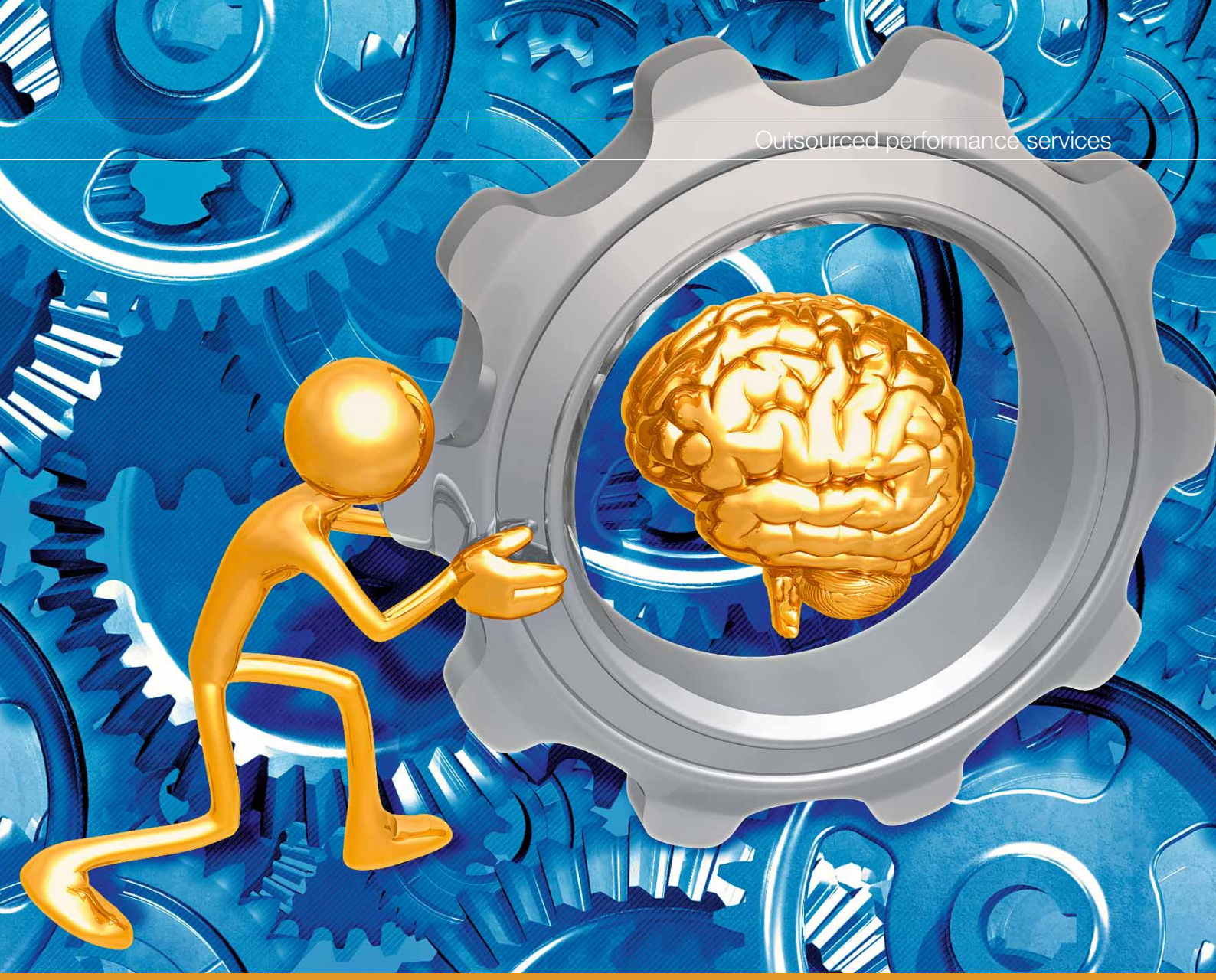


Outsourced maintenance

The ABB Full Service® solution

Johan Desaegher

While most maintenance suppliers are content to confine their maintenance services to delivering acceptable levels of equipment availability, ABB has developed a comprehensive service concept that makes maintenance operations a significant contributor to plant profitability.

Currently in operation at more than 150 sites in a variety of process industries worldwide, ABB Full Service® is a unique partnership agreement in which ABB and the customer jointly define the maintenance targets and share the rewards of success.

