

THERE IS NO TRADEOFF BETWEEN EMPOWERING AND SCHEDULING

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Empowering maintenance crews and personnel means allowing them to make decisions within their areas of responsibility. This greatly increases the quality of maintenance work. However, empowering does not mean turning each of the specialized areas of maintenance loose on its own. The maintenance process takes a coordinated team effort to master and an explicit scheduling process is necessary to advance productivity. Superior maintenance requires both empowerment and scheduling. This paper explains where and how high performing maintenance organizations utilize and leverage each concept.

The following typifies a conversation between a maintenance manager and a front line, crew supervisor in many companies.

Mgr: "How did it go this week?"
Supvr: "We kept the plant running!"
Mgr: "Well, how much work did you get done?"
Supvr: "We did a lot!"
Mgr: "Well, how much was that?"
Supvr: "We did 50 jobs which was more than we ever did before!"
Mgr: "But how much was that compared to how much you could have done?"
Supvr: "You don't understand, we really worked hard! I'm supposed to be empowered!"
Mgr: "Yes, empowered to do your job, but maintenance is still a team effort."

This conversation brings out the issues of effectiveness and efficiency. Note that the crew supervisor correctly understands his job is to keep the plant running and not to exist as a speedy repair service fixing whatever breaks. Note also that there is no argument that keeping the plant running (effectiveness) is the first priority. In addition, whether or not the plant was truly running is self-evident and not even in question. On the other hand, efficiency is a more difficult notion to consider. The supervisor is conscious of how many work orders the crew completed (efficiency). Yet, the conversation implies there exists little or no concrete basis for determining whether the 50 work orders completed was an adequate rate of productivity. Was the week's effort spent productively or not? How would one know? After effectiveness, efficiency must be considered.

At this point, the supervisor raises the issue of empowerment. The supervisor has been given a crew with which to maintain the plant. Shouldn't he be authorized to do "what it takes" to accomplish this mission? On the surface, this sounds appropriate. If anyone is given a job, surely he should be empowered to carry out those duties.

The empowerment statement arose because the supervisor perceived the manager was interested in some sort of standard or measure of how much work the crew should have done. As it turns out, an advance scheduling process provides such a measure. Crew supervisors generally perceive advance scheduling by an outside group as taking away their control or empowerment.

This apparent conflict or tradeoff between empowerment and scheduling vitally concerns maintenance managers for the following reason. Statistically valid observational studies prove that delays consume large portions of craft time. Not even considering administrative time such as vacation and training, delays consume 65% to 75% of the time spent by the typical craftsman. Out of a 10-hour shift, the average person only spends 3 1/2 hours or less directly working on equipment. The other 6 1/2 hours or more are spent on activities such as obtaining parts, traveling around the plant site, receiving job instructions, or even waiting to be

assigned another job. Craftspersons must accomplish these non-productive activities in order to complete maintenance work. Yet they are non-productive because whether or not they are avoidable, they interfere with performance of maintenance directly on equipment. Furthermore, proper advance scheduling helps improve direct work time and reduces delays. Scheduling addresses one of the greatest reasons for less than desirable productivity: the crew supervisor not assigning a sufficient amount of work.

Probing deeper into the controversy of empowerment and scheduling makes it necessary not only to define the terms empowerment and schedule, but also the precise details of the mission of the maintenance crew and supervisor.

Definitions and Details

The dictionary defines EMPOWER as *investing with legal power, authorizing or to enable or permit* and SCHEDULE as *a production plan allotting work to be done and specifying deadlines*. Obviously, these definitions do not make the concepts mutually exclusive, that you cannot do one if doing the other. A maintenance crew clearly does not exist as an island isolated from the rest of the organization. In addition, just because a crew receives an advance schedule does not mean that it is hopelessly constricted and hindered from doing its job. The problem is that maintenance crew supervisors have *traditionally* exercised an extraordinary amount of freedom in selecting work activities and dictating productivity. Furthermore, while current management circles have rightly favored the concept of empowerment, they have sometimes allowed the term to carry a life of its own even to an unjustified extreme. Finally, advance scheduling requires more coordination and accountability with crew supervisors. Consequently, when management implements an advance schedule program in a modern environment promoting empowerment, crew supervisors usually perceive a loss of "control."

