



Setup / Changeover Optimization

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Large lots waiting in queue cause long manufacturing lead-times and high levels of work-in-process inventory. Large lots are typically justified by the need to spread the labor cost of long setups over many parts. Changeover time is the duration from the last good piece produced in the previous lot to the first good piece produced in the next lot, after steady state production is achieved. Simplifying or eliminating steps, standardizing methods, shifting internal elements to external, mistake-proofing, visual workplace organization and minimizing adjustments, accomplish setup or changeover time reduction.

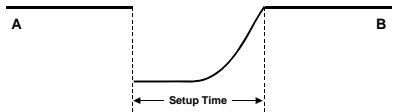
Key Benefits

- Ability to reduce lot sizes and queues to improve responsiveness and reduce lead-times
- More predictable and reliable setups improve quality and reduce waste
- More reliable and responsive order commitments and on-time delivery
- Reduced inventory for improved cash flow

Activities

- Videotape and analyze setup / changeover methods using a structured approach based on the Single Minute Exchange of Die (SMED) technology developed by Shigeo Shingo, a Japanese industrial engineer
- Facilitate team to review, analyze, improve and track progress on setup / changeover performance
- Call upon experience with many different types of setups in a variety of industrial settings
- Apply extensive industrial engineering education and experience in methods improvement techniques

Do long setup times get in the way of reducing batch sizes? Do the large batches lining up in queue contribute to long lead-times? This phenomenon is similar to the delay when waiting for a line of buses to leave a school parking lot before you can drop off your child. It just seems too expensive to setup to run just a few pieces. To reduce batch sizes and gain flexibility you must first reduce setup or changeover times. A proven methodology, facilitated by a process expert, can help to achieve results.

What Is a Setup / Changeover?	5 Phases of Setup Time Reduction
<p>“The total elapsed time from making the <u>last good</u> item of item A to the <u>first good</u> item of item B.”</p>  <p>This includes:</p> <ul style="list-style-type: none"> • Tweaking time to “get the process just right” • Time the process is not up to production speed • Time the process is not consistently making good product <p><small>Setup Reduction 4</small></p>	<ol style="list-style-type: none"> 1. Identify internal and potentially external elements 2. Convert internal elements to external 3. Reduce setup processing time 4. Optimize setup processes 5. Standardize setup – the right way, the same way – every time

Four Basic Steps Defined

✎ Preparation

- Making sure material or parts are available in the correct location and quantity and that shop paperwork is correct.
- Assuring tools and dies are in place and functioning properly. Confirming extracted tools get cleaned, checked for maintenance needs and put away properly.

✎ Mounting and Extraction

- What most people consider to be the set-up, the mechanical steps to take out the old setup components including dies, tools and parts and put in the new setup components.

✎ Measurements, calibrations and control settings

- Centering, dimensioning, measuring temperature, etc.

✎ Trial runs and adjustments

- All time spent running trial pieces and making adjustments until a good piece is produced and sustained production is possible

Setup Reduction

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Specific Analysis Steps

- Identify the setup – part numbers, description, date
- List every step and time required – look for time-consuming steps
- Track the amount of movement and distance traveled (“spaghetti diagram”)
- Distinguish between internal and external steps
- Look for adjustments or threaded fasteners
- Convert as many internal steps to external steps as possible
- Minimize adjustments & threaded fasteners
- Note when people leave the area and/or are searching for tools and materials
- Look for ways setup can be done wrong and define ways to goof-proof
- Seek out teamwork opportunities
- Reduce the internal steps times
- Reduce the external steps times
- Plot the current setup time graph
- Plot the improved graph setup time
- Define the ideal setup
- Plot the ideal graph and drive toward it

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