

# Integrating 6 Sigma & Asset Management Programs (can it be the perfect marriage?)

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- *"The world is flat" Thomas Freidman*
- Globalisation of markets
  - Increasing pressure on manufacturing margins
  - Shrinking customer lead-time requirements
- Industry response
  - Optimise efficiency of operations 6 Sigma
  - Optimise availability of plant Asset Management
- Mixed success in SA





### Content

- Sleeping in separate beds
- Fuelling the divide
- The perfect marriage
- Secrets to success







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### Sleeping in separate beds

- Financial benefits ascribed to Lean 6 Sigma deployments are widely published
  - Increased production
  - Increased quality
  - Reduced costs
  - Reduced waste
- Similarly for mature Asset Management Programs
  - Reduced unplanned downtime
  - Increased plant availability
  - Reduced costs (productivity & efficiency)





### Sleeping in separate beds

- Very few success stories of an integrated approach between 6 Sigma & Asset Management (AM)
- Organisations view 6 Sigma & AM as mutually exclusive
  - Clearly defined boundaries
  - Same objectives, but sleeping in separate beds
- Are we not missing out on a potential multiplying effect of benefits?



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- For years, Lean and 6 Sigma were seen in the same light
  - had to choose between the one or the other
  - consultants refused to acknowledge common ground
- Wheat, Mills & Carnell broke down the barrier in 2003
- Now, virtually every 6 Sigma consultant offers Lean 6 Sigma deployments
  - Lean first (early wins)
  - Pave way for 6 Sigma projects





Lean & TPM





## Why Lean and not 6 Sigma?

- Maintenance personnel on the flour are typically very practically orientated
- Developed own techniques to "get the job done as quickly as possible"
- Adapt at "maak 'n plan"
  - without fully scoping the problem
  - or using data
- Busy with daily workload
  - no time to understand 6 Sigma concepts
  - no time to go through the DMAIC problem solving methodology to solve recurring problem





"At my factory we have a maintenance guy that is good at Lean, so the shop is well organised...they have dropped mold changeovers from 8 hours to 2 hours, but they are crap at keeping track of times to prove it. The Lean rolls right in, but the data analysis falls apart quickly"

Plastic Factory Owner: March 2008



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### Focus on core strengths

- Both Asset Management & 6 Sigma have long histories
- Built-up significant "know how" in respective fields
- Each should focus on core strengths
  - Asset Management
    - Shift maintenance culture
  - 6 Sigma
    - Continuous improvement of AM
    - Reduction of Variance
    - Utilise data generate by software system





### **Example: Increase Efficiency**





### **Pareto of Reasons**





### **Eliminate >45hr durations**





### **Example: Variation in MTTR**

- A certain piece of production equipment requires 10 hours of PM per week – how should it be scheduled?
- 24x7 operating environment (dependable events)
- Keep CV = 2
  - 1 x 10 hrs, SDEV = 20 hrs
  - 2 x 5 hrs, SDEV = 10 hrs
  - $-5 \times 2$  hrs, SDEV = 4 hrs
- Exact same availability
- Look at average queue length & SDEV



Data obtained from Preventative Maintenance Principles Course SPL 7.2 – part of MIT's ESD.60 course on Lean/Six Sigma Systems – as found on Internet



### **Example: Variation in MTTR**

### For exact same availability of equipment

Mean	Std Dev	Ave Q length	SDEV of Q length
1 x 10 hrs	20 hrs	56	63
2 x 5 hrs	10 hrs	38	52
5 x 2 hrs	4 hrs	8	8

#### Use DOE & Design for Six Sigma (DFSS) principles to optimise PM schedule

Data obtained from Preventative Maintenance Principles Course SPL 7.2 – part of MIT's ESD.60 course on Lean/Six Sigma Systems – as found on Internet



### **Example: Variation in MTTR**

### The Impact of Variation

Mean	Std Dev	Ave Q length	SDEV of Q length
1 x 10 hrs	20 hrs	56	63
2 x 5 hrs	10 hrs	38	52
5 x 2 hrs	4 hrs	8	8
5 x 2 hrs	6 hrs	56	57

#### Launch 6 Sigma project to reduce variation in MTTR

Data obtained from Preventative Maintenance Principles Course SPL 7.2 – part of MIT's ESD.60 course on Lean/Six Sigma Systems – as found on Internet



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### It does not just happen...

- Marriage does not just work because two potential partners are brought together. Need:
  - common vision, and
  - clear understanding of role of each partner
- Same for integrating AM & 6 Sigma. Need:
  - strategic alignment
  - clear deployment plant







- Senior Management commitment & drive
- Clear execution plan design team
- Deployment management & tracking
- Estimation, capturing & tracking of benefits



# **MNS** Senior Management commitment

- Conduct regular deployment reviews to validate progress
- Being certified as a Green Belt and completing at least
  2 projects per annum "walk the talk"
- Insisting on data-driven decision making in meetings
- Visibly prioritising 6 sigma & AM above other initiatives, projects & programs
- Using a "common language" throughout the organisation, based on 6 sigma & AM
- Linking, and communicating the links, between asset management, 6 sigma and the corporate strategy

# Mission Senior Management commitment

To whem it muy concern, Since you have just told clices he is fined, This note or to inform you that I now re-instate him e 2x his pay. Please don't fire him again an the is setting expensive, Thanks Bilmo



### **Clear execution plan**

- Early decisions will have largest impact on future results
- Cannot build a program based purely on training & projects (commodity approach)
  - companies & their cultures are not commodities
  - there is no "one size fits all" plan
  - it's not about job cards, planning, statistics & projects its about change!!
  - the point is to change the culture to get a different result
- The combined deployment must be aligned with the vision, mission & strategy of the company
- Responsibility of design team



### Execution Plan – Design Team

- Strategy Alignment
- Budget
- Language issues
- Metric of Program
- Change / Acceptance issues
- AM Tracking
- Project Tracking
- Benefits Capture
- Training Planning
- Certification / Accreditation
- Rewards & Recognition
- Career Management / Succession Planning

- Burning platform
- Financial targets
- Report Structure
- Roles & Responsibilities
- Recruiting / Selection
  Procedures
- Communication Plan (All levels)

The result must be a cohesive plan that is executable

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Project Attractiveness

💿 Savings > Costs 🐞 Costs > Savings

### **Deployment tracking**

#### Executive Dashboard

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## **Deployment Tracking**



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### **Benefits capture & tracking**

- Process designed to have rigour, accountability, common systems and methodology
- Process must be transparent and auditable
- The process and methodology must be "business owned" and "finance governed"
- 3-way sign-off (Champion, PM, Finance) validates project completion.
- Incorporate project impact into the forecast. Use the forecast to drive champion accountability.
- In short: looking for a credible process of reconciling last year's cost position to current costs – and demonstrating clear improvement



**Benefits Capture** 

### **Reconcile all Material Gains and Leakages**





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