Empowered to Do What?

Listing a number of necessary components of the maintenance process helps one defines the proper area of responsibility of a maintenance crew and supervisor and one deal with the concern of empowerment. First, the maintenance process makes considerable use of the work order system. The work order itself is the vehicle by which requesters of work identify needs; maintenance planners predict parts, tools, skills, and hours; and the crew executes work. Clearly, the crew supervisor does not "lose empowerment" by the work order being processed among various groups. Next, the established plant priority system aids communication on the importance of individual jobs. In fact, this system really should drive to a large degree which job is next tackled by the crew. Again, the crew supervisor sees this system helping, not hindering. Similarly, the crew supervisor does not see it necessary to have complete control over hiring, training, tools, spare parts, and payroll.

Beginning with choosing exactly what job to execute, the crew supervisor begins to feel a little more ownership in what lies more completely within his control. Yet, did not the plant priority system help decide this? In addition, the culture itself, if not management, should desire adequate preventive maintenance (PM) to prevent failures. The plant itself should also promote predictive maintenance (PdM) to head off problems and project work to improve equipment. These are not just the concern of the crew supervisor. Plus, coordination with production crews, even if just to clear equipment for maintenance, naturally would take a crew supervisor outside of any isolation. Yet, most crew supervisors would agree that even these areas do not infringe on their "empowerment."

Now consider actually assigning work to individuals. Certainly the crew supervisor is most knowledgeable about which individual persons work best together and are best suited for specific assignments at specific times. In addition, he is in the best position to direct the sudden reaction of even an entire crew to handle emergencies. These are areas most within the area of responsibility of a crew supervisor.

Next, consider two periods of time where many of the preceding concepts are applied. First, an outage is a period requiring an entire unit or plant to be taken out of production for maintenance. Different groups come together to ensure there are sufficient spare parts and labor for the anticipated work. In addition, a schedule in

the form of a work scope lists all the desired work. Companies usually execute outages with great efficiency in part due to this advance schedule. Few persons would insist on lessening the coordination involved for the sake of "empowerment." Second, consider a maintenance period where no outages take place, just routine maintenance. This is the type of period that suffers from low productivity. Simply having groups coordinate and work to a definite schedule of anticipated work for non-outage periods greatly improves productivity.

Why We Usually Do Not Assign Enough Work

Crew supervisors typically assign individual work orders to technicians and there are a number of reasons why supervisors might not assign enough work. Together these reasons perpetuate a powerful culture to maintain the status quo. The personalities of the supervisors do not cause this problem. The overall maintenance system encourages the problem.

To begin with, crew supervisors develop a feel for how much work persons should complete in day. During the past years that seasoned supervisors, no planning function existed. The plant also may not have had an adequate storeroom, tools, or other resources they have now. It used to take all day for two technicians to complete one or two work assignments. The technicians had to stay busy rounding up parts and tools. Frequently they had to clarify instructions and job scopes during job execution. They persevered and completed their one or two jobs. Now, however, with it easier to complete those one or two jobs, the maintenance supervisors may not be assigning more than the customary amount of work.

Perhaps the supervisors do assign more work. Perhaps they assign two or three jobs to the two technicians. But why only two or three jobs? Why not four or five?

Next, consider a scheduled outage. The maintenance group completes a lot of work in a short amount of time. A problem is that after the outage supervisors may think they are rewarding their crews by not pushing for completing a lot of work every day. A supervisor may feel the outage where everyone works so hard justifies not working as hard later.

