Aberdeen*Group*

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Collaborative Asset Maintenance Strategies

Redefining the Roles of Product Manufacturers and Operators in the Service Chain

December 2006

— Underwritten, in Part, by —

Executive Summary

In asset intensive industries, such as automotive, metals, mining, oil and gas, process manufacturing, utilities, and the public sector, the reliability and productivity of capital assets is essential to an organization's financial success. Maintenance of these assets can dramatically impact the overall performance and useful life of an asset. Accordingly, asset owners/operators and asset service providers are continually trying to improve their maintenance practices. This benchmark report focuses on the strategies, processes, and technologies organizations are using to refine and enhance the effectiveness of their maintenance operations.

Key Business Value Findings

- Preventive Maintenance (PM) is the dominant maintenance strategy in asset intensive industries, but more proactive maintenance approaches, such as predictive maintenance and reliability centered maintenance processes produce greater asset performance.
- Nearly half of all survey respondents report the same common challenges in improving asset maintenance including:
  - Insufficient data available on asset performance and service history,
  - Management does not see maintenance as a top priority, and
  - Disjointed, nonstandard maintenance processes prevail.
- Best-in-class organizations reap substantially larger benefits from improved maintenance practices than do average and laggard establishments, including:
  - Significantly improved asset reliability,
  - Greater asset uptime and availability,
  - Lower costs of servicing assets,
  - Fewer unexpected downtimes and outages, and
  - A higher return in invested capital.

Implications & Analysis

Best-in-class organizations share many common traits, to name just a few:

- A senior-level executive heads up all asset maintenance operations at more best-in-class organizations than is the case in average and laggard establishments;
- They employ additional proactive maintenance strategies to augment their preventive maintenance activities; and
- They establish and systematically monitor specific KPIs on a routine and regularly scheduled basis.

Recommendations for Action

- Implement aggressive proactive maintenance strategies.
- Ensure that maintenance and operations staff collaborate to optimize maintenance schedules.

- Use analytics software to measure actual asset performance against established goals.
- Centralize management and control of asset maintenance.
- Build a case for the CFO regarding the importance of investing to support proper service and maintenance practices.
- Consider spare parts/MRO inventory planning solutions.

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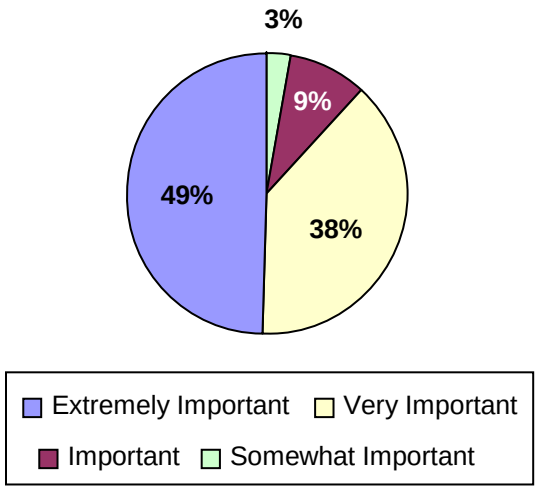
Chapter One:
Issue at Hand

Key Takeaways

- 87% of respondents report that asset maintenance is very or extremely important to their organizations overall financial performance, but only 7% are completely satisfied with their maintenance performance.
- Asset reliability is a core driver of service and maintenance innovation for nearly 70% of survey respondents.
- More than 70% of survey respondents report that their maintenance departments function on a stand-alone basis.

Companies and organizations in asset intensive industries such as utilities; food and beverage processing; metals and mining; chemicals; oil and gas; automotive; public sector; and others universally recognize that proper service and maintenance of the assets they manage, own, and operate is crucial to the overall success of their organization. Nearly all organizations say effective service and maintenance practices are very or extremely important to their organizations' financial success, yet only 7% are completely satisfied with their service and maintenance performance. (Figure 1)

Figure 1: Importance of Asset Service and Maintenance



Source: Aberdeen*Group*, December 2006

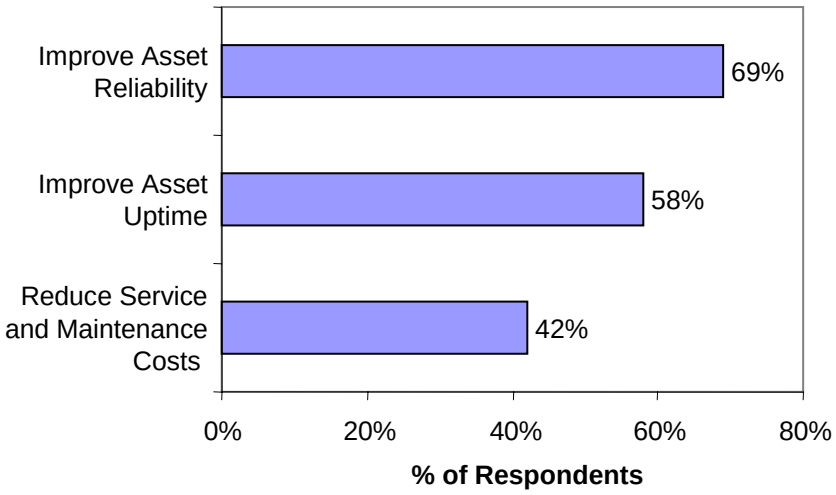
Asset Reliability Drives Service and Maintenance Improvements

The need to improve asset reliability and boost asset uptime and availability are the most common factors driving improvements in service and maintenance performance. Escalating service costs also serve as a key motivator in finding more cost-effective ways to maintain production assets (Figure 2).

