

## Operator Driven Reliability- Who owns your mill's equipment?

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Today's paper industry is far different than the industry we knew even five years ago. Increased foreign competition and a slowing domestic economy have fueled the consolidation of the U.S. paper industry. Facility closures and employee layoffs have become commonplace and feed an "only the strong survive" mentality, which has forced mills to look for any and all ways to remain competitive and economically viable. Since we cannot control market price or raw material costs at the mill level, we are forced to look inward for ways to improve our bottom line.

By narrowing our focus to the variables that are within our control, most mills have found that improved reliability is a key area of cost and productivity improvement. Over the years, our quest for lower production costs through technology has drastically changed the role the operator in our mills. Once an operator spent the majority of his day "on the floor." This provided a hands-on knowledge of how equipment worked and what are the signs of it starting to fail. In today's world, most operators are running the mill via computer-controlled systems. While this strategy has been successful in lowering production costs and in some cases increasing product quality, it did not include a strategy for equipment reliability. In most cases, this is a responsibility that has fallen back to the mill maintenance department. While this group is qualified to fill the task, are they the right people to hold the responsibility for first pass identification of potential failures? Is your auto mechanic responsible for identifying potential failures on your automobile?

At International Paper, we recognized reliability as a huge potential for cost savings. As a corporation we decided to focus on restoring a hands-on approach to reliability through a project called Advantage. In this project we focused on operations driven reliability, planning and scheduling, root cause failure analysis, and precision maintenance equipment installations.

Although the systems were not as effective as they could have been, planning and scheduling, root cause failure analysis, and precision maintenance techniques already existed at the Augusta Mill. Planning and scheduling was loosely in place as an expectation for how work was to be accomplished and a paper root cause failure analysis program did exist mill wide. Our vibration, infrared, acoustical and preventive maintenance programs all use analytical tools to identify problems and focus our maintenance efforts toward prior to catastrophic failures. Operations driven reliability (ODR), on the other hand, had not been in place since the days of the hands-on operator. We did have "process rounds" in place which require operators to look at gauges and meters to optimize the process parameters, but no formal reliability checks were included in that system. It seemed the days of an operator checking a bearing with a broom handle and catching it a day before it would have shut us down had long since passed us by.

This led us to the revelation that the only way we can maintain our competitive position in the market is to have operators who not only run our equipment, but OWN it. Just like all of us have to take the responsibility of keeping our cars running, the operators must take the responsibility of keeping the process equipment running in their areas.

Once your organization sees that light bulb come on, the hardest part of starting a program like this is behind you. With dedicated resources and a well-defined timeframe, this program can provide the financial results we are all looking for.

### **Strategic Planning**

So now that we have decided to develop this program, what do we do first? The most critical component of a successful ODR program is management buy-in. Without support from the highest levels of the organization, the program will never

receive the time, money and support necessary to see positive results.

The first step in implementing the ODR program is the development of the mill's ODR mission statement and goals. Developed by the mill leadership team, it should include program metrics, milestones, budgets and mill wide roles and responsibilities. Next, the leadership team should select a champion to oversee the implementation of the program. The person selected should be a well-respected individual from a highly visible position. They will be required to have strong leadership and team facilitator skills since they will be managing largely through influence. This person should be quickly selected and promoted within the mill as having responsibility for implementing the program. This will make it easier for them to navigate the area-specific political waters. The leadership team must ensure that the champion is aware of the role he/she is being asked to fill and the boundaries he must navigate in the successful implementation of the program. As a rule of thumb, this person is responsible for identifying and rectifying mill roadblocks, keeping the mill leadership team informed on progress, selecting a mill team to implement the program, and maintaining visibility and expectations for the program.

Next, the ODR champion will need to identify the key operating areas of the mill and select a team member to represent each area on the mill's ODR team. In Augusta, we identified six critical operating areas – woodyard, pulp mill, powerhouse, paper mill, finishing and shipping and water and waste and selected a team member for each. The team member is responsible for identifying equipment that will be placed on operator routes, developing the walking order of the routes and the setting the frequency of inspections. They are also responsible for the area metrics, area communications plan, identifying analytical tool needs and a department recognition plan. Like the program champion, the team members should be well respected in their area, self-motivated and have the ability to work on multiple tasks at once.

