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Effective maintenance is strongly linked to effective job plans. Pay attention to the required components. Don't skip anything.

Let's re-cap: In the first part of this article , the discussion focused on how critical maintenance planning is to the success of your maintenance organization. In fact, we made the uncontestable point that your maintenance effort will fail IF YOU DO NOT plan. Let me say that again. Your maintenance effort will fail if you do not plan.

There is no place in the modern maintenance organization for job plans that rely simply upon luck and common sense. You can't hope your way into a reliable manufacturing process, no matter how many rabbit's feet you carry.

In the last article, we also discussed the importance of selecting the right candidate for the job of maintenance planner. Planning is a meticulous and detail-oriented job, and if you want your planning initiative to succeed, your planner will have to exhibit those qualities. Close enough is not good enough when writing a job plan. It has to be perfect. It is an exercise in absolutes. That said, let's now turn our attention to the creation of a good job plan.

There are several components to a good job plan—*the order in which you assemble these pieces is not nearly as important as the fact that none of them are to be skipped* . We'll get to the best way to put them into the job packet later. The various components of a

complete job plan include: job steps; tool list; skills roster; bill of materials (BOM) and parts list; diagrams, photographs, illustrations; standard maintenance procedures (SMPs); and safety, including lockout and personal protective equipment (PPE).

It's often helpful to read several job plans written by others before beginning, just to get the feel for what the end product should look like. My recommendation is to begin by writing down the actual job steps. The procedure should be written as a numbered list with each number representing one of the finite steps of the job. This list will also serve as an outline for your planner as he/she puts together the job packet. The steps should, of course, be recorded in the order they are to occur. If the planner happens to be a former technician who has performed the task before, then this portion of the process should be pretty straightforward. If the planner has not performed the job before, he/she must consult with someone who has. If the job being planned has not been performed by any current employee, it is strongly recommended that you hire an outside contractor or a factory representative to not only help write the job plan, but assist in doing the actual job as well. When it comes to industrial maintenance, there is no substitute for knowledge and experience.

Notes on providing job-step specificity...

I have been asked on several occasions about just how specific the written job steps should be, and my answer is always the same: Your job steps should be as specific as needed to successfully complete the work at hand. I'm not being a wise guy—*it depends on your maintenance organization and the level to which your technicians have been trained.*
Keep the least skilled in mind.

If all your millwrights have been properly trained in torque specifications and know how many foot-pounds of torque a grade-eight bolt requires, then that job step can be written in general terms. If, however, they haven't been trained in torque specifications and if you don't want to have a rash of looseness issues over the coming months, your planner had better spell out quite plainly that the ½" bolt should be torqued to 119 foot-pounds. The same concept holds true for belt tension, sprocket alignment, bearing installation, fan balancing, motor wiring, hose construction and countless other tasks. If the planner knows that the millwrights and technicians have been recently checked-out on the task, then that task can be referred to in less-specific terms.

There is one final note about the job-steps portion of the job plan. The work-order document should be designed with adequate space for a technician to jot notes and comments on it. Doing just that should be a departmental requirement, rather than a suggestion.

The job plan is a living document, and each time the job is performed there should be valuable feedback from the field that can be incorporated back into the plan. The idea is to eventually arrive at the one safest, most effective and most efficient way to do the job. Additionally, there should be spaces for the maintenance professionals to sign off that they have completed the work according to the specifications laid out in the document. This step is nothing less than crucial. Accountability must be embraced in any maintenance department if it is to succeed.

Notes on constructing a tool list...

Once the job steps have been written down in order and checked by a maintenance professional for errors or omissions, the next step is to analyze the job with an eye to constructing the tool list. The tools referred to here are in addition to those that we would normally expect to find in a multicraft's tool pouch—*they're specific tools required to do the job*. These items might include welders, torches, shackles, straps, cables, cranes, come-alongs, jacks, porta-powers, alignment and measurement devices, specialty tools, power tools, man lifts, forklifts and a large variety of other things not needed for every job. This is a critical step that must not be skipped by the planner. (I would venture that there is not a single reader of this article who hasn't had at least one major job grind to a halt because the need for a specialty tool was not planned for.)

