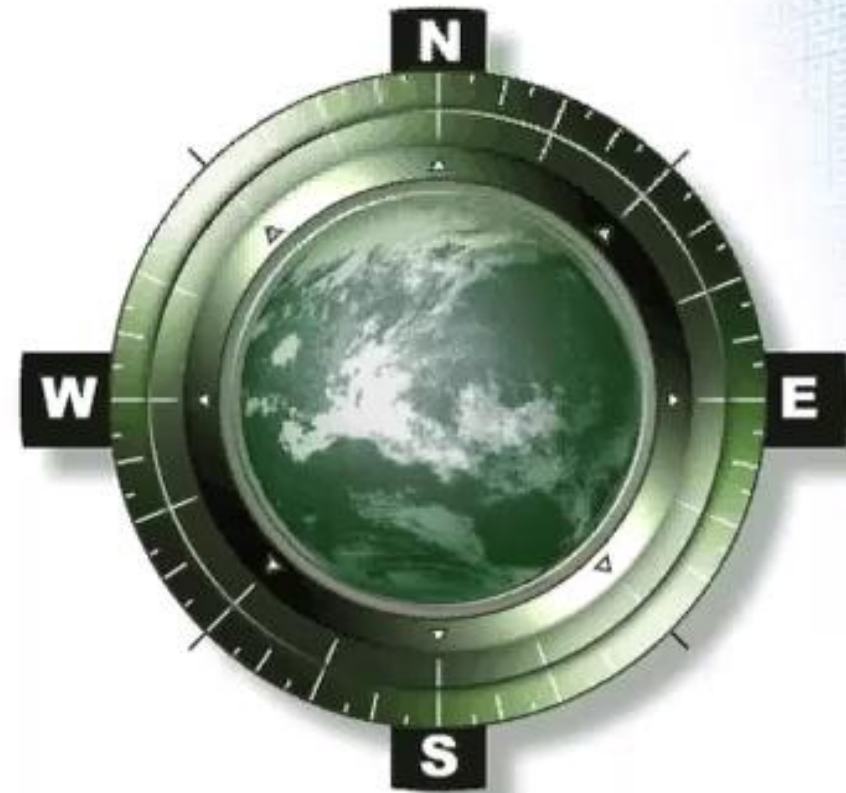


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GLOBAL OPTIMIZATION EXPERTS | LEAN LEADERSHIP COACHES

Our Application of TPS Thinking & Practices

Case Studies in Various Industries
& Deployment Methodologies



Impacted Industries & Satisfied Clients

Aerospace / Aviation

MEGGITT



Financial



Off-Shore / Construction



Automotive

DENSO



Heavy Equipment



Paper / Wood



Consulting



Hospitality / Retail



Rail / Transportation



Electronics

THALES



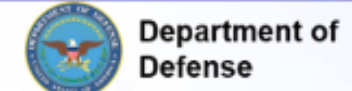
Insurance



Telecom



Government / Defense



Logistics



And Many Others...

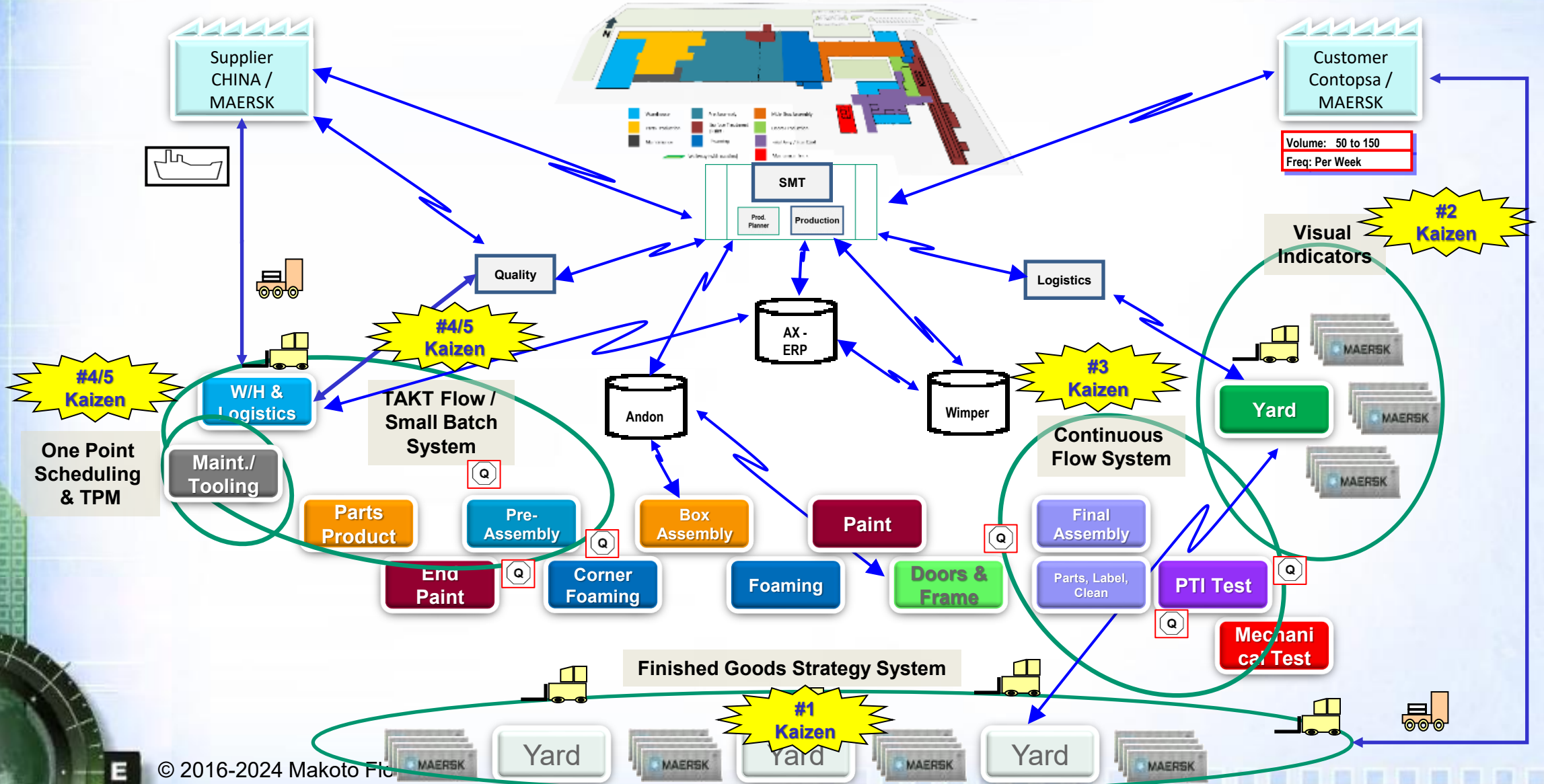
- Casino's
- Entertainment
- Flavors & Fragrances
- FMCG
- Healthcare
- Material Solutions
- Oil & Gas

