Equipment Performance Part 3 – A Closer Look at SMED

IMPLEMENTING SMED

Our customers require us to send the product they need in a specific sequence and quantity. Our equipment does not always agree with this need due to complex changeovers, so we build large batches of parts to cover the customer's demand. This inventory is "tied up cash flow" that could be used to generate income, but instead, it burdens us with excess carrying costs. To remedy this, our best course of action is to attack the root cause, which is the actual changeover time. Successfully reducing changeover time allows us to reduce inventory, increase production capacity, provide greater flexibility, reduce lead-time, and level production. Ultimately, it allows us to be more profitable.

During the process of implementing Single-Minute Exchange of Die (SMED) or Quick Changeover, we strive to attack all eight forms of waste. The below examples of waste are some of the many items we will find as we examine our changeovers with the SMED approach.

WASTE EXAMPLES

Over Production: Performing obsolete/ unnecessary steps in the changeover process; Batching orders to avoid changeovers

Waiting: Waiting for tools or materials; poor execution of scheduled changeovers

Transport: Traveling to get parts or a poorly organized storeroom.

Excess Processing: Reworking steps in the changeover or conducting the wrong changeover and having to do another one. Excessive adjustments to "dial-in" a machine after a changeover.

Inventory: Excessive changeover materials, WIP to hide changeover time.

Excess Motion: Doing tasks that do not add value to the changeover. Having to search for needed tools.

Defects: Not executing the changeover properly.

Wasted Creativity: Not utilizing the people closest to the process to improve the changeovers.

TEAM SELECTED

To begin, a team is selected to complete the assignment. This team preferably consists of individuals from engineering, maintenance, and operations. Each team member should be inclined to new thinking and experienced in the area where the changeover will occur. Once the team is assembled, we video the process being targeted for Quick Changeover. It is important to video each person performing the changeover, so more than one camera may be required. Once the initial video of the changeover is complete, the video can then be analyzed.

CORA

We input each step of the changeover into a worksheet called a CORA (Change Over Reduction Analysis). We focus on the external and internal aspects of the changeover in addition to the streamlining of the entire changeover process. External aspects are items that can be done while the process is still producing a product. Internal aspects will be items that must be done while the machine is NOT producing a product. The CORA is used to capture the changes that will be made to the new changeover process and show the associated time saved based on the team's knowledge of the process. This is done in three stages.

Click here for a free version of our CORA Worksheet

STAGE ONE

In stage one, we focus on separating the obvious internal and external work that must be done to perform the changeover. We create checklists to ensure the external work is done before the process is halted for the changeover. 3This may include placing everything needed for the changeover on a cart. We also conduct function checks on any tools, tooling, or equipment that will be used during the changeover.

STAGE TWO

In stage two, we address the internal aspects of the changeover. We deeply examine the purpose of each internal item to ensure it has a function and purpose for the changeover. We also get creative in finding ways to convert internal items into external items. It is important to look at the changeover process as if we are seeing it for the first time. Our focus is to prepare operating conditions in advance, standardize essential functions, use intermediary jigs where possible, and design fixtures that accommodate multiple part numbers, thus eliminating the need to change over.

STAGE THREE

In stage three, we focus on streamlining the entire changeover process. We look at the specific purpose of each element and ask, "how can we further improve changeover time?" We utilize 5S principles for the storage of major components of the changeover. If there is a need, we create changeover carts. We consider if having the operations of the changeover done in a parallel manner will improve the changeover. We make common fasteners and institute quicker fastening methods where applicable. We target to eliminate adjustments. However, where they are necessary, we take the guesswork out of adjustments providing fixed numerical settings that can be easily repeated during each changeover. As a last resort, we consider any automation that would benefit us in the changeover process.

Now that we know the benefits and processes for Quick Changeovers, we must decide what criteria to use in selecting a candidate for our changeover reduction initiative. The ideal candidate will currently require inventory to be built ahead before the changeover, ensure that the changeover will be greater than ten minutes, make certain the EPEI (Every Part Every Interval) will exceed the delivery cycle for product to the customer, and/or have duplicate processes to cover up the excessive changeover times. If there are any processes that meet any of these criteria, we have an opportunity to improve by conducting Rapid Improvement Events. At DRIVE, we average a 70% reduction in changeover times

during these events. In one case study, we were able to give an organization 540 additional hours of production time per week (across multiple machines), thus eliminating their excessive overtime.

Do you have long changeover times between products? Do you struggle with engaging all people in improving changeover times? Are you loosing valuable output due to excessive changeover times? Many of our consultants have decades of experience in equipment changeover improvements using the SMED Process. For a no-obligation introduction meeting, please contact Paul Eakle at paul.eakle@driveinc.com or 865-323-3491.