

Lean 6 Sigma 5s



Improve



- **Sort**
- **Set in Order**
- **Shine**
- **Standardise**

CANDO

An acronym developed by Henry Ford to make the work area more organized and efficient.

- C = Cleaning up
- A = Arranging
- N = Neatness
- D = Discipline
- O = Ongoing improvement

- 
- **Sort**
 - **Set in Order**
 - **Shine**
 - **Standardise**

What are the 5's?



What are the 5's?



What are the 5's?



What are the 5's?



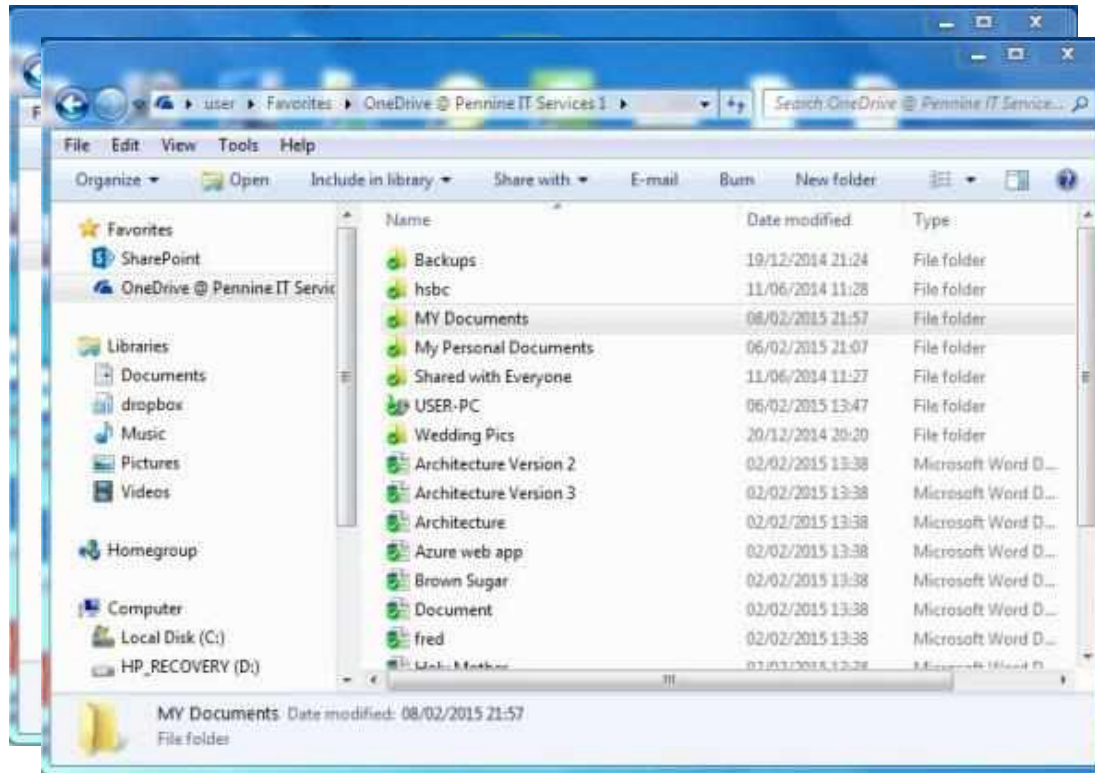
What are the 5's?



What are the 5's?



What are the 5's?



What are the 5's?