The final members of the development team should be an additional group of salaried or hourly employees selected to develop the routes. At Augusta, we utilized two different strategies for the route development. We started the rollout by focusing on our Woodyard. For this phase, we selected two hourly operations employees for route development. We felt they would have better knowledge of the equipment and operators perspective and at the same time give more credibility to the routes to the remaining area operators. While this has proven to be a successful way to implement the Woodyard routes, it has been very time consuming. The hourly employees had the desire to make the program work, but they lacked computer skills and a strong sense of problem solving. We developed a new strategy for the subsequent areas. We took four newly hired engineers and set them up to complete the development of the rest of the mill. This turned out to have two major benefits. They helped us develop the routes quickly with their computer skills and problem solving training, and it helped them learn the areas and personnel within the mill.

Both tactics can be very effective but will vary mill to mill based on personnel. This is an excellent decision to let the project team hash out. They will not only bring a knowledge of all operating area personnel to the decision, but they will also form a strong ownership in the project by being allowed to voice their opinions.

### **Analytical Tools**

Many ODR programs stall over the issue of analytical tools and the associated costs and training. There are many benefits to be had by using a full stable of analytical tools. You can provide more accurate readings, better means of exception reporting, real time trending of data in the field, minimize the ability to “pencil whip” routes, and lend a sense of credibility to a new program. While all of these are “nice to haves,” they are by no means showstoppers when it comes to

implementing an ODR program and can easily be added to a program as it matures.

That said, there is a variety of equipment available to help refine your data collection.

- Infrared temperature guns – Give exact temperature with increased safety, as they give operators an accurate reading without coming into contact with potentially hot equipment.
- Stroboscopes – Used to look for loose couplings or belts, find missing bolts or material defects on in-service rotating equipment. They do require access to the couples or belts by having inspection doors on guards or expanded metal guards.
- Vibration pens – Checks the condition and trend bearing vibration levels. Require use of the same point and angle for readings to give accurate trending.
- Personal digital assistants (PDAs) – Handheld units for electronic routes. Provide field trending, bar code reading to insure the right equipment checks are completed, electronic route compliance and one button exception recording. Downsides include cost, extensive training necessary and possible excuse for incomplete routes.

The Augusta Mill has implemented the ODR program with just temperature guns and paper routes. This decision was made with the safety risks involved in touching potential hot equipment and the knowledge that we will advance to more analytical tools as the program matures and prices continue to decline.

### **Communication**

As with any program that will involve a large number of employees, communication is critical to sustain the program until it has become part of the culture. If employees do not receive consistent feedback on their routes, they will assume that the routes are a low-priority item and will quickly start “pencil whipping” the routes. If they continue to not receive feedback they will eventually stop running them altogether. Therefore, it is key to have a written communications and recognition plan in place for the mill.

In Augusta, we found that each department had mature communications vehicles they already used to pass along feedback and information. Some areas used personal conversations with the foremen while others used a bulletin board and weekly update. Allowing them to help develop the plan with the communications manager at the mill increased their ownership in the program and brought to light the best alternative for each area.

Regardless of the method used, an ODR communications plan must include: department roles and responsibilities, timing of routes and follow-up paperwork, feedback system, expectations, training and how recognition will be handled in the area.

### **Route Development**

The meat of the program is based on route development. There are many different philosophies of route development ranging from including only critical equipment to including all equipment and everything in between. In reality, the area ODR leaders will have to determine how much time their operators have to look at equipment conditions and develop their routes to fully utilize that time. People often overlook the time needed to get from one piece of equipment to the next. This is critical, especially in remote areas where time between equipment can be more than double the time spent completing the route. Ultimately, each route must be timed to

ensure operators can complete their assigned routes while maintaining their current roles. You must also be aware of the additional time that may be needed to use analytical tools. In the beginning, the use of the tools this can add time significantly, but will taper down as the employees become more familiar with the equipment and tools.

In Augusta, we set 20 minutes as the rule of thumb for route length, though length varied by position throughout the mill. We then used the area team member to identify the “right” equipment to include on the routes. Based on current mill manpower, some areas check only critical equipment that could cause area process downtime while others also include high cost and repetitive repair equipment.

Route frequency is another factor to consider in the development. Ideally, we would use the failure development period of all failures we can detect with ODR and set our inspection frequencies at half that time interval to ensure we catch failures before they occur. While this is a nice goal, most mills’ manpower today will only allow us to focus on what is most likely to happen and then adjust if we find an unacceptable liability in the future.

Routes are also substantially easier to manage if all equipment is checked at the same time, rather than different route frequencies for several pieces of equipment within an area. At Augusta, we decided to grow the frequency history through experience. The routes were developed to be run weekly and we’ll utilize the root cause failure program to identify when an inspection has been left off the route that should be completed.