Preventive maintenance (PM) is a commonly used and effective maintenance strategy. But more proactive maintenance strategies such as predictive maintenance — which employs the use of sensing devices for vibration, ultrasonic, lubrication, infrared thermography, and the like — further improve maintenance performance. Reliability-centered maintenance (RCM), a more advanced maintenance philosophy, involves structuring a maintenance program based upon the understanding of equipment needs and priorities, — as well as available financial and personnel resources — to plan activities such that equipment maintenance is prioritized while operations are optimized. These strategies are often employed for even greater maintenance effectiveness and improved asset reliability.

In order to improve the reliability of its manufacturing equipment, one **large beverage manufacturer** focused on reliability-centered maintenance processes as well as predictive tools. Two of the primary approaches the company used for boosting asset reliability were improvements in preventive maintenance (PM) practices and implementation of reliability-centered maintenance (RCM) processes.

Figure 2: Asset Reliability Tops the List of Motivators for Improving Maintenance



Source: AberdeenGroup, December 2006

Almost 90% of polled companies report that Preventive Maintenance (PM) is their most commonly used maintenance strategy. But further analysis reveals that more advanced strategies such as Predictive Maintenance and Reliability Centered Maintenance (RCM) practices also have a positive impact on asset performance and reliability, though are not nearly as widely used as preventive maintenance (Table 1).

Table 1: Preventive Maintenance (PM) Most Commonly Used Strategy

Maintenance Strategies Employed	% of Respondents
Preventive Maintenance	88%
Predictive Maintenance	58%
Reliability Centered Maintenance	28%

Source: Aberdeen*Group*, December 2006

Common Challenges Plague Multiple Industries

Nearly half of all survey respondents reported the same top three challenges to improving their service and maintenance practices:

1. Inadequate information about the assets they maintain and operate,
2. Maintenance is not a top corporate priority, and
3. Disjointed, non-standard maintenance procedures are commonplace.

Although the need for access to more data about asset performance and asset service history tops the list, a mere 1% separates these top three challenges in importance.

A manager in a **process manufacturing plant** reported that maintenance is unfortunately not a high priority in his company. He stated that they are working on getting senior management to recognize the importance of asset reliability, but unfortunately asset maintenance is treated as an afterthought. The company's primary maintenance strategy is reactive and the culture is that they expect things to break. As a result, their maintenance costs are higher than other companies in the same business. Not surprisingly, this company falls into the laggard category in Aberdeen's maturity matrix (Table 5).

Chapter Two:
Key Business Value Findings

Key Takeaways

- Best-in-class companies are most successful in controlling service and maintenance costs reporting a near 10% advantage over laggards. These firms also significantly outperform others in terms of asset uptime, productivity, and Return on Invested Capital.
- 91% of Best-in-class firms have been able to enhance their asset uptime over the last two years, compared to only 27% of laggards.
- 38% of firms currently outsource parts of their service and maintenance to third parties.

Strategies to improve asset maintenance procedures are only as good as the results they deliver. As such, Aberdeen used four key performance criteria to distinguish best-in-class companies from average and laggard companies. These key performance indicators (KPIs) represent *financial measures* – with return on invested capital, and service and maintenance costs (as a % of revenue); and *operational measures* – with asset uptime and availability, and asset productivity (as a % of capacity) (Table 2).

Based on aggregate scores that incorporated all four of these metrics, those companies in the top 20% achieved "best-in-class" status, those in the middle 50% were "average," and those in the bottom 30% were "laggard."

Table 2: Companies with Top Performance Scores Earn "Best-in-Class" Status

Definition of Maturity Class	Mean Class Performance
Best-in-Class: Top 20% of aggregate performance scorers	• Asset uptime and availability = 92% • Asset productivity (as a % of capacity) = 90% • Return on invested capital = 97% • Service and maintenance costs (as a % of revenue) = 18%
Average: Middle 50% of aggregate performance scorers	• Asset uptime and availability = 88% • Asset productivity (as a % of capacity) = 82% • Return on invested capital = 77% • Service and maintenance costs (as a % of revenue) = 20%
Laggard: Bottom 30% of aggregate performance scorers	• Asset uptime and availability = 79% • Asset productivity (as a % of capacity) = 69% • Return on invested capital = 59% • Service and maintenance costs (as a % of revenue) = 28%

Source: Aberdeen*Group*, December 2006

Best-in-class companies also consistently reported improvements in their top key performance indicators over the past two years. A much higher percentage of best-in-class organizations have realized advances in these KPIs than have average and laggard organizations (Table 3).

