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# ACHIEVING QUICK CHANGEOVERS (SMED)

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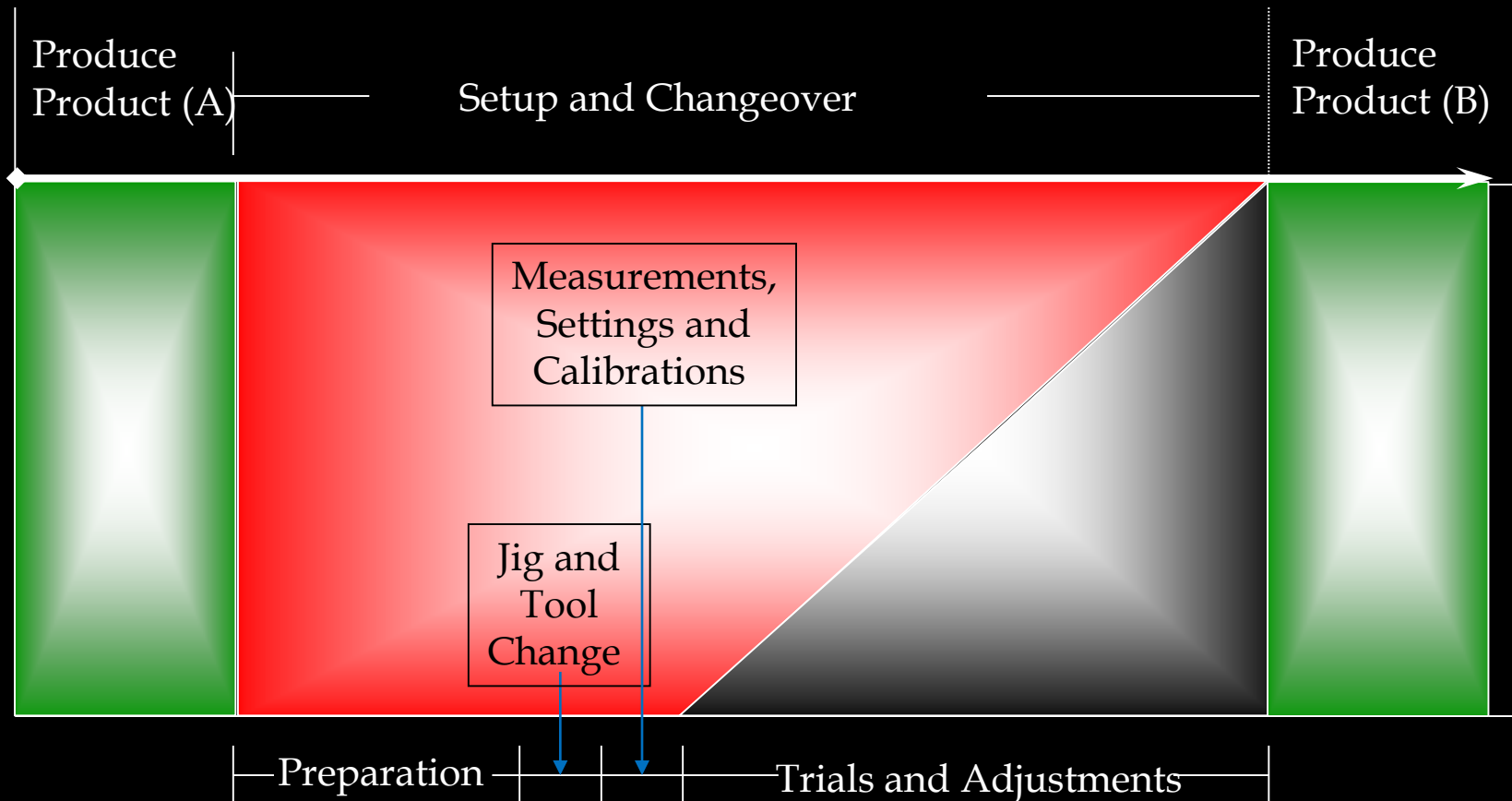
A very simple way to improve your  
operations based on the logic concepts  
of Shigeo Shingo

# QUICK CHANOVERS

- ❑ This process will lead you to discover a number of opportunities *that already exist in your plant*, where you can apply these logical and simple practices and start to immediately benefit from their implementation.
- ❑ The theory and techniques of performing set-up operations and changeovers in under 10 minutes...

