

Change Over or Set Up Reduction

Russell Page – Principal Consultant

rpage@hflconsulting.uk

07813 984846

SMED – Isn't That About Making Cars?

*Shutdown/turnaround/changeover/cleanout/decontamination
..... reduction*

- Aim
 - To reduce the time taken (45% reduction each iteration!)
- Benefits
 - Increased uptime
 - bottom line
 - and/or
 - Improved flexibility
 - customer service
 - lead time
 - stock turns

Background

- Not take one minute, but should take less than 10 minutes (“single digit minute”)
 - One-Touch Exchange of Die (OTED – less than 100 seconds)
- Shigeo Shingo consulting in 1950’s and 60’s (including Toyota)
- Inability to eliminate bottlenecks
 - Long tool changeover times
- Changeover time impacts on unit cost

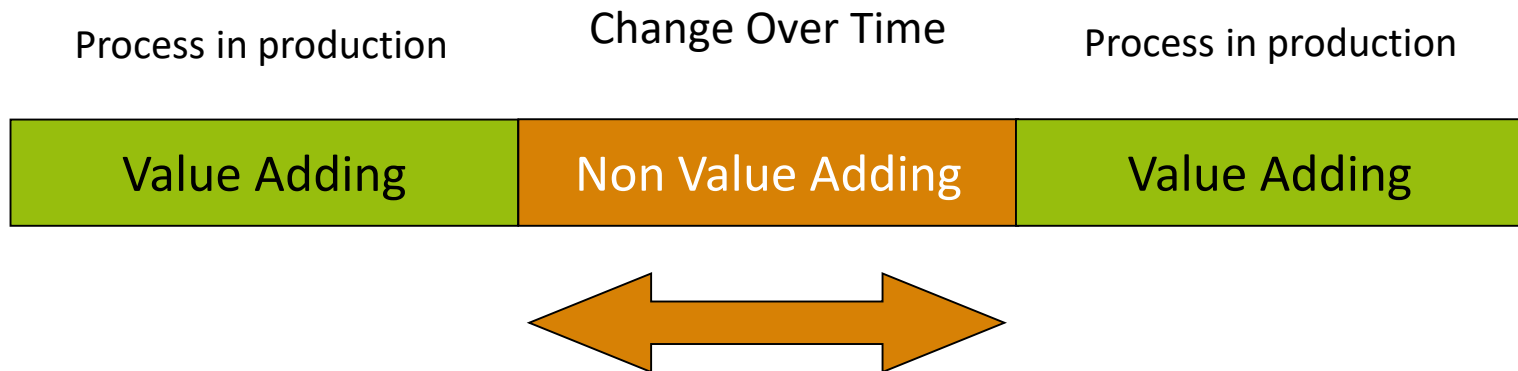
Changeover time	Lot size	Process time per item	Operation time	Ratio
8 hours	100	1 min	5.8 min	480%
8 hours	1,000	1 min	1.48 min	48%
8 hours	10,000	1 min	1.048 min	5%

What is it?

Change Over Reduction

Definition of change over time:

The amount of time taken to change a process over from the last part of a production run to the first good repeatable part of the next production run.

