



People Centric - Asset Management

Nov 20th 2019

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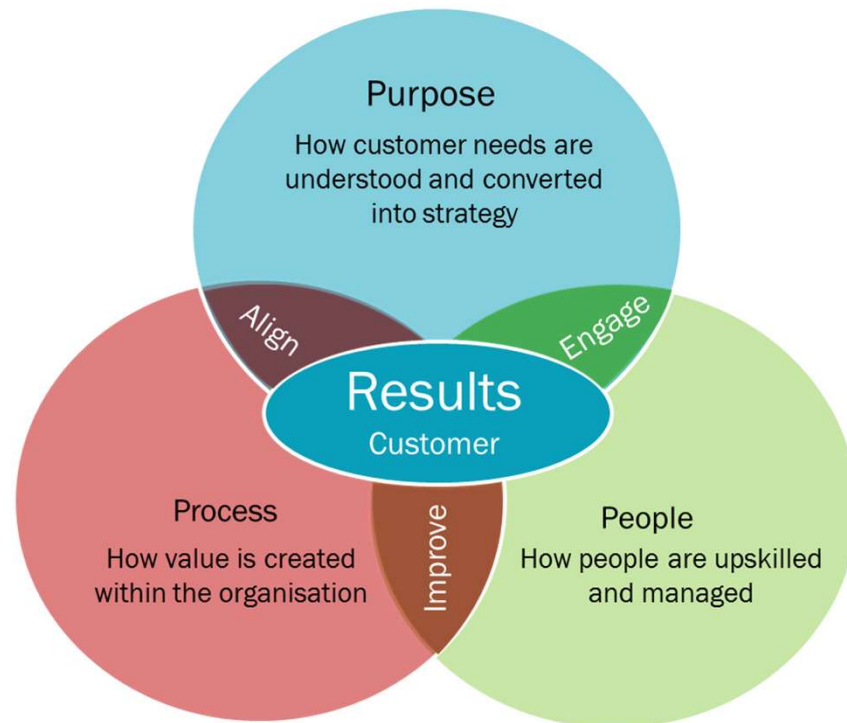
What is Asset Management about ?

- ▶ Asset Management is about establishing the correct **relationship** between **people** and their equipment to create **‘ownership’**
- ▶ It’s about unlocking our installed productive capacity by unlocking the **potential of our people**
- ▶ Asset management is about maintaining that **flow** through **our critical assets**

Its all about teamwork



Asset Management is an enabling Philosophy for Enterprise Excellence



- ▶ It aligns Process Capability with the businesses strategic purpose
- ▶ Defines a **system** by which the process capability is continually challenged and improved
- ▶ **Engages** and develops the skills of individuals working within the process
- ▶ It quickly delivers tangible business **results**

Five founding principles of Asset Management (TPM)

Principle 1

Increase the Overall Equipment Effectiveness (OEE)

Principle 2

Improve existing Planned Maintenance systems (PM)

Principle 3

Make front line routine Asset Care part of the job

Principle 4

Increase Skills

Principle 5

Early Equipment Management

Principle 1: Myths & Realities of OEE

Myth:

An OEE of 85% is World Class

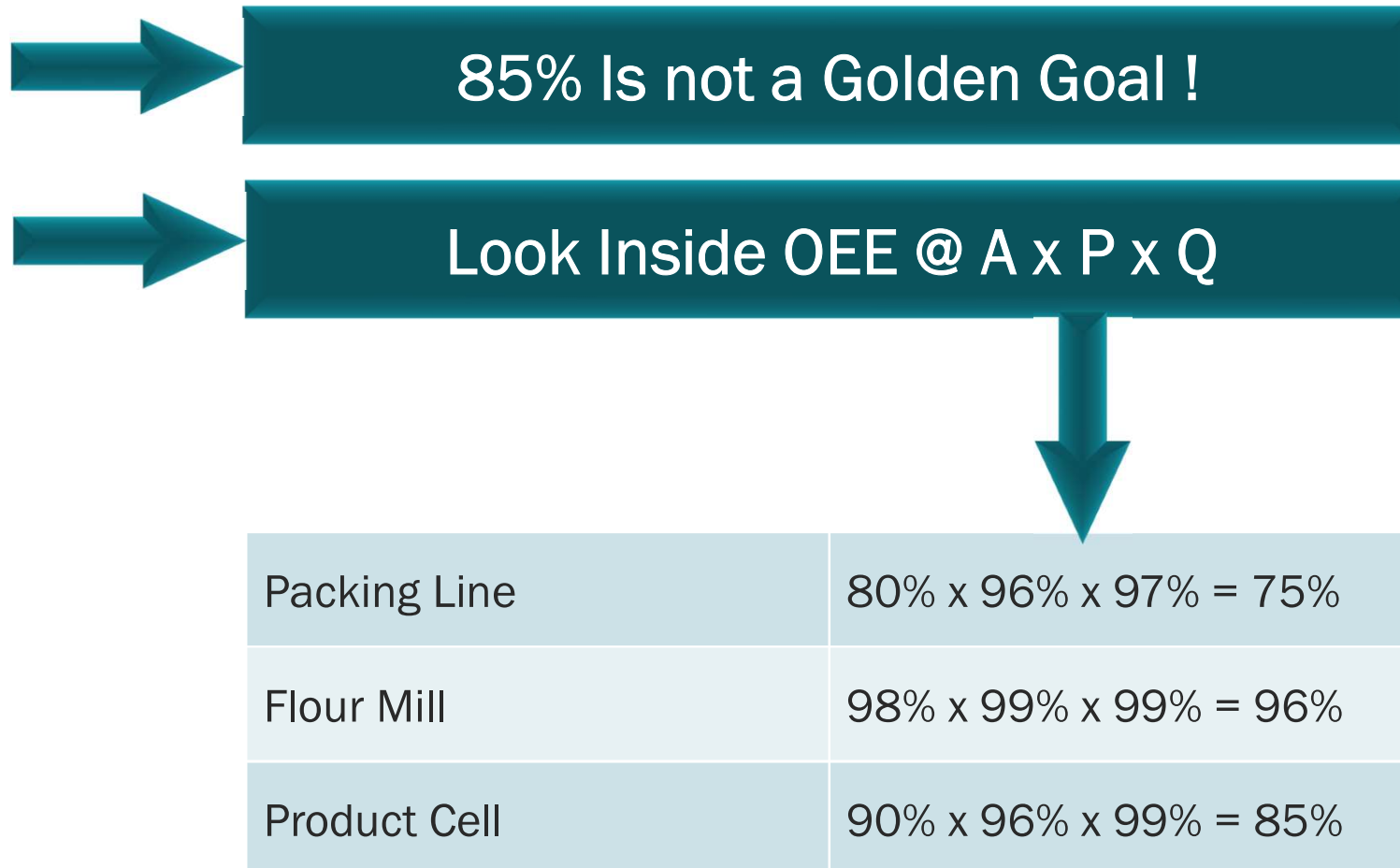


Reality:

It certainly is NOT
We didn't let the Japanese finish their sentence !