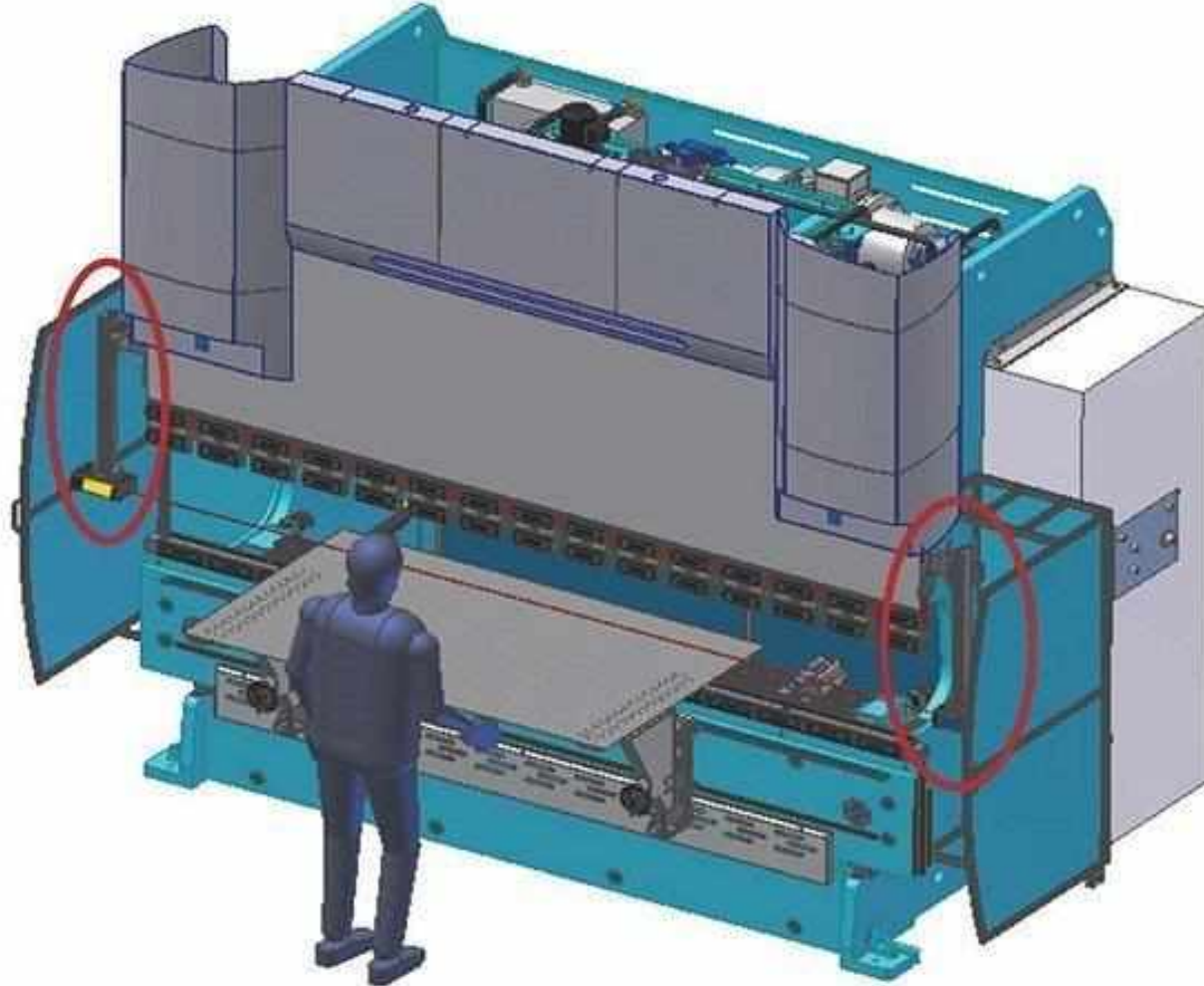
Lean Six Sigma SMED



SMED

(Single Minute Exchange of Dies)



