

Maintenance planning and scheduling certification of cross-functional teams improves plant productivity and cuts costs

After scaling back its facility and retiring some assets, a major pulp and paper mill in the Southeastern U.S. sought to optimize the maintenance effectiveness of its remaining machinery, in an effort to improve overall plant reliability and maximize productivity. The company's goal was to run the existing paper machines harder, faster and longer than it had in the past, so that the facility could continue to meet ongoing customer demands in the most cost-effective way, without compromising safety or environmental requirements.

A comprehensive reliability improvement program at any industrial facility will require that a number of parallel efforts be undertaken, such as improvement and standardization of maintenance procedures, improved planning and scheduling protocols for maintenance related activities and more, and that relevant metrics be developed and monitored to verify results and track progress. This case study profiles the steps that were undertaken at this pulp-and-paper mill to improve the human aspect of its reliability improvement program. It discusses the training and certification efforts that were used to define the roles of key personnel, provide enhanced training and coaching, and verify the success of the certification program.



Business challenge

As this pulp and paper mill sought to maximize asset reliability and productivity following a facility consolidation, it partnered with ABB to help identify and implement a variety of maintenance improvement initiatives. ABB's first step was to conduct a detailed benchmark study of the existing maintenance and reliability situation at the mill, and develop a list of prioritized recommendations.

Part of this initiative was to hone the maintenance-related planning and scheduling capabilities of both the operations and maintenance departments. To do this, ABB provided a mix of classroom training, in-field and on-the-job coaching, follow-up audits and refresher courses to key personnel from each of eight critical functional areas — papermaking (involving three specific paper machines), the waste treatment plant, the bleach plant, the unbleached pulp mill, the power generation facility, the chemical recovery area and the woodyard.

This training and certification program involved a Core Team — consisting of Maintenance Planners, Maintenance Supervisors and Validators (these are representative members from the operations staff) — from each of these eight functional areas. The curriculum was focused on improving maintenance-related planning and scheduling (P&S) activities to support a world-class maintenance and reliability program. Three levels of certification (bronze, silver and gold) were possible for individual team members, and certification of the entire Core Team required that each team member received his or her individual certification.

Breaking down cultural barriers

At this pulp and paper mill, the eight separate Core Teams received the training needed to improve the knowledge base and performance of each team member, in an effort to improve overall reliability. Traditionally, each of these functional areas had its own processes and procedures with regard to maintenance-related planning and schedule, so one goal of the program was to develop unified processes and standardized work practices that could be implemented as broadly as possible across the entire facility.

Breaking down barriers

In many industrial facilities, a certain level of competition exists between the operations and maintenance personnel, and each has its own agenda when it comes to operating and maintaining critical components. For instance, operations personnel make it “Job 1” to meet aggressive, customer-driven production schedules, while maintenance personnel pride themselves in carrying out preventive maintenance activities to forestall unplanned downtime or equipment failures.

If any operations staff members have the authority to chase away the maintenance staff and say “not on my shift,” this sets up a very dysfunctional situation at the facility. To break the logjam, ABB’s reliability-related training and certification program involves personnel from both camps.

Since reliability is everybody’s responsibility, both sides must work together to maximize the utility and reliability of every equipment component. This approach helps personnel from both the maintenance and operations roles to better understand and appreciate each other’s roles and responsibilities.

The industry-specific curriculum developed by ABB for the certification process combines world-class practices with lessons that are tailored to meet the mill’s site-specific issues and needs. Common topics include maintenance planning and work prioritization, backlog management, planned and rebuild parts management, spare parts identification, time estimation for work order execution, part and tools, work permit estimation, performance indicators and more.

Leveling the playing field

At the mill, all participants from each Core Team took the same classroom and field training and the same tests, so the certification process created a level playing field. This gave the facility the data and knowledge it needed to identify who had the best skill sets, experience and temperament for each role.

Equally important, this level playing field also took the ‘political element’ out of the decisionmaking, so the mill was able to reorganize the structure and reassign some job roles, as needed, to support the facility’s reliability-improvement initiatives

in the most efficient and least controversial way. Such an approach can be especially helpful for facilities that have a unionized work force, because it removes the basis for union grievances related to job reassignments.

