When Reliability Is Considered A Maintenance Activity

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Production in general doesn't know the value of using reliability tools, such as opportunity analysis (OA) and root cause analysis (RCA), as a business tool to gain consistent high productivity.

Most production leadership has never spent time in maintenance and/or reliability roles and therefore they see a different big picture. The pieces of the big picture are interconnected like a puzzle, and most production people see the puzzle assembled one way while the maintenance and reliability people see the puzzle assembled another way.

The production leadership typically sees the pieces of the bigger picture as receiving an order, running the assets at capacity or in many cases exceeding capacity for the length of the order. During these runs, decisions are regularly made to:

1. Defer scheduled preventive maintenance.
2. Ignore predictive maintenance exception reports of high risk defects.
3. Downgrade optimum quality priorities.
4. Employees are expected to take unnecessary risks (implied) to get the production out in a timely manner.

The production paradigm often is "the equipment is there to run product and any equipment breakdowns are not a production problem, they are maintenance's problem."

Often the long runs are never maintained because the equipment starts to have component failures, which cause maintenance to perform quick fixes, which accumulate, similar to tolerance stacking and eventually lead to major repairs. This method over the long run has cost companies dearly in secondary damage.

The result:

1. High equipment repair costs.
2. High energy costs.
3. High injury costs.
4. Property damage costs.
5. Customer complaints.

Maintenance and reliability people know the value of a focused approach that

enables equipment availability to produce higher production output over time. Yes, it is important to get the customer's order produced on time, but what risk to company assets is considered acceptable to meet that order? Heavy repair costs and the like eat away at margins, making the company less profitable.

It is possible to have equipment availability for long runs, but it takes discipline on the part of maintenance and production to work together and follow a regimented approach. The reliability approach for production longevity is focus, priority and proaction. Three very simple words, but embedded in these three words is a powerful system for attaining continuous improvement.

When in the heat of a good production run, the last thing in the world operations wants to incur is unscheduled downtime of any sort. So how can unscheduled downtime be eliminated, leaving the path open to consistently exceed production targets?

Focus on the system's past performance. Looking at what has kept the equipment down in the past can be of great assistance to a production leader.

If the production process is broken down into subsystems, an isolated failure definition can be used in conjunction with the subsystems to interview employees about why the equipment has been taken out of service.

This allows the production leader to flush out all the reasons each subsystem has been unavailable for production. It seems maintenance histories are not all-inclusive because many items have been uncovered through interviews that were significant losses and not entered into the work order system, because they were repaired on the run.

Apply the definition to each subsystem and the lost time events can be identified, along with the failure modes that caused the event to occur.

When the frequency of loss is multiplied by the impact of the loss, an annual expense for each mode can be obtained. Sort by cost or lost hours, and it will be clear what the most significant reasons for downtime are. A production leader equipped with this powerful information has opportunities for improvement that are concrete and justified with numbers (no longer an opinion).

Now that production leadership has focus, let's talk about priority and how to use the opportunity analysis information. The sorted opportunity analysis can be set up in a Pareto Chart to clearly show the 20 percent of the problems causing 80 percent of the overall losses.

See Figure 1.

The 20 percent are the RCA candidates, and as a production leader, they are the priority. By using the RCA tool to solve the significant few candidates (the 20

percent), the overall availability of the area will be significantly increased, making the production forecasts more predictable.

See Figure 2.

Now that focus and priority are clear, proaction can be addressed. Proaction is the human act of taking action before an incident can occur and avoiding the undesirable event all together.

There are many ways to be proactive, let’s start with predictive reliability tools, such as vibration analysis, non-destructive testing, alarm trending, infrared testing, ultrasonic testing and the like.

Predictive technology data should be an essential source of valuable information for production leaders. Prediction allows a look into the future, which in turn, allows decisions that affect availability to be made long before a loss is incurred.

Think about it in terms of a business that must utilize raw materials to continue to produce product. There will be a reorder point based on a calculated lead time to ensure that raw material is always available for production (at least in most cases). The inventory usage is monitored at predetermined intervals until the reorder point is met and a new order is generated ensuring raw material availability (which is proactive.)

See Figure 3.

Now let’s look at it from the reliability approach side of production availability. An example would be that the vibration technician takes a reading on a piece of essential equipment and discovers a bearing defect. At this point, the loss of the bearing is eminent; however, when the bearing should be replaced is not known. The bearing will have a reorder point just like the raw material except it will be a triggered setting based on severity. The severity has a priority setting that calls for replacement just like reordering raw materials.

In essence, the vibration technician is monitoring the remaining capacity of the equipment components to be available to continue to produce. It is as important to have component replacement lead time as it is to have inventory replenishment lead time. If either is not available, production is halted.

See Figure 4.

Raw material reorder points have serious consequences if they are missed or forgotten, but defective component triggers are often overlooked by production

leadership as a nuisance that can wait. The component life matters when the production leadership is looking at overall system capacity and long uninterrupted runs.

This is why production and maintenance/reliability must work in conjunction with each other to ensure overall system availability.

Using all three tools effectively will demonstrate the power of reliability on the bottom line. When production and maintenance use the same tools with the discipline required to be successful, it becomes “us” instead of “us and them”… It becomes “our responsibility.”

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