Notes on constructing a skills roster...

The skills roster is, in many ways, similar to the tool list. The difference is that while your tool list specifies the exact tools that will be needed to successfully complete a job, this roster is a list of the skill sets that will be required to finish the task. Many organizations are moving (or have moved) toward multicraft status for their maintenance professionals. In these cases, the assumption would be that any employee who picks up the work packet could perform all of the tasks that the job calls for. But even in a multicraft organization—*and especially in a non-multicraft environment* —the truth is that some maintenance professionals are better at certain things than others. Thus, it's always better to list the skill sets that will be needed to complete the project. A few of these specialties might include welding, cutting, fabrication, millwright, hydraulics specialist, electrician, plc programmer, pneumatics specialist, machine operator, alignment technician, reliability technician and machine-specific technician.

Notes on constructing a bill of materials and parts list...

The bill of materials (BOM) and parts list is one of the most important portions of the job plan. It represents, literally, the nuts and bolts of the job. As such, it should be as specific as possible. Parts should be listed by both part number and description, and no job plan should progress to the ready stage until every part is on hand and has been verified to be the correct part. This

specificity is not only important with regards to parts. Materials such as wire nuts, epoxy, twist-ties, shims, loose steel, grease, nuts, bolts, washers, rubber hose, O-rings and hundreds of other non-job-specific materials must be listed on the job plan, and when the job is scheduled, these materials must be verified as being on-hand and available for use. In addition to being a complete record of all parts and materials, your BOM and parts list should also indicate any special disposal instructions for removed or replaced parts.

Notes on compiling diagrams, photographs and/or illustrations...

Everyone has heard the old saying that a picture is worth a thousand words. That's an understatement when it comes to a maintenance job plan. Your planner literally cannot include too much illustrative material with a job plan.

A good planner should take advantage of the fact that we live in a digital world and illustrate job plans accordingly. Even something as simple as a good color picture of the job site with a circle drawn around the part to be replaced or repaired can be a great help to a team of technicians unfamiliar with the job. Each diagram, photo and/or illustration should be numbered or lettered and referred to with that designation in the appropriate written job step—*as in "See Illustration #2" or "Refer to Diagram A."*

Specific materials that come with parts should be handled in the same manner, with copies of the instruction sheets being included in the job packet while the original remains with the part.

Notes on including standard maintenance procedures (SMPs)...

It's helpful to include copies of specific SMPs in the job plan if those procedures are necessary to the successful completion of the job. As discussed earlier, if you have confidence that your maintenance professionals are performing in practice at the same level that they are on paper, this step may not be necessary. But your planner should include the SMP if there is any doubt that any member of your staff may find himself or herself out in the field under the pressure of a deadline not knowing how to perform a task. Remember that a job plan must be written with your least-skilled technician in mind, because that is the person who might draw the work. An SMP is, in reality, a small job plan, and it is designed to impart information to those who need it.

Notes on addressing safety, lockout and PPE ...

After the rest of the job plan is written, the planner has all of the necessary components to be able to write the crucial safety portion of the job plan. Once the scope of the work has been determined, critical information such as which machines to lock out, what PPE will be required and which safety protocols must be observed can be determined. The planner should consult with a millwright familiar with the machine, an operator and the safety manager or safety committee when outlining the safety components of the job plan.

Notes on assembling the job packet...

After all components of the job plan have been completed, it is time to put together the job packet. The order I recommend is:

- Safety (including Lockout and PPE)
- Job Steps
- Tool List
- Skills Roster
- Bill of Materials (BOM) and Parts
- Diagrams, Photographs and/or Illustrations
- Standard Maintenance Procedures (SMPs)

Once the packet has been assembled, it should be given to a millwright or technician who should then read over the job plan with the following question in mind: If I had to complete this job using only this job plan as my guide, could I do it? The answer will determine whether or not the job plan is complete. If any part of the plan is unclear, the time to make the change is before the job begins. **MT**

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