Outsourced performance services

Most companies see outsourcing as a way to reduce costs in their non-core activities. Maintenance often falls into this category, especially when it is considered to be no more than a cost center. Once a manufacturer decides to outsource its maintenance function, it can select from basically two types of maintenance suppliers: those who concentrate solely on delivering reduced costs to their customers, and those who take maintenance to the next level. Usually, next level means maintenance that increases the availability of production equipment.

ABB has taken this next level even further with its Full Service offering, where the focus is no longer only on maintenance but also on improving production. It is not just about saving costs but also about contributing to the customer's bottom line. This maintenance outsourcing model is a unique partnership where ABB and the customer jointly create targeted metrics and share risks.

ABB Full Service® is a strategic solution that helps improve the customer's bottom line by driving their plant maintenance function. As such, ABB Full Service® is a maintenance program that turns routine maintenance activities into a profit source by concentrating on five business values 1:

1. Compliance with local and global regulations
2. Efficient use of energy
3. Optimization of production costs
4. Better utilization of resources
5. Effective use of equipment

The maintenance function

In a Full Service agreement, ABB takes over the maintenance function of an industrial plant. The maintenance function encompasses reliability engineering, planning and scheduling, and maintenance execution, which form the heart of the maintenance outsourcing program. By establishing and developing these different maintenance functions, ABB is able to improve the customer's business values.

Reliability engineering defines the preventive maintenance program for equipment and has the ultimate goal of reducing the amount of maintenance required on the site. By setting up the equipment properly, as well as adequately operating and looking after it, ABB can extend the equipment's life cycle. This translates into real savings as it decreases the maintenance budget required – labor is freed up and overall equipment effectiveness is increased due to the less frequent interventions required (planned or unplanned).

In a Full Service agreement, ABB takes over the maintenance function of an industrial plant.

While the initial goal is to manage the current requirements of maintenance, the long-term goal of reliability engineering is to effectively manage the entire life cycle of the equipment. Not only does this involve issues of installation and early operating life, it extends to the equipment's old age and eventual obsolescence.

Planning and scheduling ensures that work orders are executed according to instructions and within the given time interval of the preventive maintenance program. As such, planning and scheduling identifies how, when and by whom a task is to be executed and that it is carried out in coordination with the customer's production planning.

Maintenance execution is not just about performing maintenance tasks but about ensuring that they are done well. This is one of ABB's core competencies. Without skilled workmanship and expertise, maintenance plans will fail to deliver value. Maintenance execution is responsible for a safe and quality workplace based on detailed maintenance instructions and in accordance with the maintenance plan. A library of more than 50 precision maintenance instructions guarantees the level of workmanship at an ABB Full Service® site.

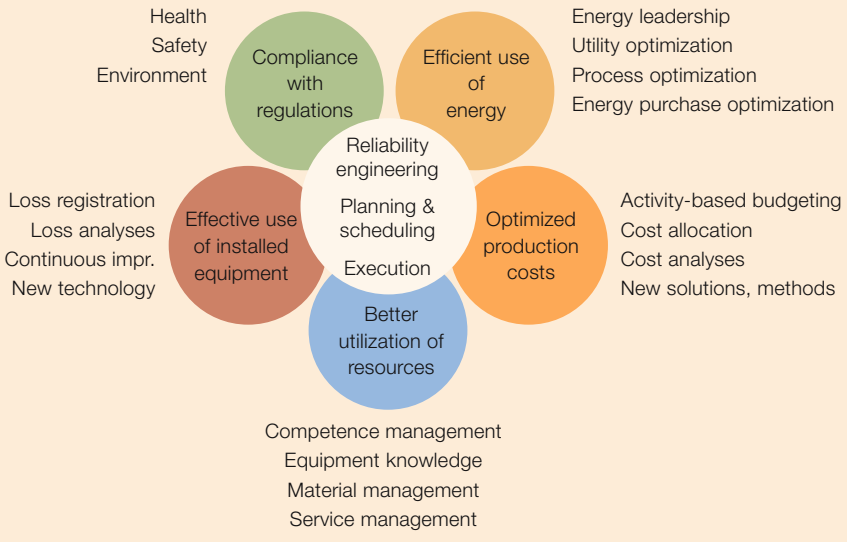
The five business values

By defining and executing the different functions described above, a maintenance organization can help customers proactively drive their business values. The following describe the five business values important to ABB Full Service®.

Compliance with regulations

Health, safety and environmental (HSE) regulations are increasingly important for maintenance. It is the task of maintenance to ensure that the equipment is safe and that it is maintained and operated in a healthy and environmentally friendly way. This ensures compliance with local and global regulations; it also avoids penalties and does not put the customer's operating license at risk.

