

The Fundamentals: How To Write A Standard Maintenance Procedure

Written by Raymond L. Atkins CPMM, CMRP
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Shortcuts won't work when it comes to developing the type of clear, easy-to-understand instructions that everyone can follow.

A Standard Maintenance Procedure, or SMP, is a written set of instructions that specifies how a maintenance procedure is to be performed. It should be specific and detailed enough so that a qualified maintenance technician who has never before performed the task can do so successfully by reading and following the instructions contained in it.

Encompassing standards, measurements and specific techniques, the central idea behind an SMP is that there is only one right way to perform any task. Let me say that again: There is only one safest, most efficient and most effective way to perform any given task. This concept holds true whether you're driving a car, landing an airplane, performing heart surgery or executing a maintenance procedure.

Unpleasant surprises

Keep in mind that it takes only one deviation from that "right" way of doing things to produce a failure. For example, you can lubricate a bearing correctly 99 times in a row, but if you deviate from the SMP during the one-hundredth lube, you run the risk of ruining the bearing and invalidating all of your previous good work. Don't believe it? Try the following experiment.

Select five of your best maintenance technicians, and send each of them to lubricate a bearing somewhere at your site. If possible, direct them all to the same type of bearing. Then, check the results. How many different types of grease were used? Were the zerks wiped with a clean rag? How many shots of grease did each bearing receive? Were the grease guns cleaned and calibrated? Was the grease compatible with the lubricant that was already in the bearings? Did the technicians leave their work areas clean when they finished?

You will be surprised at how much variability you discover surrounding this relatively simple procedure. And, to be blunt, you will be unpleasantly surprised when you discover how many times this procedure was performed incorrectly out of the five opportunities presented. How much more variability and error do you suppose there is in your more complex procedures? That, in a nutshell, is why you take the time to write an SMP.

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There are two types of maintenance procedures that must be placed under the SMP umbrella. They will differ somewhat in scope.

Developing routine SMPs

Routine maintenance procedures—such as a bearing lubrication—are performed over and over again on a regular basis. The need for a Standard Maintenance Procedure with this type of task is obvious. Remember, if we take care of our smaller details correctly and consistently, our larger functions and processes will for the most part take care of themselves.

To write an SMP for your more routine procedures, you must first decide which of them will provide you with the greatest initial benefit. In the beginning, you should be targeting the most frequently performed tasks in your plant. Good examples of this type of procedure include bearing lubrication, gearbox lubrication, drive belt tensioning, alignments, bearing installation, drive chain replacement, hydraulic hose construction and replacement, wear component replacement and clean oilhandling techniques.

Once you have determined your most common routine tasks, you must decide the standard to which you want them performed. If you have a reliability engineer, he/she will be invaluable at this point. By consulting OEM specs, maintenance technicians and machine operators, the reliability engineer can develop a set of standards and instructions for those procedures that must be consistently performed to the same level of excellence each time—no matter who is doing the work.

The “routine” SMP should include safety concerns, tool lists, parts lists and step-by-step instructions about how the procedure should be performed. These instructions must include torque specifications, measurements, readings and oil and grease types. Additionally, in this age of digital cameras, it can be relatively easy (and very helpful) to augment the text with photographs.

As important as an SMP is, it has no value if it is not being used. As your routine SMPs are developed, it is critical that they be communicated to the maintenance technicians. We’re not talking about handing out a sheaf of these documents at the weekly meeting with the suggestion that “You guys need to read these.”

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Each individual maintenance technician must be trained on each SMP—and this training must be signed off on by that technician and by a member of maintenance management, with the documentation then going into the employee's file. Once you have verified the skill and documented the verification, you have accountability.

Periodically, a supervisor must observe a technician in the field to be certain that the standards set forth in the SMP are still being achieved. In other words, if the SMP details hydraulic hose construction, then each member of the maintenance department must construct a hose to specification in the presence of a supervisor or manager—and must do this on the bench, as well as later on out in the field. Should technicians be incapable of doing this, they must be retrained until they can accomplish the task. If you do not intend to verify the knowledge that you are documenting and communicating with these SMPs—and to document that verification—there is not much point to the exercise.