In addition, many supervisors feel that during a regular, non-outage workday, the company is a little over-staffed. The supervisor reasons incorrectly that the company has to carry extra persons so it can be ready for the outages. This reasoning is faulty because there is much work that needs to be done on the normal workday for the competitive company. Outages exhaust maintenance personnel because crews work hard, but they always need to work hard to be competitive. Maintenance forces can work hard for forty hours each week without being too exhausted.

The crew supervisor may also feel that there is not enough work for the crews on non-outage days because they are only working the urgent or high visibility jobs. They may be ignoring the lower priority jobs to prevent future failures. The crews keep somewhat busy fixing those things that break or fail. These jobs give an enormous sense of satisfaction because technicians can directly relate their completion to plant availability. The lower priority jobs' link to availability is less clear. To make this situation even worse, crews try to make the backlog of satisfying jobs "last" so they do not "run out" of work.

A common related practice is when the technician receives a single job assignment at a time with the understanding to "come back" for a second job when he finishes the first. Three things occur. First, the technician feels that the first job is "the" job for the day unless it is very obvious it should only take an hour or two. So nearly every job becomes an eight or ten hour job depending not on the job details, but on the hourly shift duration. Second, the psychology of the arrangement encourages the technician to presume the "next job" is somehow a worse job not to be rushed into. Third, if the technician does return for a next job and there is nothing urgent in the backlog, the supervisor may well assign the technician to help someone else on an urgent job currently in progress.

Similar to the manner in which many jobs are assigned or executed as eight or ten hour jobs, the practice of assigning two persons to each and every job may exist. True, many jobs require the safety consideration of an extra set of hands, but this practice could become a bad habit.

Many of the above circumstances support a powerful counterproductive culture of peer pressure. Ample reason exists for not productively completing jobs quickly. Maintenance management needs a method helping supervisors know how much work to assign.

Using Advance Scheduling as a Method to Increase Productivity

Advance scheduling primarily simply sets goals for how much work crews should complete. Other benefits of advance scheduling include facilitation of staging parts and better inter-craft coordination. These goals and additional benefits improve productivity by minimizing delays. Another benefit more supporting quality of plant operation would be the improved likelihood of selecting PM and other proactive tasks when looking beyond a single day's work.

Advance scheduling is done on a weekly basis. A week's worth of work has a remarkably accurate overall time estimate even when made up of somewhat imprecise individual job estimates. A week time-frame also seems to present a reasonable goal that does not include an overwhelmingly large amount of work. A week is also short enough to avoid too many new work orders that could shift the overall focus of what work is important to the plant.

Advance scheduling simply matches available labor hours for the week with job hours out of the backlog. To do this requires a forecast of labor hours that will be available next week and a prioritized backlog of work orders with estimates for both hours and skill level. The forecast normally comes from the crew supervisor and the job details for the backlog normally comes from a planning group.

The resulting advance schedule merely allocates a listing of work for the crew for the next week. This simple setting of goals and attention by management helps increase crew productivity. The process overcomes the system's otherwise inclination toward not assigning enough work.

Planning versus Crew Supervision

As noted, job planning provides work order time estimates needed for scheduling. The crew supervisors could provide these individual job estimates, but a separate planning group truly frees and helps empower crew supervisors to function "in the present." Without having to prepare for future work, supervisors can give more attention to today's work quality and crew performance. The planning group functions "in the future" giving attention to preparing job plans not only with time estimates, but details to avoid anticipated delays.

The planning group works in the future. Planners develop job plans with time estimates. They develop the weekly schedule looking at the entire plant work backlog. The planning group uses crew forecasts of overall labor without regard to individual names. The planning group executes its portion of the maintenance process for the overall benefit of the maintenance team and maintenance manager. This is the proper area of responsibility for the planning group.

The crew and its supervisor work in the present. The crew members execute assigned work, empowered to concentrate on today's work without regard to organizing details for future work. The supervisor monitors today's work and assigns tomorrow's work. The supervisor develops the daily schedule using the weekly schedule allocation, but also considering any urgent work that cannot wait until next week. The supervisor works with individual technicians. The crew and its supervisor execute their portion of the maintenance process for the overall benefit of the maintenance team and maintenance manager. This is the proper area of responsibility for the crew and its supervisor.