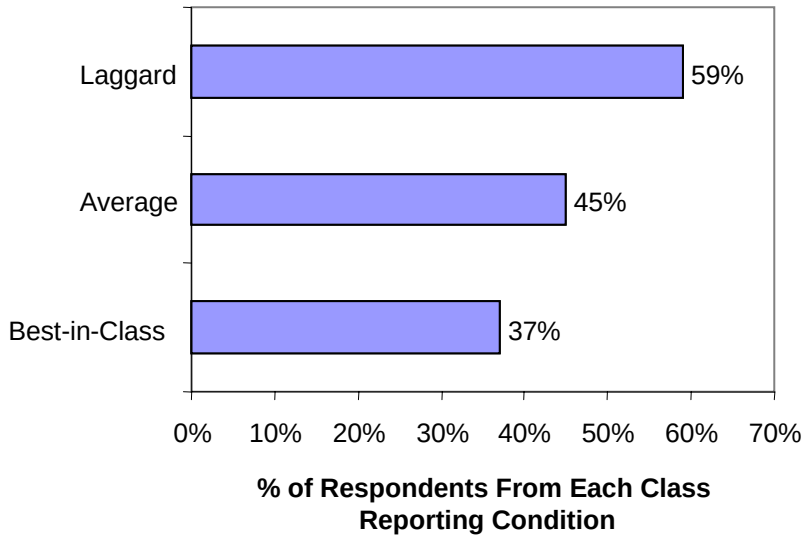
Table 3: Best-in-Class Reap Significant Benefits

Key Performance Indicator (Change over past two years)	Performance (% of respondents in class reporting improvement)		
	Laggard	Average	Best-in-class
Increases in Asset Reliability	18%	62%	91%
Greater Asset Uptime and Availability	27%	67%	91%
Reduction in Cost of Servicing Assets	3%	21%	39%
Fewer Unexpected Downtimes or Outages	12%	48%	77%
Growth in Return on Invested Capital	7%	21%	66%
Greater Asset Productivity	39%	54%	79%
Higher "Yields" of Quality Goods Produced	19%	36%	62%
Reduction in Cost of Spare Parts (MRO Inventory)	3%	13%	14%
Longer Usable Asset Life	11%	29%	58%
Fewer Safety Related Incidents	29%	54%	77%
Return on Assets (ROA)	3%	22%	50%

Source: Aberdeen*Group*, December 2006

Laggards and average organizations have trouble justifying investments in service and maintenance, and laggards especially struggle. Nearly 60% of laggard companies polled in this study reported that the perceived high cost of automating service was a top challenge for their firms. Best-in-class, on the other hand, have done a better job at convincing management that investments in service and maintenance are indeed worthwhile (Figure 3).

Figure 3: Cost of Automating Service is Perceived to be Too High



Source: AberdeenGroup, December 2006

Maintenance Costs are on the Rise

Nearly half (48%) of all survey respondents reported that service and maintenance costs have increased, with average and laggard companies faring the worst (Table 4)

Table 4: Service and Maintenance Costs

Have Costs Increased?	% of Respondents in class reporting increase		
	Laggard	Average	Best-in-class
Total cost of servicing assets	65%	49%	20%
Costs for MRO/spare parts	63%	53%	34%

Source: AberdeenGroup, December 2006

Yet, as performance by the best-in-class clearly indicates, maintenance costs can be controlled and even reduced. In fact, **nearly 40%** of best-in-class organizations have actually been able to reduce their overall service costs, and they were more nearly **five times as likely** to lower their MRO/spare parts inventory investment than were laggard companies.

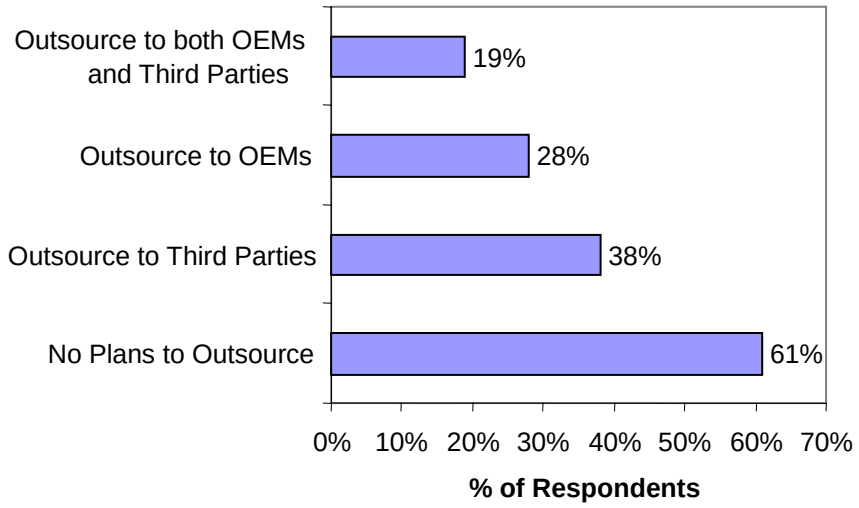
Investments in automating service and maintenance processes pay off in multiple ways. The beverage manufacturer mentioned earlier in this document said it automated its parts storeroom to identify excess inventory and improve visibility of available inventory across the U.S. One impressive result the company has seen is a 50% reduction in its MRO/spare parts inventory costs.

