Business Growth Hub

03
Factsheet

SMED: Reducing machine changeover times

SMED is a system for significantly reducing machine setup and changeover times. The aim is to convert as many steps as possible to 'external' tasks which can be carried out while the machine is running.

Projected performance gains

Improved

- Additional production capacity available
- Lead times for customers
- Sustainability of production
- Standardisation

Reduced

- Wasted productive time
- Batch sizes that run more frequently
- Inventory

What investment is needed to understand the concept?

DIFFICULTY

Medium

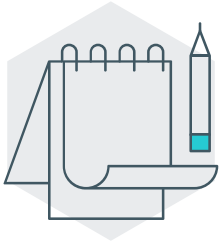
Requires some reading around the subject and a structured approach

ACTIVITY

Team

Best results come from a team of engineers and assembly operators

EQUIPMENT



Tools

Potential investment in hand tools, jigs and fixtures

For more advice, case studies and additional factsheets visit: www.businessgrowthhub.com/manufacturing

SMED: Reducing machine changeover times

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Explanation of the concept

Quick Changeover and set up of machines is key to efficient manufacturing.

Reducing setup and changeover times will result in:

- Smaller batch sizes enabling frequent product changes
- Increased responsiveness to customer demands due to more flexible scheduling.
- Lower inventory levels due to smaller batch sizes
- Lower manufacturing costs due to less downtime
- Increased capacity

SMED - A Single Minute Exchange of Die, a concept used to reduce change-over and set-up times.

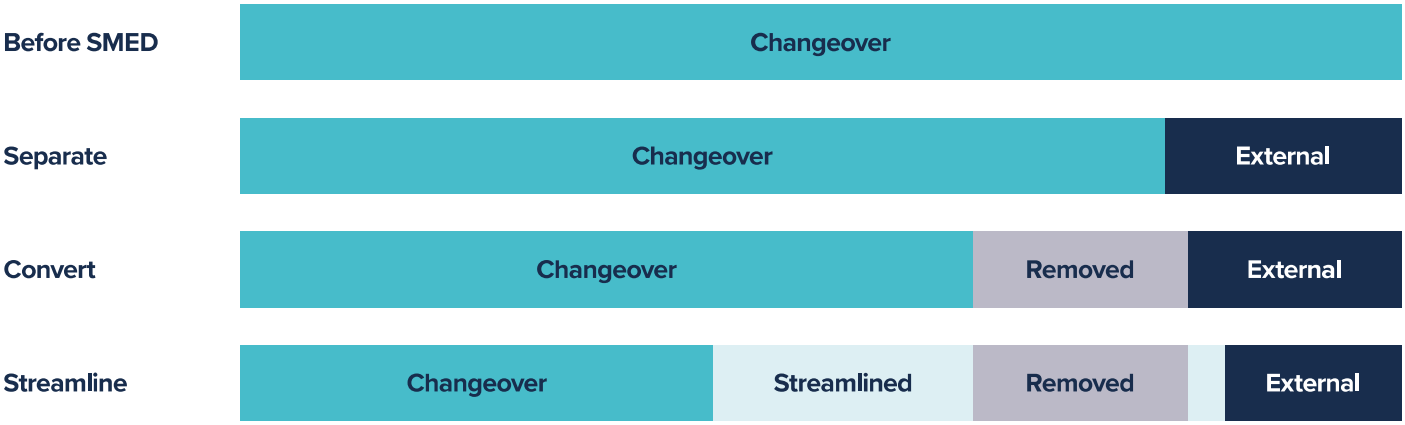
A SMED approach focuses on changeovers to compress them and will usually reduce the time taken by at least 50%. SMED defines the length of the changeover time as the "time from the last good part/product off the machine to the time for the first good part/product off the machine".

The focus of SMED is to capture how changeovers are done now and categorise the individual activities into elements:

- Internal elements: Activities which must be completed when the machine is stopped
- External elements: Activities which can be carried out while the machine is running

The SMED process makes as many elements as possible external while simplifying and streamlining all elements.

The challenge is to compress the times for all activities and to convert Internal activities into External activities. This means that the machine is stopped for the shortest amount of time. In the diagram, the blue section is the Internal time. Using SMED, the Internal time is separated into Internal and External time. Some activities are then removed altogether.



Who is SMED for?

Almost every manufacturing company could benefit from SMED but it may not be the first priority. First of all it is necessary to identify the causes of machine downtime. SMED would be beneficial if:

- A large proportion of machine downtime (approx 20%) is due to changeovers and setups.
- Setup and changeover times are long enough to make a significant improvement
- Setups and changeovers are frequent enough to have an impact on overall efficiency
- The equipment is a constraint or bottleneck

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What action should I take?

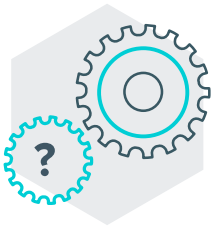
1.

Gather together a cross section of the stakeholders in the process to ensure buy-in throughout the organisation

2.

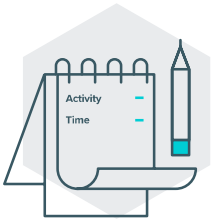
Explain the concepts behind SMED systems

3.



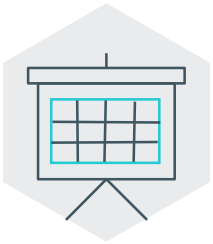
Observe and record a machine changeover

4.



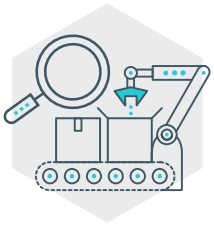
Identify the individual activities and how long each one takes. Note which activities are done by people or by machine

5.



Categorise them as internal or external activities

6.



Run the changeover again and record it; doing the external tasks in advance so the machine can be kept running as long as possible

7.

Calculate the reduction in changeover time

8.

Document the new process so that people can be trained how to do it.

Before making this investment consider if there is any capital funding or grants available to contribute to the cost. The GC Business Growth Hub's Access to Finance team can advise you on this.

Recommended resources

Shingo, S. (1985) A Revolution in Manufacturing: The SMED System. Cambridge. [ISBN: 9780915299034]

GC Business Growth Hub Factsheet 06: 5S / Workplace Organisation

GC Business Growth Hub Factsheet 08: Standard Work

GC Business Growth Hub Factsheet 13: Visual Management

Glossary

Changeover and Set Up: The activities required to change production from one part/product to another

SMED: Single Minute Exchange of Die, a concept used to reduce change-over/set-up times created by Shigeo Shingo at the Toyota Motor Company.

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