
	Share asset performance and cost information with all value chain counterparts in real time		
	21%	17%	33%
MRO/Field Service technology currently in place:			

	Laggards	Average	Best-in-Class
Technology	<ul style="list-style-type: none"> • 15% Business intelligence/analytics • 27% EAM • 6% Remote Product Monitoring (M2M) • 6% RFID • 24% Mobile Field Service Solution 	<ul style="list-style-type: none"> • 24% Business intelligence/analytics • 33% EAM • 22% Remote Product Monitoring (M2M) • 5% RFID • 25% Mobile Field Service Solution 	<ul style="list-style-type: none"> • 33% Business intelligence/analytics • 42% EAM • 33% Remote Product Monitoring • 29% RFID • 29% Mobile Field Service Solution
Performance	Systematic and frequent measurement of Service/MRO performance		
	27%	41%	54%

Source: Aberdeen Group, June 2007

Organizational Capabilities and Technology Enablers

These key process, organization, knowledge management, and technology enablers are the collective foundation that separate leading organizations from average counterparts and pays off in significant efficiency gains.

• Process

Best in Class organizations are more likely to have formal business processes in place to forecast service demand, in terms of people and parts, by historical usage, asset performance trends and business growth. These organizations are also far more likely to have business practices in place that ensure the sharing of key data throughout the entire value chain.

• Organization

Best in Class organizations are 30% more likely to have a senior executive in charge of their MRO/service organization. Aberdeen’s research among service organizations over the past two years has shown this consistent organizational proof point – that service organizations with high-level oversight perform better in terms of efficiency, cost and profit performance, and customer retention.

• Technology

Best in Class organizations significantly outpace average and laggard counterparts in adoption of a comprehensive set of technology tools to aid service operations. While other firms seem to be closing the gap in deployment of mobile solutions, Best in Class organizations are much further along the adoption curve in most other technology solutions.

Customer Quote

“We’re using mobile technology even within our shop locations to facilitate the tremendous amount of data that is captured on repair activities. We don’t have enough room in our facilities for all of the terminals needed. Mobile technology should enable us to at least double our throughput of information.”