One **light and power utility** reported it has improved its data gathering analysis techniques to get a much better handle on the material it needs for maintenance and construction jobs. It analyzes seasonal service usage patterns as well as information about where construction is taking place in the state it serves. The utility found that it was replicating stock at multiple work centers. As a result of its data analysis, it was able to reduce materials inventory by up to half in some cases.

Service and Maintenance Outsourcing

Approximately one-third of survey respondents reported that they outsource at least some of their service to either an OEM or to a third-party service provider, while another 11% of respondents plan to outsource maintenance within the next two years. Nearly 20% outsource maintenance activities to a combination of OEMs *and* third-party service providers. And more than 60% say they have no plans to outsource at all (Figure 4).

Figure 4: Current Involvement in Service and Maintenance Outsourcing



Source: AberdeenGroup, December 2006

Skills and Costs are Top Drivers for Outsourcing

The most common reason given for outsourcing maintenance services is that the specific technical skills required are best provided by someone outside the organization (Table 5). The cost of maintaining and training a maintenance staff was also cited by many as the reason for outsourcing maintenance. Loss of knowledge as skilled workers depart through attrition is an issue for several organizations.

Table 5: Why Outsource?

Outsourcing Drivers	% of Respondents
Technician Knowledge and Skills	54%

Outsourcing Drivers	% of Respondents
Costs of maintaining and educating internal staff	50%
Loss of internal knowledge and skills due to attrition	34%

Source: Aberdeen*Group*, December 2006

It is important to note that organizations that do outsource appear to outsource some – but not all – of their service and maintenance activities. Outsourcing may be an important part of, but not the totality of, an organization's asset maintenance strategy. For example, a **petroleum refining organization** said it only outsources its annual inspection shut-downs. All other maintenance – which constitutes 95% of the work – is done by its in-house maintenance staff.

Chapter Three:
Implications & Analysis

Key Takeaways

- 77% of best-in-class firms use predictive maintenance processes, compared to 43% of laggards.
- 73% of best-in-class firms consistently gather and share data with all service and maintenance stakeholders
- Use of analytics is a key differentiator for best-in-class firms, with 37% of such firms reporting the use of analytics compared to 22% of laggards.

As noted earlier, surveyed companies' performance in asset service and maintenance determined whether they ranked as best-in-class, industry average, or laggard. In addition to these performance measurements, each of these maturity classes also share attributes in these key categories – process, organizational structure, data management, technology usage, and performance metrics (Table 6).

Table 6: Asset Maintenance Competitive Framework

	Laggards	Industry Average	Best-in-class
Process	Reactive break/fix work, with little to no proactive maintenance processes	Primarily ad hoc, decentralized use of preventive maintenance procedures	Predictive maintenance, reliability centered maintenance, total productive maintenance, and/or root cause analysis
Organizational Structure	Maintenance functions independently and reactively. Limited or no corporate level strategy or metrics in place	Limited or ad-hoc team activity; sporadic communications with other departments. Primarily accountable to own departmental metrics and goals	A senior executive leads a cross-functional team and is responsible for asset service and asset performance across the enterprise
Knowledge/ Data Management	Limited to no asset service data and asset performance data is captured or shared with other constituents	Asset service data and asset performance data is captured over time, housed within the service organization, and periodically shared with other constituents	Asset service data and asset performance data is captured and analyzed over time and is systematically shared with all service constituents
Technology Usage	Primary automation tools are spreadsheets and Computerized Maintenance Management Systems (CMMS)	Spreadsheets, CMMS, and broader use of Enterprise Asset Management (EAM) and financial applications	Broad use of software technologies, with greater use of analytics and business intelligence software.

	Laggards	Industry Average	Best-in-class
Performance Management	Key Performance Indicators are not established or are not systematically and regularly measured	KPIs are established, but are measured on an ad-hoc, irregular, or infrequent basis	Specific KPIs are in place and are monitored in near real-time, or at a minimum on a daily or weekly basis

Source: AberdeenGroup, December 2006

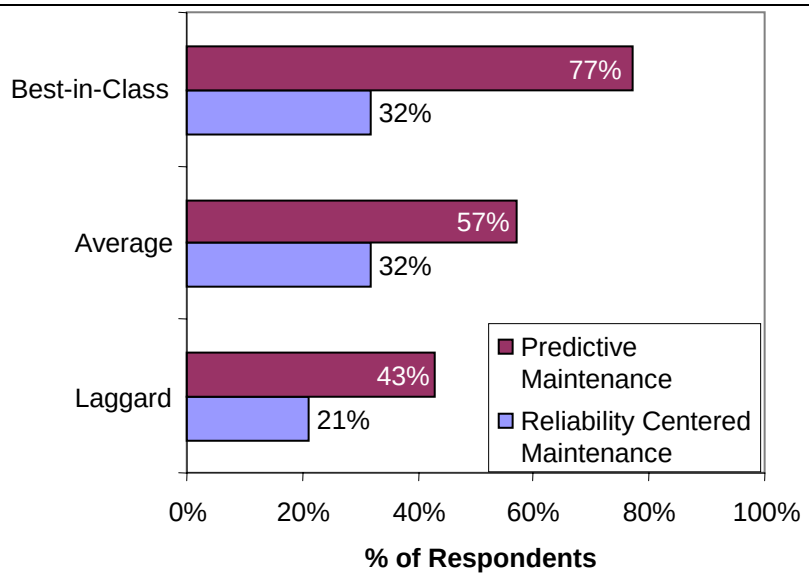
Preventive Maintenance Processes Alone Fall Short