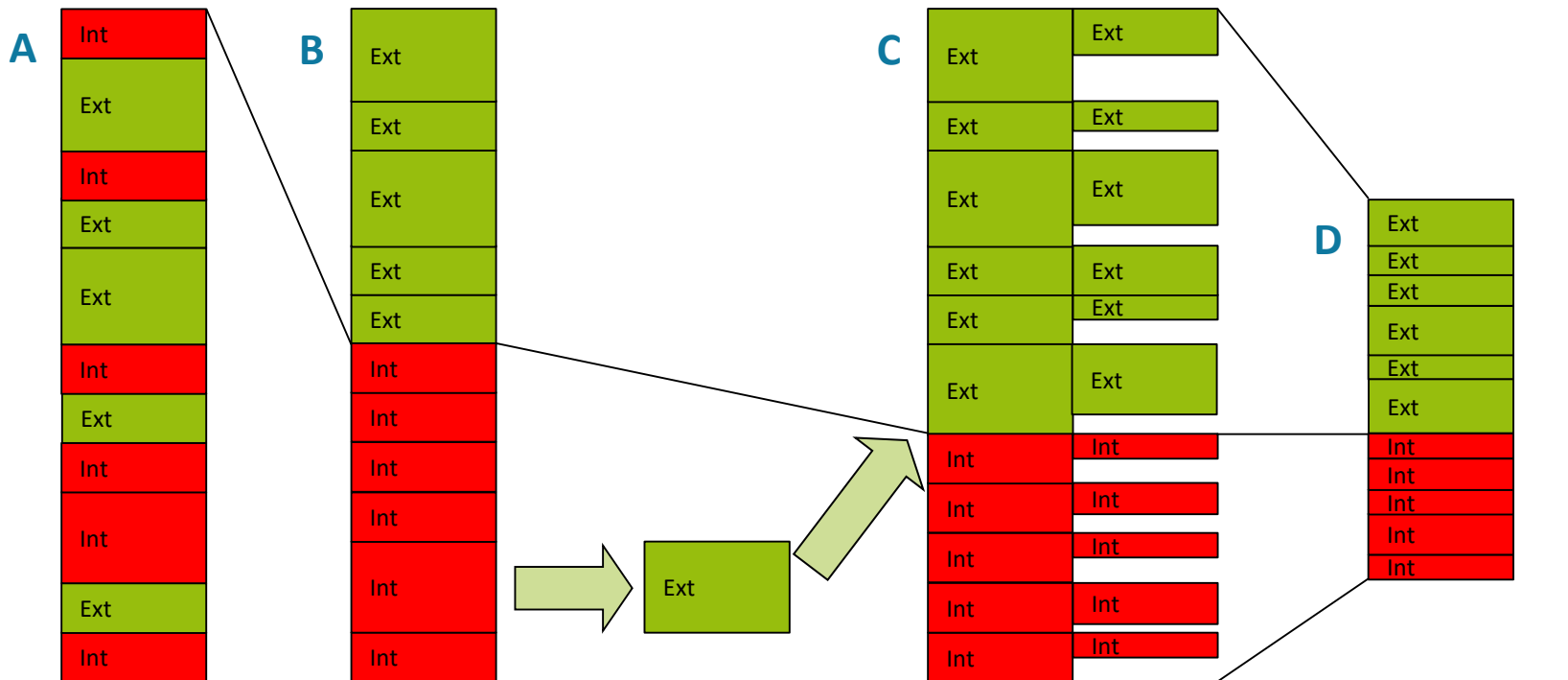


Note: It is the clock time, not the labour time

Internal or external?

- All changeover (turnaround) activities can be classed as either internal or external
- **Internal** – Can only be carried out safely when the plant is not in production.
- **External** – Anything that can be done when the plant is in production.

7 Steps of SMED



1. OBSERVE the current method (A)
2. Separate the INTERNAL and EXTERNAL activities (B)
3. Convert (where possible) Internal activities into External ones (C)
4. Streamline the remaining Internal activities, by simplifying them and eliminating WASTE (D)
5. Streamline the External activities, so that they are of a similar scale to the Internal ones (D)
6. Document the new procedure, and actions that are yet to be completed
7. Do it all again: For each iteration a 45% improvement in set-up times should be expected, so it may take several goes to get under the ten minute mark



Am I really going to have to watch all 200 hours of this?

Do I really have to video all 200 hours of this?

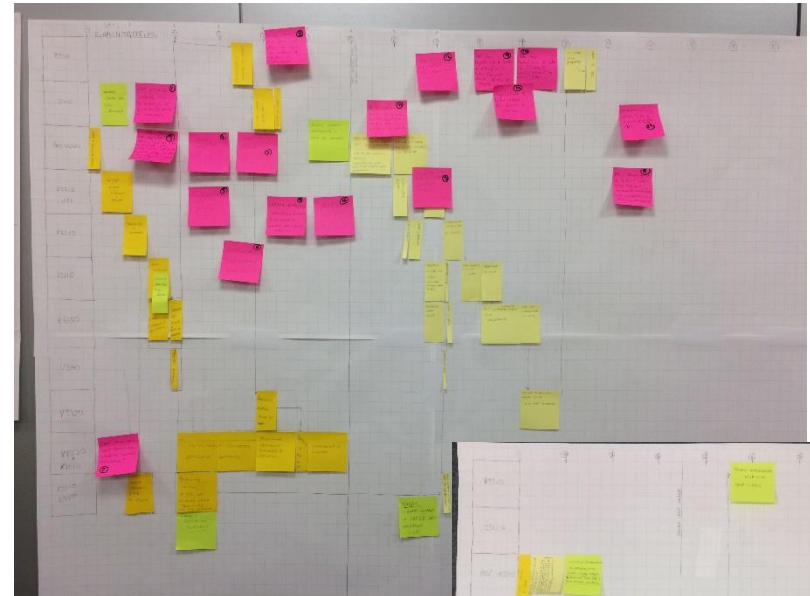
But sometimes SMED doesn't seem so simple!