Director of Operations,
Municipal Transit
Authority

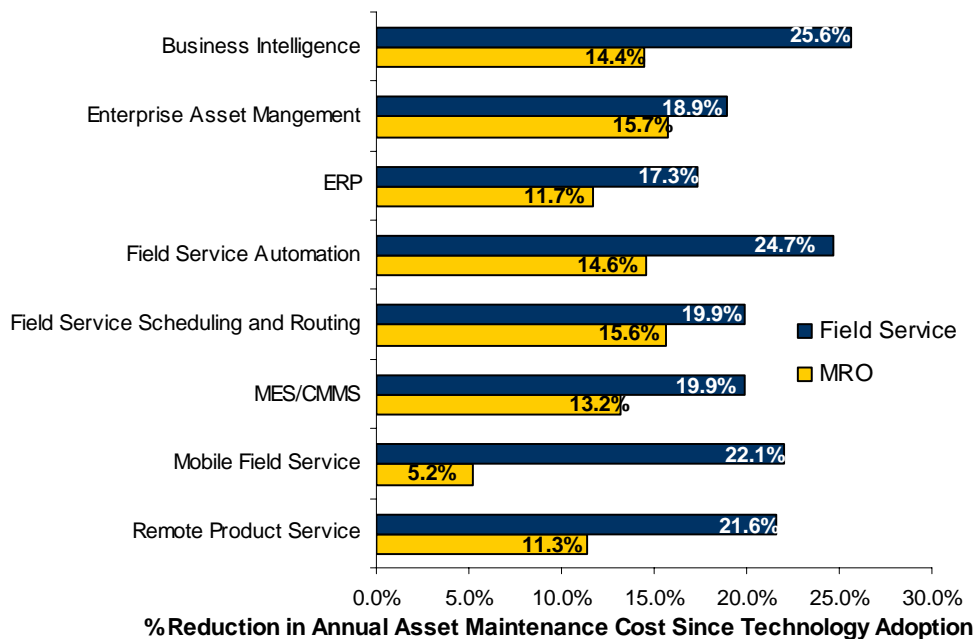
Table 4: Crossover Technology Adoption

Solution Type	% of Firms reporting Current Usage	
	MRO Respondents	Field Service Respondents
Enterprise Asset Management (EAM)	38%	23%
Computerized Maintenance Mgt. (CMMS) or Mfg. Execution System (MES)	48%	26%
Mobile Field Service Solution	17%	32%
Spare Parts Execution System	31%	49%

Source: Aberdeen Group, June 2007

Service and MRO organizations are starting to adopt common technologies to enhance gains in service and maintenance operations. MRO organizations have done more to adopt technologies around the overall management and maintenance of assets with MES and CMMS systems while field service organizations are more likely to have mobile solutions and parts execution systems in place (Table 4). With only 17% of MRO organizations with mobile field service solutions in place but 42% planning to adopt mobile technology within the next 24 months, these organizations should begin to see maintenance cost reductions similar to their field service counterparts (Figure 3).

Figure 3: Reduction in Maintenance Costs from Technology



Source: Aberdeen Group, June 2007

Case Study: Columbia Gas Transmission – Using Mobile Technology to Drive Maintenance Excellence

Columbia Gas Transmission, an operating company of NiSource, Inc. operates one of North America's largest underground natural gas storage systems and moves more than 3 billion cubic feet of natural gas per day through a 12,750 mile pipeline network. They serve local gas distribution companies, energy marketers, electric power generating facilities and hundreds of industrial and commercial end users in about a dozen states.

To eliminate inefficient paper-based maintenance systems, Columbia Gas Transmission implemented a mobile work management system that provides two-way data flow between the company's information system and field technicians. Designed to aid preventive maintenance and regulatory compliance actions, the system tracks all work orders, providing instant access to asset information as well as regulatory requirements around the work order. It allows Columbia Gas Transmission to maintain a complete work history to meet audit requirements and produce better, more accurate data around work activities. It also allows technicians in the field to generate work orders, monitor asset conditions in the field and capture remote asset performance data.

While the end results are impressive, implementing such a comprehensive system requires effective planning and attention to a myriad of details. Michele Forsbrey, Sr. Work Management Consultant with Columbia Gas Transmission cites two: user acceptance and the selection of the right mobile devices to provide the final link in the system. "For example, we knew we needed a ruggedized device for our 500 field users," she said. "A consumer device just wouldn't stand up to the work we do. It had to be intrinsically safe given the environment around natural gas. And we needed a device that would have greater longevity with fewer model changes than typical consumer devices."

Once the software and hardware decisions had been made and project implemented, Michele and her team had to deal with a common service transformation challenge - user acceptance. "One of our biggest hurdles was the users themselves and their willingness to accept the new technology," Forsbrey says, "They had been doing it on paper for so long that many of them were reluctant to change." The team was able to overcome the challenges by identifying technology "champions" in each service team that piloted the new technology. As others saw the productivity improvement the system offered, adoption accelerated.

Despite initial user challenges, Columbia Gas Transmission has been running their mobile solution across 500 mobile technicians within its service force since 2001 and has posted significant gains. In the area of compliance alone they have been able to reduce the time needed to prepare data for numerous required DOT audits from a week to a few hours, saving them 19-28 labor weeks per year.

Key Fact

In the area of compliance alone, Columbia Gas has been able to reduce the time needed to prepare data for numerous required DOT audits from a week to a few hours, saving them 19 – 28 labor weeks per year.

