



How to Develop A Preventive Maintenance System

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Healthcare for production machinery

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Developing a preventive maintenance (PM) or predictive maintenance (PdM) program is not an easy or quick process. Many preventive maintenance programs fail because they are not cost effective, not cost justified, too complex or take too long to develop. It is much more effective to have a few tasks that are always done than a very complex program with poor schedule compliance.

An Effective Overall DIY Strategy

Goals

Your first step should be to put down on paper what the goals of the program are. These goals should be realistic, specific and measurable. There should be both internal goals to measure the details and external goals to assess the business impact. They will be used later to measure the effectiveness of the program.

Develop An Overall Plan Of Attack

Your next step should be to develop an overall plan of attack. You should detail the planning steps and action steps you will take as you develop the program. How will you obtain approval and budget? What's the best way to gain buy-in from the trades and middle management? How will you decide what tasks to do to which machine? What kind of training and procedures are needed? These and more should be considered while doing the initial planning.

Approval And Cost-Benefit Procedures

One of your jobs will be to cost justify and get approval to install the program. It's important to understand the outlook of the person who will approve or disapprove your plan and budget request. What does that person consider when making this kind of decision, what points should you emphasize or de-emphasize? Are they knowledgeable

about maintenance or should you try to educate them? Or should you leave the technical aspects out completely and just concentrate on the financial aspects.

Get someone from your financial or accounting department on your team early. They will know how senior management is used to seeing cost justifications done and what payback or ROI they require. It also insures that when the CEO looks at the CFO and says, "Do you agree with these numbers?" the CFO says yes because his people helped put them together.

Select A Way To Decide What Areas And Machines To Address First

Determine how the machines and areas will be ranked. Make sure you get agreement with production and management as to the method. If you say a machine is important and they don't, you've got problems. Consider safety, impact of a failure on sales or production, cost of failure in parts and manpower, and frequency of failure. Remember the cumulative cost of many small failures can be more than one or two highly political ones.

How Will Tasking Be Developed

Where will you find out what tasks to do to each machine? How often should they be done? The equipment manufacturers (OEM) recommendations are a good place to start. But they will probably have to be modified because your operation is different from the average that the OEM uses. The OEM probably bases his recommendations on an 8-hour day, 5 days per week in a moderate environment. You may run 24 hours per or 6 days per week. You may have an especially hot or cold, humid or dry environment. You may also have corrosive chemicals or other factors to consider.

For very critical equipment, you may want to consider using Reliability Centered Maintenance to determine the tasks. Though expensive and time consuming, it has proven its effectiveness in the aviation and nuclear industries.

Decide How The System Will Be Used

How will the workorders be generated? By who? What information should be collected on them during the work? How detailed should it be? Who will approve close out of the WO? Who will do the data entry from the WO?

Once you've decided the answers to those and more, you have to decide how you're going to train people to use the system correctly and in accordance with procedures.

Develop A Plan To Gain Support And Buy-In

Buy-in from the work force is critical. If they don't fully understand and support what you're trying to do, they may go through the motions but you won't be successful.

Recruit a champion for the program. A champion is someone in senior management who can remove roadblocks and act as an advisor in gaining acceptance for the program. The champion should be well respected throughout the organization and believe in what you're trying to accomplish.

Select One Or Two Key Production Areas

Quick, visible pay back will build support and credibility for program. To achieve this, you should start the program where the payback is most dramatic and assured. Choose an area that is often visible because of problems. Then enlist the key tradesmen in those areas. Their support can make or break the program.

Inventory Equipment

The first big job is to inventory the equipment. During inventory you collect such things as nameplate data, physical and functional locations, asset numbers, aliases, source of power, input and output

of product, impact on production of failure, sub-components, etc.

Collect Existing History

Your next step is to collect existing history. It may be quantitative collected from a machinery history database, qualitative based on a partial review of closed job orders, or anecdotal based on interviews with operators and maintainers.

Your tradesmen and operators are one of your best sources and should not be overlooked. They live with the machines everyday and know them. They probably know what needs to be done. Including them in the process and using the information they provide is also important to gaining buy-in.

Define Requirements For The Machines In Those Areas

Once you've selected the area to start and enlisted the support of the key people in those areas, its time to start developing tasking for the machines in that area.

You should determine the depth of PM to do on each machine. Machines that have a safety or sales impact should receive relatively more PM than machines that don't. The least depth of PM is given to machines that have no safety impact and their cost of failure is less than the cost to do preventive maintenance. Use a run to failure philosophy on these machines.

Decide what tasks each machine should have. Establish a frequency for those tasks. Frequency is often the hard part. In the absence of numerical failure data, a survey of production and maintenance personnel may give you enough information. One survey method is to do a Risk-Priority Ranking. This survey of operations and maintenance personnel asks them to categorize how often each machine fails and what the impact of that failure is. The product of the answers to each of those questions is the Risk-Priority Rank. The failure rate information is useful for setting initial frequencies.

Develop Annual Schedule

After you've developed the tasking for the machines its time to put it all together in an annual schedule. Information on work and production schedules, vacation periods, holidays, the first day of hunting season and planned outages and shutdowns is useful when putting together the annual plan and workload. Try to match workload to available resources. This will show you what the total workload is and where you may need to take action to meet the requirements. Properly ranking of machines and PM tasks is valuable in fine-tuning workload.

Procedures

Just installing the system without a well thought out set of operating procedures doesn't work. You need everyone using the system the correct way. You probably should develop procedures for planning and scheduling, use of work-orders, history collection, system maintenance, program effectiveness measurement and program improvement.

Training

The best system won't work unless the users know how to use it. Train them. A combination of classroom and on the job

training (OJT) is best. In the classroom teach them the basics, run them through examples. Use OJT to work out the bugs, correct misunderstandings and insure everyone knows how to do it.

Field evaluation and OJT is important to insuring that the procedures work the way they're supposed to and that the people are using the system correctly. It should be done frequently at first, less frequently as the system becomes more established. Try once a week at first tapering off to once a quarter or once every six months.

Expand To Other Plant Areas

As part of your plan of attack, plan how you are going to expand the program to the rest of the plant. Once the success in one area becomes apparent, other areas will clamor to be next. You need a plan so the expansion is orderly and logical.

Summary

Deciding what to do to a machine and when is only part of the job. You need to consider how the system will be used, who will do what and when, how to gain support and buy-in from the trades and middle management and a myriad of other details when starting a preventive maintenance program. Careful thought, a detailed written plan and schedule and aggressive, achievable goals are all necessary for a successful program.