### **Training**

This is another component that is widely overlooked when starting an ODR program. Too often we feel like the operators already know their equipment and, as long as the checks are on the paper route, they will not need any additional training. In Augusta we found this to be far from the truth. We found that operators knew equipment by completely different names than what was identified on the computerized maintenance management system. This made it very difficult to identify exactly what repairs needed to be made without walking the route down with the operator who identified it. With Augusta’s 12-hour shift schedule, this could mean waiting almost a month to have that employee back on days during the week. We also found that only a few operators knew how the equipment worked and why it was important to do the checks they were asked to complete. The why and how of the training is critical to have operator ownership of the program and their area equipment.

Two distinct groups must be trained to successfully implement and sustain your ODR program – managers and operators. Managers must understand the goals of the program, how it is set up and expectations of them to make the program work. Operators need to be trained on

- what a route is
- how to use the analytical tools
- how to properly perform checks
- how to complete adequate documentation
- area communications plan

For our hourly employees, we developed a four-hour course in Augusta utilizing IDCON’s Condition Monitoring Standards as the backbone. This provides:

- what a piece of equipment is designed to do
- what checks should be made on a given piece of equipment

- how to do the checks
- why checks are important

The training also included a hands-on walking of a route and time afterward to ask questions and discuss what they experienced.

For managers, we conducted one-on-one sessions with their area team member. This included the route equipment, process flow, the communications and recognition plan, and their role and responsibility as the program manager.

### **Sustainability**

The ODR program must become part of the mill culture to be sustainable. It must become the easiest way for an operator to get equipment worked on in his or her area. Constant feedback is critical to help them understand what work is getting done, when and why. It also helps ensure that the routes are the best routes for the area.

Ultimately, the dedicated resources in the beginning of the program will be reassigned and the program must have enough momentum to make the department assume responsibility of sustaining ODR routes.

We included a timeline for developing a mill sustainability program in Augusta in an effort to ensure that the work done by the ODR team is picked up and assumed by the areas. Recognition is an important aspect of our sustainability. A \$5 gift certificate to the cafeteria for each department's ODR employee of the month will help maintain the visibility of the program and reinforce the area's efforts to instill ownership in the operators. At under \$500 a year to maintain, it's an attractive recognition program to reinforce ODR.

### **Housekeeping**

Housekeeping is the "blocking and tackling" of the equipment reliability world. Without clean equipment, temperatures soar, leaks go undetected and small equipment faults become costly equipment failures. For some mills, this is a non-issue. They already have a housekeeping expectation and culture in place. For others, this can be a sizable roadblock that has the potential to make even a well-developed system fail. If housekeeping is an issue at your mill, do not overlook it. It should be discussed and a plan formulated for how to address real issues. Unfortunately, housekeeping is a very emotional issue. We tend to point fingers at someone else or come up with a reason why it "can't" be done.

At Augusta, we recognized housekeeping as an issue we needed to deal with. We integrated housekeeping into the training and emphasized to the importance of keeping equipment clean. Wire brushes, rags and a flashlight are included in the ODR kits in an effort to help make housekeeping a part of the mill culture. Some areas are already taking ownership of this aspect by taking digital pictures of housekeeping issues in the area and discussing and addressing them at weekly crew meetings. This is definitely an elephant-type problems- you have to eat it one piece at a time. In our training, we told them to spend the time to really clean up the last piece of equipment on their routes. Once that one is cleaned, clean up the 2nd to the last on the next round, and so on. With four different crews running routes, it shouldn't take long to get them all in decent shape.

Our mill trainers did an experiment and went out and thoroughly cleaned one motor and pump set. They said it took them about half an hour to complete. So far, it has stayed relatively clean over the last four months. There will be some pieces of equipment that will get covered in stock regularly due to some other issue. For example a hole in a chute or a chest that runs over. These should be written up on their routes and in an attempt to justify fixing them. Nothing will get buy-in quicker

from your hourly employees than seeing ODR fix something that has bothered them for years.

### **Conclusion**

Market pressures show no sign of receding and we must explore all avenues to provide the highest quality product at the lowest cost. Equipment reliability has already been identified as a key component of the cost equation and it is easy to see that Operator Driven Reliability must be part of the mill reliability strategy. Without the ownership of your mill equipment in the operator's hands, you cannot hope to be reliable. Using a well-planned approach involving all mill employees, equipment reliability will have a direct, positive impact on your bottom line.