2nd Understand: Gemba Walk Visualized

High Level Value Stream Map

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3rd Plan: Results & Engagement Recommendations



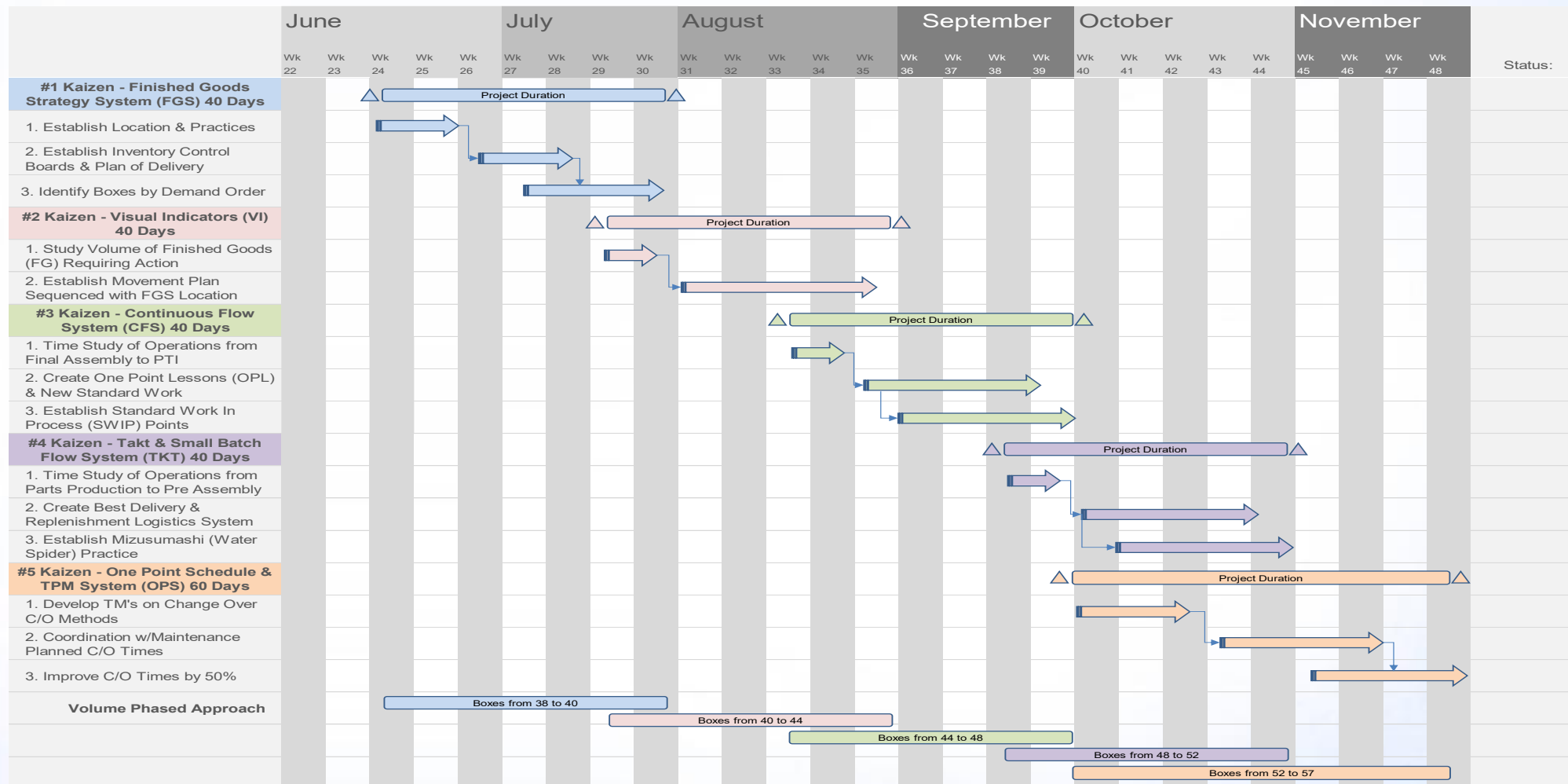
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GLOBAL OPTIMIZATION EXPERTS | LEAN LEADERSHIP COACHES

Gap Initiatives Roll Out Plan

6 Month Project Timeline

Start Date:

6/4/2017



4th Execute: System Focused Changes & Deliverables



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Focused Results or Impacts by Nov 2017

