

# Can the Global Lean Standard ISO18404 offer a breakthrough for the Construction Sector?

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- Apprentice Carpenter / Carpenter/ General Builder – 1976 – 1998
- Customer Care (snag buster) / Innovation Manager --1998 – 2004
- Discovered Lean around 2001 and applied to Hotel & Supermarket projects – 20% lead time reductions.
- CLIP Engineer (Building Research Establishment) 2004 – 2007
- Lean Construction Training & Consultancy --2007 on

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BSI Standards Publication

Quantitative methods in process improvement - Six Sigma - Competencies for key personnel and their organizations in relation to Six Sigma and Lean implementation

bsi

...making excellence a habit

ROYAL  
STATISTICAL  
SOCIETY  
DATA | EVIDENCE | DECISIONS

**RSS 18404**

Royal Statistical Society  
Certification Scheme for  
demonstrating compliance  
to ISO 18404:2015

This document describes the Royal Statistical Society's Certification Scheme for organisational certification against ISO 18404. It is intended primarily to be used for reference by participating Accredited Certification Bodies and their client organisations, as well as the United Kingdom Accreditation Service (UKAS), and individuals wishing to be certified for their competence under ISO 18404. The scheme, which is known as RSS 18404, should be read in conjunction with ISO 18404.



International  
Organization for  
Standardization

ISO 18404:2015

**bsi.**



Lean

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# Lean Intervention Vs Transformation

- Lean Intervention

- Definitions

- The act or fact of [intervening](#).
    - Ad Hoc deployment of Lean Techniques based on Waste Removal

- An Example



# What do you see?

When you look at sites, offices, fabrication yards...

What do you see?

Lots of busy people?

Busy at what?



**ACTIVITY = WORK + WASTE**



# 3 Elements of a Day

## Value Adding



Something changes to get closer to what the customer wants

## Support Activity



Something we currently MUST do but does not in itself add value for the customer

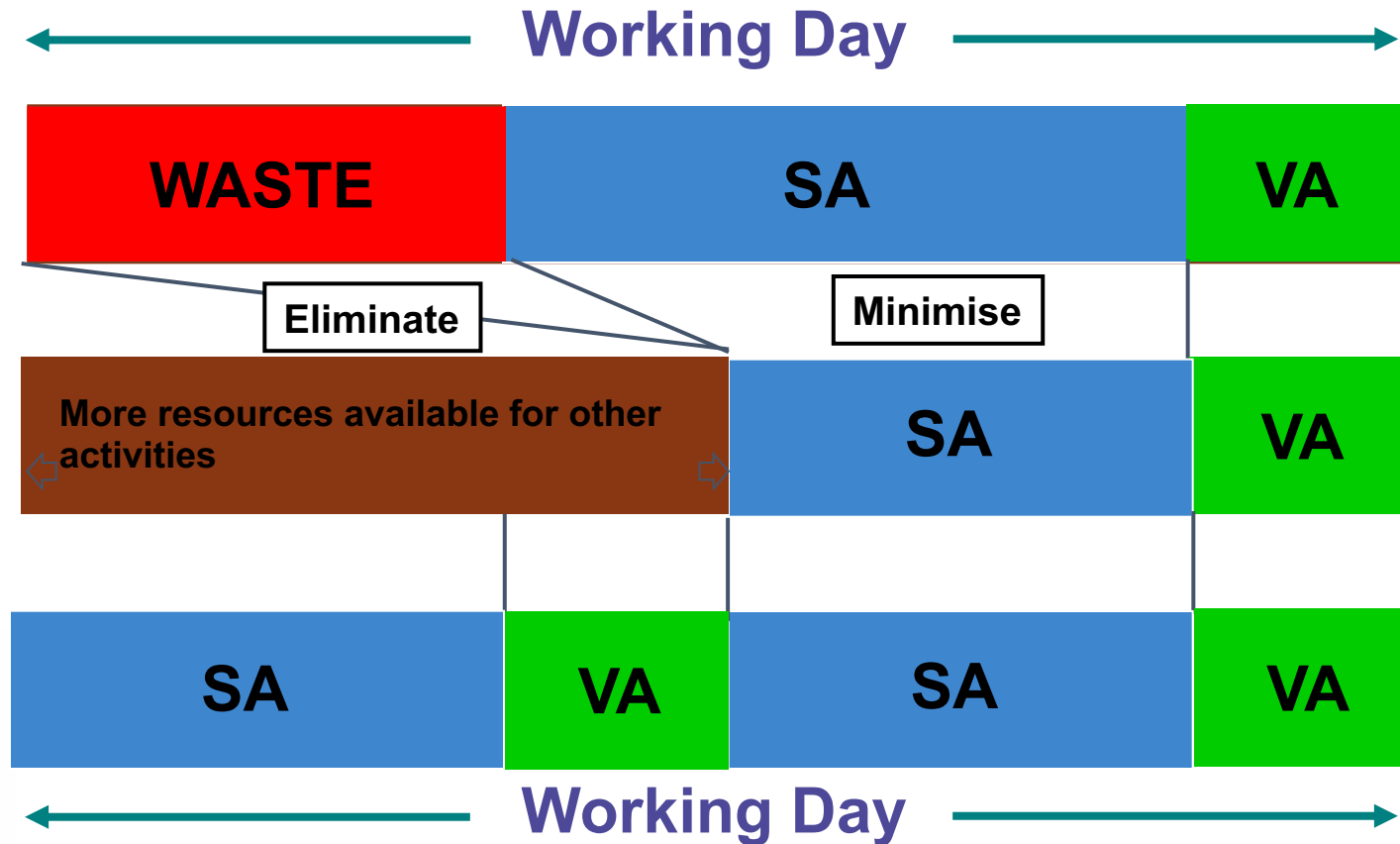
## Waste



Transport  
Inventory  
Motion  
Waiting  
Over Process  
Over Production  
Defects

# Making Value FLOW

To raise the ratio of **Value Added** activities to **Support Activity** and **Waste**