For typical semi-automated machine center with multiple change overs
(Seiichi Nakajima)

World Class OEE

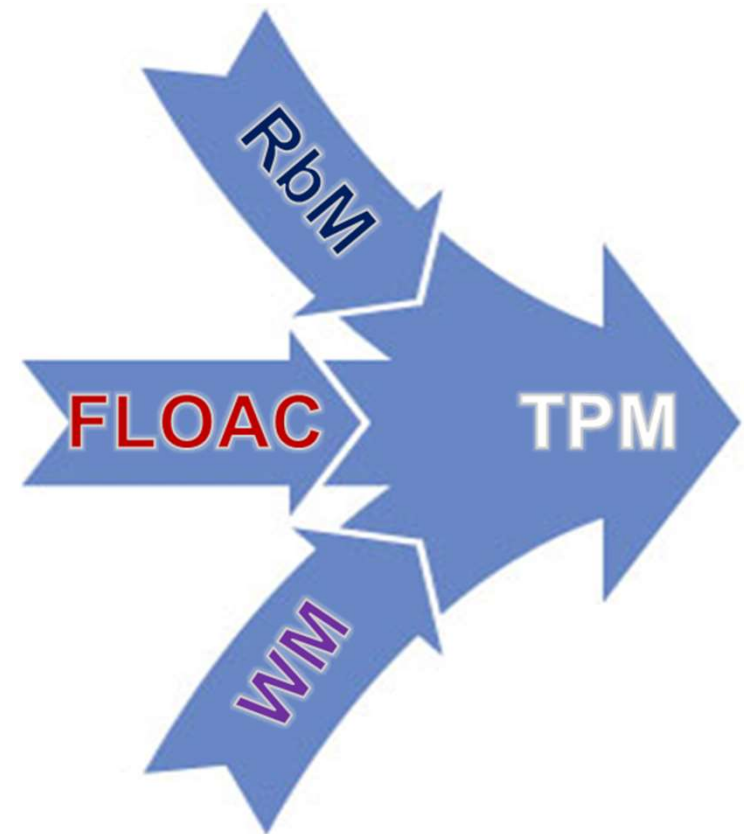


Asset Management – Links

A successful TPM Program encompasses Reliability by using data to measure, understand and improve the performance of equipment.

The TPM Program also includes Work Management to ensure work is identified, prioritised, planned, scheduled, executed and analysed to minimise the impact of downtime on our assets.

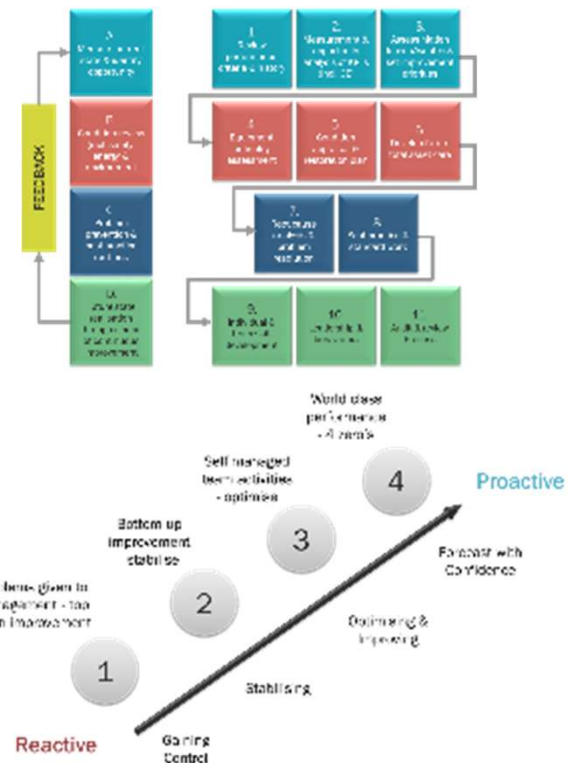
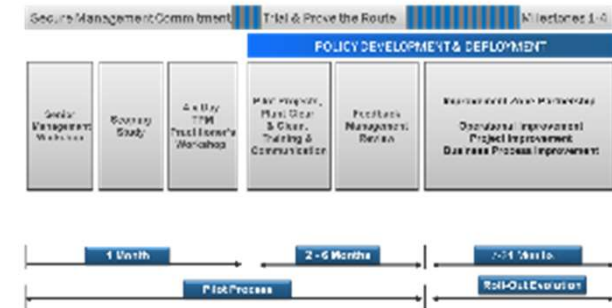
Finally the TPM Program includes FLOAC to identify and address potential abnormalities before they become a breakdown.



