How and Why to Decrease Downtime and Improve Productivity

Single Minute Exchange of Die (SMED) is a tool used to decrease time for set-up, exchange of Dies, thorough cleaning for Total Productive Maintenance, and to increase quality. These activities often take a significant amount of time and can significantly add to lead times. Setups are often time consuming and are considered unproductive, or "waste" in the LEAN vernacular. Setup times are often regarded as something that just "has to be done", and "we've always done it this way". Therefore, little effort is used to plan the work in advance, and to modify the equipment for quicker changeovers. However, when implemented properly, it is possible to greatly reduce the set-up times. The best results are achieved through better teamwork, planning, focus and simple modifications.

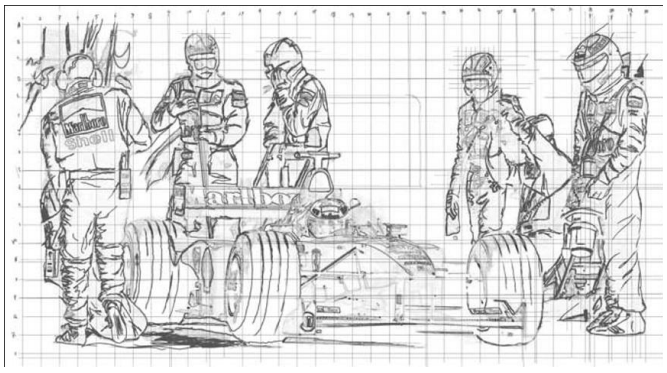
The SMED method was formally practiced and originally documented by Shigeo Shingo, one of the pioneers in LEAN, in the 1950's and has revolutionized Japanese manufacturing since that time. However, not until somewhere around the 1980s did the SMED technique begin to gain acceptance with companies outside Japan.

There are 4 basic steps for achieving SMED:

1) Do a 5S + Safety event on the workplace to be studied:
As a matter of preference, most employees desire to work in a fresh, clean, and well-functioning workplace. A cluttered and filthy work area makes it extremely difficult to find anything and/or tell how a process is running. On the other hand, a clean and tidy environment makes tools, test equipment, and all necessary information easier to find and creates more productivity compared to messy and disorganized work areas. The 5S + Safety program not only brings organization and cleanliness to the workplace, it also adds Flow – the third LEAN principle.

2) Analyze the present situation:
The present situation is analyzed, typically using video-technique. Then the video is studied to classify all steps as being external or internal. All known wastes and/or work stoppages are listed as well.

3) Separate the internal steps from the external steps:
Internal steps are those that must be performed while the machine is stopped; external steps are those that can be performed with the machine running. The purpose is to change as many internal steps to external steps - set-ups that are performed when the machine is running.



4) Mistake Proofing/Waste Elimination:
Elimination of all need for adjustments. -Exchange of bolts for quick-fasteners

One excellent example of Single Minute Exchange of Die is when an auto racer stops in the pits for fuel, tires, water, and chassis adjustments, plus whatever else they need. In the pits, they are racing the clock because making that pit stop means they are giving up their place to the competitors still on the track. Typically they are in and out of the pit in an

average of 13 seconds. Some crews need 12.5 seconds and some need 14 seconds. However, at racing speeds of 180 miles/hr, 1.5 seconds made up in the pit can gain a racer over one-half mile (almost 3,500 feet). The margin of victory in many races is often in inches.

This same philosophy can apply to all manufacturing facilities in all industries. Once a production run has finished, it is important to get the production line changed over and up and running on the next product. Failure to do so will result in increased costs from lost capacity, wasted labor, lost production, and the lost opportunity to be first to market.

How does that racecar get in and out of the pit so quickly? While it may not be obvious or easy, the concepts and methods used are fairly simple. First, the specific pit stop process is formally defined. Everybody on the pit crew knows their job and everybody focuses and steps up to achieve the overall objective of short pit times. They have all parts and materials pre-staged before the pit stop begins. They have eliminated the use of tools where possible (i.e.; tear away windshields) and use the proper tool where they cannot be eliminated. Standardization of tools is done as much as possible. All steps that can be taken prior to the car arriving in the pit are done before it's there – putting the tires where they're needed, getting the tools placed properly, etc.

One way to gain efficiencies and affect the bottom line in the mind of many plant managers is to plan on large lots of the same product so that downtime needed for changeovers can be avoided. Obviously making large lots of a product will decrease changeovers, but they can also increase inventory, which has to be stored and counted, and decrease flexibility of meeting customer demands, ultimately costing the organization money. This investment of dollars in inventory makes cash less liquid, reduces cash flow, and puts margin at risk as the product sits in a warehouse and/or if the required design changes.

Therefore, the value of Single Minute Exchange of Die is:

- Lot-sizes can be reduced
- Inventory can be reduced
- Set-up labor can be reduced
- Increased capacity on bottleneck equipment
- Improves quality
- Reduces the possibility of product obsolescence from being in inventory too long.

You can realize significant savings and increased productivity by implementing SMED in your operations. Its applicability and the opportunities to implement are limited only by your willingness to commit to World-Class Performance!

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