Case Study 1:
**Decontamination of Chemical
Plant for Annual Shutdown**

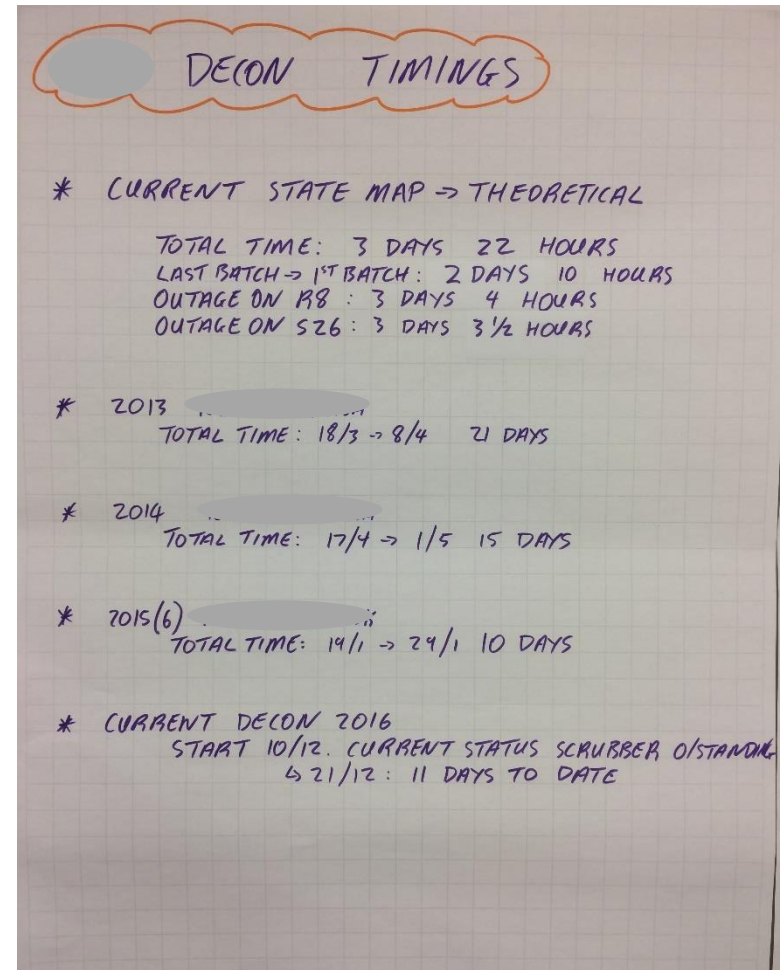
Map it out – 50% reduction in time

- Mapping out process gave 50% reduction (11 days)
- Subsequent ideas reduced time by a further 50% (5 days)
- 75% total reduction in decontamination time
- Similar benefits for maintenance activities



Improvements

- Control the activity
 - Issues with operators free to select next task
 - Task sequence not optimised
- Cleaning batch follows last production batch
 - Cannot keep up, extends times
 - Clean in parallel
- Use alternatives to clean
 - Spray balls
 - Cleaning materials cost savings

