



# AMERICAN PRESS TECHNOLOGIES, Inc.

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## **SOME THOUGHTS on MANAGING DOWNTIME**

Many of our customers are struggling with significant downtime due to equipment failures. To assist these customers in getting control over these costs we offer the following thoughts:

- Definition of downtime
- Consequences of downtime being out of control
- Cost of excessive automation
- Costs/benefits of a preventative maintenance program
- Challenges of creating and managing an effective preventative maintenance program
- Pros/cons of a progressive maintenance program
- Pros/cons of a comprehensive (periodic) maintenance program
- Setting a goal

### **Definition of downtime**

Maintenance downtime falls into two categories: unscheduled and scheduled. Because they effect efficiency differently, we will discuss them separately. For the purposes of this discussion, we will define unscheduled downtime as the difference between scheduled operation hours and the hours required to produce a given amount of product at rated operational speeds. By this definition, running at 80% of rated speed due to worn parts results in 20% downtime even though for accounting purposes no actual downtime is logged. Rated operational speed is not the manufacturer's rated maximum speed, but is the maximum rate at which a machine in good condition can reasonably be expected to produce a product. Also included in downtime is any unscheduled time spent diagnosing and making repairs. Scheduled maintenance includes: a set number of hours per month for lubrication or other routine maintenance that has been identified as necessary (for example changing feed belts), preventive maintenance, and machine overhaul. Downtime resulting from scheduling errors, logistical problems, and a lack of work or crew are outside the scope of this discussion.

### **Consequences of downtime being out of control**

Besides the obvious direct cost of machine downtime, there is the often underestimated cost of the managerial time being diverted to getting the machine "running". Managers and supervisors attention is taken away from managing the business to managing the crisis. Planning for the repair is, by definition, impossible. The quality of the repair work usually suffers from the urgency of the situation, the lack of planning, and the focus of management being diverted from repair quality to getting the machine "running". Temporary repairs made necessary by time constraints, or the unavailability of the proper repair parts or technicians require managerial resources for proper follow up. The situation on the manufacturing floor can quickly spin out of control.

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### **Cost of excessive automation**

It is easy to be impressed with the automated features demonstrated by machinery manufacturers on trade show floors. The important questions needing an honest answer are: (1) Is the automated feature beneficial and reliable enough to make a productivity improvement that exceeds its cost, and the true cost of its maintenance? (2) Is this feature important enough for me to shut down a whole machine to repair if it doesn't work properly? (3) Am I willing and able to devote the time, training and other resources required to maintain the feature? (4) Am I operating an automated function in a manual mode? (5) Is my manufacturing process over-engineered?

### **Costs/benefits of a preventative maintenance program**

Besides the obvious cost of the machine time and labor to perform preventative maintenance, there is the cost of developing and managing the program. Significant effort and skills are required to determine what to do when, and how to do it. One of the goals of the maintenance program should be to insure the reliable and predictable machine operation that make production managers and supervisors more efficient. Continuous operations significantly increase the benefits of an effective maintenance program as there is no time the equipment is down to "squeeze in" repairs. Reliable equipment is essential to achieving any benefits from continuous operations or reduced inventories.

### **Challenges of creating and managing an effective preventative maintenance program**

Supervising and managing maintenance work is very different, and more difficult than supervising and managing production. Production is about following established procedures that work. Maintenance is often about dealing with the problems resulting from established procedures not working. More managerial involvement is needed to monitor the quality of workmanship, and to detect when other resources need to be brought to the problem. Procedures and quality standards often need to be developed. Extensive quality standards often exist for the product being produced while virtually none exist for the condition of the equipment. One of the key principles of statistical process control is that the opposite should be true. Without standards for the quality of repair work, it is impossible to create the culture needed for an effective maintenance program. Finding people with the skills to create effective maintenance/equipment standards and procedures has always been difficult and will only continue to get more so as technology becomes more complex.

### **Pros/cons of a progressive maintenance program**

Many manufacturing plants find it easier to cope with a progressive maintenance program employing frequent short periods for scheduled maintenance than a program employing fewer longer periods. With no ability to move orders to a different machine, a progressive plan may be the only option for a small company with a very limited number of machines, but it makes managing the program much more difficult, less efficient and less effective.

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### **Pros/cons of a comprehensive (periodic) maintenance program**

With a longer uninterrupted maintenance period, meeting production scheduling demands can be more difficult, and cash flows can be affected. However, when bad parts are unexpectedly encountered, there is time to obtain new ones. The unnecessary expense of making temporary repairs is avoided. Spare parts inventories can be reduced if it is possible to obtain them in a timely manner. Managerial time and errors in tracking incomplete repairs are reduced. Good management practice should emphasize undertaking the major tasks first so that the minor tasks can be undertaken while waiting for parts or for outside contractors to repair parts removed from the machine. Crews working under a progressive plan will often repeatedly perform the simple jobs and avoid the major, time consuming tasks as they fear not being able to complete them. This can still happen with a comprehensive plan, but supervisors have the opportunity to prevent it. Another major problem with the progressive plan is the machine is never returned to its optimum state. Some uncommon problems will eventually develop that will never be identifiable until after the basics have been addressed. A bad transfer cylinder bearing on a sheet feed litho press is a classic example. These bearings fail infrequently, but when they do, their failure is impossible to detect until repairs to the gripper systems are completed. While it is true that a larger amount of maintenance done at one time generates a greater opportunity for getting out of control, it also offers a greater opportunity for good supervisors and crews to be much more efficient. With a commitment to learning how to “do-it-right” a comprehensive plan’s advantages far outweigh their costs.

### **Setting a goal**

Setting a goal for downtime is difficult. It varies widely with the nature of the equipment. Extremely low levels of unscheduled downtime will require an excessive amount of capital equipment cost and excessive scheduled maintenance costs. In setting goals it is important to recognize the hidden impact of excessive unscheduled break-downs. The negative impact on the culture, and the overwhelming effect on managers who are attempting to deal with it should not be ignored. Generally, achieving less than 5% unscheduled downtime will cost more than its return. On the other hand, by the time unscheduled downtime has reached 20%, the situation is totally out of control.