Empowerment versus Scheduling

The supervisor must be empowered to execute his part of the process. The supervisor is in the best position to handle the current day's work by assigning names to tasks, coordinating resources and clearances, and handling emergencies or other urgent work that cannot wait.

Together with an advance schedule from the planning group, the supervisor directs the daily execution of work toward an allocated goal of work tailored to his crew's abilities for the week.

The Result

The plant with advance scheduling and empowered crews results in discussions between management and supervisors that lead to information that can improve plant maintenance. Such information becomes available because advance scheduling provides a standard that leads to specific questions.

Mgr: "How did it go this week?"

Supvr: "We did a lot!"

Mgr: "Well, how much of the work scheduled for this week is done?"

Supvr: "Most of it."

Mgr: "Let me see the jobs not yet started . . . I see we did not start about 100 hours of work. What happened?"

Supvr: "Let's see. On three jobs, we didn't have parts in stock so we had to place an order for next week. On one job we did complete, the estimate was too short by half even though the job went smoothly. Another job was delayed when we ran out of solvent and I authorized a field order to buy some so we could finish."

Mgr: "That's okay. On some weeks, we have things we just have to deal with. I know you were working hard because I was on the shop floor several times. I am concerned a bit about three planned jobs not having parts available as well as running out of solvent. I'll talk to the planners about the parts and the tool room about the solvent."

The above discussion leads to information that can be used to improve performance. Joe Spielman of General Motors focuses us on the real goal by saying, "All I want is a plant that runs around the clock without any problems." Accomplishing this goal takes a systematic approach to maintenance, not just separated, isolated groups of "empowered" crews working as best they can. Many different elements make up the effective maintenance process. Advance scheduling is one component of the process which improves crew productivity. Not only does scheduling improve productivity, but John Crosson of Chlorox points out that the success of meeting the weekly schedule is the "ultimate measure of proactive maintenance." This is because if the crew can concentrate on the scheduled work without interruption by emergencies, then the crew is proactively dictating to the equipment rather than the equipment reactively dictating to the crew. Another element in the effective maintenance process is empowerment at the crew level to promote effective maintenance. There is no tradeoff between empowering crew supervisors and working toward a week of scheduled work. The maintenance force should do both.

Bibliography

Crossan, John. 1997. Experiences in a corporate maintenance improvement initiative. Discussion during paper presented at Society for Maintenance and Reliability Professionals Annual Conference, 5-8 October, Pittsburgh, Pennsylvania USA.

Spielman, Joe. 1997. Maintenance and reliability as a competitive advantage. Keynote address presented at Society for Maintenance and Reliability Professionals Annual Conference, 5-8 October, Pittsburgh, Pennsylvania USA.

Additional Reading

Palmer, Doc. 1999. *Maintenance Planning and Scheduling Handbook*. New York, NY: McGraw-Hill. 1-800-262-4729

Biography

Doc Palmer works in the maintenance department of a major electric utility in the United States with over 21 years of industrial maintenance and construction experience. From 1990 through 1994, Palmer was responsible for overhauling the existing mechanical maintenance planning organization including developing and implementing the necessary planning principles and practices. The resulting success played a role in expanding planning to all crafts and stations owned and operated by the utility. He has also directed the purchase and implementation of a computerized maintenance management system. Currently, Palmer advises the utility's ongoing planning program and directs the power stations' preventive maintenance program.

Palmer is the author of McGraw-Hill's recently published *Maintenance Planning and Scheduling Handbook*. Additionally, he has delivered a number of well-received maintenance articles and presentations for industry.

Doc Palmer is a registered professional engineer with a master's degree in business administration. He also is a CMRP, Certified Maintenance and Reliability Professional.

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