# Work Observation

## Value Stream Map (VSM)

TOTAL TIME	60 min.
V.A.	11 min
S.A.	<del>30</del> 29
WASTE	20

Support activity & waste constitute 83% of the concrete panel erection process. Main waste activities include:

1. Locating & identifying the correct brackets
2. Moving and manoeuvring the cherry picker
3. Adjusting the concrete panels





# Lean Intervention Vs Transformation

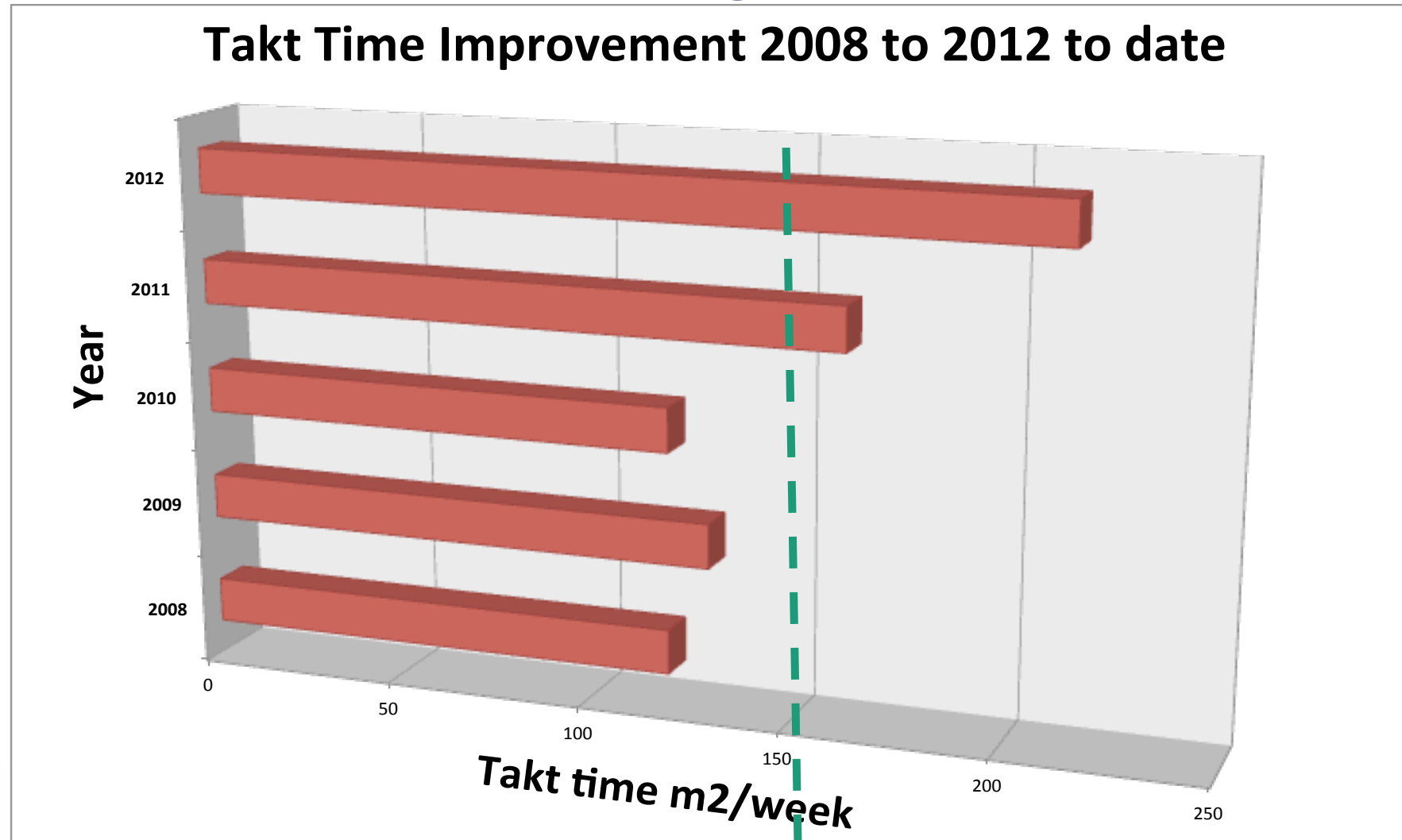
- Lean Transformation

- A systems wide, *long term* and *continuous* approach to improving operations, based on Lean Thinking that benefits customers, employees and the business.

