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Weighing the Odds When Does a Maintenance Program Make Sense?

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Proactive. Predictive. Preventive. Reliability. These are all terms we've come to associate with maintaining operations of critical equipment within a restaurant facility. The theory is often discussed and adhered to. Yet, this is one area of facilities operations that seems to be contested when faced with the ever-increasing call to save operational expenses. Many facility managers and directors have been appointed the task of finding ways to cut costs and still sustain operational efficiency. The first thing that the upper echelons of management teams look to cut is usually the maintenance program itself.

While many facilities professionals hold a strong belief that a proactive maintenance program delivers as promised and saves money in the long haul, they sometimes are not afforded the proper information to defend that position. This article series is designed to give these facilities professionals some ammunition to defend their position and provide industry data to further shore up their argument when this situation presents itself.

The Proactive Approach

We must first discuss the theory behind a proactive, preventive maintenance program. Figure 1.1 illustrates what's known in reliability maintenance as the Bathtub Curve. The figure illustrates component failure and useful life within mechanical and electro-mechanical systems.

You'll notice that failure rates are not eliminated as a whole, even with an efficient preventive program in place. But, it does demonstrate an extension of useful life. Unfortunately, the curve is limited in its scope when used in regard to restaurant equipment because many variables contribute to the failure of components within these systems and a constant failure rate is difficult to determine.

Such variables include operational demands, local climate, working environment, product type and storage. However, the curve can be applied to these systems when it is considered to be just one of many component failure patterns.

Considering the Failure Pattern

Figure 1.2 illustrates failure patterns that are more indicative of what we see in our restaurant equipment and can help us to determine if proactive-predictive maintenance makes sense. Now we'll discuss in detail each failure pattern, how a maintenance program can help mitigate these failures and to what extent.

- **Bathtub (4 percent):** As the first figure illustrates, proactive maintenance can extend the operating life of equipment components and increase its operating age, but an efficient program cannot and will not mitigate all component failures.
- **Age related (2 percent):** Proactive, predictive maintenance can help identify aging components in need of replacement to stave off expensive downtime and peripheral component failure within the system.
- **Fatigue Related (5 percent):** We all know that refrigeration or HVAC compressors work harder and will suffer from premature fatigue failure if their condenser coils are not cleaned. This pattern can be addressed across the spectrum of restaurant equipment, where cleaning and lubrication are required by the manufacturer to maintain optimum operational efficiency.
- **Condition Related (7 percent):** This failure pattern is affected by environmental issues, such as operating conditions and local climate. A maintenance and inspection program can determine the frequency and depth to which the equipment needs to be maintained to help mitigate condition-related failures.
- **Random Failure (14 percent):** Analysis has determined that a high number of failures are completely random.

Unfortunately, nothing can be done to prevent these failures.

- **Infant Mortality (68 percent):** This is the most common failure pattern. Manufacturer defects and improper application or installation usually are the overriding factors in these failures. Warranties on materials and workmanship were designed for this failure pattern as customer confidence is eroded in this case.

Considering that an efficient maintenance program can address bathtub, age, fatigue and condition-related failures, the aggregate of mitigated failures is at or around 18 percent. That is an impressive number in cost reduction, regardless of what area of operational expenses it is applied to. Remember that an efficient maintenance program has proven to provide an extension of useful equipment life, further increasing asset ROI.

Assessing the Conditions

We've determined an efficient maintenance program can mitigate at or around 18 percent of failures within restaurant equipment systems. But when does a maintenance program truly make sense?

Two conditions must be met:

1. The component/equipment in question has an increasing failure rate. In other words, the failure rate of the component increases with time, thus implying the component is subject to the failure patterns outlined previously.
2. The overall cost of the preventive maintenance action is usually less than the overall cost of a corrective action. (Note: In the overall cost for a corrective action, one should include ancillary tangible and/or intangible costs, such as downtime costs, loss of production costs, lawsuits over the failure of a safety-critical item and loss of goodwill.)

Energy and operational efficiency is usually a given when discussing a maintenance program. But routine inspection also helps facility professionals plan and budget for equipment replacement or retrofitting.

There is yet another important statistic to remember, especially in the beginning stages of implementing an effective maintenance program. According to Dennis J. Wilkins, reliability specialist at Hewlett Packard, "In many cases, actual maintenance expenditures will increase during the first and, possibly, second year following implementation of an effective program. This increase, typically 10 to 15 percent, is caused by the inherent reliability problems discovered by the use of preventive and predictive techniques. When these problems are addressed and repaired, the typical result is a reduction in labor and material cost of between 35 and 50 percent."

The belief that a proactive maintenance service program will eliminate all incidents of failure is unrealistic. But it can address many of the reasons systems fail and help extend the operating life of your equipment.

There are risks involved, as with any service plan, such as quality of workmanship, working knowledge of your equipment and damage to adjacent equipment or to the equipment receiving maintenance service. The primary goal of an effective maintenance program is reducing downtime, loss of product or revenues, fostering customer goodwill and reducing safety-related issues for your staff and, most importantly, your customers. It will also help your operators focus the majority of their efforts on guest experience as opposed to dividing their time addressing equipment failures.

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