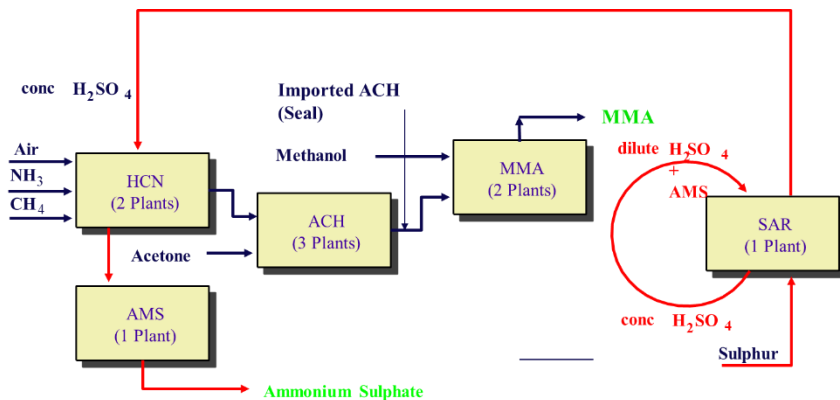


Case Study 2: Breakdowns

Lucite Cassel Works

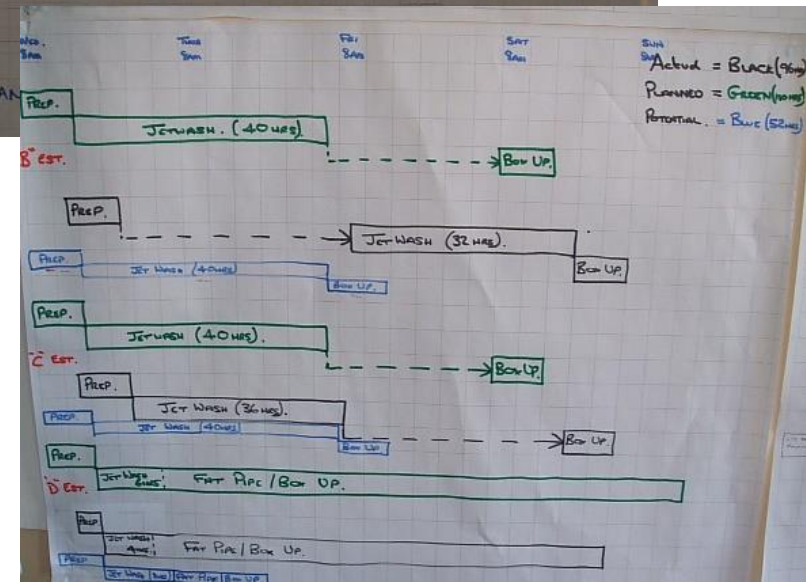
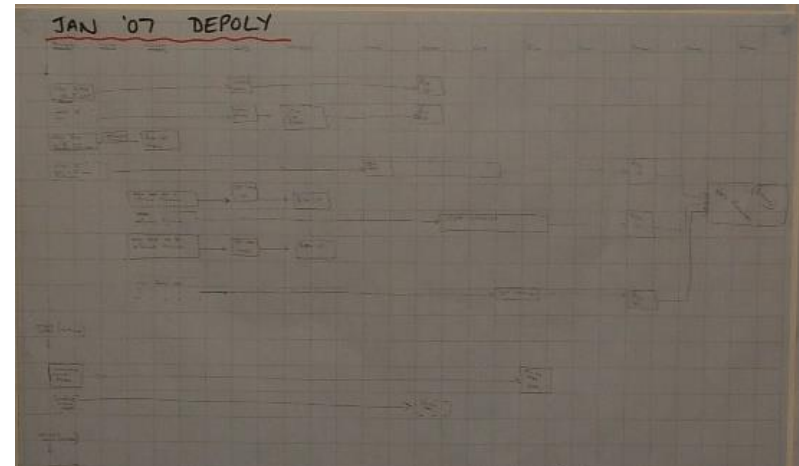
- Initially implemented on Depoly activities
 - 2 to 3 Depoly activities/ year
 - Average 9 day outage
- Reduced to 6 ½ days
 - £180k benefit per event

- Cooling Tower Clean
 - 72 hours to 32 hours
 - HCN units able to remain online
 - £200k cost avoidance
- Oleum pump change
 - Within 15 hour window
 - Avoided 4 day plant shutdown
 - £740k cost avoidance