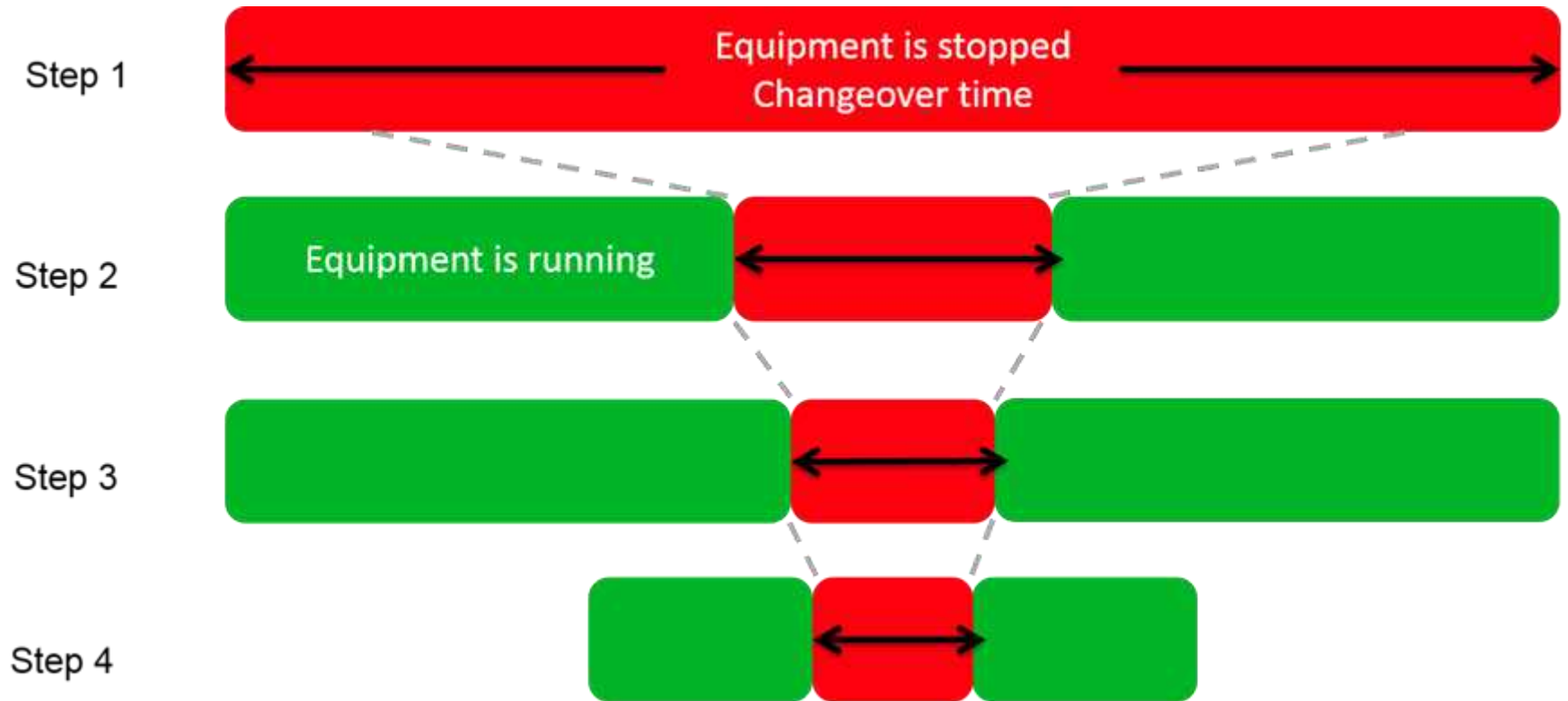




SMED

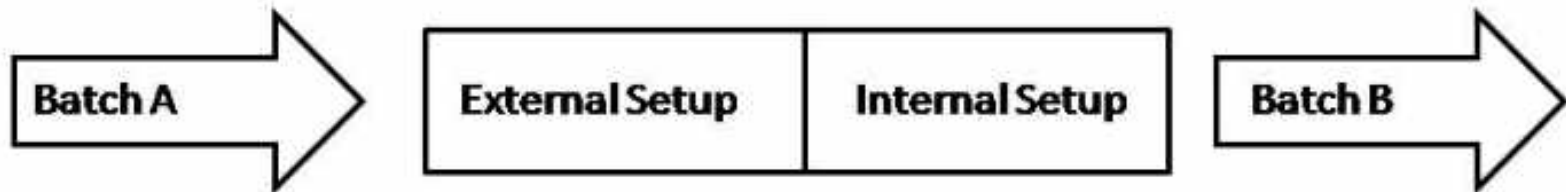
(Single Minute Exchange of Dies)



