

## Reliable wind power

### Estonia factory takes full service approach to maintenance performance improvement

The ABB Electrical Machine Factory in Juri, Estonia, is the largest ABB factory in the Baltic region. Its customers around the world depend on this manufacturer of wind power generator components to keep their utilities operational.

In 2005, the factory decided it needed to overhaul its maintenance strategy. Maintenance expenditures had been difficult to forecast, the program was largely reactive, and there was no incentive to improve performance. This put at risk the plant's ability to guarantee their customers 100% on-time delivery.

To get on track, the plant outsourced the entire maintenance operation to ABB Service under a full-service, performance-oriented maintenance management agreement. Specific performance goals are connected to financial incentives. If goals are missed, ABB Service incurs penalties.

Under the agreement, ABB Service uses best practices, efficient systems and skilled manpower to improve reliability at the factory and mitigate high-risk losses. The performance for the first half of 2006 was positive. MTBF grew more than 100% from Q1 to Q2. One customer satisfaction index – Excellent - increased by 20% from 2005 to 2006. The average preventive/corrective ratio increased by 17% year-over-year, and there were no accidents in the service organization in 2006.

#### Juri's results for the first six months of 2006:

- MTBF grew more than 100% from Q1 to Q2
- Customer satisfaction index "Excellent" increased by 20% from 2005 to 2006
- Preventive/corrective ratio average increased by 17% year over year
- No accidents in the Service organization in 2006

Because ABB Service has the ability and incentive to improve performance continuously, the ABB Electrical Machines Factory is likely to see these short-term results develop into long-term gains.



ABB's Electrical Machine (EM) Factory in Juri, Estonia, manufactures components for wind power generators that are delivered to major wind-power generation companies around the globe. These electrical power generators must provide 100% reliability. This requires the utmost level of coordination between factory maintenance, operations and purchasing, with optimum quality and regulatory controls.

After struggling to ensure maximum equipment availability at the lowest possible cost, while encouraging ongoing efficiency improvements, ABB EM Factory made a radical decision – to outsource the entire maintenance operation.

### **Converting challenges to opportunities**

The wind energy industry, one of the world's fastest growing sources of green renewable energy, harnesses wind power with highly efficient wind turbines. The local climate and physical environment can place extraordinary demands on the turbines and their components.

ABB met the growing demand for complex wind power components head-on with the construction of the ABB EM Factory near the capital city of Tallinn. When it opened in early 2003, it was the largest ABB factory in the Republic of Estonia and the Baltic Region.



The factory's primary goals are to be reliable and cost effective. From the cost effectiveness point of view, it's essential that we use our fixed assets and production equipment in the most reasonable way. In terms of reliability, it's not only important that the utilization rate is high, but we ensure each machine is operational when it's needed. Therefore, we must avoid unexpected breakdowns, and we should be able to guarantee 100% on-time-delivery to our end customers.

At the outset, production equipment maintenance at the plant was contracted to a sister division, ABB Service, on an hourly basis. However, this agreement didn't support the factory's strategic goals. Maintenance expenditures were difficult to forecast, and hourly rate-based service operations failed to motivate performance improvements. Ineffective processes affected equipment availability and the plant's output. The operations were largely reactive and the attitude wasn't customer-oriented.

To achieve the factory's stated objectives, EM management moved away from hourly service operations and adopted a more innovative maintenance approach. We outsourced the entire maintenance function to ABB Service with a fixed price, performance-based, full service agreement.



### **Full lifecycle maintenance partnership**

Under the Full Service agreement, the ABB Service organization commits to maintaining and improving production equipment by taking over responsibility for the complete scope of the plant's maintenance activities, including engineering, planning, execution and management. If performance goals are achieved, financial incentives are awarded and if goals are missed, ABB incurs penalties.

ABB's full service maintenance strategy promised to:

- Improve performance.
- Increase reliability and the equipment lifecycle.
- Manage maintenance as a business.
- Manage change by creating a service culture.
- Leverage the resources and knowledge of ABB's global network.
- Leverage ABB's technology and industry best practices.

Under the agreement, the EM Factory provides the office space, warehouse space and workshop for ABB Service technicians. In turn, ABB Service provides experts in machinery and service operations, including relevant systems and business processes, and delivers a systematic and focused approach to preventive and corrective maintenance.

### **Maintenance management master plan**

When the partnership agreement commenced, the EM Factory and Service organizations jointly developed a Maintenance Management Master Plan (MMMP), which laid the foundation for a common maintenance strategy with measurable performance goals.

Factory targets were established for overall equipment effectiveness (OEE), technical availability, mean down time (MDT), and mean time between failures (MTBF). Customer satisfaction targets measured competence, cooperation, communication and effectiveness.

The master plan includes sharing knowledge and best practices. ABB's local and global Full Service specialists provided on-site training to the factory's new maintenance team, as well as off-site support from remote locations. In addition, maintenance personnel from Juri participated in a month-long exchange program to cross-train with their Full Service colleagues at ABB's Helsinki, Finland plant.

The knowledge-sharing practice proved to broaden the experience of every participant, accelerate the learning process and foster teamwork. Cross-training enabled the individual engineers and technicians to operate effectively in multiple factories. Furthermore, requiring English and Estonian language skills in maintenance personnel lifted barriers to communication.

A computerized maintenance management system (CMMS) was installed to execute the Full Service maintenance strategy. Manufacturing equipment, associated workflow and inventory are now tracked in the Maximo CMMS. It provides the basis for reliability-centered maintenance (RCM), root cause analysis, risk assessments, spare parts optimization and reporting performance benchmarks.

Additionally, continuous improvement strategies have been implemented across the board, from work processes, employee development and supplier selection, to the proposal of equipment modernization and investment projects. Juri's plant personnel and the Full Service staff work together in teams to maximize the factory's performance levels, product quality and customer satisfaction. Performance evaluations and improvement workshops ensure that ongoing refinements continue.

### **Proof of success**

Each major metric is showing improvement. For example, the MTBF more than doubled in a single quarter. From 2005 to 2006, customer satisfaction indices increased by as much as 20% and the average preventive/corrective ratio increased 17%. OEE and technical availability measurements were benchmarked in the first half of 2006 and tracking began in the second half.

Outsourcing our service operation brings us a real competitive edge. For instance, by improving our major production equipment efficiency, we avoid unnecessary capital investments. Moreover, ABB Service's extensive experience with Maximo resulted in the system being implemented in less than two weeks.

The results in Juri have been so positive that ABB's Electrical Machine business decided to implement Full Service at additional sites such as Ludvika, Sweden and Shanghai, China. The new EM factory in Shanghai just started electrical machines production and signed a Full Service agreement. To facilitate similar results, their Full Service start-up is supported by the same manager that launched the service agreement at Juri.

"Full Service needs to be the best service company, not only for ABB clients, but for ABB's own factories as well. We're taking every step to provide maximum value to ABB's Estonia factory, as we do with each site that selects our Full Service maintenance program," said Timo Jatila, service center manager and start-up manager for ABB Service. The decision to outsource the maintenance function benefits not only the factory but our customers. "By striving to deliver better quality products and services, we will make our customers more competitive," said Bo Henriksson, Country Manager for ABB Baltic Countries.

The preliminary results indicate that we're doing the right things and that the outsourced maintenance strategy is delivering results. We're off to an excellent start and future improvements in OEE, technical availability and cost effectiveness will determine long-term success.