



The Secret to Reducing MTTR and Increasing MTBF

A primary goal for all system design is to reduce downtime—and the most effective way to do it is by designing reliable systems. **Mean time to recovery (MTTR)** and **mean time between failures (MTBF)** are two useful metrics in evaluating the reliability of a system.

MTTR is the average time it takes for a tool or process to recover from any failure. MTBF is the average time between inherent failures of a system during operation. A well-designed system should look to decrease MTTR and increase MTBF, but what are the most effective means toward achieving these ends?

In this article, we look at how companies can reduce downtime and, by doing so, improve efficiency and profitability.

Using MTTR to Reduce Downtime

Downtime reduction often requires looking at a system holistically, not one or two parts of the whole. Consider the semiconductor industry. The MTTR of a microelectronics assembly process should include all the integral parts of that process, such as wafer handling equipment, gas, and chemical distribution systems. Calculating the MTTR of a single component in a process tool in isolation wouldn't provide a useful metric.

Once MTTR is measured accurately, it can be improved. Technology plays a critical role in

reducing downtime. In semiconductor plants, for example, cutting-edge, self-diagnostic flow meters can constantly monitor potentially harmful gases and chemicals, without requiring a person to be present in a dangerous working environment, and trend the data to identify when systems are heading into a repair or failure mode so time can be scheduled in advance of a system failure and the repair can be made in optimal conditions vs. an unscheduled down time event.

New monitoring technologies give teams real-time, 24x7 visibility into the performance of systems. Performance can be viewed on-site or remotely using smartphones or tablets. This allows an operator, engineer, or manager to assess the functionality and performance levels of their systems or machines and plan for service or repairs well before they fail.

Using MTBF to Reduce Downtime

A good example of the significance of MTBF can be found in the mining industry, where proper lubrication of field service equipment in rugged industrial environments can increase the MTBF of heavy haul trucks, crushers, and saw mills. This is critical in remote areas, where maintenance and repair contractors may not be able to access the equipment easily or regularly.

Continuously operating field equipment, such as sawmills, fuel trucks, and lubrication trucks, all require a high degree of serviceability. By measuring the MTBF of each piece of equipment,

operators have a very good idea of the expected lifetime of that machine. Being able to understand when a tool may fail helps when creating a maintenance schedule and thereby helping avoid unplanned downtime.

Again, technology plays a critical role in reducing downtime. In a mine, lubrication multi-injection ports can be used to continuously lubricate field service equipment in dusty, hazardous environments. This allows companies to avoid paying for costly emergency repairs. Preventative maintenance increases the time between machine failures and allows companies to reduce the need for crew members to rush out to remote areas in order to get machinery back online.

The significance of technology in preventing unplanned downtime is clear in almost all manufacturing environments. Utilizing remote monitoring technology, alongside heavy-duty equipment, and including components designed for quick repair and/or replacement, are both

excellent design initiatives that help to reduce unplanned downtime.

Partnering With Experts

The design expertise required to create systems to reduce MTTR and increase MTBF is not always widely available. You may not have a team of people in-house who thoroughly understand the complexities of this level of intelligent design, but experts can be found to assist you.

When looking to take on a partner to help in this process, look for a company that has the expertise and experience necessary to apply MTTR and MTBF effectively. Use of these metrics will improve the design and planning processes, which will help in developing a reliable system and avoiding unplanned downtime. By finding the right partner to support you through this re-design process, you're putting yourself in prime position to benefit from the advances inherent in modern intelligent designs.

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