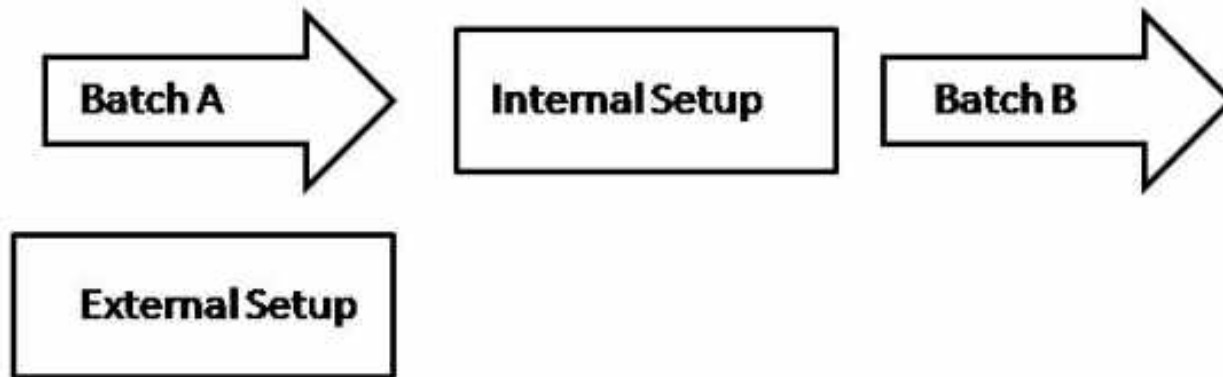




Stage 1 – Identify External and Internal Setup Activities



Stage 1 – Separate External Activities





GIVE  BLOOD
Save Lives



dcm THE
LEARNING
EXPERTS

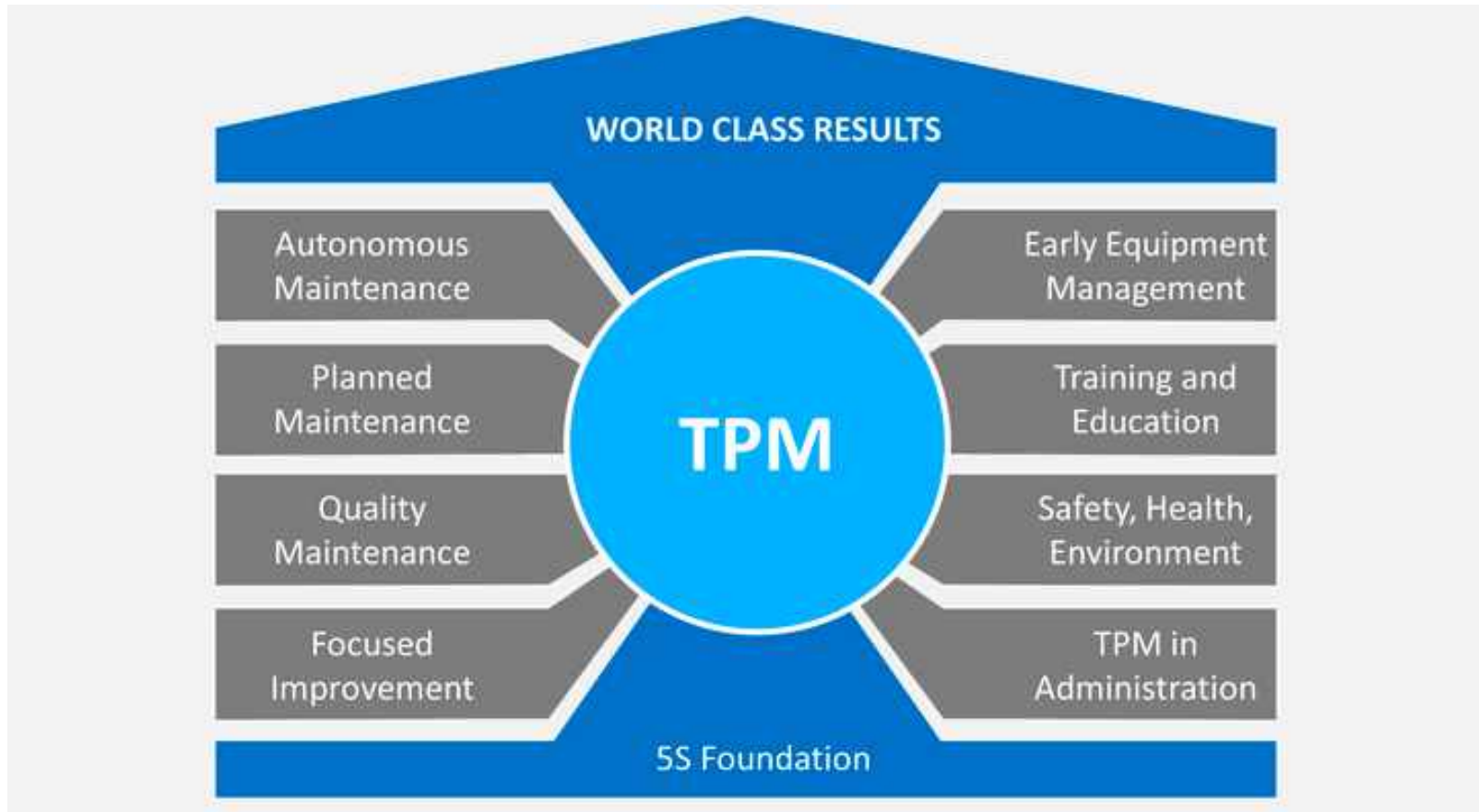




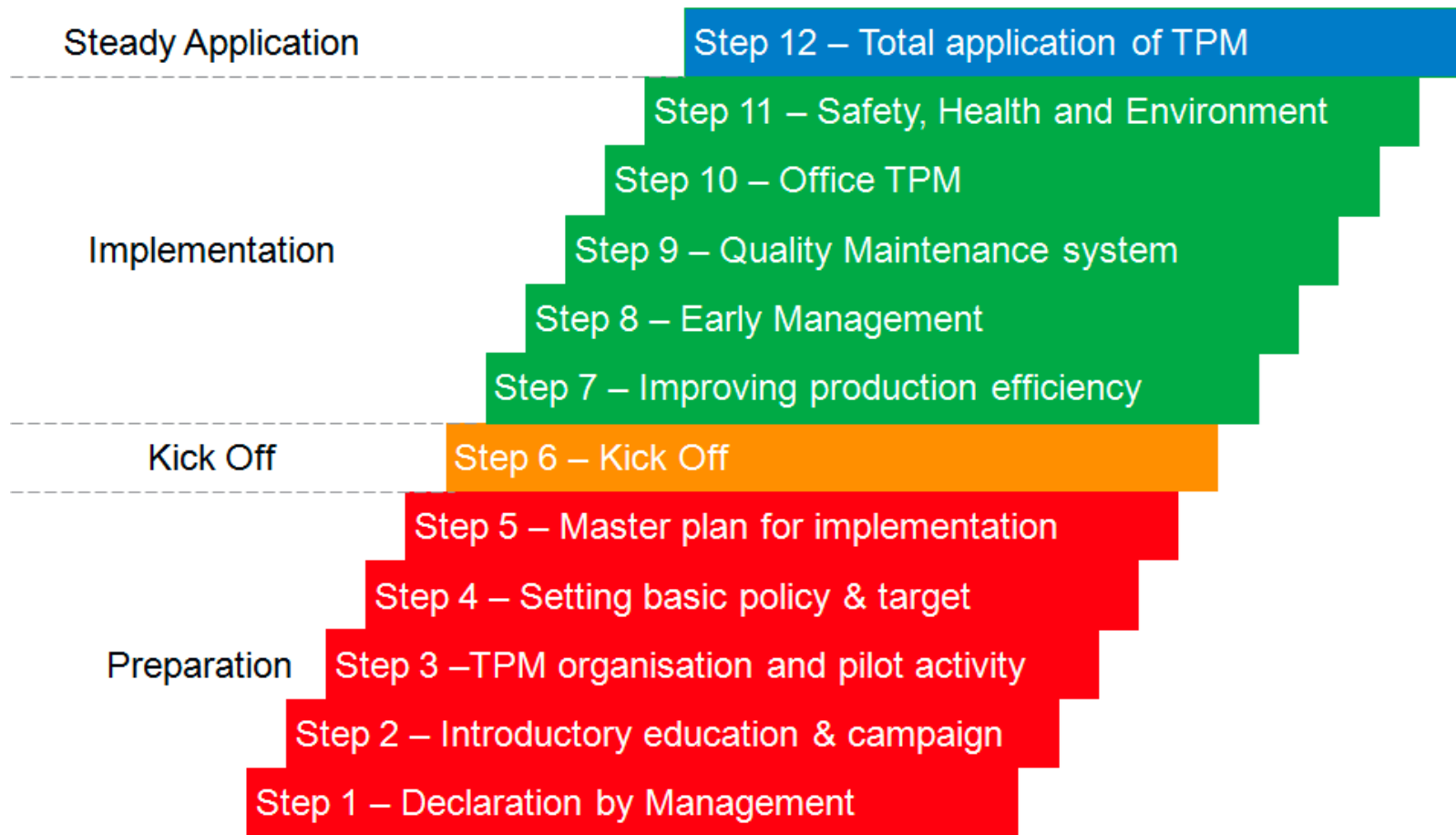
Lean Six Sigma TPM



Total Productive Maintenance (TPM)



Total Productive Maintenance (TPM)



Total Productive Maintenance (TPM)

The screenshot displays the Microsoft Excel interface with the 'TPM Template' open. The ribbon is set to the 'Home' tab, showing options for font, paragraph, and cell formatting. The spreadsheet grid shows a header row (A-N) and a data area (A-N) with columns for months (Jan-Dec) and rows for categories (Segment, Buildings, Equipment, Personnel, IT, Hardware, Utilities). The data area is currently empty.