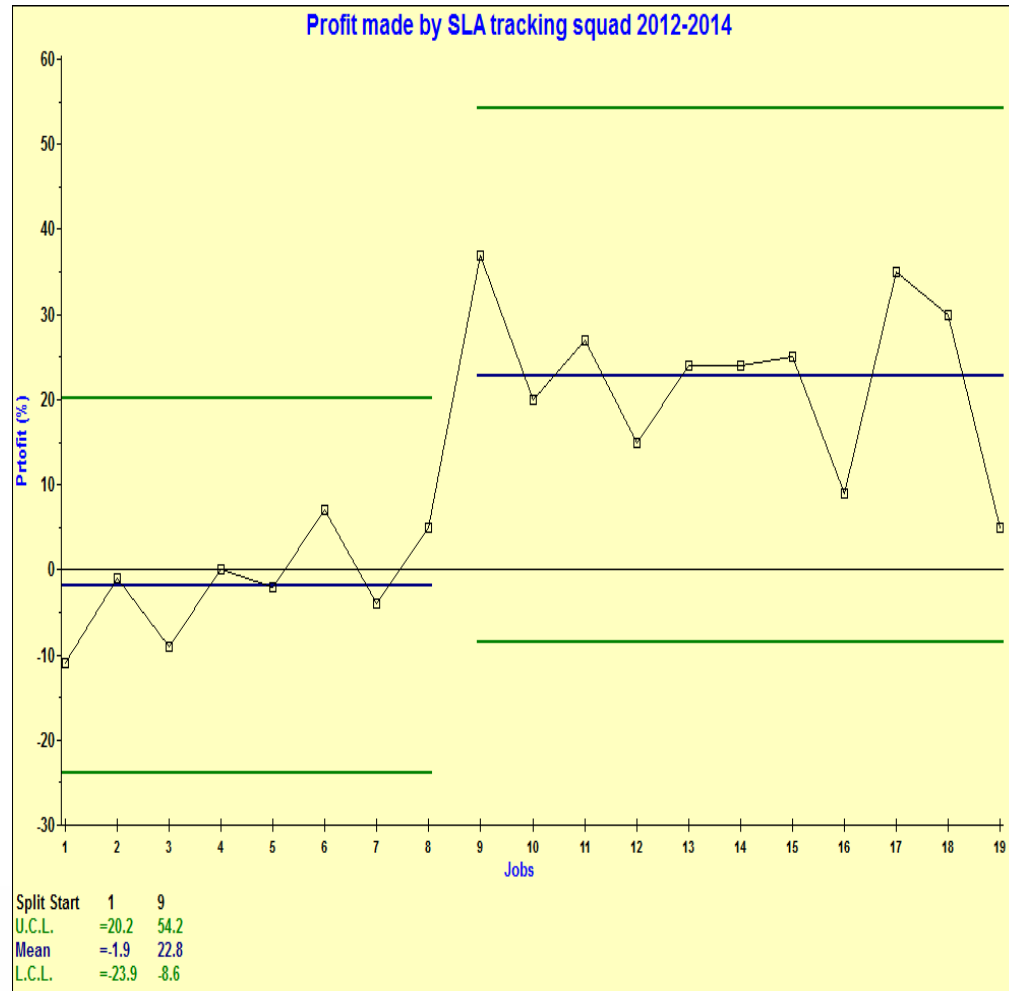
- An Example



# Interesting chart



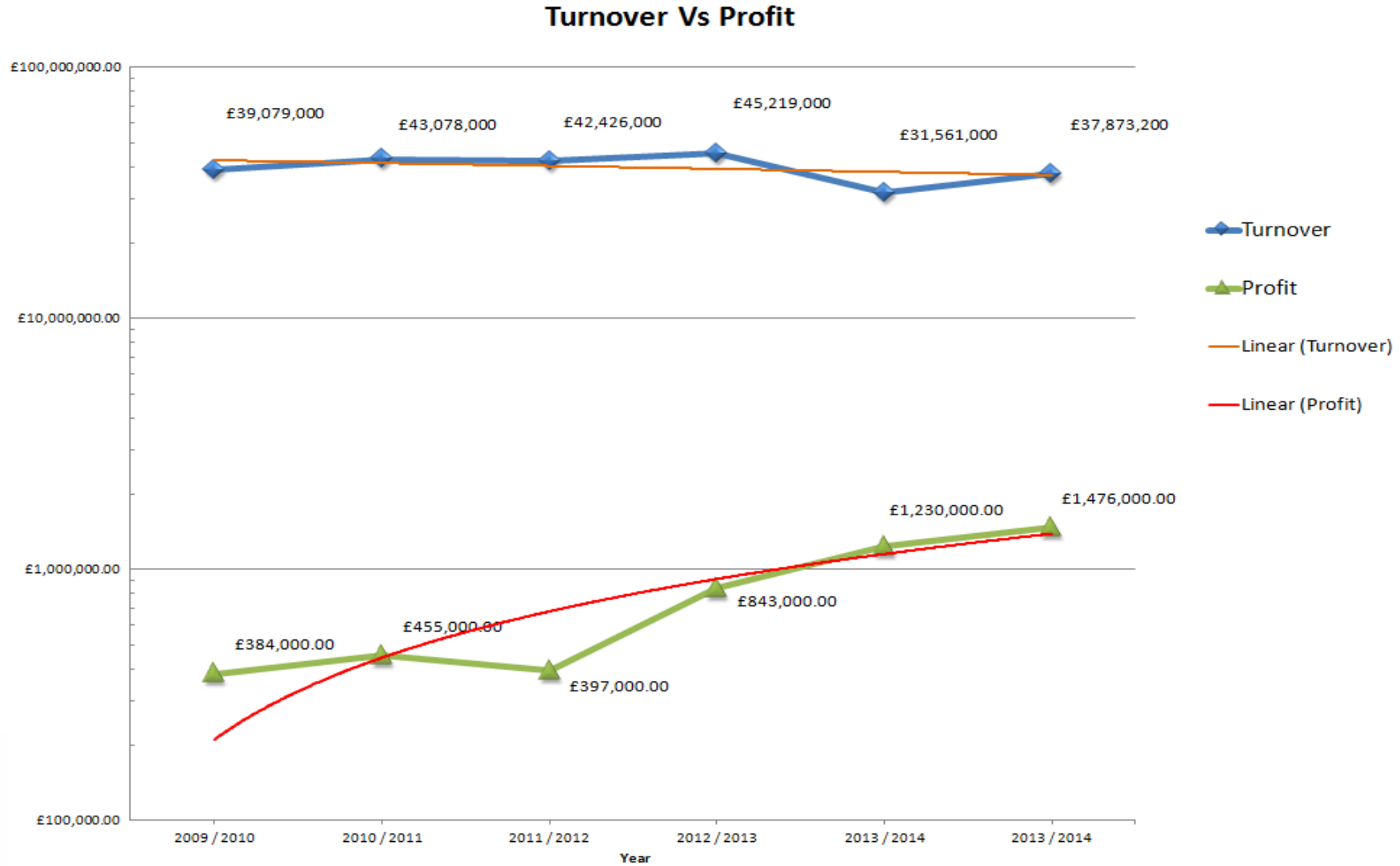
# Small Scale Actions...



Over the last 3 years...

Street Lighting +20%  
Patching +20%  
Slurry sealing +30%  
Blairgowrie +10%  
Forfar +10%

# Produce large scale benefits



# Why ISO 18404?

- We Didn't know how it might apply/work?
- Had heard Resistance?
- Critics?
- Gut feel was it's the right way to go.

Now we have an informed view.