Despite the large percentage of organizations who report using preventive maintenance, 25% of survey respondents say they still rely primarily on a break/fix approach with little or no proactive maintenance processes. Furthermore, only 36% report that they employ a broad range of standardized processes to enable proactive maintenance.

While preventive maintenance is widely used across all classes of organizations, those in the best-in-class category are much more apt to employ predictive maintenance and reliability centered maintenance (RCM) processes, especially when compared to laggard organizations. (Figure 5)

A major **consumer products manufacturer** implemented a commercially available reliability-centered maintenance solution to help improve its maintenance processes. The software gives the manufacturer a better understanding of the relationship among machine events, operational events, and maintenance events. According to the supervising manager, the biggest benefit the company has seen is an acceleration of the understanding of the data and trends impacting machine performance, which it relies on to make adjustments to its maintenance activities.

Figure 5: Best-in-Class Use Proactive Maintenance Strategies More Frequently



Source: AberdeenGroup, December 2006

Proactive maintenance processes that augment regularly scheduled preventive maintenance routines tend to boost organizations into the best-in-class category. Corollary data strongly supports that best-in-class organizations operate in a "break/fix" mode far less often than do their laggard counterparts. Standardized and enterprise-wide proactive maintenance processes also tend to improve results in important KPI measurements (Table 7).

Table 7: Proactive Maintenance Processes Boost Performance Metrics

Maintenance Process	Average Performance
Standardized, enterprise-wide **proactive maintenance processes** such as predictive maintenance, reliability centered maintenance, total productive maintenance, and root cause analysis	• Asset uptime and availability = 88.8% • Asset productivity (as a % of capacity) = 84.2% • Service & maintenance cost (as a % of revenue) = 17.2%
No or **ad hoc and limited use of proactive maintenance** processes. Routine preventive maintenance the most widely accepted approach to service assets and equipment	• Asset uptime and availability = 87.2% • Asset productivity (as a % of capacity) = 81.9% • Service & maintenance cost (as a % of revenue) = 20.8%
Reactive break/fix work is the primary approach with **little to no** preventive or other **proactive** maintenance	• Asset uptime and availability = 81.8% • Asset productivity (as a % of capacity) = 79.2% • Service & maintenance cost (as a % of revenue) = 23.5%

Source: Aberdeen*Group*, December 2006

Case in point, the **petroleum refinery** mentioned previously has aggressively pursued predictive and reliability-centered maintenance processes. Predictive maintenance technologies – such as vibration, oil analysis, circuit analysis, and thermography – continually monitor asset performance. If a measurement is outside the defined parameters, the refinery takes proactive steps to correct the issue before it creates a problem.

The company has also implemented reliability-centered maintenance techniques to examine all asset functions, including what is needed to maintain the equipment in peak working condition, what could go wrong, and what are the most critical assets. This analysis results in the development of an optimal maintenance strategy for the assets the company operates. For its efforts, the refinery received the Malcolm Baldridge National Quality award in 2005.

Maintenance and Production Staffs Must Collaborate

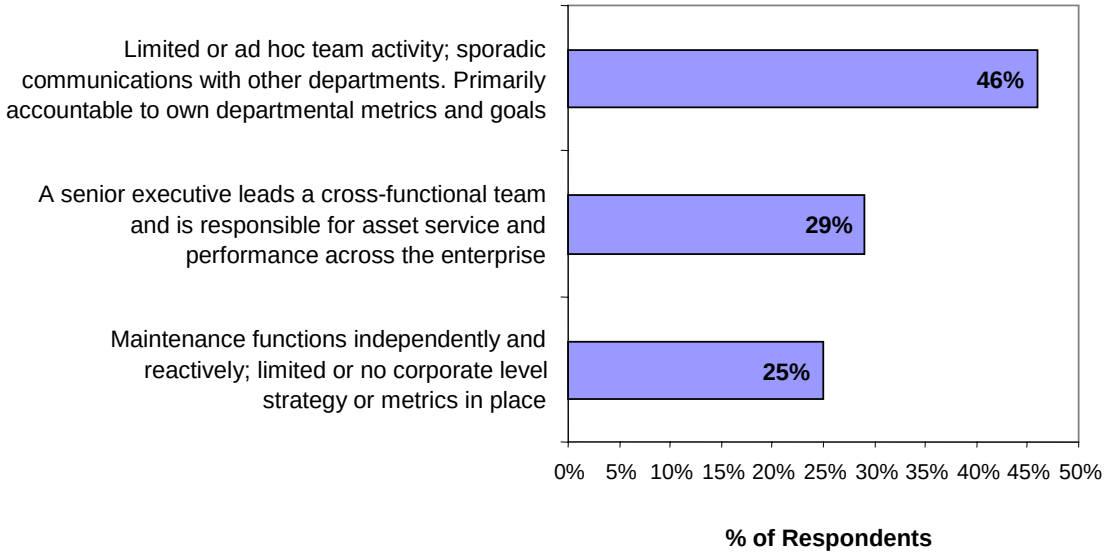
Optimal asset performance is not dependent on maintenance practices alone. Planned maintenance activities must be scheduled to minimally impact production requirements and schedules. This necessitates close collaboration and planning between both maintenance and operations staff.