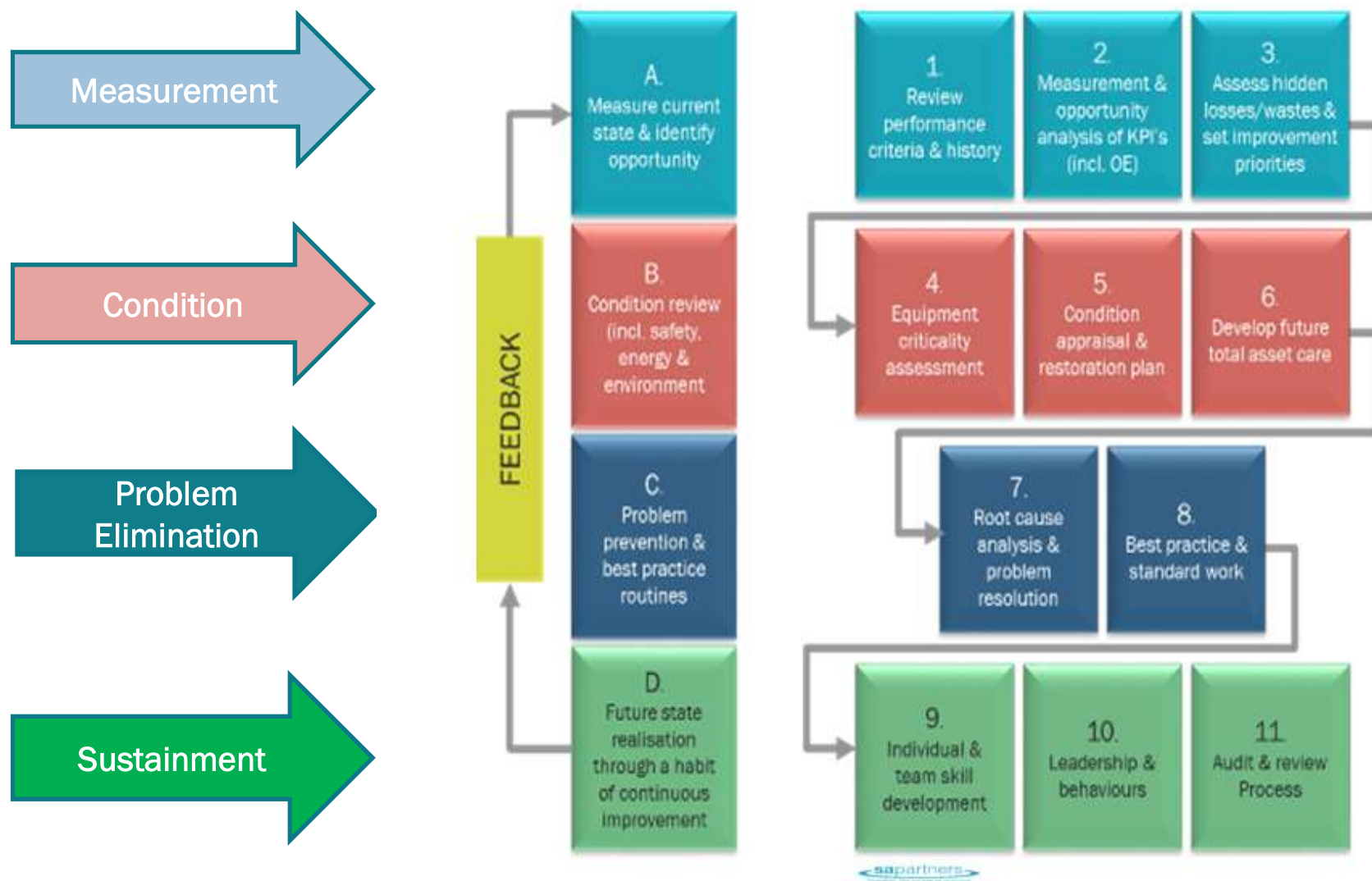
TPM Program Elements can start independently but need to align and then converge to gain maximum benefits and efficiencies

The TPM System Model

- ▶ Our TPM programme is applied via a defined introductory and deployment process within the business unit - *Purpose*
- ▶ The application of our TPM model is applied through a defined sequence of team based '*learning by doing*' activity - *Process*
- ▶ The outputs of this application are aligned to an evidence based assessment process linked to the teams progress through the model - *People*



Four cycle - 11 step TPM



Best of Best - BoB

A.
Measure current
state & identify
opportunity

- Thinking about potential interim and long term targets



Self assessment example

	Availability %	Performance Rate %	Quality Rate %	OEE %
	<ul style="list-style-type: none"> ▶ Breakdowns ▶ Set Ups/ changeovers 	<ul style="list-style-type: none"> ▶ Running at reduced speed ▶ Minor stops & idling 	<ul style="list-style-type: none"> ▶ Scrap rework ▶ Start-up losses 	
Current 4 Wks average OEE	80	90	97	70
4 weeks' Best of Best (BoB)	90 (Wk1)	95 (Wk3)	98 (Wk1& 4)	84
World Class	95	96	99	90

Difference between current average & BoB is $(14/70) \times 100\%$
 = 20% real improvement In productive capacity

The Impact? What is BoB and World Class OEE performance worth to us?

If this asset is planned to be manned for 168 hours per week

- ▶ At 70% OEE we only achieve 118 productive hrs / week
- ▶ At 84% OEE we can achieve 141 productive hrs / week
- ▶ Yielding a benefit of 23 productive hrs / week or 1,150 hrs / year

A *choice* of flexibility at 84% OEE that we do not enjoy at 70% OEE

(when we hit world class levels of 90% OEE the benefit is worth 1,660 extra productive hrs/year)

