Upscaling/Capacity Enhancement Techniques

You would use this approach to increase your ability to output more product.

Projected performance gains

Increased

- Production capacity
- Production efficiencies
- Ability to meet growing customer demand

Reduced

- Lead times

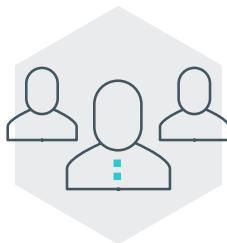## What investment is needed to understand the concept?

DIFFICULTY

Medium

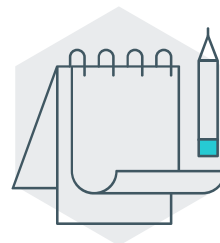Requires some reading around the subject on the internet and a structured approach

ACTIVITY

Team

Best results come from a team of Planners, Engineers and Operators

EQUIPMENT

None

No equipment needed

Explanation of the concept

There are a limited number of ways to increase production capacity.

1. Increase the effectiveness of the existing equipment

2. Increase the hours/shifts worked on the existing equipment

3. Break the production bottleneck(s)

4. Use the most appropriate scheduling system

5. Invest in additional equipment.

Overall Equipment Effectiveness (OEE)

OEE is a calculation which tells you the percentage of manufacturing time that is productive.

It is calculated by measuring the "Six Big Losses" that reduce machine output.