Scheduling appropriate downtime windows within which to perform planned maintenance is essential. One **energy company** explained that it had determined the optimal time windows within which to perform maintenance. The company has gone so far as to develop a five year maintenance optimization plan. The improved maintenance practices have already reaped benefits. The company reported that it had recently completed the longest production run in its history, beating the old record by 25%.

Management and Organizational Structure Matter

Asset maintenance is infrequently viewed as a top priority by upper management. This is further underscored by the fact that more than 70% of survey respondents report their maintenance departments function on a stand-alone basis, or at best, with limited interaction and coordination with other departments involved with asset performance. Less than 30% of organizations have a senior-level executive managing all asset maintenance and asset performance issues (Figure 6).

Figure 6: Organizational Structure Often Inadequate for Coordinated Maintenance Processes



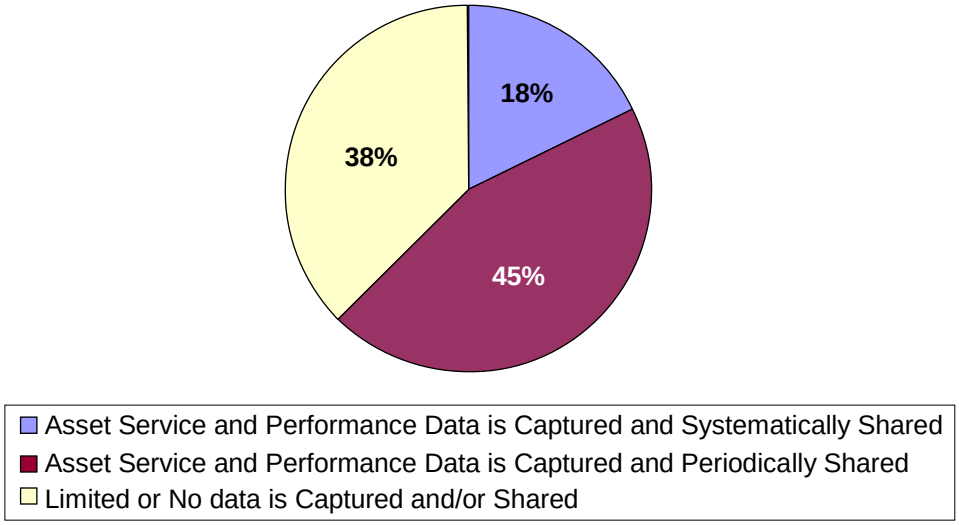
Source: AberdeenGroup, December 2006

The data also suggests that organizations achieving superior performance do so, at least in part, because they have placed a senior-level executive manager in charge of all asset maintenance and asset performance issues. For example, companies with a senior executive in charge of asset service are 56% more likely to have asset uptime and availability in excess of 91% than companies whose maintenance department functions independently and reactively. Similarly, maintenance departments managed by a senior-level executive are 32% more likely to have asset productivity rates above 91% than are companies that do not have a senior manager in charge.

Data Management and Information Access is Lacking

Less than 20% of organizations regularly capture and share data about asset performance with all the parties involved, including third-party service providers. In fact, roughly 80% of organizations either gather no data at all, or they capture and share data with other interested constituents only sporadically (Figure 7). In contrast, 73% of best-in-class companies consistently gather and share data with all service and maintenance stakeholders.

