

BREAKTHROUGH

Lean Implementation & Training Resource Publication
Brought to you by Lean Manufacturing Solutions Partnership, Inc.

A CLOSER LOOK AT SMED

By Harold Chapman

ATTACK ALL FORMS OF WASTE

Our customers require us to send the product they need in a specific sequence and quantity. Our equipment doesn't 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 cost. However, our best course of action is to attack the root cause, which is the actual changeover time. This 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 Quick Changeover, we strive to attack all eight forms of waste. Below is a list of the eight forms of waste as they relate to Changeovers:

- Over Production:** Performing obsolete/ unnecessary steps in the changeover process.
- Waiting:** Waiting for tools or materials; poor execution of scheduled changeovers
- Transportation:** Traveling to get parts or a poorly organized storeroom.
- Excess Processing:** Not doing the changeover correctly and having to repeat it.
- Inventory:** Needed Materials not available, WIP to hide changeover time.
- Excess Motion:** Doing tasks that do not add value to the changeover.
- Correction:** Conducting the wrong changeover.
- Wasted Creativity:** Not utilizing the people closest to the process to improve the process.

TAKE A TEAM APPROACH

These examples of wastes are some of the many examples we will find as we begin looking at our changeovers with this new approach.

To begin, we must first select a team for the assignment. The team should consist of individuals from Engineering, Maintenance, and Operations. Each team member must 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 doing the changeover, so we may need more than one camera. Once we have completed the initial video of the changeover, we can then analyze the video.

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 will be items that can be done while the process is still producing product. Internal aspects will be items that must be done while the machine is NOT producing 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.

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STAGES TO RESULTS

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 stopped for the changeover. This may include having 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.

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 to become external items. It is important to look at the changeover process as if we were 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 changeover.

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 process for Quick Changeovers, we need to decide what criteria to use in selecting a Quick Changeover candidate. The ideal candidate will currently require inventory to be built ahead before the changeover, the changeover will be greater than ten minutes, the Every Part Every Interval (EPEI) 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 Quick Changeover Workshops. At LMSPI, we average a 70% reduction in changeover times in our improvement events. To learn more about how to schedule an onsite introduction meeting at your operation sometime soon, just visit us online at www.LMSPI.com.

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OUR APPROACH: [hear. see. DO. Lean](#)

Studies regarding human learning indicate that we retain only 10% of what we hear; 20% of what we see; 65% of what we hear and see; but 90% of what we hear, see and DO. We help you identify the opportunity, align the organization, create a plan and execute that plan. Throughout this process, we are teaching all levels of the organization. The implementation learning curve is accelerated and improvement velocity is increased utilizing this hear. see. DO. approach. Visit www.LMSPI.com to learn more about our approach.

Stay tuned!

Look for more special editions coming soon – the next publication looks at 4M: Man, Machine, Material, and Method.