



# Best practices equal profits

## Preventive mill maintenance practices pay for themselves

by Mark Fowler



Most people in the milling industry have read about, participated in, or even implemented a preventive maintenance program. But when was the last time you reviewed or measured the effectiveness of your program?

Periodic evaluation of preventative maintenance practices can lead to opportunities for increased mill productivity, reduce maintenance costs and increased profitability. Preventive maintenance is defined as all maintenance performed in order to prevent equipment failure or to detect a failure early. Preventive maintenance practices include inspection, lubrication and cleaning of equipment and production areas.

(Above) Inspecting equipment is an important part of a preventive maintenance program. Photos courtesy of Kansas State University.

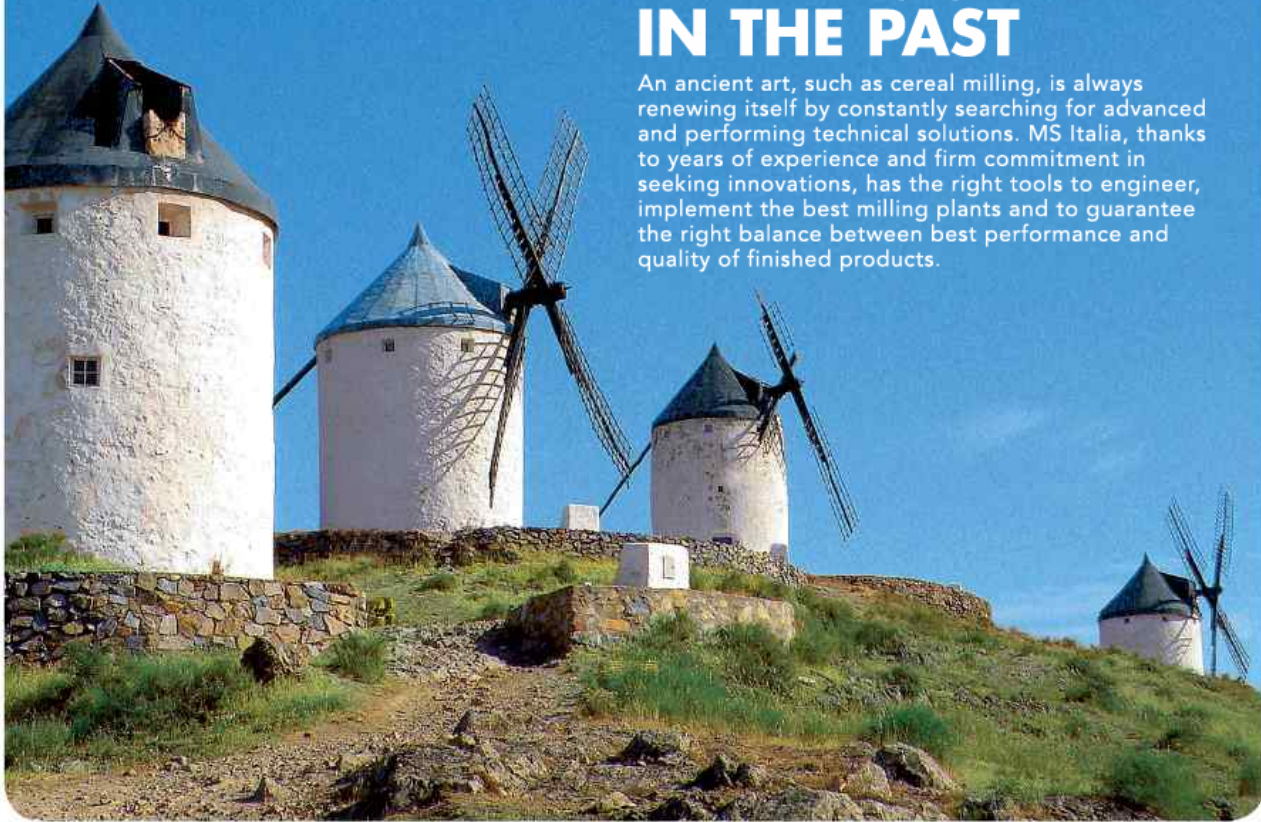
A good preventive maintenance program requires planning, tracking and accounting of the time and cost of all maintenance-related activities. In the competitive grain processing business, a miller must be more cost-effective than the competitor to succeed. An effective preventive maintenance program enables a company to maintain its competitive advantage by reducing maintenance costs and increasing available production time for the processing plant.

### BENCHMARKING AND GOAL SETTING

To determine the effectiveness of a preventive maintenance program, it is necessary to first establish the goals and objectives for the program. Benchmarking against current mainte-

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## MILLING OPERATIONS

nance practices within the facility is a good starting point. Targeting a goal established by the industry or other facilities within the company is an objective standard which can measure improvement as well. Areas that are easy targets to measure and improve include labor cost (both in-house and contracted), spare part inventory and planned and unplanned downtime for the processing facility.

For example, an easily measured goal is tracking the number of hours or occurrences that cause production interruptions.

Excessive unplanned repairs should lead to a review of the facility's approach to preventive maintenance. A sound preventive maintenance program is the foundation for equipment reliability and directly proportional to the facility's processing and financial performance.

#### DEFINING ROLES AND RESPONSIBILITIES

Addressing the existing roles and responsibilities of the various departments in the organization that conduct maintenance activities is vital when reviewing maintenance practices.

Questions to ask include: Are maintenance tasks conducted by personnel on multiple shifts? How are responsibilities divided? Do the day-shift personnel handle maintenance issues within day-shift hours and which maintenance personnel are responsible for issues that occur during other hours? Who has primary responsibility for preventive maintenance tasks? What maintenance is performed by other departments such as cleaning assignments for sifters and roll changing that in many cases are done by the milling department? Do preventive maintenance tasks receive the priority necessary to stay on schedule?

