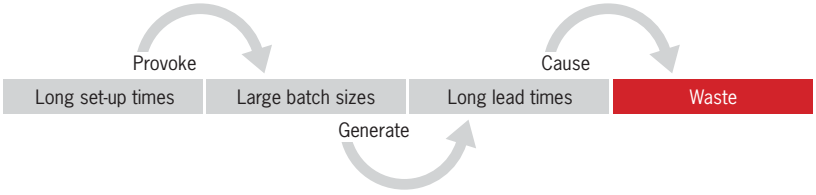
Reduction in Set-Up Time Increases Flexibility

The ability to react quickly is an important foundation for sustainable success in any market. This is why companies who constantly follow lean principles strive to improve the lead times for their products to increase flexibility. The traditional causes of high lead times are large levels of stock within the system which, in lean production, are regarded as waste. In machine-driven processes, it is primarily long changeover or set-up times which lead to high batch sizes and high levels of stock in the supply chain (production process).

Porsche Consulting offers an effective method for reducing set-up times, so that levels of stock can be continuously cut. It is commonly known as SMED (Single Minute Exchange of Die). This process has a major impact. It allows batch sizes to be cut proportionally to the reduction in the time taken to perform the changeover. This involves not only the time taken for the changeover process itself, but also that needed to "run in" the machine. Initially, the process is monitored intensively – by a team of several people equipped with a stop watch and a video camera. This is followed by analysis and classification of the various aspects of the work involved (including maintenance, cleaning, checking, adjustment and mechanical reconstruction). In the next step, the specific work tasks are assigned. The key questions are: Which activities are "internal" – i.e., they really must be performed with the machine at a standstill, and which are "external," i.e., simply preparation and reworking? Finally, the remaining internal activities are optimized by means of ECRS analysis (eliminate, combine, replace, simplify). The number of work steps and aspects of the work are reduced further by changing the sequence and improving and standardizing the manner in which the workplace is organized. The batch sizes must be adjusted at the same time.

The basis for the success of this method is intensive training to ensure that all those involved are qualified to carry out a changeover process. A SMED workshop, which, in addition to the employee performing the set-up work, should be attended by the foreman and representatives from the areas of maintenance, time management and production control, can last up to two weeks depending on its scope. The effort pays off: in general, set-up times – and hence batch sizes – can be reduced by 50 percent or more in the first workshop.

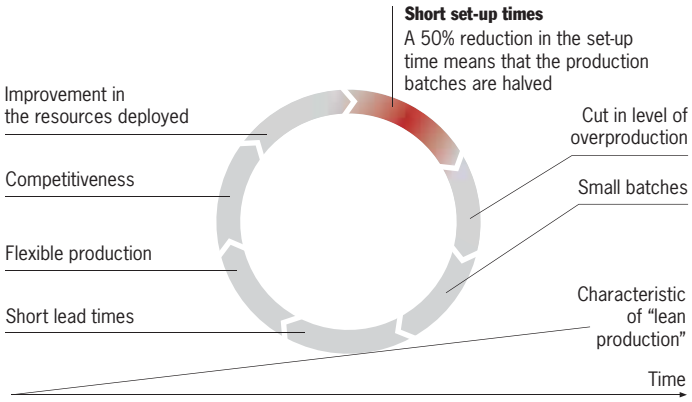
Long set-up times inevitably result in long lead times and are the cause of all kinds of waste within the process



Impact chain of long set-up times

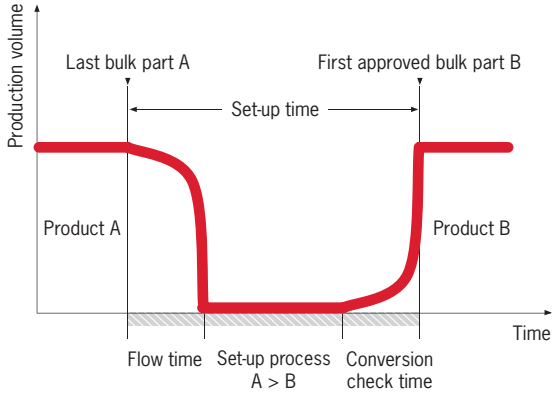
Rapid changeover is a factor determining success on the path to "lean production"

Effects on traditional batch production



The procedural analysis takes account of all non-productive time

Flow time, set-up time, conversion check time



The ECRS analysis prescribes the target value lower limit for the second recording of the set-up time

Evaluate third step – ECRS analysis: Eliminate, Combine, Rearrange and Simplify the internal set-up steps