# QUICK CHANGEOVER MODEL

## What is Setup and Changeover?



# S.M.E.D.

- ❑ “Single Minute Exchange of Dies” is the name given to a discipline focused on simplifying machine setups and is also used to reduce time taken for removing or replacing parts during planned maintenance.
- ❑ Set up and changeover times are measured as the time between the last good part produced and the first good part of the next run.
- ❑ These techniques are comparable to the process of removing and replacing a set of tires in a racing car in under 8 seconds. **We are also in a competition, remember?**
- ❑ We must be very careful though that we do not compromise safety or quality in search for speed.

# WHY SHOULD WE ADOPT IT?

- ❑ Manufacturing experts consider that with growing international competition it will not be possible for a company to remain competitive that does not implement these disciplines in their operations
- ❑ The Global Economy has created stronger competition at all levels in both manufacturing and service businesses
- ❑ Manufacturing industries face continuous reduction in profit margins in order to keep a share of the market
- ❑ Each saving (no matter how small) contributes to improve the economy of the enterprise and its community
- ❑ Innovative methods of 'Sweating' every available asset is now standard practice in leading businesses
- ❑ The Human Resource is perhaps the most critical of all...

# SMED BENEFITS

- ❑ Less time between production runs
- ❑ Less Waste
- ❑ Improved Quality Rate
- ❑ Less need for stock on hand
- ❑ Increased Throughput
- ❑ Flexibility for producing smaller lots
- ❑ Reduced stops (downtime)
- ❑ Operational and Life Cycle Costs are reduced
- ❑ Team ownership





# WAR GAMES

- ❑ Using a Mini Factory simulator teams will learn to:
  - ❑ Plan a factory layout (ergo dynamics)
  - ❑ Plan and execute a changeover (increase production time)
  - ❑ Implement process changes (continuous improvement)
  - ❑ Work as a team to reduce time & work (work flow)
  - ❑ Challenge current process thinking (innovation)
  - ❑ Practically use new skills & theory



# VISUAL COMMUNICATION

## ? Example of 5 Why's

Q. Why did the machine stop? ?

A. The fuse blew due to an overload.

B. Q. Why was there an overload? ?

A. The bearing lubrication was inadequate.

Q. Why was the bearing lubrication inadequate? ?

A. The lubrication pump is ineffective.

Q. Why is the pump ineffective? ?

A. The pump spindle is worn.

Q. Why is the pump spindle worn? ?

A. Because the swarf gets in.

?

*What is the corrective action?*

- Visual boards are used for both problem solving and process mapping.



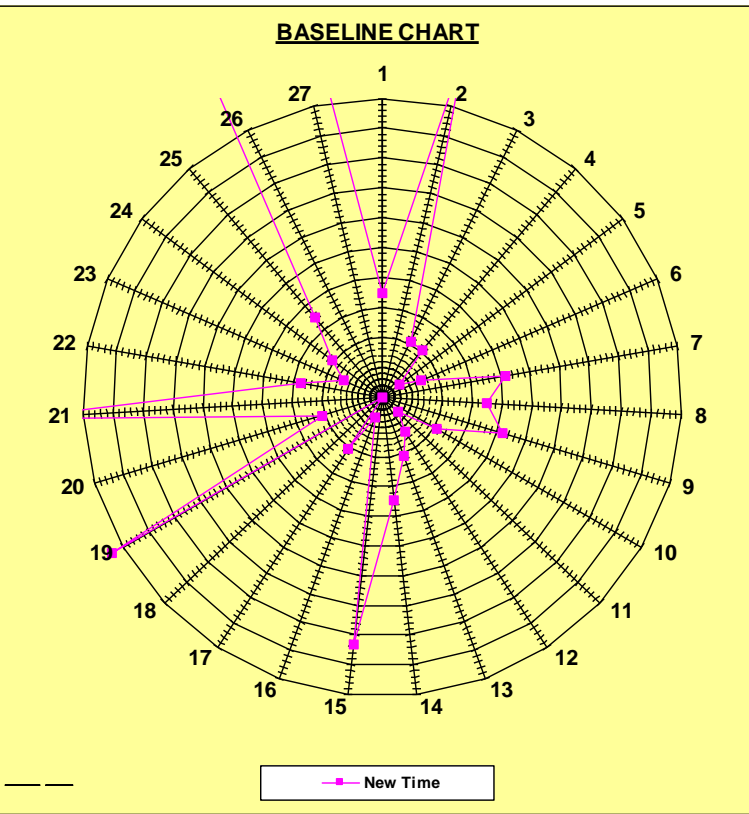


# CREATING BENCHMARKS

## BASELINE CHART

Changeover:	<b>38 TO 35/92</b>	Cost per Minute:	<b>R 92,00</b>	at R1:00 per can			
Last Changeover Time:	<b>05:16:00</b>	From:	<b>09:00 AM</b>	To:	<b>02:16 PM</b>	Date:	<b>August 21, 2014</b>