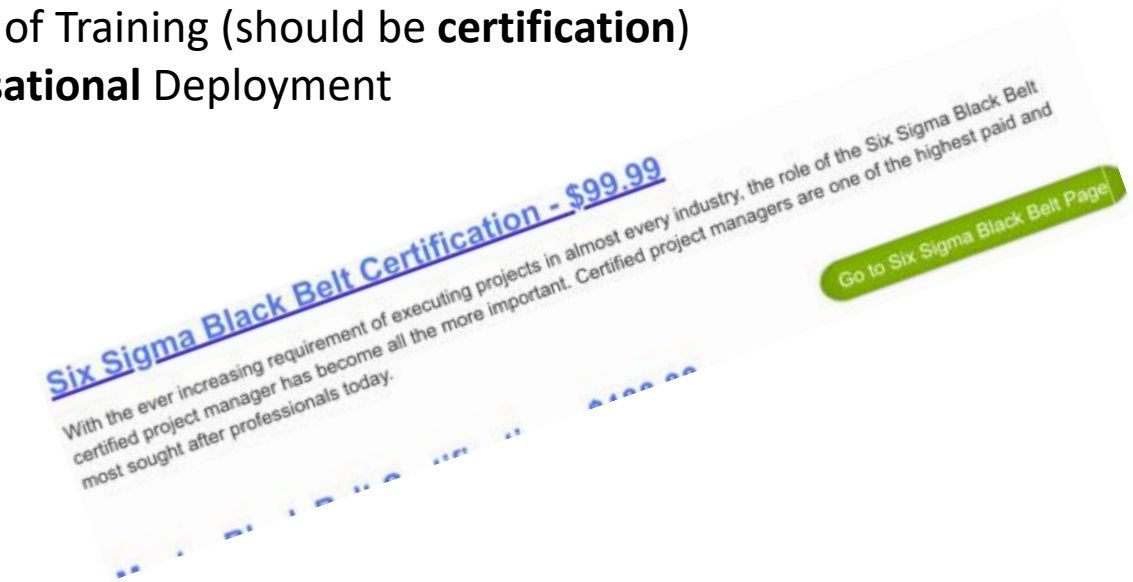


# Why ISO 18404?

ISO 18404 attempts to deal with two issues.

- Quality of Training (should be **certification**)
- **Organisational** Deployment

## Quality of Training



- Yellow Belts? Really?
- Quality of training – some questionable
- Tendering confusion for clients – companies claiming to be Lean to get work.

# Why ISO 18404?



- **Competency of Personnel**
  - Knowledge, experience, auditable competence
- **Adequacy of the organisations approach**
  - **Strategy**
    - Must be clear link to business plan
    - Defined objectives
  - **Architecture**
    - E.g. steering groups, reporting structure, accountabilities, supporting resources.
  - **Continuous Improvement**
    - Defined Metrics, targets & review mechanisms

# IGLC Paper Dublin - July 2019



# Research Methods – A Single Case Study, Structured Interviews and Literature Review last.

- Literature Review – IGLC Conference paper search returns.
  - ISO18404 no papers
  - “Transformation” 79 papers retrieved but many about TFV Theory(Koskela)
  - 15 relevant papers about lean transformation in construction organisations

## Four Themes emerged (Things needed to achieve transformation)

1. Organisational Structure --- “Must be clear link between Lean operations, strategy and capability”
2. *Roadmaps* for Lean and clarification of concepts
3. Lean Leadership --Simultaneous top down & bottom-up strategy
4. Change by Force ---we know what to do but won't do it until forced. (UK Farmer Report concurs)