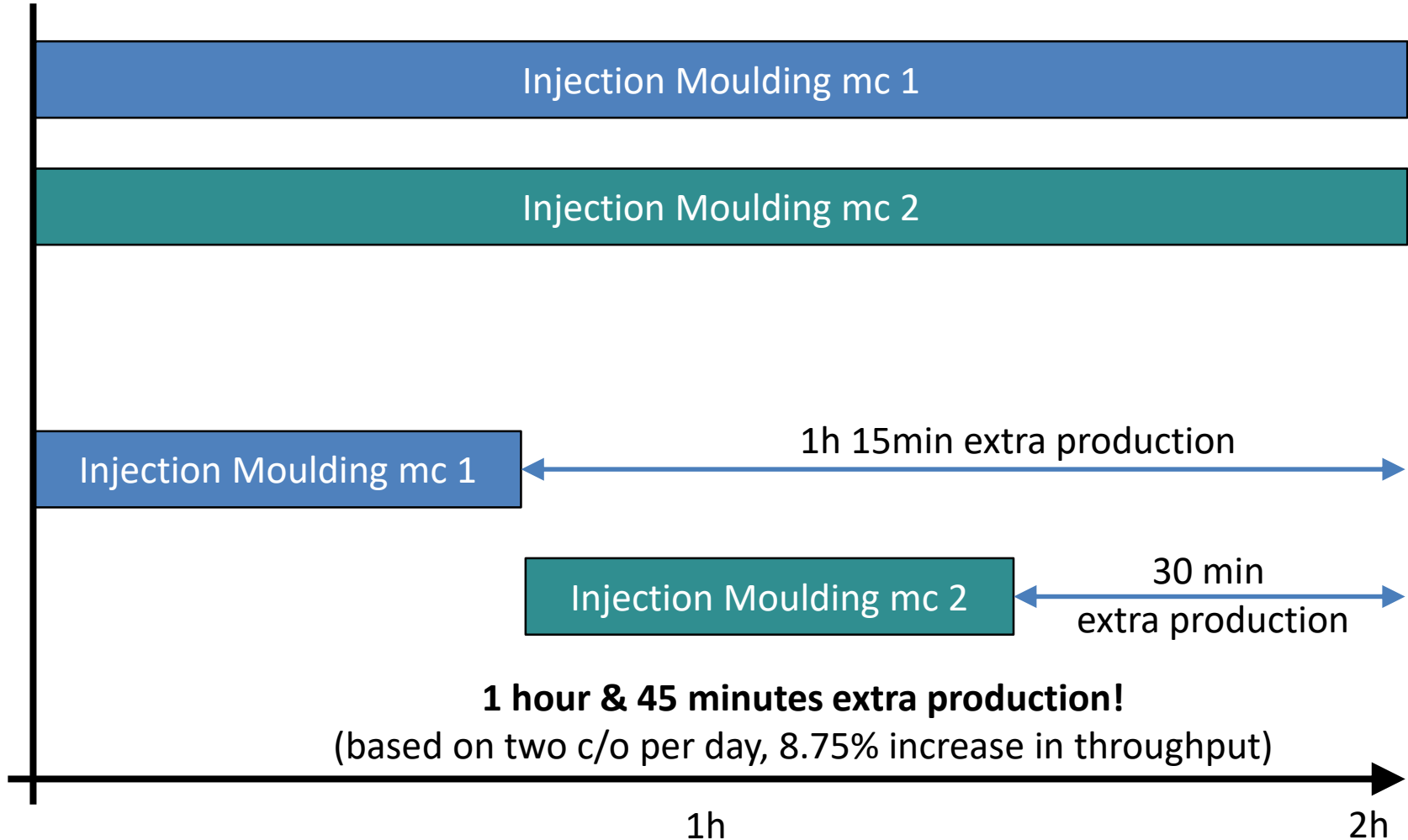
Lucite

- “Reviews each step and asks the questions to reduce the time taken to achieve a particular step”
- “May require more
 - Personnel
 - Power operated tools,
 - Working of parallel activities
 - Etc”