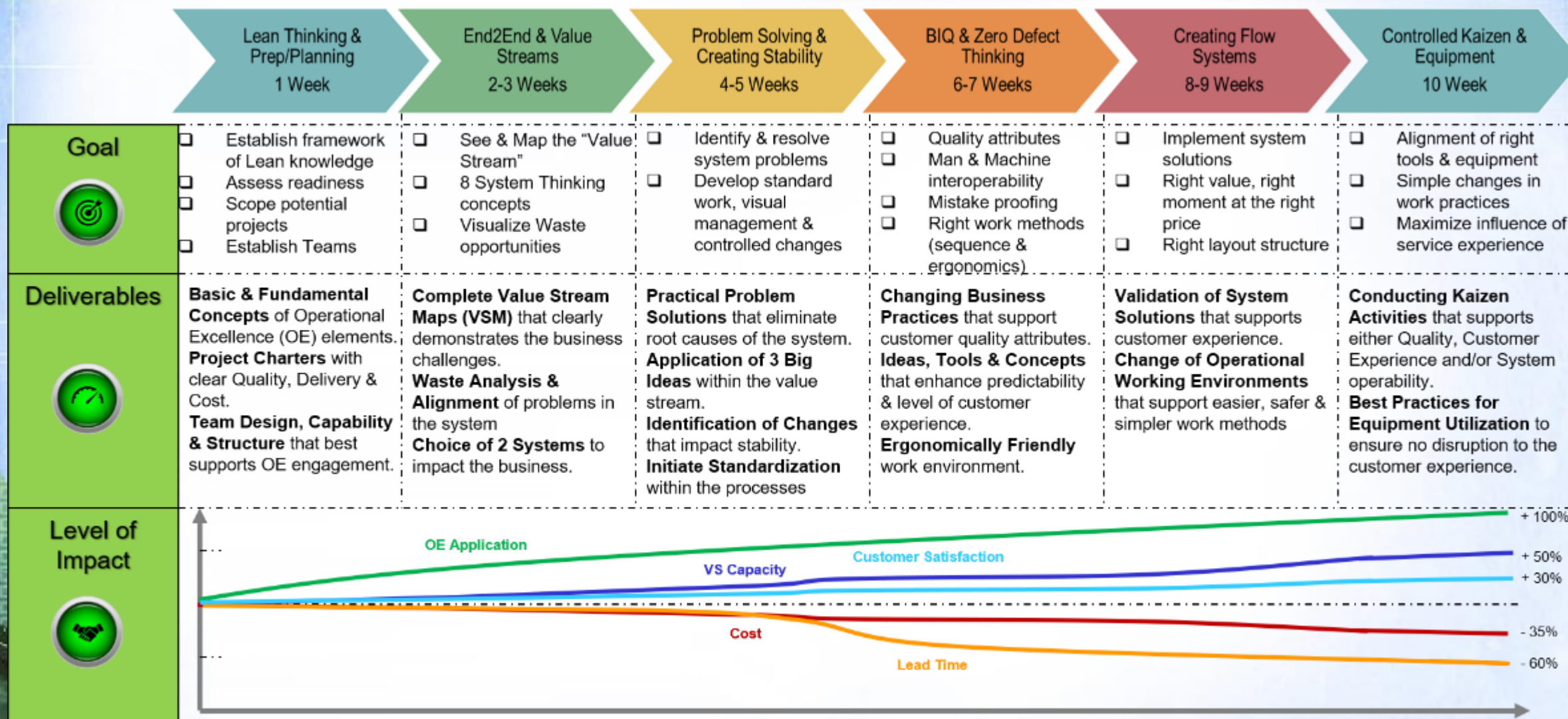
System	Current Issues	Future	Impact / Variance
1. Finished Goods Strategy (FGS) Yard	❖ Variance in Daily/Weekly Output ❖ Searching Time ❖ Method of Receiving & Shipping	▪ Standardization of “Known” Output ▪ Smooth Identification & Flow throughout the Yard	➤ 96% OTD (9180 to 14448) ➤ 33% Mthly Deliveries (16.7 to 25.08)
2. Visual Indicators (VI) End of the Line (EL)	❖ Excess Touches/Movement ❖ Unknown Cycle Times for Rework, Inspections & Re-Tests	▪ Standardization of “Flow and Movement Practices”	➤ 37% EL Usage (38 to 52 Units) ➤ 50-66% Touches (8-12 to 3-4)
3. Continuous Flow (CI) End of the Line (EL)	❖ Unbalanced Work Cycles ❖ Uncontrolled NVA Effort ❖ Delays, Rejects & Rework	▪ Slower CT aligned to 92% of TAKT ▪ Standard Work, Balance & Reduction of NVA = Demand	➤ 12-18% Volume Increases (38 – 46 – 52 – 57) ➤ 7.5% Cost Per/Box (11,624.64 to 10,761.76)
4. TAKT & Small Batch Flow (TKT) at Pre-Assembly	❖ Uncontrolled Work, Materials & Output Flow ❖ Under Utilized Work Space	▪ Improved Flow & Consumption Capacity ▪ Calculated Parts Delivery	➤ 33.4% Capacity (38 to 57) ➤ 15-23% Energy Cost
5. One Point Scheduling (OPS) & TPM Efforts	❖ Delays in C/O & Preventive Maint.	▪ TM C/O Practices ▪ Speed of Flexibility (Mins v Hrs)	➤ 50-75% C/O Times

Structured Road Maps for Each Engagement

Supporting Focused Efforts & Durational Periods of Time



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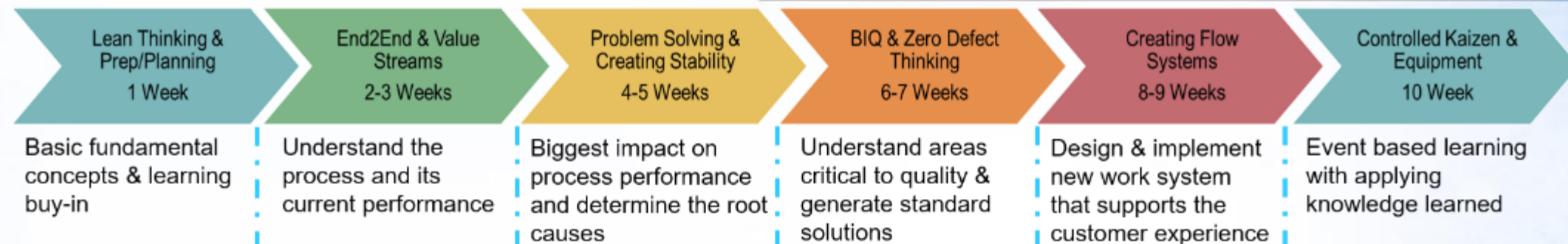