Lean

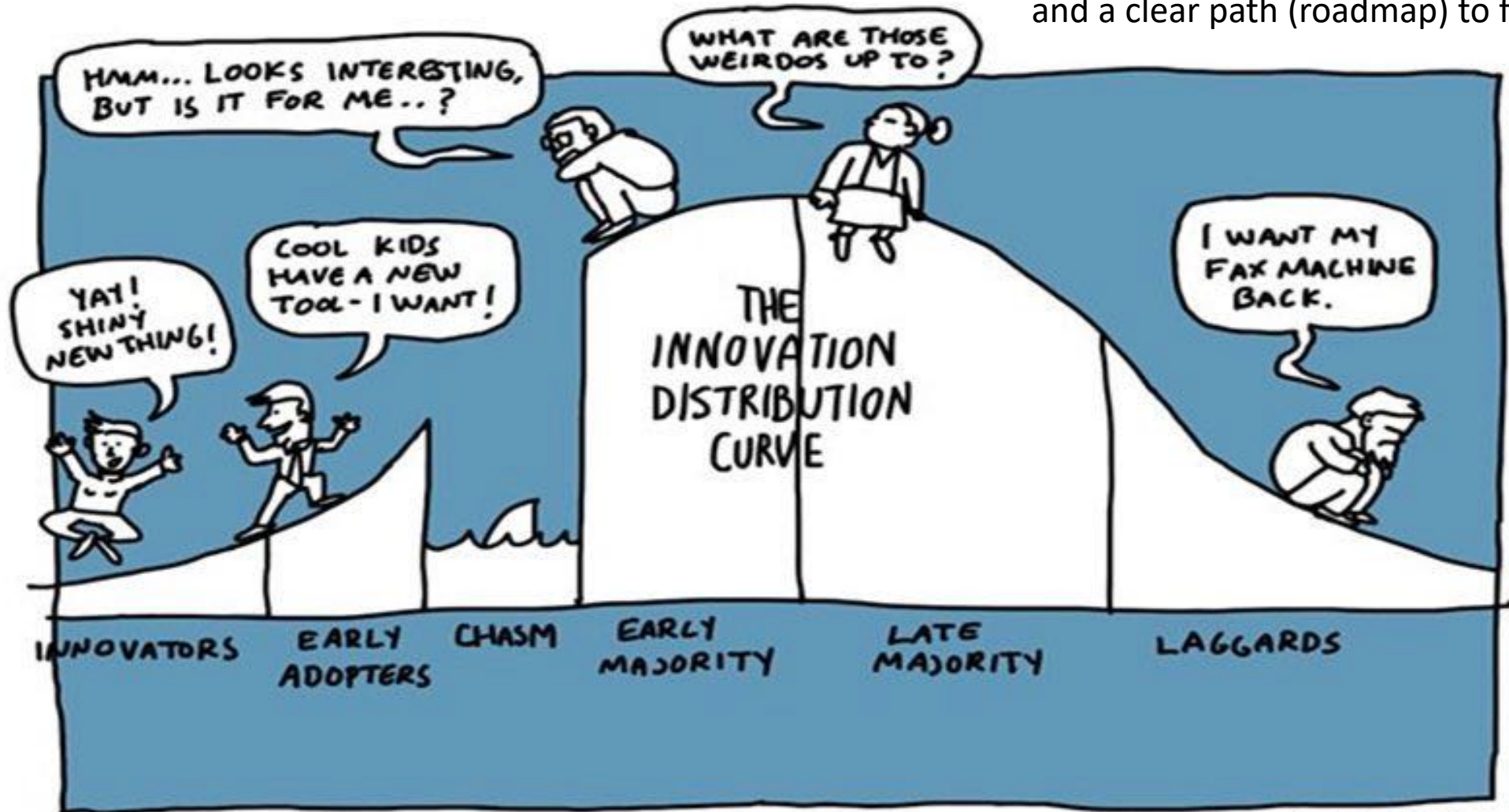
Construct

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# The Need for a Road Map

The Early Majority need: A compelling case and a clear path (roadmap) to follow



# Piloting ISO 18404 as a Transformation Model

# Gilbert & Goode Ltd

- Cornish Main Contractor & Developer (with a social purpose)
- Operating for over 40 years
- Growing Rapidly
- Owned by Ocean Housing Group

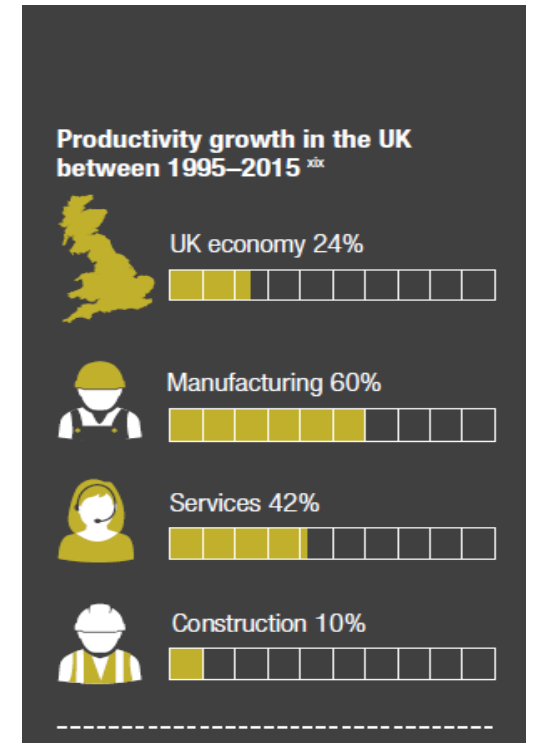
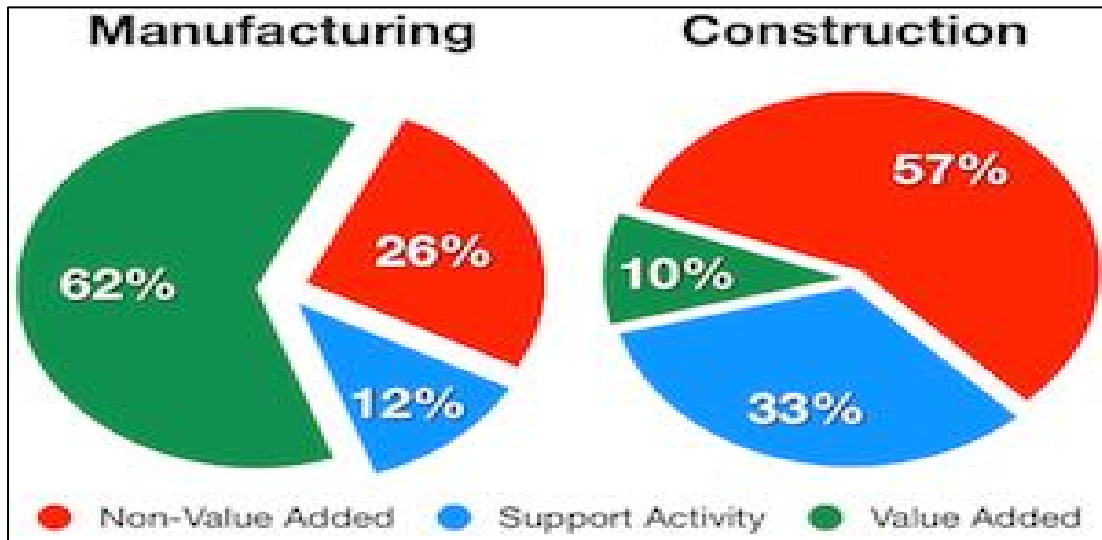


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# Productivity

Cornwall Productivity  
75.1% of UK Average





# Lean Journey

- Success realised for two pilot projects; desire to rollout across company and all operations
- Desire to move from “Intervention to Transformation”
- Selected ISO18404 as a route map



## G&G Lean Objective Hierarchy

**Ocean Corporate Plan**  
200 new homes per annum

**G&G Vision / Raison D'être**  
Maximise value to the Ocean Group

**How**  
Professionalism & Innovation (Good to work with/for) – Productivity & Efficiency – Customer Satisfaction/Reputation

### Long Term Targets

20% design time reduction

20% site time reduction

10% build cost reduction

100% Customer Satisfaction

20% defect reduction

10% accident reduction

### Short Term Targets

10% design time reduction

10% site time reduction

5% build cost reduction

98% Customer Satisfaction

10% defect reduction

5% accident reduction

### Deployment

Lean Forums – Improvement Projects via Lean Leaders, Lean Practitioners, Lean Implementer's