1 Five business values



The preventive maintenance program includes methods and techniques like hazard and operability (HAZOP) studies, safety instructions, lock-out and tag-out procedures, work permits and risk-based inspection (RBI). Based on ABB's RBI+© program, they form the cornerstone for safe execution of maintenance tasks. ABB requires that OHSA 18001 be implemented at every maintenance site.

Efficient use of energy

Efficient use of energy has a direct impact on a manufacturer's bottom line. ABB experience shows that energy savings of around 3 to 10 percent can be obtained at most process industry sites. For many plants, the energy bill is bigger than the maintenance bill. ABB's energy program focuses on improving, reducing and optimizing energy efficiency for industries and utilities based on four main principles:

- Energy leadership
- Industrial utility optimization
- Process optimization
- Energy purchase optimization

ABB is uniquely positioned to develop and evaluate emerging technologies and apply them as they become commercially viable.

The implementation of ABB's industrial energy efficiency model takes place in three main phases: opportunity scoping, detailed assessment and energy management master plan, and implementation. In the services sector, this kind of model is known as an energy service company (ESCO) or energy performance contracting (EPC). The idea of the entire program is to be self-funding. Savings realized are shared by the service supplier and customer through an agreed improvement program saving model.

Optimization of production costs

Maintenance cost is an element of the total cost of production. This means that an effective and efficient preventive maintenance program can yield higher resource utilization and lower prices for materials and services, and can optimize the plant's manufacturing operations. ABB has developed worldwide standardized workflows to manage the maintenance function as a profit center. Equipped with a customized computerized maintenance management system, where maintenance execution allocates the actual cost of the work orders, the site is capable of analyzing and identifying the major cost contributors. Comparison and exchange of information with other maintenance sites around the world allows the individual site to optimize its maintenance costs. With a professional budgeting tool supported by a financial controller, ABB commits itself to achieving the targets agreed with the customer through risk and reward sharing.

Better utilization of resources

Improved use of resources results in a more effective maintenance organization. Resources in this context refer to skills and competence management, materials or supplies, contractors or services, and asset knowledge.

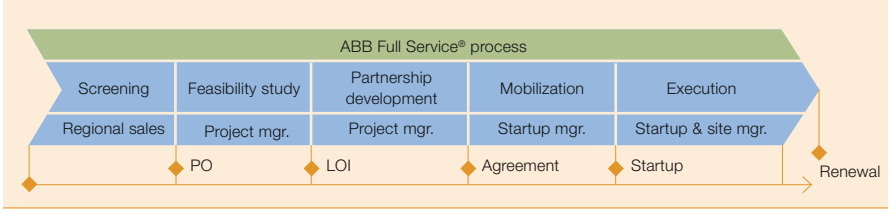
Skills and competence management focuses on the professional development of ABB employees by means of a wide range of global and local training programs that enhance skills at all levels of the maintenance organization.

To manage *materials* or supplies in a cost effective way, ABB has global, regional and local purchasing agreements. The computerized maintenance management system (CMMS) at the maintenance site tracks the inventory and warehouse indicators to optimize the amount of capital tied up in stock and the quantity of materials used.

Contractors on site are also managed via the CMMS. A preferred supplier list is established and regular performance reviews are carried out to improve the quality of delivery.

Asset knowledge is the competence of collecting, managing and using all information about the equipment maintained. Information includes drawings,

2 ABB Full Service® process



Outsourced performance services

electrical diagrams, original equipment manufacturer (OEM) manuals, supplier catalogs, certificates, as well as maintenance history and information on condition monitoring. ABB's Optimize^{IT} Asset Optimizer and an electronic data management system help the sites to manage dynamic and static information more efficiently.

Effective use of equipment

This seeks to increase the overall equipment effectiveness (OEE) of the plant. By increasing the OEE, it is possible to produce more output with the same investment, or the same output with less investment. To start the improvement cycle, ABB installs – in cooperation with the customer – an online monitoring system that captures the actual performance of the equipment. Then the root cause of the various losses is analyzed by reliability engineers and improvement teams. The ultimate goal is to use this technology as a competitive advantage for the customer's plant operations.

The ABB Full Service® process

ABB has created a tried and tested process in which it develops a collaborative agreement together with the customer 2. The process helps identify the customer's needs and ensures that the methods and systems implemented will improve the customer's business values. A core team of ABB and customer resources follows a proven methodology to collect and analyze information in a stage-gate process that balances investments in time and resources against the data needed to make sound business decisions. At the conclusion of each stage, ABB and the customer review progress and reach agreement on how to proceed.