Organized Deployment of Principles & Practices



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Giving Our Clients Sustainable Results



Methods & Tools Application Per Engagement

- 7 Deadly Wastes
- 3 Mu's of Business
- Lead & Cycle Times
- Catch Ball Exercise
- Scope Project
- Project Charter
- Voice of the Customer

Pre-meetings w/ Process Owners



Project Charter



Catch Ball Simulation



- Refined Project Charter
- Gemba Walks
- Process Maps
- 8 Steps of Value Stream Maps (Service)
- Waste Hunts (21)
- Pain Gain Charts
- 8 Systems Thinking
- Initial Problem ID

Value Stream



8 Systems



- Office Simulation
- 8 Steps to Practical Problem Solving
- Brainstorming & Multi-voting (Consensus)
- Ishikawa + Risk / Impact + 5 Why Analysis
- Countermeasures/VSIP
- 1S-3S Rollout Concept

Problem Solving



Ishikawa



- Standard Work Model
- Takt Time, Balancing Work
- Work Sequence/Layout
- Communication Cells
- Leader Standard Work
- Mistake Proofing
- 4S-6S Rollout Concept

Standard Work Model



6S Rollout



Poke Yoke



- 21 Rules to Creating Flow (Layout Support)
- Frontline Support
- Hypothesis Testing
- Ergonomic Golden Circle
- 6 Levels Service Flow
- Pilot & Simulation for Replication

Service Flow



Hypothesis Testing



Lean Office



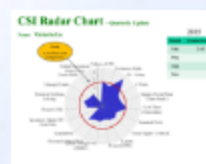
- Engage Spot Kaizens
- Pre & Post Activities for Event Based Kaizens
- Equipment/Technical Kaizens (Kobetsu)
- Facilitation Skills, Chart & 12 Tools

Event Defined

Our Kaizen Events are based on a 1-4 Week timeline:
1 Week of Preparation (Brainstorming, Teaming)
2 Weeks of Event (One Defined)
1 Week of Tracking Results & Documented Results



Evaluation



5th Document Outcome: Case Study: Kaizen Event F&B Restaurant (30 Days)



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Process Before Kaizen Activities



Problem Statement: Due to high volume customer demands, wait times exceeded 11.5min. For 30% of patrons, turning of tables about 9.2min. this results in a loss of covers (sales) about 22%.



Process After 5 Days

Through in-depth analysis of both the process, value stream, waste & problems, action plans were established to change the system using Standard Work & Flow concepts.



30 Day Engagement Plan & Activities

Takt Time (Beverage)

- Link Ping POS to Diplomat printer for special drinks orders only
- Diplomat bar observation (drinks preparation time)
- New Beverage Pick Up Chart

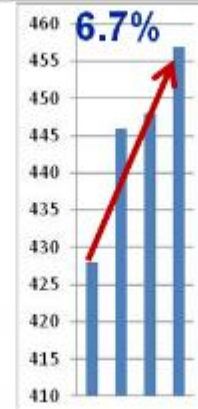
Visual Indicator (Food)

- Design a visual.
- Re-arrange the runner location.
- Create a visual indicator.

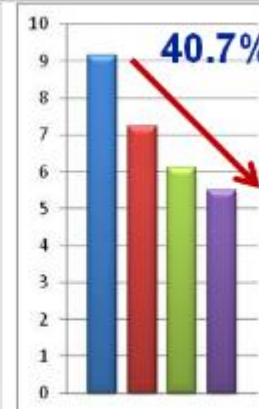
FIFO (Table Clearing)

- Observe OE cleaning, Breakage and Documentations
- Establish standard rules for FIFO
- Establish One Point Learning evolutions & implement

Results



of Covers



Turn Time



Revenue

Case Study: Kaizen Event Resort Facilities Services Center (30 Days)

Process Before

This event consisted of 4 Sub-Value Streams that support the overall Value Stream Improvements within the Venetian. Key metrics included Abandon Call Rate; Process Time; Work Order Completion.



Process After 5 Days

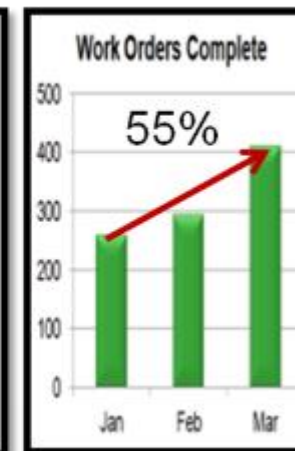
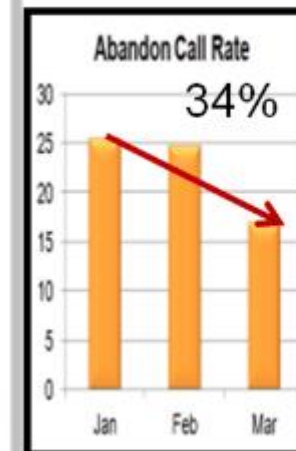
After detailed discussions with process owners and instituting operating Standards, the team achieved initial success and tested the impact of the changes.