Criticality assessment outputs

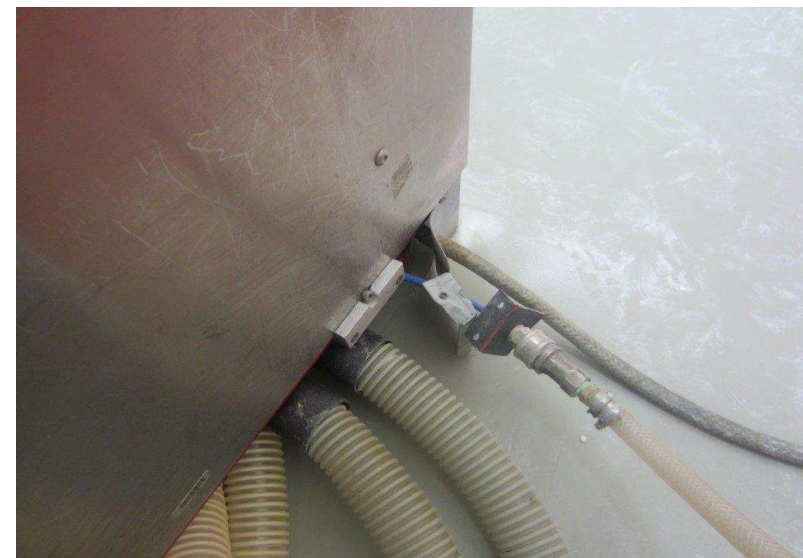
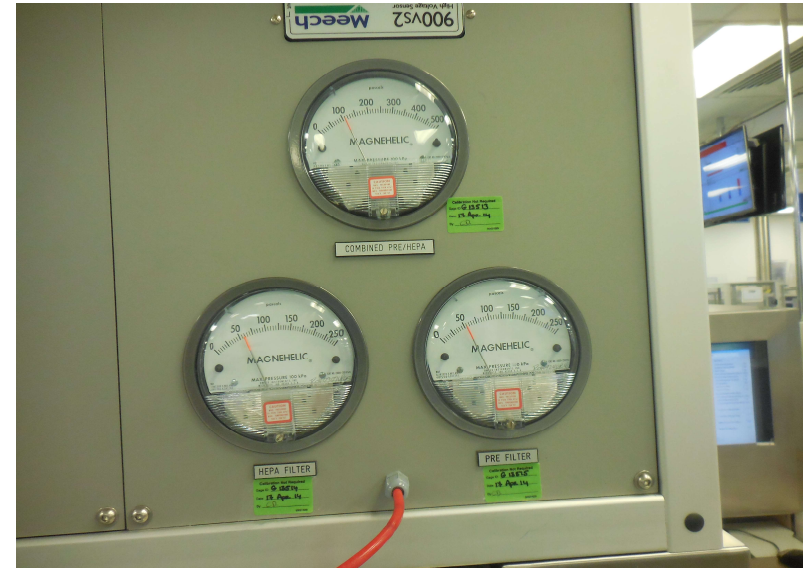
B.
Condition review
(incl. safety,
energy &
environment)

- ▶ Builds teamwork between operators & maintainers
- ▶ Understanding of the equipment functionality
- ▶ Checklist for condition appraisal (Step 5a)
- ▶ Focus for future TPM Asset Care (Step 6)
- ▶ Highlights safety & environmentally critical items
- ▶ Potential impact on OEE
- ▶ Highlights weaknesses regarding:-
 - ☑ Ease of operation
 - ☑ Inherent reliability
 - ☑ Ease of maintenance