Figure 7: Data and Information Access Practices



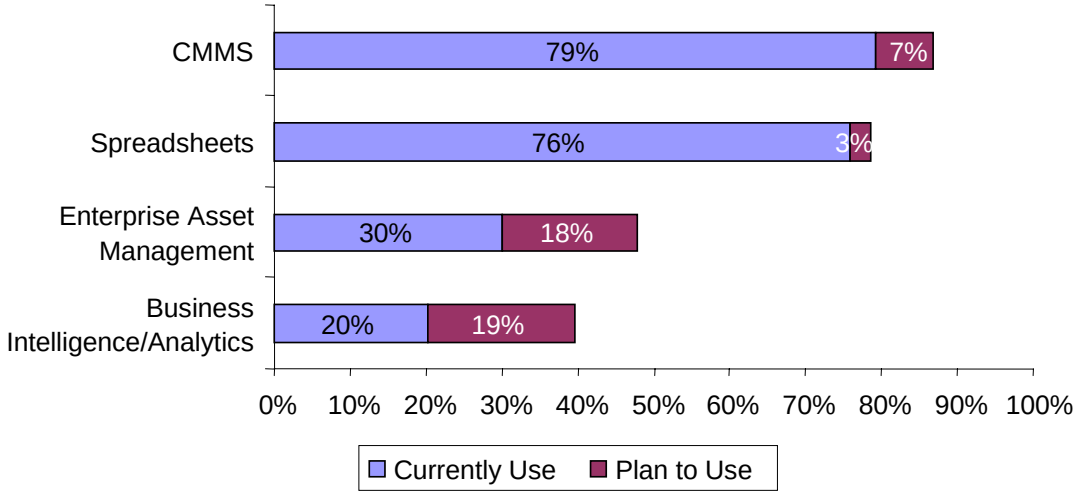
Source: Aberdeen*Group*, December 2006

A **power generation utility** in the Pacific Northwest explained that they have integrated their financial system and maintenance system. The combined information gives them more complete reporting and analysis capabilities so they can study maintenance costs from the "highest levels to crew levels". They are further evaluating a commercially available analytic solution which will help them identify machine performance anomalies before a problem occurs.

Asset Analytics Differentiate Best from Rest

Computerized Maintenance Management Systems (CMMS) and spreadsheets currently top the list of software used to track asset service and maintenance issues. However, increasing numbers of organizations plan to deploy enterprise asset management (EAM) and/or analytics software in the near term to help track and control asset service and maintenance (Figure 8).

Figure 8: CMMS and Spreadsheets Dominate Software Usage



Source: AberdeenGroup, December 2006

While analytics and business intelligence solutions are not widely deployed in asset management environments, best-in-class companies increasingly rely on them for differentiated performance. In fact, this technology category exhibited the widest gap of usage between laggard and best-in-class companies (Table 8).

Table 8: Asset Analytics Differentiate Best from Rest

Solution	% of Respondents in class reporting usage		
	Laggard	Average	Best-in-class
Analytics and/or Business Intelligence Software	22%	24%	37%
Financial and Accounting Systems	77%	86%	85%

Source: AberdeenGroup, December 2006

Best-in-Class Keep Close Tabs

In addition to gathering, disseminating, and analyzing asset maintenance and performance data more effectively, best-in-class companies are consistently superior at establishing KPIs and using the data they gather to measure their actual performance against those goals (Table 9). The top KPIs measured by best-in-class organizations include the following:

- Asset reliability
- Asset productivity
- Asset uptime and availability

- Frequency of unexpected downtimes
- Cost of servicing and maintaining assets

Table 9: Performance Measurement Processes

KPI Measurements	% of Respondents		
	Laggard	Average	Best-in-class
Specific KPIs are in place and are monitored in real-time, near real-time, or at a minimum on a daily or weekly basis	30%	39%	49%

Source: AberdeenGroup, December 2006

For example, a **Northeast electric power generation and transmission cooperative** – among the best-in-class survey respondents – reported that it consistently measures 20 different key performance indicators. To improve its performance against these metrics, it also instituted a variety of predictive maintenance processes and deployed maintenance automation solutions that allowed its service technicians to monitor asset performance via their desktops.

Equipment uptime has improved nearly 10%, with huge financial implications. What is more, the company has seen a 75% increase in reliability on some systems, and unscheduled downtimes have been reduced by as much as 75%.

Chapter Four: Recommendations for Action

Key Takeaways

- Implement aggressive proactive maintenance strategies.
- Use analytics software to measure asset performance and asset maintenance against established goals.
- Centralize control of asset maintenance under one common management structure.

The financial and operational benefits of boosting service and maintenance effectiveness in asset intensive industries are substantial. To capture these benefits, Aberdeen recommends that executives consider the following actions:

1. **Implement aggressive proactive maintenance strategies**. Preventive maintenance is effective, but best-in-class operations consistently prove that additional proactive maintenance strategies such as predictive maintenance and reliability centered maintenance processes have a positive impact on nearly every asset performance measurement. Collaborate with operations staff to develop planned maintenance schedules that minimally impact production requirements.
2. **Use analytics software to measure actual asset performance against established goals.** Set specific key performance indicator targets, such as percent of asset uptime and availability, cost of servicing assets, frequency of unexpected outages, etc. Systematically measure how you actually perform against those established targets. Implement available technologies such as analytics software which continually monitors actual asset performance, displays out-of-parameter results, and provides "drill down" functionality so you can determine specific causes for missed KPI targets.
3. **Centralize management and control of asset maintenance.** Average and laggard organizations work in a more fragmented organizational structure than do many best-in-class organizations. Bring all maintenance planning and maintenance operations together under the control of one senior-level executive to strengthen maintenance processes across the entire enterprise, not just within individual departments or operations.
4. **Educate financial management**. Estimate the financial impact of asset downtime or under-utilization to your company's overall performance. With a focus on such metrics as return on invested capital, asset uptime, asset utilization (as a % of capacity), and overall maintenance costs, build a case for the CFO regarding the importance of proper service and maintenance practices and the necessity to invest in technologies that improve asset performance.
5. **Consider spare parts/MRO inventory planning solutions**. Costs for spare parts are on the rise in the majority of average and laggard organizations. Yet best-in-class organizations report a higher rate of spare parts cost reductions. Evaluate commercially available parts planning solutions with an eye toward im-

plementing a solution that will help optimize investments in spares and MRO inventory.

