

Can't We All Get Along?

Written by Michael Israel igniteService, Inc.
Friday, 01 February 2008 00:00

Coordinating production and maintenance can be a big challenge for an operation, but it doesn't have to erupt in a range war. Effective peacemakers are out there, including those in the form of advanced software tools.



It's a typical quandary in asset-intensive production environments. Maintenance management is tasked with ensuring that production equipment operates at peak efficiency so that production targets can be met. But, production management is sometimes reluctant to turn over equipment for maintenance because the resulting downtime might negatively impact their ability to meet those same targets. Those responsible for maintenance then lament that they can't access the equipment to perform essential maintenance activities. As those on both sides of the fence know, this conflict can become a vicious circle, resulting in both insufficient maintenance and inadequate or poor quality production throughput.

Across the great divide

Responsible maintenance and production managers know they must coordinate their planning efforts to benefit the entire organization, not just their individual departments. More importantly, they have to frequently communicate and closely collaborate during the actual execution of the production and maintenance schedules to be sure they're operating at maximum efficiency and that all targets—both production and maintenance—are met. The coordination and planning for these two different, but closely related, activities have typically been manual, time consuming and prone to error. Automated processes, however, can significantly improve the planning, scheduling and execution of both maintenance and production functions.

Most, if not all, asset-intensive production operations function in two primary phases: 1) the long-term planning phase; and 2) the actual execution—or production—phase. This discussion

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refers to the long-term planning phase where desired production schedules are established and maintenance strategies are adopted as the “slow loop” phase. It also targets the execution phase, where production equipment is running, product is being produced, and maintenance plans are actually carried out, as the “fast loop” phase.

Slow and fast loop planning in our own lives...

Consider the following example of slow and fast loop planning. It's one to which more and more of us can relate these days.

You want to attend an important industry conference in Orlando, fl. You begin making your plans (this is the “slow loop” phase). You arrange flights, rental car, hotel and even set up a breakfast meeting with an important client. Everything is organized and looks great, until...

On the afternoon of your departure, you arrive at the airport 90 minutes ahead of time, only to learn that severe storms are causing all flights to be delayed. When the gate agent announces that your plane will leave an hour later than scheduled, it's clear that you almost certainly will miss your connection out of Atlanta.

Upon finally arriving at ATL and galloping across the crowded concourse to your connecting flight's gate, you find it has just left—and that the last Orlando flight of the day is overbooked. You're stuck in Atlanta until the next morning.

In case you haven't guessed it, you're now in the “fast loop.” That is, you're in the phase of your trip that is the actual execution of your plans, but things aren't going as you had anticipated. Accordingly, you begin to adjust. You rebook on the earliest flight out in the morning. You try to find a reasonably priced hotel for the night, as close to Hartsfield as possible. You cancel your hotel room in Orlando for tonight only. You call the car rental company to adjust your pickup arrangements. You try to reach your important client so he'll know well in advance why you won't be showing up for breakfast the next morning. When everything else is taken care of, you revisit the conference schedule to see what sessions you probably will be missing tomorrow, hoping against hope that you can catch a repeat presentation or two on the second day. Sound familiar?

Slow and fast loop planning in a production operation...

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Now think of the previous analogy in terms of a typical production environment.

Sales targets at Great & Speedy Product Company have been set for the coming fiscal year. Those targets dictate what the production output must be. The production and maintenance management teams must devise a plan that will create the product required to fulfill the anticipated demand.

Maintenance plays an important role in this planning session because production assets must be maintained at peak performance in order to generate the required amount of throughput. Thus, production and maintenance management teams now collaborate to determine the best maintenance times and procedures needed to keep the equipment running properly, and to minimize the impact on production output. Using available information and historical maintenance and equipment failure data, both teams agree on a preventive maintenance (PM) schedule, include some maintenance time for unanticipated failures and derive an overall schedule that will support both anticipated maintenance and production output requirements. At this point, the slow loop, or planning phase, has been completed.

The new fiscal year—the fast loop—begins. Operations run smoothly and as planned—for a while...

In the second month, though, there is a sudden and unexpected surge in demand for the product—much to the delight of sales—and production must be increased by 20% over at least the next month, perhaps longer. Faced with this new demand, production management decides to forego scheduled maintenance on two important pieces of equipment to keep them available for a greater number of production hours. Maintenance objects, but, given the newly revised targets, it has little say in the matter and concedes that it will catch up on those maintenance activities the next time around.

New production demands are being met and all seems well—but again, only for a while. Soon, one of the machines where maintenance has been skipped suffers a catastrophic breakdown and has to be taken off line for an extended period of time while replacement parts are ordered and repairs are made.

It turns out that the machine in question was already close to a major mechanical component

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failure about the same time its skipped PM should have been done. That maintenance would have detected the impending failure and corrected it before a catastrophic event actually occurred. Since that didn't happen, the new production demands will not be met in the near term and maintenance costs on this particular machine will exceed the planned budget.

As a result of the unexpected surge in demand and the unanticipated equipment failure, the maintenance and production plans that were developed and accepted back in the original slow loop planning phase will now likely be out of sync as well. Revisiting, reanalyzing and revising the original maintenance and production and maintenance schedules may also be necessary.