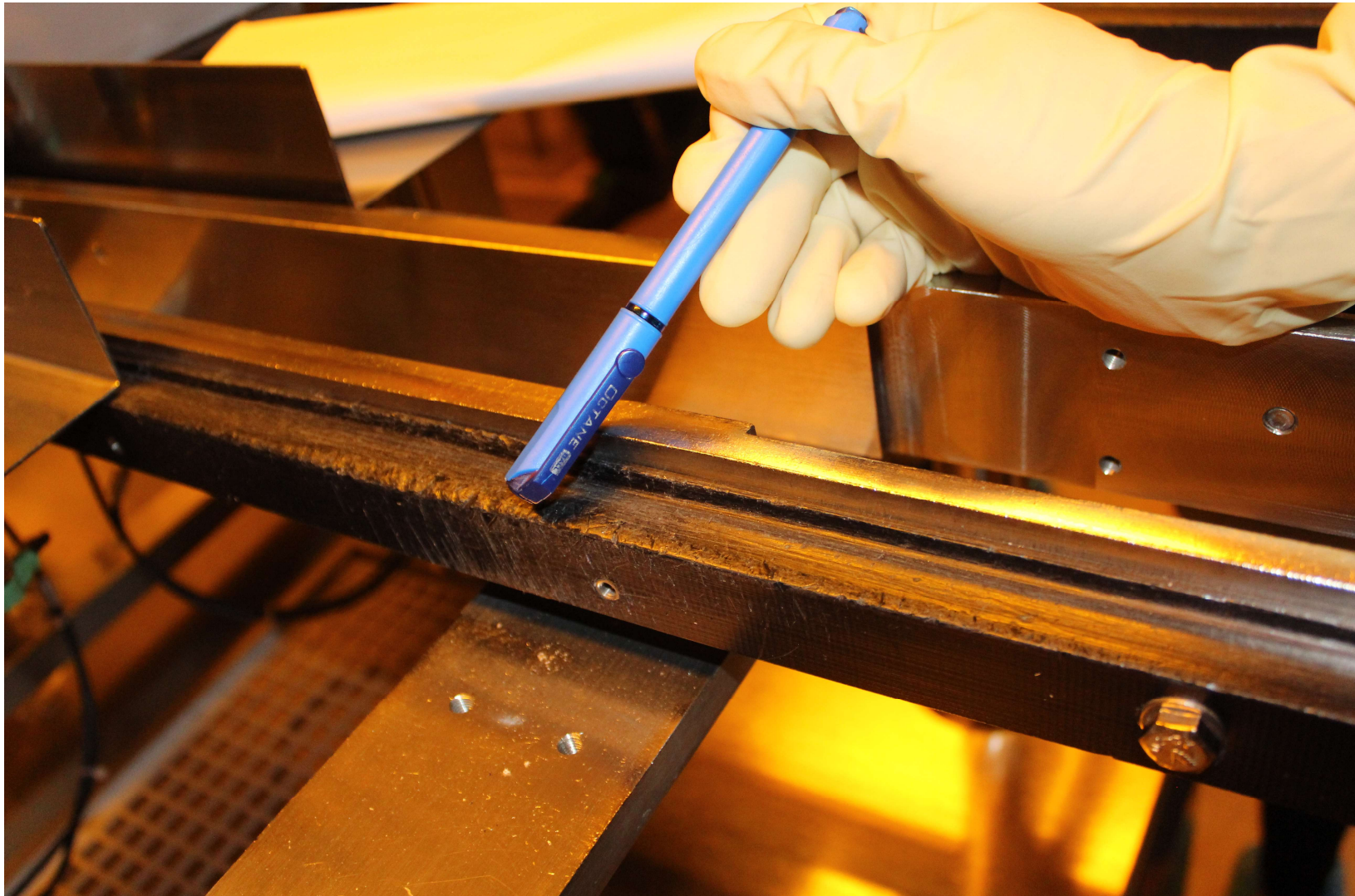
Condition appraisal examples – Obvious



Condition appraisal examples – Less obvious

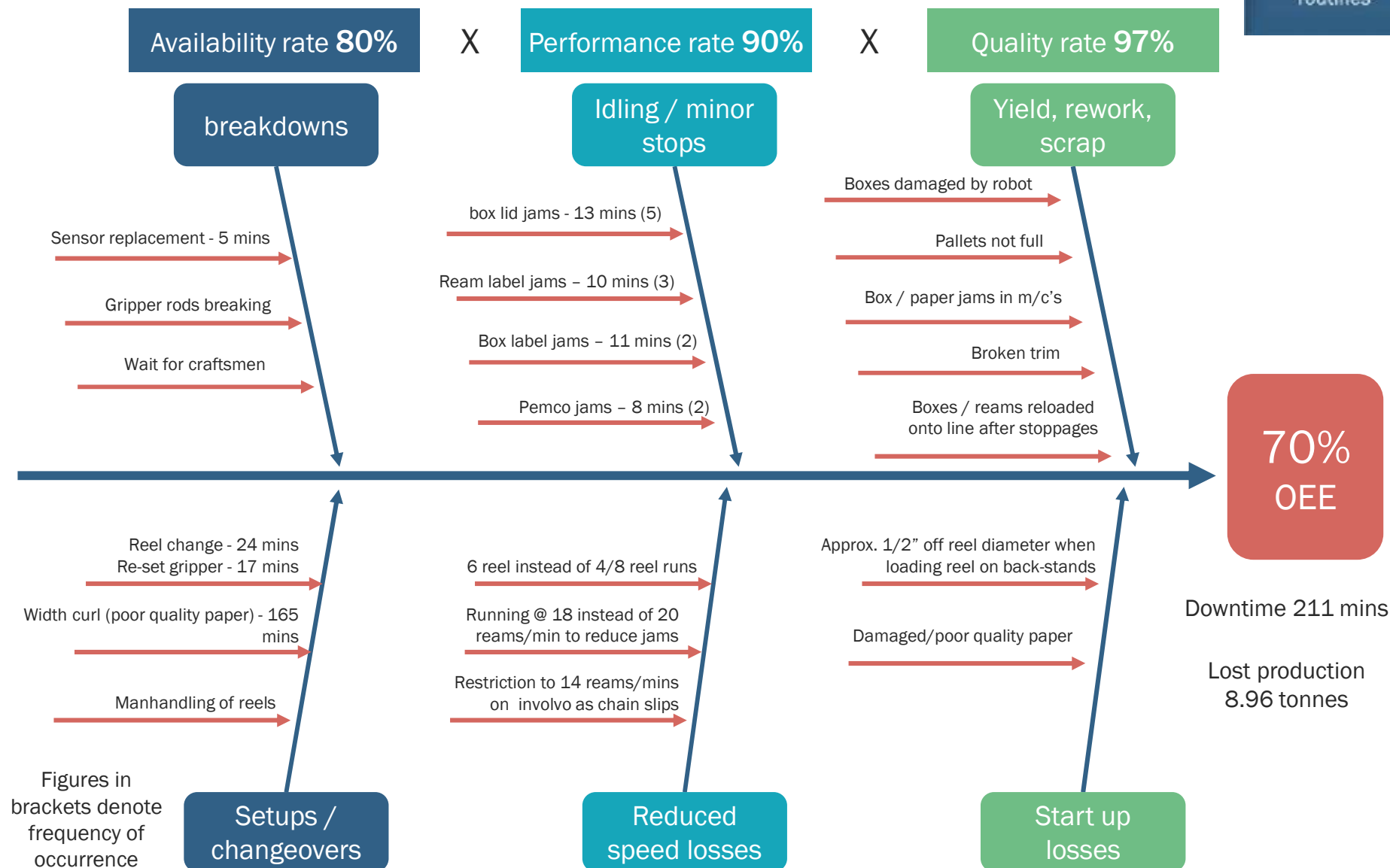


Condition appraisal examples – Less obvious



Fishbone format for assessing 6 losses

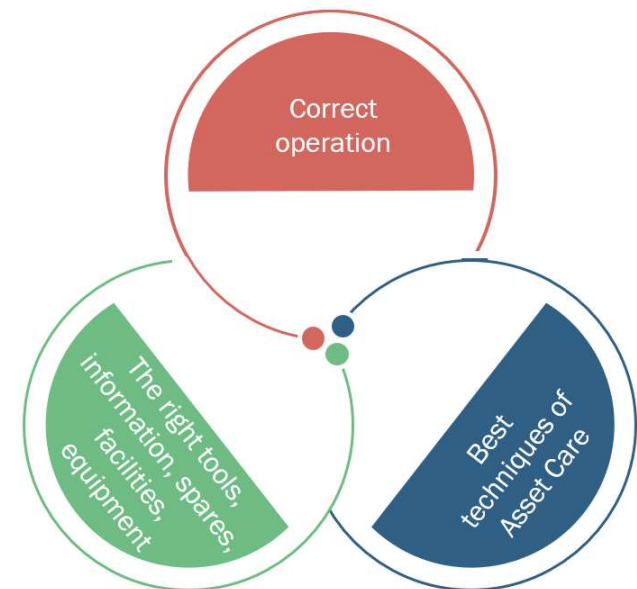
C.
Problem
prevention &
best practice
routines