The Six Big Losses

Availability

1. Breakdown losses

2. Changeover and adjustment losses

Performance

3. Minor stops and idling
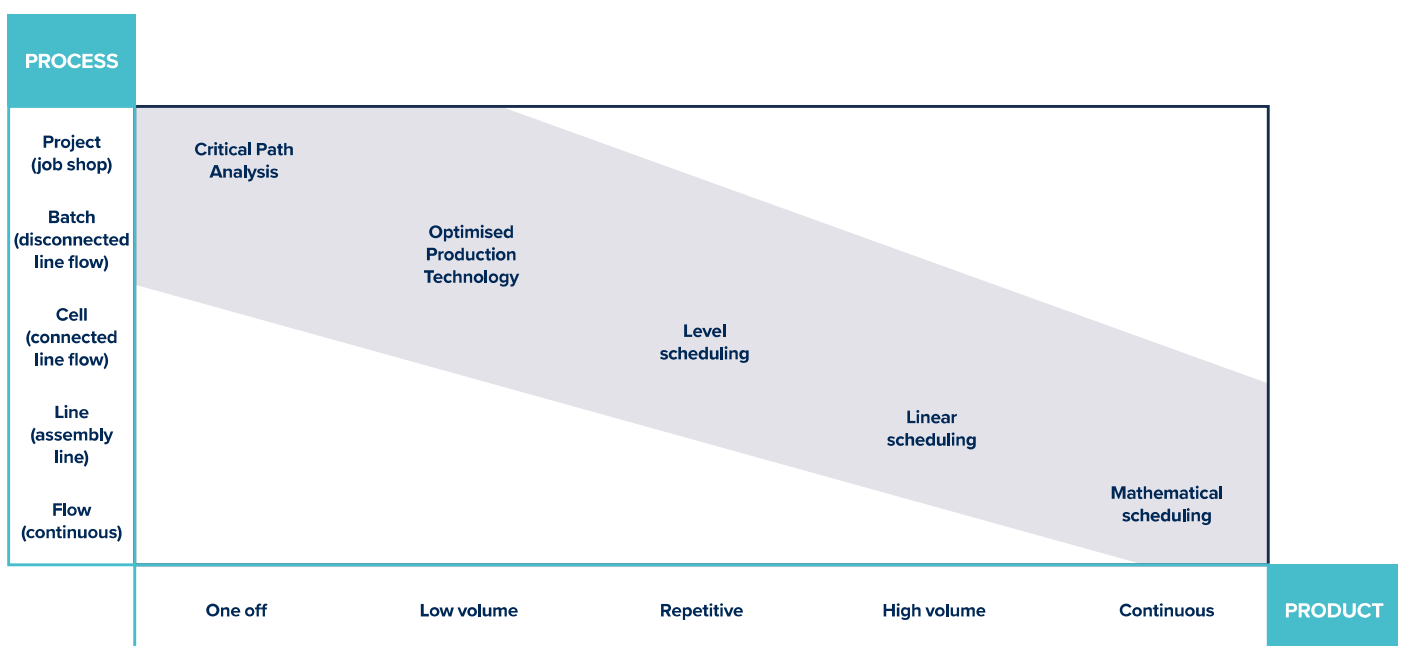
4. Reduced speed losses

Quality

5. Defects – scrap and rework

6. Start-up losses

An OEE score of 100% means you are manufacturing only good parts, as fast as possible, with no stop time. In the language of OEE that means 100% 'Quality' (only good parts), 100% 'Performance' (as fast as possible), and 100% 'Availability' (no stop time).

Using a suitable scheduling system for work is essential because the process or layout must evolve as the volume increases.

Product Process Matrix - Planning / Scheduling Method

PROCESS	One off	Low volume	Repetitive	High volume	Continuous
Project (job shop)	Critical Path Analysis				
Batch (disconnected line flow)		Optimised Production Technology			
Cell (connected line flow)			Level scheduling		
Line (assembly line)				Linear scheduling	
Flow (continuous)					Mathematical scheduling

PRODUCT

Explanation of the concept

The Hub's OEE factsheet can be used to help you identify and remove the Six Big Losses. Results can be achieved by:

• reducing time spent on changeover or set up times

• refurbishing machines and instigating planned maintenance

• collecting data and working with operatives to identify and eliminate the cause of slow cycle times, idling or minor stoppages.

Increasing hours/shifts worked should follow on from efforts to drive up OEE. It is good practice to have a simple model that allows an understanding of how working more hours would release additional capacity. The table below is a simplified example of this.

Identifying and breaking a bottleneck process is another way to release capacity. In the book "The Goal" by Eliyahu Goldratt, a story is used to explain how a bottleneck machine or process restricts the capacity of the whole process. "A minute saved at the bottleneck, is a minute saved for the whole process".

As a last resort, after all of the previous steps have been exhausted, is the opportunity to invest in new equipment.

ACTION	ADDITIONAL CAPACITY	TIME TO INTRODUCE
Cover breaks	3% to 5%	Same day
Work overtime	5% to 15%	2 days notice
Put on an additional shift	30% to 50%	4 weeks

What action should I take?

1.

Gather together a group of Planners, Engineers and Operators.
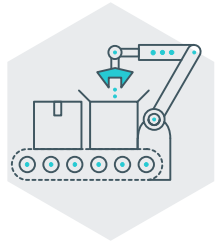
2.

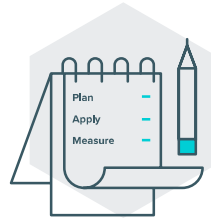Explain the concepts behind upscaling and capacity enhancement.

3.

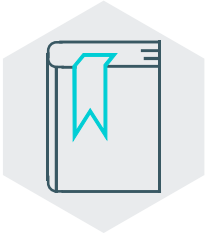Gather data on current equipment performance.

4.

Identify opportunities to improve equipment performance.

5.

Create an improvement plan.

Recommended resources

Goldratt, E. M. (2004). The Goal. Edition 3. Routledge.
ISBN 978-0566086656

GC Business Growth Hub Factsheet 01: Bottleneck Analysis

GC Business Growth Hub Factsheet 09: Kanban / Pull Replenishment Systems

GC Business Growth Hub Factsheet 20: Overall Equipment Effectiveness (OEE)

Glossary

Bottleneck: A machine or process that cannot keep up with customer demand.

OEE: Overall Equipment Effectiveness (OEE) identifies the percentage of manufacturing time that is truly productive.

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

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