Who in a production operation can't relate to this hypothetical example of unexpected changes to the plan? Suffice it to say that the "fast loop" is always full of surprises, and that the "slow loop" can't anticipate them all.

Coping with uncertainty

How do you cope with and minimize—or even eliminate—the negative impact these "surprises" can have on your operations? Most organizations today don't effectively coordinate maintenance and production schedules. Sadly, some organizations don't appear to coordinate these two tightly coupled activities at all, electing to treat the maintenance function, in the words of one maintenance manager for a large process operation, as merely an "afterthought."

What if you could successfully coordinate the development of both maintenance and production schedules to:

- Always know how maintenance activities are going to impact production?
- Guarantee that important maintenance procedures are always done on time?
- Improve responsiveness to unanticipated disruptions, equipment failures or changes to production demand?
- Minimize or even eliminate the risk of machine failures and missed production targets?
- Boost your ability to meet production targets?
- Assure that maintenance and production managers are always in sync?
- Increase your overall operational effectiveness?

Today's software technology, including that offered by Actenum Corporation (see Sidebar) enables automated planning and scheduling for both maintenance and production activities.

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Maintenance and production managers can work collaboratively to develop a slow loop schedule that simultaneously evaluates both required production output and essential maintenance activities to produce a plan that:

- Shows expected production output by specific time period.
- Lists detailed maintenance activities and frequencies.
- Measures and displays the risk of missing targets.
- Evaluates and displays potential conflicts.
- Analyzes and displays other user-definable key performance indicators (KPIs), such as equipment availability or utilization.

This type of advanced software can automatically calculate and optimize both the maintenance and production schedules to deliver the production output required and fit within constraints that maintenance and production managers may define. For example, management can establish a threshold for the risk it is willing to accept for missing a production target or allowing a machine to fail.

These software tools can then analyze the planned maintenance and production schedules and automatically calculate and display the risk of missing that target, or the risk of a device failing. If the calculated risk exceeds the acceptable threshold, the software can automatically and continuously suggest adjustments to the maintenance and production schedules until an acceptable level of risk is attained.

Of course, the experience and knowledge of the managers in charge of the operations cannot be discounted. Therefore, smart managers will use software capabilities to augment their decision-making in a “two-expert approach.” They can—and should—adjust and tweak the schedules until they are satisfied with the results. Some software allows them to do so using a simple “drag and drop” interface to add, move or change planned maintenance events. All the while, the impact of such changes on the production target and other KPIs is automatically calculated and displayed for management consideration and action.

From uncertainty to confidence

So, let's apply these capabilities to the hypothetical (but often real) scenario at Great & Speedy Product Company.

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In the slow loop and armed with the type of software described here, Good & Speedy's maintenance and production management teams can automatically develop a maintenance schedule that ensures production targets are consistently met and virtually guarantees key maintenance activities are never missed. Furthermore, the software also displays the impacts of the proposed schedule on specific user defined KPIs, including: a risk factor for missing the targets, the risk of equipment failure, the actual amount of production output expected, the optimal schedule for performing maintenance to achieve production targets but protect against unforeseen failures, and potential conflicts (such as a missing skilled worker required for a scheduled maintenance activity).

Management can then either automatically or manually revise the schedule until an optimum outcome is reached—and even play “what if” games to come up with alternative schedules to accommodate potential unforeseen events. For example, by anticipating a potential boost in demand and developing an alternative production and maintenance schedule in advance, management could make sure increased demand is capable of being met without sacrificing important maintenance routines.

Suppose, though, that despite everyone's best efforts, an unexpected equipment failure still occurs several weeks into a fast loop production run. In such a case, software, such as that by Actenum, can generate an optimal revised maintenance and production schedule based upon the unforeseen failure. It can evaluate the existing production targets and maintenance requirements, and generate an updated schedule that will ensure production runs get back on track in the shortest possible time, while still assuring that important maintenance events are not overlooked.

In short, software technology available today can make both maintenance and production managers' planning responsibilities a lot easier and much more accurate. Given organizational goals, the software can automatically analyze, rationalize and produce the best possible maintenance and production schedule needed to achieve those goals. The results are purely objective and not influenced by individual biases or personalities. And it's hard to argue with a fact based, objective plan.

A better way

Bottom line? Tearing down the fences that once divided production and maintenance in an operation is not as difficult as it once was. Advanced software technology means there are easier, faster and more accurate ways to develop your maintenance and production schedules than in the past. Today's comprehensive software solutions also let you refine those schedules as unanticipated events occur. If these activities are still a largely manual process in your

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organization, remember that there really is a better way for the parties in asset intensive production environments to get along. **MT**

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About Actenum Corporation

Actenum Corporation, based in Vancouver, BC, develops software solutions that enable organizations to increase their ability to achieve production targets and reduce their operational risk. According to the company, it specializes in providing tools for the effective planning and scheduling of key assets, as well as decision support for disruption management in complex operations, where conditions are constantly changing.