During the initial screening phase, scope and boundaries, desired outcomes, resource requirements, executive sponsorship, and schedules are evaluated and documented to guide the team through the process.

The next step is the feasibility study phase where functional requirements are developed; benchmarking and gap analysis is completed; current and future states of maintenance approaches, equipment condition, people skills, etc. are identified; expected benefits and costs (value proposition) are identified; and a preliminary decision and risk analysis is conducted.

A partnership development phase follows when the maintenance management master plan is developed to set the strategy for maintenance and reliability at the site. Due diligence is performed for finance, human resources (HR), legal affairs, health and safety, and technical issues. Indicators are defined and the mobilization and transition plan is created. At this point, a maintenance alliance agreement is signed to initiate mobilization.

During the mobilization phase, systems and networks are installed, the new maintenance organization is announced, and implementation plans are finalized for HR, facilities, supply management and accounting. A communication plan is developed to facilitate change management and identify issues early in the program.

The maintenance agreement execution phase begins with startup and training, and the introduction of any new processes. The alliance management process governs the relationship, and continuous improvement programs are introduced to improve performance at the site.

Benefits of ABB Full Service®

The performance-based partnership between ABB and the customer is beneficial to both parties and enables them to work together to achieve a common goal. Results of a Full Service agreement are measurable in terms of cost savings, performance improvements, higher quality, and access to world-class maintenance practices 3.

3 The Boliden copper smelter at Harjavalta, Finland, where an ABB Full Service® agreement has achieved substantial improvements in OEE and concentrate feed, as well as significantly reduced base maintenance costs, and has halved the total recordable injury rate

Performance and financial impact

Each agreement is measured against key performance indicators defined in cooperation with the customer. To demonstrate ABB's commitment to the customer's success, ABB Full Service® includes risk and reward sharing that is linked directly to the plant's performance. Performance improvements are achieved through increased plant efficiency, measured in terms of OEE or optimized energy usage.

Reliability improvement and life-cycle extension

By implementing reliability engineering and life-cycle management, the effectiveness of capital expenditure is improved. ABB Full Service® has more than 400 data records of how to maintain generic equipment in the most

optimal way. ABB's track record of more then 150 outsourced maintenance agreements gives customers access to best practices, from maintenance organizations to work-order planning and inventory management.

A risk/reward performance mechanism ensures that continuous improvement opportunities are identified and captured over the life of the agreement.

Enhancement of the supply chain

By determining the ratios of ordering/handling costs versus inventory carrying costs, the optimal classification scheme for replenishment can be determined, taking into account safety stocks. This enables customers to reduce their inventory costs and increase the service level of spare parts in a plant maintenance environment.

Maintenance managed as a business

A detailed feasibility study is carried out and a maintenance management master plan drawn up before signing a Full Service agreement. This provides the customer and ABB with a clear picture of the current state of the assets, and allows costs to be accurately forecasted and managed over a multi-year contract. As production levels increase or decrease, maintenance costs can be scaled accordingly, allowing benefits to be calculated on a per-unit basis and eliminating the need to allocate significant fixed costs over variable production levels.

Creation of a service mindset and culture

The transformation to a service-minded culture is guided by a change-management program that includes HR processes and the orientation and motivation of new and existing employees.

Access to ABB know-how

Reliability technology is a core competence at ABB, and the company is uniquely positioned to develop and evaluate emerging technologies and apply them as they become commercially viable. In addition, ABB's large customer base and early exposure to new technologies allows it to maintain a highly skilled workforce that is able to implement and maintain industry-specific solutions.

ABB Full Service® partnerships

ABB Full Service® partnerships are three- to five-year performance-based agreements, in which ABB works with the customer to continuously maintain and improve equipment performance and reliability for an entire facility. By focusing on reliability and improvement, ABB facilitates better and more intelligent budgeting, workflow planning and resource allocation, and ultimately delivers maintenance activities that contribute to profits.

With a global network of world-class expertise, shared knowledge of best practices and the latest technologies, ABB's Full Service agreements support the efficient introduction and use of new process technology and concepts. A risk/reward performance mechanism ensures that continuous improvement opportunities are identified and captured over the life of the contract to reinforce the strategic intent of the agreement.

For more information on ABB's Full Service offering, see "Contracting good health" on page 84 and "A head start to profitability" on page 88 of this *ABB Review Special Report*.

Johan Desaegher
ABB Process Automation Service
Zaventem, Belgium
johan.desaegher@be.abb.com