Best practice routines

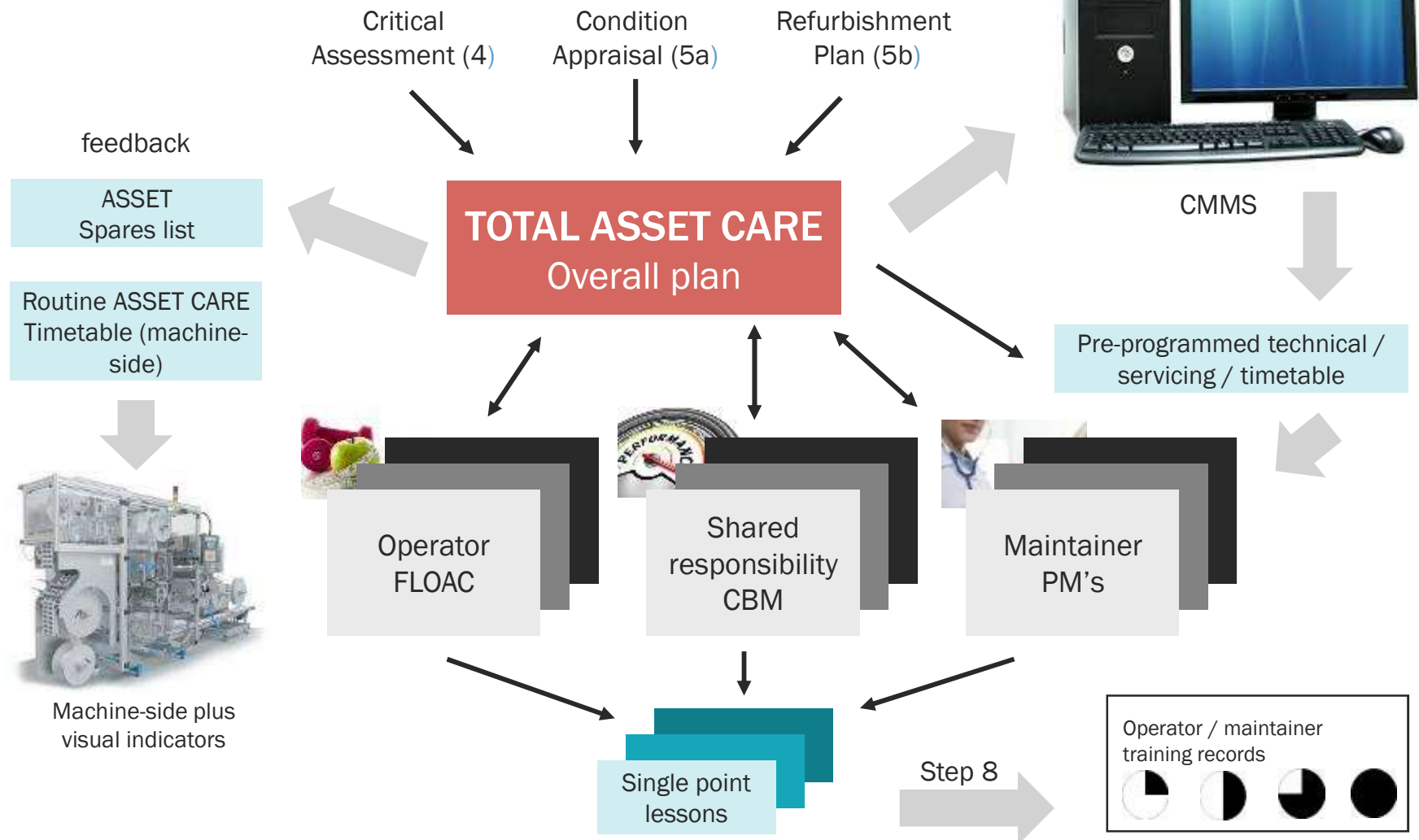
C.
Problem
prevention &
best practice
routines

- ▶ Agree best practice framework
- ▶ Standardise (train and assess)
- ▶ Practice and refine (pass on lessons learnt)



Develop future Total Asset Care

Develop Asset Care lists, inspection and PM's



Eliminating breakdowns and other 'unplanned' events - the reality

- ▶ For every 100 unplanned breakdowns or minor stoppages:
 - ↓ 40 can be eliminated by refurbishing and hence restoring equipment to standard conditions
 - ↓ 20 can be eliminated by applying appropriate daily asset care checks and best practice routines of operation
 - ↓ 25 can be eliminated by applying regular and relevant condition monitoring and planned maintenance
 - ↓ 15 can be eliminated by designing out physical weaknesses in the equipment

Do you still think It's the other way around ?



4 milestones of Asset management & team performance



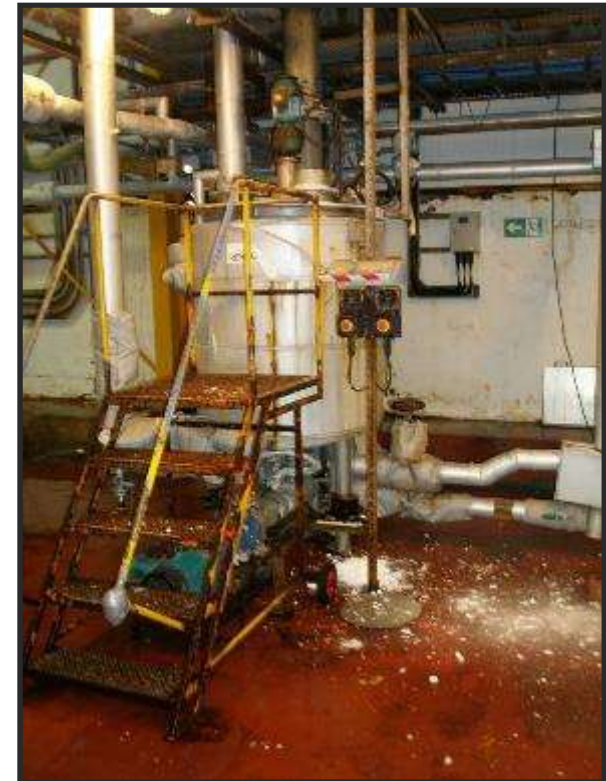
Where would you prefer to work? (33% OEE)



Hammer Rash



**Product Waste
& Contamination**



Safety Hazard

Where would you prefer to work? (33% OEE)

Safety Hazard & contamination & yield Loss



Where would you prefer to work? (74% OEE)



In a plant with well designed, fit for purpose, reliable and well maintained equipment? –(Same place 20 weeks later Having been TPM 11 Stepped)

Where would you prefer to work? (74% OEE)



In a plant treated with TLC- where it's easy to do a good job-safely

Why Asset Management and Links to business drivers? (Example)

Company ABC business drivers	Potential impact of TPM
Increase capacity	3
Demonstrated output reliably & consistently	3
Schedule adherence	3
Reduce accidents & near misses through safety culture	3
Best in class re GMP & regulatory compliance	1
New products & markets	1
Increase sales / balance per litre (FTR)	2

Where 0= none ,1= some, 2 =significant, 3=major



Case Study Examples

A Case Study – Food processing

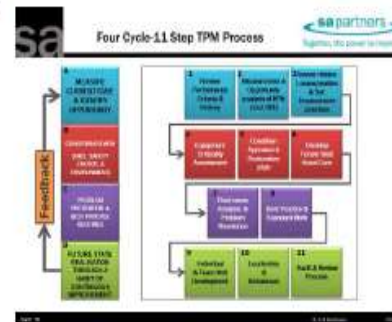
TPM in a Food Processing Plant

Client Testimonial

- The Client recognised that in order to fulfil an increase in sales of a main product line to meet retail customers' demand, an improvement in productivity was required. Significant improvements in productivity had already been achieved through line optimisation work. This had been carried out to reduce product waste, reduce product giveaway and reduce manufacturing cost per kilo. Although this had improved and stabilised performance, the rate of further improvement was proving somewhat of a challenge.
- It was decided that the next phase of their improvement journey (line optimisation phase two) would be TPM (Total Productive Maintenance) and the use of O.E.E. to measure productivity and subsequent productivity improvements.

