Business Growth Hub

19 Factsheet

Total Productive Maintenance (TPM)

You would use this approach to drive up the performance and availability of your equipment or machines and increase the quality of the products that they produce.

Projected performance gains

Improved

- Machine Performance – speeds
- Machine Availability – reduce chronic and sporadic breakdowns
- Product Quality – reduce start-up losses and improve production yields

What investment is needed to understand the concept?

DIFFICULTY

Medium

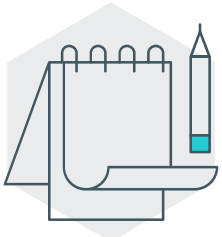
Requires some reading around the subject and a structured approach.

ACTIVITY

Team

Best results come from a team of Maintenance Engineers and Assembly Operators.

EQUIPMENT



Yes

Shadow Boards, White Boards, potentially some additional tooling and cleaning equipment, additional spare parts

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

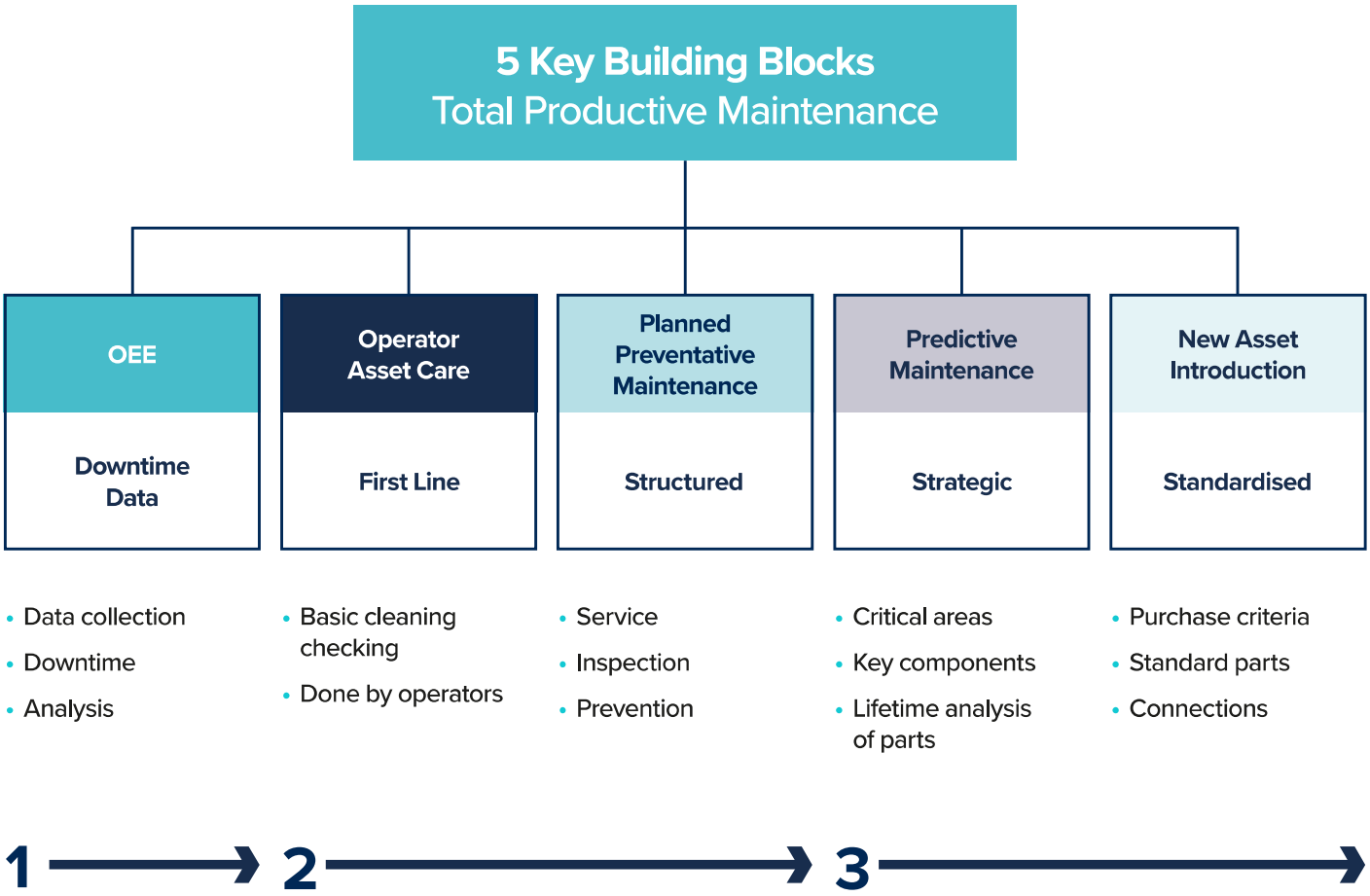
Total Productive Maintenance (TPM)

Factsheet 19

Explanation of the concept

Most factories use some form of equipment and machines as part of their production processes. These need to be inspected and maintained if they are to deliver the required performance levels. TPM is a system that uses a mixture of Operator Asset Care (OAC) and Planned Preventative Maintenance (PPM) to keep machines and equipment performing to their best levels.