Aberdeen Insights – Technology

Best-in-Class organizations in this survey are dramatically ahead of average and laggard firms in deployment and usage of remote monitoring and RFID for asset maintenance. While remote monitoring isn't new in the MRO environment, a trend supported by the data in this study is the percent of field service organizations adopting the technology to move from a traditional break/fix environment to a more controllable and potentially more profitable predictive maintenance model for the assets they service.

MRO organizations that have already taken performance improvements from CMMS systems can find new improvement opportunities from mobility solutions and spare parts execution systems while their field service counterparts have the opportunity to leverage deep asset management and computer-driven maintenance programs to facilitate better repair operations.

Chapter Three: Required Actions

The convergence of best practices among field service and MRO organizations is being driven by a combination of factors – demand for higher asset uptime and availability, the need to enhance workforce productivity and growing understanding of the value of using performance metrics to monitor and adjust service operations.

Whether an organization is trying to improve its workforce's productivity, internal efficiency or customer-facing performance from "Laggard" to "Industry Average", or "Industry Average" to "Best in Class", the following actions will help spur the necessary performance improvements:

Laggards Steps to Success

For both Field Service and MRO organizations

- **Start measuring the things that count**

More than 20% of the laggard respondents to our survey indicated they didn't know their current performance in asset uptime, the most critical market driver across both field service and MRO organizations. And only 27% have the capability of systematic and regular measurement of MRO performance. Measuring not only asset uptime, but overall asset maintenance costs can provide critical baseline information for service and repair organizations. Installing the systems and implementing the discipline shown by Best in Class companies to regularly measure performance is the foundation for overall operational improvement.

For MRO organizations

- **Place Sr. Exec in charge of service/MRO operations**

Aberdeen's research shows that less than half of laggard organizations either have or plan to have a senior executive in charge of MRO operations. Executive oversight of service operations is one of the most cited best practices of Best in Class service organizations and 89% of Best in Class companies in this survey either have or plan to have senior executive oversight. Placing critical service and maintenance functions in the hands of a senior executive with high enterprise visibility is a proven strategy to drive transformation.

For Field Service organizations

- **Place a priority on scheduling and dispatch optimization**

Efficiently scheduling service calls involves analysis of workforce, fleet and parts resources, and addressing unexpected disruptions caused by customer emergency calls, traffic delays, spare part stock outs and technician unavailability. This can be a challenge for any service organization, but is especially daunting for a field service organization with

Fast Facts

To achieve Best in Class status manufacturers must:

- Integrate service support to facilitate better data flow and decision support
- Accelerate evaluation of remote asset monitoring systems
- Ensure robust asset history is collected and maintained to better manage maintenance/service as well as asset lifecycle costs.

a large technician staff handling a high volume of work orders. Using technology to automate as much of this process as possible can improve ability to meet customer commitments and reduce mean time to repair performance. The data shows that the better service organizations understand this, as 70% of average firms and 98% of Best in Class organizations either have or plan to have this capability.

Industry Average Steps to Success

For both Field Service and MRO organizations

- **Implement location-enabled resource tracking**

Knowing where service resources are at any given time is fundamental to effective asset maintenance, especially when dealing with critical and unexpected asset failures. For organizations responsible for servicing disbursed assets, location-tracking needs to be extended to the asset itself. Eighty percent of best-in-class organizations have or plan to implement this capability to better manage resources.

For MRO organizations

- **Use historical usage and requirement trends to plan, forecast and allocate maintenance and service resources**

Data shows MRO organizations lag field service counterparts in this best practice approach to ensuring the correct level of resources to address increasing asset maintenance demands while maintaining proper cost controls. Research shows the best companies apply this approach to planning workforce, parts and fleet resources.

For Field Service Organizations

- **Implement real-time data sharing around asset performance and service costs across entire service chain**

Breaking down the information silos that often exist in organizations can speed resource decision-making, aid in forecasting critical service trends and avoid problems caused by conflicting departmental priorities. It's an important best practice for 89% of best-in-class who have or plan to implement. This is a more difficult, but equally important, challenge for field service than MRO organizations due to the decentralized nature of those operations. The broad use of mobile technology and solutions to link technicians to centralized knowledge management systems can be a critical part of this information flow. For example, field service organizations that have implemented mobile solutions report over 22% improvement in asset maintenance costs and over 18% improvement in mean time to repair performance.