Highlights of the Intervention

- Practical, hands on 'learning by doing' workshop
- Improved cross functional team working
- Increase in keys skills of all involved
- Improved 'equipment consciousness'
- Governance structure for sustainability and roll out



Increase in OEE from 54% to 70%



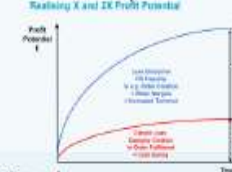
Reduction in minor stops 700 mins per week to 200



Benefits Delivered

Financial

- Profitable sales growth (X versus 2X) with 30% increase in capacity to handle additional sales volume
- 8% reduction in cost per kilo



Operational

- Increase in OEE from 54% to 70%
- Reduction in minor stops from 700 minutes per week to 200
- Improved product quality, reduced defects, reduced customer complaints

Ways of Working

- The working relationship between maintenance and production has improved significantly and the periods between planned maintenance activities have been extended as a result of the implementation of Operator asset care checks. This has allowed the maintenance team to carry out predictive maintenance such as Condition-based monitoring and thermography

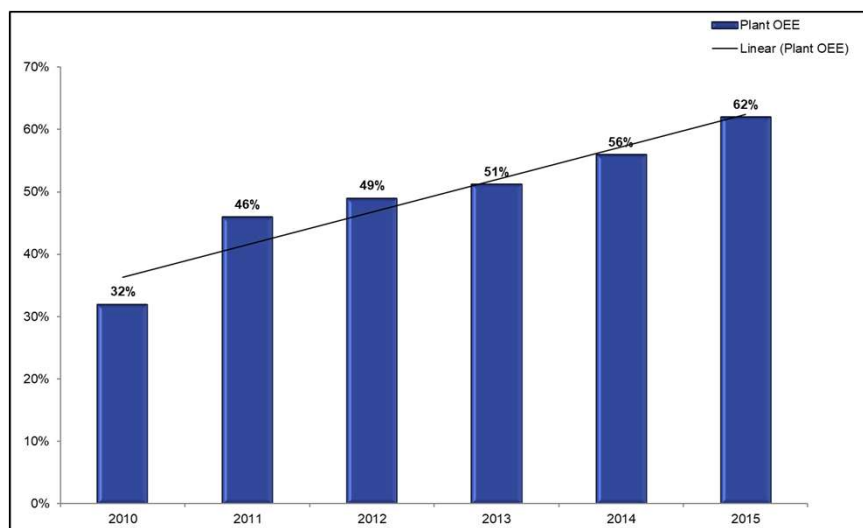
For more information visit
www.sapartners.com

A Case Study – Pharma

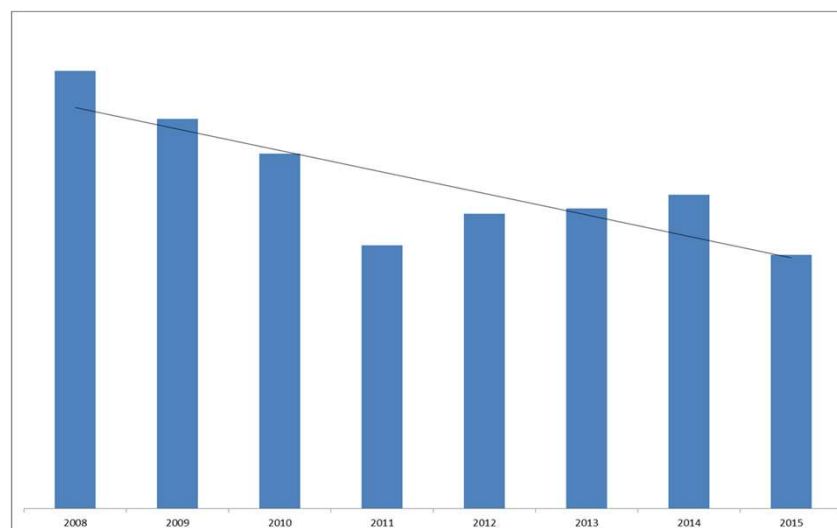
Site wide results over 3 years using Asset Management (TPM) as the major driver

	Reference Year	3 Years Later	% Change
Maintenance Cost per Pack	\$0.084	\$0.031	-64%
Energy Cost per Unit of Output	\$0.063	\$0.024	-62%
Output Units per Head count	120,192	189,434	+37%
Total Cost per Unit of Output	\$0.85	\$0.48	-48%
Site wide OEE	32%	51% (63% @ 6 years)	+59%

Plant OEE Average



Cost per pack



A Case Study – Utilities

Asset Optimisation was the approach based on the fact that Welsh Water had been running a RCM (Reliability Centred Maintenance) programme that had yielded a mixture of results in terms of tangible benefits but had not delivered in terms of the ‘ownership’ culture change that the lean programme aspired to achieve. RCM is a tool above the waterline (see figure 4 below) and on its own, without all the clearly defined strategy, embracing the right management behaviours and leadership below the waterline, no matter how well deployed, benefits will not be sustained.

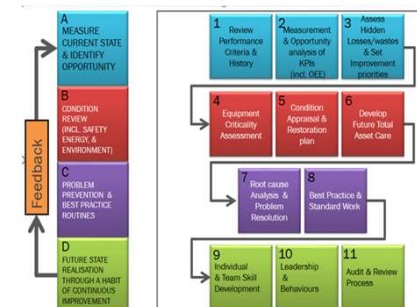
The aim of the AO was to improve sludge quality (within a consistent range of 6.5% to 7.0%), and improve reliability of the equipment which would ensure a smooth delivery to the next customer in the process; the digester. This would lead to a positive reduction impact on both the site's reactive costs as sludge "cost per tonne" and "cost to serve".

