

# Set-up Time Reduction Process - An easy guide



(Batch size reduction is possible now!)

## 1. The Background

In the past a lot of effort has been put into reducing the cycle time and speeding up the output rate whilst totally ignoring the changeover time from one product to another. This has led to the Economic Batch Quantity (EBQ) concept and has resulted in small batches appearing to be uneconomical to run.

Whatever an order consists of then the complete order must be produced and delivered before the customer will pay for any of the order. In a typical factory the some products are made and stored until enough orders are available for low demand items to make the changeover worthwhile. Reducing set up times allows the introduction of variety as a competitive edge and a manufacturing advantage. What would sales be like if alternate coloured products could be produced? What would it do the cash flow, storage needs and ability to sell higher value-added products?

Reducing set-up times (which we rarely concentrate on) can give the equivalent of a huge increase in process speed (which we almost always concentrate on). This is all achieved without detriment to the quality of the product (almost always a by-product of increasing output speed).

The ideal of a set-up time reduction plan is to move towards SMED (Single Minute Exchange of Dies) or OTED (One Touch Exchange of Dies). These remove set-up times entirely and make EBQ concepts redundant. Large batches no longer appear on the shop floor, lead times disappear, work in progress disappears, customer response is improved and variety can be increased. Making daily and selling daily becomes normal rather than a dream.

In many cases set-up time reduction can be achieved simply by changing the working method and 80% of the benefits can be achieved simply by working smarter rather than faster. Set-up time reduction is not difficult and the benefits are huge.

## 2. The Method

In general the sequence for improvement of set-up times (without significant investment) is:

### Stage 1: Analyse the existing changeover times.

Try putting these on a chalkboard to show the employees what is important. There will be an immediate improvement. You need to start out by setting a baseline so that you can measure the improvements.

### Stage 2: Divide the total time into internal and external set-up operations.

“Internal Set-up Operations” are operations that can only be carried out when the machine has stopped.

Improvements can be made by:

- quick change tooling / connections.
- standard base plates with doweled or quick locate and fit connections.
- combining handed tooling.
- parallel operations.
- set-up sheets for all variables.

“External Set-up Operations” are operations that can be carried out while the machine is running.

Improvements can be made by:

- pre-setting of tooling.
- pre-setting of gauges.
- keeping tool kits for all operations beside the machine.
- special equipment availability.
- standard base plates and connectors.

**Stage 3: Convert as many internal operations as possible to external operations (duplicate tooling?).**

External operations can and should be done while the machine is operating. Converting internal operations to external operations will quickly reduce the set-up time.

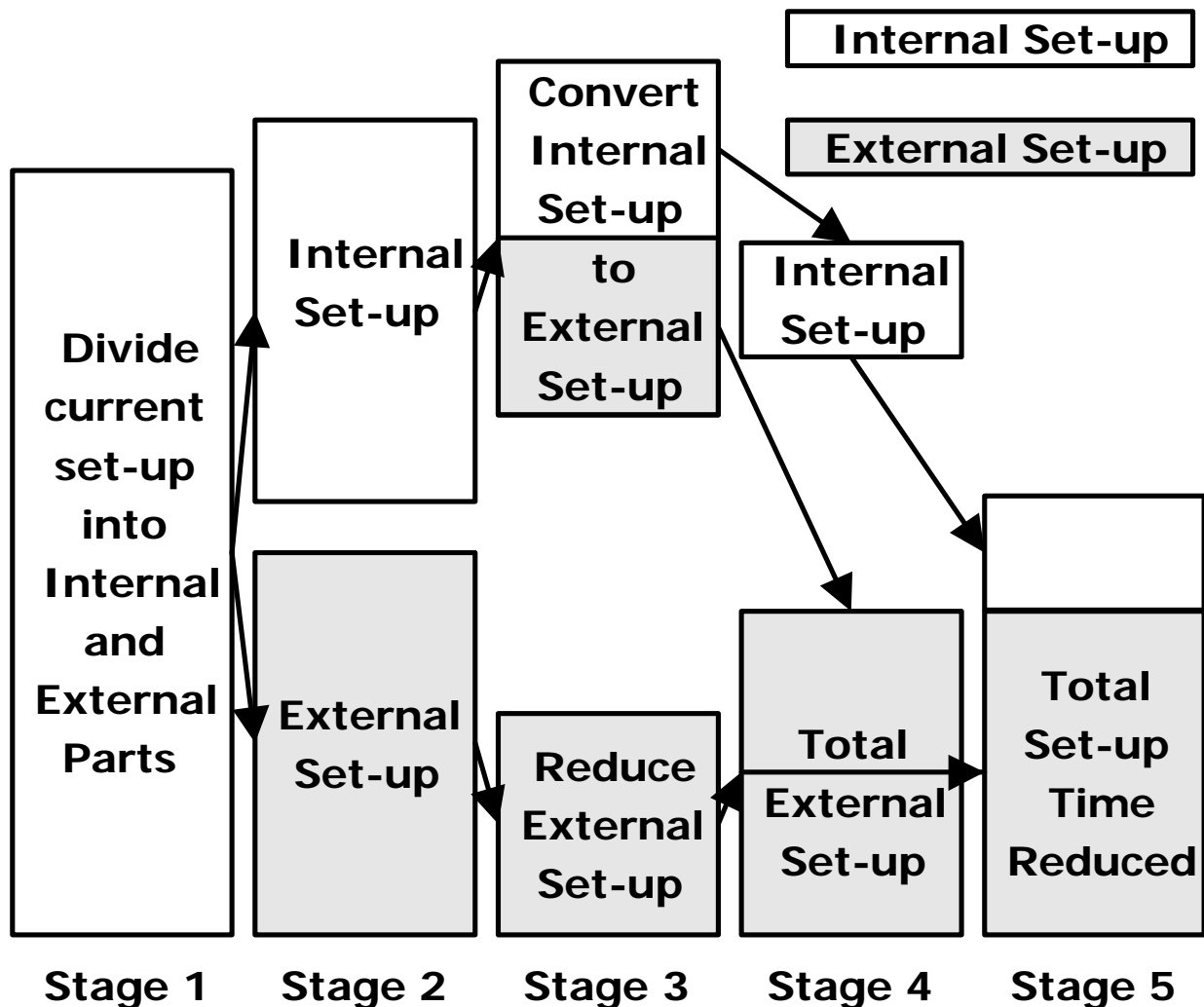
**Stage 4: Reduce internal set-up and external set-up further through experience.**

**Stage 5: Start the process again from a much reduced total set-up time.**

This process is illustrated below.

Set-up times are a key area in the drive to continuously improve productivity performance. Established standards and targets should be set regularly and visibly displayed and there must be a regular audit to evaluate rates of improvement.

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The set-up time reduction process

The basic outline of the set-up time reduction process. The process is not a once-and-for-all process but continues as part of the continuous improvement programme.