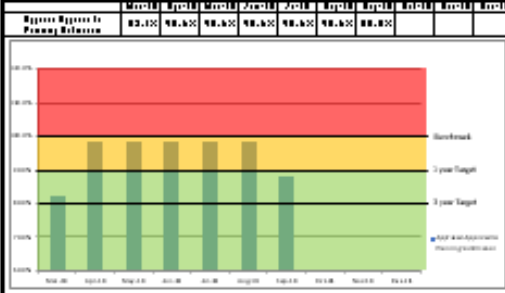


## Business KPI's

Working towards ISO18404

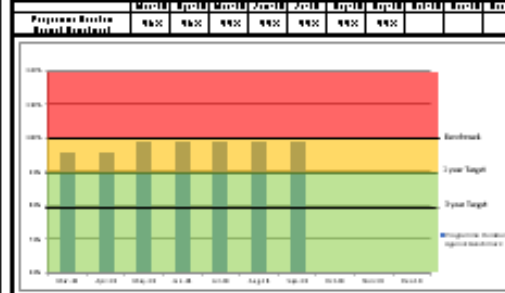


### Design - Pre Planning



Periods for Improvement	
Relax	
Cost Practice to Reduce	

### Construction Programme Durations



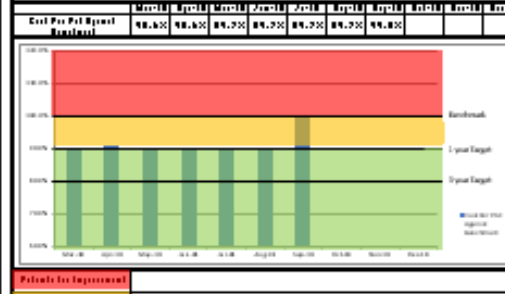
Periods for Improvement	
Relax	
Cost Practice to Reduce	

### Design - Post Planning



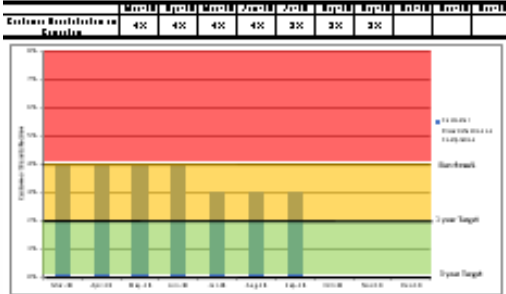
Periods for Improvement	
Relax	
Cost Practice to Reduce	

### Build Cost



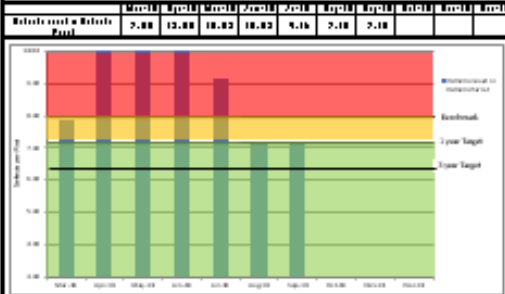
Periods for Improvement	
Relax	
Cost Practice to Reduce	

### Customer Satisfaction - On Completion



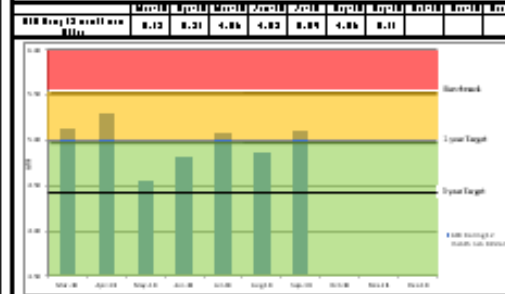
Periods for Improvement	
Relax	
Cost Practice to Reduce	

### Defects - Average no. of Defects per Plot



Periods for Improvement	
Relax	
Cost Practice to Reduce	

### Accident Frequency Rates - Non Riddor



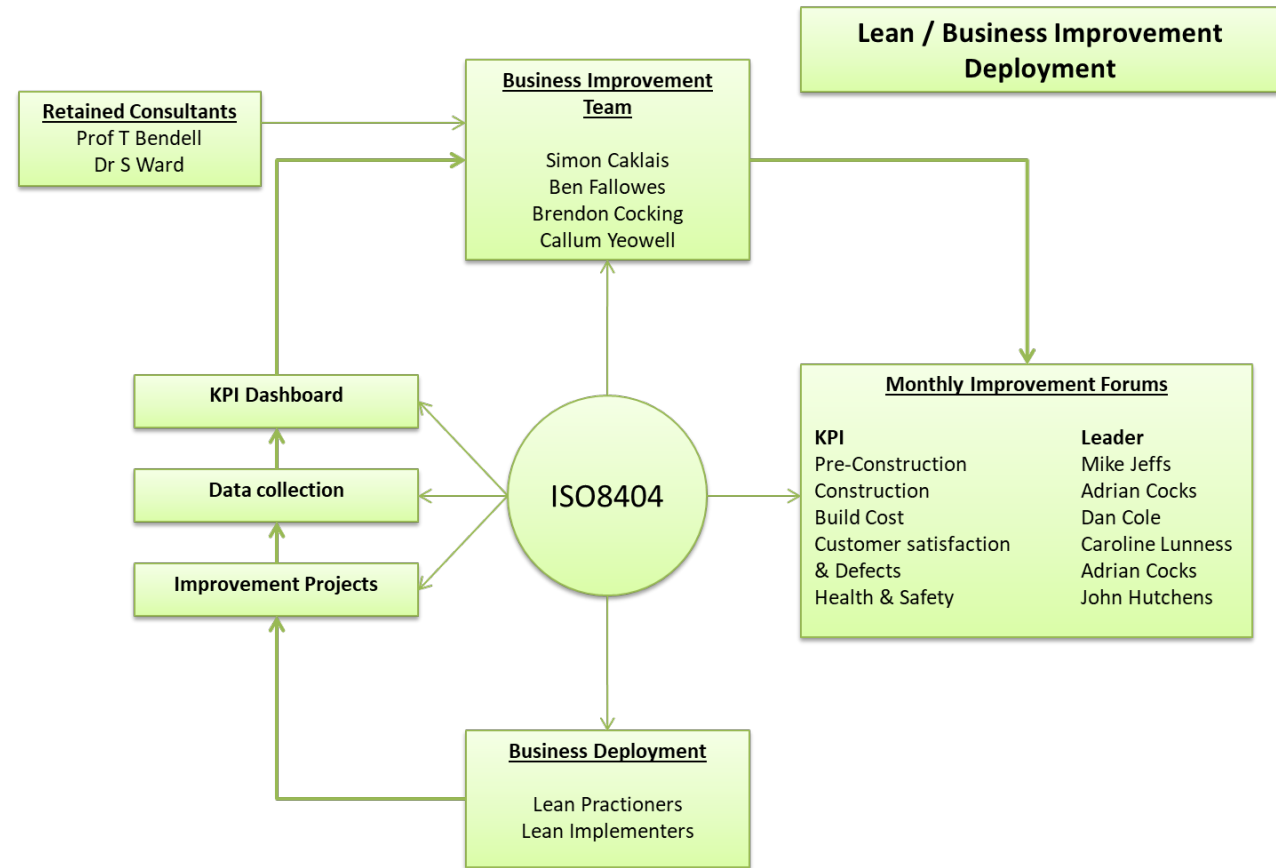
Periods for Improvement	
Relax	
Cost Practice to Reduce	