Development Process for Planned Maintenance



Explanation of the concept

The initial phase of TPM is to measure current machine performance using the Overall Equipment.

Effectiveness (OEE) measure = Availability (%) x Performance (%) x Quality (%).

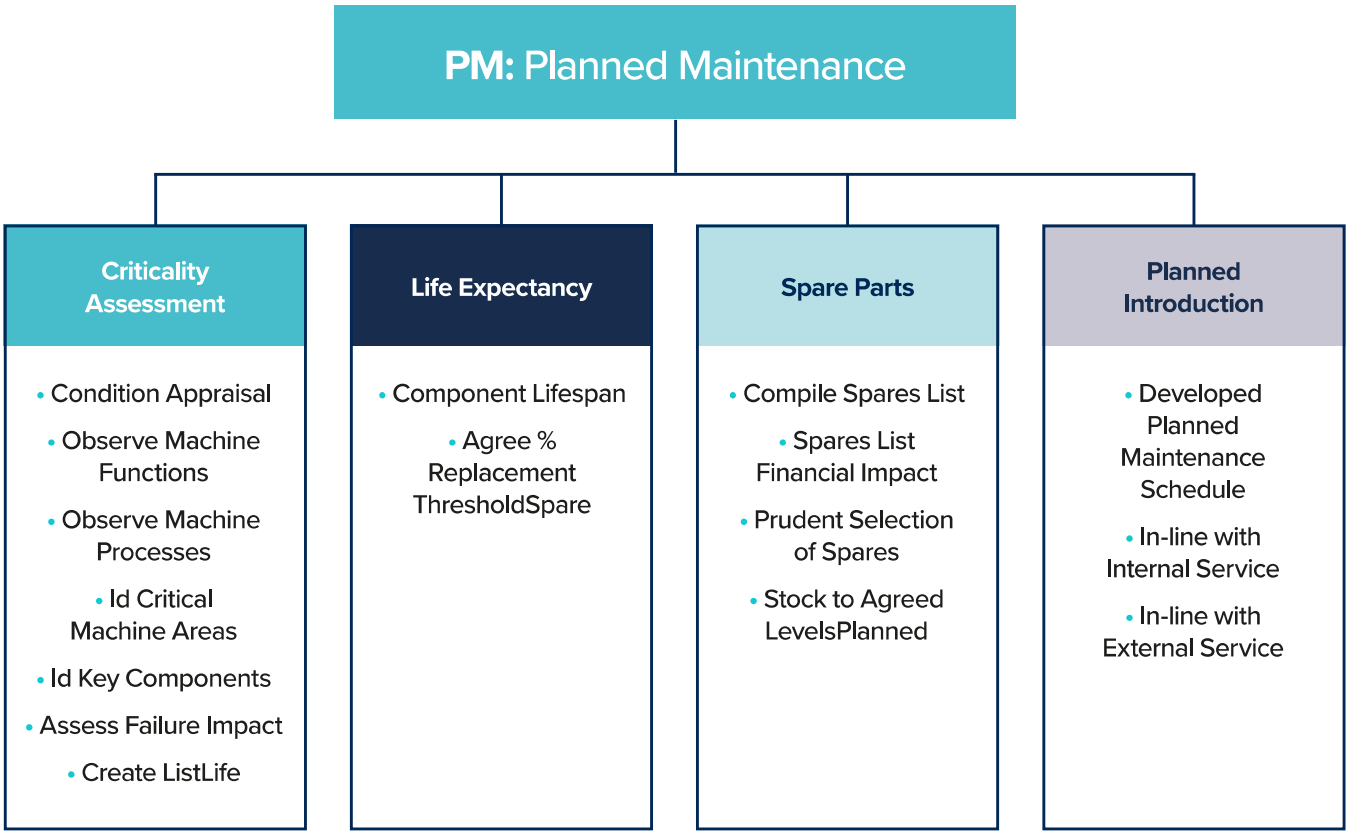
The machines are then inspected in detail by a team of Operators and Engineers and a Refurbishment Plan created to bring the machine back up to the required standard.