Answering these questions is the only the beginning in your task of reviewing the effectiveness of how the preventive maintenance program is implemented.

#### SCHEDULING AND PLANNING

Effective preventive maintenance programs begin with scheduling. It is important to assign sufficient time or people for the specific task of completing scheduled preventive maintenance.

When reviewing maintenance records, are there a significant number of work orders that were not planned? When a repair is required due to an emergency or unplanned occurrence, productivity

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of everyone suffers. Work orders need to be well planned and the required materials ready for the mechanics when they received their assignments. When preventive maintenance receives priority, unplanned downtime will be reduced.

Tracking of repairs is also important. Is the same piece of equipment being repaired often? Are repeated repairs tracked to be sure the cause of the breakdown is eliminated, or is it simply the symptom? If a fan bearing is replaced, is it confirmed the fan is properly balanced and the belts are properly tensioned? If a motor burns up, are the fuses checked or overloaded to see why they failed to protect the motor?

Predictive maintenance practices are activities that are performed in order to find failures early. Regularly scheduled infrared scanning of electrical circuits and panels identify hot spots. Hot spots in motor control circuits are the result of loose or worn connections. Infrared scanning of these circuits identifies these potential problems before they result in unplanned downtime.

Vibration analysis of motors and all rotating equipment help with the early detection of wear to allow corrective actions to be planned. Vibration is the most destructive force in any rotating equipment. Wear on bearings, belts, isolation pads and many other parts can result in

vibrations in equipment that are not easily noticed. By monitoring equipment for vibrations, they can be identified and corrected before the vibrations result in excessive wear on the equipment.

Monitoring of equipment is vital for proper scheduling and planning. There are many ways to monitor periodic maintenance requirements for equipment.

Fixed interval maintenance is required for almost all equipment. The


best resource for determining the necessary interval is the manufacturer. Changing the oil and air filters in positive displacement blowers and tightening the brackets suspending a sifter are examples of maintenance that should be performed on a regular fixed interval, generally based on the number of hours a piece of equipment is operated.

Objective interval maintenance is based on monitoring operating conditions of equipment and planning maintenance based on pre-determined targets. One example in grain processing facilities is the monitoring of magnetic gauges measuring the pressure drop across filter socks to determine when to replace or clean the socks. Another example is the monitoring of amp loads and product granulation to determine when to replace worn grinding rolls.

Subjective inspections are the responsibility of all plant personnel. Subjective inspections are as simple as using one's senses when walking through the facility. Stop, look, listen, feel and smell. Be aware of changes in the mill environment that may be caused by equipment wear.

#### MONITORING THE SPARES AND SUPPLY INVENTORY

An evaluation storeroom inventory can also be a revealing experience and



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an opportunity for significant cost savings. Identifying wrong or obsolete parts and getting them out of inventory reduces time and space requirements needed to store and maintain the parts inventory.

It may also result in unexpected revenue if they can be sold and used by another mill within your company or region. Time and money can be lost if the storeroom issues the incorrect parts for a work order. Supplies such as lubricants need to be removed if they are not useable in existing equipment. Equipment failure or product contamination may be the result of using the wrong lubricant. Just like every other facet of maintenance, getting the process implemented to purchase and store necessary spares under control requires good planning and scheduling.

#### MEASURING MAINTENANCE COSTS

A common measurement of maintenance performance is the cost. Maintenance costs are often used to compare maintenance performance between companies or between mills within the same company. However, setting a standard for measuring maintenance costs is difficult. Each company, sometimes even mills within the same company, may have their own definition of maintenance costs. For this reason, mainte-

nance cost comparisons should always be accompanied by a clear definition of what is included and excluded for each plant. Some examples of maintenance costs that may or may not be included are the cost of capital investment or scheduled equipment replacement, training, and maintenance tasks performed by employees in other departments.

Time is another common measure to track maintenance performance. One example is the time it takes to perform common maintenance tasks such as sifter maintenance or roll replacements. Lost time due to breakdowns or unplanned production interruptions is also an important measure of maintenance effectiveness. Unplanned production interruptions can be expensive as production is lost, but you are also paying employees for the lost time. Tracking of lost time due to unplanned equipment failures should be a vital part of evaluating the effectiveness of maintenance practices.

#### IMPLEMENTING THE PLAN

A large initiative, such as measuring the effectiveness of or implementing a preventive maintenance program, takes a lot of commitment. Top management, team leaders and team members must be committed to the process.

Some of the most common causes for failing to meet the long-term objectives

of a preventive maintenance program include:

- management not understanding the resources and long-term support required to fully implement the program;
- program initiatives and goals that are shortsighted and too cost-focused instead of long-term and reliability-focused;
- conflicted or disjointed organizational goals and objectives;
- failing to understand that the reliability and maintenance improvement initiative is a continuous process driven by disciplined thoughts and actions of people, not a program with a defined beginning and end; and
- technology applied and implemented that is secondary to the behavior of the employees charged with its implementation and usage.

#### MASTERING THE CHALLENGES

A lack of communication is often the greatest challenge when implementing a new process or evaluating an existing program. An organization must communicate a clear message of teamwork and the desire to improve, and not create an atmosphere of distrust and assigning blame for past mistakes.

To implement change, management must communicate why changes are needed, who will be affected and when the change will occur. Changing the culture of a workplace is probably the most difficult barrier to overcome in a workforce.

Preventive maintenance programs require a high level of commitment and regular evaluation of their effectiveness. However, a well-managed, fully implemented preventive maintenance program will reward the organization with greater profitability, improved process efficiencies and better employee satisfaction due to a job well done. **WG**

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