Process After 30 Days

Facilities Service Center 2013 - Koko Un		
January	Result	Target
Abandon call rate	35.40%	Expecting 5.4% decrease from January (because customers are getting used to the Voice Response System for FSC hotline operation)
Process time	249 seconds	Expected to have 10% improvement (because the Post Scheduling will be implemented on February)
Service Assurance (Customer Satisfaction)	58%	Target to get 60% on February
February	Result	Target
Abandon call rate	26.7%	Expected to be 20% on March (Expecting 4.7% decrease from February because customers are getting used to the Voice Response System for FSC hotline operation)
Process time	218 seconds	Expected to have another 10% improvement (because streamline project has been applied to FSC on March 1)
Service Assurance (Customer Satisfaction)	59%	Target to get 70% on March

Final Results



Case Study: Events Based Fullfillment Pulp Paper Production (30 Days)

The Reality "Understanding the Need for Change"

Problem Statement:

Due to high volume customer demands, frequency of demand changes and lack of a clear plan that is understood by all, lead to reduction in quality, on time delivery and excessive Overtime by workers.



Gaining Understanding of The Process After 30 Days

Through in-depth analysis of the value stream, understanding the processes, elimination of waste, and conducting practical problem solving, action plans were established to change the system using Standard Work & Visual Management concepts.



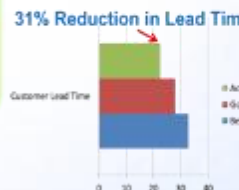
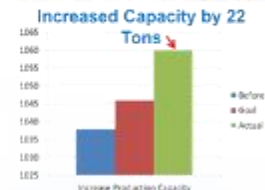
Development of Plan & Activities

Expected Results

- Reduction in WIP by 81 Tons @ month
- Increase Production by 8 Tons @ Month
- Increase OTAPTF (On Time As Promised To Fulfillment) to 92%
- Reduce Lead time to Customer from 32.8 days to 28.1

The Results after 90 Days

Actual Results:



Case Study: Events Based Construction Execution Design (45 Days)

Process Before Kaizen Activities

Problem Statement: Lots of time spent processing customer information and working with the problems in the product design



Process – worked with all aspects of information flow
Estimating – Design – Drawings – Procurement – Project
Management - Finance



By examining the process as well as establishing standards and giving help where help was needed, the capacity for processing was increased and better coordination was possible. Visuals help find problems earlier.

30 Day Engagement Plan & Activities

Category
Make visual board for Program managers and issues per job
Establish a product improvement group
Synchronize the work in engineering / shop / field to the Takt time
One piece flow of drawing and checking to prevent large defects
Change when certain parts are ordered & delivered
One piece flow of drawing and checking to prevent large defects

Actual Results

1. The number of rework has been reduced by 35% by waiting later to process
2. Visual display for real time status of production / engineering and field installation
3. Late parts reduced by 80% through planning and also changing when they are needed
4. Program management are identifying issues earlier with new hand-over meetings
5. Meetings are taking 60% less time by standardizing sequence and discussion points

Case Study: Events Based Model Line Concept Dairy Products (60-90 Days)



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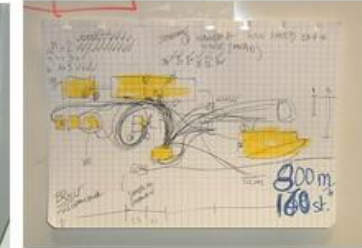
Process Before Kaizen Activities



Problem Statement: Due to emerging market demands, company wishes to adopt 30 New Lines per year. With challenges in a variety of Mixes & New Product Introductions, both Operating & Capital Costs are constantly rising by 32% over the next 5 years. Focus of this optimization effort is to minimize both while increasing "flexibility" and "evolution capability".

Process After 10 Days over 2 Months

Our initial onsite visit was 2 days and through visualization of the value-stream for Line #13, focused filming for in-depth analysis of "critical to quality" procedures, plus identifying the most impactful wastes hindering the process & equipment via "muda hunts", a decision was made to implement a "Continuous Flow" with "Visual Indicators" as the best way to adopt a Model Line Concept.



30 Day Engagement Plan & Activities

RESOLVE FLOW ISSUES:

- Create Flexibility in Changing Bottle Sizes & Caps
- Minimize or Eliminate Transportation / Handling Multiple Times
- Reduce Stoppage of Lines due to over Conveyance

IMPLEMENT A CONTINUOUS FLOW SYSTEM:

- Apply the 24 Rules to Creating Flow Systems
- Focus on Reducing area size by 50%
- Adopt Visual Indicators (Andon) for Stoppages & Problems

IMPROVE OVERALL EQUIPMENT EFFECTIVENESS:

- Focus on the 6 Major Losses to Improve Overall OEE
- Adopt Minimal Autonomous Maintenance Activities to ensure Up-Time is Maintained
- Adopt Visual Indicators (Andon) for Stoppages & Problems

Results



Space Utilization

BEFORE:

OEE	66%
Aval Rate	65%
Perf Rate	116%
Qual Rate	87%

AFTER:

OEE	72%
Aval Rate	83%
Perf Rate	91%
Qual Rate	95%

OEE



Cost Optimization

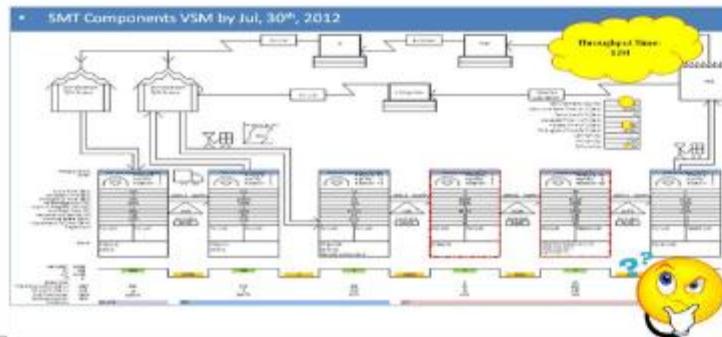
Case Study: Project Kaizen Adoption of JIT at SMT Manufacturing (90 Days)



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Process Before Kaizen Activities