Customer Quote

"We're facing not only equipment issues but significant people issues. We're losing the young people. Traditional ways of providing service won't work. We have to find more proactive ways to provide service with fewer people and less time involved."

Wayne Vincent,
Strategic Planning
Manager,
Regional Service.
Bell Aliant

Best in Class Steps to Success

For both Field Service and MRO organizations

- **Implement advanced analytics to measure and improve asset maintenance/service performance**

Organizations across both Field Service and MRO organizations that have implemented business intelligence and analytic technology to measure service and maintenance operations are showing substantial improvements across all relevant performance measurement areas. Regular review of performance, coupled with systems that pinpoint exact variances between planned and actual activity, and that make information available to all relevant line executives can have significant impact on operations.

For MRO organizations

- **Use proactive as well as predictive maintenance strategies as part of a total maintenance solution**

Adopting preventive maintenance strategies alone have proven to be far less effective than when combined with predictive and reliability-centered approaches. Monitoring the condition of serviceable assets to avoid potential downtime and provide necessary data for asset lifecycle analysis can yield significant gains in both asset availability and cost control. Linking the data through an enterprise knowledge base can result in significant overall maintenance and service performance.

For Field Service organizations

- **Continue moving from break/fix to more predictive maintenance model to improve asset uptime and meet customer demand**

Employing emerging technologies in Remote Product Service as well as broad adoption of mobile technology will promote more planned preventive service work and minimize costly reactive service calls centered on asset breakdown. Enabling work planning activities that add preventive maintenance actions when break/fix events occur minimizes truck rolls, increases technician wrench time and, over the long term, reduces asset downtime. Subsequently, this approach leads to profitable service contract implementation around overall asset performance.

Customer Quote

"The best way to implement any type of condition-based maintenance program is to make sure you have the absolutely the best people who intimately understand the equipment working with the systems and knowledge bases. There may be 10,000 you can monitor, you obviously can't do all in real time. So you need the best people to help recognize how to identify failures and how to best react to failures."

MRO Director,
Large North American
Steel Manufacturer

Aberdeen Insights – Summary

Aberdeen's research has validated that there is a best practices convergence occurring between traditional MRO organizations and field service providers. This is to be expected since both organizations share a common goal – maximize asset uptime and availability in the most efficient manner possible and at the lowest possible maintenance cost. Both groups are keenly focused on improving systems that support the incredible amount of data transfer that asset maintenance requires – ensuring that information is available to maintenance techs at the point of service as well as utilizing that information to make longer-term adjustments to best practices. Leading companies are also beginning to see the merits of proactive asset maintenance strategies as a key part of an overall approach to achieving maximum asset uptime at lowest cost.

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Appendix A: Research Methodology

In May and June of 2007, Aberdeen Group examined the asset maintenance/service strategies, capabilities, and related technologies of over 175 companies. Responding executives completed an online survey that included questions designed to determine the following:

- The degree to which asset maintenance/service strategies and capabilities are deployed across the operation and the convergence of strategies between field service and MRO firms
- The structure and effectiveness of existing strategies, policies, and procedures
- Current and planned use of field service and EAM technologies.
- The benefits achieved by organizations in both communities by the adoption of best practices prevalent across all enterprises

Aberdeen supplemented this online survey effort with telephone interviews with select survey respondents, gathering additional information on asset maintenance/service capabilities, technologies, and real-time integration strategies, experiences, and results.