Another important aspect of ABB’s approach to reliability-related certification was to carry out the training for each Core Team as a cohesive unit — rather than, for instance, training all of the Planners, Supervisors and Validators as separate groups. This forces the group to work together as a cohesive team with common goals, and reinforces the learning that the team must carry out going forward. It also helps the group to identify old, ineffective tactics (both in the classroom and in the field), challenge the status quo and replace those outdated approaches with more-effective tactics for improved results.

Another useful element of ABB’s certification process was to define so-called ‘swim lanes’ to ensure that the roles, responsibilities and accountability for each job title was clearly defined and understood by all stakeholders. Adopting the ‘swim lane’ concept, nobody ever wonders ‘Was I supposed to do that?’ and workers are able to work within their own swim lane instead of being preoccupied with concerns about the roles of others.

In its reliability consulting efforts, ABB analyzes more than 50 Key Performance Indicators (KPIs). At site-specific engagements, the customer is able to determine the most appropriate KPIs to track for its own purposes. Examples of KPIs that are tracked at this pulp and paper mill to demonstrate continuous improvement include plant schedule compliance (%), the number of emergency work orders created, the percentage of urgent work orders created, the maintenance spend as a function of asset replacement value (which is expressed as maintenance spend/ARV) and others.

Results

While Asset Availability (expressed as a percentage of time the process is running divided by planned production time) is a useful and widely used metric to characterize machine performance, it does not provide a complete picture of overall plant reliability. In recent years, the overarching concept of Overall Equipment Effectiveness (OEE) has emerged as a key performance indicator for monitoring and managing the reliability of critical plant assets and systems. Because OEE is calculated as a function of unplanned downtime losses, speed-related losses and quality-related losses, it provides a more direct measure to track how improved reliability practices are saving money for the operator. Specifically, OEE reflects how machinery, production lines and processes are performing as a function of availability, performance and quality, and takes into account not only whether the equipment is available and running when it should be, but whether the facility is making quality product when it should be.

As a result of the reliability improvement initiatives carried out at this pulp and paper mill, of which training and certification of Core Team members was just one part, the facility achieved a 3-4% improvement in Overall Equipment Effectiveness (OEE) across all three of its paper machines.

Similarly, the maintenance spend/ARV (maintenance spend as a function of average replacement value) at the facility improved from 3.1 to 2.7. . This means that it costs the mill far less now to maintain the same set of assets. This method of measuring reduction in maintenance costs allows the mill to compare itself to others mills and even other manufacturing facilities, to help determine if its reduced maintenance spend is approaching a world-class level, or if there is still room for improvement.

Meanwhile, among the Planners who took the initial assessment exam, 50% passed on the first try, but after the entire team received additional training and coaching, all passed the second reassessment. This kind of result is not about finger wagging. Rather, it is about ensuring that you have identified all of the gaps, and given all key players receive the training and certification they need to move the needle on overall plant reliability.

Assessment	Classroom training	In-field coaching	Written exam	Planning & scheduling process audits	Results & certification
Assess planning & scheduling organization	3-4 days	1 week per planner	Based on classroom training document	2-3 days per planner	Each planner receives a certificate from ABB University for the level reached
Evaluate planner capabilities	Single point lessons	Daily and weekly scheduling meetings implementation	Go no/go for certification	35 technical topics and 8 management topics	Meeting with planning & scheduling client project leader and individual planners to present results
Evaluate training and coaching needs	Exercises	Team backlog review	Documentation not allowed	Score provided for each topic for the group average and individual	Identify with clients needs and re-training, re-coaching or additional support
Define performance measurement	Start work on weekly agenda, backlog review, scheduling tool, KPI development	Identification of improvement opportunities and best practices	80% required to pass. Second try allowed		
			Certification from ABB University		

North America Customer Service Center

29801 Euclid Avenue

Wickliffe OH 44092 1832, USA

Phone: 1 800 HELP 365

(1 800 435 7365) Option 4

Outside USA/Canada: +1 440 585 7804

Fax: +1 440 585 5087

E-mail: NAService_info@us.abb.com

www.abb.com

3BUS095474