Lean Construct

# Business Improvement Model - Deployment

- Lean Leaders – run BIT
- Lean Practitioners run forums
- Deployment via Lean Practitioners & Lean Implementors
- Engagement with front line staff and supply chain



# Progress to date

		LEGEND		KPI's													
		Status No.		Pre-Construction (10% for yr1, 20% for yr3)	Construction (10% for yr1, 20% for yr3)	H&S AFR (5% for yr1, 10% for yr3)	Build Cost (5% for yr1, 10% for yr3)	Customer Satisfaction (On Completion) (2% for yr1, 4% for yr3)	Customer Satisfaction (After Defects Period) (5% for yr1, 10% for yr3)	Defects (10% for yr1, 20% for yr3)	Reduce Failure Demand / Free up Time						
		Allocated	1														
		Started	2														
		Reviewed	3														
		Complete	4														
		Strong Impact	p														
		Partial Impact	t														
Improvement Projects	Project ref.	Description	Lean Champion	Pre-Construction (10% for yr1, 20% for yr3)	Construction (10% for yr1, 20% for yr3)	H&S AFR (5% for yr1, 10% for yr3)	Build Cost (5% for yr1, 10% for yr3)	Customer Satisfaction (On Completion) (2% for yr1, 4% for yr3)	Customer Satisfaction (After Defects Period) (5% for yr1, 10% for yr3)	Defects (10% for yr1, 20% for yr3)	Reduce Failure Demand / Free up Time	Progress	Remaining				
	Des1	Design Last Planner (Tracker)	Mike Jeffs	0%									100%	0%			
	Des2	Designer Monthly Planner	Mike Jeffs	5%									0%	100%			
	Cons1	Weekly Work Planning & PPC	Callum Yeowell		5%		2%						80%	20%			
	Cons2	Timber Frame Option Trials	Callum Yeowell		0%		0%						100%	0%			
	Cons3	Groundworks Procedure Restructure	Adrian Cocks		1%	1%	1%						0%	100%			
	Cons4	On Time Material Procurement	Adrian Cocks & Callum Yeowell		0.5%								10%	90%			
	Cons5	Reducing Kitchen Lead Times	Adrian Cocks & Callum Yeowell		0.5%		0.2%						10%	90%			
	Cons6	6 Weekly Lookaheads	Callum Yeowell & Adrian Cocks		2%		1%						20%	80%			
	Cons7	Jetfloor (New Floor System)	Adrian Cocks		1%		0.2%						5%	95%			
	Cost1	New QS Required Info Forms	Shaun Rabey									◆	25%	75%			
	Cost2	Reduced no. of Skips	Dan Cole				0.2%						10%	90%			
	Cost3	Estimating Make Ready Needs	Darren Hicks									◆	50%	50%			
	Cost4	Process Map of Key QS Functions	Shaun Rabey									□	0%	100%			
	Cost5	Estimating Enquiries Standardised	Darren Hicks									◆	50%	50%			
	Cost6	General QS Failure Demand Assessment	Dan Cole									□	10%	90%			
	Dfct1	New QA System	Adrian Cocks & Callum Yeowell				0.4%				5%		90%	10%			
	H&S1	New Accident & Near Miss Reporting Documents	Callum Yeowell			0%						◆	100%	0%			
	H&S2	Standardised H&S Standards	Adrian Cocks			1%							25%	75%			
	H&S3	Accidents from 1st Half 2018	Adrian Cocks & John Hutchens			1%											
Total				5%	10%	3%	5%	0%	0%	5%							
Remaining Percentage for 1 Year Target				5%	0%	2%	0%	2%	3%	5%							