Responding enterprises included the following:

- **Field Service or MRO:** Field service (55%), MRO (45%)
- **Job title/function:** The research sample included respondents with the following job titles: CxO or President (16%); Vice-President (3%); Director (18%); Manager (37%), Staff (11%), and Other (15%).
- **Industry:** The research sample included respondents from different industries. Represented industries were Industrial Manufacturing (12%); Chemicals and Metals (11%); High Tech (11%); Consumer (9%); Utilities (9%); Mining/oil/gas (8%); Telecommunications (8%); Transportation/Logistics (7%); Medical Manufacturing (7%); Public Sector (5%).
- **Geography:** The majority of respondents (64%) were from North America. Remaining respondents were from the Asia-Pacific region (13%), and EMEA (21%). The remaining 2% were from Latin America.
- **Company size:** About 38% of respondents were from large enterprises (annual revenues above US\$1 billion); 34% from midsize enterprises (annual revenues between \$50 million and \$1 billion); and 28% of respondents were from small businesses (annual revenues of \$50 million or less).
- **Number of Maintenance/Service Employees:** 29% of respondents had less than 50 service/maintenance employees, 16% had between 51-100 service employees, 24% between 100-500; and 31% had more than 500 service employees.

Table 5: PACE Framework

PACE Key

Aberdeen applies a methodology to benchmark research that evaluates the business pressures, actions, capabilities, and enablers (PACE) that indicate corporate behavior in specific business processes. These terms are defined as follows:

Pressures — external forces that impact an organization's market position, competitiveness, or business operations (e.g., economic, political and regulatory, technology, changing customer preferences, competitive)

Actions — the strategic approaches that an organization takes in response to industry pressures (e.g., align the corporate business model to leverage industry opportunities, such as product/service strategy, target markets, financial strategy, go-to-market, and sales strategy)

Capabilities — the business process competencies required to execute corporate strategy (e.g., skilled people, brand, market positioning, viable products/services, ecosystem partners, financing)

Enablers — the key functionality of technology solutions required to support the organization's enabling business practices (e.g., development platform, applications, network connectivity, user interface, training and support, partner interfaces, data cleansing, and management)

Source: Aberdeen Group, June 2007

Table 6: Maturity Framework

Maturity Framework Key

The Aberdeen Maturity Framework defines enterprises as falling into one of the following three levels of practices and performance:

Best in Class (20%) — Asset Maintenance/Service initiatives that are currently being employed and significantly superior to the industry norm, and result in the top industry performance.

Industry norm (50%) — Asset Maintenance/Service initiatives that represent the average or norm, and result in average industry performance.

Laggards (30%) — Asset Maintenance/Service initiatives that are significantly behind the average of the industry, and result in below average performance

Source: Aberdeen Group, June 2007

Table 7: Competitive Framework

Competitive Framework Key

Process — What is the scope of process standardization? What is the efficiency and effectiveness of this process?

Organization — How is your company currently organized to manage and optimize this particular process?

Knowledge — What visibility do you have into key data and intelligence required to manage this process?

Technology — What level of automation have you used to support this process? How is this automation integrated and aligned?

Performance — What do you measure? How frequently? What's your actual performance?

Source: Aberdeen Group, June 2007

Table 8: Relationship between PACE and Competitive Framework

PACE and Competitive Framework How They Interact

Aberdeen research indicates that companies that identify the most impactful pressures and take the most transformational and effective actions are most likely to achieve superior performance. The level of competitive performance that a company achieves is strongly determined by the PACE choices that they make and how well they execute.

Source: Aberdeen Group, June 2007

Appendix B: Related Aberdeen Research

Related Aberdeen research that forms a companion or reference to this report includes:

- [*Strategic Service Management*](#), May 2007
- [*Service on Time: All the Time*](#), April 2007
- [*Collaborative Asset Maintenance Strategies*](#), December 2006
- [*The Mobile Field Service Benchmark: 2007 and Beyond*](#), December 2006
- [*Remote Product Service Update*](#), November 2006
- [*The Asset Management Benchmark Report : Moving Toward Zero Downtime*](#), April 2006

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