Case Study 3: Labour Economy is a False Economy

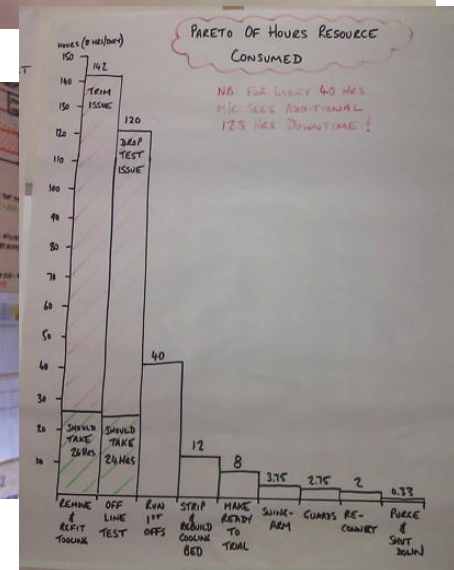
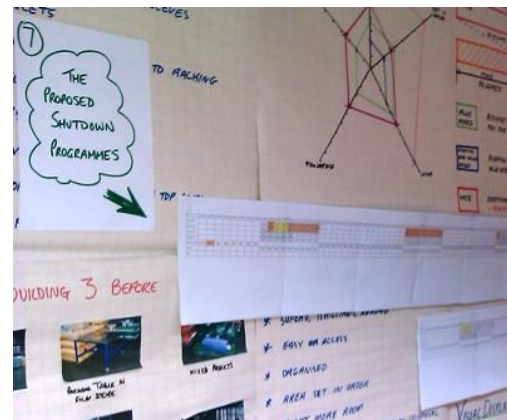
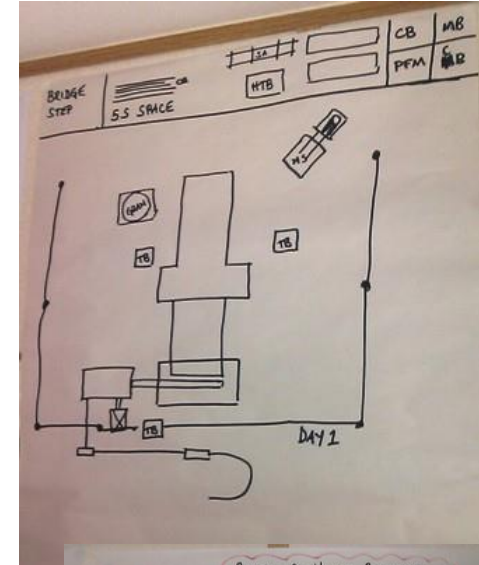
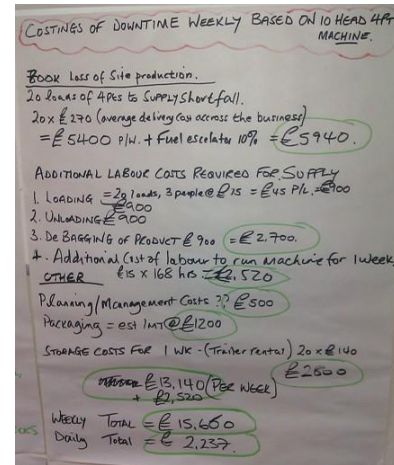
Optimise the Activity, not the Labour



Case Study 4: Data Drives Decisions

Good Analysis Leads to Good Improvements

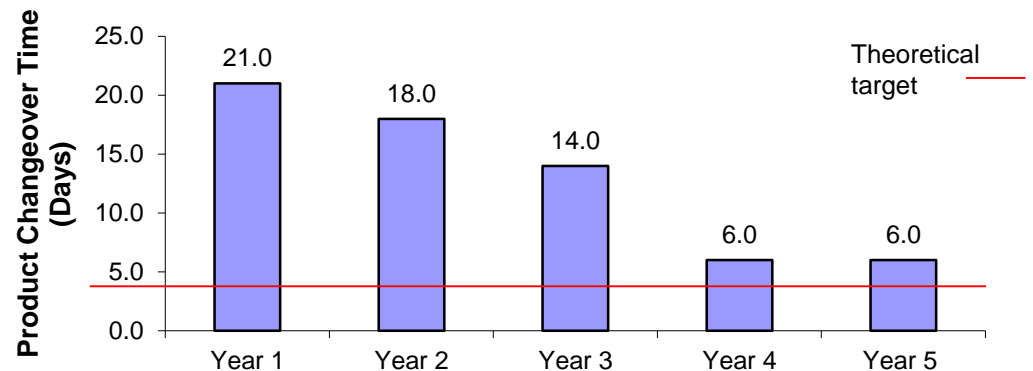
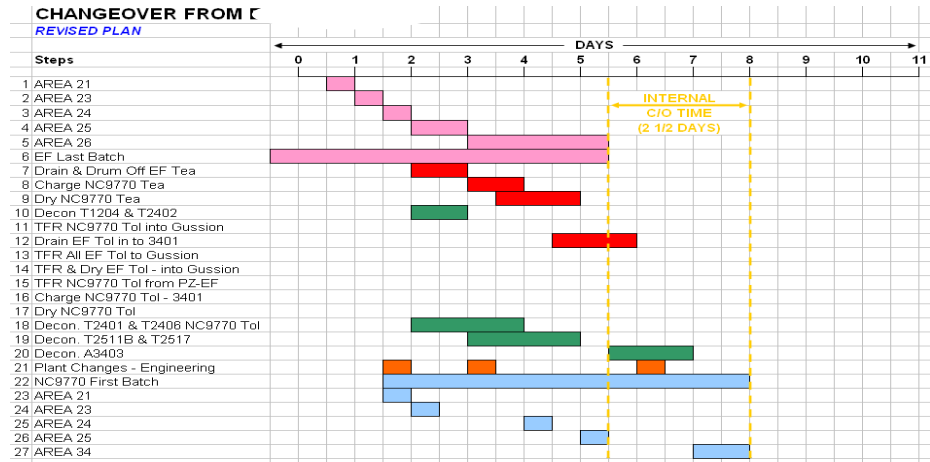
- Understand the costs
 - Drives behaviours
- Analyse the timings
 - Gives focus to improvements
- Plan in advance, set targets & measure performance
- Pay attention to the detail
 - Workplace Organisation (5S) is a powerful tool
- Original plan of 3 weeks reduced to 1 or 1 ½ weeks depending on tasks