ELEMENTS	No.	OLD TIME	NEW TIME	NEW COST
<b>PHASE 1 : PARTS C/O</b>				
Fill Rumbler with new slugs	1	0:10:00	0:05:00	R 460,00
Empty hopper of old slugs	2	0:30:00	0:17:00	R 1 564,00
Remove slug feed unit & chute	3	0:10:00	0:03:00	R 276,00
Remove guards and vacuum pipe	4	0:05:00	0:03:00	R 276,00
Remove cutout switch	5	0:01:00	0:01:00	R 92,00
Replace take off cup	6	0:03:00	0:02:00	R 184,00
Remove diebase punch & stripper	7	0:10:00	0:06:00	R 552,00
Remove jaws from slug feed unit	8	0:05:00	0:05:00	R 460,00
Clean and lubricate all moving parts	9	0:15:00	0:06:00	R 552,00
Fit new jaws to slug feed unit	10	0:05:00	0:03:00	R 276,00
Fit new stripper in unit	11	0:05:00	0:01:00	R 92,00
Fit new punch & diebase	12	0:10:00	0:02:00	R 184,00
Make can by inching	13	0:10:00	0:03:00	R 276,00
Check can specs.	14	0:05:00	0:05:00	R 460,00
Drop slugfeed unit& chute back in	15	0:12:00	0:12:00	R 1 104,00
Replace cutout switch	16	0:01:00	0:01:00	R 92,00
Move ram back and replace guards	17	0:05:00	0:03:00	R 276,00
<b>Trimmer</b>	18	0:00:00	0:00:00	R 0,00
Move / replace trimming knife	19	0:15:00	0:15:00	R 1 380,00
Remove trimming guide plate	20	0:05:00	0:03:00	R 276,00
Replace stripper	21	0:25:00	0:18:00	R 1 656,00
Pull brush up	22	0:05:00	0:04:00	R 368,00
Replace take off control	23	0:04:00	0:02:00	R 184,00
Vacuum drum	24	0:05:00	0:03:00	R 276,00
Reset inner ironing roller	25	0:05:00	0:05:00	R 460,00
Replace lubricated mandrils	26	1:00:00	0:25:00	R 2 300,00
Set- up & set conveyors	27	0:50:00	0:50:00	R 4 600,00



<b>OLD Changeover Time</b>	<b>5:16:00</b>
<b>NEW Change Over Time</b>	<b>3:01:00</b>
<b>Pre Stage Time</b>	<b>0:43:00</b>

<b>Time saving this Changeover</b>	<b>2:15:00</b>	by process improvements
<b>Cost saving this Changeover</b>	<b>R 12 420,00</b>	

# MEASURING PERFORMANCE

Puffer Ltd		Aerosol- Line 2 - Swage	OEE
			Shift 1
Loading Time	A	Working Hours (often 480 minutes per shift)	480
	B	Planned Downtime (Planned Maintenance)	16
	B	Planned Downtime (Union Meetings)	1
	B	Planned Downtime (Changeovers)	180
	C	Loading Time (running time) (A-B)	300
Availability	D	Unplanned Downtime (breakdowns etc.)	90
	E	Operating Time (C-D)	210
	F	Availability (E divided by A x 100)	43,75%
Performance	G	Output during operating time (total processed amount)	19320
	H	Theoretical Standard Cycle Time (piece/min)	100
	I	Performance Efficiency (H divided by (G x E) x 100)	92,00%
Quality	J	Rejects during operating time	800
	K	Rate of quality products (G - J divided by G x 100)	95,86%
		Overall O.E.E. (F x I x K x 100)	38,58%
Notes:	Calculated by the team		

Quicker changeover times would improve availability.

The team and machine would benefit by using the 5S's system.

World Class OEE is 85%

# RESULTS

- ❑ **Filling Line** – saved R 58 520 by reducing changeover time from 340 minutes to 91 minutes
- ❑ **Printing Press** – saved R 52 500 in 2 weeks through improved set-up times and machine costs
- ❑ **Coating Plant** – reduced changeover time from 150 minutes to 20 minutes

