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The three pillars of OEE

Build technical, process, and supervisory skills to gain operational knowledge.

Most of us are already aware that overall equipment effectiveness (OEE) measures the technical performance and capacity utilization of a manufacturing asset and hence allows us to judge the effectiveness with which an asset is being used, in order to add value to the business. It allows the analysis of all the sources of capacity losses, whatever their origin may be.

However, actually bringing about improvements can seem complicated. What are the real OEE drivers and levers, and how should they be implemented? This article outlines how, by taking an integrated approach to OEE and keeping things straightforward, you can use OEE to increase productivity and savings.

The Three-Pillar approach

When discussing OEE improvements, most concentrate on the technical aspect, preferring to invest in plants and machines to create additional value and minimize losses. Naturally, that can have a direct impact on OEE, but it is a very cost-driven approach and the necessary budget may not always be available. What most forget is that there are two other key pillars of OEE that can and should be used to achieve shared goals, which include the proper management of structures, processes, and people.

Pillar One: The Technical Aspect

Starting with the technical aspect of OEE, having identified the levers that can improve the process flow/bottleneck to increase output—for example, machine configuration, metering, formulation, or correct batch size—it is important to transfer them into a detailed overall structured activity plan (OSAP).

The OSAP should include a breakdown structure for the work packs and their activities, as well as cost, start and end dates, impact, implementation progress, and responsibilities. Secure routines must be in place to update the plan and conduct continuous tracking of improvements. Start with the quick wins in terms of motivation.

The OSAP must be treated as a living document and used to implement a problem-solving meeting routine where employees at all levels work together proactively to achieve regular, incremental improvements to the manufacturing process.

New, confirmed improvement measurements should be transferred into the overall technical activity plan, while workshops should be set up to consider different functions (such as production manager, engineer, shift leader). These workshops must be highlighted by a preparation, execution, and follow-up phase.

For handling very specific problems, for example concerning Ishikawa, brainstorming, or 5W, an initial training session on the necessary functions must be carried out.

Pillar Two: Processes

One of the major goals of OEE programs is to reduce and/or eliminate what are known as the Six Big Losses: breakdowns, setup and adjustments, small stops, reduced speed, startup rejects, and production rejects. The most common causes of efficiency loss in manufacturing. However, honest analysis is often lacking when it comes to OEE, meaning that results don't always give a true picture of reality, and improvements are either disappointing or simply not implemented. If the full benefits of OEE are to be realized, it is absolutely essential that all processes are analyzed to identify areas for improvement and to put the necessary tools in place to achieve it.

Single Minute Exchange of Die (SMED)

SMED is a system for reducing the time for cleaning and changeovers, both of which must be analyzed to

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see whether they can be simplified or streamlined. Before optimizing the changeover routine, all possible improvements must have been investigated by the people doing them. Standard times for cleanings and changeovers should then be defined by the shift leaders and be confirmed by the operator.

Employees need to have understood the influence of the cleaning and campaign changes on OEE in order for them to work in practice, so workflows need to be visualized in the form of an operating procedure and a standard provided to all stakeholders.

Maintenance

Maintenance can impact many of the value drivers, such as the losses for breakdowns, and forms a key element of successful operations needed to sustain asset performance. As a result, both the maintenance effectiveness and efficiency need to be challenged as they also influence reliability improvement. Without full maintenance integration the optimum OEE improvements will not be realized. Improving maintenance practices involves operations.

Operators need to know what to look for during their daily routines that will impact reliability. They need to submit these via the work order management (WOM) system to drive preventive maintenance that can be conducted during changeovers or breakdowns. A robust set of maintenance KPIs (7 to 12) will identify those areas within actual maintenance execution that require attention.

Visual Management and KPIs

For changes to be taken on board, people need to understand exactly what is expected of them and what the changes are. Using whiteboards as a communication tool to describe changes will help to prevent confusion and drive empowerment and accountability. The whiteboard should display the current state of all the production zones, equipment, and changeovers and what issues or work is ongoing in those zones.

The performance dialogue between employees should then be supported by KPIs, which help them to assess goal attainment via plan/actual comparisons and the analysis of deviations to focus on doing the right things. By putting a strong focus on management by objectives, the whiteboard approach will improve shift performance and ensure team alignment with site and business strategy.