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Suite 410 – The Landing, 375 Water Street, Vancouver, BC, V6B 5C6, Canada
(604) 681-1262, fax: (604) 687-1256, web: www.actenum.com

Author Profiles

Mark W. Vigoroso, Chief Research Officer & SVP, Service Chain Management Research Aberdeen Group, Inc.

(617) 854-5278
mark.vigoroso@aberdeen.com

Mark Vigoroso spearheads primary market research in service management and assesses software and services that automate and streamline these and other value chain processes.

Vigoroso's current efforts include quantifying Global 5000 executives' strategies, experiences, and deployment plans in the area of field service optimization.

He has published research in the areas of strategic sourcing, supplier performance measurement, enterprise spending analysis, total cost management, global trade management, and product management.

Vigoroso has spent years covering electronic procurement, supply chain, and logistics management trends as a journalist, editor, speaker, and columnist for various industry publications. Specializing in e-business applications and strategies, he was an editor at *Purchasing* magazine and *Manufacturing Marketplace*. He has also been a columnist and feature writer for *The E-Commerce Times*, ZDNet *TechUpdate*, and Workz.com.

Michael Israel, Research Director Service Chain Management Research Aberdeen Group, Inc.

(617) 854-5246
michael.israel@aberdeen.com

Michael Israel is a senior analyst and research director focusing on Service Chain Management research. Through primary market research, Michael analyzes how service executives are utilizing field service management, mobile field service, service parts planning and execution, service force optimization, machine-to-machine (M2M), and other solutions to automate, streamline, and improve post-sales and aftermarket service and support processes.

Israel has worked in the service chain field for more than 30 years. He has significant service operational experience, having spent 15 years managing both field service and service parts operations. And he has more than 20 years experience in selling and marketing service management software solutions to manufacturers and service providers in a wide variety of industries.

Appendix A:
Research Methodology

In October and November, 2006 Aberdeen Group and its publication partners captured more than 300 qualified respondents in a quantitative survey about the importance of service and maintenance activities in asset intensive industries.

Responding maintenance and operational executives and staff completed an online survey that included questions designed to determine the following:

- The importance of asset maintenance activities to their organizations' overall financial performance;
- Whether or not service and maintenance importance has grown over the previous two years;
- The maintenance strategies organizations currently use and plan to use going forward;
- How much and why organizations outsource service to OEM's or third party service organizations;
- Current and planned use of software solutions and technologies to aid service and maintenance activities; and
- The benefits derived from implementing processes and solutions that have improved service and maintenance effectiveness.

Aberdeen supplemented this survey effort with telephone interviews with select survey respondents, gathering additional information on asset maintenance strategies, experiences, and results.

Survey respondents can be characterized as follows:

- ***Job title/function:*** The research sample included respondents with the following job titles: C-Level, director, executive vice president, internal consultant, manager, senior vice president, staff, and vice president. 8% are C-level, EVP/SVP or VP, 60% are directors or managers, 27% are staff, and 5% are internal consultants.
- ***Industry:*** Responses were received from 29 different industry segments. The largest concentration of responses came from: utilities – 14%, food and beverage manufacturers – 9%, metals and metal products – 9%, chemicals – 7%, mining, oil & gas – 6%, automotive – 6%, public sector – 5%, consumer goods – 5%.
- ***Geography:*** Responses were received from all geographic areas of the world – 83% from North America, 9% from EMEA, 6% from Asia/Pacific, 1% from South and Central America.
- ***Company size:*** 35% from large enterprises (> US$1 billion); 24% from midsize enterprises (revenues between $100 million and $1 billion); and 41% of respondents were from smaller businesses (annual revenues of $100 million or less).

Research Partner:

The survey was promoted to the potential respondent community with the assistance of **Reliabilityweb.com** - an online maintenance and reliability focused community with free membership at www.reliabilityweb.com.

Appendix B:
Related Aberdeen Research & Tools

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

- *Location. Location. Location. Does it Matter in Mobile Field Service?* (October 2006)
- *The Service Parts Management Update Benchmark* (October 2006)
- *Shoring Up the Front Lines of Product Service: The Call Center* (September 2006)
- *Service as a Profit Center: The CFO's View* (August 2006)
- *Best Practices in Service Chain Performance Management* (August 2006)
- *Winning with Integrated Warranty Management* (June 2006)
- *Best Practices in Mobile Field Service* (June 2006)
- *The Asset Management Benchmark Report: Moving Toward Zero Downtime* (April 2006)

Information on these and any other Aberdeen publications can be found at www.chiefserviceofficer.com or inquire by e-mail at memberservices@aberdeen.com.

Aberdeen Group, Inc.
260 Franklin Street
Boston, Massachusetts
02110-3112
USA

Telephone: 617 723 7890
Fax: 617 723 7897
www.aberdeen.com

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