

“Reduce Machine Down Time” – PlasticCity Electric

A key principle of manufacturing states that if you don't measure it, you can't correct it. Downtime is a great example of a significant loss that must be measured in order to correct the problems that cause it.

By exposing downtime in real-time you enable those closest to the problem the swiftest opportunity to fix it. Exposing downtime also creates a sense of urgency that is not felt in a downtime report a day or week later.

1. **Follow the money.** Where are your highest equipment maintenance costs? List the top ten equipment items.
2. **Follow the data.** What are the types of or reasons for failures? At this point, “root cause” is optional information. List the top ten reasons for the top ten equipment items.
3. **Follow the interruptions.** Where is the highest amount of process downtime or business/flow interruptions? List the top ten equipment items.
4. **Connect the dots.** Look at your lists (A Pareto chart works well here). Identify the highest cost equipment causing the highest levels of downtime. This will give you the top two or three equipment items for focused equipment improvements.
5. **Drill the data deeper.** For these top three equipment items, identify the types of or reasons for failure (A Pareto chart works well here too).
6. **Follow the money (again).** Look into the purchasing records and find out the parts used to address the top two or three reasons for failure.
7. **Focus.** Target only one piece of equipment based on the data and information accumulated in the first six steps. The goals: eliminate downtime, reduce O&M costs, improve throughput (revenues) in a sustainable manner.
8. **Find the right people.** Engage everyone who touches the targeted equipment, along with those who make decisions that affect the equipment performance, reliability, and costs. Don't

forget about the contractors and the original equipment manufacturers or representatives. This group is the “team” who has enough power to make and sustain the necessary changes.

9. **Focus on results.** Draw on the team-based approach to make the problems go away using new skills and knowledge. Address operator involvement. Improve the preventive/predictive maintenance. Develop/improve maintenance procedures. Enforce work order compliance and accuracy. Address spare parts purchasing, storage, and inventory levels. Train, train, train for proper equipment operation and maintenance, for effective use of the managed maintenance process. Improve the equipment for ease of maintenance and operations. Determine the key performance indicators that should be monitored (availability, efficiency, quality, costs, MTBF, MTTR, etc.).
10. **Set new expectations.** Define, in very specific terms, what is expected of the entire team and of each person to move ahead with new and improved approaches to maintenance. Dedicate a sub-team to follow-up, monitor, and direct the changes. Document these and make sure everyone has input into his or her list of expectations. These expectations become a central part of the new job roles.
11. **Be accountability.** Monitor the key performance indicators. Provide regular and timely feedback to the team. Recognize that the results of the equipment performance and reliability are direct consequences of how well the people, individually and collectively, are performing their new job roles (new behaviors). Hold people accountable for performing as expected and achieving results. Celebrate, reward, and recognize successes. Learn from mistakes. Never, never punish or blame. Focus on the root cause of performance failure and take corrective action.
12. **Leverage the gains.** Continue to make improvements on the targeted equipment as outlined in the previous eleven steps. When sustainable results can be seen, review the data and begin addressing the next targeted piece of equipment using the same process. Some changes can be quickly “migrated” to other equipment with minimal “team” involvement, but with extensive training focused on the new methods and why they are important.

More tips:

13. List all repetitive work. One of the first things that a maintenance supervisor should be concerned with is repetitive work. Any and all repetitive work should be identified and isolated. This list can then be prioritized as to criticality to Production and plant effectiveness.

After the list has been rearranged, each task item must be analyzed to determine if the repetitive work is actually aimed at fixing a problem or fixing a symptom of a deeper problem. Fixing symptoms has the immediate effect of allowing production to rapidly resume, but does nothing for the underlying problem(s). In fact, the underlying problem may get worse.

14. Development of a solutions. As soon as a high priority problem has been identified and analyzed, work should begin on development of a solution to the problem. Once the solution to the problem has been developed, plans can be made for purchasing required parts and material and then scheduling the manpower and production time to implement the solution.

15. Maintenance planning of machine repairs. Complete documentation is absolutely essential for control of the maintenance process. How can the process of maintenance be under control if the person in charge has no complete idea of what the total maintenance activities and costs are? If needed repairs are not documented and planned for, a considerable portion of these needed repairs and modifications will be forgotten or ignored until production tries to run again.

16. Justify machine repair cost. Planning essential repairs and modifications requires documentation. It is easy to say that we need a modification to this particular machine and output of this line can be increased 25%. However, with no planning, six months later no work has been done on the idea. Even if the idea were actually to be somehow implemented, the output increase may not come to fruition.

If no research was carried out on the rest of the line equipment, there is no certain way of determining line and equipment capacity. How would the machine be able to increase output 25% if its current output was already 100% of the lines actual output capacity? All the costs associated with increasing the one machine's

capacity would have been wasted, unless additional work was undertaken to bring the rest of the production line up to the output of the one machine.

A production line's output capacity is only as great as it's least piece of equipment. That bears repeating. A production line is only as fast as it's slowest piece of equipment. A chain is only as strong as its weakest link.

17. Prioritize your maintenance planning list. With documentation, the list of priority work problems to solve can be reduced fairly rapidly, at first. The list of easily solved problem areas will gradually be replaced by higher cost work items. Research and planning may reveal that the costs involved with eliminating some repetitive repairs are more than living with the repetitive repairs.

18. Compare production downtime after solution. After implementation of the solution, production downtime for that particular item can be documented and compared to pre-implementation production output. Maintenance time not spent on working on that solved problem can also be documented for the same time period. These savings can then be extrapolated for an entire year and presented to management to justify the cost of repairs.

Without documentation, research, and planning, the person in charge of making the decisions is working in the dark. With documentation, research, and planning, the great wall of China can be built, or the Panama Canal, or the Aswan Dam, or a world-class maintenance organization.

Maintenance Policy and Procedures is a plan to organize your maintenance department. Following the plan will cause you to document your department's activities. Other department's maintenance activities and interactions with the Maintenance Department will also be documented. With the documentation, planning can begin. For information on this article and Maintenance Policy and Procedures, contact the author.

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