Problem Statement: Throughput time is as long as 12 hours; Materials Kitted in advance and stuck in kitting area creating a backlog; Limited space + hard to search materials and OLE low. Poor 5S in kitting area



Process Engagements 10 to 30 Days



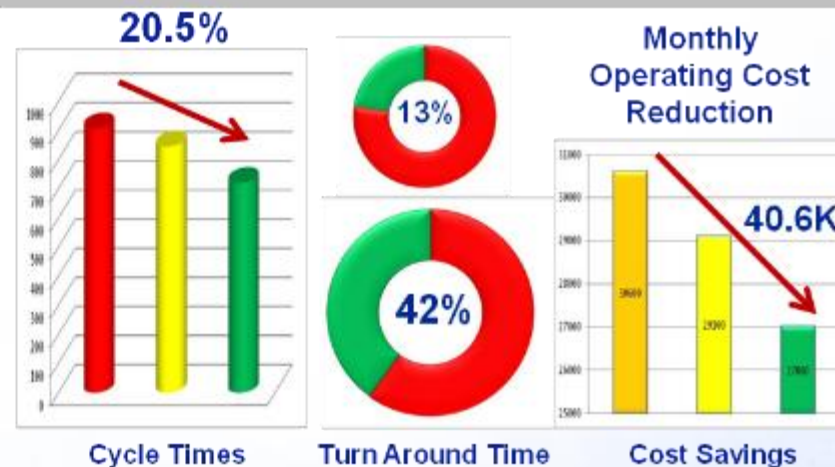
Through in-depth analysis of both the process, value stream, waste & problems, 7 action plans were created to change the system using Standard Work & Flow concepts.

90 Day Action Plans + 7 Root Cause Improvement Activities

Root cause	Solution	Schedule	Owner	Status
Preparing materials method	1. Combine all W/C preparing materials mode. 2. One person is for one workstation.	13-Aug-12 to 16-Aug-12	Yijun su Dongying wang	Closed
Layout not reasonable	1. Create standard material's flow 2. Lay out for one piece flow purpose 3. Re-layout working station area	16-Aug-12 to 22-Aug-12	Yijun su Wanfeng Li Dongying wang	Closed
Working table not fit	1. Contact IE to re-design size 2. Evaluate use status 3. Make desirable work desk	Improvement 4.2: Create Flow		
Materials demand focus on a certain time point	1. Change method of sending photo 2. Control MFG lead time of applying materials			
MES system function limited	1. Contact IT to deploy new system function 2. Optimize feed list form			
Over-processing Unnecessary verification	1. Evaluate every process necessary 2. Cancel unnecessary process 3. Re-define every process function			

Re-layout the whole SMT kitting area so that materials flow more fluently. Decrease unnecessary transportation.

120 Day Final Results



Case Study: Project Kaizen

Heavy Equipment Parts Manufacturing (90 Days)

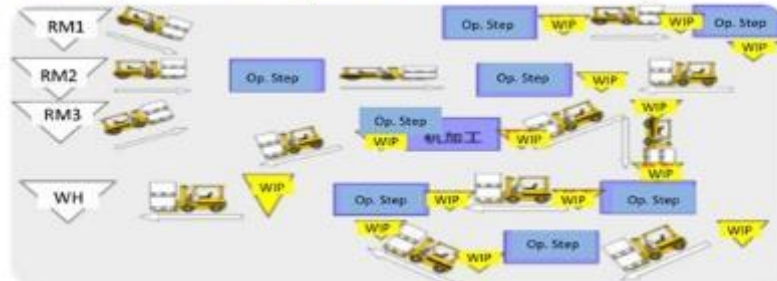
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Before kaizen

Background :

Lack of flow and lots of WIP points.
Frequent part shortages and poor management of parts and inventory levels.



Kaizen Path

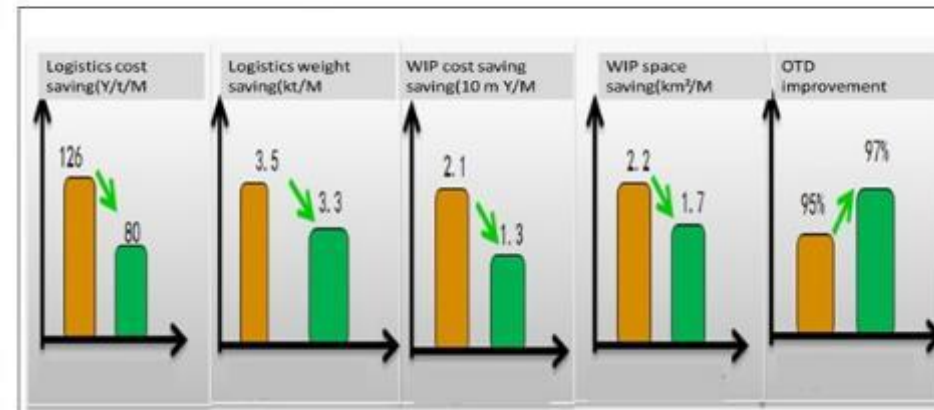
Project step	2013					
	Apr.	May	June	July	Aug.	Sep.
Project team setup						
Project kick-off meeting and training						
Internal Logistics Flow-CSA (Current Status Analysis)						
Root cause analysis and solution study						
Line Logistics Flow-Future VSM design						
Future VAM action plan						
Action processing						
Control -Std.work and sharing						

After kaizen

In 5 days the team came up with a 6 month plan to improve internal logistics and started on the path.



Final Results



Case Study: Project Based - Hourly Production Management Car Parts (120 Days)



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Process Before Kaizen Activities

Problem Statement: Push System made WIP in each processes. Production Lead time was 2 weeks. They needed transport again in the final packaging area because of 5 days of WIP.



Process After 4 Months

Managers succeeded in involving all workers through sharing Kaizen by the end of the day. Pull Production with Hourly Production management Board reduced Production Leadtime from 2 weeks to 3 days.