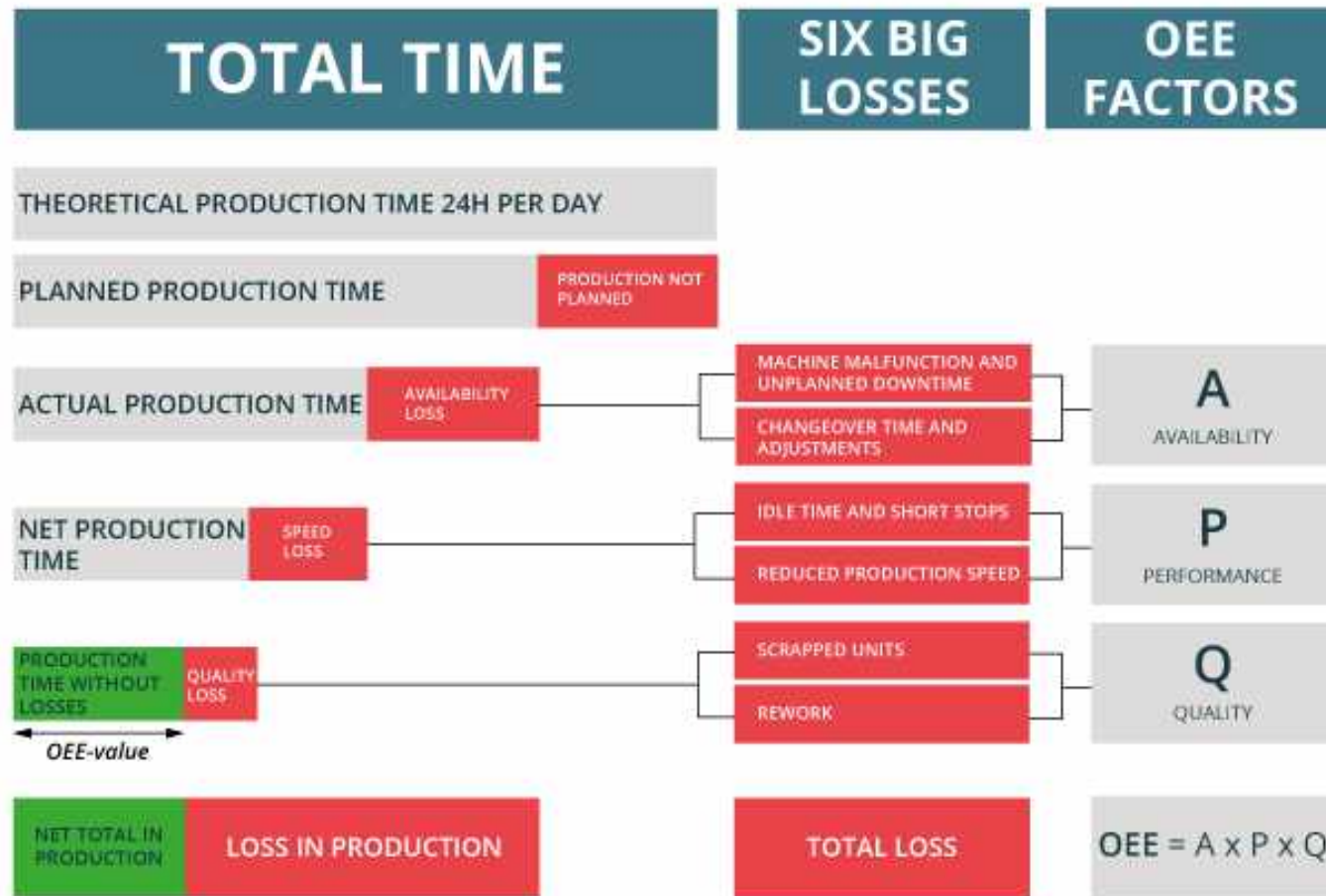




Lean Six Sigma OEE



Overall Equipment Effectiveness (OEE)



Overall Equipment Effectiveness (OEE)

PREFERRED CALCULATION

The preferred OEE calculation is based on the three OEE Factors: Availability, Performance, and Quality.

$$\text{A} \times \text{P} \times \text{Q} = \text{OEE}$$

OEE is calculated by multiplying the three OEE factors: Availability, Performance, and Quality.

Overall Equipment Effectiveness (OEE)

Overall Equipment Effectiveness	Recommended Six Big Losses	Traditional Six Big Losses
Availability Loss	Unplanned Stops	Equipment Failure
	Planned Stops	Setup and Adjustments
Performance Loss	Small Stops	Idling and Minor Stops
	Slow Cycles	Reduced Speed
Quality Loss	Production Rejects	Process Defects
	Startup Rejects	Reduced Yield
OEE	Fully Productive Time	Valuable Operating Time

Overall Equipment Effectiveness (OEE)

Availability takes into account all events that stop planned production long enough where it makes sense to track a reason for being down (typically several minutes).

Availability = Runtime / Planned Production Time

Overall Equipment Effectiveness (OEE)

Performance takes into account anything that causes the manufacturing process to run at less than the maximum possible speed when it is running (including both Slow Cycles and Small Stops).

Performance is the ratio of Net Run time : Run Time

Performance = Ideal cycle time * Total Count / Run Time

Overall Equipment Effectiveness (OEE)

Quality takes into account manufactured parts that do not meet quality standards, including parts that need rework.

OEE Quality is similar to RTY, in that it defines Good Parts as parts that successfully pass through the manufacturing process the first time without needing any rework.

Quality = Good Count / Total Count

Calculating OEE

Calculating OEE:

EXAMPLE

$$\text{Availability} = \frac{\text{Running time}}{\text{Net operating time}} = \frac{360 \text{ minutes}}{480 \text{ minutes}} = \mathbf{0.75} \text{ (x 100 = 75\%)}$$

$$\text{Performance} = \frac{\text{Actual output}}{\text{Target output}} = \frac{648 \text{ lbs}}{1080 \text{ lbs}} = \mathbf{0.60} \text{ (x 100 = 60\%)}$$

$$\text{Quality} = \frac{\text{Good output}}{\text{Actual output}} = \frac{518 \text{ lbs}}{648 \text{ lbs}} = \mathbf{0.8} \text{ (x 100 = 80\%)}$$