Case Study 5: Operators' Bright Ideas

Engage Your Best Assets

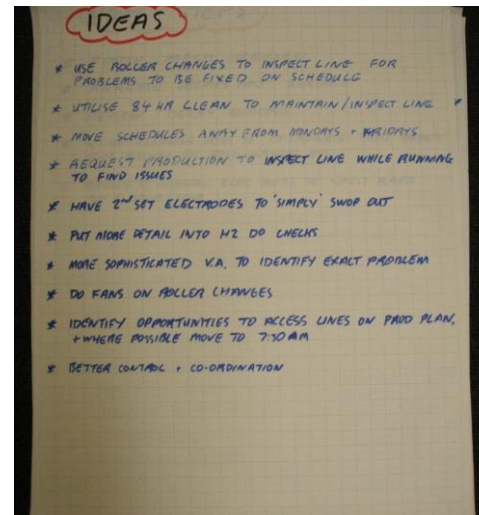
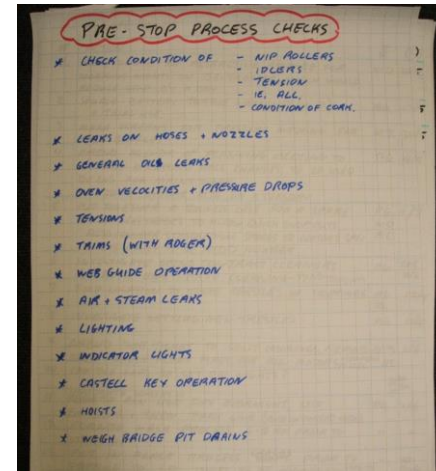
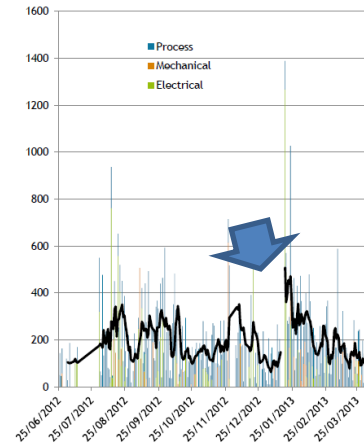
- Site needed to introduce new products
 - Current products not filling capacity
- Changeover time prohibitive
 - Nearly consumed all spare capacity
- Operators suggested removing WIP
- WIP then used to quickly restart process after alternative campaign



Case Study 6: Stay Focused

Benefits not always in reducing time

- Targeting improved start ups & completing the work
- Finding alternatives for Schedule (turnaround) tasks
- Sensible timing of Schedule
- Make some tasks external
- Turnarounds are not for finding issues



Summary

1. Powerful tool
2. Adaptable to a variety of scenarios
3. Will deliver time savings