The Operators and Engineers then agree on what the Operators can do on a daily/shift basis to inspect the equipment to make sure it remains at the required standard. This is called Operator Asset Care (OAC) and can include some low level maintenance activities e.g. topping up fluid, checking sensors are working etc. These activities are captured in an OAC Sheet which is a highly visual operating procedure.

The Engineers review their maintenance plans based on an assessment of the critical parts of the machines and historical performance issues. The Planned Preventative Maintenance is then developed.

Refer to Factsheet 20: Calculating and Using OEE to help you with this

Development Process for Planned Maintenance



What action should I take?

1.

Gather together a group of Maintenance Engineers and Operators.

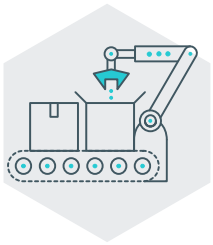
2.

Explain the concepts behind TPM.

3.

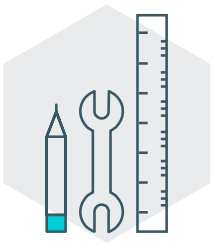
Gather OEE data over at least a 2 week period.

4.



Perform a deep clean and inspection of the machine and create a Refurbishment Plan.

5.

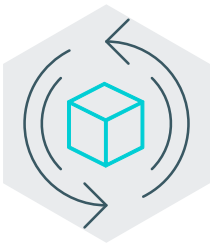


Use the Refurbishment Plan to bring the machine up to the required condition.

6.

Identify the critical parts of the machine.

7.



Create Operator Asset Care sheets.

8.

Create Planned Preventative Maintenance sheets.

Recommended resources

Bicheno, J. (2004). The New Lean Toolbox. Picsie Books.
ISBN: 0-9541-2441-3

Willmott, P. (1994). Total Productive Maintenance: The Western Way. Butterworth Heinemann.
ISBN: 978-0750619257

GC Business Growth Hub Factsheet 20: Calculating and Using OEE

Glossary

Chronic Breakdown: Small, regular recurring machine stoppages

Sporadic Breakdown: Long, unexpected machine stoppages

Overall Equipment Effectiveness (OEE): A holistic measure of machine performance that covers Performance, Availability and Quality of product produced

Refurbishment Plan: Plan to bring a machine back up to the required standard condition

WEEK COMMENCING:

NO	TASK DESCRIPTION	FREQ	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		SUNDAY	
			S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
14	Check air pressure on taper (80-85 PSI)	Shift	✓	✓	✓	✓										
15	4 tape roller sensors, 1 case sensor light indicators	Shift	✓													
15	Test e-stops and interlocks on taper	Weekly	✓	✓	✓	1										
16	Alignment and wear of blue belts and padde springs	Shift	✓	✓												
16	Infeed gate operation (timing of eye sensor and cylinder)	Shift	✓	✓												
16	Kicker operation (range of motion and micro switches)	Shift	✓	✓												
17	Drag chain condition and alignment (bigfoot)	Shift	✓	✓												
17	Check paddle functions	Shift	✓	✓												
17	Test both e-stops on bigfoot	Weekly	✓													
18	Test gate micro switch on bigfoot	Shift	✓	✓												
18	Check pressure for bigfoot (80-85 PSI) (no air leaks)	Shift	✓	✓												
19	Check chaing alignment and condition (case shaker)	Shift	✓	✓												
20	Check shaker infeed, kicker and micro switches	Shift	✓	✓												
21	Test e-stops and interlocks on case shaker	Weekly	✓													
7	No fiber dust and debris on taper (vacuum)	Shift	✓	✓												
7	Tape head, cut off knife and rollers - remove tape build up	Shift	✓	✓												
8	No fiber dust and debris on bigfoot (vacuum)	Shift	✓	✓												
9	No fiber dust and debris on case shaker (vacuum)	Shift	✓	✓												
		Operator Signoff	✓	✓												
		Supervisor Signoff	✓	✓												
		Shift Manager Signoff	✓	✓												

KEY:

- Inspection Number
- Frequency of Inspection
- Inspection Point
- Cleaning Point
- S1 = Days
- S2 = Nights
- Example of a Planned Preventative Maintenance schedule

PROBLEM NO	PROBLEM	CORRECTIVE ACTION
1	Record Abnormalities	Record Corrective Action
2		
3		
4		
5		
6		
7		
8		

WEEK COMMENCING:

NO	TASK DESCRIPTION	FREQ	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		SUNDAY	
			S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
		Operator Signoff														
		Supervisor Signoff														
		Shift Manager Signoff														

KEY:

S1 = Days

S2 = Nights

PROBLEM NO	PROBLEM	CORRECTIVE ACTION
1		
2		
3		
4		
5		
6		
7		
8		