Developing larger, more complicated SMPs

The second type of procedure that falls under the SMP umbrella is the larger, more complicated procedure. Every plant has these—overhauls, pump replacements, motor changes, bushing replacements—and they are generally performed by the technicians who have always done them. Over time, the best way to execute a specific “complicated” task simply will have “evolved.” Provided that the interval has not been too long, a technician usually can remember at least some of how that job was done last time. The problem here, of course, is that your expert may have retired or moved on. Or it has been too long since the task was last carried out and the team can't remember some of the facts. Or some field engineering occurred that no one remembered to document. Consequently, instead of a well-planned operation with no surprises, what actually results can only be described as another badly planned, poorly executed job that takes twice as long as it should while costing three times as much as it ought to. The SMP is the road out of this cycle.

The method of development for the SMP on a larger, more complicated task has several steps—but the principles of concise documentation and absolute accountability are the same as with those of the routine SMP. The following steps are important when it comes to developing SMPs for larger jobs:

- **Have a pre-plan.** Before you begin the large job, have the maintenance planner sit down with all of the personnel who were members of the work team the last time the job was done, or at least as many of them as are available. The planner should write out the steps the way they are remembered. This plan—sketchy though it may be—will form the outline of the upcoming job.
- **Photograph the job.** The importance of this step is paramount. Even a well-written job

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plan can be misread or misunderstood. A photograph, however, speaks for itself. If you have the equipment and personnel, videotaping the procedure is even better. The supervisor is not a good choice for this role, because he/she needs to be supervising. If the reliability engineer is not available, perhaps the scheduler or the clerk can pitch in. Another idea is to enlist the aid of an employee who has been assigned to restricted duty.

- **Write it down.** The maintenance planner should be the one to write down the action step-by-step, beginning with the safe lockout of the machine. This individual should assume that he/she is writing the procedure for someone who is a total stranger to the plant and the machines—and that the written procedure will ensure that this imaginary person can successfully complete the job. The planner should be looking not only at what currently is being done, but also for ways to improve on the procedure (including ways the job can go more smoothly in the future). He/she also should be sure to record the number of man hours associated with each step, from kitting the job right on down to cleanup.

- **Write out a complete parts list.** This list should be as comprehensive as possible, down to the numbers and grades of the nuts, bolts and washers that are needed. Lead times for special-order or fabricated parts should be noted.

- **Write out a complete supplies, tools and experts list.** If special jigs or stands are made for the job, they should be noted on the SMP, including where they are stored. Have there been shortages of special welding rods or bottled gas? Jacks, cranes and special tools also should be noted. What about consultants or factory reps? If they were present last time, chances are they will be needed next time. Does an operator need to be present? Will it be desirable to have predictive maintenance personnel available to take readings for baselines after the job is completed?

- **Include drawings and diagrams.** Any tool, document or image that can help the technician as he/she is performing the job should be available.

Once all of the foregoing information has been compiled, it's time to write the SMP. This should be done with the entire work team present—while memories are still fresh. Whether you decide to write it directly into the CMMS or as a Word document, the important thing is to be as complete as possible. Each step, as it is recorded, should represent the consensus of the work team.

Write the work steps in order from start to finish. Try to make the language as friendly as possible. Present the parts list first, followed by the supplies and tools. Next, specify the lockout and any safety concerns. If anyone has ever been injured performing the task, present this information as a side bar. Finally, move into the job steps themselves.

As you write each step, be thorough, accurate and concise. Incorporate the photos you have taken into the plan. If your particular CMMS does not allow for the inclusion of photos and

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drawings, make a note in the SMP that these items are available and where they can be found.

Finally, as you write the steps from your notes, the evolutionary nature of the large-job SMP requires you to ask the maintenance technicians if the way the job was performed in the past is the way it should be done from now on. Every time a job is performed, someone on the work team probably will have an idea on how to do some portion of it better. It is critical for these improvements to be captured and incorporated into the SMP for next time.

Remember, we said the central idea behind a Standard Maintenance Procedure is that there is only one right way to perform any task. By treating the large-job SMP as a living document, you will guarantee that over time it becomes the one right way to do a job.

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