$$\text{OEE} = 0.75 \times 0.6 \times 0.8 \times 100 = \mathbf{36\%}$$

dcm THE
LEARNING
EXPERTS

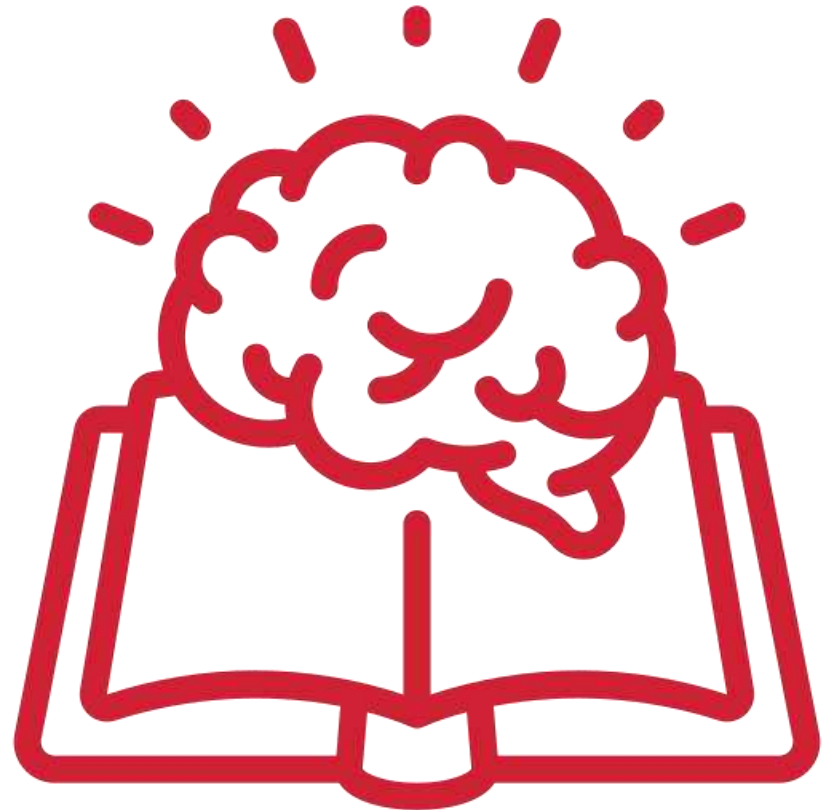


Lean Six Sigma Gemba



Gemba Walks

- Frequent
- Respectful
- To observe
- To learn





6-Step Gemba Walk Preparation







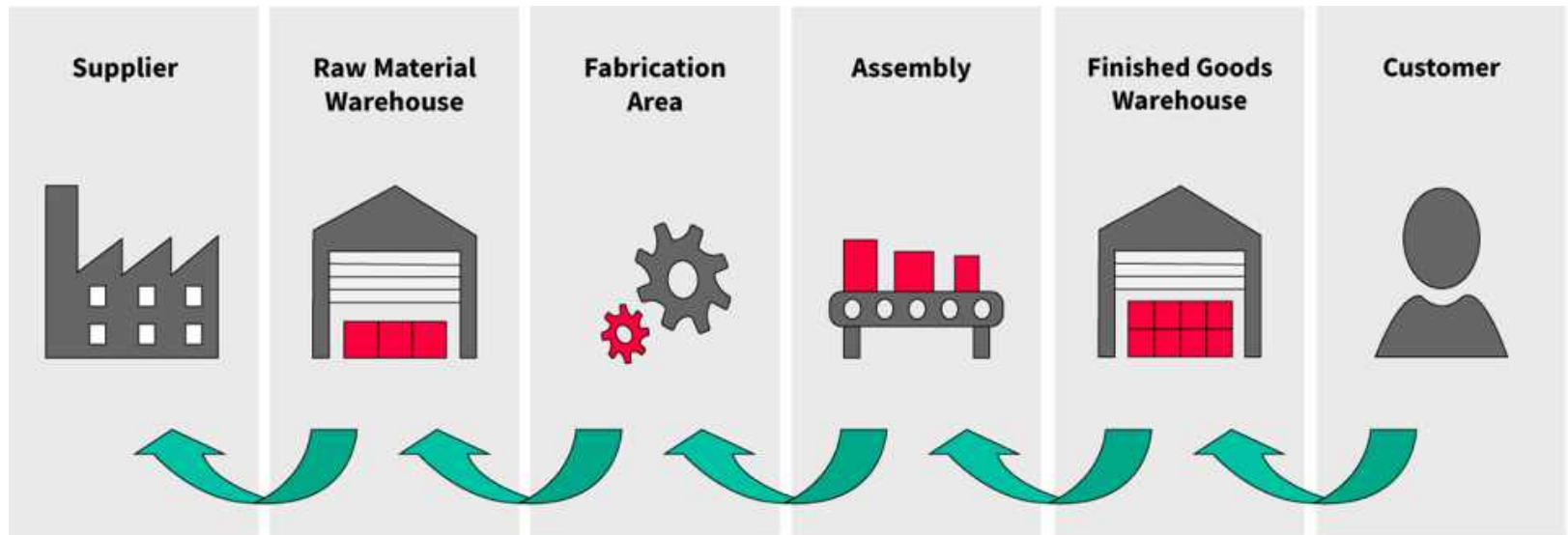
Lean Six Sigma KanBan



Kanban



Kanban



McDonald's menu board displaying various items and prices:

Item	Price
Small Coke™	~90
Cold Coffee	~90
EXTRA VALUE MEAL	Meal for \$15
1 McVeggie™	Meal for \$85
2 Peanut Butter Wrap	Meal for \$119
3 McChicken™	Meal for \$99
4 Cheese Chicken Meal™	Meal for \$119
5 Pico-O-Pito™	Meal for \$119
6 Chicken Chicken Wrap™	Meal for \$119
7 Chicken...	Meal for \$119