2 Visits over 4 months Kaizen Activities

Pull Production

- Placing based on Store and Fridge
- Making a Process Flow
- Setting Parts system

Visualization

- Shipping Management Board
- Hourly Production management Board

Results



Case Study: Project Kaizen

Flow Systems Heavy Equipment Mfg (140 Days)



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Before kaizen

Background : Need to be more competitive in the market and also add capacity to take on major projects

- 1、Reduce Defects
- 2、Shorten Delivery
- 3、Reduce WIP
- 4、Labor Efficiency



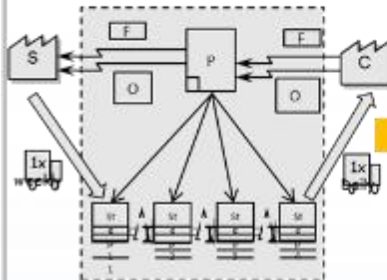
After kaizen&Final Results



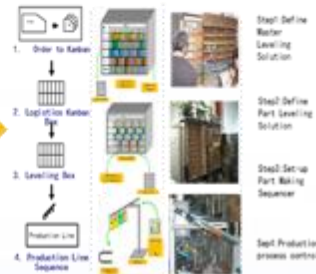
Kaizen Path

Project duration: 2013.2~2013.7

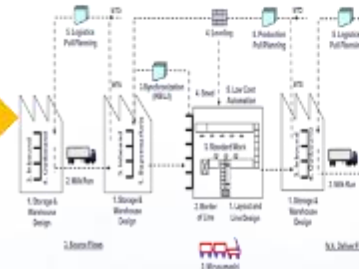
1. Value Stream Analysis: Identify and quantify waste



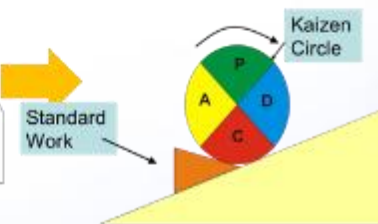
2. Problem Solving
Solve wastes and establish standards



3. Make Flow Production
Problem solving and standard operations throughout the process



4. Continuous Improvement
Make Lean part of the culture and promote it



Case Study: Project Kaizen Focused Transformation at Wind Energy Production (180 Days)



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Before kaizen

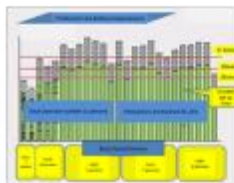
Background :

Company had to deal with varying demand levels and could not keep up. The model was a typical batch layout. Lots of handling and extra management was required.



Kaizen Focus

1. Reduce Material Handling
2. Shorten manufacturing cycle
3. Process Quality Control
4. JIT delivery of mtl's to line
5. Production Leveling
6. Tooling / Mold Kaizen

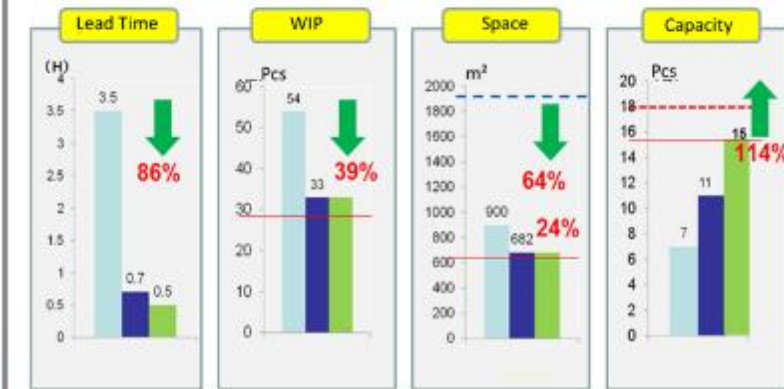


After kaizen

2014.1~2014.7: Line layout improvement



Final Results



Case Study: Project KZ & SMED Aerospace Industry (180 Days)

Introduction

A world leader in carbon fibre and composite materials for commercial and defence aircraft, helicopters, engines, satellites and launchers, Hexcel is also a specialist in lightweight composite components.



Hexcel was awarded the contract to supply pre-preg for all primary structures on the Airbus A350 XWB, including the fuselage.

- OEE is currently measured on the pre-preg tower and ranges from 12% to 100%. The average OEE is approximately 45-50%
- 50% opportunity lies within set up and cleaning.
- Pre-preg sets up can take between 6 to 10 hours with up to 6 change overs being undertaken in one week.

Improvement

TOWER - TURN AROUND - PRE CHECK LIST TO DO BEFORE
END OF RUN

Product	Time	Done
Product setting up	00:00:00	Done
Area 1 checked yes / no	00:00:00	Done
Area 2 checked yes / no	00:00:00	Done
Area 3 checked yes / no	00:00:00	Done
Area 4 checked yes / no	00:00:00	Done
Area 5 checked yes / no	00:00:00	Done
Area 6 checked yes / no	00:00:00	Done
Area 7 checked yes / no	00:00:00	Done
Area 8 checked yes / no	00:00:00	Done
Area 9 checked yes / no	00:00:00	Done
Area 10 checked yes / no	00:00:00	Done
Area 11 checked yes / no	00:00:00	Done
Area 12 checked yes / no	00:00:00	Done
Area 13 checked yes / no	00:00:00	Done
Area 14 checked yes / no	00:00:00	Done
Area 15 checked yes / no	00:00:00	Done
Area 16 checked yes / no	00:00:00	Done
Area 17 checked yes / no	00:00:00	Done
Area 18 checked yes / no	00:00:00	Done
Area 19 checked yes / no	00:00:00	Done
Area 20 checked yes / no	00:00:00	Done
Area 21 checked yes / no	00:00:00	Done
Area 22 checked yes / no	00:00:00	Done
Area 23 checked yes / no	00:00:00	Done
Area 24 checked yes / no	00:00:00	Done
Area 25 checked yes / no	00:00:00	Done
Area 26 checked yes / no	00:00:00	Done
Area 27 checked yes / no	00:00:00	Done
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Area 42 checked yes / no	00:00:00	Done
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Area 93 checked yes / no	00:00:00	Done
Area 94 checked yes / no	00:00:00	Done
Area 95 checked yes / no	00:00:00	Done
Area 96 checked yes / no	00:00:00	Done
Area 97 checked yes / no	00:00:00	Done
Area 98 checked yes / no	00:00:00	Done
Area 99 checked yes / no	00:00:00	Done
Area 100 checked yes / no	00:00:00	Done

- Mapped out the initial observations against timeline.
- Applied SMED principles to design new method.