# Training & Communication





# Competency Evidence

Index	Competency	Performance criteria	Suggested evidence of understanding the competency	Suggested evidence of applying the competency	Relaxed Evidence of evidence	Suggested evidence of managing the competency	Relaxed Evidence of evidence	Suggested evidence of training the competency	Relaxed evidence of evidence
1	Understanding and communicating reported benefits of Lean	Ability to explain the reported benefits of Lean from water stream and in organizations. Including such concepts as reduced lead time, equal time, applying pressure, increased capacity, predictability, and quality.	Can explain the benefits of Lean from water stream and in organizations. Including such concepts as reduced lead time, equal time, applying pressure, increased capacity, predictability, and quality.	Not applicable		Has communicated effectively to a			
1.1	History of Lean	Has knowledge of the origin and development of Lean	Can describe the origin of Lean.			Can be applied in the specific environment or sector; what will be done to the individual in organization and its outcomes. Can understand and employ lead time, equal time and staffing requirements. Can understand and employ lead time, equal time and staffing requirements. Can understand and employ lead time and use in budget		appreciate in the organization.	
		Can describe how to use data in quality improvements.	Has used data appropriately to demonstrate improvements.			Has evidence of communicating benefit using appropriate data.		Not applicable	
2	Value	Can describe the Lean principles.	Can describe Lean principles of flow value, and related the water stream, waste flow, waste pull, value for generation.	Can apply Lean principles to a specific situation.		Can apply Lean principles to a specific situation.		Not applicable	
2.1	Value	Value	Defines value in the eyes of the customer, the transformation of an unutilized need to a satisfied need, use for a product or a service. Can identify and describe water-added activities (VA), non-value-added (NVA) process issues such as waste, overcapacity, overburden (Muda, Mura, Mori) and overusing non value-added activities (MVMN). Non-value-added activities (MVMN), Non-value-added activities (MVMN), Non-value-added activities (MVMN) can be used in waste identification.	Has evidence of identifying and eliminating waste from processes.		Can manage value in the eyes of the customer, identifying what is water add and what is non-value-add.		Not applicable	
2.2	Value Stream	Value Stream	Understands the water stream and the knowledge of implementation. The water stream defines the stages of transformation and the waste along the journey, as fully described by a water stream map or material and information	Has evidence of building a current state water stream map or material and information flow map from a live process, populating with appropriate stages, flows and numbers, building a Future State water stream map.		Manages the water stream and can follow and utilize a water stream map or material and information flow map of a live process.		Trains others in water stream thinking, including how to create a water stream map or material and	
2.3	Flow	Flow	Creates flow, removes the barriers, identified through waste maps (Muda), removal of work in progress between process stages.	Creates flow, can identify and remove the barriers, identified through waste maps (Muda), removing work in progress between process stages and lagging (at the workplace) to improve flow; uses techniques such as water Stream maps/material and information flow maps, spaghetti diagrams, work combination sheets, workload leveling, Ohno circles to identify and remove Muda		Flow, can identify and manage the removal of the barriers identified through waste maps (Muda), improving flow.		Not applicable	
		Can describe how to use workload leveling techniques to improve flow.	Can demonstrate use of workload leveling techniques to improve flow.			Has evidence of review of process flow to identify where workload leveling would be appropriate.		Not applicable	
2.4	Pull	Pull	Can describe pull, giving the customer what they need, when they need it. In familiar lean use it is a signal from a customer summarizing the transformation process.	Can demonstrate practice of pull in a process, giving the customer what they need, when they need it. Uses Kanban techniques to transmit the signal from a customer to the process.		Can manage pull, giving the customer what they need, when they need it. Deploy Kanban techniques to transmit the signal from a		Not applicable	
2.5	Can describe what it means "to deliver for production"	Can describe the value for production, starting from a customer-defined process, making additional improvements, in quality, cost and delivery, critical flow driver to create value from the current state and to sustain improvements, working an improved and current state every day.	Has applied standard work to processes, making reported improvements, in quality, cost and delivery, critical flow driver to create value from the current state working an improved and current state every day.			Sliver for production, demonstrate additional improvements, in quality, cost and delivery, critical flow driver to create value from the current state working an improved and		Not applicable	
3	Stakeholder management	Stakeholder management	Oversees range of stakeholder and appropriate techniques for stakeholder management.	To lead cross-functional practice and sustained achievement of stakeholder. Stays in pursuit of operational goals.		Demonstration of continuous stakeholder management and monitoring using appropriate techniques.		Demonstration of training activities on stakeholder's management techniques and methods.	
3.1	Communication skills	Communication skills	Can describe the importance of communication skills in Lean implementation and consequences of poor communication.	Has evidence of the use of appropriate communication approaches with teams and individuals.		Has evidence of planning, initiating and progressing appropriate communication.		Trains others in the importance of the training process.	
3.2	Change efforts on individuals	Change efforts on individuals	Can describe change process, including Lean implementation.	Has evidence of analysis of situation based on understanding of change process, e.g. transition from manual to automated to help explain attitudes and resistance of self or team.		Has evidence of analysis of situation and planning of actions based on understanding of change process, e.g. transition manual to change		Trains others in the importance of the training process.	
3.3	Change of organizational level	Change of organizational level	Can explain the importance of cultural change in Lean implementation, rather than individual change or process change.	Writes evidence of identification of analysis of cultural state and identification of cultural issues which need to be addressed.		Writes evidence of identification of possible issues, of challenges considered in practice and any plan of action required on overall. Evidence of action taken, including monitoring of effectiveness and		Trains others in the need for cultural change.	
4	Measurement of process performance	Measurement of process performance	Selecting and collecting data for process improvement.	Has evidence of selection and collection of appropriate data.		Not applicable		Trains others in the appropriate collection methods for data.	
4.1	Measurement of process performance	Measurement of process performance	Can describe the metrics used in current state diagnosis and workload planning, e.g. customer demand, equal time, Lakt, resource requirements, defect rate, failures, rework.	Has evidence of calculation of appropriate metrics and their use to improve process and quality improvements.		Manages processes or teams using appropriate metrics. Communicates		Trains others in the appropriate use of metrics	
5	Creating thinking	Creating thinking	Understands the need to apply creative thinking approaches to process lean	Describes the different thinking modes [e.g. creative and analytical].	Evidence of use of this approach.				
6	Visual management and control	Visual management and control	Can describe what is meant by visual management and what efforts can be reported.	Has evidence of implementing visual management and/or control in a process.		Reviews effectiveness of visual management and adjusts as appropriate.		Trains others in the appropriate use of visual management and control.	

Competencies in 18 Areas

Understanding, Applying, Managing and Training.



# Recap & Compare - Four Themes found in IGLC literature (Things needed to achieve transformation)

1. Organisational Structure --- “Must be clear link between Lean operations, strategy and capability”
2. *Roadmaps* for Lean and clarification of concepts
3. Lean Leadership --Simultaneous top down & bottom up strategy
4. Change by Force ---we know what to do but won't do it until forced. (The UK Farmer Report concurs)

*“ISO18404 Provides a Roadmap, demands Organisational Structure, encourages good leadership and offers a lever for sector wide change”*

# In Summary

## ISO18404 Provides.....

- Confidence in certified individual's competence in Lean
- Confidence in an Organisation's genuine Commitment to Lean Improvement
- A Roadmap for Lean Transformation that works and facilitates “buy-in”

# Thank you for listening

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