What are the main positives of AO for you?

Rhodri: “As the machinery on site now runs far more efficiently with fewer breakdowns, my work / life balance has improved significantly and I am far less likely to be called into work during evenings and at weekends now.”

John: “a great benefit is that Health and Safety risks are reduced in the workplace”

Rhodri: “I now know how, why and what I do in my role will affect how well my site performs and when important tasks need to be carried out to maintain the smooth running of the site, I feel far more in control now”



Asset Optimisation 4-Day Hands-on Workshop Programme

DAY 1	DAY 2	DAY 3	DAY 4
<ul style="list-style-type: none"> • Introduction to Asset Opt Interface-World class Comparison • Exercise-Maintenance Assessment • Asset Opt PRINCIPLES • CME 101 Power Play Start • Asset Opt TECHNIQUES • CME 102 • IMPROVEMENT PLAN 	<ul style="list-style-type: none"> • CONDITION CYCLE • Exercise - Disability Assessment (On-the-job) • AGENCY/STATE/LOCALITY Assessment Approval • Subpart/Return-to-Work 	<ul style="list-style-type: none"> • Review of Progress Since last session-Brain review of activity books • 6) Future Asset Case • PREVENTION CYCLE • (On-the-Job) • psychomotor Learning • Elder Practice-Books 	<ul style="list-style-type: none"> • PREPARE PRESENTATION • Dry Run Presentations • SYNOPSIS PRESENTATIONS • REVIEW AND KEY LEARNING POINTS • Note-ops • PROFITS & STAGE • BOLDOUT
<ul style="list-style-type: none"> • Visit to Police and Plan the Plan Equipment • Building Asset Opt Activity Books • Considering Measurement and Condition Cycles • MEASUREMENT CYCLE • (On-the-job) • Limbore/Research • CME 202 Measures • Not Low Assessment 		<ul style="list-style-type: none"> • PROBLEM PREVENTION CYCLE • COST. 	<ul style="list-style-type: none"> • Getting Started SUPPORTING THE PROFITS • Course Assessment



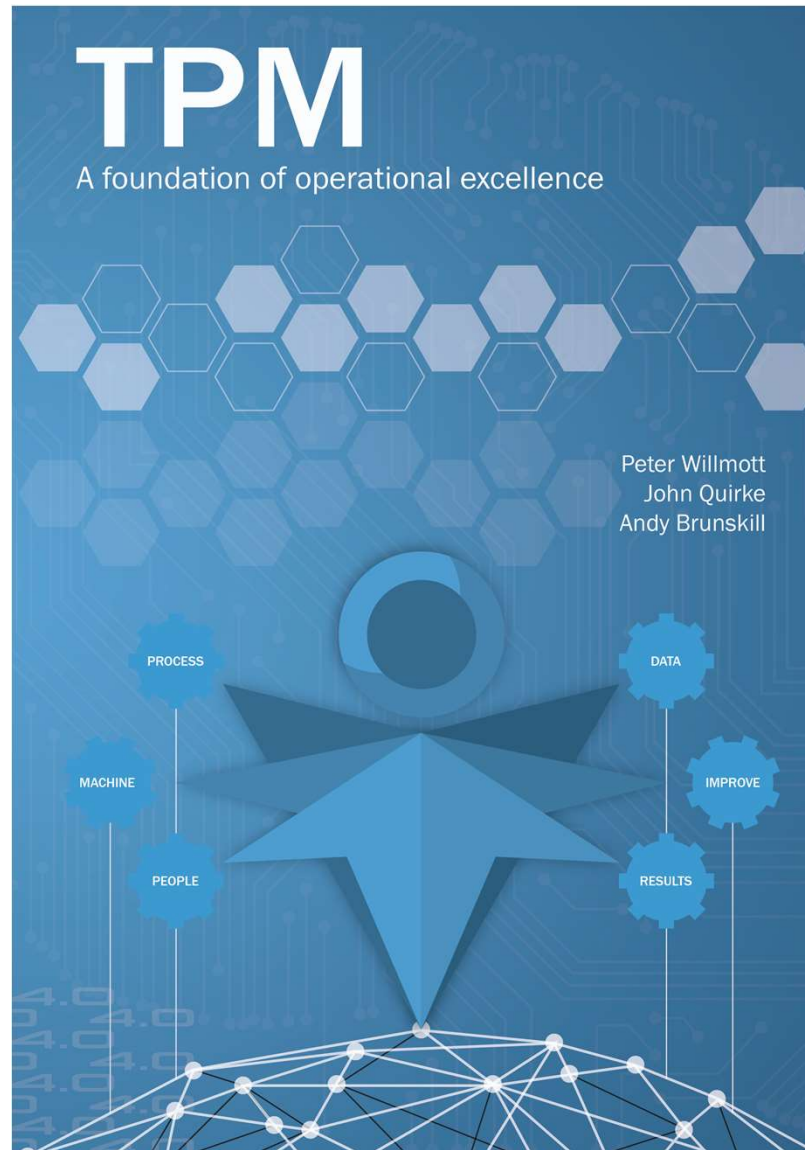
The 'end game' vision using the Asset Management 'enabling' tool - example

Achieving the 'end game' will require striving for....

- ▶ Zero accidents
 - ▶ Zero customer complaints / defects
 - ▶ Zero breakdowns
 - ▶ Zero minor stoppages & interventions
 - ▶ Plus...standard (and therefore safe) operating procedures
- ▶ Create a safe, fit for purpose working environment
 - ▶ Develop a team-based learning culture with appropriate individual skill sets
 - ▶ Use the skill sets to resolve problems and prevent reoccurrence
 - ▶ Drive behaviours based on robust standards, self determined asset care routines & operator / maintenance teamwork, resulting in equipment assets that are both reliable and predictable
 - ▶ Schedule adherence 100% on time in full and hence deliver the manufacturing programme
 - ▶ Assess progress through regular top down and bottom up evidence based audits
 - ▶ Create a 'world class' workplace through a visual factory where its easy to do things right and difficult to do things wrong

Asset Management / TPM

A foundation of Operational Excellence





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