Process analysis



Development of new Standards

- New SOPs and Checklists developed to ensure understanding and importance of each role prior to & during change over .
- New standard operating procedures introduced for many parts of process
- Change over tracker put in place to monitor further improvement and ensure compliance to new standards.

SMED: Change over reduction

Initial Observation at Gemba

- Improvement team trained in SMED principles
- Each person involved observed change-over to get baseline measurement.
- First measurement: 290 minutes on this type of material [some are longer]
- Lots of Muda observed
- Main areas for improvement centred around preparation, movement & waiting.



Manual cleaning – no preparation before change over



Walking to main panel – note poor condition of tool rack on left



2 man operation – no lifting equipment



Results

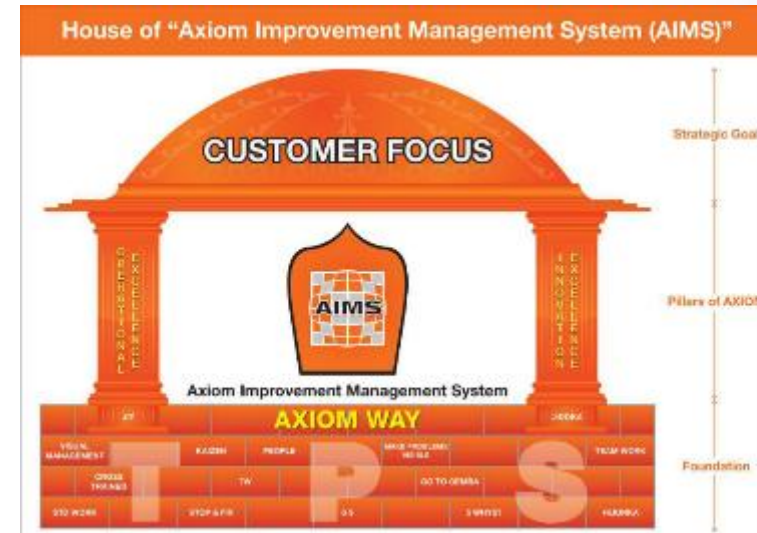
- First pass change-over time reduced from 290 minutes to 140 minutes (actual) **48 %**
- Saving of **£89,000 per year**
- Development of action plan to further reduce change-over by additional 45 minutes [target].
- New & improved tooling purchased
- Mixing room layout reviewed to ease access to tower – middle wall removal
- Development of new standardised change-over procedure.
- Purchase of new change-over cart to improve readiness & point of use
- OEE improvement monitor in place based on change-over reduction

ACTIONS	WHO	open or closed	WHEN
Devise a checklist for Joe to stamp, so the operators are aware by visual aid what has / has not been done	CG	complete	03/12/2010
Investigate new procedure for delivering / collecting samples, and new labelling	RY	open	02/12/2010
Devise a checklist for clean down, to be done 1 hour before end of job / rags solvent / scrapers poly for lining PPE and blades / STL to be called re entry permit.	RY / AOB	DONE	16/12/2010
Design a clean down trolley	RY	done	2010
Speak to process Ref end sample being taken from last but one roll	FC	CLOSE	N/A
Set up a project team to discuss area lay out	DS	open	31/01/2011
Update new solvent rag bin	RY	DONE	26/11/2010
Investigate Office lay out	CG	DONE	06/01/2011
etc	DS	open	ASAP
Investigate a new model	DS	open	ASAP
Take pump	DS	DONE	ASAP
Change forward doctor blades to go reverse	VE	open	ASAP
Quick release system for doctor blades / blade holders / talk to supplier to change design	DS	DONE	EWO
Resamp small blade holders, align holes properly	DS	DONE	EWO
Do the resins need to be coloured	FC	closed	closed
Review the need for entry permits for top turn over rollers cleaning	VE	closed	closed
result of review yes still needed	VE	closed	19/11/2010
use the white board to log the start time of bath all getting / circulating	DS	open	EWO
Extract fans need overhauling	DS	done	ASAP
lighting needs an upgrade in coating area	DS	open	ASAP
19 safety guards around 50 wrap rollers	DSNS	open	ASAP
covers for the roller ends, of the S rollers in the 20 bath	DS	open	ASAP
21 U bend for pipe cleaning	AOB	closed	N/A
22 plot change over times both new and old	VE	open	ongoing

Case Study: Global Transformation 4 Phased Approach (100 Week Plan)

Makoto Phased Approach & Lean Thinking Impact in Middle East Telecom Retail Company (2.2Yrs/2010-2013 - 3K FTE)

- Sales growth from \$900M to \$2B USD
- Net Profit Increased 6.2% Yr-on-Yr
- Profit per store increased by 27%
- Inventory reductions of >64%
- Kaizen implemented >148K (49)
- Won Dubai Quality Award 2012



Case Study: Global Transformation 4 Phased Approach(150 Week Plan)

Makoto Phased Approach & Lean Thinking Impact in Global Electronics Company (3Yrs/2012-2015)

- Savings of over €260M
- Quality improvements of 30% Year-on-Year
- Inventory reductions of >30%
- Floor space reductions typically 20-30%
- Kaizen implemented >140K



Thank You!

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