Kanban

Do not replenish



Replenish



Kanban



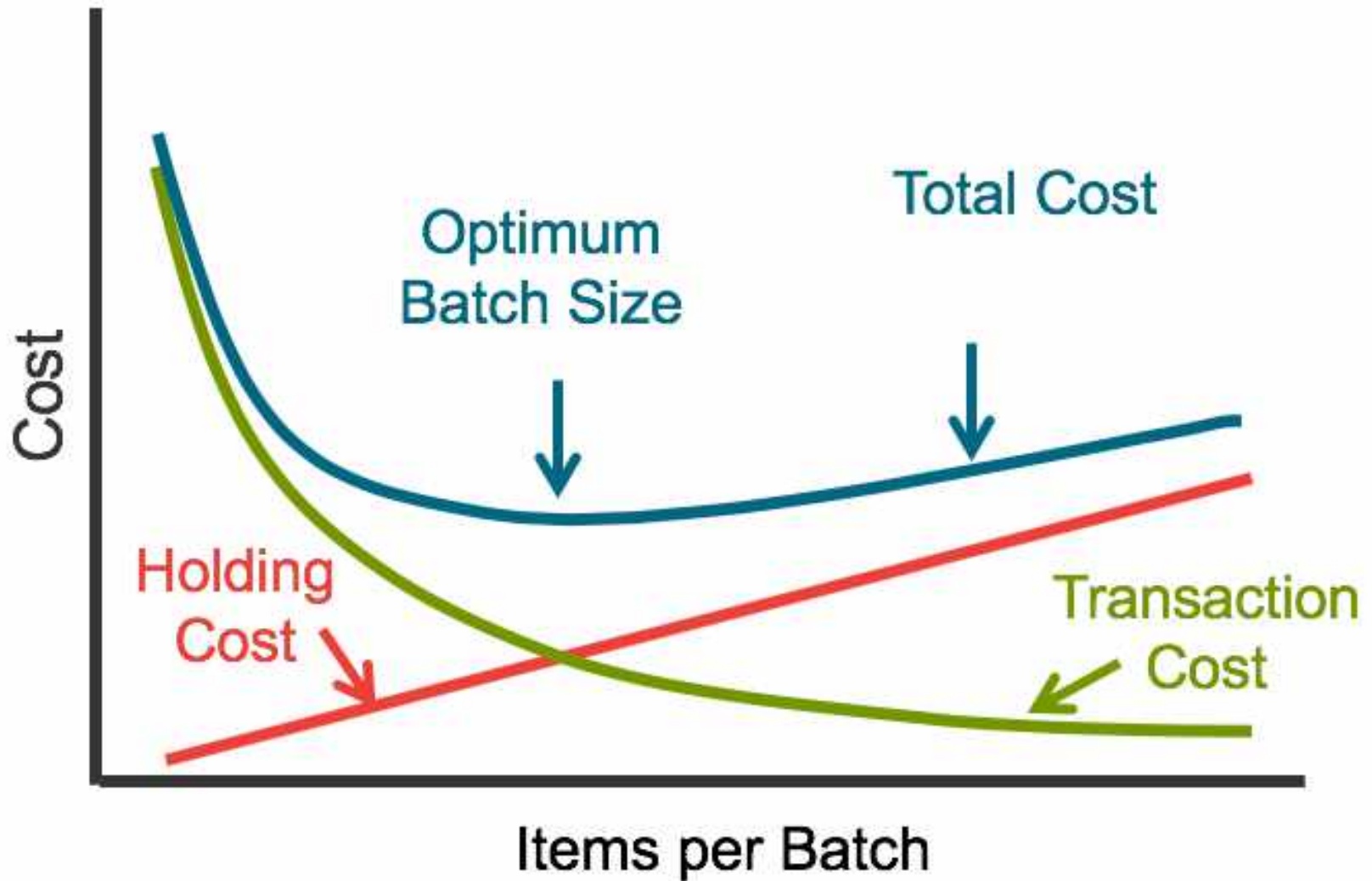
Kanban card w/ reorder info

Kanban Board

Backlog	Priority	In Progress	Done
404 Bug	Load Time	Comments	New Shapes
Calendar	Free Draw Glitch	New Palettes	Landing Page Misfire
New Fonts	Customization		SVG downloads
			Redesign



Batch Quantity



5 Factors That Influence Card Formulas

- ☐ Customer takt
- ☐ Regular time of replenishment system
- ☐ Changes in replenishment system
- ☐ Customer changes
- ☐ Buffer/safety margin

Number of Kanban

=

$$DT(1+x)/C$$

Number of Kanban = $DT(1+x)/C$

D: Demand per unit of time

T: Lead time

C: Container capacity

X: Buffer, or safety factor

